

Endangered Fishes and the Delta

Peter Moyle

UC Davis

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MESSAGES

- Endangered fishes and ecosystems a statewide problem
- Root cause of RECENT fish declines in Delta is water diversions
- Delta is part one of best studied estuaries in world

California

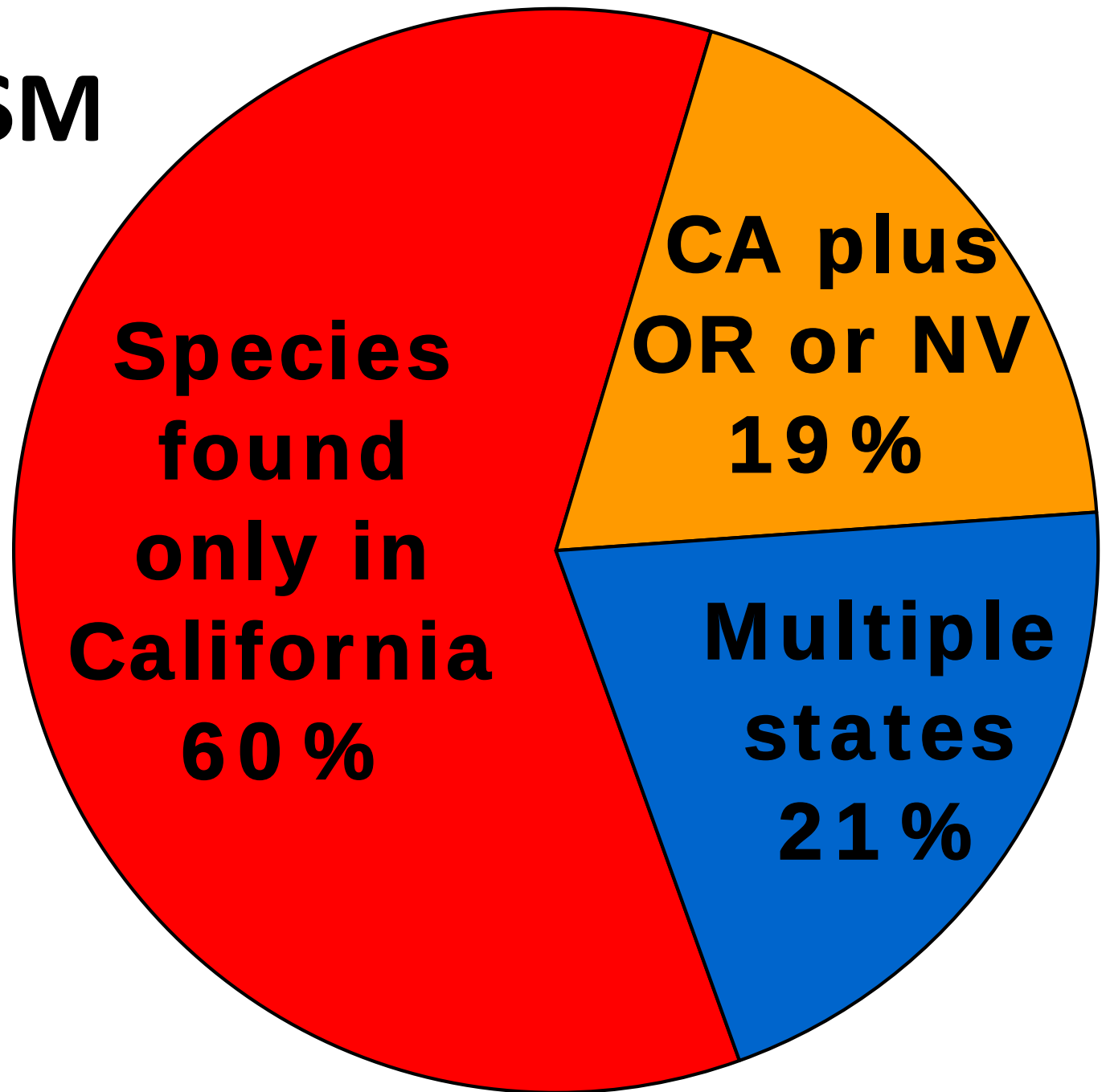
Spans 10 degrees, latitude
411,000 sq km area
2100 km coastline



