

Wetland Mitigation Banking: An Assessment of the Ohio Wetlands Foundation

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I. INTRODUCTION

Throughout history, humans have constantly modified their surroundings, often at the expense of environmental integrity. With global conservation efforts becoming increasingly important, there has been a great deal of focus placed on water systems. Wetlands in particular have become the subject of serious concern, giving rise to a variety of international organizations and efforts to combat the increase in wetlands destruction. For example, one hundred and fifty-nine countries are currently signatories to the Ramsar Convention on Wetlands, which provides a framework for international cooperation for the conservation and use of wetlands.¹ Although the definition varies, there are three essential components to the definition of a wetland: hydrology, hydric soils, and hydrophytic vegetation.² The U.S.

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¹ Ramsar.org, *Contracting Parties to the Ramsar Convention on Wetlands*, <http://www.ramsar.org> (follow "About Ramsar" hyperlink; then "Contracting Parties" hyperlink; then follow "List of Contracting Parties, with numbers of Ramsar sites" hyperlink) (last visited June 10, 2010).

² US ARMY CORPS OF ENGINEERS, *DEVELOPING A 'REGIONALIZED' VERSION OF THE CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL: ISSUES AND RECOMMENDATIONS*, available at http://www.usace.army.mil/CECW/Documents/cecwo/reg/dev_reg_wetlands.pdf (last visited June 11, 2010). Hydrology means "[t]he area is inundated either permanently or periodically at mean water depths <6.6 ft, or the soil is saturated to the surface at some time during the growing

Environmental Protection Agency (“EPA”) defines wetlands as “lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface.”³ Wetlands constitute a diverse collection of ecosystems. Each wetland has unique soil composition, climate, water flow, water chemistry, and plant life.⁴ The EPA has classified wetlands into four major categories: marshes, swamps, bogs, and fens.⁵ As a result of this variation, these ecosystems

season of the prevalent vegetation. The period of inundation or soil saturation varies according to the hydrologic/soil moisture regime and occurs in both tidal and nontidal situations. US ARMY CORPS OF ENGINEERS, WETLANDS DELINEATION MANUAL, PART II: TECHNICAL GUIDELINES 26(b)(3), available at <http://www.wetlands.com/pdf/wdm0225e.pdf>. To satisfy the vegetation requirement, “[t]he prevalent vegetation consists of macrophytes that are typically adapted to areas having hydrologic and soil conditions described . . . above. Hydrophytic species, due to morphological, physiological, and/or reproductive adaptations, have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions.” *Id.* Hydric soils “are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions.” *Id.*

³ EPA, Wetland Definitions, <http://www.epa.gov/owow/wetlands/what/definitions.html>; See US ARMY CORPS OF ENGINEERS, WETLANDS DELINEATION MANUAL (2002) available at http://www.usace.army.mil/CECW/Documents/cecwo/reg/dev_reg_wetlands.pdf (discussing the various definitions of wetlands at 7-11).

⁴ THOMAS M. SMITH & ROBERT LEO SMITH, ELEMENTS OF ECOLOGY 547 (Pearson Educ. Inc., 6th ed. 2006).

⁵ EPA, TYPES OF WETLANDS, EPA 843-F-01-002b, (Sept. 2001), available at <http://www.epa.gov/nscep/> (click "'Simple Search'" and enter 843f01022b in search field to locate pdf).

support rich biological diversity. In fact, some researchers suggest that in the United States almost 150 species of birds and over 200 species of fish depend on wetlands for their survival.⁶

In addition to providing essential wildlife habitat, wetlands perform a number of other functions. For example, they absorb water and prevent flooding, filter sediments and pollutants, increase water quality and help prevent shoreline erosion.⁷ These ecosystems also have a number of recreational and aesthetic values; they provide locations for fishing, hunting, and boating.⁸ The Ramsar Convention on Wetlands estimates the Florida Keys wetland area alone generates around \$800 million in annual income from tourism activities.⁹

Yet despite these benefits, the wetlands in the United States continue to decline in both area and quality, and the lower 48 states only have about 40 million hectares (ha) of wetlands left.¹⁰ To combat the negative impacts that result from wetland destruction and degradation, the federal government has created a number of

⁶ Kathryn Flynn, *Understanding Wetlands and Endangered Species: Definitions and Relationships*, ANR-979, (May 1996), available at <http://www.aces.edu/pubs/docs/A/ANR-0979>.

⁷ EPA, *Wetlands Functions and Values*, <http://www.epa.gov/watertrain/wetlands/> (last visited June 12, 2010).

⁸ See EPA, *Wetlands Functions and Values*, <http://www.epa.gov/watertrain/wetlands/module09.htm> (last visited June 12, 2010).

⁹ Ramsar.org, *Wetland Values and Functions: Recreation/Tourism*, http://www.ramsar.org/pdf/info/values_recreation_e.pdf, (last visited June 12, 2010).

¹⁰ MARTHA J. GROOM ET AL., *PRINCIPLES OF CONSERVATION BIOLOGY* 571 (Sunderland, Mass: Sinauer Assoc. Inc., 3d ed. 2006).

important legislative and regulatory provisions requiring restoration and protection of U.S. wetlands. One of the most controversial methods utilized is wetland mitigation banking, a relatively new tool created in response to changing policy goals.

This paper attempts to examine the wetland mitigation bank system in the United States by focusing on the state of Ohio. Section II begins by discussing wetlands in general, as well as their history in the United States. Part (a) of this section concerns the Clean Water Act and other federal laws and regulations which impact wetlands in this country. In Part (b), the positive and negative aspects of wetlands mitigation and wetlands mitigation banking are explored, as well as the federal laws and documents dealing with these concepts. This paper will focus specifically on wetlands and their history in Ohio in Part (c). Section III discusses The Ohio Wetlands Foundation, a non-profit wetlands mitigation banker in Ohio. In Part (a) of Section III, an ecological assessment of the Foundation's various banks is summarized. Part (b) analyzes these banks under the Clean Water Act and the federal banking guidelines, and considers whether these banks are providing the functions for which they were intended. Finally, Part (c) will provide some concluding thoughts as to whether the problems with mitigation banking can be solved. Although wetlands mitigation banking currently has a number of serious deficiencies, the adoption of a more stringent monitoring requirement and the use of adaptive management based on sound scientific analysis will enhance the benefits of the mitigation system.

II. BACKGROUND

Wetlands are unique environments that provide a number of essential functions for both the public and the environment. They spread across every portion of the United States and differ greatly from region to region.¹¹ Wetlands provide a large number of food sources and an abundance of ecological niches and as a result, they are habitat for a wide range of species, including a variety of invertebrate species upon which other organisms rely.¹² The Natural Resources Conservation Service estimates that one third of all species of birds and 190 species of amphibians need wetlands to survive.¹³

They are essential for American birds. It has been estimated that eighty percent of U.S. birds and over fifty percent of protected migratory birds rely on wetlands.¹⁴ Due to the fact that many plant and animal species depend on these habitats, the destruction and degradation of wetlands have impacted population numbers. In 1986, roughly fifty percent of the 188 species of animal listed as threatened

¹¹ EPA, TYPES OF WETLANDS, EPA 843-F-01-002b, (Sept. 2001), available at <http://www.epa.gov/wetlands/pdf/types.pdf>.

¹² Flynn, *supra* note 6, at 2; Some animals that use wetlands include: the great blue heron, great egret, bald eagle, osprey, red-shouldered hawk, owls, wild turkey, belted kingfisher, red-bellied woodpecker, pileated woodpecker, and several species of swallows, sparrows, warblers, duck, mallards, black ducks, blue-winged teal, gadwall, widgeon, the northern pintail, muskrat, beaver, raccoon, and white-tailed deer. *Id.*

¹³ U.S. DEPT. OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, *Living in Harmony with Wetlands: Plantlife, Wildlife, and Endangered Species*, <http://www.nrcs.usda.gov/FEATURE/highlights/wetlands/life.html> (last visited June 12, 2010).

¹⁴ Flynn, *supra* note 6, at 4.

or endangered depended on wetlands in some form,¹⁵ including charismatic megafauna like the whooping crane, bald eagle, and the red wolf.¹⁶

Wetlands also play essential roles in the water cycle. They improve water quality by filtering nutrients and contaminants and provide flood protection by acting as natural sponges that collect surface water runoff.¹⁷ Their economic benefits are extensive; wetlands are used in agriculture, fisheries, timber production, recreation and tourism.¹⁸ Although it is difficult to calculate the monetary benefits of wetland ecosystems, the U.S. EPA estimated that in 1991 alone, recreational activities that rely on wetlands contributed an additional \$59.5 million to the national economy.¹⁹ Recent scientific

¹⁵ *Id.* at 3.

¹⁶ U.S. DEPT. OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, *Living in Harmony with Wetlands: Plantlife, Wildlife, and Endangered Species*, <http://www.nrcs.usda.gov/FEATURE/highlights/wetlands/life.html> (last visited June 12, 2010).

