Providing The Fuel For A Structured Decision Making Framework:

Serving Up Juvenile Salmon Data Collected With Rotary Screw Traps

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Since 1993, rotary screw traps (RSTs) have been used to monitor the production or abundance of juvenile Chinook salmon at 51 locations in 16 watersheds in the Central Valley of California.

In most cases, the biologists in the different watershed have developed watershed-specific methods and approaches for processing their data and reporting RST data in the Central Valley.




Photographs by Andrea Fuller, FishBio consulting company

The variations in the way different biologists in different watersheds have calculated salmon production varies, and confounds the ability to aggregate data at a Central Valley-wide.

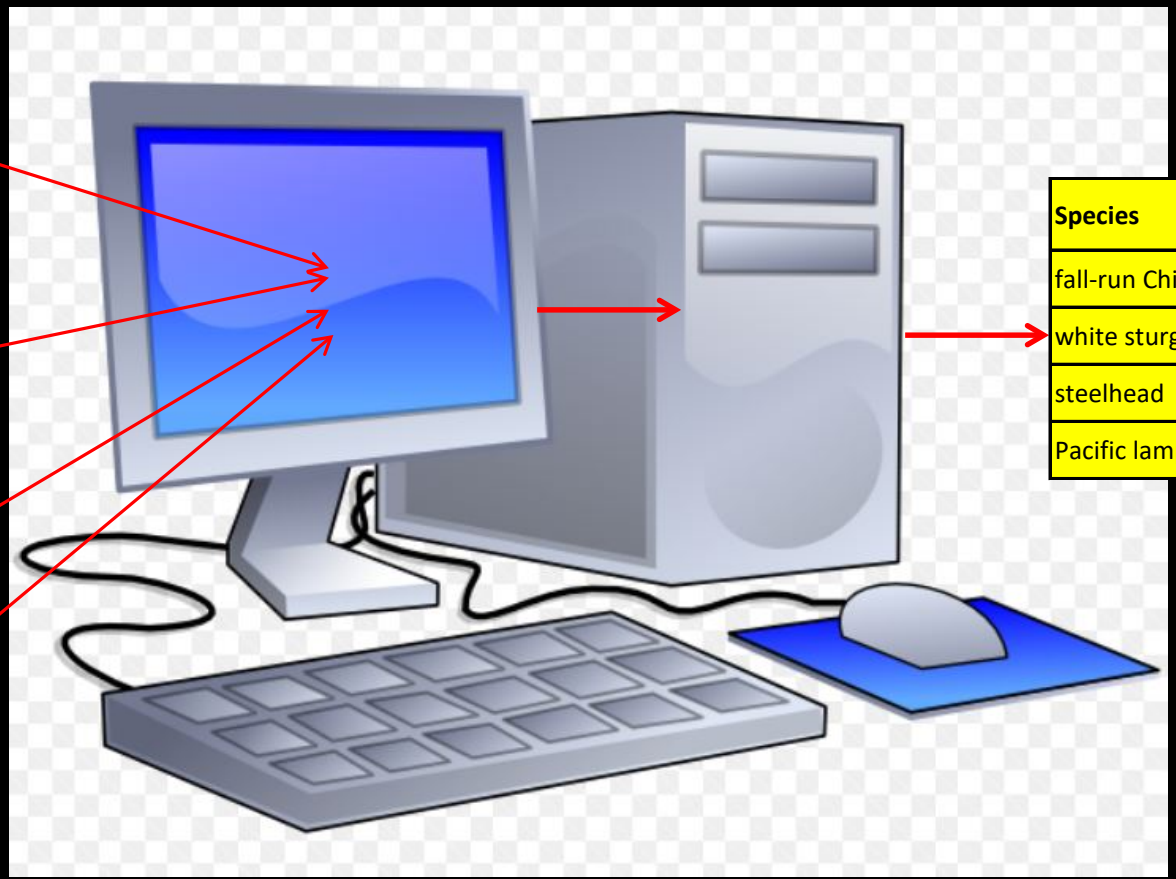
Those confounding issues include:

1) The trap efficiency models used to expand catch to develop a salmon production estimate, and

2) How catch is imputed during days/times not fished.

A MORE UNIFIED APPROACH

A Rotary Screw Trap Platform that provides a mechanism for storing, analyzing, and reporting RST data in a standardized manner.



