
State Water Resources Control Board

Draft Guidance

for the

State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State

February 2020

This Guidance is designed to assist in the implementation of the Procedures. This Guidance is non-regulatory and does not have the force or effect of law. This Guidance does not supersede the Procedures. In the event of any inadvertent conflict, the language in the Procedures shall control.

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Introduction

On April 2, 2019, the State Water Resources Control Board (State Water Board) adopted a State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (Procedures), for inclusion in the forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California. The Procedures consist of four major elements: 1) a wetland definition; 2) wetland delineation procedures; 3) a framework for determining if a feature that meets the wetland definition is a water of the state; and 4) procedures for the submittal, review and approval of applications for Water Quality Certifications and Waste Discharge Requirements for dredge or fill activities. In adopting the Procedures, the State Water Board directed staff to develop implementation guidance for potential applicants.

In developing this document to provide such guidance, staff solicited input from stakeholders. The outreach consisted of two publicly noticed stakeholder meetings, receipt of informal comments and questions from the public, and providing drafts of this document for public review. Following finalization of this document, public training meetings are scheduled in various locations across the state to further provide information and guidance to public stakeholders. The State Water Board may continue to revise this guidance as new information regarding the implementation process becomes available.

This document is composed of, and was largely gleaned from, existing materials such as the [Staff Report for the Procedures](https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/staffrpt_conformed.pdf) (https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/staffrpt_conformed.pdf), the [2019 Response to Comments](https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/wrapp/df_rtc_clean.pdf) (https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/wrapp/df_rtc_clean.pdf), and [the Procedures](https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/procedures_confirmed.pdf) (https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/procedures_confirmed.pdf). The goal of this document is to provide applicants some general guidance in preparing their application materials for a dredge or fill project. This document does not cover all possible topics related to implementation of the Procedures; rather, the topics covered reflect the most common requests from stakeholders as identified through a public process. For topics that are not covered in this document, applicants and Water Board staff are encouraged to refer to the Procedures' supporting documentation, for example, the Staff Report, and the 2019 Response to Comments. Applicants that have project specific questions are also encouraged to contact the appropriate Water Board staff at the State or Regional Water Quality Control Boards for more information. Visit the State Water Board's [Dredge or Fill Program staff directory](https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/staffdirectory.pdf) to locate the appropriate staff contact information (https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/staffdirectory.pdf).

A note on definitions: as defined in the Procedures, Order means waste discharge requirements, waivers of waste discharge requirements, or water quality certification.

For the purposes of this document, the terms “permit” and “order” are used interchangeably. In addition, Permitting Authority means the entity or person issuing the Order (i.e., the applicable Water Board, Executive Director or Executive Officer, or his or her designee). For the purposes of this document, the terms “Water Boards” and permitting authority is used interchangeably.

Lastly, this document includes links and references to other resources that applicants or staff could find helpful for certain topics as a convenience and for informational purposes only. The links do not constitute an endorsement or an approval by the State Water Board of any of the products, services or opinions of any corporation, organization, or individual. The State Water Board bears no responsibility for the accuracy, legality or content of the external site or documents. As with this Guidance document itself, these resources are not incorporated into the Procedures, are non-regulatory, and in the event of any inadvertent conflict, the language in the Procedures shall control.

I. Wetland Definition, Delineation, and Jurisdictional Framework

Wetlands Topics	Procedures Section	Page(s)
Wetland definition	Section II	1
Wetland delineation methods	Section III	3
Wetland or aquatic resource delineation report	Section IV.A.1.b and c Section IV.B.2	5,10
Supplemental wet season data for dry season delineations	Section IV.A.2.a	7
Wetland delineation definition	Section V	15-18

A. Wetland Definition

The Procedures define an area as wetland as follows: *An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area’s vegetation is dominated by hydrophytes or the area lacks vegetation.*

This modified three-parameter definition is similar to the federal definition in that it identifies three wetland characteristics that determine the presence of a wetland: wetland hydrology, hydric soils, and hydrophytic vegetation. Unlike the federal definition, however, the Procedures’ wetland definition includes one exception: it would only require the presence of hydric soils and wetland hydrology for an area devoid of vegetation (less than 5% cover) to be considered a wetland. However, if any vegetation is present, then the U.S. Army Corps of Engineers’ (Corps) delineation procedures would apply to the vegetated component (i.e., hydrophytes must dominate). Examples of waters that would be considered wetlands by the Procedures, but not by the federal wetland definition, are non-vegetated wetlands, or wetlands characterized by exposed bare substrates like mudflats and playas, as long as they met the three-parameters as described in the Procedures. It is important to note that while the Corps may not designate a feature as a wetland, that feature could be considered a special aquatic site or other water of the U.S. by the Corps and potentially subject to Corps’ jurisdiction. The Corps definition refers to “saturated soil conditions,” whereas the Procedures’ definition refers to saturated substrate leading to “anaerobic conditions in the upper substrate” which is a more inclusive term. However, both of these descriptions define conditions that would lead to dominance of hydrophytes, if the site is vegetated.

It is important to note that the wetland definition is not a two-parameter definition. Use of the Procedures’ definition for identification and delineation requires careful consideration of hydrology, substrate, and vegetation in every case. In other words, the definition would not qualify all areas that are void of vegetation as wetlands simply because those areas are void of vegetation. The lack of vegetation does not, by itself,

establish an area as a wetland. In cases where the hydrology and substrate criteria are present, but vegetation is absent, an analysis must be conducted to determine if that absence is a natural consequence of the hydrologic and substrate conditions and, if it is not, if the expected vegetation would be predominantly hydrophytic or not.

The statewide wetland definition is intended to provide clear and consistent direction for determining whether an aquatic feature is a wetland. This definition does not affect the meaning of “waters of the state” as it pertains to the Water Boards’ jurisdiction pursuant to the Porter-Cologne Act, nor does it modify the current authorities of the Water Boards to protect water quality. Rather, a statewide wetland definition provides consistent identification standards for certain types of aquatic features that are sometimes difficult to identify in the field, and for which current policy does not provide adequate guidance.

B. Wetland Delineation

Wetland Delineation means the application of a technical and procedural method to establish if an area is a wetland, and if so, identify the boundary of a wetland area within a specified study site by identifying the presence or absence of wetland indicators at multiple points at the site and by establishing boundaries that group together sets of points that share the same status as wetland versus non-wetland. (Procedures section IV.D.)

It is the Water Boards’ intent to assist applicants by relying on available wetland delineations where available and appropriate. Per section III of the Procedures, “[t]he permitting authority shall rely on any wetland area delineation from a final aquatic resource report verified by the U.S. Army Corps of Engineers (Corps) for the purposes of determining the extent of wetland waters of the U.S. A delineation of any wetland areas potentially impacted by the project that are not delineated in a final aquatic resource report verified by the Corps shall be performed using the methods described in the three federal documents listed below (collectively referred to as “1987 Manual and Supplements”) to determine whether the area meets the state definition of a wetland as defined above. As described in the 1987 Manual and Supplements, an area “lacks vegetation” if it has less than 5 percent areal coverage of plants at the peak of the growing season. The methods shall be modified only to allow for the fact that the lack of vegetation does not preclude the determination of such an area that meets the definition of wetland. Terms as defined in these Procedures shall be used if there is conflict with terms in the 1987 Manual and Supplements.”

Applicants must delineate all waters, including wetlands, that are within the Project Evaluation Area and may be subject to Water Board regulation. Wetland waters of the U.S. and waters of the state should be delineated using the same wetland delineation procedures identified in section III of the Procedures, taking into consideration that the methods shall be modified only to allow for the fact that the lack of vegetation does not preclude such an area from meeting the definition of wetland. (Also see other resources listed below.)

The Procedures indicate that the Water Boards will rely on any wetland area delineation from a final aquatic resource report verified by the Corps. If the Corps does not require an aquatic resource delineation report, an applicant must submit a delineation of all waters, but these delineations will be verified by Water Board staff during application review. Similarly, if the Corps does not require a delineation, but similar information is prepared by the California Department of Fish and Wildlife, the applicant can submit that information to the Water Boards, who will determine if it is sufficient for the Water Board's purposes. Applicants are encouraged to contact the appropriate Water Board office for a pre-application consultation to discuss the best strategy to verify jurisdiction for a particular project.

C. Waters of the State

California Code of Regulations, title 23, section 3831(w) states that “[a]ll waters of the United States are also ‘waters of the state.’” This regulation has remained in effect despite Supreme Court decisions such as *Rapanos* and *SWANCC*, which added limitations to what could be considered a water of the U.S. Therefore, the regulation reflects the Water Boards intent to include a broad interpretation of waters of the United States into the definition of waters of the state. Waters of the state includes features that have been determined by the U.S. EPA or the U.S. Army Corps of Engineers to be “waters of the U.S.” in an approved jurisdictional determination; “waters of the U.S.” identified in an aquatic resource report certified by the Corps upon which a permitting decision was based; and features that are consistent with any current or historic final judicial interpretation of “waters of the U.S.” or any current or historic federal regulation defining “waters of the U.S.” Because the interpretation of waters of the U.S. in place at the time section 3831(w) was adopted was broader than any post-*Rapanos* or post-*SWANCC* regulatory definitions that incorporated more limitations into the scope of federal jurisdiction, it is consistent with the Water Boards’ intent to include both historic and current definitions of waters of the United States into the Water Boards’ wetland jurisdictional framework. Further, the people of California have a reasonable expectation that a wetland will continue to be protected when it has been regulated in the past as a water of the U.S. regardless of any subsequent changes in federal regulations. The inclusion of both current and historic definitions of “waters of the U.S.” will help ensure some regulatory stability in an area that has otherwise been in flux. Like the other categories of the Water Boards’ wetland jurisdictional framework, the definition of waters of the U. S. may only be used to establish that a wetland qualifies as a water of the state; it cannot be used to exclude a wetland from qualifying as a water of the state. In other words, wetlands that are categorically excluded from as a water of the U.S. may nevertheless qualify as waters of the state under another jurisdictional category. In cases of uncertainty regarding the interpretation of a “current or historic waters of the U.S.,” such as when there is no applicable jurisdictional determination for that wetland, it is advisable to first analyze whether the wetland would fit within another jurisdictional category.

D. Wetland Jurisdictional Framework

The Procedures include a jurisdictional framework that applies to aquatic features that meet the technical wetland definition. Types of wetlands that would be considered waters of the state include natural wetlands, wetlands created by a modification of a surface water of the state, and certain artificial wetlands, such as those specifically identified in a water quality control plan as a wetland or other water of the state.

The jurisdictional framework is intended to exclude artificially-created, temporary features, such as tire ruts or other transient depressions caused by human activity from regulation, while still capturing smaller, naturally-occurring features, such as seasonal wetlands and small vernal pools that may be outside of federal jurisdiction. Note that this jurisdictional framework applies only to features meeting the technical definition of a wetland. If an aquatic feature does not meet the definition of a wetland, it may nonetheless be a different type of aquatic feature that may still be regulated as a water of the state (e.g., lake, streams, and ocean waters). The Procedures do not include guidance for jurisdictional determinations for other waters of the state. See also Figure 1: Informational Flowchart for Determining if a Wetland is a Water of the State. Stakeholders requested additional clarification regarding two specific elements of the jurisdictional framework. This is provided below.

Artificial Wetlands that Resulted from Historic Human Activity

Human activity can cause changes to the surrounding landscape (e.g., grading activities, road construction, direct hydromodification) such that wetlands form where wetlands did not previously exist. Where such artificial wetlands are now a relatively permanent part of the natural landscape, and are not subject to ongoing operation and maintenance, they are waters of the state. By requiring that the wetlands are relatively permanent, the framework excludes wetlands that are temporary or transitory. That they are part of the natural landscape also indicates the relative permanence of the wetlands and suggests that the wetland is self-sustaining without ongoing operation and maintenance activities, and provides similar ecosystem services as natural wetlands. By way of example, this category of wetlands includes situations where water flow is permanently redirected as the result of human activity, such as grading in another area, such that new wetlands form in areas that were previously dry. These wetlands may not be natural wetlands because they result from human activity and they were not formed by modifying a water of the state (rather they were an indirect result), but nevertheless they take on the function of natural wetlands such that they should be considered waters of the state. This category would not include artificial wetlands constructed for specific purposes listed in section II.3.d because the construction of the artificial wetlands would be too recent to be deemed “historic” and the artificial wetland would likely require ongoing maintenance such that they would not be deemed “relatively permanent,” and/or the artificial wetland is not part of the “natural landscape.”

Modification of a Water of the State

Wetlands can be created by modifying stream channels, lakes, and coastal areas, or converting a wetland from one type to another. Modification means that the wetland that is being evaluated was created by modifying an area that was a surface water of the

state at the time of such modification. It does not include a wetland that is created in a location where a water of the state had existed historically, but had already been completely eliminated at some time prior to the creation of the wetland. The wetland being evaluated does not become a water of the state due solely to a diversion of water from a different water of the state. By way of example, if a water is converted to dry land, and subsequently wetland features develop on that dry land, those wetlands would not be considered “created by modification of a water of the state.” To determine if a wetland was created by modification of a water of the state, an applicant should research historical site conditions to determine whether any portion of the wetland was created in a pre-existing water of the state. The following sources could be used to make this determination:

- Maps that show a channel flowing through, into or out of the wetland;
- Historical aerial photos that show a waterbody or inundation;
- National Wetland Inventory of California Aquatic Resource Inventory maps that show a wetland or other water of the state;
- Hydric soil maps;
- Evidence of springs, seeps or wetlands upslope of the site; or
- Evidence of a channel flowing into the site.

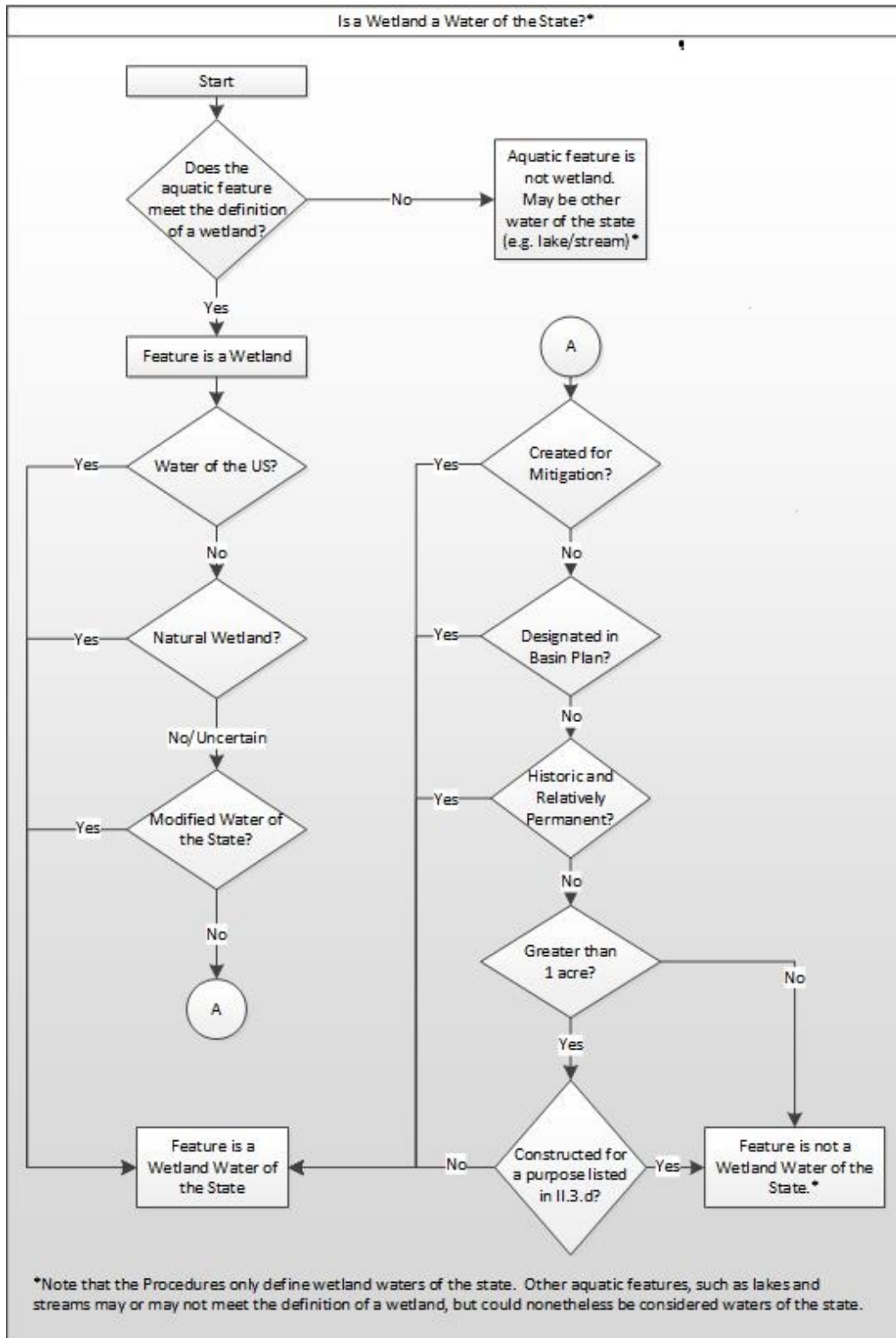


Figure 1: Informational Flowchart for Determining if a Wetland is a Water of the State. (Taken from the Staff Report for the Procedures. April 2, 2019.)

