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Covington, Louisiana

July 20, 2011

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The Honorable Lisa Jackson
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

The Honorable Jo-Ellen Darcy
Assistant Secretary of the Army, Civil Works
108 Army Pentagon
Washington, DC 20310

Attn: Docket ID No. EPA-HQ-OW-2011-0409

Dear Administrator Jackson and Assistant Secretary Darcy:

Ducks Unlimited was founded in 1937 by concerned and farsighted sportsmen conservationists. Our mission is to conserve, restore, and manage wetlands and associated habitats for North America's waterfowl, and for the benefits these resources provide other wildlife and the people who enjoy and value them. DU has grown from a handful of people to an organization of over 1,000,000 supporters who now make up the largest wetlands and waterfowl conservation organization in the world. With our many private and public partners we have conserved over 12 million acres of habitat for waterfowl and associated wildlife in the U.S., Canada, and Mexico. Ducks Unlimited is a science-based conservation organization. Every aspect of our habitat conservation work is rooted in the fundamental principles of scientific disciplines such as wetland ecology, waterfowl biology, hydrology, and landscape ecology. Thus, our perspectives on the Clean Water Act (CWA) and related issues are based on our extensive grounding in these scientific disciplines, and on our experience as a part of the CWA's "regulated community." It is from this perspective that we offer our organization's comments on the "Draft Guidance on Identifying Waters Protected by the Clean Water Act."

An additional perspective that Ducks Unlimited brings to this issue stems from our organization's longstanding and ongoing partnership with the agricultural/ranching communities as a whole, and also with many thousands of individual farmers. Hundreds of thousands of DU members and volunteers are farmers or ranchers or are members of their families, are from farming/ranching communities, or are associated with the nation's vital agricultural and livestock-based economy. Thus, while we do not purport to represent the farming and ranching communities' views of the Clean Water Act, we are sensitive to their concerns.

Many farmers and ranchers with whom we have spoken about this issue have directly indicated that they do not have a concern with conserving the natural wetlands that remain on the landscape storing waters that they use and from which they derive pleasure, and providing habitat for the fish and wildlife that most enjoy sharing their lands with. Their primary concern is that CWA jurisdiction not be expanded beyond that which long existed, and that they do not suddenly find low spots in fields that they have farmed for more than 25 years now being affected by CWA permit requirements that would affect their day-to-day ability to farm or run livestock. Based on some of what they have been hearing from some sources, they are concerned that water-filled tractor tire ruts could be declared jurisdictional wetlands and interfere with their ability to make a living.

Ducks Unlimited agrees with such concerns of the agricultural/ranching communities. Thus, we are pleased to see that while this guidance will benefit wetland conservation by restoring some of the long-standing CWA protections for many wetlands and other waters that existed until 2001, it also respects the long-standing exemptions for farming, ranching, forestry and several other economic activities undertaken by landowners. The agencies' publication, "Agriculture Exemptions Remain" (<http://water.epa.gov/lawsregs/guidance/wetlands/upload/cwa-guidance-agriculture.pdf>), is helpful in clarifying how the draft guidance relates to agriculture, and we commend the agencies for taking the proactive step of developing and disseminating such information. Ducks Unlimited stands ready to assist in communicating with the agricultural and ranching communities to help clarify how the draft guidance relates to the average farmer's and rancher's day-to-day operations.

The Clean Water Act

- **The touchstone for understanding and implementing jurisdiction must be the principal purpose of the Act – “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”**

We will not review the extensive legislative and judicial history of the Clean Water Act here but recent U.S. Supreme Court decisions notwithstanding, it is important and relevant to the issue of assessing appropriate jurisdictional limits to keep in mind the purposes of the Act and the intent of Congress. The overarching intent of the Act, as expressly articulated by Congress, was “to establish a comprehensive long-range policy for the elimination of water pollution.” The Act’s well-known primary purpose, cited above, underscores their intention. In addition, Congress directed the agencies to “develop comprehensive programs for preventing, reducing, or eliminating the pollution of the navigable waters and ground waters and improving the sanitary condition of surface and underground waters.”

The legislative history of the Act makes clear that the 1972 Act was intended to curb and eliminate the pollution of the Nation’s waters. Congress also clearly understood that achieving their objective would require broadly protecting the inter-connected waters of the U.S., including

its wetland resources. This goal has been shared by the states, who cooperatively administer the Act. In contexts as recent as comments to the 2003 advance notice of proposed rulemaking and an amicus brief from states' attorneys general and the District of Columbia in the *Rapanos/Carabell* case, at least 42 states expressed strong support for broad, federal jurisdiction of wetlands and other waters under provisions of the Clean Water Act.

Thus, while needing to appropriately interpret the findings of the Supreme Court and incorporate them into administration of the Act through guidance and potentially new regulations, it is important to expressly do so within the context of Congress' intent. We believe that Justice Kennedy's language in his *Rapanos* opinion provides a strong basis for doing that, and for restoring CWA jurisdiction to many wetlands that were protected prior to 2001. However, although guidance and a new rule can go a long way, they cannot fully restore the protections that existed for several decades prior to the *SWANCC* decision, and the level of protection necessary to restore and maintain the Nation's waters as Congress intended.

The CWA and Wetland Status and Trends

- **The U.S. has lost over 50% of its wetlands, and despite the contribution of the CWA in slowing down the rate of loss, the nation continues to annually lose over 80,000 acres of the wetlands most important to fish and wildlife resources.**

The CWA has been an important component of the national framework of wetland conservation for over 30 years. It has been one of the most successful environmental programs in the nation's history, and has helped measurably improve the chemical, physical, and biological aspects of the country's water since its enactment.

However, the current context is that approximately 53% of the estimated 221 million acres of wetlands originally present in the United States have been lost (Dahl 2000). The CWA has undoubtedly contributed to a decrease in the rate of wetland loss since 1972. Although the rate of wetland loss has declined since the mid-1950s, recent studies document that nationwide losses of wetlands most important to waterfowl and other wildlife continue to exceed 80,000 acres per year (Dahl 2006). Not counting the additions of ponds that have little wildlife value (e.g., farm ponds, golf course ponds, storm water retention lagoons, etc.), the nation has experienced a net loss of over 16 million acres of wetlands since the mid-1950s. Since 1986, the nation has lost over 2 million acres of vegetated wetlands and 1.4 million acres of freshwater marshes that are among the most important wetlands for waterfowl and other wildlife (data from Dahl 2000, 2006). These kinds and magnitudes of losses have had a cumulative negative impact on both the waterfowl habitats that our one million supporters care so passionately about, and on the nation's water quality and other federal interests.

We are not aware of any recently completed systematic analysis of wetland status that could provide a valid basis for comparing pre- and post-*SWANCC* rates of wetland loss. However, it is reasonable to expect that wetland loss has likely accelerated because of the recent Supreme Court cases and subsequent administrative guidance that have either removed CWA protection from a

minimum estimate of 20 million acres of wetlands, or made it much more difficult to establish jurisdiction and/or enforce CWA protections.

Importantly, the CWA has been a key component of several inter-related wetland protection tools, including the Swampbuster provision of the federal Farm Bill, and some states' wetland protection regulations. However, in the absence of CWA protection, many wetlands, particularly non-proximate waters such as prairie potholes, are increasingly vulnerable to filling and drainage. In many agriculturally dominated landscapes, state regulations are weak to non-existent. This has left Swampbuster, tenuous and relatively limited as its protections might be, as essentially the only remaining wetland protection mechanism for millions of acres of important and valuable wetlands. Therefore, the future status of wetlands in the U.S. is likely highly dependent upon final guidance and a new rule that restores CWA protection to as high a percentage of wetlands protected before 2001 as possible.

Legal Backdrop for DU's Comments

- **The Supreme Court's findings and language in three rulings underscore the importance of interpretation on the basis of the scientific evidence that establishes existence of a "significant nexus" between most wetlands and navigable waters. Additionally, it is anticipated that if guidance and a potential new rule is clearly based on that compelling body of science, future judicial interpretations will be made with a better understanding of the scientific principles that underlay the Clean Water Act, providing better protection of our nation's waters, as well as regulatory clarity related to the CWA.**

Although our comments are science-based, it is important that they be considered within the legal context within which they have been developed and are offered. We are aware of the EPA's and Corps' in-depth base of understanding of the CWA and related laws, rules, and judicial history. However, we think it is important to highlight some of what we believe to be key elements of the legal context that have caused us to focus our limited time on certain elements of the extensive wetland, hydrologic, ecologic, and other science that should collectively inform this issue.

In the U.S. Supreme Court's (henceforth, "the Court") unanimous decision in the *Riverside Bayview* case, the justices "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"" (as quoted in their *SWANCC* decision). They therein recognized the intent of Congress to protect wetlands that are connected to the waters of the U.S.

This recognition set the stage for the first appearance of the now meaningful phrase, "significant nexus," in the Court's 5-4 *SWANCC* decision. The Court's majority (including Justice Kennedy) in *SWANCC* stated that the wetlands at issue in the *Riverside Bayview* case were considered jurisdictional because they were adjacent to navigable waters and possessed a "significant nexus" with them. However, the *SWANCC* decision raised jurisdictional questions regarding many non-adjacent waters, including so-called "non-navigable, isolated, intrastate waters," and gave legal

meaning to the ecological misnomer of “isolated” wetlands. However, because few wetlands are truly isolated from other waters (Whigham and Jordan 2003), from an ecological perspective they are indeed “inseparably bound up with” navigable waters and therefore often possess the significant nexus for which the Court was looking. In the end, however, the ruling in *SWANCC* was a narrow one that essentially simply invalidated use by migratory birds as the sole basis for exerting federal CWA jurisdiction.

In *Rapanos*, the four dissenters in *SWANCC* continued to support broad CWA jurisdiction in keeping with expressed Congressional intent. The plurality, however, supported an unprecedentedly narrow interpretation of the scope of the CWA, essentially protecting only relatively permanent waters and wetlands that directly abut such waters and apparently dismissing the science supporting the fact that many wetlands (and tributaries) have important hydrologic and ecologic connections to these more permanent waters (i.e., are “inseparably bound up with”), even though they might sometimes be miles apart. Their interpretation placed a scientifically untenable emphasis on the word “isolated” in the context of wetlands and other waters.

However, Justice Kennedy, while searching for a limit to federal jurisdiction, nevertheless diverged from the plurality in returning to, and putting great emphasis upon some of the language of the *SWANCC* majority. He recognized the importance of a “significant nexus” for exerting CWA jurisdiction and stated, “*The Corps’ jurisdiction over wetlands depends upon the existence of a significant nexus between the wetlands in question and navigable waters in the traditional sense.*” “*The required nexus must be assessed in terms of the statute’s goals and purposes,*” i.e., the control of pollution (he included silt, as well as chemicals in this category) and other aspects of maintaining the integrity of the Nation’s waters. Thus, for Justice Kennedy, the “existence” (and not necessarily the “showing” for every individual water) of an ecologically meaningful connection to navigable waters was paramount for exerting jurisdiction.

Kennedy added, “*Wetlands possess the requisite nexus, and thus come within the statutory phrase ‘navigable waters,’ if the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as ‘navigable.’*” This is a critically important point in that Justice Kennedy explicitly recognizes the importance of assessing the potential cumulative impact of wetlands, in the aggregate, on fulfilling the purposes of the CWA within a region. He therefore allows for assessing the jurisdictional status of a wetland within the context of the region and its other waters. Scientific facts and principles can and must be used to assess the interconnections of waters and wetlands in the aggregate.

As an indication of the breadth of his interpretation of this point, and its potential application in practice, Justice Kennedy stated, “*important public interests are served by the Clean Water Act in general and by the protection of wetlands in particular.*” He then cited the example of the hypoxic or oxygen-depleted “dead zone” in the Gulf of Mexico that has been created by nutrient-rich runoff from the Mississippi River, and he alluded to the scientific evidence that “*wetlands play a critical*

role in controlling and filtering runoff.” His choice of this example is telling, because scientists know that the problem of Gulf hypoxia that he cites is significantly related to the *cumulative* impact of the loss of many thousands of large and small individual wetlands, involving millions of acres, from across the entire Mississippi River basin. For the CWA to be genuinely useful in addressing the Gulf of Mexico’s hypoxic zone, jurisdiction must necessarily be viewed broadly, and certainly as closely as possible to the pre-SWANCC jurisdictional baseline that existed for decades.

Finally, Justice Kennedy not only recognized the importance of direct and indirect hydrologic connections, he also explicitly highlighted the critical nature and validity of ecological relationships, stating that “*Given the role wetlands play in pollutant filtering, flood control, and runoff storage, it may well be the absence of hydrologic connection (in the sense of interchange of waters) that shows the wetlands’ significance for the aquatic system.*” This, too, is a scientifically critical point in that he explicitly recognizes the diversity of values that functional wetlands provide to society, in this case as those values relate to navigable waters and are derived from even “isolated,” physically non-proximate wetlands. Justice Kennedy recognizes here that the absence of a hydrologic connection may be what makes a wetland important to navigable waters. We will show in our comments how this statement is particularly important relative to jurisdiction over wetlands such as those in the prairie pothole region (even though potholes are in fact generally hydrologically and ecologically interconnected and in the aggregate have a significant nexus to downstream navigable waters), and provides the foundation for the “compelling scientific basis for treating a group of such waters as similarly situated waters in the same region.”¹

In light of this legal backdrop, the emphasis of our comments will therefore be placed on demonstrating the scientific bases for the multitude of “significant nexuses” that exist, as viewed by Justice Kennedy, between wetlands, streams, and other waters and that ultimately, either individually or in the aggregate, impact the chemical, physical, and biological integrity of the Nation’s waters.

