

# DRAFT

## **Instream Flow Studies for the Protection of Public Trust Resources: A Prioritized Schedule and Estimate of Costs**

### **Executive Summary**

Chapter 5 of the 2009-10 Seventh Extraordinary Session (SB X7 1, Simitian) directs the State Water Resources Control Board (Board) to submit to the Legislature, by December 31, 2010, a prioritized schedule and estimate of costs to complete instream flow studies for two categories of rivers and streams, by two specific deadlines:

- 1) high priority rivers and streams in the Delta watershed that were not covered in the Board's "Final Report on Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem" by 2012; and
- 2) all major rivers and streams outside the Sacramento River watershed by 2018.

The definition of the two stream categories is ambiguous. There are a number of tributaries that are both in the Delta watershed and outside the Sacramento River watershed, including the San Joaquin, Calaveras, Cosumnes, and Mokelumne Rivers. The Board interprets the first category to mean all Delta and Sacramento River tributaries not covered under the Board's "Final Report on Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem." Two additional schedules are prioritized for "all major rivers and streams outside the Sacramento River watershed."

This report identifies 127 rivers and streams for instream flow studies. The total estimated cost to conduct scientific instream flow studies for the high priority rivers and streams tributary to the Delta is \$24.7 million. The total estimated cost to conduct scientific instream flow studies for the high priority rivers and streams outside the Delta watershed is \$107.3 million. The detailed schedules and costs are preceded with a few short discussions on the timelines given in the directive, the organization of schedules, the cost estimates for instream flow studies, and cost estimates for the next logical step: setting instream flow objectives.

### **I. Timelines for Instream Flow Studies**

In order to comply with requirements of Chapter 5/X7 2009, the Board has provided three schedules in this report: Schedule 1 identifies high priority rivers and streams tributary to the Sacramento River and Delta. Schedule 2 identifies high priority rivers and streams outside the Sacramento River and the Delta watershed that support anadromous species. Schedule 3 identifies high priority rivers and streams outside the Sacramento River and the Delta watershed that support non-anadromous species. The Legislature calls for a completion date for Schedule 1 waterbodies in 2012 and a completion date for Schedule 2 and Schedule 3 waterbodies in 2018. The Board notes, however, that the 2012 and 2018 deadlines for conducting the instream flow studies, as specified in Chapter 5/2009, are unrealistic. An instream flow study rooted in sound science requires at least three years of sampling and monitoring. The 2012 deadline

# DRAFT

would allow for a maximum of one and a half years of study. Realistically, completing instream flow studies and preparing flow recommendations for all rivers and streams listed in this report is a project that will take substantial time to complete.

## II. Organization of Schedules and Prioritization Criteria

In developing these schedules, the Board has coordinated with the Department of Fish and Game (as required by Water Code Section 85087) as well as the Regional Water Boards. To prioritize the schedules, the Board determined that those streams which serve as habitat for endangered anadromous fish, such as Coho and Chinook salmon and Steelhead trout, should be prioritized for instream flow studies. Some of the rivers and streams listed may no longer support anadromous populations. These water bodies are included in the list as candidates for restoration of anadromous populations. Inland streams that do not generally support anadromous populations are prioritized in a separate schedule. Rivers and streams which are located within the habitat range of declining native amphibian and reptile populations, such as the California Red-Legged Frog and Western Pond Turtle, are noted. The presence of these species across all three schedules demonstrates a shared ecological concern between different regions of the state.