ENDEMISM

N = 131

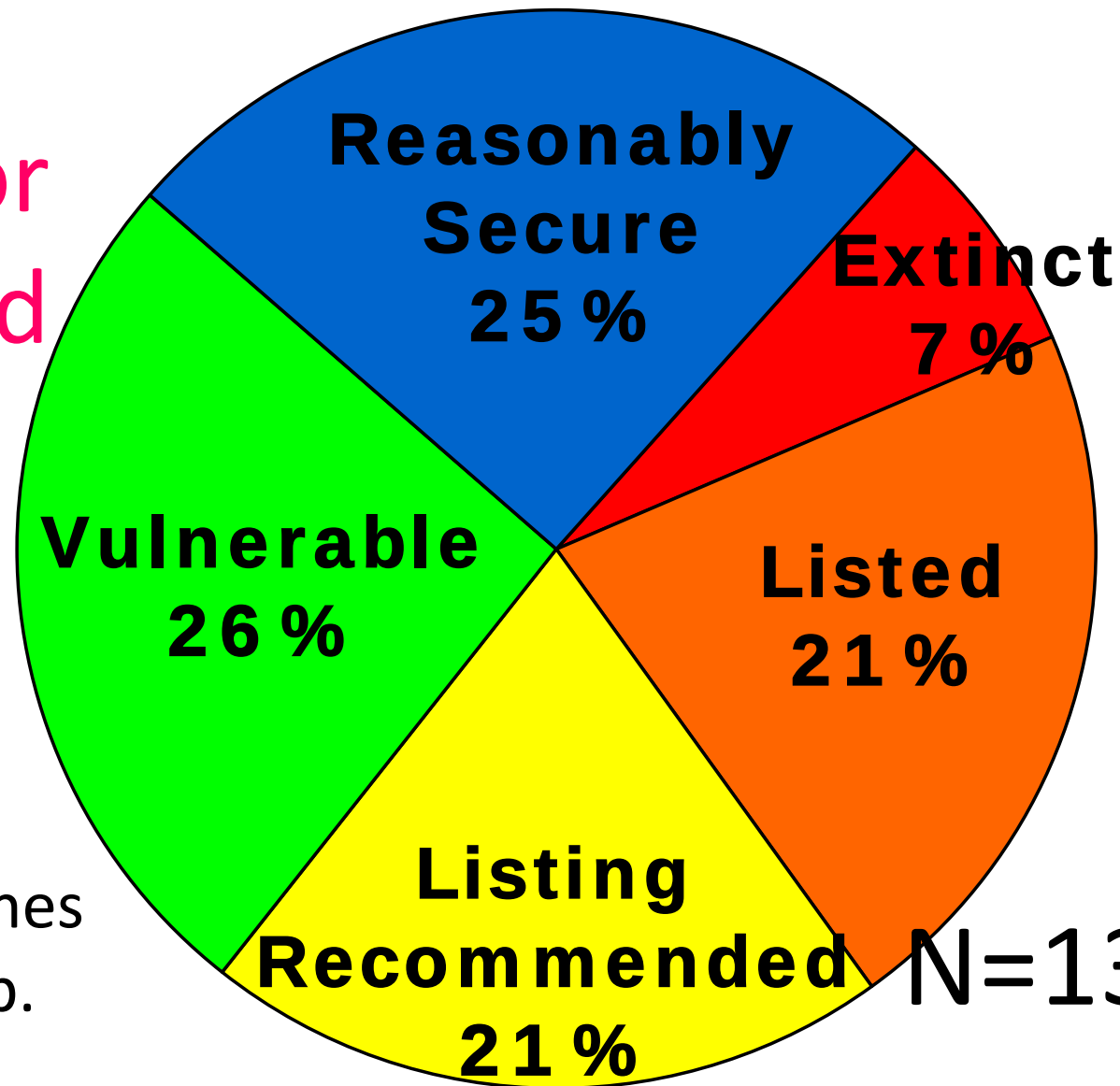
79% are
state or regional
endemics



CA FISHES: STATUS, 2009

49%

extinct or
imperiled



Moyle, Quinones
& Katz, in prep.

N=131



Globally extinct

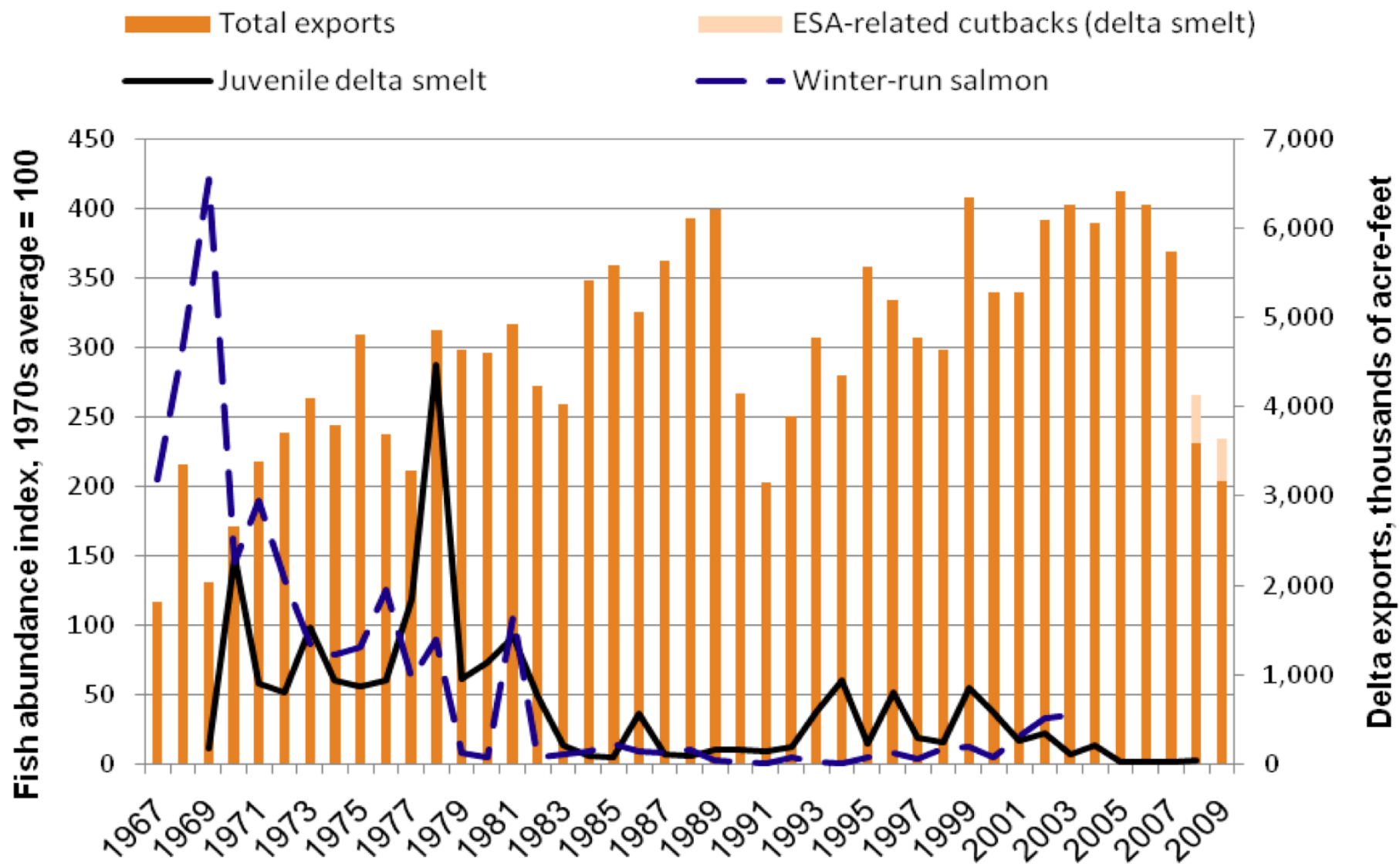
EXTINCTION HAPPENS!