The Language and Standards of Science and the Law

- **The language and construction of the guidance should seek to avoid the often necessarily conditional language of science being confused by the regulatory and judicial systems as being synonymous with “speculative.” To fulfill the purposes of the Act in a science-based fashion, we recommend that a “preponderance of the science” standard be applied to the maximum extent possible, as reflected by the standard practices of science as they are applied to land management decisions and practices.**

The confusing judicial findings make clear that it will be important in finalizing guidance and pursuing a rulemaking to explicitly recognize and consider the misunderstandings that can result

¹ Taken from Section 6, “Other Waters That Are Not Physically Proximate to Jurisdictional Waters,” in the draft guidance.

from the inherent differences between the languages of science and law. For example, after stating in his *Rapanos* decision that “when wetlands’ effects on water quality are *speculative or insubstantial*” [emphasis ours] they would fall outside the protected class of “navigable waters,” Justice Kennedy went on to express concern over the Corps’ use of “conditional language,” such as “potential ability” and “possible flooding” as applied to the relationship between a wetland and a jurisdictional water.

Outside the context of specific findings applicable to a specific situation or relatively narrow class of circumstances, typically involving statistical measures of “significance,” the natural language of scientists is to necessarily speak conditionally when applying specific findings more broadly. Scientists are trained to carefully communicate in this conditional fashion and qualify findings so as not to overstate importance of, or inject bias into their research results. Indeed, rigorous peer review as part of the publication process may also lead to even more conditional and qualifying statements than necessary in many instances.

With the accumulation of sufficient evidence, however, confidence among scientists in the general applicability of findings grows and the use of conditional language is reduced. Nevertheless, while having complete conviction in the general truth of the principle, they will still necessarily use caution in applying the generality to individual circumstances. That inherent nature of the language of science is apparently at times misconstrued by the legal system (and unfortunately by the media and many or most other non-scientific audiences) as representing speculation.

In that light, we encourage the agencies to not let the often inherently conditional language of science detract from the ability of the guidance and a potential rule to be applied in ways that fulfill the broad purposes of the act, while also satisfying the intent and requirements of the Court’s decisions. To borrow from a legal perspective, we suggest that progress toward fulfilling these dual objectives can be enhanced by applying the relevant science to the question of jurisdiction by viewing it within a “preponderance of the science” standard that is applied as generally as justified by the science, rather than using a standard that demands scientific proof within the context of individual wetlands.

Some of Justice Kennedy’s language regarding categorical and/or regional protection of wetlands explicitly entertains this approach. Furthermore, in their 9-0 *Riverside Bayview* decision, the Court explicitly recognized that while “*not every adjacent wetland is of great importance to the environment of adjoining bodies of water,*” “*if it is reasonable for the Corps to conclude that in the majority of cases adjacent wetlands have significant effects on water quality and the ecosystem, its definition [of adjacency] can stand.*”

With regard to the current issue of how the guidance and rules should be applied to finding jurisdiction, these statements by a unanimous Court should be considered relevant and very important. If adjacency is interpreted within the context of “*functional*” relationships that exist between waters (as our comments will strive to demonstrate) rather than using physical adjacency

or proximity as a surrogate measure of nexus, the views of the Court as quoted above would support the use of the “preponderance of the science” standard in extending jurisdiction to wetlands which as a class have been shown to possess a significant nexus to other waters, even in the absence of individual studies for individual wetlands.

Structure of DU’s Comments

- **Our comments will largely follow the structure of the draft guidance, and will focus on Sections 3, 5, and 6. However, the legal descriptors of “adjacent” and “not physically proximate” as applied to wetlands create an artificial dichotomy among wetlands that in nature exist as a continuum. Thus, we will not attempt to segregate the scientific literature we cite into these two groups, although we will provide distance information where available and applicable.**

To facilitate the agencies’ consideration, the structure of our comments will mirror the format of the draft guidance. We will focus on the science relevant to the issue of the definition of “waters of the U.S.,” the preponderance of which we believe supports a broad interpretation that would restore CWA protections to a high percentage of wetlands for which protections have been in doubt since the *SWANCC* and *Rapanos* decisions and subsequent 2003 and 2008 guidance.

Most of our emphasis will be placed on Section 3 - Significant Nexus Analysis, Section 5 – Adjacent Wetlands, and Section 6 – Other Waters. However, much of the literature that we cite and points that we make in the context of sections 3, 5, or 6 will be just as applicable to these other sections. This is primarily the result of two inter-related points. First, there has been much confusion propagated as a result the past characterization by the courts of some wetlands as being “isolated.” For the most part, the concept of an “isolated wetland” is a legal construct with little to no meaning from within a scientific context because very few wetlands are truly isolated. Scientists recognize that virtually all wetlands are interconnected, hydrologically, chemically and/or ecologically, with other waters. Scientists attempted to provide use of the term “isolated” some validity (consistent with the intent of its original use by the Courts) by adding a qualifier and referencing “geographically isolated wetlands.” However, this accurate but cumbersome phrase was frequently shortened to “isolated,” thereby propagating the confusion and scientific mischaracterization. We note with scientific satisfaction that the draft guidance does not use the phrase “isolated,” but rather uses the more scientifically accurate descriptor, “physically non-proximate.”

The second, closely related issue pertains to the concept of adjacency. The courts seem to view adjacency as a surrogate measure of the potential significance of the nexus between a wetland and navigable water. However, although distance is undeniably an important component of the nature and degree of connections that exist between many water bodies, distance is by no means the only important issue in the case of many wetlands and navigable waters. In other words, as we will show with examples from the scientific literature, the distance between a wetland and navigable

water is not necessarily proportional to the strength of a nexus or its significance between those two water bodies. At times, wetlands many miles from a river may have a more significant nexus to the river than a nearby wetland in an ecological context.

For these interrelated reasons, the organization of the literature that we will cite will not attempt to make a separation along the continuum of adjacent and non-proximate waters, except to reference distances when they appear in the literature and are relevant to the points being made herein. In many cases, it will be clear that wetlands located many miles from traditionally navigable waters possess a documented significant nexus with those navigable waters.. In general, our comments will seek to show that the preponderance of the scientific evidence supports the fact that ecologic and hydrologic nexuses exist between most wetlands and other waters and downstream or downslope traditionally navigable waters, and that in the aggregate these nexuses are significant in their effect on “the chemical, physical, and biological integrity of the Nation’s waters.” In fact, in the absence of unreasonably constrained definitions of “in the aggregate” or “significant,” a lack of a significant nexus would be a rare exception.

Draft Guidance and Potential Rulemaking: Overview

- **Ducks Unlimited supports the draft guidance as an important first step toward restoring wetland protections under the CWA. However, we believe that it does not go as far as the science and law supports, and we will provide scientific information that we encourage the agencies to use to provide additional protection to some key wetland systems in the final guidance and/or a proposed rule. We also strongly encourage the agencies to proceed expeditiously with a formal rulemaking to further extend protection to waters as consistent with the science and the law, and to make the entire process of CWA implementation more efficient and less costly to the regulated community, other affected parties, and to the agencies themselves. We support the clarification that the draft guidance provides regarding the long-standing statutory exemptions, particularly those related to agricultural practices that would be untouched by the guidance. We suggest that those exemptions be even more explicitly highlighted.**

In light of the science that has already been brought to bear on the question of the significant nexuses that exist between wetlands [“and other waters” should henceforth be implied as being included when “wetlands” is referenced in this context] and traditional navigable waters [throughout the document, when referencing the need to establish a significant nexus for a wetland, our comments will often simply reference “traditionally navigable water” or “navigable water,” and this phrase is also meant to include “interstate/international waters.”], and in light of the experience that the agencies have gained with the existing guidance released in 2003 and 2008 it is appropriate that the agencies have moved forward with issuing revised guidance.

Ducks Unlimited supports the advances that the draft guidance makes in restoring CWA protections to many tributaries, adjacent wetlands and other waters. This guidance is a positive first step. It is a significant improvement over existing guidance in that it is more true to the related science, more true to the view of the majority on the Court and particularly to Justice Kennedy's opinion, and more protective of wetlands and therefore more true to the intent of Congress and the purposes of the CWA. It also provides more clarity and certainty regarding the waters that will be considered jurisdictional and protected by the CWA and those that will not. CWA processes and administration under the interim guidance released immediately subsequent to the *SWANCC* and *Rapanos* cases, and under the 2003 and 2008 guidance, seem to have been universally frustrating. Permit applicants, farmers, conservationists, landowners, communities, state and local agencies and other affected entities have all long expressed a strong desire for greater certainty and clearer processes since *SWANCC*, and this guidance takes an important step toward that objective. Ducks Unlimited encourages the agencies to finalize the guidance as quickly as possible.

Overall, we believe that the draft guidance does not go as far toward restoring CWA protection to wetlands and other waters as the science allows, and we therefore encourage the agencies prepare as comprehensive a set of guidance as possible within the scope of their legal authorities. We understand that there are legal limitations to the scope of the revisions that can be made through revised guidance. Thus, we are pleased to note that the agencies anticipate proposing revisions of existing regulations through a formal rulemaking process. Ducks Unlimited encourages initiation of such a rulemaking as soon as possible in order to extend CWA wetland protections as far as the science and the law allows, and to streamline the administrative processes for the benefit of the regulated community, for conservation, and for the agencies themselves. Two Court justices explicitly called for it in their *Rapanos* opinions. Other opinions at least implicitly encouraged it, including Justice Kennedy who stated, "Absent more specific regulations, the Corps must establish a significant nexus on a case-by-case basis when seeking to regulate wetlands based on adjacency to nonnavigable tributaries." As the agencies know very well, even in instances in which a preponderance of the science would indicate that a significant nexus is very likely to exist, a case-by-case showing is often very difficult, often necessarily time-consuming (such as the documentation of important, but sometimes very slow, groundwater connections), and therefore more costly and perhaps unnecessarily frustrating to both the agencies and the permit applicants.

Draft Guidance: Introduction and Summary of Key Points

We support the agencies not addressing the regulatory exclusions for waste treatment systems and prior converted croplands in this guidance. We were also pleased to see the explicit mention that the longstanding exemptions for normal agricultural, forestry and ranching practices (among

others) are unequivocally unaffected by this guidance. We recognize these issues have been a significant concern for agriculture and some other parties, and there has been significant misunderstanding about the intent of legislation proposed in recent Congresses regarding these issues. Thus, in order to avoid unnecessary distractions from the important questions more directly involved with the draft guidance, it is important that these exemptions and regulatory exclusions are explicitly highlighted as being unaffected in any way.

The Summary of Key Points is helpful in several respects. First, it provides a concise summary of: (1) the waters that are categorically protected by the CWA; (2) the waters and wetlands that require a determination of a significant nexus to jurisdictional water; and (3) aquatic areas that are not protected by the CWA. Although in our comments we will offer support for extending the list of waters that are categorically protected in the final guidance and/or a proposed new rule, this kind of a summary will be a useful part of the final document. The explicit listing of the latter category, those areas not protected, is particularly important for addressing misunderstandings and demonstrating that jurisdiction would not and could not be expanded beyond the wetlands and other waters that had longstanding protection during the pre-SWANCC baseline period. DU has a strong, long-standing partnership with the agricultural community, and this partnership has helped us be aware of their concerns that CWA jurisdiction not be expanded beyond that which existed in 2001. We support this goal, and the clarification in the guidance of areas not protected by the CWA should be helpful for addressing some significant misunderstandings that exist regarding the level of jurisdiction that could result from the guidance.

Section 1: Traditional Navigable Waters

The protection of traditional navigable waters (TNWs) by the CWA is firmly established in law and a multitude of court cases, and this section seems to reflect the long-standing protection of such waters. Therefore, DU has no suggested changes or recommendations with respect to this section.

Section 2: Interstate Waters

Although the definition of interstate waters makes relatively clear that international waters would be included here, the section title might be better and more fully described if it was “*Interstate and International Waters*.” We support the view that those waters that flow across or form a part of state boundaries, including those whose waters are shared with Canada and Mexico, should be within CWA jurisdiction. There are a large number of rivers and streams that flow across our borders into Mexico and Canada, and that flow into shared international waters such as the Great Lakes, the Gulf of Mexico, and the Pacific and Atlantic Oceans. The proposal that the jurisdiction would extend upstream and downstream for the entire length that the water is of the same stream order should be a minimum standard of jurisdiction relative to protecting these waters.

We agree with the treatment of wetlands adjacent to these waters in the same fashion as the treatment of all other adjacent waters. However, the wording should make more explicitly clear

that wetlands, in their entirety, would also be considered jurisdictional as interstate and international waters if they form a part of or sit astride state boundaries. We believe that is the intent of the guidance, but it should be made clearer with an explicit reference to “wetlands.”

Given the legal background discussed previously, we agree with TNWs and interstate / international waters serving as the “anchors” to which jurisdiction is tied and that, based on the science and with time and experience, jurisdiction can be extended upstream and to wetlands based on the demonstrable or predictable significant nexus (based on the preponderance of the science) of these other waters to the “anchors” of the system.

Section 3: Significant Nexus Analysis

For the reasons articulated previously as being the central issues to determining jurisdiction in light of the Supreme Court’s *SWANCC* and *Rapanos* rulings, Ducks Unlimited is in general supportive of the direction of the guidance relative to determining significant nexus. However, we submit that the significant nexus determination can be even more broadly applied to the protection of wetlands while remaining fully consistent with the law and the Court’s decisions, and that the guidance should go as far as it can within constraints of the law and preponderance of science, with additional protection offered through a rulemaking based on the available science.

