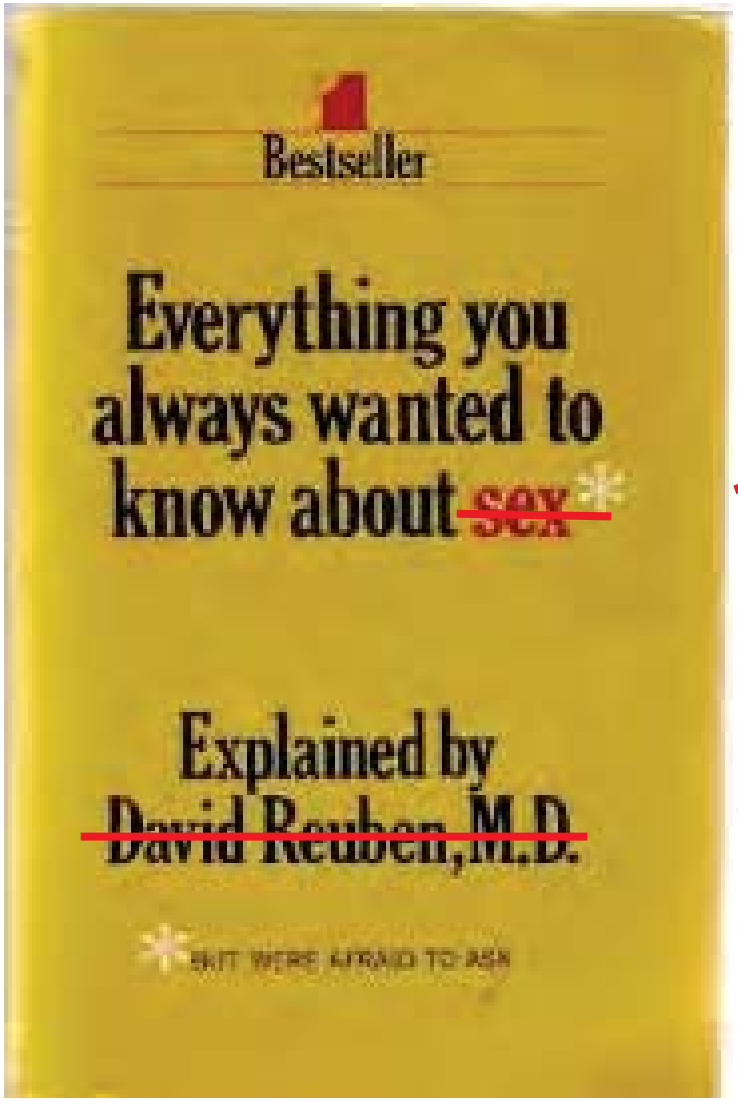


Tahoe

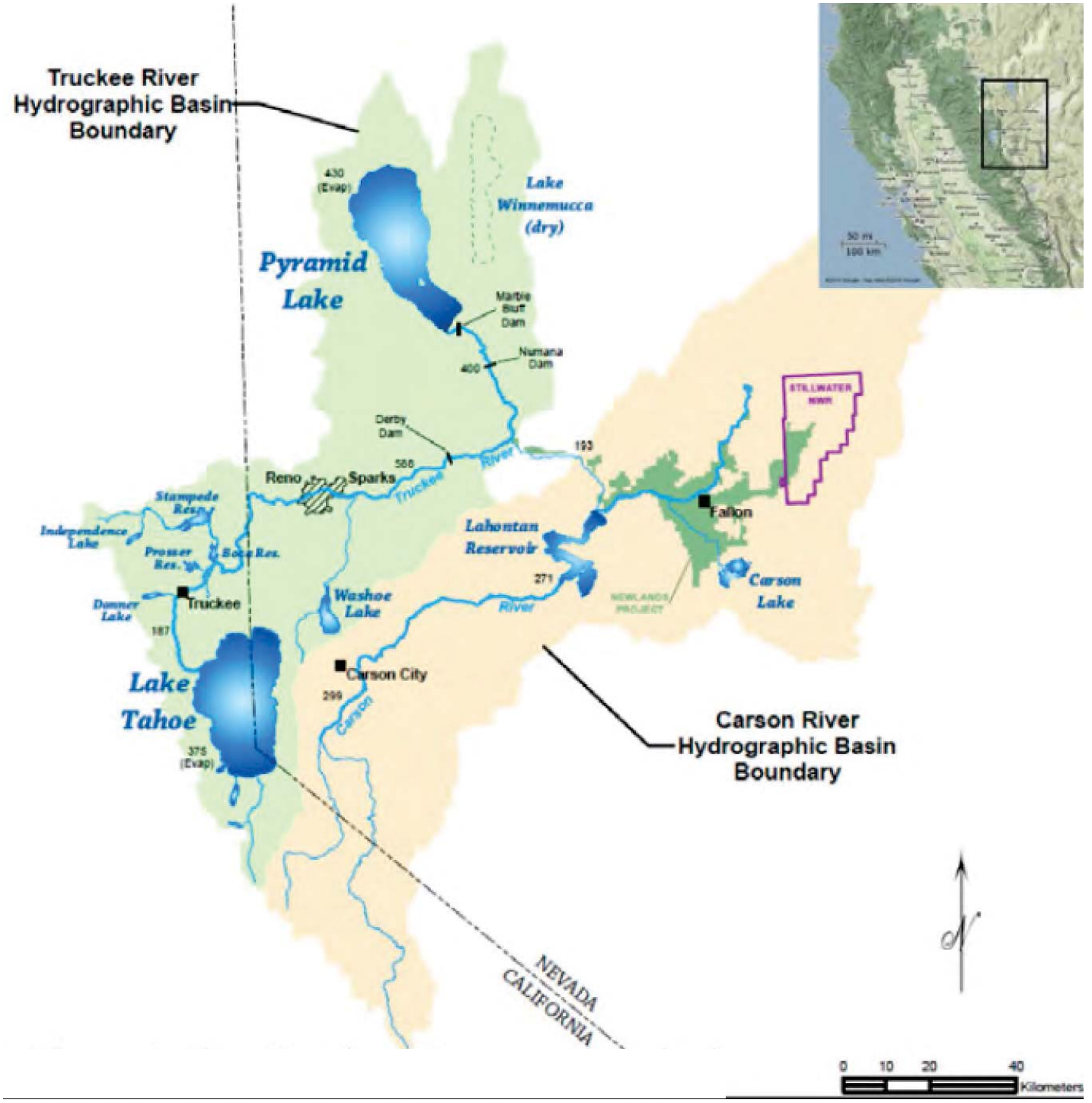
Heather Segale,
UC Davis TERC

John Frémont

Kit Carson

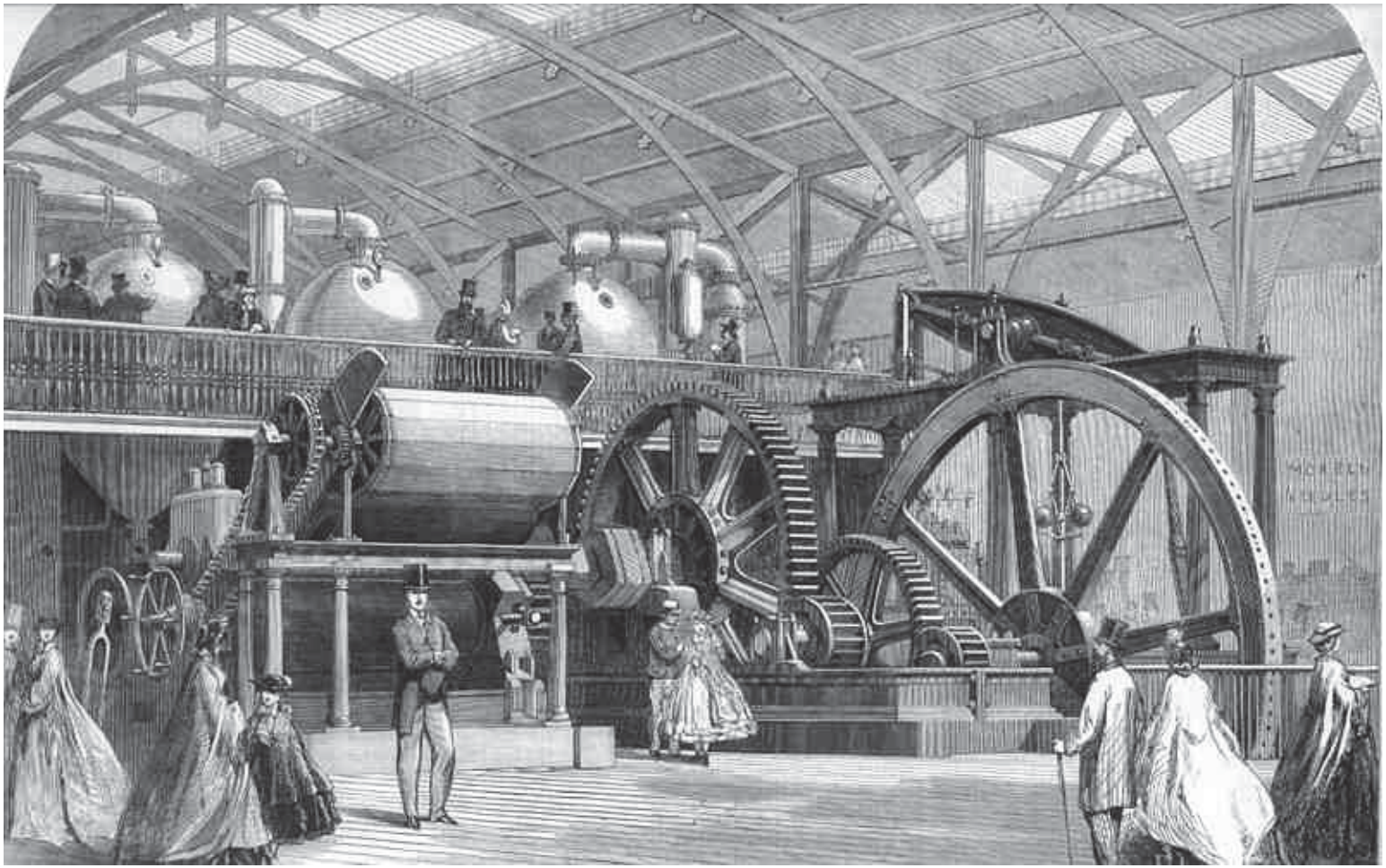
An ancient, modern lake – 2 million years old, but first viewed by "Europeans" in 1844 (two years before the Donner Party)

UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER



UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

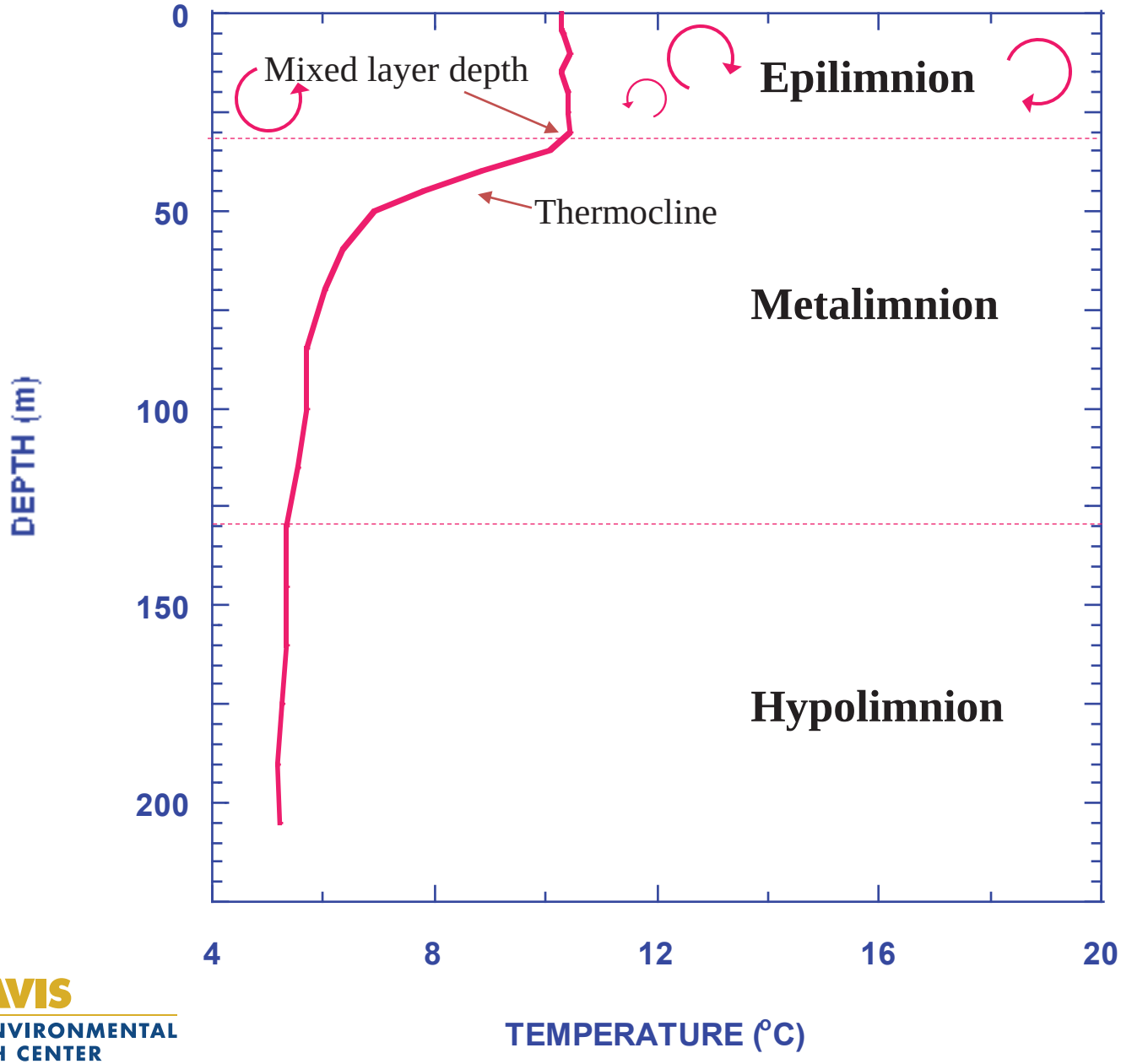
How do lakes work??



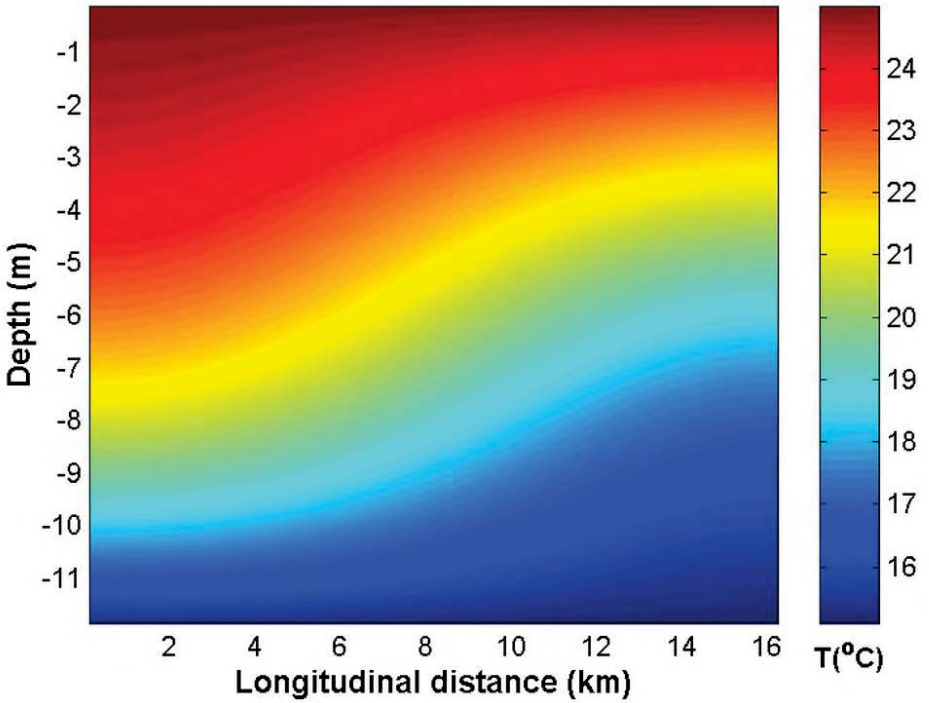
UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