E. Frequently Asked Questions: Wetland Definition, Delineations, and Jurisdictional Framework

1. How will Water Board staff verify a delineation report?

Delineations may be verified through a desktop analysis to verify and/or compare historical conditions to conditions reflected in the aquatic resource verification report. In some cases, staff may need to perform a site visit in order to verify the conditions identified in the delineation report. The Procedures do not mandate a particular process for verifying delineation reports. The appropriate verification method will depend on the nature, location, and complexity of the project.

2. How do I define or delineate non-wetland waters?

The wetland definition and delineation methods set forth in the Procedures apply to wetlands only. The Procedures do not include definitions or identify delineation methods for non-wetland aquatic features. Contact the appropriate regional board to confirm how non-wetland waters should be delineated. Depending on the project, Water Board staff may rely on methods used by the Corps or other state or federal agencies. Some of the frequently used Corps methods and other delineation resources are listed below under Other Resources for Wetland Definition and Delineations.

3. What types of artificial wetlands does the exemption in section II.3.d.iii apply to?

The Procedures provide a jurisdictional exemption for artificial wetlands that are currently used and maintained for detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial stormwater permitting program. This jurisdictional exemption was drafted with NPDES permits in mind – individual and general – because currently the MS4 and industrial programs have Water Board permits that incentivize large stormwater retention basins. Dischargers with WDRs that may qualify for this exemption should contact their Regional Board to confirm. It should be noted that the stormwater facilities are still subject to the limitations set forth in 2, 3a, and 3b, and wetlands smaller than 1 acre in size (and that do not meet the criteria in 2, 3a, and 3b) are also excluded from jurisdiction.

Other Resources for Wetland Definition and Delineations

- [1987 Wetland Delineation Manual:](http://www.cpe.rutgers.edu/Wetlands/1987-Army-Corps-Wetlands-Delineation-Manual.pdf)
(<http://www.cpe.rutgers.edu/Wetlands/1987-Army-Corps-Wetlands-Delineation-Manual.pdf>)
- [Arid West Supplement:](https://usace.contentdm.oclc.org/utis/getfile/collection/p266001coll1/id/7627)
(<https://usace.contentdm.oclc.org/utis/getfile/collection/p266001coll1/id/7627>)
- [Western Mountains Supplement:](https://usace.contentdm.oclc.org/utis/getfile/collection/p266001coll1/id/7646)
(<https://usace.contentdm.oclc.org/utis/getfile/collection/p266001coll1/id/7646>)
- [A Field Guide to the Identification of the Ordinary High Water Mark \(OHWM\) in the Arid West Region of the Western United States:](#)

(https://www.spl.usace.army.mil/Portals/17/docs/regulatory/JD/FinalOHWMManual_2008.pdf)

- [Guide to Ordinary High Water Mark Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States:](https://usace.contentdm.oclc.org/utis/getfile/collection/p266001coll1/id/7645)
(<https://usace.contentdm.oclc.org/utis/getfile/collection/p266001coll1/id/7645>)
- [Wetland Delineation TAT Memo:](https://www.waterboards.ca.gov/water_issues/programs/peer_review/wetl_def_deline/docs/tat_memo4_2011.pdf)
(https://www.waterboards.ca.gov/water_issues/programs/peer_review/wetl_def_deline/docs/tat_memo4_2011.pdf)
- [Peer Review of the Wetland Definition and Delineation Method \(TAT Memorandum\) website:](https://www.waterboards.ca.gov/water_issues/programs/peer_review/wetl_def_deline/index.html)
(https://www.waterboards.ca.gov/water_issues/programs/peer_review/wetl_def_deline/index.html)

II. Application Completeness Determinations

Application Completeness Topics	Procedures Section	Page(s)
Timeline for determining if an application is complete	Section IV.A	5
List of items required for a complete application	Section IV.A.1	5-7
List of additional items that may be required for a complete application	Section IV.A.2	7-9

A. Pre-application Consultations

Procedures' section IV, and Appendix A section 230.94 (a), encourages applicants to consult with the Water Boards, and any other regulatory agencies, early in the project development process. This is highly recommended for complex or potentially contentious projects. Pre-application meetings or informal consultations will benefit the applicant and Water Board staff by discussing important aspects of the proposed project which could prevent delays during application review prior to submitting an application. In addition, applicants and Water Board staff could discuss the potential for items required for a complete application on a case-by-case basis thereby potentially eliminating the additional 30-day review period allotted for review of these additional items once they are submitted.

In addition, pre-application consultation will facilitate interagency coordination if those other agencies are invited to participate in that consultation. The Water Boards are committed to interagency coordination to streamline application review and attempt to concurrently reach multiple goals set by various agencies. Applicants are encouraged to keep Water Board staff informed of meetings with other agencies and pre-application site visits so that staff may participate and provide applicants with any information that could assist in preventing application processing delays. For example, applicants should

notify the Water Boards if the Corps is reviewing their project during the Corps' regularly scheduled pre-application meetings, which may be attended by Water Board staff.

The following is a list of suggested topics that could be discussed in a pre-application consultation and/or a site visit in order to facilitate substantive and productive pre-application consultation:

- Verification of delineations of wetlands, and other waters of the state;
- Mutual understanding of the proposed project's description and purpose;
- Mutual understanding of potential project impacts and how to avoid them;
- Discussion of potential project alternatives that should be analyzed for practicability and elimination of project alternatives that are not practicable;
- Mutual understanding of temporarily impacted areas and appropriate approaches to restoring them to pre-project conditions; and/or
- Compensatory mitigation proposals – especially for projects that propose permittee responsible compensatory mitigation.

B. Processing Applications

The Procedures provide a list of items required for a complete application. Section IV.A.1 lists items that are always required for a complete application. Section IV.A.2 lists items that may be required on a conditional or case-by-case basis. Water Board staff will review an application within 30 days of receipt and will provide a determination to the applicant. An application determination will encompass one of the following options:

1. Application complete, and no additional information is needed to make a determination;
2. Application complete, but additional information will be needed to clarify or supplement the application;
3. Application incomplete, and staff will request missing items listed in section IV.A.1 and/or request items required on a case-by-case basis listed in section IV.A.2; or
4. Denial or Denial without Prejudice.

When reviewing applications, Water Board staff will analyze the project description and other information provided in order to determine if any items listed in section IV.A.2 are required. For example, if a project description indicates that an activity would require in-water work or a water diversion, Water Board staff will assess whether the in-water work or water diversion would contribute to water quality impairments. If so, Water Board staff may require that an applicant prepare and submit a water quality monitoring plan in order to monitor compliance with water quality objectives. If items listed in section IV.A.2 are required, Water Board staff have an additional 30 days to review those items once submitted to determine if the application is complete.

If an application for a license or permit to another state or federal agency includes any of the information required for a complete application, the applicant may submit those materials to the Water Board. Staff will review the materials to determine if they satisfy the corresponding Procedures application requirements. Per the Procedures, applicants

shall indicate where these items are located within the application materials. This could also help to expedite staff review of the application materials.

C. Taking Action on a Complete Application

Section IV.B of the Procedures describes how the Water Boards will evaluate the potential impacts on the aquatic environment from the proposed project based on the information submitted in an application. In order to facilitate an accurate and timely application review process, applicants should ensure that items required for a complete application are thorough, accurate, and as organized as possible. As set forth in section IV.B.1, the Water Boards have the discretion to approve a project only if the applicant has demonstrated the following:

- A sequence of actions has been taken to first avoid, then to minimize, and lastly compensate for adverse impacts that cannot be practicably avoided or minimized to waters of the state;
- The potential impacts will not contribute to a net loss of the overall abundance, diversity, and condition of aquatic resources in a watershed (or multiple watersheds when compensatory mitigation is permitted in another watershed as set forth in section IV.B.5(d));
- The discharge of dredged or fill material will not violate water quality standards and will be consistent with all applicable water quality control plans and policies for water quality control; and
- The discharge of dredged or fill material will not cause or contribute to significant degradation of the waters of the state.

D. Supplemental Field Data from the Wet Season to Substantiate Dry Season Delineations

Section IV.A.2.a of the Procedures states that Water Board staff may require, on a case-by-case basis, supplemental field data from the wet season to substantiate dry season delineations.

Generally, wet season delineations are more likely to be necessary in areas where wetland indicators are difficult to resolve. The ideal time to delineate a wetland is during the wet portion of the growing season of a normal climatic period. Otherwise, indicators provided in the Corps' delineation manuals must be relied on to identify wetland boundaries. Collection of supplemental information in certain situations is an accepted practice and is consistent with recommendations presented in the Corps regional supplements for wetland delineation, which recommends that practitioners return to the delineation site, if possible, during the "normal wet portion of the growing season" (Arid West Regional Supplement, pp. 58, 87, 104; Western Mountains, Valleys, and Coast Regional Supplement, pp. 66, 100) to resolve wetland indicators that were unresolved during the dry-season delineation. To avoid the risk of unanticipated project delays, applicants should consult with the appropriate Water Board regarding whether supplemental data may be necessary prior to submitting an application.

E. Water Quality Monitoring Plans

Section IV.A.2.c of the Procedures allows the permitting authority to require an applicant to submit a water quality monitoring plan if project activities include in-water work or water diversions, on a case-by-case basis, where the permitting authority determines that the activities could cause water quality impacts. An applicant may need to demonstrate that a plan to monitor water quality to ensure that objectives such as turbidity, oil and grease, pH, and dissolved oxygen are not exceeded during project activities. This requirement will assist applicants in complying with regional water quality control plans and thus avoid delays in application review. Applicants may work with the Water Boards in developing draft water quality monitoring plans.

F. Restoration Plans for Temporary Impacts

Section IV.A.2.d of the Procedures requires a draft restoration plan in all cases where temporary impacts are proposed. Temporarily impacted areas are those that can temporarily cause a physical loss and/or degradation of an aquatic resource. Temporarily impacted areas can include areas such as temporary material staging areas, parking lots, or access roads. Generally, temporarily impacted areas are those that can be restored to pre-project conditions within a short period of time (e.g. prior to the end of a growing season, or the occurrence of a sensitive resource period, such as a spawning season). In this context, “restoration plan” is only about temporary impacts, and does not refer to the entirety of a restoration project, such as an Ecological Restoration and Enhancement Projects (EREPs), that seeks to permanently restore water quality in an area.

Water Board staff will identify permanent and temporary impacts to waters of the state when considering items submitted with the application, such as the project and impact description. In order to avoid application processing delays, applicants should identify if their project activities will temporarily impact areas and if so, submit a draft restoration plan with the initial application.

Water Board staff will review the draft restoration plan and will generally require that a final restoration plan is submitted prior to issuing an Order for the proposed project. In limited circumstances, final restoration plans may be submitted prior to initiation of temporary impacts, consistent with section IV.B.4 of the Procedures. The extent and level of detail in a draft restoration plan should be commensurate with the size and the scope of the proposed temporary impacts. If an applicant is unsure about the level of detail that will be sufficient for a restoration plan, they should contact the Water Boards for pre-application consultation.

G. Frequently Asked Questions: Application Completeness Determinations

1. How do I avoid iterative submittals during the application process?

The Procedures include a list of items that are needed in order to make determinations on proposed projects and issue water quality certifications. In addition to engaging the Water Boards early in the application process through pre-application consultation, applicants are encouraged to prepare materials that are likely to be required for a complete application prior to submitting an application. For example, if environmental review has shown that project impacts will result in a net loss of wetlands or other waters of the state, applicants are encouraged to prepare and submit a draft compensatory mitigation plan with the initial application. Note that if items required for a complete application are the same as items submitted for another agency’s regulatory process, those documents, or information within those documents may be submitted. If used, they should be clearly identified.

2. What does a typical water quality monitoring plan consist of?

Generally, water quality monitoring plans consist of components used to assess the activity’s effect(s) on water quality. This may include visual monitoring to detect accidental discharge of construction related pollutants (e.g. oil and grease, turbidity plume, or uncured concrete). Water quality monitoring plans may also include a proposal for how dischargers plan to test for constituents that may be discharged during the activity. This includes a unit of measurement, type of sample, and frequency of measurement for specific parameters.

3. Once an application is determined complete, can the permitting authority require additional information?

Yes, the permitting authority may require additional information before it is able to issue an Order as necessary to clarify, amplify, correct, or supplement the information required in the application. It is recommended that applicants remain responsive to requests for information from Water Board staff. Where information necessary to provide reasonable assurance that the project would comply with water quality standards and other appropriate requirements of state law is outstanding and the applicable timeline for Water Board action will lapse before the information is received, the application may be denied.

Other Resources for Application Completeness Determinations

- [State Water Board Office of Chief Counsel Memorandum regarding Processing Applications for Development Permits under the Permit Streamlining Act \(May 1, 2013\)](https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/psa_memo.pdf)
https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/psa_memo.pdf

III. Alternatives Analysis

Alternatives Analysis Topics	Procedures Section	Page(s)
Exemptions	Section IV.A.1.g	6-7
Tiers (level of effort)	Section IV.A.1.h	7
Staff review	Section IV.B.3	10

Rebuttable presumption	Section IV.B.3	10
Definition	Section V	15
Restriction on discharges and practicable alternatives	Appendix A, subpart B: § 230.10	20-21

A. Alternatives Analysis Definition and Purpose

An **alternatives analysis** is the process of analyzing project alternatives, including the proposed project, to determine the alternative that is the least environmentally damaging practicable alternative (LEDPA) (Procedures section V). An alternatives analysis, as required by the Procedures, refers to the analysis required by section IV.A.1.h and is a means to comply with Procedures section IV.B.3.a and the State Supplemental Dredge or Fill Guidelines, section 230.10(a). Procedures section IV.B.3.a states that the permitting authority must “establish that the proposed project alternative is the LEDPA in light of all potential direct, secondary (indirect), and cumulative impacts on the physical, chemical, and biological elements of the aquatic ecosystem.” Section 230.10(a) states that “No discharge of dredge or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.”

This alternatives analysis is distinct from an alternative analysis required to comply with other statutory or regulatory requirements, such as the California Environmental Quality Act (CEQA), the National Environmental Policy Act (NEPA), or a regional water quality control plan discharge prohibition. However, the alternatives analysis, as required by the Procedures, may be fulfilled through environmental documentation needed to comply with other statutory or regulatory requirements if that environmental documentation is sufficient for staff to determine that the proposed alternative is the LEDPA. To the extent that the Water Boards are acting as the lead agency under CEQA, it may be necessary for the Water Boards to conduct further analysis to comply with CEQA. See also Frequently Asked Questions: Alternatives Analysis.

Under the U.S. EPA's 404(b)(1) Guidelines, the Corps is required to analyze project alternatives and select the LEDPA. An alternatives analysis conducted by the Corps may not consider impacts to non-federal waters of the state.

B. Deferral to Corps' Alternatives Analysis Determinations

In cases when the Corps requires an alternatives analysis for impact to waters of the U.S., Procedures' section IV.B.3.b states that the permitting authority will defer to the Corps' determination on the adequacy of the alternatives analysis except if the Executive Officer or Executive Director determines that:

- 1) *The permitting authority was not provided an adequate opportunity to collaborate in the development of the alternatives analysis.*

Applicants are encouraged to engage the Water Boards, and the Corps concurrently, early in the alternatives analysis process to increase the likelihood that the Water Boards have adequate opportunity to collaborate with the Corps on the development of alternatives. Giving the Water Boards an opportunity to collaborate in the development of an alternatives analysis will help ensure that the project is determined by both the Corps and the Water Boards to be the LEDPA and avoid application approval delays.

- 2) *The alternatives analysis does not adequately address aquatic resource issues identified in writing by the Executive Officer or Executive Director to the Corps during the development of the alternatives analysis.*

This may occur if the permitting authority was provided an adequate opportunity to collaborate in the development of an alternatives analysis, and the permitting authority raised concerns in writing, but those concerns were not addressed during the development. For example, if the Executive Officer or Executive director provides written comments on an alternatives analysis that specifically requests that waters outside of federal jurisdiction are avoided, but the Corps project LEDPA does not avoid those waters, the alternatives analysis does not adequately address issues that have been identified in writing and the permitting authority would not defer to the Corps in this instance.

