

DEPARTMENT OF WATER RESOURCES

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August 3, 2017

TO: Distribution List

RE: California Watershed Boundaries Dataset

I am writing your organization as a signatory to the Memorandum of Understanding (MOU) Regarding the Use and Maintenance of California Watershed Map in 1998. Two watershed datasets have existed for California, the California Watershed Map, (also known as Calwater v.2.2.1,) and the California Watershed Boundaries Dataset. The California Watershed Map is outdated and will not be updated. Please be advised that what would have been version 3.0 of the California Watershed Map will become the California Watershed Boundaries Dataset (CWBD) and that DWR will update CWBD hereafter.

In July 2016, DWR secured funding to edit and improve California's National Hydrography Dataset and the Watershed Boundaries Dataset. DWR is in the process of signing an MOU with the U.S. Geological Survey to become the official state steward of these two datasets. The best way to ensure consistency between the California Watershed Map and Watershed Boundaries Dataset is to make the next version of the California Watershed Map match the Watershed Boundaries Dataset. DWR's state stewardship responsibilities provides a process to maintain and improve watershed delineation.

If you want additional information, please contact me at (916) 653-3937 or Kamyar.Guivetchi@water.ca.gov, or Greg Smith at (916) 653-6410 or Greg.Smith@water.ca.gov

Sincerely,

A handwritten signature in blue ink, appearing to read "Kamyar Guivetchi" followed by the date "8/3/2017".

Kamyar Guivetchi, Manager
Division of Statewide Integrated Water Management

Attachment:

1998 MOU Regarding the Use and Maintenance the California Watersheds Map

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**MEMORANDUM OF UNDERSTANDING
REGARDING THE USE AND MAINTENANCE
OF THE CALIFORNIA WATERSHED MAP**

UPDATE ADDENDA

December 21, 2004

This document serves as an Update to the original MOU (see attached).

Page 1: Purpose

The original MOU establishes responsibilities relating to using, managing, and maintaining the California Watershed Map. This update documents changes to Calwater that are reflected in the current version (CALWATER Version 2.2.1.) A copy of Calwater is attached and incorporated by this reference herein to this MOU. The Calwater Committee has adopted California Interagency Watershed Map of 1999 as the formal title.

Page 1: Intent

The intent of Calwater continues to be improvement of planning and coordination of land management activities on public and private lands by providing a set of agreed upon watersheds boundaries. This update acknowledges the recent federal initiative to refine standardized watershed boundaries nationwide (Watershed Boundary Dataset (WBD); FGDC, 2003). By adopting FGDC guidelines, Calwater will begin the process of conformance with federal standards for watershed delineation and digital, geospatial metadata (FGDC, 1994).

The original MOU documents inter-agency consensus on four levels of watershed sub-divisions. This update documents the California Division of Forestry's (CDF) eventual implementation of two additional levels of watershed sub-division (i.e. super planning watershed and planning watershed).

The added delineations are not intended to modify any existing agreements that may be based on watershed delineations that are different from those defined by the current or previous versions of CalWater.

Page 2: Background and Objectives

Exhibit B of the original MOU provides watershed delineation criteria. This update acknowledges additional criteria as stated under WBD guidelines.

The CalWater committee has agreed to use WBD as guidelines for further Calwater development. Both the Federal and State watershed attributing systems for names and numbers will be continued in future versions of CalWater.

Exhibit C in the original MOU incorporated the procedure used to identify the hierarchy designations of the four levels of watershed subdivision. This update provides an addendum to exhibit C that cross-references WBD watershed sub-divisions with Calwater sub-divisions.

Page 2: Selection and Responsibility of Custodian, Distributor, and Archival Facility

The original MOU stated that the interagency committee members will select the custodian, distributor, and archival facility for CALWATER for three years, after which the committee members may reassess those appointments. This update changes the above protocol to one where the designated role of custodian, distributor, or archival facility will be assigned and revised as needed. Changes to these roles will be noted annually in the CalWater meeting minutes.

