

Lamprey Passage Considerations

Where should we expect
lampreys, and how do they get
there?

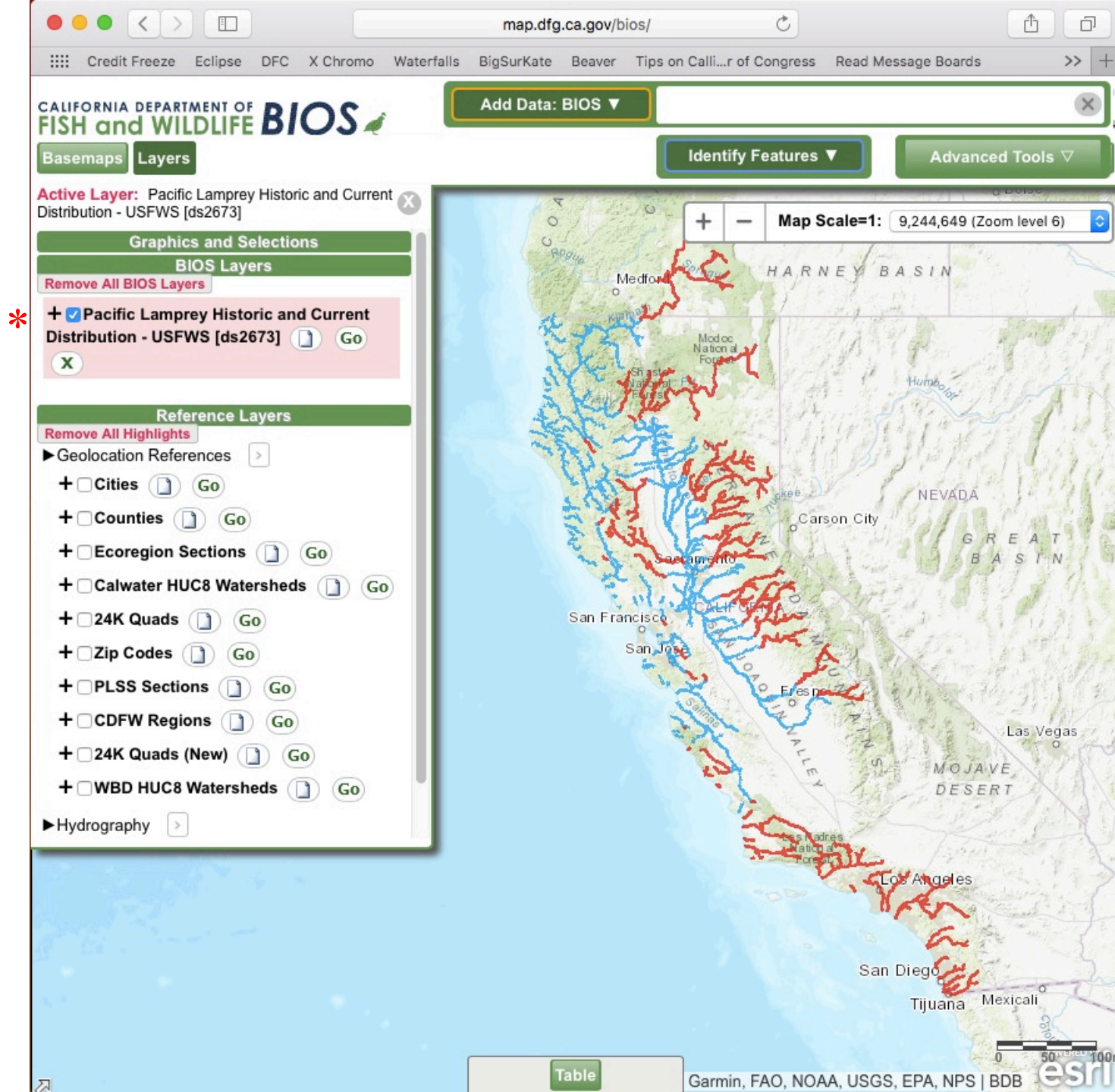
