



State Water Resources Control Board



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Arnold Schwarzenegger
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TO: Gerald W. Bowes, Ph.D.
Manager, Cal/EPA Scientific Peer Review Program
Office of Research, Planning and Performance

Will Orme

FROM: Bill Orme, Chief
401 Certification and Wetland Program
DIVISION OF WATER QUALITY

DATE: November 22, 2010

SUBJECT: REQUEST FOR EXTERNAL SCIENTIFIC PEER REVIEW: PROPOSED ACCEPTANCE OF A WETLAND DEFINITION AND A DELINEATION METHOD BY THE STATE WATER RESOURCES CONTROL BOARD AS THE APPROVED MEANS IDENTIFYING WETLANDS FOR ALL STATE WATER RESOURCES CONTROL BOARD PROGRAMS

The California State Water Resources Control Board (State Water Board) staff request that you identify and assign reviewers to provide external scientific peer review of the following: a) proposed State Water Board wetland definition and b) supporting wetland delineation methods to identify wetlands in California. The request is made pursuant to the peer review requirements of Health and Safety Code section 57004.

The purpose of this peer review is to determine the scientific validity of a proposed State Water Board wetland definition, its theoretical basis, and its proposed use to reliably support identification and delineation of wetlands in California using standard methods.

Because the proposed State Water Board wetland definition and related delineation methods require knowledge of wetland science and regulatory protection of wetlands, we request that you identify a minimum of three reviewers with expertise in the following areas:

1. Wetland science, including expertise in wetland delineation and classification, hydrologic processes, "isolated" wetlands, seasonal wetlands, wetland functions, and restoration.

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2. The United States Army Corps of Engineers wetland delineation practices for California.
3. The climate, geology, and diversity of aquatic ecosystems in California.
4. The application of wetland and watershed science to wetland protection.

Included with this cover letter are five attachments as follows:

1. Attachment 1: Highlights of the Proposed State Water Board Definition and Delineation Method
2. Attachment 2: Scientific Findings, Conclusions and Assumptions to Be Derived
3. Attachment 3: Individuals Involved In Developing the Proposed State Water Board Definition
4. Attachment 4: References
5. Attachment 5: Resolution 2008-0026

The proposed State Water Board wetland definition and associated delineation methods are being proposed in response to State Water Board Resolution No. 2008-0026 (April 15, 2008) (Attachment 5) which directs staff to develop a policy to protect wetlands and riparian areas. A number of public meetings have been held to date to obtain public input on the policy. Additional public input on the policy will be sought as the policy moves forward for adoption by the State Water Board.

The resolution specifies that the State Water Board definition be based on the United States Army Corps of Engineers' (Corps) wetland delineation procedures to the extent feasible. This means that the Corps field practices for identifying wetland soils, plants and hydrology should be largely applicable to the proposed State Water Board wetland definition. The intent is to maintain the use of the well accepted and understood Corps wetland field identification procedures as much as possible.

Recognizing the complexity of adopting a wetland definition and supporting delineation methods for an area as varied as California, staff made the decision to seek outside expertise. Using funds received from a United States Environmental Protection Agency (U.S. EPA) Wetland Development Grant, staff contracted with a group of pre-eminent wetland scientists to assist in evaluating existing definitions. A number of State Water Board staff and this group of scientists then formed a Technical Advisory Team. The Technical Advisory Team made the decision to evaluate existing definitions first, and if

these were found to be unsuitable, then develop a new definition and related delineation methods. This included the Corps definition, as well as the Corps delineation procedures for California. According to the direction of the State Water Board, the definition should be based on the Corps wetland delineation methods to the extent feasible. After reviewing definitions currently being used by governmental agencies and scientific organizations throughout the United States and worldwide, the Technical Advisory Team proceeded to develop a definition that specifically fit the range of wetlands found in California.

The Technical Advisory Team's proposed definition and related delineation methods (hereinafter referred to as the proposed State Water Board wetland definition and delineation methods) are the focus of this peer review request. Peer reviewers will be asked to determine if the proposed State Water Board definition and supporting delineation methods are based on sound scientific knowledge, methods, and practices. The Technical Advisory Team has prepared a series of Technical Memoranda which form the scientific basis for the proposed State Water Board definition and delineation methods. These memoranda will be provided to the reviewers. Excerpts from standard reference texts and standard government documents will also be provided. Web addresses are listed for those documents that are available on the internet.

We request the peer review be completed within 30 days. We also request that any communication from the reviewers be addressed to Dr. Gerald Bowes, who can be reached at (916) 341-5567 or via email at gbowes@waterboards.ca.gov. Likewise, all communication from the State Water Board to the reviewers will be through Dr. Bowes.

Attachments (5)

cc:

Elizabeth L. Haven
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Ken Harris, Manager
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HIGHLIGHTS

PROPOSED WETLAND DEFINITION AND DELINEATION METHOD FOR USE BY THE STATE WATER BOARD

I. Need

The State Water Board has directed that a Wetland and Riparian Area Protection Policy (policy) be developed that will include a "wetland definition for California" (Resolution No. 2008-0026, Attachment 5). The definition is to be based on the Corps delineation methods to the extent feasible.

Delineation methods are used to establish the boundary of a wetland, and therefore its size and location, for the purposes of federal, State and local regulations. Delineation methods are developed to identify three common wetland indicators: (1) the presence of water at or near the land surface permanently or periodically or for some portion of the growing season; (2) hydric soils that develop under saturated soil conditions; and (3) predominance of hydrophytic plants adapted for living in saturated conditions. Essentially, a line is established in the field that separates the wetland area from the adjacent upland or deep water area. In the process, a determination is made as to whether the area meets the definition of a wetland.