Species	Number of individuals
fall-run Chinook salmon	3
white sturgeon	1
steelhead	1
Pacific lamprey	1

The RST Platform:

1. Consolidates RST data from different watersheds into one standardized database structure.

2. Compensates for operational conditions that affect RST data analyses in a standardized manner, e.g. days when RSTs did not operate.

3. Produces statistically robust production estimates for different juvenile life stage/size classes and temporal scales (e.g., daily, monthly, etc.). And,

4. Generates corresponding bootstrapped estimates of production precision.

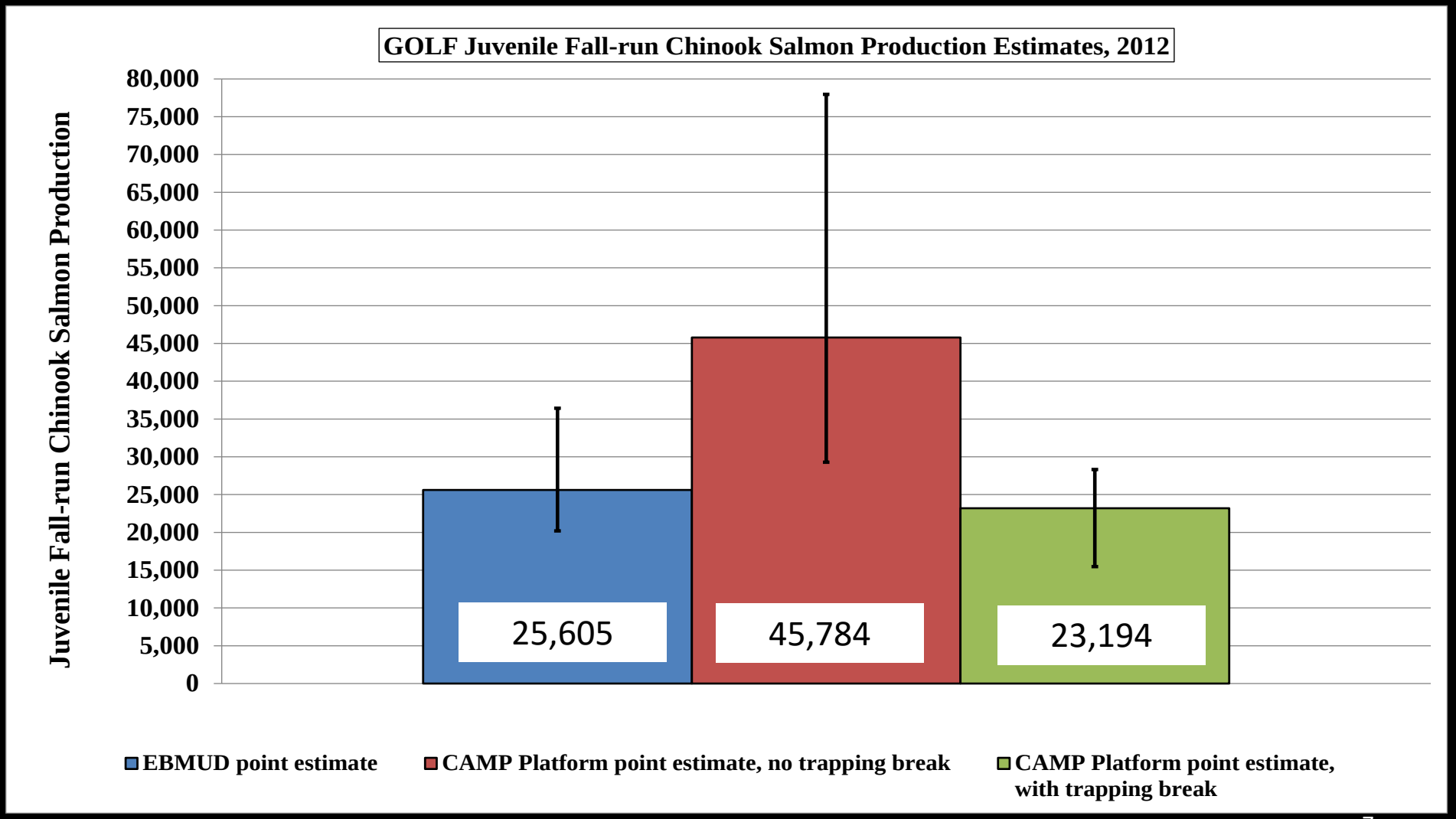
The benefit of standardizing data analysis:

an example using Mokelumne River RST data at the Golf trap site

Brood year	EBMUD salmon production estimate	CAMP Platform salmon production estimate	% difference in EBMUD vs. CAMP production estimates
2006	1,197,778	1,100,907	8%
2007	19,582	30,442	-55%
2008	18,347	23,316	-27%
2009	8,590	9,869	-15%
2010	66,751	50,587	24%
2011	281,481	287,883	-2%
2012	25,605	45,784	-79%