Global extinction pending



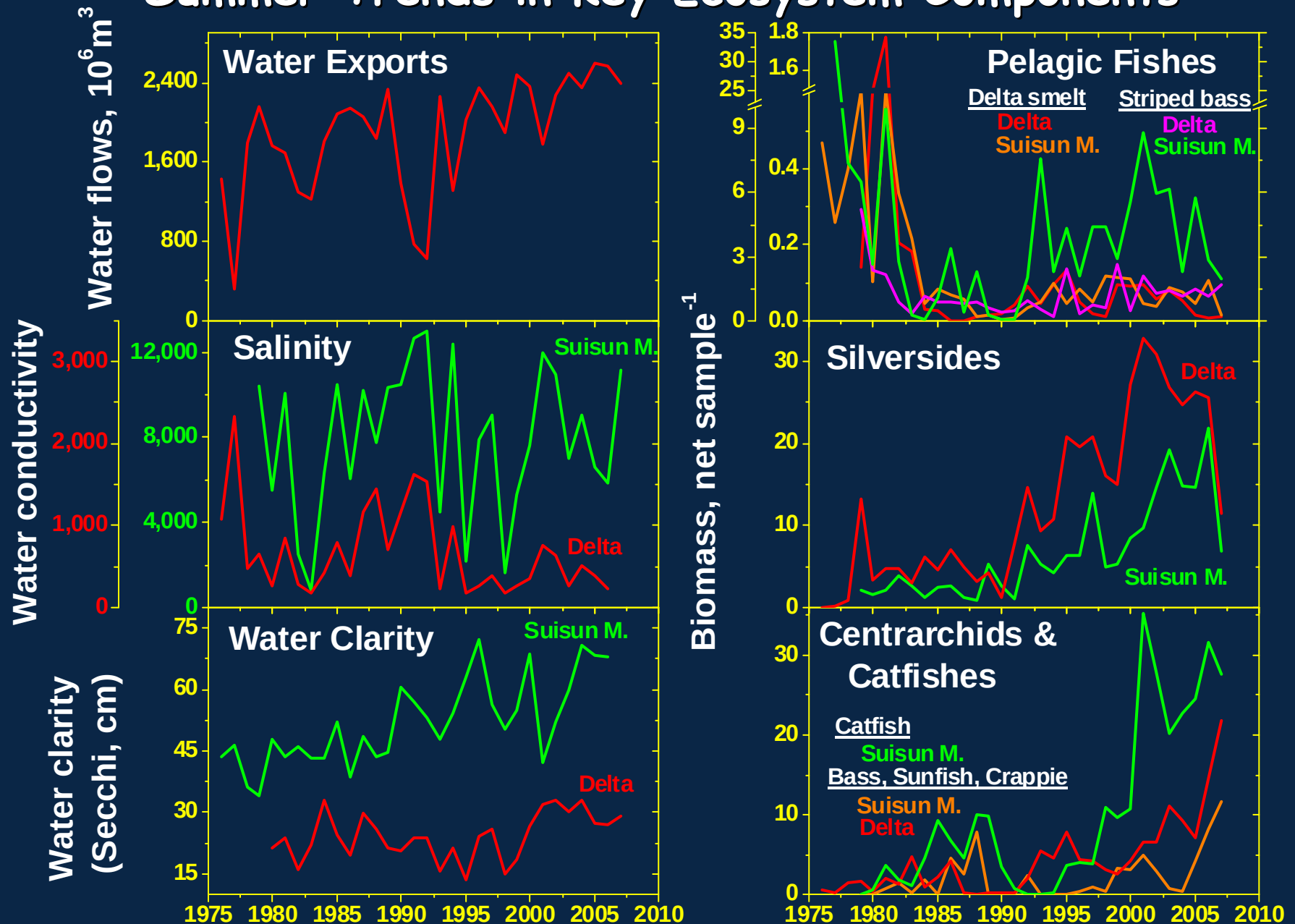
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Lund et al. 2010