The definition and associated delineation methods are to be used by the State Water Board to identify those areas that are protected as wetlands under the California Water Code. Staff are currently developing this policy and it includes a proposed State Water Board wetland definition and supporting delineation methods which are the subject of this review.

The State Water Board directed that this policy be developed in response to the shrinking role of federal wetland protection in California and other states due to recent U.S. Supreme Court rulings (*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 2001; and *Rapanos v. United States* and *Carabell v. United States*, 2006). The decision by the State Water Board to proceed with a policy and definition has proven to be contentious. Over 3,000 comment letters were received by the State Water Board after two public scoping meetings held in 2008. One of the principle issues is the definition since it will be used to determine what is regulated under the policy.

As mentioned in the cover letter to Dr. Gerald Bowes, State Water Board staff, using U.S. EPA grant funds, formed a Technical Advisory Team composed of staff and experts in the field of wetland science. The Team was to develop a wetland definition and associated delineation methods for California in accordance with the direction received from the State Water Board in Resolution No. 2008-0026. The Technical Advisory Team reviewed and evaluated

definitions currently being used by governmental agencies and scientific organizations throughout the United States and worldwide.

In the end, the Technical Advisory Team found that there were no existing definitions that would reliably define the diverse array of California wetlands. Therefore, the Technical Advisory Team proceeded to develop a definition that specifically fit the range of wetlands found in California and that could be used with the Corps field delineation methods. A number of modifications to the Corps standard field delineation procedures are suggested by the Technical Advisory Team in order to fit these methods to the new definition.

The proposed State Water Board wetland definition and related delineation methods are among the subjects for review in Attachment 2.

II. The Nuts and Bolts of It.

The rationale for the proposed definition and supporting delineation methods is presented in the State Water Board Staff Report and four Technical Memoranda as follows (these appear as citations 1 through 5 in Attachment 4):

- State Water Board Staff Report. October, 2010.
- No. 1: Technical Advisory Team (Membership and Purpose). July 15, 2009, revised October 12, 2009. 31p Technical Advisory Team.
- No. 2: Wetland Definition. June 25, 2010, revised February 22, 2010. 22p. Technical Advisory Team
- No. 3: Landscape Framework for Wetlands and Other Aquatic Areas. October 20, 2009, revised February 22, 2010. 31p. Technical Advisory Team
- No. 4: Wetland Identification and Delineation. April 5, 2010. 30p. Technical Advisory Team

The staff report and the four memoranda provide a full description of the scientific basis for the proposed State Water Board wetland definition and associated delineation methods. As recommended in Technical Memorandum No. 4, the State Water Board would adopt the Corps delineation methods, but with certain changes to accommodate the application of the State Water Board definition to the variety of ecological conditions found in California. Full bibliographic information for the staff report and the four memoranda are found in Attachment 4.

The staff report and the four memoranda provide the technical basis for this peer review request. This technical foundation is translated into scientific findings, assumptions and conclusions in Attachment 2 to provide focus for the reviewers.

III. Purpose of the Proposed State Water Board Definition and Delineation Method

As with any wetland definition, its usefulness is dependent on the purpose for which it is intended. In this case, the proposed State Water Board definition and the supporting delineation methods are intended to serve as a basis for the State Water Board's regulatory program of wetland protection under the policy.

IV. Wetland Related Terms

A number of scientific terms relate to the discussion of the State Water Board definition and delineation methods. A full glossary for wetland related terms is provided in Technical Memorandum No. 2, but for convenience, the following are the meanings of selected key terms:

Anaerobic means growing in the absence of molecular oxygen, as with anaerobic bacteria, or occurring in the absence of molecular oxygen, as with certain biochemical processes.

Hydric means having or characterized by excessive moisture (wordnetweb.princeton.edu/perl/webwn).

Hydric Conditions are conditions of upper substrate that form if water saturation in the upper substrate (including flooding, or ponding) lasts long enough to create anaerobic conditions. For the purposes of this definition, the minimum duration of saturation required to form anaerobic conditions in the upper substrate is identified as 14 consecutive days during the growing season. However, the minimum duration required to develop anaerobic conditions in the upper substrate is known to vary with soil temperature, soil pH, and other environmental factors, and scientific evidence indicates that in some California environments the chemical transformation to anaerobic conditions in the upper substrate may occur in fewer than 14 days.

Hydrophytic vegetation or hydric plant species, are plants adapted to inundated or saturated substrates.

Substrate is the solid organic or inorganic material that forms the physical surface of a landscape area, including wetlands. Substrate may include rock, boulder, cobble, gravel, sand, silt, clay, and other inorganic materials; peat, muck, and other organic materials; and various mixtures of inorganic and organic

materials. Substrate generally also includes water, other liquids, and gaseous materials.

Upper Substrate is the portion of substrate that includes the major portion of the root zone for vegetation, and the zone within which relevant anaerobic chemical conditions develop in wetlands. The "major portion of root zone" is interpreted by the Corps to be the zone containing >50 percent of the living root mass of the dominant hydric plant species. The depth of the upper substrate that influences wetland indicators will vary, depending on vegetation, substrate texture, depths to impermeable layers, and substrate chemistry. The Corps 1987 manual identifies the "major portion of the root zone" as typically 30 centimeters (12 inches) deep; for the purposes of this definition, the upper substrate is typically the zone extending downward from the substrate surface to a depth of 50 centimeters (20 inches), as indicated in the Corps regional supplements for California. However, the Corps method requires that hydrology observations consider that saturation must occur within the majority of the dominant hydric plant species root zone, and in porous soils the upper substrate may extend to depths greater than 50 cm.

