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THE CLEAN WATER ACT JURISDICTIONAL HANDBOOK

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Contents

Introduction

What waters can call on the Clean Water Act for protection? And which remain unprotected, absent action by Congress or the states? The *Clean Water Act Jurisdictional Handbook* is intended to answer these questions under the current legal framework.

When Congress passed the Clean Water Act in 1972 in response to the national water pollution crisis, few could have guessed that we would still be asking such basic questions about the scope of the Nation's landmark water protection law more than 35 years later. But the two most recent Supreme Court decisions addressing the reach of Clean Water Act coverage have rendered a once well-settled area of law uncertain.

In 2001, the U.S. Supreme Court handed down a 5-4 ruling in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (known as the *SWANCC* case) that constrained the reach of federal authority under the Clean Water Act for the first time, casting doubt on an expansive interpretation of Clean Water Act jurisdiction that had held sway for over two decades. Then, in 2006, the Supreme Court decided *Rapanos v. United States*, a blockbuster case on the scope of federal jurisdiction under the Clean Water Act. This time, the Justices divided so sharply over both results and rationales that there was no majority opinion. Together, the one-two punch of *SWANCC* and *Rapanos* has left anyone who cares about the protection of America's water resources struggling to sort out just what the Clean Water Act still covers—and what may now lie beyond its reach.

Ensuring Federal Protection for Wetlands and Streams

In the wake of the Supreme Court's *SWANCC* and *Rapanos* rulings, ensuring the protection of wetlands and streams, in particular, has become a pressing concern. In this *Handbook*, the terms "wetlands" and "streams" are used as follows—

- *Wetlands* are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

- *Streams* are linear geographic features that convey flowing waters. Headwater streams are the uppermost, low-order streams of a watershed and comprise the majority of streams in the United States, both in terms of numbers and length. Streams can be perennial, ephemeral, or intermittent.

The central subject of this *Handbook* is the extent to which the Clean Water Act covers wetlands and streams—particularly "non-navigable" wetlands and streams—and how such coverage can be demonstrated with reference to existing scientific literature and other types of evidence and tools.

The *Handbook* begins with three chapters that introduce and explain, in straightforward language, the sometimes confusing law of Clean Water Act jurisdiction. Chapter Four offers a general approach to assessing Clean Water Act coverage for wetlands and streams—with a checklist for each. Chapter Five explains how scientific literature on wetlands and streams can be used to inform the determination of whether a particular wetland or stream is covered by the Act. A glossary of scientific terms is included as a further resource. Finally, Appendix One alerts the reader to potential shifts in the scientific and legal landscape of Clean Water Act coverage; Appendix Two summarizes lower federal court rulings issued since the Supreme Court's 2006 *Rapanos* decision; and Appendix Three introduces the new Corps/EPA joint guidance document on Clean Water Act jurisdiction, post-*Rapanos*.

Who Should Use this *Handbook*?

The *Handbook* is intended for the use of anyone who is faced with the question of whether a particular wetland or stream is subject to the protections of the Clean Water Act. The *Handbook* serves as both an accessible starting point for the layperson seeking to understand Clean Water Act jurisdiction and a reference for those with experience in this area of law. The *Handbook* was developed and written with a lay audience in mind. As such, the user need be neither a lawyer nor a water resources scientist.

Watershed organizations and concerned citizens can use the *Handbook* as an aid in evaluating whether activities needing a federal permit, such as the dredging and filling of wetlands, are taking place—or are about to take place—in waters that are protected by the Clean Water Act. If so, these organizations and citizens may choose to notify the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, or state natural resources officials of the potential violations, or may consider filing a citizen lawsuit under the Act.

The *Handbook* can assist residential, commercial, and industrial property owners in assessing whether wetlands on their property are likely subject to federal jurisdiction.

The *Handbook* is further intended to serve as a legal and scientific informational resource to federal and state regulators who must regularly make difficult jurisdictional calls on wetlands and streams for a variety of purposes: for example, with respect to the programs operating under Sections 303, 401, 402, and 404 of the Clean Water Act.

The *Handbook* is not designed to be exhaustive. Rather, it identifies and explains the most authoritative sources of legal and scientific information bearing on whether specific wetlands and streams are likely to be covered by the Clean Water Act—namely, the text of the Act itself, the major Supreme Court cases interpreting the Act, and key scientific literature. To be sure, other factors also affect the determination of whether a particular wetland or stream comes within the coverage of the Act. For example, the two federal agencies with primary responsibility for implementing the Clean Water Act, the U.S. Army Corps of Engineers (the "Corps") and the U.S. Environmental Protection Agency ("EPA"), issued a long-awaited joint guidance document on June 5, 2007 that is intended to clarify their current interpretation of Clean Water Act coverage. Although the guidance is not legally binding, it provides insight into how the federal Government plans to interpret and assert Clean Water Act jurisdiction in light of the *Rapanos* decision. (See Appendix Three of the *Handbook* for more on the guidance.)

Nothing contained in this *Handbook* is intended to constitute legal advice, nor should the reader assume that any materials used to help demonstrate Clean Water Act coverage—such as scientific journal articles, photographs, or maps—will necessarily be admissible as evidence in legal proceedings. A reader in doubt about his or her legal rights, which may vary based on court decisions in particular judicial districts (see Appendix Two), should consult an attorney.

A Word on "Jurisdiction" as It Is Used Here

The *Handbook* uses the words "jurisdiction" and "jurisdictional" throughout. This term is intended to refer simply to the geographic coverage of the Clean Water Act—that is, to characterize what waters are "in" (or jurisdictional), and what waters are "out" (or non-jurisdictional). In this sense, the word "jurisdiction" is synonymous with "coverage," "scope," or "reach."

Lawyers could quibble with the *Handbook*'s non-technical use of this word. This is because jurisdiction, as a legal term of art, refers to legal power or authority, as in a court's jurisdiction over a person or a controversy, or federal—as opposed to state—jurisdiction over a controversy. From this more technical perspective, the *Handbook* is really concerned with determining what waters are subject to federal jurisdiction under the Clean Water Act.

Chapter One

THE CLEAN WATER ACT

The Federal Water Pollution Control Act, better known as the Clean Water Act,[1] establishes the legal framework for the protection of water resources in the United States. This chapter describes the purpose and key components of the Act. It also introduces the terms Congress used to define which waters are protected by the Act.

An All-Encompassing Program of Water Pollution Regulation

Congress intended the Clean Water Act to represent a comprehensive and unprecedented approach to the national problem of water pollution.[2] The opening words of the Act state its clear and ambitious objective: "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[3] Congress used the word "integrity" here to refer to "a condition in which the natural structure and function of ecosystems is maintained."[4]

The purpose of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.

As the Supreme Court explained in one of the first cases interpreting the Act, Congress' intent "was clearly to establish an all-encompassing program of water pollution regulation."[5] And the Court recognized in a later case that the Clean Water Act applies to "virtually all bodies of water."[6]

How Does The Clean Water Act Work?

The Clean Water Act contains various interrelated mechanisms designed to achieve the law's broad remedial purpose. Each of these mechanisms shares the same jurisdictional term, "navigable waters."

The heart of the Act is found in the prohibition contained in Section 301: it is illegal to discharge pollutants except in compliance with the Act.[7] Many of the words used in the Act are defined within the law, and their meanings are not always evident. The term "discharge" includes the "discharge of a pollutant" or the "discharge of pollutants,"[8] which in turn means "any addition of any pollutant to navigable waters from any point source."[9] A pollutant can be practically anything: "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water."[10] A "point source" under the Act is "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged."[11]

There are two major exceptions to the Section 301 prohibition—and both are implemented through permitting programs. The first is the *National Pollutant Discharge Elimination System*, or "NPDES," permit program. Established by Section 402 of the Clean Water Act, the NPDES permit program allows for a pollutant to be discharged into the Nation's waters when done in compliance with a properly issued permit.[12] An individual NPDES permit includes various requirements, including an important requirement that the discharger meet effluent limits. These permit limits are derived from a calculation of both technology-based limits and water quality-based effluent limits needed to protect the receiving waters.[13] Although the Clean Water Act grants EPA oversight authority for Section 402 permitting, nearly every state now administers its own NPDES permit program under a delegation of authority from EPA.[14]

The second major exception to the Section 301 prohibition on discharges into the Nation's waters is the "dredge and fill" permit program administered by the Corps of Engineers in cooperation with EPA. Under this program, established by Section 404 of the Clean Water Act, the Corps may issue permits for the discharge of "dredged or fill material" at specified disposal sites.[15] Although states may apply for delegated authority to administer certain Section 404 permits,[16] few states have done so, leaving the "dredge and fill" program—unlike the NPDES permit program—largely the province of the federal government.[17]

Also important is Section 401 of the Clean Water Act, which requires an applicant for any federal permit covering an activity that may result in a "discharge" into "navigable waters" to first obtain a state certification, to ensure that the project will comply with state water quality standards.[18] Technically, a water quality standard, used to determine water quality-based effluent limits and for 401 certification, consists of "designated uses" (for example, public water supply, propagation of fish and wildlife, or recreation) for the waters involved, as well as the water quality criteria for such waters based on those uses.[19]

Another essential mechanism in the Clean Water Act was intended essentially as a backstop to the technology-based requirements governing discharge of pollutants: the requirement that states establish water quality standards and, where those standards have not been met, determine pollutant loads that will ensure that the standards are satisfied.[20] When a state determines that waters are impaired—that is, that the waters do not meet the water quality standard—the state must establish a priority listing of such waters and calculate a *total maximum daily load*, or "TMDL," for them.[21] TMDLs are "the actual plans that identify pollution loadings, allocate them to sources, and present mechanisms for their abatement."[22] EPA oversees state compliance with the TMDL program.[23]

The Clean Water Act contains many more provisions than those summarized here. This summary simply highlights Clean Water Act programs where disputes over the reach of federal jurisdiction under the Act are most likely to arise.[24]

The Act Covers "Waters of the United States"

Every requirement contained in the Clean Water Act, including each of the programs discussed above, applies only to waters that come within the scope of the Act. The Act asserts jurisdiction over "navigable waters,"[25] which it defines as "waters of the United States, including the territorial seas."[26] Thus, the discharge of a pollutant is covered by the Clean Water Act only if the discharge is into "navigable waters." And states are required to establish and implement water quality standards only for "navigable waters." Bodies of water that are not "navigable waters" are beyond the scope of the Clean Water Act—though they may be regulated by state law or other federal laws.

Use of the term "navigable waters" was based on Congress's historical use of its constitutional power to regulate commerce among the several states, a power that has been applied to navigable waters since the early 1800s.[27] As applied to regulation of discharges to water, the term derives from a permitting provision from the 1899 Refuse Act that made unlawful the discharge of materials without authorization from the Corps of Engineers into "any navigable water of the United States, or into any tributary of any navigable water from which the same shall float or be washed into such navigable water . . . or on the bank of any tributary."[28] Early versions of the Federal Water Pollution Control Act in the mid-twentieth century first used the term "interstate waters" to define jurisdiction,[29] but in 1961 Congress amended the Act to adopt the term "navigable waters" in order to achieve broader coverage.[30] In 1972, Congress defined this term in the Clean Water Act as noted above.

The Supreme Court has observed that in adopting the new definition in 1972, "Congress evidently intended to repudiate limits that had been placed on federal regulation by earlier water pollution control statutes and to exercise its powers under the Commerce Clause to regulate at least some waters that would not be deemed 'navigable' under the classical understanding of that term," such as wetlands that are not navigable in fact nor capable of being made navigable.[31]

So what *are* "navigable waters" for purposes of the Clean Water Act? The Act defines this term to mean "the waters of the United States, including the territorial seas."[32] This, of course, leads to the next question: what are "waters of the United States?" The Act gives no answer. However, the Corps and EPA have enacted matching regulations identifying the various categories of water bodies that they deem to be "waters of the United States," based on their interpretation of the Clean Water Act.[33] These regulations cannot be read in isolation, as their validity and scope remain subject to the many judicial decisions interpreting them. The result is a complex field of law where many water bodies are undoubtedly "waters of the United States," and coverage for other waters is less certain. Hence the need for this *Handbook*.

One broad category of water bodies whose coverage is not in dispute consists of all *traditional navigable waters*—that is, waters that are, were, or could be used in interstate or foreign commerce, including waters that are influenced by the tide.[34] The word "commerce" for these purposes is not limited to the obvious, such as the use of major waterways by large barges hauling freight. Rather, the word is sweeping in its application and can include, for example, historical use of the waters by canoes and frontier craft, use for the commercial movement of logs, and even use by recreational craft. As a result, large numbers of streams and wetlands throughout the United States are properly considered traditional navigable waters, meaning that they are clearly covered by the Clean Water Act. Each local District office of the U.S. Army Corps of Engineers maintains a list of these waters located within the District, providing an excellent starting point for determining whether a particular wetland or stream is covered.[35]

Other undisputed categories of "waters of the United States" include wetlands and streams that cross state lines,[36] as well as wetlands that are adjacent to traditional navigable waters.[37]

Because of recent Supreme Court decisions, however, the scope of the term "waters of the United States" is less clear with respect to wetlands and streams that neither qualify as traditional navigable waters (or, in the case of wetlands, as adjacent to traditional navigable waters) nor cross state lines. To assist the reader in understanding and applying the many legal tests that can be used to demonstrate Clean Water Act coverage over a wetland or stream, Chapter Four of the *Handbook* provides two checklists—one for wetlands and one for streams—that set forth in plain language *all* of the tests.

Determining what wetlands and streams are protected by the Clean Water Act is a critically important task for concerned citizens, property owners, and government officials. Waters that are unprotected by federal law may risk impairment of many important values—including drinking water supplies, beneficial uses of water by property owners, fish and wildlife habitat, and resilience to flood hazards. Recent decisions of the Supreme Court provide the most important benchmarks for making the Clean Water Act jurisdictional determination, as the next chapter explains.

Chapter Two

The Supreme Court on Clean Water Act Jurisdiction

Since the Clean Water Act was enacted in its modern form in 1972, the U.S. Supreme Court has three times addressed the Act's coverage of "waters of the United States." Together, these three cases establish the framework for understanding the scope of federal jurisdiction over wetlands and streams. This chapter provides an overview of the cases known as *Riverside Bayview*, *SWANCC*, and *Rapanos*.

Wetlands Adjacent to Traditional Navigable Waters Are Covered—*Riverside Bayview,* 1985

In 1985, the Supreme Court ruled in *United States v. Riverside Bayview Homes, Inc.*,[38] that the U.S. Army Corps of Engineers had acted reasonably by interpreting the Clean Water Act to require permits for the discharge of fill material into wetlands that were adjacent to "waters of the United States."[39] The Justices agreed, 9 to 0, that their decision was "compelled" by "the language, policies, and history of the Clean Water Act."[40] The rule of *Riverside Bayview* is that wetlands adjacent to traditional navigable waters are covered by the Act. No inquiry beyond the showing of adjacency is required.[41]

The Court recognized in *Riverside Bayview* that while "on a purely linguistic level" classifying "'lands,' wet or otherwise, as 'waters'" might appear unreasonable, a simplistic approach to jurisdictional interpretation does justice "neither to the problems faced by the Corps in defining the scope of its authority under [the Clean Water Act], nor to the realities of the problem of water pollution that [the Act] was intended to combat."[42] In language that echoes through more than twenty years of subsequent Clean Water Act case law, and remains relevant today, the unanimous Court discussed these practical difficulties:

> [T]he Corps must necessarily choose some point at which water ends and land begins. Our common experience tells us that this is often no easy task: the transition from water to solid ground is not necessarily or even typically an abrupt one. Rather, between open waters and dry land may lie shallows, marshes, mudflats, swamps, bogs—in short, a huge array of areas that are not wholly aquatic but nevertheless fall far short of being dry land. Where on this continuum to find the limit of 'waters' is far from obvious.[43]

Given the real-world difficulties in drawing sharp jurisdictional lines under the Clean Water Act, the Court explained that the Corps must be granted latitude on matters of jurisdiction.[44] The Corps' "ecological judgment about the relationship between waters and their adjacent wetlands" is sufficient even for wetlands that are "not the result of flooding or permeation by water having its source in adjacent bodies of open water."[45]

The rule of *Riverside Bayview* ***is that wetlands adjacent to traditional navigable waters are covered by the Clean Water Act.***

The Court concluded that Congress, by defining the jurisdictional term "navigable waters" to mean "waters of the United States," had intended that the historical word "navigable" be "of limited import."[46] Rather, Congress meant to "repudiate limits placed on federal regulation by past water pollution control statutes" and use its constitutional authority to regulate "at least some waters that would not be deemed 'navigable' under the classical understanding of that term."[47]

Use of "Isolated" Ponds by Migratory Birds Does Not Confer Jurisdiction—*SWANCC*, 2001

The Supreme Court next weighed in on Clean Water Act jurisdiction in 2001 with its ruling in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*,[48] commonly known as "*SWANCC*." In a 5 to 4 decision, the Court ruled that Congress had not intended the Clean Water Act to reach "isolated ponds, some only seasonal" that were located wholly within one state, where the only asserted basis for jurisdiction was their use as habitat by migratory birds.[49]

Underlying the result in *SWANCC* was the Court's determination to give some effect to Congress' use of the word "navigable" in the Clean Water Act jurisdictional term "navigable waters."[50] Acknowledging *Riverside Bayview*'s characterization of the word "navigable" as being of "limited import," the Court in *SWANCC* countered that "it is one thing to give a word limited effect and quite another to give it no effect whatever. The term 'navigable' has at least the import of showing us what Congress had in mind as its authority for enacting the [Clean Water Act]: its traditional jurisdiction over waters that were or had been navigable in fact or which could reasonably be so made."[51] The Court concluded that jurisdiction did not extend to "ponds that are not adjacent to open water," declining to take the "next step" to expand *Riverside Bayview*, and explaining that "[i]t was the significant nexus between the wetlands and 'navigable waters' that informed our reading of the [Act]" in that case.[52] The four dissenters contended that the majority's "miserly construction" of the Clean Water Act incorrectly limited the broad jurisdiction that Congress had intended to exercise.[53]

Wetlands and Streams with a Significant Nexus to Traditional Navigable Waters Are Covered—*Rapanos*, 2006

In 2006, the Supreme Court handed down *Rapanos v. United States*,[54] the latest word from the Court on the meaning of "waters of the United States." The question in *Rapanos* was whether the Clean Water Act covers wetlands that do not contain, and are not adjacent to, traditional navigable waters.[55] Specifically, the Court was presented with two factual scenarios that arose out of two different lower court cases:[56] in the first, the wetlands in question *shared a surface water connection* with non-navigable tributaries of traditional navigable waters;[57] and, in the second, the wetlands at issue were *separated by a berm* from non-navigable tributaries of traditional navigable waters.[58] In a sharply divided 4-1-4 ruling, five Justices agreed to overturn the lower court decisions (which had found Clean Water Act jurisdiction over the wetlands) and send the cases back for further consideration.[59] Four dissenting Justices would instead have affirmed the lower court judgments, validating the Corps' assertion of Clean Water Act jurisdiction in both cases.[60]

The five Justices who agreed to reverse the lower courts could not, however, agree on the jurisdictional test that the lower courts would now have to apply. As a result, competing approaches to Clean Water Act jurisdiction emerged in *Rapanos*.