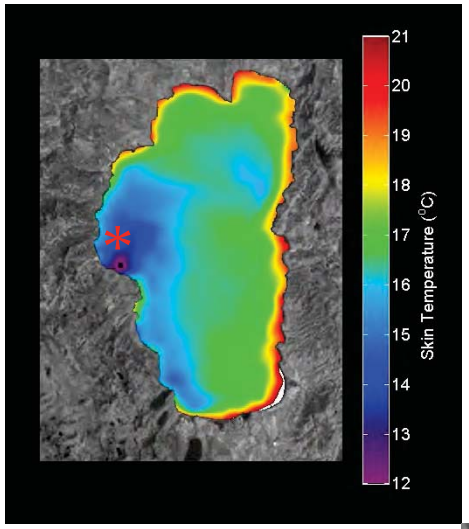
LIMNOLOGY 101

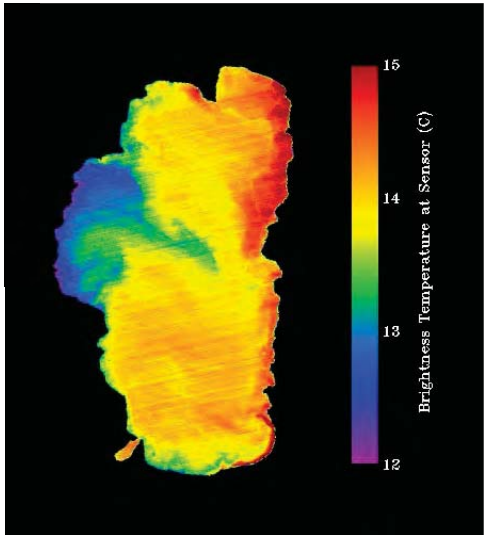
LAKE IS "PARTITIONED" BASED ON THERMAL (aka DENSITY) STRATIFICATION

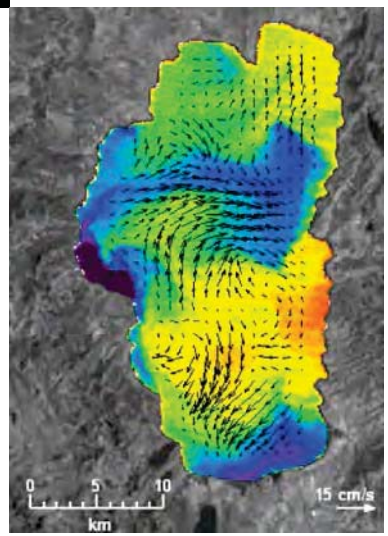


UCDAVIS TAHOE ENVIRONMENTAL RESEARCH CENTER

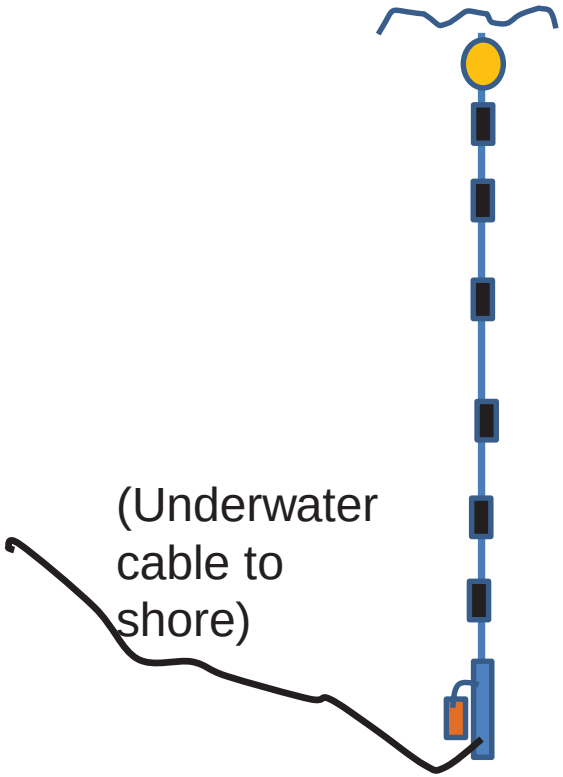


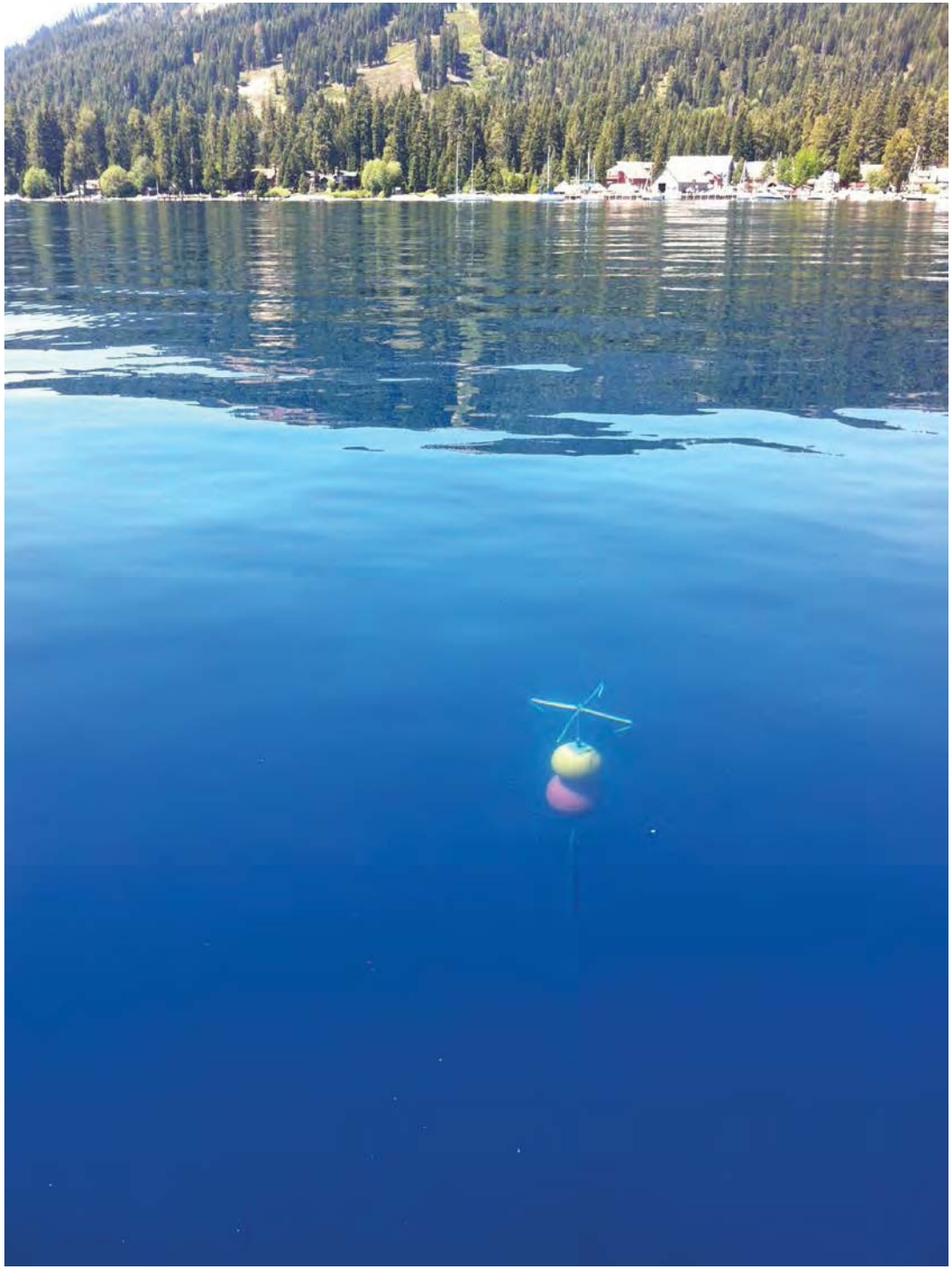






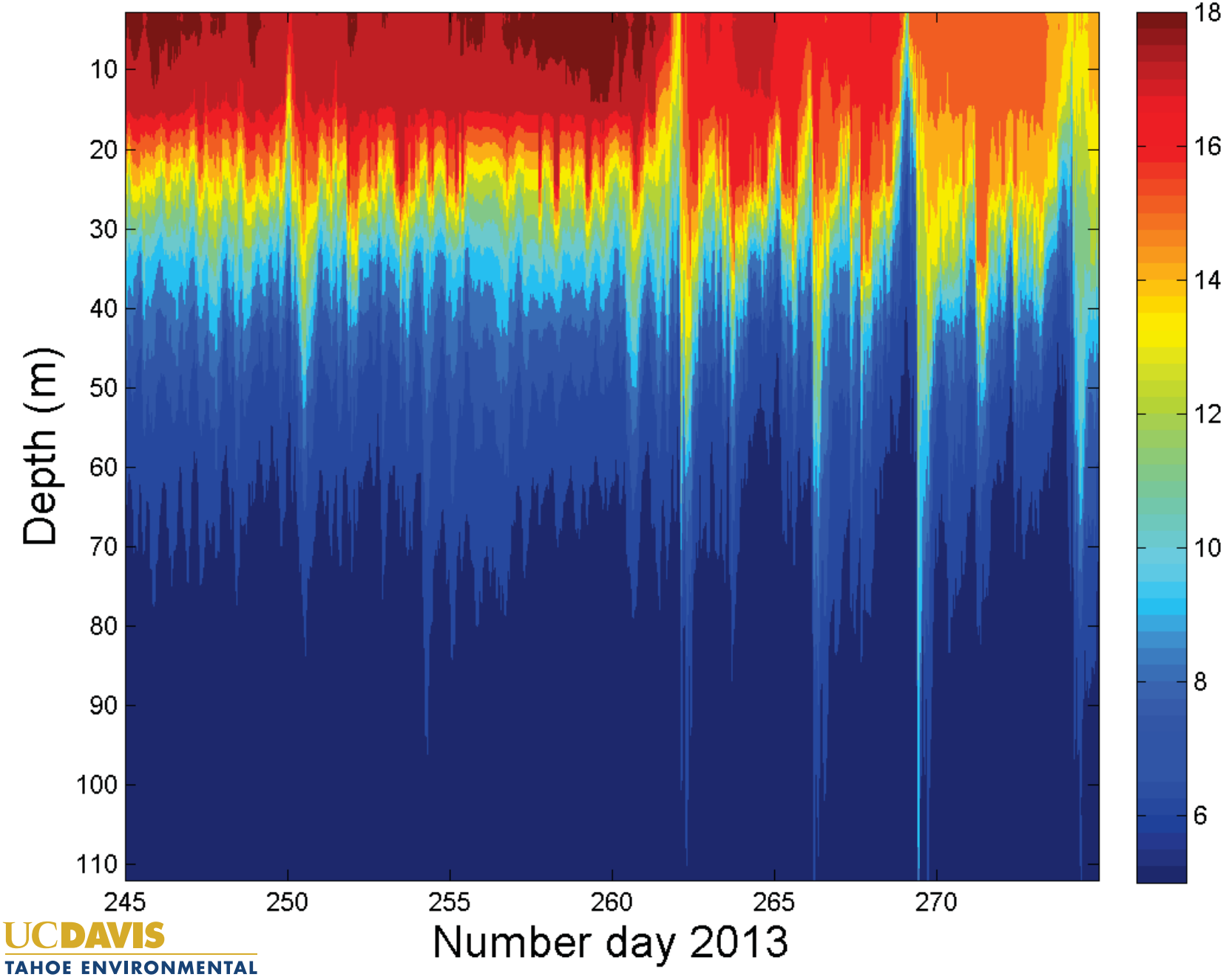
UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER



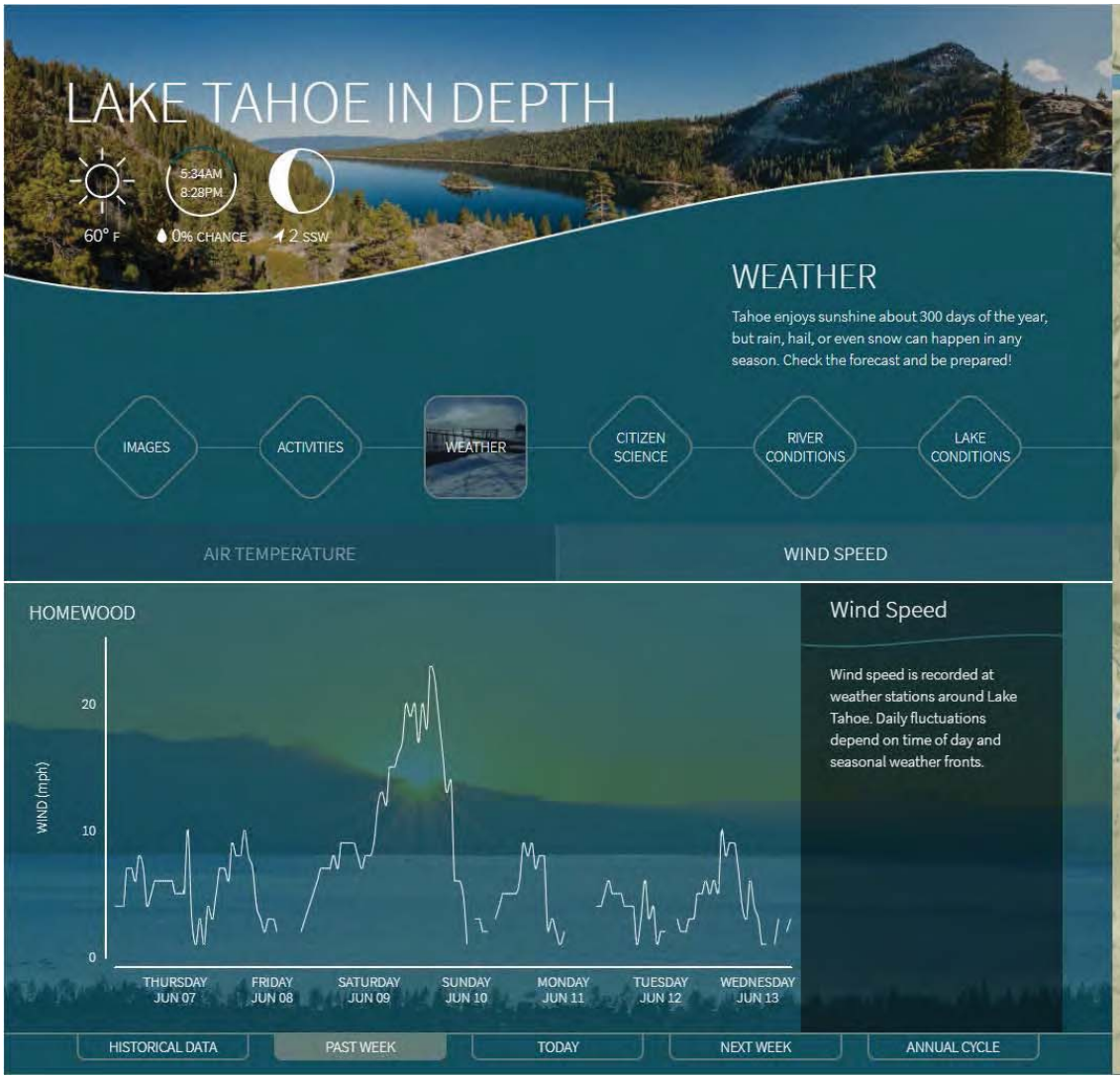


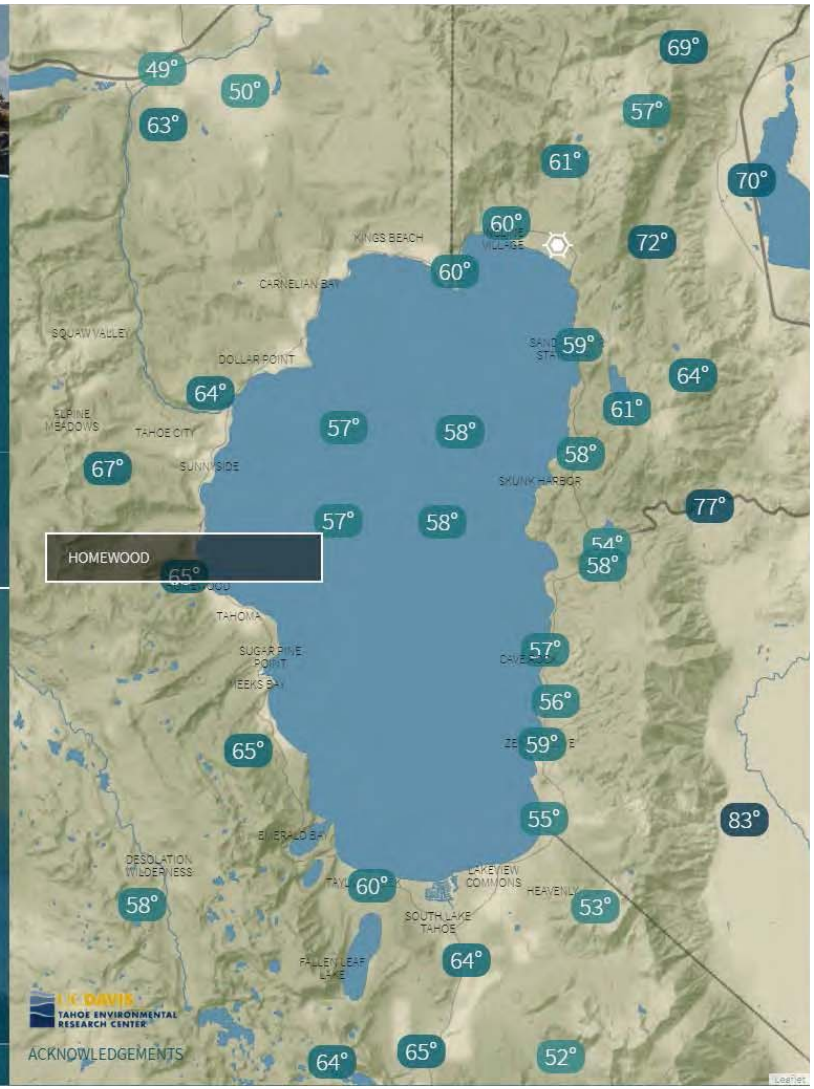
UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

Homewood Thermistor Chain Data: September

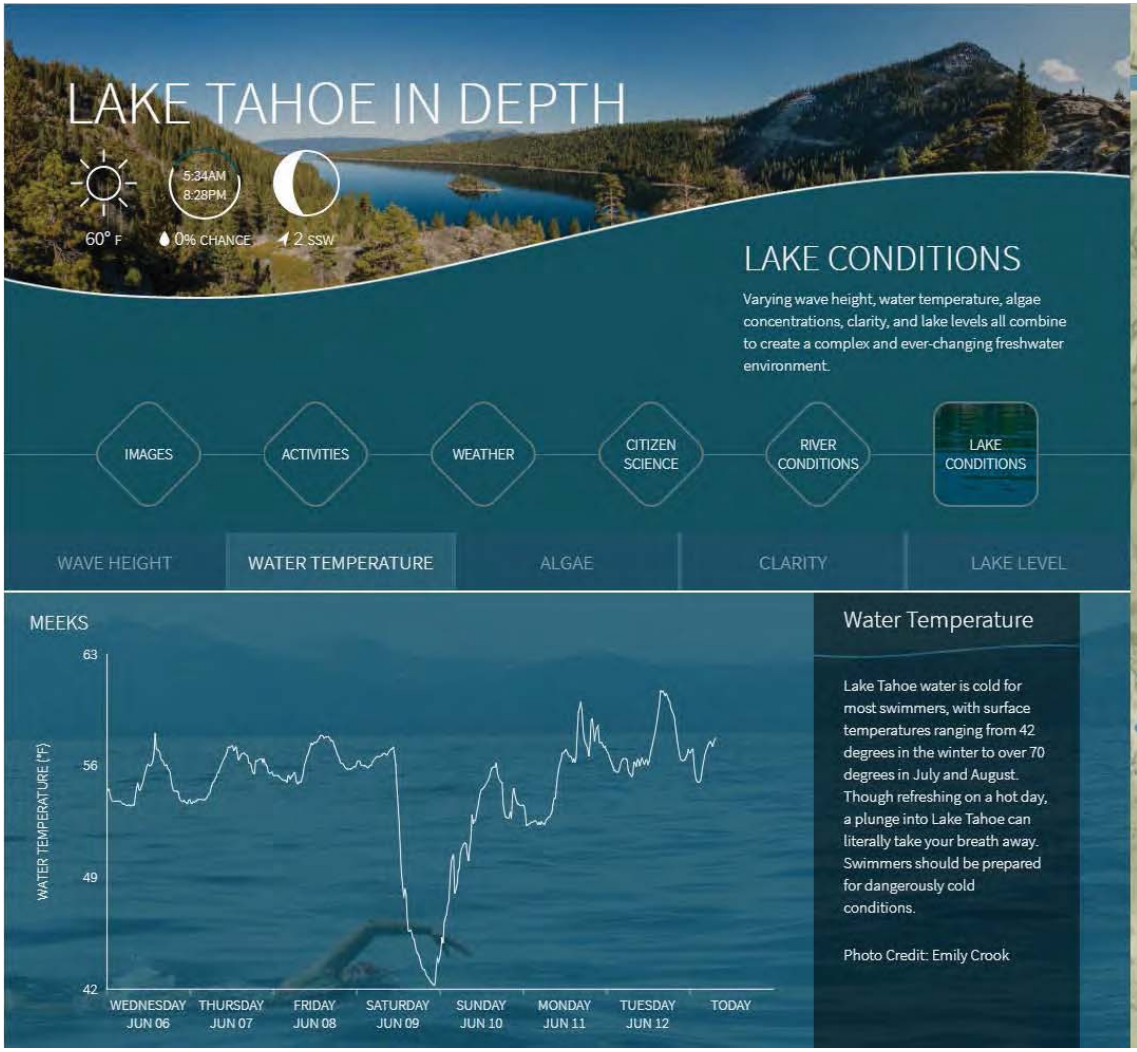


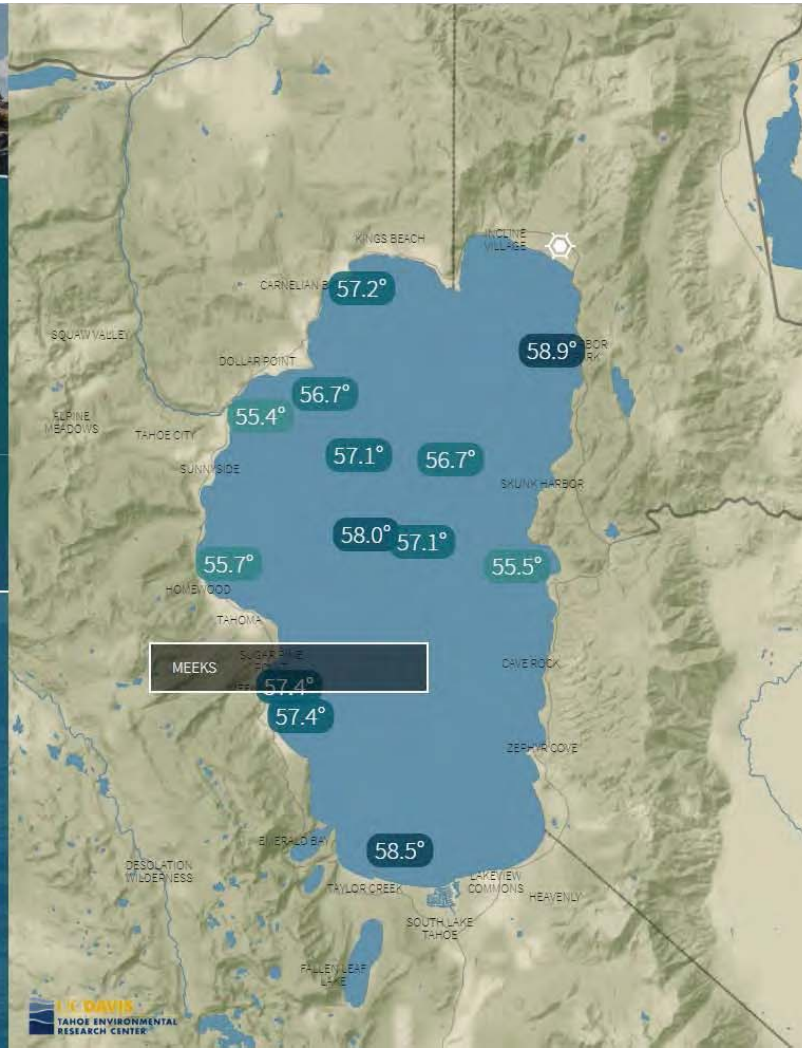
UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER



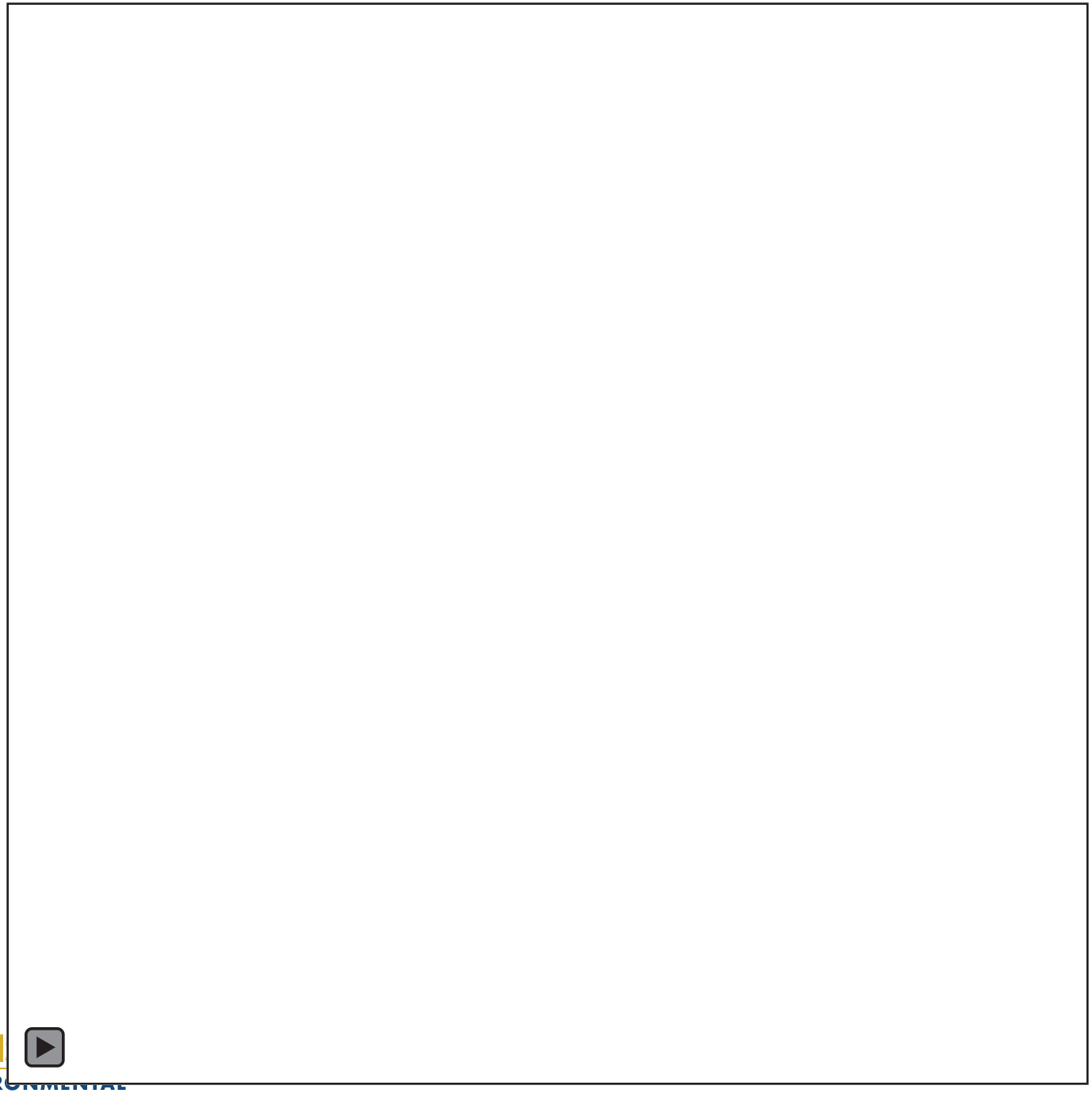


UCDAVIS
TAHOE ENVIRONMENTAL RESEARCH CENTER





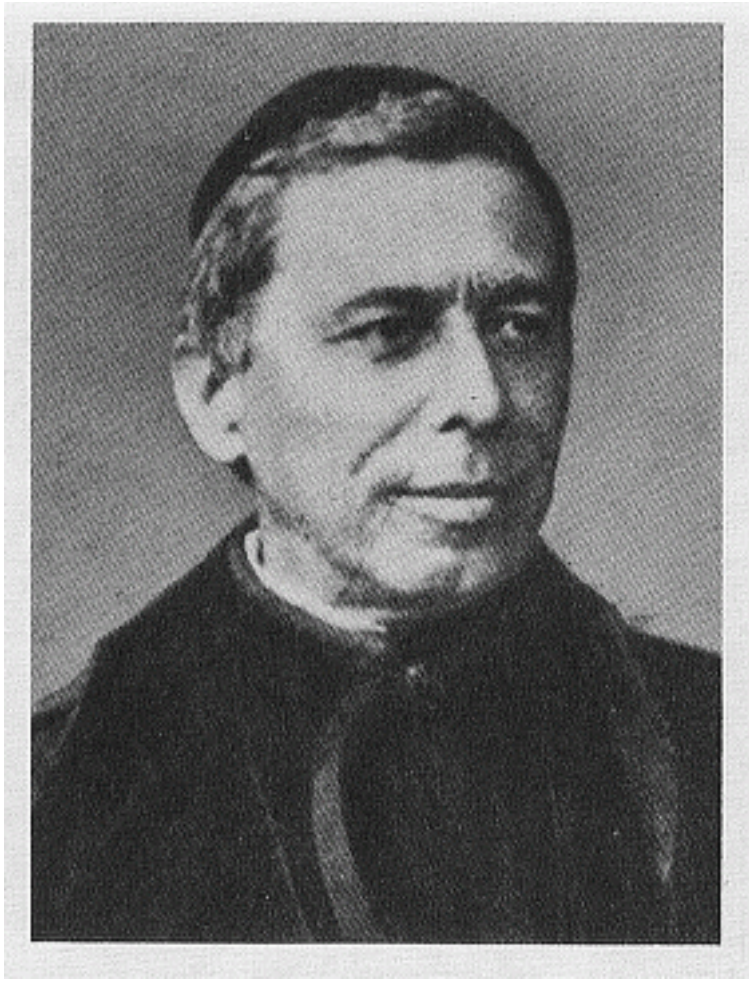
UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

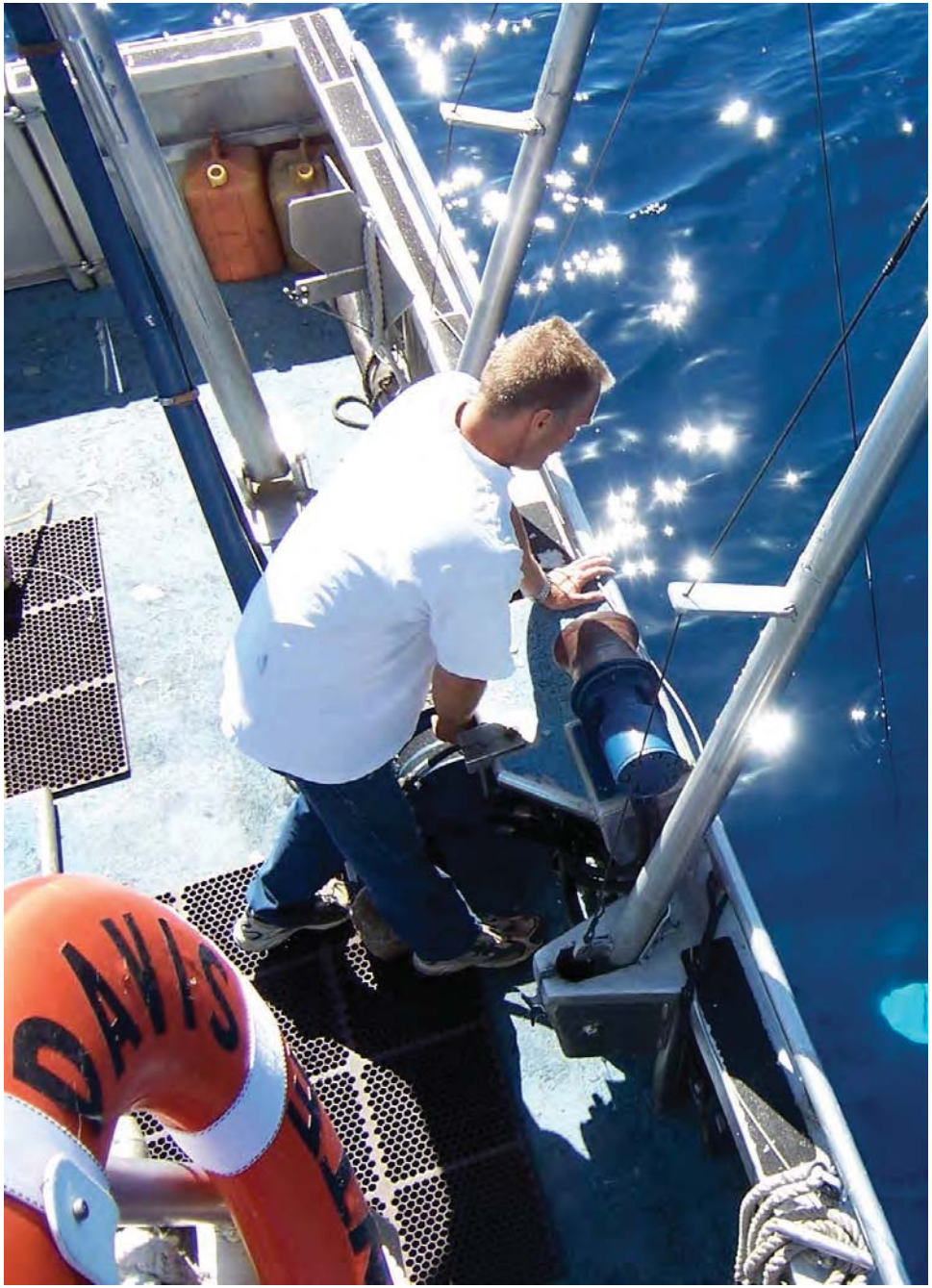


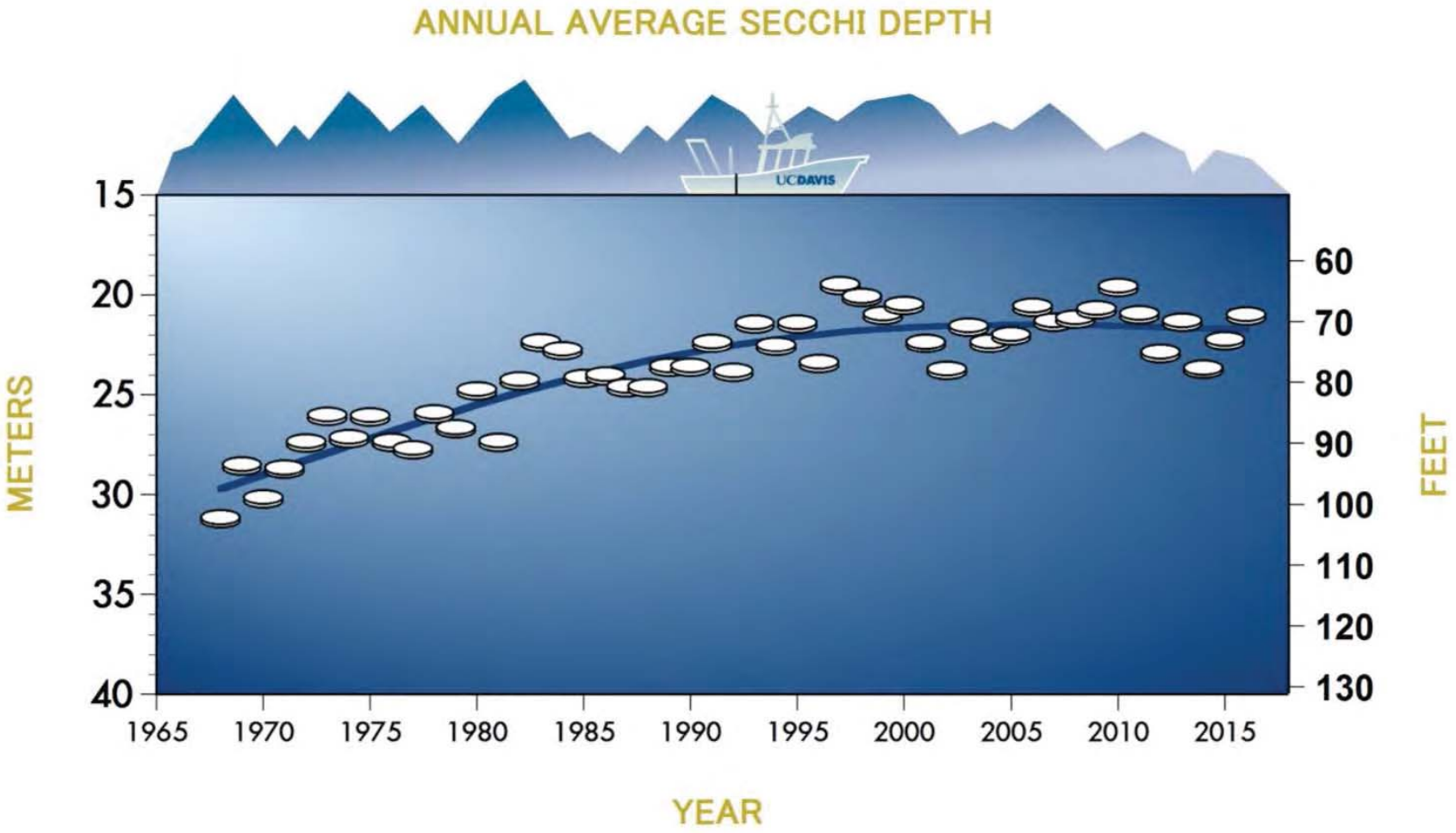
UC DAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

Clarity

Father Angelo Secchi (1818-1878) was the “Father of Astrophysics”, renowned meteorologist, founder of the Vatican observatory. And credited by others for inventing the Secchi disk.



