No. 11-1447

In the Supreme Court of the United States

COY A. KOONTZ, JR.,
Petitioner,

v.

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT,
Respondent.

ON WRIT OF CERTIORARI TO THE SUPREME COURT OF THE STATE OF FLORIDA

BRIEF OF FORMER MEMBERS OF THE NATIONAL RESEARCH COUNCIL COMMITTEE ON MITIGATING WETLAND LOSSES AS *AMICI CURIAE* IN SUPPORT OF RESPONDENT

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STATEMENT OF INTEREST

In accordance with United States Supreme Court Rule 37, we respectfully submit this brief with the parties' consent as *amici curiae* in support of Respondent, St. Johns River Water Management District.[1]

Amici are distinguished wetland scientists, academics, and professionals who are former members of the National Research Council (NRC) Committee on Mitigating Wetland Losses. As NRC Committee members, they evaluated the ability of practitioners to restore lost wetland functions, reviewing scientific literature, federal and state wetland mitigation policies, and on-the-ground mitigation projects. Their 2001 NRC report, "Compensating for Wetland Losses under the Clean Water Act," concluded that the widely accepted policy goal of "no net loss" of wetlands was not being achieved. The report recommended policy reforms to ensure that permit conditions reflect a tight nexus between wetland functions lost as the result of permitted activity and wetland functions gained through compensatory mitigation projects. Some of the report's recommendations formed the basis for a 2008 federal compensatory mitigation regulation.

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[1] Pursuant to United States Supreme Court Rule 37.6, this brief was not authored in whole or in part by counsel for a party, and no counsel or a party, other than *amici curiae* or their counsel, made a monetary contribution intended to fund the preparation or submission of this brief.

This brief describes the specific context of wetland permitting in which this case arose, and outlines the substantial scientific and policy rationale for wetland mitigation requirements.

The attached appendix contains brief biographies of the *amici curiae*.

SUMMARY OF ARGUMENT

Through their chemical, physical, and biological functions, wetlands provide essential ecosystem services to people, businesses, and communities. These ecosystem services, such as improving water quality, providing flood control and coastal storm mitigation, supporting fish, shellfish, avian, and other wildlife populations, and sequestering climate-harming carbon, yield significant economic value. Conversely, the destruction and degradation of wetlands trigger a cumulative loss of wetland functions and services. Consequently, federal and state agencies, including those in Florida, have adopted the objective of "no net loss" of wetland function.

When a proposed regulated activity will adversely affect wetlands, federal and state agencies typically follow an "avoid-minimize-compensate" approach. As an initial matter, impacts to wetlands are to be avoided. If impacts cannot be entirely avoided (because of, for example, the size or type of project), then the impacts should be minimized to the extent practicable. Any remaining impacts should then be eliminated or offset through

compensatory mitigation projects: restoration, enhancement, creation, and/or preservation of other wetlands.

Compensatory mitigation projects, which are required through permit conditions, should result in "no net loss" of wetland function. In practice, however, the National Research Council (NRC) Committee on Mitigating Wetland Losses and studies both before and since 2001 found that we are not achieving "no net loss" of wetland function. In light of on-going permitted and unpermitted wetland losses, and the adverse environmental, public safety, and economic impacts of those losses, it is critical that mitigation efforts ensure effective replacement of lost wetland functions.

One acre of wetland is not necessarily equivalent to another acre of wetland. The ecosystem services provided by a particular wetland depend on, among other things, its location within a watershed and its hydrology. Accordingly, the NRC Committee recommended that the accounting of wetland functional loss (through permitted activities) and wetland functional gain (through mitigation projects) should be done in a watershed context. An accurate measurement of this functional loss and gain requires the use of an assessment methodology. Federal and state agencies have collaborated to develop rapid assessment methodologies that are applied to the impact site and the mitigation site to determine what functions will be lost and what functions will be gained—if the mitigation project meets its performance standards.

The NRC Committee and subsequent studies found that compensatory mitigation projects often failed to meet their performance standards. Even when a project met its performance standards, it did not necessarily provide the same functions at the same level as reference wetlands of the same type. Therefore, to account for the risk of mitigation failure and the temporal loss of wetland functions, mitigation at greater than a ratio of 1:1 is often needed to fully compensate for wetland impacts.

The NRC Committee recognized that restoration of destroyed or degraded wetlands is the preferred technique for replacing lost wetland functions. Moreover, the Committee observed that off-site mitigation within the watershed often can be more effective than on-site mitigation in replacing wetland functions lost as the result of the permitted activity. Finally, the Committee recognized that simply preserving existing wetlands, in and of itself, does not replace lost wetland functions. Permitting 3.4 acres of wetlands to be filled on the condition that eleven other existing acres be preserved, as was proposed in this case, still results in a net loss of 3.4 acres—as well as the loss of the ecosystem goods and services that the area provided.

Federal and state water resource permitting standards require that wetland mitigation permit conditions—including conditions requiring off-site mitigation and greater than 1:1 wetland acre replacement ratios—be reasonably related to the impacts of the permitted development. Federal compensatory mitigation policy dictates that the

amount of mitigation required must be "*roughly proportional* with the permitted impacts, so that it is *sufficient to offset those lost aquatic resource functions*." Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. 19,594, 19,633 (Apr. 10, 2008) (emphasis added). Florida's compensatory mitigation policies follow suit.

In short, the sound scientific and legal framework that bounds mitigation conditions requires a reasonable relationship between wetland functions lost due to permitted activity and wetland functions to be gained through wetland mitigation permit conditions. This required nexus between wetland functions lost and gained is essential to achieving "no net loss" of wetland functions and services.

ARGUMENT

I. Fully Replacing Lost Wetland Functions is a Central Tenet of Modern Water Law.

A. Wetlands perform chemical, physical, and biological functions essential to watershed integrity and provide services essential to community well-being.

Wetlands are complex ecosystems that, depending on their type and on circumstances within a watershed, can improve water quality, provide natural flood control, diminish droughts, recharge groundwater aquifers, and stabilize shorelines. They

often support a wide variety of plants and animals, including rare and endangered species, migratory birds, and the young of commercially valuable fishes. Their beauty and diversity contribute to their recreational value.[2] The public interest in conserving wetland functions and services as a public good is well-established both scientifically and economically.

Wetlands serve a number of ecological functions, most notably those related to water quality, hydrology, habitat, and carbon sequestration.[3] Some of these ecological functions provide human benefits, or "ecosystem services,"[4] such as storing flood waters, pollutants, and sediment that would otherwise flow downstream.[5]

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[2] Nat'l Research Council, *Compensating for Wetland Losses Under the Clean Water Act* 1 (Nat'l Acad. Press 2001) [hereinafter NRC, *Wetland Mitigation Report*].

[3] *Id.* at 27; *see also* Millennium Ecosystem Assessment, *Ecosystems and Human Well-Being: Wetlands and Water Synthesis* 1–3, tbl.1, 34–38 (World Res. Inst. 2005) [hereinafter Millennium Ecosystem Assessment, *Wetlands*].

[4] The physical, chemical, and biological processes that occur in wetlands and other aquatic resources are referred to as "functions," while the benefits that human populations receive from these aquatic resource functions are often referred to as "services" or "ecosystem services." *See* 33 C.F.R. § 332.2 (2012) (providing the 2008 Corps and EPA compensatory mitigation regulation definitions)*; see also* Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,604.