¹⁷ See Canadian Wildlife Service, Environment Canada, *Wetlands*, <http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=27147C37-1> (last visited June 12, 2010).

¹⁸ Alain Lambert, *Economic Valuation of Wetlands: an Important Component of Wetland Management Strategies at the River Basin Scale*, at 5 (May 2003), available at http://conservationfinance.net/Documents/CF_related_papers/Economic%20valuation%20of%20wetlands%2019%20May%202003%5B1%5D.pdf.

¹⁹ EPA, *Economic Benefits of Wetlands*, <http://www.epa.gov/OWOW/wetlands/facts/fact4.html> (last visited June 12, 2010). The EPA further reports that the wetland related activities of hunting, fishing, bird watching and wildlife photography are a boost to state-to-state tourism. *Id.*

studies have also suggested that wetlands may play a significant role in combating global climate change.²⁰ The International Union for Conservation of Nature believes wetlands capture twenty percent of the Earth's carbon and therefore supports the preservation of wetlands as part of its international effort to combat global warming.²¹

Wetlands, however, were once considered economic wastelands desperately in need of draining for more productive uses. Little was known or understood about these systems. When the first settlers arrived in the country, the U.S. had about 221 million acres of wetlands.²² After colonization, settlers considered wetlands as disease-ridden, useless, and an impediment to development, and as a result the government encouraged draining.²³ Wetland drainage and modification continued as the population grew and expanded westward.²⁴ Technological advancements, railroads, and new agricultural methods caused significant wetland loss in the 1700s.²⁵ The notion of "drain first, ask questions later" continued for most of the

²⁰ See RAMSAR.ORG, RAMSAR CONVENTION ON WETLANDS, *World Wetlands Day 2010: Caring for Wetlands: An Answer to Climate Change*, (Feb 2010) available at http://www.ramsar.org/pdf/wwd/10/wwd2010_aa_leaflet_e.pdf.

²¹ INT'L UNION FOR CONSERVATION OF NATURE, (IUCN), *Saving Wetlands to Fight Climate Change*, (Oct. 30, 2008) <http://www.iucn.org/about/union/commissions/cem/news/?2075/Saving-wetlands-to-fight-climate-change>.

²² Thomas E. Dahl & Gregory J. Allord, UNITED STATES GEOLOGICAL SURVEY, WATER SUPPLY PAPER 2425, TECHNICAL ASPECTS OF WETLANDS: HISTORY OF WETLANDS IN THE CONTERMINOUS UNITED STATES, available at <http://water.usgs.gov/nwsum/WSP2425/history.html>. (last visited June 12, 2010).

²³ *Id.*

²⁴ *Id.*

²⁵ *Id.*

nation's history. In the 1930s, the U.S. Government supported the draining of wetlands by farmers and even shared the cost of drainage projects in the 1940s.²⁶ By the mid 1980s, about 103 millions acres of wetlands remained from the original 221 million.²⁷ Between the 1970s and the mid-1980s, twenty two states lost over fifty percent of their original wetlands.²⁸

The public's attitude towards wetlands began to change in the 1950s as the benefits of these ecosystems became more understood. As a result of this shift in attitude towards nature, the federal government implemented new legislation and policies. The 1972 Clean Water Act, the 1972 Coastal Zone Management Act, and the 1986 Emergency Wetland Resources Act are some of the more important legislation reflecting the government's new, more environmentally-friendly, outlook.²⁹

Although the federal government is more aware than ever of the many roles and benefits of wetlands, these ecosystems are still under serious threat. According to the U.S. EPA, over half of the original US wetlands have been drained and converted to other uses, and about

²⁶ *Id.*

²⁷ Thomas E. Dahl & Craig E. Johnson, U.S. DEPT. OF THE INTERIOR & U.S. FISH AND WILDLIFE SERVICE, *WETLANDS: STATUS AND TRENDS IN THE COTERMINOUS UNITED STATES MID-1970'S-MID 1980'S*, 8 (1991)
<http://www.nwrc.usgs.gov/wdb/pub/others/wetstatus.pdf>.

²⁸ *Id.* at 2, fig. 1.

²⁹ See R.C. Lane & William A. Taylor, U.S. GEOLOGICAL SURVEY, *WATER-SUPPLY PAPER 2425, Washington's Wetland Resources*, (1996), available at <http://wa.water.usgs.gov/pubs/misc/wetlands/>.

60,000 acres continue to be lost annually.³⁰ Although draining for agriculture was once the greatest threat to wetlands, development as a result of human population growth is now becoming the primary cause of wetland loss. As wetlands are lost and degraded, there are significant economic and environmental impacts. Effects will include critical habitat loss, decreased water supply and water quality, flooding, and loss of biological diversity.³¹

A. THE CLEAN WATER ACT

Although early conservation efforts were often largely lacking in science, since the 1970s restoration efforts have gradually shifted to a more science based approach with particular emphasis on biological integrity.³² The purpose of the Clean Water Act is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."³³ The Act further stipulates that maintenance of wetland integrity is necessary for the protection of the nation's surface waters.³⁴

³⁰ See R.C. Lane & William A. Taylor, U.S. GEOLOGICAL SURVEY, WATER-SUPPLY PAPER 2425, *Washington's Wetland Resources*, (1996) available at <http://wa.water.usgs.gov/pubs/misc/wetlands/> .

³¹ See *id.*; see Micheal Moser, Crawford Prentice & Scott Frazier, RAMSAR, *A Global Overview of Wetland Loss and Degradation*, (1996) available at http://www.ramsar.org/cda/en/ramsar-news-archives-2002--a-global-overview-of/main/ramsar/1-26-45-87%5E16905_4000_0__.

³² GROOM ET AL., *supra* note 10; See EPA, *Introduction to the Clean Water Act*, <http://www.epa.gov/watertrain/cwa/> (last visited June 11, 2010).

³³ 33 U.S.C.A. §1251(a).

³⁴ 33 U.S.C.A. §1251(a); The Clean Water Act covers all navigable waters, which includes "the waters of the United States, including the territorial seas." 33 U.S.C.A. §1362(7).

Section 404 of the Act employs a permit based approach to regulate the discharge of dredged or filled material into these waters.³⁵ Section 404(f) lists various exemptions to this regulation, however, provided the discharges do not convert the waters to a new use and do not impair the water flow.³⁶ Activities that do not generally require permits include normal farming and ranching activities, such as plowing, cultivating, minor drainage, and harvesting for food and forest products.³⁷ In the event that a project has unavoidable impacts on U.S. waters, the Clean Water Act requires those responsible to mitigate these impacts.³⁸

The 1990 Memorandum of Agreement (“MOA”) between the EPA and the Corps formalized the no-net-loss of wetland policy (wetland losses equal wetland gains) advocated by President George Bush in 1988.³⁹ The MOA also clarified the measures necessary to

³⁵ 33 U.S.C.A. §1344.

³⁶ 33 U.S.C.A. §1344(f).

³⁷ 33 U.S.C.A. §1344(f)(1)(A).

³⁸ GROOM ET AL, *supra* note 10 at 569.

³⁹ MEMORANDUM OF AGREEMENT BETWEEN THE DEPARTMENT OF THE ARMY AND THE ENVIRONMENTAL PROTECTION AGENCY CONCERNING THE CLEAN WATER ACT SECTION 404(B)(1) GUIDELINES [hereinafter MOA] (Feb 6, 1990), available at <http://www.wetlands.com/fed/moafe90.htm>; “In 1987, EPA initiated the National Wetlands Policy Forum to gain insight into wetlands protection issues. The Forum comprised state and local elected officials, regulatory agency representatives, representatives of business, agriculture, and environmental groups, and academic experts. In 1988, the Forum recommended adoption of a national goal of “no net loss” for wetlands and suggested an action plan for reaching this goal. President Bush pledged the Administration’s commitment to this goal and charged task force of the Domestic Policy Council to prepare a plan for defining and achieving no net loss of

offset the impacts allowed under section 404 of the Clean Water Act.⁴⁰ The MOA sets forth a three-part analysis to help guide compensatory mitigation decisions.⁴¹ The first step, avoidance, does not allow discharge when there is a practicable alternative to the proposed project and its impacts.⁴² The second step is minimization, which requires the minimization of adverse impacts through project modifications and conditions on the permit.⁴³ The final step, mitigation, requires “appropriate and practicable compensatory mitigation” for the remaining adverse impacts.⁴⁴ The MOA requires that appropriate mitigation is based only on the values and functions of the water system.⁴⁵

B. WETLANDS MITIGATION AND MITIGATION BANKING

Wetland compensatory mitigation refers to “the process of lessening the impact of an activity on the wetland or replacing destroyed or damaged wetlands by creating comparable new wetland

wetlands.” National Society of Professional Engineers, *Wetlands Protection*, <http://www.nspe.org/resources/GR%20downloadables/Wetlands%20Protection.pdf> (last visited June 12, 2010).

