Internet of Water: Accessing and Integrating California Stream Gage Data

## Draft Concept Note

March 2021

# Overview

In California and across the nation, data from stream gages play an essential role in water management, in particular for managing water rights, transboundary water issues, and water budgeting. A recent analysis of the California stream gage network by The Nature Conservancy (TNC) Gage Gap project found that 87% of California river and stream length is “poorly” gaged.[[1]](#footnote-1) To address this challenge, California Senate Bill 19 (SB 19 Dodd. Water resources: stream gages) directs the California Department of Water Resources (DWR) and the California State Water Resources Control Board (SWRCB) to develop a stream gaging plan for California (SB 19 Stream Gaging Plan). The law calls for the plan to consider “integration with the Open and Transparent Water Data Act.[[2]](#footnote-2)

Significantly, the TNC Gage Gap project noted that “poor” gaging is due to not only a lack of active physical gages, but also the result of **inadequate findability, accessibility, interoperability, and reusability of the data from existing gages**. The TNC Gage Gap only gathered gage locations from six databases, three of which are from USGS, and all of which have overlapping records of gages: The CA DWR California Data Exchange Center ([CDEC](http://cdec.water.ca.gov/intro.html)), [USGS Gages II](https://water.usgs.gov/GIS/metadata/usgswrd/XML/gagesII_Sept2011.xml#stdorder), USGS National Streamflow Information Program ([NSIP](https://water.usgs.gov/GIS/metadata/usgswrd/XML/stream%20gagebasins.xml)), USGS National Water Information System ([NWIS](https://water.usgs.gov/GIS/dsdl/MasterList.zip)), National Oceanic and Atmospheric Administration ([NOAA](http://water.weather.gov/ahps/download.php)), and the Los Angeles Department of Public Works ([LADPW](https://egis3.lacounty.gov/dataportal/2011/01/27/stream-gage-locations/)).

The Internet of Water (IoW) project at Duke University is non-profit, philanthropically funded effort to assist state and local agencies with the modernization of water data infrastructure in the United States. The IoW seeks to improve the sharing and exchange of water data and information for better water management outcomes. In partnership with the IoW, DWR and SWRCB are exploring a pilot project with a small steering group of California stakeholders to improve the discoverability and accessibility of streamflow data in California.

# Proposed Objectives

The primary objective of this effort will be to develop a prototype approach to strengthen the management of California stream sensor[[3]](#footnote-3) data over time. This approach will include: 1) determining a common platform and method for managing and publishing stream sensor metadata; 2) creating a method for linking stream sensor metadata to hydrographic data; 3) building on previous efforts by TNC and others, designing a process for stream-reach sensor prioritization, including a software tool; and 4) documentation of this approach as part of the data management component of the SB19 Stream Gage Plan.

# Proposed Tasks

For this effort, California could develop the following tasks as part of the data management portion of the SB 19 Stream Gage Plan.

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| Task | Responsible Party | Duration | Timing / Dependencies | Financial and data resources |
| 1. Determine platform and method for managing and publishing stream sensor metadata. | DWR; SWRCB; IoW assist | 2 months | Can start immediately | Existing resources\* |
| 1. Develop and pilot a method for linking published sensor metadata with hydrographic data. | IoW | 1 month | Can start immediately with data in CDEC | Existing resources |
| 1. Develop a prototype “Stream Planning Tool” for stream-reach gage prioritization with a basic user interface | IoW | 3 months | Dependent on #1 & #2 but could begin before they are done | Existing resources |
| 1. Document these approaches within the SB 19 Stream Gage Plan. | DWR; SWRCB; SB 19 TAC (TBD); IoW assist | 3 months | Dependent on #1-3 | Existing resources |

\*Existing financial resources indicates no further fundraising will be required for these activities, and that the project will rely on publicly available data resources currently being curated by the state without requiring additional stakeholder engagement.

# Next Steps

This concept note will be reviewed by the steering group (see below) and considered for final approval by the IoW California Governing team. The overall cost of the project can be met within the existing resources of California state agencies and the Internet of Water Project, under a current grant from the Gordon and Betty Moore Foundation.