Wetland Hydrology is the study of the movement of water in and out of the wetland ecosystem. Wetland hydrology is typically evaluated using information on three related elements: the duration of saturation, the depth of saturation, and the frequency of saturation. In wetlands the presence of water is the critical characteristic of the ecosystem. Without water, a wetland will not remain a wetland, and so is considered to be the "master variable" (ref. #6. Wetlands: Characteristics and Boundaries, National Research Council, 1995, Ch. 3, p. 62).

FINDINGS, ASSUMPTIONS AND CONCLUSIONS TO BE REVIEWED

The statute mandate for external scientific peer review (Health and Safety Code Section 57004) states that the reviewer's responsibility is to determine whether the scientific portion of the proposed rule is based upon sound scientific knowledge, methods, and practices.

We request that you make this determination for each of the following findings, assumptions and conclusions that constitute the scientific basis of the proposed regulatory action. An explanatory statement is provided for each issue to focus the review.

For those work products which are not proposed rules, as with the subject of this review, reviewers must measure the quality of the product with respect to the same exacting standard as if it was subject to Health and Safety Code Section 57004 requirements.

The topics of this review include a proposed State Water Board wetland definition and a related delineation methods. Both of these will be implemented in a planned State Water Board wetland policy, currently under development.

This attachment consists of twelve statements to be addressed. The statements are scientific findings, assumptions and conclusions. We are requesting that all statements be addressed, as expertise allows, in the order presented. The statements are arranged by the following two topics:

- I. A Proposed Wetland Definition for Use By the State Water Board
- II. A Wetland Delineation Method for the Proposed State Water Board Definition.

Each statement includes citations to sections in the Technical Memoranda and related literature. Literature references, which are numbered in order of citation, are listed in Attachment 4. Full copies of all reference material, except standard texts, will be provided to the reviewers in a separate binder.

A Proposed Wetland Definition for Use by the State Water Board

1. The proposed definition references three indicators normally present which reflect current scientific understanding of the formation and functioning of wetlands: a) wetland hydrology; b) hydric substrates; and c) hydrophytic vegetation.

The specific hydrologic regime of a wetland is its defining attribute, and this hydrologic regime commonly leads to the formation of characteristics such as hydric soils, which in turn support unique biotic communities, such as hydrophytic vegetation. The National Research Council (NRC) explains:

“A wetland is an ecosystem that depends on constant or recurrent, shallow inundation or saturation at or near the surface of the substrate. The minimum essential characteristics of a wetland are recurrent, sustained inundation or saturation at or near the surface and the presence of physical, chemical, and biological features reflective of recurrent, sustained inundation or saturation. Common diagnostic features of wetlands are hydric soils and hydrophytic vegetation (ref. #6. Ch. 3, p. 59).”

2. Use of the phrase "saturated by groundwater or inundated by shallow surface water for a duration sufficient to cause anaerobic conditions within the upper substrate" is consistent with the scientific understanding of wetland characteristics.

Wetland hydrology is defined by the NRC as “constant or recurrent, shallow inundation or saturation at or near the surface of the substrate” (ref. #6., p. 3, p. 59). Wetland hydrology is considered the “driving force” that “controls the abiotic and biotic characteristics of wetlands” (ref. #6., p. 22). Duration refers to the length of time that an area is continuously saturated or covered by water. It is the period available for the formation of anaerobic substrate conditions.

3. Use of the phrase “hydric substrate conditions indicative of such hydrology” is consistent with the scientific understanding of wetland characteristics.

The NRC defines hydric soil as “soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part (1991 National Technical Committee on Hydric Soils definition)” (ref. #6., p. 286). While many standard reference texts refer to hydric soil indicators and processes, this should not be taken to exclude non-soil substrates from

consideration when identifying a wetland area. Cowardin, et al. (ref. #7. 1979, p. 11) notes that "The single feature that most wetlands share is soil or substrate that is at least periodically saturated with or covered by water." The NRC states that "...recurrent, sustained saturation of the upper part of the substrate is the most basic requirement for wetlands" (ref. #6., 1995, p. 90). The NRC also states on p. 57 that "although most wetlands do form on soils and are specifically associated with hydric soils, a few types occupy substrates that are nonsoil or nonhydric soil..." and "... the vast majority of wetlands do in fact have hydric soils, and they can be identified by the presence of hydric soils in the absence of hydrologic alterations. Some wetlands do, however, develop on substrates that are not now classified as hydric soil." The NRC goes on to report that "some frequently saturated substrates do not develop hydric soil because they are frequently disturbed (mud flats, sand bars) or because they receive insufficient amounts of organic matter to support the development of hydric soil" (ref. #6., Ch. 5, p. 136).

4. Use of the phrase "anaerobic conditions within the upper substrate" is consistent with the scientific understanding of wetland characteristics.