⁴⁰ ENVIRONMENTAL LAW INSTITUTE, *BANKS AND FEES: THE STATUS OF OFF-SITE WETLAND MITIGATION IN THE UNITED STATES 12* (Sept 2002)

available at

http://www.elistore.org/Data/products/d12_08.pdf; see MOA, *supra* note 39.

⁴¹ MOA, *supra* note 39. The three part process is also referred to as the “sequencing guidelines.” ENVIRONMENTAL LAW INST., *BANKS AND FEES: THE STATUS OF OFF-SITE WETLAND MITIGATION IN THE UNITED STATES 12* (Sept 2002), *available at* http://www.elistore.org/Data/products/d12_08.pdf.

⁴² MOA, *supra* note 39.

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

areas.”⁴⁶ The Corps authorizes 22,000 acres of wetland impacts on average per year.⁴⁷ To offset these damages, the Corps requires 49,000 acres of compensatory wetlands.⁴⁸ On-site mitigation, where the compensatory project occurs in areas adjacent or continuous to the original wetland, is preferred. If off-site compensatory mitigation is necessary, however, the site should be in the same geographic areas “if practicable,” meaning the location of the mitigation wetland is “in close physical proximity and, to the extent possible, the same watershed.”⁴⁹ The MOA also established wetland mitigation banking as a legitimate source of wetland compensatory mitigation.⁵⁰ However, mitigation banking was still not commonly utilized in the early 1990s⁵¹ in part because of the uncertainty surrounding this new regulatory scheme.⁵² Environmentalists, conservationists, and members of the public sector feared mitigation banks would backfire and produce a net loss of

⁴⁶ PAUL J. LILLY, NORTH CAROLINA COOPERATIVE EXTENSION SERVICE, SOIL FACTS: WETLAND ISSUES, *The Principle of Mitigation*, <http://www.soil.ncsu.edu/publications/Soilfacts/AG-439-26/> (last visited June 12, 2010); see MOA, *supra* note 39.

⁴⁷ U.S. ARMY CORPS OF ENGINEERS, COMPENSATORY MITIGATION RULE (April 2008) http://www.mvm.usace.army.mil/regulatory/guidelines/v11_Wetland_Mitigation.pdf.

⁴⁸ *Id.*

⁴⁹ MOA, *supra* note 39.

⁵⁰ MOA, *supra* note 39.

⁵¹ ENVIRONMENTAL LAW INST., BANKS AND FEES: THE STATUS OF OFF-SITE WETLAND MITIGATION IN THE UNITED STATES 13 (Sept 2002), available at http://www.elistore.org/Data/products/d12_08.pdf.

⁵² LINDELL L. MARSH ET AL., MITIGATION BANKING: THEORY AND PRACTICE 1, 2 (Island Press, 1996).

wetlands.⁵³ The fact that the majority of people did not fully grasp the concept of mitigation banks further impeded the use of these banks.⁵⁴

As part of an effort to explain mitigation banks as they worked under section 404 of the Clean Water Act, the Corps, EPA, and several other federal agencies published the "Federal Guidance for the Establishment, Use and Operation of Mitigation Banks" in 1995.⁵⁵ The report defines mitigation banks as a means of restoring, creating, enhancing, and, in exceptional cases only, preserving wetlands "for the purpose of providing compensatory mitigation for authorized adverse impacts to wetlands and other aquatic resources."⁵⁶

In essence, wetland mitigation banking takes a market approach to compensatory mitigation.⁵⁷ Developers of projects with adverse impacts to existing wetlands can purchase credits⁵⁸ from a third party

⁵³ See *id.* at 76.

⁵⁴ See *id.* at 2.

⁵⁵ Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks, 60 Fed. Reg. 228, 58605-58614 (Nov. 1995), available at <http://www.epa.gov/owow/wetlands/guidance/mitbankn.html>.

⁵⁶ See *id.*

⁵⁷ MARSH ET AL., *supra* note 52, at 1.

⁵⁸ See ENVTL. LAW INST., *supra* note 40, at 25. A mitigation credit is defined as "a unit of measure of the increase in wetland functional value achieved at a mitigation site, and therefore a unit of exchange for compensatory mitigation." MARSH ET AL., *supra* note 52, at xi; Further, "[a] credit can be measured by some standard of functional replacement, habitat unit, or by acreage of a particular type or quantity of wetland. Although ideally credits are determined by a measure of functional equivalency, methodologies for conducting functional assessments tend to be complicated and time consuming. As a result, acreage is commonly used as the measure for defining credits." ENVTL. LAW INST., *supra* note 40, at 23.

“mitigation banker” who has created, restored, or enhanced another wetland.⁵⁹

A bank can be created by any entity "under a formal agreement with a regulatory agency."⁶⁰ Mitigation banks have four components: 1) the bank site, 2) the bank instrument, which is the formal agreement between the bank owners and the regulatory agency, 3) the Interagency Review Team, which is responsible for regulatory review, approval, and oversight of the bank, and 4) the geographic area for which the bank is authorized to provide services.⁶¹ Ecological assessments verify that the credits available for sale at a given bank correspond to the ecological functions of the original wetland.⁶² The EPA, U.S. Fish and Wildlife Services, and state and local regulatory resource agencies usually serve on the Interagency Review Team.⁶³

The 1995 guidance report listed several benefits of mitigation banking, including: providing greater flexibility to applicants; increasing the ability to maintain ecological integrity by consolidating mitigation into one large parcel; bringing together financial resources, planning, and science; increasing monitoring efficiency; and reducing permit processing times and providing cost effective opportunities for the qualifying projects.⁶⁴ The bank is responsible for the construction,

⁵⁹ MARSH ET AL., *supra* note 52, at 1.

⁶⁰ EPA, *Mitigation Banking Factsheet*, <http://www.epa.gov/wetlands/facts/fact16.html> (last visited June 12, 2010).

⁶¹ *See id.*

⁶² *See id.*

⁶³ ENVTL. LAW INST., *supra* note 40, at 21.

⁶⁴ Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks, 60 Fed. Reg. 228, 58605-

monitoring, and ecological assessments of the mitigation site and thus, this system has been especially attractive to developers seeking section 404 permits.⁶⁵ Many supporters of the banking system call it a “win-win” situation; it provides an effective means of meeting the no-net-loss of wetlands goal while reducing overall mitigation costs and liability for the developer.⁶⁶ According to its proponents, mitigation banking is an innovative, adaptive method that answers development concerns in light of changing policy goals. Some consider it a creative solution to the “jobs versus the environment” conflict.⁶⁷ By the end of 2001, there were approximately 219 approved wetland mitigation banks in the U.S., a 376% increase in the number of banks since 1991.⁶⁸ A 2005 study estimated there were 450 approved banks in the U.S., fifty nine of which had sold out of credits.⁶⁹

58614 (Nov. 1995) available at <http://www.epa.gov/owow/wetlands/guidance/mitbankn.html>.

⁶⁵ EPA, *Mitigation Banking Factsheet*, <http://www.epa.gov/wetlands/facts/fact16.html> (last visited June 12, 2010).

⁶⁶ BRIAN T. NORMANLY & SAM VACCA, A PRIMER ON MITIGATION BANKING: PROCESS AND POTENTIAL REVENUE 46 (Forest Landowner), (Nov.-Dec. 2007) available at http://www.ecologicalsolutions.net/pdfs/APrimeronMitigationBanking_v2.pdf.

⁶⁷ Michael G. Le Desma, *A Sound of Thunder: Problems and Prospects in Wetland Mitigation Banking*, 19 COLUM. J. ENVTL. L. 497, 500 (1994).

⁶⁸ EPA, *Mitigation Banking Factsheet*, <http://www.epa.gov/wetlands/facts/fact16.html> (last visited June 12, 2010).

⁶⁹ EPA, *Mitigation Banking Factsheet*, <http://www.epa.gov/wetlands/facts/fact16.html> (last visited June 12, 2010).

Despite the tremendous increase in the number and use of mitigation banks, many environmentalists remain skeptical about using them for compensation purposes. Indeed, not all adaptation is beneficial, or even functional. One widespread fear is that developers will cease avoiding development of projects that impact wetlands and instead will simply buy themselves out of any liability.⁷⁰ Authors Ruhl and Salzman have pointed out that wetland mitigation banking often shifts wetland resources from urban to rural areas, essentially denying large groups of people the benefits of wetlands.⁷¹ Reports have also shown that mitigation banking and mitigation in general do not produce the ecological results that the EPA and the Corps had in mind in their 1995 guidance report. For example, in a 2001 publication, "Compensating for Wetland Losses under the Clean Water Act," a committee of the National Research Council compiled various reports and assessments of existing wetland mitigation sites to evaluate their performances.⁷² The authors found that some types of wetlands were much more difficult to mitigate; shrub swamps and forested wetlands, for example, are hard "to create or restore because of the time needed to establish the mature woody plants" characteristic of those ecosystems.⁷³ Vernal pools, fens, and bogs were "difficult to impossible

⁷⁰ MARSH ET AL., *supra* note 52, at 76.

