

California's other mussels - the sensitive, native types



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Non-native mussels in the news

Los Angeles Times | ARTICLE COLLECTIONS

Taskforce urges boaters' vigilance over Memorial Day weekend against invasive quagga and zebra mussels

May 28, 2010 | 12:10 pm



Quagga and Zebra Mussel Sightings Distribution in California, 2007- 2010

- LOCATIONS
1. Lake Havasu - San Bernardino Co. - Jan 2007
 2. Colorado River - Parker Dam - San Bernardino Co. - Jan 2007
 3. Copper Basin Reservoir - San Bernardino Co. - Mar 2007
 4. Colorado River Aqueduct - Riverside Co. - July 2007
 5. Lake Matthews - Riverside Co. - Aug 2007
 6. Lake Skinner - Riverside Co. - Aug 2007
 7. Dixon Reservoir - San Diego Co. - Aug 2007
 8. Lower Otay Reservoir - San Diego Co. - Aug 2007
 9. San Vicente Reservoir - San Diego Co. - Aug 2007
 10. Murray Reservoir - San Diego Co. - Sept 2007
 11. Lake Miramar - San Diego Co. - Dec 2007
 12. Sweetwater Reservoir - San Diego Co. - Dec 2007
 13. San Justo Lake - San Benito Co. - Jan 2008
 14. El Capitan Reservoir - San Diego Co. - Jan 2008
 15. Imperial Dam - Imperial Co. - Feb 2008
 16. Lake Jennings - San Diego Co. - April 2008
 17. Olivenhain Reservoir - San Diego Co. - Mar 2008
 18. Irvine Lake - Orange Co. - April 2008
 19. Rattlesnake Reservoir - Orange Co. - May 2008
 20. Lake Ramona - San Diego Co. - March 2009
 21. Walnut Canyon Reservoir - Orange Co. - July 2009
 22. Kraemer Basin - Orange Co. - September 2009
 23. Anaheim Lake - Orange Co. - September 2009
 24. Yorba Linda, a golf course pond - Orange Co. - January 2010
 25. Lake Poway - San Diego Co. - April 2010

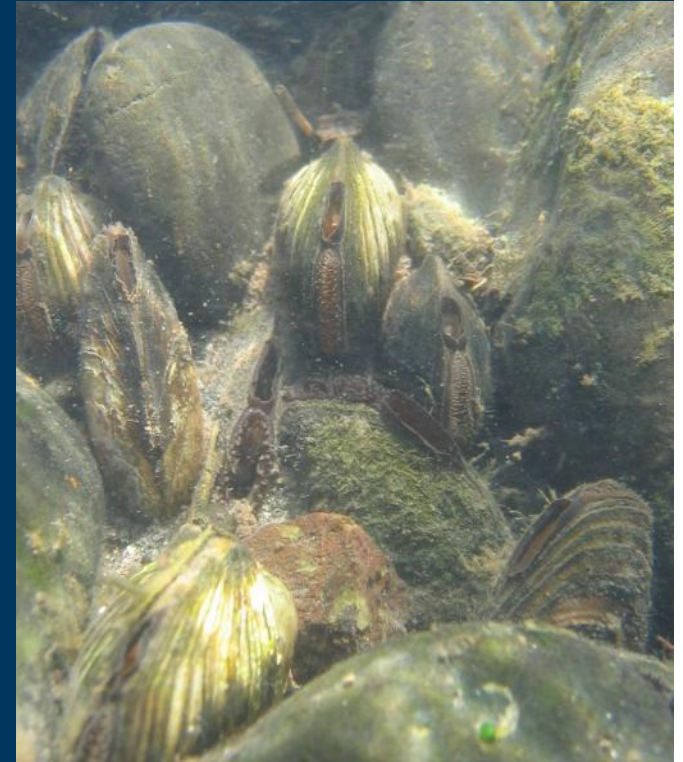


Data Sources: California Dept. of Fish and Game, City of San Diego Water Authority, Imperial Irrigation District, Helix Water District, Irvine Ranch Water District, National Park Service
 Map produced by the U.S. Geological Survey, May, 18, 2010.



Why care about NATIVE mussels?