[5] *See e.g.*, NRC, *Wetland Mitigation Report*, *supra* note 2, at 27–30; Millennium Ecosystem Assessment, *Wetlands*, *supra* note 3, at 1–3, tbl.1, 34, 36–37; Virginia Carter, *Wetland Hydrology, Water Quality, and Associated Functions*, *in* National Water Summary on Wetland Resources 35, 43–46 (Judy D. Fretwell et al. eds., U.S. Dep't of Interior & U.S. Geological Survey, USGS Water-Supply Paper 2425, 1996), *available at*

Wetlands often store waters that later contribute to stream flow during low-flow periods.[6] They store and filter surface water and recharge shallow groundwater aquifers, providing a critical supply of fresh water for human use.[7] Wetlands also provide important spawning, nesting, feeding, refuge, and other habitat requirements for fish, migratory birds, other wildlife, and the invertebrates, amphibians, and other organisms on which fish and wildlife depend for survival and reproduction.[8]

The ecosystem services of intact wetlands also have significant economic value. And the total

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http://water.usgs.gov/nwsum/WSP2425/hydrology.html; W. Aaron Jenkins et al., *Valuing Ecosystem Services from Wetlands Restoration in the Mississippi Alluvial Valley*, 69 Ecological Econ. 1051, 1055–56 (2010); William J. Mitsch & James G. Gosselink, *The Value of Wetlands: Importance of Scale and Landscape Setting*, 35 Ecological Econ. 25, 28 (2000); Curtis J. Richardson, *Ecological Functions and Human Values in Wetlands: A Framework for Assessing Forestry Impacts*, 14 Wetlands 1, 3 (1994); Dennis F. Whigham & Thomas E. Jordan, *Isolated Wetlands and Water Quality*, 23 Wetlands 541, 542–44 (2003).

[6] Millennium Ecosystem Assessment, *Wetlands*, *supra* note 3, at 1–3, tbl.1, 36–38; William J. Mitsch & James G. Gosselink, *Wetlands* 347 (4th ed., John Wiley & Sons, Inc. 2007); Thomas C. Winter et al., *Ground Water and Surface Water: A Single Resource,* U.S. Geological Survey Circular 1139, at 67 (1998), *available at* http://pubs.usgs.gov/circ/circ1139/pdf/circ1139.pdf.

[7] *See e.g.*, NRC, *Wetland Mitigation Report*, *supra* note 2, at 1; Millennium Ecosystem Assessment, *Wetlands*, *supra* note 3, at 1–3, tbl.1, 30–32; Carter, *supra* note 5, at 44.

[8] *See e.g.*, NRC, *Wetland Mitigation Report*, *supra* note 2, at 27, 51–53; Millennium Ecosystem Assessment, *Wetlands*, *supra* note 3, at 1–3, tbl.1, 30–32; Paul H. Zedler, *Vernal Pools and the Concept of Isolated Wetlands*, 23 Wetlands 597, 599–604 (2003).

economic value of unconverted wetlands is often greater than converted wetlands.[9] For example, a single acre of wetland can store 1 to 1.5 million gallons of flood water,[10] and just a 1% loss of a watershed's wetlands can substantially increase peak flow and flood volume in the watershed.[11] The Great Midwest Flood of 1993 caused an estimated $21 billion in flood damages.[12] The extensive loss of Mississippi Basin wetlands was an important factor in the severity of that flood.[13] Floodplain flood storage services have significant economic value[14] and are estimated to be worth over $50,000 per acre.[15] Wetland water filtration services can save

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[9] Millennium Ecosystem Assessment, *Wetlands*, *supra* note 3, at 2–3, tbl.1, 34–35, Box 3.1 (noting as an example that intact Canadian freshwater marshes valued at $5,800/hectare for hunting, angling, and trapping benefits compared to $2,400/hectare for marshes drained for agriculture).

[10] EPA, Functions and Values of Wetlands, EPA 843-F-01-002c (Sept. 2001), *available at* http://water.epa.gov/type/wetlands/upload/2006_08_11_wetlands_fun_val.pdf.

[11] Misganaw Demissie & Abdul Khan, *Influence of Wetlands on Streamflow in Illinois*, Illinois State Water Survey Contract Report 561, at vi, 44–45 (Oct. 1993).

[12] Neal Lott & Tom Ross, *Tracking and Evaluating U.S. Billion Dollar Weather Disasters*, *1980–2005* (Nat'l Oceanic & Atmospheric Admin. Nat'l Climatic Data Ctr. 2006), *available at* http://www1.ncdc.noaa.gov/pub/data/papers/200686ams1.2nlfree.pdf.

[13] Millennium Ecosystem Assessment, *Wetlands*, *supra* note 3, at 47–48.

[14] *Id.* at 2–3, tbl.1, 36–37, Box 3.2.

[15] Nat'l Research Council, *Valuing Ecosystem Services: Towards Better Environmental Decision-Making* 170 (2005).

communities millions of dollars that would otherwise have to be spent for water treatment.[16]

Estuarine and coastal wetlands in particular play essential roles in the lifecycles of 75% of fish and shellfish commercially harvested and up to 90% of fish recreationally caught in the United States.[17] In 2009, commercial fishermen in the United States harvested 7.9 billion pounds of finfish and shellfish, earning $3.9 billion for their catch.[18] The American Sportfishing Association reports that anglers generated nearly $125 billion in total economic activity in 2006.[19] Florida touts itself as the official "Fishing Capital of the World"[20] and enjoys a $65 billion annual tourism industry "inextricably linked

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[16] John C. Austin et al., *Healthy Waters, Strong Economy: The Benefits of Restoring the Great Lakes Ecosystem* 8 (Brookings Inst. 2007) (estimating that Great Lakes clean up and restoration would reduce water treatment costs by $50–125 million).

[17] EPA, Economic Benefits of Wetlands, EPA 843-F-06-004 (May 2006), *available at* http://water.epa.gov/type/wetlands/outreach/upload/EconomicBenefits.pdf.

[18] Nat'l Oceanic & Atmospheric Admin., National Overview: U.S. Summary 5 (2009), *available at* http://www.st.nmfs.noaa.gov/st5/publication/econ/2009/US_ALL_Econ.pdf.

[19] Southwick Assocs., *Sportfishing in America: An Economic Engine and Conservation Powerhouse* 5 (Am. Sportfishing Ass'n 2007), *available at* http://asafishing.org/uploads/Sportfishing_in_America_Jan_2008_Revised.pdf.

[20] Fla. Fish & Wildlife Conservation Comm'n, *Why Florida is the Fishing Capital of the World*, http://www.visitflorida.com/fishing/articles/why-florida-is-the-fishing-capital-of-the-world (last updated July 17, 2012).

to the utilization and enjoyment of our state's natural resources."[21] Hunting and fishing alone contributed $8 billion to the Florida economy in 2006 and supported over 85,000 jobs.[22] This robust sport hunting and fishing industry "requires healthy freshwater, forest, and marine ecosystems to sustain the state's fisheries and wildlife populations."[23]

B. "No net loss" of wetland function is a widely accepted objective guiding the issuance and conditioning of state and federal water permits.

In 1989, President George H.W. Bush announced a national policy goal of "no net loss" of wetlands,[24] a policy goal that had previously been endorsed by stakeholders from federal, state, and local government and the development and conservation communities.[25] "No net loss" of wetland functions and services soon became the explicit guide

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[21] The Nature Conservancy, *Economic Benefits of Land Conservation: A Case for Florida Forever* 4 (2009), *available at* http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/florida/howwework/economic_benefits_of_land_conservation-2.pdf.