⁷¹ J. B. Ruhl & James E. Salzman, *The Effects of Wetland Mitigation Banking on People*, 1, FSU College of Law, Public Law Research Paper No. 179 (Jan. 2006), available at <http://ssrn.com/abstract=878331>.

⁷² COMMITTEE ON MITIGATING WETLAND LOSSES, BOARD ON ENVIRONMENTAL STUDIES AND TOXICOLOGY, WATER SCIENCE AND TECHNOLOGY BOARD, & NATIONAL RESEARCH COUNCIL, *COMPENSATING FOR WETLAND LOSSES UNDER THE CLEAN WATER ACT 94* (Washington, D.C.: Nat'l Academy Press, 2001).

⁷³ *Id.* at 23.

to create" because they "require a more specific combination of plant types, soil composition, and water supply."⁷⁴

In addition, mitigation banks can pose a greater risk than individual, smaller mitigation sites. Rather than having several small, independent mitigation wetlands, wetland banks enable the creation of a single, large wetland. If one of the individual sites fails to function, the impact to the surrounding ecosystem will likely be proportionately minor. However, "when a 100 ha mitigation bank fails, the loss to the aquatic resource is substantial."⁷⁵

C. OHIO WETLANDS

Ohio was once covered with large wetlands. However, "from the 1780's to the 1980's, Ohio wetlands declined from about 5,000,000 acres to about 483,000 acres."⁷⁶ The westward movement of settlers from 1800 to 1860 had especially damaging effects on Ohio as wetlands were converted to farmlands on a large scale.⁷⁷ Many of Ohio's wetlands were destroyed or damaged as a result of development of farms, roads and houses, as well as increased mining and logging.⁷⁸ By

⁷⁴ *Id.* at 24.

⁷⁵ J.J. MACK & M. MICACCHION, OHIO ENVIRONMENTAL PROTECTION AGENCY, DIVISION OF SURFACE WATER, WETLAND ECOLOGY GROUP, OHIO EPA TECHNICAL REPORT WET/2006-1, *An Ecological Assessment of Ohio Mitigation Banks: Vegetation, Amphibians, Hydrology, and Soils*, (2006), available at <http://epa.ohio.gov/dsw/wetlands/WetlandBankReport.aspx>, (follow "An Ecological Assessment of Ohio Mitigation Banks" hyperlink).

⁷⁶ Ohio DNR, *Wetland History*, (Nov. 6, 2008), available at <http://www.dnr.state.oh.us/dnap/wetlands/history/tabid/1001/Default.aspx>.

⁷⁷ Dahl & Allord, *supra* note 22, at fig. 6.

⁷⁸ *Id.*

the mid-1850s, Ohio was one of three states contributing the majority of the U.S. lumber industry's timber.⁷⁹ As railroad construction expanded, many more wetlands were lost in Ohio, including the Black Swamp,⁸⁰ which was originally roughly the same size as Connecticut.⁸¹ Only about five percent of this swamp exists today.⁸² Technological advancement further exacerbated the conversion of the state's wetlands. The introduction of drainage technology meant that by the 1880s, "20,000 miles of public ditches were" established in Ohio "to drain eleven million acres of land."⁸³ According to the Ohio Department of Natural Resources, ninety percent of Ohio's original wetlands have been destroyed.⁸⁴

Ohio wetlands are habitat for a large number of endangered and threatened species. In 2001, the Ohio Department of Natural Resources stated that "in Ohio, wetlands are the form of habitat at highest risk of loss and of the highest benefit to endangered species . . . two-thirds of Ohio's threatened and endangered species require wetlands during some point in their life cycle."⁸⁵

III. THE OHIO WETLANDS FOUNDATION

Ohio is using wetland mitigation banking as a means of balancing preservation goals for its remaining wetlands with

⁷⁹ *Id.*

⁸⁰ *Id.* at fig. 8.

⁸¹ Ohio DNR, *supra* note 76.

⁸² *Id.*

⁸³ Dahl & Allord, *supra* note 22.

⁸⁴ Ohio DNR, *supra* note 76.

⁸⁵ Ohio DNR, *Ohio Endangered Wildlife Thriving Along the State's Coastal Landscape*, News Release, (Nov. 29, 2001), <http://dnr.state.oh.us/news/nov01/1129endangered/tabid/12833/Default.aspx>.

developmental goals and pressures. In 2005, Ohio had twelve mitigation banks at twelve different locations. The Ohio Wetlands Foundation is the founding source of many of these wetlands mitigation banks. Ohio's experiences with wetlands mitigation banking has been mixed at best. The Ohio Environmental Protection Agency ("Ohio EPA") released its report, "Ecological Assessment of Ohio Mitigation Banks," in 2006.⁸⁶ This technical report examined the ecological characteristics of the mitigated wetlands "using biological, biogeochemical and hydrologic monitoring techniques."⁸⁷ The researchers studied twelve of eighteen mitigation banks that existed in Ohio as of 2003.⁸⁸ Vegetation, soil, water, amphibians, and macro invertebrate were sampled.⁸⁹ The results showed that approximately 25% of the bank area assessed did not meet the definition of a wetland, but were instead "primarily shallow unvegetated pond."⁹⁰ Wood frogs or spotted salamanders,

⁸⁶ MACK & MICACCHION, *supra* note 75, at 1.

⁸⁷ *Id.*

⁸⁸ *Id.* at 2.

⁸⁹ *Id.* at 2-5.

⁹⁰ *Id.* at 17; In addition, "of the remaining 'wetland' acreage, approximately 24% was poor quality, 58% was fair quality, 18% was good quality when compared to the Vegetation IBI scores of a large natural reference wetland data set." *Id.*; Vegetation IBI refers to the Vegetation Index of Biological Integrity, a method used by many states in which plant communities are used to assess performance of created and restored wetlands. JOHN J. MACK, OHIO EPA, WETLAND ECOLOGY GROUP DIV. OF SURFACE WATER, OHIO EPA TECHNICAL REPORT WET/2004-4, *Integrated Wetland Assessment Program, Part 4: Vegetation Index of Biotic Integrity (VIBI) and Tiered Aquatic Life Uses (TALUs) for Ohio Wetlands*, 2 (2004) available at http://www.epa.ohio.gov/portals/35/wetlands/PART4_VIBI_OH_WTLDs.pdf.

which are indicative of high quality sites,⁹¹ were not found at any mitigation bank, and sensitive amphibian species were rarely found at any of the sites.⁹² The researchers also found that although the Ohio bankers are required to collect data on their performance, the reports often lacked in substance, had little to no evaluation of trends, and lacked even the simplest of statistical analysis.⁹³

A case study of the Ohio Wetlands Foundation provides a more detailed analysis of the strengths and weaknesses of wetlands mitigation banking generally. Formed in 1992, the Ohio Wetlands Foundation is a non-profit organization created to provide off-site wetlands mitigation alternatives in Ohio.⁹⁴ According to the Foundation, it was the “first wetlands mitigation bank in the United States to successfully achieve the required performance standards and to complete the required monitoring.”⁹⁵ The bank has sold out of credits at five of its mitigation banks: Hebron, Big Island, Sandy Ridge,

⁹¹ M. MICACCHION, OHIO EPA, DIV. OF SURFACE WATER WETLAND ECOLOGY GROUP, FINAL REPORT TO U.S. EPA GRANT NO. CD985875-01, VOL. 3, *Amphibian Index of Biotic Integrity (AmphIBI) for Wetlands*, 28 (2002), available at http://www.epa.state.oh.us/portals/35/wetlands/2002_Amphibian_report_final_rev.pdf. (testing biological metrics and development of wetland assessment techniques using reference sites).

⁹² MACK & MICACCHION, *supra* note 75, at 17.

⁹³ *Id.* at 17-18.

⁹⁴ The Ohio Wetlands Foundation, *Who We Are*, <http://www.ohiowetlands.org/who-we-are> (last visited June 12, 2010).

⁹⁵ *Id.*

Three Eagles, and Slate Run.⁹⁶ These banks represent almost 700 acres of restored wetland.⁹⁷ Credits are still being sold at six more wetland mitigation banks: Trumbell Creek, Pine Brook, Big Darby-Hellbranch, Little Stillwater, and Pearson Metro Park.⁹⁸ The Foundation will also work with developers to identify off-site mitigation alternatives when a mitigation bank is not appropriate.⁹⁹

The Foundation follows the April 10, 2008 Federal Law for Compensatory Mitigation for Losses of Aquatic Resource,¹⁰⁰ which requires developers to follow the federal laws regarding wetlands impacts and obtain a federal or Ohio EPA permit.¹⁰¹ The Foundation maintains that all funds received for mitigation purposes are used to purchase, design, construct, and maintain the property, as well as for the education of the public and the funding of research.¹⁰²

⁹⁶ The Ohio Wetlands Foundation, *Mitigation Banks*, <http://www.ohiowetlands.org/mitigation-banks> (last visited June 12, 2010).