Page 3: Terms of MOU

No change.

Page 3: Termination

No Change

EXHIBIT A - Addenda: The history of the CalWater dataset and the Interagency Watershed Mapping Committee can be found on the CalWater web pages:
 California Interagency Watershed Mapping Committee: <http://cain.nbii.gov/calwater>
 California Spatial Information Library (CaSIL): <http://gis.ca.gov/meta.epl?oid=22175>
 Calwater Metadata complies with FGDC standards, available at:
<http://www.fgdc.gov/metadata/metadata.html>

EXHIBIT B - Addenda: WBD watershed delineation guidelines can be found at
<http://www.ncgc.nrcs.usda.gov/products/datasets/watershed/>

EXHIBIT C - Addenda: The original MOU designated four levels of watershed sub-division. The table below is an addendum that shows both the federal (i.e. WBD) and state watershed designations (i.e. Calwater 2.2.1).

Federal WBD Level	Federal Designations	Federal Hydrologic Unit Code	Federal Area (approx.)	State of California Designations	California Area (approx.)
Level 1	Region	2 digit	180,000 sq miles 115,193,577 acres		
Level 2	Sub-region	4 digit	16,844 sq miles 10,779,559 acres	Hydrologic Region	12,735 sq miles 8,150,000 acres
Level 3	Basin	6 digit (formerly "accounting unit")	10,600 sq miles 6,783,622 acres	Hydrologic Units	672 sq miles 430,000 acres
Level 4	Sub-basin	8 digit (formerly "cataloging unit")	703-1,735 sq miles 449,895 - 1,110,338 acres	Hydrologic Areas	244 sq miles 156,000 acres
Level 5	Watershed	10 digit (formerly 11 digit in NRCS)	63-391 sq miles 40,000 to 250,000 acres	Hydrologic Sub-areas	195 sq miles 125,000 acres
Level 6	Sub-watershed	12 digit (formerly 14 digit in NRCS)	16-63 sq miles 10,000 to 40,000 acres	Super Planning Watershed	78 sq miles 50,000 acres
Level 7*	Drainage	14 digit	15 sq miles 10,000 acres	Planning Watersheds	5-16 sq miles 3,000-10,000
Level 8*	Site	16 digit	1 sq mile 650 acres		

* Level 7 and 8 are extensions of the Federal designations for use at the local watershed level.

Distributed To
MEMORANDUM OF UNDERSTANDING
REGARDING THE USE AND MAINTENANCE
OF THE CALIFORNIA WATERSHED MAP

THE STATE OF CALIFORNIA

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MEMORANDUM OF UNDERSTANDING REGARDING THE USE AND MAINTENANCE OF THE CALIFORNIA WATERSHED MAP

THIS MEMORANDUM OF UNDERSTANDING (MOU) is entered into by and between the California Department of Water Resources(DWR), the California Department of Forestry and Fire Protection(CDF), the California Department of Fish and Game (DFG), the State Water Resources Control Board (SWRCB), the U.S. Forest Service (USFS), the U.S. Geological Survey (USGS), the U.S. Environmental Protection Agency (USEPA), the U.S. Department of Agriculture Natural Resources Conservation Service (USDA-NRCS), the U.S. Bureau of Reclamation (USBR), and the U.S. Bureau of Land Management (BLM) for the use, management, and maintenance of a common watershed map of California.

Purpose

This MOU establishes the respective responsibilities relating to using, managing, and maintaining the newly developed California Watershed Map (CALWATER, current version 2.0, release date), which is a digital data set, mapped on the USGS 7.5 minute series. A copy of CALWATER is attached and incorporated by this reference herein to this MOU.

Intent

This "Memorandum of Understanding", or "MOU", is not itself intended to be a contract. This document is intended to set forth policy, described below, in the use and maintenance of the California Watershed Map.