- 3) *The proposed project and all the identified alternatives would not comply with water quality standards.*

In such cases the Water Boards are unable to defer to the Corps' determination because the Water Boards are unable to approve a project that would not comply with water quality standards. If the project is not revised to comply with water quality standards, the application would be denied. Because all projects must comply with water quality standards, this exception to deference is consistent with historic and current practice of denying certifications where a project will not meet water quality standards.

Where there is no project-specific alternatives analysis required by the Corps, or where the Corps' alternatives analysis did not consider impacts to non-federal waters of the state, it is not feasible to defer to the Corps' alternatives analysis. In these cases, the applicant must prepare a project-specific alternatives analysis, or a supplemental alternatives analysis to consider non-federal waters of the state, unless the project meets one of several exemptions. (Section IV.A.1.g & h.)

C. Exemptions to the Alternatives Analysis Requirement

Section IV.A.1.g of the Procedures provides five exemptions from the alternatives analysis requirement. These exemptions are provided pursuant to the Procedures, and do not affect any alternatives analysis conducted pursuant to another statutory or regulatory requirement. These exemptions are explained in more detail below:

- 1) Projects that would otherwise qualify for a Water Board-certified Corps' general permit, except that they impact non-federal waters of the state and therefore cannot qualify for the Water Board general certification (Procedures section IV.A.1(g)(i)). In other words, this exemption applies only to projects that do not qualify for the general Order due to federal jurisdiction limitations. (Note that the entire project must meet the terms and condition of the Water Board certified Corps' general permit, including any Corps District's regional terms and conditions.)

Remember, if the project impacts only federal waters, and the project qualifies for a Water Board-certified Corps general permit (e.g., certain NWP, RGP related to emergencies), the applicant does not need to follow section IV of the Procedures and should instead follow the terms and conditions set forth in the Water Board general Order. See section IV.C of the Procedures.

- 2) The Procedures also exclude projects that meet the terms and conditions for coverage under an *uncertified* Corps' general permit, including any Corps District's regional terms and conditions, unless that project meets specific criteria. Projects do not qualify for the exemption if the discharge of dredge or fill material will directly impact: more than two-tenths (0.2) of an acre or 300 linear feet of waters of the state, or directly impact rare, threatened, or endangered species habitat in waters of the state, wetlands, eel grass beds, Outstanding National Resource Waters (ONRWs), or Areas of Special Biological Significance (ASBS). These criteria allow the Water Boards to focus resources on large projects or projects that propose to impact difficult to replace resources, such as wetlands.

Rare, threatened, or endangered species, as used in the Procedures, refers to plant and animal species listed as rare, threatened, or endangered pursuant to the California Endangered Species Act of 1984 (Fish & Game Code, § 2050 et seq.), the Native Plant Protection Act of 1977 (Fish & Game Code, § 1900 et seq.), or the Federal Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.). (Procedures Footnote 12.)

Applicants can evaluate if their project may impact resources described above by accessing various resources that are publicly available or that are developed during the project planning process. These include, but are not limited to:

- [California Department of Fish and Wildlife Biographic Information and Observation System \(BIOS\) map viewer](https://wildlife.ca.gov/Data/BIOS)
(<https://wildlife.ca.gov/Data/BIOS>)
- [California Natural Diversity Database \(CNDDDB\)](https://wildlife.ca.gov/Data/CNDDDB)
(<https://wildlife.ca.gov/Data/CNDDDB>)
- [National Oceanic and Atmospheric Association \(NOAA\) Critical Habitat Designations available in maps and GIS data](https://www.fisheries.noaa.gov/national/endangered-species-conservation/critical-habitat)
(<https://www.fisheries.noaa.gov/national/endangered-species-conservation/critical-habitat>)

- [USFWS Environmental Conservation Online System \(ECOS\) – Active Critical Habitat Report](https://ecos.fws.gov/ecp/report/table/critical-habitat.html)
(<https://ecos.fws.gov/ecp/report/table/critical-habitat.html>)
 - [CalFish Anadromous Fish Distribution – A California Cooperative Anadromous Fish and Habitat Data Program](https://www.calfish.org/ProgramsData/Species/AnadromousFishDistribution.aspx)
(<https://www.calfish.org/ProgramsData/Species/AnadromousFishDistribution.aspx>)
 - Species Survey Data from nearby projects and watershed/regional planning documents
 - Water quality control basin plans for a catalog of RARE beneficial use designations
 - [EcoAtlas](https://www.ecoatlas.org/) (<https://www.ecoatlas.org/>)
 - [State Water Quality Protection Areas – Areas of Significant Biological Significance \(ASBS\)](https://www.waterboards.ca.gov/water_issues/programs/ocean/asbs.html)
(https://www.waterboards.ca.gov/water_issues/programs/ocean/asbs.html)
 - [Outstanding National Resource Waters \(ONRWs\)](https://www.epa.gov/sites/production/files/2018-11/documents/pgp_tier3waters-2018oct23.pdf)
(https://www.epa.gov/sites/production/files/2018-11/documents/pgp_tier3waters-2018oct23.pdf)
- 3) A project may also be exempt from the alternatives analysis requirement if the project would be conducted in accordance with a watershed plan that has been approved for use by the permitting authority. In order to qualify for this exemption, the watershed plan needs to meet the definition of a watershed plan in section V and it needs to be analyzed in an environmental document that includes sufficient alternatives analysis, monitoring provisions, and guidance on compensatory mitigation opportunities. Applicants may propose watershed plans for the permitting authority's approval.
- 4) If the project meets the definition of an Ecological Restoration and Enhancement Project, as set forth in section V of the Procedures, an alternatives analysis is not required. Ecological Restoration and Enhancement Projects typically undergo a separate vetting process involving input from multiple agencies; therefore, it is appropriate to provide regulatory relief through an alternatives analysis exemption.
- 5) Finally, a project may be exempt from the alternatives analysis requirement if the project has no permanent impacts to aquatic resources and there are no impacts to rare, threatened, or endangered species habitat in waters of the state, wetlands or eelgrass beds, Outstanding Natural Resource Waters or Areas of Special Biological Significance and all implementation actions in the restoration plan can reasonably be implemented in one year.

Essentially, this exemption is intended to provide regulatory relief for projects that would only result in temporary impacts and all actions needed to restore those impacts can be implemented in one year. Temporary impacts are commonly understood as those that are restored to pre-project conditions (i.e., allowing the

area to return to its natural state through natural processes or active restoration). Actions needed to restore temporarily impacted areas include regrading, revegetation, and active management. Successful restoration of temporary impacts is dependent on on-site specific information including the type of aquatic resources, the severity and duration of the impact, type of equipment, and environmental conditions. In order to demonstrate that a project would qualify for this exemption, an applicant should submit a draft restoration plan consistent with the requirement set forth in section IV.A.2.d of the Procedures.

D. Appropriate Level of Effort for an Alternatives Analysis

Where an alternatives analysis is required by the Water Boards, the Procedures provide applicants quantitative and qualitative guidance to determine the appropriate level of effort to include in an analysis. The tiered approach (see Procedures section IV.A.1.h) will allow a more in-depth analysis for projects with larger impacts and allow for less analysis for minimally impacting projects, including consideration of indirect impacts. Tier 3 projects may result in significant impacts or impacts to sensitive habitat types; therefore, analysis of Tier 3 projects shall include a comparison of on-site and off-site practicable alternatives. Tier 2 projects may result in moderate impacts or cannot inherently be in an alternate location; therefore, analysis of Tier 2 projects need only include a comparison of practicable on-site alternatives because off-site alternatives are not logistically feasible. Evaluation of Tier 1 projects requires a description of steps that have been or will be taken to avoid and minimize the loss of, or significant adverse impacts to, beneficial uses of waters of the state. Note that impacts, as used in the size criteria, include both permanent and temporary impacts. See also Frequently Asked Questions: Alternatives Analysis below.

E. Determining Practicability

When an alternatives analysis is required, the applicant must demonstrate that the proposed alternative is the Least Environmentally Damaging Practicable Alternative (LEDPA). The term practicable means available and capable of being done after taking into consideration cost, existing technology, and other logistics in light of the overall project purpose. (Procedures section 230.3 Definitions.) Therefore, the Water Boards recommend a structured stepwise approach. The first step in conducting the alternatives analysis is to establish the project's overall purpose that will be used to evaluate practicable alternatives. Water Board staff must consider the purpose and objectives of the project set forth by the applicant. Water Board staff should accept legitimate formulations of overall project purpose, but the applicant may not define the purpose so narrowly so as to preclude the existence of practicable alternatives. In such cases, the overall project purpose may be revised accordingly. Next, an applicant should list, and briefly describe, alternatives that could meet the overall project purpose. This could include the applicants proposed alternative, offsite alternatives (for a tier 3 project), and onsite alternatives (for a tier 2 project). The alternatives should be analyzed for practicability. To determine if an alternative is practicable, an applicant should consider the following:

- 1) **Cost:** This may include the consideration of costs associated with various infrastructure components such as roadways or utilities. This may include those that may need to be upgraded for a particular alternative. Cost is analyzed in the context of the overall cost of the project and whether it is unreasonably expensive or exorbitant.
- 2) **Existing Technology:** This includes the consideration the limitations of existing technology. However, the applicant should incorporate the most efficient/least-impacting construction methods that are available.
- 3) **Logistics:** Logistics may include considerations associated with the placement of facilities within a required distance, utilization of existing storage or staging areas and/or safety concerns.
- 4) **Other significant adverse environmental consequences:** An alternative is not the LEDPA where it may cause other significant adverse environmental consequences.

After an applicant has considered practicability for each identified alternative, the LEDPA should be identified. It is not necessary to analyze each of the above considerations when one consideration renders an alternative not practicable. For example, logistics need not be analyzed where the cost renders an alternative not practicable.

F. Frequently Asked Questions: Alternatives Analysis

1. How should I integrate an alternatives analysis into the CEQA process?

The CEQA alternatives analysis may be sufficient to fulfill the alternatives analysis requirements set forth in the Procedures if that analysis demonstrates that the project proponent has considered a range of project alternatives that include analysis of impacts to waters of the state and the proposed project is the LEDPA. To utilize a CEQA alternatives analysis to satisfy the alternatives analysis requirement in the Procedures, the applicant should engage the permitting authority and the Corps (if applicable) during the process of developing the CEQA document. Where CEQA alternatives are likely to address the siting of a project in relation to waters or the project has substantial impacts to waters, it may be prudent to begin early and concurrent consultation for both analyses.

Note that it is not always advantageous to integrate the alternatives analysis into the CEQA process. Where a CEQA analysis considers larger-scale project alternatives and a project has only small water quality impacts relative to other environmental impacts, it may not make sense to integrate a specific focus on avoidance and minimization measures with respect to water quality impacts. In such cases, it is more likely that avoidance and minimization measures could be integrated into the project at a later date without altering the CEQA alternatives analysis. In addition, a CEQA analysis could inform an evaluation of whether an alternative is not practicable for an alternatives analysis because it identifies other significant adverse environmental consequences associated with alternatives.

2. What happens if a complete CEQA document did not consider alternatives for waters of the state? If the Water Board requires an alternatives analysis, would this require amending the CEQA document?

If CEQA was completed for a project before the effective date of the Procedures, the effect of the Procedures alternatives analysis will depend on the level of detail of avoidance and minimization of water quality impacts already in the CEQA document, whether the LEDPA determination is the same as the CEQA preferred alternative, and if not, the magnitude of the project modifications necessitated by the alternatives analysis.

3. Can there be different levels of effort within each tier?

Yes, depending on the project, the level of effort to prepare an alternatives analysis within a single tier may vary. The Procedures state that the level of effort for the alternatives analysis should be commensurate with the significance of the impacts resulting from the discharge. This concept also applies to levels of effort within each tier. For example, within Tier 2, applicants are required to prepare an alternatives analysis for only on-site alternatives. However, if the project is for routine operation and maintenance of existing facilities, then the alternatives analysis (and level of effort) within Tier 2 would be further limited to only examining alternatives for the operation and maintenance activities.

4. What happens in the event of conflicting LEDPA, where agency requirements are completely incompatible?

The Procedures have been written to minimize the potential for conflicting LEDPA determinations. Specifically, the Procedures require that Water Board staff generally defer to the Corps in cases in which the Corps requires an alternatives analysis, except in circumstances outlined in section IV.B.3(b) and discussed in section III.B of this guidance. In addition, the determination that deference is inappropriate must be made at the level of the Executive Officer or Executive Director, ensuring that such determination will not be made lightly. Deference to the Corps will reduce the risk of conflicting requirements.

Furthermore, an applicant will be expected to submit materials that are submitted to the Corps when the Corps requires an alternatives analysis for a complete application. Ensuring both agencies are considering the same information will further reduce the potential for conflict. Applicants are encouraged to engage the Water Boards before the application process to ensure that a proposed alternative does not violate state water quality standards.

Despite these safeguards, if the Water Board concludes that the Corps' LEDPA determination is not sufficiently protective of waters of the state and state water quality standards, the Water Board may include appropriate conditions in the certification for the project. The agencies may engage in additional coordination to confirm that such conditions are an acceptable resolution to any identified conflicts. Ultimately, conflicting LEDPA determinations may result in a denial of the project application if such issues cannot be resolved.

5. How will exemptions to the alternatives analysis requirement be determined? Does an exemption have to be approved by the regional board executive officer?

Applicants that believe that their project meets the criteria for exemption from the alternatives analysis requirement should include information in their application to demonstrate their project meets the exemption criteria and provide any relevant documentation that supports their justification. The application form, which can be found on the [State Water Board's website](https://www.waterboards.ca.gov/water_issues/programs/cwa401/) at:

https://www.waterboards.ca.gov/water_issues/programs/cwa401/ requires the applicant to describe how the alternatives analysis requirement has been met. The applicant should indicate what exemption applies and why. Applicability of the exemption would be verified by staff during the application completeness determination. Exemptions from the alternatives analysis requirement do not need approval from the regional board executive officer.

6. Some of the exemptions for alternatives analyses do not apply if a project impacts a wetland. What types of waterbodies do not meet the Procedures' wetland definition?

Section II of the Procedures defines an area as a "wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation."

If an area does not meet the above three criteria, then the area is not defined as a wetland area under the Procedures. Examples of non-wetland areas include oceans, lakes, streams, certain types of riparian areas, and ephemeral features that do not develop anaerobic conditions in the upper substrate. See also section I of this guidance for discussion on what defines a wetland under the Procedures.

7. What are some examples of on-site avoidance and minimization measures that would be considered consistent with the alternatives analysis requirement for projects that are limited by location?

Examples of avoidance and minimization measures that may be considered for projects that inherently cannot be located at an alternate location include, but are not limited to: incorporation of alternate project designs to allow for the restoration of natural hydrologic flows, facilitate fish crossing, and/or increase habitat connectivity; on-site revegetation; non-mechanized vegetation removal; timing requirements for in-water work; erosion control measures; and use of pre-existing staging areas or access roads.

8. How do I document discussions and decisions made in the field that inform the alternatives analysis requirement?

Any discussions or decisions from an on-site visit relevant to the alternatives analysis should be documented in writing. The written document may be incorporated into the application materials or exchanged between the applicant and Water Board staff in subsequent e-mail or letter correspondence. Written documentation is necessary to confirm mutual agreement on the characterization of the discussion or decision. Upon

mutual concurrence, Water Board staff should ensure any documentation is included in the administrative record and, if relevant, the certification for the project.

9. How should a LEDPA finding be documented for projects that are exempt from review under CEQA?

If a project is CEQA exempt and alternatives analysis is required, the applicant should submit an alternatives analysis with the application. The final Order should include the final LEDPA determination.