[22] *Id.* at 24.

[23] *Id.*

[24] NRC, *Wetland Mitigation Report*, *supra* note 2, at 2.

[25] *See* Conservation Found., *Protecting America's Wetlands: An Action Agenda: The Final Report of the National Wetlands Policy Forum* 1–3 (1988) (Forum members, including governors, state and local legislators, industry leaders, academics, and conservation leaders studied and adopted the no overall net loss of wetlands goal.).

for Clean Water Act mitigation policies of the U.S. Army Corps of Engineers (Corps) and the U.S. Environmental Protection Agency (EPA):

> The Clean Water Act and the [CWA Section 404(b)(1)] Guidelines set forth a goal of restoring and maintaining existing aquatic resources. The Corps will strive to avoid adverse impacts and offset unavoidable adverse impacts to existing aquatic resources, and for wetlands, will strive to achieve a goal of no overall net loss of values and functions. In focusing the goal on no overall net loss to wetlands only, EPA and Army have explicitly recognized the special significance of the nation's wetlands resources.[26]

The agencies recognized that "no net loss" of wetland functions may not be achieved in "each and every permit action," but the agencies affirmed that "it remains a goal of the Section 404 regulatory program to contribute to the national goal of no overall net loss of the nation's remaining wetlands base."[27] The agencies' 1990 mitigation policy

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[26] Memorandum of Agreement between the Dep't of the Army & the Envtl. Prot. Agency Concerning the Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines § IIB (Feb. 6, 1990) [hereinafter 1990 Mitigation MOA], *available at* http://water.epa.gov/lawsregs/guidance/wetlands/mitigate.cfm.

[27] *Id.* § IIIB; *see also* Corps Regulatory Guidance Letter (RGL) 02-02 (2002) (stating that "all [Corps] Districts will strive to

specifically provided that "for wetlands, such mitigation should provide, *at a minimum*, one for one functional replacement (i.e., no net loss of values), *with an adequate margin of safety* to reflect the expected degree of success associated with the mitigation plan."[28] The "no net loss" policy goal continues to guide federal wetland mitigation policy, as the Corps and EPA reaffirmed, after notice-and-comment rulemaking, in their 2008 compensatory mitigation regulation. 33 C.F.R. § 332; 40 C.F.R. § 230.[29]

Florida likewise has adopted a "no net loss" of wetland functions goal and compensatory mitigation permitting policies to meet that goal. Florida rules direct the state's Department of Environmental Protection (DEP) and water management districts to:

> protect, preserve and restore the quality, quantity, and environmental values of surface and ground water resources; to prevent existing

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achieve [the "no net loss"] goal on a cumulative basis, and the Corps will achieve the goal programmatically").

[28] 1990 Mitigation MOA, *supra* note 26, at § IIIB (emphasis added).

[29] *See also* Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,594 (noting that "compensatory mitigation is a critical tool in helping the federal government to meet the longstanding national goal of "no net loss" of wetland acreage and function"); *id.* at 19,604 ("The agencies have a long-standing policy of achieving no overall net loss for wetland acreage and function. Simply requiring one-to-one acreage replacement may not adequately compensate for the aquatic resource functions and services lost.").

> environmental, water quantity, and water quality problems from becoming worse; to reduce existing flooding problems; improve existing water quality; promote and protect the availability of sufficient water for all existing and future reasonable-beneficial uses and natural systems, and preserve or restore natural systems.[30]

Florida's environmental statutes dictate that the DEP and the governing board of a water management district "*shall* take into account cumulative impacts on water resources [including wetlands], and manage those resources in a manner to ensure their sustainability." *See* Fla. Stat. §§ 373.016(2) (emphasis added), 373.019(27) (2012) (defining "wetlands"). The statutes further require that "[t]he mitigation must offset the adverse effects caused by the regulated activity." *See id.* § 373.414(1)(b).[31] In order to achieve "no net loss,"

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[30] Fla. Admin. Code r. 62-40.425(1)–(2) (2005)*; see also* Fla. Stat. §§ 163.3177, 187.201(9)(a) ("Florida shall protect and acquire unique natural habitats and ecological systems, such as wetlands . . . and restore degraded natural systems to a functional condition.").

[31] *See also* Fla. Admin. Code r. 62-345.100(2) (2005) ("[T]he methodology in this chapter provides a standardized procedure for assessing the functions provided by wetlands and other surface waters, the amount that those functions are reduced by a proposed impact, and the amount of mitigation necessary to offset that loss."); *id.* at r. 40C-4.091 (2010) (incorporating by reference St. Johns River Water Mgmt. Dist., *Applicant's Handbook: Management and Storage of Surface Waters*); St.

Florida's compensatory mitigation policies require accounting for the time lag between the immediate impacts of a proposed activity and the eventual replacement of ecological value, as well as the risk that mitigation will fail to fully achieve its intended benefits. *See* Fla. Admin. Code r. 62-345.600 (2001).

While the "no net loss" goal is widely accepted, it is far from being met in practice. This conclusion was a serious concern and a principal finding of the NRC Committee in 2001,[32] and it is reinforced by recent studies of wetland status and trends.[33]

Johns River Water Mgmt. Dist., *Applicant's Handbook: Management and Storage of Surface Waters* § 12.1, *available at* http://www.sjrwmd.com/handbooks/pdfs/msswhdbk.pdf [hereinafter St. Johns River Water Mgmt. Dist., *Applicant's Handbook*] ("It is the intent of the Governing Board that the criteria in subsections 12.2 through 12.3.8 be implemented in a manner which achieves a programmatic goal, and a project permitting goal, of no net loss in wetland or other surface water functions."); Fla. Stat. §§ 373.4144(1)(d), (2) (The Legislature intends to facilitate coordination between state and federal water permitting programs and intends state permits to be "at least as protective of the environment and natural resources as existing state law under this part and federal law under the Clean Water Act and the Rivers and Harbors Act of 1899.").

[32] NRC, *Wetland Mitigation Report*, *supra* note 2, at 2–3, 16–20, 120–22; *see also* R. Eugene Turner, Ann M. Redmond & Joy B. Zedler, *Count It by Acre or Function—Mitigation Adds Up to Net Loss of Wetlands*, 23 Nat'l Wetlands Newsl. 5, 15 (Nov.–Dec. 2001).

[33] *See* Thomas E. Dahl, *Status and Trends of Wetlands in the Conterminous United States 1998 to 2004*, at 16 (U.S. Fish & Wildlife Serv. 2006) (noting that acreage gains in "open ponds" probably do not represent gains in wetland function comparable to those of a vegetated freshwater wetland); Thomas E. Dahl, *Status and Trends of Wetlands in the Conterminous United*

Florida, perhaps more than most states, has struggled to come close to achieving "no net loss" of wetland function.[34] In light of on-going permitted and unpermitted wetland losses, effective replacement of lost wetland functions through compensatory mitigation continues to play a critical role in the attempt to achieve "no net loss" of wetland functions and services.

C. "No net loss" of wetland function is achieved through avoiding, minimizing, and compensating for wetland impacts.

Florida, like many other states, employs wetland mitigation standards and practices that are

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States 2004 to 2009, at 16 (U.S. Fish & Wildlife Serv. 2011) (stating that "the estimated wetland loss rate increased 140 percent [between 2004 and 2009] and, as a consequence, national wetland losses have outdistanced gains"); Susan Marie Stedman & Thomas E. Dahl, *Coastal Wetlands of the Eastern United States: 1998-2004 Status and Trends,* 40 Nat'l Wetlands Newsl. 18, 19–20 (July–Aug. 2008) (finding "an average annual net loss of about 59,000 acres [of coastal wetlands] over the 6-year period of this study").