- ***Schedule 1 – High Priority Rivers and Streams Tributary to the Sacramento River and Delta.*** There are two priority groups in this schedule. Priority 1 includes rivers and streams that serve as habitat for spring-run Chinook salmon. Spring-run Chinook are more adversely affected by lack of flow than fall-run Chinook because they enter fresh waterways as the dry season begins.
- ***Schedule 2 – High Priority Rivers and Streams Outside the Sacramento River and Delta Watershed that Support Anadromous Species.*** There are two priority groups in this schedule. Priority 1 includes rivers and streams that serve as habitat for either Coho salmon, or Southern California Steelhead. Coho salmon are more sensitive than Chinook or Steelhead. Their range is limited to the North Coast, where they are federally listed as threatened, and the Central Coast where they are federally listed as endangered. Southern California Steelhead are federally listed as endangered.
- ***Schedule 3 – High Priority Rivers and Streams Outside the Sacramento River and Delta Watershed that Support Non-Anadromous Species.*** The rivers and streams in this schedule do not generally serve as habitat for the anadromous species used to prioritize the rest of the schedules. There are two priority groups in this schedule. Priority 1 includes rivers and streams that serve as habitat for the Lahontan Cutthroat Trout, a federally listed threatened species, as well as the Lost River, which is the sole habitat of the Lost River Sucker, a federally listed endangered species. All other rivers and streams in Schedule 3 list species that are endemic to the Lahontan region and are sensitive according to the California Natural Diversity Database.

# DRAFT

A table summarizing total estimated costs precedes the detailed schedule of streams. The rivers and streams are listed in alphabetical order within each respective priority grouping.

### III. Cost Estimates for Contracted Instream Flow Studies

Given the ecological diversity of the watersheds represented in this list, a generic cost estimate to complete instream flow studies state-wide is difficult to determine. The studies required for any given stream would need to be tailored on a case-by-case basis after the stream has been physically examined. Scientific studies would need to be accomplished through contracted consultants. Contracted activities that may need to occur in an instream flow study are flow/habitat modeling, spawning gravel studies, fish passage studies, water temperature monitoring/modeling, developing timing of pulse flows, and compilation of hydrology. The length of study also factors into the cost. Some streams may require longer study periods than others, depending on the complexities of the habitat.

The staffing required to oversee the consultants and manage the contracts also depends on the complexity of the studies required. Out of necessity, the cost estimates included in this report are highly generalized. Each stream is rated on an estimated range of costs:

- **High Cost Range:** the contract cost estimate of instream flow studies is in a range of \$800,000 - \$2,000,000. For this category, the Board would require one staff position, costing \$150,000 annually to manage the studies for two rivers. Using one individual, over an average three year study period, amounts to \$450,000 in staffing costs to manage the study contracts for two rivers or streams.
- **Mid Cost Range:** the contract cost estimate of instream flow studies is in a range of \$400,000 – \$800,000. For this category, the Board would require one staff position, costing \$150,000 annually to manage the contracts for studies of three rivers or streams. Over an average three year study period, consequently, one position and \$450,000 would be needed per three rivers or streams.
- **Low Cost Range:** the contract cost estimate of instream flow studies is in a range of \$150,000 - \$400,000. For this category, the Board would require one staff position, costing \$150,000 annually to manage the studies of four rivers or streams. Over an average three year, study period, consequently, the Board would need \$450,000 to fund a staff position to manage the study contracts for four rivers or streams.

The dollar amount in each schedule summary is based on the high end of each cost estimate range. Staffing and staff cost estimates are prorated to the number of rivers and streams in each priority grouping as described above.

# DRAFT

## **Potential Cost Savings and Existing Studies**

Significant cost savings could be achieved by relying upon existing studies and information that has already been collected and, in some cases, also analyzed. For example, information on instream flow needs in the American River is available in a Surface Water Resources, Inc. report prepared for the Water Forum: *A Draft Policy Document for the Lower American River Flow Management Standard*. The cost for instream flow studies in the American River may therefore be far less than the high cost estimate of \$800,000 to \$2,000,000, if the Board can rely upon the information summarized in this report. Review of existing information is therefore a necessary first step prior to initiating any new studies.