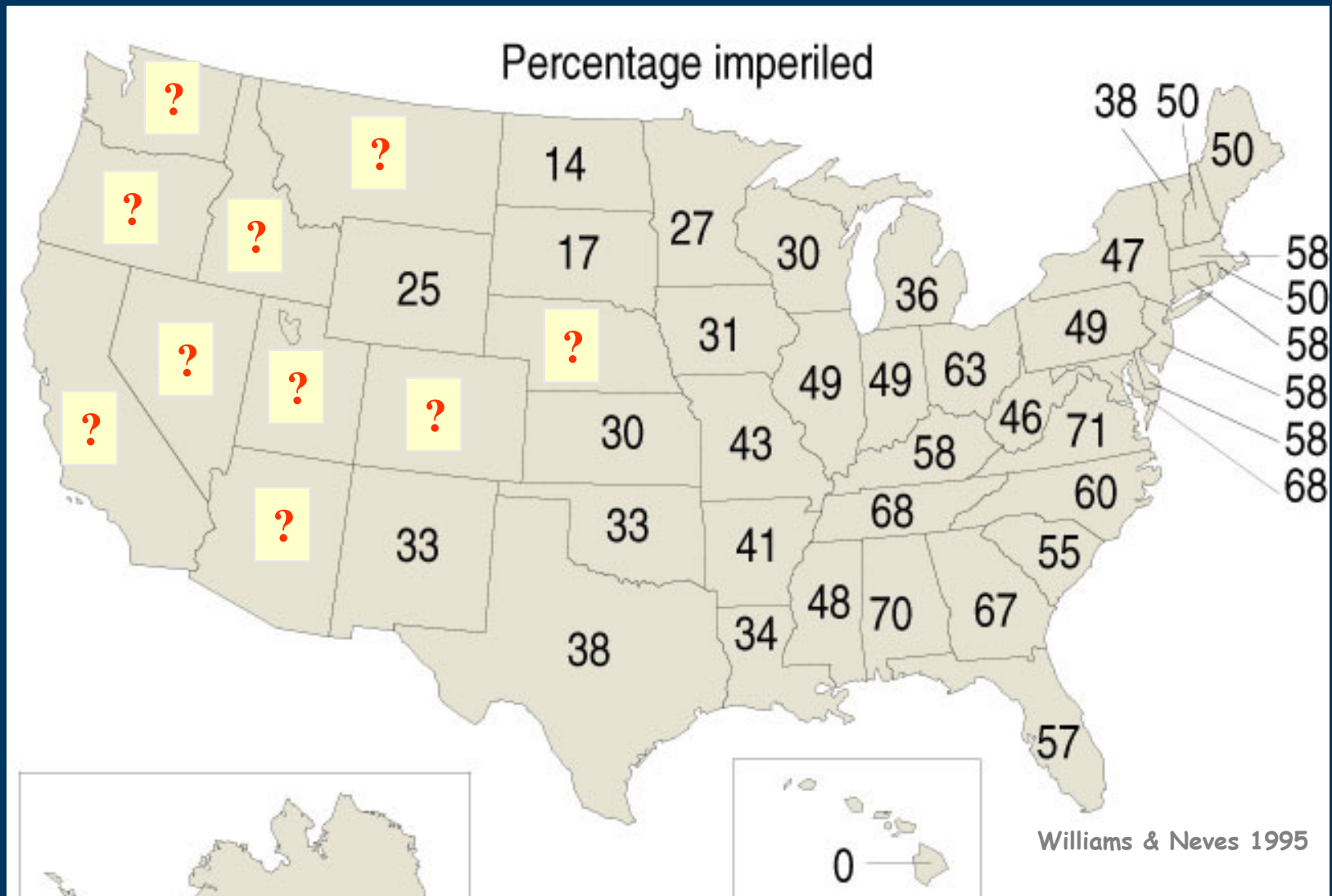
- ❑ Greatest diversity in North America
- ❑ Links with salmonids and other fishes
- ❑ Highly endangered
- ❑ Long-lived - (> 100 years)
- ❑ Provide link between pelagic and benthic environments
- ❑ Often largest biomass in benthic environment



Lonely on the Western Frontier



Conservation Status



Western Species



Western pearlshell
Margaritifera falcata



Floater
Anodonta sp.