[34] Fla. Dep't of Envtl. Regulation (FDER), *Operational and Compliance Audit of Mitigation in the Wetland Resource Regulation Permitting Process*, Report no. AR-249 (Nov. 1, 1991); FDER, *Report of the Effectiveness of Permitted Mitigation* (Mar. 5, 1991) [hereinafter FDER, *Effectiveness Report*]; *see* Kelly Chinners Reiss et al., *An Evaluation of the Effectiveness of Mitigation Banking in Florida: Ecological Success and Compliance with Permit Criteria* ix–xiii, 1–2 (Fla. Dep't of Envtl. Prot. & Univ. of Fla. 2007), *available at* http://www.dep.state.fl.us/water/wetlands/docs/mitigation/Final_Report.pdf.

based on federal implementation of the Clean Water Act. In 1972, Congress enacted the Clean Water Act to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters," including its wetlands. 33 U.S.C. § 1251(a) (2012). Congress required EPA, working with States and Tribes, to adopt state-specific water quality standards, permitting standards, and permitting programs that would limit point source discharges of dredged and fill material and other pollutants. *See id.* §§ 1311–1319, 1341–1344. Section 404 of the Clean Water Act allows the Corps, or delegated States under an approved program, to prohibit or permit the discharge of dredged or fill material into waters and to attach conditions to those permits. *Id.* §§ 1344 (b)(1), 1343(c)(1); 40 C.F.R. § 230. Clean Water Act Section 404 permits must be issued in accordance with Guidelines established by EPA. 33 U.S.C. § 1344(b)(1); 40 C.F.R. § 230.

In order to maintain natural aquatic ecosystem function in accordance with the Act and the "no net loss" goal, the Section 404(b)(1) Guidelines emphasize the outright avoidance of adverse impacts on wetlands and other waters, requiring a "sequential mitigation" approach to permitting. Permit applicants and the Corps must first avoid impacts, then minimize impacts that cannot be avoided, and only after those two steps compensate for those impacts that can be neither avoided nor minimized. 40 C.F.R. §§ 230.10(a), (d).[35]

[35] *See also* 33 C.F.R. §§ 320.4(a), (b), (l), (r) (Corps permitting regulations require consideration of the public interest in

"[A]ppropriate and practicable" steps must be taken that will minimize or mitigate the potential unavoidable adverse impacts of the discharge on the aquatic ecosystem. *Id.* § 230.10(d).

The agencies' 2008 compensatory mitigation regulation reiterates that compliance with the Guidelines' impact avoidance and minimization requirements must be met before compensatory mitigation plans can be approved and a Section 404 individual permit issued. *See* 33 C.F.R. §§ 332.1(c)(2), (f)(2); 40 C.F.R. §§ 230.91(c)(2), (f)(2); Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,596, 19,619–20. The agencies define compensatory mitigation as "the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved." 33 C.F.R. § 332.2; 40 C.F.R. § 230.92 (providing definitions).

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maintaining the ecological and hydrological functions of wetlands, including food chain production, nesting, spawning, rearing and resting habitat for fish and wildlife; storm and flood water storage; ground water discharge and recharge that replenishes water supplies; and water purification. The regulations also direct the avoidance, minimization, and mitigation of individual and cumulative adverse impacts to these functions.); 1990 Mitigation MOA, *supra* note 26, at § IIC.

Many states, including Florida, employ their own wetland mitigation standards and practices based on Clean Water Act Section 401 or 404 authority and/or independent state water laws. As with federal mitigation, these state mitigation provisions often establish a "no net loss" goal, emphasize impact avoidance and minimization, and include mitigation ratio requirements and wetland site and kind preferences.[36] Florida requires

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[36] *See* Fla. Stat. § 373.414(1)(a).

> In determining whether an activity . . . is not contrary to the public interest or is clearly in the public interest, the governing board or the department shall consider and balance . . . [w]hether the activity will adversely affect conservation of fish and wildlife, including endangered or threatened species, or their habitats; . . . adversely affect . . . the flow of water or cause harmful erosion . . . ; . . . adversely affect . . . fishing or . . . marine productivity . . . ; . . . will be of a temporary or permanent nature; . . . and . . . current condition and relative value of functions . . . performed by areas affected by the proposed activity.

Id.

> If the applicant is unable to otherwise meet the criteria . . . , the governing board or the department . . . , shall consider measures proposed by or acceptable to the applicant to mitigate adverse effects . . . . Such measures may include . . . onsite mitigation, offsite mitigation, offsite regional mitigation, and the purchase of mitigation credits from mitigation banks . . . . The mitigation must offset the adverse effects caused by the regulated activity.

Id. § 373.414(1)(b)*; see* U.S. EPA, *Core Elements of an Effective State and Tribal Wetlands Program*,

comprehensive planning that "[d]irects future land uses that are incompatible with the protection and conservation of wetlands and wetland functions away from wetlands . . . . Where incompatible land uses are allowed to occur, mitigation shall be considered as one means to compensate for loss of wetlands functions." Fla. Stat. § 163.3177.

II. A Sound Scientific and Legal Framework Requires that Mitigation Conditions Replace Wetland Functional Losses in a Watershed Context.

A. Wetland functional loss and gain are most accurately accounted for in a watershed context.

Another principal finding of the NRC Committee was that wetland functions, and thus planning and implementing wetland mitigation, must be understood within a watershed context.[37] A watershed is a land area that drains to a common waterway, such as a stream, lake, estuary, wetland, or ultimately the ocean. 33 C.F.R. § 332.2; 40 C.F.R. § 230.92 (providing definitions). How a given wetland functions and what services it provides will often depend upon its setting within the watershed.[38] For example, a particular wetland site's potential for water quality improvement is

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http://water.epa.gov/grants_funding/wetlands/cef_full.cfm#reg (last updated Apr. 17, 2012); Envtl. Law Inst., *State Wetland Program Evaluation: Phase I*, at 5, 12–13 (Jan. 2005).

[37] NRC, *Wetland Mitigation Report*, *supra* note 2, at 46–59.

[38] *Id.*

determined largely by the quality and quantity of inflowing water from the upstream portion of the watershed. The timing and volume of water flowing in from upstream also determines the wetland's flood abatement potential, both at the wetland site and downstream.[39]

Biodiversity and habitat services depend in part on "the number, type, size, and connectivity of other wetlands and open spaces in the entire watershed and the position of the site in the watershed."[40] In addition, a wetland mitigation site's functions will often depend on the extent of urban or agricultural development nearby and in the watershed.[41] Careful placement of mitigation wetlands within the landscape to ensure appropriate hydrological conditions is necessary for wetland sustainability and for replacement of wetland functions.[42]

In light of these considerations, the NRC Committee concluded that a watershed approach would improve permit decision-making, and specifically recommended as follows:

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[39] Royal C. Gardner et al., *Compensating for Wetland Losses under the Clean Water Act (Redux): Evaluating the Federal Compensatory Mitigation Regulation*, 38 Stetson L. Rev. 213, 221 (2009); NRC, *Wetland Mitigation Report*, *supra* note 2, at 48–49.

[40] Gardner et al., *supra* note 39, at 221 (citing Joy B. Zedler, *Wetlands at Your Service: Reducing Impacts of Agriculture at the Watershed Scale*, 1 Frontiers in Ecology & Env. 65, 69 (Mar. 2003)).