⁹⁷ *Id.*

⁹⁸ *Id.*

⁹⁹ *Id.*

¹⁰⁰ *Compensatory Mitigation for Losses of Aquatic Resources*, 73 Fed. Reg. 19594-01 (10 April 2008); Army Corps of Engineers, 33 C.F.R. Parts 325 and 332; EPA, 40 C.F.R. Part 230.

¹⁰¹ See The Ohio Wetlands Foundation, *Resource Center*, <http://www.ohiowetlands.org/resource-center> (last visited June 12, 2010).

¹⁰² The Ohio Wetlands Foundation, *Who We Are*, <http://www.ohiowetlands.org/who-we-are> (last visited June 12, 2010).

A. ASSESSMENT OF THE FOUNDATION'S SITES

The Sandy Ridge mitigation bank is located in Lorain County, Ohio, within the Sandy Ridge Metro Park.¹⁰³ Construction of the bank began in September 1997 and was completed a year later.¹⁰⁴ The bank is approximately 106 acres, sixty-seven of which is newly constructed wetland and fifty-five acres of the bank were converted farm field used for agriculture production.¹⁰⁵ The bank's three hydrologically connected areas cause a variation of water depths that range from shallow emergent wetland to deep water areas.¹⁰⁶ Water averages sixty to ninety centimeters to over 1.5 meters in the unvegetated open water.¹⁰⁷

Sandy Ridge has already completed its five years of monitoring as required by the federal banking guidelines.¹⁰⁸ The fifth year report was published in December of 2002 and outlined eight performance goals for the site.¹⁰⁹ In the 2006 technical report assessing Ohio mitigation banks, the researchers also reexamined the Sandy Ridge wetlands to determine if the site was complying with the eight performance goals.¹¹⁰ The data showed that six of the eight goals did not appear to be met.¹¹¹ As outlined in the design plan, the wetland

¹⁰³ MACK & MICACCHION, *supra* note 75, at 94.

¹⁰⁴ *Id.* at 95.

¹⁰⁵ *Id.*

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

¹⁰⁸ See The Ohio Wetlands Foundation, *Mitigation Banks*, <http://www.ohiowetlands.org/mitigation-banks>; see MACK & MICACCHION, *supra* note 75, at 94-95.

¹⁰⁹ *Id.* at 98, 102.

¹¹⁰ *Id.* at 98-101.

¹¹¹ *Id.*

was supposed to be seasonally to regularly flooded; the majority of the bank is "basically permanently" inundated.¹¹² Although 65.3% of the site has hydrophytic vegetation, most of these plants are nonnative, annual species, including aggressive aquatic weeds.¹¹³ Also, plant diversity has "at best stayed the same" since the beginning of the monitoring period.¹¹⁴ According to the researchers, "the Sandy Ridge Bank shares very little in common with diverse, high quality natural marshes, shrub swamps, or forested wetlands in Ohio."¹¹⁵

The bank also appears to have negatively affected the surrounding areas. The report outlined how "existing wetland shrub thickets at the north end of the bank" are now completely gone.¹¹⁶ Before construction, the area had species suggesting the wetland was growing into a forest or shrub wetland.¹¹⁷ In the northwest areas, pre-existing tree species have died as a result of continuous inundation.¹¹⁸ No forest or shrub wetland areas are currently developing.¹¹⁹ Despite these negative evaluations, Ohio Wetlands Foundation calls Sandy Ridge its "third successful bank."¹²⁰

¹¹² *Id.* at 98.

¹¹³ *Id.* at 99-100.

¹¹⁴ *Id.* at 99.

¹¹⁵ *Id.* at 100.

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.* at 95.

¹¹⁹ *Id.* at 100.

¹²⁰ See Radio: INFOOHIO, NPR, Karen Schaefer, Sandy Ridge: Wetlands Mitigation, March 15, 2000 <http://www.wcpn.org/WCPN/news/7260>. As of 2008, the Ohio Wetlands Foundation's Sandy Ridge website was claiming it as a success at <http://www.ohiowetlands.org/sandy/htm> - but that link has since been removed and can be found archived at <http://192.220.61.205/sandy.htm> (last visited

The report also obtained data from Big Island, Hebron, Three Eagles, Slate Run, Little Scioto, and Trumbell Creek.¹²¹ The research shows that each site has differing ecological successes and failures. In addition, within a single large mitigation bank, certain areas do better or worse than others.

The Big Island, the second mitigation bank created in Ohio, is a large bank site in the west of Marion located on former wet prairie land that was drained and farmed.¹²² The bank is part of the Big Island Wildlife Area, which includes over 2,000 acres of land.¹²³ Constructed in 1995, it covers over 340 acres.¹²⁴ “Big Island is the only Ohio mitigation bank that has successfully initiated secondary forest succession” in parts of its site.¹²⁵ Wet prairie has also been successfully

June 14, 2010). This like may be subject to inaccessibility.

¹²¹ MACK & MICACCHION, *supra* note 75, at 91.

¹²² *Id.*

¹²³ The Ohio Wetlands Foundation website used to provide description of the Big Island Mitigation Bank at <http://www.ohiowetlands.org/bigisland.htm> as of 2008, but due to the bank's closure that information is no longer readily accessible as the webpage has been archived at <http://192.220.61.205/bigisland.htm> (last visited June 14, 2010) and may be subject to inaccessibility. Contact the Ohio Wetlands Foundation at info@ohiowetlands.org or see Pure Strategies, Wetland Mitigation Banking in Ohio and the Mitigation Bank at Big Island, at 1,6 (June 2000), available at <http://www.purestrategies.com/pdf/BigIslandOhioWet.pdf> for verification of acreage and bank completion date.

¹²⁴ *See id.*

¹²⁵ MACK & MICACCHION, *supra* note 75, at 91. Succession is the natural temporal development of a community's structure; secondary succession occurs on a previously

restored in some parts of the bank, and within those areas the vegetation was considered good to high quality.¹²⁶ Despite the ecological successes in some of the areas, other portions of the site are facing serious problems. Beavers are blocking water, likely killing the developing forest, water is not exiting properly, causing soil erosion, and one area has no vegetation at all.¹²⁷ Overall, much of Big Island is still non-wetland shallow pond.¹²⁸ Nevertheless, the bank is open to the public for recreational uses, including hiking, bird watching, and hunting.¹²⁹

“Located a few miles northeast of the Big Island bank,” the Little Scioto bank lies in a former prairie region.¹³⁰ It “consists of four areas north and south of the Little Scioto River.”¹³¹ The bank has since become part of the Big Island Wildlife Area.¹³² “Existing upland and

occupied site after a disturbance. SMITH, *supra* note 4, at 374, 378.

¹²⁶ MACK & MICACCHION, *supra* note 75, at 91.

¹²⁷ *Id.*

¹²⁸ *Id.*

¹²⁹ See The Ohio Ornithological Society, Big Island Wildlife Area,

http://www.ohiobirds.org/birdingsites/showsite.php?Site_ID=7 (last visited June 13, 2010). As of 2008, The Ohio Wetlands Foundation had a separate site for the Big Islands Wetlands Mitigation Bank, at <http://www.ohiowetlands.org/bigisland.htm> which specifically contained that information, but it has since been removed and archived at <http://192.220.61.205/bigisland.htm> (last visited June 14, 2010) but may be subject to unavailability.

¹³⁰ MACK & MICACCHION, *supra* note 75, at 93.

¹³¹ *Id.*

¹³² See The Ohio Wetlands Foundation, Mitigation Banks, <http://www.ohiowetlands.org/mitigation-banks> (last visited June 13, 2010). The map of completed sites lists only the

wetland forest and marsh along” the river were “preserved as part of the site.”¹³³ The northeast and northwest areas are mostly “submersed/floating leaved marshes” and have “extensive unvegetated open water.”¹³⁴ The researchers did notice a positive attribute of interaction in the northern areas of “the wetland and upland areas and the mostly shallow inundation.”¹³⁵ The south area consists of shallow ponds with modest vegetation.¹³⁶ Yet, little had been done to reestablish its preexisting biological conditions that included mesic prairie and oak savanna species; nor had other prairie species been introduced regardless of their presence just north of the wetland.¹³⁷ On a positive note, the VIBI scores were fairly low.¹³⁸ A large amount of water was restored at the wetland after a flood in the spring of 2004.¹³⁹

Hebron, the oldest mitigation bank in Ohio, is located in Licking County at the Hebron Fish Hatchery in central Ohio.¹⁴⁰ The thirty-three acre bank is located in the Buckeye Lake region, which was once a large bog wetland that was destroyed in the 1820s.¹⁴¹ The site was constructed on the area’s hydric soils “near existing swamp forest and

Big Island Wildlife Area and not Little Scioto separately, suggesting the merger of the two banks.