## **IV. Cost Estimates for Setting Instream Flow Objectives**

Streamflow studies do not result in additional streamflow. If existing streamflows are insufficient to meet environmental needs, voluntary or regulatory actions are necessary to ensure that the flows are made available. After conducting instream flow studies, the next logical step would be to set instream flow objectives as part of the regulatory framework needed to prevent further ecological damage to the Delta or other California rivers and streams. Streamflow objectives can be set administratively either as part of the State Water Board's planning processes, which would then require subsequent implementation actions, or directly as the result of a regulatory water rights action taken to amend specific water right permits and licenses. In either case, the activity would require compliance with: (1) the California Environmental Quality Act (CEQA), (2) the Water Code, and (3) the Administrative Procedures Act, as well as other regulatory requirements. A wide range of cost could occur as a result of these processes. A simple case with a smaller watershed and limited water use would cost approximately \$600,000. A larger watershed with more complex water use issues would cost several million dollars.

# D R A F T

## Summary of Cost Estimates and Completion Dates (Table A)

Priority Group	Contract Oversight Staffing Estimate	Contracted Scientific Studies Estimate	Total Cost Estimate for Studies and Study Oversight
<b>Schedule 1 High-priority Rivers and Streams Tributary to the Sacramento River and Delta</b>			
1	\$1.16 million	\$6.4 million	\$7.56 million
2	\$1.95 million	\$15.2 million	\$17.15 million
Total Estimated Costs for Schedule 1			<b>\$24.7 million</b>
<b>Schedule 2 High Priority Rivers and Streams that Support Anadromous Species</b>			
1	\$10.01 million	\$59.2 million	\$69.21 million
2	\$2.74 million	\$14.8 million	\$17.54 million
Total Estimated Costs for Schedule 2			<b>\$86.75 million</b>
<b>Schedule 3 High Priority Rivers and Streams that Support Only Non-Anadromous Species</b>			
1	\$1.12 million	\$4.8 million	\$5.92 million
2	\$2.17 million	\$12.4 million	\$14.57 million
Total Estimated Costs for Schedule 3			<b>\$20.5 million</b>

# D R A F T

## V. Detailed Stream Lists with Instream Flow Studies Cost Estimate Range

<b>Schedule 1 (Table B) High Priority Rivers and Streams Tributary to the Sacramento River and Delta</b>			
<b>Priority Group</b>	<b>Name of River or Stream</b>	<b>Species of Concern</b>	<b>Estimated Cost Range for Contracted Studies<sup>1</sup></b>
1	Antelope Creek (Tributary to Sacramento River near Red Bluff)	Spring Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Mid
1	Battle Creek (Tributary to Sacramento River)	Spring Chinook Salmon, Winter Steelhead Trout, Green Sturgeon, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Mid
1	Bear River (Tributary to Feather River)	Spring Chinook Salmon, Steelhead Trout, Sierra Nevada Yellow-Legged Frog, Foothill Yellow-Legged Frog, Western Pond Turtle	Low
1	Big Chico Creek	Spring Chinook Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low
1	Cottonwood Creek (two forks, tributary to Sacramento River)	Spring Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low

<sup>1</sup> High Cost Range: \$800,000 - \$2,000,000  
 Mid Cost Range: \$400,000 - \$800,000  
 Low Cost Range: \$150,000 - \$400,000

# D R A F T

1	Lower Butte Creek	Spring Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, California Red- Legged Frog, Western Pond Turtle	Mid
1	Deer Creek (Tributary to Sacramento River)	Spring Chinook Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red- Legged Frog, Western Pond Turtle	Mid
1	Mill Creek (Tributary to Sacramento River)	Spring Chinook Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red- Legged Frog, Western Pond Turtle	High
2	American River	Fall Chinook Salmon, Winter Steelhead Trout, Sierra Nevada Yellow- Legged Frog, Foothill Yellow Legged-Frog, California Red-Legged Frog, Western Pond Turtle	High
2	Calaveras River	Fall Chinook Salmon, Winter Steelhead Trout, Sierra Nevada Yellow- Legged Frog, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Mid
2	Cosumnes River	Fall Chinook Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red- Legged Frog, Western Pond Turtle	Mid