Other Resources for Alternatives Analysis

- [Practicable Alternatives for Wetlands Development Under the Clean Water Act. Mandelker, Daniel. October 2018.](https://elr.info/news-analysis/48/10894/practicable-alternatives-wetlands-development-under-clean-water-act)
(<https://elr.info/news-analysis/48/10894/practicable-alternatives-wetlands-development-under-clean-water-act>)
- [The Federal Wetland Permitting Program: Avoidance and Minimization Requirements. Environmental Law Institute. March 2008.](https://www.eli.org/sites/default/files/eli-pubs/d18_03.pdf)
(https://www.eli.org/sites/default/files/eli-pubs/d18_03.pdf)
- [The Steepest Hurdle in Obtaining a Clean Water Act Section 404 Permit: Complying with EPA's 404 \(b\)\(1\) Guidelines' Least Environmentally Damaging Practicable Alternative Requirement. Schutz, Jon. 2005.](https://escholarship.org/uc/item/2976c9tq)
(<https://escholarship.org/uc/item/2976c9tq>)

IV. Compensatory Mitigation

Compensatory Mitigation Topics	Location in the Procedures	Page(s)
General considerations	Section IV.B.5 Appendix A, subpart J	10-12, 25
Definitions	Appendix A, subpart J, § 230.92	25-27
Soft preference for mitigation banks	Appendix A, subpart J, § 230.93 (a)	27-28
Type and location	Section IV.B.5.d Appendix A, subpart J, § 230.93 (b)	12, 28-30
Watershed approach to mitigation	Section IV.A.2.b Section IV.B.5.c Section IV.B.5.d Appendix A, subpart J, § 230.93 (c)	7-8, 11,12 30-32
Watershed approach - definition	Section V	17-18
Site selection	Appendix A, subpart J, § 230.93 (d)	32
Mitigation type	Appendix A, subpart J, § 230.93 (e)	32-33
Amount	Section IV.B.5.c Appendix A, subpart J, § 230.93 (f)	11,33
Use of banks and in-lieu fee programs	Section IV.A.2.b Appendix A, subpart J, § 230.93 (g)	7-8, 33
Preservation	Appendix A, subpart J, § 230.93 (h)	33-34
Buffers	Appendix A, subpart J, § 230.93 (i)	34

Relationship to other federal, tribal, state, and local programs	Appendix A, subpart J, § 230.93 (j)	34-35
Order conditions	Appendix A, subpart J, § 230.93 (k)	35
Party responsible for mitigation	Appendix A, subpart J, § 230.93 (l)	35-36
Timing	Appendix A, subpart J, § 230.93 (m)	36
Financial assurances	Section IV.B.5.f Appendix A, subpart J, § 230.93 (n)	12, 36-37
Compliance with applicable law	Appendix A, subpart J, § 230.93 (o)	37
Mitigation plans	Section IV.A.2.b Section IV.B.5.e Appendix A, subpart J, § 230.94 (c)	7-8, 12 37-39
Ecological performance standards	Appendix A, subpart J, § 230.95	39
Monitoring	Appendix A, subpart J, § 230.96	39-40
Management: site protection, sustainability, adaptive management, and long-term management	Appendix A, subpart J, § 230.97	40-42
Climate change assessment	Section IV.A.2.b.viii	8

A. Compensatory Mitigation Requirements

Compensatory mitigation means the restoration, establishment, enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved (Appendix A, Subpart J § 230.92). In cases when compensatory mitigation is required, a draft compensatory mitigation plan is required for a complete application. The contents of a draft compensatory mitigation plan are listed in section IV.A.2.b of the Procedures and plans should be consistent with the requirements listed in Appendix A, Subpart J. Water Board staff will review the draft compensatory mitigation plan to ensure that the plan is consistent with section IV.B.5 of the Procedures and will require that a final compensatory mitigation plan is submitted prior to issuing an Order for the proposed project, or prior to initiation of the discharge of dredged or fill material, consistent with section IV.B.5.e of the Procedures.

B. Watershed Approach

Watershed approach is defined in Procedures section IV.D as “an analytical process for evaluating the environmental effects of a proposed project and making decisions that support the sustainability or improvement of aquatic resources in a watershed. The watershed approach recognizes that the abundance, diversity, and condition of aquatic resources in a watershed affect beneficial uses. Diversity of aquatic resources includes both the types of aquatic resources and the locations of those aquatic resources in a watershed. Consideration is also given to understanding historic and potential aquatic resource conditions, past and projected aquatic resource impacts in the watershed, and terrestrial connections between aquatic resources. The watershed approach can be

used to evaluate avoidance and minimization of direct, secondary (indirect), and cumulative project impacts. It also can be used in determining compensatory mitigation requirements.”

Mitigation amounts, type, and location will be informed by the applicant’s use of the watershed approach based on a watershed profile (Procedures section IV.B.5 (pages 10-12); Procedures Appendix A, § 230.93(b) (pages 28 – 37)).

C. Watershed Profile

A watershed profile is defined in Procedures section IV.D as “a compilation of data or information on the abundance, diversity, and condition of aquatic resources in a project evaluation area. The watershed profile shall include a map and a report characterizing the location, abundance and diversity of aquatic resources in the project evaluation area, assessing the condition of aquatic resources in the project evaluation area, and describing the environmental stress factors affecting that condition.

The watershed profile shall include information sufficient to evaluate direct, indirect, and cumulative impacts of project and factors that may favor or hinder the success of compensatory mitigation projects and help define watershed goals. It may include such things as current trends in habitat loss or conservation, cumulative impacts of past development activities, current development trends, the presence and need of sensitive species, and chronic environmental problems or site conditions such as flooding or poor water quality.

The scope and detail of the watershed profile shall be commensurate with the magnitude of impact associated with the proposed project. Information sources include online searches, maps, watershed plans, and possibly some fieldwork, if necessary. In some cases, field data may need to be collected in the project evaluation area to confirm the reported condition. Some or all of the information may be obtained from a watershed plan. Watershed profiles for subsequent projects in a watershed can be used to track the cumulative effectiveness of the permitting authority’s decisions.”

D. Watershed Plan

A watershed plan is defined in the Procedures’ section IV.D, as “a document, or a set of documents, developed in consultation with relevant stakeholders, a specific goal of which is aquatic resource restoration, establishment, enhancement, and preservation within a watershed. A watershed plan addresses aquatic resource conditions in the watershed, multiple stakeholder interests, and land uses. Watershed plans should include information about implementing the watershed plan. Watershed plans may also identify priority sites for aquatic resource restoration and protection. Examples of watershed plans include special area management plans, advance identification programs, and wetland management plans. The permitting authority may approve the use of other plans, including for example, Habitat Conservation Plans (HCPs), Natural Community Conservation Plans (NCCPs), or municipal stormwater permit watershed management programs as watershed plans, if they substantially meet the stated above.

Any NCCP approved by the California Department of Fish and Wildlife (CDFW) before December 31, 2020, and any regional HCP approved by the United States Fish and Wildlife Service (USFWS) before December 31, 2020, which includes biological goals for aquatic resources, shall be used by the permitting authority as a watershed plan for such aquatic resources, unless the permitting authority determines in writing that the HCP or NCCP does not substantially meet the definition of a watershed plan for such aquatic resources.”

The use of a watershed plan is not a mandatory requirement in the Procedures, but applicants may propose watershed plans for use in determining if a project qualifies for the alternatives analysis exemption and potentially less compensatory mitigation. As described in Appendix A, subpart J, section § 230.93 (c)(3)(i), “[i]n the absence of a watershed plan...the permitting authority will use a watershed approach based on analysis of information regarding watershed conditions (as identified in the watershed profile) and needs, including potential sites for aquatic resource restoration activities and priorities for aquatic resource restoration and preservation.”

Watershed plans developed for the Procedures may have utility for other Water Board programs. Conversely, watershed plans developed for other programs may have utility for the Procedures. For example, watershed plans developed for the Nonpoint Source Grant Program could be used to qualify for an alternatives analysis exemption, while watershed plans developed for the Procedures could be used for the Nonpoint Source Grant Program. Applicants are encouraged to develop watershed plans that meet as multiple agency requirements. For more information about the Nonpoint Source Grant Program, see the State Water Board’s [Nonpoint Source Pollution Grant Program website](https://www.waterboards.ca.gov/water_issues/programs/nps/319grants.html) (https://www.waterboards.ca.gov/water_issues/programs/nps/319grants.html).

E. Project Evaluation Area

Project evaluation area is defined in Procedures section IV.D as “an area that includes the project impact site, and/or the compensatory mitigation site, and is sufficiently large to evaluate the effects of the project and/or the compensatory mitigation on the abundance, diversity, and condition of aquatic resources in an ecologically meaningful unit of the watershed. The size and location of the ecologically meaningful unit shall be based on a reasonable rationale.”

In describing the project evaluation area, applicants may want to consider the following boundaries in relation to both the project impact area and the proposed mitigation site: area of ground disturbance, watershed(s), buffer(s), administrative and/or parcel areas, and existing planning documents. Other factors that could inform the contents and/or boundaries of a project evaluation area include, but are not limited to: current trends in habitat loss or conservation; cumulative impacts of past development activities; current development trends and land use; presence and need of sensitive species including critical designated habitats; chronic environmental problems or site conditions; flooding; and/or local water quality concerns.

F. Mitigation Banks and In-Lieu Fee Programs

Mitigation bank means “a site, or suite of sites, where aquatic resources . . . are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for unavoidable impacts authorized by Orders. In general, a mitigation bank sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation bank are governed by a mitigation banking instrument.” Mitigation banking instrument means the legal document for the establishment, operation, and use of a mitigation bank. (Appendix A, Subpart J, section 230.92.)

In-lieu fee program means “a program involving the restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to satisfy compensatory mitigation requirements. Similar to a mitigation bank, an in-lieu fee program sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the in-lieu program sponsor. However, the rules governing the operation and use of in-lieu fee programs may be different from the rules governing operation and use of mitigation banks. Projects approved under an in-lieu program may be implemented prior to, concurrent with, or after adverse impacts whereas compensatory mitigation banks are established prior to adverse impacts. The operation and use of an in-lieu fee program are governed by an in-lieu fee program instrument.” In-lieu fee program instrument “means the legal document for the establishment, operation, and use of an in-lieu fee program.” (Appendix A, Subpart J, section 230.92.)

In many cases, the environmentally preferable compensatory mitigation may be provided through mitigation banks or in-lieu fee programs because they usually involve consolidating compensatory mitigation projects where ecologically appropriate, consolidating resources, providing financial planning and scientific expertise (which often is not practical for permittee-responsible compensatory mitigation projects), reducing temporal losses of functions, and reducing uncertainty over project success (section 293.93(a)(1)).

Consistent with the Corps 404(b)(1) Guidelines, and stated in section 230.93(b) of the State Supplemental Dredge or Fill Guidelines, the permitting authority shall approve compensatory mitigation types based on what is environmentally preferable with a soft preference to mitigation banks, in-lieu fee programs, and finally, permittee responsible compensatory mitigation. This soft preference requires Water Board staff to take into consideration the best environmental outcome to compensate for the adverse impacts, whether it is through mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. Applicants and staff should also be aware that mitigation banks and in-lieu fee programs are not available everywhere in the state, and in some cases, permittee-responsible mitigation provides the environmentally preferable outcome. The standards for making that determination are set forth in the Procedures, subpart J of Appendix A.

Currently, the Water Boards may, but are not required to, participate in inter-agency review teams (IRTs) that evaluate and approve the establishment mitigation banks and in-lieu fee programs. Participation on the IRTs can help increase the likelihood that the mitigation banks and in-lieu fee programs are available for future use. Regardless of whether the Water Boards participate on the IRTs, however, the Water Boards must evaluate whether the purchase of credits from a mitigation bank or in-lieu fee program is appropriate for the proposed project impacts.

Applicants seeking to use mitigation bank or in-lieu fee program credits for impacts to non-federal waters of the state will need to confirm with the bank or in-lieu fee sponsor that such credits are available for purchase and with Water Board staff that such a purchase is appropriate for the proposed project impacts.

G. Frequently Asked Questions: Compensatory Mitigation

1. How should I assess mitigation projects that would convert one type of aquatic resource to another (type conversion)?

When assessing compensatory mitigation projects that include proposals for type conversion, applicants and Water Board staff may reference the “Aquatic Resource Type Conversion Framework,” which is currently under development and expected to be finalized in early 2020. This type conversion framework was developed by the Southern California Coastal Water Research Project in collaboration with other agencies including the Corps, EPA, and Water Boards. The type conversion framework provides applicants and staff with tools that may be used when identifying the types of functions that will be gained, lost or neutral through type conversion. The framework provides guidance on how to conduct site specific assessments and assessments in the regional context.

2. When am I required to submit a watershed profile?

A watershed profile is required to be submitted as part of a draft compensatory mitigation plan. The watershed profile should be developed using either an approved watershed plan or using a watershed approach for a project evaluation area. An applicant may qualify for a potential reduction in the amount of compensatory mitigation required to offset impacts if the watershed profile was developed using information in a watershed plan that has been approved by the Water Boards.

3. Can multiple applicants use the same watershed profile, on a regional basis?

Yes. If a watershed profile was developed on a regional basis, complies with the requirements for watershed profiles as defined in the Procedures, and was developed to address multiple projects and/or applicants, it is feasible that a single regional watershed profile could be used by multiple applicants for dredge or fill projects. However, it should be noted that if a watershed profile is developed with regional considerations in mind, it may qualify as a watershed plan that, if approved by the Water Boards, may be used to qualify the project for additional regulatory relief, such as an exemption from the alternatives analysis requirement.

4. Are applicants required to use CRAM?

When a project includes unavoidable impacts to waters requiring mitigation, the permitting authority will require an assessment of the overall condition of those waters using an assessment method approved by the Water Boards. While the California Rapid Assessment Method (CRAM) is one such method that may be approved for use by the Water Boards, other assessment methods, such as the California Stream Condition Index, could be approved for use by the Water Boards.

When available CRAM is likely appropriate for assessing overall condition because it has been peer reviewed and has been used to assess various wetland types common in California. CRAM has been proven to be cost effective and scientifically defensible when used for monitoring ecological conditions and assessing the performance of compensatory mitigation projects and is widely used in California for these purposes. The Water Boards encourage, but do not require, the use of CRAM to assess the overall condition of waters in order to provide statewide consistency in the permitting process.

CRAM is a component of the Wetland and Riparian Area Monitoring Plan (WRAMP) endorsed by the California Water Quality Monitoring Council. CRAM is a Level 2 assessment method within the U.S. EPA's 3 Level framework for wetland monitoring. Level 1 includes mapping information and Level 3 consists of intensive quantitative data collected to validate Level 1 and Level 2 assessments. In approving assessment methods, the Water Boards will cooperate in achieving goals of the California Water Quality Monitoring Council (Monitoring Council) in the collection and reporting of water quality data and information pursuant to Water Code section 13181. This includes implementing guidance, methods, and plans endorsed or directed by the Monitoring Council for monitoring and assessment of aquatic resources.

Because other types of assessment methods – for instance Level 3 assessments - could possibly be more appropriate than CRAM for a selected site or type of habitat, the Procedures allow the use of another method, if it is approved by the permitting authority.

Other Resources for Compensatory Mitigation

- [Placeholder for Aquatic Resource Type Conversion Framework Reference]
- [U.S. EPA Handbook for Developing Watershed Plans to Restore and Protect our Waters](https://www.epa.gov/sites/production/files/2015-09/documents/2008_04_18_nps_watershed_handbook_handbook-2.pdf)
(https://www.epa.gov/sites/production/files/2015-09/documents/2008_04_18_nps_watershed_handbook_handbook-2.pdf)
- [Environmental Law Institute's Watershed Approach Handbook](https://www.eli.org/research-report/watershed-approach-handbook)
(<https://www.eli.org/research-report/watershed-approach-handbook>)
- [USGS Stream Stats](https://streamstats.usgs.gov/ss/)
(<https://streamstats.usgs.gov/ss/>)
- [USGS Topo maps for Google Earth](http://www.earthpoint.us/TopoMap.aspx)
(<http://www.earthpoint.us/TopoMap.aspx>)
- [USGS Earth Explorer](https://earthexplorer.usgs.gov/)
(<https://earthexplorer.usgs.gov/>)