[41] *Id.* at 221–22.

[42] NRC, *Wetland Mitigation Report*, *supra* note 2, at 4.

> Site selection for wetland conservation and mitigation should be conducted on a watershed scale in order to maintain wetland diversity, connectivity, and appropriate proportions of upland and wetland systems needed to enhance the long-term stability of the wetland and riparian systems.[43]
>
> Individual compensatory mitigation sites should be designed and constructed to maximize the likelihood that they will make an ongoing ecological contribution to the watershed; this contribution should be specified in advance.[44]

These conclusions have been implemented at the federal level. Following the NRC Committee's recommendations, the Corps now "must use a watershed approach to establish compensatory mitigation requirements in DA [Army Corps] permits to the extent appropriate and practicable." 33 C.F.R. § 332.3(c)(1); 40 C.F.R. § 230.93(c)(1). The Corps and EPA define this watershed approach as "an analytical process for making compensatory mitigation decisions that support the sustainability or improvement of aquatic resources in a watershed." 33 C.F.R. § 332.2; 40 C.F.R. § 230.92. This process "involves consideration of watershed needs, and how locations and types of compensatory

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[43] *Id.*

[44] *Id.* at 7.

mitigation projects address those needs." 33 C.F.R. § 332.2; 40 C.F.R. § 230.92. It should include inventories of historic and existing aquatic resources, as well as identification of degraded aquatic resources and aquatic resource needs within watersheds that can be met through mitigation projects. 33 C.F.R. § 332.3(c)(2)(iv); 40 C.F.R. § 230.93(c)(2)(iv).[45]

The stated goal of the watershed approach is to "maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites." 33 C.F.R. § 332.3(c)(1); 40 C.F.R. § 230.93(c)(1); Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,598. The Corps and EPA are directed to use an appropriate watershed plan when available to guide compensatory mitigation requirements. 33 C.F.R. § 332.3(c)(1); 40 C.F.R. § 230.93(c)(1). These plans generally will be developed by governmental and/or non-profit resource planners, in consultation with relevant watershed stakeholders. 33 C.F.R. § 332.2; 40 C.F.R. § 230.92; Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,610.

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[45] For a promising illustration of the watershed approach, see The Nature Conservancy, *The Duck-Pensaukee Watershed Approach: Mapping Wetland Services, Meeting Watershed Needs*, http://www.conservationgateway.org/ConservationPractices/EcosystemServices/NaturesValues/NaturesValuesEcosystemServicesProvidedbyWetlands/TheDuck-PensaukeeWatershedApproach/Pages/duck-pensaukee-watershed-approach.aspx (last visited Dec. 13, 2012).

Florida also mandates a watershed focus in determining compensatory mitigation requirements, requiring a clear nexus between the cumulative impacts of wetland loss within the watershed and the wetland functions restored to the watershed through mitigation. Fla. Stat. §§ 373.414 (8)(a)–(b). Florida law directs its water management districts to consider "the cumulative impacts upon surface water and wetlands . . . within the same drainage basin" and declares that in-basin mitigation compensates for and potentially avoids cumulative impacts within the same basin. *Id.* § 373.414 (8)(a).

Similarly, Florida law requires the DEP and water management districts to use regional watersheds to guide the establishment of mitigation bank service areas. *Id.* § 373.4136(6)(b). Mitigation banks, which are a type of off-site mitigation, "shall be consistent with . . . watershed management objectives" and regional ecological benefits. Fla. Admin. Code r. 62-342.100 (2001). The Florida Administrative Code requires that mitigation banks "improve ecological conditions of the regional watershed" and provide viable and sustainable ecological and hydrological functions. *Id.* at r. 62-342.400(1)(a). When mitigation is performed outside the regional watershed, the mitigation credit requirement is set higher to account for the related loss of ecological function within the watershed.[46]

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[46] *See* Fla. Stat. § 373.4135(1)(d) ("A Mitigation Service Area may be larger than the regional watershed if the Mitigation Bank provides exceptional ecological value such that adverse impacts to wetlands outside the regional watershed could reasonably be expected to be adequately offset . . . because of

The regional water management districts in Florida are tasked with determining mitigation requirements specific to particular watersheds.[47]

B. Scientifically sound functional assessment methodologies measure the permitted loss and necessary replacement of wetland function.

Federal compensatory mitigation policy dictates that the amount of mitigation required must be "*roughly proportional* with the permitted impacts, so that it is *sufficient to offset those lost aquatic resource functions*." Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,633 (emphasis added). Both the NRC report[48] and the 2008 compensatory mitigation regulation highlight the importance of using "appropriate functional or condition assessment methods or other suitable metrics," where available, to measure how much

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local ecological or hydrological conditions."); Fla. Admin. Code r. 62-342.600(2), (6) (2007).

[47] *See* Fla. Admin. Code r. 40C-41.011 (2006) (incorporating by reference St. Johns River Water Mgmt. Dist., *Applicant's Handbook*, and providing for watershed-specific mitigation considerations); St. Johns River Water Mgmt. Dist., *Applicant's Handbook*, *supra* note 31, at § 11.4.4 (For the Econlockhatchee River Hydrologic Basin, "[off-site land preservation as] [m]itigation . . . must offset . . . adverse impacts of the system to the functions provided by the Econlockhatchee River Riparian Habitat Protection Zone and wetlands outside this zone, to aquatic and wetland dependent species. The lands proposed for preservation must be regionally significant or provide unique fish and wildlife habitat.").

[48] NRC, *Wetland Mitigation Report*, *supra* note 2, at 7.

compensatory mitigation is required. 33 C.F.R. § 332.3(f)(1); 40 C.F.R. § 230.93(f)(1). Functional assessments typically provide quantitative measures of the specific functions performed by an impact site and the functions expected to be provided by the compensatory mitigation site. Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,634.

Wetland functional assessment methodologies have been evolving since the 1980s and continue to evolve, with regional guide books tailored to regional wetland subclasses.[49] Federal and state resource managers work together to develop state and regional rapid assessment methodologies that strive to be both scientifically sound and efficient to apply in the permitting context.[50]

Florida law directs the DEP and water management districts responsible for implementation of the environmental resource permitting program to develop a uniform mitigation assessment methodology (UMAM) for wetlands and other surface waters.[51] The methodology must: (1)

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[49] *Id.* at 131–37.

[50] *See* Fla. Stat. § 373.414(18)(a) ("In developing the uniform mitigation assessment method, the department shall seek input from the United States Army Corps of Engineers in order to promote consistency in the mitigation assessment methods used by the state and federal permitting programs."); *see also* Kelly Chinners Reiss et al., *supra* note 34, at 1 (citation omitted) (detailing the integration of state and federal permitting for mitigation banks in Florida).

[51] In 2000, the Legislature directed the DEP and regional water management districts to develop a uniform wetland mitigation

require the application of "reasonable scientific judgment;" (2) determine the "value of functions provided by wetlands and other surface waters" considering current site conditions, utilization by fish and wildlife, location, uniqueness, hydrologic connection, and factors specifically applicable to mitigation banks; (3) account for the expected time-lag associated with offsetting impacts and the degree of risk associated with the proposed mitigation; and (4) account for different ecological communities in different areas of the state. Fla. Stat. § 373.414(18); *see also* Fla. Admin. Code r. 62-345.100 (2005) (requiring uniform assessment methodology to determine mitigation credits).