Justice Kennedy, who wrote a solo opinion "concurring in the judgment" to return the cases to the lower courts, would find Clean Water Act jurisdiction over wetlands adjacent to non-navigable tributaries where the wetlands have a "significant nexus" with traditional navigable waters.[61] (This significant nexus test, as framed by Justice Kennedy, is discussed in detail in Chapter Three of the *Handbook*.)

Justice Scalia, on the other hand, writing for a plurality of four justices, would limit Clean Water Act jurisdiction to circumstances where a wetland is both adjacent to, and has a continuous surface connection with, a "relatively permanent" body of water "connected to" traditional interstate navigable waters.[62] In a footnote, Justice Scalia suggests that "relatively permanent" excludes intermittent and ephemeral streams, but may include "seasonal" rivers, as well as those water bodies that might "dry up in extraordinary circumstances, such as drought."[63] The Scalia test rests on two premises. First, that "waters," as defined in the dictionary and hence as presumably intended by Congress, "include only relatively permanent, standing or flowing bodies of water."[64] And, second, that the result in *Riverside Bayview* finding jurisdiction over adjacent wetlands "rested upon the inherent ambiguity" in defining where water ends and abutting, or adjacent, wetlands begin, justifying the *Rapanos* plurality's new requirement for a "continuous surface connection."[65] Justice Kennedy did not agree with either of these two glosses on the Court's prior decisions, finding the plurality's proposed jurisdictional test to be "inconsistent with the Act's text, structure, and purpose" while agreeing that the cases needed to be returned to the lower courts for further consideration under the significant nexus test.[66]

So, which of these two very different approaches to Clean Water Act jurisdiction will apply in future cases—Justice Kennedy's test or Justice Scalia's test?

In the wake of the splintered *Rapanos* ruling, a legal consensus is building around the view that *Rapanos* (in light of the case law on interpreting divided Supreme Court decisions) means that a body of water is covered by the Clean Water Act if it satisfies *either* the Kennedy test *or* the Scalia test.[67]

As a practical matter, Justice Scalia's test (although easy to apply to flowing waters and wetlands with continuous surface connections to those waters) will only rarely result in a finding of jurisdiction over wetlands where Justice Kennedy's test would not.[68] But Justice Kennedy's test will sustain jurisdiction over many waters that the plurality's test fails to reach. Perhaps as a result, some lower courts have simply deemed Justice Kennedy's approach to be the controlling one.[69]

Rapanos ***supports a finding of Clean Water Act coverage when either—***

- *There is a significant nexus between the wetlands in question and navigable waters in the traditional sense; or*
- *A relatively permanent body of water is connected to traditional interstate navigable waters, and a wetland has a continuous surface connection with that water.*

Chapter Three

Using the Significant Nexus Test to Find Clean Water Act Coverage for Wetlands and Streams

This chapter describes the "significant nexus" legal test that, following *Rapanos v. United States*, must now be used in many instances to determine whether a particular wetland or stream is covered by the Act. Note that although *Rapanos* was concerned only with the question of whether certain wetlands (those adjacent to non-navigable tributaries) are within the coverage of the Clean Water Act, both the language and reasoning of Justice Kennedy's opinion suggest that Clean Water Act jurisdiction over non-navigable streams can also be determined by using the significant nexus test.[70]

The Significant Nexus Test

When no other jurisdictional test applies (see Chapter Four of this *Handbook*), whether a non-navigable wetland or stream comes within the scope of the Clean Water Act "depends upon the existence of a significant nexus" between the wetland or stream in question and "navigable waters in the traditional sense."[71] Nexus is a word that may be unfamiliar to non-lawyers. Webster's New International Dictionary (3d. ed. 1967) defines it as "connection, interconnection, tie, or link" or as "a connected group or series." It has the same root as the English word "connection."

Though it is a relatively new feature of Clean Water Act law, some form of significant nexus test has often been used in other legal contexts where a court must decide whether a particular relationship—often one of a complex factual nature—rises to the level of legal importance.[72] The test is *not* a two-part test. Rather, "significant nexus" is simply a way of referring to a connection that is legally meaningful. In other words, the relevant relationship between the wetland or stream in question and the traditionally navigable waters cannot be "speculative or insubstantial."[73]

Determining that a wetland has a significant nexus with traditional navigable waters is another way of finding that it is an "integral part of the aquatic environment," and hence under federal jurisdiction as "waters of the United States."[74]

Justice Kennedy describes the test like this: "The required nexus must be assessed in terms of the statute's goals and purposes . . . 'to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.'"[75] So, rather than establishing a simple but rigid rule that would bring certain categories of waters within federal jurisdiction and exclude others, this flexible, fact-specific test allows federal jurisdiction under the Clean Water Act to attach to *any* non-navigable wetland or stream based on its *effects on traditional navigable waters*.

A significant nexus exists where a wetland, either alone or in combination with similarly situated lands in the region, significantly affects the chemical, physical, and biological integrity of waters more readily understood as navigable.

The Congressional objectives to restore and maintain the "chemical, physical, biological integrity" of the Nation's waters are not narrow at all. They don't require demonstration of adverse effects on human health; and they don't require demonstration of degradation of waters in order to assert jurisdiction.[76] The objectives were included by Congress in the 1972 Clean Water Act specifically to maintain the natural structure and functions of ecosystems.[77] Indeed, Justice Kennedy states that a significant nexus exists where a wetland, "either alone or in combination with similarly situated lands in the region," significantly affects the chemical, physical, and biological integrity of waters more readily understood as navigable.[78]

In the course of his opinion, Justice Kennedy identifies various functions and characteristics of wetlands and streams that can help to demonstrate significant effects on downstream water quality. Especially critical are the wetland functions of pollutant trapping and filtering, flood control, and runoff storage.[79] He also notes the importance of the "ecological interconnection" between wetlands and adjacent navigable waters, without expressly defining the term.[80] He indicates that the "volume of flow (either annually or on average)," as well as the "regularity" of flow, for tributaries "may be important" in assessing significant nexus.[81] He suggests that many specific types of evidence, presented in the *Rapanos* case in the trial court, could contribute to a significant nexus determination for a wetland. These include that the wetland provides habitat, sediment trapping, nutrient recycling, flood peak diminution, and reduction of flow water augmentation, particularly if these can be "supplemented by further evidence about the significance of the tributaries to which the wetlands are connected."[82] The presence of surface water connections between wetlands and tributaries of traditional navigable waters also helps to support a significant nexus finding.[83]

So, although Justice Kennedy was unwilling in *Rapanos* to presume the existence of significant effects based solely on a wetland's adjacency and surface connection to non-navigable tributaries, the various types of evidence that he identifies as relevant to the nexus determination illustrate the wide range of factors that *can* be used to demonstrate significant effects.

Is a Hydrologic Connection Required?

A hydrologic connection between wetlands or streams and traditional navigable waters can help to serve as the basis for a significant nexus sufficient to bring these waters within the protection of the Clean Water Act. Justice Kennedy notes that such a connection can suffice if there is "some measure of the significance of the non-navigable waters for downstream water quality" that demonstrates that the connection is not "too insubstantial."[84]

However, wetlands and streams *need not necessarily* have a hydrologic connection with traditional navigable waters to significantly affect them. Sometimes it is the "absence of hydrologic connection" that helps to demonstrate the positive effects of a non-navigable aquatic resource on navigable waters.[85] For example, as discussed above, wetlands filter pollutants, hold back flood waters, and store runoff water. These wetland

Jurisdiction over the prairie pothole wetland (bottom left) depends upon demonstrating a significant nexus to the traditionally navigable waterbody (upper right). Photo by Calvin B. DeWitt.

functions protect traditional navigable waters in the same aquatic system, even though the wetlands may have no interchange of waters with the traditional navigable waters.[86] Indeed, "it may be the absence of an interchange of waters prior to the dredge and fill activity that makes protection of the wetlands critical to the statutory scheme."[87]

What Are Similarly Situated Lands?

In the case of wetlands, the significant nexus test does not require that each wetland be assessed standing alone—that is, whether a wetland is covered by the Clean Water Act is not necessarily limited to the effects of that wetland individually on the quality of traditional navigable waters. A significant nexus also exists where the wetland, considered "in combination with similarly situated lands in the region," significantly affects the chemical, physical, and biological integrity of traditional navigable waters.[88]

Justice Kennedy's opinion does not define the scope of the "region" that may be considered with respect to assessing similarly situated lands. However, his repeated use in *Rapanos* of the term "aquatic system"[89] suggests that "region" is to be defined flexibly, based on local circumstances, with reference to the effects that a wetland provides within its watershed.[90]

The principle here can be illustrated by the example of "prairie potholes," which are depressional wetlands. While a small parcel of land containing prairie potholes, standing alone, may not significantly affect the quality of traditional navigable waters—and, in any event, it may be difficult to document the effects of a single prairie pothole—similarly situated lands (that is, other prairie potholes) in the region, considered in combination, will almost certainly have significant effects on the quality of traditional navigable waters within that aquatic system.[91]

Moreover, when an adequate nexus is established for a particular wetland, Justice Kennedy notes, "it may be permissible, as a matter of administrative convenience or necessity, to presume covered status for other comparable wetlands in the region."[92]

Justice Kennedy's discussion in *Rapanos* of combining, or "aggregating," similarly situated lands was based solely on wetlands.[93] Thus, it remains unclear whether a stream can be aggregated with similarly situated streams under the same rationale. However, his reasoning, focusing on the integrity of the traditional navigable waters, applies with equal force to streams, suggesting that it may also be possible to aggregate them under the significant nexus test.

The Significant Nexus Test in the Courts, Post-*Rapanos*

Lower federal courts can take years to interpret and give meaningful shape to a new legal precedent that first appears in a Supreme Court decision. Although the concept of a significant nexus in the Clean Water Act context predates the *Rapanos* decision,[94] Justice Kennedy gave the test its present form, and it remains a new feature on the Clean Water Act legal landscape. As a result, the lower federal courts are still in an early stage of applying the test to different categories of wetlands and streams.[95]

As courts continue to hand down decisions interpreting the significant nexus test in various contexts, how the test is to be applied may become clearer—or, courts may disagree on how the test is applied in one or more situations, potentially creating the possibility of further review by the Supreme Court. Regardless, a growing body of case law will add to the principles set forth in this *Handbook* and inform how the significant nexus test should be understood and applied in the future.

Is There an Easier Way to Demonstrate Clean Water Act Coverage?

In many instances, applying the significant nexus test to determine Clean Water Act coverage for a wetland or stream will prove labor-intensive, requiring a consideration of wetland and stream functions and some understanding of how the particular wetland or stream impacts downstream waters. And sometimes the significant nexus test may be the only means available to show Clean Water Act coverage—for example, when a wetland is adjacent to a small, intermittent stream.

However, it is critical to remember that applying the significant nexus test is only one among various ways to demonstrate Clean Water Act coverage for wetlands and streams. The reader should always consider whether a simpler basis for showing jurisdiction may exist—for example, is the wetland itself a traditional navigable water? Is the stream continuously flowing or seasonal? The checklists in the next chapter lay out all of the options.

Chapter Four

Is a Particular Wetland or Stream Covered by the Clean Water Act?

The reach of federal jurisdiction under the Clean Water Act involves the interplay of many factors, including the text and history of the Act, rulings of the U.S. Supreme Court and the lower federal courts, and actions taken by the Corps and EPA. Taking these variables into account, this chapter presents checklists containing all of the tests that can be used under current law to determine whether a particular wetland or stream is covered by the Clean Water Act. This chapter also surveys the additional sources of scientific, technical, and legal information that can be used to establish federal jurisdiction over a wetland or stream.

Checklists for Finding Clean Water Act Jurisdiction

A wetland or stream can be subject to Clean Water Act jurisdiction for one or more reasons. The checklists on the next two pages—one for wetlands, and one for streams—contain questions, each corresponding to a legal rule or test for Clean Water Act coverage. If the answer to *any one of these questions* with respect to a particular wetland or stream is "yes," the law considers that wetland or stream to come within the category of "waters of the United States"—and, therefore, to be covered by the Clean Water Act. Be sure to review the table of Explanatory Notes, as it contains important information expanding on both checklists.

Also, it is critical to remember that these checklists—and the rest of the *Handbook*—reflect the law only as it stands at the time of publication. New federal court decisions, as well as potential new regulations and administrative determinations issued by the Corps or EPA, will continue to shape the law of Clean Water Act jurisdiction. And now that the Corps and EPA have issued a joint guidance document, it is possible that they will move on to new jurisdictional regulations, at the invitation of the Supreme Court in *Rapanos*.[96] Given this high likelihood of further legal developments, the checklists on the pages that follow must be read in light of any such changes. Especially important will be any new Agency regulations that provide Clean Water Act coverage for designated categories of waters, an action which could be used to easily demonstrate jurisdiction over particular classes of wetlands and streams without the need to apply more cumbersome legal tests.

Table 1. Wetlands Checklist

*A "yes" response to **any** question indicates Clean Water Act (CWA) coverage for the wetland.*
Be sure to consult the Explanatory Notes on page 27.

	QUESTION	LEGAL RULE OR TEST
1	Does the wetland *cross state lines*?[97]	Interstate Waters
2	Is the wetland *a traditional navigable water*? (A body of water that is currently used, or was used in the past, or is susceptible to use in the future, in interstate or foreign commerce. Includes all waters that are subject to the ebb and flow of the tide.)[98]	Traditional Navigable Waters
3	Is the wetland *adjacent to traditional navigable waters*?[99]	Adjacency Rule
4	Does the wetland, either *alone or in combination with similarly situated lands in the region, significantly affect* the— (A) *chemical integrity*, or (B) *physical integrity*, or (C) *biological integrity* —of any *traditional navigable waters*?[100]	Significant Nexus Test
5	Is the wetland *adjacent to*—and does it have a *continuous surface connection with*—a *relatively permanent, standing or continuously flowing body of water* that is *connected to traditional interstate navigable waters*?[101]	Adjacency + Continuous Surface Connection Test
6	Could the *degradation or destruction* of the wetland *affect interstate or foreign commerce*? Includes any wetland— (A) that is or could be *used by interstate or foreign travelers* for recreational or other purposes; or (B) from which *fish or shellfish are or could be taken and sold in interstate or foreign commerce*; or (C) that is or could be *used for industrial purpose by industries in interstate commerce*?[102]	Affecting Interstate or Foreign Commerce Test

Table 2. Streams Checklist

A "yes" response to ***any*** *question indicates Clean Water Act (CWA) coverage for the stream.*
Be sure to consult the Explanatory Notes on page 27.