Summer Trends in Key Ecosystem Components

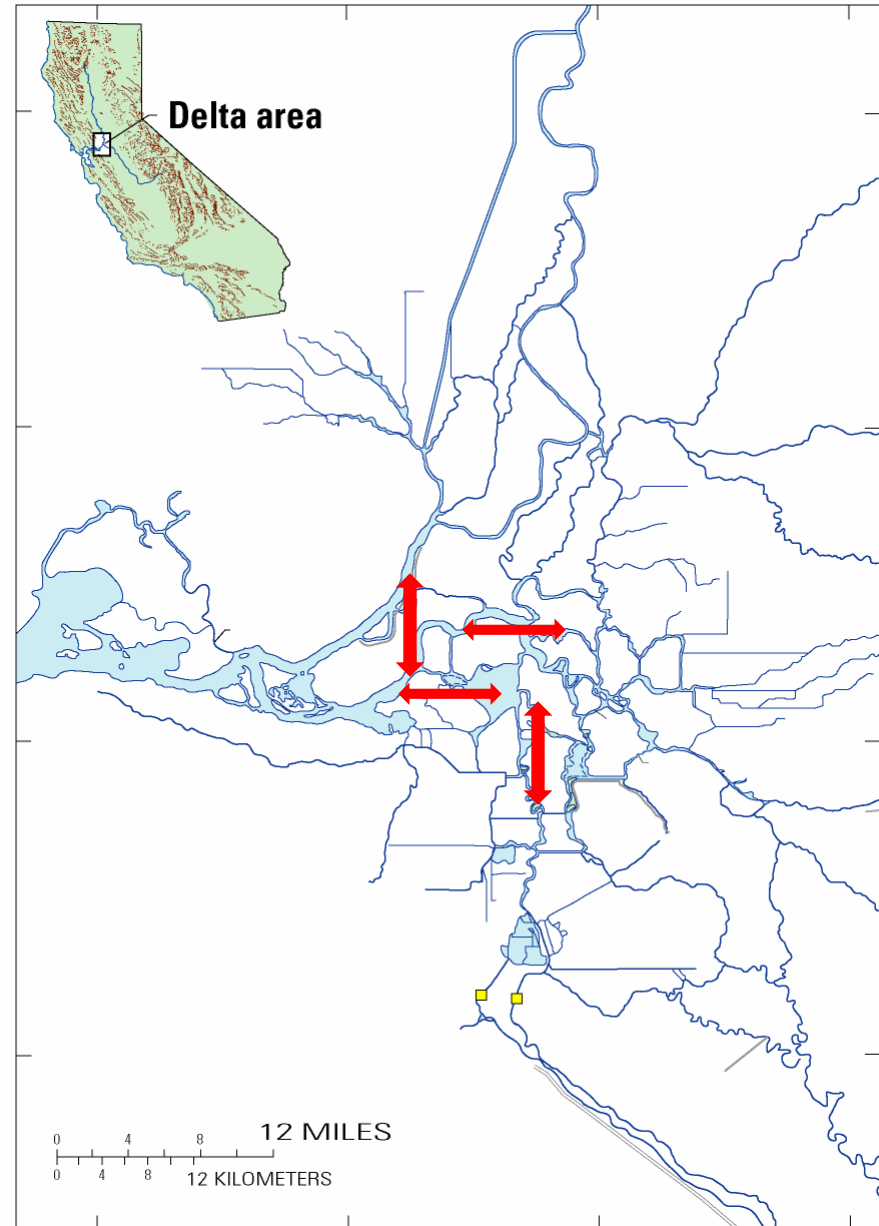


Hydrodynamic Changes

J. Burau & C. Enright:

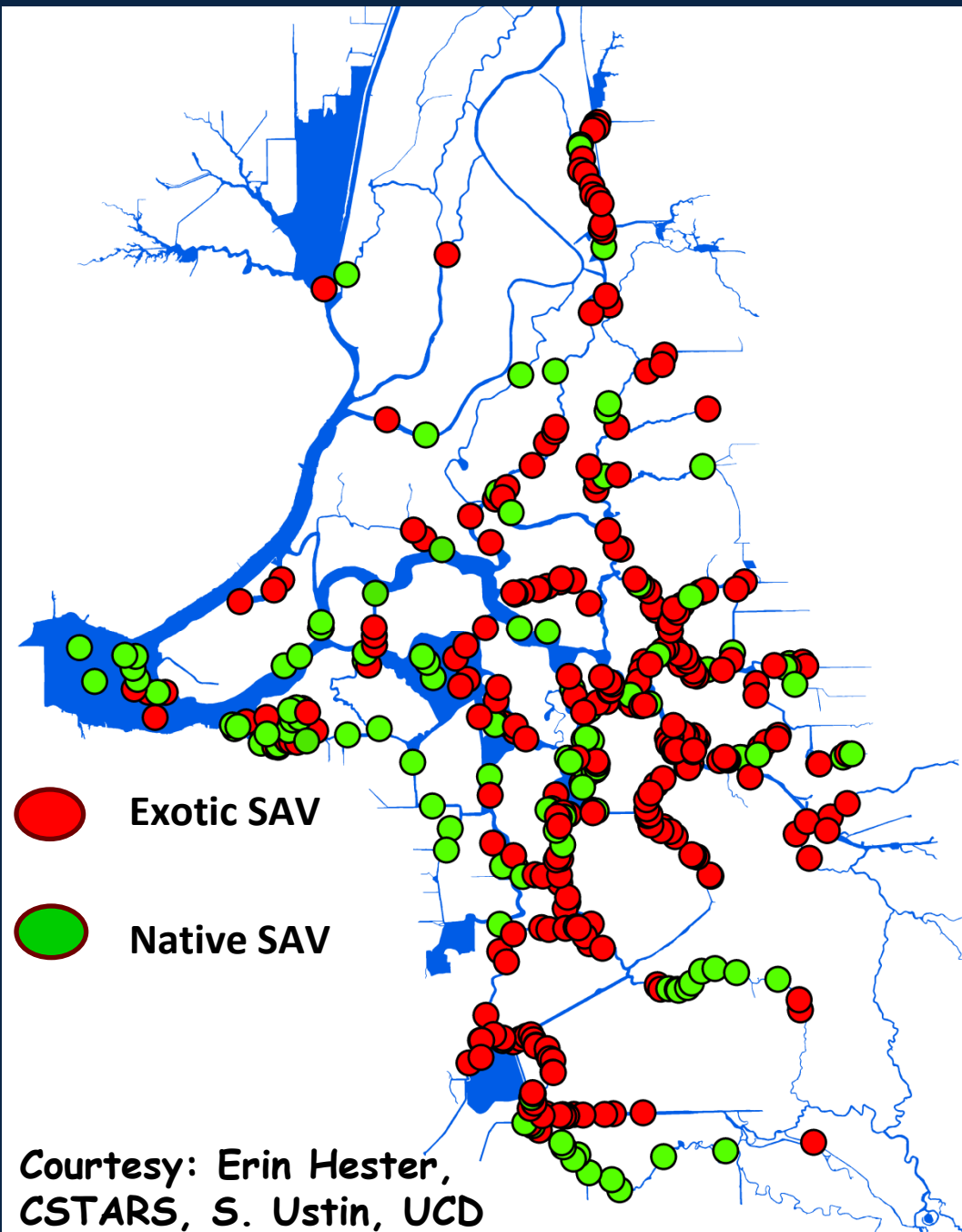