This agreement is a commitment by all involved agencies to reference the California Watershed Map watershed delineations for resource management and planning studies; for environmental assessment, analysis, and regulatory purposes; for presentations of resource information and interagency communications; and as the base for future mapping and modeling activities related to watershed management. Agencies may develop special versions of this primary base map for their own needs, as long as the integrity of CALWATER is not jeopardized. All parties agree that the California Watershed Map, with four levels of watershed subdivision, will be accepted, with the understanding that level four (subarea) delineations will continue to be examined in greater detail and revised, if necessary. It is further agreed that all parties will continue to examine the additional watershed subdivisions (levels five and six) done by CDF. This MOU also defines procedures for modifications and distribution of the map.

Background and Objectives

Over the past several decades various attempts have been made to develop a reliable watershed map of California that would be free from indiscriminate modifications. In early 1995, the California Department of Water Resources initiated an interagency effort to produce detailed digital coverage that would be acceptable to all resource agencies in California. At that time, DWR established an interagency committee to develop watershed delineation criteria, and to review on-going work by CDF to digitize watershed boundaries. See Exhibit A for more information on the background. Exhibit A is attached and incorporated herein by this reference.

The attached Exhibit B, which is incorporated herein by this reference, presents the criteria followed in delineating the watersheds shown on CALWATER. These criteria were developed and agreed upon by the committee members.

The attached Exhibit C, which is incorporated herein by this reference, presents the procedure used to identify the hierarchy designations of the four levels of watershed subdivision.

Selection and Responsibility of Custodian, Distributor, and Archival Facility

The interagency committee members will select the custodian, distributor, and archival facility for CALWATER for three years, after which the committee members may reassess those appointments.

The Custodian shall:

- be an entity competent in both GIS technology and watershed delineation skills.
- be responsible for coordinating with the other agencies on any future necessary modifications or editing of the map file, and for arranging such changes in the GIS coverage; further, the custodian shall not modify or change any of the watershed delineations without approval of all agencies signatory to this MOU
- be responsible for initiating periodic meetings of the committee, as needed, to discuss activities related to CALWATER
- provide the most current published version of the map file to distributors and to archives

Distributors :

- can be all of the signatory agencies, at their option
- shall retain the latest version of CALWATER on a computer home page for users to access, along with any necessary notifications of changes to the file.

The Archival Facility shall:

- have necessary expertise and equipment to store the most current copy of the data file, and have the file available on an 'ftp' site
- store a secure copy of the official version of the file

DWR has agreed to be the custodian for a three year period, and Teale Data Center has agreed to be the archival facility.

Terms of MOU

This MOU may be amended only by mutual written agreement of the parties hereto. This MOU shall commence upon the signatures of all parties involved.


Termination

This MOU may be terminated by mutual written consent of all of the parties. An agency may terminate its participation in this MOU upon 60 days written notice to the other cooperating agencies.

Signature Page

MEMORANDUM OF UNDERSTANDING
REGARDING THE USE AND MAINTENANCE
OF THE CALIFORNIA WATERSHED MAP


THE STATE OF CALIFORNIA

By 
Deputy Director
Department of Water Resources


Date 11/15/98

By 
Director
Department of Forestry and Fire
Protection

Date DEC 18 1998

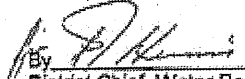
By 
Executive Director
State Water Resources Control Board

Date 9/22/99

By 
Deputy Director
Department of Fish and Game

Date 9/27/99


THE UNITED STATES OF AMERICA

By 
District Chief, Water Resources Division
U.S. Geological Survey


Date DEC 09 1998

By 
Administrator, Region IX
U.S. Environmental Protection Agency

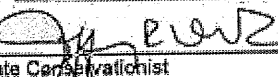
Date FEB 23 2000

By 
Regional Forester, Region 5
U.S. Forest Service, HQ-5-99-20-033

Date 2/23/99

By 
Regional Director, Mid-Pacific Region
U.S. Bureau of Reclamation

Date DEC 08 1998

By 
State Conservationist
U.S.D.A. Natural Resources
Conservation Service

Date 2-16-99

By 
State Director
U.S. Bureau of Land Management

Date 12/9/98

EXHIBIT A MAPPING BACKGROUND

Watershed mapping efforts in California have been ongoing for many years. In 1970, the National Water Resources Council led an interagency effort to produce large-scale watershed delineations for the entire nation, including California. The objective was to create an interagency standard of one master set of watershed delineations. California, like the rest of the nation, was divided up into major hydrologic regions, which were further subdivided into smaller discrete units.