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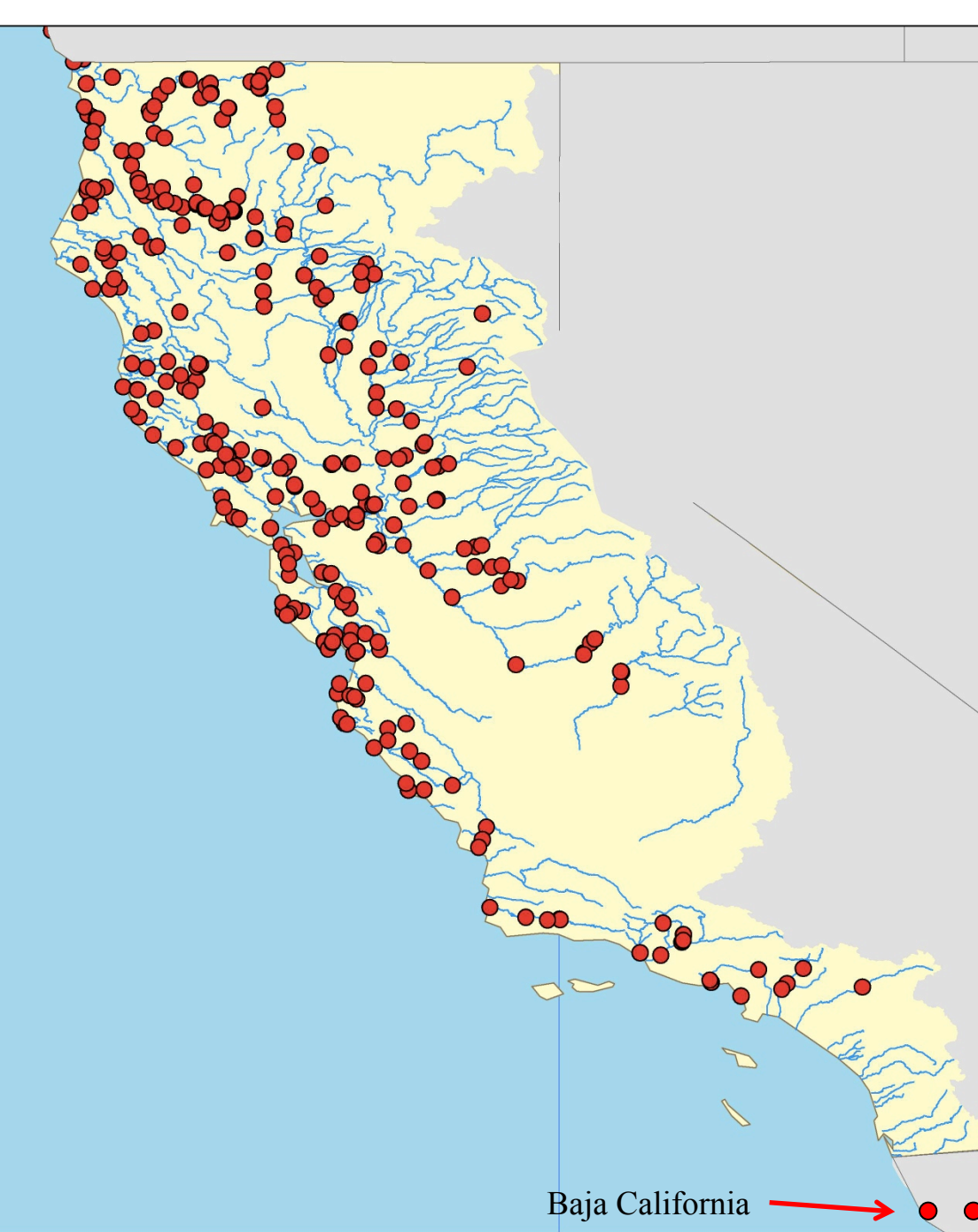
Reid and
Goodman 2017

