

Southern California Steelhead



Steve Howard

**United Water Conservation
District
Santa Paula, CA**

**Harborside Speaker Series
March 1, 2009**

What is a Steelhead?

- Steelhead and resident rainbow trout are of the same species, *Oncorhynchus mykiss*
- A steelhead is a rainbow trout that spends part of its life in the ocean and part in rivers and streams
- This life cycle or behavior trait is called anadromy and steelhead are anadromous
- There are two general forms of rainbow trout, resident rainbow trout and anadromous rainbow trout (steelhead) known collectively as coastal rainbow trout
- Juvenile steelhead that migrate to the ocean are called “smolts”



Steelhead Distribution and Characteristics

- Steelhead are found on the west coast of the United States from southeast Alaska to Mexico and in parts of Russia
- Rainbow trout are the most widely introduced trout species in the world.
- Unlike Pacific salmon, steelhead do not necessarily die after spawning
- Steelhead can live from 4-7 years and can weigh up to 20 pounds
- There is little known as to why a coastal rainbow trout chooses the resident or anadromous life cycle



Anadromy vs Residency

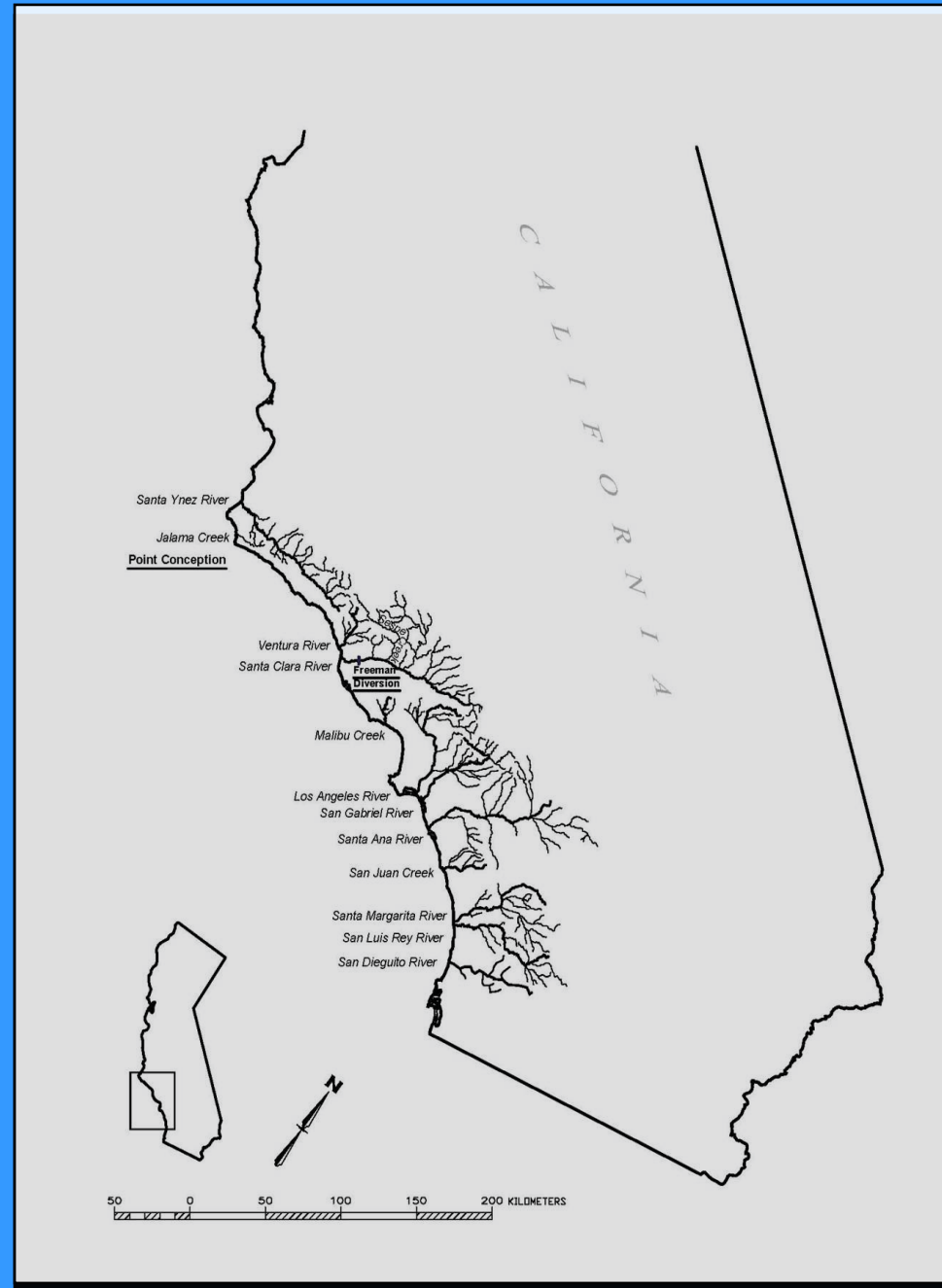
- Multiple studies have demonstrated that rainbow trout (*Oncorhynchus mykiss*) exhibit a high degree of phenotypic plasticity throughout this species range with two divergent but overlapping ecotypes (anadromous and resident)
- This plasticity in life history is more pronounced and important to the viability of steelhead in southern California
- Currently, downstream gene flow (smolts) continues to occur with minimal upstream anadromous (adults) gene flow