Later the SWRCB's 1:500,000 scale watershed maps, first published in 1973 and revised several times, presented a five digit areal coding and a basin naming system, which was an adaptation of the areal coding used by DWR in their Bulletin 94 and Bulletin 130 series. Also, DWR's Bulletin 230 series, "Index to Sources of Hydrologic Data", presented a hydrologic watershed "Areal Designation" map of the State, which utilized a five digit alphanumeric code. None of these maps were digitized into an acceptable product for today's needs; but they did have a system developed for four hierarchical levels of watershed subdivision. In 1976 the SWRCB and DWR agreed to use the four hierarchical levels for watershed mapping in California. The first level was called the hydrologic basin, and divided the State into major geographic areas based on topographic, hydrologic, and institutional considerations. The second level of watershed designation divided the hydrologic basins into hydrologic units. These represented such features as total river basins, contiguous small watersheds having similar hydrologic characteristics, or a closed drainage area. Level three further subdivided the hydrologic units into hydrologic areas, which could be typified as a major tributary within the unit. Where additional watershed subdivision was needed, there was a fourth level breakdown called subareas. At the time it was envisioned that all types of resource data could be stored with its own areal designation identification, and then retrieved by users.

In recent years various agencies have corrected, modified, and further subdivided these watersheds to meet their specific needs. Much of the original National Water Resources Council intent has been lost in the process of changing and publishing different versions of these watershed maps. Problems arise when trying to compare watershed information obtained from different map versions. Furthermore, there are several sets of basin coding and naming systems being used without any cross reference system available. In 1995, CDF and DWR initiated an effort to reconcile differences between agencies and re-establish one master set of watershed delineations to be used as a common starting point for all agencies working with California water and water resources issues. DWR formed and chaired an interagency watershed mapping committee (committee) for this purpose. The committee is composed of representatives from 10 California and United States government agencies.

In late 1994, CDF completed a digitized draft version of the large scale watershed map, which was developed for Bulletin 230-81. This map had four levels of watershed

subdivision. CDF further subdivided upland forest areas into two additional watershed sizes for forest management needs. CDF offered this GIS coverage on the condition that the committee would do a quality check of the watershed delineations and coding. DWR offered to initiate a process to verify the first four watershed levels (down to and including subareas) with the cooperation and periodic review of the committee to resolve watershed boundary questions. The committee also agreed to accept the basin coding system used by CDF, and would develop a cross reference system between the new map and other existing watershed maps.

Necessary changes to the CDF GIS coverage were done by the Teale Data Center GIS Lab, under the direction of DWR. Teale Data Center work was funded separately by several of the agencies involved in this effort. The objective was to complete an approved digitized watershed map that would be accepted and used by all agencies involved. It was also agreed from the outset that there would be a custodian agency responsible for maintaining the GIS coverage and distributing the information. The results of these efforts is the current version of the California Watershed Map.

EXHIBIT B CALIFORNIA WATERSHED DELINEATION CRITERIA

The following criteria are presented to bring consistent uniformity to watershed delineations.