Ducks Unlimited is strongly supportive of the analysis of significant nexus using the aggregation of wetlands and other waters within a region, as Justice Kennedy supports. With regard to the three elements that the agencies intend to consider in evaluating the presence or absence of a significant nexus, we offer the following points:

- (1) We believe that in considering waters to be “similarly situated” waters of the same resource type, “(c) other waters that are in *close physical proximity* to”² jurisdictional waters is an artificial distinction not rooted in science. Just as use by migratory birds cannot serve as the sole basis for asserting CWA jurisdiction, as we have stated and will show, distance from jurisdictional waters should also not serve as the sole basis upon which to exclude a waterbody from consideration as potentially having a significant nexus to a TNW or other jurisdictional water. This interpretation is fully consistent with Justice Kennedy’s opinion. *Wetlands of the same type that are situated within a watershed* is a more appropriate and science-based approach to evaluating significant nexus than is the approach of *eliminating all those similar wetlands within the watershed that are not close to a jurisdictional waterbody*, and then conducting the significant nexus analysis. We believe, and will demonstrate as a general principle using several key example landscapes, that “there is a compelling scientific basis for treating a group of such waters as similarly situated waters in the same region.”³

² Quote from Section 3, page 8 of the draft guidance.

³ Footnote vii in the draft guidance.

- (2) We believe that there is a sound basis for using watersheds as the starting point for defining a “region.” In addition, we support the principle espoused in the draft guidance of allowing for some flexibility in the use of watershed-based analyses by field staff. However, we believe that an additional layer of flexibility would in many cases be scientifically justified, would in those cases be consistent with Justice Kennedy’s perspective on what constitutes a “region,” would lead toward greater clarity and certainty, and would provide the basis for a much more effective and efficient regulatory process.

We would suggest that a combination of watersheds and physiographic regions or ecoregions be used to delineate groups of watersheds that could be scientifically viewed as sufficiently similar to constitute a “region.” In a significant number of situations, the “single point of entry” watershed to a TNW or interstate water will cause work, i.e., jurisdictional determinations, to be unnecessarily repeated for adjacent watersheds when the wetland, riverine, and other land use conditions for adjacent watersheds would be largely indistinguishable. For example, there are a number of watersheds with a single point of entry lined up north to south in Minnesota and North Dakota along the Red River. Many of these are in the same physiographic region, and in many cases the current and past land use mirrors one another. Unless there was a valid scientific and hydrologically based reason to separate them, a significant nexus analysis of the wetlands and waters in one watershed could likely be applicable to the next.

There are numerous such examples of single point of entry watersheds that would be sufficiently similar, ecologically and hydrologically, to be grouped as conditions justify. We would expect that EPA regions and Corps districts could evaluate the lands within their respective responsibilities to devise groupings of single point of entry watersheds that were scientifically valid to serve as “regions” for significant nexus analyses.

Such multi-watershed regions, when delineated using scientifically valid processes, would then permit the use of jurisdictional determinations in subsequent determinations across a larger area. This would significantly increase the efficiency of the review and permitting process, and over time and the accumulation of determinations would bring an increasing degree of certainty to the system.

We are pleased to see that staff are not expected to develop new information on similarly situated waters, and that they are encouraged to use scientific information from the literature in conjunction with site-specific information. This will promote and support the use of the preponderance of the science standard that is most appropriate for applications of science to field situations such as these jurisdictional situations. However, it also will require a sufficiently rigorous review and documentation process for each determination to allow for use in future reviews, and for the compilation of this information into a useful scientific compendium and bibliography. In addition,

because the availability of field studies is highly variable across the landscapes of the U.S., this will allow the more general application of scientific literature to the extent that it is scientifically valid to apply it to other geographic situations.

Significant Nexus Analysis: Regional Examples

To provide support for the analysis of significant nexus using the kinds of scientific information discussed in the draft guidance, our comments will provide information for wetland types and regions from around the country. We place some specific emphasis on several regions that are notable for the concentrations of physically non-proximate wetlands that they contain. While we put special focus on the Prairie Pothole Region, we have also compiled similar information on playa lake wetlands of the Southern Great Plains. Similar information for landscapes such as the sandhill wetlands of Nebraska and the coastal wetlands of Texas is also important and distributed through the information pertaining to wetland functions as they relate to significant nexus. The wetland types and regions that we have focused on were selected for emphasis for several reasons: (1) they are all key wetlands and landscapes for waterfowl conservation; (2) wetland loss has been significant in each region and the remaining wetlands are highly threatened in the absence of CWA protections; (3) there is literature that clearly demonstrates the abundance and strength of the significant nexuses that exist among these waters and with TNWs or with interstate / international waters; (4) these wetland types largely fall into the “other waters” of Section 6 of the guidance, with most of these wetlands falling within the physically non-proximate category of waters; and, (5) despite being physically non-proximate, there is a compelling scientific basis for the vast majority of these waters being considered jurisdictional on the basis of Justice Kennedy’s significant nexus standard. Our intent is that demonstrating the compelling basis for the significant nexus of these other, physically non-proximate waters with TNWs will aid in demonstrating and underscoring the strong, scientific basis for the existence of a significant nexus of most other waters and wetlands with the jurisdictional “anchors.”

We will also provide functional information that relates to significant nexus analyses outside of those particular regions and adds to the strength of the cumulative body of science that supports the fact that the vast majority of wetlands and other waters do indeed have a significant nexus with TNWs, and that if a presumption were to be made, it would be that based on the science and examples herein, a significant nexus exists unless there was scientific evidence or valid reasons to predict otherwise.

Prairie Pothole Region

The Prairie Pothole Region (PPR; Figure 1) of the northern Great Plains encompasses over 300,000 square miles, and is the most important breeding area for ducks (e.g., mallards, blue-winged teal, northern pintails, canvasbacks) in North America (Ducks Unlimited 2001). An estimated 50% of the total average annual production of continental duck populations originate

from this region (Dahl 1990), including 70% in wet years (Ducks Unlimited 2001). One analysis (U.S. Fish and Wildlife Service 2001) suggested that duck production in the PPR of the U.S. northern prairies would decline by over 70% if all wetlands less than 1 acre were lost, and another analysis (Johnson 2010) estimated that pre-CWA wetland loss in a five-county portion of the PPR in west-central Minnesota resulted in a reduction in waterfowl productivity in excess of 80%. Because of the PPR's importance to continental waterfowl populations, and as a response to the challenges of wetland loss in the region, Ducks Unlimited and its partners have expended billions of dollars to protect and conserve the wetlands and other habitats that remain in the region. However, despite those investments, including significant resources of the federal government, there continues to be a net loss of wetlands in this important region (Dahl 2006). Oslund et al (2010) documented that the Prairie Coteau portion of Minnesota's PPR lost 15% of its wetlands between 1980 and 2007, and the Minnesota River Prairie ecological region lost 7.9%.

Prairie pothole wetlands are stereotypical examples of wetlands that would generally be characterized as being physically non-proximate, or "geographically isolated." The region is characterized by high wetland densities, and typically contains between 15 and 150 wetlands per square mile. (National Wetlands Working Group 1988; Figures 2 - 6). With high wetland densities over such a large area, it is estimated that there were originally approximately 20 million acres of prairie pothole wetlands, largely in the Dakotas, Minnesota and Iowa, and one study estimated that wetlands covered approximately 25,000 square miles of the region (van der Valk and Pederson 2003). However, it is estimated that only approximately 7 million acres of these wetlands remain, equating to a ~66% overall loss (U.S. Dept. of the Interior 1988).

In general, the PPR possesses a limited internal drainage system, so inflow and outflow to prairie potholes via streams is uncommon (Winter and Woo 1990). One analysis (Petrie et al. 2001) documented that most (>95%) prairie potholes would likely not be considered adjacent to, or even located (~50%) within 0.6 mi of navigable or jurisdictional waters. We will provide a sense of the documentation and scientific literature that demonstrates that prairie potholes, in the aggregate, generally possess a significant nexus with navigable waters as outlined by Justice Kennedy. In many cases, however, this case is most efficiently and convincingly made at watershed scales larger than the single point of entry watershed.

There are several compilations of peer-reviewed literature and related information (e.g., Tiner et al. 2002; several papers in the September 2003 special issue of the journal *Wetlands*; attached annotated bibliography, Mykut 2006) that provide an abundance of detail regarding the points that we refer to in these comments.

Prairie Potholes: Surface Water Storage and Flood Attenuation

Prairie pothole wetlands and their function of flood water retention could have been what Justice Kennedy had in mind when he wrote that, "*given the role wetlands play in pollutant filtering, flood control, and runoff storage, it may well be the absence of hydrologic connection (in the sense*

of interchange of waters) that shows the wetlands' significance for the aquatic system," and that "wetlands possess the requisite nexus, and thus come within the statutory phrase "navigable waters," if the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as 'navigable.'" The abundance and density of potholes on the landscape of the PPR in conjunction with their general lack of direct surface water connection to streams and rivers is precisely what creates the basis for an especially significant nexus between these wetlands and navigable waters like the Red, Missouri and the Mississippi rivers.

Their nature and position on the landscape is the primary reason that potholes can capture runoff and store it in non-contributing basins, i.e., wetlands and lakes (Winter et al. 1984). In general, the presence of many isolated wetlands decreases runoff velocity and volume by releasing water over an extended period (Carter 1996). The net effect of this important wetland function is to abate flooding by lowering and moderating the peaks of flood stages, thereby reducing flood damages (Mitsch and Gosselink 1986). Prairie potholes store surface water and attenuate flood flows (Hubbard and Linder 1986; Gleason and Tangen 2008; Minke et al. 2009), and potholes in North Dakota have been estimated to hold roughly half the surface water within the state (Ripley 1990). Winter (1989) stated that for selected watersheds in Minnesota, mean annual flood increases were inversely related to the percentage of lakes and wetlands within the watersheds. Stated another way, the flood increases in the watersheds Winter (1989) studied are directly proportional to the amount of drainage of lakes and wetlands within the watersheds."

However, wetland drainage has significantly decreased the cumulative storage capacity of wetlands (Dahl 1990; Dahl and Johnson 1991), and this decrease has been linked to increases in the frequency of flooding in and around the PPR (Brun et al. 1981; Miller and Frink 1984; Miller and Nudds 1996; Manale 2000). In most cases, when a pothole is drained or filled, the water that would have otherwise been retained in the basin is diverted to a ditch or other conveyance makes its way to a navigable waterway much more rapidly than when the wetland was intact. The significant nexus between the intact pothole and the nearest navigable water, described best as the "absence of [direct] hydrologic connection," then becomes apparent as the altered flow pattern brings more water, carrying more sediment, nutrients and other pollutants, much more rapidly, to the navigable water and downstream communities, farms, and other downstream landowners. For example, a recent study of the Broughton Creek watershed in the northeast PPR (Yang et al. 2008) documented that 70% of the wetlands had been lost or degraded due to drainage between 1968 and 2005. These wetland impacts were associated with a 31% increase in area draining downstream, which was associated with a 30% increase in stream flow and an 18% increase in peak flow. Johnson et al. (1997) reported that about 33% of the drained wetlands in the flood-prone Vermillion River watershed (southeast South Dakota) flowed into artificial drainage ditches, and that a quantity of water equivalent to about half of the river's annual flow could be stored by restoring those wetlands.

Hey (1992) estimated that as a result of approximately two-thirds of the original potholes having been lost through drainage, the region has lost 20-30 million acre-feet (0.87 – 2.2 trillion cubic feet) of water storage capacity. A number of studies have concluded that loss of pothole wetlands has contributed significantly to flooding and increases in associated damages along the Red River of North Dakota and in portions of Minnesota and Iowa (e.g., Campbell and Johnson 1975; Moore and Larson 1979; Brun et al. 1981). Ludden et al. (1983) found that small basins in the Devil's Lake watershed in North Dakota could store 72% of the total runoff from a 2-year frequency flood and approximately 41% of the total runoff from a 100-year frequency flood, with Malcolm (1979) and Gleason et al. (2007) and others reporting impacts of similar magnitude for north central North Dakota and western Minnesota, respectively. Hann and Johnson (1968) found that depression areas in north central Iowa had the ability to store more than one-half inch of precipitation runoff within their individual watersheds.

The results of several studies that shed light on the issue from a converse approach, strongly support the same contention of a significant nexus between prairie potholes, in the aggregate, and nearby (viewed from a regional, but certainly ecologically valid scale) navigable waterways. Gleason et al. (2008), based on a study covering almost 500 wetlands across Iowa, North Dakota, South Dakota, Minnesota, and Montana, conservatively estimated that wetland catchments covering ~1.1 million acres on USDA Conservation Reserve Program and Wetland Reserve Program lands can capture and store an average of 1.1 acre-feet of water per acre of wetland (a total of more than 1.2 million acre-feet [52.2 billion cubic feet] of water). This estimate did not account for the additional water that would further reduce water flowing to the navigable waters as a result of infiltration to groundwater, evapotranspiration, and transport to the atmosphere. Although these particular areas represented pothole wetlands that were restored to the landscape as a result of a voluntary government incentive program, the clear inference that can be drawn is that if this quantity of natural wetlands were lost because of a lack of CWA protection, there would be significant impacts from more than 1.2 million acre-feet of water flowing more directly and quickly to the nearest downslope navigable waters.

Gleason et al. (2007) simulated the effects of wetland restoration in the upper Mustinka sub-basin (west central Minnesota; Red River valley) and found that restoring 25% of the restorable wetlands there would increase flood storage by 27-32%, and a 50% restoration would increase storage by 53-63%. Similarly, if viewed as if those wetlands were natural wetlands remaining on the landscape and impacts of their removal was under consideration, these results provide a sense of the magnitude of impacts on downstream waters, i.e., the significance of the nexus, as a result of the lost flood storage capacity.