- [USGS Federal Standards and Procedures for the National Watershed Boundary Dataset \(WBD\)](https://pubs.usgs.gov/tm/11/a3/pdf/tm11-a3.pdf)
(https://pubs.usgs.gov/tm/11/a3/pdf/tm11-a3.pdf)
- [USGS “Hydrologic Unit Maps”](https://water.usgs.gov/GIS/huc.html)
(https://water.usgs.gov/GIS/huc.html)
- [“CalWater – Delta Revision” powerpoint](http://www.deltarevision.com/2004_docs/CalWater2004Status1.ppt)
(http://www.deltarevision.com/2004_docs/CalWater2004Status1.ppt)
- [U.S. EPA “Ecoregions”](https://www.epa.gov/eco-research/ecoregions)
(https://www.epa.gov/eco-research/ecoregions)
- [Ecoregions of the Conterminous United States: Evolution of a Hierarchical Spatial Framework](https://link.springer.com/article/10.1007%2Fs00267-014-0364-1)
(https://link.springer.com/article/10.1007%2Fs00267-014-0364-1)
- [USGS “Ecoregions of California”](https://pubs.usgs.gov/of/2016/1021/ofr20161021_sheet1.pdf)
(https://pubs.usgs.gov/of/2016/1021/ofr20161021_sheet1.pdf)
- [USDA Description of “Ecological Subregions: Sections of the Conterminous United States”](https://www.fs.fed.us/research/publications/misc/73327-wo-gtr-76b-mcnab2007.pdf)
(https://www.fs.fed.us/research/publications/misc/73327-wo-gtr-76b-mcnab2007.pdf)
- [USGS Physiographic Provinces of the Conterminous U.S.](https://water.usgs.gov/GIS/metadata/usgswrd/XML/physio.xml)
(https://water.usgs.gov/GIS/metadata/usgswrd/XML/physio.xml)
- [California Geomorphic Provinces](https://www.conservation.ca.gov/cgs/Documents/CGS-Note-36.pdf)
(https://www.conservation.ca.gov/cgs/Documents/CGS-Note-36.pdf)
- [SFEI California Aquatic Resource Inventory \(CARI\)](https://www.sfei.org/cari)
(https://www.sfei.org/cari)
- [USFWS National Wetland Inventory](https://www.fws.gov/wetlands/) (https://www.fws.gov/wetlands/)
- [USGS National Hydrology](https://www.usgs.gov/core-science-systems/ngp/national-hydrography)
(https://www.usgs.gov/core-science-systems/ngp/national-hydrography)
- [CDFW California Natural Diversity Database \(CNDDDB\)](https://wildlife.ca.gov/Data/CNDDDB)
(https://wildlife.ca.gov/Data/CNDDDB)
- [USDA National Agriculture Imagery Program \(NAIP\)](https://www.fsa.usda.gov/programs-and-services/aerial-photography/imagery-programs/naip-imagery/)
(https://www.fsa.usda.gov/programs-and-services/aerial-photography/imagery-programs/naip-imagery/)
- [U.S. EPA Overview of Listing Impaired Waters under CWA Section 303\(d\)](https://www.epa.gov/tmdl/overview-listing-impaired-waters-under-cwa-section-303d)
(https://www.epa.gov/tmdl/overview-listing-impaired-waters-under-cwa-section-303d)
- [California Rapid Assessment Method \(CRAM\)](https://www.cramwetlands.org/)
(https://www.cramwetlands.org/)
- [California Stream Condition Index \(CSCI\)](https://www.waterboards.ca.gov/water_issues/programs/swamp/bioassessment/data_tools.html)
(https://www.waterboards.ca.gov/water_issues/programs/swamp/bioassessment/data_tools.html)
- [South Sacramento Habitat Conservation Plan \(SSHCP\)](https://www.southsachcp.com/)
(https://www.southsachcp.com/)
- [Central Valley Flood Protection Plan](http://cvfppb.ca.gov/cvfpp/)
(http://cvfppb.ca.gov/cvfpp/)
- [Santa Margarita Watershed Management Area \(WMA\)](#)

- (<http://www.projectcleanwater.org/watersheds/santa-margarita-wma/>)
- [Eco-Atlas](https://www.ecoatlas.org/)
(<https://www.ecoatlas.org/>)
- [CDFW Natural Community Conservation Planning \(NCCP\)](https://www.wildlife.ca.gov/Conservation/Planning/NCCP)
(<https://www.wildlife.ca.gov/Conservation/Planning/NCCP>)
- [CDFW-approved NCCP Plans](https://www.wildlife.ca.gov/Conservation/Planning/NCCP/Plans)
(<https://www.wildlife.ca.gov/Conservation/Planning/NCCP/Plans>)
- [USFWS's Habitat Conservation Plans \(HCPs\)](https://www.fws.gov/endangered/what-we-do/hcp-overview.html)
(<https://www.fws.gov/endangered/what-we-do/hcp-overview.html>)
- [2008 Compensatory Mitigation for Losses of Aquatic Resources \(2008 Mitigation Rule\)](https://www.epa.gov/sites/production/files/2015-03/documents/2008_04_10_wetlands_wetlands_mitigation_final_rule_4_10_08.pdf) **
(https://www.epa.gov/sites/production/files/2015-03/documents/2008_04_10_wetlands_wetlands_mitigation_final_rule_4_10_08.pdf)
- [U.S. EPA Background about Compensatory Mitigation Requirements under CWA Section 404](https://www.epa.gov/cwa-404/background-about-compensatory-mitigation-requirements-under-cwa-section-404)
(<https://www.epa.gov/cwa-404/background-about-compensatory-mitigation-requirements-under-cwa-section-404>)
- [U.S. EPA Compensatory Mitigation Rule Timeline for Bank or ILF Instrument Approval](https://www.epa.gov/sites/production/files/2015-07/documents/irt_timeline.pdf)
(https://www.epa.gov/sites/production/files/2015-07/documents/irt_timeline.pdf)
- [California Water Quality Monitoring Council's Wetland and Riparian Area Monitoring Plan \(WRAMP\)](https://mywaterquality.ca.gov/monitoring_council/wetland_workgroup/wramp/index.html)
(https://mywaterquality.ca.gov/monitoring_council/wetland_workgroup/wramp/index.html)
- [The State Water Board's Peer Review CRAM website](https://www.waterboards.ca.gov/water_issues/programs/peer_review/cram.shtml)
(https://www.waterboards.ca.gov/water_issues/programs/peer_review/cram.shtml)

V. Climate Change Assessment

The Procedures provide that where permittee-responsible compensatory mitigation is proposed, the permitting authority may require a climate change assessment as part of a draft compensatory mitigation plan. A climate change assessment should consider the potential impacts of climate change on the long-term viability and success of the compensatory mitigation project. Specifically, it should be an assessment of reasonably foreseeable impacts to the compensatory mitigation associated with climate change, and any measures to avoid or minimize those potential impacts. (See also Procedures section IV.A.2.b.viii, page 8.)

This climate change assessment is distinct from an analysis of the project's effect, related to emissions, on climate change required to comply with the California Environmental Quality Act (CEQA). However, the climate change assessment, if required by the permitting authority, may be partially or fully informed through other environmental documentation needed to comply with the Procedures (such as the watershed plan, watershed profile, or alternatives analysis), or other statutory or

regulatory requirements if that environmental documentation is sufficient to meet the requirements as outlined in the Procedures.

For guidance on how and when to prepare a climate change assessment for a permittee-responsible mitigation project, refer to **Attachment A: Climate Change Assessment Framework for Aquatic Resource Compensatory Mitigation Plans**.

VI. Other Frequently Asked Questions

1. Can a single discharger with multiple facilities at different locations apply with one application?

Whether it is appropriate to cover activities at multiple facilities at different locations with one Order depends on the nature of the activities and whether those activities will result in similar types of discharges, the potential adverse impacts are the same, specific project impact details are known at the time of the Order, and the conditions and limitations necessary to alleviate potential adverse impacts are the same.

2. What is the difference between a general order and an individual order?

Requirements for the issuance of a general order are set forth in California Code of Regulations, title 23, section 3861. Pursuant to section 3861, subdivision a: “[a] certifying agency may, on its own motion, take a ‘general’ certification action on discharges within its own geographic area of jurisdiction that may result from a class or classes of activities...A class of activities receiving the general certification shall: 1) consist of the same or similar types of activities; 2) involve the same or similar types of discharges and possible adverse impacts requiring the same or similar certification conditions or limitations in order to alleviate potential adverse impacts to water quality; and 3) be determined by the certifying agency to more appropriately be regulated under a general certification action than under individual certification actions.”

Subdivision d of section 3861 sets forth further limitations on general orders. The general order may only be issued “if the activities to be certified individually or cumulatively will not have any of the following impacts, taking into account the probable effectiveness of any conditions or certification in avoiding or mitigating such impacts:

- 1) Significant adverse impacts on water quality that could feasibly be avoided if individual certification, for proposed activities seeking individual federal licenses or permits, was issued.
- 2) Violation of any water quality objectives adopted or approved under Sections 13170 or 13245 of the Water Code.
- 3) The taking of any candidate, threatened, or endangered species or the violation of the federal Endangered Species Act (16 USC Section 1531 et seq.) or the California Endangered Species Act (Fish and Game Code Section 2050 et seq.).
- 4) Exposure of people or structures to potential substantial adverse effects - including the risk of loss, injury, or death - from flooding, landslides, or soil erosion.”

(Cal. Code Regs., tit. 23, § 3861(d)).

3. Is there a process for confirming that my project is excluded from complying with the Procedures?

Dischargers that believe that their project is excluded from complying with the Procedures and wishing to have written verification may request a written confirmation from the appropriate Water Board(s). This request should include a written statement indicating why the project is excluded and any relevant supporting documentation.

Note that applicants asserting that their project is excluded under section IV.D.1.c of the Procedures should confirm with the appropriate Water Board(s) whether their project is exempt before submitting their application for a section 401 certification or waste discharge requirement, or include a written explanation for why the activity qualifies for an exclusion with their application. As set forth in section IV.D.1.c, “[t]he permitting authority has full discretion to determine whether an activity . . . qualifies for this exclusion based on the application submitted and other relevant information.”

4. Is there a process for appealing a regional board decision or determination with the State Water Board?

Grievances related to regional board actions or failures to act may be petitioned to the state board for reconsideration according to the Cal Code of Regs., tit. 23, section 3867. A standard statewide process for appealing to the state board outside of the petition process outlined in the California Code of Regulations has not been established.

After implementation of the Procedures, the Water Boards will establish contact information for stakeholders to provide feedback on issues regarding consistent implementation of the Procedures.

5. The Procedures state that “[t]he permitting authority may amend an existing Order solely for the purpose of extending the expiration date without requiring a new application.” How should applicants request such extensions?

Requests for to extend an Order’s should be submitted to the appropriate Water Board, in writing. Permittees should consult with the appropriate Water Board if they have further concerns or questions related to requesting extensions.

6. Procedures section IV.D.1.c provides an exclusion for routine and emergency operation and maintenance activities. How is emergency defined?

As set forth in section IV.D.1.c, “[t]he permitting authority has full discretion to determine whether an activity described [in section IV.D.1.d] qualifies for this exclusion based on the application submitted and other relevant information.” The permitting authority may use the definition of emergency projects set forth in California Code of Regulations, section 15269 to guide determinations regarding what constitutes an emergency activity. Generally, emergency activities are actions that are taken to prevent or mitigate

an emergency. Emergency activities may include repairs to publicly owned service facilities necessary to maintain service essential to the public health, safety or welfare.

However, it should be noted that public agencies, water utilities or special districts that may qualify for this exclusion may still need to submit an application consistent with California Code of Regulations, title 23, section 3856 or waste discharge requirements consistent with Water Code section 13260. In some cases, an emergency activity may qualify for a Water Board certified Regional General Permit for emergency activities.

Attachment A: Climate Change Assessment Framework for Aquatic Resource Compensatory Mitigation Plans

I. Introduction

A. Background

The Procedures state that the Water Boards may require a climate change assessment, as part of a compensatory mitigation plan, when permittee-responsible compensatory mitigation is required to offset unavoidable permanent impacts to wetlands or other aquatic resources. This provision was included to address the fact that altered regional patterns in precipitation, temperature, and other drivers due to climate change may negatively impact the ability of compensatory mitigation projects to support the long-term functions and beneficial uses they are intended to provide. State Water Board Resolution No. 2019-0015 directed staff to work with stakeholders, relevant state agencies, and scientific organizations to develop best practices for conducting a climate change assessment. This framework is the product resulting from that collaborative work.

B. Goal

The overall goal of this framework is to support the development and implementation of compensatory mitigation projects that will be resilient to climate change so they can support the long-term functions and beneficial uses of aquatic resources. The framework proposes best practices for applicants and Water Board staff in preparing and evaluating climate change assessments for compensatory mitigation plans. Broadly speaking, climate change assessments are recommended where climate change poses a high level of risk to the aquatic resource in the mitigation plan. The framework provides guidance on 1) identifying reasonably foreseeable impacts to compensatory mitigation projects from climate change; 2) what a climate change assessment should consist of, including resources for assessing climate change impacts; and 3) how to plan compensatory mitigation projects to avoid or minimize impacts from climate change. Applicants should prioritize planning strategies that alleviate the highest risk factors related to climate change for their project.

C. Guidance for Audience

Procedures section IV.A.2.b.viii states that a climate change assessment may be required as part of a draft compensatory mitigation plan for permittee-responsible compensatory mitigation. If a climate change assessment is not provided with the initial application materials, the Water Boards may, on a case-by-case basis, require an assessment be provided within 30 days of receipt of the items set forth in Procedures section IV.A.1. If applicants are unsure if they should submit a climate

change assessment with their application, they are encouraged to contact the appropriate Water Board staff prior to submitting the application.

The framework is aimed at applicants that are both well versed in climate change issues, and those that are unfamiliar with climate change issues. It may also be useful for Water Board staff to use in determining if an applicant should be required to prepare a climate change assessment for a proposed mitigation project and in reviewing climate change assessments submitted by applicants. This framework and the accompanying Appendix A: Optional Climate Change Impact Assessment Worksheet may be used as an organizational tool and general stepwise method. Use of this framework and worksheet are not required, nor are they intended to comprehensively evaluate all possible risk factors or impacts from climate change on a mitigation project. Additionally, other types of assessments related to climate change may be more appropriate to use, depending on the aquatic resource type, type of mitigation, and scale of project. Refer to the List of Resources and References in section V for links to other existing assessment methodologies.

When possible, applicants and Water Board staff should utilize other relevant information provided in application materials in preparing a climate change assessment, such as a watershed profile, watershed plan, and/or long-term management plans, as these application materials will likely already contain some of the information suggested for use in this framework. Lastly, if the mitigation project has been planned in a way that incorporates climate change impacts into long-term viability, a separate climate change assessment may not be necessary.

D. When will a Climate Change Assessment be Required?

The Water Boards may require, on a case-by-case basis, an assessment of reasonably foreseeable impacts to permittee-responsible compensatory mitigation from climate change. In general, Water Board staff may require a climate change assessment for the proposed compensatory mitigation after considering the ability of the aquatic resource to maintain key functions and/or beneficial uses in the face of climate change, as measured by the aquatic resource's exposure, vulnerability, and resilience to climate change. Specifically, Water Board staff may consider (1) the key functions of the aquatic resource that support those beneficial uses, (2) the physical drivers that support those key functions, and (3) how those drivers are likely to be impacted by climate change. Applicants are encouraged to consult with the appropriate Water Board prior to submitting an application to determine if a climate change assessment will be required. In general, it is expected that Water Board staff will evaluate the same type of risk criteria described in section II and Appendix A: Optional Climate Change Impact Assessment Worksheet to determine if a climate change assessment will be required.

II. Preparing a Climate Change Assessment: Identifying Reasonably Foreseeable Impacts from Climate Change

To effectively assess how an aquatic resource may be impacted by climate change, it is important to understand how the physical processes that support the aquatic resource's function may change over time based on expected climate change impacts within that region. By assessing how these functions are likely to change over time, applicants and staff can infer how vulnerable the mitigation project is to impacts from climate change, and thus identify location, design, and management strategies to avoid and minimize those impacts.

The first step in preparing an assessment is to consider how a given aquatic resource is likely to be impacted by climate change. California's different types of aquatic resources, and the functions, services, and beneficial uses that they support (e.g., wildlife habitat, recreation), are ultimately governed by a suite of landscape controls including climate, watershed geology and hydrology, and land use. Climate is a fundamental control on wetland functions, services, and beneficial uses because it helps determine the source of water that supports a wetland (e.g., surface water or groundwater), the way in which the water is delivered to the wetland (e.g., through rain, snowmelt, runoff, fog drip, or flooding), the rate at which water leaves a wetland (e.g., through evaporation and/or transpiration, which are partially governed by temperature), the vegetation communities (or lack thereof) that establish and evolve within a wetland, and related physical and ecological conditions and processes. These relationships are discussed and explored in-depth in the 2012 California Wetland and Riparian Area Protection Policy, Technical Advisory Team Technical Memorandum No. 3.¹

Because climate helps define the physical processes that support aquatic resources, climate change will impact different types of resources in different ways. For example, high Sierra meadows that are largely supported by snowmelt will be impacted by changes in the amount and timing of seasonal snowpack and the relative amount of precipitation that falls as snow instead of rain. Seasonal wetlands in the Central Valley that are supported by surface water and shallow groundwater will be impacted by changes in the timing, duration, and magnitude of storm events, which affect the relative rates of surface runoff and subsurface infiltration. Estuarine wetlands will be impacted by both changes to watershed hydrology and by sea level rise, and by interactions between the two. This variability in governing physical processes across aquatic resource types means that each is vulnerable to climate change through different mechanisms, some of which may be addressed through project location, design, and/or management.

¹ https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/wrapp/memo3.pdf

Climate not only helps govern aquatic resource form and structure, it also governs the ways in which these systems are connected throughout a landscape. These connections can include physical connections (e.g., connectivity between a river and floodplain wetlands during floods) as well as ecological connections (e.g., waterfowl movement between physically disconnected vernal pools or seasonal wetlands). These landscape connections are especially important when considering the impacts of climate change on aquatic resources because climate change affects entire landscapes. For example, with the exception of estuarine and coastal wetlands, aquatic resources in the upper portions of watersheds have smaller contributing watersheds than resources lower in a watershed, so upper-watershed aquatic resources may be relatively more vulnerable to climate-driven changes in the volume, timing, and duration of surface water and/or groundwater. However, aquatic resources lower in watersheds are more vulnerable to cumulative change across broader landscapes. Aquatic resources that provide habitat for rare, special-status, and/or sensitive keystone species may in some cases be less resilient than those without these sensitive species, if the species in question can only persist within a narrow band of environmental conditions that may not be supported in a future climate.

