Jacques and D.L. Lorenz, *Techniques for Estimating the Magnitude and Frequency of Floods of Ungauged Streams in Minnesota*, USGS Water-Resources Investigations Report 84-4170 (Washington, D.C.: U.S. Geological Survey, 1988); D.L. Lorenz, *et al.*, *Techniques for Estimating the Magnitude and Frequency of Peak Flows on Small Streams in Minnesota Based on Data through Water Year 2005*, U.S. Geological Survey Scientific Investigations Report 2009-5250 (Reston, VA: U.S. Geological Survey, 2010)). Similar to wetlands, ponds are often used by invertebrate, reptile, and amphibian species that also utilized downstream waters for various life history requirements, particularly because many ponds, particularly temporary ponds, are free of predators, such as fish, that prey on larvae. The American toad and Eastern newt are widespread habitat generalists that can move among streams, wetlands, and ponds to take advantage of each aquatic habitat, feeding on aquatic invertebrate prey, and avoiding predators. *See*, e.g., *Id.* at 5-33 (citing K.J. Babbitt *et al.*, "Patterns of Larval Amphibian Distribution along a Wetland Hydroperiod Gradient," *Canadian Journal of Zoology-Revue Canadienne De Zoologie* 81:1539-1552 (2003); D.M. Green, "*Bufo americanus*, American Toad," *in* M. Lannoo, ed., *Amphibian Declines: The Conservation Status of United States Species*, (Berkeley, CA: University of California Press, 2005), pp. 692-704; T.W. Hunsinger and M.J. Lannoo, "*Notophthalmus viridescens*, Eastern Newt," *in* M. Lannoo, ed., *Amphibian Declines: The Conservation Status of United States Species*, (Berkeley, CA: University of California Press, 2005), pp. 912-914; J.W. Petranka and C.T. Holbrook, "Wetland Restoration for Amphibians: Should Local Sites Be Designed to Support Metapopulations or Patchy Populations?," *Restoration Ecology* 14:404-411 (2006)). Additionally, stream networks that are not part of the tributary system (*e.g.*, streams in closed basins without an (a)(1) to (a)(3) water or losing streams and other streams that cease to flow before reaching downstream (a)(1) to (a)(3)

the literature may, at some future date when it is more mature, support the existence or the likelihood of the existence of a connection between these aquatic resources and downstream waters. S*ee, e.g., id.* at 5-57, 6-7 . The agencies do not propose to define any of these waters categorically as "waters of the United States" such that a case-specific significant nexus determination is not required. The agencies seek comment, data, and information on whether there are subcategories of "other waters" or specific combinations of characteristics that are "likely, in the majority of cases, to perform important functions for an aquatic ecosystem incorporating navigable waters," and, thus, should be *per se* jurisdictional. For example, if there are additional studies addressing the connectivity of prairie potholes in the Red River Valley, including the factors influencing that connectivity and how it is important to particular downstream waters, that would be relevant information.

Under today's proposal, on a case-specific basis, "other waters" that have a significant nexus to an (a)(1) through (a)(3) water are waters of the United States under (a)(7). Tthe scientific literature and data in the Report and elsewhere support that some "other waters" (including some of those in the case studies), along with other similarly situated waters in the region, do greatly affect the chemical, physical, or biological integrity of (a)(1) through (a)(3) waters, and thus would be jurisdictional under (a)(7).

Though much of the literature cited in the Report relates to "other waters" that are wetlands, the Report indicates that non-wetland waters that are not (a)(1) through (a)(6) waters also can have chemical, physical, or biological connections that significantly impact downstream waters. For instance, non-adjacent ponds or lakes that are not part of the tributary network can still be connected to downstream waters through chemical, physical, and biological connections. Lake storage has been found to attenuate peak streamflows in Minnesota. *Id.* at 5-25 (citing J.

glaciated vernal pools in western states are periodically connected downstream and have functioned as refuges of plants and animal diversity since the Mesozoic era; they are currently reservoirs of biodiversity and are possibly genetically connected to other locations and aquatic habitats through continuing dispersal. *Id.* at 5-72 (citing J.L. King, *et al.*, "Species Richness, Endemism and Ecology of Crustacean Assemblages in Northern California Vernal Pools," *Hydrobiologia* 328:85-116 (1996); E.T. Bauder and S. McMillan, "Current Distribution and Historical Extent of Vernal Pools in Southern California and Northern Baja California, Mexico," *in* C. W. Witham, *et al.*, ed., (1998), pp. 56-70; J.E. Keeley and P.H. Zedler, "Characterization and Global Distribution of Vernal Pools," *in* C.W. Witham, *et al.*, ed., (1998), pp. 1-14; P.H. Zedler, "Vernal Pools and the Concept of 'Isolated Wetlands,'" *Wetlands* 23:597-607 (2003)). Organisms, including invertebrates and zooplankton may be flushed from Western pools into downstream waters (sometimes over long distances) during the seasonal periods of overflow, carried by animal vectors (including humans), or dispersed by wind, further supporting a biological connection between western pools and downstream waters. *Id.* at 5-73 (citing B. Vanschoenwinkel, *et al.*, "Wind Mediated Dispersal of Freshwater Invertebrates in a Rock Pool Metacommunity: Differences in Dispersal Capacities and Modes," *Hydrobiologia* 635:363-372 (2009)).

The evidence in the literature regarding Carolina and Delmarva bays, prairie potholes, and vernal pools is illustrative of the literature regarding "other waters" that are not (a)(1) through (a)(6) waters. Scientific literature to date has infrequently had as the main objective of the study to evaluate the connectivity to downstream waters, though this is a topic of increasing interest to scientists. S.G. Leibowitz and T.-L. Nadeau, "Isolated Wetlands: State-of-the-Science and Future Directions," *Wetlands* 23:517-531 (2003). Nevertheless, the relevant information in

(2008)). Indirect evidence indicates that Northern vernal pools without perched aquifers are hydrologically connected to downstream waters via surface and sub-surface flows. *Id.* at 5-71 to 5-72 (citing R.B. Boone, *et al.*, "Simulating Vernal Pool Hydrology in Central Minnesota, USA," *Wetlands* 26:581-592 (2006)). Although individually small, temporary storage of heavy rainfall and snowmelt in vernal pool systems can attenuate flooding, provide a reservoir for adjacent vegetation during the spring growth period, and increase nutrient availability, particularly when vernal pools are considered in the aggregate with similarly situated vernal pools. *See, e.g., id.* at 5-72 (citing W.A. Hobson and R.A. Dahlgren, "Soil Forming Processes in Vernal Pools of Northern California, Chico Area," *in* C. W. Witham, *et al.*, ed., *Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference*, (Sacramento, CA: California Native Plant Society, 1998), pp. 24-37). During the seasonal period of inundation, aquatic species depend on vernal pools for completion of their life cycles. *Id.* at 5-67 (citing P.H. Zedler, "Vernal Pools and the Concept of 'Isolated Wetlands,'" *Wetlands* 23:597-607 (2003)). Many insects and amphibians that can live in streams or more permanent pools opportunistically use Northern vernal pools as alternative breeding habitat, refuge from predators or environmental stressors, hunting or foraging habitat, or stepping-stone corridors for dispersal and migration, providing biological connections between pools and downstream waters. *Id.* at 5-73 (citing R.D. Semlitsch and J.R. Bodie, "Are Small, Isolated Wetlands Expendable?," *Conservation Biology* 12:1129-1133 (1998); R.T. Brooks, "Annual and Seasonal Variation and the Effects of Hydroperiod on Benthic Macroinvertebrates of Seasonal Forest ('Vernal') Ponds in Central Massachusetts, USA," *Wetlands* 20:707-715 (2000); J.W. Gibbons, *et al.*, "Remarkable Amphibian Biomass and Abundance in an Isolated Wetland: Implications for Wetland Conservation," *Conservation Biology* 20:1457-1465 (2006)). As stated previously, non-

66. In turn, these features affect river geomorphology and biological communities, thus having an impact on physical and biological integrity of downstream waters. Additionally, potholes may have direct biological effects on downstream river networks via connectivity of resident populations, although these effects are less well-known and studied. *Id.* Some prairie potholes also discharge through overland flow when they have reached their capacity to hold water, often spilling over into downstream waters. *Id.* at 5-62 (citing Winter and Rosenberry 1998; Leibowitz and Vining 2003; S.N. Kahara, *et al.*, "Spatiotemporal patterns of wetland occurrence in the prairie pothole region of eastern South Dakota," *Wetlands* 29:678-689 (2009)).

Vernal pools are typically shallow seasonal wetlands that accumulate water during colder, wetter months and gradually dry down during warm, dryer months. *Id.* at 5-66. Vernal pools are generally separated into two categories: western vernal pools (located in coastal areas of the Western states) and northern vernal pools (located in glaciated areas of Northeastern and Midwestern states), which the case study examines separately. *Id.* at 5-67 (citing P.H. Zedler, "Vernal Pools and the Concept of 'Isolated Wetlands,'" *Wetlands* 23:597-607 (2003)). In the aquatic phase, some western vernal pools are filled to capacity in most years, creating conditions under which water can flow from pools into downstream waters, thus providing a seasonal hydrologic connection to downstream waters. *Id.* at 5-22, 5-70 to 5-71 (citing T. Hanes, and L. Stromberg, "Hydrology of vernal pools on non-volcanic soils in the Sacramento Valley," *in* C.W. Witham, *et al.*, ed., *Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference* (Sacramento, CA: California Native Plant Society, 1998), pp. 38-49; C.R. Pyke, "Simulating vernal pool hydrologic regimes for two locations in California, USA," *Ecological Modelling* 173:109-127 (2004); M.C. Rains, *et al.*, "Geological control of physical and chemical hydrology in California vernal pools," *Wetlands* 28:347-362

in the form of spring snowmelt runoff and/or direct summer rainfall is the primary source of water inflows, though some potholes also receive groundwater discharge. *Id.* at 5-58 (citing T.C. Winter and D.O. Rosenberry, "Hydrology of Prairie Pothole Wetlands during Drought and Deluge: A 17-year Study of the Cottonwood Lake Wetland Complex in North Dakota in the Perspective of Longer Term Measured and Proxy Hydrological Records," *Climatic Change* 40:189-209 (1998); R. Carroll, *et al.*, "Simulation of a Semipermanent Wetland Basin in the Cottonwood Lake Area, East-Central North Dakota," *Journal of Hydrologic Engineering* 10:70-84 (2005)). Water outflow occurs mostly through evapotranspiration and also through shallow or regional groundwater recharge. *Id.* (citing R. Carroll, *et al.* 2005; G. van der Kamp and M. Hayashi, "Groundwater-Wetland Ecosystem Interaction in the Semiarid Glaciated Plains of North America," *Hydrogeology Journal* 17:203-214 (2009)). The degree to which potholes are connected or have the ability to be connected to downstream waters is dependent on many factors such as distance to rivers and streams, topography, precipitation, climate cycles (seasonal and on longer time scales), biotic community composition, and man-made drainage. *Id.* at 5-66. Within the PPR, distance to rivers and streams is strongly influenced by the three major physiographic regions (Red River Valley, Drift Prairie, and Missouri Coteau), which vary in number of potholes and stream density, among other factors with relevance to connectivity. *Id.* at 5-59, 5-66. Potholes in the Red River Valley, in particular, because of the wetter climatic condition and the predominant soil type, may be a region with strong connectivity to downstream waters. *Id.* at 5-61, 5-62 (citing S.G. Leibowitz, and K.C. Vining, "Temporal connectivity in a prairie pothole complex," *Wetlands* 23:13-25 (2003)). Hydrologic sink and/or source functions of potholes can physically and chemically impact downstream waters in the PPR, including multiple aspects of flow and associated transport of nutrients, sediment and pesticides. *Id.* at 5-

qualify as either tributary waters or adjacent waters. A brief summary of the findings of each case study follows below.

Carolina and Delmarva bays are elliptical-shaped, ponded depressional wetlands located along the Atlantic Coastal Plain from Northern Florida to New Jersey. *Report* at 5-49 (citing W.F. Prouty, "Carolina Bays and Their Origin," *Bulletin of the Geological Society of America* 63:167-224 (1952); D.D. Williams, "Environmental Constraints in Temporary Fresh Waters and Their Consequences for the Insect Fauna," *Journal of the North American Benthological Society* 15:634-650 (1996); T.W. Hunsinger and M.J. Lannoo, "*Notophthalmus viridescens*, Eastern Newt," *in* M.J. Lannoo, ed., *Amphibian Declines: The Conservation Status of United States Species* (Berkeley, CA: University of California Press, 2005), pp. 912-914). Bays typically are in close proximity to each other or to streams, and are surrounded by very flat land, which is thought to likely result in surface water connections in large rain events. *Id.* at 5-49. Amphibians and reptiles use bays extensively for breeding and rearing young; these animals can disperse many meters on the landscape and possibly enter or be food in downstream waters. Similarly, bays foster abundant insects that have the ability to become part of the downstream food chain for fish.

Prairie potholes are a complex of glacially-formed wetlands and waterbodies, usually occurring in depressions that lack permanent natural outlets, and are located in the north-central United States and southern Canada, the area commonly known as the Prairie Pothole Region (PPR). *Report* at 5-58 (citing H.A. Kantrud, *et al.*, *Prairie Basin Wetlands of the Dakotas: A Community Profile*, Biological Report 85(7.28) (Washington, D.C.: U.S. Department of the Interior, Fish and Wildlife Service and U.S. Environmental Protection Agency, 1989)). The clay that underlies potholes allows for the collection and temporary retention of water. Precipitation

Geological Survey, 2002); R.A. Gleason, *et al.*, *Estimating Water Storage Capacity of Existing and Potentially Restorable Wetland Depressions in a Subbasin of the Red River of the North*, U.S. Geological Survey Open-File Report 2007-1159 (Reston, VA: U.S. Geological Survey, 2007); D.L. Lorenz, *et al.*, "Techniques for Estimating the Magnitude and Frequency of Peak Flows on Small Streams in Minnesota Based on Through Water Year 2005," *USGS Scientific Investigations Report* 2009-5250, (Reston, VA: U.S. Geological Survey, 2010)). Filling wetlands reduces water storage capacity in the landscape and causes runoff from rainstorms to overwhelm the remaining available water conveyance system. *See, e.g.,* C.A. Johnston, *et al.*, "The Cumulative Effect of Wetlands on Stream Water Quality and Quantity," *Biogeochemistry* 10:105-141 (1990); A.L. Moscrip and D.R. Montgomery, "Urbanization, Flood Frequency, and Salmon Abundance in Puget Lowland Streams," *Journal of the American Water Resources Association* 33:1289-1297 (1997); N.E. Detenbeck, *et al.*, "Evaluating Perturbations and Developing Restoration Strategies for Inland Wetlands in the Great Lakes Basin," *Wetlands* 19(4): 789-820 (1999); N.E. Beck, *et al.*, "Relationship of Stream Flow Regime in the Western Lake Superior Basin to Watershed Type Characteristics," *Journal of Hydrology* 309(1-4): 258-276 (2005). Wetlands, even when lacking a hydrologic connection downstream, improve downstream water quality by accumulating nutrients, trapping sediments, and transforming a variety of substances. *See, e.g.*, National Research Council, *Wetlands: Characteristics and Boundaries* (Washington, D.C.: National Academy Press, 1995), p. 38.

As examples, the Report includes case studies of the chemical, physical, and biological connections that Carolina and Delmarva Bays, prairie potholes, and vernal pools have with downstream waters. These waters may fit into the category of "other waters" where they do not

Designed to Support Metapopulations or Patchy Populations?," *Restoration Ecology* 14:404-411 (2006)).

Even when a surface or groundwater hydrologic connection between a water and a downstream water is visibly absent, many waters still have the ability to substantially influence the integrity of downstream waters. However, such circumstances would be uncommon. *Id.* at 5-22 to 5-25. Aquatic systems that may seem disconnected hydrologically are often connected but at irregular timeframes or through subsurface flow, and perform important functions that can be vital to the chemical, physical or biological integrity of downstream waters. Some wetlands that are not adjacent may be hydrologically disconnected most of the time but connected to the stream network during rare high-flow events. The lack of a hydrologic connection also allows for water storage in "other waters," attenuating peak streamflows, and, thus, downstream flooding, and also reducing nutrient and soil pollution in downstream waters. *Report* at 5-25 to 5-26, 5-36. Prairie potholes a great distance from any tributary, for example, are thought to store significant amounts of runoff. *Id.* at 5-36 (citing R.P. Novitzki, "Hydrologic Characteristics of Wisconsin's Wetlands and Their Influence on Floods," *in* P. Greeson, *et al.*, ed., *Wetland Functions and Values: The Status of Our Understanding*, Proceedings of the National Symposium on Wetlands (Minneapolis, MN: American Water Resources Association, 1979), pp. 377-388; D.E. Hubbard and R.L. Linder, "Spring Runoff Retention in Prairie Pothole Wetlands," *Journal of Soil and Water Conservation* 41:122-125 (1986); J. Jacques and D.L. Lorenz, "Techniques for Estimating the Magnitude and Frequency of Floods in Minnesota," *Water Resources Investigations Report* 87-4170, (St. Paul, MN: U.S. Geological Survey, 1988); K.C. Vining, "Simulation of Streamflow and Wetland Storage, Starkweather Coulee Subbasin, North Dakota, Water Years 1981-98," *Water-Resources Investigations Report* 02-4113 (Bismarck, North Dakota: U.S.

in Temporary Fresh Waters and Their Consequences for the Insect Fauna," *Journal of the North American Benthological Society* 15:634-650 (1996); A.J. Bohonak and D.G. Jenkins, "Ecological and Evolutionary Significance of Dispersal by Freshwater Invertebrates," *Ecology Letters* 6:783-796 (2003)). Amphibians and reptiles also move between "other waters" and downstream waters to satisfy part of their life history requirements. *Id.* at 5-33. Alligators in the Southeast, for instance, can move from tributaries to shallow, seasonal limesink wetlands for nesting, and also use these wetlands as nurseries for juveniles; sub-adults then shift back to the tributary network through overland movements. *Id.* (citing A.L. Subalusky, *et al.*, "Ontogenetic Niche Shifts in the American Alligator Establish Functional Connectivity between Aquatic Systems," *Biological Conservation* 142:1507-1514 (2009); A.L. Subalusky, *et al.*, "Detection of American Alligators in Isolated, Seasonal Wetlands," *Applied Herpetology* 6:199-210 (2009)). Similarly, amphibians and small reptile species, such as frogs, toads, and newts, commonly use both tributaries and "other waters," during one or more stages of their life cycle, and can at times disperse over long distances. *Id.* (citing V.S. Lamoureux and D.M. Madison, "Overwintering Habitats of Radio-Implanted Green Frogs, *Rana clamitans*," *Journal of Herpetology* 33:430-435 (1999); K.J. Babbitt, *et al.*, "Patterns of Larval Amphibian Distribution along a Wetland Hydroperiod Gradient," *Canadian Journal of Zoology-Revue Canadienne De Zoologie* 81:1539-1552 (2003); S.B. Adams, *et al.*, "Instream Movements by Boreal Toads (*Bufo boreas boreas*)," *Herpetological Review* 36:27–33 (2005); D.M. Green, "*Bufo americanus*, American Toad," *in* M. Lannoo, ed., *Amphibian Declines: The Conservation Status of the United States Species* (Berkeley, CA: University of California Press, 2005), pp. 692-704; T.W. Hunsinger and M. J. Lannoo, "*Notophthalmus viridescens*, Eastern Newt," *in* M. Lannoo, ed., 2005, pp. 912-914; J.W. Petranka and C.T. Holbrook, "Wetland Restoration for Amphibians: Should Local Sites Be

Wind-Dispersed Grassland Forbs," *Journal of Ecology* 90:1033-1043 (2002); M.B. Soons, "Wind Dispersal in Freshwater Wetlands: Knowledge for Conservation and Restoration," *Applied Vegetation Science* 9:271-278 (2006); C. Nilsson, *et al.*, "The Role of Hydrochory in Structuring Riparian and Wetland Vegetation," *Biological Reviews* 85:837-858 (2010)). Mammals that disperse overland can also contribute to connectivity and can act as transport vectors for hitchhikers such as algae. *Id.* at 5-32 (citing C.E. Shanks and G.C. Arthur, "Muskrat Movements and Population Dynamics in Missouri Farm Ponds and Streams," *Journal of Wildlife Management* 16:138-148 (1952); J.P. Roscher, "Alga Dispersal by Muskrat Intestinal Contents," *Transactions of the American Microscopical Society* 86:497-498 (1967); W.R. Clark, "Ecology of Muskrats in Prairie Wetlands," *in* H. R. Murkin, *et al.*, ed., 2000, pp. 287-313)). Invertebrates also utilize birds and mamals to hitchhike, and these hitchhikers can be an important factor structuring invertebrate metapopulations in "other waters" and in aquatic habitats separated by hundreds, or potentially, thousands of kilometers. *Id.* (citing J. Figuerola and A.J. Green, "Dispersal of Aquatic Organisms by Waterbirds: A Review of Past Research and Priorities for Future Studies," *Freshwater Biology* 47:483-494 (2002); J. Figuerola, *et al.*, "Invertebrate Eggs Can Fly: Evidence of Waterfowl-Mediated Gene Flow in Aquatic Invertebrates," *American Naturalist* 165:274-280 (2005); M.R. Allen, "Measuring and Modeling Dispersal of Adult Zooplankton," *Oecologia* 153:135-143 (2007); D. Frisch, *et al.*, "High Dispersal Capacity of a Broad Spectrum of Aquatic Invertebrates Via Waterbirds," *Aquatic Sciences* 69:568-574 (2007)). Numerous flight-capable insects use both "other waters" and downstream waters; these insects move outside the tributary network to find suitable habitat for overwintering, refuge from adverse conditions, hunting, foraging, or breeding, and then can return back to the tributary network for other lifecycle needs. *Id.* at 5-33 (citing D.D. Williams, "Environmental Constraints

it may be their lack of a direct hydrologic connection that enables the prairie potholes to more effectively retain nutrients. *Id.* at 543.

"Other waters" can be biologically connected to each other and to downstream waters through the movement of seeds, macroinvertebrates, amphibians, reptiles, birds, and mammals. *Report* at 5-31 to 5-33; S.G. Leibowitz, "Isolated Wetlands and Their Functions: An Ecological Perspective," *Wetlands* 23:517-531 (2003) at 519. The movement of organisms between "other waters" and downstream waters is governed by many of the same factors that affect movement of organisms between adjacent wetlands and downstream waters (See Part II Section 2.A.d.). *Report* at 5-31. Generally, "other waters" are further away from stream channels than adjacent waters, making hydrologic connectivity less frequent, and increasing the number and variety of landscape barriers over which organisms must disperse. *Id.* Plants, though non-mobile, have evolved many adaptations to achieve dispersal over a variety of distances, including water-borne dispersal during periodic hydrologic connections, "hitchhiking" on or inside highly mobile animals, and more typically via wind dispersal of seeds and/or pollen. *Id.* at 5-31 (citing S.M. Galatowitsch and A.G. van der Valk, "The Vegetation of Restored and Natural Prairie Wetlands,"*Ecological Applications* 6:102-112 (1996); H.R. Murkin and P.J. Caldwell, "Avian Use of Prairie Wetlands," *in* H.R. Murkin, *et al.*, ed., *Prairie Wetland Ecology: The Contribution of the Marsh Ecology Research Program*, (Ames, IA: Iowa State University Press, 2000), pp. 249-286; J.M. Amezaga, *et al.*, "Biotic Wetland Connectivity - Supporting a New Approach for Wetland Policy," *Acta Oecologica-International Journal of Ecology* 23:213-222 (2002); J. Figuerola and A.J. Green, "Dispersal of Aquatic Organisms by Waterbirds: a Review of Past Research and Priorities for Future Studies," *Freshwater Biology* 47:483-494 (2002); M.B. Soons and G.W. Heil, "Reduced Colonization Capacity in Fragmented Populations of

Freshwater Society, 1981), pp. 153-163; H.F. Hemond, "The Nitrogen Budget of Thoreau's Bog," *Ecology* 64:99-109 (1983); K.C. Ewel and H.T. Odum, ed., *Cypress Swamps*, (Gainesville, Florida: University of Florida Press, 1984); J.T. Moraghan, "Loss and Assimilation of 15N-nitrate Added to a North Dakota Cattail Marsh," *Aquatic Botany* 46:225-234 (1993); C.M. Kao, *et al.*, "Non-point Source Pesticide Removal by a Mountainous Wetland," *Water Science and Technology* 46:199-206 (2002); P.I. Boon, "Biogeochemistry and Bacterial Ecology of Hydrologically Dynamic Wetlands," *in* D.P. Batzer and R.R. Sharitz, ed., *Ecology of Freshwater and Estuarine Wetlands* (Berkeley, CA: University of California Press, 2006), pp. 115-176; E.J. Dunne, *et al.*, "Phosphorus Release and Retention by Soils of Natural Isolated Wetlands," *International Journal of Environment and Pollution* 28:496-516 (2006); T.E. Jordan, *et al.*, "Comparing Functional Assessments of Wetlands to Measurements of Soil Characteristics and Nitrogen Processing," *Wetlands* 27:479-497 (2007); S.L. Whitmire and S.K. Hamilton, "Rates of Anaerobic Microbial Metabolism in Wetlands of Divergent Hydrology on a Glacial Landscape," *Wetlands* 28:703-714 (2008)). Also *see, e.g.*, T.M. Isenhart, *Transformation and Fate of Nitrate in Northern Prairie Wetlands*, Ph.D. Dissertation (Ames, Iowa: Iowa State University, 1992). The body of published scientific literature and the Report indicate that sink removal of nutrients and other pollutants by "other waters" is significant and geographically widespread. *Report* at 5-30. Water quality characteristics of "other waters" are highly variable, depending primarily on the sources of water, characteristics of the substrate, and land uses within the watershed. D.F. Whigham and T.E. Jordan, "Isolated Wetlands and Water Quality," *Wetlands* 23:541-549 (2003) at 541. These variables inform whether an "other water" has a significant nexus to an (a)(1) to (a)(3) water. For instance, some prairie potholes may improve water quality and may efficiently retain nutrients that might otherwise cause water quality problems downstream; in such systems

several factors, including the intervening distance and the properties of the rock or unconsolidated sediments between the waterbodies (*i.e.,* the hydraulic conductivity of the material). *Id.* at 5-24. Surface and groundwater hydrological connections are those generating the capacity for "other waters" to affect downstream waters, as water from the "other water" may contribute to baseflow or stormflow through groundwater recharge. *Id.* at 5-25. Contributions to baseflow are important for maintaining conditions that support aquatic life in downstream waters. As discussed further below, even in cases where waters lack a connection to downstream waters, they can influence downstream water through water storage and mitigation of peak flows. *Id.* at 5-36.