Sustained inundation or saturation tends to create anaerobic conditions, or a lack of oxygen, in wetland substrates, which limits the types of chemical and biological activity that can occur. The minimum duration of inundation or saturation needed to cause reducing conditions for all substrate types is difficult to determine (ref. #6., p. 20). Technical Memorandum No. 4 explains "the regional supplements adopt a minimum duration of 14 days as a standard, but the same supplements also conclude that areas where the substrate is inundated and/or saturated to the surface for 7 continuous days are wetlands, provided the soil and vegetation parameters are met" (Technical Memorandum No. 4, Section 4.7.2, p.20). Although this minimum duration is known to vary with soil temperature, soil pH, and other environmental factors, scientific evidence indicates that in most California environments the chemical transformation to anaerobic conditions in the upper substrate occurs within 7 to 14 days.

5. In California, wetland vegetation may not be present in areas where the physical, chemical and biological functions characteristic of wetlands are evident. Vegetation may be lacking in some years (especially during prolonged dry periods), or may permanently lack vegetation such as tidal flats, playas, and non-vegetated shallow snowmelt pools. As reviewed above, normally wetlands are identified based on three indicators: (1) wetland hydrology, (2) hydric substrate and (3) hydrophytic plants. However, in the special case where vegetation is entirely absent, wetland identification may be based on the remaining two wetland indicators (i.e., wetland

hydrology and hydric substrates) (Technical Memorandum No. 2, p. 4). (To clarify: this statement only addresses the condition where vegetation is absent and is not intended to imply that other combinations of two out of three indicators are equally applicable.)

What the statement applies to are areas that lack vegetation that meet both the wetland hydrology and hydric substrate criteria and provide functions and services commonly ascribed to wetlands. Dominance by hydrophytes (greater than 50% dominance based on percent cover) need only be considered as a criterion if the wetland is vegetated.

Scientific support for identifying wetlands based solely on wetland hydrology and hydric substrate indicators may be found in the report from the NRC, which provides a reference definition of wetlands:

Common diagnostic features of wetlands are hydric soils and hydrophytic vegetation. **These features will be present except where specific physicochemical, biotic, or anthropogenic factors have removed them or prevented their development** (emphasis added).” (ref. #6., Ch. 3, p. 59)

The NRC definition recognizes that that hydric soils and hydrophytic plants are common diagnostic features, but that they are not absolute necessities in identifying wetlands. In support of this viewpoint, the NRC cites Mitsch and Gosselink’s textbook in the discussion of “*Other Indicators of the Substrate and Biological Criteria*,” which states that:

The biological criterion for wetlands is typically satisfied by vegetation analysis, although..... some wetlands lack vascular plants entirely, either because the plants have been removed or because the chemical or physical habitat is unsuited for their growth, as in the case of some playas or mud flats or areas where sulfide accumulation causes high vegetation mortality (ref. #8. Mitsch and Gosselink, Wetlands, 2nd edition, 1993, Ch. 5, p. 136).”

In California, the condition of “no evident vegetation” is specifically addressed in the Arid West Regional Supplement to the Corps Wetland Delineation Manual which states that:

“Many factors affect the structure and composition of plant communities in the Arid West, including climatic variability, ephemeral water sources, saline soils, and human land-use practices. As a result, some wetlands may exhibit indicators of hydric soil and wetland hydrology but lack any of the hydrophytic vegetation indicators”. (ref. #9. U.S. Army Corps of Engineers, 2008a, p 85-86).

Some areas in California function as wetlands despite lacking abundant wetland vegetation. For example, non-vegetated playas, tidal flats, river bars, and ephemeral or intermittent washes provide a variety of wetland functions, including water filtration, groundwater recharge, and the support of wildlife. (Technical Memorandum No. 2, p.4).

6. Definition of wetlands proposed for adoption:

An area is wetland if, under normal circumstances, it

- (1) is saturated by ground water or inundated by shallow surface water for a duration sufficient to cause anaerobic conditions within the upper substrate;***
- (2) exhibits hydric substrate conditions indicative of such hydrology; and***
- (3) either lacks vegetation or the vegetation is dominated by hydrophytes.***

This proposed definition was developed based on the current scientific understanding of the formation and functioning of wetlands found in California, and is consistent with standard scientific research (ref. #6., p. 60-63).

Wetland Delineation Methods for the Proposed Definition

As noted in Technical Memorandum No. 4, delineating a wetland area is "the process of demarcating wetland areas from other adjoining areas that do not satisfy the wetland definition, based on field investigation." In California, the Corps delineation methods (ref. #'s 9, and 10,11. U.S. Army Corps of Engineers, 1987, 2008a, 2008b) are commonly used for both federal and State regulatory purposes in identifying wetland boundaries. (Technical Memorandum No. 4, Section 2.0, p. 2).

As mentioned in Attachment 1, the State Water Board directed staff to develop a wetland definition for California that not only captured the regional variation in wetlands across the State, but that was also based on the Corps delineation methods to the extent possible. The proposed State Water Board wetland delineation methods use the Corps delineation procedures with appropriate modifications to allow field identification of wetlands based on the proposed State Water Board wetland definition. These proposed changes to the standard Corps delineation methods for use with the proposed State Water Board wetland

definition are described in Technical Advisory Team Technical Memorandum No 4 (discussed below in statement No. 4).

To clarify, the reviewer is asked to focus comments on the delineation methods that may vary from the Corps procedures as highlighted in Technical Memorandum No. 4. However the review should not focus on the merits of these changes but on whether the scientific portion of the proposal (including the proposed delineation methods) is based on sound scientific knowledge, methods, and practices.

7. Some procedural clarifications in the Corps delineation methods are proposed to be used when conducting wetland delineations based on the proposed State Water Board definition. Implementing these adjustments would effectively implement delineation methods applicable to the proposed State Water Board definition (Table 1 in Technical Memorandum No. 4).

