65 Implementing wetland protection for agricultural lands in Cuyahoga Valley National Park, Ohio

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Introduction

Balancing the protection of natural resources with those of significant cultural resources is an ongoing challenge for national park managers. However, by integrating science-based natural resource protection goals with cultural landscape protection initiatives, we may alleviate some of the potential conflicts inherent in multiple-use areas. The primary goal of the park manager is to maximize both natural and cultural resource values.

Congress created Cuyahoga Valley National Park in 1974 to preserve and protect historic, scenic, and natural resources for the recreational use and enjoyment of present and future generations. The park encompasses over 33,000 acres of relatively undeveloped land along 22 miles of the Cuyahoga River between the metropolitan areas of Cleveland and Akron, Ohio. Much of the park is currently forested, but other significant land-cover types include old field habitats, shrub and scrub, agricultural land, and wetlands.

Much of the valley was farmed in the past. While most of the park is now reforested, the rural landscape that characterized the valley is considered a cultural resource that requires protection. Short-term agricultural leases and traditional farming practices maintained by private landholders in the park have maintained some of this rural character. Under a new program called the Countryside Initiative, the park is taking a more active role in restoring agricultural activity on small, historical farmsteads within the park. Considering its national park setting, this initiative is promoting sustainable and ecologically friendly farming practices that avoid or minimize impacts on natural resources.

Status and importance of wetlands in Cuyahoga Valley

Wetlands are important natural resources that are often associated with potential farmlands. Wetland habitats in Ohio declined in area by 90% between the 1780s and 1980s (Noss and Peters 1995). Most of these losses can be attributed to draining and filling for agricultural use. Development and urban sprawl continually threaten the wetlands that remain in northeastern Ohio and around the park. As these wetland losses continue, the wetlands within Cuyahoga Valley become increasingly valuable at a regional level.

Healthy wetlands provide many benefits (Mitsch and Gosselink 1993). Water quality is improved as wetland areas filter out nutrient loads and pollutants before they reach rivers and streams. Wetlands provide habitat for a diversity of plants and wildlife, many of which are becoming increasingly scarce both locally and regionally due to continuing wetland losses. Wetland complexes also serve as important stopover areas for migrating birds. In addition to their ecological significance, wetlands exhibit a variety of educational, recreational, and aesthetic values.

It is important to note that while it is relatively clear how large wetland complexes provide these benefits, several recent studies have shown how small, isolated wetlands can be considered just as crucial for maintaining regional biodiversity (Dodd and Cade 1997; Semlitsch and Bodie 1998; Snodgrass et al. 2000).

From **Crossing Boundaries in Park Management: Proceedings of the 11th Conference on Research and Resource Management in Parks and on Public Lands,** edited by David Harmon (Hancock, Michigan: The George Wright Society, 2001).

In 1999, an ambitious wetland inventory was initiated at the park to help characterize wetland resources for planning, environmental review, and restoration purposes. Potential wetland areas were identified, classified according to the national wetland classification standard (Cowardin et al. 1979) and mapped. Information on wetland type, dominant vegetation, hydrology, presence of exotics, and restoration potential was collected and linked to a geographic information system (GIS).

This inventory revealed more than 1,200 wetlands totaling over 1,700 acres in the park (Davey Resource Group 2001). Most of the wetlands are quite small, with only 190 greater than an acre in size and only 35 greater than 10 acres in size. A wide variety of wetlands was identified. A few large inundated wetlands are found where natural hydrology has returned or where beaver *(Castor canadensis)* have altered flow regimes. Much more typical are small emergent wetlands that have become established in areas previously disturbed by humans. Tiny pockets of emergent wetlands have become established in some areas as a result of previous use of the landscape, including small depressions, tire-rut wetlands, and roadside ditches. Additionally, hillside seeps generate small wetland areas adjacent to many previously farmed areas.

Wetland protection guidelines and regulations

Executive Order 11990, "Protection of Wetlands," directs federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve, enhance, and restore the natural and beneficial values of wetlands. National Park Service (NPS) policies for implementing this order are found in Director's Order 77-1, "Wetland Protection," and the associated procedural manual. NPS requires that parks avoid adverse impacts to wetlands to the extent practicable for any new development or projects. Proposed actions that have "potential direct or indirect adverse impacts" require special National Environmental Policy Act (NEPA) compliance procedures.

