



FISH & WILDLIFE GROUNDWATER PLANNING CONSIDERATIONS

Freshwater Wetlands

JUNE | 2019

PREFACE

In 2014, California passed the Sustainable Groundwater Management Act (SGMA) (AB1739, SB 1168, SB 1319), authorizing local groundwater sustainability agencies to develop groundwater sustainability plans for a subset of California's alluvial aquifers. This document provides considerations to assist local groundwater sustainability agencies in avoiding or minimizing adverse impacts to freshwater wetland beneficial uses and users of groundwater in local groundwater management planning and implementation. The information provided is intended to help local groundwater planners, groundwater planning proponents and consultants, and California Department of Fish and Wildlife (CDFW) staff work together to protect wetlands as a public trust resource.

WETLANDS

When acting in an advisory role, CDFW typically considers the U.S. Fish and Wildlife Service's definition of wetlands as "...lands transitional between terrestrial and aquatic systems..." that have one or more of the following attributes:

- (1) at least periodically, the land supports plants that grow wholly or partially in water;
- (2) the substrate is predominantly impermeable or semi-impermeable soil that allows for shallow water retention rather than rapid percolation of surface water to groundwater; and
- (3) the substrate is non-soil and is saturated with water or covered by shallow water at some point during the growing season of each year.

It is estimated that California has lost more than 90% of its historical wetlands.¹



California's managed wetlands support the highest densities of wintering waterfowl found anywhere in the world.

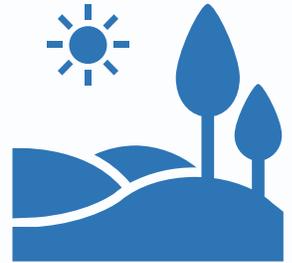
¹ Central Valley Joint Venture Implementation Plan



ECOSYSTEM SERVICES

Wetlands may provide some or all of the following critical ecosystem services:

- purify water by trapping sediments and breaking down pollutants and bacteria;
- recharge groundwater aquifers and contribute to streamflow;
- reduce peak water flows during storm events (flood control);
- store carbon through wetland vegetation and decomposition of organic matter;
- support biodiversity through habitat provision for hundreds of species, including state and federally listed species; and
- buffer climate extremes such as drought and flood.



SOCIO-ECONOMIC VALUE

Wetlands may generate some or all of the following socio-economic values:

- sustain migrating waterfowl and fisheries;
- provide recreation opportunities including waterfowl hunting, bird watching, hiking, and fishing;
- remediate polluted waters by removing excess nitrogen and sediment;
- protect eroding streambanks from high velocity flows;
- support food-supply (e.g. rice fields); and
- maintain cultural and aesthetic values of the landscape, including tribal wetland resources.



WETLAND MANAGEMENT CATEGORIES

Wetlands are often categorized based on the timing of flooded habitat and the species they support. Examples of managed Central Valley freshwater wetland types and their beneficiary species are as follows:

- Seasonal wetlands | Typically flooded for 6 months from October through March | Provide habitat for migratory waterfowl and shorebirds | Most abundant wetland in California;
- Semi-permanent wetlands | Typically flooded for 10 months from October through July | Provide critical habitat for breeding waterfowl and shorebirds, and state and federally listed species (e.g. state-listed Tricolored blackbird); and
- Permanent wetlands | Flooded year-round | Provide critical habitat for molting waterfowl and state- and federally listed-species (e.g., giant garter snake).



WATER RESOURCES

Wetlands – naturally-occurring and managed – receive water from precipitation, surface water, and/or groundwater. Most wetlands have seasonal water needs, meaning they require ‘flooding’ (natural or managed) during specific times of the year. For example, in the Central Valley, many wetlands undergo a fall ‘flood-up’ wherein wetlands are inundated during the fall, ensuring saturated surface conditions for waterfowl migrating south during the winter.

Naturally occurring wetlands rely on precipitation; surface water over-bank flow during floods; and/or high groundwater tables that intersect the ground surface and cause pooling, constituting a groundwater dependent ecosystem. Managed flooding, relying on surface water diversions and groundwater extraction, is used to mimic historic natural flooding or groundwater seepage which has diminished or ceased entirely under contemporary reservoir management regimes and groundwater resource development.