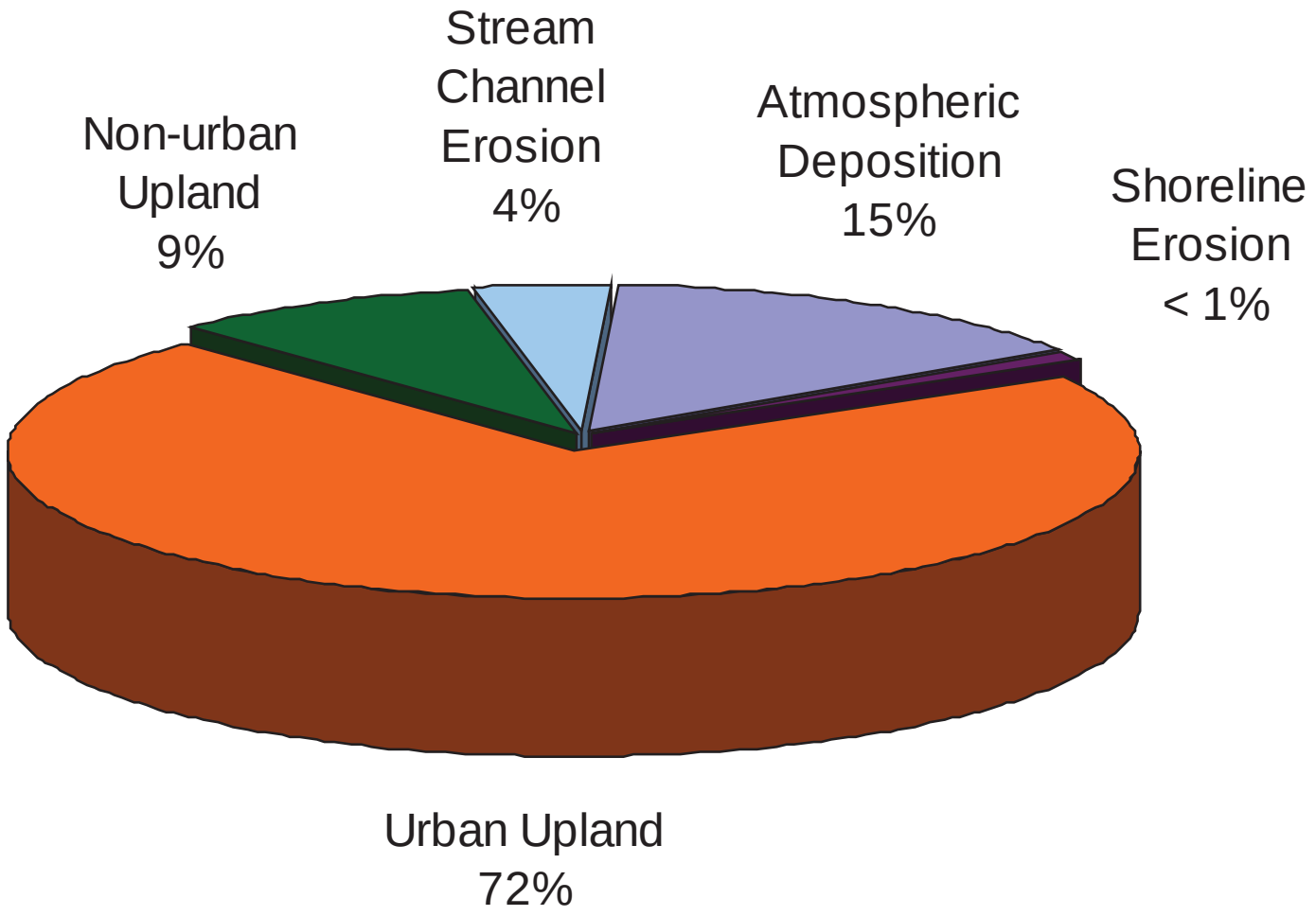




UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

Fine Particles < 20 microns (really < 8)

$5x10^{20}$/year



UCDAVIS
TAHOE ENVIRONMENTAL RESEARCH CENTER

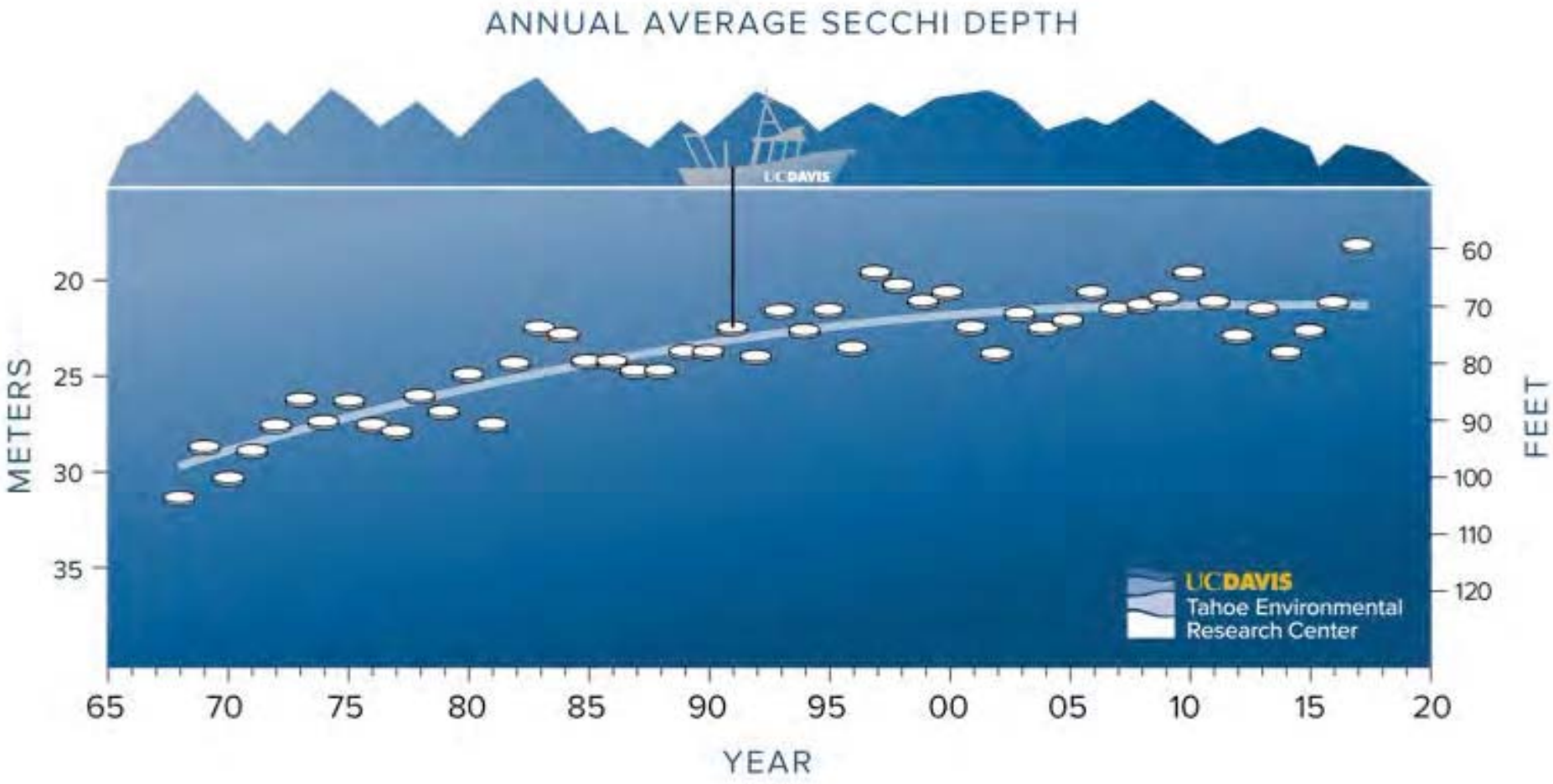
PARTICLE INPUT TO THE LAKE FROM URBAN AREAS – THE LEADING LOCAL CAUSE OF CLARITY LOSS

UCDAVIS
TAHOE ENVIRONMENTAL RESEARCH CENTER

Lake Tahoe Clarity in 2017 – Harbinger of the Future or Confluence of Extreme Events?

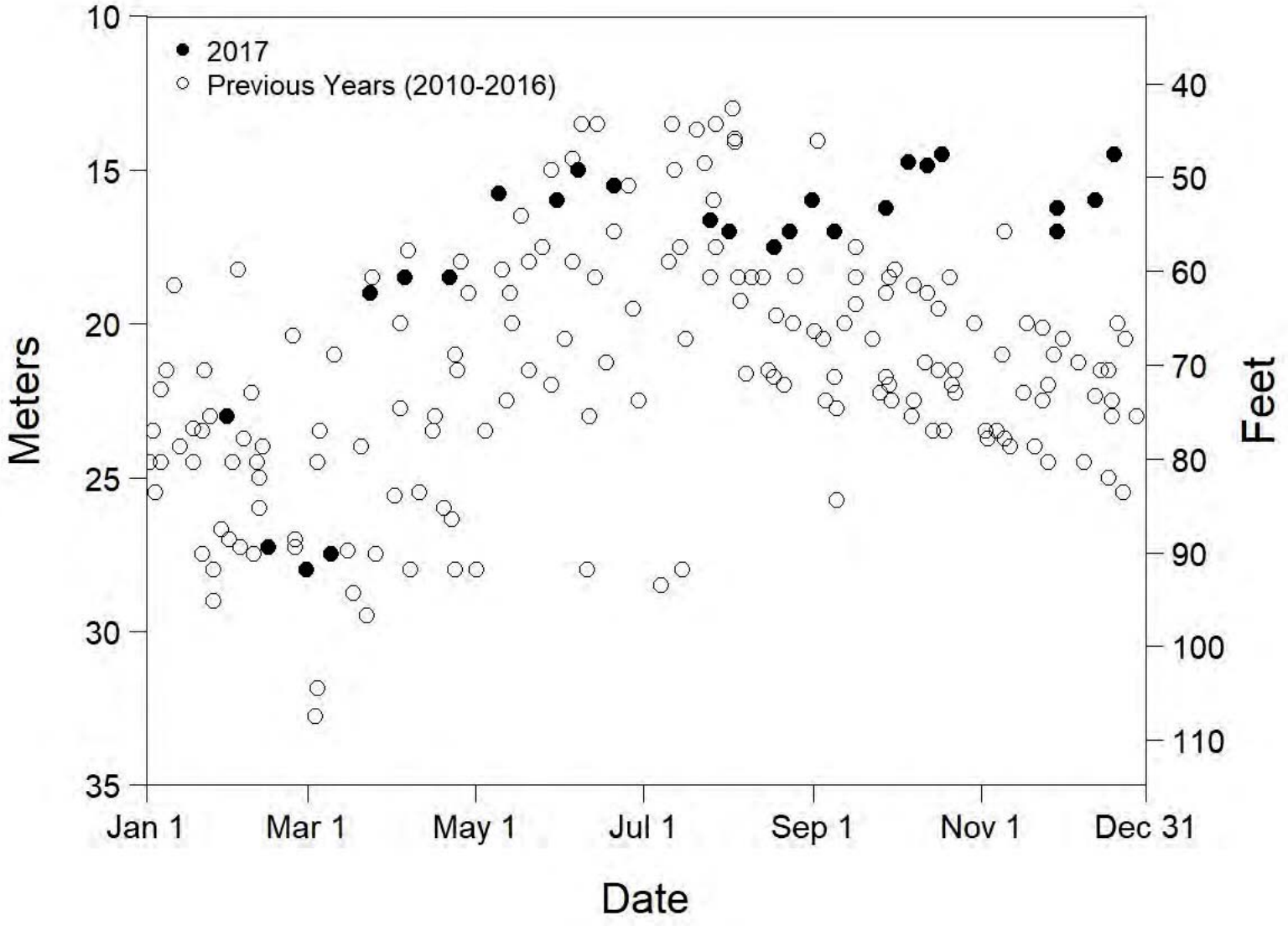
"The average annual clarity level for 2017 was 59.7 feet. This was a 9.5-foot decrease from the previous year, surpassing the previous lowest value of 64.1 feet in 1997"