Pacific Lamprey

GIS Layers

Distribution: Historical and Current

4th Order Streams



vouchered

Historical Specimens 1860 – 2014

Principal
U.S. & Canadian museums

20 Museums with CA
lampreys

220 historical specimen lots
+ 52 sites from this project



Ethnographic information from upper drainages reporting usage of lampreys from above salmonid distributions.

A lifetime Maidu resident River (73 years old in 1936 when interviewed) of Indian Valley, North Fork Feather provided a local name for lamprey and refers to lamprey being eaten and caught in nets.

CULTURE ELEMENT DISTRIBUTIONS:

NORTHEAST CALIFORNIA

ERMINIE W VOEGELIN 1942

ANTHROPOLOGICAL RECORDS Vol. 7, No. 2

Historical Range

5 Simple Assumptions

- 1) Pacific Lamprey are limited to anadromous streams, but distance is not a limitation.
- 2) Elevational range 0 - 4,900 ft in Calif. records, but up to 7,000 ft.
- 3) They occupy all suitable habitat upstream to a major physical barrier.
- 4) Rearing requires low-energy depositional habitat, so lampreys tend not to occupy high gradient reaches, except as corridors to higher meadows etc.
- 5) They require perennial flow for over-wintering and rearing.



- 1) Pacific Lamprey are limited to **anadromous** streams, but distance is not a limitation.

Historical Records:

Alturas Lake - Snake River, Idaho

elev. 7,025 ft

1,400 km from the ocean

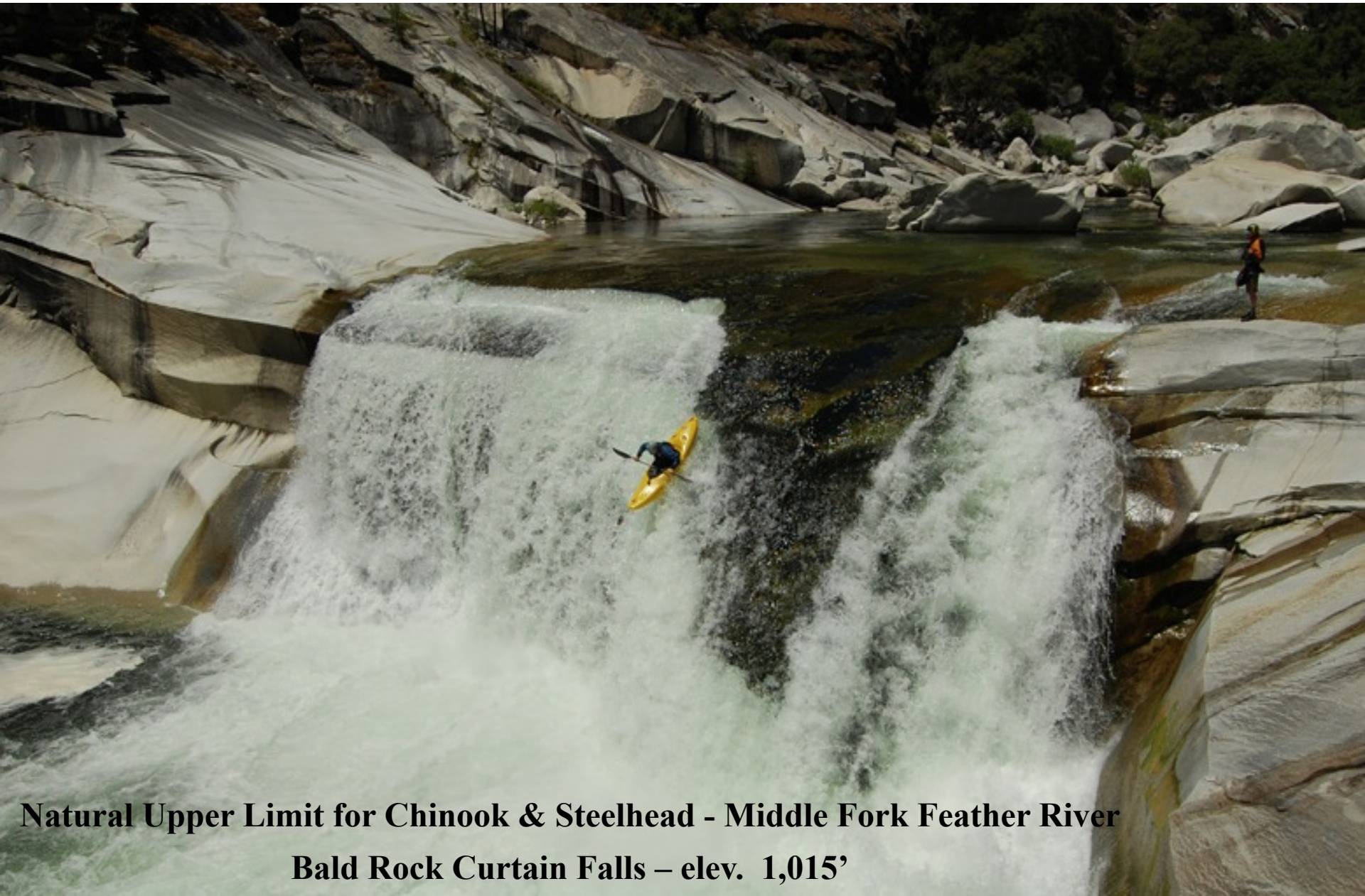
Everman & Meek 1896



2) Elevational Range

- historical specimens in Feather River just below Sierra Valley, at **4,900'** elev.
- historical records in Idaho at **7,025'** (Alturas Lake, Salmon River)
- similar *Entosphenus* species at **6,600'** in Klamath & Goose basins.