1. The California watershed map and GIS coverage will normally have four nested, hierarchical levels of basin delineations. The largest will be the major hydrologic regions and the smallest will be the hydrologic subareas (see Exhibit C). These basic hydrologic delineations will be the basis of any additional basin subdivisions, if needed, by participating agencies. Basin delineations should be at 1:24,000 scale.
2. Watershed boundaries should be on ridges whenever possible. Exceptions may be in valleys where flood channels, leveed floodways, or other major man-made structures intercept streams and surface runoff.
3. Watershed subdivisions may be developed for important hydrologic points, such as stream gaging sites, dams, diversion points, or resource management points of concern. Watershed subdivision boundaries should follow a ridge down to the stream, go directly across the stream, and continue up a defined ridge on the opposite side. Stream crossings should be generally agreed upon by the committee and will remain fixed unless later modified by agreement.
4. Since many of the stream channels lose identity after entering developed valley agricultural areas, such as in the Central Valley and Salinas Valley, the committee agreed that the edge of the valley floor should be a watershed boundary line. The valley floor could best be described by using the groundwater basin boundary that outlines the valley sediments. This is based on the geologic formations and valley alluvium as presented on the State Geologic Map.
5. In highly developed valley agricultural areas, where natural watershed ridge features no longer exist, the interagency committee may decide on boundary locations for subdividing the valley into discrete units. These subdivisions may be political, administrative, or water district boundaries if necessary. In the case of the Sacramento and San Joaquin Valleys, which have uniquely different hydrologic features between east and west sides, the Sacramento River channel and the San Joaquin River channel may provide reasonable subdivision boundaries.
6. The Sacramento and San Joaquin River Legal Delta shall be outlined as an independent hydrologic unit (level two) following the boundaries defined in the California Water Code (Chapter 2, the Delta, Sec. 12220).
7. Small coastal front drainage areas flowing directly into the ocean will be combined into larger residual areas. To preserve data continuity to the extent possible, coastal residual areas shown in the previous areal designation map completed by the Department of Water Resources for Bulletin 230-81 will be preserved.

8. The basin numbering code will be similar to the State Water Resources Control Boards' five digit code system, which is comparable to a zip code. There will also be cross indexing between the California Watershed Map coding and other existing maps.

9. Lake surface areas will not be outlined as discrete basins. For water quality enforcement, or other purposes, a separate GIS layer can be made showing water bodies. This would be at the discretion of the responsible agency in need of such information.

10. Whenever a small residual area occurs between two adjacent side tributaries entering a main river, it will be combined with the closest upstream basin.

EXHIBIT C WATERSHED DESIGNATION SYSTEM

Resource information of all classes by all agencies can be identified and retrieved by watershed designation. Watershed designation is a system that defines hydrologic boundaries over the entire State. The system divides the State into four levels designated as hydrologic regions, hydrologic units, hydrologic areas, and hydrologic subareas. All designations are identified by name and numeric code, similar to a zip code.

Hydrologic Region

The hydrologic regions divide the State into ten major geographic areas based on topographic and hydrologic considerations.

Hydrologic Unit

Each hydrologic region is divided into hydrologic units, which are defined by surface drainage as well as topographic and geologic conditions. A hydrologic unit may encompass a major river watershed or a major groundwater basin, contiguous watersheds with similar hydrologic characteristics, or a closed drainage area, such as a desert basin or a group of such basins.

Hydrologic Area

Hydrologic areas are the major subdivisions of hydrologic units. They are best described as major tributaries of a river, a large valley groundwater basin, or a component of a stream or desert basin group.

Hydrologic Subarea

The hydrologic subarea consists of a major segment of a hydrologic area having significant geographical characteristics or hydrological homogeneity.

The four levels and the number of designated watersheds in each level are:

Hydrologic Regions	10
Hydrologic Units	182
Hydrologic Areas	462
Hydrologic Subareas	622

NOTE:

The Regional Water Quality Control Boards in the South Coast Hydrologic Region have three jurisdictional Hydrologic Basin Planning Areas (HBPA) in that region, as defined in the California Water Code. These are the Los Angeles, Santa Ana, and San Diego HBPA's. The North and South Lahontan Hydrologic Regions are treated as one HBPA by the Lahontan Region 6 Board; and the Sacramento River, San Joaquin River, and Tulare Lake Hydrologic Regions are treated as one

HBPA by the Central Valley Region 5 Board. The Regional Water Quality Control Boards' Hydrologic Basin Planning Areas are recognized by the Hydrologic Unit code designations for those specific areas.