Kurz et al. (2007) modeled peak flow reductions associated with artificial storage of precipitation on flooded agricultural lands in the Red River valley of the north central PPR, and estimated that with both conservative (259,000 acre-feet) and moderate (2,188,400 acre-feet) storage volumes placed on the landscape, flood stages like those of the flood of 1997 on the Red River could have been reduced by 2-5 feet at Grand Forks. Thus, it is reasonable to predict that similar impacts of

flood attenuation would be associated with similar storage volumes in natural wetlands, again demonstrating the significant nexus that exists between the aggregate of these non-proximate wetlands on the landscape with navigable waters.

Although potholes typically are not directly hydrologically connected to other waters via surface connections, during wet periods water tables rise and surface water levels reach outlet elevations of most potholes (Sloan 1972; LaBaugh et al. 1998; Winter et al. 1998; USGS 1999). This phenomenon results in temporary but direct hydrologic connections among and between potholes, and between complexes of potholes and the streams and rivers in the region, with associated impacts on regional water regimes in navigable waters and their tributaries (Stichling and Blackwell 1957; Sloan 1972; Leitch 1981; Winter 1989; USGS 1999; Leibowitz and Vining 2003).

Prairie Potholes: Ground Water Relationships

Potholes and many other physically non-proximate waters can, and very often do, contribute to groundwater recharge (and discharge), and this groundwater often continues to move downslope toward intermittent or flowing streams ultimately terminating in navigable waters (Winter et al. 1998). For prairie potholes, where the water table tends to be a subdued image of the topography and is generally very near the land surface (Sloan 1972), pothole wetlands can serve as groundwater recharge sites (Euliss et al. 1999). In the PPR, there is little groundwater recharge under dry uplands outside depressions, and groundwater recharge from small depressions constitutes a large proportion of the total recharge in many areas (van der Kamp and Hayashi 1998). A number of studies have shown that connections between the groundwater and surface water in the isolated potholes occur mainly at the shoreline zones where more impermeable soils of the basin grade into more permeable soils in transition zones, or through fractures in the basins' substrate (Williams and Farvolden 1967; Millar 1971; Eisenlohr and Sloan 1972; Sloan 1972; Weller 1981). Furthermore, because seepage contributions to groundwater are greatest where wetland shoreline is largest relative to the water volume (Millar 1971), the smallest pothole wetlands are proportionately more important to groundwater connectivity. Sloan (1972) stated that surface water seepage to groundwater was greater for ephemeral and temporary wetlands than for other wetland types. Thus, in the PPR (as in many other regions), the size and permanence of wetlands is not necessarily proportional to the significance of the wetlands' (in the aggregate) nexus to navigable waters.

Some potholes have a net seepage outflow (groundwater recharge basins), others have a net seepage inflow (groundwater discharge basins), and many basins function alternately and at times have a net outflow into the groundwater and at other times have a net inflow (Sloan 1972; LaBaugh et al. 1998). Hubbard and Linder (1986) concluded that approximately 12% of the total storage capacity of wetlands in an area in northeast South Dakota infiltrated to groundwater as recharge, and that drainage of potholes therefore significantly reduces ground water recharge rates. Net seepage outflow into the groundwater can more typically amount to 20-30 percent of the total

water loss for prairie wetlands (Eisenlohr and Sloan 1968; Shjeflo 1968; Eisenlohr and Sloan 1972; Winter and Rosenberry 1995).

Pothole wetlands are generally connected to and continuous with the groundwater in the surrounding area in relatively local groundwater flows (van der Kamp and Hayashi 2008), and these surficial aquifers can extend up to several miles. Regional aquifers are located deeper than the surface aquifers, and water flow into and through these deeper aquifers can be significant in locations in which they underlay an extensive area, and often flow to distant discharge areas (van der Kamp and Hayashi 2008). While a relatively small portion of recharge water flows to these deeper, geographically more expansive regional aquifers, this portion of the groundwater recharge from wetlands is important for sustaining groundwater resources (van der Kamp and Hayashi 2008). Input from wetlands on the topographically higher parts of the landscape (such as the Missouri Coteau and Prairie Coteau in North and South Dakota and Minnesota, where wetland densities are often highest) most commonly recharge regional aquifers. Hayashi et al. (1998a) documented for one wetland that approximately 4% of infiltration reached a regional aquifer, so multiplied by tens of hundreds of wetlands in a region this clearly can be significant volume of water in the recharge of aquifers.

To support CWA jurisdiction, it is important to note that the groundwater to which the pothole wetlands are linked subsequently provides input to lower-lying wetlands and stream valleys (van der Kamp and Hayashi 1998). Numerical simulation of regional groundwater flow systems in Stutsman and Kidder counties, North Dakota, portrayed lateral movement of groundwater flow over 16 to discharge into Pipestem Creek, a prominent stream in the region (Winter and Carr 1980).

In another area of the PPR in northwest Minnesota, Cowdery et al. (2008) demonstrated that horizontal hydraulic conductivity in shallow aquifers was high and that these aquifers can extend tens of miles in the region and interact with deep aquifers in some areas. Surface aquifers were recharged in significant part from surface waters, particularly seasonal and ephemeral wetlands. Notably, discharge areas for the water from these shallow aquifers included surface waters, as well as withdrawal from wells. In fact, 17-41% of the water from the surface aquifers was discharged to surface waters that left the study area, and groundwater discharge comprised 30-71% of all surface drainage flow, helping to maintain base flow. Van Voast and Novitzki (1968) concluded that groundwater and surface water interconnections (including flowing waters) were typical in the Yellow Medicine River watershed in the PPR region of southwest Minnesota.

Prairie Potholes: Water Quality Relationships

Potholes act as a sink for nutrients, including those widely used for agricultural purposes, thereby improving the quality of runoff water (Davis et al. 1981; Crumpton and Goldsborough 1998; van der Valk 1989; Whigham and Jordan 2003). Yang et al.'s (2008) study of the Broughton Creek watershed demonstrated that a 31% increase in nitrogen and phosphorus load from the watershed

and a 41% increase in sediment loading were associated with wetland loss in the watershed. Thus, when as a result of ditching or filling wetlands the retention time of water is shortened or eliminated and its associated biochemical processes are significantly altered, the cleansing or filtration function of the former wetland is lost or degraded and there are direct negative impacts on the quality of receiving navigable waters. Similarly, water retained in a pothole is cleansed of much of its load of pollutants via biochemical processes before it enters groundwater and flows laterally to other areas and other waters, or downward into deeper aquifers.

Goldhaber et al. (2011) indicated that oxygenated groundwater in the region interacts with soil constituents and focuses sulfate-bearing water from topographically higher to lower areas. Of course, drainage courses which ultimately flow to navigable waters are the topographically lowest areas in the landscape, and would therefore be chemically altered as a consequence of changes to the connections between wetlands, groundwater, and the flowing waters. In addition, Cowdery et al. (2008) noted that one of the discharges of aquifers was withdrawal from wells for domestic and farm/ranch use. Therefore, filling of pothole wetlands so that infiltration is reduced or water quality affected, or the addition of pollutants to the wetland from any source, would likely ultimately affect the well water quality (as well as quality of navigable waters receiving discharges from the affected aquifer from either surface or subsurface flow).

Blann et al. (2009) provided an important and comprehensive review of the effects of agricultural drainage in the southern PPR on the aquatic ecosystems of the region. Their work provides an excellent overview of the inter-relationships between predominately physically non-proximate wetlands, groundwater, and flowing waters that are or could be jurisdictional.

In summary, when potholes are drained or filled and no longer fulfill their water quality improvement functions, the water quality of the receiving downstream navigable waters is negatively affected because the waters flowing through the drained basins are directly linked to the downstream waters. The extent to which navigable waters are impaired depends upon the scale of the altered inputs, thereby reinforcing the importance of using an appropriate watershed scale, or groupings of watersheds, to assess aggregate impacts. Again, we believe that Justice Kennedy's choice of the Gulf of Mexico's hypoxic zone as an example of the type of water quality issue that the CWA is intended to address should shed some light on the scale of watersheds that should be used to assess aggregate impacts. While we do not believe that he would consider the entire Mississippi River watershed as the basis for such determinations, we again suggest that a single point of entry watershed will in many cases be too small to appropriately assess aggregate impacts of wetlands similarly situated within a region. Thus, we would again suggest that a combination of watersheds and physiographic regions or ecoregions should be used to delineate groups of watersheds that could be scientifically viewed as sufficiently similar to constitute a "region."

Prairie Potholes: Biological Nexus

Although prairie potholes are significant on a continental scale due to their importance to waterfowl and other migratory birds, because of the relative paucity of internal drainage networks there has not been much research on the biological connections between these non-proximate wetlands and navigable waters. In one important study, however, Lannoo (1996) demonstrated that where PPR wetlands have been connected to navigable waters (e.g., in the Iowa Great Plains region), amphibian populations in the formerly isolated wetlands have decreased significantly. Thus, in an instance such as this, the creation (by draining and ditching) of a surface hydrological nexus where none previously existed between the wetland and navigable water had a significant negative effect on the biological integrity of the waters involved.

Prairie Potholes: Economics

Some of the greatest economic impacts associated with the wetland-navigable water significant nexus considerations in the PPR are those associated with flood damages as a result of lost flood attenuation functions. For example, the estimated net benefit of artificially storing water in the Red River valley as described by Kurz et al. (2007) exceeded \$800 million over 50 years in some scenarios as a result of reduced flood stages in the Red River and avoided damages and other benefits. Given the extent of seemingly increasingly frequent damaging floods along rivers in and flowing out of the Prairie Pothole region (as well as in other areas around the country), the economics associated with avoided damages through wetland protection and maintenance of flood water storage functions should be an important component of significant nexus analyses.

One recent study (Yang et al. 2008) also estimated the value of the nutrient removal and carbon sequestration services lost due to draining or altering wetlands in the Broughton Creek watershed since 1968 to be \$430 million.

Playa Wetlands

The science of playas (often referred to as “playa lakes”) and related waters provides another excellent demonstration of the predominance of the existence of linkages and a significant nexus between even physically remote wetlands and navigable waters, in this case via critical groundwater connections.

Playas are relatively shallow, ephemeral, closed-basin wetlands usually not proximate or adjacent to navigable waters (Figure 7). These shallow, typically circular basins often lie at the lowest points in relatively flat watersheds, and each collects runoff from the surrounding area. About 66,000 playas remain in the relatively flat topographic landscape of the southern Great Plains of Kansas, Colorado, Oklahoma, Texas, and New Mexico (Playa Lakes Joint Venture <http://www.pljv.org>; Figure 8). The Ogallala (or High Plains) aquifer underlies about 170,000 square miles and is shared by eight states, including much of the playa region. This aquifer is the primary source of water in the region with about 97% being used to support irrigated agriculture (Maupin and Barber 2005), and the water has an economic value of approximately \$20 billion

(Moody 1990). The aquifer also provides drinking water for about 82% of the region's residents (Maupin and Barber 2005).

Conceptual models have proposed for years that the playas are critical recharge zones for the Ogallala (e.g., Wood 2000). Gurdak and Roe (2009) recently provided a comprehensive synthesis of the related literature (approximately 175 studies) and concluded that playas are pathways of relatively rapid recharge and provide an important percentage of recharge to the Ogallala aquifer. Thus, playas are, in the aggregate, critical to supplying water to an important, interstate water body, and they therefore impact the water quantity of the underlying aquifer (Gurdak et al. 2009). Furthermore, Rainwater and Thompson (1994) stated that landscape changes increased water collection in playas and that infiltration had also increased. They further stated that these factors increased the contribution of playas to Ogallala aquifer recharge and that, in some areas, infiltration from playas that receive runoff are the principal source of aquifer recharge.

Understanding that the CWA has no jurisdiction over groundwater, the importance of the aquifer to human health, welfare and economic benefit is therefore not a direct, independent concern of the Act except as it is affected by condition of surface water and wetlands. However, Weeks and Gutentag (1984) stated that groundwater from this aquifer discharges naturally into flowing streams and springs, and that the aquifer and valley-fill deposits and associated streams comprise a stream-aquifer system that links the High Plains aquifer to surface tributaries of the Platte, Republican and Arkansas rivers, as well as the Pecos and Canadian rivers (Kreitler and Dutton 1984). Slade et al. (2002) showed that channel gain or loss in Beals Creek (in the Colorado River of Texas) corresponds to discharges from or recharges to the Ogallala aquifer. Thus, the significant nexus between the playa wetlands and navigable waters is created by their direct linkage through the Ogallala aquifer.

In addition to the impact that playa wetlands have on the quantity of water moving from the wetlands, through the aquifer, and to navigable waters, they also have an impact on the quality of that water. Ramsey et al. (1994) showed that playa wetlands improve the water quality of storm runoff, demonstrating that water quality in the playa is better than that found in storm runoff before entering the wetland. They stated that this wetland function thereby contributes to improving/maintaining groundwater quality in the aquifer, as would be predicted in light of playas being the principal source of aquifer recharge in some areas (Rainwater and Thompson 1994). Thus, as a result of the relationships with navigable rivers in the region (Weeks and Gutentag 1994), playas must also improve water quality in those streams and rivers as well.

Hence, impaired water quality functions of playas would have adverse impacts on the quality of water in the aquifer and linked navigable waters. Increased agricultural application of nitrate fertilizers makes the groundwater more vulnerable to nitrate contamination (Gurdak and Roe 2009) via playa recharge. In addition, as a result of slow recharge rates, the limited ability of the aquifer

to attenuate contaminants such as nitrates, and the prolonged travel times of aquifer water, any potential contamination would have very long duration (Gurdak and Roe 2009) even if corrective action were taken. Thus, the natural denitrification function of intact playas takes on added significance in relation to the quality of water in the aquifer, and ultimately, to its interconnected flowing waters.