¹³³ MACK & MICACCHION, *supra* note 75, at 93.

¹³⁴ *Id.* at 94.

¹³⁵ *Id.*

¹³⁶ *Id.*

¹³⁷ *Id.*

¹³⁸ *Id.*

¹³⁹ MACK & MICACCHION, *supra* note 75, at 94.

¹⁴⁰ *Id.* at 93.

¹⁴¹ *Id.*; see The Ohio Wetland Foundation, Mitigation Banks, <http://www.ohiowetlands.org/mitigation-banks> (last visited June 13, 2010). Click on the map's Hebron Bank icon.

hatchery ponds."¹⁴² The bank originally had high plant species diversity, but now many of the areas have become dominated by reed canary grass and a large portion is shallow, unvegetated open water.¹⁴³ The Ohio Wetlands Foundation nevertheless calls the bank "a remarkable success."¹⁴⁴

The Three Eagles bank is located in the old lake plain of northeast Sandusky County and was completed in November 1999.¹⁴⁵ With 11.4 acres of wetlands already present, the plan projected the development of 120 acres of restored, created and enhanced wetlands on the site.¹⁴⁶ Like the Hebron bank, large portions of the north end of the marsh are unvegetated open water.¹⁴⁷ Invasive plant species are dominating the shallower water zones.¹⁴⁸ The western area lacks the hydrology to make that area an actual wetland, and trees are dying in the eastern portion because of increased water flow.¹⁴⁹

The Slate Run Mitigation Bank lies within the Slate Run Metro Park in Pickaway County, southeast of Columbus.¹⁵⁰ Built in 1999 on land used for agriculture, the bank has also completed its five year monitoring period.¹⁵¹ Although the goal was to develop 81.5 acres of

¹⁴² MACK & MICACCHION, *supra* note 75, at 93.

¹⁴³ *Id.*

¹⁴⁴ The Ohio Wetlands Foundation, Hebron Wetlands Mitigation Bank, <http://192.220.61.205/hebron.htm> (last visited June 13, 2010).

¹⁴⁵ MACK & MICACCHION, *supra* note 75, at 95.

¹⁴⁶ *Id.* at 96.

¹⁴⁷ *Id.*

¹⁴⁸ *Id.*

¹⁴⁹ *Id.*

¹⁵⁰ MACK & MICACCHION, *supra* note 75, at 95.

¹⁵¹ *Id.*

jurisdictional wetlands and 6.3 acres of unvegetated open water, most of the wetlands are “pond-like” with existing water levels much deeper than the design plan proposed.¹⁵² Again, the parts of the site that contain vegetation are dominated by non-native plant species.¹⁵³ However, the site is advertised as containing upland areas consisting of native prairie grasses and hardwood forest.¹⁵⁴ The bank is also used as a birding site and has an interpretive learning program that offers wetlands education.¹⁵⁵

The Trumbull Creek bank is located in Geauga and Ashtabula Counties and encompasses 462 acres.¹⁵⁶ A dam permit was required for the construction of the site. The construction of the bank is taking place in two parts; the first part has been completed.¹⁵⁷ The bank

¹⁵² *Id.*

¹⁵³ *Id.*

¹⁵⁴ See Metro Parks, Slate Run, <http://www.metroparks.net/ParksSlateRun.aspx> (last visited June 13, 2010). As of 2008, The Ohio Wetlands Foundation had this information posted on a specific Slate Run Wetlands Mitigation Bank site at <http://www.ohiowetlands.org/slaterun.htm>, but it has since been removed to <http://192.220.61.205/slaterun.htm> (last visited June 14, 2010). This website may be subject to inaccessibility.

¹⁵⁵ See The Ohio Ornithological Society, Slate Run Metro Park, http://www.ohiobirds.org/birdingsites/showsite.php?Site_ID=35 (last visited June 13, 2010); Metro Parks, Upcoming Programs and Events, <http://reservations.metroparks.net/programs/> (last visited June 13, 2010) (listing the wetlands education available at Slate Run).

¹⁵⁶ MACK & MICACCHION, *supra* note 75, at 96.

¹⁵⁷ *Id.*

appears very pond-like.¹⁵⁸ Some forested areas are being inundated by the flood pool; as a result the trees are mostly dead or dying.¹⁵⁹ Although there are many deep water zones with no hydrophytes, the shallower areas contain vegetation and “are developing good quality marsh plant communities.”¹⁶⁰ The second part of the bank is designed to develop swamp forest with vernal pools.¹⁶¹ The Foundation hopes the nearby presence of diverse wetland vegetation will provide a seed source for the wetlands to be restored.¹⁶² When both parts are completed, the Foundation will donate the site to the Ohio Division of Natural Resources, at which point the site will be open to the public for hiking, bird watching, hunting, trapping, and other recreational uses.¹⁶³ As part of the site, about 4,000 feet of high quality headwater habitat streams will be permanently protected.¹⁶⁴

B. ANALYSIS OF THE FOUNDATION

Under the Ohio Administrative Code, “restoration or creation of wetlands as compensatory mitigation shall replace the impacted wetland with an equivalent or higher quality wetland.”¹⁶⁵ The results of the ecological assessments of the Foundation’s banks show that they are not meeting the legal requirements for compensatory mitigation of wetland loss in several respects: 1) hydrophytic plant prevalence; 2)

¹⁵⁸ *Id.* at 96.

¹⁵⁹ *Id.*

¹⁶⁰ *Id.*

¹⁶¹ *Id.* at 96.

¹⁶² The Ohio Wetlands Foundation, Trumbull Creek Wetlands Mitigation Bank, <http://ohiowetlands.org/mitigation-banks/trumbull-creek> (last visited Nov. 6, 2008).

¹⁶³ *Id.*

¹⁶⁴ *Id.*

¹⁶⁵ OHIO ADMIN. CODE § 3745-1-54 (2009).

species diversity; 3) biological integrity; 4) overall no-net-loss of wetlands; 5) impact on surrounding ecological communities; 6) adaptive management; and 7) monitoring and responsiveness to feedback loops. Put simply, the banks are not meeting the qualifications for a successful mitigation bank as outlined in the federal banking guideline, which provides: “the objective of a mitigation bank is to provide for the replacement of the chemical, physical and biological functions of wetlands and other aquatic resources which are lost as a result of authorized impacts.”¹⁶⁶ The first major problem with these mitigation banks is the frequent absence of hydrophytic plant communities. To be classified as a wetland, there must be a “prevalence of vegetation typically adapted for life in saturated soil conditions.”¹⁶⁷ “Open water” is defined as “areas of inundation with or without rooted emergent vegetation, and does not meet the hydrophytic vegetation criterion of the 1987 Delineation Manual.”¹⁶⁸ Every one of the Foundation’s mitigation banks contains at least some areas that do not have these characteristics. Almost all of Little Scioto and Hebron is classified as shallow ponds with unvegetated open water.¹⁶⁹ Although Big Island has some areas where the vegetation is good quality, much of the wetland is still non-wetland shallow unvegetated pond.¹⁷⁰ The researchers refuse to classify Three Eagles as

¹⁶⁶ Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks, 60 Fed. Reg. 228, 58605–58614 (Nov. 1995) available at <http://www.epa.gov/owow/wetlands/guidance/mitbankn.html>.

¹⁶⁷ US ARMY CORPS OF ENGINEERS, *supra* note 2, at 26(a).

¹⁶⁸ MACK & MICACCHION, *supra* note 75, at 7.

¹⁶⁹ *Id.* at 93.

¹⁷⁰ *Id.* at 91.

an actual wetland because it lacks the hydrology and contains such a large amount of unvegetated open water.¹⁷¹ While not yet completed, Trumbell Creek already appears pond-like and has many areas with no hydrophytes.¹⁷² According to the Wetlands Delineation Manual, the predominant condition of the mitigation site is used to determine if the site is vegetated.¹⁷³ However, because many of the areas of each site is unvegetated and open water, many of these mitigation banks do not currently satisfy the “prevalence of vegetation” requirement.

Many of the mitigation sites are also violating the Clean Water Act. One of the Act’s purposes is to maintain biological integrity, which is defined as “the capability of supporting and maintaining a balanced integrated, adaptive community of organisms having species composition, diversity, and functional organization comparable to that of natural habitat of the region.”¹⁷⁴ Many Ohio bank instruments mimic the Clean Water Act by requiring that the sites be dominated by

¹⁷¹ *Id.* at 96.