The differences can be explained:

production estimates with and without breaks in trapping



CONCLUSION:

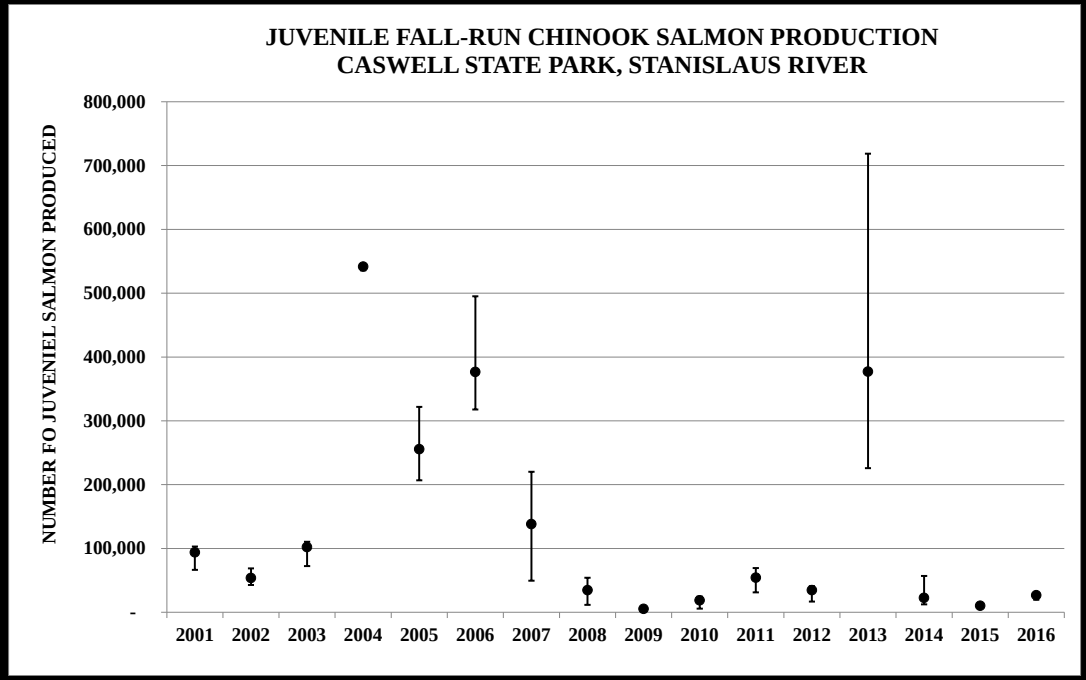
A standardized approach to storing and analyzing data is essential if trends in the abundance of juvenile salmon are to be assessed across watershed boundaries.

The CAMP rotary screw trap Platform has the ability to produce several types of reports in a standardized, automated fashion. These include:

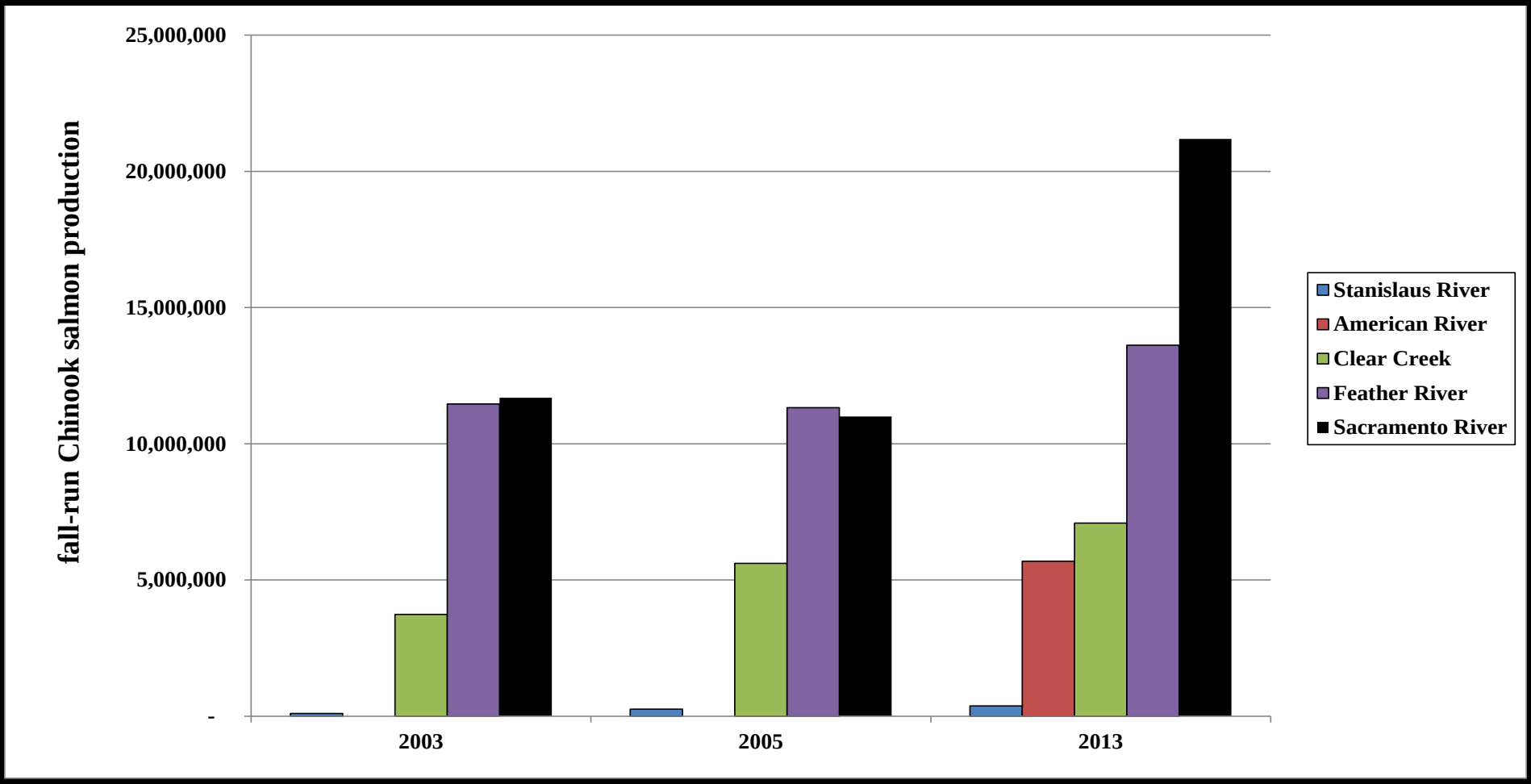
- Salmon production estimates at different temporal scales. And,
- Tabular data that can be used to characterize outmigration timing.