Significant Nexus Analysis: Functional Linkages

Because DU has focused its conservation efforts and developed greater expertise in some regions more than others, our preceding analyses have concentrated on prairie pothole and playa wetlands. However, the scientific literature documents that other types of wetlands and waters, including non-proximate wetlands, have similar types of significant nexuses with traditionally navigable and interstate waters. The following sections of our comments provide a sense of the information that is available for other wetland types such as sandhill wetlands, inland freshwater wetlands along the Gulf coast, and Great Lakes wetlands.

The draft guidance recognizes the multiple ways through which wetlands can exhibit a significant nexus with TNWs and interstate/international waters, alone or in the aggregate. Therefore, the remainder of our comments and supporting references and literature regarding the existence of those avenues of significant nexus are organized by hydrologic and ecologic functions. We divide our citations into the four categories of “*surface water storage and flood abatement*,” “*groundwater recharge and base flow maintenance*,” “*water quality relationships*,” and “*biological nexus*.” It should be clear from the regional examples cited above, however, that these individual wetland functions and avenues of significant nexus can and do interact in important ways.

Surface Water Storage and Flood Abatement

Wetlands in any watershed, including physically non-proximate wetlands, serve a critical function in storing and holding water and associated pollutants (including sediment) that otherwise would flow more rapidly and directly toward navigable waters. Thus, wetlands play a significant role in regional water flow regimes by intercepting storm runoff and storing and releasing those waters over an extended period, either through surface or groundwater discharges (Mitsch and Gosselink 1986). As has been all too evident during spring 2011, floods continue to be the most economically significant natural hazard in the U.S., and have a significant negative impact on the national, regional, and local economies, as well as taking a toll on human life, health, and general welfare.

The presence of wetlands in watersheds was found to be a significant factor in the reduction of 50- to 100-year floods (Novitski 1978a). In Wisconsin, Illinois, and the northeast U.S., wetland area within watersheds has been shown to be positively correlated with reduction in peak flows

(Novitzki 1978a, 1982, 1985; Demissie et al. 1988; Demissie and Khan 1993). Johnston et al. (1990) modeled the relationship between wetland flood storage and flood peak reduction and found that in watersheds with a wetland area of less than 10%, major effects on flood flows were associated with small additional losses in wetland area.

The decrease of 80% of the storage capacity of the Mississippi River floodplain as a result of levees and loss of forested and other wetlands (Gosselink et al. 1981) is widely considered an important contributing factor to the increasing frequency of flooding along the Mississippi River (Belt 1975). Miller and Nudds (1996) compared U.S. and Canadian rivers and landscape changes to provide further evidence that wetland drainage in the upper reaches of the Mississippi River watershed has increased flooding in the Cannonball and Sheyenne rivers in North Dakota, and the Moreau and Big Sioux rivers in South Dakota. Hey et al. (2004) calculated that restoring 4 million acres of former wetlands in the Mississippi River floodplain could create approximately 16.5 million acre-feet of flood storage. Conversely, the loss of existing wetland acreage in the floodplain and watershed would increase flood flows on this navigable river.

Studies in landscapes with other types of non-proximate wetlands have similarly demonstrated that their drainage results in increased peak flows in navigable waters and their tributaries (Skaggs et al. 1980). Ogawa and Male (1983) employed a hydrologic simulation model to demonstrate that for relatively low frequency floods (those occurring with 100-year interval or greater which are also those with the greatest potential for catastrophic losses) the increase in peak stream flow was very significant for all sizes of streams when wetlands were removed from the watershed. Brody et al. (2007) analyzed 383 non-hurricane flood events in Florida, and their results suggested that property damage caused by floods was significantly increased by alteration of naturally occurring wetlands. Many of these floods were presumably in association with jurisdictional waters.

As with USDA programs in the prairie pothole region, Duffy and Kahara (2011) showed that wetlands restored by the Wetland Reserve Program in the Central Valley of California provided flood storage of 113 billion cubic feet in 2008. They also documented that, in the aggregate, that the palustrine, riparian, and vernal pool wetlands in the region provided flood storage of 4159, 2182, and 2140 cubic meters, respectively. Clearly, loss of wetlands in this region would ultimately increase flood flows in navigable rivers like the Sacramento and San Joaquin.

Viewed on the whole, studies like these provide examples of the general importance of wetlands in flood attenuation. The aggregate contributions of individual wetlands distributed across a regional landscape, and often located within topographically higher portions of the watershed and non-proximate to other jurisdictional waters, can nevertheless exert a very significant effect on flood volumes. Thus, many physically non-proximate wetlands are in fact adjacent in functional sense, and exhibit a significant nexus with, navigable waters that are clearly jurisdictional from the perspective of the Clean Water Act and federal interests such as flood and pollution control.

Groundwater Recharge and Base Flow Maintenance: Linkages between Wetlands and Jurisdictional Waters

There is a much greater degree of linkage between wetlands, including aggregations of physically non-proximate wetlands, and navigable waters via groundwater connections than is generally appreciated. As Justice Kennedy and the draft guidance state, significant nexus analyses and functional adjacency must be considered in hydrologic and ecologic contexts, not merely a physical or geographic one, in order for the regulatory environment to adequately address the stated purposes of the CWA and intent of Congress. Wetlands very often contribute to groundwater recharge, and this groundwater then continues to move downslope toward flowing streams and rivers and thus ultimately contributing water to jurisdictional waters (Ackroyd et al. 1967; Winter et al. 1998). Sloan (1972) stated that water seepage to groundwater was greater for ephemeral and temporary wetlands than for other wetland types.

Winter (1998) provided a good overview of the interconnections between streams, lakes, and groundwater systems. He concluded, "Groundwater interacts with surface water in nearly all landscapes," and provided examples from glacial, dune, coastal, karst, and riverine systems regarding these interactions. Hayashi and Rosenberry (2002) also reviewed these almost universally prevalent significant nexuses and cited many examples, coming to the same conclusions as Winter (1998). Woessner (2000) provided an overview of the interactions between groundwater and flowing waters in a fluvial plain setting, and highlighted the significant potential that exists for pollution of surface waters, such as jurisdictional waters, if groundwater becomes contaminated. (See later discussion for more on this topic.) Other review papers and individual studies typically demonstrate that not only do connections almost always exist between wetlands, groundwater, and streams and rivers, but also that these interconnections are usually complex.

Ginsberg (1985) noted that in the approximately 12 million-acre sandhill lakes region of central and eastern Nebraska, its many (~1,000) wetlands and lakes are predominantly hydrologically connected to the groundwater and, in many cases, thereby supply base flows to the streams and other waters in the region. These sandhill wetlands developed as groundwater seepage areas in the valleys of wind-deposited sand dunes (Sidle and Faanes 1997). Rundquist et al. (1985) provided evidence of groundwater flow-through in a shallow lake, with the groundwater flowing toward Blue Creek, about 3 miles away. LaBaugh (1986) also documented interconnections and flow between sandhill wetlands and lakes and groundwater as water in this interconnected system flowed toward lower elevations. Novacek (1986) stated that the sandhill wetlands in Nebraska (including wet meadows) are important to water table and aquifer recharge, with the region containing five principal drainage basins that all ultimately empty into the Platte and Missouri rivers. Tiner et al. (2002) indicated that most sandhill wetlands are interconnected with the local groundwater and the important Ogallala aquifer. Further strengthening documentation of the linkage of wetlands, groundwater, and flowing navigable waters, Slade et al. (2002) showed that

channel gain or loss in Beals Creek (draining into the Colorado River basin of Texas) corresponded to discharges from or recharges to the Ogallala aquifer,.

Gonthier (1996) documented the linkage and flow of water between an extensive bottomland hardwood wetland in Arkansas (a Ramsar-designated Wetland of International Importance), local flow of groundwater, and the Cache River, up to ~2 miles away. However, the farther the wetland from the river, the more likely the water from the wetland was to enter groundwater flowing to the deeper Mississippi Alluvial Valley aquifer which discharges flows to major navigable rivers, including the Cache, White and Mississippi.

Flow of water and its chemical constituents from wetlands, via groundwater, to the water of the Great Lakes (i.e., TNWs) is extensive and important and has been frequently documented. Doss (1993) examined a coastal wetland complex in Indiana on the south shore of Lake Michigan and found strong hydrologic connectivity between the many interdunal wetlands and the lake, noting that groundwater discharge to Lake Michigan was the only significant loss of water from the wetlands besides evapotranspiration. Holtschlag (1997) evaluated Michigan's entire Lower Peninsula, and estimated that groundwater discharge constituted 29.6 to 97.0 percent of the annual percentage of stream flow in the region. While he did not evaluate wetland interactions with groundwater per se, there presumably is significant recharge of the groundwater from wetland basins in the region, although this will require further review of data from the region to verify. Holtschlag and Nicholas (1998) estimated that 67.3% of stream flow in the Great Lakes basin is groundwater discharge, and represents 22-42% of the Great Lakes water supply, its largest component. A significant portion of this groundwater is likely the result of recharge from wetland basins. In Wisconsin, groundwater flow into Lake Michigan is between 7 and 11% of the river flow, a significant part of the lake's total water budget (Chekauer and Hensel 1986).

In the case of vernal pools in California, Hanes and Stromberg (1996) reported that wetlands with discontinuous or a weakly developed hardpan had high rates of seepage and therefore contributed to subsurface flow. Tiner et al. (2002) stated that during the wet seasons these geographically isolated wetlands formed hydrologically linked complexes that could drain into perennial streams.

Non-proximate wetlands that exist in karst topography are often directly linked to subsurface water flows of relatively high velocity, moving easily through underground channels, caves, streams, and cracks in the rock. There tend to be many springs and seeps, many with surface connections, which are the source of some large streams (Winter et al. 1998), and Winter (1998) stated that groundwater recharge in karst terrain is efficient. Entire streams can go subsurface and reappear in other areas, connect directly with wetland basins, and contaminants are easily mobilized in these regions.

In addition to the direct hydrologic connections that exist between groundwater and streams, the nature of the groundwater discharge to streams can have impacts such as influencing benthic productivity (Hunt et al. 2006). The nature of recharge from wetlands to this pool of groundwater can therefore create an even more complex significant nexus between the wetlands (frequently non-proximate) and the navigable water as a result of the interacting hydrologic and biologic relationships.

A particularly interesting and relevant example of the significant nexus between physically non-proximate and traditional navigable waters is Nebraska's Platte River and its tributaries in Colorado (South Platte River) and Wyoming (North Platte), an area covering 23,000 sq. mi. Additionally, the Platte River provides important habitat for four federally listed threatened and endangered species. Large amounts of surface water have been diverted from this river system to service the irrigation needs of farmers and ranchers all along the system. The effects of this diversion on the river have been significant enough to cause the Platte River in Nebraska to occasionally run dry (e.g., in 2003).

As a consequence of the over-appropriation of water in the region, and acceptance as fact that wetlands and other physically non-proximate waters in this region provide groundwater recharge that in turn provides base flow to the navigable rivers, artificial groundwater recharge sites and projects have long been a common tool for replenishing river water (Warner et al. 1986; Watt 2003). Complex hydrologic models have been developed so that landowners and regulators can closely estimate how much water, and in what time frame, will be "delivered" to the river from a particular wetland or recharge site (Warner et al. 1986). Through contractual agreements supported by Colorado water law, and under the auspices of the interstate federal "Platte River Recovery Implementation Program Cooperative Agreement" signed in 2006, the water in this single wetland-lake/groundwater/Platte river system is commercially exchanged on the basis of this well-established significant nexus. Notably, recharge wetlands and other sites are typically located a mile or more away from the river and would not be considered "adjacent" by virtue of a test based on proximity, as opposed to taking a functional perspective on adjacency. Some sites are much farther away. For example, the Fort Morgan recharge sites (Warner et al. 1986) and Brush Prairie wetlands/ponds are located 5-7 miles from the South Platte, and are credited with the capacity to recharge 13,000 acre-feet of water annually to the river. Thus, a significant component of the fiscal and water economy of the region is based upon the recognition of the significant nexus that exists between non-proximate waters and the Platte River and its major tributaries.

Clearly, demonstrated linkages between wetlands, groundwater and navigable waters within a broad variety of wetland categories and across a diversity of landscapes and regions, indicate that adjacency and significant nexus should be interpreted from a functional perspective if water quality is to be protected as intended by the CWA.

Water Quality Relationships

The importance of the relationships between wetlands and the water quality of navigable waters is central to an informed understanding of what should constitute jurisdictional wetlands under the CWA. It is well established that wetlands of all types have the capability to improve water quality by trapping, precipitating, transforming, recycling, and/or exporting many of its chemical and waterborne constituents (van der Valk et al. 1978; Mitsch and Gosselink 1986). They serve as a natural buffer zone between upland drainage areas and open or flowing water. They can improve water quality by removing heavy metals and pesticides from the water column, and by facilitating the settling of sediment to which many pollutants are attached. Wetlands remove excess nutrients, e.g., phosphorus and nitrogen compounds, by incorporating them into plant tissue or the soil structure and by fostering an environment in which microbial and other biological activity pulls these compounds out of the water, thereby enhancing water quality.

Importantly, water quality contributions by wetlands can occur no matter where the wetland occurs on the landscape, and non-proximate waters also serve as chemical and nutrient sinks, trapping and holding these compounds (Mitsch and Gosselink 1986). For example, it has been shown that when water naturally filters through Delmarva bays (a category of geographically isolated wetlands) instead of being circumvented through drainage canals to a navigable water, it flows through groundwater pathways to the Chesapeake Bay with much of its nitrogen having been removed (Laney 1988; Shedlock et al. 1991; Bachman et al. 1992; Fretwell et al. 1996). Nitrogen is one of the principal pollutants of concern in the waters of the Chesapeake Bay, and in many other waters that supply domestic, municipal, irrigation and commercial needs. In Michigan, Whitmire and Hamilton (2005) concluded that a remarkably small area of wetland can strongly influence water quality relative to nitrate and sulfates. Some of their study wetlands were connected to the groundwater system.