Technical Memorandum No. 4 recommends adoption of the 1987 Corps Wetland Delineation Manual with the Arid West Supplement and the Western Mountains Supplement as the primary guidance for wetland delineation under the proposed wetland definition. Specific details on implementing the Corps delineation procedures in California, including the modifications noted in Table 1, are found in Sections 4.2 (Vegetation), 4.3 (Substrates) and 4.4 (Hydrology) in Technical Memorandum No. 4. These procedural adjustments include emphasizing the presence of observed substrate conditions (as opposed to soil conditions; see Assumption 3). In addition, the proposed definition allows an area to be identified as wetland if it's not vegetated and thus some indicators of wetland hydrology and substrate/soil used in the Corps delineation procedures would not apply to the Water Board delineation methods because the Corps procedures rely on the presence of vegetation.

8. Delineating a wetland requires evaluating whether the area meets the criteria of the wetland definition. This includes determining whether the presence or absence of wetland conditions are due to "normal circumstances," or "altered circumstances," or "new normal circumstances" or to being a "problem area" (Sections 3.2.2 - 3.2.4 and Section 4.1.1 of Technical Memorandum No. 4).

These terms, as recommended in Technical Memorandum No. 4, should be used for delineating wetlands using the proposed definition.

- A "**normal circumstance**" is defined and further described in Technical Memorandum No. 4 as follows:

“the hydrologic, substrate, and vegetation conditions that are present in the absence of altered circumstances. Normal circumstances include natural seasonal and interannual variations in hydrology, substrate, and vegetation conditions. Natural, purposeful, or inadvertent conversion of a non-wetland area into a wetland area, or conversion of a non-channel area into a channel can cause **new normal circumstances** (see below). This definition incorporates much of the meaning of normal circumstances as defined by the Corps, which states that normal circumstances are the soil and hydrologic conditions that are normally present, without regard to whether the vegetation has been removed. The determination of whether or not normal circumstances exist in a disturbed area involves an evaluation of the extent and relative permanence of the physical alteration of hydrology and hydrophytic vegetation and consideration of the purpose and cause of the physical alterations to hydrology and vegetation (based on Regulatory Guidance Letter 90-7, 26 Sep 90; HQ USACE, 7 Oct 91” (Technical Memorandum No. 4, Sec. 3.2.1., p. 8, and Glossary, p.28-29).

- According to the Corps delineation procedures, **new normal circumstances** exist when altered circumstances are likely to be permanent (see *altered circumstances* below). For example, the establishment, enhancement, and restoration of wetlands can cause new normal circumstances.
- In Technical Memorandum No. 4 the definition of “atypical situations” is modified for California by terming it “**altered circumstances**” and defining it as existing:

“for wetland areas when one or more of the three wetland parameters (hydrology, substrate, and vegetation) have been sufficiently altered by recent human activities or natural processes to preclude wetland conditions, based on the State Water Board methodology for identifying and delineating wetlands. The determination of altered circumstances requires a consideration of both their causes and their expected duration. Given altered circumstances for wetlands, practitioners must use supplementary identification/delineation procedures to characterize the pre-alteration condition. This definition incorporates the concept of “atypical” wetland situations presented in the Corps methodology for wetland identification and delineation (ref. #10. U.S. Army Corps of Engineers - Environmental Laboratory, 1987)” (Technical Memorandum No. 4, p.26).
- Some typical characteristics that occur in California wetlands are referred to as “**problem areas**” by the Corps. Problem areas are defined by the Corps as areas in which indicators of one or more of the three common wetland characteristics “may be periodically lacking due to normal seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events” (ref. #10., p. 77). For this reason, the recommendation is made for the State Water Board delineation methods that the term “problem areas” be replaced with “**difficult to resolve**” areas.

9. The proposed delineation methods include a provision that delineations be made during the wet season, but if done during the dry season, that boundaries of wetlands be considered provisional or temporary until verified by wet-season data if possible and if conditions permit. (Technical Memorandum No. 4, Sec. 3.2.5, p. 10 and 4.2, p. 13).

Reliance on delineations during the wet portion of the growing season will help minimize the uncertainty of wetland identification and delineation, especially in arid regions of the State.

10. Describing the wetland area's water source and landscape context as part of the delineation process provides information useful for analyzing the wetland's beneficial uses and the potential sources of stress from surrounding areas. (Technical Memorandum No. 4, Sec. 4.4).

Generally, wetland hydrology is the study of the movement of water in and out of the wetland ecosystem. In wetlands the presence of water is the critical characteristic of the ecosystem. Technical Memorandum No. 4 recommends that the proposed State Water Board delineation methods incorporate a requirement to report the water source(s) and landscape setting(s) of the delineated areas (e.g., site location at toe of slope; fringe of another water body; floodplain area; concave land surface). This recommendation provides a basis for understanding wetland ecological functioning at any given site and the potential sources of stress. It is consistent with standard references and the NRC recommendations as noted below:

“Hydrology is probably the single most important determinant of the establishment and maintenance of specific types of wetlands and wetland processes....The starting point for the hydrology of a wetland is the climate and basin geomorphology...” (ref. #12., Mitsch & Gosselink, 2000, p. 108).

“Because particular hydrologic conditions are essential requirements for wetlands, it is logical that hydrology be evaluated when wetlands are identified or delineated.” (ref. #6., Ch. 5, p.91)

11. Since the three wetland indicators (wetland hydrology, hydric substrates and hydrophytic plants) vary geographically due to such factors as climate, geology and topography, consideration should be given to developing statewide ecological regions and providing supplemental delineation guidance for these regions. (Technical Memorandum No. 4, Section 3.2.6, p. 11).