	QUESTION	LEGAL RULE OR TEST
1	Does the stream *cross state lines*?[103]	Interstate Waters
2	Is the stream *a traditional navigable water*? (A body of water that is currently used, or was used in the past, or is susceptible to use in the future, in interstate or foreign commerce. Includes all waters that are subject to the ebb and flow of the tide.)[104]	Traditional Navigable Waters
3	Is the stream a *continuously flowing* or *relatively permanent body of water* that *flows into traditional interstate navigable waters*?[105]	Continuously Flowing/ Relatively Permanent Test
4	Does the stream (whether continuously flowing or not) *significantly affect* the— (A) *chemical integrity*, or (B) *physical integrity*, or (C) *biological integrity* —of any *traditional navigable waters*?[106]	Significant Nexus Test
5	Could the *degradation or destruction* of the stream *affect interstate or foreign commerce*? Includes any stream— (A) that is or could be *used by interstate or foreign travelers* for recreational or other purposes; or (B) from which *fish or shellfish are or could be taken and sold in interstate or foreign commerce*; or (C) that is or could be *used for industrial purpose by industries in interstate commerce*?[107]	Affecting Interstate or Foreign Commerce Test

Explanatory Notes to Tables 1 and 2

Adjacency Rule as Applied to Non-Navigable Tributaries

A wetland is jurisdictional based solely on its adjacency to a non-navigable tributary if *either* the answer to Question No. 5 on the Wetlands Checklist (Table 1) is "yes," *or* if the wetland is adjacent to a tributary coming within a category of non-navigable tributaries that the Corps has identified as significant.[108]

Relatively Permanent Bodies of Water

Relatively permanent bodies of water include some rivers characterized as "seasonal" that have continuous flow during some months of the year but no flow during dry months, as well as waters that might dry up in extraordinary circumstances, such as drought.[109]

Man-Made Dikes or Barriers, Natural River Berms, and Beach Dunes

The presence of a man-made or natural barrier between a wetland and traditional navigable waters (or their tributaries) is not a bar to Clean Water Act jurisdiction.[110]

Prior Converted Cropland

The Clean Water Act does not cover prior converted cropland, an issue that arises most often in the Section 404 program.[111]

Use of Aggregation for Streams

Under current law, it is uncertain whether the significant nexus test, as applied to a stream, allows for the stream to be combined with similarly situated lands (or streams) in the region for purposes of assessing its effects—as may be done with wetlands.[112]

Impoundments

Impoundments of waters that are "waters of the United States" are covered by the Clean Water Act.[113]

Physical Boundaries of Jurisdiction

Corps regulations fix the precise limits of its jurisdiction over both *tidal waters* and *non-tidal waters*, respectively.[114]

Determining the answer to any of the first three questions on either checklist for a particular wetland or stream will often be a straightforward task. In many instances, this will require little more than a physical inspection of the wetland or stream and its immediate surroundings, or a review of maps or aerial photographs of the area. In contrast, coming up with answers to the remaining questions on each checklist (when necessary) may be much more involved, requiring consultation of the scientific literature surveyed in Chapter Five of this *Handbook*, and, potentially, looking beyond this *Handbook* to other scientific, technical, and legal resources. These resources are briefly introduced in the next two sections.

It is also important to note that the validity of the "Affecting Interstate or Foreign Commerce Test," which appears on both checklists, has been called into doubt by the reasoning contained in recent Supreme Court decisions.[115] Although the Supreme Court has never ruled on the test, and so it technically remains good law, the prudent approach would be to identify and rely on other grounds for Clean Water Act jurisdiction for a wetland or stream, if at all possible.

This creek, not itself navigable, is continuously flowing and connects to a Wisconsin lake popular for fishing and boating. Photo by Joy Zedler.

Beyond the Handbook: Scientific and Technical Resources

From a scientific perspective, the most important aspect of assessing jurisdiction over a wetland or stream can be understanding the functions that it performs—and more specifically, the benefits that a specific, local wetland or stream provides for traditional navigable waters within the watershed. There are many methodologies and procedures for making these assessments, which vary in their rigor and cost. A prudent (but possibly expensive) option is to retain an environmental consultant to report on these functions and impacts for the specific wetland or stream at issue. Federal and state regulatory offices often have the benefit of in-house scientific expertise; watershed groups and property owners may have to be more creative in locating free or affordable sources of scientific and technical know-how. One option is to consider seeking free assistance from a local university professor, a PhD candidate, or other graduate-level students in environmental sciences.

Additionally, scientific and technical documents can serve as important sources of information—though their effective use requires carefully targeting the scientific literature based on the nature and location of the wetland or stream under consideration. Also, these resources typically presume that the reader has a technical background. Assistance from someone expert in the field will prove helpful.

Specifically, the Corps and EPA have indicated in a recently issued guidance document that "[m]aps, aerial photography, soil surveys, watershed studies, local development plans, literature citations, and references from studies pertinent to the parameters being reviewed are examples of information that will assist staff in completing accurate jurisdictional determinations."[116]

Chapter Five of the *Handbook* provides an introduction to and broad overview of the relevant science that can assist in finding a significant nexus for a wetland or stream. The following list illustrates the types of scientific and technical resources that may be consulted (though this list is not intended to be exhaustive):

- Textbooks and treatises[117]
- Delineation manuals for wetlands or streams[118]
- Scientific journals[119]

- Assessment methodologies for wetlands or streams[120]

- Technical reports issued by federal and state agencies[121]

- Watershed plans and assessments[122]

- Wetland and stream databases[123]

- Publications, online resources, and research reports produced by state and local agencies, and by organizations such as The Nature Conservancy (TNC), the Association of State Wetland Managers (ASWM), and the National Academy of Sciences (NAS)[124]

As noted above, *Handbook* users may find valuable local or regional information in watershed plans prepared for various purposes under state and federal law, or on a voluntary basis. Hundreds of watershed plans have been prepared by local governments, watershed organizations, state agencies, and coalitions of public and private entities for a variety of purposes, including improving water quality, restoring lands and waters, or conducting compensatory mitigation for wetlands or habitat loss. Many of these plans contain data on waters within the watershed, including streams and wetlands, and contain scientific information on regional hydrology, sources of pollution, species or habitats of concern, and various other data potentially useful for site-specific evaluations on aquatic resource functions.

Some places to begin a search for watershed planning documents and data are with a state environmental or natural resources agency, county planning office, metropolitan planning organization, Council of Governments, local soil conservation district, or Natural Resources Conservation Service (NRCS) office. These entities often will know whether a watershed plan has been prepared. Another source of watershed information is EPA's "Surf your Watershed," a clickable national map that links to data on watersheds throughout the United States.[125]

Beyond the Handbook: Legal Resources

From a legal perspective, the most authoritative sources for understanding Clean Water Act jurisdiction are the text of the Act,[126] the Supreme Court decisions interpreting the Act, and the Agency regulations that implement it.[127] Also to be considered are lower federal court rulings and actions taken by the Corps and EPA—specifically, regulations, guidance documents,[128] and administrative opinions that deal with Clean Water Act jurisdictional issues.[129]

In addition, although this *Handbook* summarizes the current legal framework governing Clean Water Act coverage for wetlands and streams, it is critical to understand that the controlling law and rules can vary slightly—or even significantly—based on precisely where in the United States a wetland or stream is located. This is because not every legal question concerning Clean Water Act jurisdiction makes it all the way to the Supreme Court. Rather, legal rulings arising out of each of the 13 U.S. Courts of Appeals become, effectively, the "last word" on particular legal issues—at least until the Supreme Court decides to take them up, or Congress changes the law. These lower court determinations vary by region, or "circuit," with questions of Clean Water Act jurisdiction in a particular state being governed by the rulings of the Court of Appeals for the circuit in which the state is located. Appendix Two identifies, by Circuit and state, relevant federal judicial decisions that had been issued as of press time for the *Handbook*.

Of course, most disputes over Clean Water Act jurisdiction never reach the federal courts at all, and are instead resolved by the Corps or EPA at the agency level. As a result, it will in some instances be useful to contact local Corps and EPA offices directly to inquire about possible regional or local variations with respect to Clean Water Act jurisdiction. The Corps has eight U.S. Divisions (which follow watershed boundaries), further subdivided into 38 Districts, with offices located throughout the United States.[130] Similarly, EPA has ten Regions and various local offices nationwide.[131] For additional information on which major Clean Water Act regulatory programs are overseen by these agencies, refer to Chapter One of this *Handbook*.

Although a discussion of state law is beyond the scope of this *Handbook*, it is important to remember that states can potentially play a significant role in the protection of wetlands and streams. In up to one third of states, state law may confer regulatory jurisdiction over *some* wetlands and streams, even in the face of uncertainty about federal coverage.[132] Most states have agencies responsible for environmental issues such as pollution control, water management, and natural resources. Contacting the local office of one of these agencies may be a good first step to determining whether the law in a particular state may be used to protect a specific wetland or stream.

Of course, the most effective way to understand and apply legal resources is with the assistance of competent legal counsel. Quality legal services can be very expensive. Should a non-governmental *Handbook* user determine that a lawyer is required, one option is to contact a local law school, many of which have environmental legal clinics that could potentially provide free legal advice . Another possible approach is to contact local lawyers with expertise in environmental law and seek free (or *pro bono*) legal assistance. Sometimes an initial consultation will be sufficient to determine whether legal assistance is needed and on what terms it may be available.

Chapter Five

Using Science to Establish a Significant Nexus

Where the *Handbook* user seeks to establish Clean Water Act coverage over a wetland or stream by way of the significant nexus test discussed in Chapter Three, a site-specific evaluation must be supported by scientific evidence for the effects the wetland or stream in question has on the chemical, physical, or biological integrity of traditional navigable waters. (It is important to remember, however, that many wetlands and streams fall within federal jurisdiction through one or more of the other tests presented in this *Handbook* and will not require the finding of a significant nexus.)

This chapter identifies the kinds of accepted scientific evidence that are available to support a significant nexus finding. These determinations require a site-specific evaluation; in making an individual jurisdictional determination, scientific evidence that specifically pertains to the water and/or region in question will provide the strongest support for a jurisdictional finding. However, scientific literature addressing similar resource types—even if pertaining to other geographic regions, such as many of the studies discussed below—will also be helpful. This chapter organizes the science by water resource type for easier reference.

Water Resource Types

Scientists have developed several definitions and systems of classification for water resources to assist in understanding their functions. In the United States, definitions and terminology have been resolved to some extent by efforts within the scientific, regulatory, and management communities to define and characterize water resources for purposes of the Clean Water Act.[133]

Most wetland classification systems recognize the three categories of distinguishing features for these water resources—hydrology, soils, and vegetation. The National Research Council, an arm of the National Academy of Sciences, notes that the latter "diagnostic" features, hydric soils and hydrophytic vegetation, "will be present except where specific physiochemical, biotic, or anthropogenic factors have removed them or prevented their development."[134]

Although stream classification has received less attention from the scientific community, terms and definitions commonly used by scientists, managers, and the conservation community refer to stream order (where the stream lies within the network extending from headwaters to the seas), patterns of temporal flow (seasonal and other variation in flow), and water source (spring, seep, meltwater, wetland).[135]

For this review of the science available to support findings of a significant nexus, we have organized categories of wetlands based on Mitsch and Gosselink 3d. ed. (2000), the leading wetlands scientific textbook.[136] Seven major types of wetlands are organized into two groups: inland (freshwater marsh, peatland, freshwater swamp, and riparian ecosystem) and coastal (tidal saltwater marsh, tidal freshwater marsh, and mangrove). Although coastal wetlands will almost always fall within federal jurisdiction without requiring a finding of significant nexus, we address them in our review for completeness. These wetland categories encompass generally recognizable ecosystems and cover the majority of wetlands in North America.[137] Scientific literature, management strategies, and regulations are often organized into analogous categories.[138] The stream categories are derived from a collection of authoritative scientific articles and regulatory guidance documents that reference common definitions.[139]

Categories of Water Resources

INLAND WETLANDS	COASTAL WETLANDS	STREAMS
Freshwater marsh	Tidal saltwater marsh	Ephemeral stream
Peatland	Tidal freshwater marsh	Intermittent stream
Freshwater swamp	Mangrove	Perennial stream or river
Riparian ecosystem		

Scientific Evidence for Significant Nexus

If you are dealing with a wetland or stream that does not meet other tests of Clean Water Act jurisdiction (that is, the waterbody in question is not itself a traditional navigable water, adjacent or interstate, or does not flow continuously into a traditional navigable water), you will need to determine whether it satisfies the significant nexus test. In other words, you will need to determine whether the wetland or stream in question significantly affects the chemical, physical, or biological integrity of associated traditional navigable waters. Science is the place to begin.

Inland Wetlands

Although some inland wetlands clearly demonstrate adjacency and/or continuous surface connections to traditional navigable waters, or are themselves traditional navigable waters, many are likely to be the focus of controversies that arise in the wake of the Supreme Court's recent articulation of the significant nexus test. Scientific literature identifies a substantial number of connections between these waters and traditional navigable waters. The main areas of linkage include water purification, regulation of flow, biological productivity, flood attenuation, and maintenance of temperature, among others.

Freshwater Marsh. Freshwater marshes comprise a diverse set of wetland types. They are primarily characterized as non-tidal, freshwater systems dominated by grasses, sedges, and other emergent herbaceous hydrophytic vegetation. These waters range from the prairie potholes of the Midwest to the playas of the Southwest, the marshes of the Great Lakes to the tundra of Alaska, and the Everglades system of Florida to the vernal pools of the West.[140] Wetland terms/types that may be associated with this water resource category include: *prairie pothole*, *playa*, *depressional wetland*, *fringe wetland*, *riverine marsh*, *Great Lakes marsh*, *oxbow*, *wet meadow*, and *vernal pool*.

Chemical Connections. Depressional wetlands such as playas, prairie potholes, and vernal pools improve water quality by removing sediment and nutrients within watersheds.[141] Several studies, conducted across the country, illustrate the role of freshwater marshes as sinks for nutrients and sediment.[142] For example, studies conducted in freshwater marshes adjacent to Lake Erie demonstrate that these wetlands effectively reduce nutrient loading into the lake.[143] Research has also shown prairie pothole wetlands to provide important nitrogen sinks, reducing nitrogen loads by as much as 80 percent within studied watersheds.[144] Furthermore, drainage or ditching in previously unaltered prairie pothole wetlands has high potential for discharge of nutrients to downstream systems.[145]

Physical Connections. Depressional wetlands perform important flow maintenance functions within the watershed, including retaining inflow and temporarily storing flood waters.[146] For example, vernal pools help regulate the water supply of hydrologically-connected navigable waters by transferring seepage from surface waters, where it would otherwise be lost to evapotranspiration, to groundwaters that may feed permanent springs or riparian zones.[147] The Delmarva pothole wetlands, abundant along the Maryland-Delaware border, provide temporary storage of surface water, helping to reduce local flooding, and serve as groundwater recharge and discharge areas. Groundwater recharge contributes to stream baseflows that are vital for sustaining aquatic biota in hydrologically-connected waters.[148]

Biological Connections. In many instances, freshwater marshes provide the only natural habitat within a watershed, particularly when adjacent lands have been largely converted for agricultural or other purposes. In addition, regardless of the adjacent landscape, these wetlands may provide breeding grounds for species unable to successfully reproduce in faster-moving water and that move between the marsh and other waters throughout their life span. Thus, these wetlands' role in maintaining populations of invertebrates, waterfowl, fish, and amphibians is critical.[149] For example, freshwater marshes often serve as nurseries and spawning grounds for fish species. Field research in a Manitoba freshwater marsh showed the northern pike (*Esox lucius*) to use the wetlands for nursery habitat, with emigration of the fish to other waters during the autumn season.[150] A study conducted in an Ontario Great Lakes marsh complex showed several fish species' use of the wetlands for spawning and nursery habitat, demonstrating the importance of these resources for fish reproduction in Lake Ontario.[151]

Peatlands. Peatlands refer mostly to bogs and fens—inland, non-forested, freshwater wetlands that occur commonly in boreal zones. Topographic, chemical, and hydrological characteristics vary, but these peat-producing systems generally have been shown to provide important sinks for nutrients. Peat within these systems stores nutrients below the rooting zone, making it unavailable to plants. In addition, biogeochemical cycling is slow due to colder temperatures, nutrient deficiency in litter, and waterlogging of substrates.[152] Wetland terms/types that may be associated with this water resource category include: *bog*, *fen*, *pocosin*, *shrub-carr*, *shrub swamp*, *moor*, and *mire*.

Chemical Connections. Positioned at the interface between groundwater and surface water, fens provide the primary buffer between downstream waters and nutrients and other pollutants derived from upland areas. For example, fen soils promote high rates of nitrogen removal, reducing nitrate derived from surrounding agricultural lands, grazing animals, or atmospheric deposition, before it reaches downstream rivers and lakes.[153] Groundwater-fed wetlands, including peatlands, that are associated with springs remove significant amounts of nitrate during the summer months, suggesting that alterations to these wetlands would result in the loss of nutrient retention capacity and the export of nutrients to downstream waters and wetlands.[154] A study conducted in one Minnesota watershed found peatlands to retain between 30 and 60 percent of annual nutrient inputs.[155]

Physical Connections. Peatlands can also perform important flow maintenance functions within the watershed, including storing and conserving groundwater, receiving surface water runoff, and maintaining flow.[156] A study of Minnesota peatlands showed that bogs played important flow maintenance functions within the watershed specifically because the hydric soils surrounding these wetlands play an important role in groundwater recharge.[157]

Fens also moderate the temperature of waters flowing to streams and lakes. In general, fen waters and soils are cooler in the summer and warmer in the winter than air temperatures and other surface waters in the region; thus, fens buffer surface-water temperatures by supplying water that is cooler in summer and warmer in winter than other surface waters.[158]

Biological Connections. By performing important functions such as water purification, regulation of flow, and maintenance of water temperature,[159] peatlands indirectly maintain the habitat conditions for biota residing in other aquatic systems within the watershed.