JUVENILE FALL-RUN CHINOOK SALMON PRODUCTION AT CASWELL STATE PARK, STANISLAUS RIVER, 2001 - 2016

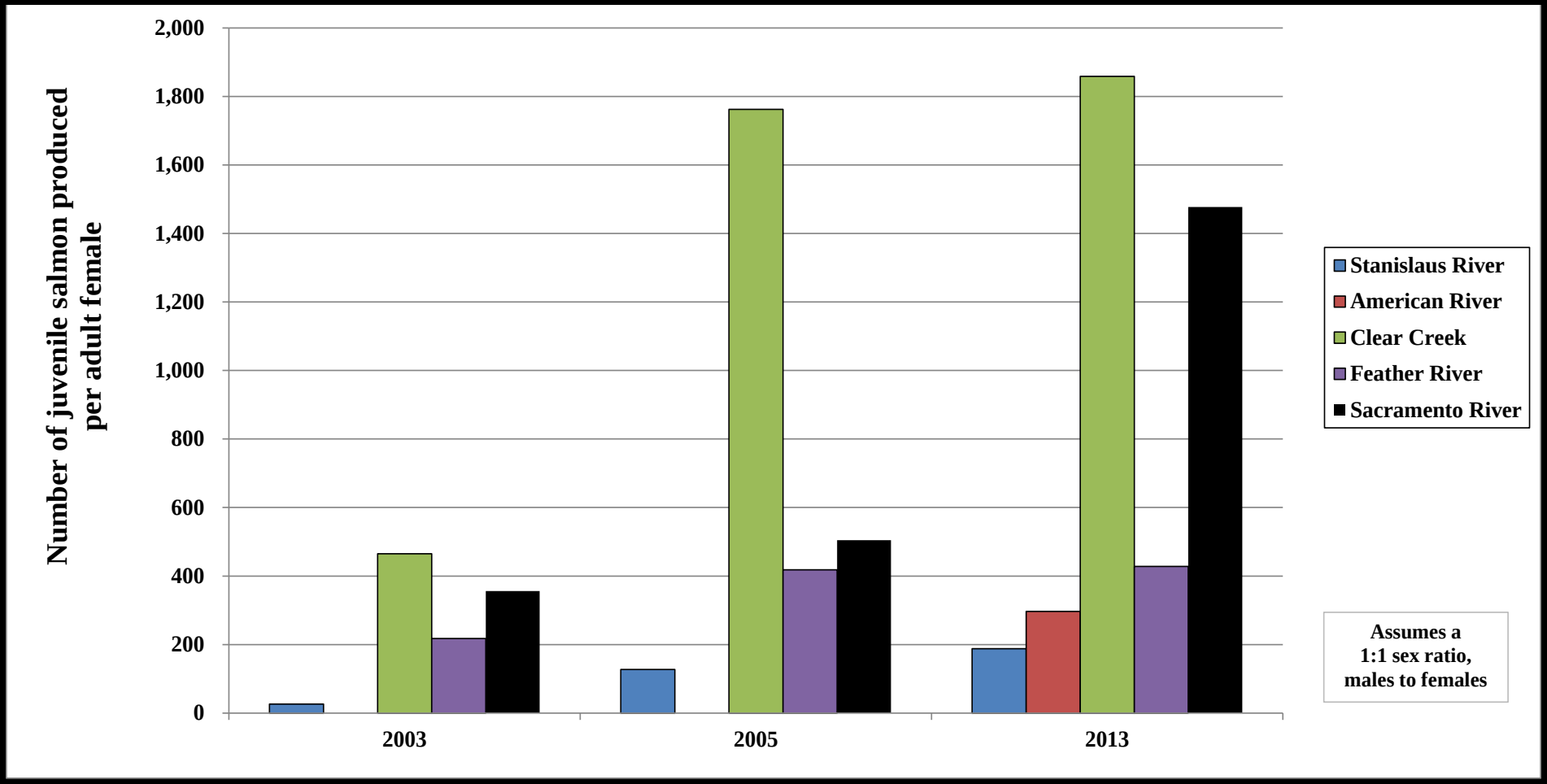
Year	Total Annual Passage	Lower95pctCI	Upper95pctCI
2001	93,887	66,504	103,046
2002	53,619	42,858	68,901
2003	102,231	72,390	110,595
2004	541,514	535,763	543,495
2005	255,522	206,724	321,792
2006	376,483	317,648	495,233
2007	138,117	49,415	220,264
2008	34,773	11,761	54,116
2009	5,444	3,462	6,124
2010	18,844	5,640	24,584
2011	54,329	31,232	69,368
2012	34,695	16,883	40,950
2013	377,026	225,743	718,560
2014	22,469	12,346	56,969
2015	10,160	9,402	14,536
2016	26,609	19,543	29,119



JUVENILE FALL-RUN CHINOOK SALMON PRODUCTION ON THE STANISLAUS, AMERICAN, FEATHER, AND SACRAMENTO RIVERS AND CLEAR CREEK, 2003, 2005, 2013



NUMBER OF JUVENILE FALL-RUN CHINOOK SALMON PRODUCED PER ADULT FEMALE ON THE STANISLAUS, AMERICAN, FEATHER, AND SACRAMENTO RIVERS AND CLEAR CREEK, 2003, 2005, 2013



The CAMP RST Platform and Adaptive Resource Management

The Platform provides:

- A tool for understanding the status and historical trends in salmon populations in the Central Valley.
- Information about population life history and dynamics, e.g., number of juveniles produced per female.
- Information that can be used to more accurately forecast the biological response to future restoration actions.

Monitoring and Adaptive Resource Management

Monitoring data *must* match model predictions,

i.e., monitoring data are used to improve predicted responses

to management activities.

Monitoring variable	**Model prediction**
Abundance	**Population size**
Number of fry, parr, smolts	**Life history diversity**
Number and location of salmon redds or carcasses	**Species occupancy/distribution**