Lin and Norman (2003) demonstrated that wetlands in California were able to remove an average of 69% of the selenium contained within agricultural runoff they received, thereby providing a natural mechanism for reducing the availability of this trace element which becomes toxic if bioaccumulated in the food chain. Weller et al. (1996) demonstrated that riparian wetlands of all types in eight watersheds of Lake Champlain were important in reducing phosphorus loading of surface waters.

In the sandhill wetlands of Nebraska, return of too much polluted irrigation water can enter the aquifer or regional watershed through these non-proximate wetlands and degrade water quality (Winter 1998). Winter (1998) stated, "groundwater and surface-water interactions have a major role in affecting chemical and biological processes in lakes, wetlands and streams, which in turn affect water quality throughout the hydrologic system." Katz et al. (1995) demonstrated the ease with which changes in the chemistry of physically non-proximate surface waters are transported and reflected in the water quality of groundwater.

The increased flood flow that is directly associated with the loss of wetlands from across watersheds and regions (e.g., Brun et al. 1981) is an important factor in stream bank erosion. This kind of erosion is a significant water quality problem in many areas downstream of physically non-proximate wetlands in the United States, contributing substantially to sediment pollution loads, including navigable waters. Bellrose et al. (1983) and Mills et al. (1966) describe how sedimentation, including stream bank erosion, has created navigation and ecological problems on the Illinois River.

Fennessy and Craft (2011) examined the relationships of Farm Bill wetland conservation programs to nutrient and sediment loads contributed by the entire Glaciated Interior Plains, (encompassing much of a seven-state area from Minnesota to Ohio) to the Mississippi River and Gulf of Mexico. Wetlands involved included about 260,000 acres of a variety of wetland types scattered throughout the region. They estimated that these wetlands reduced the region's contribution of nitrogen, phosphorus, and sediment to the Mississippi River by 6.8%, 4.9%, and 11.5%, respectively. Given that excess nitrogen is widely accepted as the primary cause of the hypoxic zone (Moreau et al. 2008), these wetlands clearly exhibit a significant nexus and provided significant benefit to the Mississippi River and Gulf of Mexico. However, it is important to recognize that if analyzed on the basis of only single point of entry watersheds, they would likely not have been determined to be jurisdictional wetlands, and this benefit to the Mississippi River and Gulf would be lost if those waters were significantly impacted by the draining or filling of the wetlands. A disproportionately high percentage of the nitrate load that the Mississippi River exports to the Gulf of Mexico comes from this region (Hey 2002). In a similar analysis of USDA programs in California's Central Valley, Duffy and Kahara (2011) calculated that wetlands restored via the Wetland Reserve Program in the valley could improve the quality of incoming water by removing substantial amounts of nitrate-nitrogen, thereby benefiting and exhibiting a significant nexus with downstream receiving waters.

In south Texas near Galveston Bay, coastal prairie wetlands are an important component of the landscape. Two recent studies (Forbes et al. 2010; Wilcox et al. 2011) showed that in the case of these coastal depressional wetlands that had previously been considered "geographically isolated wetlands," intermittent surface water connections with the surrounding coastal jurisdictional waterways involved 17-18% of the watershed precipitation during the study. Both studies concluded that much of the surface runoff entering the navigable Galveston Bay and other nearby waters likely passes through coastal prairie wetlands. One study area (Forbes et al. 2010) included 10,349 palustrine wetlands covering 200 square miles. Not only is the nexus between these wetlands and the coastal waters significant on the basis of the quantity of water flows, but Forbes et al. (2010) also found that each wetland was capable of significantly affecting water quality on its way to the navigable waters by reducing incoming nitrate-nitrogen by approximately 98%. Thus, these wetlands are positioned within the hydrologic flows to provide substantial reduction of runoff pollution of waters that ultimately enter the Galveston Bay estuary. The fixed carbon and

nitrogen then exported from these wetlands to the navigable waters provides valuable food web support, thereby creating a biological nexus, as well. Forbes (2007) serves as a useful annotated bibliography for coastal prairie freshwater wetlands.

There is a vast body of scientific literature dealing with the relationship of wetlands (including those that are physically non-proximate) and water quality, and the literature cited above is only a small sample of what is available on the topic. Many studies, as cited above, also document widespread and direct physical linkages between the water contained in wetlands, groundwater, and in flowing waters and tributaries considered “waters of the United States.” However, taken as a whole it provides compelling evidence that to protect the nation’s water quality, as intended by the CWA and amendments. Further, this body of information affirms that the definition of adjacency and significant nexus must be evaluated from within a context of wetland and water quality *functions*, not simply physical proximity. As Whigham and Jordan (2003) concluded in a review paper, from a water quality perspective, “so-called isolated wetlands are rarely isolated” from other waters of the United States

Non-Proximate Waters and Human Health Risks

A few examples of pollution of waters are informative regarding the risks associated with failing to recognize that a significant nexus exists between wetlands and other physically non-proximate waters, groundwater, and navigable waters, and failing to view them as a single system in determining CWA jurisdiction. Additionally, from the standpoint of interpreting these risks, some examples of “artificial” waters nevertheless serve as instructive surrogates for the potential water-borne pollution pathways for natural wetlands.

For example, Ryan and Kipp (1997) assessed the impact of liquid wastes discharged from an enriched uranium recovery plant to evaporation ponds in Rhode Island. They identified chemical and radioactive constituents that infiltrated from the ponds to the groundwater aquifer, creating a plume that ultimately discharged into the Pawcatuck River.

Superfund sites offer many examples of the hazards associated with the pollution of non-proximate waters, whether natural or artificial, to navigable waters. In Macomb County, Michigan, at a 100-acre site at which effluent from a waste oil reclamation facility was held in ponds (EPA Superfund ID No. MID980410823), groundwater was found to be contaminated with volatile organic compounds which flowed toward business and residences, causing residents to use bottled water for potable purposes. Fish collected in the nearby Clinton River had elevated PCB levels. The Vertac site in Arkansas (EPA RCRA ID No. ARD000023440) involved the contamination of an aquifer with dioxins, furans and other chemicals that eventually contaminated Bayou Meto, a traditionally navigable waterway. White and Seginak (1994) documented that as a result of the dioxins and furans in Bayou Meto, wood ducks breeding there experienced suppressed nest success, hatching success, and duckling production. Teratogenic effects, such as crossed-bills, were documented at the sites with the highest levels of contamination. Similar situations of

contamination of navigable waters as a result of linkages to non-proximate waters and groundwater are unfortunately not uncommon.

More recently, concerns have arisen over coal ash settling ponds and their nexuses to navigable and other waters. At a site adjoining Lake Michigan and the Indiana Dunes National Seashore in northwest Indiana, Cohen and Shedlock (1986) noted elevated levels of boron, arsenic, and molybdenum in groundwater associated with a coal ash pond. Subsequent to the 1.1 billion-gallon ash release from holding ponds in Tennessee, the Gibson plant in Indiana has come under scrutiny as a result of boron concentrations (reported to cause nausea and diarrhea, among other potential adverse health effects) increasing in drinking water wells of East Mount Carmel (www.courier-journal.com February 23, 2009). Significantly elevated concentrations of selenium (teratogenic and toxic at high concentrations) in an associated cooling lake caused a closure to public fishing and raised concerns about nesting endangered least terns. Our understanding is that the EPA has been assessing the risks associated with coal ash more closely. While the question of the level of hazard associated with coal ash is not directly at issue with respect to the CWA, we encourage the EPA to look to those situations as examples of “artificial” physically non-proximate surface waters that can provide information and perspectives on the relevant question of the many avenues of significant nexus between non-proximate and other waters that exists in regions across the country.

Biological Nexus

As is the case with respect to wetlands and water quality, there is also a vast literature regarding the significance of wetlands of the United States to fish, wildlife, amphibians, and other biota of the country and the continent. However, the primary question with respect to the draft guidance is to what extent biological information can be used to contribute to the establishment of a significant nexus between wetlands and jurisdictional waters. In addressing the issue from that perspective, we will continue to focus our attention on physically non-proximate waters.

Leibowitz (2003) pointed to the need for examples of organisms that require both navigable waters and “isolated” wetlands, and we agree that additional effort should be placed on identifying such linkages. Nevertheless, even for non-proximate waters, we can highlight a few important examples.

In the context of this issue, however, we must strongly disagree with the statement in the draft guidance under Section 6, Other Waters, which states, “in accordance with the decision in *SWANCC*, consideration of use by migratory species is not relevant to the significant determination for non-physically proximate waters.” First, the *SWANCC* decision did not say that migratory birds were irrelevant to jurisdiction. Rather the decision indicated just that migratory bird use could not be the sole basis for determining CWA jurisdiction. We accept the interpretation of the *SWANCC* case that would make use by a *migrating* bird relatively irrelevant. But, in the context of establishing a biological basis for significant nexus, a *migrating bird* and a *migratory bird* are two different entities. We understand that, for example, that a redhead duck

migrating from its breeding habitat in North Dakota and stopping for a short time at a wetland in central Iowa on its way to its wintering ground on the Texas Gulf coast cannot in and of itself be used to assert jurisdiction over the Iowa wetland. However, when a migratory bird (a legal designation of a large category of birds, as opposed to resident or non-migratory species) like the redhead can be shown to be dependent upon *both* navigable waters and physically non-proximate waters *within* a season and within a relatively local or regional, context, then use by migratory birds should indeed contribute to the establishment of a significant nexus for the non-proximate waters.

Wintering redheads and lesser scaup provide excellent examples. Approximately 80% of the entire North American population of redheads winters in estuaries of the Gulf of Mexico, most in the Laguna Madre of Texas and Tamaulipas, Mexico (Adair et al. 1996; Ballard et al. 2010). They forage almost exclusively on shoalgrass (*Halodule wrightii*) in the hypersaline lagoon, which is a traditionally navigable waterway (Ballard et al. 2010). Large numbers of lesser scaup also winter in the Gulf Coast region, and generally forage on invertebrates in the saline and brackish marshes and offshore habitats of Texas and Louisiana (McMahan 1970). Large concentrations of diving ducks in the region, including these two species, also make heavy daily use of inland, coastal freshwater ponds in order to dilute the salt loads ingested while feeding in the saline habitats (Adair et al. 1996; Ballard et al. 2010). Activity budgets documented that redheads and scaup spent approximately 37% and 25%, respectively, of their time on the freshwater wetlands actively drinking (Adair et al. 1996). Drinking was the dominant behavior while on freshwater wetlands (Adair et al. 1996). While both studies found that redheads and scaup tended to make greater use of wetlands that were in closer proximity to the coast when they were available, because they require the fresh water to survive they flew farther inland during dry conditions to acquire freshwater. Adair et al. (1996) found that redheads used wetlands up to 13 miles inland, and scaup used wetlands up to 33 miles from the coastal navigable waters. Thus, these researchers and others (e.g., Woodin 1994) concluded that these migratory bird species are dependent upon *both* the navigable saline waters of the Laguna Madre and Gulf of Mexico, *and* the inland, physically non-proximate freshwater wetlands. If the inland freshwater wetland habitats are adversely impacted because of a lack of CWA jurisdiction, the region becomes less able to support redhead, scaup and other diving duck populations, and the biological integrity of the traditionally navigable water of the Laguna Madre would therefore be affected. This clearly constitutes a significant nexus.

Other avian species that spend significant time daily on saltwater (navigable) habitats are similarly dependent upon the presence of regional freshwater wetlands for purposes of osmoregulation (Woodin 1994). We must emphasize that these examples all apply to *within*-season, local/regional habitat use, and do *not* include the period of migration. Some examples of such species include: black ducks in the northeast and mid-Atlantic coast and Chesapeake Bay that also depend upon inland freshwater wetlands (see Morton et al. 1989); California gulls using hypersaline Mono Lake and freshwater wetlands in southern California (Mahoney and Jehl 1985); and white ibises using

estuarine rookeries and requiring freshwater wetland-derived prey for osmoregulation (Bildstein et al. 1990).

The Platte River and Rainwater Basin region of central Nebraska is an inland situation that should be examined in more detail. Millions of waterfowl migrate through the region every year and concentrate on the small percentage of the region's remaining wetlands (approximately 5%) that provide habitat, particularly in the spring. In addition, nearly the entire population of mid-continent sandhill cranes (~500,000 birds) stages there (Krapu et al. 1982; Vrtiska and Sullivan 2009), and it is an important concentration site for the federally endangered whooping crane (Austin and Richert 2005). Although this region is a migration and staging area for the crane species, the situation requires further examination because huge numbers of the sandhill cranes, and non-negligible percentages of the whooping crane, roost at night by standing in the very shallow waters of the Platte River (along about 65 miles of its length in central Nebraska), but they leave the river to use other habitats for feeding and loafing during the day. While the sandhill cranes feed predominantly on waste grain in crop fields (Krapu et al. 1984; Davis 2003; Anteau et al. 2011), the whooping crane spends more time in palustrine wetland habitats (Austin and Richert 2005). Austin and Richert (2005) analyzed habitat use from 1977-99, but did not appear to directly review their data relative to the question of the degree of dependence of whooping cranes on both the riverine habitat and the freshwater wetlands in the sense required to firmly establish a significant nexus as currently proposed.

We believe that, as shown clearly by the examples of the redheads and lesser scaup on the Gulf Coast, the dependence upon *both* navigable waters and non-proximate wetlands can constitute a significant nexus. In these cases, without the wetlands, the species would not occupy the region as a whole and the biological integrity of the navigable waters would therefore be impacted. Within-season use of both categories of waters by examples of other migratory (not migrating) birds demonstrates similar dependency and a similar nexus. This interdependence on both navigable and non-proximate waters should be given the same consideration for establishing a significant nexus, as would the dependence upon adjacent wetlands and riverine habitats by an amphibian species, for example. Although the scale is different, they are scientifically and biologically analogous, and there is nothing in the *SWANCC* and *Rapanos* decisions that would justify disallowing the use of this kind of situation (e.g., redheads) as a basis for the biological nexus that Justice Kennedy described.

