

WATER BUDGET NAVIGATOR INSTRUCTIONS



Internet
of Water

WHAT IS THE WATER BUDGET NAVIGATOR?

The Water Budget Navigator is a web application developed by the Internet of Water (IoW) that allows users to compare the water budgeting and water use estimation frameworks used by a variety of water resources agencies. A water budget is an accounting of all inflows and outflows of water within an area of interest. It is similar conceptually to a banking account statement that tracks deposits, withdrawals, and transfers between accounts. Just as a banking account statement is essential for prudent financial management, a water budget is essential for planning and management of water resources. There are many different ways to prepare water budgets, with different decisions to be made about defining which inflows, outflows, and transfers to keep track of, how to estimate these flows, using which source data. It can be difficult to meaningfully compare the numbers used by different agencies in their water budgets due to this variability. The purpose of the water budget navigator is to represent any water budgeting approach in a standard format that allows different approaches to be compared. Currently, the navigator allows comparison of water budget frameworks published by:

- California Department of Water Resources
- New Mexico Office of the State Engineer
- Colorado's Decision Support Systems
- Wyoming Water Development Office
- Utah Division of Water Resources

The Navigator rests on a standardized representation of these frameworks which is based on the overall framework of the California Department of Water Resources Handbook for Water Budget Development. This handbook is not prescriptive, but provides a useful framework to describe water budgeting using hydrologic concepts. This representation is based around the idea of “water budget zones” and “components” (Figure 1).

A component is flow of water for which a numerical estimate is provided in a water budget conducted by an agency in a Jurisdiction. Typical components might include “precipitation”, “stream inflow”, and “evapotranspiration”. Components are calculated for a particular water budget zone, or three-dimensional area of interest where water might exist in one of three systems: surface water (e.g. rivers and lakes), the land (e.g. in agricultural fields or enclosed storage tanks), or groundwater. Components must flow as an inflow from a flow source outside the water budget zone into a flow sink of one of three systems; as an outflow from one of the three systems to a system outside the water budget zone; or as an internal transfer between systems within the water budget zone.

For a given water budgeting framework, each component has one or more estimation methods - procedures by which a numerical estimate for the value of a component is produced in a given water budget framework. For example, the estimation method for the component “evapotranspiration” might be “Modified Blaney-Criddle”, the name of a particular mathematical equation. Each estimation method in turn, requires one or more parameters - discrete quantities or measures that are required by an estimation method. For example, the “Modified Blaney-Criddle” estimation method requires the parameters “mean daily temperature” and “mean daily percentage of annual daytime hours”. Each parameter might be calculated from a variety of different data sources, such as particular weather stations or remote sensing data products.