Freshwater Swamp. Freshwater swamps refer to forested, inland, non-tidal, non-riparian wetlands. Found throughout the United States, these wetlands include the cypress swamps of the South, the red maple swamps of the Northeast, and the cedar swamps of the east and Gulf coasts.[160]

Chemical Connections. Freshwater swamps have been shown to absorb both sediments and nutrients, particularly phosphorous, and are often studied for their role in wastewater management.[161] For example, scientific research on depressional wetlands in Florida shows that almost all organic matter and nutrients from wastewater inflows are removed or stored within the substrate of the wetlands, although nutrients may be exported downstream when the wetlands' storage capacity is exceeded.[162] Similar studies conducted in other regions of the country also show a significant reduction in nutrients and sediment in waters downstream to freshwater swamps.[163]

Physical Connections. Freshwater swamps are subject to flooding that results either directly from precipitation events or surface inflow from upland runoff and/or overflow of flooding streams, rivers, and lakes. In some cases, inflow from groundwater may also contribute. Hydroperiods for freshwater swamps widely vary depending on a variety of factors, including geomorphic position in the watershed, evapotranspiration rates, and seepage, among other distinguishing features.[164] These hydrologic features may result in various benefits for downstream waters (depending on individual hydrologic processes), including: reduction of downstream peak discharge and volume; recharge of aquifers; and maintenance of seasonal flows, baseflow for streams, and groundwater supplies.[165] A study of Florida cypress swamps found that a removal of 80 percent of the wetlands would result in a 45 percent reduction in associated groundwater supplies.[166] Groundwater supplies may play an important role in maintenance of downstream flow and/or drinking water supply. Forested wetlands overlying permeable soil may release up to 100,000 gallons/acre/day into groundwater.[167]

Biological Connections. Field research in Carolina bays shows that these depressional wetlands, which are located throughout the Atlantic Coastal Plain from Florida to Virginia and occur most often in the Carolinas, are critical to the survival of multiple species of snakes and amphibians that reside in surrounding uplands and/or larger basins.[168] For example, two species of snakes within the genus *Farnancia* live in Carolina bays as juveniles, where they feed primarily on larval salamanders, and as adults in river swamps and streams considered to be waters of the United States.[169]

Riparian wetlands. Like freshwater swamps, riparian wetlands are forested, inland, non-tidal wetlands, but are distinguished by their location in the floodplain along river and stream corridors. In the United States, riparian wetlands range from the bottomland hardwood forests of the Southeast to the riparian ecosystems lining the river and stream corridors of the arid Southwest. These wetlands are linear and provide an important link between stream and river systems and adjacent uplands. Indeed, flooding from adjacent waters contributes to these wetlands' regulation of nutrients and organic matter from adjacent uplands. Riparian wetlands also are extremely productive and diverse ecosystems that provide important habitat for wildlife, particularly in the arid West where they may support the only dense vegetation within miles.[170] Wetland terms that may be associated with this water resource category include: *bottomland hardwood swamp*, *bottomland hardwood forest*, *floodplain forest*, *riparian buffer*, *mesic riparian ecosystem*, *bosque*, *streambank vegetation*, and *southern deepwater swamp*.

Chemical Connections. Riparian wetlands play an important role as a sink for nutrient runoff from adjacent uplands and as a nutrient transformer for water flow downstream.[171] Riparian and floodplain wetlands also typically remove sediment from the surrounding watershed.[172] For example, riparian wetlands in the Mississippi River Basin remove nitrates that cause eutrophication in waters such as the Gulf of Mexico. Resulting algal blooms and hypoxia are demonstrated to have severe effects on Gulf aquatic life.[173] In South Carolina, bottomland hardwood swamps were shown to remove a quantity of pollutants from watershed water resources equivalent to that which would be removed by a $5 million water treatment plant.[174]

Physical Connections. Hydrologic cycles for riparian systems vary widely and are determined by many factors, including: climate (*e.g.*, variations are great between the eastern and western parts of the United States); watershed characteristics (*e.g*, size and slope of the watershed, elevation); geomorphic characteristics (*e.g*, zones of erosion or sediment storage, transport, or deposition); and riparian vegetation.[175] Hydrogeomorphic features may result in various benefits for downstream waters (depending on individual processes within reaches of the system), including maintenance of seasonal flows, baseflows, and surface water temperatures and reduction of downstream peak discharge and volume.[176] For example, one study shows that loss of floodplain forested wetlands and confinement by levees has reduced the floodwater storage capacity of the Mississippi River by 80 percent.[177]

Biological Connections. Because riparian wetlands represent the transition between terrestrial and aquatic systems, the diversity and abundance of species is quite high in these systems. Indeed, multiple species of both flora and fauna rely on this valuable habitat.[178] For eastern riparian systems, several scientific studies illustrate the dependence of fisheries on these wetlands. Fish spawn and feed within the floodplains of riparian systems during flood events;[179] in addition, productivity in large, lowland rivers depends on the exchange of nutrients with floodplains.[180] In the western United States and Canada, healthy salmon habitat depends on intact riparian wetlands.[181]

In addition, watersheds dominated by riparian wetlands export large amounts of carbon critical to downstream marine and lacustrine ecosystems.[182] Particulate carbon is important for shredders and filter-feeders of these systems,[183] while dissolved carbon is important for the microorganisms of these systems.[184]

Coastal Wetlands

Jurisdictional issues are unlikely to arise with coastal wetlands. Federal jurisdiction over coastal waters is among the oldest and best recognized forms of regulatory jurisdiction.[185] However, we briefly discuss coastal wetlands' chemical, physical, and biological connections to traditional navigable waters below.

Tidal Salt Marshes. Tidal salt marshes form along coastlines in temperate zones wherever the accumulation of sediments is equal to or greater than the rate of land subsidence and where there is adequate protection from destructive waves and storms. These resources are characterized by tidal flooding frequency and duration, soil salinity and permeability, and nutrient availability, and are dominated by salt-tolerant grasses and rushes. Tidal salt marshes are extremely complex and productive ecosystems that export organic energy to adjacent coastal waters through currents and species movement, among other mechanisms, and provide sinks for nutrients.[186] In the United States, salt marshes are most prevalent on the East Coast and Gulf Coast (*e.g.*, the Chesapeake Bay region and Mississippi Delta region), but are also found in narrow belts along the West Coast and the coastline of Alaska.[187] Wetland terms that may be associated with this water resource category include: *saltwater marsh*, *brackish marsh*, and *estuarine emergent wetland*.

Chemical Connections. Nutrient dynamics can be extremely complicated and vary widely among tidal marsh systems. However, salt marshes have been shown to provide important sources and sinks for nutrients, particularly nitrogen. Nutrients and other organic matter, such as detritus from marsh surfaces, "outwell" from these highly productive ecosystems into adjacent estuaries and ocean waters, accounting for a significant portion of phytoplankton production in these waters.[188] Some salt marshes may also provide a sink for nutrients carried in through precipitation, surface water, groundwater, and tidal exchange. Nitrogen fixation and phosphorous- and nitrogen-rich organic matter that accumulates as peat provide storage of these nutrients.[189] Phosphorous has also been shown to accumulate in high concentrations in the soils of tidal salt marshes, without limiting the growth of their resident plant species.[190]

Physical Connections. The ebb and flow of tides over mudflats form "tidal creeks," which provide for energy transfer between the marsh itself and adjacent traditional navigable coastal waters. Tidal creeks, which flow in both directions, maintain a salinity level similar to that of adjacent coastal waters. They vary in water depth as water fluctuates, and differences in depth, duration of inundation, and salinity form many "zones" of vegetation and many aquatic food chains that overlap with those of adjacent navigable waters. Tidal salt marshes also accumulate sediment from river silt, organic productivity, or marine deposits.[191]

Biological Connections. Tidal salt marshes have extremely high rates of primary productivity and have been shown by a number of scientific studies to support the spawning and feeding habitats of several marine organisms, many of which are commercially important.[192] Many migratory fish species feed along the edge of tidal salt marshes or move into the marsh to feed during high tides.[193] Other marine- and estuarine-dependent migratory species use the marsh for food or shelter intermittently, spawning offshore, migrating into the marsh as juveniles in search of food and shelter, and returning back to the estuary or offshore as adults.[194]

Benthic organisms also play an important role. Microbial fungi and bacteria feed on marshes' decaying plant biomass and are, in turn, preyed upon by microscopic animal life, or meiofauna. Gastropods, polychaetes, amphipods, and crustaceans then prey upon these meiofauna. For example, blue crab (*Callinectes sapidus*), the focus of much of the Chesapeake Bay's commercial and recreational fishing activity, comprises an important component of this detrital food chain as a predator of the meiofauna that reside in the tidal salt marshes of the Chesapeake Bay.[195]

Tidal Freshwater Marshes. Tidal freshwater marshes are located close enough to the coast to be tidally influenced, but maintain lower salinity levels than the shoreward tidal salt marsh. These wetland resources typically occur where a major river meets coastal waters, predominately along the Atlantic and northern Gulf coasts in the United States. Plant diversity and primary productivity in these wetlands are particularly high due to the reduced salt stress. Tidal freshwater marshes also support the largest and most diverse bird populations of all wetland habitats.[196]

Chemical Connections. Because of their close proximity to rivers used both for shipping and as a source of freshwater for residential and commercial purposes, tidal freshwater marshes are often found where major cities and industries have developed. Due to their key location, these wetlands often absorb pollution from development and serve as efficient sinks for metals and nutrients that would otherwise flow into adjacent rivers.[197]

Physical Connections. Flooding within freshwater tidal marshes varies regionally, depending on river flow, tidal cycles, elevation, gradients of soil, physical and chemical attributes, and vegetation.[198] These marshes, in turn, help to regulate the volume and flow to adjacent waters.[199]

Biological Connections. Tidal freshwater marshes provide important habitat for many free-swimming aquatic species. For example, anadromous and semi-anadromous fish species pass through freshwater marshes on spawning runs to freshwater streams. The marshes also provide habitat for juveniles of these fish species. Many herring and shad species (*Alosa* spp. and *Dorosoma* spp., respectively) complete the juvenile stage of their life in tidal freshwater marshes, where they not only feed on invertebrate species but also provide prey for important sportfish species such as striped bass (*Morone saxatilis*) and catfish (*Ictalurus* spp.). As they mature, they migrate downstream and offshore.[200]

Mangrove Wetlands. Mangrove wetlands replace tidal saltwater marshes along coastlines in subtropical and tropical latitudes—in the United States, they are located only in southern Florida and Puerto Rico.[201] Like tidal salt marshes, they may form only where there is adequate protection from destructive waves and storms and are characterized by tidal flooding frequency and duration and saline waters.[202] Mangrove wetlands are well known for providing unique habitat, stabilizing many shorelines, protecting inland areas during hurricanes, exporting nutrients and organic matter to coastal habitats, and accumulating carbon and other nutrients.[203]

Chemical Connections. As with tidal salt marshes, mangrove wetlands "outwell" organic material, including organic carbon and nutrients, important to the function of adjacent coastal waters and their overall secondary productivity.[204]

Physical Connections. Mangroves also slow erosion and increase the accretion of sediments for coastal areas. Research shows that removal of mangroves contributes to erosion of coastal resources.[205]

Biological Connections. Studies have shown mangrove wetlands to provide shelter for juvenile fish species and an important food source for many commercially and recreationally important fish species.[206] Seasonal availability of mangrove detrital vegetation is clearly connected to adjacent plankton and seagrass productivity and fish movement and secondary productivity in open waters.[207]

Streams

Headwater streams are the uppermost, low-order (first- and second-order) streams of a watershed. Although headwater streams comprise the majority of streams in the United States, both in terms of numbers and length, their full extent has neither been mapped nor comprehensively studied.[208] Stream segments are often called "reaches," and headwater streams may also be referred to as *startreaches.* Headwater streams may be intermittent, ephemeral or perennial.

A first order stream. Photo by Joy Zedler.

Perennial streams, both those classified as low-order and otherwise, contain water almost year-round, have a well-defined channel, and may be fed by a variety of sources, including groundwater, snowmelt, runoff, and/or stormwater. ***Ephemeral streams*** flow only in direct response to precipitation, and do not generally contain water except during and after significant storm events. Ephemeral stream channels are not well-defined and lie above the water table at all times. Water resource terms associated with ephemeral streams include *arroyo* and *drywash*. ***Intermittent streams*** may be fed by numerous sources, including groundwater, snowmelt, or precipitation, and also do not flow continuously, typically ceasing during dry periods. Intermittent stream channels are well-defined, but, like ephemeral streams, lack the hydrological characteristics associated with perennial streams.[209] It is important to examine the entire stream reach when applying the jurisdictional tests.[210]

Chemical Connections. Headwater streams strongly influence the water quality of downstream rivers, lakes, and estuaries. Streams efficiently remove and transform nutrients, such as inorganic nitrogen derived from agriculture, human and animal waste, and fossil fuel combustion, before they reach downstream waters where they may cause disruption to forest ecosystems, acidify lakes and streams, and degrade coastal waters through eutrophication, algal blooms, and hypoxia.[211] In fact, scientific research suggests that the smallest streams provide the most rapid uptake and transformation of inorganic nitrogen.[212] In particular, ephemeral and intermittent streams maintain water quality despite their lack of continuous flow because fertilizers and other pollutants are most likely to enter stream systems during storms and other times of high runoff—the same times when ephemeral and intermittent streams are likely to have a continuous water flow and are processing nutrients.[213]

Physical Connections. Headwater streams also play an important role in regulating water flow and reducing erosion and sedimentation. Streams absorb runoff and snowmelt, providing water storage that reduces downstream flooding. Natural streambeds, which provide rough and bumpy passages for water, reduce the velocity of water moving over the landscape, not only allowing for increased infiltration, but also reducing the ability of moving water to erode streambanks and carry sediment downstream.[214]

For example, ephemeral streams can retain a significant amount of sediment despite their temporary nature. In Oregon, researchers found that 60 to 80 percent of the sediment generated from forest roads was stored in ephemeral stream pools.[215] In the Bear River Basin of California, stream channels continue to store hydraulic gold mining sediment more than a century after the cessation of mining.[216] In arid parts of the country, ephemeral streams are an integral part of the regional hydrology, despite temporal and physical gaps in the surface flow to downstream wetlands, streams, and rivers. These streams recharge groundwater systems that ultimately support springs and aquifers, baseflow for streams and rivers, and other "isolated" waters. Indeed, ephemeral streams in arid and semi-arid basins may provide the primary or only point of recharge, thus playing an important role in groundwater/surface water dynamics.[217] Alteration of small streams disrupts both the quantity and availability of water to downstream river systems.[218]

Biological Connections. Many fish species rely on headwater streams for habitat through one or all of their life stages. Various trout, minnow, and small sunfish species reside in headwater streams, moving in and out as the stream system expands and contracts; other species, such as cutthroat trout (*Oncorhynchus clarki*) and chum salmon (*Oncorhynchus keta*), reside in larger, downstream systems but use small streams for spawning and as nurseries.[219] For example, the tributaries of Oregon's Rogue River, which are dry in the summer months, support spawning steelhead salmon (*Oncorhynchus mykiss*) in winter months.[220] One study conducted in Sagehen Creek, California reported that nearly half of the adult rainbow trout population spawned in an intermittent tributary.[221] Other fish species rely on streams for temperature refuges during extreme winter and/or summer temperatures. For example, the Arkansas darter (*Etheostoma cragini*) and brook trout (*Salvelinus fontinalis*) rely on the cool temperatures streams maintain during the heat of the summer months and/or drought.[222]

Small streams also provide feeding grounds for migrants from higher-order waters. High levels of detritus, primary productivity, and retention capacity result in rich food sources for primary consumers such as crustaceans and mollusks, which are in turn preyed upon by both resident and migrant vertebrates.[223] For example, research conducted in the Northwest demonstrates that intermittent streams and ephemeral swamps contribute to both the size and mass of the coho salmon (*Oncorhynchus kisutch*) population.[224] Finally, small streams also maintain biodiversity in downstream waters by providing both movement corridors for plants and animals across the landscape and a source of colonists for recovery of downstream systems following a disturbance.[225]

Making Connections Among Water Resources

The functions of traditional navigable waters, wetlands, and non-navigable streams are often connected to conditions in other wetlands and streams in the surrounding landscape. Indeed, the National Research Council states that common wetland and stream functions within the landscape, such as maintenance of biodiversity, flood control, and water quality, are determined by the number, position, and extent of the *collection* of wetlands and streams in a watershed rather than by any individual resource.[226] Thus, impacts to an individual wetland or stream may affect associated traditional navigable waters primarily in combination with impacts to the assemblage of wetlands and/or streams in a region.

Cumulative impacts and effects are seldom addressed comprehensively in environmental management, largely due to the lack of availability of tools for conducting such analyses.[227] However, there are some examples of cumulative impact assessments being developed to better assess the broader, regional effects resulting from impacts to individual resources. For example, the U.S. Environmental Protection Agency's 2005 publication *Hydrogeomorphic Wetland Profiling: An Approach to Landscape and Cumulative Impacts Analysis* provides a method for characterizing wetlands and their functions at landscape scale.[228]

Regional and/or watershed planning efforts may also provide a valuable resource for understanding the collective effects of aquatic resources within specific regions. For example, scientific support for the finding of a particular wetland or stream's significant nexus to traditional navigable waters, especially in combination with other waters, may be provided by basinwide water quality management plans and/or analyses, regional flood analyses, Total Maximum Daily Load ("TMDL") reports, natural heritage programs or plans, state wildlife action plans that provide geographically specific ecological data, and other watershed or landscape planning/ analysis documents developed by local governments or conservation organizations, state resource or pollution control agencies, or various federal natural resources agencies. Watershed plans may be among the most useful resources in beginning a search for a significant nexus.

Factors that the Corps and EPA Will Consider

On June 5, 2007, the Corps and EPA issued a new joint guidance document describing the factors that they will consider in making a jurisdictional determination for a wetland or stream based on the significant nexus test. Generally, the Agencies have stated their intent to emphasize a range of *hydrologic* and *ecologic* considerations in assessing the presence of a significant nexus. The scientific discussion contained in this chapter of the *Handbook* will assist the concerned citizen, the regulator, and the property owner in identifying and assessing these factors for a given type of wetland or stream.

An introduction to the guidance, including citation to the significant nexus factors that the Corps and EPA intend to use, appears in Appendix Three of this *Handbook*.

Science Glossary

Anadromous
Refers to marine species that spawn in freshwater streams.

Benthic/Benthos
An organism that feeds on the sediment at the bottom of a water body such as an ocean, lake, or river.

Biogeochemical cycling
The transport and transformation of chemicals in ecosystems.

Depressional
A wetland located in a depression in the landscape so that the catchment area for surface runoff is generally small.