Section 4: Tributaries

In these comments, as stated previously, we have intentionally devoted most of our time to the consideration of the bases for the establishment of a significant nexus for wetlands. Thus, our comments regarding tributaries are comparatively brief. We are aware that other organizations, entities, and individuals with more expertise in the science of streams and rivers have concentrated more effort on this portion of the guidance. However, we recognize the importance of tributaries

given their capability to transport pollutants, as well as being a critical link from navigable waters to wetlands that occur in a region.

In general, however, we agree with and support the agencies' definition and treatment of tributaries in the draft guidance. The clarification and direction taken regarding tributaries that would be considered as having a significant nexus with navigable or interstate waters under the standards of the plurality and Justice Kennedy are much improved from the existing guidance. The emphasis on the capability of the tributary to transport pollutants, including sediment, to navigable or interstate waters is a clear linkage to the purposes of the CWA, and clearly within the bounds established by the two recent Supreme Court decisions. The additional treatment of the seasonality of tributaries is much improved over existing guidance. It is much more thorough and, most importantly, it much better reflects the related science and the regional and other sources of variability that exists with respect to the issue of "seasonal" flows. Overall, we believe that this guidance regarding jurisdiction over tributaries will have the net effect of helping to restore CWA protection for many waters for which such protection has been in doubt since the Rapanos decision, and thereby more closely fulfill the intent of Congress and the purposes of the Act.

However, as rulemaking is considered, and for the sake of further increased clarity and efficiency that will benefit the agencies as well as the regulated community, we urge the agencies to consider how to categorically include as many tributaries as possible and reasonable in jurisdictional waters without the necessity of individual or even aggregate significant nexus determinations. Science provides the support for recognition or presumption of a significant nexus for such categorical designations, which are also supported by Justice Kennedy as long as the science supports the designations. In light of the disproportionate significance of the upper reaches and smaller tributaries of most watersheds to the functional integrity of the entire system, it is important that CWA protections be restored to the fullest extent supported by the science.

We also support the clarification and definition of the kinds of erosion features, ditches, and swales that will not be treated or considered as tributaries for purposes of the guidance. This is at least as important an element of providing clarity as is defining what will be considered potentially jurisdictional with demonstration of significant nexus.

Section 5: Adjacent Wetlands

Most of the information that we provided under Section 3, Significant Nexus, was intended to inform the framework of the final guidance for assessing significant nexus of wetlands and for guiding subsequent jurisdictional decisions. We emphasized the science related to significant nexus between navigable waters and physically non-proximate wetlands, often in the aggregate. However, although the bases for significant nexus are usually more apparent as a result of physical proximity, at least some of these same kinds of relationships nearly always exist between navigable waters and adjacent, as well as non-proximate, wetlands.

The significant nexus test of the plurality standard will be relatively self-evident in most cases given their requirement for a continuous surface connection. The most important part of the process under the plurality standard will be first determining whether the non-navigable tributary is itself a jurisdictional water. This underscores the need for the agencies to steadily accumulate the benefit of individual and aggregate jurisdictional determinations to build a base of determinations and compilation of science across watersheds and regions that in turn will increase the efficiency of the entire process. In a rulemaking, we believe that the process in many cases and regions of the country can ultimately be made even more efficient and clearer by compiling in advance the science related to potential a priori categorical designations of significant nexus for wetland classes in a regional context.

We support the inclusion of the definition of “adjacent” in the guidance as a clarification of the existing regulations, and we support the framework for first determining adjacency and then assessing the existence of a significant nexus. While we strongly support the assessment of jurisdiction for wetlands in the aggregate as explicitly allowed by Justice Kennedy, we continue to disagree with the limited and scientifically unjustified over-reliance on physical proximity in the draft guidance.

Adjacency should be interpreted on a functional basis, that is, on the basis of the inter-connections and nexus that exists between waters regardless of distance. Physical adjacency in the nearly all-or-nothing application in the regulations and draft guidance, like isolation, is largely a legal construct and is an artificial distinction from the perspective of hydrology and wetland science. Importantly, from an implementation standpoint, this artificial distinction means that aggregate analyses of wetlands within a watershed, however delineated, will be limited only to the aggregation of adjacent wetlands. Again, because proximity to navigable waters or jurisdictional tributaries is only one aspect of the interrelationships between wetlands and other waters, it should not in itself be used as a surrogate for the existence of a nexus or as a metric for the level of its significance. The net result of excluding all wetlands except those that are physically adjacent in this aggregate analysis amounts to selecting a biased sampling frame for evaluating the nexus of wetlands in the aggregate relative to protection of the jurisdictional water. This can in no way be justified by the related science or scientific process, and Justice Kennedy’s language regarding significant nexus, aggregate analysis, and ecological linkages does not justify this limitation. In fact, this limitation seems incongruent with the more scientifically valid perspective offered later in the section which states that, “All wetlands within a wetland mosaic should ordinarily be considered collectively when determining adjacency. Wetlands present in such systems act generally as a single ecological unit.” This is particularly true when viewing adjacency from the more appropriate functional context rather than merely with regard to proximity.

Recognizing that adjacency will continue to be used as at least one aspect of determining jurisdiction, we agree that one sufficient condition of adjacency should be location within a riparian area or floodplain. We suggest that “floodplain” be further defined as at least the 100-year floodplain, or perhaps as any area inundated by a flood for which records exist. However, it

should be clear that while location in the floodplain should be sufficient to show adjacency, placement in the floodplain would not be a requirement for adjacency.

The clarification that water does not have to be present continuously in either surface or subsurface connections is valuable and scientifically sound relative to the purposes of the Act. In addition, the fact that the hydrologic connections do not need to be waters of the U.S. or regulated by the CWA is an important clarification. Again, this is a scientifically sound principle in relation to the purposes of the CWA.

As stated earlier, the distinctions made in this section between “species that move between an adjacent wetland and a jurisdictional water” and “migratory species” should be re-interpreted to be more scientifically accurate, and to better reflect the actual decisions in *SWANCC* and *Rapanos*. These two classes of species are not mutually exclusive or distinguishable. “Migratory birds” represents a legal categorization of bird taxa that reflects their tendency to migrate from a breeding area to a wintering area, sometimes distant from one another. The U.S. Fish and Wildlife Service is legally responsible for maintaining the list of bird taxa that are considered “migratory” species. Other bird taxa are considered resident or non-migratory species and spend their lives within a relatively small region. We understand the rationale, in light of *SWANCC*, for not considering the use of a wetland “during a journey to a different area” by a *migrating* bird or other species as a basis for demonstrating ecological interconnections for purposes of demonstrating adjacency or significant nexus. However, the *within* season use of both aquatic habitats, particularly when there is at least some degree of dependency on both waters, should be a valid basis for contributing to the demonstration of ecological interconnectedness regardless of whether the species migrates from the area/region during another season or stage of its annual life cycle. There is neither a scientific nor a legal rationale for doing otherwise.

We should note that our comments above are offered with an appreciation of the difference in determining adjacency and significant nexus, in light of the existing regulations. We believe that this distinction can be made clearer (or eliminated) in the context of revised regulations that could be formulated with an emphasis on showing and using the conceptual similarities between “functional adjacency” and “significant nexus.” The primary aspect of significant nexus that science alone cannot fully address is the question of “significance” relative to the purposes of the Act and jurisdiction. This determination of significance must include assessment of the level of risks that society is willing to accept. However, judgments regarding acceptable risks must be made with the understanding that if, for example, there is a hydrologic connection between waters, there is also an increased risk of contaminants entering the shared water system with more limited jurisdiction. Similarly elevated risks to individual, local, state and federal interests are associated with limited CWA jurisdiction.

Section 6: Other Waters

Many of our preceding comments bear directly on this section of the draft guidance. For the most part, we believe that the agencies will therefore understand Ducks Unlimited's perspective that the treatment of other waters, particularly those deemed to be "not physically proximate to jurisdictional waters," must ultimately be modified to more adequately reflect the purposes of the Act, the related science, and a more appropriate and accurate interpretation of the Court decisions. We note the agencies' expectation to provide further clarification as part of a notice and rulemaking, and we again encourage that this rulemaking be initiated as soon as possible.

For example, the distinction that "proximate other waters" are waters "that would satisfy the regulatory definition of 'adjacent' if they were wetlands, seems to be an unnecessarily convoluted legal structure given the continuum of waters that this attempts to address. Also, in the context of the guidance relative to the assessment of the aggregate of these waters for purposes of the significant nexus analysis, for reasons previously articulated we continue to disagree with the limitations to considering only other physically proximate waters (presumably excluding wetlands as well as similar waters that might not physically proximate) as a structurally biased sampling frame, and to the use of only the point-of-entry watershed.

With regard to this section's treatment of "other waters that are not physically proximate to jurisdictional waters," we reference the agencies to our earlier comments relative to a review of this section of the draft guidance. Given that the guidance does not provide specific direction on these wetlands and other waters, we encourage that the headquarters of the agencies to which these needed determinations will be referred fully consider the kinds of related science provided in these comments. Recognizing that what we have provided only touches on the available and relevant information, we encourage the agencies to compile this information for use in making these determinations by agency headquarters. Our primary intent has been to elevate the awareness that there is indeed "a compelling scientific basis" for treating some types of physically non-proximate wetlands, such as but not limited to prairie potholes and playas, as being "similarly situated waters in the same region."

Section 7: Waters Generally Not Jurisdictional

We support the inclusion of this section, and view it as being important to providing a greater degree of clarity about what types of water bodies are not within the CWA jurisdiction in any case, and therefore are not affected in any way by this guidance. Over the last several years, there has been considerable confusion among farmers, landowners, communities, organizations, and elected officials regarding the scope of the CWA. Too often, much concern has been elicited as a result of an incorrect understanding of waters that have never been regulated by the Act, and have not been proposed to be regulated either in past legislation that has been introduced, or in the draft guidance. Thus, clearly articulating the waters that are not subject to the CWA or this guidance is an important step toward increasing the level of clarity.

We suggest be that additional clarity could be provided if the “waterbodies excluded from coverage under the CWA by existing regulations” could be listed in the guidance, or at least in the appendix. We recognize that these exemptions are referenced in the introduction, but we suggest that an explicit listing in this section of the guidance would be valuable. Much of the expressed concern has come from the agricultural community, and listing the exemptions that clearly state that “normal agricultural practices,” for example, would be helpful to expanding awareness of these statutory exemptions and the fact that they are unaffected by the regulation (and by this guidance) as a matter of existing statute.

Section 8: Documentation

We agree with the direction provided by the guidance relative to documentation, and we underscore the importance and utility of consistently maintaining accurate, complete records of jurisdictional determinations in all agency regions and districts, as well in the headquarters. Responsibly established and maintained, this cumulative record can be an essential part of compiling the science relevant to fulfilling the purposes of the Act through jurisdictional determinations, and will be important for improving the efficiency, clarity and certainty of the process over time. We also appreciate the recognition of the agencies that scientific information need not always be specific to individual waters, but that regional and national studies of similar waters can be used to help inform analyses and determinations. We believe that this approach supports our recommendation of the application of a “preponderance of the science” standard in working to fulfill the purposes of the Act while remaining true to the available science and existing law.

Economic and Social Considerations

Although not directly linked to the issue of the technical substance of the draft guidance, the economic and social implications of restoring protection to wetlands and other waters, and of striving “*to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters*”, i.e., to fulfill the purpose of the Clean Water Act, should provide important context within which the final guidance and a potential rulemaking are developed. There are significant economic and societal implications if protection of the nation’s water quality and wetland conservation continue to be compromised.

The outdoor industry contributes an estimated \$730 billion to the nation’s economy, and fish and wildlife-related recreation (hunting, angling, wildlife-watching) accounts for \$122.3 billion in annual expenditures (U.S. Fish and Wildlife Service 2006), and is a major industry. A high percentage of that economy is associated with water resources. Waterfowl alone represents a tremendously valuable interstate and international economic resource. In 2006, more than 1.3 million waterfowl hunters expended approximately \$900 million with a total related industry output of \$2.3 billion (Carver 2008). This analysis also calculated that waterfowl hunting created approximately 28,000 jobs in 2006. Birding, much of it also water-related as evidence by

waterfowl accounting for the type of bird observed by 77% of away-from-home birders, supported total trip-related and equipment expenditures of \$36 billion in 2006 (Carver 2009). These direct expenditures resulted in a total industry output of \$82 billion and created 671,000 jobs (with an average annual salary of \$41,000; Carver 2009). The total economic contribution of fishing, obviously dependent upon water resources, is \$61 billion (American Sportfishing Association 2002). These economic benefits of water resources simultaneously accrue to the states, as indicated by the example of Texas in which the expenditures by migratory bird hunters and wildlife watchers totaled \$1.3 billion in 2001 (U.S. Fish and Wildlife Service 2002), a level of expenditure that when compared to the state's agricultural commodities would rank second behind only cattle and calves (<http://www.ers.usda.gov/statefacts/TX.htm>).

The negative economic consequences of increased flooding associated with a reduction in the flood storage capacity of wetlands in the nation's watersheds were touched upon earlier. Another indication of the economic implications of protecting the nation's water resources is revealed in the example of the actions taken by New York City to initiate a \$250 million program to acquire and protect up to 350,000 acres of wetlands and riparian lands in the Catskill Mountains (Dailey et al. 1999). The city viewed this as a way to protect the quality of its water supply as an alternative to constructing water treatment plants which could cost as much as \$6-8 billion. In South Carolina, a study showed that without the wetland services provided by the Congaree Swamp, a \$5 million wastewater treatment plant would be required (www.epa.gov/owow/wetlands 2003). Thus, wetlands provide low cost services to society, as well as reducing costs of infrastructure and long-term maintenance.