Western-ridged mussel
Gonidea angulata

Western Species

Currently recognized Western Species:

Anodonta beringiana - Yukon floater (Middendorff 1851)

Anodonta californiensis - California floater (I. Lea 1852)

Anodonta dejecta - Woebegone floater (Lewis, 1875)

Anodonta kennerlyi - Western floater (I. Lea 1860)

Anodonta nuttalliana - Winged floater (I. Lea 1838)

Anodonta oregonensis - Oregon floater (I. Lea, 1838)

Gonidea angulata - Western ridged mussel (I. Lea 1838)

Margaritifera falcata - Western pearlshell (Gould, 1850)

(Based on Turgeon et al., 1998. Names of Mollusks)

Current Project Objectives

Develop understanding of distribution, diversity and abundance of freshwater mussels at historical sites throughout California.



- Museum Collections
 - * Smithsonian (Washington DC)
 - * Academy of Natural Sciences (Philadelphia)
 - * California Academy of Sciences (SF)
- Published and unpublished records



Methods: Current Status

Field Surveys:

- Snorkel
- Scuba
- Timed searches
- At least 5 geomorphic units



Results: Historical Records

- 434 total historical records** (pre 1995):
- 152 Cal Academy
 - 53 Smithsonian
 - 40 Academy of Natural Sciences
 - 153 Published
 - 2 Personal communication



Results: Historical Records

274 = Locality information –
can relocate site

115 = River only

4 = City

17 = County

20 = General area (e.g. Central
Valley)

4 = Unknown (e.g.
Monument 219; In tributary
to Secret Creek at Karlo Road
crossing)



Results: Historical Records

Oldest records:

Date	Data Source	Species	Location
1877	Smithsonian	<i>Anodonta nuttaliana</i>	Sierra Valley
1892	Cal Academy	<i>Anodonta wahlamatensis</i>	Mountain Lake, San Francisco
1897	Cal Academy	<i>Gonidea angulata</i>	Russian River near Wall Springs near Forestville

Results: Historical Records

434 historical records result in 113 historical collection sites (multiple records from individual sites)