Although the policy adopts the Corps two Regional Supplements, recognizing additional sub-regions will improve wetland delineations by identifying wetland indicators unique to these smaller areas, including lists of wetland plants.

12. The wetland delineation procedure should include two delineations: the inner wetland boundary and an adjacent outer “aquatic support area” boundary that defines an area related to the wetland area since it shares the same moisture continuum (see Figure 1 below). Additionally locating the outer “aquatic support area” boundary would provide information on where the wetland boundary might shift during the wet season if the wetland is delineated during the dry season. It also would indicate the area that should be protected through the policy to assure that the beneficial uses of the wetland area are adequately protected. (Technical Memorandum No. 4, Sec. 4.3, p. 15).

A Wetland may be recognized as a landform found along an extended moisture continuum from a wet area, such as a stream, to a dry upland area. The area immediately outside of a wetland will exhibit one or two of the three wetland indicators and may be identified as an “aquatic support area” (See Figure 1 below). These areas are connected to wetlands ecologically and/or through hydrology (i.e., runoff, high groundwater, etc), and therefore may be viewed as “supporting” the health of the wetland and its functions. The ecological importance of this area is recognized in buffering wetlands from stressors and supporting and enhancing wetland functions by increasing adjacent wildlife habitat and providing linkages with other aquatic or upland areas. (Technical Memorandum No. 3, Section 2.3, p. 7)

Technical Memorandum No. 4, Section 4.3 recommends that aquatic support areas be identified and delineated along with wetland areas (*aquatic support areas* exhibit some but not all the characteristics of wetlands; “aquatic support area” is defined in Technical Memorandum No. 4, Glossary). The intended result of the field delineation exercise is a map with two boundaries, one for the wetland area and one for the associated aquatic support area. The delineation will depict both the area of focus for the delineation (i.e., the wetland area) and the area that should be considered to enhance protection of the wetland area (i.e., the aquatic support areas).

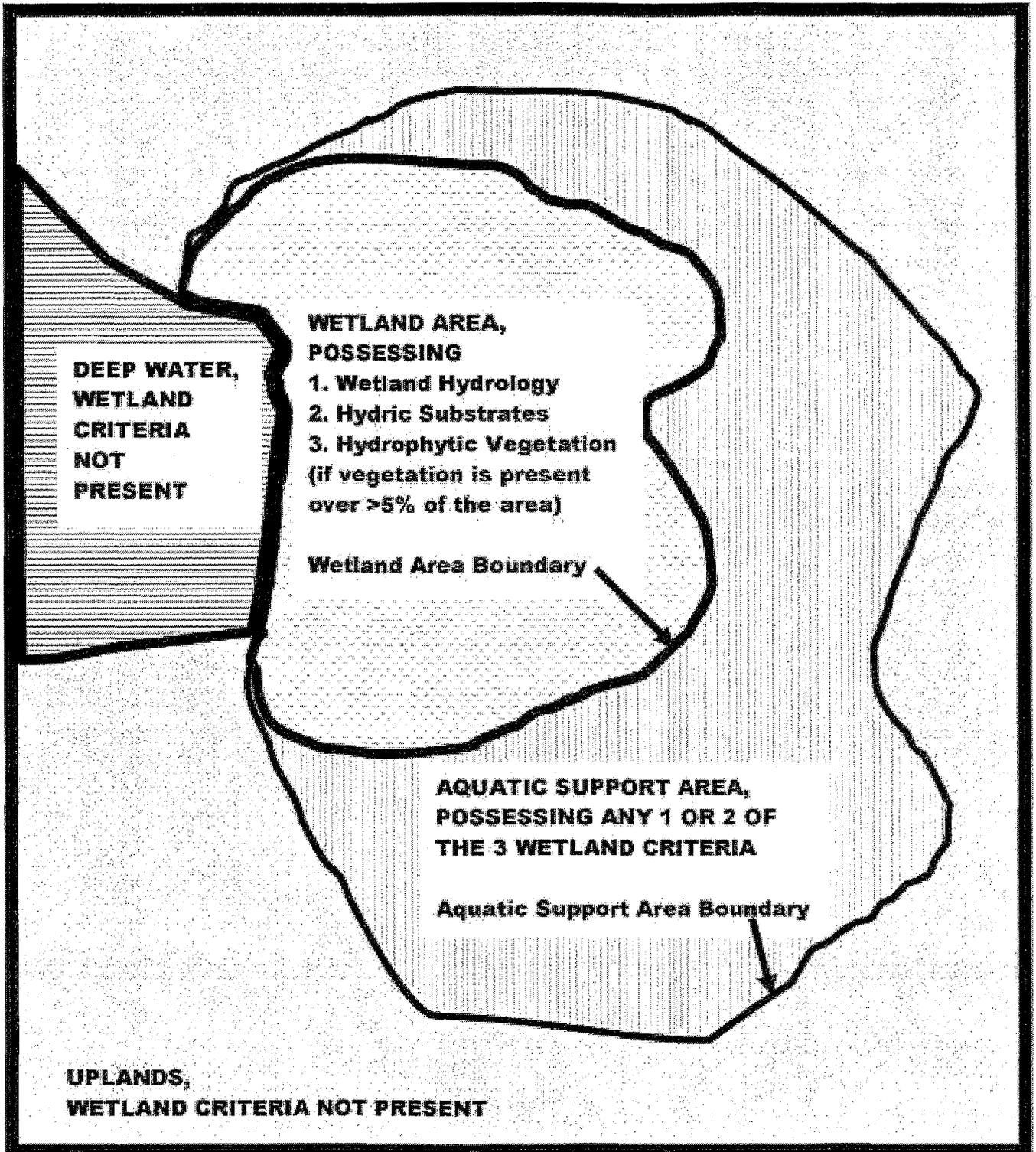


Figure 1: Schematic diagram of relationship between wetland areas, aquatic support areas, upland areas and deep water areas under the proposed wetland definition.