Central Delta has
Become a more
homogenous environment

Not functioning like
estuary



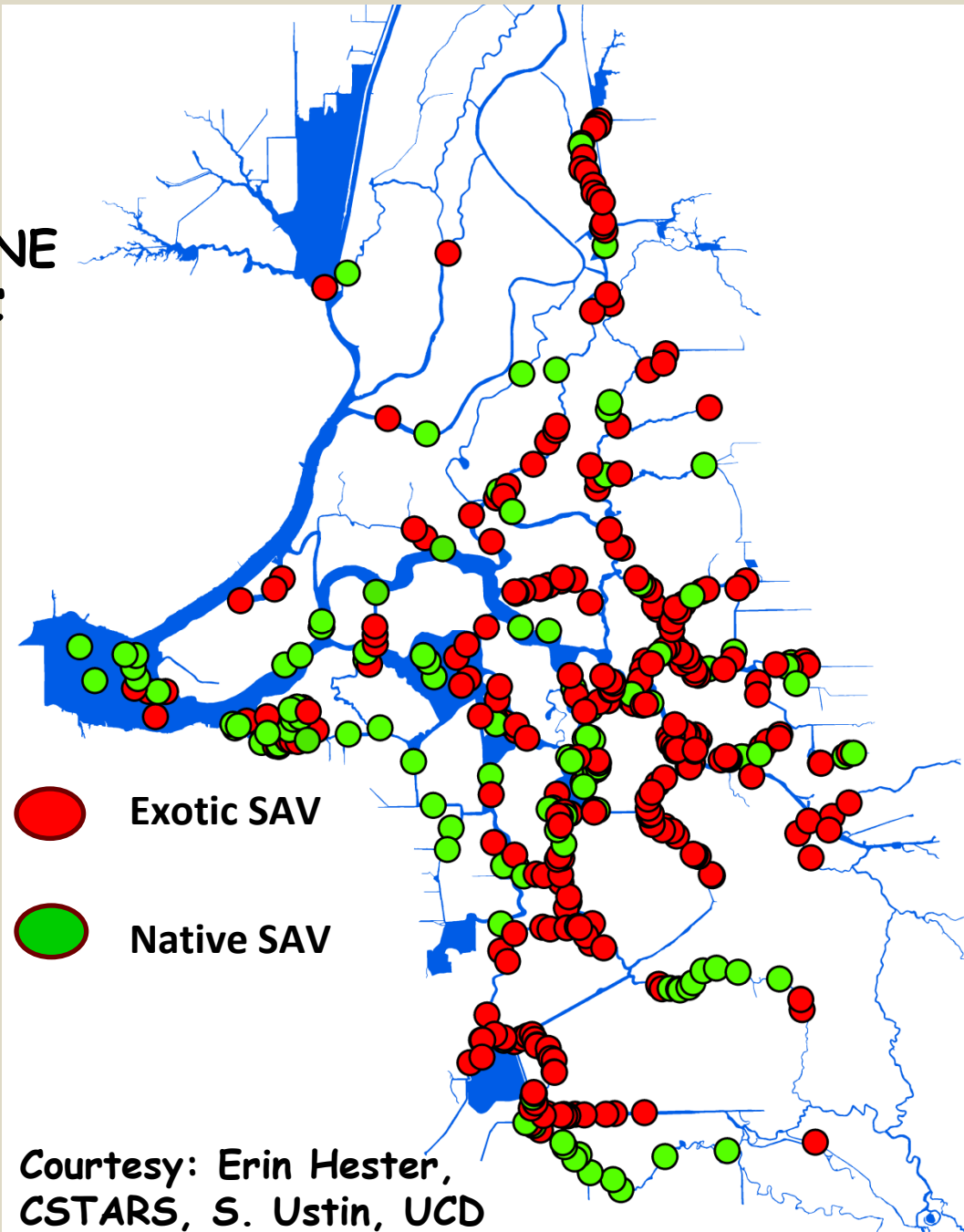
Distribution of submerged aquatic vegetation beds June 2008