Estuarine
Pertaining to the general location where rivers meet sea and freshwater mixes with saltwater.

Eutrophication
Process of aquatic ecosystem development whereby an ecosystem such as a lake, estuary, or wetland goes from an oligotrophic (nutrient poor) to eutrophic (nutrient rich) condition.

Herbaceous
With the characteristics of an herb; a plant with no persistent woody stem above ground.

Hydric soils
Soils that are formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

Hydrogeomorphology
Combination of climate, basin geomorphology, and hydrology that collectively influences a wetland's function.

Hydrology
The science dealing with the properties, distribution, and circulation of water.

Hydrophytic vegetation
Plant community dominated by hydrophytes, or plants adapted to wet conditions.

Hypoxia
Waters with dissolved oxygen less than 2 mg/L.

Lacustrine
Pertaining to lakes or lake shores.

Meiofauna
A type of microfauna (the smallest animals in a community, not visible to the naked eye) that inhabit algae, rock fissures, and superficial layers of the muddy sea bottom; they are smaller than 1 millimeter but larger than 0.1 millimeter.

Primary productivity
The rate at which biomass is produced by organisms that synthesize complex organic substances from simple inorganic substrates, such as in photosynthesis and chemosynthesis.

Riparian
Pertaining to the bank of a body of flowing water; the land adjacent to a river or stream that is, at least periodically, influenced by flooding.

Secondary productivity
The rate of biomass production resulting from the assimilation of organic matter produced by a primary consumer; production by organisms (mainly animals) which consume primary producers (mainly plants).

Stream order (1st, 2nd, …)
A numerical system that classifies stream and river segments by size according to the order of tributaries. The assigned number (for example, 1st, 2nd, 3rd, etc.) designates the relative position of the stream segment in a drainage basin network (that is, 1st-order corresponds to the smallest, unbranched segments; 2nd-order corresponds to the segment produced by the junction of two 1st-order streams; 3rd-order corresponds to the segment produced by the junction of two 2nd-order streams; and so on).

Subsidence
Sinking of ground level, caused by natural and artificial settling of sediments over time.

Substrate
The surface or medium that serves as a base.

Glossary Sources:

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Mitsch, William J. and James G. Gosselink. *Wetlands*. 3rd. ed. New York: John Wiley & Sons, Inc., 2000.

Terms of Environment: Glossary, Abbreviations and Acronyms. 2006. U.S. Environmental Protection Agency. 30 May 2007 <http://www.epa.gov/OCEPAterms/>.

Appendix One

The Future of Federal Jurisdiction Over Wetlands and Streams

The Environmental Law Institute's *Clean Water Act Jurisdictional Handbook* provides an approach to Clean Water Act coverage for wetlands and streams that is based on the relevant science and law as they exist today. Major changes in the state of the scientific literature, as well as any Congressional amendment to the Clean Water Act or Agency overhaul of the implementing regulations, would almost certainly alter the approach presented here.

The Science

The existing scientific literature, as surveyed in Chapter Five, helps to illustrate many of the important impacts that wetlands and streams have on the chemical, physical, and biological integrity of traditional navigable waters. The science in hand will, in many instances, help provide a basis for identifying the existence of a significant nexus, as that test is explained in Chapter Three.

However, much of the published science surrounding the important ecological functions and ecosystem services provided by wetlands and streams does not now focus on their direct influence on the health and integrity of *traditional navigable waters* in the landscape. Instead it frequently focuses on their broader ecosystem value for habitat, flood attenuation, water purification, and other functions. Over the long term, successfully protecting the full range of wetlands and streams—under the present legal framework—will likely require more detailed scientific information about these resources' effects on the chemical, physical, and biological integrity of traditional navigable waters. Generating and collecting the necessary new research may, in turn, require the expenditure of substantial additional state, federal, and academic resources, particularly where specific wetland types have not previously been the subject of academic inquiry.

For example, additional research on the connections between intermittent and ephemeral streams—including the arroyos and washes of the Southwest—and traditional navigable waters is likely to be necessary to provide more thorough documentation of the conditions demonstrating a significant nexus. Similarly, the relationships between complexes of mixed wetland types and traditionally navigable waters will need exploration—both by government scientists and by privately funded research efforts, if science is to serve the agenda of the law.

The Law

The law of Clean Water Act jurisdiction for wetlands and streams remains in flux following the Supreme Court's 2006 ruling in *Rapanos v. United States*. Thus, the reader should remain vigilant for new interpretations of the law that may appear in future federal court decisions, and in any regulations, new or revised guidance documents, and agency adjudications issued by the U.S. Army Corps of Engineers or the Environmental Protection Agency. There is, however, another potential source of legal change: Congress could amend the Clean Water Act in an effort to clarify the scope of federal jurisdiction over wetlands and streams.

The Supreme Court's interpretation of the Act's reach has, to date, been heavily influenced by Congress's use of the jurisdictional term "navigable waters" in the Act and, historically, in other laws protecting the Nation's waters. If Congress were to enact new legislation deleting this reference to "navigability," or otherwise clarifying the intended scope of the Act, citizens, landowners, and regulators would need to evaluate federal jurisdiction over wetlands, streams, and other waters in light of such changes.

There have already been efforts to amend the Clean Water Act in precisely this manner. The Clean Water Restoration Act, or "CWRA," was introduced in the House of Representatives in May 2007. This bill (H.R. 2421, 110th

Congress) would replace the jurisdictional term "navigable waters" throughout the Clean Water Act with "waters of the United States," and adopt a broad statutory definition of "waters of the United States" intended to restore the scope of the law to that which existed prior to the Supreme Court's 2001 ruling in the *SWANCC* case.

Appendix Two

SUMMARY OF LOWER COURT RULINGS SINCE *RAPANOS V. UNITED STATES*

This appendix surveys rulings issued by U.S. Courts of Appeals and District Courts since the Supreme Court decided *Rapanos v. United States* in June 2006. Many of these cases remain subject to ongoing litigation and appeals.

Decisions of the United States Courts of Appeals (by Circuit)

The decision of a U.S. Court of Appeals on a legal issue is binding in all future federal court cases in states located within that Circuit, unless and until the Supreme Court rules on the issue. Court of Appeals decisions in one Circuit do *not* bind courts in other Circuits, although judges are free to rely on decisions from their sister Circuits as "persuasive" authority.

1ST CIRCUIT

Maine, Massachusetts, New Hampshire, Puerto Rico, & Rhode Island

***United States v. Johnson*, 467 F.3d 56 (1st Cir. 2006), *vacating* 437 F.3d 157 (1st Cir. 2006).**

In a civil suit brought by the United States against cranberry farmers for dredging and filling wetlands in violation of the Clean Water Act ("CWA"), the 1st Circuit held that, post-*Rapanos*, the Government may seek to demonstrate federal jurisdiction over wetlands adjacent to non-navigable tributaries of traditional navigable waters under either Justice Kennedy's significant nexus test or the plurality's "adjacency + continuous surface connection" test.

7TH CIRCUIT

Illinois, Indiana, & Wisconsin

***United States v. Gerke Excavating, Inc.*, 464 F.3d 723 (7th Cir. 2006), *petition for cert. filed*, 75 U.S.L.W. 3556 (U.S. Apr. 2, 2007) (No. 06-1331). *See also Gerke Excavating, Inc. v. United States*, 126 S.Ct. 2964 (June 26, 2006) (order), *vacating United States v. Gerke Excavating, Inc.*, 412 F.3d 804 (7th Cir. 2006).**

In a civil suit brought by the United States against a contractor for filling wetlands in violation of the CWA, the 7th Circuit held that, post-*Rapanos*, Justice Kennedy's significant nexus test controls the question of federal jurisdiction over wetlands adjacent to non-navigable tributaries of traditional navigable waters.

9TH CIRCUIT

Alaska, Arizona, California, Guam, Idaho, Montana, N. Marianas, Nevada, Oregon, Washington, & Hawaii

***San Francisco Baykeeper v. Cargill Salt Division*, 481 F.3d 700 (9th Cir. 2007).**

In a citizen suit brought against a salt-making company for discharging pollutants in violation of the CWA, the 9th Circuit held that, under current regulations and Supreme Court precedent, "mere adjacency" of a water body to traditional navigable waters may only be used to demonstrate CWA coverage when the water body in question is a wetland. Here, the water body was a pond separated by an earthen levee from the nearby Mowry Slough, a traditional navigable water and tributary of the San Francisco Bay. (Baykeeper never argued or presented evidence that the pond qualified as a wetland.) The 9th Circuit reversed the lower court's finding of jurisdiction on the adjacency theory and further held that, on the specific circumstances of this case, Baykeeper had waived its right to allege CWA coverage under other theories.

***Northern California River Watch v. City of Healdsburg*, 457 F.3d 1023 (9th Cir. 2006).**

In a citizen suit brought against the city for dumping wastewater into a pond and its surrounding wetlands in violation of the CWA, the 9th Circuit held that, post-*Rapanos*, Justice Kennedy's significant nexus test provides the controlling rule of law for finding jurisdiction—even where the wetlands were adjacent to traditional navigable waters (based on the 9th Circuit's further holding that *Rapanos* had narrowed the scope of *Riverside Bayview*, with adjacency of wetlands to navigable waters no longer sufficient to show jurisdiction).

The 9th Circuit relied on the following evidence and findings of the trial court to conclude that the pond where the city dumped wastewater had a significant nexus with the Russian River, a traditional navigable water: the pond and the river were separated only by a man-made levee, and water from the pond seeped directly into the river; there was an actual surface connection between the two bodies of water when the river overflows the levee; the pond drained into the surrounding aquifer, and at least ¼ of the pond's volume annually reached the river; there was an underground hydraulic connection between the two bodies, so a change in water level in one immediately affected the other; the wetlands supported substantial bird, mammal and fish populations, "all as an integral part of and indistinguishable from" the rest of the Russian River ecosystem; many of the bird populations at the pond were familiar along the river (including cormorants, great egrets, mallards, sparrows, and fish-eaters); fish indigenous to the river also lived in the pond due to the recurring breaches of the levee; and the pond increased the chloride levels of the river, with the chloride from the pond reaching the River in higher concentrations as a direct result of the city's discharge of sewage into the pond.

The fact that the pond and wetlands were man-made did not affect the court's analysis.

Decisions of the United States District Courts (by State)

The decision of a U.S. District Court is generally not binding outside of the case in which it is issued. However, other courts may choose to rely on a District Court opinion as "persuasive authority." District Court opinions can also provide practical insight into how trial courts are applying the rules of law formulated by the Supreme Court and the federal appeals courts.

California

***Environmental Protection Information Center v. Pacific Lumber Company,* 469 F.Supp.2d 803 (N.D. Cal. 2007).**

In a citizen suit against a lumber company for point source discharges into streams in violation of CWA, the court held on plaintiff's motion for summary judgment that it was bound by the 9th Circuit's *Healdsburg* ruling to apply the *Rapanos* significant nexus test—and not the plurality test—to determine CWA jurisdiction. At issue were pollutants that washed from culverts, ditches, erosion gullies, and other alleged channels into headwater streams of the nearby traditional navigable waters of Bear Creek and the Eel River. The court further held that the significant nexus test requires evidence of a hydrologic connection, which may suffice in some but not all cases to demonstrate jurisdiction; and that the significant nexus test does *not* require a showing of actual flow of pollutants into traditional navigable waters.

The court found that while the evidence, in the form of GIS maps, did support the existence of a hydrological connection between the streams (certain of which were intermittent and ephemeral) and traditional navigable waters, plaintiff had offered no evidence that the streams significantly affected the chemical, physical, and biological integrity of those waters. As a result, the court denied plaintiff's motion for partial summary judgment on the issue of defendants' liability under the CWA.

Connecticut

***Simsbury-Avon Preservation Society, LLC v. Metacon Gun Club, Inc.*, 472 F.Supp.2d 219 (D. Conn. 2007).**

In a citizen suit brought by neighboring homeowners against a gun club for violating the CWA by discharging lead shot into a vernal pool adjoining its shooting range, the court granted defendant's motion for summary judgment. The court held that, post-*Rapanos*, federal jurisdiction over the wetland could be proven under *either* Justice Kennedy's significant nexus test or the plurality's "adjacency + continuous surface connection" test.

The Metacon wetland was separated by a berm from Horseshoe Cove, a standing body of water that flows into nearby Farmington River, a traditional navigable water. Witness testimony and undated photographs demonstrated that, due to seasonal flooding following heavy rains and snowmelt, a surface water connection was sometimes present between the Metacon wetland and Horseshoe Cove. Test results regarding lead concentrations in the area were "inconclusive." The court held that this evidence fell short of the continuous surface connection requirement of the plurality test, and was also insufficient to show a significant nexus under the Kennedy test.

DISTRICT OF COLUMBIA

***P&V Enterprises v. U.S. Army Corps of Engineers*, 466 F.Supp.2d 134 (D.D.C. 2006).**

The court dismissed as time-barred a case brought by property developers against the Corps to challenge the facial validity of a Corps regulation providing for assertion of CWA jurisdiction over waters whose use, degradation, or destruction could affect interstate or foreign commerce—that is, the category of so-called "(a)(3) waters." The case involves the potential development of an area including non-navigable tributaries of the Mojave River. Plaintiffs have appealed to the DC Circuit.

FLORIDA

***United States v. Evans*, 2006 WL 2221629 (M.D. Fla. 2006) (unpublished).**

In a criminal case involving allegations of illegal discharge of pollutants into a creek, defendants moved the court to suppress evidence obtained under search warrants on the grounds that warrants were invalid, because the creek was non-jurisdictional. In denying the motion, the court held that, post-*Rapanos*, the Government may seek to demonstrate federal jurisdiction over the creek under *either* Justice Kennedy's significant nexus test or the plurality's test.

The court found that the affidavits in support of the warrants contained facts sufficient to satisfy both *Rapanos* tests: a federal agent had observed a PVC pipe on defendants' property discharging wastewater into the creek; the creek itself was seven-to-eight feet wide and one foot deep, and contained visibly flowing water; and city maps and aerial photos showed that the creek was a headwater of Cow Creek, which flows into the St. Johns River, a traditional navigable water. The court did not reach the Government's alternative rationale for finding CWA jurisdiction—*i.e.*, that the creek had conveyed pollutants downstream to other covered waters.

INDIANA

***United States v. Fabian*, __ F.Supp.2d __, 2007 WL 1035078 (N.D. Ind. 2007).**

In civil suit brought by the United States against the defendant for filling wetlands in violation of the CWA, the court on cross-motions for summary judgment held that, post-*Rapanos*, Justice Kennedy's opinion controlled the question whether the Act covered wetlands adjacent to a nearby river. In this case, the wetlands were separated from Burns Ditch, also known as the Little Calumet River, by a levee 15 feet high and 130 feet wide.

The court found the Little Calumet River to be navigable-in-fact, based on the following evidence: a declaration from a USGS hydrologist to the effect that the river can and does support boat traffic (he and another hydrologist had navigated a reach of the river in an aluminum canoe to obtain data on the river's width and depth, with no need for portaging); and a 1982 Corps report finding the river to be navigable based on both present and historical use. Because defendant's wetlands were adjacent to navigable-in-fact waters, they came within CWA coverage under the part of Justice Kennedy's *Rapanos* opinion discussing *United States v. Riverside Bayview Homes,* Inc., without the need to identify a significant nexus.

KENTUCKY

***United States v. Cundiff*, __ F. Supp. 2d __, 2007 WL 957346 (W.D. Ky. 2007).**

In a civil suit brought by the United States against defendants for draining and filling wetlands in violation of the CWA, the court held that, post-*Rapanos*, the Government may seek to demonstrate federal jurisdiction over wetlands adjacent to non-navigable tributaries of traditional navigable waters under *either* Justice Kennedy's significant nexus test or the plurality's "adjacency + continuous surface connection" test.

The wetlands on defendants' property (which also contained drainage from past mining activities) were adjacent to Pond and Caney Creeks, non-navigable tributaries of the Green and Ohio Rivers, traditional navigable waters. The court found jurisdiction under both *Rapanos* tests.

The finding of significant nexus was based primarily on testimony from several experts, including a wetlands scientist and a state environmental control supervisor with the Division of Water: the Cundiff wetlands served several important ecological functions, including both temporary and long-term water storage, the filtering and trapping of acid mine drainage and sediment, and habitat support for plant and wildlife species endemic to wetland ecosystems; defendants' activities had diminished the capacity of the wetlands to store water, affecting frequency and extent of downstream flooding, and in turn impacting navigation, crop production in bottomlands, downstream bank erosion, and sedimentation; and defendants' activities had channelized Pond Creek, causing acid mine drainage to bypass the wetlands and move quickly into the traditional navigable waters, resulting in impacts to navigation due to sediment accumulation and to aquatic food webs not adapted to thrive in acid waters and sediment-choked environments.

The plurality test in *Rapanos* was satisfied by the following evidence: expert testimony and aerial photos demonstrating that the creeks in question were relatively permanent bodies of water connected to the Green River; maps, historical aerial photos, and an aerial videotape showing that Pond Creek and Caney Creek are open waterbodies with significant quantities of flowing water, and that they have a continuous surface connection with the wetlands; and expert testimony that there is no clear demarcation between waters and wetlands at the site, and that there are continuous surface connections during significant storm events, "bank full" periods, and ordinary high flows, as well as during flood stage. The court rejected defendants' argument that the surface level of the wetland and covered waters must be completely level.