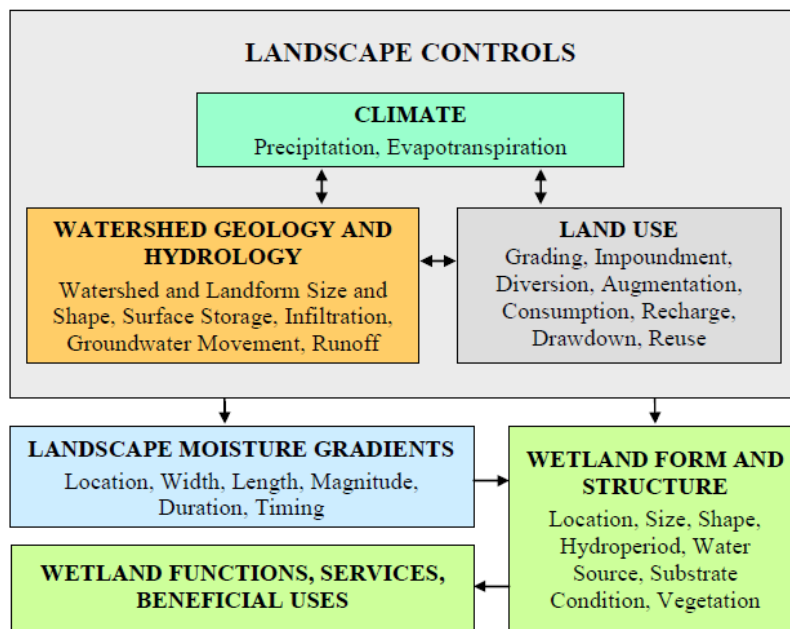


Figure 1. Landscape framework for interpreting wetland functions, services, and beneficial uses in the context of landscape moisture gradients that form within watersheds. 2012 TAT Technical Memo 3.

Section II.A proposes a suite of site-scale and landscape-scale factors that applicants and Water Board staff may consider when developing and accessing climate change assessments for permittee-responsible compensatory mitigation plans. Section II.B describes California’s unique climate regions and summarizes how climate change is likely to impact aquatic resources, including precipitation, temperature, and sea level rise, within those climate regions.

A. Site-Specific and Landscape-Scale Factors to Consider in a Climate Change Assessment

Table 1 presents a list of site-specific and landscape-scale factors that may be considered when determining an aquatic resource's vulnerability to climate change. The list should be expanded where additional region-specific climate change resources and adaptation guidance are available. The table includes criteria to generally determine whether a given factor is low, medium, or high risk.

It is important to emphasize that this list is meant to provide **general guidance only**. Each of these factors and associated risk levels must be considered within the site and landscape contexts of the beneficial uses the resource is intended to provide, the key functions of the aquatic resources that support those beneficial uses, the physical drivers that support those key functions, and how those drivers are likely to be impacted by climate change (based on the site's location within the climate regions discussed in Section II.B). For example: a large vernal pool in the flats of the relatively drier Central Valley supported by rainfall may be more vulnerable to climate change impacts than a small groundwater-fed wetland along the slopes of the relatively wetter North Coast, the high degree of landscape manipulation in more urbanized areas makes the presence/absence of wetland soils in these areas a less reliable indicator of wetland vulnerability than in rural areas, and so forth. Applicants and Water Board staff should consult with published resources and technical experts in their respective regions if they have questions or uncertainties about any of the factors listed below.

Table 1. Factors and risk levels generally associated with climate change impacts to mitigation projects.

	Factor	Low Risk (score = 1)	Medium Risk (score = 2)	High Risk (score = 3)
1.	Aquatic resource type ²	Lacustrine, large riverine wetlands	Perennial depressional, playas, wadeable perennial streams	Seasonal depressional, vernal pools, episodic streams, slope wetlands, estuarine wetlands
2.	Size ³	Large size and small edge: area ratio	Medium Size and medium edge: area ratio	Small Size and large edge: area ratio
3.	Position in watershed	Upper watershed	Mid-watershed	Lower watershed
4.	Soil type and/or appropriate permeability for aquatic resource type	Wetland soils are present, and/or existing permeability is appropriate	Wetland soils are likely present, and/or permeability is likely appropriate	Wetland soils are not present, and/or soils or substrate require significant amending to achieve appropriate permeability
5.	Surrounding land use intensity or encroachment ⁴	Low intensity or encroachment	Medium intensity or encroachment	High intensity or encroachment

² Aquatic resources should be classified based on unique physical characteristics including geomorphic setting, water source, and transport mechanisms, and hydrodynamics. It is recommended that aquatic resources are classified using the California Aquatic Resource Inventory (CARI). CARI is a Geographic Information System (GIS) dataset of wetlands, streams, and riparian areas consisting of polygon and line features that are standardized to a common classification system. CARI is continually updated, so applicants and staff should be sure they're working with the most current version when developing a mitigation proposal and climate change assessment.

³ When determining if an aquatic resource is large, medium, or small the aquatic resource should be compared to other naturally occurring aquatic resources of the same type within the same area (e.g., regional water board, watershed, or climate region). The size determination should be relative to the average sizes of other naturally occurring aquatic resources.

⁴ Climate change impacts should be considered cumulatively in the context of other anthropogenic impacts (e.g., land use and encroachment pressures), which are more immediately and more extensively threatening. Consideration of trends, as well as present and recent pressures on the aquatic resource, will allow a better understanding of where the resource is headed.

	Factor	Low Risk (score = 1)	Medium Risk (score = 2)	High Risk (score = 3)
6.	Hydrological connectivity	Highly connected system through both surface and groundwater or directly abutting an artificial drainage system	Medium hydrological connectivity	Reduced or no hydrological connectivity
7.	Habitat fragmentation	The aquatic resource is located within a project evaluation area ⁵ made of somewhat large, contiguous similar habitats	The aquatic resource is located within a project evaluation area where contiguous habitats are present, but a division into smaller patches is occurring	The aquatic resource is located within a project evaluation area made of several small patches, and isolated from each other by a matrix of habitats unlike the original
8.	Mitigating project design	Project minimizes potential future water deficits ⁶	Project neither minimizes nor maximizes potential future water deficits	Project maximizes potential future water deficits
9.	Existing mitigating aquatic resource conservation plan	There are one or more existing plans that will likely mitigate for <i>most</i> of the climate change impacts	There are one or more existing plans that will likely mitigate for <i>some</i> of the climate change impacts	There are no existing plans that will mitigate for the climate change impacts

B. Regionally Based Climate Factors

California is a large state with diverse landscapes, so climate change impacts vary widely depending on location within the state. California’s overall climate is

⁵ A project evaluation area means an area that includes the project impact site, and/or the compensatory mitigation site, and is sufficiently large to evaluate the effects of the project and/or the compensatory mitigation on the abundance, diversity, and condition of aquatic resources in an ecologically meaningful unit of the watershed. The size and location of the ecologically meaningful unit shall be based on a reasonable rationale.

⁶ Water deficits occur when water demand or connectivity exceeds supply. Water deficits are further compounded by the effects of climate change where changes in precipitation, evapotranspiration, loss of wetlands, decreased groundwater connectivity, and consequent changes on land use are all occurring at an increasing rate.

Mediterranean with a brief, cool, wet season and a longer, warm, dry season. However, California's eleven climate regions, which were developed by the Western Regional Climate Center (WRCC), differ significantly from one another with regards to the timing, volume, and form of precipitation, trends in temperature, and other major climate variables. Scientists from the California Department of Water Resources (DWR) and the WRCC use these regions to track regional differences in how climate change affects trends in precipitation and temperature (Abatzoglou et al. 2009).

How will my aquatic resource be impacted by climate change?

Information that can help applicants and staff assess how an aquatic resource may be impacted by climate change may already be summarized in regional climate change adaptation plans, watershed plans, or other regional planning documents. If a regional planning document exists for the area where the compensatory mitigation project is being proposed, then an applicant should plan the project in accordance with that regional plan. Examples of regional planning documents can be found in section V.A, List of Resources and Documents.

If a regional document does not exist, an applicant may glean information from the summaries of California's eleven climate regions, below. These climate regions are used to track regional differences in climate change trends and the summaries can inform how an aquatic resource may be impacted from climate change. California's climate regions do not directly align with the jurisdictional boundaries of the nine Regional Water Quality Control Boards. Applicants should identify both the appropriate Regional Water Quality Control Board's jurisdiction and the climate region in which their compensatory mitigation project is located (see Figure 2). Regional water boards issue water quality certifications within their region (unless the project overlaps two regional boards, in which case the State Water Board will issue the certification). Use of climate regions is only intended to inform how the physical processes that support the aquatic resource's function may change over time, based on expected climate change impacts within that climate region.

The projections presented in these summaries are drawn from California's *Fourth Climate Change Assessment* (2018)⁷ and *California Climate Science and Data for Water Resources Management* (2015).⁸ The *Fourth Climate Change Assessment* was written and reviewed by researchers from state agencies, federal agencies, state universities, and the private sector. This report provides the most recent climate change projections with statewide coverage available at this time. *California Climate Science and Data for Water Resources Management* was developed by the California Department of Water Resources and relies on WRCC monitoring and

⁷ The statewide assessment, plus regional assessments and technical reports, are available at <http://climateassessment.ca.gov/>.

⁸[https://water.ca.gov/LegacyFiles/climatechange/docs/CA Climate Science and Data Final Release June 2015.pdf](https://water.ca.gov/LegacyFiles/climatechange/docs/CA_Climate_Science_and_Data_Final_Release_June_2015.pdf)

projection data. Applicants should use more recent reports as they become available.

For the proposed compensatory mitigation project, a risk score for *precipitation*, *sea level rise*, and *temperature change* should be generated based on the climate region summaries, below. For example, a mitigation project located in a tidal zone in the North Coast climate region would likely have a high-risk score for sea level rise impacts. For ease of use, refer to Appendix A: Optional Climate Change Impact Assessment Worksheet for guidance on how assess risk for these factors. As a caveat to users, these risk levels are general in nature and do not reflect site-specific conditions or other local considerations. For example, local considerations could include other non-climate stressors such as land use, water management, population growth, and unsustainable development. Applicants may adjust risk levels based on site-specific conditions, provided there is sufficient justification for the adjustment. Risk scores can generally be applied, as follows:

Precipitation Impact Risk Levels:

Low (score = 1): precipitation unlikely to change at the site in the long term

Medium (score = 2): precipitation likely to change at the site in the long term

High (score = 3): precipitation highly likely to significantly increase (flood risk) or decrease (drought risk) at the site, in both the short and long term

Sea Level Rise Impact Risk Levels:

None (score = 0): site is outside of the effects of sea level rise

Medium (score = 2): site may be directly impacted by sea level change

High (score = 3): site will be directly impacted by sea level change in the short and long term

Temperature Impact Risk Levels:

Low (score = 1): temperature change not likely to impact site

Medium (score = 2): temperature change may impact site in the long term

High (score = 3): temperature change likely to impact site in short and long term

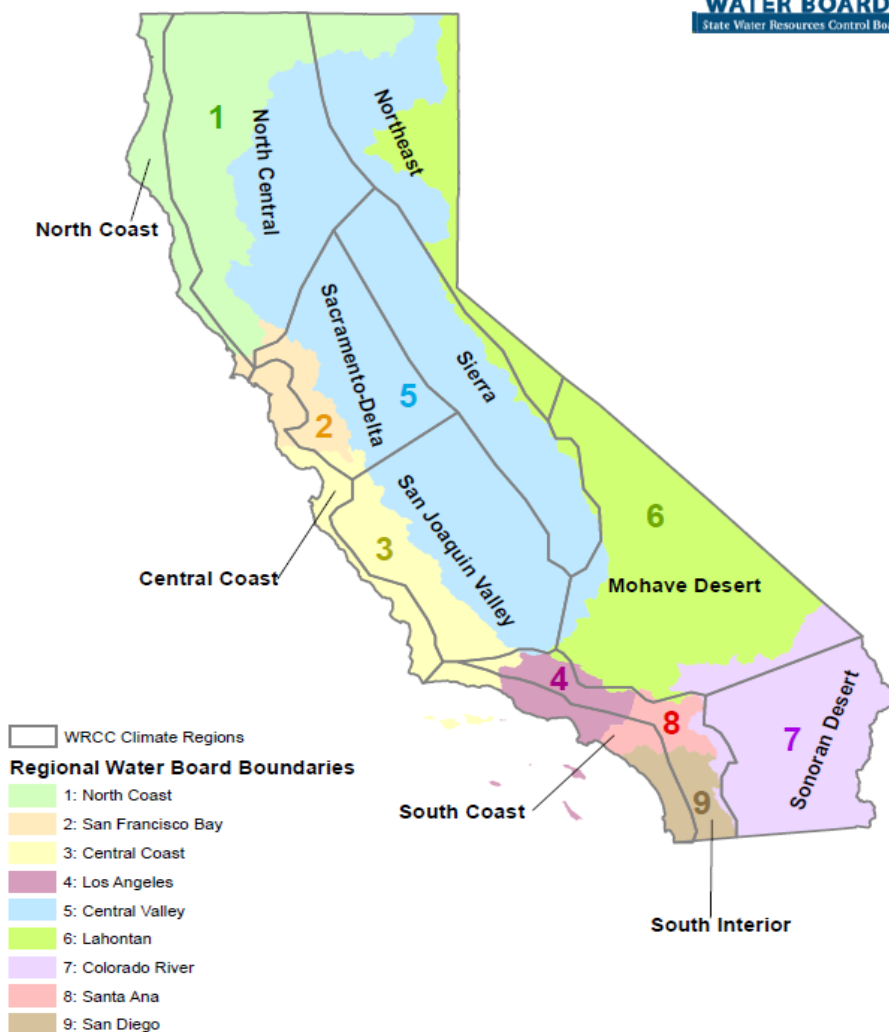


Figure 2. California’s Regional Water Board and Climate Region Boundaries.

1. North Coast

The North Coast Climate Region (North Coast Region) encompasses portions of the North Coast and San Francisco Bay Regional Water Quality Control Boards. The North Coast Region is a narrow, rugged coastline extending from the Oregon border to just south of Point Reyes National Seashore. Temperatures range from the low-30s in winter to the mid-80s in summer due to the moderating effects of the Pacific Ocean. Precipitation falls from November to April followed by a prolonged dry season. Annual rainfall averages 55 inches, making the North Coast Region the wettest part of California. Most of the region’s annual precipitation is delivered by large storms that track eastwards from the Pacific Ocean, resulting in much wetter conditions along the Coast compared to the adjacent North Central Region. Coastal

fog is present year-round and plays a vital role in coastal ecosystems. The spatial pattern of fog and low cloud cover on the North Coast is relatively consistent and is affected by the shape of the coastline relative to prevailing winds, elevation, and orientation of terrain features.

In the North Coast Region, climate change is expected to influence temperatures, precipitation patterns, fog dynamics, and sea-level rise. Summer season temperatures are projected to increase 3-5°F by mid-century and 6-9°F by end-century. Winter season temperatures are expected to increase by a greater magnitude: 5-7°F by mid-century, and 8-11°F by end of century. Increased winter temperatures will result in less precipitation falling as snow, reducing total snowpack to a small fraction of its historical average. Model predictions of annual precipitation fall within the range of historical variation but trend towards slightly higher (2-16%) precipitation across the region by the end of century. However, projections indicate an increase in the intensity of individual storms. The projected rise in the frequency of wet and dry year extremes has been termed “precipitation whiplash” and describes a new climate regime consisting of frequent, dramatic swings between wet and dry years. Precipitation pattern impacts may include changes in soil moisture, extended fire seasons, drought, and flooding. Changes in temperature and precipitation patterns are predicted to reduce summertime coastal fog; however, quantitative projections are difficult to calculate since fog is affected by several complex ocean-atmospheric processes. Land subsidence along the Pacific Northwest coast in combination with the thermal expansion of the ocean drives sea-level rise. Some locations exhibit a rise of 0.09 inches per year, 34 percent greater than the global average rate of 0.06 inches per year. For example, recent estimates of sea-level rise indicate that Humboldt Bay has the highest sea-level rise rate (0.20 in/yr) in California.

2. North Central

The North Central Climate Region (North Central Region) encompasses the inland portion of the North Coast and the north western portion of the Central Valley Regional Water Quality Control Boards. It is positioned between the rugged coastline of the North Coast Climate Region and Northeastern Climate Region. High inter-annual variability is typical for the North Central Region since it encompasses such a large portion of California. Its central position leads to drier conditions and more variable temperatures, which often fall below 30°F in the winter and exceed 100°F in the summer. Rainfall varies in this region and is dependent upon proximity to the coastline and mountain ranges. Most of the region’s precipitation drains into large coastal rivers or large reservoirs.