¹⁷² *Id.*

¹⁷³ The Manual specifies that “in determining whether an area is ‘vegetated’ for the purpose of Section 404 jurisdiction, users must consider the density of vegetation at the site being evaluated. While it is not possible to develop a numerical method to determine how many plants or how much biomass is needed to establish an area as being vegetated or unvegetated, it is intended that the predominant condition of the site be used to make that characterization.” U.S. ARMY CORPS OF ENGINEERS, WETLANDS DELINEATION MANUAL, PART III: CHARACTERISTICS AND INDICATIONS OF HYDROPHYTIC VEGETATION, HYDRIC SOILS, AND WETLAND HYDROLOGY 29 (1995) available at <http://www.wetlands.com/coe/87manp3a.htm>.

¹⁷⁴ J.R. Karr & D.R. Dudley, *Ecological Perspective on Water Quality Goals*, 5 ENVTL. MGMT. 55, 56 (1981).

perennial native hydrophytes and have a low frequency of invasive plant species (usually less than ten percent).¹⁷⁵ However, multiple banks contain species-poor communities dominated by a few native tolerant plant species or aggressive non-native species. Although over sixty percent of Sandy Ridge has hydrophytic vegetation, most of these plants are nonnative, annual species, including aggressive aquatic weeds.¹⁷⁶ The plant diversity in Sandy Ridge has basically remained the same since the site's construction.¹⁷⁷ Three Eagles has invasive plant species dominating its shallow water.¹⁷⁸ Hebron originally had high plant species diversity but many portions of the site are becoming dominated by reed canary grass, a non-native species that is considered a major threat to natural wetlands because of its aggressive nature and rapid growth.¹⁷⁹ No examples of typical Ohio wetland shrub communities were found at any of the mitigation banks.¹⁸⁰ This further demonstrates that these banks are simply not functioning as comparable natural wetlands.

Some of the sites did contain a wider sample of species diversity, as required by the Clean Water Act. Tiger salamander and red spotted newt, two sensitive species, were collected at Slate Run.¹⁸¹

¹⁷⁵ MACK & MICACCHION, *supra* note 75, at 7.

¹⁷⁶ *Id.* at 99.

¹⁷⁷ *Id.* at 99-100.

¹⁷⁸ *Id.* at 96.

¹⁷⁹ *Id.* at 93; See also MAX HUTCHISON, ILLINOIS NATURE PRESERVES COMMISSION, No. 19, VEGETATION MANAGEMENT GUIDELINE: REED CANARY GRASS (PHALARIS ARUNDINACEA) (1990) <http://dnr.state.il.us/INPC/VMG/VMG%20Reed%20canary%20revised%202002.pdf>.

¹⁸⁰ MACK & MICACCHION, *supra* note 75, at 10-11.

¹⁸¹ *Id.* at 9.

However, they were collected near an existing wetland forest, suggesting that these species might be present because the surrounding forest, not Slate Run, was able to support them.¹⁸² Similarly, red spotted newts were found in several areas of Trumbell Creek, but each of these areas is located within or next to large acreages of mature intact forest.¹⁸³ Many species of birds have been found at Hebron, but because the site is near a number of hatchery ponds, the researchers believe many of the birds are attracted to these ponds and not Hebron itself.¹⁸⁴ In essence, because the nearby presence of pre-existing, established habitat might be the actual source of these species, these mitigation banks in reality may not be capable of supporting a diversity of species as required by the Clean Water Act.

Compensatory mitigation was essentially created to ensure that the environment remains in a state of equilibrium; hence the idea behind “no-net-loss” of wetlands. However, many of the banks do not have the vegetation and water characteristics to classify them as wetlands under the Wetlands Delineation Manual. In fact, the data suggests each of the mitigation banks, with the exception of Hebron, do not meet the criteria necessary to consider them jurisdictional wetlands.¹⁸⁵ Trumbell Creek is currently only forty percent jurisdictional wetlands, which equals about a forty-three acre loss of wetlands.¹⁸⁶ All together, the Foundation’s sites constitute a total net

¹⁸² See *id.* at 9-10.

¹⁸³ *Id.* at 9-10.

¹⁸⁴ *Id.* at 93.

¹⁸⁵ MACK & MICACCHION, *supra* note 75, at 37 discussing Table 8.

¹⁸⁶ *Id.*

loss of 124.6 acres of wetlands.¹⁸⁷ This is a clear violation of the no-net-loss policy as codified in the 1990 MOA.

In addition, not only is there a net loss of wetlands occurring, but there are facts showing some of these banks are negatively impacting their surroundings thereby causing even greater impact to the environment. Sandy Ridge appears to be having very negative effects on the surrounding ecosystem.¹⁸⁸ Although the area appeared to be developing into a forest or shrub wetland at the beginning of the site construction, there is no longer any indication the development will continue.¹⁸⁹ Wetland shrub thickets that were once at the north end of the bank are gone and pre-existing tree species have died because of flooding.¹⁹⁰ The hydrology seems to be affecting the areas around several of the other sites as well. Many of the trees at both Three Eagles and Trumbell Creek are dead or dying because of the water flow.¹⁹¹ In one portion of Big Island, water is draining incorrectly and causing soil erosion.¹⁹² Beavers are blocking water in another area, thereby threatening the developing forest.¹⁹³ These negative impacts on the surrounding environments are serious problems that deserve considerable attention. Adverse impacts on the surrounding ecosystem are serious violations of the goal of no-net-loss of wetlands.

Unfortunately, the mitigation bank managers are not utilizing an adaptive management approach to address these myriad of problems.

¹⁸⁷ *Id.*

¹⁸⁸ *Id.* at 99, 100.

¹⁸⁹ MACK & MICACCHION, *supra* note 75, at 100.

¹⁹⁰ *Id.*

¹⁹¹ *Id.* at 96.

¹⁹² *Id.* at 91.

¹⁹³ *Id.*

Ecological systems are inherently dynamic and can fluctuate unexpectedly; the managers of these sites must be prepared to adapt accordingly. However, there is not much evidence of this approach. Although many of the sites are not meeting the standards of wetlands vegetations, the mitigation bank managers are putting little effort into encouraging the communities into functional wetlands. For example, there is prairie vegetation just north of the Little Scioto wetland, yet no attempt has been made to introduce these species to the bank.¹⁹⁴ Although the banking instruments contain goals and plans to ensure a successful bank, these goals are often not met. Sandy Ridge, which has passed its five year monitoring period, is still not meeting many of the ecological goals outlined in the fifth year report.¹⁹⁵ Although plant diversity has stayed the same since the beginning of the monitoring period, there is no evidence that the managers are making efforts to introduce new species and encourage plant growth.¹⁹⁶

Lastly, there is a serious problem with lack of stringent monitoring and responsiveness. Until the system appears to be functioning stably as a true wetland, the banks will require monitoring and a more hands-on approach than has been demonstrated at these sites. One of the main problems is the lack of native hydrophytic plant species, yet there is little indication that the site managers have taken active steps to remedy this problem. An example used before is Little Scioto, where the managers have made no efforts to introduce prairie plants into the site, even though there is a community of these plants

¹⁹⁴ *Id.* at 94.

¹⁹⁵ MACK & MICACCHION, *supra* note 75, at 98-100.

¹⁹⁶ *Id.* at 99-100.

just north of the mitigation site.¹⁹⁷ The researchers also pointed out that the data collected by the bankers at each of the sites lacked in substance and analysis.¹⁹⁸ Monitoring of sites like these is often completed only to comply with the regulatory requirements, and “compliance monitoring typically yields different information than scientific monitoring.”¹⁹⁹ For the banks to be successful, more stringent monitoring requirements will be needed to ensure the goals and management practices are based on accurate scientific data.

C. LOOKING FORWARD

The Ohio EPA assessment demonstrated various problems associated with the mitigation banking system. The question is whether these issues can be solved or whether they are inherent in mitigation banking itself. Although the very nature of the system has intrinsic shortcomings, the possible benefits that can be derived from mitigation banking necessitates its use. However, mitigation banking as it currently stands requires serious modification for the system to reach any measurable level of success. Policymakers must reconsider or reemphasize: 1) the location of the banking site; 2) the size of the mitigation bank; 3) the complex relationship between the bank and the public; 4) the adaptive management approach; and 5) the monitoring and responsiveness requirements.

The choice in site selection is given substantial consideration when creating the banking instrument.²⁰⁰ Many of the locations were

¹⁹⁷ *Id.* at 94.

¹⁹⁸ *Id.* at 17-18.

¹⁹⁹ GROOM ET AL, *supra* note 10, at 561.