The chemical effects that "other waters" have on downstream waters are linked to their hydrologic connection downstream, though a surface connection is not needed for a water to influence the chemical integrity of the downstream water. Because the majority of "other waters" are hydrologically connected to downstream waters via surface or groundwater connections, most "other waters" can affect water quality downstream (although these connections do not meet the definition of adjacency). D.F. Whigham and T. E. Jordan, "Isolated Wetlands and Water Quality," *Wetlands* 23:541-549 (2003) at 542. "Other waters" can act as sinks and transformers for nitrogen and phosphorus, metals, pesticides, and other contaminants that could otherwise negatively impact downstream waters. *Report* at 5-30 (citing R.R. Brooks, *et al.*, "Cobalt and Nickel Uptake by the Nyssaceae," *Taxon* 26:197-201 (1977); H.F. Hemond, "Biogeochemistry of Thoreau's Bog, Concord, Massachusetts," *Ecological Monographs* 50:507-526 (1980); C.B. Davis, *et al.*, "Prairie Pothole Marshes as Traps for Nitrogen and Phosphorus in Agricultural Runoff," *in* B. Richardson, ed., *Selected Proceedings of the Midwest Conference on Wetland Values and Management, June 17-19, 1981, St. Paul, MN,* (St. Paul, MN: The

by receiving groundwater discharge (flow of groundwater to the "other water"), contributing to groundwater recharge (flow of water from the "other water" to the groundwater), or both. *Id.* at 5-23 (citing R.F. Lide, *et al.*, "Hydrology of a Carolina Bay Located on the Upper Coastal Plain of Western South Carolina," *Wetlands* 15:47-57 (1995); K.J. Devito, *et al.*, "Groundwater Surface-Water Interactions in Headwater Forested Wetlands of the Canadian Shield," *Journal of Hydrology* 181:127-47 (1996); R.K. Matheney and P.J. Gerla, "Environmental Isotopic Evidence for the Origins of Ground and Surface Water in a Prairie Discharge Wetland," *Wetlands* 16:109-120 (1996); D.O. Rosenberry and T.C. Winter, "Dynamics of Water-Table Fluctuations in an Upland between Two Prairie-Pothole Wetlands in North Dakota," *Journal of Hydrology* 191:266-289 (1997); J.E. Pyzoha, *et al.*, "A Conceptual Hydrologic Model for a Forested Carolina Bay Depressional Wetland on the Coastal Plain of South Carolina, USA," *Hydrological Processes* 22:2689-2698 (2008)). Factors that determine whether a water recharges groundwater or is a site of groundwater discharge include topography, geology, soil features, and seasonal position of the water table relative to the water. *Id.* at 5-24 (citing P.J. Phillips and R.J. Shedlock, "Hydrology and Chemistry of Groundwater and Seasonal Ponds in the Atlantic Coastal-Plain in Delaware, USA," *Journal of Hydrology* 141:157-78 (1993); R.J. Shedlock, *et al.*, "Interactions between Ground-Water and Wetlands, Southern Shore of Lake-Michigan, USA," *Journal of Hydrology* 141:127-55 (1993); D.O. Rosenberry and T.C. Winter, "Dynamics of Water-Table Fluctuations in an Upland Between two Prairie-Pothole Wetlands in North Dakota," *Journal of Hydrology* 191:266-89 (1997); J.E. Pyzoha, *et al.*, "A Conceptual Hydrologic Model for a Forested Carolina Bay Depressional Wetland on the Coastal Plain of South Carolina, USA," *Hydrological Processes* 22: 2689-98 (2008)). Similarly, the magnitude and transit time of groundwater flow from an "other water" to downstream waters depend on

downstream water, using any available site-information and field observations where available, relevant scientific studies or data, or other relevant jurisdictional determinations that have been made on similar resources in the region.

The hydrologic connectivity of "other waters" to downstream waters occurs on a gradient and can include waters that have groundwater or occasional surface water connections (through overland flow) to the tributary network and waters that have no hydrologic connection to the tributary network. *Id.* at 5-1. The connectivity of "other waters" to downstream waters will vary within a watershed as a function of local factors (e.g. position, topography, and soil characteristics). *Id.* at 3-41 to 3-43. Connectivity also varies over time, as the tributary network and water table expand and contract in response to local climate. *Id.* at 3-31 to 3-33. Lack of connection does not necessarily translate to lack of impact; even when lacking connectivity, waters can still impact chemical, physical, and biological conditions downstream. *Id.* at 3-29, 3-31.

The physical effect that "other waters" have downstream is less obvious than the physical connections of waters that are adjacent or waters that are tributary, due to the physical distance of "other waters" from the stream network. Despite this physical distance, they are frequently connected in some degree through either surface water or groundwater systems; over time, impacts in one part of the hydrologic system will be felt in other parts. T.C. Winter and J.W. LaBaugh, "Hydrologic Considerations in Defining Isolated Wetlands," *Wetlands* 23:532-540 (2003) at 538. For example, "other waters" that overspill into downstream waterbodies during times of abundant precipitation are connected over the long term. *Id.* at 539. Wetlands that lack surface connectivity in a particular season or year can, nonetheless, be highly connected in wetter seasons or years. *Report* at 5-22 to 5-25. Many "other waters" interact with groundwater, either

determining what waters to aggregate. Due to relative similarity of soils, topography, or groundwater connections, for example, there may be a group of wetlands scattered throughout a watershed, at similar distances from the tributaries in the watershed and performing similar functions. It is appropriate to assess the significance of the nexus of those waters in the aggregate, consistent with Justice Kennedy's standard.

C. Significant Nexus

The scientific literature regarding "other waters" documents their functions, including the chemical, physical, and biological impact they can have downstream. Available literature indicates that "other waters" have important hydrologic, water quality, and habitat functions that have the ability to affect downstream waters if and when a connection exists between the "other water" and downstream waters. *Report* at 6-1. "Other waters" generally fit into the category of unidirectional waters as described in the Report. However, there are some unidirectional waters that are in fact adjacent under (a)(6) to (a)(1) through (a)(5) waters (*e.g.*, neighboring waters that are outside of the riparian area and/or floodplain but that have a surface or shallow subsurface hydrologic connection to (a)(1) through (a)(5) waters). Connectivity of "other waters" to downstream waters that do not meet the definition of adjacent will vary within a watershed and over time, which is why a case-specific significant nexus determination for "other waters" is necessary under (a)(7). *See, e.g.*, *id.* at 6-2. The types of chemical, physical, and biological connections between "other waters" and downstream waters are described below for illustrative purposes. As described in the preamble above, when the agencies are conducting a case-specific determination for significant nexus under (a)(7), they examine the connections between the water (including any similarly situated waters in the region) and downstream waters and determine if those connections significantly affect the chemical, physical, or biological integrity of the

integrity of downstream waters. In many watersheds, wetlands have a disproportionate effect on water quality relative to their surface area because wetland plants slow down water flow, allowing suspended sediments, nutrients, and pollutants to settle out. They filter these materials out of the water received from large areas, absorbing or processing them, and then releasing higher quality water. National Research Council, *Wetlands: Characteristics and Boundaries* (Washington, D.C.: National Academy Press, 1995), p. 38. For an individual wetland, this is most pronounced where it lies immediately upstream of a drinking water intake, for example. *See, e.g.,* C.A. Johnston, *et al.*, "The Cumulative Effect of Wetlands on Stream Water Quality and Quantity," *Biogeochemistry* 10:105-141 (1990).

The structure and function of a river are highly dependent on the constituent materials that are stored in, or transported through the river. Most of the materials found in rivers originate outside of them. Thus, the fundamental way that "other waters" are able to affect river structure and function is by providing or altering the materials delivered to the river. *Report* at 1-13. Since the alteration of material fluxes depends on the functions within these waters and the degree of connectivity, it is appropriate to consider both these factors for purposes of significant nexus under this provision.

Numerous factors affect chemical, physical, and biological connectivity, operating at multiple spatial and temporal scales, and interacting with each other in complex ways, to determine where components of aquatic systems fall on the connectivity-isolation gradient at a given time. Some of these factors include climate, watershed characteristics, spatial distribution patterns, biota, and human activities and alterations. *Id.* at 3-33. Recognizing the limits on the ability to observe or document all of these interacting factors, it is reasonable to look for visible patterns in the landscape and waters that are often indicative of the connectivity factors, in

reference information that informs the understanding of the functions performed by many types of aquatic systems nationwide.

These waters, primarily depressional wetlands, small open waters and peatlands, are known to have important hydrologic, water quality, and habitat functions which vary as a result of the diverse settings in which they exist across the country. For example, a report that reviewed the results of multiple scientific studies concluded that depressional wetlands lacking a surface outlet functioned together to significantly reduce or attenuate flooding. *Report* at 5-26 (citing A. Bullock and M. Acreman, "The Role of Wetlands in the Hydrological Cycle," *Hydrology and Earth System Sciences* 7:358-389 (2003)). Some of the important factors which influence the variability of their functions and connectivity include the topography, geology, soil features, antecedent moisture conditions, and seasonal position of the water table relative to the wetland. *Report* at 5-25.

When proposing that "other waters" are sufficiently close and should be considered similarly situated, it is recognized that they are more likely to have similar influence with regard to their effect on the chemical, physical, or biological integrity of a downstream water identified in paragraphs (a)(1) through (a)(3)). If a water is a great distance from a group of similar "other waters," it may be performing some of the same functions as those in the group, but their distance from each other or from downstream (a)(1) through (a)(3) waters will decrease the probability that it has some kind of chemical, physical, or biological connectivity to the downstream water, assuming that conditions governing the type and quantity of flows (*e.g.* slope, soil, and aquifer permeability, etc) are similar. *Id.* at 5-2, 5-41.

Consideration of the aggregate effects of wetlands and other waters often gives the most complete information about how such waters influence the chemical, physical, and biological

13:249-262 (1998); W.J. Mitsch *et al.*, "Reducing Nitrogen Loading to the Gulf of Mexico from the Mississippi River Basin: Strategies to Counter a Persistent Ecological Problem," *BioScience* 51(5): 373-388 (2001); M.G. Forbes, *et al.*, "Nutrient Transformation and Retention by Coastal Prairie Wetlands, Upper Gulf Coast, Texas," *Wetlands* 32(4):705-15 (2012). Cumulatively, many small wetlands can hold a large amount of snowmelt and precipitation, reducing the likelihood of flooding downstream. *Report* at 5-25 (citing D.E. Hubbard and R.L. Linder, "Spring Runoff Retention in Prairie Pothole Wetlands," *Journal of Soil and Water Conservation* 41(2):122-125 (1986)).

Scientists can and do routinely classify similar waters and wetlands into groups for a number of different reasons; because of their inherent physical characteristics, because they provide similar functions, because they were formed by similar geomorphic processes, and by their level of biological diversity, for example. Classifying wetlands based on their functions is also the basis for the U.S. Army Corps of Engineers hydrogeomorphic (HGM) classification of wetlands. M.M. Brinson, *A Hydrogeomorphic Classification for Wetlands* (Washington, D.C.: U.S. Army Corps of Engineers, 1993). The HGM method is a wetlands assessment approach pioneered by the Corps in the 1990s, and extensively applied via regional handbooks since then. The Corps HGM method uses a conceptual framework for identifying broad wetland classes based on common structural and functional features, which includes a method for using local attributes to further subdivide the broad classes into regional subclasses. Assessment methods like the HGM provide a basis for determining if waters provide similar functions based on their structural attributes and indicator species. Scientists also directly measure attributes and processes taking place in particular types of waters during in-depth field studies that provide

supported in the scientific literature. *See, e.g.*, R.J. Stevenson and F.R. Hauer, "Integrating Hydrogeomorphic and Index of Biotic Integrity Approaches for Environmental Assessment of Wetlands," *Journal of the North American Benthological Society* 21(3): 502-513 (2002); S.G. Leibowitz, "Isolated Wetlands and Their Functions: An Ecological Perspective," *Wetlands* 23:517-531 (2003); D. Gamble, *et al.*, *An Ecological and Functional Assessment of Urban Wetlands in Central Ohio*, Ohio EPA Technical Report WET/2007-3B (Columbus, OH: Ohio Environmental Protection Agency, 2007); C.R. Lane and E. D'Amico, "Calculating the Ecosystem Service of Water Storage in Isolated Wetlands using LiDAR in North Central Florida, USA," *Wetlands* 30:967–977 (2010); B.P. Wilcox, *et al.*, "Evidence of Surface Connectivity for Texas Gulf Coast Depressional Wetlands," *Wetlands* 31(3):451-8 (2011). Similarly, streams and rivers are routinely aggregated by scientists to estimate their combined effect on downstream waters in the same watershed. This is because chemical, physical, or biological integrity of downstream waters is directly related to the aggregate contribution of upstream waters that flow into them, including any tributaries and connected wetlands. As a result, the scientific literature and the Report consistently documents that the health of larger downstream waters is directly related to the aggregate health of waters located upstream, including waters such as wetlands that may not be hydrologically connected but function together to prevent floodwaters and contaminants from reaching downstream waters.

In the aggregate, similarly situated wetlands may have significant effects on the quality of water many miles away, particularly in circumstances where numerous similarly situated waters are located in the same region and are performing like functions that combine to influence downstream waters. *See, e.g.*, A. Jansson *et al.*, "Quantifying the Nitrogen Retention Capacity of Natural Wetlands in the Large-Scale Drainage Basin of the Baltic Sea," *Landscape Ecology*

The Corps is organized based on watersheds and has used framework approaches for water sources, navigation approaches for over 100 years, and in the regulatory program since its inception. Also, using a watershed framework is consistent with over two decades of practice by EPA and many other governmental, academic, and other entities which recognize that a watershed approach is the most effective framework to address water resource challenges. U.S. Environmental Protection Agency, *The Watershed Protection Approach Framework* (Oct. 1991). The agencies both recognize the importance of the watershed approach by investing in opportunities to advance watershed protection and in developing useful watershed tools and services. For example, EPA is allowing States that are reorganizing programs to function on a watershed basis to have short-term backlogs on CWA Section 402 National Pollution Discharge Elimination System (NPDES) permit review -- without penalty. This flexibility gives States time to synchronize the reissuance of major and minor permits within a watershed. By managing NPDES permits on a watershed basis, all the permits for discharges to the waterbody can be coordinated and the most efficient and equitable allocation of pollution control responsibility can be made. U.S. Environmental Protection Agency, *Why Watersheds?*, EPA 800-F-96-001 (February 1996). Applying a watershed approach continues to be a priority of EPA, and is one of the three key strategies the agency is using to drive progress toward the Agency's health and environmental goals over the next five years. U.S Environmental Protection Agency, *FY 2011-2015 Strategic Plan: Achieving Our Vision*, 2010.

B. Similarly Situated

Scientists routinely aggregate the effects of groups of waters, multiplying the known effect of one water by the number of similar waters in a specific geographic area, or to a certain scale. This kind of functional aggregation of non-adjacent (and other types of waters) is well-

USDA/ARS Southwest Watershed Research Center, EPA/600/R-08/134, ARS/2330462008: *The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest* (Washington, D.C.: U.S. EPA and USDA/ARS Southwest Watershed Research Center, Levick *et al.*, 2008) (Levick, *et. al.*). For these reasons, it is more appropriate to conduct a significant nexus determination at the watershed scale than to focus on a specific site, such as an individual stream segment. The watershed size reflects the specific water management objective, and is scaled up or down as is appropriate to meet that objective. If the objective is to manage the water quality in a particular receiving waterbody (the "target" waterbody), the watershed should include all those waters that are contributing to that target water since they will primarily determine the quality of the receiving water.

The watershed that drains to the single point of entry to a traditional navigable water, interstate water or territorial sea is a logical spatial framework for the evaluation of the nexus. This is because, from a water quality management perspective, the (a)(1), (a)(2) or (a)(3) water is the downstream affected river or lake whose water quality that is dependent on the condition of the contributing upstream waters, including streams, lakes, and wetlands. To restore or maintain the health of the downstream affected river or lake, it is standard practice to evaluate the condition of the waters that are in the contributing watersheds and to develop a plan to address the issues of concern. The functions of the contributing waters are inextricably linked and have a cumulative effect on the integrity of the downstream traditional navigable water, interstate water or territorial sea. The size of that watershed can be determined by identifying the geographic area that drains to the nearest traditional navigable water or interstate water, and then using that point of entry watershed to conduct a significant nexus evaluation. P.E. Black, "Watershed Functions," *Journal of the American Water Resources Association* 33.1:1-11 (1997).

The agencies have determined that because the movement of water from watershed drainage basins to river networks and lakes shapes the development and function of these systems in a way that is critical to their long term health, the watershed is a reasonable and technically appropriate interpretation of Justice Kennedy's standard. *See, e.g.*, D.R. Montgomery, "Process Domains and the River Continuum," *Journal of the American Water Resources Association* 35:397-410 (1999).

Using a watershed as the framework for conducting significant nexus evaluations is scientifically supportable. Watersheds are generally regarded as the most appropriate spatial unit for water resource management. *See, e.g.*, J.M. Omernik and R.G. Bailey, "Distinguishing Between Watersheds and Ecoregions," *Journal of the American Water Resources Association* 33.5: 939-40 (1997); D.R. Montgomery, "Process Domains and the River Continuum," *Journal of the American Water Resources Association* 35: 397-410 (1999); T.C. Winter "The Concept of Hydrologic Landscapes," *Journal of the American Water Resources Association* 37: 335-49 (2001); J.S. Baron, *et al.*, "Meeting Ecological and Societal Needs for Freshwater," *Ecological Applications* 12: 1247-60 (2002); J.D. Allan, "Landscapes and Riverscapes: The Influence of Land Use on Stream Ecosystems," *Annual Review of Ecology Evolution and Systematics* 35: 257-84 (2004); United States, EPA 841-B-08-002: U.S. Environmental Protection Agency, *Handbook for Developing Watershed Plans to Restore and Protect Our Waters: Planning & Implementation Steps* (Washington D.C.: U.S. EPA, March 2008); P.J. Wigington, *et al.*, "Oregon Hydrologic Landscapes: A Classification Framework," *Journal of the American Water Resources Association* 49.1:163-82 (2013). Anthropogenic actions and natural events can have widespread effects within the watershed that collectively impact the quality of the relevant traditional navigable water, interstate water or territorial sea. United States, U.S. EPA and

establish any categories of "other waters" that are jurisdictional by rule without the necessity of a case-specific significant nexus standard.

The term "other waters" refers to waters that cannot be considered "adjacent" to downstream jurisdictional waters and that are not tributaries of such waters. "Other waters" are found outside the riparian zone and the floodplain, as waters within these areas are considered to be "adjacent." As such, wetlands that are "other waters" typically will have unidirectional flow. As mentioned in Part II, section 2.B. above, many unidirectional wetlands are considered adjacent and interact with downstream jurisdictional waters through channels, shallow subsurface flow, or by providing additional functions such as storage and mitigating peak flows. Unidirectional wetlands that lack a surface connection to downstream waters and are surrounded by uplands will typically fall under the definition of "other waters," and are often referred to in scientific literature and policy as "geographically isolated waters." The term "geographically isolated" should not be used to implicate the lack of connectivity to downstream waters, as these wetlands are often connected to downstream waters through shallow subsurface flow, biological connections, or spillage. The degree of connectivity of such wetlands will vary depending on landscape features such as distance from downstream waters and proximity to other wetlands of similar nature that as a group connect to jurisdictional downstream waters. *Report* at 3-43, 5-2.

For purposes of assessing whether a particular water is a water of the United States because it, alone or in combination with other similarly situated waters, has a significant nexus to an (a)(1) through (a)(3) water, the agencies are proposing to define each of the elements of Justice Kennedy's significant nexus standard in the definition of "significant nexus."

A. In the Region

scientific literature supports the conclusion that adjacent waters generally play a larger role in the ecological condition of smaller tributary systems, which, in turn, determines the effects on the chemical, physical and biological health of larger downstream waters.

iii. "Other Waters"

The Report includes a focused evaluation of the connections and effects to downstream waters for several regional types of streams and wetlands: prairie streams, southwest intermittent and ephemeral streams, oxbow lakes, Carolina and Delmarva bays, prairie potholes, and vernal pools. These regional types were chosen for evaluation because they represent a broad geographic area as well as a diversity of water types based on their origin, landscape setting, hydrology, and other factors. Most prairie streams and southwest intermittent and ephemeral streams are likely to be considered tributaries to (a)(1) to (a)(3) waters (with the exception of streams, for example, located in closed basins, which lack an (a)(1) to (a)(3) water or a connection thereto); similarly, most oxbow lakes are likely to be considered adjacent to (a)(1) to (a)(5) waters. Carolina and Delmarva bays, prairie potholes, and vernal pools may or may not be considered adjacent to (a)(1) to (a)(5) waters. Where waters are not considered tributaries (e.g. waters in a solely intrastate closed basin that does not contain a traditional navigable water, interstate water, or a territorial sea, or a connection thereto) or where waters, including wetlands, do not meet the proposed regulatory definition of adjacent, they should be evaluated to determine whether they are (a)(7) waters. While the peer-reviewed published literature and the Report contain documentation of functions provided by these "other waters," as well as local factors that influence their degree of downstream connectivity, the agencies are not currently proposing to

and provide fish and wildlife habitat. *Id.* The functions in turn provide numerous and substantial benefits to the nearby river.

4. Conclusions Regarding Adjacent Waters

The scientific literature documents that waters which are adjacent to (a)(1) through (a)(5) waters, including wetlands, oxbow lakes and adjacent ponds, are integral parts of tributary networks to (a)(1) through (a)(3) waters because they are directly connected to streams via permanent surface features that concentrate, mix, transform, and transport water and other materials, including food resources, downstream to larger rivers. Adjacent wetlands and other adjacent waters filter pollutants before they enter the tributary system, they attenuate flow during flood events, they regulate flow rate and timing, they trap sediment, and they input organic material into rivers and streams, providing the basic building blocks for their healthy functioning. These waters also are biologically connected to downstream waters by providing habitat and refuge to many species, and storing and releasing food sources. The scientific literature demonstrates that adjacent waters in a watershed together exert a strong influence on the character and functioning of rivers, streams and lakes.

Adjacent waters, as defined, alone or in combination with other adjacent waters in a watershed, significantly affect the chemical, physical and biological integrity of traditional navigable waters, interstate waters, or the territorial seas. Based on studies of waters in riparian areas, flood plains, and hydrologic connections to the tributary system there is sufficient scientific evidence regarding the important functions of these adjacent wetlands to demonstrate that, alone or in combination with similarly situated waters in the region, wetlands and open waters adjacent to any tributary have a significant effect on the chemical, physical or biological integrity of traditional navigable waters, interstate waters, or the territorial seas. The reviewed

insects, amphibians, and resident and migratory birds all use interdunal wetlands as critical habitat, and the wetlands provide better shelter than the nearby exposed beach. D.A. Albert, *Borne of the Wind: An Introduction to the Ecology of Michigan Sand Dunes* (Lansing, MI: Michigan Natural Features Inventory, 2000), 63 pp.; S.M. Smith, *et al.*, "Development of Vegetation in Dune Slack Wetlands of Cape Cod National Seashore (Massachusetts, USA)," *Plant Ecology* 194(2): 243-256 (2008). In marine coastal areas, the wetlands are often the only freshwater system in the immediate landscape, thus providing critical drinking water for the species that utilize both the wetlands and the nearby (a)(1) and/or (a)(3) waters, although some interdunal wetlands are brackish in nature. *See, e.g.,* C.M. Heckscher and C.R. Bartlett, "Rediscovery and Habitat Associations of Photuris Bethaniensis McDermott (Coleoptera: Lampyridae)," *The Coleopterists Bulletin* 58(3): 349-353 (2004).