## D R A F T

2	Cow Creek (Tributary to Sacramento River)	Fall Chinook Salmon, Spring Chinook Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Mid
2	Merced River	Fall Chinook Salmon, Steelhead Trout, Yosemite Toad, Sierra Nevada Yellow-Legged Frog, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	High
2	Mokelumne River	Fall Chinook Salmon, Winter Steelhead Trout, Sierra Nevada Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Mid
2	Lower San Joaquin (below Merced River)	Fall Chinook Salmon, Winter Steelhead Trout, Green Sturgeon, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	High
2	Upper San Joaquin River	Fall Chinook Salmon, Winter Steelhead Trout, Green Sturgeon, Sierra Nevada Yellow-Legged Frog, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	High
2	Stanislaus River	Fall Chinook Salmon, Winter Steelhead Trout, Yosemite Toad, Sierra Nevada Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	High



# DRAFT

2	Tuolumne River	Fall Chinook Salmon, Steelhead Trout, Yosemite Toad, Sierra Nevada Yellow-Legged Frog, Foothill Yellow- Legged Frog, California Red Legged Frog, Western Pond Turtle	High
---	----------------	---	------

# D R A F T

<b>Schedule 2 (Table C) High Priority Rivers and Streams that Support Anadromous Species</b>			
<b>Priority Group</b>	<b>Name of River or Stream</b>	<b>Species of Concern</b>	<b>Estimated Cost Range for Contracted Studies<sup>2</sup></b>
1	Albion River	Coho Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Mid
1	Aptos Creek	Coho Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Mid
1	Arroyo Siquit	Southern Steelhead Trout, California Red-Legged Frog	Low
1	Bear Creek (Tributary to West Fork San Gabriel)	Southern Steelhead Trout, Western Pond Turtle	Low
1	Bear River (Humboldt County)	Coho Salmon, Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	Low
1	Big River (Two Forks)	Coho Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	High
1	Carpinteria Creek	Southern Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low

<sup>2</sup> High Cost Range: \$800,000 - \$2,000,000  
 Mid Cost Range: \$400,000 - \$800,000  
 Low Cost Range: \$150,000 - \$400,000

## D R A F T

1	Conejo Creek	Southern Steelhead Trout, California Red-Legged Frog	Low
1	Dos Pueblos Canyon Creek	Southern Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Low
1	Dume Creek (Zuma Canyon, Los Angeles County)	Southern Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Low
1	South Fork Eel River	Coho Salmon, Fall Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	High
1	Middle Fork Eel River	Coho Salmon, Chinook Salmon, Winter and Summer Steelhead Trout, Foothill Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	High
1	Lower Eel River	Coho Salmon, Chinook Salmon, Steelhead Trout, Green Sturgeon, Foothill Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	Mid
1	Escondido Canyon Creek (Los Angeles County)	Southern Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Low
1	Fish Fork (Tributary to San Gabriel)	Southern Steelhead Trout, Western Pond Turtle	Low

## DRAFT

1	Garcia River	Coho Salmon, Pink Salmon, Winter Steelhead Trout, California Red-Legged Frog, Northwestern Salamander, Western Pond Turtle	Mid
1	Gazos Creek	Coho Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low
1	Gualala River	Coho Salmon, Winter Steelhead Trout, California Red-Legged Frog, Foothill Yellow-Legged Frog, Western Pond Turtle	Mid
1	Hopper Canyon Creek	Southern Steelhead Trout, California Red-Legged Frog, Foothill Yellow-Legged Frog, Arroyo Toad, Western Pond Turtle	Low
1	Middle Klamath River	Coho Salmon, Winter and Summer Steelhead Trout, Green Sturgeon, Foothill Yellow-Legged Frog, Western Pond Turtle	High
1	Lower Klamath River	Coho Salmon, Winter and Summer Steelhead Trout, Green Sturgeon, Shortnose Sucker, Foothill Yellow-Legged Frog, Western Pond Turtle	Mid
1	Lagunitas Creek	Coho Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Mid