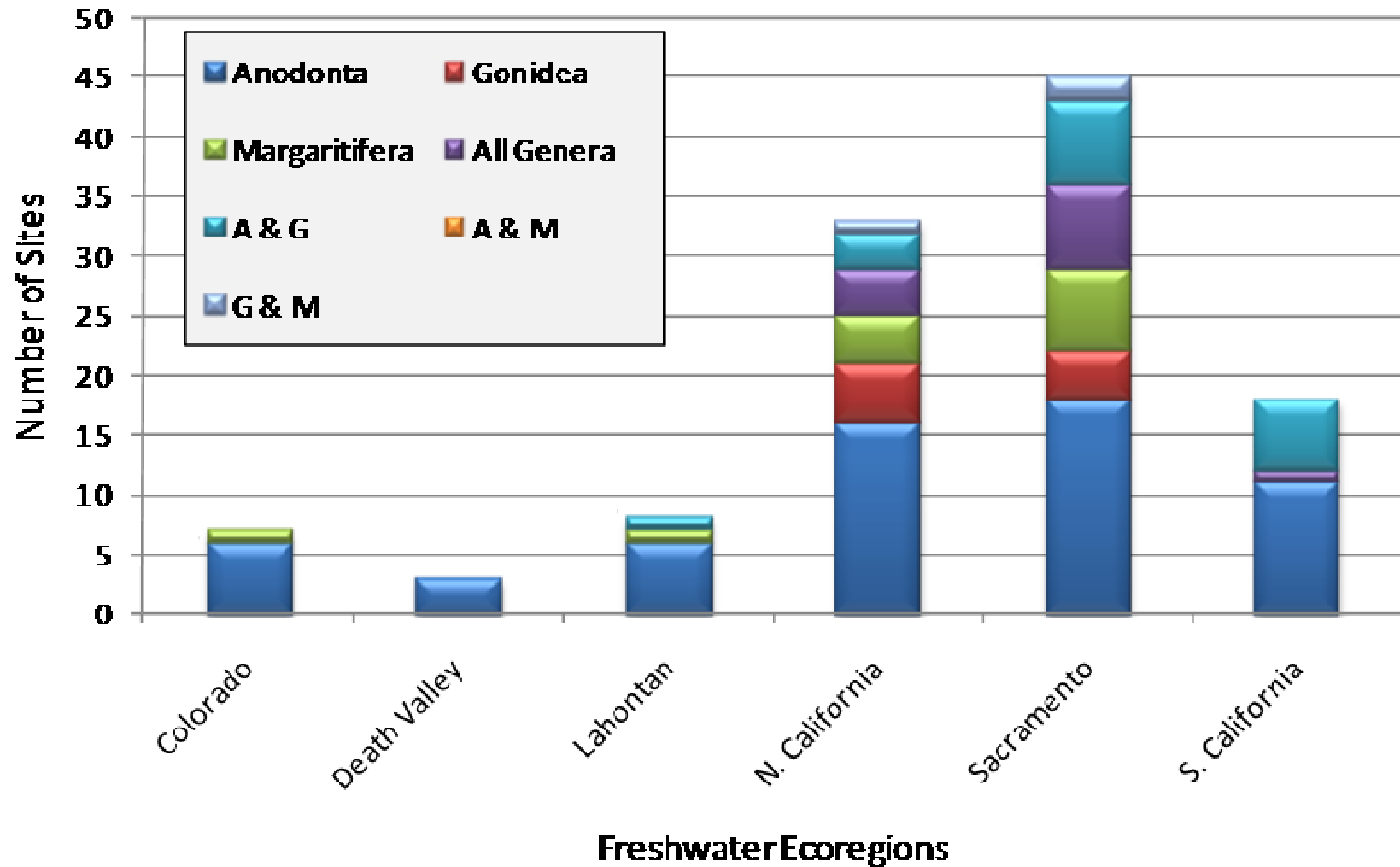


Results: Historical Records