- Exotic SAV primarily Brazilian waterweed.



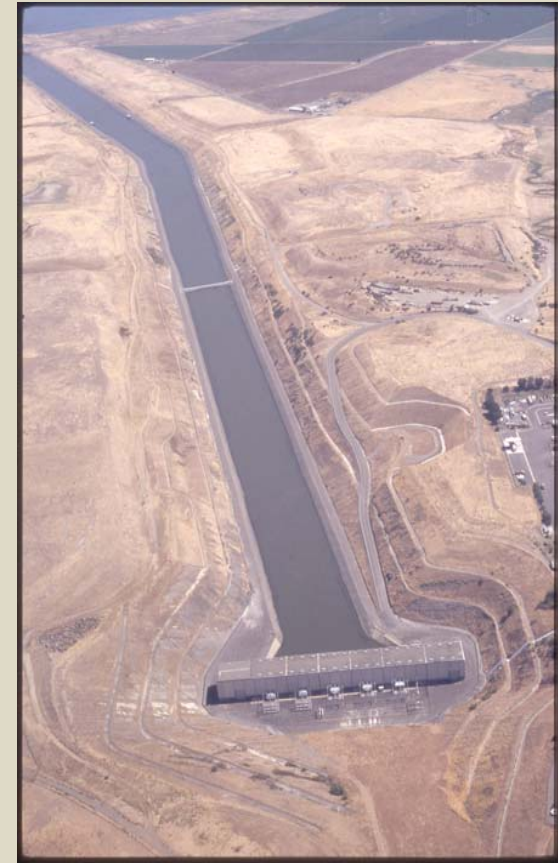
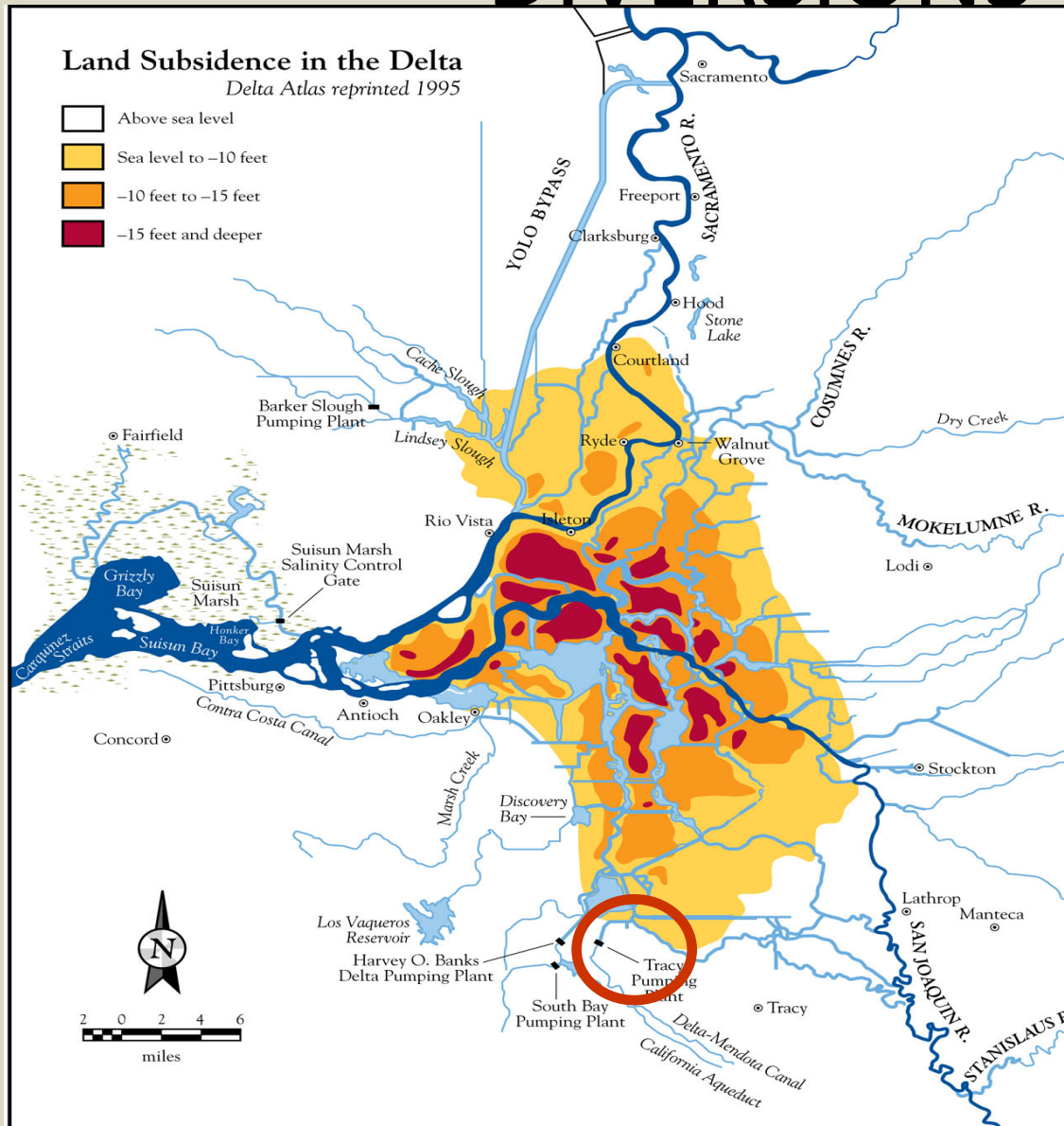
REGIME SHIFT