Polasky and Ren (2010) cited research that estimated that if two lakes (Big Sandy and Leech) in Minnesota had an increase in water clarity of three feet, lakefront property owners would realize a benefit of between \$50 and \$100 million. Southwick Associates (2006) estimated that the present value of Saginaw Bay coastal marshes for active recreational use was \$239 million, or approximately \$10,000 per acre.

Additionally, the vast majority of the citizens of the United States and our society place a high priority on conservation of wetlands and maintenance of high standards of water quality, for many reasons that go well beyond their direct economic values. A nationwide survey (Responsive Management 2001) documented that there were 15 times the number of citizens who believed there were too few wetlands compared to the number that thought there were too many. The same survey showed that 91% of the public thought that it was "very" (64%) or "somewhat" (27%) important to protect or conserve wetlands. Only 3% were neutral or considered it unimportant.

Furthermore, survey after survey has documented that the American public has a deep concern about water quality and high expectations for water conservation. For example: water pollution was identified as the most important environmental issue facing Florida (Responsive Management

1998a); 65% of Idaho residents thought more time and money should be spent on protecting Idaho's water resources (Responsive Management 1994); 89% of Indiana residents thought that improving water quality was very important (Responsive Management 1998b); 75% of West Virginia residents thought much more effort should be spent on restoring streams that have been damaged by acid rain or acid mine drainage (Responsive Management 1998c). Kaplowitz and Kerr (2003) noted that 75% of Michigan residents viewed the flood control services provided by wetlands as very or extremely important, and 87% viewed the wildlife habitat functions provided by wetlands similarly. A recent survey of Minnesota residents found that 83% of the electorate is concerned about the pollution of drinking water (Fairbank, Maslin, Maulin, Metz and Assoc. and Public Opinion Strategies 2010). Duda et al. (2010) describes how survey after survey of sportsmen and of the general public shows significant concern regarding safe, abundant, high quality water resources.

Many additional studies can be cited that demonstrate the value of wetlands and other water resources to federal, state and local economies, and to the great majority of U.S. citizens. Although we understand that this issue is not directly relevant to the technical aspects of the draft guidance, we nevertheless believe that the available literature regarding the economic benefits of protecting the nation's wetlands and other resources, and regarding the sentiment of the general public in support of clean and abundant water, provides valuable context for the overall direction that the guidance and a potential rulemaking should take. Taken together, the overall message of the relevant economic and societal information supports the view, frequently shown to be shared by the vast majority of the public, that the conservation of wetlands and water resources is not and should not be viewed as a choice *between* economic and environmental benefits, but rather that long-term, shared economic benefits are *dependent upon* water resource protection.

Summary

In summary, Ducks Unlimited supports the draft guidance as an important step toward restoring CWA protections to some of the wetlands and other waters from which they were removed subsequent to the *SWANCC* and *Rapanos* U.S. Supreme Court decisions. However, we have attempted to illustrate with the scientific information that we have provided, and in light of Justice Kennedy's significant nexus language, that there is a compelling scientific basis for going significantly farther in restoring protections to other wetlands, most notably to many physically non-proximate waters, including many categories of so-called "geographically isolated wetlands such as the prairie potholes. We strongly encourage the agencies to consider this compelling scientific evidence and to go as far as allowable in restoring protections to the nation's wetlands and other waters.


However, understanding that guidance can only go so far in addressing this objective, DU strongly encourages the agencies to initiate a rulemaking process as soon as possible. It is only through

such a process that new rules to address the Supreme Court's decisions, and in light of the compelling wetland and hydrologic science, that CWA protections can be restored to the fullest extent of the law. Notably, virtually all sectors of the public have endorsed that such a rulemaking be initiated.

Finally, we support the maintenance in the draft guidance of the long-standing exemptions for agriculture, ranching, forestry, and a number of other economic activities from CWA jurisdiction. To help reduce the confusion that exists about these exemptions, we encourage the agencies to make them more explicit in the final guidance that emerges from this process, as well as in the intended development of the proposed rule that is mentioned in the draft guidance.

If you have any questions about Ducks Unlimited's comments, please do not hesitate to contact Dr. Scott Yaich at syaich@ducks.org, or 901-758-3874.

Sincerely,

A handwritten signature in black ink that reads "Paul R. Schmidt". The signature is written in a cursive, slightly slanted style.

Paul R. Schmidt
Chief Conservation Officer

cc: Dale Hall, Chief Executive Officer, DU
John Newman, President, DU
Paul Bonderson, Chair, Conservation Programs Committee

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Figure 1. Wetlands and waters in the Prairie Pothole Region. Note particularly high densities of wetlands in many areas. (Only wetlands and other waters are colored, with colors representing various classes of wetlands and other waters.)

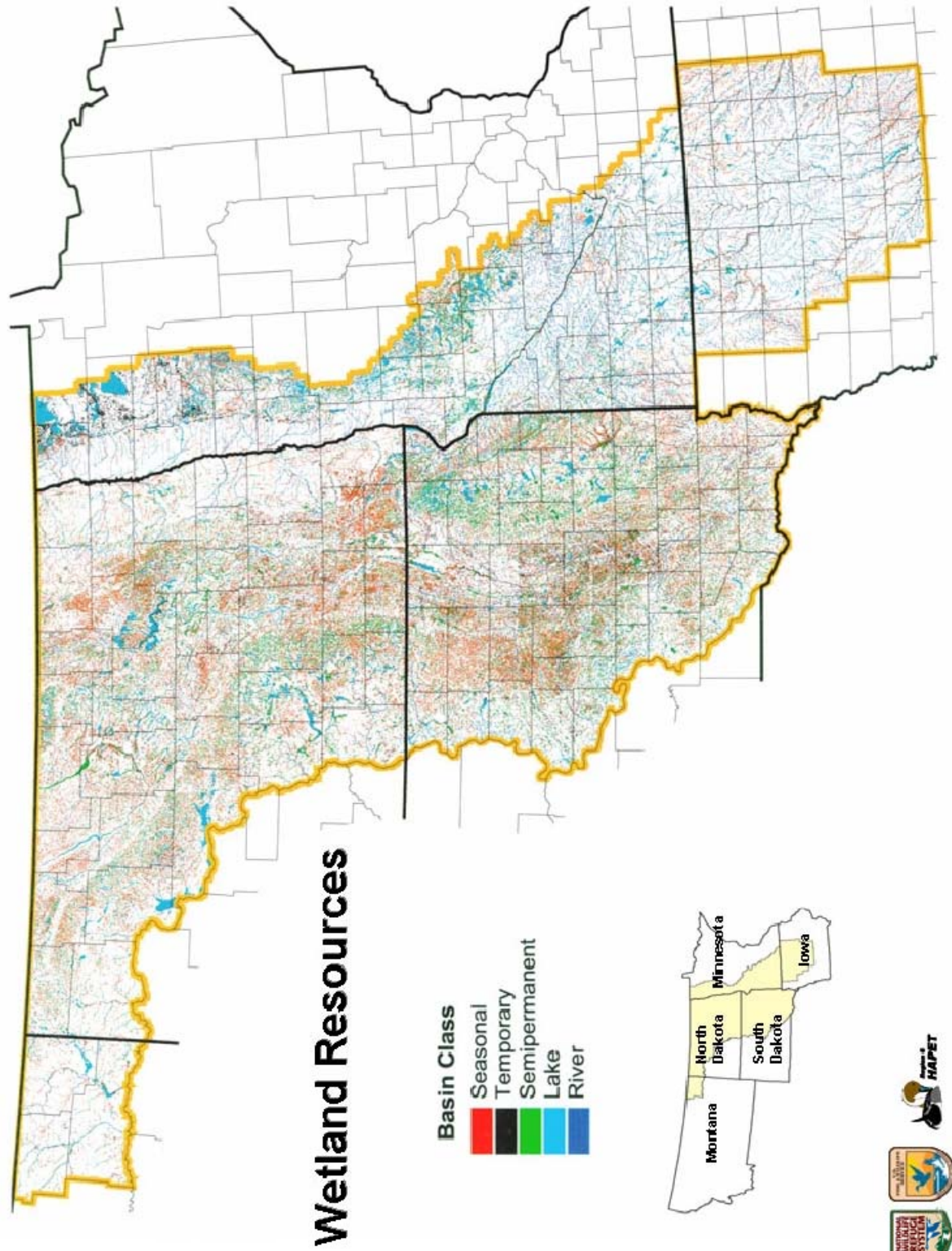


Figure 2. Aerial photograph of high density of prairie potholes (physically non-proximate waters) in the Missouri River watershed, common in many areas of the Missouri Coteau of North Dakota, South Dakota, and Montana. The water storage capacity is evident in these and the following images.



Figure 3. Aerial photograph of an area with a high density of prairie potholes (physically non-proximate waters) in Cavalier County, northeast North Dakota, in the Red River watershed (image approx. four miles by three miles) .

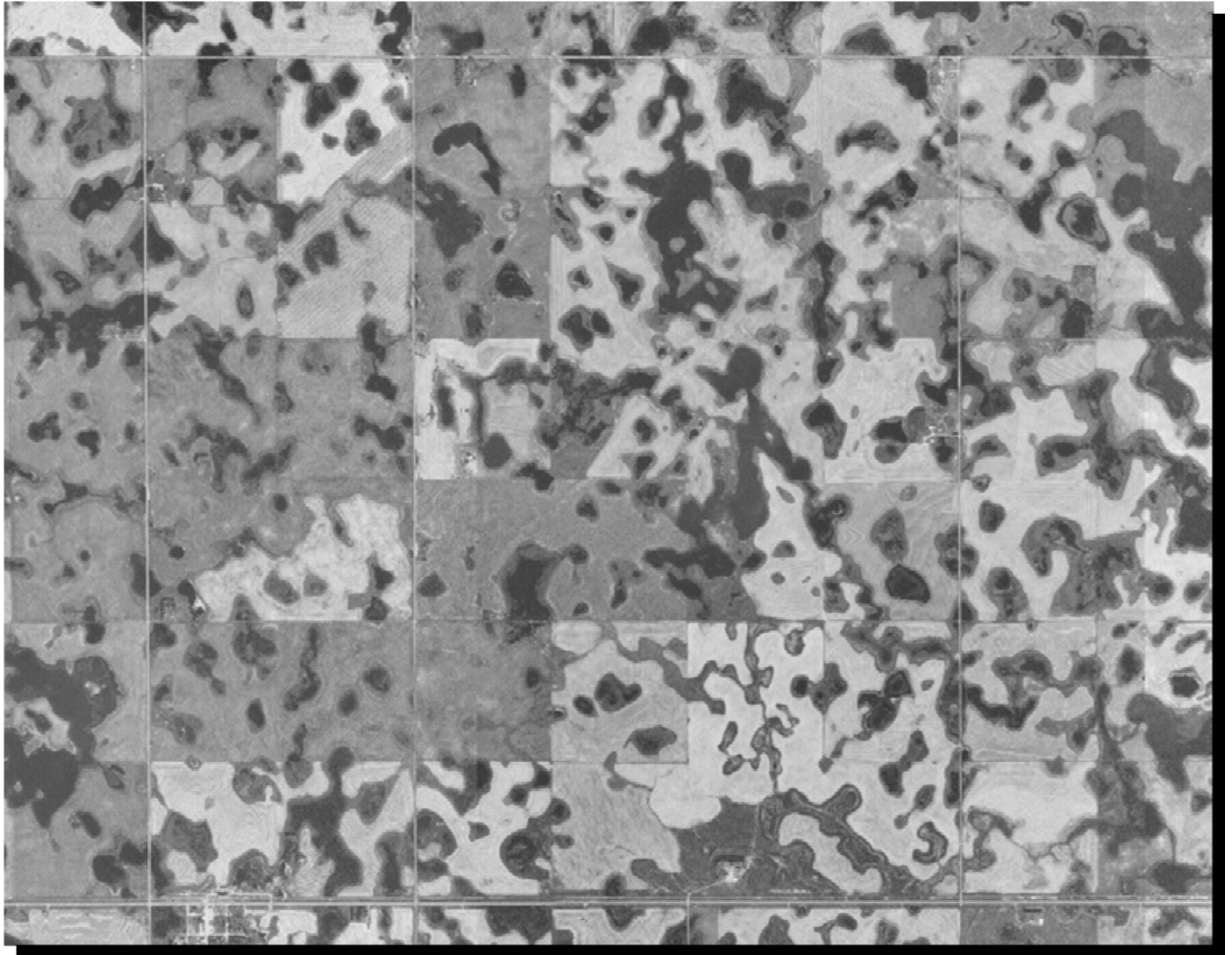


Figure 4. High density of prairie potholes in Souris River watershed, south (upstream) of Minot, North Dakota (Ward County).



Figure 5. High density of prairie potholes in the Missouri and James River watersheds of North Dakota (Stutsman County).



Figure 6. A high density of physically non-proximate waters in the vicinity of Lake Sakakawea, North Dakota (Missouri River), a traditional navigable water (McLean County).



Figure 7. Aerial photograph of playa wetlands. (Photograph taken from cover of Gurdak and Roe 2009)



Figure 8. Distribution and abundance of playas in relation to the High Plains (or Ogallala) aquifer. Approximately 92 percent of the more than 66,000 playas of the southern Great Plains and Playa Lakes Joint Venture (PLJV) region are located on the High Plains aquifer. Playas in southeastern Wyoming are not shown because these playas are not within the PLJV boundary. (Map from Gurdak and Roe 2009)