MICHIGAN

***United States v. Marion L. Kincaid Trust*, 463 F.Supp.2d 680 (E.D. Mich. 2006).**

The United States sued property owners for carrying out grading and dozing activities in the wetlands of Lake Huron in violation of the CWA, but then later dropped the lawsuit. In deciding a motion by property owners to obtain attorneys fees and costs as the "prevailing party," the court found that the Government's claim that the property owners' beach was a jurisdictional wetland was substantially justified under the pre-*Rapanos* law in effect at the time the lawsuit was filed. In *dictum* discussing the *Rapanos* ruling, the court cited the *Rapanos* plurality opinion for what it described as *Rapanos*'s "requirement," for jurisdictional purposes, of a continuous surface connection between wetlands and other covered waters.

TEXAS

***United States v. Chevron Pipe Line Co.*, 437 F.Supp.2d 605 (N.D. Tex. 2006).**

In a civil suit brought by the United States against an oil pipeline company for incomplete clean-up of an oil spill in violation of the CWA (as amended by the Oil Pollution Act), the court granted defendant's motion for summary judgment. The court declined to find jurisdiction over the intermittent stream where spilled oil had ponded. The court based its decision on the *Rapanos* plurality opinion and pre-*Rapanos* 5th Circuit cases, but added in a footnote that the Government had failed, in any event, to present evidence that would satisfy Justice Kennedy's significant nexus test (which the court characterized as "ambiguous," "vague," and "subjective").

Appendix Three

CORPS/EPA JOINT GUIDANCE DOCUMENT

On June 5, 2007, the U.S. Army Corps of Engineers and the Environmental Protection Agency issued a long-anticipated joint guidance document interpreting the jurisdictional reach of Section 404 of the Clean Water Act in light of the *Rapanos* decision. Intended to provide guidance to Corps and EPA field offices tasked with making jurisdictional determinations under the Act, the document expresses the Agencies' intent to assert Clean Water Act protections "to the maximum extent allowed" under the *Rapanos* ruling. (See Q&A Document Accompanying Guidance at 2.)

Content of the Joint Guidance Document

The guidance begins with a *Summary of Key Points*, reproduced on the next page, that the Agencies characterize as a "reference tool."

Note that while the guidance indicates that swales, erosional features, and upland ditches will "generally" not be covered in the view of the Agencies, the guidance does not rule out protection for such features. The guidance does envision coverage under the significant nexus test for certain ephemeral waters in the arid West. (See Guidance at 11.)

The Corps and EPA have repeatedly stated that the guidance is intended neither to expand nor contract Clean Water Act jurisdiction post-*Rapanos*. (See, *e.g.*, Q&A Document Accompanying Guidance at 1.)

Summary of Key Points

The agencies will assert jurisdiction over the following waters:

- Traditional navigable waters
- Wetlands adjacent to traditional navigable waters
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months)
- Wetlands that directly abut such tributaries

The agencies will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable water:

- Non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary

The agencies generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow)
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water

The agencies will apply the significant nexus standard as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters
- Significant nexus includes consideration of hydrologic and ecologic factors

How the Agencies Will Apply the Significant Nexus Test

The guidance document identifies various factors that the Agencies will consider when applying the significant nexus test to a wetland or stream:

> Principal considerations when evaluating significant nexus include the volume, duration, and frequency of the flow of water in the tributary and the proximity of the tributary to a traditional navigable water. In addition to any available hydrologic information (*e.g.*, gauge data, flood predictions, historic records of water flow, statistical data, personal observations/records, etc.), the agencies may reasonably consider certain physical characteristics of the tributary to characterize its flow, and thus help to inform the determination of whether or not a significant nexus is present between the tributary and downstream traditional navigable waters. Physical indicators of flow may include the presence and characteristics of a reliable ordinary high water mark

(OHWM) with a channel defined by bed and banks. Other physical indicators of flow may include shelving, wracking, water staining, sediment sorting, and scour. Consideration will also be given to certain relevant contextual factors that directly influence the hydrology of tributaries including the size of the tributary's watershed, average annual rainfall, average annual winter snow pack, slope, and channel dimensions.

In addition, the agencies will consider other relevant factors, including the functions performed by the tributary together with the functions performed by any adjacent wetlands. One such factor is the extent to which the tributary and adjacent wetlands have the capacity to carry pollutants (*e.g.*, petroleum wastes, toxic wastes, sediment) or flood waters to traditional navigable waters, or to reduce the amount of pollutants or flood waters that would otherwise enter traditional navigable waters. The agencies will also evaluate ecological functions performed by the tributary and any adjacent wetlands which affect downstream traditional navigable waters, such as the capacity to transfer nutrients and organic carbon vital to support downstream foodwebs (*e.g.*, macroinvertebrates present in headwater streams convert carbon in leaf litter making it available to species downstream), habitat services such as providing spawning areas for recreationally or commercially important species in downstream waters, and the extent to which the tributary and adjacent wetlands perform functions related to maintenance of downstream water quality such as sediment trapping.

After assessing the flow characteristics and functions of the tributary and its adjacent wetlands, the agencies will evaluate whether the tributary and its adjacent wetlands are likely to have an effect that is more than speculative or insubstantial on the chemical, physical, and biological integrity of a traditional navigable water. As the distance from the tributary to the navigable water increases, it will become increasingly important to document whether the tributary and its adjacent wetlands have a significant nexus rather than a speculative or insubstantial nexus with a traditional navigable water. (See Guidance at 9-10 (footnotes omitted).)

The Joint Guidance Document: A First Step by the Agencies

The Corps/EPA joint guidance document is a new, but important, element on the post-*Rapanos* legal landscape. It explains how the Corps and EPA intend—at least for the time being—to interpret the *Rapanos* decision and apply the various jurisdictional tests that are the subject of this *Handbook*.

However, by its own terms, the guidance "does not impose legally binding requirements on EPA, the Corps, or the regulated community, and may not apply to a particular situation depending on the circumstances." (See Guidance at 4, note 16.) The Corps and EPA, like everyone else, continue to be bound by the law as passed by Congress and interpreted by the courts. The Agencies acknowledge, as they must, that Clean Water Act jurisdiction over any particular water is still based on the applicable statutes, regulations, and case law. (See Guidance at 4, note 16.)

The joint guidance document represents the Agencies' first effort to make sense of Clean Water Act jurisdiction in the wake of the Supreme Court's controversial 2006 ruling in *Rapanos*. There is every reason to think that the guidance should be understood simply as an initial, incremental attempt by the Agencies to tackle this complex subject—an attempt that is likely to be modified over time. Indeed, the Corps and EPA indicate that they "intend to more broadly consider jurisdictional issues, including clarification and definition of key terminology, through rulemaking or other appropriate policy process." (See Guidance at 3.)

Obtaining (and Commenting on) the Joint Guidance Document

The 12-page guidance document—together with a related Memorandum of Agreement between the Corps and EPA (discussing interagency coordination) and a short Q&A document—are available online at http://www.epa.gov/owow/wetlands/guidance/CWAwaters.html.

The Corps and EPA have opened a six-month public comment period on the guidance and intend to revise, reissue, or suspend the guidance three months after the close of the comment period.

Endnotes

1. What we think of as the Clean Water Act was actually a set of 1972 amendments to the existing Federal Water Pollution Control Act. *See* Pub. L. 92-500, 86 Stat. 816 (Oct. 18, 1972). The name "Clean Water Act" was actually added by the 1977 amendments. Pub. L. 95-217, § 1 (Dec. 27, 1977).
2. *See, e.g.*, Robin Kundis Craig, *The Clean Water Act and the Constitution*: *Legal Structure and the Public's Right to a Clean and Healthy Environment* 26 (Environmental Law Institute 2004) (1972 amendments "represented a sea change in U.S. involvement in comprehensive water quality regulation").
3. 33 U.S.C. § 1251(a), CWA § 101(a).
4. H.R. Rep. No. 92-911, p. 76 (1972). The concept of maintaining water's chemical and physical integrity tends to be well understood. However, the notion of "biological integrity" has proven thornier. As a result, EPA has, over the years, engaged in what it describes as a "quest for a practical definition of biological integrity." Today, "biological integrity" is defined by EPA as "the capability of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region." *See* U.S. Environmental Protection Agency, "Biological Indicators of Watershed Health/Biological Integrity," available online at http://www.epa.gov/bioiweb1/html/biointeg.html.
5. *Milwaukee v. Illinois*, 451 U.S. 304, 318 (1981). Then-Justice Rehnquist's opinion in *Milwaukee* surveys the legislative history of the Clean Water Act and leaves no doubt about Congress' intent to achieve broad-reaching reform. "The 'major' purpose of the Amendments was 'to establish a *comprehensive* long-range policy for the elimination of water pollution.'" *Id.* (citations omitted) (emphasis in original). "No Congressman's remarks on the legislation were complete without reference to the 'comprehensive' nature of the Amendments. . . . Senator Randolph, Chairman of the responsible Committee in the Senate, stated: 'It is perhaps the most comprehensive legislation ever developed in its field. It is perhaps the most comprehensive legislation that the Congress of the United States has ever developed in this particular field of the environment.'" *Id.* (citations omitted). "The 1972 Amendments to the Federal Water Pollution Control Act were not merely another law touching interstate waters . . . Rather, the Amendments were viewed by Congress as a 'total restructuring' and 'complete rewriting' of the existing water pollution legislation." *Id.* at 317 (citations omitted).
6. *International Paper Co. v. Ouellette*, 479 U.S. 481, 492 (1987).
7. 33 U.S.C. § 1311(a), CWA § 301(a).
8. 33 U.S.C. § 1362(16), CWA § 502(16).
9. 33 U.S.C. § 1362(12)(A), CWA § 502(12)(A). The law also covers the addition of pollutants to the waters of the contiguous zone or the ocean from point sources other than vessels or other floating craft. 33 U.S.C. § 1362(12)(B), CWA § 502(12)(B).
10. 33 U.S.C. § 1362(6), CWA § 502(6). There are several limited exceptions to the meaning of the term "pollutant" that deal with vessels and certain oil and gas production operations. *Id.*
11. 33 U.S.C. § 1362(14), CWA § 502(14). However, agricultural stormwater discharges and return flows from irrigated agriculture are not "point sources." *Id.*
12. *See* 33 U.S.C. § 1342, CWA § 402. *See also* EPA's web page describing the NPDES program at http://cfpub.epa.gov/npdes/. Permits can be issued to individual applicants, or, for certain classes of activities, applicants can come under the terms of general permits.
13. *See* EPA's resources pertaining to "NPDES Permit Program Basics," available online at http://cfpub.epa.gov/npdes/home.cfm?program_id=45.
14. 33 U.S.C. § 1342(b), CWA § 402(b). As of 2007, 45 states had applied for and received delegated authority to administer the NPDES Program.
15. 33 U.S.C. § 1344, CWA § 404. *See also* the Corps' web page describing the 404 Program at http://www.usace.army.mil/cw/cecwo/reg/oceover.htm. EPA has an oversight and consultative role in the 404 program, may veto permits, and may take enforcement action. Section 404 permits can be individual or general. With respect to general permits, the Corps recently reissued all of its existing Nationwide Permits (NWPs) and also issued new ones. *See Reissuance of Nationwide Permits; Notice*, 72 Fed. Reg. 11092 (March 12, 2007). The Corps notes in its "Discussion of Public Comments" with respect to the NWPs that, while the Supreme Court's decision in *Rapanos v. United States* "raises questions" about Clean Water Act jurisdiction over "some intermittent and ephemeral streams and their adjacent wetlands," intermittent and ephemeral streams "may" still be covered under existing regulations and guidance, and the Corps will assess jurisdiction on a case-by-case basis and in accordance with evolving case law and any new agency regulations or guidance. *Id.* at 11098. The Corps also notes that ditches may be subject to Clean Water Act coverage. *Id.* Little should be inferred from the

Corps' comments here, however, as the Corps goes on to say that this document is "not address[ing] the limits of jurisdiction after *Rapanos* . . . ."

16. 33 U.S.C. § 1344(g), CWA § 404(g).
17. *See* Craig, *supra* note 2, at 34.
18. *See* 33 U.S.C. § 1341(a), CWA § 401(a).
19. 33 U.S.C. § 1313(c)(2), CWA § 303(c)(2).
20. *See* 33 U.S.C. § 1313, CWA § 303.
21. 33 U.S.C. § 1313(d), CWA § 303(d).
22. Oliver A. Houck, *The Clean Water Act TMDL Program: Law, Policy, and Implementation* 106 (Environmental Law Institute 2d ed. 2002). The Act requires that a TMDL for a pollutant "be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." 33 U.S.C. § 1313(d)(1)(C), CWA § 303(d)(1)(C).
23. *E.g.*, 33 U.S.C. § 1313(d)(2), CWA § 303(d)(2). *See also* EPA's web page describing the TMDL program at http://www.epa.gov/owow/tmdl/.
24. Another area of controversy includes regulation of oil spills in the "navigable waters of the United States." *See*, *e.g.*, 33 U.S.C. § 1321, CWA § 311 (oil and hazardous substance liability). *See also* 33 U.S.C. §§ 2701-61, OPA §§ 1001-7001 (Oil Pollution Act, which pertains to "navigable waters").
25. *E.g.*, 33 U.S.C. § 1251(a), CWA § 101(a) (referencing national clean water goals and policies in the context of *navigable waters*); 33 U.S.C. § 1313(c)(2)(a), CWA § 303(c)(2)(a) (discussing requirement of water quality standards for *navigable waters*); 33 U.S.C. § 1344(a), CWA § 404(a) (providing for issuance of permits for the discharge of dredged or fill material into *navigable waters*); and 33 U.S.C. § 1362(12), CWA § 502(12) (defining "discharge of a pollutant" as an addition of any pollutant to *navigable waters*) (emphases added).
26. 33 U.S.C. § 1362(7), CWA § 502(7).
27. U.S. Const. Art. 1 § 8 cl. 3. *Gibbons v. Ogden*, 22 U.S. (9 Wheat.) 1 (1824), *The Daniel Ball*, 77 U.S. (10 Wall.) 557 (1871).
28. Section 13 of the Rivers and Harbors Act of 1899, 30 Stat. 1121, 1152, currently codified at 33 U.S.C. § 407.
29. Pub. L. No. 80-845, § 10, 62 Stat. 1155, 1161 (June 30, 1948).
30. Pub. L. No. 87-88, § 8(a), 75 Stat. 208 (June 20, 1961).
31. *United States v.Riverside Bayview Homes, Inc.*, 474 U.S. 121, 133 (1985). For more on the historical evolution of navigability, and the term "navigable waters," *see generally* Donna Downing *et al.*, "Navigating through Clean Water Act Jurisdiction: A Legal Review," 23(3) Wetlands 527 (2003).
32. 33 U.S.C. § 1362(7), CWA § 502(7).
33. 33 C.F.R § 328.3(a), 40 C.F.R. § 230.3(s).
34. *See*, *e.g.*, *The Daniel Ball*, 77 U.S. (10 Wall.) 557 (1870) (defining "navigable in fact"); *Economy Light Co. v. United States*, 256 U.S. 113 (1921) (holding that when once found to be navigable, a waterway remains so); *United States v. Appalachian Electric Power Co.*, 311 U.S. 377, 407-09 (1940) (holding that determination of a waterway's susceptibility to use in commerce includes considering the effects of reasonable improvements). *See also* 33 C.F.R. § 328.3(a)(1) (Corps/Section 404 permitting program); 40 C.F.R. § 230.3(s)(1) (EPA/Section 404 permitting program); 40 C.F.R. § 122.2 (EPA/NPDES permitting program). *See also* William W. Sapp, *et al.*, "From the Fields of Runnymede to the Waters of the United States: A Historical Review of the Clean Water Act and the Term 'Navigable Waters,'" 36 Environmental Law Reporter 10190, 10191 (2006) (describing "present use," or "navigable-in-fact" waters; susceptible use waters; and historic waters); Lance D. Wood, "Don't be Misled: CWA Jurisdiction Extends to All Non-Navigable Tributaries of the Traditional Navigable Waters and to Their Adjacent Wetlands," 34 Environmental Law Reporter 10187, 10191-92 (2004) (discussing usage of the term "traditional navigable waters").
35. Contact information for all 38 Corps District offices is available online at http://www.usace.army.mil/cw/cecwo/reg/district.htm.
36. *See* 33 C.F.R. § 328.3(a)(2) (Corps/Section 404 permitting program); 40 C.F.R. § 230.3(s)(2) (EPA/Section 404 permitting program); 40 C.F.R. § 122.2 (EPA/NPDES permitting program). *See also United States v. Riverside Bayview Homes, Inc.*, 474 U.S. 121, 129 (1985) (upholding Corps regulation that covers "all wetlands adjacent to navigable or *interstate waters* and their tributaries") (emphasis added).
37. *See* 33 C.F.R. § 328.3(a)(7), (a)(1), (b) (Corps/Section 404 permitting program); 40 C.F.R. § 230.3(s)(7), (s)(1), (b) (EPA/Section 404 permitting program); 40 C.F.R. § 122.2 (EPA/NPDES permitting program). *See also*, *e.g.*, *United States v. Riverside Bayview Homes, Inc.*, 474 U.S. 121, 139 (1985) (holding that Corps acted reasonably in interpreting CWA to cover wetlands adjacent to traditional navigable waters); *Rapanos v. United States*, 126 S.Ct. 2208, 2248 (2006) (Kennedy, J., concurring in the judgment) (reaffirming holding of *Riverside Bayview*).
38. 474 U.S. 121 (1985).
39. *Id.* at 139.
40. *Id.*
41. *See Rapanos v. United States*, 126 S.Ct. 2208, 2248 (2006) (Kennedy, J., concurring in the judgment) (discussing *Riverside Bayview*).
42. *Riverside Bayview*, 474 U.S. at 132.
43. *Id.*
44. The Court wrote: "[i]f it is reasonable for the Corps to conclude that in the majority of cases, adjacent wetlands have significant effects on water quality and the aquatic ecosystem, its definition can stand. That the definition

may include some wetlands that are not significantly intertwined with the ecosystem of adjacent waterways is of little moment, for where it appears that a wetland covered by the Corps' definition is in fact lacking in importance to the aquatic environment—or where its importance is outweighed by other values—the Corps may always allow development of the wetland for other uses simply by issuing a permit." *Id.* at 135 n.9. This oft-quoted passage has become well-known among lawyers as "*Riverside Bayview* Footnote 9."