Agricultural activity poses potential threats to wetlands by direct encroachment, nutrient enrichment from fertilizers and animal waste, chemical and pesticide pollution, introduction of exotic plants through feed or plantings, and edge effects from field clearing (e.g., increased cowbird parasitism). Indeed, human activities (e.g., forest clearing, paved roads) may negatively affect wetlands in a variety of ways at distances of up to 2 km (Findlay and Houlihan 1997). Effective buffer zones can be established to minimize and avoid potential adverse impacts.

Under the Countryside Initiative, numerous farm fields associated with proposed farmsteads would need to be assessed for potential wetland issues each year. A standard procedure for screening farm fields to identify the potential for impacts was required. This paper outlines the specific protocol Cuyahoga Valley National Park has developed for implementing NPS wetland protection policies on proposed agricultural lands.

Wetland protection protocol

To assess the potential for wetland impacts, a simple protocol was established (Figure 65.1). A *wetland identification process* determines whether wetlands are associated with proposed farming areas. If wetlands are not present in a proposed farm field, then it is obvious that no impacts are expected. If wetlands are associated with a potential farm field, then the potential for direct or indirect impacts must be assessed.

A *wetland quality assessment* is conducted and then *wetland buffer recommendations* are assigned. If direct encroachment into wetland areas can easily be avoided, then no potential exists for direct impacts. In almost all cases, the park will explicitly avoid direct impacts to wetlands. If effective buffer zones that protect the wetland values and functions can be established, then no potential indirect impacts are expected. After initial buffer recommendations are set, *buffer zone adjustments* may be made and efforts for *monitoring buffer effectiveness* are established.

If, through this screening process, it is uncertain whether direct or indirect impacts can be expected, or if some impacts may be unavoidable, then areas would either be explicitly excluded from agricultural use or assessed using the standard NEPA compliance procedures.

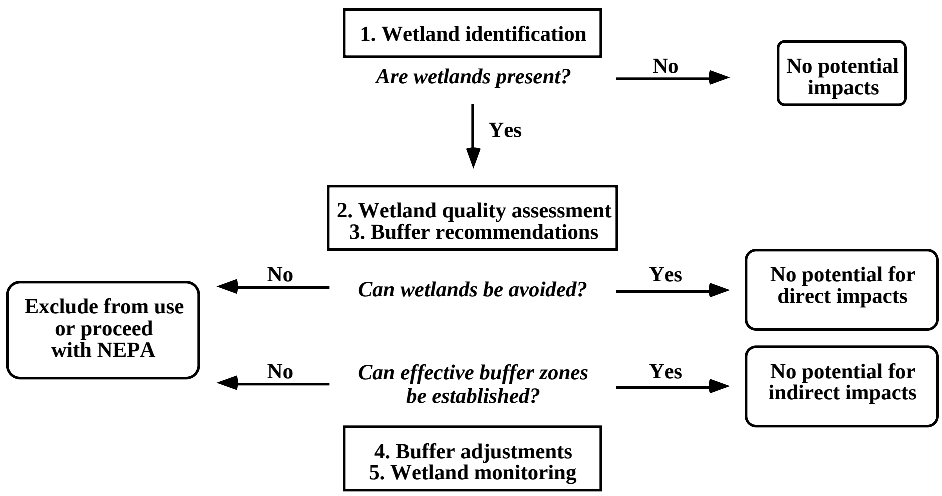

Figure 65.1. Wetland protection protocol for agricultural lands.

Wetland identification

Parcels proposed for agricultural use are reviewed to identify potential wetland issues. All existing information is reviewed, including GIS data layers, the park wetland inventory, National Wetland Inventory, Ohio Wetland Inventory, county soil surveys, and hydrology. Field visits are conducted to confirm initial findings and identify other potential wetland areas through observation of vegetation and hydrology. Any areas that have documented wetlands or wetland indicators in the proposed use area or within approximately 200 ft of the edge of the proposed use area are referred to a qualified wetland specialist for assessment.