## D R A F T

1	Lake Casitas Tributaries	Southern Steelhead Trout, California Red-Legged Frog, Yellow-Legged Frog, Western Pond Turtle	Mid
1	Little River	Coho Salmon, Chinook Salmon, Steelhead Trout, California Red-Legged Frog, Foothills Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	Mid
1	Los Alisos Canyon Creek	Southern Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Low
1	Malibu Creek	Southern Steelhead Trout, Tidewater Goby, California Red-Legged Frog, Western Pond Turtle	Low
1	Matilija Creek (Two Forks)	Southern Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle, Arroyo Toad	Mid
1	Mattole River	Coho Salmon, Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	High
1	Murietta Canyon Creek	Southern Steelhead Trout, California Red-Legged Frog, Yellow-Legged Frog, Western Pond Turtle, Arroyo Toad	Low
1	Navarro River	Coho Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, Western Pond Turtle	High

## D R A F T

1	Noyo River	Coho Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Northwestern Salamander, Western Pond Turtle	Low
1	Otay River	Southern Steelhead Trout, Arroyo Toad, Western Pond Turtle	Mid
1	Piru Creek (Incl. Lockwood Creek)	Southern Steelhead Trout, California Red-Legged Frog, Foothill Yellow-Legged Frog, Arroyo Toad, Western Pond Turtle	Low
1	Redwood Creek (Marin County)	Coho Salmon, Winter Steelhead Trout, California Red-Legged Frog, Foothill Yellow-Legged Frog, Western Pond Turtle	Low
1	Russian River (Lower, Middle, and Upper)	Coho Salmon, Fall Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	High
1	San Antonio Creek (Santa Barbara County)	Southern Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low
1	San Dieguito Creek	Southern Steelhead Trout, Western Pond Turtle	Low
1	San Gabriel River (Main Stem, North Fork, West Fork, East Fork)	Southern Steelhead Trout, Western Pond Turtle	High
1	San Geronimo Creek	Coho Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low

## D R A F T

1	San Juan Creek (Incl. Arroyo Trabuco)	Southern Steelhead Trout, California Red-Legged Frog, Arroyo Toad, Western Pond Turtle	Mid
1	San Luis Rey River	Southern Steelhead Trout, California Red-Legged Frog, Arroyo Toad, Western Pond Turtle	Mid
1	Santa Margarita River	Southern Steelhead Trout, Arroyo Toad, Western Pond Turtle	Mid
1	San Mateo Creek	Southern Steelhead Trout, Arroyo Toad, Western Pond Turtle	Mid
1	San Onofre Creek	Southern Steelhead Trout, Arroyo Toad, Western Pond Turtle	Low
1	San Vicente Creek (Santa Cruz)	Coho Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low
1	Santa Anita Canyon Creek	Southern Steelhead, California Red-Legged Frog, Western Pond Turtle	Low
1	Santa Clara River	Southern Steelhead Trout, California Red-Legged Frog, Foothill Yellow-Legged Frog, Arroyo Toad, Western Pond Turtle	High
1	Santa Maria River	Southern Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Mid
1	Santa Paula Creek	Southern Steelhead Trout, California Red-Legged Frog, Foothill Yellow-Legged Frog, Arroyo Toad, Western Pond Turtle	Low