Southern California Steelhead

- Annual steelhead migrations in the Pacific Northwest are called runs. Steelhead in southern California migrate in and out of rivers only during years with sufficient river flow
- Extended fresh water sequestration of anadromous coastal rainbow trout in streams and rivers during dry and extended drought years is a natural phenomenon in southern California
- Human induced habitat fragmentation in the form of dams, diversions and groundwater water pumping has potentially exacerbated this fresh water sequestration as well as limited anadromous upstream gene flow

Potential Historic Southern Steelhead Distribution south of Point Conception



History of Steelhead Fishing in Ventura County 1800's and early 1900's

August 14, 1875 – Ventura Signal

I caught fourteen trout, one of which measured seventeen inches and seven of them weighed eight pounds. There are plenty left, some larger than any I caught... Signed

S.P.G. (S.P. Guiberson).

October 23, 1875 – Ventura Signal

They came in to vote Wednesday, and reported the capture of a trout measuring 25 inches in length, in the Arroyo los Coyotes. They corralled the monster in a pool, and despatched him with rocks. This is the largest trout ever captured in this part of the country.

April 4, 1909 – Los Angeles Times

a two days' fishing expedition at the mouth of the Ventura River, where each man landed the limit of steelhead trout. About half of the catch was thrown back on account of their small size, and the 150 fish that formed the real catch averaged about nine inches in length. The largest was fifteen inches long.

History of Steelhead Stocking in Ventura County

- Extensive stocking of steelhead fry from Pacific Northwest to Ventura County until 1930's

November 6, 1909 – Ventura Free Press

Santa Paula Fish and Game Protective Association, Santa Paula and See-Saw (Sisar) creeks, 30,000 rainbow and 20,000 Loch Leven; H.H. Elkins, Sespe, 20,000 rainbow and 30,000 Loch Leven.

October 15, 1915 – Ventura Free Press

ANOTHER BIG TROUT SHIPMENT COMING – The second big shipment of young trout for the Ventura county streams will arrive on October 21st and 22nd at which time Game Warden Barnet will received from the state hatcheries 100,000 steelhead, 75,000 of which he will place in the Ventura river and the remaining 25,000 will be planted in the Sespe.

- Stocking of steelhead ends in 1930's and changes to stocking of catchable size resident rainbow trout

Fish Car (Train)



Fish Car and Fish Cans



Locals Stocking Trout

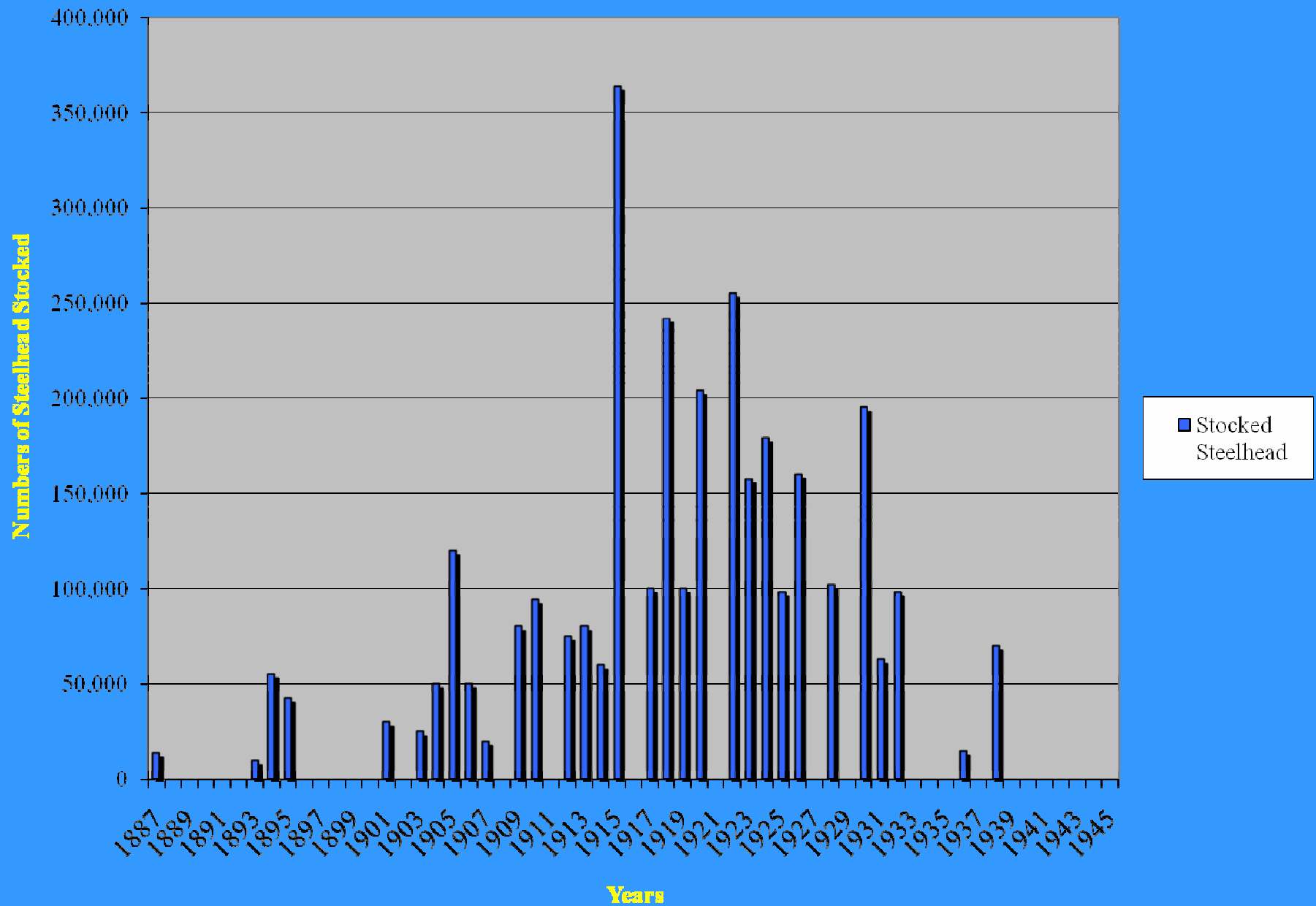
October 16, 1919 – Santa Paula Chronicle