FROM VARIABLE ESTUARINE
SYSTEM TO MORE STATIC
FRESHWATER SYSTEM



Why a freshwater, less variable Delta?

DIVERSIONS



SECONDARY EFFECTS

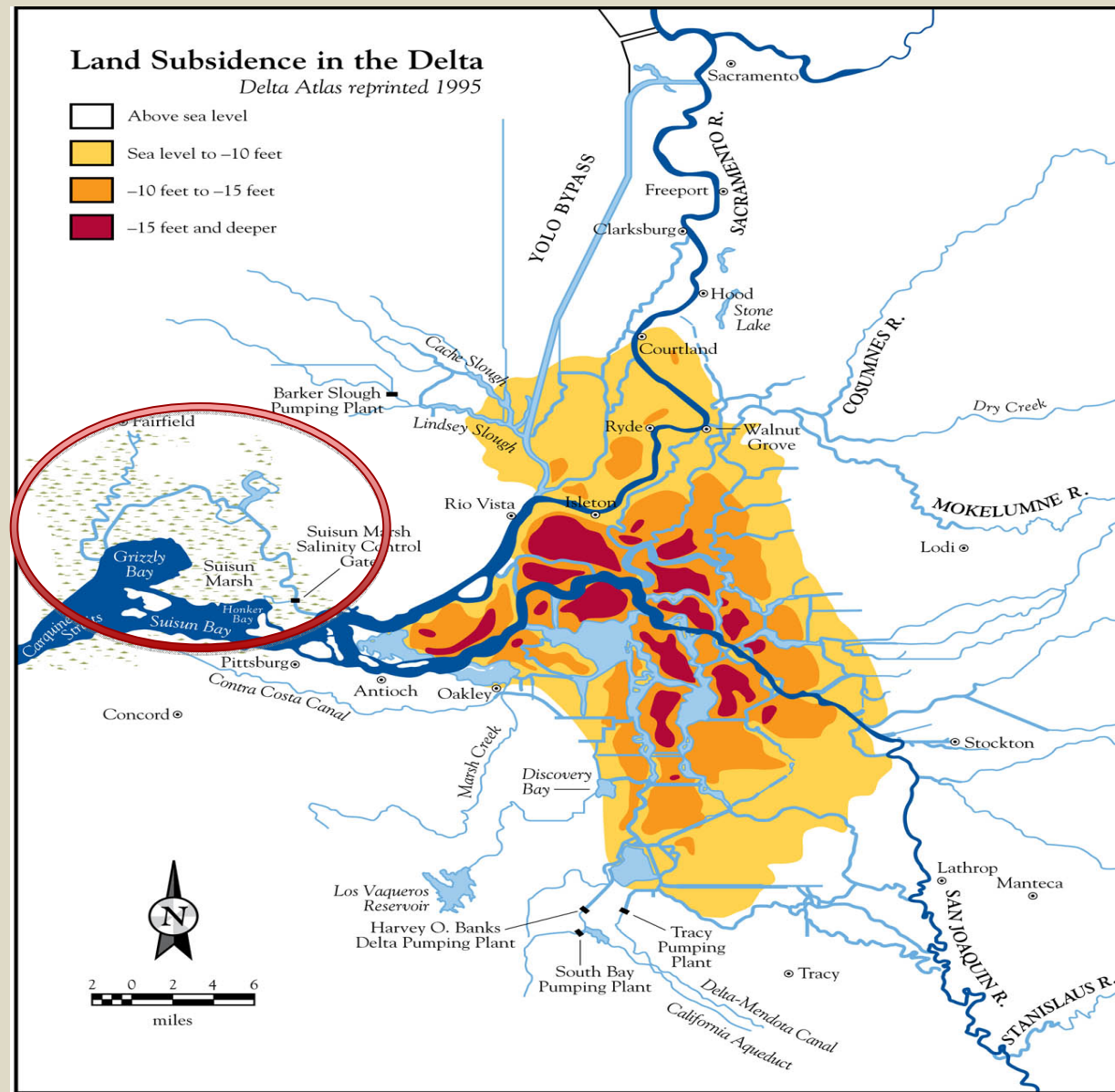
- ENHANCED ALIEN INVASIONS
- REDUCED FOOD SUPPLIES
- WATER QUALITY CHANGES
- INCREASED POLLUTION EFFECTS
- PREDATION
- ETC.