Wetlands behind the extensive levee system in the Yazoo Basin are an example of adjacent waters behind man-made barriers. A regional hydrogeomorphic approach guidebook for the Yazoo Basin of the Lower Mississippi River Alluvial Valley assesses the functions of these wetlands. R.D. Smith and C.V. Klimas, *A Regional Guidebook for Applying the Hydrogeomorphic Approach to Assessing Wetland Functions of Selected Regional Wetland Subclasses, Yazoo Basin, Lower Mississippi River Alluvial Valle*, Prepared for the U.S. Army Corps of Engineers, ERDC/EL TR-02-4 (2002). An extensive levee system was built along the river system to prevent flooding of the Mississippi River, resulting in drastic effects to the hydrology of the basin. *Id.* at 47. Despite the alteration of hydrology in the basin, extensive wetlands systems still exist behind the man-made and natural levees and maintain a hydrologic connection to the river system. These wetlands detain floodwater, detain precipitation, cycle nutrients, export organic carbon, remove elements and compounds, maintain plant communities,

Interdunal Wetland (Lansing, MI: Michigan Natural Features Inventory, 2007), 6 pp. For those along the ocean coast, they are typically formed as a result of oceanic processes where the wetlands establish behind relict dune ridges (dunes that were formed along a previously existing coast line). Wetlands in the interdunal system are in close proximity to each other and to the surrounding (a)(1) and/or (a)(3) waters. Their proximity to one another and to the (a)(1) and/or (a)(3) waters indicates a close physical relationship between interdunal wetland systems and the TNWs or territorial seas. Despite the presence of the beach dunes, interdunal wetlands have physical, chemical, and biological connections that greatly influence the integrity of the nearby (a)(1) and/or (a)(3) waters. The wetlands are hydrologically connected to these (a)(1) and/or (a)(3) waters through unconfined, directional flow and shallow subsurface flow during normal precipitation events and extreme events. As previously noted, they are linked to the rise and fall of the surrounding tides—the water-level fluctuations of the nearby a)(1) and/or (a)(3) waters are important for the dynamics of the wetlands. D.A. Albert, *Between Land and Lake: Michigan's Great Lakes Coastal Wetlands*, Bulletin E-2902 (East Lansing, MI: Michigan Natural Features Inventory, Michigan State University Extension, 2003), 96 pp. The wetlands provide floodwater storage and attenuation, retaining and slowly releasing floodwaters before they reach the nearby (a)(1) and/or (a)(3) waters. Like other adjacent wetlands, interdunal wetlands also have important chemical connections to the nearby (a)(1) and/or (a)(3) waters, as they serve important water quality benefits. The wetlands store sediment and pollutants that would otherwise reach the surrounding (a)(1) and/or (a)(3) waters. The wetlands are biologically connected to the surrounding (a)(1) and/or (a)(3) waters. For instance, they provide critical habitats for species that utilize both the wetlands and the nearby (a)(1) and/or (a)(3) waters, supporting high diversity and structure. Habitat uses include basic food, shelter, and reproductive requirements. Aquatic

wading birds are able to utilize both wetland and adjacent stream/ditch habitats; wetland amphibians would be able to bypass the berm in their adult stage; aquatic invertebrates and fish would still interact with terrestrial/wetland predators and prey in common food web relationships despite the presence of a berm. *See, e.g.,* G.S. Butcher, and B. Zimpel, "Habitat Value of Isolated Waters to Migratory Birds," Prepared by Cornell Laboratory of Ornithology and The Cadmus Group, Inc. for U.S. Environmental Protection Agency Office of Wetlands Protection, (Washington, D.C.: Cornell and Cadmus, 1991); M.F. Willson and K.C. Halupka, "Anadromous Fish as Keystone Species in Vertebrate Communities," *Conservation Biology* 9(3):489-497 (1995); C.J. Cederholm, *et al.*, "Pacific Salmon Carcasses: Essential Contributions of Nutrients and Energy for Aquatic and Terrestrial Ecosystems," *Fisheries* 24(10):6-15 (1999); S.S. Schwartz and D.G. Jenkins, "Temporary Aquatic Habitats: Constraints and Opportunities," *Aquatic Ecology* 34:3-8 (2000); D.T. Bilton, *et al.*, "Dispersal in Freshwater Invertebrates," *Annual Review of Ecology and Systematics* 32:159-81 (2001).

One example of adjacent waters behind berms and the like are interdunal wetlands located in coastal areas, including some areas of the Great Lakes and along barrier islands. Interdunal wetlands form in swales or depressions within open dunes or between beach ridges along the coast and experience a fluctuating water table seasonally and yearly in synchrony with sea or lake level changes. W.E. Odum, "Non-Tidal Freshwater Wetlands in Virginia," *Virginia Journal of Natural Resources Law* 7: 421-434 (1988); D.A. Albert, *Borne of the Wind: An Introduction to the Ecology of Michigan Sand Dunes* (Lansing, MI: Michigan Natural Features Inventory, 2000), 63 pp.; D.A. Albert, *Between Land and Lake: Michigan's Great Lakes Coastal Wetlands*, Bulletin E-2902 (East Lansing, MI: Michigan Natural Features Inventory, Michigan State University Extension, 2003), 96 pp; D.A. Albert, *Natural Community Abstract for*

adjacent waters. *Id.*; J.L. Florsheim and J.F. Mount, "Changes in Lowland Floodplain Sedimentation Processes: Pre-disturbance to Post-rehabilitation, Cosumnes River, CA," *Geomorphology* 56(3-4):305-323 (2003). However, the presence of a berm does not completely eliminate the transport of sediments and water from the river to the nearby adjacent wetland, as suspended sediments and water can overflow both natural and man-made levees, though the transport is usually more pronounced in settings with natural levees. *See, e.g.,* R.E. Turner, *et al.*, "Wetland Sedimentation from Hurricanes Katrina and Rita," *Science* 314(5798):449-452 (2006); P.A. Keddy, *et al.*, "The Wetlands of Lakes Pontchartrain and Maurepas: Past, Present and Future," *Environmental Reviews* 15:43-77 (2007). Sediment deposition over levees is particularly enhanced by extreme events like hurricanes. *Id.*; D.J. Reed, *et al.*, "Reducing the Effects of Dredged Material Levees on Coastal Marsh Function: Sediment Deposition and Nekton Utilization," *Environmental Management* 37(5):671-685 (2006). Wetlands behind berms, where the system is extensive, can help reduce the impacts of storm surges caused by hurricanes. J.W. Day, *et al.*, "Restoration of the Mississippi Delta: Lessons from Hurricanes Katrina and Rita," *Science* 315(5819):1679-1684 (2007).

Adjacent waters, including wetlands, separated from water bodies by berms and the like maintain ecological connection with those water bodies. Though a berm may reduce habitat functional value and may prevent some species from moving back and forth from the wetland to the river, many major species that prefer habitats at the interface of wetland and stream ecosystems remain able to utilize both habitats despite the presence of such a berm. Additional species that are physically isolated in either stream or wetlands habitat still interact ecologically with species from the other component. Thus, adjacent wetlands with or without small berms can retain numerous similarities in ecological function. For example: wetland bird species such as

Because a hydrologic connection between adjacent wetlands and waters and downstream waters still exists despite the presence of a berm or the like, the chemical and biological connections that rely on a hydrologic connection also exist. For instance, adjacent waters behind berms can still serve important water quality functions, serving to filter pollutants and sediment before they reach downstream waters. Wetlands behind berms can function to filter pollutants before they enter the nearby tributary, with the water slowly released to the stream through seepage or other hydrological connections. *See, e.g.,* L.L. Osborne and D.A. Kovacic, "Riparian Vegetated Buffer Strips in Water-Quality Restoration and Stream Management," *Freshwater Biology* 29(2): 243-258 (1993); D.A. Kovacic, *et al.*, "Effectiveness of Constructed Wetlands in Reducing Nitrogen and Phosphorus Export from Agricultural Tile Drainage," *Journal of Environmental Quality* 29(4): 1262-1274 (2000). Their ability to retain sediment and floodwaters may be enhanced by the presence of the berm. For instance, some backwater wetlands in floodplain/riparian areas exhibit higher sedimentation rates than streamside locations. E.J. Kuenzler, *et al.*, "Distributions and Budgets of Carbon, Phosphorus, Iron and Manganese in a Floodplain Swamp Ecosystem," *Water Resources Research Institute Report 157* (Chapel Hill, NC: University of North Carolina, 1980); C.A. Johnston, *et al.*, "Nutrient Dynamics in Relation to Geomorphology of Riverine Wetlands," *Soil Science Society of America Journal* 65(2): 557-577 (2001). The presence of manmade levees can actually increase denitrification rates, meaning that the adjacent waters can more quickly transform nitrogen. S.E. Gergel, *et al.*, "Do Dams and Levees Impact Nitrogen Cycling? Simulating the Effects of Flood Alterations on Floodplain Denitrification," *Global Change Biology* 11(8): 1352-1367 (2005). However, the presence of manmade berms does limit the ability of the river to connect with its adjacent wetlands through overbank flooding and thus limits sediment, water and nutrients transported from the river to the

Furthermore, even in cases where a hydrologic connection may not exist, there are other important considerations, such as chemical and biological factors, that result in a significant nexus between the adjacent wetlands or waters and the nearby waters of the United States, and (a)(1) through (a)(3) waters.

The movement of surface and subsurface both over berms and through soils and berms adjacent to rivers and streams is a hydrologic connection between wetlands and flowing watercourses. The intermittent connection of surface waters over top of, or around, natural and manmade berms further strengthens the evidence of hydrologic connection between wetlands and flowing watercourses. Both natural and man-made barriers can be topped by occasional floods or storm events. *See, e.g.,* R.E. Turner, et al., "Wetland Sedimentation from Hurricanes Katrina and Rita," *Science* 314(5798): 449-452 (2006); P.A. Keddy, *et al.*, "The Wetlands of Lakes Pontchartrain and Maurepas: Past, Present and Future," *Environmental Reviews* 15: 43-77 (2007). When berms are periodically overtopped by water, wetlands and waters behind the barriers are directly connected to and interacting with the nearby stream and its downstream waters. In addition, surface waters move to and from adjacent soils (including adjacent wetland soils) continually. Along their entire length, streams alternate between effluent (water-gaining) and influent (water-losing) zones as the direction of water exchange with the streambed and banks varies. Federal Interagency Stream Restoration Working Group, *Stream Corridor Restoration: Principles, Processes and Practices*, USDA National Engineering Handbook Part 653 (1999). The adjacent areas involved in this surface water exchange with a stream or river are known as the hyporheic zone. Hyporheic zone waters are part of total surface waters temporarily moving through soil or sediment. Like within-channel waters, these waters are oxygenated and support living communities of organisms in the hyporheic zone.

Corridor Restoration: Principles, Processes and Practices, USDA National Engineering Handbook Part 653 (1999). Different deposition patterns occur under varying levels of streamflow, with higher flows having the most influence on the resulting shape of streambanks and floodplains. *Id.* In relatively flat landscapes drained by low-gradient streams, this natural process deposits the most sediment on the bank immediately next to the stream channel while floodplains farther from the channel are usually lower-lying wetlands ("backswamps" or "backwater wetlands") that receive less sediment. *See, e.g.,* C.A. Johnston, *et al.*, "The Potential Role of Riverine Wetlands as Buffer Zones," *in* N.E. Haycock, *et al.*, ed., *Buffer Zones Their Processes and Potential in Water Protection* (Quest International, 1997), pp.155-170. The somewhat elevated land thus built up at streamside is called a natural levee, and this entirely natural landform is physically and hydrologically similar to narrow, man-made berms. *See, e.g.,* L.B. Leopold, *et al.*, *Fluvial Processes in Geomorphology* (Toronto: General Publishing Co. Ltd., 1964). Natural levees are discontinuous, which allows for a hydrologic connection to the stream or river via openings in the levees and thus the periodic mixing of river water and backwater. C.A. Johnston, *et al.*, "Nutrient Dynamics in Relation to Geomorphology of Riverine Wetlands," *Soil Science Society of America Journal* 65(2): 557-577 (2001). In addition, streams with natural levees, in settings with no human interference whatsoever, retain hydrologic connection with their wetlands behind the levees by periodic flooding during high water and via seepage through and under the levee. Similarly, man-made berms are typically periodically overtopped with water from the near-by stream, and as previously mentioned, are connected via seepage.

Waters, including wetlands, separated from a stream by a natural or man-made berm serve many of the same functions as those discussed above on other adjacent waters.

U.S. Army Corps of Engineers, Engineering and Design: Design Guidance for Levee Underseepage, ELT 1110-2-569, Washington, D.C.: Department of the Army, 2005), pp. 1-9. These surface strata constitute impervious or semipervious blankets when considered in connection with seepage. Principle seepage control measures for foundation underseepage are (a) cutoff trenches, (b) riverside impervious blankets, (c) landslide berms, (d) pervious toe trenches, and (e) pressure relief wells. Department of the Army, U.S. Army Corps of Engineers, Engineering and Design – Design and Construction of Levees, EM 1110-2-1913 (Washington, D.C., Department of the Army, 2000), p. 1-1. Overtopping of an embankment dam is very undesirable because the embankment materials may be eroded away. Additionally, only a small number of concrete dams have been designed to be overtopped. Water normally passes through the main spillway or outlet works; it should pass over an auxiliary spillway only during periods of high reservoir levels and high water inflow. All embankment and most concrete dams have some seepage. *See, e.g.,* http://www.damsafety.org/layout/subsection.aspx?groupid=14&contentid=47. However, it is important to control the seepage to prevent internal erosion and instability. Proper dam construction, and maintenance and monitoring of seepage provide control.

Berm-like landforms known as natural levees occur naturally and do not isolate adjacent wetlands from the streams that form them. Natural levees and the wetlands and waters behind them are part of the floodplain, including along some small streams and streams in the Arid West. C.A. Johnston, *et al.*, "Nutrient Dynamics in Relation to Geomorphology of Riverine Wetlands," *Soil Science Society of America Journal* 65(2):557-577 (2001). Every flowing watercourse transports not only water, but sediment—eroding and rebuilding its banks and floodplains continually. Federal Interagency Stream Restoration Working Group, *Stream*

number and size of cracks and voids within the embankment. All but the smallest earthen dams are commonly built with internal subsurface drains to intercept water seeping from the reservoir (i.e., upstream side) to the downstream side. Department of the Army, U.S. Army Corps of Engineers, Construction Control for Earth and Rock-filled Dams, EM 1110-2-1911, September 30, 1995, Washington, D.C., 20314-1000, Page 1-1. Where it is not intercepted by a subsurface drain, the seepage will emerge downstream from or at the toe of the embankment. Michigan Department of Environmental Quality, Seepage Through Earth Dams (2002), http://www.michigan.gov/deq/0,1607,7-135-3313_3684_3723-9515--,00.html. Seepage may vary in appearance from a "soft," wet area to a flowing "spring." It may show up first as an area where the vegetation is lush and darker green. Cattails, reeds, mosses, and other marsh vegetation may grow in a seepage area. Michigan Department of Environmental Quality, Seepage Through Earth Dams (2002), http://www.michigan.gov/deq/0,1607,7-135-3313_3684_3723-9515--,00.html.

Engineered berms are typically designed to interfere with the seasonal pattern of water level (hydroperiod) of the area behind the berm, reducing the frequency and severity of inundation. Berms are not designed to eliminate all hydrologic connection between the channel on one side and the area behind the berm on the other. It is almost always impracticable to build a berm that will not be overtopped by a flood of maximum severity, and most berms are not designed to withstand severe floods. *See, e.g.,* Department of the Army, U.S. Army Corps of Engineers, Seepage Analysis and Control for Dams, EM 1110-2-1901, (Washington, D.C.: Department of the Army, Original 1986 – Revised 1993), Page 1-1. Levees are designed to allow seepage and are frequently situated on foundations having natural covers of relatively fine-grain impervious to semipervious soils overlying pervious sands and gravels. Department of the Army,

and Rock-filled Dams, EM 1110-2-2300 (Washington, D.C.: Department of the Army, 2004), pp. 6-1 to 6-7. Concrete gravity and arch dams similarly are subject to seepage through the foundation and abutments. Department of the Army, U.S. Army Corps of Engineers, Seepage Analysis and Control for Dams, EM 1110-2-1901 (Washington, D.C.: Department of the Army, Original 1986 – Revised 1993), Page 1-1. Levees and the like are subject to breaches and breaks during times of floods. C. Nilsson, *et al.*, "Fragmentation and Flow Regulation of the World's Large River Systems," *Science* 308(5720):405-408 (2005). Levees are similarly subject to failure in the case of extreme events, such as the extensive levee failures caused by Hurricanes Katrina and Rita. J.W. Day, *et al.*, "Restoration of the Mississippi Delta: Lessons from Hurricanes Katrina and Rita," *Science* 315(5819): 1679-1684 (2007). In designing levees and similar structures, seepage control is necessary to prevent possible failure caused by excessive uplift pressures, instability of the downstream slope, piping through the embankment and/or foundation, and erosion of material by migration into open joints in the foundation and abutments. *Id.*; D.A.Kovacic, *et al.*, "Effectiveness of Constructed Wetlands in Reducing Nitrogen and Phosphorus Export from Agricultural Tile Drainage," *Journal of Environmental Quality* 29(4): 1262-1274 (2000); U.S. Department of the Interior, Bureau of Reclamation, Upper Colorado Region, see http://www.usbr.gov/uc/provo/progact/damsafety.html; International Atomic Energy Agency, Investigating Leaks through Dams and Reservoirs, see http://www-tc.iaea.org/tcweb/publications/factsheets/sheet20dr.pdf; California Division of Safety of Dams, Embankment Design, see http://damsafety.water.ca.gov/guidelines/embankment.htm.

The rate at which water moves through the embankment depends on the type of soil in the embankment, how well it is compacted, the foundation and abutment preparation, and the

designed and constructed to impound large amounts of water effectively and safely, do not prevent all water flow, but rather allow seepage under the foundation of the dam and through the dam itself. *See, e.g.,* International Atomic Energy Agency, Factsheet on Investigating Leaks through Dams and Reservoirs, http://www.tc.iaea.org/tcweb/publications/factsheets/sheet20dr.pdf ; U.S. Bureau of Reclamation, Provo Office, Safety of Dams, http://www.usbr.gov/uc/provo/progact/damsafety.html; Federal Energy Regulatory Commission (FERC), "Chapter 14: Dam Safety Performance Monitoring Program," Engineering Guidelines for the Evaluation of Hydropower Projects (FERC, 2005), pp. 14-36 to 14-39.

Seepage is the flow of a fluid through the soil pores. Seepage through a dam, through the embankments, foundations or abutments, or through a berm is a normal condition. D.A.Kovacic, *et al.*, "Effectiveness of Constructed Wetlands in Reducing Nitrogen and Phosphorus Export from Agricultural Tile Drainage," *Journal of Environmental Quality* 29(4): 1262-1274 (2000); Federal Energy Regulatory Commission (FERC), "Chapter 14: Dam Safety Performance Monitoring Program," Engineering Guidelines for the Evaluation of Hydropower Projects (FERC, 2005), pp. 14-36 to 14-39. This is because water seeks paths of least resistance through the berm or dam and its foundation. Michigan Department of Environmental Quality, Seepage Through Earth Dams (2002), http://www.michigan.gov/deq/0,1607,7-135-3313_3684_3723-9515--,00.html. All earth and rock-fill dams are subject to seepage through the embankment, foundation, and abutments. Department of the Army, U.S. Army Corps of Engineers, Seepage Analysis and Control for Dams, EM 1110-2-1901, (Washington, D.C.: Department of the Army, Original 1986 – Revised 1993), Page 1-1; Department of the Army, U.S. Army Corps of Engineers, Engineering and Design: General Design and Construction Considerations for Earth

Channelization and Levee Construction on Western Tennessee Floodplain Forest Function," *Wetlands* 29(2): 451-464 (2009). The investigation methods to determine the presence or absence of the hydrologic connection depend on the type of structure, the underlying soils, the presence of groundwater, and the depth of the water table. Department of the Army, U.S. Army Corps of Engineers, Engineering and Design – Design and Construction of Levees, EM 1110-2-1913 (Washington, D.C., Department of the Army, 2000), p. 1-1.

Man-made berms and the like are fairly common along streams and rivers across the United States and often accompany stream channelization. S.B. Franklin, *et al.*, "Complex Effects of Channelization and Levee Construction on Western Tennessee Floodplain Forest Function," *Wetlands* 29(2): 451-464 (2009). One study conducted in Portland, Oregon found that 42% of surveyed wetlands had dams, dikes, or berms. M. Kentula, *et al.*, "Tracking Changes in Wetlands with Urbanization: Sixteen Years of Experience in Portland, Oregon, USA," *Wetlands* 24(4):734-743 (2004). Likewise, over 90% of the tidal freshwater wetlands of the Sacramento-San Joaquin Delta have been diked or leveed. C. Simenstad, *et al.*, "Preliminary Results from the Sacramento-San Joaquin Delta Breached Levee Wetland Study," *Interagency Ecological Program for the Sacramento-San Joaquin Estuary Newsletter* 12(4):15-21 (1999). At least 40,000 kilometers of levees, floodwalls, embankments, and dikes are estimated across the United States, with approximately 17,000 kilometers of levees in the Upper Mississippi Valley alone. S.E. Gergel, *et al.*, "Consequences of Human-altered Floods: Levees, Floods, and Floodplain Forests along the Wisconsin River," *Ecological Applications* 12(6): 1755-1770 (2002).

Adjacent waters separated from the tributary network by dikes, levees, berms and the like continue to have a hydrologic connection to downstream waters. This is because berms and similar features typically do not block all water flow. Indeed, even dams, which as specifically

The distance between these wetlands and jurisdictional waters may influence the connectivity since wetlands with shorter distances to the stream network will have higher hydrological and biological connectivity than wetlands located further from the same network. *Id.* at 3-43. The distance between the wetland and water may also influence whether waters are connected via surface or shallow subsurface hydrologic connections. For wetlands connected to tributaries through groundwater flows, less distant wetlands/waters are generally connected through shallower flowpaths, assuming similar soil and geologic properties. *Id.* at 3-11 (Figure 3-5), 3-42. These shallower groundwater flows have the greatest interchange with surface waters and travel between points in the shortest amount of time. *Id.* at 3-42.

3. Adjacent Waters, Including Wetlands, Separated from Other Waters of the United States by Man-made Dikes or Barriers, Natural River Berms, Beach Dunes and the Like Significantly Affect the Chemical, Physical, and Biological Integrity of (a)(1) through (a)(3) Waters

The terms earthen dam, dike, berm, and levee are used to describe similar structures whose primary purpose is to help control flood waters. Such structures vary in scale and size. A levee is an embankment whose primary purpose is to furnish flood protection from seasonal high water and which is therefore subject to water loading for periods of only a few days or weeks a year. Earthen embankments that are subject to water loading for prolonged periods (longer than normal flood protection requirements) are called earth dams. There are a wide variety of types of structures and an even wider set of construction methods. These range from a poorly constructed, low earthen berm pushed up by a backhoe to a well-constructed, impervious core, riprap lined levee that protects houses and cropland. Generally, levees are built to detach the floodplain from the channel, decreasing overbank flood events. S.B. Franklin, *et al.*, "Complex Effects of

subsurface connections may be found below the ordinary root zone (below 12 inches), where other wetland delineation factors may not be present. The presence of an aquiclude (impervious layer) near the surface leads to shallow subsurface flows through the soil, which favors local groundwater flowpaths that connect to nearby wetlands or streams. *Report* at 3-38.

Wetlands with shallow subsurface connections can affect the physical integrity of waters to which they connect. In general, the volume and sustainability of streamflow within river networks depends on contributions from groundwater, especially in areas with shallow groundwater tables and pervious (meaning water can easily pass through) subsurfaces. *Id.* at 3-12 (citing J.J. de Vries, "Seasonal Expansion and Contraction of Stream Networks in Shallow Groundwater Systems," *Journal of Hydrology* 170:15-26 (1995); T.C. Winter, "The Role of Groundwater in Generating Streamflow in Headwater Areas and in Maintaining Base Flow," *Journal of the American Water Resources Association* 43:15-25 (2007); G.R. Kish, *et al.*, "A Geochemical Mass-Balance Method for Base-Flow Separation, Upper Hillsborough River Watershed, West-Central Florida, 2003-2005 and 2009," *USGS Scientific Investigations Report 2010–5092* (Washington, D.C.: U.S. Department of the Interior, U.S. Geological Survey, 2010). Because wetlands with shallow subsurface connections to streams and rivers provide some of these groundwater contributions, they influence the flow regime. Wetlands connected via shallow subsurface connections also can act as water sinks when evapotranspiration is high, but as water sources when evapotranspiration is low. *Id.* at 3-25. As a result, these adjacent waters moderate peak flows, reduce downstream flooding, and provide runoff to help maintain baseflow for streams during times of low flows.

Wetlands and other waters with shallow subsurface connections affect the chemical and biological integrity of downstream waters in ways similar to wetlands with surface connections.

Zooplankton Grazing in a Floodplain System of the River Danube," *Journal of Plankton Research* 25:243-253 (2003)). Similarly, some degree of hydrological disconnectedness is important in increasing the number of mollusk species and macroinvertebrate diversity in oxbow lakes, which in turn support the diversity of mollusks throughout the aquatic system. *Id.* at 5-46 to 5-47 (citing W. Reckendorfer, *et al.*, "Floodplain Restoration by Reinforcing Hydrological Connectivity: Expected Effects on Aquatic Mollusc Communities," *Journal of Applied Ecology* 43:474-484 (2006); K. Obolewski, *et al.*, "Effect of Hydrological Connectivity on the Molluscan Community Structure in Oxbow Lakes of the Lyna River," *Oceanological and Hydrobiological Studies* 38:75-88 (2009).

2. **Surface and Shallow Subsurface Hydrologic Connections Significantly Affect the Chemical, Physical, and Biological Integrity of (a)(1) through (a)(3) waters.**

Wetlands and open waters, including those outside the riparian zone and floodplain, can be connected downstream through unidirectional flow from the wetland or open water to a nearby tributary. Many such connections are through a shallow subsurface hydrologic connection. *Report* at 3-7, 5-23. A shallow subsurface hydrologic connection is lateral water flow through a shallow subsurface layer, such as can be found in steeply sloping areas with shallow soils and soils with a restrictive horizon that prevents vertical water flow, or in karst systems. K.J. Devito, *et al.*, "Groundwater-Surface Water Interactions in Headwater Forested Wetlands of the Canadian Shield," *Journal of Hydrology* 181:127-47 (1996); M.A. O'Driscoll and R.R. Parizek, "The Hydrologic Catchment Area of a Chain of Karst Wetlands in Central Pennsylvania, USA," *Wetlands* 23:171-79 (2003); B.J. Cook and F.R. Hauer, "Effects of Hydrologic Connectivity on Water Chemistry, Soils, and Vegetation Structure and Function in an Intermontane Depressional Wetland Landscape," *Wetlands* 27:719-38 (2007). Shallow

Ecology 69:1055-1063 (1988); B. Middleton, "Hydrochory, Seed Banks, and Regeneration Dynamics Along the Landscape Boundaries of a Forested Wetland," *Plant Ecology* 146:169-184 (2000); A.M. Gurnell, "Analogies Between Mineral Sediment and Vegetative Particle Dynamics in Fluvial Systems," *Geomorphology* 89:9-22 (2007); A. Gurnell, *et al.*, "Propagule Deposition Along River Margins: Linking Hydrology and Ecology," *Journal of Ecology* 96:553-565 (2008); C. Nilsson, *et al.*, "The Role of Hydrochory in Structuring Riparian and Wetland Vegetation," *Biological Reviews* 85:837-858 (2010); L.M. Tronstad, *et al.*, "Aerial Colonization and Growth: Rapid Invertebrate Responses to Temporary Aquatic Habitats in a River Floodplain," *Journal of the North American Benthological Society* 26:460-471 (2007)). Animals, particularly migratory fish, may thus move between adjacent waters and (a)(1) through (a)(3) waters. And even when some species do not traverse the entire distance from adjacent waters to downstream waters, the downstream waters still benefit from the ecological integrity that persists because of the close relationship that adjacent waters have with nearby waters. This is because the chemical and biological properties that arise from interactions between adjacent waters and tributaries move downstream and support the integrity of (a)(1) through (a)(3) waters.