# IoW-CA Steering Committee

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| --- | --- | --- | --- |
| **First Name** | **Last Name** | **Organization** | **Email** |
| Teresa | Connor | CA-DWR, Northern Region Office  (Lead, SB 19 Implementation Team) | teresa.connor@water.ca.gov |
| Matt | Correa | CA-DWR, Div. of Planning (TSID) | matthew.correa@water.ca.gov |
| James | Dennedy-Frank | Lawrence-Berkeley National Lab | pjdf@lbl.gov |
| Greg | Gearheart | CA-SWRCB, Office of Information Management & Analysis | greg.gearheart@waterboards.ca.gov |
| Abdul | Khan | CA-DWR, Div. of Planning (TSID) | abdul.khan@water.ca.gov |
| Kris | Klausmeyer | The Nature Conservancy | kklausmeyer@tnc.org |
| Julie | Rizzardo | CA-SWRCB, Div. of Water Rights | jule.rizzardo@waterboards.ca.gov |
| John | Paasch | CA-DWR, Div. of Flood Management  (Chief, Hydrology & Flood Operations) | john.paasch@water.ca.gov |
| Dan | Schultz | CA-SWRCB, Div. of Water Rights  (Co-Lead, SB 19 Implementation Team) | [daniel.schultz@waterboards.ca.gov](mailto:daniel.schultz@waterboards.ca.gov) |
| Steven | Springhorn | CA-DWR, Sustainable Groundwater | steven.springhorn@water.ca.gov |
| Brent | Vanderburgh | CA-SWRCB, Div. of Water Rights | brent.vanderburgh@waterboards.ca.gov |

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| --- | --- | --- | --- |
| **First Name** | **Last Name** | **Organization** | **Email** |
| Mike | Anderson | CA-DWR, Div. of Flood Management  (State Climatologist) | [michael.l.anderson@water.ca.gov](mailto:Michael.L.Anderson@water.ca.gov) |
|  |  |  |  |
| Jeremy | Hill | CA-DWR, Div. of Flood Management  (Chief, Operations Support) | [jeremy.hill@water.ca.gov](mailto:Jeremy.Hill@water.ca.gov) |
| Chris | McCready | CA-DWR, Div. of Planning (TSID) | christina.mccready@water.ca.gov |
| Jane | Schafer-Kramer | CA-DWR, Div. of Planning (TSID) (Geographic Data Specialist, National Hydrography Dataset Steward) | [jane.schafer-kramer@water.ca.gov](mailto:Jane.Schafer-Kramer@water.ca.gov) |

**IoW-CA Governing Team**

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| --- | --- | --- | --- |
| **First Name** | **Last Name** | **Organization** | **Email** |
| Joaquin | Esquivel | Chair, SWRCB | [joaquin.esquivel@waterboards.ca.gov](mailto:joaquin.esquivel@waterboards.ca.gov" \t "_blank) |
| Greg | Gearheart | CA-SWRCB, Office of Information Management & Analysis | greg.gearheart@waterboards.ca.gov |
| David | Harris | **Enterprise Chief Data Officer - California Natural Resources Agency** | [david.harris@water.ca.gov](mailto:david.harris@water.ca.gov) |
| Chris | McCready | CA-DWR, Div. of Planning (TSID) | [christina.mccready@water.ca.gov](mailto:christina.mccready@water.ca.gov) |
| Tara | Moran | California Water Data Consortium | tmoran@cawaterdata.org |

1. https://gagegap.codefornature.org/ [↑](#footnote-ref-1)
2. See [California Senate Bill 19 text](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB19) and [California Department of Water Resources AB 1755 information](https://water.ca.gov/ab1755); https://water.ca.gov/ab1755 [↑](#footnote-ref-2)
3. Stream sensor refers to both stream gages for flow and stage, as well as water quality sensors, including for aquatic habitat information. [↑](#footnote-ref-3)