In the North Central Region, direct impacts from climate change include rising temperatures, changes to precipitation patterns, and drought. Summer temperatures are projected to increase 3-5°F by mid-century and 6-9°F by end of century. Winter temperatures are expected to increase by a greater magnitude: 5-7°F by mid-century, and 8-11°F by end of century. Temperature increase in conjunction with

longer dry periods will extend the fire season, especially for higher elevations with decreasing snowpack. Loss of snowpack storage resulting from increased temperatures is also projected to impact runoff and streamflow patterns, placing additional stress on water systems. Overall, annual precipitation is predicted to fall within the range of historical variation; however, models indicate that the intensity of individual storms will increase and will be compressed into shorter periods of time. This would result in a later onset of rain in the fall and earlier spring drying.

3. Northeast

The Northeast Climate Region (Northeast Region) encompasses segments of the Central Valley, North Coast, and Lahontan Regional Water Quality Control Boards. The Northeast Region is positioned on the eastern side of the northern Sierra Nevada and southern Cascade ranges along the edge of The Great Basin. The topography of the surrounding mountain ranges produces a continental desert climate regime of dry, mild summers and cold, dry winters. The Northeast Region receives 15-18 inches of orographic precipitation annually but varies considerably year to year. At elevations of 4,000 feet or higher, precipitation will fall as snow and accumulate to form snowpack. Due to the Region's position, there is limited surface water drainage to the ocean. Most precipitation will either evaporate, sink underground, or flow into lakes (mostly saline).

Climate changes are already underway in the Northeast Region, affecting heat and precipitation extremes, with long-term warming trends, declining snowpack, and changes in streamflow timing. These climatic changes will depend on many factors, including elevation within the mountain range, with quicker warming trends and precipitation changes at highest elevations. Annual precipitation overall is projected to vary by no more than $\pm 10-15\%$ of current totals in the Northeast Region; however, precipitation extremes (both as deluge and drought) are expected to increase in frequency remarkably as a result of climate change. The observed average temperature change over the past century for the Northeast Region is an increase of 1-2°F. By the end of the century, temperatures are projected to warm by 6-10°F on average, which is enough to increase the divide between rain and snow during a storm by 1500-3000 feet. The rise in snowline translates to more rain for the Northeast Region and a decrease in overall snowpack. At the conclusion of spring, snowpack is projected to be largely gone and water that has flowed out of the range in the cool season will no longer be available. This would lead to a dramatic decline in summer runoff, streamflows, soil moisture, and groundwater recharge. In addition, an increase in temperatures combined with prolonged dry periods is projected to increase the frequency and total area burned by wildfires.

4. Sierra

The Sierra Climate Region (Sierra Region) encompasses the Central Valley and Lahontan Regional Water Quality Control Boards and is characterized by its mountainous landscape and its role as "California's reservoir." The relatively high

elevations of the mountains in the Sierra Region lend to a cool, wet climate with some of the largest year-to-year climatic fluctuations in the United States. Due to topographic differences, the southern Sierra receives more snow than the northern Sierra. The snowpack that accumulates at higher elevations comprise a seasonally varying natural reservoir that holds water equal to—on average in spring—about two-thirds of the average overall volume of water stored in the state’s man-made reservoirs. At the onset of spring, the stored water is slowly released into streams and recharges groundwater supplies. This process is known as the “spring pulse.” The annual rise in water levels inundate wetlands and act as a secondary water reservoir. The wetlands absorb runoff, reducing spring flooding downstream. The spongy soils store the water for later use while supporting plant and animal communities.

Similar to the Northeast Region, climate changes are already impacting the Sierra Region. The observed temperature change over the past century for the Sierra Region is an increase of 1-2°F. Minimum temperatures in this region have increased about three times faster than maximum temperatures. The rise in spring season minimum temperatures and decrease in the number of days with temperatures below freezing have impacted snowpack and rate of snowmelt. Snow cover is a factor affecting temperature in this region: the disappearance of snow cover exposes surfaces that absorb solar energy, resulting in further warming (a phenomenon known as “snow albedo feedback”) (Walton et al., 2017). By the end of century, temperatures are projected to warm by 6 to 10°F on average, which is enough to raise the divide between rain and snow during a storm by about 1500 to 3000 feet. The southern Sierras are partially buffered against rising temperatures by their higher elevation but are still expected to have declines in total snowpack of about 40% while the northern Sierras are expected to have almost no annual snowpack by the end-of-century. This would lead to a dramatic decline in summer runoff, streamflows, soil moisture, and groundwater recharge. Projections of future precipitation totals range from about -5% to +10% depending on location within the Sierra Region. However, precipitation from large storms - e.g., maximum-annual 3-day precipitation totals and atmospheric rivers - is projected to increase by 5-30% compared to historical norms. Increased interannual variability is projected to increase remarkably both as deluge and drought. An increase in temperatures combined with prolonged dry periods is projected to increase the frequency and total area burned by wildfires.

5. Sacramento-Delta

The Sacramento-Delta Climatological Region (Sacramento-Delta Region) encompasses the Central Valley, San Francisco Bay, and Central Coast Regional Water Quality Control Boards. It is enclosed by the Sierra Nevada mountains to the east, and the Coastal mountains to the west. The Sacramento-Delta Region has mild, wet winters and hot, dry summers with average annual rainfall of 15-25 inches (Huber-Lee et al.). The Delta of the Sacramento and San Joaquin Rivers is upstream of the largest estuary on the U.S. West Coast, the San Francisco Estuary

(Cloern et al. 2011). Both rivers are sourced from Sierra runoff and reservoir outflow which then flow onto the valley floodplains (Knowles and Cayan 2002). Once the water has been delivered to the valley, it flows over a 3,000-square-kilometer landscape comprised of islands and shallow waterways before flowing into the San Francisco Estuary.

Climate change has direct, measurable impacts to the Sacramento-Delta Region, such as rising temperatures and shifting precipitation patterns. The observed average temperature increase over the past century is 1.5-2.5°F. By mid-century, the annual mean temperature is projected to increase by 4°F, and the daily maximum temperature will increase 10°F by end of century. Rising temperatures will continue to result in more frequent and intense heat waves throughout the Sacramento-Delta Region. For example, midtown Sacramento is projected to experience a spike in extreme heat days (temperatures more than 103.9°F) from about 4 days/year to 40 days/year by the end of the century. Despite little projected change in annual precipitation, extreme weather events of drought to deluge are expected to increase approximately 25%. Extended dry periods increase the likelihood for wildfires in the spring, summer, and fall. Wetter localized winters in addition to increased winter runoff from the northern Sierras will challenge water storage and flood control systems, leading to a greater flood risk. End-of-century sea level rise in the San Francisco Bay area is likely to be 2.5 to 4 feet, which will lead to the intrusion of salty ocean waters into the freshwaters of the Sacramento-Delta Region.

6. San Joaquin Valley

The San Joaquin Valley Climate Region (San Joaquin Valley Region) encompasses the Central Valley and Central Coast Regional Water Quality Control Board. The San Joaquin Valley Region is characterized by its hot, dry summers and foggy, rainy winters. However, it receives significantly less annual rainfall than the Sacramento Valley at, on average, 5-15 inches a year. Extending southward from the Sacramento-Delta, the San Joaquin Valley Region is bounded by the Sierra Nevada to the east, Tehachapi Mountains to the south, and the Coast Ranges to the west. Like the Sacramento-Delta Region, the San Joaquin Valley Region receives most of its' surface water supply from Sierra runoff and reservoir outflow (Knowles and Cayan 2002). The San Joaquin River and its tributaries drain the northern half of the San Joaquin Valley Region and flow towards the Delta; the southern half of the San Joaquin Valley Region drains to the closed Tulare Basin.

Potential impacts from climate change in the San Joaquin Valley Region include rising temperatures, more frequent extreme weather events, more severe and frequent wildfires. The observed average temperature change over the past century is an increase of 1-2°F. By the mid-21st century, the annual mean temperature is projected to increase by 4°F. Despite little projected change in annual precipitation, extreme weather events of drought to deluge are expected to increase by the end of the century. Extended dry periods in combination with increased temperatures

increase the likelihood for wildfires in the spring, summer, and fall. Such conditions would also increase the demand on groundwater resources since Sierra snowpack is a major water resource for the San Joaquin Valley Region. Wetter localized winters in addition to increased winter runoff from the southern Sierras will challenge water storage and flood control systems, leading to a greater flood risk.

7. Central Coast

The Central Coast Climate Region (Central Coast Region) encompasses parts of the San Francisco Bay and Central Coast Regional Water Quality Control Boards. It stretches from Point Reyes National Seashore to Point Conception. The Central Coast Region is tempered by the ocean climate and coastal fog, so the temperatures are generally cooler and less variable than inland regions of the state. Fog droplets transported from the marine environment add water to coastal systems and provide up to a third of the water received by coastal ecosystems. The landscape pattern of coastal fog and low clouds is remarkably stable. Low elevation sites and valleys in the Central Coast Region that are open to northwest summer winds, such as Salinas Valley and Monterey Peninsula, average 15 hours/day of summertime fog and low cloud cover. Areas protected from the wind, such as Santa Cruz, get the least fog. Low cloud cover reflects solar radiation, which is an important cooling process and reduces plant evapotranspiration and water demand. Annual average precipitation varies depending on location but generally decreases from 37 inches in the north to 16 inches in the south.

Over the past century, the mean temperature has increased by 1.5-2°F. Due to climate change, by the end of this century, annual average minimum temperatures are projected to rise by 7-8°F across the Central Coast Region. Average precipitation is expected to increase by a relatively small amount but on a daily time scale, the wettest day of the year is expected to increase up to 35% for some locations relative to historical standards by the late-century. The Central Coast Region is projected to be subject to increasingly variable and extreme precipitation and dry weather periods, driven by El Niño conditions and atmospheric rivers. The future of coastal fog in the Central Coast Region is uncertain due to the complexities of its formation and feedbacks between ocean, air and land systems. However, historical trends have shown a decrease in over land fog due to land surface change. The Central Coast Region has historically experienced 0.84-1.39 mm/yr of sea level rise, depending on location and vertical land motion. Coupled with the accelerating rate of sea level rise over the coming decades, coastal erosion and cliff retreat rates can also be expected to increase significantly.

8. Mojave Desert

The Mojave Desert Climate Region (Mojave Desert Region) encompasses segments of the Lahontan, Central Valley, and Colorado River Basin Regional Water Quality Control Boards. It is characterized by large seasonal and diurnal fluctuations in temperatures, experiencing over 130°F during the summer in the lowest parts of the

Death Valley, and below 0°F at the highest elevations during winter months. The Mojave Desert Region is a cool high desert compared to the Sonoran Desert Region directly to the south. Average rainfall rates are highly variable from year to year at approximately 5 inches a year. Precipitation in the Mojave Desert Region occurs during two seasons. In the winter, large scale global circulations occasionally bring extratropical cyclones from the northern and eastern Pacific region. These storms are responsible for most of the annual rainfall with February typically being the wettest month. Winter precipitation increases with elevation and decreases going north to south, and west to east. In the summer, global circulations reverse, allowing the North American Monsoon to periodically drift westward into this portion of the state. The monsoonal rains account for about 15% of precipitation in the Mojave Desert Region. The Mojave Desert Region contains several large groundwater basins; however, the Colorado River is the main source of freshwater since it receives such little annual precipitation.

The observed temperature change over the past century has been an increase of 1.5-2.5°F. By the end of the next century, higher elevations are projected to experience only 2 days a year with temperatures below freezing. Victorville, for example, experienced an average of 44 days a year below freezing from 1981-2000. In contrast, daily maximum temperatures are projected to increase by 8-14°F on top of the already extreme heat the Mojave Desert Region experiences. Extremely hot days, defined as temperatures >95°F, are projected to increase in frequency from the historical average of 90 per year up to 141 by the end of the century. Higher temperatures as a result of climate change enable the atmosphere to carry more water, increasing evaporative demand on already scarce water supplies and a decrease in soil moisture. Dry soils are poor absorbers of precipitation and cause increased runoff. Climate change is also anticipated to increase the variability of precipitation patterns in the Mojave Desert Region, with reductions in minimum annual precipitation up to 50% and increases of maximum annual precipitation of 40-65% by the end of the 21st century. Sudden influxes of unprecedented precipitation in combination with drier soils have the potential to overwhelm infrastructure and cause more frequent flash flooding events. Extreme drought weather events increase the risk of wildfire given the close relationship between precipitation variability and growth of invasive grasses, which act as the major fuel for wildfire in the Mojave Desert Region.

9. Sonoran Desert

The Sonoran Desert Climate Region (Sonoran Desert Region) is entirely within the boundary of the Colorado River Regional Water Quality Control Board Summer air temperatures routinely exceed 104°F, and often reach 118°F. The Sonoran Desert Region is a hot low desert compared to the Mojave Desert Region to the north. The Region is characterized by its' extreme temperatures and moderate rainfall, averaging 3-20 inches depending on elevation. Precipitation in the Sonoran Desert Region occurs during two seasons. In the winter, large scale global circulations occasionally bring extratropical cyclones from the northern and eastern Pacific

region. These storms are responsible for most of the annual rainfall with February typically being the wettest month. Winter precipitation increases with elevation and decreases going north to south, and west to east. In the summer, global circulations reverse, allowing the North American Monsoon to periodically drift westward into this portion of the state. The monsoonal rains account for about 30% of precipitation in the Sonoran Desert Region.

Over the past century, mean temperature has increased by 1-2°F and minimum temperature has increased nearly 3°F. Daily maximum temperatures are projected to increase by 8-14°F and extremely hot days, defined as temperatures >95°F, are projected to increase in frequency from the historical average of 135 per year up to 179 by the end of the century.

Current models reveal an increase in inter-annual precipitation variability, with reductions in minimum annual precipitation of up to 50% and increases in maximum annual precipitation of 40-65% by the end of the century. Sudden influxes of unprecedented precipitation in combination with drier soils have the potential to overwhelm infrastructure and cause more frequent flash flooding events. Extreme drought weather events would increase the risk of wildfire given the close relationship between precipitation variability and growth of invasive grasses, which act as the major fuel for wildfire in the region.

10. South Interior

The South Interior Climate Region (South Interior Region) encompasses the inland portions of the Central Coast, Los Angeles, Santa Ana and San Diego Regional Water Quality Control Boards and the south western edge of the Lahontan and Colorado River Basin Regional Water Quality Control Boards. It is located directly inland of the South Coast, spanning from the Los Padres National Forest to the Cleveland National Forest at the Mexico-United States border. Due to its inland position, the South Interior Region experiences greater temperature ranges and seasonal precipitation amounts compared to the adjacent South Coast Region. During summer, daily maximum temperatures in the South Interior Region average 10-20°F warmer than the South Coast Region. In some parts, average summer maximum temperatures exceed 100 °F. At night, the dry conditions in the desert promote nighttime cooling. In winter, average coastal and desert temperatures are more similar than in summer. However, there are notable differences in the amount of day-to-day variability. The coldest winter temperatures are observed in the highest elevations, where average nighttime winter temperatures are below freezing. Most of the heaviest events occur during winter, although the region occasionally experiences a few high rainfall events from tropical storms or convective rainfall patterns during late summer and early fall. Annual total precipitation ranges between a low of 5 inches to a high of over 35 inches, depending on elevation. Similar to other California regions, the high year-to-year variability of precipitation in the South Interior Region is heavily affected by extreme precipitation events, which accounts for 80% of the year-to-year variability.

The observed temperature change over the past century for the South Interior Region has been an increase of 1-2°F. By the end of the century, climate change is expected to raise yearly average temperatures by about 7-10°F. The average hottest day is projected to increase to 110-125°F, which is 5-10°F hotter than the historical average. Although the region is projected to experience more intense precipitation events, droughts are also projected to become more frequent and intense. The increase in drought is a result of fewer wet days as the subtropical zone expands leading to more dry years. More dry years also lead to an increase in the duration, frequency, and severity droughts in the future. Higher temperatures will exacerbate future droughts leading to larger water deficits across the landscape. The projected changes in the precipitation regime, with increasing drought and drier autumns, will increase wildfire risk during the dangerous fire weather conditions that Santa Ana winds create especially during the peak season in December and January.

11. South Coast

The South Coast Climate Region (South Coast Region) encompasses the coastal portions of the Central Coast, Los Angeles, Santa Ana and San Diego Regional Water Quality Control Boards. The strip of coastline stretches from Santa Barbara county down to the Mexico-United States border. Precipitation and temperature depend on several factors, such as distance from the coast, elevation, and local topographic features. Most of the South Coast Region's surface water comes from Sierra Nevada and Colorado Rockies runoff in conjunction with reservoir outflow. Average temperatures in the South Coast Region range from 59-89°F in summer to 32-58°F during winter.