45. *Id.* at 134.
46. *Id.* at 133.
47. *Id.*
48. 531 U.S. 159 (2001).
49. *Id.* at 162, 171-72. *SWANCC* struck down the Corps' Migratory Bird Rule, interpreting 33 C.F.R. § 328.3(a)(3), 51 Fed. Reg. 41217 (1986). *SWANCC,* 531 U.S. at 174.
50. *See id.* at 172.
51. *Id.*
52. *Id.* at 168, 171, and 167.
53. *Id.* at 192 (Stevens, J., dissenting).
54. 126 S.Ct. 2208 (2006).
55. *Id.* at 2236 (Kennedy, J., concurring in the judgment).
56. The Supreme Court in *Rapanos* had consolidated two wetlands cases decided by the U.S. Court of Appeals for the Sixth Circuit: *United States v. Rapanos*, 376 F.3d 629 (6th Cir. 2004), and *Carabell v. U.S. Army Corps of Engineers*, 391 F.3d 704 (6th Cir. 2004).
57. *Id.* at 2238-39 (the *Rapanos* case).
58. *Id.* at 2239-40 (the *Carabell* case).
59. *Id.* at 2214-35 (Scalia, J., plurality). Justice Scalia's plurality opinion was joined by Chief Justice John Roberts and Justices Clarence Thomas and Samuel Alito. *Id.* at 2236-52 (Kennedy, J., concurring in the judgment).
60. *Id.* at 2252-65 (Stevens, J., dissenting). Justice Stevens was joined by Justices David Souter, Ruth Bader Ginsburg, and Stephen Breyer.
61. *Id.* at 2248 (Kennedy, J., concurring in the judgment).
62. *Id.* at 2226-27 (Scalia, J, plurality).
63. *Id.* at 2208, 2221 n.5. *See also infra* note 109 and accompanying text.
64. *Id.* at 2220-21.
65. *Id.* at 2226, 2227.
66. *Id.* at 2246 (Kennedy, J., concurring in the judgment). *See also id.* at 2242-44 (rejecting both the requirement of relatively permanent flow and continuous surface connection).
67. *See*, *e.g.*, *United States v. Johnson*, 467 F.3d 56, 66 (1st Cir. 2006), *vacating* 437 F.3d 157 (1st Cir. 2006); *United States v. Cundiff*, __ F. Supp. 2d __, 2007 WL 957346, at *4 (W.D. Ky. 2007); *Simsbury-Avon Preservation Society, LLC v. Metacon Gun Club, Inc.*, 472 F.Supp.2d 219, 226-27 (D. Conn. 2007); *United States v. Evans*, 2006 WL 2221629, at *19 (M.D. Fla. 2006) (unpublished). *See also Interpreting the Effect of the U.S. Supreme Court's Recent Decision in the Joint Cases of* Rapanos v. United States and Carabell v. U.S. Army Corps of Engineers *on "The Waters of the United States:" Hearing Before the Subcomm. on Fish, Wildlife, and Water of the S. Comm. On Environment and Public Works*, 109th Cong. 16 (2006) (statement of John C. Cruden, Deputy Assistant Attorney General, Environment and Natural Resources Division, U. S. Department of Justice) (reporting that the Department of Justice has argued to courts that the applicable standard to determine if a wetland is governed by the Clean Water Act is whether either the Rapanos plurality's test or Justice Kennedy's test is met in a particular fact situation). *See also* Corps/EPA Joint Guidance Document on *Rapanos* at 3 (June 5, 2007) (same). And Justice Stevens, foreseeing the confusion that was likely to arise from the Court's divided ruling, proposed precisely this approach for interpreting the decision. *Rapanos*, 126 S.Ct. at 2265 (Stevens, J., dissenting) ("Given that all four Justices who have joined this opinion would uphold the Corps' jurisdiction in both of these cases—and in all other cases in which either the plurality's or Justice Kennedy's test is satisfied—on remand each of the judgments should be reinstated if *either* of those tests is met.") (emphasis in original).
68. *See, e.g.*, *id.* at 2265 n.14 ("I assume that Justice Kennedy's approach will be controlling in most cases because it treats more of the Nation's waters as within the Corps' jurisdiction, but in the unlikely event that the plurality's test is met but Justice Kennedy's is not, courts should also uphold the Corps' jurisdiction.").
69. *E.g.*, *United States v. Gerke Excavating, Inc.*, 464 F.3d 723, 725 (7th Cir. 2006) (". . . [A]ny conclusion that Justice Kennedy reaches in favor of federal authority over wetlands in a future case will command the support of five Justices (himself plus the four dissenters), and in *most* cases in which he concludes that there is no federal authority he will command five votes (himself plus the four Justices in the *Rapanos* plurality), the exception being a case in which he would vote against federal authority only to be outvoted 8-to-1 (the four dissenting Justices plus the members of the *Rapanos* plurality) because there was a slight surface hydrological connection. The plurality's insistence that the issue of federal authority be governed by strict rules will on occasion align the Justices in the plurality with the *Rapanos* dissenters when the balancing approach of Justice Kennedy favors the landowner. But that will be a rare case, so as a practical matter the Kennedy concurrence is the least common denominator (always, when his view favors federal authority)."). *See also*, *e.g.*, *Northern California River Watch v. City of Healdsburg*, 457 F.3d 1023, 1029 (9th Cir. 2006) ("Justice Kennedy . . . provides the controlling rule of law.").
70. For example, in Justice Kennedy's discussion of the "ordinary high-water mark" standard, he notes that this

standard "may well" provide a reasonable measure of whether "specific minor tributaries bear a sufficient nexus with other regulated waters to constitute 'navigable waters' under the Act." *Rapanos v. United States*, 126 S.Ct. 2208, 2249 (2006) (Kennedy, J., concurring in the judgment). This comment, though dictum, suggests that Justice Kennedy would subject streams to the same nexus analysis as wetlands. Furthermore, Justice Kennedy characterizes the *SWANCC* decision as having held that to constitute "navigable waters" under the Act, "a *water or wetland* must possess a 'significant nexus' to waters that are or were navigable in fact or that could reasonably be so made." *Id.* at 2236 (emphasis added). He also notes that the Corps can reasonably interpret the Act "to cover the paths of . . . impermanent streams." *Id.* at 2243. *But see San Francisco Baykeeper v. Cargill Salt Division*, 481 F.3d 700 (9th Cir. 2007) (asserting that in *Rapanos*, "[n]o Justice, even in dictum, addressed the question whether all waterbodies with a significant nexus to navigable waters are covered by the Act"). To date, the better-reasoned view is that the significant nexus test *may* properly be applied to streams. Of course, this is not to say that Clean Water Act jurisdiction over streams exists *only* when streams satisfy the significant nexus test. As Table 2 in Chapter Four makes clear, a stream can come within Clean Water Act coverage for a variety of reasons—some of which may be easier to demonstrate than a significant nexus.

71. *See Rapanos v. United States*, 126 S.Ct. 2208, 2248 (2006) (Kennedy, J., concurring in the judgment).

72. *E.g.*, *Hamman v. American Motors Corp.*, 345 N.W.2d 699, 700-01 (Mich. App. 1984) (evaluating a defendant's claim of "inconvenient forum" depends on balancing of "various factors," and plaintiff's choice of forum is entitled to greater weight when there is a "significant nexus" between the litigation and plaintiff's chosen forum); *Reed & Reed, Inc. v. Weeks Marine, Inc.*, 335 F.Supp.2d 110, 121 (D. Maine 2004) (admiralty law is applied to a tort claim where the alleged wrong bears a "significant relationship or nexus" to traditional maritime activity); *In re Lencoke Trucking, Inc.*, 99 B.R. 200, 201 (W.D.N.Y. 1989) (a case is "related" to Title 11 bankruptcy proceedings, and thus subject to a Bankruptcy Court's jurisdiction, where there is "a significant connection or nexus" between the case and the bankruptcy proceeding; the scope of jurisdiction depends on whether the outcome of the case "could conceivably have any effect" upon the bankrupt estate); *In re Delphi Corp. Securities, Derivative and "ERISA" Litigation*, 403 F.Supp.2d 1358 (Jud. Pan. Mult. Lit. 2005) (court found in establishing new Multi-District Litigation docket that Eastern District of Michigan had a "significant nexus" to the litigation, based on consideration of several factors); *Bass v. SMG, Inc.*, 765 N.E.2d 1079, 1089 (Ill. App. 2002) (tort claims with a "significant relationship or nexus" with a contract containing a broad arbitration clause are arbitrable; courts must examine the specific links between the claims and the subject matter of the contract); *Norton v. Liddel*, 620 F.2d 1375, 1380 (10th Cir. 1980) (to maintain civil rights claim against a private defendant who allegedly conspired with an absolutely immune state official, the plaintiff must prove existence of "a significant nexus or entanglement" between the state official and the private party, in relation to the steps taken by each to fulfill the objects of their conspiracy; this must be determined "of necessity, on a case-to-case basis"); *Reiss v. Societe Centrale Du Groupe Des Assurances Nationales*, 235 F.3d 738, 746-47 (2nd Cir. 2000) (there is jurisdiction over a foreign state in federal court under an exception to the Foreign Sovereign Immunities Act where a "significant nexus" exists between commercial activity carried on in the United States by the foreign state and a plaintiff's legal claim); *Hill v. Virginia*, 438 S.E.2d 296, 300 (Va. App. 1993) (for evidence of a prior offense to be admitted to prove intent in a new proceeding, a "significant nexus" must exist between the prior offense and the intent required to prove the charge at hand; this nexus must consist of more than a basic recitation of the fact that intent is an element of the crime); *Feldman v. Kohler Co.*, 918 S.W.2d 615, 620, 623 (Tex. App. 1996) (contractor can claim immunity from state tort law under government contractor defense where a "significant nexus" exists between a product design configuration and the policy reasons behind the federal government's approval of that design configuration); and *Tucker v. State*, 411 A.2d 603, 604-05 (Del. 1980) (where police continued to interrogate defendant after defendant had declined to make a statement, and eventually obtained incriminating statements, a "significant and unacceptable nexus" existed between continued questioning and defendant's statements that rendered their admission a violation of the Fifth Amendment right against selfincrimination). Over the years, courts have also assessed factual connections using similar terminology, such as "substantial nexus" and "significant" or "substantial" "relationship." The common feature in these assessments tends to be a case-by-case, fact-specific analysis of some type of relationship as a means of determining its legal importance.

73. *Rapanos v. United States*, 126 S.Ct. 2208, 2248 (2006) (Kennedy, J., concurring in the judgment).

74. *See id.* at 2247-48 (citation omitted).

75. *Id.* at 2248, quoting 33 U.S.C. § 1231(a), CWA § 101(a).

76. In fact, Justice Kennedy emphasizes the "[i]mportant public interests" that are served by "the Clean Water Act in general and by the protection of wetlands in particular." *Id.* at 2247. He then cites the example of nutrient-rich runoff from the Mississippi River having created a hypoxic, or oxygen-depleted, "dead zone" in the Gulf of Mexico that, at times, approaches the size of Massachusetts and New Jersey. *Id.* For more on the (in)famous dead zone in the Gulf of Mexico *see also* National Centers for Coastal Ocean Science, *Hypoxia in the Gulf of Mexico*, at http://oceanservice.noaa.gov/products/pubs_hypox.html. Hypoxia reduces biological productivity and leads to fish kills, creating expansive areas of water known as "dead

zones" that are essentially devoid of life. United States Dep't of Agric., Econ. Res. Serv., *"Dead Zone" in the Gulf: Addressing Agriculture's Contribution*, Amber Waves 8 (Nov. 2003).

77. H.R. Rep. No. 911, 92d Cong., 2d Sess. 76 (1972).
78. Justice Kennedy articulates the significant nexus test in the context of wetlands: "wetlands possess the requisite nexus, and thus come within the statutory phrase 'navigable waters,' if the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as 'navigable.'" *Rapanos v. United States*, 126 S.Ct. 2208, 2248 (2006) (Kennedy, J., concurring in the judgment).
79. *Rapanos*, 126 S.Ct. at 2248, 2251.
80. *Id.* at 2248.
81. *Id.* at 2248, 2251.
82. *Id.* at 2250. Likewise, Justice Kennedy notes that the following evidence presented by the Corps in *Carabell* includes "factors relevant to the jurisdictional inquiry," although he cautions that the "conditional language" in the Corps' assessment could suggest "an undue degree of speculation":

    [b]esides the effects on wildlife habitat and water quality, the [Corps District office] also noted that the project would have a major, long-term detrimental effect on wetlands, flood retention, recreation and conservation and overall ecology." . . . The proposed work would destroy/adversely impact an area that retains rainfall and forest nutrients and would replace it with a new source area for runoff pollutants. Pollutants from this area may include lawn fertilizers, herbicides, pesticides, road salt, oil, and grease. These pollutants would then runoff directly into the waterway . . . . Overall, the operation and use of the proposed activity would have a major, long term, negative impact on water quality. The cumulative impacts of numerous such projects would be major and negative as the few remaining wetlands in the area are developed. . . . [B]y eliminat[ing] the potential ability of the wetland to act as a sediment catch basin," the proposed project "would contribute to increased runoff and accretion . . . along the drain and further downstream in Auvase Creek. . . . [I]ncreased runoff from the site would likely cause downstream areas to see an increase in possible flooding magnitude and frequency. (Citations omitted.) *Id.* at 2251-52.
83. *Id.*
84. *Rapanos*, 126 S.Ct. at 2250-51 (Kennedy, J., concurring in the judgment).
85. *See Rapanos*, 126 S.Ct. at 2251. "The Court of Appeals, considering the Carabell case after its Rapanos decision, framed the inquiry in terms of whether hydrologic connection is required to establish a significant nexus. The court held that it is not, and that much of its holding is correct." *Id.*
86. *Id.*
87. *Id.* at 2245-46. "In many cases, moreover, filling in wetlands separated from another water by a berm can mean that flood water, impurities, or runoff that would have been stored or contained in the wetlands will instead flow out to major waterways." *Id.* at 2245.
88. *Id.* at 2248.
89. *See id.* at 2248, 2249, 2251.
90. The Corps and EPA have not attempted to define the term "region" for purposes of the significant nexus test. However, they have issued a guidance in which they interpret the term "similarly situated" as used by Justice Kennedy "to include all wetlands adjacent to the same tributary." Corps/EPA Joint Guidance Document on *Rapanos* at 9 (June 5, 2007). Although this view represents a much more constrained approach to aggregation than is suggested in this section of the *Handbook*, the reader should bear two points in mind: (1) the wording of the guidance does not necessarily *exclude* consideration of similarly situated lands in the broader region; and (2) the guidance is a non-binding document—still subject to public review and comment—that the Agencies acknowledge may ultimately be revised or suspended. *See id.* For more on the guidance, see Appendix Three of this *Handbook*.
91. *E.g.*, *Rapanos*, 126 S.Ct. at 2248, 2249, 2251.
92. *Id.* at 2249.
93. *Id.* at 2248.
94. *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001).
95. *See* Appendix Two of the *Handbook*, summarizing lower court rulings to date.
96. *See*, *e.g.*, *Rapanos v. United States*, 126 S.Ct. 2208, 2266 (2006) (Breyer, J., dissenting) (concluding that "today's opinions, taken together, call for the Army Corps of Engineers to write new regulations, and speedily so").
97. *See*, *e.g.*, *United States v. Riverside Bayview Homes, Inc.*, 474 U.S. 121, 129 (1985) (upholding Corps regulation that covers "all wetlands adjacent to navigable or *interstate waters* and their tributaries") (emphasis added). *See also* 33 C.F.R. § 328.3(a)(2) (Corps/Section 404 permitting program); 40 C.F.R. § 230.3(s)(2) (EPA/Section 404 permitting program); 40 C.F.R. § 122.2 (EPA/NPDES permitting program).
98. *See supra* note 34.
99. *See*, *e.g.*, *United States v. Riverside Bayview Homes, Inc.*, 474 U.S. 121, 139 (1985) (holding that Corps acted reasonably in interpreting CWA to cover wetlands adjacent to traditional navigable waters); *Rapanos v. United States*, 126 S.Ct. 2208, 2248 (2006) (Kennedy, J., concurring in the judgment) (reaffirming holding of *Riverside Bayview*). *See also* 33 C.F.R. § 328.3(a)(7), (c) (Corps/Section 404 permitting program); 40 C.F.R. § 230.3(s)(7), (b) (EPA/Section 404 permitting program); 40 C.F.R. § 122.2 (EPA/

NPDES permitting program). *But see Northern California River Watch v. City of Healdsburg*, 457 F.3d 1023 (9th Cir. 2006) (relying on significant nexus test, rather than adjacency rule, to find jurisdiction over wetlands adjacent to traditional navigable waters).

100. *Rapanos v. United States*, 126 S.Ct. 2208, 2248 (2006) (Kennedy, J., concurring in the judgment).