3) all suitable habitat upstream to a major physical barrier.



Natural Upper Limit for Chinook & Steelhead - Middle Fork Feather River

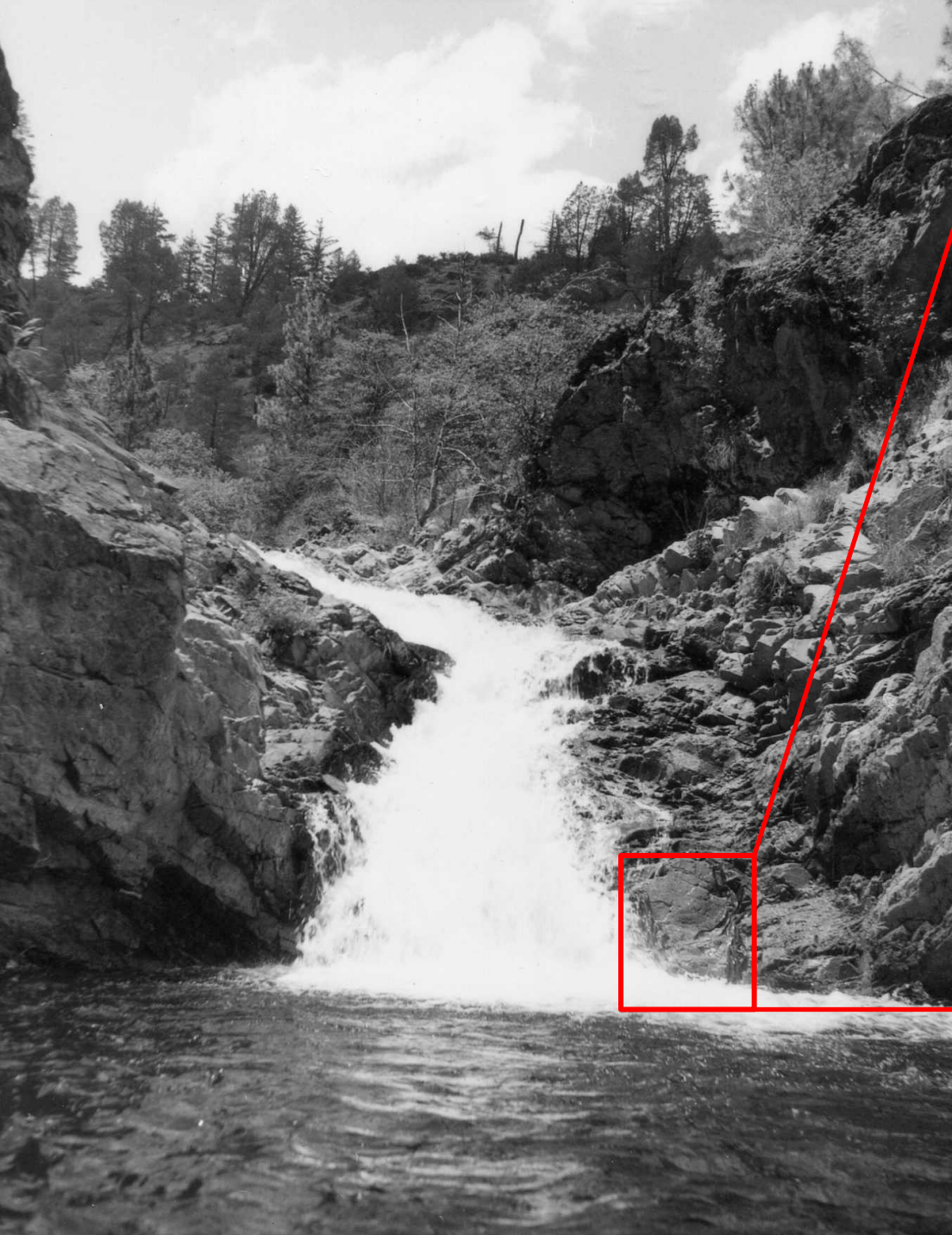
Bald Rock Curtain Falls – elev. 1,015'



“Salmon at that time ran up all the streams as far as they could get, until some perpendicular barrier which they could not leap prevented further progress.” (Angel 1882, in Yoshiyama 2001)

“Lampreys are different from salmon.”
Anonymous

**Hayfork Falls – trib. Trinity River
July 1963**



**Hayfork Falls – trib. Trinity River
July 1963**

Middle Fork Feather River – Historical Distribution of Pacific Lamprey vs. Anadromous Salmonids



Yosemite Falls

Yosemite Valley,
Merced River
elev. 4,000'



4) Rearing requires **low-energy depositional habitat**, so lampreys tend not to occupy high gradient reaches, except as corridors to higher meadows etc.