The observed temperature change over the past century for the South Coast Region has been an increase of 2-3°F, which is the largest increase of any region. However, the South Coast Region is projected to experience relatively lower amounts of warming compared to inland regions as the ocean provides a buffering effect. By the end of the century, average maximum temperatures are projected to increase 5-8°F. The number of extremely hot days is also projected to increase, with the hottest day of the year up to 10°F warmer compared to historical trends. Fifty percent of the region's annual precipitation comes from a handful of storms, resulting in less than 12 inches of rain a year. Average precipitation is highly variable year to year; however, climate change is predicted to increase periods of extreme drought and extreme rainfall. The frequency and intensity of wildfires is predicted to increase as the South Coast's climate becomes more variable with extended periods of droughts and increasing temperatures. By the middle of the twentieth century, sea level is projected to rise approximately 1-2 feet along the southern coast of California. Coupled with intensified storms, future sea level rise is predicted to cause coastal flooding and coastal erosion

C. Assessing Overall Impact Risk Level

After cumulatively considering these factors (and others, if highlighted in region-specific climate change and adaptation guidance and/or local considerations), staff must use their best professional judgment to determine if the available information indicates:

1. Whether or not a given project has a low, medium, or high risk of climate change vulnerability, and therefore will require a climate change assessment (if a climate change assessment has not already been submitted). High-risk projects will likely always require a climate change assessment, medium-risk projects will frequently require them, and low-risk projects may need them depending on landscape context and the beneficial uses/ecological functions/etc. in question.
Note: Steps 1 and 2 of Appendix A: Optional Climate Change Impact Assessment Worksheet could also be used as an initial screening tool for applicants or Water Board staff to assess if a climate change assessment will be required for a mitigation project.
2. If a climate change assessment has already been submitted, whether it adequately addresses the risks of climate change impacts by proposing appropriate design and adaptive management provisions to avoid and/or minimize the long-term impacts of medium-and high-risk climate vulnerability factors. Additional information about impact avoidance and minimization factors is provided in section III.

If inadequate information about either the project or its landscape context is provided by the applicant such that staff cannot confidently assess the factors listed above, staff should request supplemental information from the applicant.

The score generated from sections II.A and II.B will inform the overall risk of climate impacts for the proposed compensatory mitigation project. Generally, if the risk level is low (recommended score of less than twenty (20)), additional avoidance and minimization measures for the project may not be needed. If the risk level is high (recommended score of more than twenty (20)), applicants and staff should identify how avoidance and minimization measures may be incorporated to the compensatory mitigation plan. Suggestions on how to incorporate such strategies are described in section III. Note that there may be other factors or considerations in addition to the ones described in sections II.A and II.B that may increase or decrease the risk of climate change affecting the compensatory mitigation project. For example, other factors may include local considerations such as land use, water management, population growth, and unsustainable development. Applicants are encouraged to consult with the appropriate Water Board to discuss if there are any local or regional factors that should be included in the risk assessment.

III. Using a Climate Change Assessment to Inform Compensatory Mitigation Project Planning

Once the reasonably foreseeable impacts from climate change have been identified for a compensatory mitigation project, and it has been determined that a climate change assessment is necessary, the next step is to identify how avoidance and minimization measures may be incorporated to mitigate for those impacts. For example, the compensatory mitigation project may be modified with regard to the location, design (including shape and size), and/or management to lessen the risk of failure, or the long-term success standards could be modified to incorporate expected climate impacts. Essentially, by ensuring that a project is planned in a way that promotes achievement of performance standards, a project is more likely to succeed and be resilient to impacts from climate change in the future. In addition, planning projects with climate change in mind may be advantageous to applicants as this may alleviate the need for, and cost associated with, some adaptive management measures. Management strategies listed below are not meant to be prescriptive in the sense that one management strategy could apply to multiple aquatic resource types.

A. Management Strategies for Coastal Wetlands

The following is a list of general strategies that may be incorporated into a compensatory mitigation plan to mitigate for reasonably foreseeable impacts from climate change to coastal wetlands. Applicants should prioritize strategies that alleviate the highest risk factors for their project. For example, if the proposed compensatory mitigation project is at risk due to a high degree of ecological isolation, applicants can minimize that impact by removing barriers to reconnect wetlands. This strategy will facilitate species movement, natural sediment transport, and hydrological flows between wetland fragments and from river channels into wetlands. See section V.A for a list of resources and references that may assist in informing measures to offset impacts from climate change to coastal wetlands.

- Remove barriers that prevent wetlands from expanding or migrating.
- Protect, manage, and acquire adjacent land, including within the wetland-upland transition zone.
- Grade areas adjacent to wetlands to increase opportunity for migration.
- Relocate or modify adjacent infrastructure or development.
- Remove barriers to reconnect channels to wetlands.
- Allow tidal inlets to open and close naturally.
- Modify or remove structures to restore inundation regime.
- Remove barriers to release sediment held higher in the watershed.
- Manage flows in river channels to increase their capacity to move sediment from the watershed.
- Augment sediment processes to raise and maintain marsh elevation.

B. Management Strategies for Non-Coastal Wetlands

The following is a list of general strategies that may be incorporated into a compensatory mitigation plan to mitigate for reasonably foreseeable impacts from climate change to non-coastal wetlands. Applicants should prioritize strategies that alleviate the highest risk factors for their project. For example, if the proposed compensatory mitigation project is at high risk because the project maximizes its water consumption and evapotranspiration due to projected increase in temperatures, applicants can minimize that impact by incorporating shaded buffers into the project design. Increased shade may moderate water temperatures, reducing water consumption and evapotranspiration. See section V.B for a list of resources and references that may assist in informing measures to offset impacts from climate change to non-coastal wetlands.

- Include buffers in project design to reduce potential for erosion and pollution, to keep water temperature low, and to allow migration of plant and animals. For example, including buffer areas will reduce the potential for erosion by slowing the flow of surface waters to the aquatic resource during precipitation events.
- Support local biodiversity and ecosystems, provide vegetation corridors for enabling species range shift and improve habitat connectivity.
- Enlarge existing wetlands and create new ones, increasing the habitat connectivity by adding new habitat patches. For species that are sensitive to landscape barriers, increase the permeability by increasing the density of natural and semi-natural elements in anthropogenic landscapes (e.g., agricultural landscapes).
- Promote habitat diversity by maintaining macro- and microtopographic features, such as swales, oxbows, or potholes.
- Reintroduce rare and threatened species (such as seeding or planting mature native species) to restore self-sustaining and genetically diverse populations, with multiple patches in multiple locations.
- Prevention, and where possible, reversal of local drainage schemes, especially where wetlands have been historically drained or local catchment runoff has been artificially diverted around and away from natural wetlands.
- Management of other degrading factors such as stock access, grazing and cropping activities, invasive species etc.

C. Management Strategies for Streams

The overall management strategy for streams and watersheds is: 1) to protect and restore streams to render them resilient now; and 2) to make near-term resilience an explicit planning objective. Streams and ecosystems that are resilient now or in the near-term will more likely to be resilient in the future under increasing climate change threats. Such systems will have higher capacity to absorb disturbance and to reorganize in ways that retain the same functions, structures, and feedbacks, and will therefore have a higher chance to evolve into self-sustaining systems.

Applicants should prioritize strategies that restore and increase diversity and connectivity in streams and watersheds. Hydrologic and ecologic connectivity enhances capacity for self-organization and recovery at multiple scales both through space and time. Diversity and spatial/temporal variability of habitats confer resilience by maintaining functions and species diversity. Applicants should also prioritize strategies that alleviate the highest risk factors for their project. For example, if the proposed compensatory mitigation project is at risk due to a low degree of hydrologic connectivity, applicants can minimize that impact by incorporating riparian buffers, floodplain restoration, or groundwater recharge sites. See section V.B for a list of resources and references that may assist in informing measures to offset impacts from climate change to streams.

The following is a list of general strategies that may be incorporated into a compensatory mitigation plan to mitigate for reasonably foreseeable impacts from climate change to streams.

- Match the scale of mitigation and restoration to the scale of physical and biological functions at the site or watershed.
- Avoid and reverse encroachment on floodplains and riparian areas in streams. One of the most effective strategies is to include buffer zones along streams to provide space for functions to take place and to allow for a dynamic, ecologically healthy stream.
- Expand protected and natural areas. Avoid or minimize encroachment on wildlands.
- Avoid or minimize impacts to native vegetation.
- Explicitly consider management of sediment regime and not just the flow regime. Mitigation plan designs should consider changes in sediment production, transport, and delivery, in addition to changes in runoff and temperature.
- Increase shade via riparian restoration to mitigate against increases in water temperatures in areas where temperature increases are expected to be significant.
- In urban areas, recognize green infrastructure and Low Impact Development principles as the core management strategy to reduce stormwater runoff, provide additional green space, reduce impervious cover, and recharge water in the local groundwater system.

IV. List of Resources and References

A. Regional Climate Change Adaptation Plans, Watershed Plans, or Other Regional Planning Documents

DWR and WRCC maintain the *California Climate Tracker*⁹, which allows for the easy tabular or graphical presentation of historic and current climate data (currently temperature and precipitation) for all of California's climate regions.

DWR uses information from the California Climate Tracker to develop its *State Hydroclimate Reports*, released annually by the Office of the State Climatologist.¹⁰ These reports describe observed climate status and trends for each water year (WY), and support advance planning work on adapting to and mitigating for climate change impacts.

California's Fourth Climate Assessment developed a series of reports¹¹ that summarize relevant climate impacts for the state's different regions (political, not climate regions), including potential changes in temperature and precipitation.

Stakeholders in the San Francisco Bay Region (including the SF Bay Water Board) collaboratively developed an update to the *Baylands Goals Project* that focuses on how sea level rise driven by climate change will impact the Bay's tidal wetlands, and proposes a suite of strategies to improve the long-term, landscape-scale resilience of these systems.

The Southern California Wetlands Recovery Project (WRP) collaboratively developed "*Wetlands on the Edge: The Future of Southern California Wetlands, Regional Strategy 2018*"¹² which outlines key restoration priorities and approaches for coastal regions located in Southern California which include Santa Barbara, Ventura, Santa Monica, San Pedro, and San Diego.

B. Management Strategies for Coastal Wetlands

The Southern California Wetlands Recovery Project (WRP) collaboratively developed "*Wetlands on the Edge: The Future of Southern California Wetlands, Regional Strategy 2018*"¹³ which outlines key restoration priorities and approaches

⁹ <https://wrcc.dri.edu/Climate/Tracker/CA/>

¹⁰ <https://water.ca.gov/Programs/Flood-Management/Flood-Data/Climatology-and-Meteorology>

¹¹ <http://climateassessment.ca.gov/regions/>

¹² https://scwrp.org/wp-content/uploads/2018/10/WRP-Regional-Strategy-2018-100518_lowRes.pdf

¹³ https://scwrp.org/wp-content/uploads/2018/10/WRP-Regional-Strategy-2018-100518_lowRes.pdf

for coastal regions located in Southern California which include Santa Barbara, Ventura, Santa Monica, San Pedro, and San Diego.

The Association of State Wetland Managers (ASWMs) in the “*Recommendations for a National Wetlands and Climate Change Initiative*”¹⁴ provide specific adaptation measures for coastal/estuarine and freshwater wetlands.

Ivajnsič, D., & Kaligarič, M. (2014, 10). How to Preserve Coastal Wetlands, Threatened by Climate Change-Driven Rises in Sea Level. *Environmental Management*, 54(4), 671-684.

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Zedler, J. (2017, 1). What's New in Adaptive Management and Restoration of Coasts and Estuaries? *Estuaries & Coasts*, 40(1), 1-21.

C. Management Strategies for Non-Coastal wetlands

The Association of State Wetland Managers (ASWMs) in the “*Recommendations for a National Wetlands and Climate Change Initiative*”¹⁵ provide specific adaptation measures for coastal/estuarine and freshwater wetlands.

The Department of Sustainability and Environment, Victorian Government, provide the “*Indicative Assessment of Climate Change Vulnerability for Wetlands in Victoria*”¹⁶ which includes a number of management options for wetlands that may be applicable to aquatic resources in California.

New York State’s Department of Environmental Conservation developed Technical Guidance for Creating Wetlands as Part of Unconsolidated Surface Mining Reclamation (1997),¹⁷ which could be a useful resource in planning wetland restoration and/or establishment projects.

Ausden, M. (2014, 10). Climate Change Adaptation: Putting Principles into Practice. *Environmental Management*, 54(4), 685-698.

¹⁴ <https://research.fit.edu/media/site-specific/researchfitedu/coast-climate-adaptation-library/united-states/national/us---other-national-reports/ASWM.-2009.-US-National-Wetlands--CC-Initiative.pdf>

¹⁵ <https://research.fit.edu/media/site-specific/researchfitedu/coast-climate-adaptation-library/united-states/national/us---other-national-reports/ASWM.-2009.-US-National-Wetlands--CC-Initiative.pdf>

¹⁶ https://www.water.vic.gov.au/_data/assets/pdf_file/0024/66336/Wetland-vulnerability-to-climate-change-Victoria.pdf

¹⁷ http://www.dec.ny.gov/docs/materials_minerals_pdf/wetland.pdf

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D. Management Strategies for Streams

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Kingsford, R. (2011). Conservation management of rivers and wetlands under climate change—a synthesis. *Marine and Freshwater Research*, 62(3), 217-222.

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Appendix A: Optional Climate Change Impact Assessment Worksheet

The purpose of this worksheet is to provide an optional resource to applicants that are required to assess reasonably foreseeable impacts from climate change to a compensatory mitigation project. This worksheet is intended to serve as an organizational tool and general stepwise method for applicants to use when assessing the ability of the aquatic resource to maintain the beneficial uses the aquatic resource is intended to provide, the key functions of the aquatic resources that support those beneficial uses, the physical drivers that support those key functions, and how those drivers are likely to be impacted by climate change. Use of this worksheet is not required for this purpose, nor is it intended to comprehensively evaluate all possible risk factors or impacts from climate change on a mitigation project. In addition, other types of assessments related to climate change impacts may be more appropriate, depending on the aquatic resource type and scale of project. Applicants should work with staff at the Water Boards to determine if a different type of climate change assessment method is more appropriate for the proposed mitigation project.

Note: Steps 1 and 2 of this worksheet could also be used as an initial screening tool for applicants or Water Board staff to assess if a climate change assessment may be required for a mitigation project.

Step 1. Identify Reasonably Foreseeable Impacts

Fill out the table below to assess the risk of reasonably foreseeable climate change impacts to your mitigation project. For the Description of Risk or Impact Level column, refer to Table 1 in Section II.A to fill the appropriate risk description and score. The Risk Score for levels of impacts for Precipitation, Sea Level, and Temperature are generally identified by each climate region in Section II.B. For example, a compensatory mitigation project located in the tidal zone in the North Coast climate region would likely have a high-risk score (3) for sea level impacts.

What is the risk your mitigation project may be impacted by climate change?

Factor	Description of Risk or Impact Level	Risk Score
1. Aquatic resource type	<i>[Example: Lacustrine, large riverine wetlands]</i>	<i>[1]</i>
2. Size		
3. Position in watershed		
4. Soil type/permeability		
5. Land use intensity or encroachment		
6. Degree of hydrological connectivity		
7. Degree of habitat fragmentation		
8. Mitigating project design		
9. Existing mitigating aquatic resource conservation plan		
10. Precipitation Impact	See climate regions in section II.B above.	
11. Sea Level Impact	See climate regions in section II.B above.	
12. Temperature Impact	See climate regions in section II.B above.	
13. Regional Factors	If applicable; consult with your Regional Board.	

Risk Level Total

Step 2. Assess Overall Impact Risk Level

Evaluate your risk of impacts based on your Risk Level Total:

- a. If your Risk Level Total equals less than 20, then your project is generally considered to be at a low risk of being impacted by climate change.
- b. If your Risk Level Total equals more than 20, then your project is generally considered to be at a high risk of being impacted by climate change. Go on to Step 3.

Note: there may be other factors or considerations in addition to the ones listed above that may increase or decrease the risk of climate change affecting your project. Consultation with the appropriate Regional Board is encouraged to discuss if there are any local or regional factors that should be included in the risk assessment.

Step 3. Identify Avoidance and Minimization Measures

If your project scored as a high level of risk from impacts associated with climate change in Step 2, identify measures to avoid and/or minimize those impacts on your mitigation project. For guidance on what types of measures can be taken, refer to sections III and V.

A. Identify project design measures that will avoid and/or minimize impacts from climate change:

B. Identify monitoring and/or performance measures that will avoid and/or minimize impacts from climate change:

A large, empty rectangular box with a thin black border, intended for the user to provide monitoring and/or performance measures. The box is currently blank.

C. Identify management measures that will avoid and/or minimize impacts from climate change:

A large, empty rectangular box with a thin black border, intended for the user to identify management measures that will avoid and/or minimize impacts from climate change.