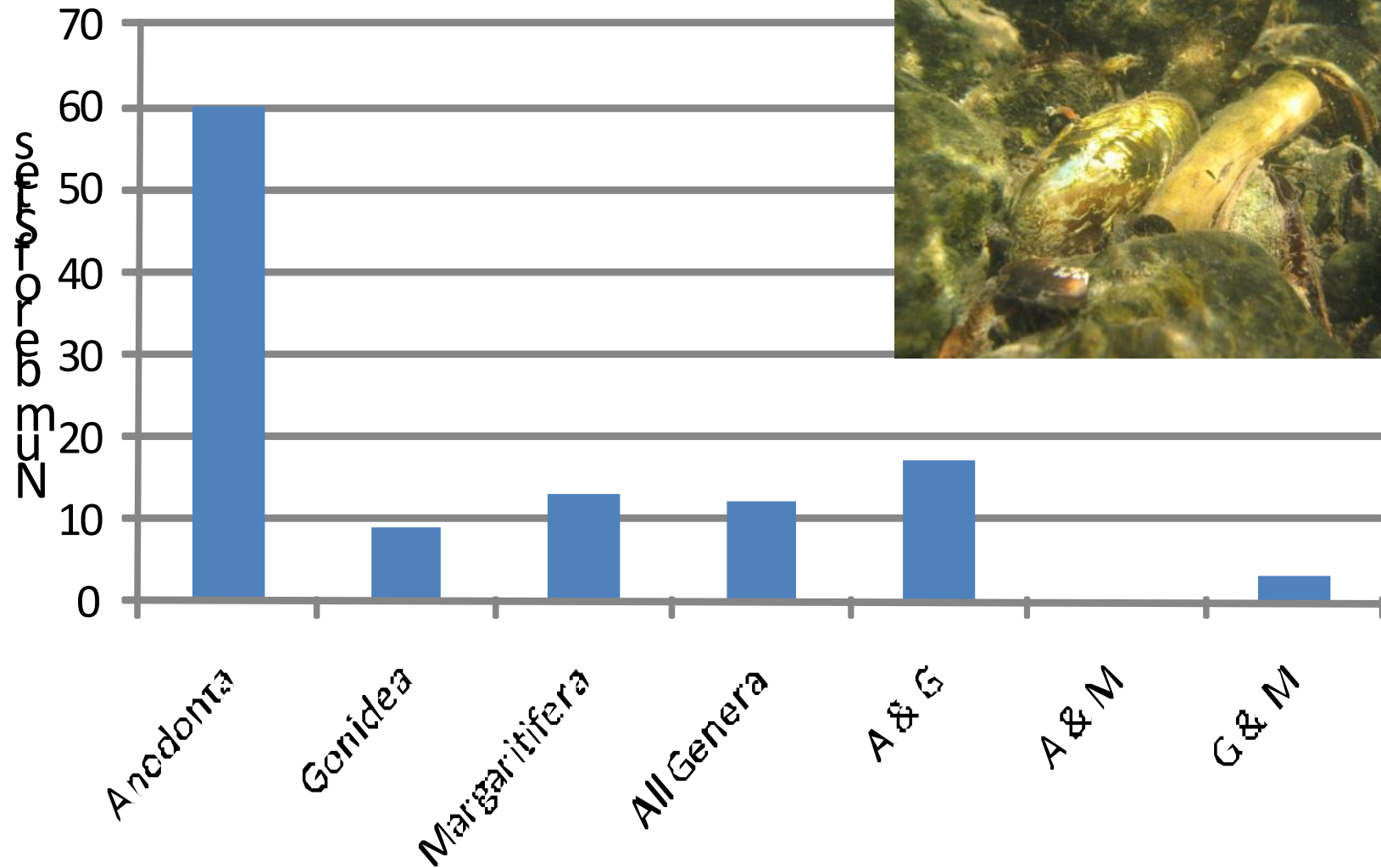
113 historical sites
in California in all
freshwater ecoregions