Higher gradient reaches (over 2 %) were trimmed from layer, if no lower gradient was available upstream.

Small high gradient streams are not typically used by lamprey.

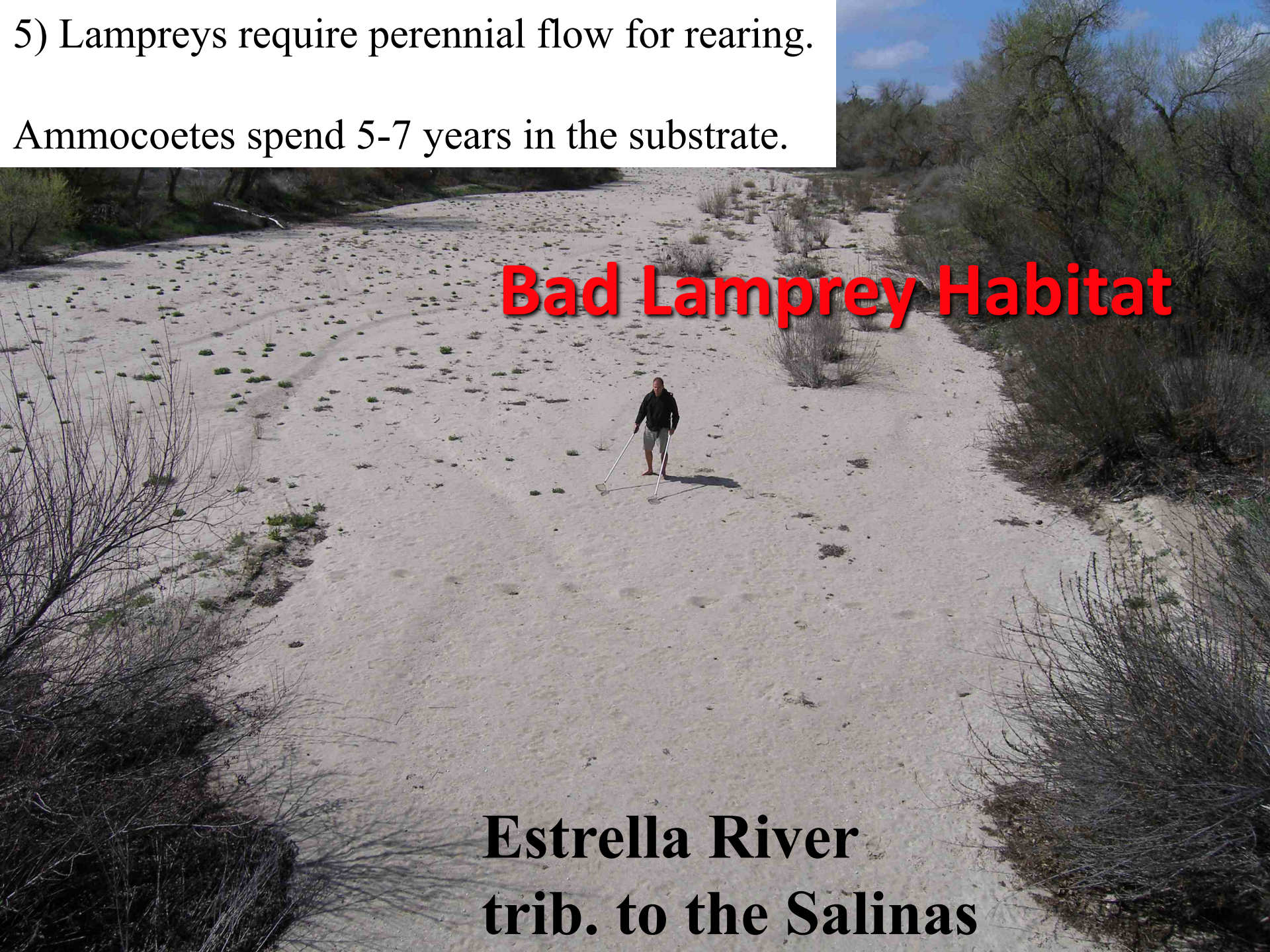


5) Lampreys require perennial flow for rearing.