Florida's uniform mitigation assessment method is "a standardized procedure for assessing the functions provided by wetlands and other surface waters, the amount that those functions are reduced by a proposed impact, and the amount of mitigation necessary to offset that loss." Fla. Admin. Code r. 62-345.100(2) (2005). Florida DEP and the water management districts must use the UMAM, applying "reasonable scientific judgment," to "quantify the acreage of mitigation, or the number of credits from a mitigation bank or regional offsite mitigation area, required to offset the impact." *Id.*;

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assessment method (UMAM). Statutory text required that upon departmental adoption of the method by rule, the method would be binding on all governmental agencies as "the sole means to determine the amount of mitigation needed to offset adverse impacts . . . and to award and deduct mitigation bank credits." Fla. Stat. § 373.414(18) (2000); Fla. Stat. § 373.414(18) (2012).

see also id. at r. 62-345.300 (2007) (providing further guidance in applying the UMAM).

C. Proper mitigation-to-wetlands loss ratios are also necessary to achieve "no net loss" of wetland function.

To fully replace lost wetland functions, mitigation requirements must account for a variety of factors. Such factors include: the type of mitigation (*e.g.*, preservation); the risk of mitigation failure; differences between the functions lost at the impact site and the functions expected to be generated through mitigation (meaning the ecological functions must be of a similar type, *e.g.*, shallow wetland functions for shallow wetland functions); the temporal losses of wetland function; the difficulty of restoring or establishing the desired resource type and functions; and/or the distance between the impacted resource and the compensation site. 33 C.F.R. § 332.3(f); Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,601–02, 19,610, 19,613, 19,633–34.[52] Where available, appropriate functional assessment methods are increasingly used to determine the total amount of mitigation in light of such considerations. 33 C.F.R. § 332.3(f)(1); 40 C.F.R. § 230.93(f)(1); *see also* Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,601, 19,634.[53] However, when such

[52] *See also* NRC, *Wetland Mitigation Report*, *supra* note 2, at 108–10.

[53] *Id.* at 7, 155.

methods are not available or appropriate, the federal mitigation rule requires a minimum 1:1 acreage or linear foot compensation ratio, with a greater than 1:1 ratio required where necessary to account for these variables. 33 C.F.R. §§ 332.3(f)(1)–(2). The federal compensatory mitigation regulation requires that the rationale for the replacement ratio be documented in the administrative record for the permit action. *Id.* § 332.3(f)(2); Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,613.

Prior to the adoption of UMAM in 2004, Florida law authorized the use of "ratios of mitigation-to-wetlands loss" and required that they be based on "the quality of the wetland to be impacted and the type of mitigation proposed."[54] However, once adopted, the Florida legislature directed that UMAM would then, with only limited exceptions, "supersede all rules, ordinances, and variance procedures from ordinances that determine the amount of mitigation needed to offset such

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[54] Fla. Stat. § 373.414; *see, e.g.*, *id.* § 403.9332(1)(a) (requiring a 2:1 mitigation ratio to replace impacts to mangrove trees); *id.* § 373.414(6)(d)(2) (For mitigation activities for limerock and sand mining, "the ratio . . . shall be based on the quality of the wetland to be impacted and the type of mitigation proposed."); *see also* Fla. Admin. Code r. 40C-4.091 (2010) (incorporating by reference St. Johns River Water Mgmt. Dist., *Applicant's Handbook*); St. Johns River Water Mgmt. Dist., *Applicant's Handbook*, *supra* note 31, at §§ 12.3.2–12.3.2.2 (providing guidelines on ratios for acreage of mitigation required compared to acreage impacted by regulated activities for certain specific types of mitigation, including creation, restoration, enhancement and preservation).

impacts" and would be "the sole means to determine the amount of mitigation needed to offset adverse impacts to wetlands and other surface waters and to award and deduct mitigation bank credits." Fla. Stat. § 373.414(18).

Where compensation ratios are used, higher ratios are required for simple preservation of existing wetlands because "the main purpose of preservation is to prevent a future loss of resources, not to provide a gain." Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,624; *see also id.* at 19,613, 19,660. Prior to adoption of UMAM, Florida authorized preservation mitigation through conveyance of a conservation easement and with the limitation that preservation mitigation "will not be granted [at] a ratio lower than 10:1."[55]

Greater than 1:1 mitigation ratios are also warranted to account for temporal loss—the time lag between the immediate loss of aquatic functions caused by the permitted impacts and the gradual replacement of aquatic functions at the mitigation site. As the NRC Committee noted, "[u]nless the replacement wetlands functions are in place before

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[55] *See* Memorandum from FDER Secretary Dale Twachtmann to FDER Permitting Division Director Randy Armstrong, *Policy for "Wetlands Preservation-as-Mitigation"* (June 20, 1988); St. Johns River Water Mgmt. Dist., *Applicant's Handbook, supra* note 31, at § 12.3.2.2(c) ("[T]he ratio guideline for preservation of wetlands and other surface waters is substantially higher than for restoration and creation. The ratio guideline for wetland and other surface water preservation will be 10:1 to 60:1 (acreage wetlands and other surface waters preserved to acreage impacted).").

the permitted impacts occur, there will be some temporal loss of wetland function in the watershed until the replacement wetland is functioning at the same level that the impact site had been."[56] Temporal loss must be considered in determining mitigation ratios, particularly for mitigation not initiated until after permitted impacts and for impacts to resources like forested wetlands with long development times. 33 C.F.R. § 332.2; Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,625, 19,638. Florida law also requires consideration of this temporal loss,[57] and the UMAM incorporates temporal loss into the assessment formula. Fla. Admin. Code r. 62-345.600(1) (2007); *see also id.* at r. 62-345.300(3)(d).

D. Wetland restoration is most likely to replace lost wetland function, but wetland preservation is not.

Of the four basic compensatory mitigation options, restoring wetlands is most likely to replace lost wetland functions. "Restoration" refers to the manipulation of the hydrology, soils, and/or vegetation of a site to return the natural/historic functions to a former or degraded aquatic resource. *See* 33 C.F.R. § 332.2; 40 C.F.R. § 230.92. It may involve, for example, restoring the natural hydrology to wetlands that have been diked or ditched and

[56] NRC, *Wetland Mitigation Report*, *supra* note 2, at 155.
[57] Fla. Stat. § 373.414(18).

drained.[58] At the federal level, restoration is consistently recognized as the first option because the likelihood of success is greater than with other forms of compensatory mitigation:

> Restoration should generally be the first option considered because the likelihood of success is greater and the impacts to potentially ecologically important uplands are reduced compared to establishment, and the potential gains in terms of aquatic resource functions are greater, compared to enhancement and preservation.[59]

Florida law also states a clear preference for restoration, emphasizing "the restoration and enhancement of degraded ecosystems and the preservation of uplands and wetlands as intact ecosystems rather than alteration of landscapes to create wetlands. This is best accomplished through restoration of ecological communities that were historically present." Fla. Stat. § 373.4135(1).

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[58] *See e.g.*, NRC, *Wetland Mitigation Report*, *supra* note 2, at 36; Royal C. Gardner, *Mitigation*, *in* Wetlands Law and Policy 253, 258 (Kim Diana Connolly et al. eds., 2005).

[59] 33 C.F.R. § 332.3(a)(2); 40 C.F.R. § 230.93(a)(2); *see also* Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,632; 1990 Mitigation MOA, *supra* note 26, at § II.C.3; NRC, *Wetland Mitigation Report*, *supra* note 2, at 5, 125–26 ("Whenever possible, choose wetland restoration over creation."); FDER, *Effectiveness Report*, *supra* note 34.