Results: Historical Records



Results: Historical Records



Historical Records - Rivers

Alameda, Arroyo Seco, Ballona Creek, Big River, Borrego Springs, Chino Creek, Coyote Creek, Dry Creek, Eel River, Feather River, Guadalupe Creek, Kern River, Klamath River, Lagunitas Creek, Los Angeles River, Los Banos River, Lost River, Mojave River, Napa River, New River, Olequa Creek, Owens River, Pacheco Creek, Pajaro River, Petaluma Creek, Pit River, Putah Creek, Russian River, Sacramento River, Salinas River, Salmon Creek, San Joaquin, San Lorenzo, San Luis Rey, Santa Ana, Santa Margarita, Shasta, Smith, South Fork American, Susan River, Truckee, Willow Creek and Yuba River

Survey Results

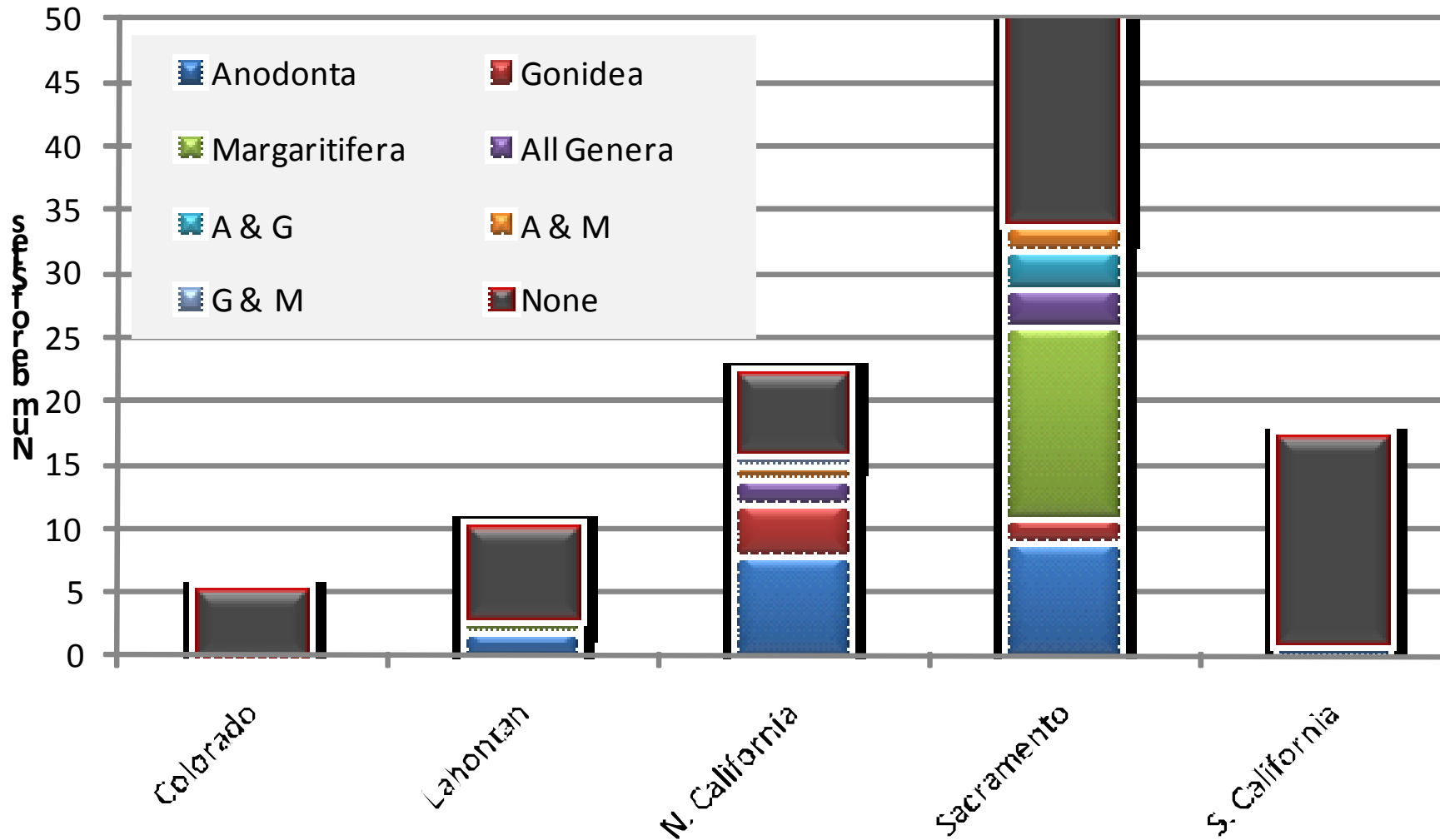
- 105 sites surveyed at or near historical sites (2008-2009)
- 58 historical sites
- 56 water bodies surveyed
- Mussels found at 52% of the sites (n=55)