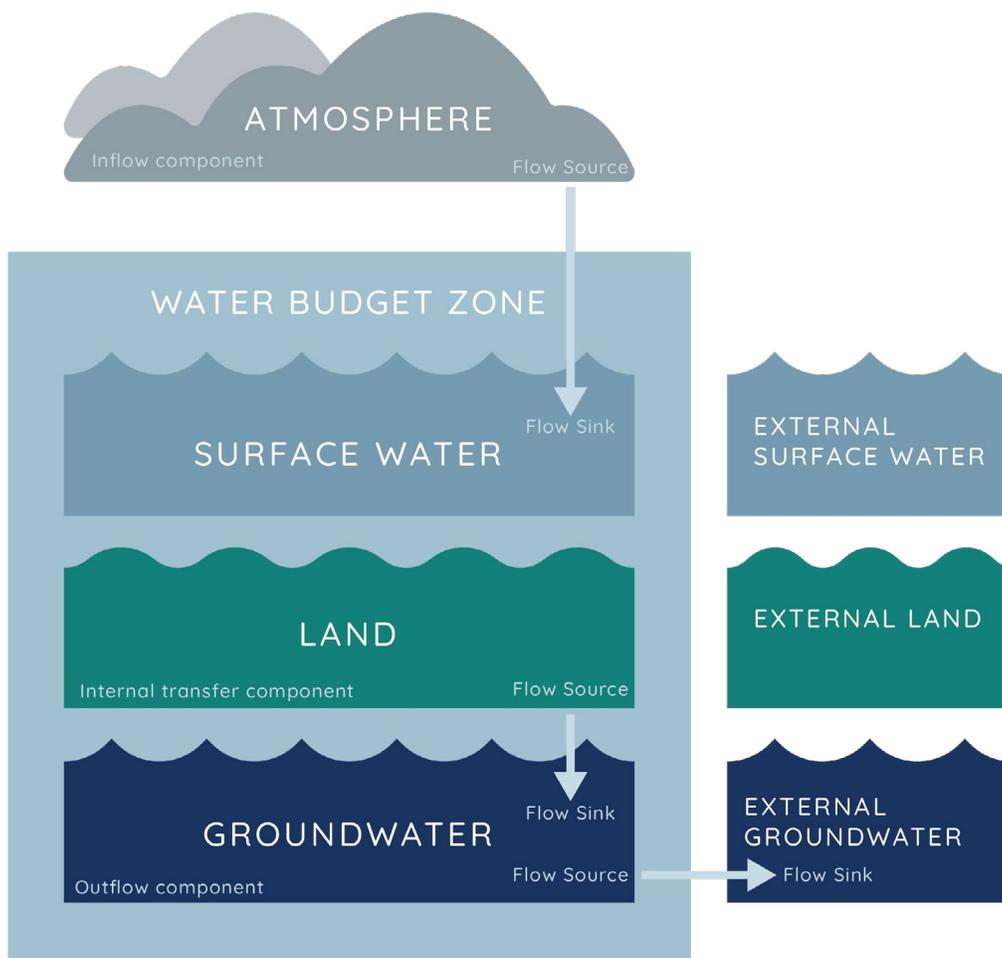


Figure 1: Standard representation of water budget components

The water budget navigator allows users to compare the various components used by different water budget frameworks, both in terms of their definitions as well as their estimation methods, and data sources.

HOW TO USE THE WATER BUDGET NAVIGATOR

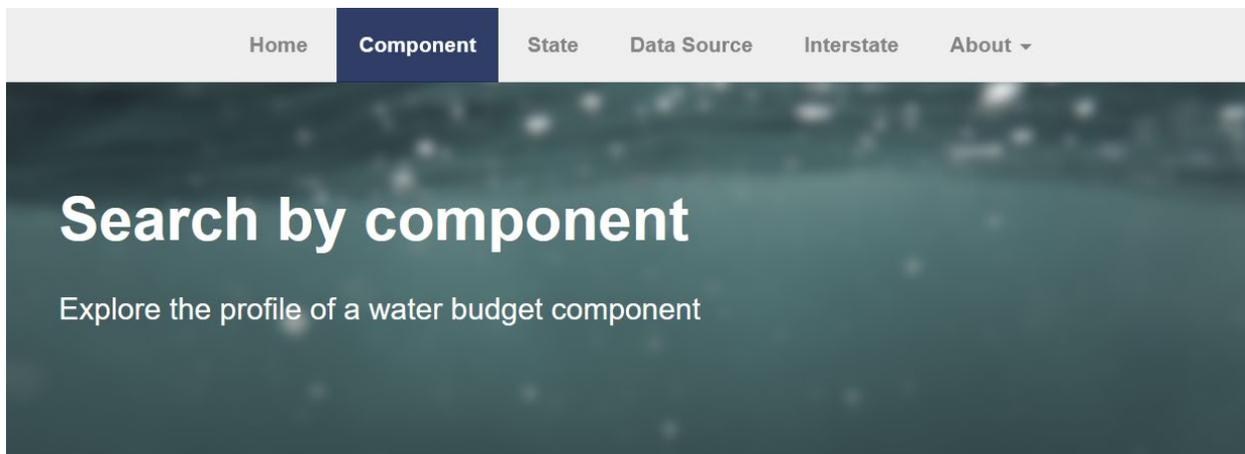
The Water Budget Navigator has four functional tabs:

1. Component
2. State
3. Data Source
4. Inter-state Comparison

1. COMPONENT TAB

In this tab, you can look up information about a particular water budget component for a selected state's water budget framework, including its estimation methods, parameters, and data sources, as well as any related flows represented by other water budget components in either the same state or other state frameworks.

First, select a state from a dropdown menu, and then select a particular component of interest. Then click the green checkmark:



1. Select a state to see all its water budget components in the drop down menu
2. Select a component to explore its relationship with other components, its flow information, estimation method(s), parameter(s) and data source(s)
3. Click on the button and scroll down to see all the information

Select state ▼

Select component ▼

After clicking the check mark, a table of information about the type of component appears, as well as a diagram showing the various estimation methods, parameters, and data sources associated with that component:

Home **Component** State Data Source Interstate About -

Runoff-CA

Flow Source: Zone Land System

Flow Sink: Zone Surface Water

Flow Type: Internal Transfer

Subcomponent of: Total Land System Outflow-CA , Total Surface Water Inflow-CA

Partial Subcomponent of: NA

Exact Match: Runoff-CA , Runoff-NM

If available, the estimation method(s), parameter(s) and data source(s) are presented below

Estimation Method	Parameter	Data Source
Runoff Curve Number Method	Precipitation	PRISM
USGS Precipitation-Runoff Modeling System (PRMS)	Daily Max and Min Air Temperature	California Data Exchange Center (CDEC)
	Daily Precipitation	California Irrigation Management Information System (CIMIS)
	Daily Short-Wave Solar Radiation	California Data Exchange Center (CDEC)
	Descriptive Data of Topography, Soils, and Vegetation	California Irrigation Management Information System (CIMIS)
		USDA Natural Resources Conservation Service Geospatial Web Soil Survey