Ammocoetes spend 5-7 years in the substrate.

Bad Lamprey Habitat

**Estrella River
trib. to the Salinas**



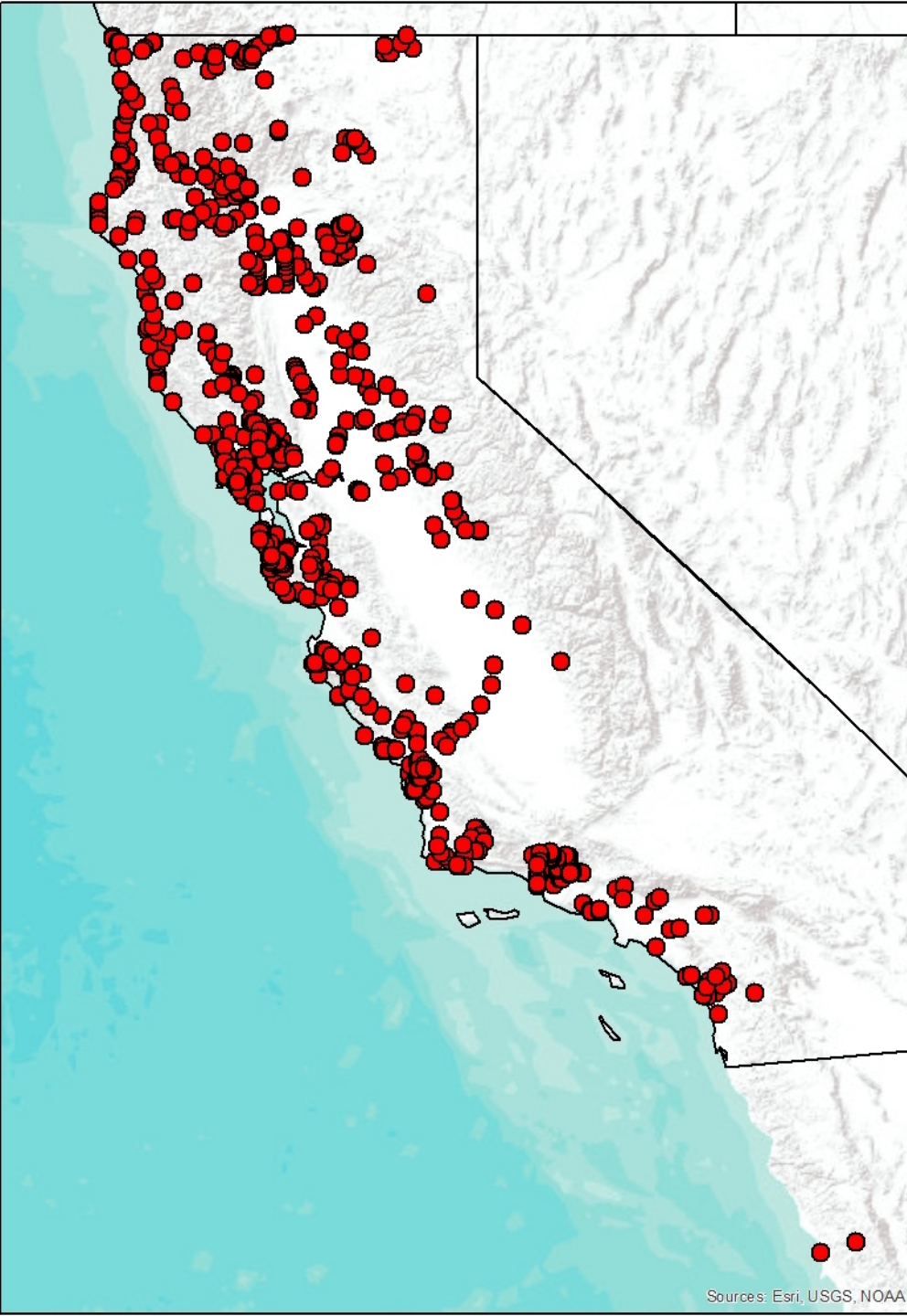
Historical: Potential Distribution

Legend

- Below 4,900 ft
- 4,900 ft to 7,000 ft
- Above 7,000 ft

Primary Constraints :

- Elevation
- Seasonal Dry Reaches
- very little excluded habitat at the 4th order stream level.