The Big Picture

Reviewers are not limited to addressing only the specific issues presented above, and are asked to contemplate the following questions.

(a) In reading the supporting documents for the proposed wetland definition and delineation methods, are any additional scientific issues found that are not described above? If so, please comment with respect to the statute language given above in the first three paragraphs of Attachment 2.

(b) Taken as a whole, are the wetland definition and delineation methods based upon sound scientific knowledge, methods, and practices?

Reviewers should also note that some proposed actions may rely significantly on professional judgment where available scientific data are not as extensive as desired to support the statute requirement for absolute scientific rigor. In these situations, the proposed course of action is favored over no action.

The preceding guidance will ensure that reviewers have an opportunity to comment on all aspects of the scientific basis of the proposed definition and delineation methods. At the same time, reviewers also should recognize that the Board has an obligation to consider and respond to all feedback on the scientific portions of these topics. Because of this obligation, reviewers are encouraged to focus feedback on the scientific issues highlighted.

**INDIVIDUALS INVOLVED IN DEVELOPMENT OF
THE CALIFORNIA WATER RESOURCES CONTROL BOARD'S PROPOSED
WETLAND DEFINITION**

Persons and agencies directly involved; i.e., persons who have reviewed or commented on the proposed Definition, or who have provided specific feedback on scientific or technical issues relating to the Definition are listed below. Persons who may have participated in more than one capacity may be listed more than once.

I. Technical Advisory Team

Lead Members

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STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2008-0026

DEVELOPMENT OF A POLICY TO PROTECT WETLANDS AND RIPARIAN AREAS.
IN ORDER TO RESTORE AND MAINTAIN THE WATER QUALITY AND BENEFICIAL USES
OF THE WATERS OF THE STATE

WHEREAS:

1. Over 85 percent of historic wetland and riparian acreage in California has been lost according to published research estimates. Remaining resources continue to be vulnerable to future impacts from projected population growth, land development, sea level rise, and climate change in California.
2. Although physically occupying only a small percentage of California watersheds, wetlands and riparian areas provide valuable water quality functions such as flood control, pollutant filtration, water supply and replenishment, recreation, and habitat for a wide variety of plants and animals. Wetlands and riparian areas act to promote the health and existence of other vital natural resources, and provide significant economic benefits to California.
3. The value of wetlands and riparian areas has been recognized in California through the enactment of the California Wetlands Conservation Policy that sets a goal to "ensure no overall net loss and achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property" (Executive Order W-59-93).
4. The State has relied primarily on requirements of the Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.) (Clean Water Act) to protect wetlands and riparian areas for water quality goals.
5. Recent U.S. Supreme Court rulings (*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 2001 and *Rapanos v. United States*, 2006) have reduced the jurisdiction of the Clean Water Act over wetland and riparian areas by limiting the definition of "waters of the United States." These decisions necessitate the use of California's independent authorities under the Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.) to protect these vital resources.
6. In 2003, the State Water Resources Control Board (State Water Board) issued a report to the Legislature titled, *Regulatory Steps Needed to Protect and Conserve Wetlands Not Subject to the Clean Water Act (Supplemental Report of the 2002 Budget Act Item 3940-001-0001)*. This report reviewed the critical role that wetlands and riparian areas have in protecting the beneficial uses of waters throughout the State. Consistent with the State Water Board and Regional Water Quality Control Boards' (Regional Water Boards) (collectively California Water Boards) 2001 Watershed Management Initiative, this report further recognizes that a watershed-level approach is needed to protect wetlands and riparian areas and their associated water quality functions.

7. In 2004, State Water Board staff initiated a *Workplan* upon the California Environmental Protection Agency's request (*Workplan: Filling the Gaps in Wetland Protection*) to address the waters of the State that are no longer protected under the Clean Water Act. This *Workplan* specified the need to adopt a State wetland definition to "provide a standard metric to help determine compensatory mitigation requirements and compliance with [the] 'no net loss' policy [Executive Order W-59-93]." In addition, the *Workplan* included developing a statewide policy for wetland protection "at least as protective as the federal requirements." To immediately address part of "the gap," the State Water Board adopted general waste discharge requirements for minor discharges to non-federal waters (Water Quality Order 2004-0004 May 4, 2004).
8. California continues to lose "functional wetlands" at an increasing rate despite the efforts of the State's 401 Water Quality Certification Program. This fact is documented in a State Water Board research study contracted with UCLA titled *An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by The California State Water Resources Control Board, 1991-2002*. The current implementation of the 401 Water Quality Certification Program does not adequately protect functional wetlands. Unfortunately, compliance with regulatory requirements has not resulted in resource protection. Clearly, there is a need for a strong statewide policy that provides both guidance on the protection and restoration of wetlands, as well as assessing and measuring net change in wetland functions. The purpose of the proposed Policy is to ensure no further net loss and ultimate long-term gain in the quantity and quality of "functional" wetlands and riparian areas within the State. Successful implementation of the proposed Policy will be assessed via measurable environmental outcomes.
9. In 2007, State Water Board staff completed public scoping meetings on wetland and riparian area policy alternatives and considered comments received in accordance with the California Environmental Quality Act.