POLICIES & PROTECTIONS

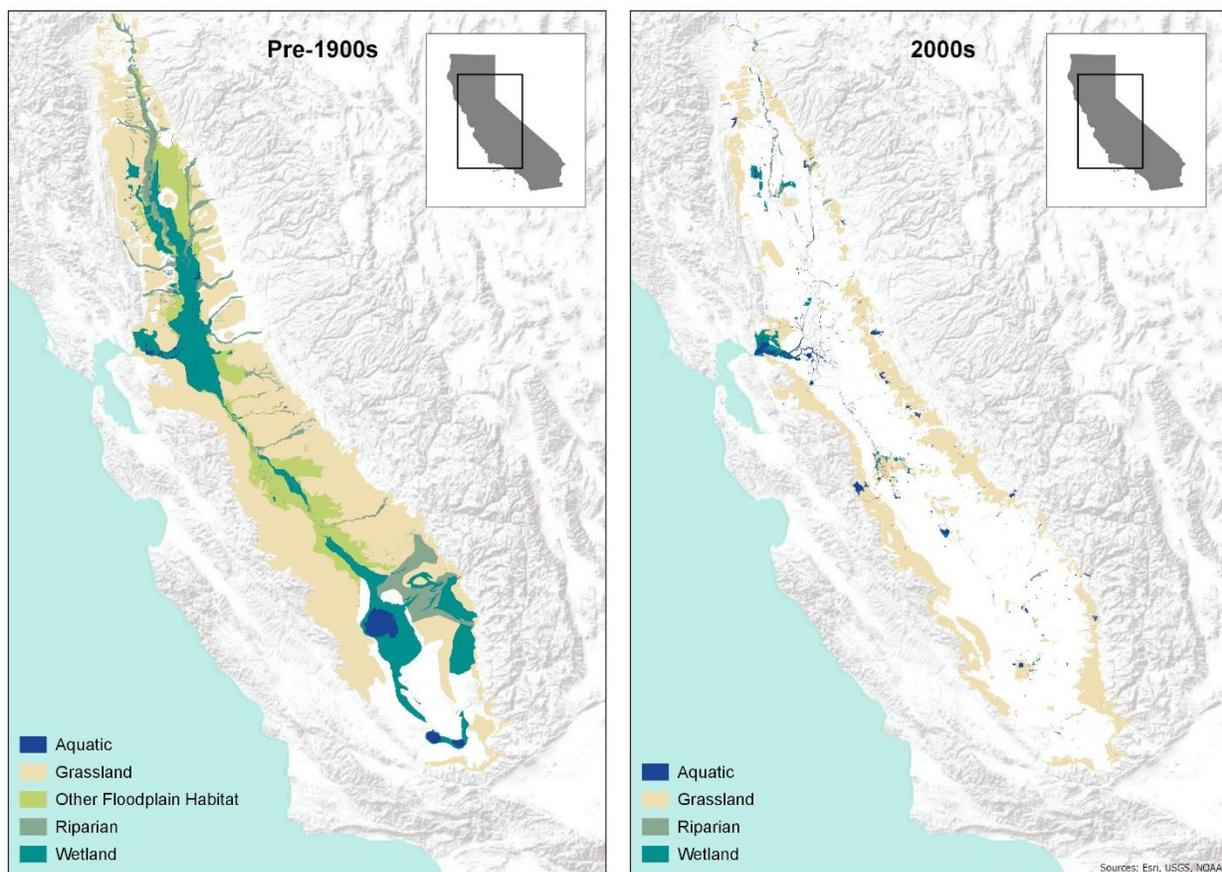
Many policies exist to protect wetlands against further loss and degradation. For example, The Wetlands Conservation Policy (Executive Order W-59-3), also known as the state’s “No Net Loss” policy, was an executive order issued in 1993 providing for the coordination of state-wide activities for the preservation and protection of wetland habitats. The State Water Resources Control Board (SWRCB) also adopted a resolution to ensure that wetlands and riparian areas that historically were protected under the federal Clean Water Act remain protected under the state Porter-Cologne Water Quality Control Act (Resolution No. 2019-0015). Wetlands may also be entitled to protection under the public trust doctrine to the extent that public trust resources, including fish and wildlife, depend on them.

In support of wetland goals and in recognition of their value, various state and federal laws, partnerships, and programs are designed to protect wetlands from further decline. These include but are not limited to: [Clean Water Act](#), [Central Valley Project Improvement Act](#), [Central Valley Joint Venture](#), [Inland Wetland Conservation Program of the Wildlife Conservation Board](#), [National Wildlife Refuge System – Wetlands of International Importance](#), [State Wildlife Areas](#), [Ramsar Convention on Wetlands](#), [Endangered Species Act – Critical Habitat Designations](#), [United States Fish and Wildlife Service \(USFWS\)](#) and [Natural Resources Conservation Service \(NRCS\)](#) federal easement programs, State easement programs (e.g., [Permanent Wetland Easement Program](#)), and State incentive programs (e.g., [California Waterfowl Habitat Program](#)).

CHALLENGES

Despite existing protections, wetland habitats face a range of threats such as development, increasing operations costs, and surface water delivery constraints. A significant number of California wetlands are actively managed, relying upon human intervention to ensure the presence and maintenance of desired wetland habitat conditions. This on-going upkeep requires landowners to have adequate funding for water deliveries and maintenance activities, which can be difficult to secure.