Biological connections between adjacent waters and river systems do not always increase with hydrologic connections. In some cases, the lack of connection improves the biological contribution provided by riparian waters towards neighboring streams, rivers, and lakes. For instance, the periodic hydrologic disconnectedness of oxbow lakes is *necessary* for the accumulation of plankton, an important source of carbon more easily assimilated by the aquatic food chain than terrestrial forms of carbon. *Id.* at 5-46 (citing C. Baranyi, *et al.*, "Zooplankton Biomass and Community Structure in a Danube River Floodplain System: Effects of Hydrology," *Freshwater Biology* 47:473-482 (2002); S. Keckeis, *et al.*, "The Significance of

(citing B.J.A. Pollux, *et al.*, "Consequences of Intraspecific Seed-Size Variation in *Sparganium emersum* for Dispersal by Fish," *Functional Ecology* 21:1084-1091 (2007)). Also, phytoplankton move between floodplain wetlands and the river network. *Id.* at 5-17 (citing D.G. Angeler, *et al.*, "Phytoplankton community similarity in a semiarid floodplain under contrasting hydrological connectivity regimes," *Ecological Research* 25:513-520 (2010)). In turn, the primary productivity conditions in the floodplain results in large populations of phytoplankton that enrich river networks when hydrological connections form. *Id.* (citing P.W. Lehman, *et al.*, "The Influence of Floodplain Habitat on the Quantity and Quality of Riverine Phytoplankton Carbon Produced During the Flood Season in San Francisco Estuary," *Aquatic Ecology* 42:363-378 (2008)). This influx of carbon into the river system nourishes the downstream waters, for example, supporting fisheries.

However, even when hydrological connections are absent, some organisms can move between riparian waters and their neighboring tributaries by overland movement in order to complete their life cycle. River-dwelling mammals, such as river otters, move from the river to riparian wetlands. *Id.* at 5-18 (citing D.G. Newman and C.R. Griffin, "Wetland Use by River Otters in Massachusetts," *Journal of Wildlife Management* 58:18-23 (1994)). Several species of amphibians and reptiles including frogs, snakes and turtles use both streams and neighboring waters. *Id.* at 1-10, 5-4 to 5-5 (Table 5-1), 5-15 (citing J.S. Richardson, *et al.*, "Riparian Communities Associated with Pacific Northwest Headwater Streams: Assemblages, Processes, and Uniqueness," *Journal of the American Water Resources Association* 41:935-947 (2005)). Movement between wetlands and the river network also occurs by the dispersal of seed and plant fragments and the wind dispersal of invertebrates. *Id.* at 5-15, 5-20 (citing R.L. Schneider and R.R. Sharitz, "Hydrochory and Regeneration in a Bald Cypress Water Tupelo Swamp Forest,"

Make a Difference?," *Limnology and Oceanography* 50:398-403 (2005), D.J. Woodford and A.R. McIntosh, "Evidence of Source-Sink Metapopulations in a Vulnerable Native Galaxiid Fish Driven by Introduced Trout," *Ecological Applications* 20:967-977 (2010)). Likewise, floodplains are important foraging, hunting, and breeding sites for fish and amphibians. *Id.* at 5-15 (citing G.H. Copp, "The Habitat Diversity and Fish Reproductive Function of Floodplain Ecosystems," *Environmental Biology of Fishes* 26:1-27 (1989); J.S. Richardson, *et al.*, "Riparian Communities Associated with Pacific Northwest Headwater Streams: Assemblages, Processes, and Uniqueness," *Journal of the American Water Resources Association* 41:935-947 (2005)).

Plants and animals move back and forth between riparian or floodplain waters and the river network. This movement is assisted in some cases when flooding events create hydrological connections. For instance, these floodplain and riparian wetlands provide refuge, feeding, and rearing habitat for many fish species. *Id.* at 5-17 (citing C.H. Wharton, *et al.*, *The Ecology of Bottomland Hardwood Swamps of the Southeast: A Community Profile*, FWS/OBS-81/37 (Washington, D.C.: U.S. Department of the Interior, Fish and Wildlife Service, Biological Services Program, 1982); M.P. Matheney and C.F. Rabeni, "Patterns of Movement and Habitat Use by Northern Hogsuckers in an Ozark Stream," *Transactions of the American Fisheries Society* 124:886-897 (1995); A.A. Pease, *et al.*, "Habitat and Resource Use by Larval and Juvenile Fishes in an Arid-Land River (Rio Grande, New Mexico)," *Freshwater Biology* 51:475-486 (2006); J.A. Henning, *et al.*, "Use of Seasonal Freshwater Wetlands by Fishes in a Temperate River Floodplain," *Journal of Fish Biology* 71:476-492 (2007); C.A. Jeffres, *et al.*, "Ephemeral Floodplain Habitats Provide Best Growth Conditions for Juvenile Chinook Salmon in a California River," *Environmental Biology of Fishes* 83:449-458 (2008)). Seeds ingested by animals such as carp are dispersed in stream channels and associated waters. See, *e.g.*, *id.* at 5-16

with these regular, systemic fluctuations. *Id.* at 5-20 (citing Jenkins and Boulton 2003). Floodplain waters therefore maintain various biological populations, which periodically replenish adjacent jurisdictional waters, serving to maintain their biological integrity.

Plants and animals use waters, including wetlands, in the riparian areas and floodplains for habitat, food, and breeding. Oxbow lakes in the floodplain provide critical fish habitat needed for feeding and rearing, leading researchers to conclude that the entire floodplain should be considered a single functional unit, essential to the river's biological integrity. *Id.* at 5-17 (citing D.E. Shoup and D.H. Wahl, "Fish Diversity and Abundance in Relation to Interannual and Lake- Specific Variation in Abiotic Characteristics of Floodplain Lakes of the Lower Kaskaskia River, Illinois," *Transactions of the American Fisheries Society* 138:1076-1092 (2009)). Since adjacent ponds are structurally and biologically similar to oxbow lakes they serve similar functions relative to the nearby river or stream. Waters, including wetlands, in the riparian areas also provide food sources for stream invertebrates, which colonize during inundation events. *Id.* at 5-19 (citing W.J. Junk, *et al.*, "The Flood Pulse Concept in River-Floodplain Systems," *in* D. P. Dodge, ed., *Proceedings of the International Large River Symposium Ottawa* (Ottawa, Canada: Canadian Special Publication of Fisheries and Aquatic Sciences 106, 1989), pp. 110-127; C. Ilg, *et al.*, "Long-term Reactions of Plants and Macroinvertebrates to Extreme Floods in Floodplain Grasslands," *Ecology* 89:2392-2398 (2008)). Riparian waters also form an integral part of the food web, linking primary producers and plants to higher animals. *Id.* (citing B. Malmqvist, "Aquatic Invertebrates in Riverine Landscapes," *Freshwater Biology* 47:679-694 (2002); G.U.Y. Woodward and A.G. Hildrew, "Food Web Structure in Riverine Landscapes," *Freshwater Biology* 47:777-798 (2002), T.K. Stead, *et al.*, "Secondary Production of a Stream Metazoan Community: Does the Meiofauna

landscape perspective of the stream corridor invasion and habitat characteristics of an exotic (Dioscorea oppositifolia) in a pristine watershed in Illinois," *Biological Invasions* 8:1103-1113 (2006); L.M. Tronstad, *et al.*, "Aerial colonization and growth: Rapid invertebrate responses to temporary aquatic habitats in a river floodplain," *Journal of the North American Benthological Society* 26:460-471 (2007); A. Gurnell, *et al.*, "Propagule deposition along river margins: Linking hydrology and ecology," *Journal of Ecology* 96:553-565 (2008)). Waters within floodplains act as sinks of seeds, plant fragments, and invertebrate eggs, allowing for cross-breeding and resulting gene flow across time. *Id.* at 5-19 to 5-21 (citing K.M. Jenkins, and A.J. Boulton, "Connectivity in a dryland river: Short-term aquatic microinvertebrate recruitment following floodplain inundation," *Ecology* 84:2708-2723 (2003); D. Frisch, and S.T. Threlkeld, "Flood-mediated dispersal versus hatching: Early recolonisation strategies of copepods in floodplain ponds," *Freshwater Biology* 50:323-330 (2005); B. Vanschoenwinkel, *et al.*, "Wind mediated dispersal of freshwater invertebrates in a rock pool metacommunity: Differences in dispersal capacities and modes," *Hydrobiologia* 635:363-372 (2009)). Micro- and macroinvertebrates colonize nutrient rich waters within floodplains during periods of inundation, facilitating an increase in population and sustaining them though times of limited resources and population decline. *Id.* at 5-19 (citing W.J. Junk, *et al.*, "The flood pulse concept in river-floodplain systems," *in* D.P. Dodge, ed., *Proceedings of the International Large River Symposium Ottawa* (Ottawa, Canada: Canadian Special Publication of Fisheries and Aquatic Sciences 106, 1989), pp. 110-127; B. Malmqvist, "Aquatic invertebrates in riverine landscapes," *Freshwater Biology* 47:679-694 (2002); C. Ilg, *et al.*, "Long-term reactions of plants and macroinvertebrates to extreme floods in floodplain grasslands," *Ecology* 89:2392-2398 (2008)). Such animals are adapted to high floods, desiccation (drying out), or other stresses that come

macroinvertebrate production in three dimensions: Channel surface, hyporheic, and floodplain environments," *Ecology* 73:876-886 (1992); L.A. Smock, "Movements of invertebrates between stream channels and forested floodplains," *Journal of the North American Benthological Society* 13:524-531 (1994); C. T. Robinson, *et al.*, "The fauna of dynamic riverine landscapes," *Freshwater Biology* 47:661-677 (2002); J.S. Richardson, *et al.*, "Riparian communities associated with Pacific Northwest headwater streams: Assemblages, processes, and uniqueness," *Journal of the American Water Resources Association* 41:935-947 (2005); C. Ilg, *et al.*, "Long-term reactions of plants and macroinvertebrates to extreme floods in floodplain grasslands," *Ecology* 89:2392-2398 (2008); D.E. Shoup, and D. H. Wahl, "Fish diversity and abundance in relation to interannual and lakespecific variation in abiotic characteristics of floodplain lakes of the lower Kaskaskia River, Illinois," *Transactions of the American Fisheries Society* 138:1076-1092 (2009)). Likewise, seeds, plant fragments, and whole plants move between riparian and floodplain waters and the river network. *Id.* at 5-15 (citing R.L. Schneider, and R.R. Sharitz, "Hydrochory and regeneration in a bald cypress water tupelo swamp forest," *Ecology* 69:1055-1063 (1988); B. Middleton, "Hydrochory, seed banks, and regeneration dynamics along the landscape boundaries of a forested wetland," *Plant Ecology* 146:169-184 (2000); C. Nilsson, *et al.*, "The role of hydrochory in structuring riparian and wetland vegetation," *Biological Reviews* 85:837-858 (2010)).

Hydrological connections are often drivers of biological connections, and flooding events enhance the existing connections between floodplain waters and the river network. As a result, waters within floodplains have important functions for aquatic health. Many species have cycles timed to flooding events, particularly in circumstances where flooding is associated with annual spring snowmelt or high precipitation. *Id.* at 5-15 to 5-17, 5-20 (citing J.R. Thomas, *et al.*, "A

pesticides alachlor and atrazine. *Id.* (citing K.G. Paterson and J.L. Schnoor, "Fate of Alachlor and Atrazine in a Riparian Zone Field Site," *Water Environment Research* 64:274-283 (1992)). Riparian waters also trap and hold pesticide contaminated runoff preventing it from harming neighboring waters.

Riparian areas are dynamic places that support a diversity of aquatic, amphibious, and terrestrial species adapted to the unique habitat created by periodic flooding events. *Id.* at 5-15 (citing W.J. Junk, *et al.*, "The flood pulse concept in river-floodplain systems," *in* D.P. Dodge, ed., *Proceedings of the International Large River Symposium Ottawa* (Ottawa, Canada: Canadian Special Publication of Fisheries and Aquatic Sciences 106, 1989), pp. 110-127; K. Tockner, *et al.*, "An Extension of the Flood Pulse Concept," *Hydrological Processes* 14:2861-2883 (2000); C.T. Robinson, *et al.*, "The Fauna of Dynamic Riverine Landscapes," *Freshwater Biology* 47:661-677 (2002)). Plants, invertebrates, and vertebrates use waters, including wetlands, in the riparian areas for habitat, nutrients, and breeding. As a result, the waters, including wetlands, in the riparian areas act as sources of organisms, particularly during inundation events, replenishing neighboring waters with organisms, seeds, and organic matter. Inundation and hydrological connectivity of riparian areas greatly increase the area of aquatic habitats and species diversity. *Id.* at 5-15 to 5-16 (citing W.J. Junk *et al.* 1989; R. Jansson, *et al.*, "Hydrochory Increases Riparian Plant Species Richness: A Comparison between a Free-Flowing and a Regulated River," *Journal of Ecology* 93:1094-1103 (2005)). Aquatic animals, including amphibians and fish, take advantage of the waters present in riparian areas, either inhabiting them or moving between the riparian water and neighboring waters. *Id.* at 5-15, 5-17, 5-19 (citing G.H. Copp, "The habitat diversity and fish reproductive function of floodplain ecosystems," *Environmental Biology of Fishes* 26:1-27 (1989); L.A. Smock, *et al.*, "Lotic

headwaters travel downstream and in turn become part of the food web for larger aquatic organisms in rivers and other waters. Organic material provided by riparian waters to small, headwater streams is therefore important not only to the small streams that directly utilize this source of energy to support their biological populations but also to the overall biological integrity of downstream waters that also benefit from the movement of fish and other species that contribute to the food web of larger streams and rivers.

Floodplain water bodies, including oxbow lakes, accumulate organic carbon, an important function influenced by the size and frequency of floods from adjacent rivers. *See, e.g., id.* at 5-45 (citing A. Cabezas, *et al.*, "Changing Patterns of Organic Carbon and Nitrogen Accretion on the Middle Ebro Floodplain (NE Spain)," *Ecological Engineering* 35:1547-1558 (2009)). These stored chemicals are available for exchange with river water when hydrological connections form. Organic materials are the basis for the food web in stream reaches where photosynthetic production of energy is absent or limited, particularly in headwater systems where vegetative litter alone makes up the base of the aquatic food web. The maintenance of floodplain waters is therefore an important component of protecting the biological integrity of downstream waters into which the headwaters flow.

The waters, including wetlands, in the riparian area play an important role in the removal of pesticides. *Id.* at 5-14 (citing P. Vidon, *et al.*, "Hot Spots and Hot Moments in Riparian Zones: Potential for Improved Water Quality Management," *Journal of the American Water Resources Association* 46:278-298 (2010). Microbes near plant roots break down these pesticides. *See, e.g., id.* (citing G. Voos, and P.M. Groffman, "Relationships between microbial biomass and dissipation of 2,4-D and dicamba in soil," *Biology and Fertility of Soils* 24:106-110 (1996)). Uptake by aquatic plants has also been shown to be an important mechanism of removal of the

d. Riparian and Floodplain Waters Significantly Affect the Biological Integrity of (a)(1) through (a)(3) Waters

Waters and wetlands located in both riparian areas and floodplains support the biological integrity of downstream (a)(1) through (a)(3) waters in a variety of ways. They provide habitat for aquatic and water-tolerant plants, invertebrates, and vertebrates, and provide feeding, refuge, and breeding areas for invertebrates and fish. Seeds, plants, and animals move between waters in the riparian zone and floodplains and the adjacent streams, and from there colonize or utilize downstream waters, including traditional navigable waters.

Organic matter from adjacent wetlands is critical to aquatic food webs, particularly in headwaters, where it is the primary source of energy flow due to low light conditions that inhibit photosynthesis. *Id.* at 5-13 (citing J.L. Tank, *et al.*, "A Review of Allochthonous Organic Matter Dynamics and Metabolism in Streams," *Journal of the North American Benthological Society* 29:118-146 (2010)). Headwater streams tend to be located in heavily vegetated areas compared to larger waters, so they are more likely to contain leaf litter, dead and decaying plants, and other organic matter that forms the basis of headwater food webs. The organic matter is processed by microbes and insects that make the energy available to higher levels of stream life such as amphibians and fish. Studies have shown that macroinvertebrates rely on leaf inputs in headwater streams and that excluding organic litter from a stream resulted in significant changes to the food web at multiple levels. *Id.* (citing G.W. Minshall, "Role of Allochthonous Detritus in the Tropic Structure of a Woodland Springbrook Community," *Ecology* 48:139-149 (1967); J.B. Wallace, *et al.*, "Multiple Trophic Levels of a Forest Stream Linked to Terrestrial Litter Inputs," *Science* 277:102-104 (1997); J.L. Meyer, *et al.*, "Leaf Litter as a Source of Dissolved Organic Carbon in Streams," *Ecosystems* 1:240-249 (1998)). Fish and amphibian species found in

5-12 (citing Vidon, *et al.* 2010). A Pennsylvania forest removed 26% of the nitrate from the subsurface. *Id.* at 5-12 (citing J.D. Newbold, *et al.*, "Water Quality Functions of a 15-Year-Old Riparian Forest Buffer System," *Journal of the American Water Resources Association* 46:299-310 (2010)). The vegetation associated with riparian waters also removes nitrogen from subsurface flows. Therefore, the conservation of riparian waters helps protect downstream waters from influxes of dissolved nitrogen.

Phosphorus is another potentially harmful nutrient that is captured and processed in riparian waters. *Id.* (citing T.A. Dillaha and S.P. Inamdar, "Buffer Zones as Sediment Traps or Sources," *in* N.E. Haycock, T.P. Burt, K.W.T. Goulding, and G. Pinay, ed., *Buffer Zones: Their Processess and Potential in Water Protection,* Proceedings of the International Conference on Buffer Zones, September 1996 (Hertfordshire, UK: Quest Environmental, 1997), pp. 33-42; A.N. Sharpley and S. Rekolainen, "Phosphorus in Agriculture and Its Environmental Implications," *in* H. Tunney, *et al.*, ed., *Phosphorus Losses from Soil to Water* (Cambridge, UK: CAB International, 1997), pp. 1-54; G.C. Carlyle and A.R. Hill, "Groundwater Phosphate Dynamics in a River Riparian Zone: Effects of Hydrologic Flowpaths, Lithology, and Redox Chemistry," *Journal of Hydrology* 247:151-168 (2001)). Biogeochemical processes, sedimentation, and plant uptake account for high rates of removal of particulate phosphorus in riparian areas. *Id.* (citing C.C. Hoffmann, *et al.*, "Phosphorus Retention in Riparian Buffers: Review of Their Efficiency," *Journal of Environmental Quality* 38:1942-1955 (2009)). The amount of contact the water has with nearby soils determines the ability of the riparian area to remove phosphorus. *Id.* This function of upstream riparian waters is crucial for maintaining the chemical and biological integrity of the waters to which they are adjacent, and for preventing eutrophication in downstream traditional navigable waters, interstate waters, and the territorial seas.

(2000)). Protection of these waters therefore helps maintain the chemical integrity of the nation's waters.

The removal of nitrogen is an important function of all waters, including wetlands, in the riparian areas. Riparian areas regularly remove more than half of dissolved nitrogen found in surface and subsurface water by plant uptake and microbial transformation. *Id.* at 5-11 (citing P. Vidon, *et al.*, "Hot Spots and Hot Moments in Riparian Zones: Potential for Improved Water Quality Management," *Journal of the American Water Resources Association* 46:278-298 (2010)). Denitrification in surface and subsurface flows is highest where there is high organic matter and/or anoxic conditions. *Id.* Denitrification occurs in wetland soils where there is high organic matter, low oxygen, denitrifying microbes, and saturated soil conditions, and rates increase with proximity to streams. *Id.* (citing S.V. Gregory, *et al.*, "An Ecosystem Perspective of Riparian Zones: Focus on Links between Land and Water," *Bioscience* 41:540-551 (1991); P. Vidon, *et al.*, "Hot Spots and Hot Moments in Riparian Zones: Potential for Improved Water Quality Management," *Journal of the American Water Resources Association* 46:278-298 (2010)). Riparian waters are therefore important in maintaining the conditions important for denitrification, which in turn protects streams, rivers, lakes and other waters from nitrogen pollution.

Plant uptake of dissolved nitrogen in subsurface flows also accounts for large quantities of nitrogen removal. Riparian forests have been found to remove 75% of dissolved nitrate transported from agricultural fields in Maryland. *Id.* (citing P. Vidon, *et al.*, "Hot Spots and Hot Moments in Riparian Zones: Potential for Improved Water Quality Management," *Journal of the American Water Resources Association* 46:278-298 (2010)). Likewise, riparian forests in Georgia remove 65% of nitrogen and 30% of phosphorus from agricultural sources. *Id.* at 5-11 to

2006), pp. 115-176; W.J. Mitsch and J.G. Gosselink, *Wetlands*, 4th edition, (Hoboken, NJ: John Wiley & Sons Inc., 2007); K.R., Reddy and R.D. DeLaune, *Biogeochemistry of Wetlands: Science and Applications* (Boca Raton, FL: CRC Press, 2008). These chemical processes reduce or eliminate pollution that would otherwise enter streams, rivers, lakes and other waters and subsequently downstream traditional navigable waters, interstate waters, or the territorial seas. The removal of the nutrients nitrogen and phosphorus is a particularly important role for riparian waters. Nutrients are necessary to support aquatic life, but the presence of excess nutrients can lead to eutrophication and the depletion of oxygen nearby waters and in waters far downstream. See, *e.g.*, *id.* at 1-8. Eutrophication is a large problem in waters across the United States including such significant ecosystems as the Chesapeake Bay and Lake Spokane in Washington. W.M. Kemp, *et al.*, "Eutrophication of Chesapeake Bay: Historical Trends and Ecological Interactions," *Marine Ecology Progress Series* 303(21):1-29 (2005); D.J. Moore and J. Ross, *Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load: Water Quality Improvement Report*, Publication No. 07-10-073 (Spokane, WA: Washington State Department of Ecology, 2010); R.R. Murphy, *et al.*, "Long-Term Trends in Chesapeake Bay Seasonal Hypoxia, Stratification, and Nutrient Loading," *Estuaries and Coasts* 34(6):1293-1309 (2011). Eutrophication is the process by which plants and algae grow in waters to such an extent that the abundance of vegetation monopolizes the available oxygen, detrimentally affecting other aquatic organisms. *Id.* Oxbow lakes also have high mineralization rates, suggesting that similar to adjacent wetlands they process and trap nutrients from runoff. *Report* at 5-45 to 5-46 (citing K.O. Winemiller, *et al.*, "Fish Assemblage Structure in Relation to Environmental Variation among Brazos River Oxbow Lakes," *Transactions of the American Fisheries Society* 129:451-468

transform a substantial amount of the nutrients, pesticides, and other pollutants before they enter streams, river, lakes and other waters.

Chemicals and other pollutants enter waters from point sources, non-point sources, atmospheric deposition, upstream reaches, and through the hyporheic zone, a region beneath and alongside a stream bed where surface water and shallow groundwater mix. *Id.* at 5-10 (citing S.W. Nixon and V.J. Lee, *Wetlands and Water Quality: A Regional Review of Recent Research in the United States on the Role of Freshwater and Saltwater Wetlands as Sources, Sinks, and Transformers of Nitrogen, Phosphorus, and Various Heavy Metals*, Technical Report Y-86-2, (Vicksburg, MS: U.S. Army Corp of Engineers, Waterways Experiment Station, 1986); D.F. Whigham and T.E. Jordan, "Isolated Wetlands and Water Quality," *Wetlands* 23:541-549 (2003); S.L.Whitmire and S.K. Hamilton, "Rates of Anaerobic Microbial Metabolism in Wetlands of Divergent Hydrology on a Glacial Landscape," *Wetlands* 28:703-714 (2008)). Throughout the stream network, but especially in headwater streams and their adjacent wetlands, chemicals are sequestered, assimilated, transformed, or lost to the atmosphere by microbes, fungi, algae, and macrophytes present in riparian waters and soils. *Id.* (citing S.W. Nixon and V.J. Lee, *Wetlands and Water Quality: A Regional Review of Recent Research in the United States on the Role of Freshwater and Saltwater Wetlands as Sources, Sinks, and Transformers of Nitrogen, Phosphorus, and Various Heavy Metals*, Technical Report Y-86-2, (Vicksburg, MS: U.S. Army Corp of Engineers, Waterways Experiment Station, 1986); C. Johnston, "Sediment and Nutrient Retention by Freshwater Wetlands: Effects on Surface Water Quality," *Critical Reviews in Environmental Control* 21:491-565 (1991); P.I. Boon, "Biogeochemistry and Bacterial Ecology of Hydrologically Dynamic Wetlands," *in* D.P. Batzer and R.R. Sharitz, ed., *Ecology of Freshwater and Estuarine Wetlands* (Berkeley, CA: University of California Press,

the future," *Hydrobiologia* 229:169-180 (1992); D.W. Schindler and P.J. Curtis, "The role of DOC in protecting freshwaters subjected to climate warming and acidification from UV exposure," *Biogeochemistry* 36:1-8 (1997); K.R. Reddy and R.D. DeLaune, *Biogeochemistry of Wetlands: Science and Applications*, (Boca Raton, FL: CRC Press, 2008)).

c. Riparian and Floodplain Waters Significantly Affect the Chemical Integrity of (a)(1) through (a)(3) Waters

As stated above in the section on tributaries, pollutants such as petroleum waste products and other harmful pollutants dumped into any part of the tributary system are likely to flow downstream, or to be washed downstream, and thereby pollute navigable or interstate waters, from which American citizens take their drinking water, shellfish, fin fish, water-based recreation, and many other uses. Some wetlands perform the valuable function of trapping or filtering out some pollutants (such as fertilizers, silt, and some pesticides), thereby reducing the likelihood that those pollutants will reach and pollute the tributaries of the downstream navigable or interstate waters (and eventually pollute those downstream waters themselves). However, many other pollutants (such as petroleum wastes and toxic chemical wastes), if dumped into wetlands or other waters that are adjacent to tributary streams, may reach those tributaries themselves, and thereafter flow downstream to pollute the nation's drinking water supply, fisheries, and recreation areas.