Each item can be clicked to reveal a more complex documentation if desired. For example, clicking “PRISM”:

Visual graph

PRISM

Types: **DataSource**

IRDF: Resource, owl:NamedIndividual

RDF rank: 0

rdfs:label: PRISM

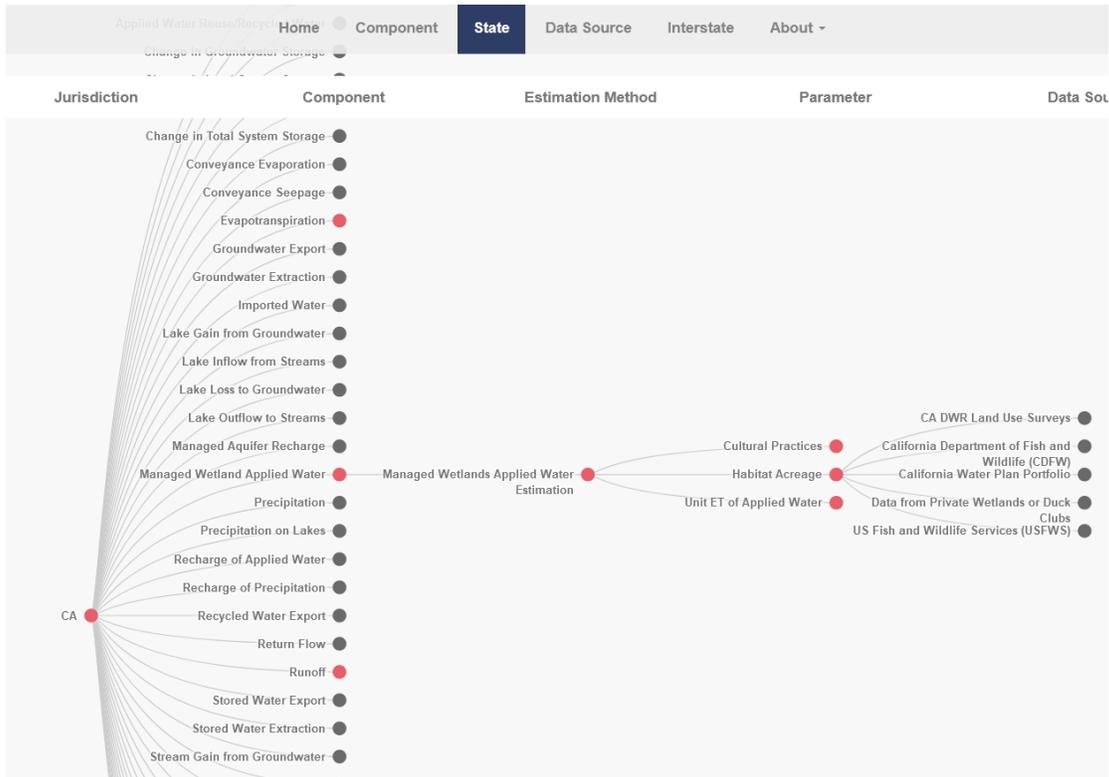
skos:definition: PRISM (Parameter elevation Regression on Independent Slopes Model) Gridded Precipitation is the result of sophisticated climatological modeling of a large network of historic and active weather stations and radar data. The PRISM model accounts for complex climatological factors including orography, rain shadows, temperature inversions, slope aspect, coastal proximity, and others. PRISM climate data are widely used for modeling and analysis at multiple scales.

skos:note: PRISM (Parameter elevation Regression on Independent Slopes Model) Gridded Precipitation is the result of sophisticated climatological modeling of a large network of historic and active weather stations and radar data. The PRISM model

This option opens a new browser tab, so navigate back to the Water Budget Navigator to continue navigating.

2. STATE TAB

In the State Tab, you choose one state to explore the water budget framework of by selecting a state from the dropdown menu and clicking on the green checkmark. This opens an interactive tree, where clicking on the red “nodes” expands the tree:



As before, clicking on text links out to more detailed documentation about a given component, estimation method, parameter, or data source.

3. DATA SOURCE TAB

The Data Source Tab functions similarly to the State Tab, only the start point is a particular data source. This can be useful to find which water budget components used by which states might rely on a common data source.



4. INTER-STATE COMPARISON TAB

This tab visualizes three kinds of relationships between the components of the different state water budget frameworks. You can choose to visualize:

- “Exact Matches” -- components that are nominally about the same flow
- “Sub components” -- components that represent flows that are completely part of flows represented by other components
- “Partial Subcomponents” - components that represent flows that partially overlap with flows represented by other components.

You can choose to view all subcomponents, or restrict to certain flow types, sources, and sinks. For example, you can choose to only visualize flows from surface water to the land system.

After all selections have been made, click the green checkbox to reveal a wheel diagram showing which components are related to each other:

