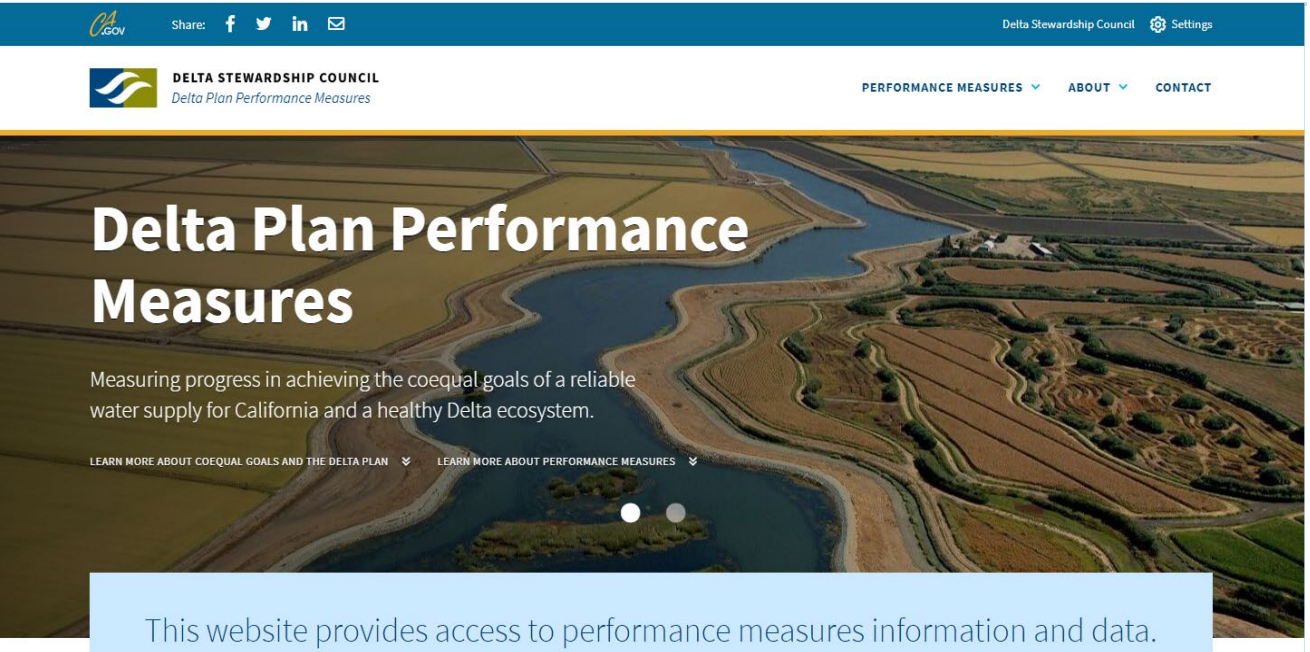
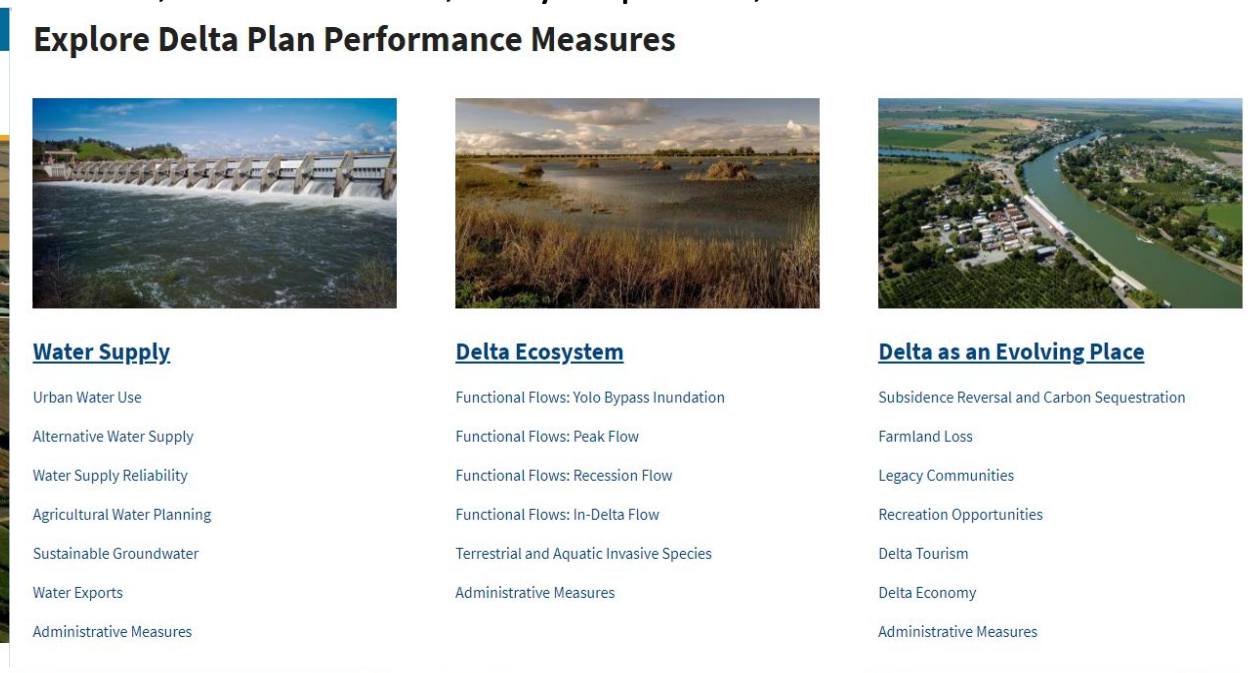
Going with the (Functional) Flow: Viewing Delta Ecosystem Performance on Functional Flows and Native Fishes

viewperformance.deltacouncil.ca.gov

Chris Kwan*, Scott Navarro, Cory Copeland, and Martina Koller





Recent website upgrades (completed in July 2020):

- Updated Performance Measures with 2019 water year data
- Added visualization captions to indicate when viewers can expect new data updates
- Added new schedule of next data updates page to inform and help viewers track the latest information

*chris.kwan@deltacouncil.ca.gov

Background

Performance measures translate programmatic goals and objectives into measurable indicators of progress. They are a vital part of the Council's adaptive management approach that provide decision-useful information of the status and trends towards the coequal goals.

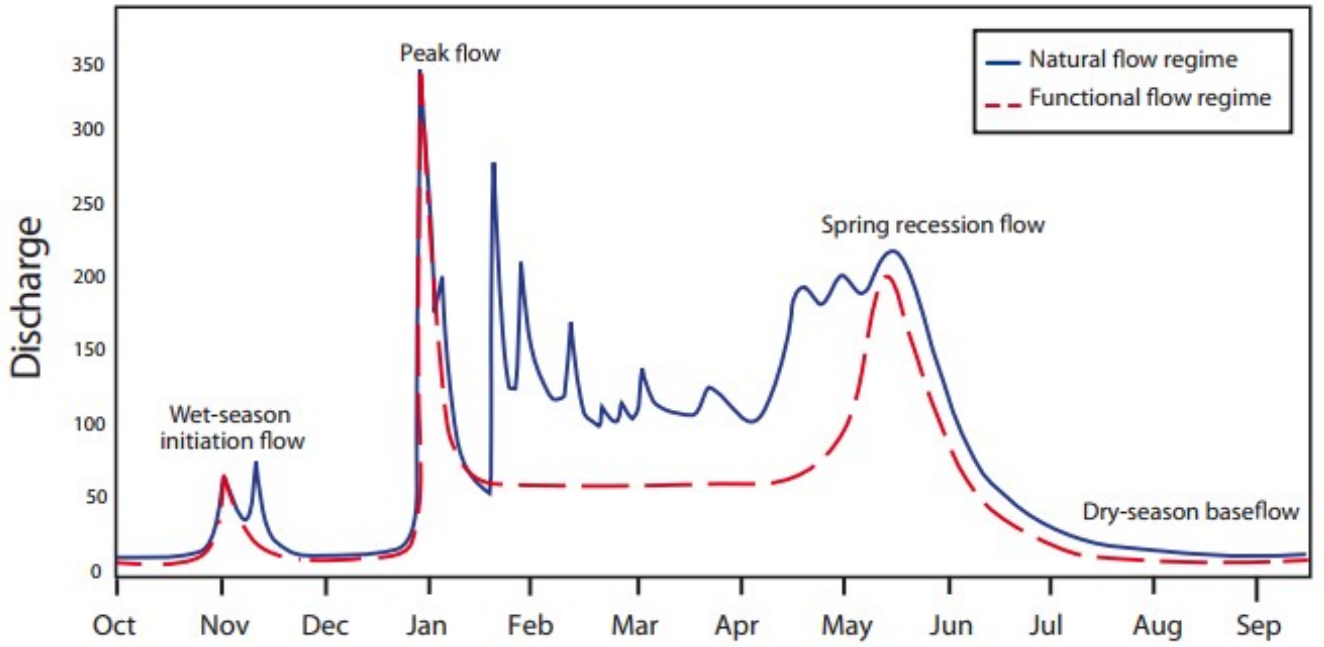
The Delta Plan is a comprehensive, long-term management plan for the Delta. Required by the 2009 Delta Reform Act, it creates new rules and recommendations to further the state's coequal goals for the Delta.

"**Coequal goals** means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place." (CA Water Code §85054)

Online Reporting Tool: Performance Measures Dashboard provides access to performance measures information and data. It tracks and reports on the performance metrics, baselines, and targets adopted by the Delta Stewardship Council in 2018.

Delta Plan implementing agencies and interested public can view the status of performance measures and understand the science-based story each measure tells about reaching the coequal goals and managing complexities within the Delta.

Functional Flows Performance Measures



Yarnell et al. 2015

- Based on functional flows approach of providing enough water at key times of the year to support native species and habitats
  - Avoids trying to fully replicate historical natural flows which may be impossible under modern infrastructural changes and environmental conditions (Yarnell et al. 2015)
- Define a suite of measurable endpoints for improved ecosystem conditions for native species
- Implement more natural functional flows to support:
  - Increased floodplain inundation to provide food and habitat for native fish rearing
  - Higher spring peak flows to improve native species habitat
  - More gradual recession flows to reduce aquatic species stranding and help establishment of riparian tree recruitment
  - Greater freshwater outflow from the Delta into the Bay to increase suitable habitat and food for native fishes

Functional Flows: Yolo Bypass Inundation

Link to webpage

Outcome Performance Sub-Measure 4.2A, Last updated: July 14, 2020 | About this Measure

In 2019, the Yolo Bypass was inundated for 30 consecutive days, supporting native fish habitat. All inundation frequency targets were met that year.

Metric:

Area and duration of inundation in the Yolo Bypass, evaluated annually on a five-year rolling basis.

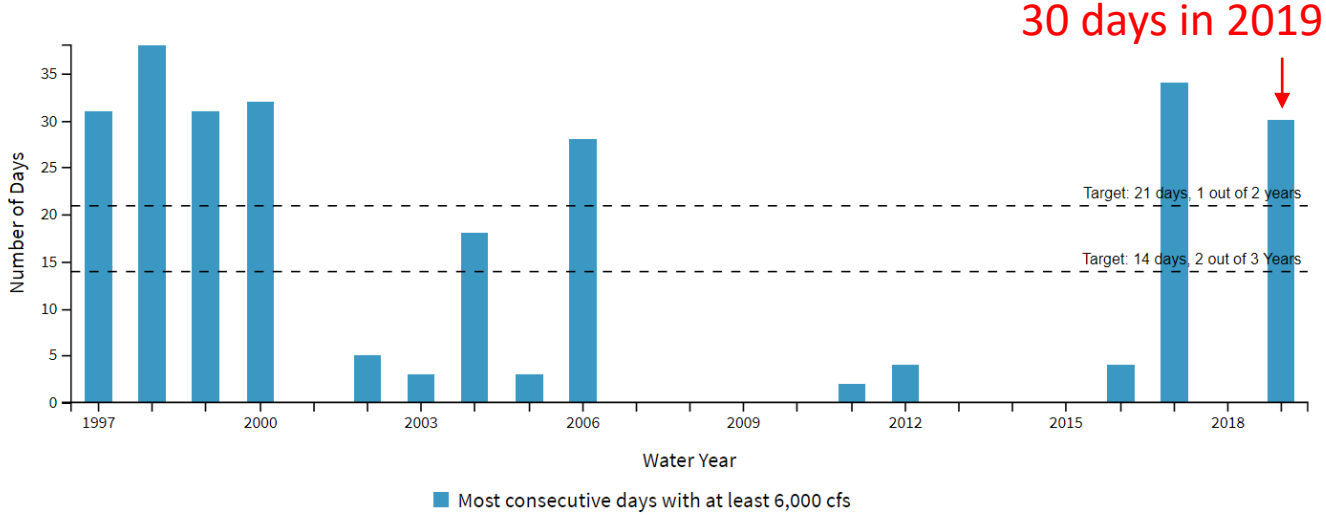
Target:

By 2030, allow for at least 17,000 acres of inundation for at least 14 days in two out of three years and at least 21 days in one out of two years, between November 1 and March 15.

Number of Consecutive Days with Fremont Weir Flows of at least 6,000 cfs, 1997-2019

Sacramento River flows into the Fremont Weir can overtop and inundate the Yolo Bypass during high flow events. The target is Fremont Weir flows of at least 6,000 cfs for sufficient inundation between November 1 and March 15. This target is used as a proxy for inundation area because current model estimates of Yolo Bypass inundation is only up to water year 2012. The target also requires sufficient inundation for 14 consecutive days every two out of three water years and 21 consecutive days every one out of two water years.

Next Data Update: The visualization below will be updated in October 2020, the beginning of the 2021 water year.



Functional Flows: Peak Flow

Link to webpage

Outcome Performance Sub-Measure 4.2B, Last updated: July 14, 2020 | About this Measure

The Sacramento River spring peak flow target for supporting important floodplain processes was last met in 2017.

Metric:

Frequency of 2-year return interval peak flows between November 1 and April 30, evaluated annually on a five-year rolling basis, at Bend Bridge on the Sacramento River.

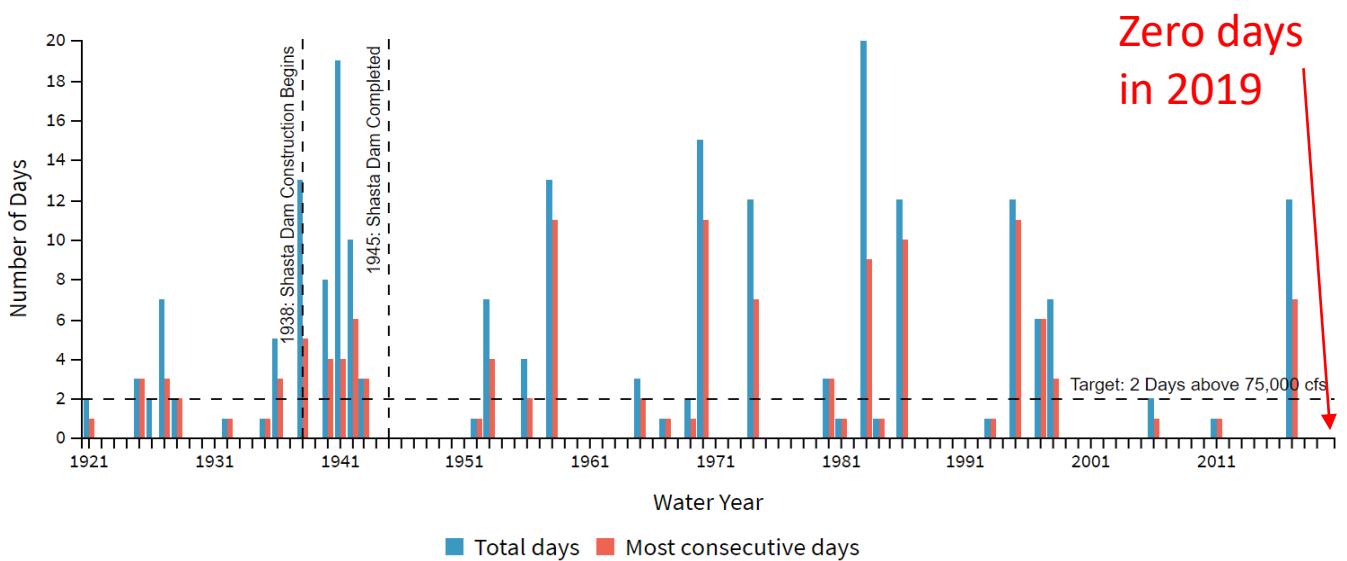
Target:

By 2030, at least one peak flow greater than 75,000 cfs and lasting at least 48 hours in duration, every two years, at Bend Bridge on the Sacramento River.

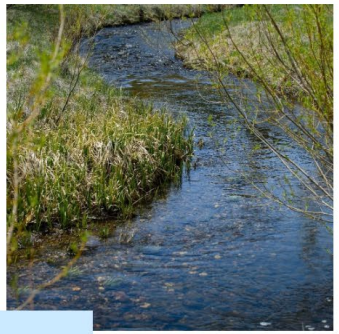
Number of days with peak flows 75,000 cfs or higher

Water years with flows 75,000 cfs or higher for at least 2 consecutive days meet the target. Blue bars indicate total number of days with flows 75,000 cfs or higher. Red bars indicate most consecutive days with flows 75,000 cfs or higher.

Next Data Update: The visualization below will be updated in October 2020, the beginning of the 2021 water year.



Functional Flows: Recession Flow



Link to webpage

Outcome Performance Sub-Measure 4.2C, Last updated: July 14, 2020 | About this Measure

The Sacramento River gradual spring recession flow target for improving survival of riparian plants and animals was last met in 2015.

Metric:

Rate of change in the hydrograph on the receding limb as measured from spring high flows to summer low flows, evaluated annually and on a five-year rolling basis, at Bend Bridge on the Sacramento River.

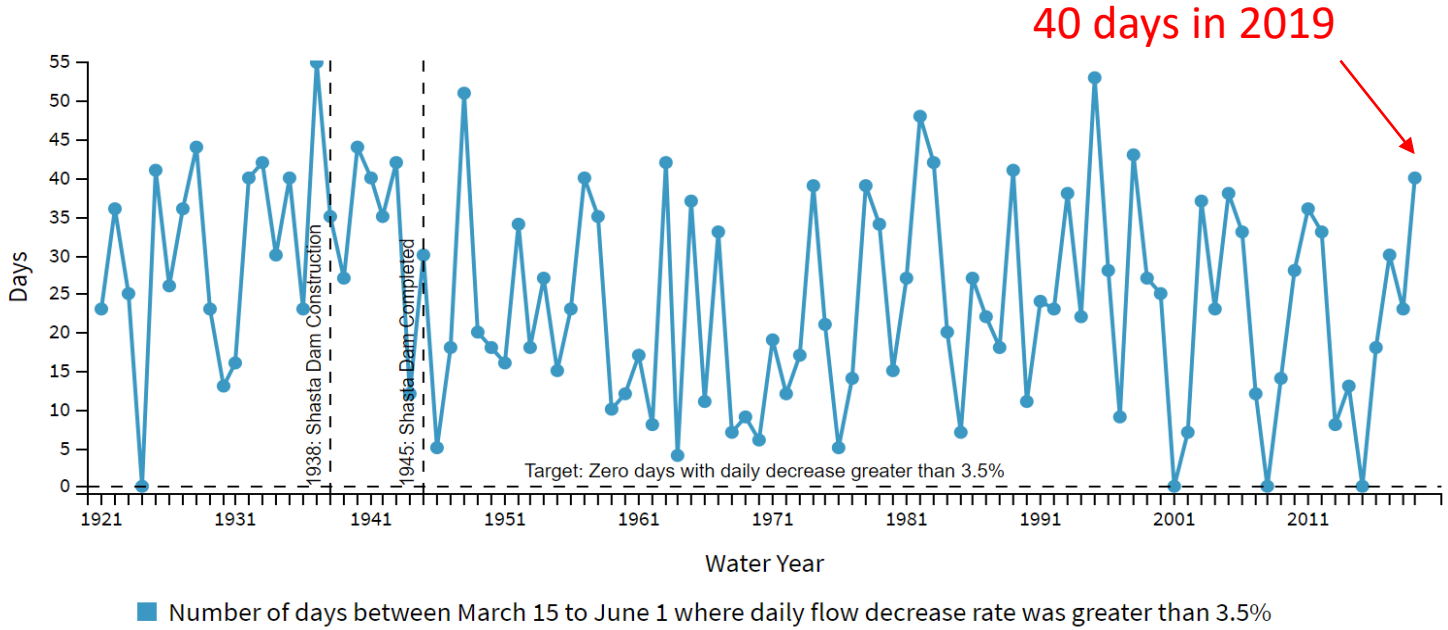
Target:

By 2030, daily decrease in flow will be less than 3.5% per day, as calculated by a five-day rolling average during the period of spring flow recession, in at least 1 out of 5 years, at Bend Bridge on the Sacramento River.

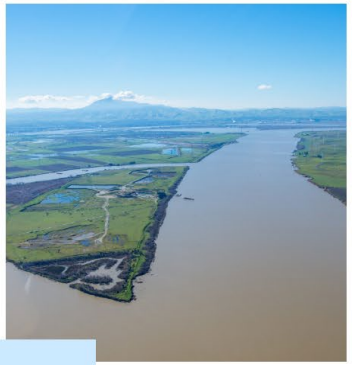
Daily Change in Recession Flows

This chart shows the number of days between March 15 to June 1 where the daily flow recession was greater than 3.5 percent of the previous day. Target: zero days with a daily flow recession rate greater than 3.5 percent.

Next Data Update: This visualization will be updated soon after the beginning of the water year in October 2020.



Functional Flows: In-Delta Flow



Link to webpage

Outcome Performance Measure 4.2D, Last updated: August 03, 2020 | About this Measure

The Delta outflow to inflow ratio target to improve native fish habitat was met in dry and critically dry years from 2013-2015.

The graph shows the annual Delta outflow to inflow ratio for different water year classifications (wet, dry, critically dry, etc.) . The target for the annual average Delta outflow to inflow ratio is 0.5 for dry and critically dry water years.

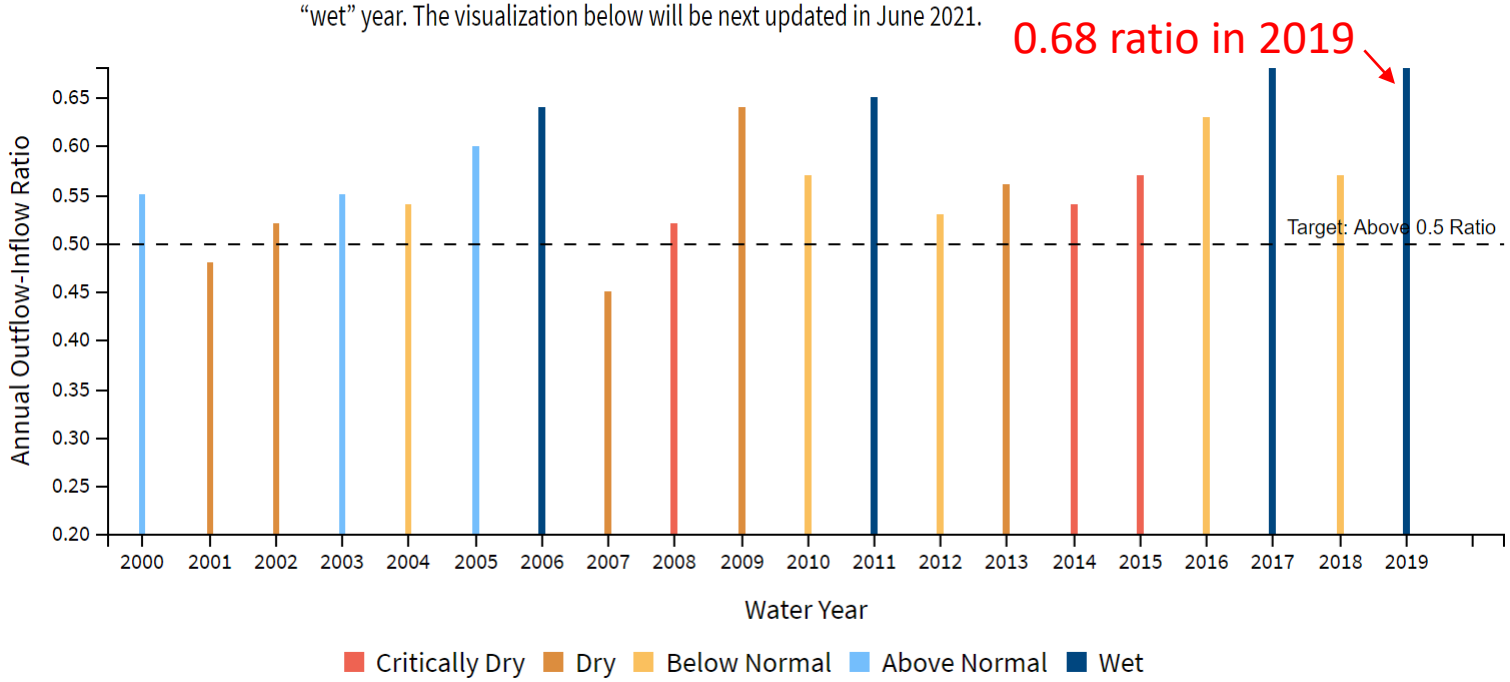
Next Data Update: The California Department of Water Resources' (DWR) Dayflow data that provides Delta outflow and inflow estimates is released annually in January. After each water year, provisional data is available. In the spring of the following year, the final water year type is determined. For example, water year 2019 was labeled a "wet" year. The visualization below will be next updated in June 2021.

Metric:

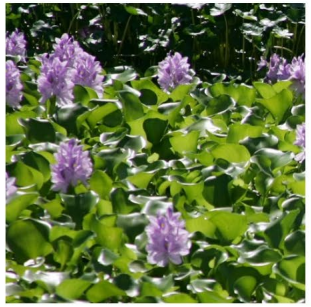
(1) 10-year rolling average slope of the Delta outflow-inflow ratio, disaggregated by seasonal, annual, and 10-year periods, (2) outflow-inflow ratio in dry and critically dry years, evaluated annually on a five-year rolling basis.

Target:

By 2030, (1) 10-year rolling average slope of Delta outflow-inflow ratio is greater than zero (i.e. positive), and (2) Annual average Delta outflow-inflow ratio in dry as well as in critically dry years is greater than 0.5.



Terrestrial and Aquatic Invasive Species



Link to webpage

Outcome Performance Measure 4.10, Last updated: August 03, 2020 | About this Measure

Increased native fishes in 2019 mainly due to higher Sacramento Splittail populations from a wet year

In 2019, non-native species such as nutria and alligatorweed were actively managed. Native fish relative biomass and abundance both increased.

Metric:

- Percentage of the biomass of fish that are native fish species based on USFWS beach seine surveys (and other relevant surveys).
- Percentage of total relative abundance that are native species in the Delta and Suisun Marsh based on USFWS beach seine surveys (and other relevant surveys).

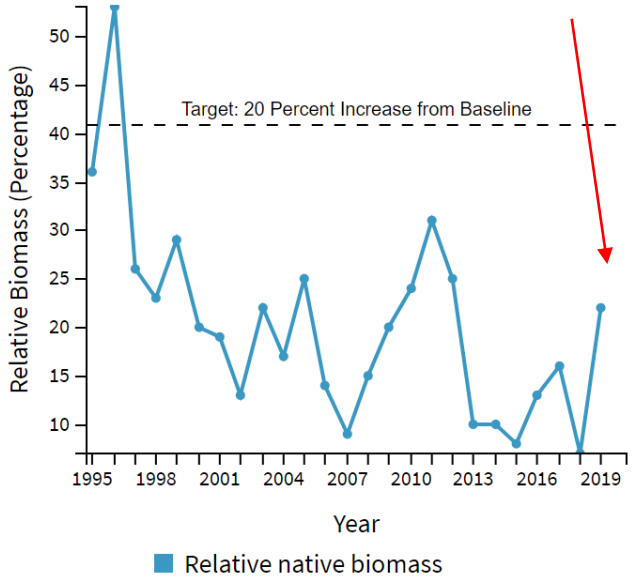
Target:

- 20 percent increase in the biomass of the native inshore fish community, relative to total fish biomass.
- 20 percent increase in the relative abundance of the native inshore fish community, compared to total relative abundance.

NATIVE FISH BIOMASS IN THE DELTA

The chart shows the percentage of native fish biomass in the Delta based on USFWS beach seine surveys. Percent increases in relative native fish biomass correlates to relative decreases in non-native fish biomass.

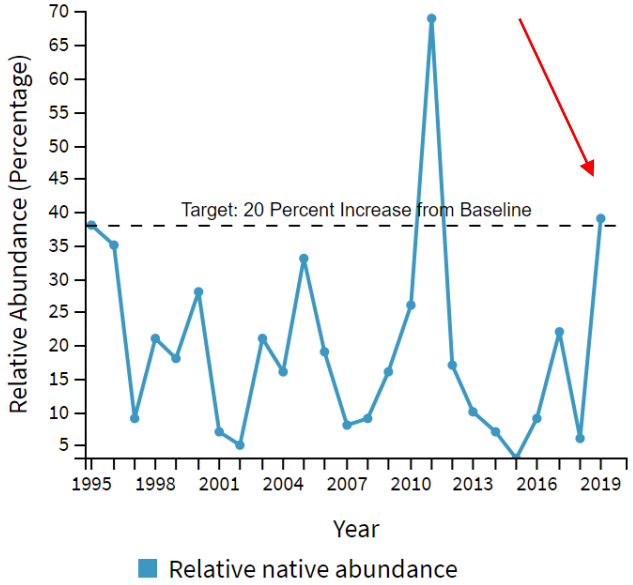
22% native in 2019



NATIVE FISH RELATIVE ABUNDANCE IN THE DELTA

The chart shows the percentage of native fish abundance in the Delta based on USFWS beach seine surveys. Percent increases in relative native fish abundance correlates to relative decreases in non-native fish abundance.

39% native in 2019



Thank you for checking out our poster presentation!

viewperformance.deltacouncil.ca.gov

Viewperformance website

- Intuitive design provides access to performance measure information and data, reaching a broad audience
- Delta Plan implementing agencies and interested public can view the status and health of the Delta
- Science-based stories illustrate progress towards coequal goals and managing complexities in the Delta
- Tracks and reports on metrics, baselines, and targets adopted by the Delta Stewardship Council
- Connects users to background information and external resources
- Download CSV files, code, tables to recreate visualizations and analyze data

Submit questions to the forum or email me at chris.kwan@deltacouncil.ca.gov

DELTA STEWARDSHIP COUNCIL
A California state agency