Increased water costs and potential groundwater extraction curtailment, in part resulting from implementation of the Sustainable Groundwater Management Act (SGMA), may pose threats to the continued existence of functional wetlands. Increased costs and decreased water availability may limit landowners' ability to manage wetland habitats to meet necessary ecosystem functions. While lands themselves may be protected from development by fee title purchase or easements, the habitat values on those lands are not necessarily protected from degradation, particularly if they are dependent on managed intervention. An inability to preserve protected lands *and* manage wetlands for habitat outcomes is likely to reduce the abundance and quality of available habitat, leading to species decline.



HABITAT LOSS IN CALIFORNIA'S CENTRAL VALLEY FROM PRE-1900'S TO THE 2000'S. *MAP CREDIT: DUCKS UNLIMITED*

HISTORIC AND CURRENT (CIRCA 1995) AQUATIC/GRASSLAND/RIPARIAN + HISTORIC WETLAND DATA SOURCE: GEOGRAPHIC INFORMATION CENTER. 2003. THE CENTRAL VALLEY HISTORIC MAPPING PROJECT. CHICO (CA): CALIFORNIA STATE UNIVERSITY. AVAILABLE FROM: [HTTPS://WWW.WATERBOARDS.CA.GOV/WATERRIGHTS/WATER_ISSUES/PROGRAMS/BAY_DELTA/DOCS/CMNT081712/Sldmwa/CSUHICODPTOFGEOGRAPHYANDPLANNINGCENTRALVALLEY.PDF](https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/cmnt081712/sldmwa/csuhicodptofgeographyandplanningcentralvalley.pdf)

CURRENT (CIRCA 2009) MANAGED WETLAND DATA SOURCE: PETRIK, K., D. FEHRINGER AND A. WEVERKO. 2013. MAPPING SEASONAL MANAGED AND SEMI-PERMANENT WETLANDS IN THE CENTRAL VALLEY OF CALIFORNIA. FINAL REPORT TO THE CENTRAL VALLEY JOINT VENTURE. DUCKS UNLIMITED, INC., RANCHO CORDOVA, CA.

SUGGESTIONS FOR CONSIDERING WETLANDS IN GROUNDWATER PLANNING AND MANAGEMENT

Wetlands are at risk of further decline. Competing water demands are likely to drive up water costs and reduce available water that might otherwise naturally return to a wetland or be applied to a managed wetland. Minimizing the financial and water supply burdens on wetland landowners supports the long-term presence and maintenance of these critical habitats. Groundwater and watershed planning processes should consider the following opportunities to ensure continued ecological and socio-economic benefits generated by wetlands:

- Identify where wetlands are hydraulically connected with the groundwater table to determine the presence of groundwater dependent ecosystems (GDEs); the identification of GDEs is required in SGMA groundwater planning [see, e.g., Water Code § 10727.4(l)].
- Account for natural and managed wetland groundwater use and recharge in water budgets as required by SGMA [Title 23 California Code of Regulations § 351(a), § 356.2(b)(4)]; account for agricultural tailwater inflows to wetlands and wetland outflows to down-stream systems in basin water budgets.
- Monitor wetland coverage over time to track trends and identify relationships to groundwater resources and management practices.
- Credit wetlands for recharge contributions and water quality improvement contributions.
- Consider categorical groundwater pricing or allotments (e.g., reduced groundwater costs for wetlands, or seasonal allotments to meet habitat needs); managed wetlands typically lack the capacity to absorb new costs in the same way as for-profit landowning entities (e.g., some wetlands are enrolled in incentive programs that have contractual obligations such as ‘no-profit’ clauses).
- Identify opportunities for mutual benefit project and management actions that help recover groundwater levels and that benefit wetland existence (e.g., managed aquifer recharge projects; water supply remediation; addition of semi-permanent wetlands by capturing excess waters from December through April and retaining this water until July or August); targeting multi-benefit actions can assist in identifying funding to implement groundwater management projects.
- Share information about existing wetland incentive programs to private wetlands facing increasing groundwater costs (e.g., [California Waterfowl Habitat Program](#)); note that available incentive program funding will support less than one quarter of Central Valley private wetlands through 2028, leaving 75% vulnerable to significant losses).

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DISCLAIMER: CDFW provides this document only as a consideration in groundwater planning. CDFW is neither dispensing legal advice nor warranting any outcome that could result from the use of these considerations. Following these considerations does not guarantee success of a groundwater plan, compliance with SGMA (which will be determined by DWR and the SWRCB), or compliance with other applicable laws and regulations. Furthermore, except to the extent that this document directly references existing statutory or regulatory requirements, the information contained herein merely represents considerations, not requirements, that may be considered in light of the individual circumstances of each groundwater plan.