FISH AND GAME LOVERS PLANT LOCAL STREAMS – Trout to the number of 50,000 were last week planted in the waters of the Santa Paula creek by local fishermen and devotees of the rod and reel. Forest Ranger Geo. Bald gave valuable assistance in the work of the planting of the fish, assisting the volunteer workers very materially by his efforts.

October 15, 1920 – Fillmore Herald

MANY FISH PLANTED – In the fishing streams around Fillmore on last Tuesday they turned loose 60,000 trout from the state fish hatchery. Most of these were taken up the Sespe by the following volunteer workers: Ranger De la Riva, driving a truck donated by the Orange Lea; Ray Lindendorf, driving a truck furnished by the Co-Op, and Parker Dear, driving a truck furnished by the Willard Oil Co. Frank Arundell made the distribution up Pole creek, while Charlie Rehart turned two cans of them loose in Fish Slough.

Stocked Steelhead in Santa Clara and Ventura Rivers



The rescue effect, evidence of a life history trait that will most likely be an important factor in the recovery of southern California steelhead



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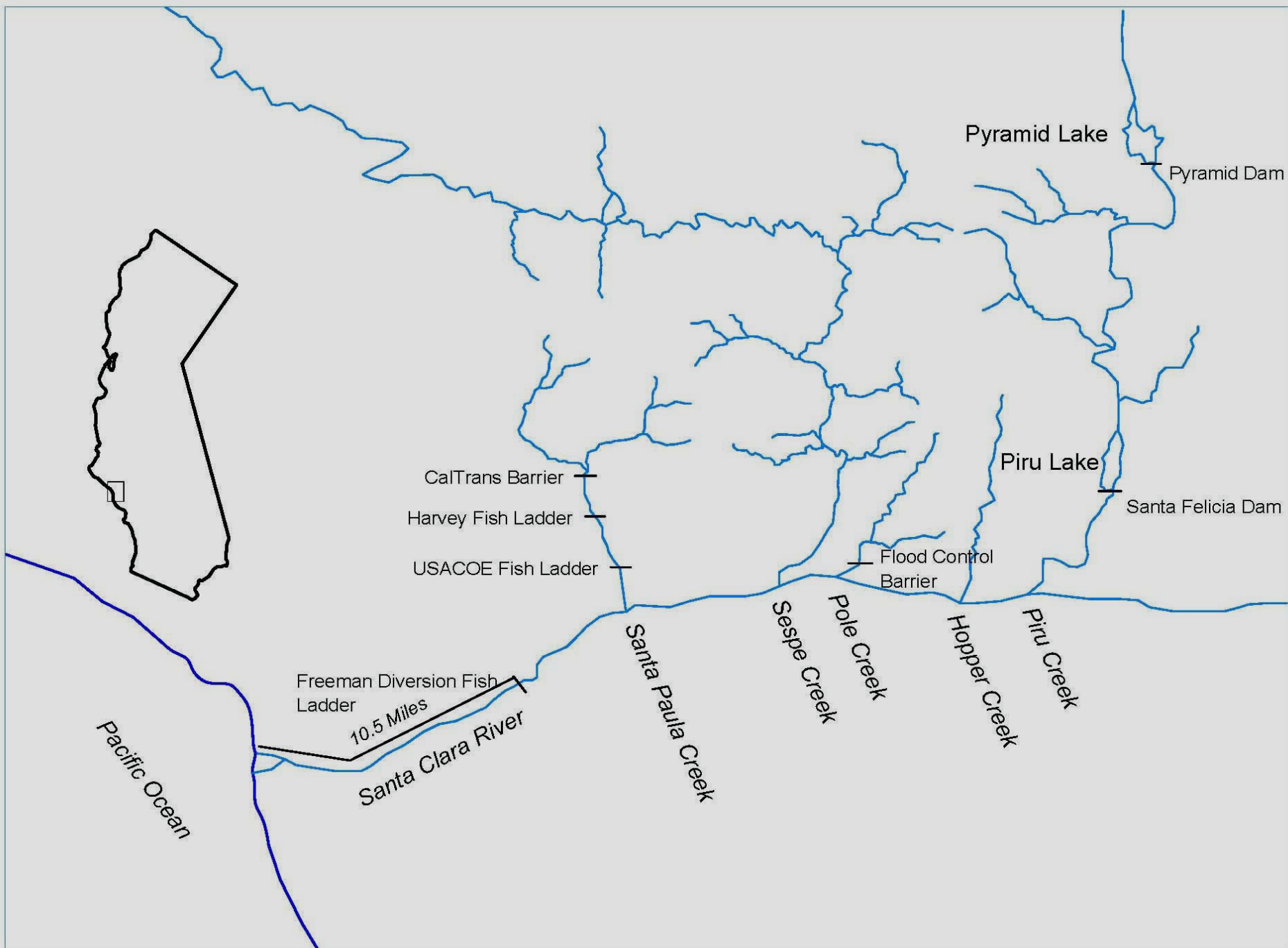