THEREFORE BE IT RESOLVED THAT:

1. The State Water Board recognizes the beneficial services of wetlands and riparian areas for people and wildlife in protecting and improving water quality, providing fish and wildlife habitat including unique plant communities (i.e., wetland and riparian vegetation), storing floodwaters, maintaining surface water flows in dry periods, and other valuable functions. California has a rich ecological diversity, therefore, the State Water Board further recognizes that watershed focused planning is the most effective strategy for maintaining and enhancing these functions.
2. The State Water Board will take action to ensure the protection of the vital beneficial services provided by wetlands and riparian areas through the development of a statewide policy to protect wetlands and riparian areas (Policy) that is watershed-based.
3. The Development Team, as defined below, will examine the environmental issues, evaluate the relevant alternatives, and make recommendations regarding the Policy. To ensure a comprehensive scope, the staff is directed to consider additional alternatives and recommendations other than those outlined in the 2004 *Workplan*.
4. In recognition that successful Policy implementation will require a supporting level of internal program infrastructure, major policy areas should be addressed in a step-wise fashion and implemented in phases to allow for commensurate program development. The Policy shall

support efforts to collect wetland data to monitor progress towards statewide wetland protection and to evaluate the level of program resources needed, including staffing, to undertake the next phases.

5. (a) The State Water Board staff is directed to develop the Policy using a collaborative process that involves the Regional Water Boards and bring that Policy to the State Water Board for consideration. A California Water Board development team (Development Team) will be formed for the Policy. The Development Team will consider and utilize relevant plans, policies, and technical documents already adopted or being developed by the Regional Water Boards, including the Stream and Wetland Systems Protection Policy Basin Plan Amendment being prepared by Regions 1 and 2.
- (b) The Development Team will coordinate with other State and federal agencies and interested stakeholders to ensure a high degree of public involvement and agency coordination throughout the Policy development process.
- (c) A charter will be developed by the Development Team defining the Development Team's purpose, responsibilities, goals and objectives, operating procedures, and timelines. The charter will identify the relationship of the Development Team to the water boards, other public agencies, and stakeholders. In July 2008, the Development Team will report back to the State Water Board on the proposed charter, before adoption by the Development Team.
- (d) The State Water Board will review the Development Team's progress in July 2008, and periodically thereafter to provide oversight guidance as needed.
- (e) The Policy, as well as the work of the Development Team, will inform and shape proposed Regional Basin Plan amendments. At a minimum for the proposed Regional Basin Plan amendments, this would include a review following the completion of the peer review process, and also a review within the public comment period prior to adoption hearings by the Regional Water Boards.

6. The Development Team will develop the Policy in three phases:

Phase 1 – establish a Policy to protect wetlands from dredge and fill activities. The Development Team is directed to develop and bring forward for State Water Board consideration: (a) a wetland definition that would reliably define the diverse array of California wetlands based on the United States Army Corps of Engineers' wetland delineation methods to the extent feasible, (b) a wetland regulatory mechanism based on the 404 (b)(1) guidelines (40 C.F.R. parts 230-233) that includes a watershed focus, and (c) an assessment method for collecting wetland data to monitor progress toward wetland protection and to evaluate program development.

Phase 2 – expand the scope of the Policy to protect wetlands from all other activities impacting water quality. The Development Team is directed to develop and bring forward for State Water Board consideration: (a) new beneficial use definitions, (b) water quality objectives, and (c) a program of implementation to achieve the water quality objectives, as necessary, to protect wetland-related functions.

Phase 3 – extend the Policy's protection to riparian areas. The Development Team is directed to develop, and bring forward for State Water Board consideration: (a) new beneficial use definitions, (b) water quality objectives, and (c) a program of implementation to achieve the water quality objectives, as necessary, to protect riparian area-related functions.

- 7. The Development Team will begin Phase 1 immediately with a target completion date of mid-2009. Work on Phases 2 and 3 will proceed in parallel or in sequence as appropriate and will follow in subsequent years. Phase 1 work products will include:
 - a. An overarching policy statement establishing the intent of the California Water Boards to protect all waters of the State using a watershed approach in coordination with the Regional Water Boards; other local, State, and federal agencies; and local watershed and stakeholder groups and forums;
 - b. A wetland definition that would reliably define the diverse array of California wetlands based on the United States Army Corps of Engineers' wetland delineation methods to the extent feasible;
 - c. A framework for protecting water quality and beneficial uses that relies on sequential avoidance, minimization, and mitigation of impacts; and,
 - d. Guidance on tracking wetland condition and function to monitor wetland protection and other required data to evaluate necessary program development resources.
- 8. At all phases, the Policy is intended to complement and support Region-specific plans and policies to protect the functionality of wetlands and riparian areas and should recognize the Regional Water Boards' essential role in implementing and informing statewide policy.

CERTIFICATION

The undersigned Clerk to the Board does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on April 15, 2008.

AYE: Chair Tam M. Doduc
 Vice Chair Gary Wolff, P.E., Ph.D
 Charles R. Hoppin
 Frances Spivy-Weber

NAY: None

ABSENT: Arthur G. Baggett, Jr.

ABSTAIN: None



Jeanine Townsend
Clerk to the Board