Riparian and floodplain waters play a critical role in controlling the chemicals that enter streams and other waters of the United States and as a result are vital in protecting the chemical, physical, and biological integrity of downstream (a)(1) through (a)(3) waters. Runoff (the water that has not evaporated or infiltrated into the groundwater) from uplands is a large source of pollution, but research has shown that wetlands and other riparian waters trap and chemically

Fluvial Processes," *Freshwater Biology* 47:601-619 (2002)). Also, the riparian vegetation that overhangs streams provides shade, providing a critically important function of reducing fluctuations in water temperature helping to reduce excessive algal production and to maintain life-supporting oxygen levels in streams and other waters. *Id.* at 5-9 (citing S.V. Gregory, *et al.*, "An Ecosystem Perspective of Riparian Zones: Focus on Links between Land and Water," *Bioscience* 41:540-551 (1991); E.C. Volkmar and R.A. Dahlgren, "Biological Oxygen Demand Dynamics in the Lower San Joaquin River, California," *Environmental Science & Technology* 40:5653-5660 (2006)). Even small changes in water temperature can have significant impacts on the type and number of species present in waters, with higher temperatures generally associated with degraded habitat which supports only those species that can tolerate higher temperatures and reduced levels of dissolved oxygen. Higher water temperatures are associated with streams and rivers with less valuable recreational and commercial fisheries. As discussed below, these physical characteristics of headwater streams influence what types of organisms live in the region.

Headwaters and nearby wetlands supply downstream waters with dissolved organic carbon as a result of decomposition processes from dead organic matter such as plants. The biological consequences of this dissolved organic carbon are discussed in more detail below. The presence of dissolved organic carbon can affect how light penetrates the water, an important factor in the growth of plants, algae, and other primary producers, and can protect aquatic organisms from the harmful effects of UV-B radiation. *Id.* at 5-28 to 5-29 (citing K.N. Eshelman and H.F. Hemond, "The role of organic acids in the acid-base status of surface waters at Bickford Watershed, Massachusetts," *Water Resources Research* 21:1503-1510 (1985); J.E. Hobbie and R.G. Wetzel, "Microbial control of dissolved organic carbon in lakes: Research for

influence on the condition and function of rivers. *Id.* at 5-48 to 5-49. That influence can vary with the distance from the river and the age of the oxbow, reflecting the frequency and nature of the exchange of materials that takes place between the two waterbodies.

Because adjacent waters support riparian vegetation, they affect the capacity of riparian vegetation to influence stream flow, morphology, and habitat provided in the nearby waterbody. Vegetation in riparian waters influences the amount of water in the stream by capturing and transpiring stream flow and intercepting groundwater and overland flow. *Id.* at 3-22, 5-7 (citing P. Meyboom, "Three Observations on Streamflow Depletion by Phreatophytes," *Journal of Hydrology* 2:248-261 (1964)). Riparian vegetation in adjacent waters also reduces stream bank erosion, serving to maintain the physical integrity of the channel. See, *e.g.*, *id.* at 5-8 (citing C.E. Beeson and P. F. Doyle, "Comparison of Bank Erosion at Vegetated and Non-Vegetated Channel Bends," *Journal of the American Water Resources Association* 31:983-990 (1995)). In addition, inputs of woody debris from aquatic vegetation into waters make important contributions to the channel's geomorphology and the stream's aquatic habitat value. *Id.* (citing N.H. Anderson and J. R. Sedell, "Detritus Processing by Macroinvertebrates in Stream Ecosystems," *Annual Review of Entomology* 24:351-377 (1979); M.E. Harmon, *et al.*, "Ecology of Coarse Woody Debris in Temperature Ecosystems," *Advances in Ecological Research* 15:133-302 (1986); F. Nakamura and F. J. Swanson, "Effects of Coarse Woody Debris on Morphology and Sediment Storage of a Mountain Stream System in Western Oregon," *Earth Surface Processes and Landforms* 18:43-61 (1993); T.E. Abbe and D. R. Montgomery, "Large Woody Debris Jams, Channel Hydraulics and Habitat Formation in Large Rivers," *Regulated Rivers: Research & Management* 12:201-221 (1996); R.J. Naiman and H. Decamps, "The Ecology of Interfaces: Riparian Zones," *Annual Review of Ecology and Systematics* 28:621-658 91997); A.M. Gurnell, *et al.*, "Large Wood and

physical shape and structure of stream channels. Significant changes to upstream channels can affect the chemical, physical, and biological condition of downstream (a)(1) through (a)(3) waters.

The physical effects of excess sediment can impair chemical and ecological integrity in a variety of ways. *Id.* at 5-9 (citing P.J. Wood and P.D. Armitage, "Biological Effects of Fine Sediment in the Lotic Environment," *Environmental Management* 21:203-217 (1997)). Excess sediment is linked to increasing contaminant and nutrient concentrations, all of which tributaries can transmit downstream, affecting water quality. Excess sediment may block and absorb sunlight transmission through the water column, inhibiting plant photosynthesis and warming the water in the stream. Sediment may fill the interstitial spaces between rocks in a streambed, which many fish and aquatic species use for mating, reproduction, and shelter from predators. This kind of physical degradation of tributary streambeds results in less suitable habitat available for animals and fish that move between upstream and downstream waters. Riparian waters that retain sediments thus protect downstream waters from the effects of excess sediment.

Oxbow lakes play similar roles in the floodplain as they are an integral part of alluvial floodplains of meandering rivers. *Id.* at 5-42 (citing K.O. Winemiller, *et al.*, "Fish Assemblage Structure in Relation to Environmental Variation among Brazos River Oxbow Lakes," *Transactions of the American Fisheries Society* 129:451-468 (2000), K. Glinska-Lewczuk, "Water Quality Dynamics of Oxbow Lakes in Young Glacial Landscape of NE Poland in Relation to Their Hydrological Connectivity," *Ecological Engineering* 35:25-37 (2009)). They connect to rivers by periodic overland flow, typically from the river during flooding events, and bidirectional shallow subsurface flow through fine river soils (bidirectional means flow from river to lake and lake to river). *Id.* at 5-43 to 5-44. Oxbow lakes generally have an important

Society 12:48-60 (1993); C. Amoros and G. Bornette, "Connectivity and Biocompexity in Waterbodies of Riverine Floodplains," *Freshwater Biology* 47:761-776 (2002); G.C. Poole, *et al.*, "Multiscale Geomorphic Drivers of Groundwater Flow Paths: Subsurface Hydrologic Dynamics and Hyporheic Diversity," *Journal of the North American Benthological Society* 25:288-303 (2006)). Riparian and floodplain wetlands are frequently contiguous with streams and other waterbodies and significantly influence the hydrology of such waterbodies. *Id.* at 5-6 (citing R.J. Naiman, *et al.*, *Riparia: Ecology, Conservation, and Management of Streamside Communities* (Burlington, MA: Elsevier Academic Press, 2005); P. Vidon, *et al.*, "Hot Spots and Hot Moments in Riparian Zones: Potential for Improved Water Quality Management," *Journal of the American Water Resources Association* 46:278-298 (2010)). Floodplain wetlands are important for the reduction or delay of floods. *Id.* (citing A. Bullock and M. Acreman, "The Role of Wetlands in the Hydrological Cycle," *Hydrology and Earth System Sciences* 7:358-389 (2003)). Oxbow lakes also retain flood waters. *Id.* at 5-44. Adjacent ponds generally function similarly to oxbow lakes.

Waters in riparian areas filter sediment washed down from uplands and collect sediment from overbank flow as the river or stream floods. *Id.* at 5-7. For example, riparian areas were observed to collect 80-90% of the sediment from farmlands in a study in North Carolina. *Id.* (citing A. Cooper, *et al.*, "Riparian Areas as Filters for Agricultural Sediment," *Soil Science Society of America Proceedings* 51:416-420 (1987); R.B. Daniels and J.G. Gilliam, "Sediment and Chemical Load Reduction by Grass and Riparian Filters," *Soil Science Society of America Journal* 60:246-251 (1996); R.J. Naiman and H. Decamps, "The Ecology of Interfaces: Riparian Zones," *Annual Review of Ecology and Systematics* 28:621-658 (1997)). Maintaining the equilibrium between sediment deposition and sediment transport is important to maintain the

in Arkansas decreased by 10-20% mainly because of floodplain water storage. *Id.* (citing R. Walton, *et al.*, "Hydrology of the Black Swamp Wetlands on the Cache River, Arkansas," *Wetlands* 16:279-287 (1996). Research has shown that floodplain wetlands in Ohio store about 40% of the flow of small streams. *Id.* at 5-6 to 5-7 (citing D.E. Gamble, *et al.*, *An Ecological and Functional Assessment of Urban Wetlands in Central Ohio. Columbus, Ohio*, EPA Technical Report WET/ 2007-3B, (Columbus, OH: Ohio Environmental Protection Agency, Wetland Ecology Group, Division of Surface Water, 2007)). These and similar findings point to the close hydrological influence that waters in riparian and floodplain areas have on streams.

Some adjacent waters are bordering or contiguous with (a)(1) through (a)(5) waters. Because of their close physical proximity to nearby waterbodies, they readily exchange their waters through the saturated soils surrounding the stream or through surface exchange. This commingling of waters allows bordering or contiguous waters to both provide chemically transformed waters to streams and to absorb excess stream flow.

Flow between neighboring waters and streams is more longitudinal (downslope) at headwaters and more lateral further downstream. *Id.* at 5-38, Table 5-3. These connections in part determine stream flow volume and duration. Waters, including wetlands, in riparian areas connect to neighboring waterbodies through various surface and subsurface connections. See, *e.g.*, *id.* at 3-4 (citing National Research Council, *Riparian Areas: Functions and Strategies for Management* (Washington, D.C.: National Academy Press, 2002)). Floodplains, similarly, are closely associated with the groundwater found beneath and beside river channels (which are considered shallow aquifers) and waters in floodplains readily exchange water with such aquifers. *Id.* at 3-14 (citing J.A. Stanford and J. V. Ward, "An Ecosystem Perspective of Alluvial Rivers: Connectivity and the Hyporheic Corridor," *Journal of the North American Benthological*

floods have a 0.2% probability of occurring in a particular year). Flood insurance rate maps are not based on an ecological definition of the term "floodplain," and therefore do not have any use in identifying adjacent wetlands and waters for the purposes of CWA jurisdiction. Flood insurance rate maps are developed by applying models and other information to identify areas that would be inundated by a flood event of a particular probability of recurring.

Riparian waters take many different forms. Some may be wetlands, which are defined in paragraph (c)(6) of the proposed rule. Others may be ponds, oxbow lakes, or other types of open waters. Oxbow lakes, commonly found in floodplains, are formed when river meanders are cutoff from the rest of the river. *Id.* at 5-42.

b. Riparian and Floodplain Waters Significantly Affect the Physical Integrity of (a)(1) through (a)(3) Waters

Scientific research shows waters and wetlands in riparian areas and floodplains to be important in protecting the physical integrity of aquatic resources. Because riparian and floodplain waters exhibit bidirectional exchange of water with the waters to which they are adjacent, they play an important role in determining the volume and duration of stream flow. Riparian and floodplain waters also have an essential role in regulating and stabilizing sediment transport to downstream waters. These characteristics are fundamental to the physical integrity of streams as well as downstream traditional navigable waters, interstate waters, and territorial seas.

Riparian and floodplain wetlands are important for the reduction or delay of floods. *Id.* at 3-22 (citing A. Bullock and M. Acreman, "The Role of Wetlands in the Hydrological Cycle," *Hydrology and Earth System Sciences* 7:358-389 (2003)). Waters in riparian areas control flooding during times of high precipitation or snowmelt by capturing water from overbank flow and storing excess stream water. *Id.* at 5-6. One study found that peak flows in the Cache River

at 31. Waters including wetlands in riparian areas significantly influence exchanges of energy and matter with aquatic ecosystems. See, *e.g.*, *id.* (citing National Research Council, *Riparian Areas: Functions and Strategies for Management* (Washington, D.C.: The National Academies Press, 2002).

Floodplains are low gradient areas bordering stream or river channels, lakes, and impoundments that were formed by sediment deposition from those waters under present climatic conditions. These natural geomorphic features are inundated during moderate to high water events. *Id.* (citing L.B. Leopold, *A View of the River* (Cambridge, MA: Harvard University Press, 1994); W.R. Osterkamp, *Annotated Definitions of Selected Geomorphic Terms and Related Terms of Hydrology, Sedimentology, Soil Science and Ecology*, USGS Open File Report 2008-1217 (Reston, VA: U.S. Department of the Interior, U.S. Geological Survey, 2008)). By "present climactic conditions," the agencies mean that currently or recently active floodplains will be used to help determine whether wetlands or waters are adjacent to waters of the United States. The proposed definition is limited to the present climactic conditions in order to best represent the floodplain that has an active and significant relationship with the stream or river channel. Historic floodplains that played a role in the river or lake dynamics in the past only will not be used to determine whether a water is adjacent. Floodplains formed under different climactic conditions that no longer connect to the stream channel that formed them are terraces. *Id.* It should be noted that "floodplain" as defined in today's proposed rule does not necessarily equate to the 100-year floodplain as defined by the Federal Emergency Management Agency (FEMA). However, the FEMA defined floodplain may often coincide with the current definition proposed in this rule. Flood insurance rate maps are based on the probability of a flood event occurring (e.g., 100-year floods have a 1% probability of occurring in a given year or 500 year-

1. **Adjacent waters under this proposed rule have a significant nexus to (a)(1) through (a)(3) waters.**

The discussion below summarizes the key points made in the Report and explains the technical basis for supporting a conclusion that adjacent waters, as defined in this proposed rule, have a significant nexus to waters identified in paragraphs (a)(1) – (a)(3) of the proposed rule. The geographic position of an "adjacent" water relative to the stream is indicative of the relationship they share, with many of its defining characteristics resulting from the movement of materials and energy between the two. A review and analysis of the scientific literature supports the conclusion that individually or in combination with similarly situated waters in a watershed, adjacent waters have a significant effect on the chemical, physical, and biological integrity of downstream traditionally navigable waters, interstate waters, and territorial seas.

a. **Riparian and Floodplain Waters Significantly Affect the Chemical, Physical, and Biological Integrity of (a)(1) through (a)(3) Waters**

Waters, including wetlands, often lie within landscape settings that have bidirectional hydrological exchange with (a)(1) through (a)(5) waters (e.g., wetlands and open waters in riparian areas and flood plains). Such waters play an integral role in the chemical, physical, and biological integrity of the waters to which they are adjacent. Riparian areas and floodplains often describe the same geographic region. *Report* at 3-4. Therefore, the discussion of the functions of waters, including wetlands, in riparian areas will typically apply to floodplains unless otherwise noted. Where connections arise specifically from the act of inundation of adjacent land during times of higher-than-normal water, the term "floodplain" is solely used to describe the area.

Riparian areas are transition zones between terrestrial and aquatic ecosystems that are distinguished by gradients in biophysical conditions, ecological processes, and biota. *Id.,* Report

waters) may likewise have a significant impact on the chemical, physical, or biological integrity of downstream waters. Non-tributary streams may be connected via groundwater to downstream waters. Such streams may also provide habitat to insect, amphibian, and reptile species that also use the tributary network.

Appendix B

Legal Analysis

Background

Congress enacted the Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816, as amended, Pub. L. No. 95-217, 91 Stat. 1566 (33 U.S.C. 1251 et seq.) (Clean Water Act or CWA) "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. 1251(a).[1] The U.S. Supreme Court first addressed the scope of waters of the United States protected by the CWA in *United States v. Riverside Bayview Homes,* 474 U.S. 121 (1985), which involved wetlands adjacent to a traditional navigable water in Michigan. In a unanimous opinion, the Court deferred to the Corps' ecological judgment that adjacent wetlands are "inseparably bound up" with the waters to which they are adjacent, and upheld the inclusion of adjacent wetlands in the regulatory definition of "waters of the United States." *Id.* at 134. The Court observed that the broad objective of the CWA to restore and maintain the integrity of the Nation's waters "... incorporated a broad, systemic view of the goal of maintaining and improving water quality .... Protection of aquatic ecosystems, Congress recognized, demanded broad federal authority to control pollution, for '[w]ater moves in hydrologic cycles and it is essential that discharge of pollutants be controlled at the source.' In keeping with these views, Congress chose to define the waters covered by the Act broadly." *Id.* at 132-33.

The issue of "waters of the United States" was addressed again by the Supreme Court in *Solid Waste Agency of Northern Cook County (SWANCC) v. U.S. Army Corps of Engineers*, 531

[1] The 1972 legislation extensively amended the Federal Water Pollution Control Act (FWPCA), which was originally enacted in 1948. Further amendments to the FWPCA enacted in 1977 changed the popular name of the statute to the Clean Water Act. See Pub. L. No. 95-217, 91 Stat. 1566; 33 U.S.C. 1251 note.

U.S. 159 (2001). In *SWANCC,* the Court addressed the question of CWA jurisdiction over isolated intrastate ponds that had formed on a proposed solid waste balefill site in Illinois. In 1986, the Corps explained in preamble language that the agencies interpreted the CWA to protect intrastate waters: (a) which are or would be used as habitat by birds protected by Migratory Bird Treaties; or (b) which are or would be used as habitat by other migratory birds which cross state lines; or (c) which are or would be used as habitat for endangered species; or (d) are used to irrigate crops sold in interstate commerce. 51 Fed. Reg. 41, 217 (1986). This interpretation came to be known as the "Migratory Bird Rule." The Corps of Engineers had asserted jurisdiction over the ponds as "other waters" under 33 C.F.R. § 328.3(a)(3) based solely on the presence of migratory birds. In a 5-4 opinion, the Court held that "33 C.F.R. Section 328.3(a)(3) as clarified and applied to petitioner's balefill site pursuant to the 'Migratory Bird Rule' … exceeds the authority granted to [the Corps] under 404 of the CWA." *SWANCC* at 174. The *SWANCC* Court noted that in *Riverside* it had "found that Congress' concern for the protection of water quality and aquatic ecosystems indicated its intent to regulate wetlands 'inseparably bound up' with the 'waters of the United States'" and that "it was the significant nexus between the wetlands and 'navigable waters' that informed our reading of the CWA" in that case. *Id.* at 172. *SWANCC* did not invalidate (a)(3) or other parts of the regulatory definition of "waters of the United States."

Five years after *SWANCC*, the U.S. Supreme Court addressed the scope of CWA protection for wetlands adjacent to tributaries of traditional navigable waters. *Rapanos v. United States*, 547 U.S. 715 (2006). In June 2006, the Justices issued five opinions with no single opinion commanding a majority of the Court. The plurality opinion, authored by Justice Scalia, stated that "waters of the United States" extended beyond traditional navigable waters to include

"relatively permanent, standing or flowing bodies of water." *Id.* at 739. Justice Scalia indicated that the phrase "relatively permanent" includes "seasonal rivers" but not "streams whose flow is 'coming and going at intervals ... broken, fitful ... or existing only, or no longer than, a day." *Id.* at 732 n. 5. The plurality also concluded that only wetlands with a continuous surface connection to other jurisdictional waters are protected by the CWA. Justice Kennedy's concurring opinion took a different approach than Justice Scalia's. Justice Kennedy concluded that "waters of the United States" includes waters "that possess a 'significant nexus' to waters that are or were navigable in fact or that could reasonably be so made." *Id.* at 759. He concluded that wetlands have the requisite significant nexus where they "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.'" *Id.* at 780. Kennedy's opinion notes that such a relationship with navigable waters must be more than "speculative or insubstantial." *Id.* at 780. Neither the plurality nor Kennedy opinion invalidated any of the regulatory provisions defining "waters of the United States."

The Circuit Courts of Appeal are not uniform as to the controlling test for "waters of the United States" under *Rapanos*. The First,Third and Eighth Circuits have concluded that CWA jurisdiction exists if <u>either</u> Justice Kennedy's or the plurality's standard is met. *United States v. Johnson*, 467 F.3d 56, 66 (1st Cir. 2006), petition for certiorari denied Oct. 9, 2007; *U.S. v. Donovan,*661 F.3d. 174 (3rd Cir. 2012); *U.S. v. Bailey*, 571 F.3d 791, 798-99 (8th Cir. 2009). The Seventh and Ninth Circuits limited their holdings that the Kennedy standard applied to the facts of the cases before them, and did not foreclose the possibility that in some cases the plurality's standard might apply. *N. Cal. River Watch v. City of Healdsburg,* 496 F.3d 993, 999-1000 (9th Cir. 2007), petition for certiorari denied Feb. 19, 2008; *United States v. Gerke Excavating, Inc.,*

464 F.3d 723, 725 (7th Cir. 2006), petition for certiorari denied Oct. 1, 2007. The Fifth and Sixth Circuits did not choose a controlling standard because the waters at issue satisfied both standards. *United States v. Robert J. Lucas, Jr.*, 516 F.3d 316, 326-27 (5th Cir. 2008), petition for certiorari denied Oct. 15, 2008; United States v. Cundiff, 555 F.3d 200, 210-13 (6th Cir. 2009), petition for certiorari denied Oct. 5, 2009. The Eleventh Circuit has held that only the Kennedy standard determines jurisdiction. *United States v. McWane,* 505 F.3d 1208 (11th Cir. 2007), petition for certiorari denied Dec. 1, 2008. No Circuit Court has held that only the plurality standard applies.

Traditional Navigable Waters:

EPA and the Corps are proposing no changes to the existing regulation at paragraph (a)(1) and will continue to assert jurisdiction over "[a]ll waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide." 33 C.F.R. § 328.3(a)(1); 40 C.F.R. § 230.3(s)(1); 40 C.F.R. § 122.2 ("waters of the U.S."(a)); 40 C.F.R. § 110.1(a) ("navigable waters"). These "(a)(1)waters" are the "traditional navigable waters." These (a)(1) waters include all of the "navigable waters of the United States," defined in 33 C.F.R. Part 329 and by numerous decisions of the federal courts, plus all other waters that are navigable-in-fact (e.g., the Great Salt Lake, UT and Lake Minnetonka, MN).

To determine whether a water body constitutes an (a)(1) water under the regulations, relevant considerations include Corps regulations, prior determinations by the Corps and by the federal courts, and case law. Corps districts and EPA regions would determine whether a particular waterbody is a traditional navigable water based on application of those considerations

to the specific facts in each case.

As noted above, the (a)(1) waters include, but are not limited to, the "navigable waters of the United States." A water body qualifies as a "navigable water of the United States" if it meets any of the tests set forth in 33 C.F.R. Part 329 (e.g., the water body is (a) subject to the ebb and flow of the tide, and/or (b) the water body is presently used, or has been used in the past, or may be susceptible for use (with or without reasonable improvements) to transport interstate or foreign commerce). The Corps districts have made determinations in the past regarding whether particular water bodies qualify as "navigable waters of the United States" for purposes of asserting jurisdiction under Sections 9 and 10 of the Rivers and Harbors Act of 1899 (33 USC Sections 401 and 403). Pursuant to 33 C.F.R. § 329.16, the Corps maintains lists of final determinations of navigability for purposes of Corps jurisdiction under the Rivers and Harbors Act of 1899. While absence from the list should not be taken as an indication that the water is not navigable (329.16(b)), Corps districts and EPA regions rely on any final Corps determination that a water body is a navigable water of the United States.

If the federal courts have determined that a water body is navigable-in-fact under federal law for any purpose, that water body qualifies as a "traditional navigable water" subject to CWA jurisdiction under 33 C.F.R. § 328.3(a)(1) and 40 C.F.R. § 230.3(s)(1). Corps districts and EPA regions are guided by the relevant opinions of the federal courts in determining whether waterbodies are "currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce" (33 C.F.R. § 328.3(a)(1); 40 C.F.R. § 230.3(s)(1)) or "navigable-in-fact."

This definition of "navigable-in-fact" comes from a long line of cases originating with *The Daniel Ball*, 77 U.S. 557 (1870). The Supreme Court stated:

> Those rivers must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water.

The Daniel Ball, 77 U.S. at 563.

In *The Montello*, the Supreme Court clarified that "customary modes of trade and travel on water" encompasses more than just navigation by larger vessels:

> The capability of use by the public for purposes of transportation and commerce affords the true criterion of the navigability of a river, rather than the extent and manner of that use. If it be capable in its natural state of being used for purposes of commerce, no matter in what mode the commerce may be conducted, it is navigable in fact, and becomes in law a public river or highway.

The Montello, 87 U.S. 430, 441-42 (1874). In that case, the Court held that early fur trading using canoes sufficiently showed that the Fox River was a navigable water of the United States. The Court was careful to note that the bare fact of a water's capacity for navigation alone is not sufficient; that capacity must be indicative of the water's being "generally and commonly useful to some purpose of trade or agriculture." *Id.* at 442.