UCDAVIS
TAHOE ENVIRONMENTAL RESEARCH CENTER



UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

Individual Secchi depth measurements for 2010-2016 (hollow circles) and 2017 (filled circled)

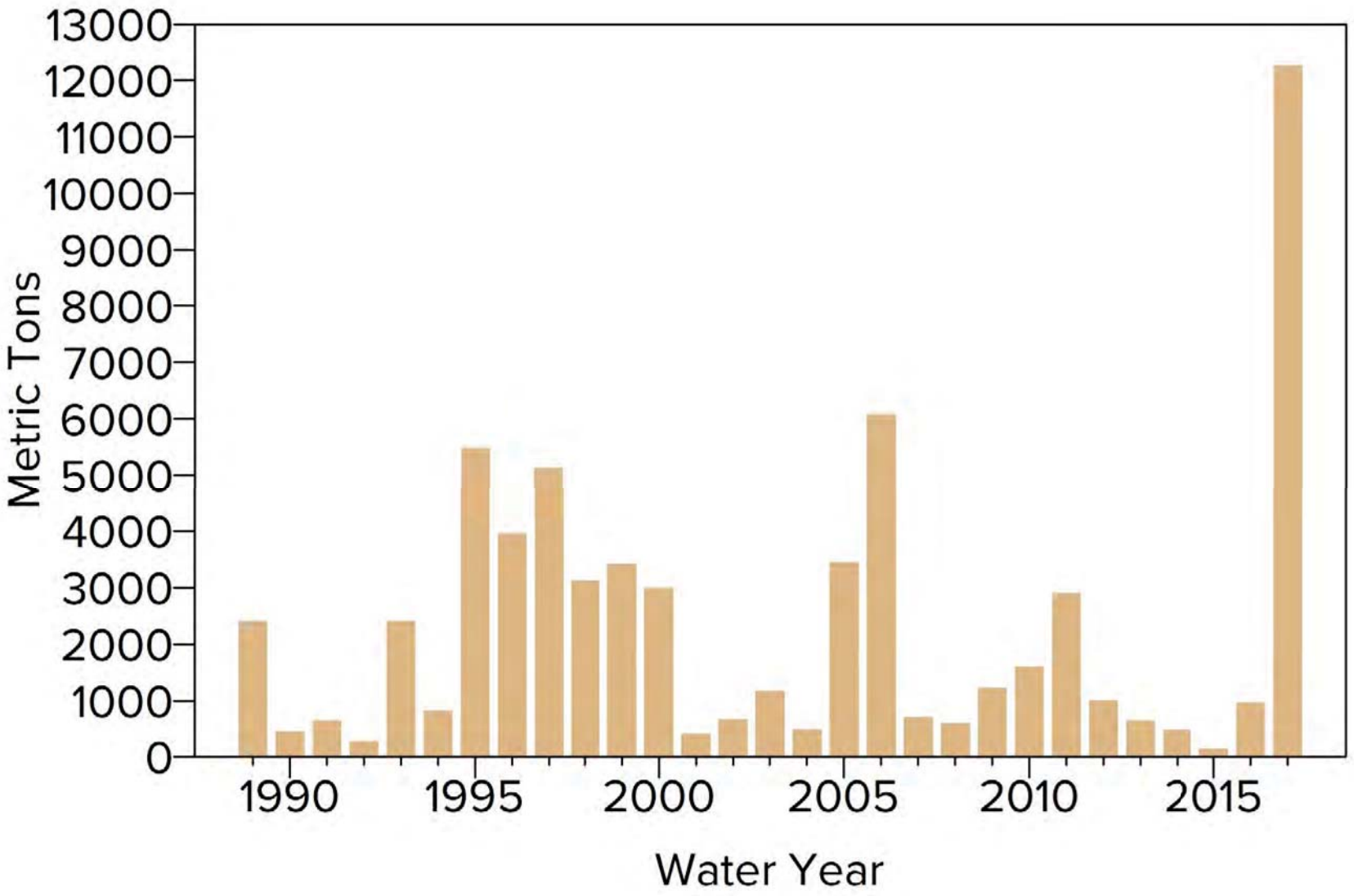


UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

Here is what happened

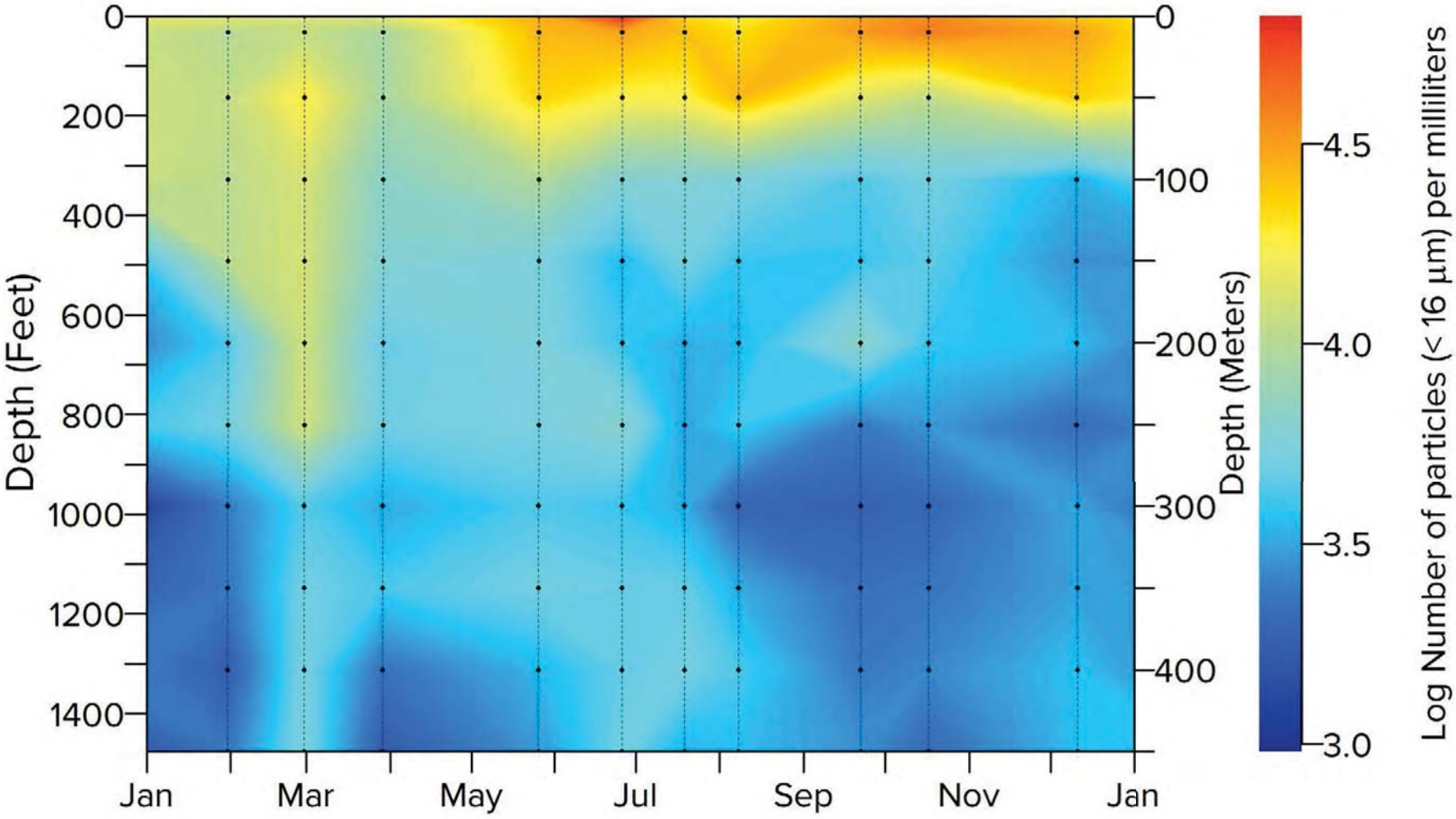
- There was a 5 year drought that was the most extreme in 1600 years
- The drought was ended with the wettest winter on record (300% of annual precipitation; 58 Atmospheric Rivers…
- 5 years of material that had accumulated in the streams PLUS a lot of new material all got washed into the lake
- The runoff occurred relatively late in the year, so the impacts persisted late into the year