## D R A F T

1	Santa Ynez River	Southern Steelhead Trout, Tidewater Goby, Foothill Yellow-Legged Frog, California Red-Legged Frog, Arroyo Toad, Western Pond Turtle	Mid
1	Scott River	Coho Salmon, Chinook Salmon, Steelhead Trout, Scott Bar Salamander, Long-toed Salamander, Foothill Yellow-Legged Frog	High
1	Sespe Creek (Incl. tributaries)	Southern Steelhead Trout, California Red-Legged Frog, Foothill Yellow-Legged Frog, Arroyo Toad, Western Pond Turtle	High
1	Shasta River	Coho Salmon, Chinook Salmon, Steelhead Trout, Shasta Salamander, Long-toed Salamander	High
1	Sisar Creek	Southern Steelhead Trout, California Red-Legged Frog, Foothill Yellow-Legged Frog, Arroyo Toad, Western Pond Turtle	Low
1	Sisquoc River (Incl. La Brea Creek (Two Forks))	Southern Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Mid
1	Smith River	Coho Salmon, Winter and Summer Steelhead Trout, Green Sturgeon, Chinook Salmon, Foothill Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	High
1	Solstice Creek	Southern Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Low



## D R A F T

1	Soquel Creek	Coho Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low
1	Sweetwater Creek (San Diego County)	Southern Steelhead Trout, California Red-Legged Frog, Arroyo Toad, Western Pond Turtle	Low
1	Topanga Canyon Creek	Southern Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Low
1	Trancas Canyon	Southern Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Low
1	Trinity River (Lower, Middle and Upper)	Coho Salmon, Winter and Summer Steelhead Trout, Fall and Spring Chinook Salmon, Foothill Yellow-Legged Frog, Long-toed Salamander, Western Pond Turtle	High
1	South Fork Trinity River	Coho Salmon, Winter and Summer Steelhead Trout, Fall and Spring Chinook Salmon, Foothill Yellow-Legged Frog, Western Pond Turtle	Mid
1	Van Duzen River	Coho Salmon, Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	Mid
1	Ventura River	Southern Steelhead Trout California Red-Legged Frog, Foothill Yellow-Legged Frog, Arroyo Toad, Western Pond Turtle	High

## D R A F T

1	Waddell Creek	Coho Salmon, Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low
1	Winchuck River	Coho Salmon, Winter Steelhead Trout, Chinook Salmon, Cutthroat Trout, Foothill Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	Mid
2	Alameda Creek	Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low
2	Arroyo de la Cruz (San Luis Obispo County)	Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low
2	Big Sur River	Winter Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	High
2	Carmel River	Winter Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Mid
2	Coyote Creek (Marin County)	Winter Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Low
2	Upper Main Eel River	Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	Low

## D R A F T

2	Middle Main Eel River	Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	Mid
2	North Fork Eel River	Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, Northwestern Salamander, Western Pond Turtle	Mid
2	Guadalupe River	Winter Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Mid
2	Napa River	Winter Steelhead Trout, Chinook Salmon, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	High
2	Salinas River	Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red- Legged Frog, Western Pond Turtle	Mid
2	Salmon River	Chinook Salmon, Steelhead Trout, Foothill Yellow-Legged Frog, Western Pond Turtle	Mid
2	San Benito River	Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red- Legged Frog, Western Pond Turtle	Mid
2	San Francisquito Creek	Winter Steelhead Trout, California Red-Legged Trout, Western Pond Turtle	Low
2	San Lorenzo River	Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red- Legged Frog, Western Pond Turtle	Mid

# DRAFT

2	San Luis Obispo Creek	Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Low
2	Santa Rosa Creek	Winter Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Mid
2	Sonoma Creek	Winter Steelhead Trout, Foothill Yellow-Legged Frog, California Red-Legged Frog, Western Pond Turtle	Mid
2	Suisun Creek	Winter Steelhead Trout, California Red-Legged Frog, Western Pond Turtle	Low