In contrast to restoration, "[p]reservation does not result in a gain of aquatic resource area or functions." 33 C.F.R. § 332.2; 40 C.F.R. § 230.92. Preservation involves "the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources." 33 C.F.R. § 332.2; 40 C.F.R. § 230.92. It does not involve alteration of the site.[60] Preservation may avoid or minimize permitted wetland loss, but by definition it does not *replace* permitted wetland losses that do occur. Preservation is disfavored as compensatory mitigation because it perpetuates a net loss of wetland functions, unless it is used in conjunction with wetland restoration, enhancement, or creation.[61] Florida's UMAM specifically requires downward adjustment of the calculation of the gain in ecological value that results from preservation as compared to restoration. Fla. Admin. Code r. 62-345.300(3)(a), (c) (2007).

E. Scientifically supported off-site mitigation can often replace more wetland function in the watershed than on-site mitigation.

Hydrology, land use, and other locational factors around a project site often limit the on-site capacity for replacing certain lost wetland functions, particularly fish and wildlife habitat functions.[62]

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[60] NRC, *Wetland Mitigation Report*, *supra* note 2, at 13–14.

[61] *Id.*

[62] *See* 33 C.F.R. § 332.3(c)(2)(ii); 40 C.F.R. § 230.93(c)(2)(ii); Compensatory Mitigation for Losses of Aquatic Resources, 73

Fundamentally, "[p]roper placement within the landscape of compensatory wetlands to establish hydrological equivalence is necessary for wetland sustainability."[63] The Corps and EPA mitigation standards highlight these constraints, noting there are circumstances in which "on-site mitigation is neither practicable nor environmentally preferable."[64]

It follows that to effectively replace lost wetland functions, a general preference for on-site mitigation "should not be automatic, but should follow from an analytically based assessment of the wetland needs in the watershed and the potential for the compensatory mitigation to persist over time."[65] The federal compensatory mitigation regulation adopts this watershed approach, finding that both on-site and off-site mitigation should be rigorously assessed and what may often be warranted is a combination of on-site mitigation measures to

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Fed. Reg. at 19,601, 19,604; NRC, *Wetland Mitigation Report*, *supra* note 2, at 4.

[63] NRC, *Wetland Mitigation Report*, *supra* note 2, at 4, 144.

[64] Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,601; *see also* 1990 Mitigation MOA, *supra* note 26, at § II.C.3; RGL 02-02, *supra* note 26, at 5; Fla. Stat. § 373.4135(1) ("Mitigation banks and offsite regional mitigation can enhance the certainty of mitigation and provide ecological value due to the improved likelihood of environmental success associated with their proper construction, maintenance, and management."); Fla. Admin. Code r. 62-342.100 (2001) (discussing mitigation banks).

[65] NRC, *Wetland Mitigation Report*, *supra* note 2, at 4; Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,629.

address water quality and quantity functions, and off-site mitigation to compensate for lost habitat functions. Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,601, 19,604; 33 C.F.R. §§ 332.3(c)(2), (d)(2); 40 C.F.R. §§ 230.93(c)(2), (d)(2).

Florida law has specifically provided for off-site mitigation within the watershed dating back to 1993. Fla. Stat. § 373.414(8)(a) (1993). Based on the state's considerable experience with wetland mitigation, Florida Statute § 373.4135 even more clearly provides for off-site mitigation through regional off-site mitigation areas and through mitigation banks, recognizing that they "can enhance the certainty of mitigation and provide ecological value due to the improved likelihood of environmental success associated with their proper construction, maintenance, and management." Fla. Stat. § 373.4135(1) (2012); *see also id.* § 373.4136 (mitigation banks); *id.* §§ 373.403(19), (22). The Florida Legislature explicitly directed the DEP and the water management districts "to participate in and encourage the establishment of private and public mitigation banks and offsite regional mitigation," *id.* § 373.4135(1), and to consider these forms of mitigation as "a permittable mitigation option" in accordance with their permitting rules. *Id.* § 373.4135(1)(c). Florida law also authorizes the DEP and the water management districts to "allow the use of a mitigation bank or offsite regional mitigation alone or in combination with other forms of mitigation to offset adverse impacts of activities regulated under this part." *Id.* § 373.4135(e).

III. The Sound Scientific and Legal Framework that Bounds Mitigation Conditions Requires a Reasonable Relationship and Rough Proportionality Between Wetland Functions Lost to Development and Those Gained Through Permit Conditions.

Federal and state water resource permitting standards already require that wetland mitigation permit conditions—including conditions requiring off-site mitigation and greater than 1:1 wetland acre replacement ratios—be reasonably related and roughly proportional to the impacts of the permitted development. These standards require that agency permitting decisions avoid, minimize, and replace permitted losses of wetland function in order to protect the public's interest in clean drinking water; flood protection; access to swimming, boating, hunting, fishing, and other outdoor recreation and associated economic benefits; and other public goods and services.

As detailed above, wetland functional loss and gain are most accurately accounted for when explicitly assessed, planned, and implemented in a watershed context. Scientifically sound functional assessment methodologies measure the permitted loss and necessary replacement of wetland function. Whether or not functional assessment methodologies are available, mitigation ratios are often required to account for the quality and type of mitigation, the risk of mitigation failure, and the temporal losses of wetland function. Restoring wetlands is more likely

to replace lost wetland functions than establishing wetlands on an upland site. Preserving existing wetlands without wetland restoration is disfavored, and functional assessment calculations of a preserved area are discounted because it does not replace lost wetland functions. Often, strategically planned off-site mitigation within the watershed can be more effective than on-site mitigation in replacing wetland functions lost as the result of the permitted activity.

The 2001 NRC Report included recommendations specifically aimed at ensuring that federal and state mitigation permit conditions translate into actual replacement of wetland functions lost due to permitted activity in the watershed.[66] Federal compensatory mitigation policy dictates that the amount of mitigation required must be "*roughly proportional* with the permitted impacts, so that it is *sufficient to offset those lost aquatic resource functions*." Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,633 (emphasis added). The Corps and EPA's mitigation regulations explicitly require this reasonable relationship and rough proportionality in mitigation permitting.[67]

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[66] NRC, *Wetland Mitigation Report*, *supra* note 2, at 4–7.

[67] Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. at 19,633; *see also id.* at 19,634 (stating that the "functional assessments typically provide quantitative measures of specific functions performed by an impact site, and expected functions to be provided by the compensatory mitigation project site" and "[w]here quantitative measures are used, there needs to be flexibility to ensure that the required compensatory mitigation is roughly proportional to the permitted impacts").

The Florida legislature is equally clear in requiring this nexus:

> [T]he governing board . . . in deciding to grant or deny a permit, shall consider measures proposed by or acceptable to the applicant to mitigate adverse effects . . . [including] onsite mitigation, offsite mitigation, offsite regional mitigation, and the purchase of mitigation credits from mitigation banks permitted under s. 373.4136. It shall be the responsibility of the applicant to choose the form of mitigation. *The mitigation must offset the adverse effects caused by the regulated activity*.[68]

Florida law allows "offsite regional mitigation" only "*where an applicant proposes to mitigate the adverse impacts of only the applicant's specific activity as a requirement of the permit*, which provides regional ecological value . . . ." Fla. Stat. § 373.403(22) (emphasis added). Florida allows monetary donations as mitigation "only where the donation is specified for use in a duly noticed environmental creation, preservation, enhancement, or restoration project, endorsed by the department or the governing board of the water management district, *which offsets the impacts of the activity permitted under this part*." *Id.* § 373.414(1)(b) (emphasis added).