Introduction

- Multiple studies have demonstrated that rainbow trout (*Oncorhynchus mykiss*) exhibit a high degree of phenotypic plasticity throughout this species range with two divergent but overlapping ecotypes (anadromous and resident)
- This plasticity in life history is more pronounced and important to the viability of steelhead in southern California
- Downstream gene flow continues to occur with minimal upstream anadromous gene flow

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- Extended fresh water sequestration of anadromous *O. mykiss* is a natural phenomenon in southern California
- Human induced habitat fragmentation in the form of dams, diversions and groundwater water pumping has potentially exacerbated this fresh water sequestration as well as limited anadromous upstream gene flow
- Steelhead migration monitoring has occurred from 1993 to present at the Freeman Diversion on the Santa Clara River





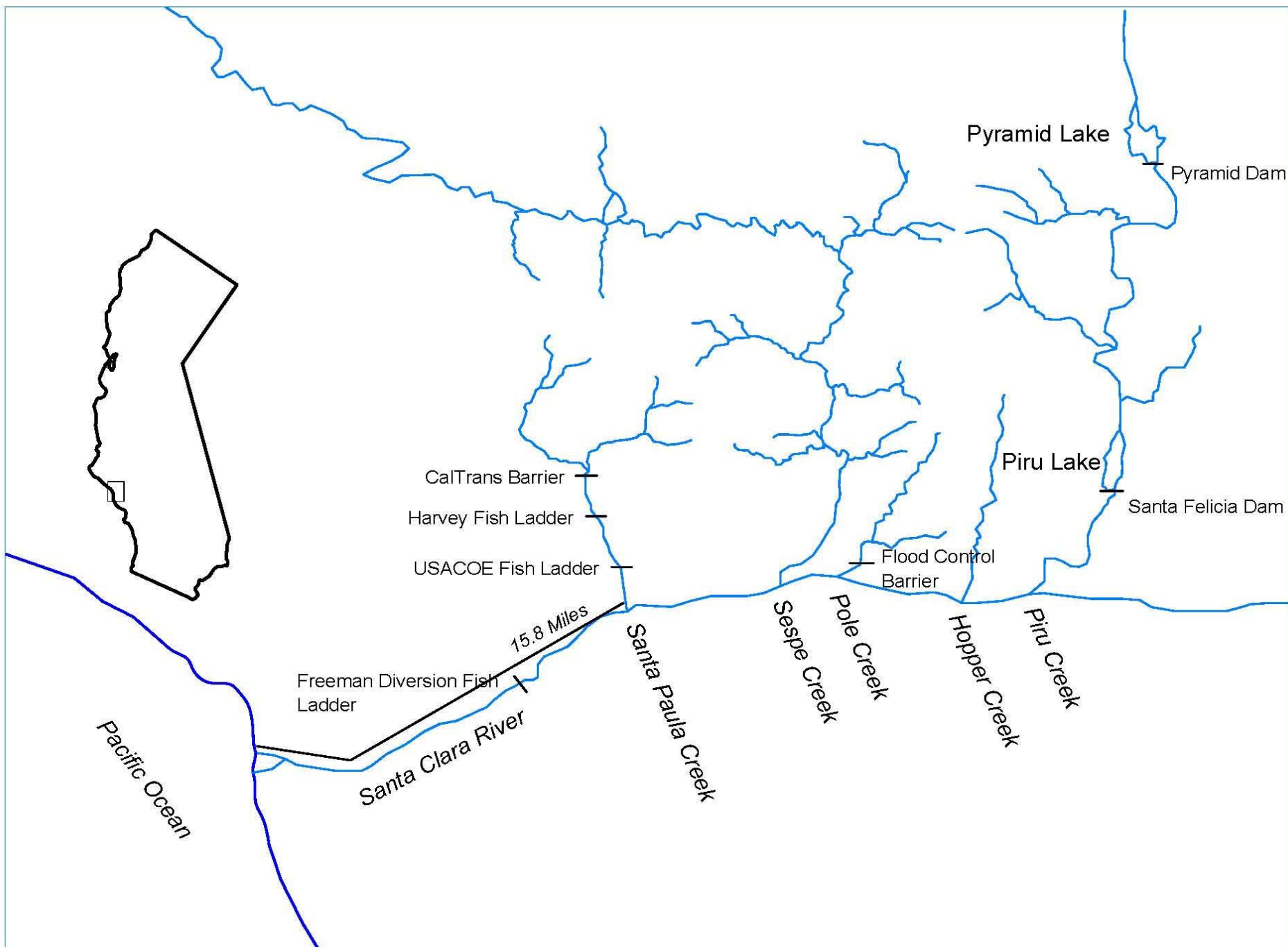


















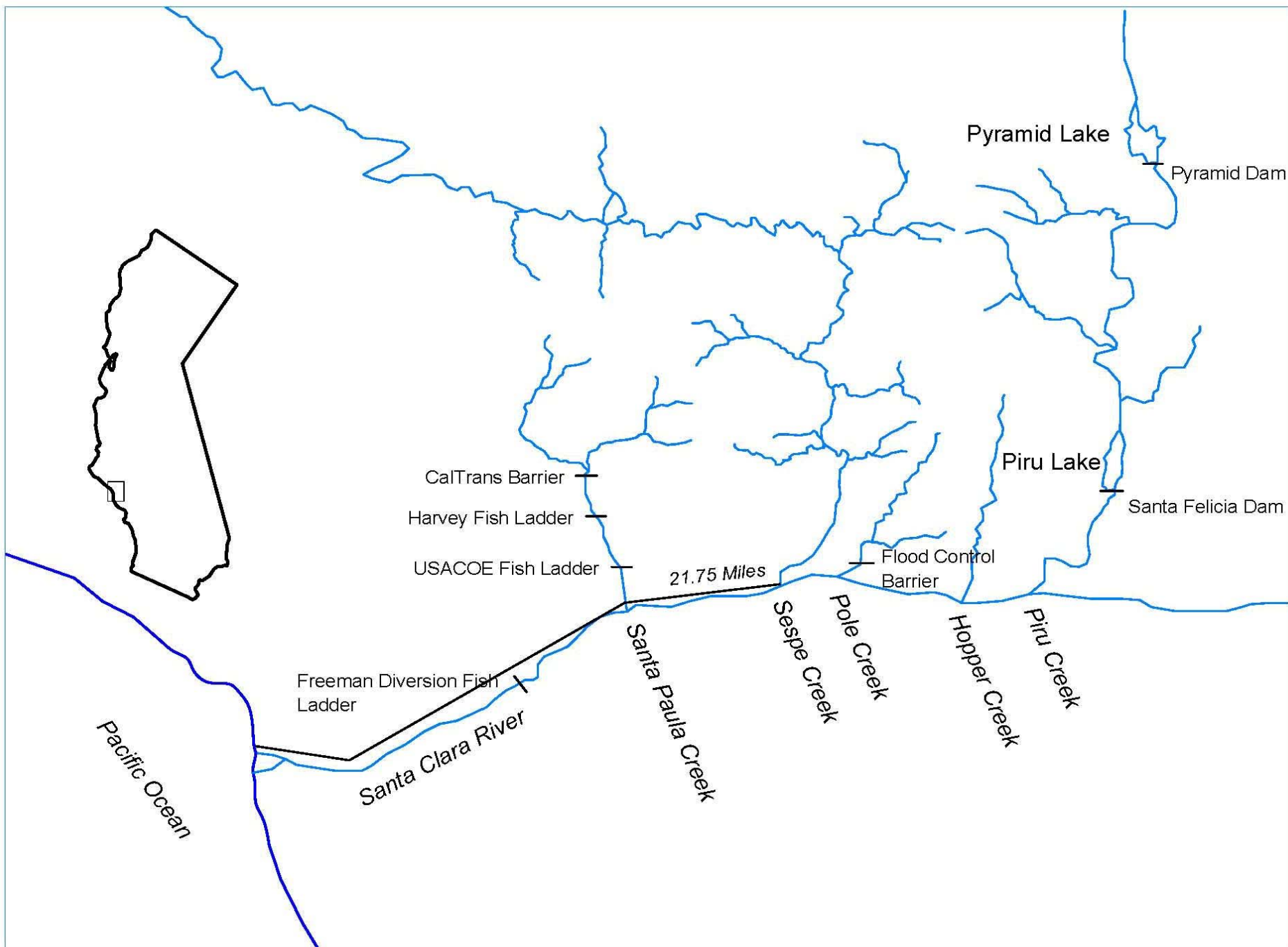
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Freeman Diversion Steelhead Migration Monitoring