²⁰⁰ Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks, 60 Fed. Reg. 228, 58605-

chosen in part because of the presence of existing wetlands. Big Island, for example, is part of a 2,000 acre wildlife area and is the only Ohio bank that has successfully initiated secondary forest succession.²⁰¹ Wet prairie has also been restored successfully in some areas.²⁰² Little Scioto was near the Big Island Wildlife Area and interacted positively with the existing wetland forest and marsh, which were preserved as part of the site.²⁰³ Placing these sites within the Wildlife Areas may be one reason why Big Island and Little Scioto appeared to be more successful in their interaction with the surrounding ecosystems. However, site selection alone does not play as important a role in the developing wetland as policymakers and legislators may believe; the data also shows that presence of older wetlands has not necessarily helped the development of the mitigation sites. Developers thought the presence of 11.4 acres of existing wetlands would help with the creation of the additional wetlands at Three Eagles, but the bank has not resulted in the amount of wetland acreage predicted.²⁰⁴ The Foundation is relying on a nearby wetland to provide seeds for the second part of Trumbell Creek, but so far the site is functioning as only forty percent jurisdictional wetlands.²⁰⁵ Although choosing sites that are located near preexisting wetlands and forest communities would seem beneficial for the success of the banks, in reality this does not appear to be the case. Placing mitigation sites near existing wetlands or

58614 , at II(B)(2). (Nov. 1995), available at <http://www.epa.gov/owow/wetlands/guidance/mitbankn.html>.

²⁰¹ MACK & MICACCHION, *supra* note 75, at 91.

²⁰² *Id.*

²⁰³ *Id.* at 93–94.

²⁰⁴ *Id.* at 96.

²⁰⁵ *Id.* at 96, and 37 discussing Table 8.

forests does not automatically guarantee a successful bank; the banks still need consistent, careful monitoring and a flexible, but rigorous, hands-on management approach.

The size of the mitigation banks is another issue of concern. One of the biggest advantages of the banking system is the consolidation of resources and efforts to create a single large mitigation site. However, the benefits of a larger size come with one of the biggest risks; a large single bank that fails will certainly have a lesser overall ecological impact than a small bank that fails. The analysis of the Foundation's sites highlights this concern. Within each site, there are a wide range of successes and failures. Trumbell Creek, for example, has areas that contain vegetation with good quality marsh plant communities.²⁰⁶ But other areas of the site have deep water zones with no hydrophytes at all.²⁰⁷ This evidence suggests that a single, sweeping wetlands plan might not be meeting the needs of these complex systems. However, leaving the mitigated wetlands as various smaller areas can deprive the system of some of its ecological benefits. Larger wetland systems are more ecologically valuable than smaller, isolated wetlands because they are more stable and provide more habitat for a wider variety of species.²⁰⁸ Larger banks also allow more efficient "scientific, planning, implementation, monitoring and management expertise" that is not possible for smaller mitigation banks.²⁰⁹ For larger banks to be

²⁰⁶ *Id.* at 96.

²⁰⁷ MACK & MICACCHION, *supra* note 75, at 91.

²⁰⁸ Jennifer Neal, *Paving the Road to Wetlands Mitigation Banking*, 27 B.C. ENVTL. AFF. L. REV. 161, 178 (1999).

²⁰⁹ JOE DE VILLARS, PIONEER INSTITUTE: PUBLIC POLICY RESEARCH, ROE PAPER No. 4, THE WETLANDS BANKING SYSTEM (2007), <http://www.pioneerinstitute.org/pdf/ROE4.pdf>.

successful, the bank goals must be comprehensive enough to deal with the complexity of such a large ecosystem. Again, adaptive management and monitoring will also be part of the overall solution.

One of the most important, and yet severely ignored, aspects of these mitigation banks is their relationship to the public. The Foundation has made significant efforts to increase the public's understanding and appreciation of wetlands. It has implemented a number of educational projects, and, upon completion, most of these banks become open for public use. Hiking, hunting, and bird watching are already allowed on Big Island, and when Trumbull Creek is completed, the site will be donated to the Ohio Division of Natural Resources and will also be open for "passive recreational uses."²¹⁰ Wetlands provide both aesthetic and recreational opportunities to the public, and by granting the public access to these mitigation sites, the Foundation is preserving these important functions.

However, opening the banks for public use does not in and of itself maintain the functions of the original wetlands. These mitigation banks service large areas; Slate Run, for example, services three full counties in Ohio and parts of fifteen other counties.²¹¹ Although most

²¹⁰ The Ohio Wetlands Foundation, Trumbull Creek Wetlands Mitigation Banks, <http://ohiowetlands.org/mitigation-banks/trumbull-creek> (last visited June 10, 2010). See The Ohio Ornithological Society, Big Island Wildlife Area, http://www.ohiobirds.org/birdingsites/showsite.php?Site_ID=7 (last visited June 14, 2010).

²¹¹ The Ohio Wetlands Foundation, Slate Run Wetlands Mitigation Bank, <http://192.220.61.205/slaterun.htm> (last visited June 14, 2010); Slate Run Wetlands Mitigation Bank Service Area Map <http://192.220.61.205/slaterunservice.htm> (last visited June 14, 2010).

of the Foundation's banks are located in the same watershed, or the watershed adjacent to, where the development is occurring,²¹² some areas are still losing the benefits of the original wetlands. When an impacted wetland is being compensated for in another part of the county (or even state), the public that originally benefited from the wetland's services are now being deprived of these services. As authors Ruhl and Salzman explain, "Simply put, if the wetlands move, their ecosystem services go with them. This means that some people inevitably will lose (and others will gain) the economic benefit of wetland ecosystem services when wetland mitigation banking takes hold in a region."²¹³ This concept is largely absent in current mitigation regulations. Although off-site banks should be located within the same watershed as the impacted wetland, it is acceptable that some banks are located outside the watershed. In that case, the population who benefited from the original wetland no longer has access to the services of the mitigation bank. Even if the bank is still within the region of the original watershed, the shift in location may still alter who receives the services.²¹⁴ Little Scioto provides one example of this redistribution. In the summer of 2004, Little Scioto stored a large amount of flood water thereby providing a very important service to the people of that immediate region and possibly denying this function to the people who live near the impacted wetland, which probably no longer provides the same benefits.²¹⁵

²¹² See *id.*

²¹³ Ruhl & Salzman, *supra* note 71, at 8.

²¹⁴ See *id.* at 8.

²¹⁵ MACK & MICACCHION, *supra* note 75, at 94.

The public, however, remains largely unaware of these issues. Evidence shows that mitigation banking does in fact redistribute some wetland ecosystem services between populations, but simply not enough attention is being paid to this impact by the authorities.²¹⁶ The federal regulations of mitigation banking should require smaller service areas for the banks to ensure the public that originally benefited from the wetlands continues to receive the services to the best extent possible. Federal, or state, banking programs must also begin investigating the problem of ecosystem services redistribution to make sure the banking program can benefit, to the greatest extent possible, the original public that benefited from the wetlands.

Many of the concerns and problems with mitigation banking can be addressed in part through the use of adaptive management and long term compliance monitoring based on sound scientific analysis. The period for monitoring is typically five years as required by the Federal Banking Guidelines but may be extended if the bank has not reached a "stable condition."²¹⁷ As the Sandy Ridge reassessment demonstrated, banks that have passed the five year monitoring requirement not only may require an extended monitoring period, but may also require a serious reworking of the management practices. Bank managers must take increased measures to encourage plant growth, physically manipulate water levels when necessary, address impacts to the surrounding environments, and begin a general inventory of species.

²¹⁶ Ruhl & Salzman, *supra* note 71, at 9, 10.

²¹⁷ Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks, 60 Fed. Reg. 228, 58605-58614 at II(E)(3). (Nov. 1995), available at <http://www.epa.gov/owow/wetlands/guidance/mitbankn.html>.

Many of these projects can be accomplished via community outreach programs or as part of education requirements for local schools. A statement of goals is not enough to fix ecological problems; stringent monitoring and adaptive responses are essential. Wetlands are an “extraordinarily delicate and sensitive natural resource” and as such require long term involvement.²¹⁸ The task of monitoring should also be delegated to EPA members or other qualified scientific personnel to ensure the response is based on accurate, unbiased, scientific data.

D. CONCLUSION

The laws and regulations governing compensatory mitigation banks are obviously in need of some clear revision. The banking system as it currently stands is not meeting the purposes of the Clean Water Act. Without clear monitoring requirements, the banks cannot be properly evaluated and efficient management is not possible. The banking guidelines over-simplify the complexity of the ecological processes of wetlands and largely ignore the importance of the interaction of wetlands and the surrounding environments. As the analysis of the Ohio Wetlands Foundation shows, this system is currently not the “win-win” solution as suggested by banking proponents. The Sandy Ridge reevaluation demonstrates that if left unaltered, mitigation banking will not produce functional wetlands, thereby violating the no-net-loss policy. However, the deficiencies associated with mitigation banking may not be fatal to the entire system. A serious reworking of the law may ameliorate the weaknesses

²¹⁸ Le Desma, *supra* note 67, at 497.

and allow the potential benefits of mitigation banking to be fully realized.