Survey Results



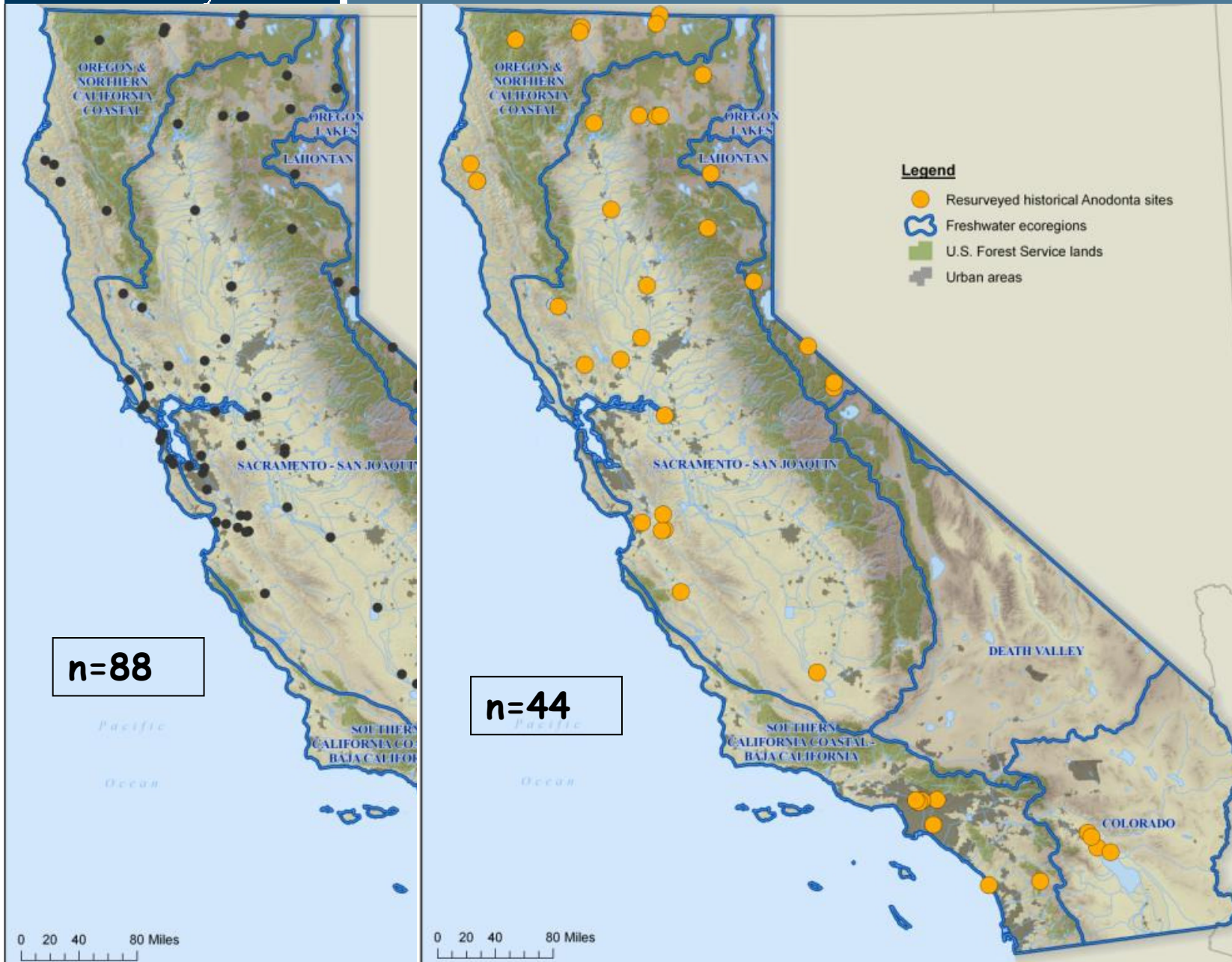
Survey Results



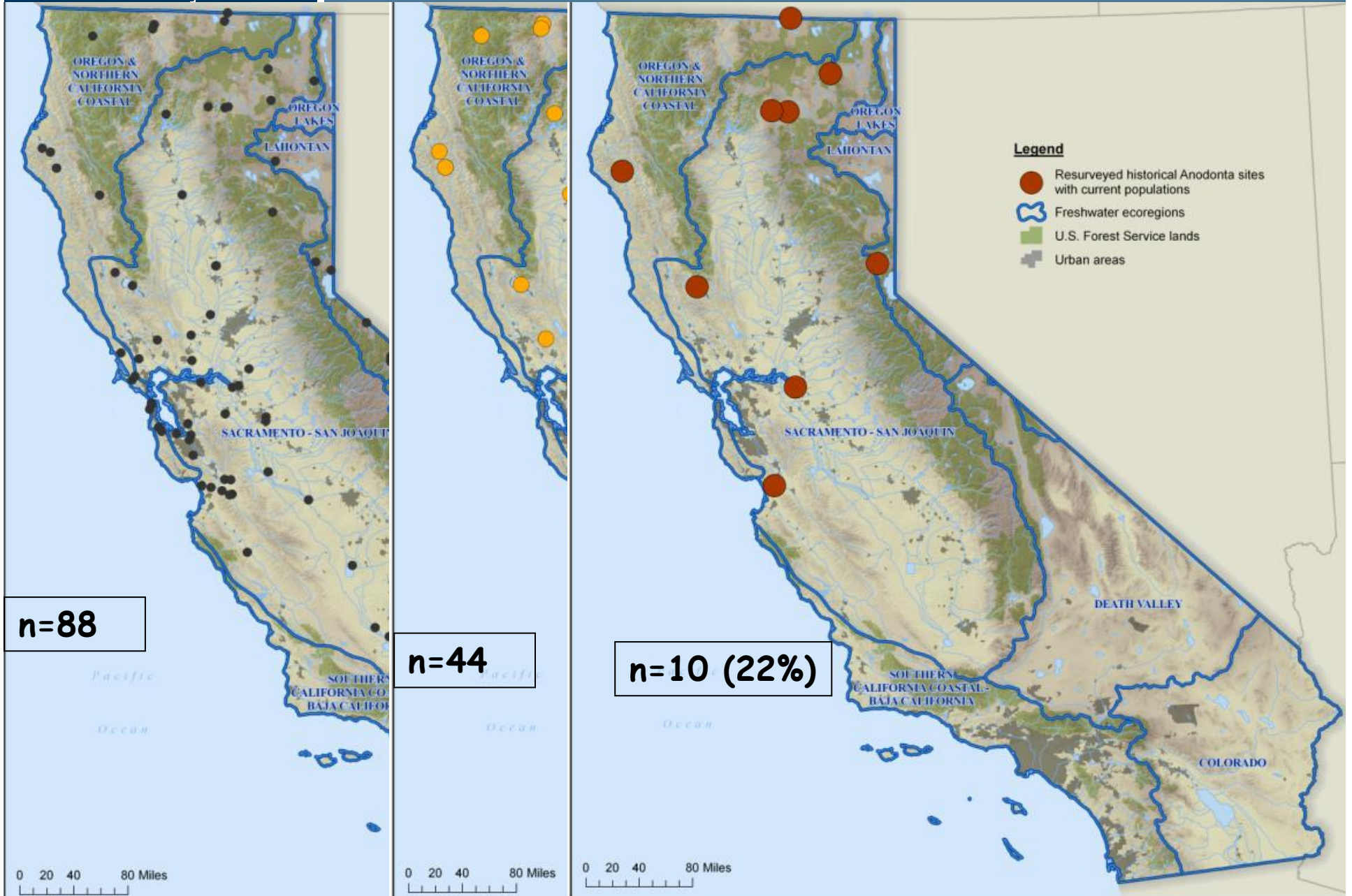
Anodonta historical sites



Anodonta sites resurveyed



Sites where *Anodonta* found



Causes of Mussel Declines

- Dams
- Channelization
- Water Management, Dewatering
- Siltation from poor forestry and agricultural practices
- Pollution
- Loss of specific fish hosts



Truckee River - 1942

- In 1942 survey 20,000+ *M. falcata* found in 0.5 mile reach
- 1 bed contained 10,000+ individuals
- Only 120+ individuals found in same river reach in 2007

Paper recommended removing mussels from river

RELATIONSHIP OF THE FRESH-WATER MUSSEL TO TROUT IN THE TRUCKEE RIVER¹

By GARTH MURPHY²

Introduction

The Truckee River, a famous trout stream, drains Lake Tahoe which lies at an elevation of 6,225 feet in the Sierra Nevada on the California-Nevada boundary. It flows for 35 miles through eastern California, then enters the State of Nevada, where it eventually reaches Pyramid Lake.

The San Francisco Fly Casting Club owns a club house and grounds three and one-half miles east of the town of Truckee. On these grounds, in 1931, it built trout rearing ponds supplied by water from the river. In these ponds, with financial support from the people of Truckee, the club raises trout for planting in the river. The California Division of Fish and Game has supplied the trout, rainbow, at the rate of about 150,000 annually. Up to 1936, they were placed in the ponds at various dates from June 1 to August 1, and were by the club until autumn, when they were released.

Each year from 1931 to 1936 an experienced angler (ms.) diagnosed the trouble by the young of the fresh-water mussel, *M. falcata* (Gould). It has been to delay the release of August that the

2. The mussels could be removed from the river. This would not be as tremendous a job as at first appears. At certain seasons the river drops very low, and during such times it should not take more than 150 man-days to clear the river of mussels from the Fly Casting Club all the way up to Lake Tahoe. This estimate is based on a survey made on certain stretches of the river in 1941. However, it would be difficult to remove all of the mussels below 40 mm. in length. This means a few glochidia would still be in the water supply and could possibly trouble; also that the mussels would be likely to come back.

European forms of the mussel have been made on the development of the life-... important phases of the life-... North American sub-... European form have not... as for a

of 1940 an investigation of the Truckee River... but it started too late to make much progress. On

for publication, February, 1942.
the time this study was made the author was temporarily employed as
Biologist by the Bureau of Fish Conservation, California Division of Fish
and Game.

Recap

- 434 historical records of mussels in California
- 113 historical sites
- 105 sites surveyed in 5 freshwater ecoregions
- Mussels found at 52% of sites surveyed
- Declining abundance at historical sites
- Mussels appear to be extirpated from Southern California

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