THE CLEAN WATER ACT JURISDICTIONAL HANDBOOK

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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.

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.

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"

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 defi

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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*.

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

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]

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]1

to exercnclu8444 Tm(Specifi)raditionreasonably be so made. a berm 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

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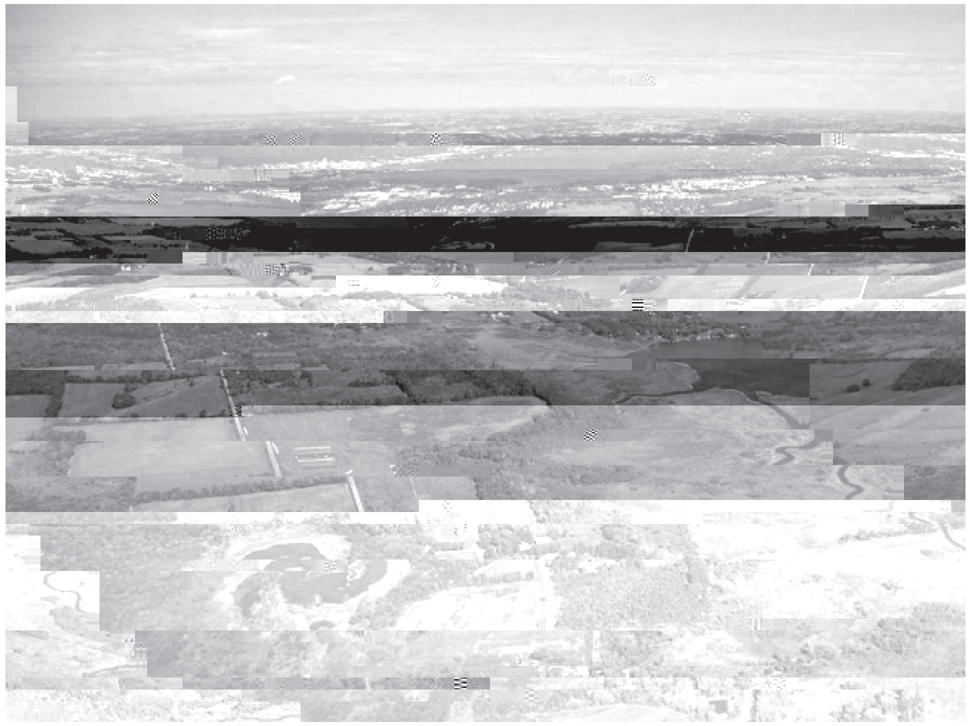
In the course of his opinion, Justice Kennedy identifies various functions



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]

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

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

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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.

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.

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	QUESTION	LEGAL RULE OR TEST
1	Does the stream ?[103]	Interstate Waters
2	Is the stream ? (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 or that ?[105]	Continuously Flowing/ Relatively Permanent Test
4	Does the stream (whether continuously flowing or not) the (A) , or (B) , or (C) —of any ?[106]	Significant Nexus Test
5	Could the	

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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

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.

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]

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*

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

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.

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 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

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]

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*.

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:

Brinson, Mark M. *A Hydrogeomorphic Classification for Wetlands* (Wetlands Research Program Technical Report WRP-DE-4). Washington, DC: U.S. Army Corps of Engineers, 1993.

Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe. *Classification of Wetlands and Deepwater Habitats of the United States*. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service, 1979.

Mac, M.J., P.A. Opler, C.E. Puckett Haeker, and P.D. Doran. *Status and Trends of the Nation's Biological Resources*. Reston, VA: U.S. Department of the Interior, U.S. Geological Survey, 1998.

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/>.

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.

Summary of Lower Court Rulings Since

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.

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

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

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").

CORPS/EPA JOINT GUIDANCE DOCUMENT

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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

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).)

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)

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 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"
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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*

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

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

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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*

für Theoretische und Augewantre Limnologie, 1828-34 (1984); *see* Mitsch & Gosselink, *supra* note 133, at 548.

182. *Id.* at 559.

183. R.L. Vannote, G.W. Minshall, K.W. Cummins, J.R. Sedell, & C.E. Cushing, *The River Continuum Concept*, 37 Canadian Journal of Fisheries and Aquatic Sciences, 130-37 (1980); *see* Mitsch & Gosselink, *supra* note 133, at 559.

184. Mark M. Brinson, A.E. Lugo, & S. Brown, *Primary*

characteristics of each stream reach are to be evaluated "at the farthest downstream limit of such tributary." *Id.*

211. Bruce J. Peterson, Wilfred M. Wollhein, Patrick J. Mulholland, Jackson R. Webster, Judy L. Meyers, Jennifer L. Tank, Eugènia Martí, William B. Bowden, H. Maurice Valett, Anne E. Hershey, William H. McDowell, Walter K. Dodds, Stephen K. Hamilton, Stanley Gregory, & Donna D. Morrall, *Control of Nitrogen Export from Watersheds by Headwater Streams*, 292 Science, 86-90 (2001); Richard B. Alexander, Elizabeth W. Boyer, Richard A. Smith, Gregory E. Schwarz, & Richard B. Moore, *The Role of Headwater Streams in Downstream Water Quality*, 43(1) Journal of the American Water Resources Association, 41-59 (2007); Frank J. Triska, John H. Duff, Richard W. Sheibley, Alan P. Jackman, & Ronald J. Avanzino, *DIN Retention-Transport Through Four Hydrologically Connected Zones in a Headwater Catchment of the Upper Mississippi River*, 43(1) Journal of the American Water Resources Association, 60-71 (2007).
212. *See* Peterson *et al.*, *supra* note 211.
213. *See* Meyers *et al.*, *supra* note 208, at 14.
214. *Id.*
215. *Id.* at 13.
216. L. Allan James, *Sustained Storage and Transport of Hydraulic Gold Mining Sediment in the Bear River, California*, 79(4) Annals of the Association of American Geographers, 570-92 (1989).
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218. *See* Meyers *et al.*, *supra* note 208.
219. Judy L. Meyers, David L. Strayer, J. Bruce Wallace, Sue L. Eggert, Gene S. Helfman, & Norman E. Leonard, *The Contribution of Headwater Streams to Biodiversity in River Networks*, 43(1) Journal of the American Water Resources Association, 86-103 (2007).
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221. *Id.*
222. *Id.*
223. *Id.*
224. T.G. Brown & G.F. Hartman, *Contribution of Seasonally Flooded Lands and Minor tributaries to the Production of Coho Salmon in Carnation Creek, British Columbia*, 117 Transaction of the American Fisheries Society, 546-51 (1988); P.J. Wigington, J.L. Ebersole, M.E. Colvin,. S.G. Leibowitz, B. Miller, B. Hansen, H. Lavigne, D. White, J.P. Baker, M.R. Church, J.R. Brooks, M.A. Cairns, & J.E. Compton, *Coho Salmon Dependence on Intermittent Streams*, 4 Frontiers in Ecology and Environment, 513-18 (2006); *see* Meyers *et al.*, *supra* note 219.
225. *Id.*
226. *See Wetlands: Characteristics and Boundaries*, *supra* note 133, at 29.
227. Allan Hirsch, *Regulatory Context for Cumulative Impact Research*, 12(5) Environmental Management, 715-23 (2005); J. Bradley Johnson, *Hydrogeomorphic Wetland Profiling: An Approach to Landscape and Cumulative Impacts Analysis*, (EPA/620/R-05/001, U.S. Environmental Protection Agency, Jan. 2005), at vi.
228. *Id.*

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