In *Economy Light & Power*, the Supreme Court held that a waterway need not be continuously navigable; it is navigable even if it has "occasional natural obstructions or portages" and even if it is not navigable "at all seasons . . . or at all stages of the water." *Economy Light & Power Co. v. U.S.*, 256 U.S. 113, 122 (1921).

In *United States v. Holt State Bank*, 270 U.S. 49 (1926), the Supreme Court summarized

the law on navigability as of 1926 as follows:

> The rule long since approved by this court in applying the Constitution and laws of the United States is that streams or lakes which are navigable in fact must be regarded as navigable in law; that they are navigable in fact when they are used, or are susceptible of being used, in their natural and ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water; and further that navigability does not depend on the particular mode in which such use is or may be had - whether by steamboats, sailing vessels or flatboats- nor on an absence of occasional difficulties in navigation, but on the fact, if it be a fact, that the stream in its natural and ordinary condition affords a channel for useful commerce.

Holt State Bank, 270 U.S. at 56.

In *U. S. v. Utah*, 283 U.S. 64 (1931) and *U.S. v. Appalachian Elec. Power Co*, 311 U.S. 377 (1940), the Supreme Court held that so long as a water is susceptible to use as a highway of commerce, it is navigable-in-fact, even if the water has never been used for any commercial purpose. *U.S. v. Utah*, at 81-83 ("The question of that susceptibility in the ordinary condition of the rivers, rather than of the mere manner or extent of actual use, is the crucial question."); *U.S. v. Appalachian Elec. Power Co.*, 311 U.S. 377, 416 (1940) ("Nor is lack of commercial traffic a bar to a conclusion of navigability where personal or private use by boats demonstrates the availability of the stream for the simpler types of commercial navigation.").

In 1971, in *Utah v. United States*, 403 U.S. 9 (1971), the Supreme Court held that the Great Salt Lake, an intrastate water body, was navigable under federal law even though it "is not part of a navigable interstate or international commercial highway." *Id.* at 10. In doing so, the

Supreme Court stated that the fact that the Lake was used for hauling of animals by ranchers rather than for the transportation of "water-borne freight" was an "irrelevant detail." *Id.* at 11. "The lake was used as a highway and that is the gist of the federal test." *Id.*

Also of note are two decisions from the courts of appeals. In *FPL Energy Marine Hydro*, a case involving the Federal Power Act, the D.C. Circuit reiterated the fact that "*actual use* is not necessary for a navigability determination" and repeated earlier Supreme Court holdings that navigability and capacity of a water to carry commerce could be shown through "physical characteristics and experimentation." *FPL Energy Marine Hydro LLC v. FERC*, 287 F.3d 1151, 1157 (D.C. Cir. 2002). In that case, the D.C. Circuit upheld a FERC navigability determination that was based upon three experimental canoe trips taken specifically to demonstrate the river's navigability. *Id.* at 1158-59.

The 9th Circuit has also implemented the Supreme Court's holding that a water need only be susceptible to being used for waterborne commerce to be navigable-in-fact. *Alaska v. Ahtna, Inc.*, 891 F.2d 1404 (9th Cir. 1989). In *Ahtna*, the 9th Circuit held that current use of an Alaskan river for commercial recreational boating is sufficient evidence of the water's capacity to carry waterborne commerce at the time that Alaska became a state. *Id.* at 1405. It was found to be irrelevant whether or not the river was actually being navigated or being used for commerce at the time, because current navigation showed that the river always had the capacity to support such navigation. *Id.* at 1404.

In summary, when determining whether a water body qualifies as a "traditional navigable water" (*i.e.*, an (a)(1) water), relevant considerations include whether a Corps District has determined that the water body is a navigable water of the United States pursuant to 33 C.F.R § 329.14, or the water body qualifies as a navigable water of the United States under any of the

tests set forth in 33 C.F.R. § 329, or a federal court has determined that the water body is navigable-in-fact under federal law for any purpose, or the water body is "navigable-in-fact" under the standards that have been used by the federal courts.

Interstate Waters:

1. Interstate Waters

The agencies' proposal today makes no change to the interstate waters section of the existing regulations and the agencies would continue to assert jurisdiction over interstate waters, including interstate wetlands. The language of the CWA is clear that Congress intended the term "navigable waters" to include interstate waters, and the agencies' interpretation, promulgated contemporaneously with the passage of the CWA, is consistent with the statute and legislative history. The Supreme Court's decisions in *SWANCC* and *Rapanos* did not address the interstate waters provision of the existing regulation.

A. The Language of the Clean Water Act, the Statute as a Whole, and the Statutory History Demonstrate Congress' Clear Intent to Include Interstate Waters as "Navigable Waters" Subject to the Clean Water Act

While as a general matter, the scope of the terms "navigable waters" and "waters of the United States" is ambiguous, the language of the CWA, particularly when read as a whole, demonstrates that Congress clearly intended to continue to subject interstate waters to federal regulation. The statutory history of federal water pollution control places the terms of the CWA in context and provides further evidence of Congressional intent to include interstate waters within the scope of the "navigable waters" protected by the Act. Congress clearly intended to subject interstate waters to CWA jurisdiction without imposing a requirement that they be water

that is navigable for purposes of federal regulation under the Commerce Clauses themselves or be connected to water that is navigable for purposes of federal regulation under the Commerce Clauses.[2] The CWA itself is clear that interstate waters that were previously subject to federal regulation remain subject to federal regulation. The text of the CWA, specifically the CWA's provision with respect to interstate waters and their water quality standards, in conjunction with the definition of navigable waters, provides clear indication of Congress' intent. Thus, interstate waters are "navigable waters" protected by the CWA.

(1) The Plain Language of the Clean Water Act and the Statute as a Whole Clearly Indicate Congress' Intent to Include Interstate Waters within the Scope of "Navigable Waters" for Purposes of the Clean Water Act

Under well settled principles, the phrase "navigable waters" should not be read in isolation from the remainder of the statute. As the Supreme Court has explained:

> The definition of words in isolation, however, is not necessarily controlling in statutory construction. A word in a statute may or may not extend to the outer limits of its definitional possibilities. Interpretation of a word or phrase depends upon reading the whole statutory text, considering the purpose and context of the statute, and consulting any precedents or authorities that inform the analysis.

Dolan v. U.S. Postal Service, 546 U.S. 481, 486 (2006); *see also United States Nat'l. Bank of Oregon v. Indep. Ins. Agents of Am., Inc.*, 508 U.S. 439, 455 (1993).

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[2] For purposes of the CWA, EPA and the Corps have interpreted the term "traditional navigable waters" to include all of the "navigable waters of the United States," defined in 33 C.F.R. Part 329 and by numerous decisions of the federal courts, plus all other waters that are navigable-in-fact (e.g., the Great Salt Lake, UT and Lake Minnetonka MN). This section explains why EPA and the Corps do not interpret the CWA or the Supreme Court's decisions in *Solid Waste Agency of Northern Cook County (SWANCC) v. U.S. Army Corps of Engineers,* 531 U.S. 159 (2001) and *Rapanos v. United States*, 547 U.S. 715 (2006), to restrict CWA jurisdiction over interstate waters to only those interstate waters that are traditional navigable waters or that connect to traditional navigable waters.

While the term "navigable waters" is, in general, ambiguous, interstate waters are waters that are clearly covered by the plain language of the definition of "navigable waters."[3] Congress defined "navigable waters" to mean "the waters of the United States, including the territorial seas." Interstate waters are the waters of the several States and, thus, the United States. While the 1972 Act was clearly not limited to interstate waters, it was clearly intended to include interstate waters.

Furthermore, the CWA does not simply define "navigable waters." Other provisions of the statute provide additional textual evidence of the scope of the primary jurisdictional term of the Act. Most importantly, there is a specific provision in the 1972 CWA establishing requirements for those interstate waters which were subject to the prior Water Pollution Control acts.

The CWA requires States to establish water quality standards for navigable waters and submit them to the Administrator for review.[4] Under section 303(a) of the Act:

> *In order to carry out the purpose of this Act*, any water quality standard applicable to *interstate waters* which was adopted by any State and submitted to, and approved by, or is awaiting approval by, the Administrator pursuant to this Act as in effect immediately prior to the date of enactment of the Federal Water Pollution Control Act Amendments of 1972, *shall remain in effect* unless the Administrator determined that such standard is not consistent with the applicable

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[3] The Supreme Court has found that the term "waters of the United States" is ambiguous in some respects. *Rapanos*, 547 U.S. at 752 (plurality opinion), 804 (dissent).

[4] Section 303 of the Act requires the States to submit revised and new water quality standards to the Administrator for review. CWA section 303(c)(2)(A). Such revised or new water quality standards "shall consist of the designated uses of the navigable waters involved and the water quality criteria for such waters." *Id.* If the Administrator determines that a revised or new standard is not consistent with the Act's requirements, or determines that a revised or new standard is necessary to meet the Act's requirements, and the State does not make required changes, "[t]he Administrator shall promptly prepare and publish proposed regulations setting forth a revised or new water quality standard for the navigable waters involved." CWA section 303(c)(4).

> requirements of this Act as in effect immediately prior to the date of enactment of the Federal Water Pollution Control Act Amendments of 1972. If the Administrator makes such a determination he shall, within three months after the date of enactment of the Federal Water Pollution Control Act Amendments of 1972, notify the State and specify the changes needed to meet such requirements. If such changes are not adopted by the State within ninety days after the date of such notification, the Administrator shall promulgate such changes in accordance with subsection (b) of this section.

CWA section 303(a)(1) (*emphasis added*).

Under the 1965 Act, as discussed in more detail below, States were directed to develop water quality standards establishing water quality goals for interstate waters. By the early 1970s, all the States had adopted such water quality standards. Advanced Notice of Proposed Rulemaking, Water Quality Standards Regulation, 63 Fed. Reg. 36742, 36745 (July 7, 1998). In section 303(a), Congress clearly intended for existing federal regulation of interstate waters to continue under the amended CWA. Water quality standards for interstate waters were not merely to remain in effect, but EPA was required to actively assess those water quality standards and even promulgate revised standards for interstate waters if States did not make necessary changes. By the plain language of the statute, these water quality standards for interstate waters were to remain in effect "in order to carry out the purpose of this Act." The objective of the Act is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." CWA section 101(a). It would contravene Congress' clearly stated intent for a court to impose an additional jurisdictional requirement on all rivers, lakes, and other waters that flow across, or form a part of, State boundaries ("interstate waters" as defined by the 1948 Act, § 10,

62 Stat. 1161), such that interstate waters that were previously protected were no longer protected because they lacked a connection to a water that is navigable for purposes of federal regulation under the Commerce Clause. Nor would the existing water quality standards be "carry[ing] out the purpose of this Act," if only those water quality standards established for interstate waters that are also water that is navigable for purposes of federal regulation under the Commerce Clauses or that connect to water that is navigable for purposes of federal regulation under the Commerce Clauses could be implemented under the Act through, for example, National Pollutant Discharge Elimination System permits under Section 402 of the Act. Nowhere in Section 303(a) does Congress make such a distinction.

(2) The Federal Water Pollution Control Statute That Became the Clean Water Act Covered Interstate Waters

In 1972, when Congress rewrote the law governing water pollution, two federal statutes addressed discharges of pollutants into interstate waters and water that is navigable for purposes of federal regulation under the Commerce Clause, and tributaries of each: the Water Pollution Control Act of 1948, as amended, and Section 13 of the Rivers and Harbors Act of 1899 (known as the "Refuse Act"). Of the two, the Water Pollution Control Act extended federal authority over interstate waters and their tributaries. In contrast, the Refuse Act extended federal jurisdiction over the "navigable waters of the United States" and their tributaries. These two separate statutes demonstrate that Congress recognized that interstate waters and "navigable waters of the United States" were independent lawful bases of federal jurisdiction.

a. The Federal Water Pollution Control Act Prior to 1972

From the outset, and through all the amendments pre-dating the 1972 Amendments, the federal authority to abate water pollution under the Water Pollution Control Act, and the Federal

Water Pollution Control Act (FWPCA) as it was renamed in 1956, extended to interstate waters. In addition, since first enacted in 1948, and throughout all the amendments, the goals of the Act have been, inter alia, to protect public water supplies, propagation of fish and aquatic life, recreation, agricultural, industrial, and other legitimate uses. *See* 62 Stat. 1155 and 33 U.S.C. § 466 (1952), 33 U.S.C. § 466 (1958), 33 U.S.C. § 466 (1964), 33 U.S.C. § 1151 (1970).

In 1948, Congress enacted the Water Pollution Control Act "in connection with the exercise of jurisdiction over the waterways of the Nation and in the consequence of the benefits to public health and welfare by the abatement of stream pollution." *See* Pub. L. No. 80-845, 62 Stat. 1155 (June 30, 1948). The Act authorized technical assistance and financial aid to States for stream pollution abatement programs, and made discharges of pollutants into interstate waters and their tributaries a nuisance, subject to abatement and prosecution by the United States. *See* § 2(d)(1),(4), 62 Stat. at 1156-1157 (Section 2(d)(1) of the Water Pollution Control Act of 1948, 62 Stat. at 1156, stated: "The pollution of *interstate waters* in or adjacent to any State or States (whether the matter causing or contributing to such pollution is discharged directly into such waters or reaches such waters after discharge into a tributary of such waters), which endangers the health or welfare of persons in a State other than that in which the discharge originates, is hereby declared to be a public nuisance and subject to abatement as herein provided." (emphasis added)); § 2(a), 62 Stat. 1155 (requiring comprehensive programs for "interstate waters and tributaries thereof"); § 5, 62 Stat. 1158 (authorizing loans for sewage treatment to abate discharges into "interstate waters or into a tributary of such waters"). Under the statute, "interstate waters" were defined as all rivers, lakes, and other waters that flow across, or form a part of, State boundaries. § 10, 62 Stat. 1161.

In 1956, Congress strengthened measures for controlling pollution of interstate waters and their tributaries. Pub. L. No. 84-660, 70 Stat. 498 (1956) (directing further cooperation between the federal and State governments in development of "comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries . . . and improving the sanitary condition of surface and underground waters," and authorizing the Surgeon General to make joint investigations with States into the conditions of and discharges into "any waters of any State or States.").

In 1961, Congress amended the FWPCA to substitute the term "interstate or navigable waters" for "interstate waters." *See* Pub. L. No. 87-88, 75 Stat. 208 (1961). Accordingly, beginning in 1961, the provisions of the FWPCA applied to all interstate waters <u>and</u> navigable waters <u>and</u> the tributaries of each, *see* 33 U.S.C. §§ 466a, 466g(a) (1964).[5]

In 1965, Congress approved a second set of major legislative changes, requiring each State to develop water quality standards for interstate waters within its boundaries by 1967. Pub. L. No. 89-234, 79 Stat. 908 (1965).[6] Failing establishment of adequate standards by the State, the Act authorized establishment of water quality standards by federal regulation. *Id.* at 908. The 1965 Amendments provided that the "discharge of matter into such interstate waters or portions thereof, which reduces the quality of such waters below the water quality standards established under this subsection (whether the matter causing or contributing to such reduction is discharged directly into such waters or reaches such waters after discharge into tributaries of

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[5] Congress did not define the term "navigable waters" in the 1961 Amendments, or in subsequent FWPCA Amendments, until 1972.

[6] In 1967, the State of Arizona created the Water Quality Control Council (Council) to implement the requirements of the 1965 FWPCA. The Council adopted water quality standards for those waters that were considered "interstate waters" pursuant to the existing federal law. The Council identified the Santa Cruz River as an interstate water and promulgated water quality standards for the river in accordance with federal law.

such waters), is subject to abatement" through procedures specified in the Act, including (after conferences and negotiations and consideration by a Hearing Board) legal action in the courts. *Id.* at 909.[7]

b. The Refuse Act

Since its original enactment in 1899, the Refuse Act has prohibited the discharge of refuse matter "into any navigable water of the United States, or into any tributary of any navigable water." Ch. 425, 30 Stat. 1152 (1899). It also has prohibited the discharge of such material on the bank of any tributary where it is liable to be washed into a navigable water. *Id.* Violators are subject to fines and imprisonment. *Id.* at 1153 (codified at 33 U.S.C. § 412). In 1966, the Supreme Court upheld the Corps' interpretation of the Refuse Act as prohibiting discharges that pollute the navigable waters, and not just those discharges that obstruct navigation. *United States v. Standard Oil Co.*, 384 U.S. 224, 230 (1966). In 1970, President Nixon signed an Executive Order directing the Corps (in consultation with the Federal Water Pollution Control Administration[8]) to implement a permit program under Section 13 of the RHA "to regulate the discharge of pollutants and other refuse matter into the navigable waters of the United States or their tributaries and the placing of such matter upon their banks." E.O. 11574, 35 Fed. Reg. 19,627 (Dec. 25, 1970). In 1971, the Corps promulgated regulations establishing the Refuse Act Permit Program. 36 Fed. Reg. 6564, 6565 (April 7, 1971). The regulations made it unlawful to discharge any pollutant (except those flowing from streets and sewers in a liquid state) "into a navigable waterway or tributary," except pursuant to a permit. Under the permit

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[7] The 1966 Amendments authorized civil fines for failing to provide information about an alleged discharge causing or contributing to water pollution. Pub. L. No. 89-753, 80 Stat. 1250 (1966); *see also* S. Rep. No. 414, 92d Congress, 1st Sess. 10 (1972) (describing the history of the FWPCA).

[8] In December 1970, administration of the Federal Water Pollution Control Administration was transferred from the Secretary of the Interior to EPA. S. Rep. No. 414, 92d Congress, 1st Sess. (1972).

program, EPA advised the Corps regarding the consistency of a proposed discharge with water quality standards and considerations, and the Corps evaluated a permit application for impacts on anchorage, navigation, and fish and wildlife resources. *Id.* at 6566.

c. The Federal Water Pollution Control Act of 1972

When Congress passed the Federal Water Pollution Control Act amendments of 1972 (referred to hereinafter as the CWA or CWA), it was not acting on a blank slate. It was amending existing law that provided for a federal/state program to address water pollution. The Supreme Court has recognized that Congress, in enacting the CWA in 1972, "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." *Riverside Bayview Homes,* 474 U.S. at 133; *see also International Paper Co. v. Ouellette*, 479 U.S. 481, 486, n.6 (1987).

The amendments of 1972 defined the term "navigable waters" to mean "the waters of the United States, including the territorial seas." 33 U.S.C. § 1362(7). While earlier versions of the 1972 legislation defined the term to mean "the navigable waters of the United States," the Conference Committee deleted the word "navigable" and expressed the intent to reject prior geographic limits on the scope of federal water-protection measures. Compare S. Conf. Rep. No. 1236, 92d Cong., 2d Sess. 144 (1972), with H.R. Rep. No. 911, 92 Cong., 2d Sess. 356 (1972) (bill reported by the House Committee provided that "[t]he term 'navigable waters' means the navigable waters of the United States, including the territorial seas"); *see also* S. Rep. No. 414, 92d Cong., 1st Sess. 77 ("Through a narrow interpretation of the definition of interstate waters the implementation of the 1965 Act was severely limited. . . . Therefore, reference to the control

requirements must be made to the navigable waters, portions thereof, and their tributaries."). Thus, Congress intended the scope of the 1972 Act to include, at a minimum, the waters already subject to federal water pollution control law – both interstate waters and water that is navigable for purposes of federal regulation under the Commerce Clause. Those statutes covered interstate waters, defined interstate waters without requiring that they be a traditional navigable water or be connected to water that is a traditional navigable water, and demonstrated that Congress knew that there are interstate waters that are not navigable for purposes of federal regulation under the Commerce Clause.

In fact, Congress amended the Water Pollution Control Act in 1961 to substitute the term "interstate or navigable waters" for "interstate waters," demonstrating that Congress wanted to be very clear that it was asserting jurisdiction over both types of waters: interstate waters even if they were not navigable for purposes of federal regulation under the Commerce Clause, and traditional navigable waters even if they were not interstate waters. At no point were the interstate waters already subject to federal water pollution control authority required to be navigable or to connect to a traditional navigable water. Further, as discussed above, the legislative history clearly demonstrates that Congress was expanding jurisdiction – not narrowing it – with the 1972 amendments. Thus, it is reasonable to conclude that by defining "navigable waters" as "the waters of the United States" in the 1972 amendments, Congress included not just traditionally navigable waters, but all waters previously regulated under the FWPCA, including non-navigable interstate waters.

Based on the statutory definition of navigable waters, the requirement of Section 303(a) for water quality standards for interstate waters to remain in effect, the purposes of the Act, and the more than three decades of federal water pollution control regulation that provides a context

for reading those provisions of the statute, the intent of Congress is clear that the term "navigable waters" includes "interstate waters" as an independent basis for CWA jurisdiction, whether or not they themselves are traditional navigable waters or are connected to a traditional navigable water.

B. Supreme Court Precedent Supports CWA Jurisdiction Over Interstate Waters Without Respect to Navigability

In two seminal decisions, the Supreme Court established that resolving interstate water pollution issues was a matter of federal law and that the CWA was the comprehensive regulatory scheme for addressing interstate water pollution. *Illinois v. Milwaukee*, 406 U.S. 91 (1972); *City of Milwaukee v. Illinois*, 451 U.S. 304 (1981). In both of these decisions, the Court held that federal law applied to interstate waters. Moreover, these cases analyzed the applicable federal statutory schemes and determined that the provisions of the Federal Water Pollution Control Act and the CWA regulating water pollution applied generally to interstate waters. The holdings of these cases recognized the federal interest in interstate water quality pollution; and *City of Milwaukee* recognized that CWA jurisdiction extends to interstate waters without regard to navigability.

In *Illinois v. Milwaukee*, the Court considered a public nuisance claim brought by the State of Illinois against the City of Milwaukee to address the adverse effects of Milwaukee's discharges of poorly treated sewage into Lake Michigan, "a body of interstate water." 406 U.S. at 93. In relevant part, the Court held that the federal common law of nuisance was an appropriate mechanism to resolve disputes involving interstate water pollution. 406 U.S. at 107 ("federal courts will be empowered to appraise the equities of suits alleging creation of a public nuisance by water pollution"). The Court further noted that in such actions the Court could

consider a State's interest in protecting its high water quality standards from "the more degrading standards of a neighbor." *Id.*

In reaching this conclusion, the Court examined in detail the scope of the federal regulatory scheme as it existed prior to the October, 1972 FWPCA amendments. In its April, 1972 decision, the Court concluded that the Federal Water Pollution Control Act "makes clear that it is federal, not state, law that in the end controls the pollution of *interstate or navigable waters*." 406 U.S. at 102 (*emphasis added*). The Court, in this case, concluded that the regulatory provisions of the Federal Water Pollution Control Act did not address the right of a state to file suit to protect water quality. However, this was not because this statute did not reach interstate waters. The Court specifically noted that Section 10(a) of the Federal Water Pollution Control Act "makes pollution of *interstate or navigable waters* subject 'to abatement'" 406 U.S. at 102 (*emphasis added*). Rather, the Court noted that the plaintiff in this action was seeking relief outside the scope of the Federal Water Pollution Control Act and that statute explicitly provided that independent "'state and interstate action to abate pollution of interstate or navigable waters shall be encouraged and shall not ... be displaced by Federal enforcement action." 406 U.S. at 104 (citing section 10(b) of the Federal Water Pollution Control Act).

In addition, in *Illinois v. Milwaukee*, the Court acknowledged that it was essential for federal law to resolve interstate water pollution disputes, citing with approval the following discussion from *Texas v. Pankey*:

> Federal common law and not the varying common law of the individual states is, we think, entitled and necessary to be recognized as a basis for dealing in uniform standard with the environmental rights of a State against improper impairment by sources outside its domain.... Until the field has been made the subject of comprehensive legislation or

> authorized administrative standards, only a federal common law basis can provide an adequate means for dealing with such claims as alleged federal rights.

406 U.S. at 107 n. 9, citing *Texas v. Pankey*, 441 F.2d 236, 241-242.

In *City of Milwaukee*, the Court revisited this dispute and addressed the expanded statutory provisions of the CWA regulating water pollution. The scope of the CWA amendments led the Court to reverse its decision in *Illinois v. Milwaukee*. In reaching this result, the Court concluded that Congress had elected to exercise its authority under federal law to occupy the field of water pollution regulation. As a result, the Court concluded that there was no basis for maintaining a federal common law of nuisance.

> Congress has not left the formulation of appropriate federal standards to the courts through application of often vague and indeterminate nuisance concepts and maxims of equity jurisprudence, but rather has occupied the field through the establishment of a comprehensive regulatory program supervised by an expert administrative agency. 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 considered in that case.

451 U.S. at 317.

The Court's analysis in *Illinois v. Milwaukee* made clear that federal common law was necessary to protect "the environmental rights of States against improper impairment by sources outside its domain." 406 U.S. at 107, n. 9. In the context of interstate water pollution, nothing in the Court's language or logic limits the reach of this conclusion to only navigable interstate waters. In *City of Milwaukee*, the Court found that the CWA was the "comprehensive regulatory

program" that "occupied the field" (451 U.S. 317) with regard to interstate water pollution, eliminating the basis for an independent common law of nuisance to address interstate water pollution. Since the federal common law of nuisance (as well as the statutory provisions regulating water pollution in the Federal Water Pollution Control Act) applied to interstate waters whether navigable or not, the CWA could only occupy the field of interstate water pollution if it too extended to non-navigable as well as navigable interstate waters.