The wetland specialist then conducts a wetland determination for the identified fields. This determination will include marking and mapping the boundaries of any wetlands and reporting on their size and quality, characteristic vegetation, and hydrology. Some detailed information collection performed in formal wetland delineations (e.g., paired sampling along boundaries) will be abbreviated, as such accuracy is not critical unless planning for mitigation. All wetlands identified on or near proposed farmlands undergo further review for buffer recommendations.

Importance of wetland buffers

Wetland buffers are vegetated areas that reduce the adverse impacts to wetland values and functions from adjacent land use. An excellent overview and literature review of the roles of wetland buffers and effective buffer sizes is available (Castelle et al. 1992). Buffers protect wetlands by moderating the effects of storm water runoff—stabilizing soils, filtering harmful substances, reducing sedimentation and nutrient input, and moderating water level fluctuations. Forested buffers shade waters, thereby moderating temperatures and oxygen levels for aquatic wildlife.

Buffers also provide essential wildlife habitat for feeding, roosting, and breeding. Buffer areas afford cover for safety and thermal protection. For example, many waterfowl species feed in wetlands but build their nests on adjacent dry land to avoid flooding nests. Some bird species, such as the wood duck *(Aix sponsa)* and pileated woodpecker *(Drycopus pileatus)* require large dead trees in wetland margins for nesting. Many amphibians spend only a small portion of the year in wetland areas, dwelling in terrestrial habitats adjacent to ponds and wetlands during other seasons.

Wetland buffer sizes

Buffer size recommendations will vary depending upon wetland function and value. A general summary of the values affected by a variety of buffer sizes is found in Table 65.1. Buffers narrower than 50 ft are generally ineffective or minimally effective in protecting wetlands (Castelle et al. 1992). Therefore, buffers narrower than 50 ft should be assigned only to very small, low quality, human-made wetlands (e.g., roadside ditches, tire-rut wetlands). Buffers designed to maintain water quality are generally on the order of 100 ft (Castelle et al. 1992).

Buffer size (ft)	Responses of wetland values and functions
300+	Waterfowl breeding/feeding retained [1] Heron feeding maintained [1] Amphibian populations retained [3] Diversity of mammals maintained (e.g., beaver, muskrat) [1] Cavity-nesting duck habitat protected [1] Bird diversity maintained [1]
200-300	Waterfowl breeding, but reduced diversity [1] Reduced mammal diversity, but beaver remain [1] Most sediment removed [1]
100-200	Waterfowl breeding, but reduced populations and diversity [1] Adequate sediment removal (75-80%) [1] Most nutrients filtered [1] Reduced salamander diversity [3] Decreased turtle abundance [2]
50-100	Loss of many wetland bird species (e.g., belted kingfisher) [1] Songbird diversity maintained in forested buffers [1]
<50	Generally ineffective in preserving major wetland functions [1] Human activities disturb breeding and feeding birds [1] Degradation of buffer habitats over time more likely [1]

Table 65.1. The responses of wetland values and functions to various buffer sizes. Sources: [1] Literature review by Castelle et al. 1992, [2] Burke and Gibbons 1995, [3] Semlisch 1997. Note: Specific research results were generalized into the above categories for ease of interpretation.

However, buffers designed for habitat protection goals are generally larger depending on the specific fauna involved. Narrow buffers in areas naturally rich in wildlife can act as ecological traps by increasing predation risks and reducing reproductive rates, possibly leading to population declines and localized extinctions. Nesting waterfowl generally require buffers of 100 ft or more to maintain diversity and abundance (Castelle et al. 1992). Some pond-breeding salamanders found in the park *(Ambystoma* spp.) can require terrestrial buffers of several hundred feet from wetlands for adequate protection (Semlitsch 1998). An approach that considers all of these buffer values is appropriate in a national park setting.

Wetland quality assessment

An assessment of the specific wetland functions and values for each wetland area is needed to establish appropriate protective buffer zones. Rather than study each wetland area in depth, the park has adopted a robust rapid assessment technique. The Ohio rapid assessment method for wetlands (ORAM) is used by the Ohio Environmental Protection Agency as guidance for assessing wetland quality and landscape context (Ohio EPA 1999). This is an adaptation of a wetland assessment technique established by the State of Washington (Washington State Department of Ecology 1993).