101. *Rapanos v. United States*, 126 S.Ct. 2208, 2225, 2226-27, 2235 (2006) (Scalia, J., plurality). Only in rare instances is the "adjacency + continuous surface connection" test likely to result in a finding of CWA coverage for a wetland where the "significant nexus" test would not. *See Rapanos*, 126 S.Ct. at 2265 n.14 (Stevens, J., dissenting). One such possible application of the "adjacency + continuous surface connection" test is where a very long tributary establishes a surface water connection between a remote wetland and traditional navigable waters. In any event, Justice Scalia's test will no doubt be easier to apply than Justice Kennedy's.

102. This test is derived from the so-called "(a)(3) waters" provision contained in the Corps and EPA regulations defining "waters of the United States." 33 C.F.R. § 328.3(a)(3) (Corps/Section 404 permitting program); 40 C.F.R. § 230.3(s)(3) (EPA/Section 404 permitting program); 40 C.F.R. § 122.2 (EPA/NPDES permitting program). The Corps and EPA have recently reaffirmed their understanding of the validity of the "(a)(3) waters" test. *See generally* Memorandum of Agreement Accompanying Corps/EPA Joint Guidance Document on *Rapanos* (June 5, 2007). Although the Supreme Court has never ruled on whether this test is a proper basis for asserting CWA jurisdiction, recent rulings of the Court cast some doubt on its continued validity under current law. *See, e.g.*, *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 531 U.S.159, 173-74 (2001) (noting that jurisdictional argument based on substantial effects on interstate commerce raises "significant constitutional questions"); and *Rapanos v. United States*, 126 S.Ct. 2208, 2249-50 (2006) (Kennedy, J., concurring in the judgment) (noting "problematic applications" of the CWA, with reference to the preceding portion of *SWANCC* majority opinion).

103. *See supra* note 97.

104. *See supra* note 34.

105. *Rapanos v. United States*, 126 S.Ct. 2208, 2225, 2226-27, 2235 (2006) (Scalia, J., plurality). Although the *Rapanos* plurality confronts the question of CWA coverage for wetlands, not streams, necessary to the result reached by the plurality is their conclusion that the category "waters of the United States" (that is, waters covered by the CWA) must include "relatively permanent, . . . continuously flowing bodies of water 'forming geographic features' that are described in ordinary parlance as 'streams . . . ,'" and which are connected to traditional interstate navigable waters. *Rapanos*, 126 S.Ct. at 2225, 2226-27 (Scalia, J., plurality).

106. *See supra* note 70 and *Rapanos v. United States*, 126 S.Ct. 2208, 2248 (2006) (Kennedy, J., concurring in the judgment). Nor does Justice Kennedy place any significance on whether an impermanent stream is natural or contained by a man-made conveyance of some type. *See, e.g.*, *id.* at 2242 (discussing the significance of the often dry Los Angeles River, which has been "encased in concrete and steel over a length of some 50 miles").

107. *See supra* note 102.

108. *See, e.g.*, *Rapanos v. United States*, 126 S.Ct. 2208, 2248 (2006) (Kennedy, J., concurring in the judgment) (explaining that the Corps may, by regulation or adjudication, choose to identify categories of tributaries that, "due to their volume of flow (either annually or on average), their proximity to navigable waters, or other relevant considerations, are significant enough that wetlands adjacent to them are likely, in the majority of cases, to perform important functions for an aquatic system incorporating navigable waters").

109. *Rapanos v. United States*, 126 S.Ct. 2208, 2221 n.5 (2006) (Scalia, J., plurality). The Corps and EPA consider waters that flow for "three months" to be "waters that have a continuous flow at least seasonally." Corps/EPA Joint Guidance Document on *Rapanos* at 5–6 (June 5, 2007).

110. *See* 33 C.F.R. § 328.3(a)(7), (c) (Corps/Section 404 permitting program); 40 C.F.R. § 230.3(s)(7), (b) (EPA/Section 404 permitting program); 40 C.F.R. § 122.2 (EPA/NPDES permitting program). *See also Rapanos v. United States*, 126 S.Ct. 2208, 2250, 2251-52 (2006) (Kennedy, J., concurring in the judgment) (noting that "the end result" in case involving a berm may be that the Corps' assertion of jurisdiction is valid); *id.* at 2263 (Stevens, J., dissenting) ("While wetlands that are physically separated from other waters may perform less valuable functions, this is a matter for the Corps to evaluate in its permitting decisions. We made this clear in *Riverside Bayview* . . . which did not impose the plurality's new requirement despite an absence of evidence that the wetland at issue had the sort of continuous surface connection required by the plurality today. . . . And as the facts of [the *Carabell* case] demonstrate, wetland separated by a berm from adjacent tributaries may still prove important to downstream water quality. . . .").

111. 33 C.F.R. § 328.3(a)(8) (Corps/Section 404 permitting program); 40 C.F.R. § 230.3(s)(7) (EPA/Section 404 permitting program); 40 C.F.R. § 122.2 (EPA/NPDES permitting program). EPA's regulations add the following clarification: "[n]otwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA." 40 C.F.R. § 230.3(s)(7); 40 C.F.R. § 122.2.

112. Justice Kennedy's discussion of aggregation in *Rapanos* was based specifically on wetlands. *Rapanos v. United States*, 126 S.Ct. 2208, 2248 (2006) (Kennedy, J., concurring in the judgment). However, the reasoning supporting his opinion applies with equal force to streams, suggesting that it may be possible to aggregate streams under the significant nexus rationale.
113. 33 C.F.R. § 328.3(a)(4) (Corps/Section 404 permitting program); 40 C.F.R. § 230.3(s)(4) (EPA/Section 404 permitting program); 40 C.F.R. § 122.2 (EPA/NPDES permitting program). The CWA does not cover waste treatment systems (including treatment ponds or lagoons designed to meet CWA requirements, but not including certain cooling ponds). 33 C.F.R. § 328.3(a)(7) (Corps/Section 404 permitting program); 40 C.F.R. § 230.3(s)(7) (EPA/Section 404 permitting program); 40 C.F.R. § 122.2 (EPA/NPDES permitting program). The question of CWA jurisdiction over waste treatment systems, particularly with respect to cooling ponds, is complex, and the regulations should be consulted.
114. *See* 33 C.F.R. §§ 328.4(b), 328.3(d), (f) (Corps/Section 404 permitting program: tidal waters); 33 C.F.R. §§ 328.4(c), 328.3(e) (Corps/Section 404 permitting program: non-tidal waters). However, the use of "ordinary high water mark" to assess jurisdiction over certain tributary streams and their adjacent wetlands has been called into doubt by Justice Kennedy's opinion in *Rapanos*. *See Rapanos*, 126 S.Ct. at 2248-49 (Kennedy, J., concurring in the judgment). The precise limits of federal jurisdiction over "waters of the United States" can change gradually due to natural causes. 33 C.F.R. § 328.5 (Corps/Section 404 permitting program).
115. *See* supra note 102.
116. Corps/EPA Joint Guidance Document on *Rapanos* at 12 (June 5, 2007).
117. *See*, *e.g.*, William J. Mitsch & James G. Gosselink, *Wetlands (3rd Ed.)* (John Wiley & Sons, Inc. 2000); J.D. Allan, *Stream Ecology: Structure and Function of Running Waters (1st Ed.)* (Chapman & Hall 1995).
118. *See*, *e.g.*, U.S. Army Corps of Engineers, *Wetlands Delineation Manual*, Wetlands Research Program Technical Report Y-87-1 (Jan. 1987); North Carolina Division of Water Quality, *Identification Methods for the Origins of Intermittent and Perennial Streams, Version 3.1* (North Carolina Department of Environment and Natural Resources, Division of Water Quality 2005).
119. *See*, *e.g.*, *Journal of the American Water Resources Association*, *Wetlands*, *Wetlands Ecology and Management*, and *Journal of Hydrology*.
120. *See*, *e.g.*, Candy C. Bartoldus, *A Comprehensive Review of Wetland Assessment Procedures: A Guide for Wetland Practitioners* (Environmental Concern, Inc. 1999); Maryland Department of Natural Resources, Chesapeake and Coastal Watershed Services, Watershed Restoration Division, *Stream Corridor Assessment Survey* (Maryland Department of Natural Resources 2001); John Galli, *Rapid Stream Assessment Technique* (Metropolitan Washington Council of Goverments 1992).
121. *See*, *e.g.*, U.S. Army Corps of Engineers, *An Approach for Assessing Wetland Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Functional Indices*, Wetlands Research Program Technical Report WRP-DE-9 (Oct. 1995); U.S. Army Corps of Engineers, *The WES Stream Investigation and Streambank Stabilization Handbook* (Oct. 1997).
122. *See, e.g.*, National Science and Technology Council Committee on Environment and Natural Resources, Integrated Assessment of Hypoxia in the Northern Gulf of Mexico (May 2000), *available at:* http://oceanservice.noaa.gov/products/pubs_hypox.html; Mississippi River/Gulf of Mexico Watershed Nutrient Task Force, Action Plan for Reducing, Mitigating, and Controlling Hypoxia in the Northern Gulf of Mexico (Jan. 2001), *available at:* http://www.epa.gov/msbasin/taskforce/pdf/actionplan.pdf.
123. *See, e.g.*, U.S. Geological Survey, National Hydrography Dataset (May. 29, 2007), *available at:* http://nhd.usgs.gov/; U.S. Fish and Wildlife Service, National Wetland Inventory (May 16, 2007), *available at:* http://www.fws.gov/nwi/.
124. *See*, *e.g.*, National Research Council, *Wetlands: Characteristics and Boundaries* (NAS 1995); Federal Interagency Stream Restoration Working Group, *Stream Corridor Restoration: Principles, Processes, and Practices*, GPO Item No. 0120-A, SuDocs No. A 57.6/2:EN3/PT.653 (Oct. 1998).
125. http://cfpub.epa.gov/surf/locate/map2.cfm. *See also* EPA's Watershed Program Home Page. http://www.epa.gov/owow/watershed/.
126. 33 U.S.C. §§ 1251-1387, available online at http://www.access.gpo.gov/uscode/title33/chapter26_.html.
127. Recent opinions of the U.S. Supreme Court are available online at the Supreme Court's website, http://www.supremecourtus.gov/opinions/opinions.html.
128. A description of the Corps' Section 404 permitting program, including links to regulations and related materials, is available online at http://www.usace.army.mil/cw/cecwo/reg/oceover.htm. EPA also provides an overview of the Section 404 permitting program online at http://www.epa.gov/owow/wetlands/facts/fact12.html, and additional links to relevant regulations are available at http://www.epa.gov/owow/wetlands/regs/index.html. A description of EPA's Section 402 NPDES permitting program, including links to regulations and related materials, is available online at http://cfpub.epa.gov/npdes/. Links to regulations and related materials for the Section 303 TMDL program are available online at http://www.epa.gov/owow/tmdl/intro.html. For more on the Corps and EPA's joint guidance document addressing Clean Water Act jurisdiction post-*Rapanos*, see Appendix Three of the *Handbook*.

129. For example, information about, and opinions issued by, the EPA's Environmental Appeals Board are available online at http://www.epa.gov/eab/.
130. More information about Corps Division and District boundaries, as well as contact information for local offices, is available online at http://www.usace.army.mil/howdoi/where.html#divisions.
131. More information about the EPA Regions, as well as contact information for local offices, is available online at http://www.epa.gov/epahome/locate2.htm.
132. *See, e.g.*, Turner Odell, "On Soggy Ground – State Protection for Isolated Wetlands," *National Wetlands Newsletter*, 25, no. 2 (Sept.-Oct. 2003), 7-10.
133. William J. Mitsch & James G. Gosselink, *Wetlands*, (3d ed., John Wiley & Sons, Inc., 2000), at 41-43; National Research Council, *Wetlands: Characteristics and Boundaries,* (National Academy of Sciences, 1995) at 36.
134. *Id.* at 3.
135. *See, e.g.*, Ken M. Fritz, Brent R. Johnson, & David M. Waters, *Field Operations Manual for Assessing the Hydrologic Permanence and Ecological Condition of Headwater Streams* (EPA 600/R-06/126, U.S. Environmental Protection Agency – Office of Research and Development, Oct. 2006); Miguel Restrepo & Pamela Waisanen, *Strategies for Stream Classification Using GIS* (U.S. Geological Survey, 2004); North Carolina Division of Water Quality, *Identification Methods for the Origins of Intermittent and Perennial Streams* (Version 3.1, North Carolina Department of Environment and Natural Resources – Division of Water Quality, Feb. 2005); Fairfax County Public Works and Environmental Services, *Perennial Stream Field Identification Protocol* (Fairfax County, May 2003).
136. *See* Mitsch & Gosselink, *supra* note 133.

    Multiple classification systems are used by scientists, regulators, and managers to identify wetlands and their functions. Cowardin's *Classification of Wetlands and Deepwater Habitats of the United States*, developed for the U.S. Fish and Wildlife Service National Wetlands Inventory, is likely the most comprehensive classification available for the nation's waters and wetlands. However, the number of categories associated with Cowardin's classification renders it unwieldy for purposes of summarizing the literature relevant to establishing a "significant nexus" to traditional navigable waters. Indeed, a substantial number of Cowardin's aquatic categories *are* traditional navigable waters. Another relevant classification system is Brinson's hydrogeomorphic (HGM) system. Developed in conjunction with the U.S. Army Corps of Engineers, the HGM approach is designed to evaluate the physical, chemical, and biological functions of wetlands. However, HGM does not easily allow for comparison of similar wetlands from different regions, requiring a regional specificity beyond the scope of this review. *See:* Lewis M. Cowardin, Virginia Carter, Francis C. Golet, Edward T. LaRoe, Classification of Wetlands and Deepwater Habitats of the United States (U.S. Fish and Wildlife Service, 1979); Mark M. Brinson, A Hydrogeomorphic Classification for Wetlands (Wetlands Research Program Technical Report WRP-DE-4, U.S. Army Corps of Engineers, Aug. 1993).
137. It should be noted that certain wetland types may "fall between the cracks" with this simple classification, *e.g.*, inland saline marshes. However, these categories cover most wetlands found in the United States.
138. *See* Mitsch & Gosselink, *supra* note 133, at 72.
139. *See, e.g.,* North Carolina Division of Water Quality, *supra* note 135; Fairfax County Public Works and Environmental Services, *supra* note 135; Restrepo & Waisanen, *supra* note 135; Featured Collection: Headwaters Hydrology, 43(1), Journal of the American Water Resources Association, 1-280 (Feb. 2007).
140. *See* Mitsch & Gosselink, *supra* note 133, at 378-82.
141. National Research Council, *Compensating for Wetland Losses Under the Clean Water Act*, (National Academy of Sciences, 2001) at 49.
142. *See* Mitsch & Gosselink, *supra* note 133, at 409-14.
143. D.M. Klarer & D.F. Millie, *Amelioration of Storm-water Quality by a Freshwater Estuary*, 116 Archiv für Hydrbiologie, 375-89 (1989); William J. Mitsch & B.C. Reeder, *Modelling Nutrient Retention of a Freshwater Coastal Wetland: Estimating the Roles of Primary Productivity, Sedimentation, Resuspension, and Hydrology*, 54 Ecological Modelling, 151-87 (1991); William J. Mitsch & B.C. Reeder, *Nutrient and Hydrologic Budgets of a Great Lakes Coastal Freshwater Wetland During a Drought Year*, 1(4) Wetlands Ecology and Management, 211-23 (1992); *see* Mitsch & Gosselink, *supra* note 133, at 409.
144. W.G. Crumpton & L.G. Goldsborough, *Nitrogen Transformation and Fate in Prairie Wetlands*, 8 Great Plains Research, 57-82 (1998).
145. Dennis F. Whigham & Thomas E. Jordan, *Isolated Wetlands and Water Quality*, 23(3) Wetlands, 541-49 (2003), at 543-44.
146. Mark M. Brinson, *A Hydrogeomorphic Classification for Wetlands* (Wetlands Research Program Technical Report WRP-DE-4, U.S. Army Corps of Engineers, Aug. 1993), at 20.
147. Paul H. Zedler, *Vernal Pools and the Concept of "Isolated Wetlands,"* 23(3) Wetlands, 597-607 (2003).
148. Ralph W. Tiner, *Geographically Isolated Wetlands of the United States*, 23(3) Wetlands, 494-516 (2003), at 505; P.J. Philips & R.J. Shedlock, *Hydrology and Chemistry of Ground Water and Seasonal Ponds in the Atlantic Coastal Plain in Delaware*, 141 Journal of Hydrology, 157-78 (1993); M.A. Hayes, *Maryland Wetland Resources*, in National Water Summary on Wetland Resources, 219-24 (J.D. Fretwell, J.S. Williams, & P.J. Redman, compilers, U.S. Geological Survey, 1996).
149. *See* Mitsch & Gosselink, *supra* note 133, at 397.
150. A.J. Derkson, *Autumn Movements of Underyearling Northern Pike,* Esox lucius, *from a Large Manitoba Marsh*, 103

Canadian Field Naturalist, 429-31 (1990); *see* Mitsch & Gosselink, *supra* note 133, at 400.

151. T.D. Stephenson, *Fish Reproductive Utilization of Coastal Marshes of Lake Ontario Near Toronto,* 16 Journal of Great Lakes Research, 71-81 (1990); *See* Mitsch & Gosselink, *supra* note 133, at 400.
152. *Id.* at 419, 454.
153. Barbara L. Bedford & Kevin S. Godwin, *Fens of the United States: Distribution, Characteristics, and Scientific Connection Versus Legal Isolation*, 23(3) Wetlands, 608-29 (2003), at 621-22.
154. *See* Whigham & Jordan, *supra* note 145, at 544-45.
155. Elon S. Verry & D.R. Timmons, Waterborne Nutrient Flow through an Upland-Peatland Watershed in Minnesota, 63.5 Ecology, 1456-67 (1982).
156. *See* Brinson, *supra* note 146, at 21.
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