With regard to the specifics of interstate water pollution, the *City of Milwaukee* Court noted that, in *Illinois v. Milwaukee*, it had been concerned that Illinois did not have a forum in which it could protect its interests in abating water pollution from out of state, absent the recognition of federal common law remedies. 451 U.S. at 325. The Court then went on to analyze in detail the specific procedures created by the CWA "for a State affected by decisions of a neighboring State's permit-granting agency to seek redress." 451 U.S. at 326. The Court noted that "any State whose waters may be affected by the issuance of a permit" is to receive notice and the opportunity to comment on the permit. *Id.* (citing to CWA § 402(b)(3)(5)); In addition the Court noted provisions giving EPA the authority to veto and issue its own permits "if a stalemate between an issuing and objecting state develops." *Id.* (citing to CWA §§ 402(d)(2)(A),(4)). In light of these protections for States affected by interstate water pollution, the court concluded that

> [t]he statutory scheme established by Congress provides a forum for the pursuit of such claims before expert agencies by means of the permit-granting process. It would be quite inconsistent with this scheme if federal courts were in effect to "write their own ticket" under the guise of federal common law after permits have already been issued and permittees have been planning and operating in reliance on them.

451 U.S. at 326.

Nothing in the language or the reasoning of this discussion limits the applicability of these protections of interstate waters to navigable interstate waters or interstate waters connected to navigable waters. If these protections only applied to navigable interstate waters, a downstream State would unable to protect many of its waters from out of state water pollution. This would hardly constitute a comprehensive regulatory scheme that occupied the field of interstate water pollution.

For these reasons, the holdings and the reasoning of these decisions establish that the regulatory reach of the CWA extends to all interstate waters without regard to navigability.[9]

C. The Supreme Court's Decisions in *SWANCC* and *Rapanos* Do Not Limit or Constrain Clean Water Act Jurisdiction Over Non-navigable Interstate Waters.

As noted above, the Supreme Court recognized that Congress, in enacting the CWA, "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." *Riverside Bayview*, 474 U.S. at 133; *see also International Paper Co. v. Ouellette*, 479 U.S. 481, 486 n.6, (1987). In *Riverside Bayview*, and subsequently in *SWANCC* and *Rapanos*, the Court addressed the construction of the CWA terms "navigable waters" and "the waters of the United

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[9] Nothing in subsequent Supreme Court case law regarding interstate waters in any way conflicts with the agencies' interpretation. *See International Paper v. Ouellette*, 479 U.S. 481 (1987); *Arkansas v. Oklahoma*, 503 U.S. 91 (1992). In both of these cases, the Court detailed how the CWA had supplanted the federal common law of nuisance to establish the controlling statutory scheme for addressing interstate water pollution disputes. Nothing in either decision limits the applicability of the CWA to interstate water pollution disputes involving navigable interstate waters or interstate waters connected to navigable waters.

States." In none of these cases did the Supreme Court address interstate waters, nor did it overrule prior Supreme Court precedent which addressed the interaction between the CWA and federal common law to address pollution of interstate waters. Therefore, the statute, even in light of *SWANCC* and *Rapanos,* does not impose an additional requirement that interstate waters must be water that is navigable for purposes of federal regulation under the Commerce Clause or connected to water that is navigable for purposes of federal regulation under the Commerce Clause to be jurisdictional waters for purposes of the CWA.

At the outset, it is worth noting that neither *SWANCC* nor *Rapanos* dealt with the jurisdictional status of interstate waters. Repeatedly in the *SWANCC* decision the Court emphasized that the question presented concerned the jurisdiction status of nonnavigable *intrastate* waters located in two Illinois counties. *SWANCC* 531 U.S. at 165-166, 171 ("we thus decline to... hold that isolated ponds, some only seasonal, *wholly located within two Illinois counties* fall under § 404(a) definition of navigable waters...") (*emphasis added*). Nowhere in Justice Rehnquist's majority opinion in *SWANCC* does the Court discuss the Court's interstate water case law.[10] The Court does not even discuss the fact that CWA jurisdictional regulations identify interstate waters as regulated waters of the United States. In fact, the repeated emphasis on the intrastate nature of the waters at issue can be read as an attempt to distinguish *SWANCC* from the Court's interstate water jurisprudence.

In *Rapanos*, the properties at issue were located entirely within the State of Michigan. 547 U.S. 715, 762-764. Thus, the Court had no occasion to address the text of the CWA with respect to interstate waters or the agencies' regulatory provisions concerning interstate waters. In addition, neither Justice Kennedy nor the plurality discusses the impact of their opinions on

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[10] It is worth noting the Justice Rehnquist was also the author of *City of Milwaukee.*

the Court's interstate waters jurisprudence. The plurality decision acknowledges that CWA jurisdictional regulations include interstate waters. 547 U.S. 715, 724. However, the plurality did not discuss in any detail its views as to the continued vitality of regulations concerning such waters.

Moreover, one of the analytical underpinnings of the *SWANCC* and *Rapanos* decisions is irrelevant to analysis of regulations asserting jurisdiction over interstate waters. In *SWANCC*, the Court declined to defer to agency regulations asserting jurisdiction over isolated waters because

> [w]here an administrative interpretation of a statute invokes the outer limits of Congress' power, we expect a clear indication that Congress intended that result....This requirement stems from our prudential desire not to needlessly reach constitutional issues and our assumption that Congress does not casually authorize administrative agencies to push the limit of Congressional authority.... This concern is heightened where the administrative interpretation alerts the federal-state framework by permitting federal encroachment upon a traditional state power.

531 U.S. at 172-173 (citations omitted).

However, the Court's analysis in *Illinois v. Milwaukee* and *City of Milwaukee* makes clear that Congress has broad authority to create federal law to resolve interstate water pollution disputes. As discussed above, the Court in *Illinois v. Milwaukee*, invited further federal legislation to address interstate water pollution, and in so doing concluded that state law was not an appropriate basis for addressing interstate water pollution issues. 406 U.S. at 107 n. 9 (citing *Texas v. Pankey*, 441 F.2d 236, 241-242). In *City of Milwaukee*, the Court indicated that central to its holding in *Illinois v. Milwaukee* was its concern "that Illinois did not have any forum to

protect its interests [in the matters involving interstate water pollution]." 451 U.S. 325. As discussed above, the Court cited with approval the statutory provisions of the CWA regulating water pollution as an appropriate means to address that concern.

The *City of Milwaukee* and *Illinois v. Milwaukee* decisions make clear that assertion of federal authority to resolve disputes involving interstate waters does not alter "the federal-state framework by permitting federal encroachment on a traditional state power." 531 U.S. at 173. "Our decisions concerning interstate waters contain the same theme. Rights in interstate streams, like questions of boundaries, have been recognized as presenting federal questions." *Illinois v. Milwaukee*, 406 U.S. at 105 (internal quotations and citations omitted).

The Supreme Court's analysis in *SWANCC* and *Rapanos* materially altered the criteria for analyzing CWA jurisdictional issues for wholly *intrastate* waters. However, these decisions by their terms did not affect the body of case law developed to address interstate waters. The holdings in the Supreme Court's interstate waters jurisprudence, in particular *City of Milwaukee*, apply CWA jurisdiction to interstate waters without regard to, or discussion of, navigability. In *City of Milwaukee*, the Court held that the CWA provided a comprehensive statutory scheme for addressing the consequences of interstate water pollution. Based on this analysis, the Court *expressly* overruled its holding in *Illinois v. Milwaukee* that the federal common law of nuisance would apply to resolving interstate water pollution disputes. Instead, the Court held that such disputes would now be resolved through application of the statutory provisions of the CWA regulating water pollution.

It would be unreasonable to interpret *SWANCC* or *Rapanos* as overruling *City of Milwaukee* with respect to CWA jurisdiction over non-navigable interstate waters. Such an interpretation would result in no law to apply to water pollution disputes with regard to such

waters, unless one were to assume that the Court intended (without discussion or analysis) to restore the federal common law of nuisance as the law to apply in such matters. Moreover, *SWANCC* and *Rapanos* acknowledge that CWA regulatory jurisdiction extends to at least some non-navigable waters. *See, e.g.*, 547 U.S. at 779 (Kennedy, J.). Neither the *SWANCC* Court nor the plurality or Kennedy opinions in *Rapanos* purports to set out the complete boundaries of CWA jurisdiction. *See, e.g.*, 547 U.S. at 731 ("[w]e need not decide the precise extent to which the qualifiers 'navigable' and 'of the United States' restrict the coverage of the Act.") (plurality opinion).

In addition, as the Supreme Court has repeatedly admonished, if a Supreme Court precedent has direct application in a case yet appears to rest on a rationale rejected in some other line of decisions, lower courts should follow the case which directly controls, leaving to the Supreme Court the prerogative of overruling its precedents. *Agostino v. Felton*, 521 U.S. 203, 237 (1997); *United States v. Hatter*, 532 U.S. 557, 566-567(1981). Moreover, when the Supreme Court overturns established precedent, it is explicit. *See*, *Lawrence v. Texas,* 539 U.S. 558, 578 ("*Bowers* was not correct when it was decided, and it is not correct today. It ought not to remain binding precedent. *Bowers v. Hardwick* should be and now is overruled.").

D. The Agencies' Longstanding Interpretation of the Term "Navigable Waters" to Include "Interstate Waters"

EPA, the agency charged with implementing the CWA, has always interpreted the 1972 Act to cover interstate waters. Final Rules, 38 Fed. Reg. 13528 (May 22, 1973) (the term "waters of the United States" includes "interstate waters and their tributaries, including adjacent wetlands"). While the Corps of Engineers initially limited the scope of coverage for purposes of section 404 of the CWA to those waters that were subject to the Rivers and Harbors Act of 1899,

after a lawsuit, the Corps amended its regulations to provide for the same definition of "waters of the United States" that EPA's regulations had always established. In 1975, the Corps' revised regulations defined "navigable waters" to include "[i]nterstate waters landward to their ordinary high water mark and up to their headwaters." In their final rules promulgated in 1977, the Corps adopted EPA's definition and included within the definition of "waters of the United States" "interstate waters and their tributaries, including adjacent wetlands." The preamble provided an explanation for the inclusion of interstate waters:

> The affects [sic] of water pollution in one state can adversely affect the quality of the waters in another, particularly if the waters involved are interstate. Prior to the FWPCA amendments of 1972, most federal statutes pertaining to water quality were limited to interstate waters. We have, therefore, included this third category consistent with the Federal government's traditional role to protect these waters from the standpoint of water quality and the obvious effects on interstate commerce that will occur through pollution of interstate waters and their tributaries.

Final Rules, 42 Fed. Reg. 37122 (July 19, 1977).

The legislative history similarly provides support for the agencies' interpretation. Congress in 1972 concluded that the mechanism for controlling discharges and, thereby abating pollution, under the FWPCA and Refuse Act "has been inadequate in every vital aspect." S. Rep. No. 414, 92d Cong., 1st Sess. 7 (1972). The Senate Committee on Public Works reported that development of water quality standards, assigned to the States under the 1965 FWPCA Amendments, "is lagging" and the "1948 abatement procedures, and the almost total lack of enforcement," prompted the search for "more direct avenues of action against water polluters and

water pollution." *Id.* at 5. The Committee further concluded that although the Refuse Act permit program created in 1970 "seeks to establish this direct approach," it was too weak because it applied only to industrial polluters and too unwieldy because the authority over each permit application was divided between two Federal agencies. *See id.* at 5; *see also id.* at 70-72 (discussing inadequacies of Refuse Act program).

In light of the poor success of those programs, the Committee recommended a more direct and comprehensive approach which, after amendment in conference, was adopted in the 1972 Act. The text, legislative history and purpose of the 1972 Amendments all show an intent – through the revisions – to broaden, improve and strengthen, not to curtail, the federal water pollution control program that had existed under the Refuse Act and FWPCA.[11] The 1972 FWPCA Amendments were "not merely another law 'touching interstate waters'" but were "viewed by Congress as a 'total restructuring' and 'complete rewriting' of the existing water pollution legislation."[12]

As the legislative history of the 1972 Act confirms, Congress' use of the term "waters of the United States" was intended to repudiate earlier limits on the reach of federal water pollution efforts: "The conferees fully intend that the term 'navigable waters' be given the broadest possible constitutional interpretation unencumbered by agency determinations which have been made or may be made for administrative purposes." *See* S. Conf. Rep. No. 1236, 92d Cong., 2d

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[11] *See id.* at 9 ("The scope of the 1899 Refuse Act is broadened; the administrative capability is strengthened."); *id.* at 43 ("Much of the Committee's time devoted to this Act centered on an effort to resolve the existing water quality program and the separate pollution program developing under the 1899 Refuse Act."). Congress made an effort "to weave" the Refuse Act permit program into the 1972 Amendments, *id.* at 71, as the statutory text shows. *See* 33 U.S.C. 1342(a) (providing that each application for a permit under 33 U.S.C. 407, pending on October 18, 1972, shall be deemed an application for a permit under 33 U.S.C. 1342(a)).

[12] *City of Milwaukee v. Illinois*, 451 U.S. at 317; *see also id.* at 318 (holding that the CWA precluded federal common-law claims because "Congress' intent in enacting the [CWA] was clearly to establish an all-encompassing program of water pollution regulation"); *Middlesex County Sewerage Auth. v. National Sea Clammers Ass'n*, 453 U.S. 1, 22 (1981) (existing statutory scheme "was completely revised" by enactment of the CWA).

Sess. 144 (1972). The House and Senate Committee Reports further elucidate the Conference Committee's rationale for removing the word "navigable" from the definition of "navigable waters," in 33 U.S.C. § 1362(7). The Senate report stated:

> The control strategy of the Act extends to navigable waters. The definition of this term means the navigable waters of the United States, portions thereof, tributaries thereof, and includes the territorial seas and the Great Lakes. Through a narrow interpretation of the definition of interstate waters the implementation of the 1965 Act was severely limited. Water moves in hydrologic cycles and it is essential that discharge of pollutants be controlled at the source. Therefore, reference to the control requirements must be made the navigable waters, portions thereof, and their tributaries.

See S. Rep. 414, 92d Cong., 1st Sess. 77 (1971); *see also* H.R. Rep. No. 911, 92d Cong., 2d Sess. 131 (1972) ("The Committee fully intends that the term "navigable waters" be given the broadest possible constitutional interpretation unencumbered by agency determinations which have been made or may be made for administrative purposes."). These passages strongly suggest that Congress intended to expand federal protection of waters. There is no evidence that Congress intended to exclude interstate waters which were protected under federal law if they were not water that is navigable for purposes of federal regulation under the Commerce Clause or connected to water that is navigable for purposes of federal regulation under the Commerce Clause. Such an exclusion would be contrary to all the stated goals of Congress in enacting the sweeping amendments which became the CWA.

The CWA was enacted in 1972. EPA's contemporaneous regulatory definition of "waters of the United States," promulgated in 1973, included interstate waters The definition has been EPA's interpretation of the geographic jurisdictional scope of the CWA for

approximately 40 years. Congress has also been aware of and has supported the Agency's longstanding interpretation of the CWA. "Where 'an agency's statutory construction has been fully brought to the attention of the public and the Congress, and the latter has not sought to alter that interpretation although it has amended the statute in other respects, then presumably the legislative intent has been correctly discerned.'" *North Haven Board of Education v. Bell*, 102 S. Ct. 1912, 1924 (1982) (quoting *United States v. Rutherford*, 99 S. Ct. 2470 (1979) (internal quotes omitted)).

The 1977 amendments to the CWA were the result of Congress' thorough analysis of the scope of CWA jurisdiction in light of EPA and Corps regulations. The 1975 interim final regulations promulgated by the Corps in response to *NRDC v. Callaway*[13], aroused considerable congressional interest. Hearings on the subject of Section 404 jurisdiction were held in both the House and the Senate.[14] An amendment to limit the geographic reach of Section 404 to waters that are navigable for purposes of federal regulation under the Commerce Clauses and their adjacent wetlands was passed by the House, 123 Cong. Rec. 10434 (1977), defeated on the floor of the Senate, 123 Cong. Rec. 26728 (1977), and eliminated by the Conference Committee, H.R. Conf. Rep. 95-830, 95th Cong., 1st Sess. 97-105 (1977). Congress rejected the proposal to limit the geographic reach of Section 404 because it wanted a permit system with "no gaps" in its protective sweep. 123 Cong. Rec. 26707 (1977) (remarks of Sen. Randolph). Rather than alter the *geographic* reach of Section 404, Congress amended the statute by exempting certain

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[13] 40 Fed.Reg. 31320, 31324 (July 25, 1975).

[14] *Section 404 of the Federal Water Pollution Control Act Amendments of 1972: Hearings Before the Senate Comm. on Public Works,* 94th Cong., 2d Sess. (1976); *Development of New Regulations by the Corps of Engineers, Implementing Section 404 of the Federal Water Pollution Control Act Concerning Permits for Disposal of Dredge or Fill Material: Hearings Before the Subcomm. on Water Resources of the House Comm. on Public Works and Transportation,* 94th Cong., 1st Sess. (1975).

activities -- most notably certain agricultural and silvicultural activities -- from the permit requirements of Section 404. *See* 33 U.S.C. § 1344(f).

Other evidence abounds to support the conclusion that when Congress rejected the attempt to limit the geographic reach of Section 404, it was well aware of the jurisdictional scope of EPA and the Corps' definition of "waters of the United States." For example, Senator Baker stated (123 Cong. Rec. 26718 (1977)):

> Interim final regulations were promulgated by the corps [on] July 25, 1975. . . .
>
> Together the regulations and [EPA] guidelines established a management program that focused the decisionmaking process on significant threats to aquatic areas while avoiding unnecessary regulation of minor activities. On July 19, 1977, the corps revised its regulations to further streamline the program and correct several misunderstandings. . . .
>
> Continuation of the comprehensive coverage of this program is essential for the protection of the aquatic environment. The once seemingly separable types of aquatic systems are, we now know, interrelated and interdependent. We cannot expect to preserve the remaining qualities of our water resources without providing appropriate protection for the entire resource.
>
> Earlier jurisdictional approaches under the [Rivers and Harbors Act] established artificial and often arbitrary boundaries . . . .

This legislative history leaves no room for doubt that Congress was aware of the agencies' definition of navigable waters. While there was controversy over the assertion of jurisdiction over all adjacent wetlands and some non-adjacent wetlands, the agencies' assertion of CWA jurisdiction over interstate waters was uncontroversial.

Finally, the constitutional concerns which led the Supreme Court to decline to defer to agency regulations in *SWANCC* and *Rapanos* are not present here where the agency is asserting jurisdiction over interstate waters. In *SWANCC*, the Court declined to defer to agency regulations asserting jurisdiction over non-adjacent, non-navigable, intrastate waters because the Court felt such an interpretation of the statute invoked the outer limits of Congress' power. The Court's concern "is heightened where the administrative interpretation alerts the federal-state framework by permitting federal encroachment upon a traditional state power." 531 U.S. at 172-173 (citations omitted). Authority over interstate waters is squarely within the bounds of Congress' Commerce Clause powers.[15] Further, the federal government is in the best position to address issues which may arise when waters cross State boundaries, so this interpretation does not disrupt the federal-state framework in the manner the Supreme Court feared that the assertion of jurisdiction over a non-adjacent, non-navigable, intrastate body of water based on the presence of migratory birds did. The Supreme Court's analysis in *Illinois v. Milwaukee* and *City of Milwaukee* makes clear that Congress has broad authority to create federal law to resolve interstate water pollution disputes. Therefore, as discussed in Section II.B above, it is appropriate for the agencies to adopt an interpretation of the extent of CWA jurisdiction over interstate waters that gives full effect to *City of Milwaukee* unless and until the Supreme Court elects to revisit its holding in that case.

Thus, based on the language of the statute, the statutory history, the legislative history, and the caselaw, the agencies' continue their longstanding interpretation of "navigable waters" to include interstate waters.

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[15] In *Illinois v. Milwaukee*, the Supreme Court noted that "Congress has enacted numerous laws touching interstate waters." 406 U.S. at 101.

Tributaries

The agencies analyzed the science to determine whether an ordinary high water mark provides a "reasonable measure of whether specific minor tributaries bear a sufficient nexus with other regulated waters to constitute 'navigable waters' under the Act." 547 U.S. at 781. Justice Kennedy provides an approach for determining what constitutes a "significant nexus" that can serve as a basis for statutory jurisdiction. Again, the four justices who signed on to Justice Stevens' opinion would have upheld jurisdiction under the agencies' existing regulations and stated that they would uphold jurisdiction under either the plurality or Justice Kennedy's opinion. Justice Kennedy concludes that *Riverside Bayview* and *SWANCC* "establish the framework for" determining whether an assertion of jurisdiction constitutes a reasonable interpretation of "navigable waters" - "the connection between a non-navigable water or wetland and a navigable water may be so close, or potentially so close, that the Corps may deem the water or wetland a 'navigable water' under the Act;" "[a]bsent a significant nexus, jurisdiction under the Act is lacking." 547 U.S. at 767. "The required nexus must be assessed in terms of the statute's goals and purposes. Congress enacted the law to 'restore and maintain the chemical, physical, and biological integrity of the Nation's waters,' 33 U.S.C. § 1251(a), and it pursued that objective by restricting dumping and filling in 'navigable waters,' §§ 1311(a), 1362(12)." *Id.* at 779. Justice Kennedy provided further guidance for determining whether wetlands should be considered to possess the requisite nexus in the context of assessing whether wetlands are jurisdictional: "if the wetlands, either alone or in combination with similarly situated [wetlands] in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as 'navigable.'" *Id.* at 780. While Justice Kennedy focused on adjacent wetlands in light of the facts of the cases before him, it is reasonable to utilize the same

standard for tributaries. In addition, Justice Kennedy stated that "[t]hrough regulation or adjudication, the Corps may 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." 547 U.S. at 780-81. As discussed in the preamble and Appendix A, based on a detailed examination of the scientific literature, the agencies concluded that tributaries as they propose to define them perform the requisite functions identified by Justice Kennedy for them to be considered, as a category, to be waters of the United States.

Assertion of jurisdiction over tributaries with a bed and banks and OHWM is also consistent with *Rapanos* because five Justices did not question the Corps' and EPA's current regulations, which assert jurisdiction over non-navigable tributaries of traditional navigable waters and interstate waters. The four justices joining Justice Stevens' dissenting opinion would have upheld the agencies' regulations as applied as a reasonable interpretation of the CWA. Justice Kennedy's opinion focuses on determining when an adjacent wetland is jurisdictional. Underlying his analysis is the premise that the tributaries to which the wetlands are adjacent are jurisdictional. Indeed, Justice Kennedy also does not question the regulation of tributaries with an OHWM. Therefore, it is reasonable to conclude that five justices would uphold the assertion of jurisdiction over tributaries with an OHWM to a traditional navigable water or interstate water.

First, Justice Kennedy rejected the plurality's approach that only "relatively permanent" tributaries are within the scope of CWA jurisdiction. Instead, Justice Kennedy concluded that "Congress could draw a line to exclude irregular waterways, but nothing in the statute suggests it

has done so;" in fact, he states that Congress has done "quite the opposite." *Id.* at 2242. Further, Justice Kennedy concludes, based on "a full reading of the dictionary definition" of "water," that "*the Corps can reasonably interpret the Act to cover the paths of such impermanent streams.*" *Id.* at 2243 (emphasis added). First, Justice Kennedy notes that the term "waters" can mean "flood or inundation," according to the Webster's Second definition, and that these events are "impermanent by definition." Second, even looking to the plurality's preferred dictionary definition of "waters," *i.e.,* "water as found in streams and bodies forming geographical features such as oceans, rivers, and lakes," Justice Kennedy notes that "intermittent flow can constitute a stream." *Id.* at 2243. And finally, Justice Kennedy notes that the plurality's reference to the statement by the *Riverside Bayview* Court comparing wetlands to "rivers, streams, and other hydrographic features more conventionally identifiable as 'waters' ... could just as well refer to intermittent streams." *Id.* (citations omitted). Even in Justice Kennedy's rejection of Justice Steven's dissent it is clear that he only rejects the broad scope of jurisdiction over wetlands without further analysis, not jurisdiction over tributaries regardless of their size or characteristics: "the dissent would permit federal regulation whenever wetlands lie alongside a ditch or drain, however remote and insubstantial, that eventually may flow into traditional navigable waters. The deference owed to the Corps' interpretation of the statute does not extend so far." *Id.* at 2246. Tellingly, in that passage Justice Kennedy expresses concern with the assertion of jurisdiction over the wetlands without a conclusion that they have a significant nexus, but does not question the regulation of the remote "ditch or drain."

Justice Kennedy also discussed in detail the existing regulation of tributaries without concluding that it was inconsistent with the scope of the Act, in direct contrast to his concerns with respect to the regulation of adjacent wetlands. Justice Kennedy described the Corps'

standard for asserting jurisdiction over tributaries: "the Corps deems a water a tributary if it feeds into a traditional navigable water (or a tributary thereof) and possesses an ordinary high-water mark." *Id.* at 2248-49. Justice Kennedy concluded that this standard "presumably provides a rough measure of the volume and regularity of flow." *Id.* In addition, if it is applied reasonably consistently, the Corps' existing standard for tributaries "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." *Id.* at 2249.

Justice Kennedy then goes on to determine the scope of jurisdiction over wetlands, and his conclusions rely on the premise that the tributaries themselves are jurisdictional since his analysis is entirely focused on whether certain adjacent wetlands are jurisdictional. Justice Kennedy concludes that, "[a]s applied to *wetlands* adjacent to navigable-in-fact waters, the Corps' conclusive standard for jurisdiction rests upon a reasonable inference of ecologic interconnection, and the assertion of jurisdiction for those wetlands is sustainable under the Act by showing adjacency alone." *Id.* (emphasis added). While Justice Kennedy also states that the same reasoning "could apply equally to wetlands adjacent to certain major tributaries[,]" the Corps would need to identify categories of tributaries that are "significant enough" such that *wetlands* adjacent to them are likely to perform important functions relating to an aquatic system containing navigable waters. *Id.* Justice Kennedy makes no such recommendation that the EPA and the Corps need to identify categories of *tributaries* that are likely to perform important functions in order to assert jurisdiction over the tributaries themselves.