ULTIMATE VS PROXIMATE CAUSES of
FISH DECLINES

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Suisun Marsh: Delta Comparisons





SAMPLING monthly since 1980

7075 trawls,
210,254 fish,

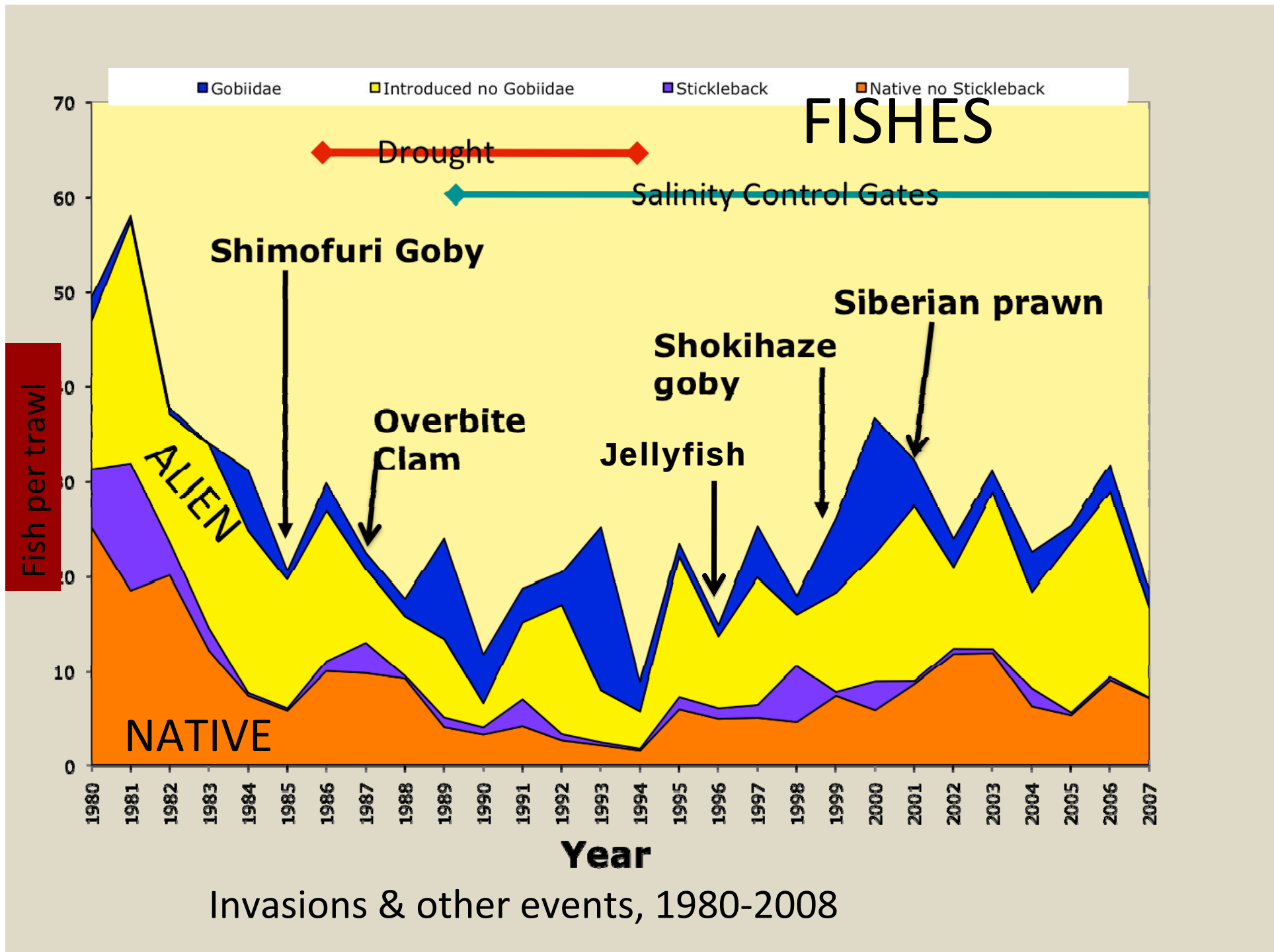
1756 seine hauls,
116,911 fish,

UCD program one of six regular
fish monitoring programs



Invertebrate Sampling





WHAT DOES THE SCIENCE TELL US?

PAST PHYSICAL HABITAT
CHANGE



DIVERSIONS



SECONDARY EFFECTS



NATIVE FISH DECLINES

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THANK YOU!