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[68] Fla. Stat. § 373.414(1)(b) (emphasis added); *see also id.* §§ 373.414(8)(a)–(b).

Further, both federal and state law provide administrative and judicial forums for a permittee to contest mitigation permit conditions that he or she believes lack the requisite nexus and proportionality between wetland functions lost from the permitted activity and those gained through the required mitigation. A Corps permit applicant can challenge permit conditions through the Corps administrative appeal process. 33 C.F.R. §§ 320.1(a)(2), 331. Having exhausted that administrative remedy, the applicant can challenge the Corps final permit decision in federal district court pursuant to the Administrative Procedure Act. *Id.* §§ 320.1(a)(2), 331.12; *see* 5 U.S.C. § 704.

Florida's Administrative Procedure Act (APA) likewise provides a prospective permittee with an administrative forum in which to dispute compensatory mitigation requirements. *See generally* Fla. Stat. § 120. The Florida APA imposes procedural requirements on both the Florida DEP and the regional water management districts. *See id.* §§ 120.52, 120.57. A permittee may file a petition or request a hearing with the agency. *Id.* § 120.569(2)(a). An administrative proceeding provides for similar discovery as a judicial proceeding, including witness testimony under oath, subpoena power, and the imposition of most sanctions afforded under state law. *Id.* § 120.569(2)(f). Additionally, the APA provides for judicial review of final agency action. *Id.* § 120.68.

The sound scientific and legal framework that bounds mitigation conditions requires a reasonable

relation and "rough proportionality" between wetland functions lost due to permitted activity and wetland functions to be gained in the watershed through compensatory mitigation.

CONCLUSION

The effective replacement of lost wetland functions through compensatory mitigation, including off-site wetland mitigation, is an essential, well-accepted, and science-based element of effective water resources policy in the United States. *Amici curiae* respectfully request that the Court affirm the decision of the Supreme Court of Florida.

Respectfully submitted,

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APPENDIX

BRIEF BIOGRAPHIES*

Dr. Joy B. Zedler is Aldo Leopold Professor of Restoration Ecology in the Botany Department and Arboretum, University of Wisconsin-Madison. She collaborates on research, teaches advanced (Adaptive Restoration) and non-majors (Plants and Humans) courses, writes for a broad range of audiences, and helps edit the journal, *Restoration Ecology*. She serves on Wisconsin's Natural Areas Preservation Council and is a Trustee of the Wisconsin Chapter of The Nature Conservancy. She served on four NRC committees and chaired the Committee on Mitigating Wetland Losses.

Dr. Leonard Shabman is Professor Emeritus at Virginia Tech in Blacksburg, Virginia. He is currently a Resident Scholar at Resources for the Future in Washington, DC. He served as vice chair of the NRC Committee on Mitigating Wetland Losses. In 2005, he was named an Associate of the National Academies.

Victoria Alvarez is a senior consultant to the California Legislature and has also served as an environmental planner and liaison to the U.S. Army Corps of Engineers. She earned a B.A. (botany) and M.A. (biology) from California State University. Her professional experience includes wetland research,

* Affiliations are provided for identification purposes only.

Clean Water Act regulation, compensatory habitat mitigation and restoration, and mitigation monitoring.

Dr. Robert O. Evans, PE and Fellow of ASABE, is Professor and Head of the Department of Biological and Agricultural Engineering at North Carolina State University. The author of more than 185 research, extension, and technology transfer publications, he has provided technical counsel to state and federal agencies on issues relating to drainage, stormwater management, wetlands delineation, and ecosystem restoration. He served on the North Carolina Senate's Coastal River Water Quality and Fish Kills select committee.

Royal C. Gardner is Professor of Law and Director of the Institute for Biodiversity Law and Policy at Stetson University. Since 2006, he has served on the Scientific and Technical Review Panel of the Ramsar Convention on Wetlands. A member of the editorial board of *Wetlands Ecology and Management*, he was the recipient of the 2006 National Wetlands Award for Education and Outreach.

Dr. Whit Gibbons is Professor Emeritus of Ecology at the University of Georgia's Savannah River Ecology Laboratory where he has conducted research on wetland ecology for four decades. He has published more than 200 scientific articles and authored over 20 books on fish, amphibians, and reptiles associated with aquatic systems. He has served on several NRC Life Sciences review panels.

Dr. Carol A. Johnston is Professor of Natural Resource Management at South Dakota State University and a former member of the NRC's Water Science and Technology Board. She served on panels of the NRC studying wetland mitigation, wetland identification and classification, and watershed management. In 2009, she received the National Wetlands Award for Science Research from the Environmental Law Institute.

Dr. William J. Mitsch is Eminent Scholar and Director of Everglades Wetland Research Park at Florida Gulf Coast University. He was founder and director for 20 years of the Ramsar-designated Olentangy River Wetland Research Park at The Ohio State University. His research and teaching focus on wetland and aquatic ecology, wetland creation and restoration, and ecosystem modeling, and he has published over 300 papers and edited or written 17 books including the standard wetland textbook *Wetlands*. A past president of the Society of Wetland Scientists, he received the Theodore M. Sperry Award in 2005 for a career in ecosystem restoration from the Society for Ecological Research. In 2004, he was a recipient of the Stockholm Water Prize from King Carl XVI Gustaf of Sweden.

Dr. Karen L. Prestegaard is Associate Professor, Department of Geology, at the University of Maryland. Her research focuses on rivers, watersheds, and wetlands, particularly interactions among geomorphology, hydrology, and biogeochemical processes in coastal and riparian wetlands. She has served on NRC panels that have

examined wetland mitigation, water use, stream flow information, and nuclear waste repositories. She is a fellow of the Geological Society of America.

Ann Redmond, CEP, is a Managing Scientist with Brown and Caldwell and an authority on environmental regulation spanning the areas of watershed-scale regulatory and planning solutions, all aspects of wetland mitigation, cumulative impacts, and habitat and ecosystem services assessments, and restoration planning frameworks. She has experience in compensatory mitigation issues from her 11 years as Florida DEP's expert on mitigation and mitigation banking, leading the statewide development, training, and implementation of policy, rules, and legislation in these areas, and following with positions as a mitigation provider and a consultant.

Charles Simenstad, Research Professor at the University of Washington's School of Aquatic and Fishery Sciences, is a Fellow of the American Association for the Advancement of Science, associate editor of three scientific journals, and recipient of the 2009 NOAA-AFS Nancy Foster Award for Habitat Conservation. He has authored or co-authored around 60 peer-reviewed scientific papers, 19 book and proceedings chapters, approximately 30 miscellaneous publications, and over 120 workshop proceedings and technical reports on estuarine and coastal ecology and restoration science.

Dr. R. Eugene Turner is a Chaired Professor, Distinguished Research Master, and Distinguished Faculty at Louisiana State University. He is a recipient of the 1998 National Wetland Award for Research, the 1999 Blasker Award for Science and Engineering with Nancy Rabalais, and the 2012 INTECOL Wetlands Lifetime Achievement Award. He is Chair of the INTECOL Wetlands Working Group, serves on numerous national and international scientific committees, and is active in scientific matters concerning scientific aspects of coastal environmental management, especially hypoxia, wetland restoration, and the impacts of the BP Macondo oil spill.