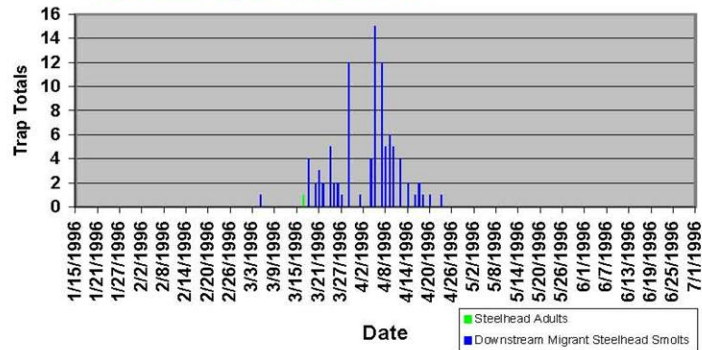
Steelhead migration monitoring has occurred from 1993 to present at the Freeman Diversion on the Santa Clara River



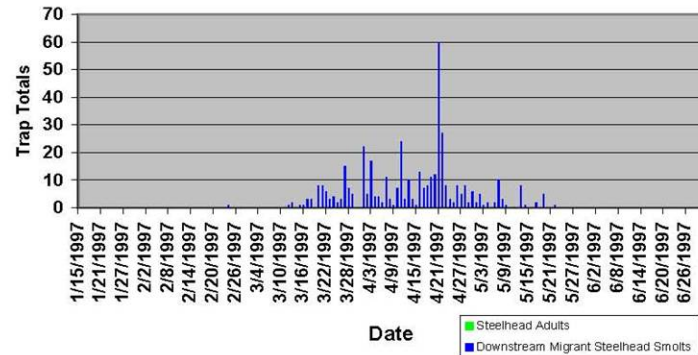


1996 Freeman Diversion Steelhead Trap Results

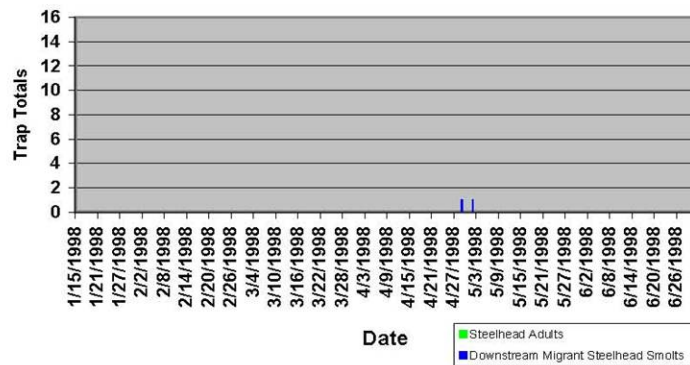
1 Upstream Migrant Adult 3/17/96



1997 Freeman Diversion Steelhead Trap Results

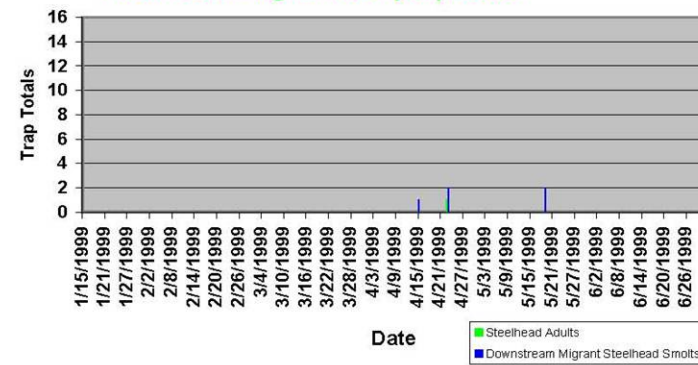


1998 Freeman Diversion Steelhead Trap Results



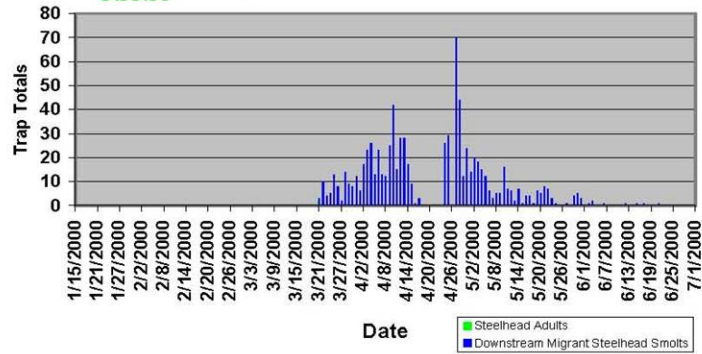
1999 Freeman Diversion Steelhead Trap Results