# D R A F T

<b>Schedule 3 (Table D) High Priority Rivers and Streams that Support Only Non-Anadromous Species</b>			
Priority Group	Name of River or Stream	Species of Concern	Estimated Cost Range for Contracted Studies <sup>3</sup>
1	Buckeye Creek	Lahontan Cutthroat Trout, Sierra Nevada Yellow-Legged Frog, Yosemite Toad	Low
1	East Walker River	Lahontan Cutthroat Trout, Sierra Nevada Yellow-Legged Frog, Yosemite Toad	Mid
1	Green Creek	Lahontan Cutthroat Trout, Sierra Nevada Yellow-Legged Frog, Yosemite Toad	Low
1	Independence Creek	Lahontan Cutthroat Trout, Sierra Nevada Yellow-Legged Frog	Low
1	Little Truckee River	Lahontan Cutthroat Trout, Sierra Nevada Yellow-Legged Frog	Mid
1	Lost River	Shortnose Sucker, Lost River Sucker, Western Pond Turtle	Mid
1	Robinson Creek	Lahontan Cutthroat Trout, Sierra Nevada Yellow-Legged Frog, Yosemite Toad	Low
1	Sagehen Creek	Lahontan Cutthroat Trout, Sierra Nevada Yellow-Legged Frog	Low
1	Virginia Creek	Lahontan Cutthroat Trout, Sierra Nevada Yellow-Legged Frog, Yosemite Toad	Low
2	Cow Head Slough	Cow Head Lake Tui Chub	Low

<sup>3</sup> High Cost Range: \$800,000 - \$2,000,000  
 Mid Cost Range: \$400,000 - \$800,000  
 Low Cost Range: \$150,000 - \$400,000

## DRAFT

2	Deep Creek	Mojave Tui Chub, California Red-Legged Frog, Sierra Madre Yellow-Legged Frog, Arroyo Toad, Western Pond Turtle	Low
2	Escondido Creek (San Diego County)	Western Pond Turtle	Low
2	Hot Creek	Owens Sucker, California Floater Freshwater Mussel	Low
2	Lee Vining Creek	Sierra Nevada Yellow-Legged Frog, Yosemite Toad, Mount Lyell Salamander	Mid
2	Little Rock (Littlerock) Creek (Eastern LA County)	Sierra Madre Yellow-Legged Frog, Arroyo Toad	Mid
2	Los Peñasquitos Canyon Creek	Arroyo Toad, Western Pond Turtle	Low
2	Mammoth Creek	Owens Sucker, California Floater Freshwater Mussel	Low
2	Mill Creek (Mono Basin)	Sierra Nevada Yellow-Legged Frog, Yosemite Toad, Mount Lyell Salamander	Low
2	Mojave River	Mojave Tui Chub, California Red-Legged Frog, Sierra Madre Yellow-Legged Frog, Arroyo Toad, Western Pond Turtle	High
2	West Fork Mojave River	Mojave Tui Chub, California Red-Legged Frog, Sierra Madre Yellow-Legged Frog, Arroyo Toad, Western Pond Turtle	High

# DRAFT

2	Owens River and Tributaries	Owens Tui Chub, Owens Speckled Dace, Owens Sucker, Owens Pupfish, Northern Leopard Frog, Sierra Nevada Yellow-Legged Frog	High
2	Pine Creek (Tributary to Eagle Lake, Lassen County)	Eagle Lake Rainbow Trout	Mid
2	Reverse Creek	Sierra Nevada Yellow-Legged Frog, Yosemite Toad, Mount Lyell Salamander	Low
2	Rush Creek	Sierra Nevada Yellow-Legged Frog, Yosemite Toad, Mount Lyell Salamander	Mid

## VI. Conclusions

In accordance with Chapter 5 of the 2009-10 Seventh Extraordinary Session, the State Water Board has developed a prioritized schedule and estimate of costs to complete instream flow studies for (1) high priority rivers and streams in the Delta watershed that were not covered in the Board's "Final Report on Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem" by 2012; and (2) all major rivers and streams outside the Sacramento River watershed by 2018.

This report identifies 127 rivers and streams for instream flow studies. The total estimated cost to conduct scientific instream flow studies for the 2012 deadline is \$24.7 million. The total estimated cost to conduct scientific instream flow studies for the 2018 deadline is \$107.3 million.