The ORAM scores wetlands based on a number of wetland characteristics, including presence of threatened or endangered species, exotic species, total area, vegetation classes and structure, plant diversity, special habitat functions (e.g., heron *(Ardea herodias)* rookeries), hydrological connections and corridors, existing buffers, and adjacent land uses. Assessments of wetland quality include both office and field ratings. Office ratings use information gathered during the delineation as well as other data. Field ratings include assessing many qualitative and quantitative wetland characteristics in a simple, straightforward manner.

The ORAM uses a standardized scoring system that classifies wetlands into three quality categories: "very low," "moderate," and "very high." In the park, four wetland quality categories will be used, with the "moderate" class split into two to ensure that larger buffers are provided to wetlands approaching "very high" quality. Initial category assignments provide a starting point for prescribing effective buffer zones.

Standard buffer recommendation

Wetland buffer recommendations are based on wetland quality. Generally, sensitive or unique wetland areas would require larger buffers and low-quality areas would require smaller. Wetland buffers in Cuyahoga Valley National Park will be established from a minimum of 25 ft to 200 ft or more. The initial buffer categories based on wetland quality are:

- Category 1, very low quality: 25-50 ft
- Category 2a, moderate quality: 50-125 ft
- Category 2b, moderate quality: 125-200 ft
- Category 3, very high quality: 200+ ft

This range includes distances similar to those established by some states that have adopted wetland buffer zone standards (Castelle et al. 1992). Only tiny tire-rut and roadside-ditch wetlands would receive buffers narrower than 50 ft. Buffers of 50 ft are recommended for all other low-quality wetlands. Buffer sizes then increase with increasing wetland quality. These increases track closely with the scope of wetland functions requiring protection.

Buffer zone adjustments

NPS wetland protection guidelines also promote restoring and enhancing wetland quality and value whenever practicable. Therefore, the current quality of a wetland is only one consideration when determining buffer needs. If wetland quality can easily be improved with restoration or removal of invasive species, then such a wetland should be afforded additional protection. As such, wetlands are qualitatively assessed for restoration potential during field visits. Considerations include current quality, accessibility, presence, extent and type of exotics, presence of human-made impediments, connectivity to other wetlands, and aesthetic value. A high restoration potential may justify raising the initial buffer recommendation.

Alternatively, much of the scientific literature assessing the adequacy of buffers for protecting against agricultural impacts is based on research on traditional agricultural practices. Using these recommendations can therefore be considered conservative and sufficiently protective in respect to more sustainable practices.

Less intensive sustainable and organic farming practices may justify smaller wetland buffers. Indeed, the actual use of buffer areas for certain agricultural activities may be allowable where such activity has been shown to enhance buffer zone quality or not adversely impact wetlands. For example, prescribed grazing practices may enhance wetland values by controlling exotics and increasing habitat for rare species in some situations (cf. Tesauro 2001). Documented scientific research justifying reduced buffer sizes or agricultural uses of buffer areas would be required before any such program is considered. Additional environmental compliance activities, mitigation, and monitoring would probably be required in most cases.

Monitoring buffer effectiveness

As much of the focus of this plan is to avoid indirect impacts on wetlands through the use of buffer areas, monitoring protocols will be set in place to ensure that the buffers are indeed performing their function. Using generally conservative recommendations does not remove the responsibility of monitoring buffer effectiveness.

A comprehensive wetland monitoring program is currently in development. Some monitoring efforts will integrate with established projects. For example, established frog call surveys and water quality monitoring efforts will be expanded to include water resources associated with new farm areas. Additionally, wetland vegetation monitoring involving quantitative assessments of exotic species and cover board readings to document changes in vegetation in wetland margins will be implemented. Buffer zone photo documentation along the length of wetland buffer and farm field boundary will provide lasting visual records. Other wetland monitoring tools are being investigated for use in the park (Danielson 1998). Baseline monitoring data are being collected before farming activity begins and will then be reassessed periodically to assess changes and trends.

Additional applications

This paper outlines the standardized procedures and protocols by which wetland protection is being integrated into a new sustainable agriculture initiative in Cuyahoga Valley National Park. However, the same principles and practices can certainly be extended to other park development projects, other significant natural resources requiring protection (e.g., riparian zones), and other NPS units.

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