1 Downstream Migrant Adult (kelt) 4/23/99



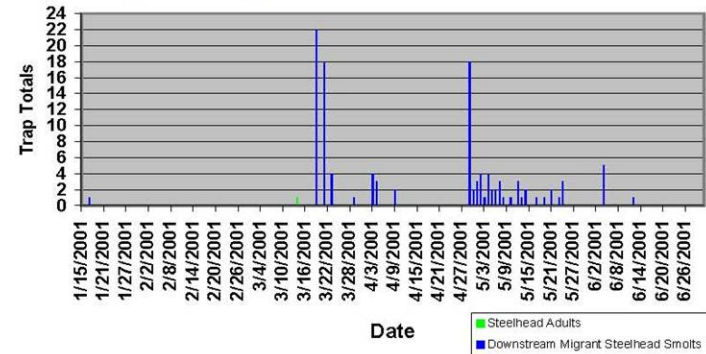
2000 Freeman Diversion Steelhead Trap Results

2 Upstream Migrant Adults

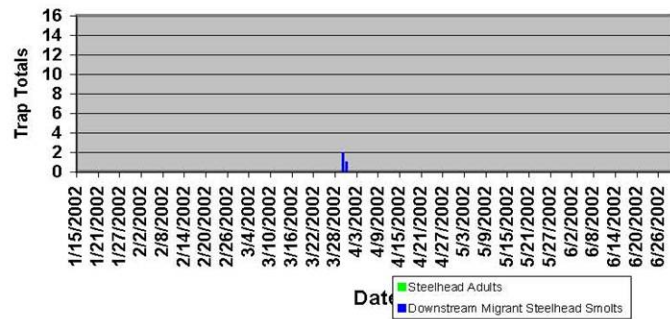


2001 Freeman Diversion Steelhead Trap Results

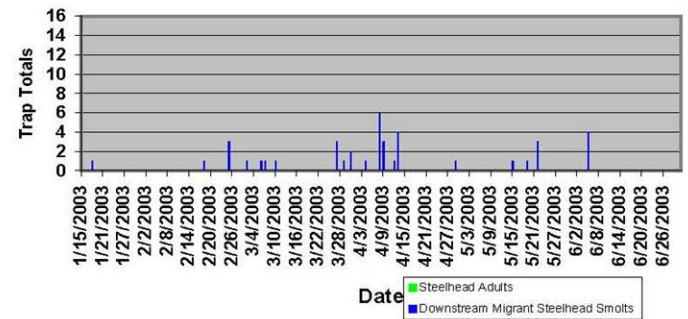
2 Upstream Migrant Adults 3/14/01



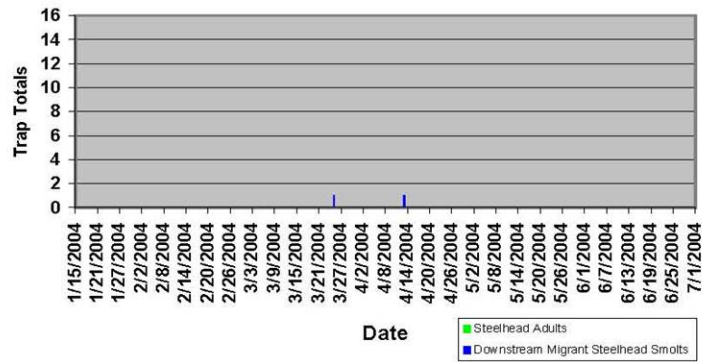
2002 Freeman Diversion Steelhead Trap Results



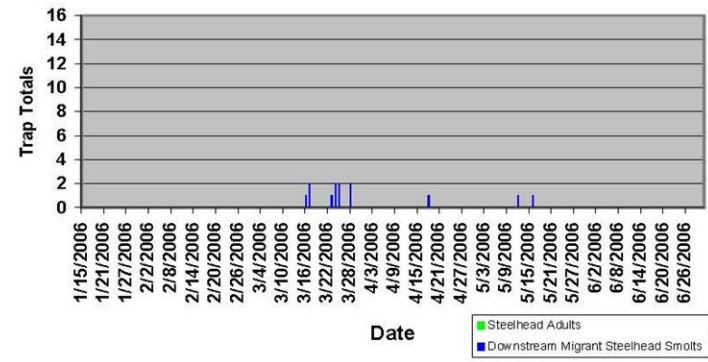
2003 Freeman Diversion Steelhead Trap Results



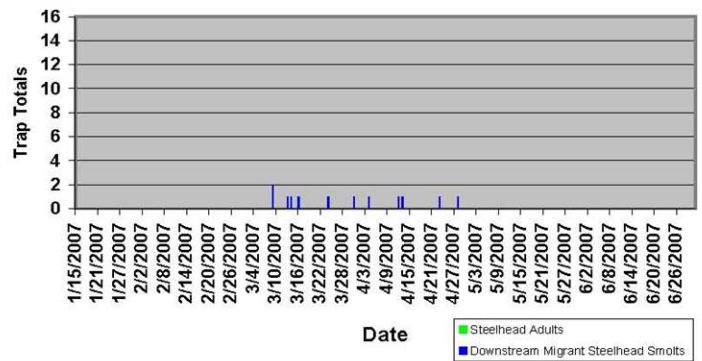
2004 Freeman Diversion Steelhead Trap Results