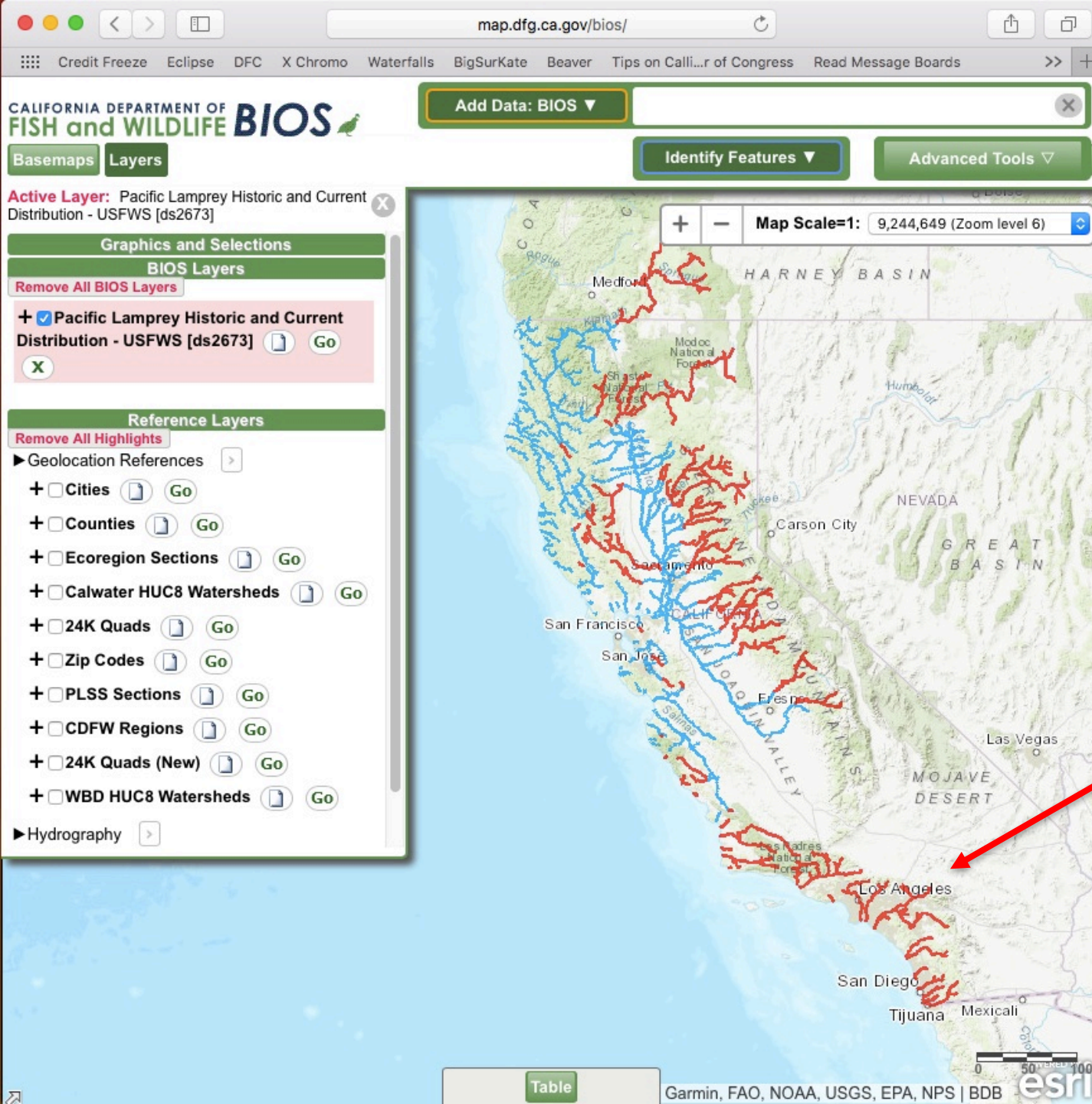
Current Distribution:

Lamprey Survey Sites

Reid and Goodman
2003-2016

~ 800+ sites
California to Baja

Reid, S.B. and D.H. Goodman. 2015.
**Detectability of Pacific Lamprey
occupancy in western drainages:
implications for distribution surveys.**
Transactions of the American Fisheries
Society 144(2):315-322.