Justice Kennedy did express a concern with the Corps's assertion of jurisdiction over tributaries with an OHWM based on a 2004 U.S. Government Accountability Office (GAO) report that found variations in Corps' district practices. In 2005, the Corps issued a regulatory

guidance letter (RGL 05-05) to Corps districts on OHWM identification that was designed to ensure more consistent practice. The Corps has also issued documents to provide additional technical assistance for problematic OHWM delineations. *See, e.g.*, R.W. Lichvar and S.M. McColley, U.S. Army Corps of Engineers, *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual,* ERDC/CRREL TR-08-12 (2008). Most importantly, the agencies propose today for the first time a regulatory definition of "tributary." The definition expressly addresses some of the issues with respect to identification of an OHWM that caused many of the inconsistencies reported by the GAO. For example, this proposed regulation is clear that a water which otherwise meets the proposed definition of tributary, remains a jurisdictional tributary even if there are natural or man-made breaks in the OHWM. The proposed definition also provides a non-exclusive list of examples of breaks in the OHWM to assist in clearly and consistently determining what meets the definition of tributary.

Adjacent Waters

The CWA explicitly establishes authority over adjacent wetlands. Under Section 404(g), states are authorized to assume responsibility for administration of the Section 404 permitting program with respect to "navigable waters (other than those waters which are presently used, or are susceptible to use in their natural condition or by reasonable improvement as a means to transport interstate or foreign commerce shoreward to their ordinary high water mark, including all waters which are subject to the ebb and flow of the tide shoreward to their mean high water mark, or mean higher high water mark on the west coast, *including wetlands adjacent thereto*)." 33 U.S.C. 1344(g)(1) (emphasis added). While this provision mainly serves as a limitation on

the scope of waters for which States may be authorized to issue permits, it also shows that Congress was concerned with the protection of adjacent wetlands and recognized their important role in protecting downstream traditional navigable waters. Indeed, the existing definition of adjacency was developed in recognition of the integral role wetlands play in broader aquatic ecosystems:

> The regulation of activities that cause water pollution cannot rely on . . . artificial lines . . . but must focus on all waters that together form the entire aquatic system. Water moves in hydrologic cycles, and the pollution of this part of the aquatic system, regardless of whether it is above or below an ordinary high water mark, or mean high tide line, will affect the water quality of the other waters within that aquatic system. For this reason, the landward limit of Federal jurisdiction under Section 404 must include any adjacent wetlands that form the border of or are in reasonable proximity to other waters of the United States, as these wetlands are part of this aquatic system.

42 Fed. Reg. 37128 (1977).

As the Supreme Court found in *United States v. Riverside Bayview Homes, Inc.*, "the evident breadth of congressional concern for protection of water quality and aquatic ecosystems suggests that it is reasonable for the Corps to interpret the term 'waters' to encompass wetlands adjacent to waters as more conventionally defined." 474 U.S. 121, 133 (1985).

In upholding the Corps' judgment about the relationship between waters and their adjacent wetlands, the Supreme Court in *Riverside Bayview* acknowledged that the agencies' regulations take into account functions provided by wetlands in support of this relationship. "Adjacent wetlands may 'serve significant natural biological functions, including food chain production, general habitat, and nesting, spawning, rearing and resting sites for aquatic . . .

species.'" 474 U.S. at 133 (citing § 320.4(b)(2)(i)). The Court further stated that the Corps had reasonably concluded that "wetlands adjacent to lakes, rivers, streams, and other bodies of water may function as integral parts of the aquatic environment even when the moisture creating the wetlands does not find its source in the adjacent bodies of water." 474 U.S. at 134-35. A majority of the Supreme Court which decided *Rapanos* continues to find the agencies' regulatory definition of adjacent wetlands reasonable. Justice Kennedy stated:

> As the Court noted in *Riverside Bayview*, 'the Corps has concluded that wetlands may serve to filter and purify water draining into adjacent bodies of water, 33 CFR § 320.4(b)(2)(vii)(1985), and to slow the flow of surface runoff into lakes, rivers, and streams and thus prevent flooding and erosion, see §§ 20.4(b)(2)(iv) and (v).' Where wetlands perform these filtering and runoff-control functions, filling them may increase downstream pollution, much as a discharge of toxic pollutants would. . . . 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. With these concerns in mind, the Corps' definition of adjacency is a reasonable one, for 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.

126 S.Ct at 2245-46.

The four dissenting justices similarly concluded:

> The Army Corps has determined that wetlands adjacent to tributaries of traditionally navigable waters preserve the quality of our Nation's waters by, among other things, providing habitat for aquatic animals, keeping excessive sediment and toxic pollutants

> out of adjacent waters, and reducing downstream flooding by absorbing water at times of high flow. The Corps' resulting decision to treat these wetlands as encompassed within the term 'waters of the United States' is a quintessential example of the Executive's reasonable interpretation of a statutory provision.

126 S.Ct. at 2252-53 (citing *Chevron U. S. A. Inc.* v. *Natural Resources Defense Council, Inc.*, 467 U. S. 837, 842-845 (1984)).

For those wetlands adjacent to (a)(1) through (a)(3) waters, Justice Kennedy concluded in *Rapanos* that the agencies' existing regulation "rests upon a reasonable inference of ecologic interconnection, and the assertion of jurisdiction for those wetlands is sustainable under the Act by showing adjacency alone." 547 U.S. at 780. For all other adjacent waters, including adjacent wetlands, Justice Kennedy provided a framework for establishing categories of waters which are *per se* "waters of the United States." First, he provided that wetlands are jurisdictional if they "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.'" 547 U.S. at 780. While the issue was not before the Supreme Court, it is reasonable to also assess whether non-wetland waters have a significant nexus, as Justice Kennedy's opinion makes clear that a significant nexus is a touchstone for CWA jurisdiction. Next, Justice Kennedy stated that "[t]hrough regulation or adjudication, the Corps may 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." 547 U.S. at 780-81.

The significant nexus standard and the category standard of Justice Kennedy's opinion should be read together. The agencies have determined that adjacent waters as defined in today's proposed rule, alone or in combination with other adjacent waters in a watershed that drains to a traditional navigable water, interstate water or the territorial seas, to significantly affect the chemical, physical and biological integrity of those waters. As explained in more detail in Section H, below, the proposed rule interprets the phrase "in the region" to mean the watershed that drains to the nearest traditional navigable water or interstate water through a single point of entry. The agencies have determined that because the movement of water from watershed drainage basins to river networks and lakes shapes the development and function of these systems in a way that is critical to their long term health, the watershed is a reasonable and technically appropriate interpretation of Justice Kennedy's standard.

The agencies have concluded that all waters that meet the proposed definition of "adjacent" are similarly situated for purposes of analyzing whether they, in the majority of cases, have a significant nexus to an (a)(1) through (a)(3) water. Based on the agencies' review of the scientific literature, we have concluded that these waters, when bordering, contiguous or located in the floodplain or riparian area, or when otherwise meeting the definition of "adjacent," provide many similar functions that significantly affect the chemical, physical, or biological integrity of traditional navigable waters, interstate waters, or the territorial seas. Further, because the proposed definition generally focuses on the location of the waters (i.e., those that are located near (a)(1) through (a)(5) waters), interpreting the term "similarly situated" to include all adjacent waters, as defined in the proposed rule, is reasonable and consistent with the science. The geographic position of an "adjacent" water relative to the tributary is indicative of the relationship to it, with many of its defining characteristics resulting from the movement of

materials and energy between the categories of waters. The scientific literature documents that waters that are adjacent to (a)(1) through (a)(5) waters, including wetlands, oxbow lakes and adjacent ponds, are integral parts of stream networks because of their ecological functions and how they interact with each other, and with downstream traditional navigable waters, interstate waters, or the territorial seas. In other words, tributaries and their adjacent waters, and the downstream traditional navigable waters, interstate waters, and territorial seas into which those waters flow, are an integrated ecological system, and discharges of pollutants, including discharges of dredged or fill material, into any component of that ecological system, must be regulated under the CWA to restore and maintain the chemical, physical, or biological integrity of these waters.

While Justice Kennedy generally thought that categories of jurisdictional adjacent waters would be most likely based on the flow of the tributary, based on the science, as summarized below, the agencies have concluded that wetlands and waters adjacent to all tributaries that meet the proposed definition of "tributary" provide vital functions for downstream traditional navigable waters, interstate waters or the territorial seas. In particular, the scientific literature supports the conclusion that waters adjacent to all tributaries as defined in section (a)(5) have a significant nexus to waters described in subsections (a)(1) through (3). Because smaller streams, whether perennial, intermittent, or ephemeral, are much more common than larger streams, the volume of a stream's flow is not the best measure of its contribution to the chemical, physical or biological integrity of downstream waters. *Report* at 48. As discussed in more detail in Appendix A, small streams cumulatively exert a strong influence on downstream waters, partly by collectively providing a substantial amount of the river's water, *id.* at 52-53, but also by playing unique roles that large streams typically do not, including providing habitat for aquatic

macroinvertebrates which help maintain the health of the downstream water. Waters adjacent to those small tributary streams, therefore, also significantly effect (a)(1) through (a)(3) waters through the movement of energy and materials between adjacent waters and those tributaries, resulting ultimately in downstream effects on the chemical, physical, and biological integrity of the (a)(1) through (a)(3) waters.

"Other Waters"

In *Rapanos*, Justice Kennedy provides an approach for determining what constitutes a "significant nexus" that can serve as a basis for defining "waters of the United States" through regulation. Again, the four justices who signed on to Justice Stevens' opinion would have upheld jurisdiction under the agencies' existing regulations and stated that they would uphold jurisdiction under either the plurality or Justice Kennedy's opinion. Justice Kennedy provided guidance for determining whether these wetlands should be considered to possess the requisite nexus in the context of assessing whether wetlands are jurisdictional: "if the wetlands, either alone or in combination with similarly situated [wetlands] in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as 'navigable.'" *Id.* at 780. While Justice Kennedy focused on adjacent wetlands in light of the facts of the cases before him; in combination with the Court's guidance in *SWANCC*, it is reasonable to apply the same standard to other waters such as ponds, lakes and non-adjacent wetlands that may have a significant nexus to a traditional navigable water, interstate water, or the territorial seas.

The proposed rule includes a definition of significant nexus that is consistent with Justice Kennedy's approach to assess the nexus by focusing on the chemical, physical, and biological

roles of waters in supporting the objective and goals of the Act. In characterizing the significant nexus standard, Justice Kennedy stated: "The required nexus must be assessed in terms of the statute's goals and purposes. Congress enacted the [CWA] to 'restore and maintain the chemical, physical, and biological integrity of the Nation's waters' . . . ." 547 U.S. at 779. It is reasonable to interpret Justice Kennedy as intending the required nexus to exist when, for example, the pollution or destruction of a wetland, or group of similarly situated wetlands, would impact the integrity of the fish population of a downstream traditional navigable water even if it would have no effect on the physical structure of the downstream water. It is clear that the statute, and thus Justice Kennedy's standard, is intended to protect the integrity of each of the fundamental attributes of the nation's waters and that intent would be subverted if waters were protected under the CWA only if they had effects on every attribute at once of a traditional navigable water, interstate water, or territorial sea. Justice Kennedy's standard is also consistent with basic scientific principles understood about how to restore and maintain the integrity of aquatic ecosystems.

Justice Kennedy's opinion provides guidance pointing to many functions of waters that might demonstrate a significant nexus, such as sediment trapping, nutrient recycling, pollutant trapping and filtering, retention or attenuation of flood waters, runoff storage, and provision of habitat. 547 U.S. at 775, 779-80. Furthermore, Justice Kennedy recognized that a hydrologic connection is not necessary to establish a significant nexus, because in some cases the lack of a hydrologic connection would show the significance of a water to the aquatic system, such as retention of flood waters or pollutants that would otherwise flow downstream to the traditional navigable water or interstate water. *Id.* at 775. Finally, Justice Kennedy was clear that the

requisite nexus must be more than "speculative or insubstantial" in order to be significant. *Id.* at 780.

Similarly Situated

For purposes of analyzing the significant nexus of tributaries and adjacent waters, tributaries that meet the proposed definition of "tributary" in a watershed draining to an (a)(1) through (a)(3) water are similarly situated, and adjacent waters that meet the proposed definition of "adjacent" in a watershed draining to an (a)(1) through (a)(3) water are similarly situated. That is reasonable because the agencies are identifying characteristics of these waters through the regulation and documenting the science that demonstrates that these defined tributaries and defined adjacent waters provide similar functions in the watershed. As stated above, the functions of the tributaries are inextricably linked and have a cumulative effect on the integrity of the downstream traditional navigable water or interstate water. There is also an obvious locational relationship between the (a)(1), (a)(2) or (a)(3) water and the streams, lakes, and wetlands that meet the definition of tributaries and the definition of adjacent waters; these waters have a clear linear relationship resulting from the simple existence of the channel itself and the direction of flow. See Appendix A, Scientific Analysis.

"Other waters," on the other hand, constitute a broad range of different types of waters performing different functions. In light of the range and degree of functions performed by waters that are neither tributaries nor adjacent waters under today's proposed rule, the agencies propose a definition of similarly situated which takes into account similarity of functions provided and situation in the landscape. Since the focus of the significant nexus standard is on protecting the chemical, physical and biological integrity of the nation's waters, the agencies propose to interpret the phrase "similarly situated" first in terms of whether the functions

provided by the particular other waters are similar and, therefore, whether such "other waters" are collectively influencing the chemical, physical, or biological integrity of downstream waters. There are many functions of waters that might demonstrate a significant nexus, such as sediment trapping, nutrient recycling, pollutant trapping and filtering, retention or attenuation of flood waters, runoff storage, and provision of habitat. 547 U.S. at 775, 779-80. This approach is consistent not only with the significant nexus standard, but with the science of aquatic systems.

The lack of a hydrologic connection between "other waters" and traditional navigable waters, interstate waters or the territorial seas may demonstrate the presence of a significant nexus between such waters, as Justice Kennedy recognized in his opinion. "Other waters" frequently function alone or cumulatively with similarly situated other waters in the region to capture runoff, rain water, or snowmelt and thereby protect the integrity of downstream waters by reducing potential flooding or trapping pollutants that would otherwise reach a traditional navigable water or interstate water. 547 U.S. at 775. Such waters can be crucial in controlling flooding as well as in maintaining water quality by trapping or transforming pollutants such as excess nutrients or sediment, for example, or retaining precipitation or snow melt, thereby reducing contamination or flooding of traditional navigable waters, interstate waters or the territorial seas.

Significant Nexus

The agencies propose to define the term "significant nexus" consistent with language in *SWANCC* and *Rapanos.* The proposed definition of "significant nexus" at (c)(7) relies most significantly on Justice Kennedy's *Rapanos* opinion which recognizes that not all waters have this requisite connection to waters covered by paragraphs (a)(1) through (a)(3) of the proposed regulations. Justice Kennedy was clear that the requisite nexus must be more than "speculative

or insubstantial," *Rapanos,* at 780, in order to be significant and the proposed rule defines significant nexus in precisely those terms. In *Rapanos*, Justice Kennedy stated that in both the consolidated cases before the Court the record contained evidence suggesting the possible existence of a significant nexus according to the principles he identified. Justice Kennedy concluded that "the end result in these cases and many others to be considered by the Corps may be the same as that suggested by the dissent, namely, that the Corps' assertion of jurisdiction is valid." Justice Kennedy remanded the cases because neither the agency nor the reviewing courts properly applied the controlling legal standard – whether the wetlands at issue had a significant nexus. Justice Kennedy was clear however, that "[m]uch the same evidence should permit the establishment of a significant nexus with navigable-in-fact waters, particularly if supplemented by further evidence about the significance of the tributaries to which the wetlands are connected." *Id.* at XX

With respect to one of the wetlands at issue in the consolidated *Rapanos* cases, Justice Kennedy stated the record also contained evidence bearing on the jurisdictional inquiry. The Corps noted in deciding the administrative appeal that "[b]esides the effects on wildlife habitat and water quality, the [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." *Id.* The Corps' evaluation further noted that by "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." *Id.* And it observed that increased runoff from the site would likely cause downstream areas to "see an increase in possible flooding magnitude and frequency." *Id.* Justice Kennedy expressed concern that the

"conditional language in these assessments—'potential ability,' 'possible flooding'—could suggest an undue degree of speculation." *Id.*

Justice Kennedy's observations regarding the above case provide guidance as to what it means for a nexus to be more than merely speculative or insubstantial and inform the proposed definition of "significant nexus." It is important to note, however, that where Justice Kennedy viewed the language "more than speculative or insubstantial" to suggest an undue degree of speculation, scientists do not equate certain conditional language (such as "may" or "could") with speculation, but rather with the rigorous and precise language of science necessary when applying specific findings in another individual situation or more broadly across a variety of situations. Certain terms used in a scientific context do not have the same implications that they have in a legal or policy context. Scientists use cautionary language, such as "may" or "could," when applying specific findings on a broader scale to avoid the appearance of overstating their research results and to avoid inserting bias into their findings (such that the reader may think the results of one study are applicable in all related studies). Words like "potential" are commonly used in the biological sciences, but when viewed under a legal and policy veil, may seem to mean the same as "speculative" or "insubstantial." Instead, potential in scientific terms means ability or capability. For example, when the term "potential" is used to describe how a wetland has the potential to act as a sink for floodwater and pollutants, scientists mean that wetlands in general do indeed perform those functions, but whether a particular wetland performs that function is dependent upon the circumstances that would create conditions for floodwater or pollutants in the watershed to reach that particular wetland to retain and transform. That does not mean, however, that this nexus to downstream waters is "speculative;" indeed the wetland would be expected to provide these functions under the proper circumstances.

Clean Water Protection Rule

List of Subjects

33 CFR Part 328.3(a)

Administrative practice and procedure, Intergovernmental relations, Environmental protection, Navigation, Water pollution control, Waterways.

40 CFR Part 110.1

Environmental Protection, Water pollution control

40 CFR Part 112.2

Environmental Protection, Water pollution control

40 CFR Part 116.3

Environmental Protection, Water pollution control

40 CFR Part 117.1

Environmental Protection, Water pollution control

40 CFR Part 122.2

Environmental Protection, Water pollution control

40 CFR Part 230.2(s)

Environmental Protection, Water pollution control

40 CFR Part 232.2

Environmental Protection, Water pollution control

40 CFR Part 300.5

Environmental Protection, Water pollution control

40 CFR Part 300 App. E

Environmental Protection, Water pollution control

40 CFR Part 302.3

Environmental Protection, Water pollution control

40 CFR Part 401.11

Environmental Protection, Water pollution control

Dated:

Dated:

Gina McCarthy,

Administrator

Environmental Protection Agency

Jo Ellen Darcy,

Assistant Secretary of the Army

(Civil Works)

Department of the Army

Proposed Rule

The following text replaces the text at 33 C.F.R. § 328.3(a), (b) and (c).

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(b) The following are not "waters of the United States" —

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity; groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section.

(c) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs

(a)(1) through (a)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (a)(1) through (a)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams, lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (a)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (a)(3) of this section.

The following text replaces the definition of "navigable waters" at 40 C.F.R. § 110.1:

Navigable waters means the waters of the United States, including the territorial seas.

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(b) The following are not "waters of the United States" —

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity;

groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section.

(c) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (a)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence

of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (a)(1) through (a)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams, lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (a)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located

sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (a)(3) of this section.

The following text replaces the definition of "navigable waters" at 40 C.F.R. §112.2.

Navigable waters means the waters of the United States, including the territorial seas.

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(b) The following are not "waters of the United States" —

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity; groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section.

(c) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (a)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (a)(1) through (a)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams,

lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (a)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (a)(3) of this section.

The following text replaces the definition of "navigable waters" at 40 C.F.R. §116.3. *Navigable waters* is defined in section 502(7) of the Act to mean ''waters of the United States, including the territorial seas."

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(b) The following are not "waters of the United States" ---

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice

growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity; groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section.

(c) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (a)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (a)(1) through (a)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams, lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other

similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (a)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (a)(3) of this section.

The following text replaces the definition of "navigable waters" at 40 C.F.R. §117.1(i).

(i) *Navigable waters* means ''waters of the United States, including the territorial seas.''

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(b) The following are not "waters of the United States" —

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity; groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section.

(c) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (a)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the

break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (a)(1) through (a)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams, lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (a)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (a)(3) of this section.

The following text replaces the definition of "Waters of the United States" at 40 C.F.R. §122.2:

Waters of the United States or *waters of the U.S.* means:

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(b) The following are not "waters of the United States" —

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act. This exclusion applies only to manmade bodies of water which neither were originally created in waters of the United States (such as disposal area in

wetlands) nor resulted from the impoundment of waters of the United States. [See Note 1 of this section.]

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity; groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section.

(c) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section,

includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (a)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (a)(1) through (a)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams,

lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (a)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (a)(3) of this section.

The following text replaces the text at 40 C.F.R. § 230.3(s) and (t).

(s) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (t) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(t) The following are not "waters of the United States" —

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity;

groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (s)(1) through (s)(3) of this section.

(u) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs (s)(1) through (s)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence

of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (s)(1) through (s)(3) of this section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (s)(1) through (s)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams, lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (s)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (s)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located

sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (s)(1) through (s)(3) of this section.

The following text replaces the definition of "Waters of the United States" at 40 C.F.R. §232.2:

Waters of the United States or *waters* means:

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the

same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(b) The following are not "waters of the United States" —

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity; groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section.

(c) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (a)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high

water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (a)(1) through (a)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams, lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (a)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (a)(3) of this section.

The following text replaces the definition of "navigable waters" at 40 C.F.R. §300.5: *Navigable waters* as defined by 40 CFR 110.1, means the waters of the United States, including the territorial seas.

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(b) The following are not "waters of the United States" —

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity; groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section.

(c) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (a)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community

structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (a)(1) through (a)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams, lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (a)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (a)(3) of this section.

The following text replaces the definition of "navigable waters" at 40 C.F.R. § 300, Appendix E to Part 300, 1.5:

Navigable waters as defined by 40 CFR 110.1, means the waters of the United States, including the territorial seas.

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(b) The following are not "waters of the United States" —

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity; groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section.

(c) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (a)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this

section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (a)(1) through (a)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams, lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (a)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a

single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (a)(3) of this section.

The following text replaces the definition of "navigable waters" at 40 C.F.R. § 302.3:

Navigable waters means the waters of the United States, including the territorial seas.

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(b) The following are not "waters of the United States" —

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity; groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section.

(c) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section,

includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (a)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (a)(1) through (a)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams,

lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (a)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (a)(3) of this section.

The following text replaces the definition of "navigable waters" at 40 C.F.R. § 401.11:

(l) The term *navigable waters* means the waters of the United States, including the territorial seas.

(a) For purposes of all sections of the Clean Water Act, 33 U.S.C. 1251 *et. seq.* and its implementing regulations, subject to the exclusions in subsection (b) of this section, the term "waters of the United States" means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) All tributaries of waters identified in paragraphs (1) through (3) of this section;

(6) All waters, including wetlands, adjacent to a water identified in paragraphs (1) through (5) of this section; and

(7) On a case-specific basis, other waters, including wetlands, provided that those waters alone, or in combination with other similarly situated waters, including wetlands, located in the same region, have a significant nexus to a water identified in paragraphs (1) through (3) of this section.

(b) The following are not "waters of the United States" —

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding 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; and,

(3) Artificially irrigated areas that would revert to upland should application of irrigation water to that area cease; artificial lakes or ponds created by excavating and/or diking dry land and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice

growing; artificial reflecting pools or swimming pools created by excavating and/or diking dry land; small ornamental waters created by excavating and/or diking dry land for primarily aesthetic reasons; water-filled depressions created incidental to construction activity; groundwater drained through subsurface drainage systems; gullies and rills; non-wetland swales; and puddles;

(4) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow; and

(5) Ditches that do not contribute flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section.

(c) Definitions —

(1) **Adjacent**: The term *adjacent* means bordering, contiguous or neighboring. Waters, including wetlands, separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent waters."

(2) **Neighboring**: The term *neighboring*, for purposes of the term "adjacent" in this section, includes waters located within the riparian area or floodplain of a water identified in paragraphs (a)(1) through (a)(5) of this section, or waters with a surface or shallow subsurface hydrologic connection to such a jurisdictional water.

(3) **Riparian area**: The term *riparian area* means an area bordering a water where surface or subsurface hydrology influence the ecological processes and plant and animal community structure in that area. Riparian areas are transitional areas between aquatic and terrestrial ecosystems that influence the exchange of energy and materials between those ecosystems.

(4) **Floodplain**: The term *floodplain* means an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows.

(5) **Tributary**: The term tributary means a waterbody physically characterized by the presence of a bed and banks and ordinary high water mark, which contributes flow, either directly or through other waterbodies, to a water identified in paragraphs (a)(1) through (a)(3) of this section. A waterbody that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more man-made breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands at the head of or along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an ordinary high water mark can be identified upstream or downstream of the break. In addition, wetlands are tributaries (even if they lack a bed and banks and ordinary high water mark) if they contribute flow, either directly or through other waterbodies to a water identified in paragraphs (a)(1) through (a)(3) of this section. A tributary, including wetlands, can be a natural, man-altered, or man-made water body and includes waters such as rivers, streams, lakes, impoundments, canals, and ditches not excluded in paragraph (b)(4) and (b)(5) of this section.

(6) **Wetlands**: The term *wetlands* means those 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.

(7) **Significant nexus**: The term *significant nexus* means a more than speculative or insubstantial effect that a water, including wetlands, either alone or in combination with other

similarly situated waters in the region (i.e., the watershed that drains to a water identified in paragraphs (a)(1) through (3) of this section), has on the chemical, physical or biological integrity of a water identified in paragraphs (a)(1) through (3) of this section. Other waters, including wetlands, are similarly situated when they perform similar functions and are located sufficiently close together or close to a "water of the U.S." so that they can be evaluated as a single landscape unit with regard to their effect on the chemical, physical, or biological integrity of a water identified in paragraphs (a)(1) through (a)(3) of this section.