2006 Freeman Diversion Steelhead Trap Results

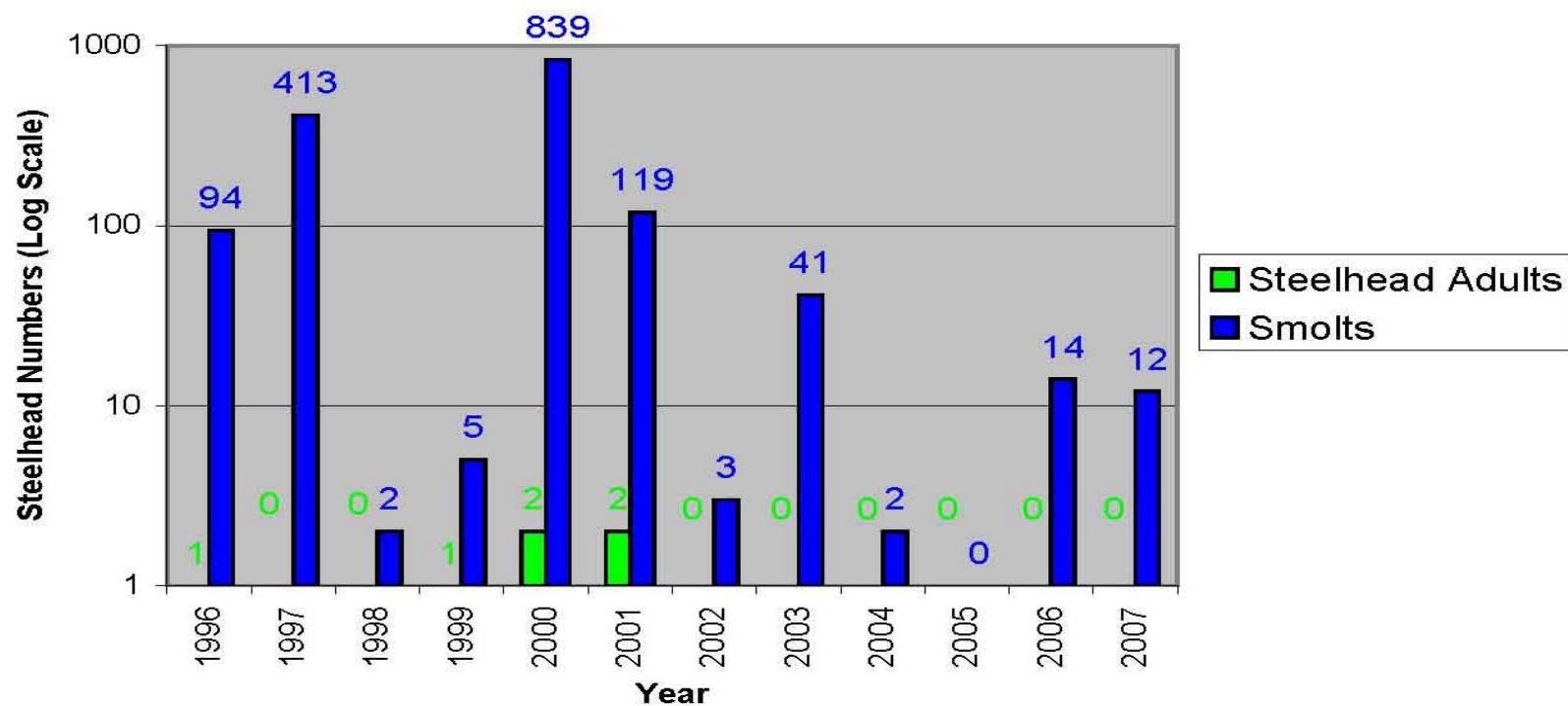


2007 Freeman Diversion Steelhead Trap Results



Freeman Diversion Results

Freeman Diversion Steelhead Adult and Smolt Annual Results



Conclusions

- Downstream gene flow continues to occur with minimal upstream gene flow
- The fraction of anadromy verses resident life history is dependent on flow and potentially other secondary factors
- The viability of this species depends not only on ocean migration but also on how the resident form contributes to anadromy

Proposed Studies

- Monitor downstream migration from tributaries (acoustic, radio tags)
- Document downstream migration from *O. mykiss* in sequestered drainages to prioritize recovery efforts
- Fix upstream migration impediments and barriers to allow for volitional migration of all life histories of *O. mykiss* and other native fishes.

2008 Steelhead Returns

- Steelhead returned to many southern California rivers in 2008
- This was most likely due to a large smolt migration during the 2005 flood events
 - Santa Ynez River had record returns
 - Ventura river had 6 returns
 - Santa Clara River had 2 returns (hatchery strays)

Santa Ynez River



Ventura River



VR Steelhead 1.avi



VR Steelhead 2.avi



Santa Clara River



Questions

Thanks for sticking around