Primary Constraints =

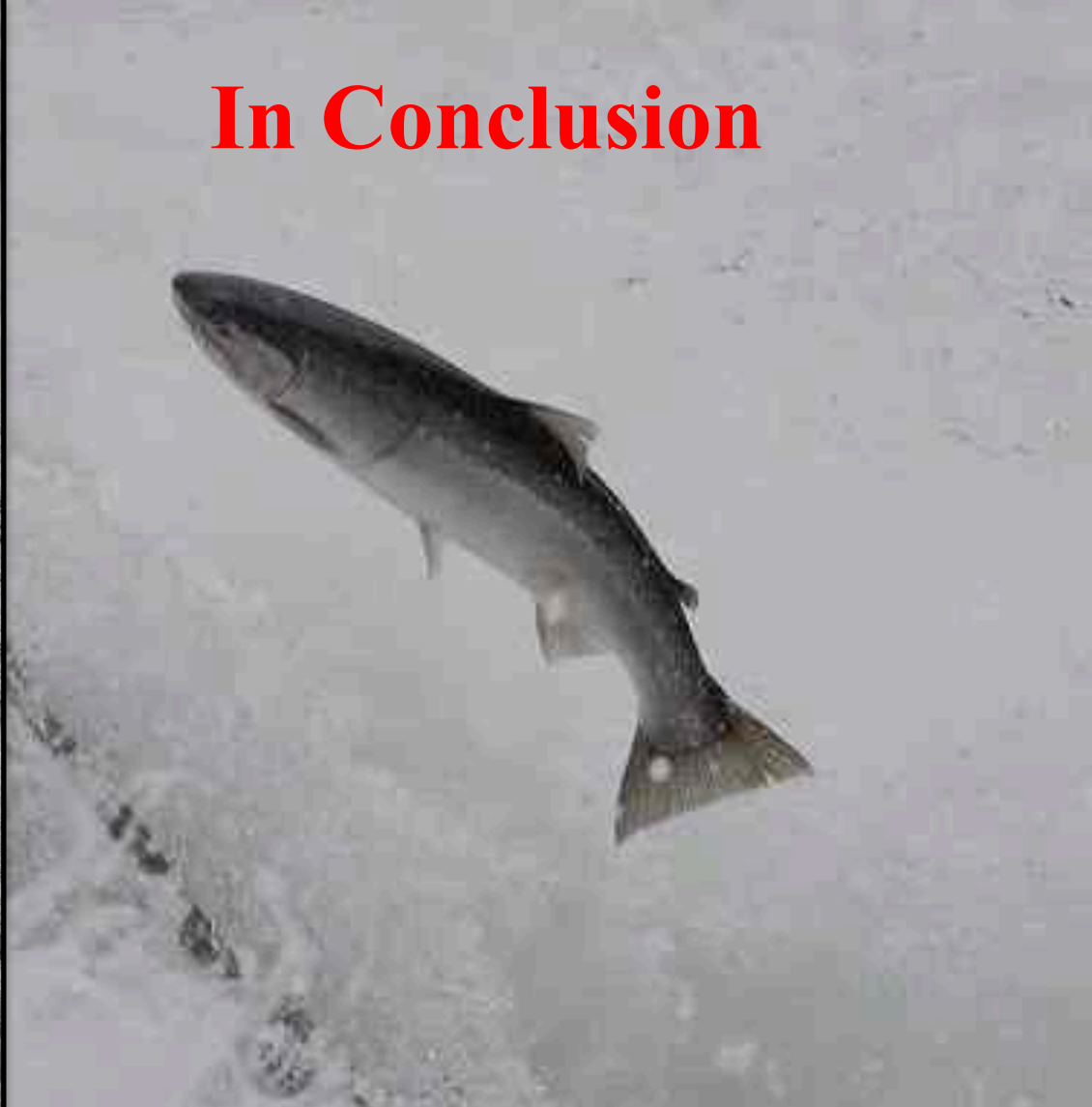
- Impassable dams
- Man-made structures

Southern contraction

Reid, S.B. and D.H. Goodman. 2016. Pacific Lamprey in coastal drainages of California: occupancy patterns and contraction of the southern range. Transactions of the American Fisheries Society 145(4): 703-711.



In Conclusion



Lampreys are not salmonids –

**They do things very differently,
with very different needs.**

Pacific Lamprey Conservation Initiative



U. S. Fish & Wildlife

The Pacific Lamprey Conservation Initiative is the USFWS's strategy, along with tribal, state, federal and other partners, to improve the status of Pacific Lamprey throughout their range in the United States.