ANNUAL SEDIMENT LOAD FROM UPPER TRUCKEE RIVER



UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

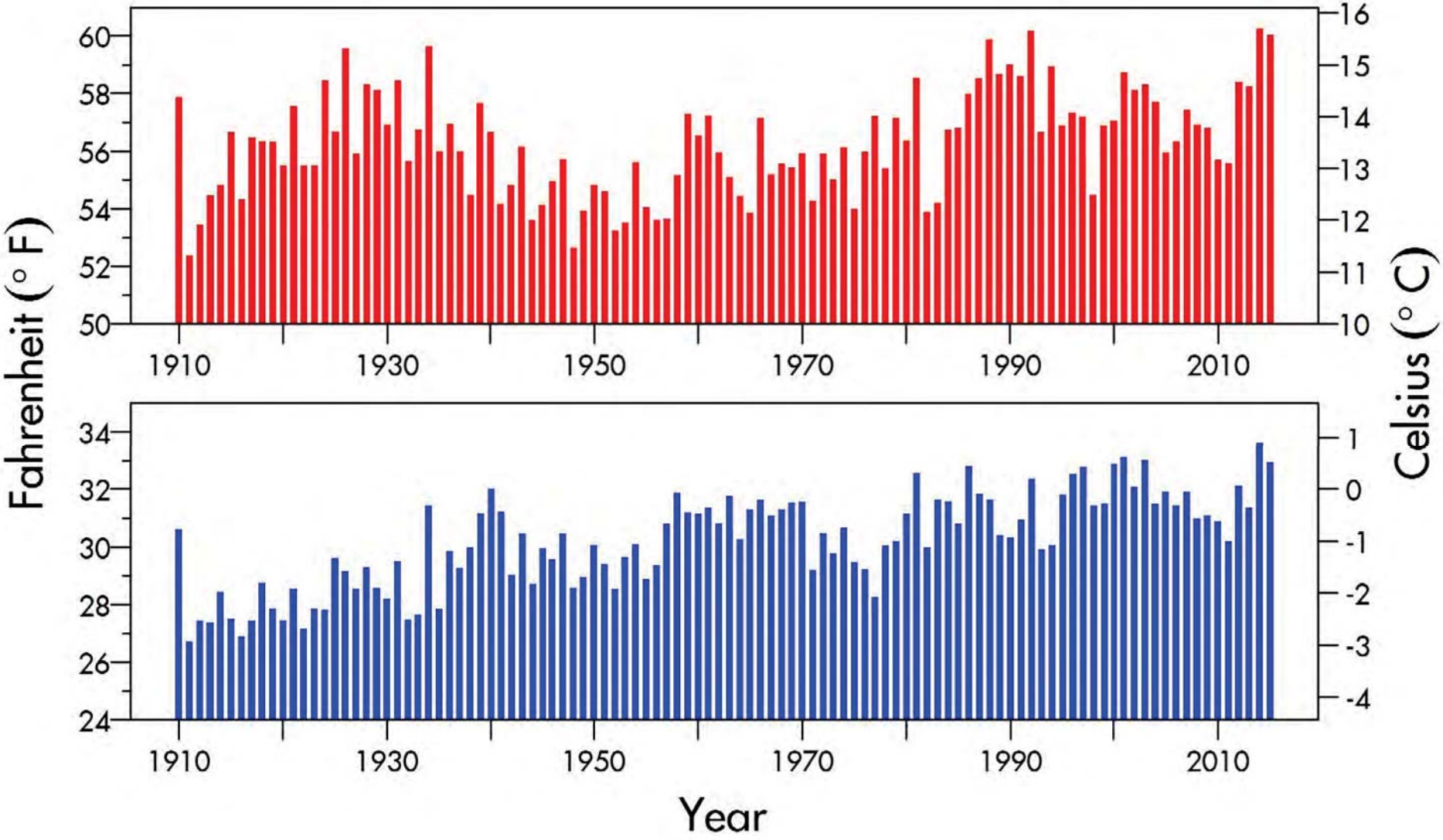
Fine particle distribution in Lake Tahoe during 2017



UCDAVIS
TAHOE ENVIRONMENTAL RESEARCH CENTER

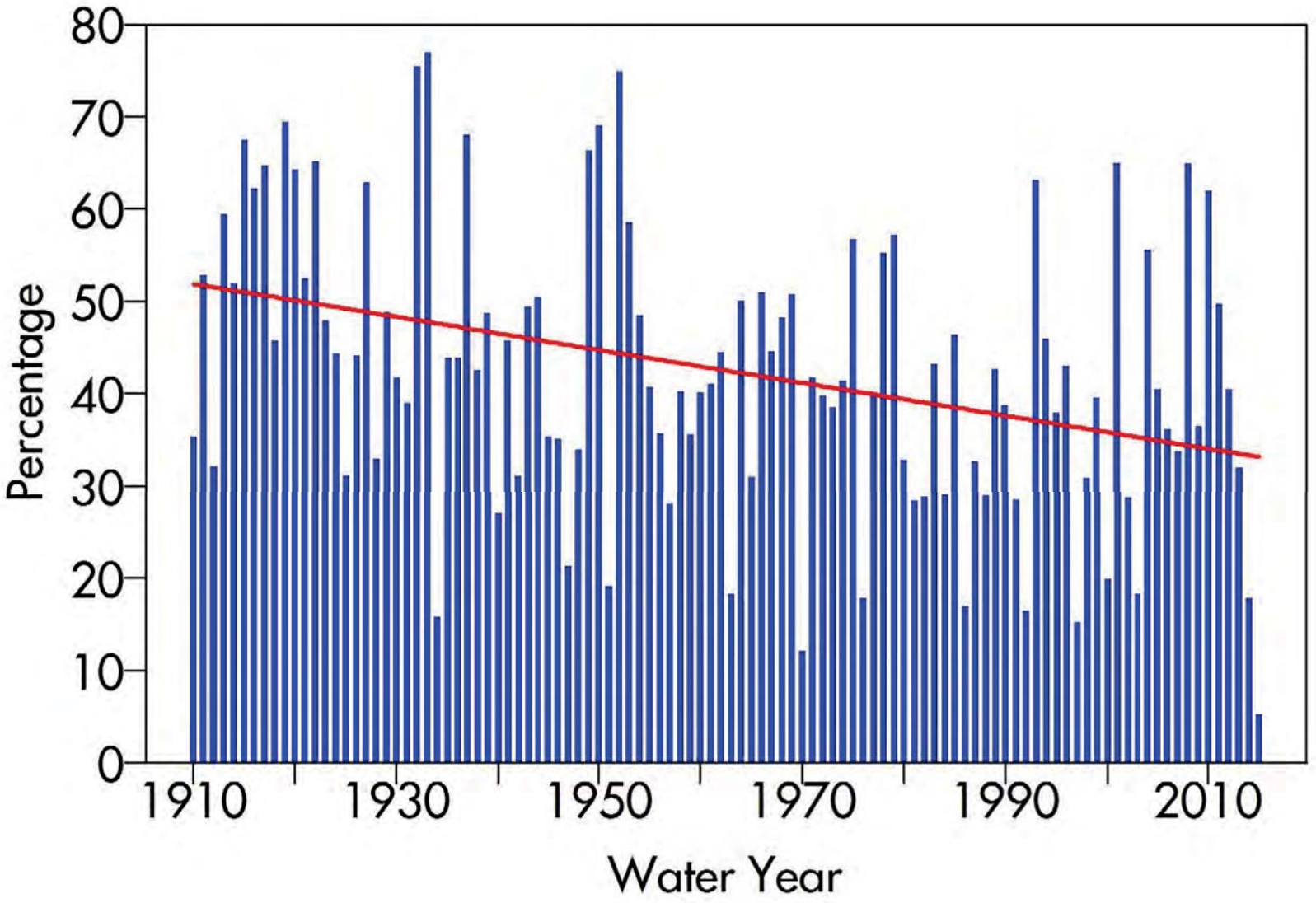
CLIMATE CHANGE

Annual Average Air Temperature - Tahoe



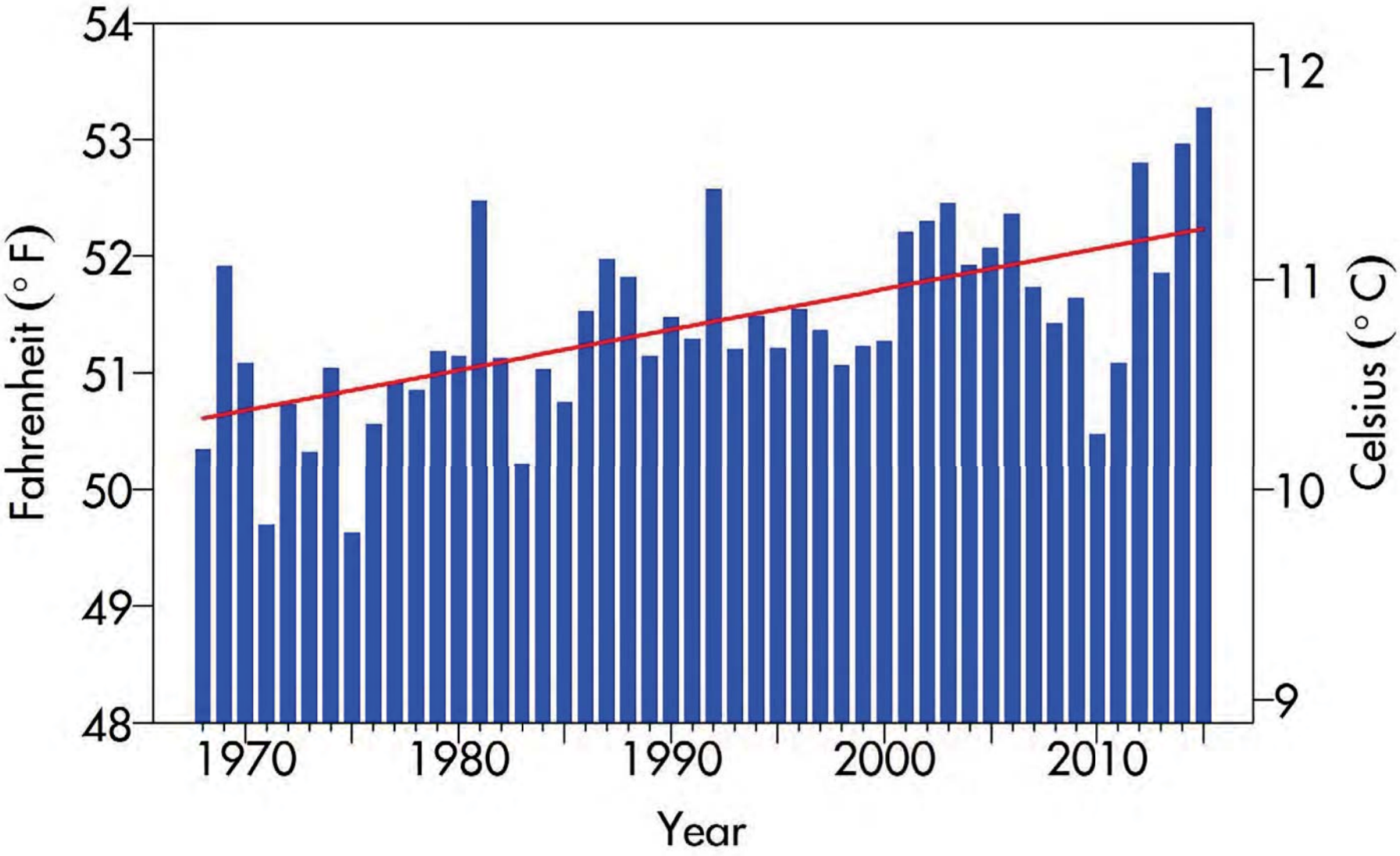
UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

Snow as a fraction of precipitation- Tahoe



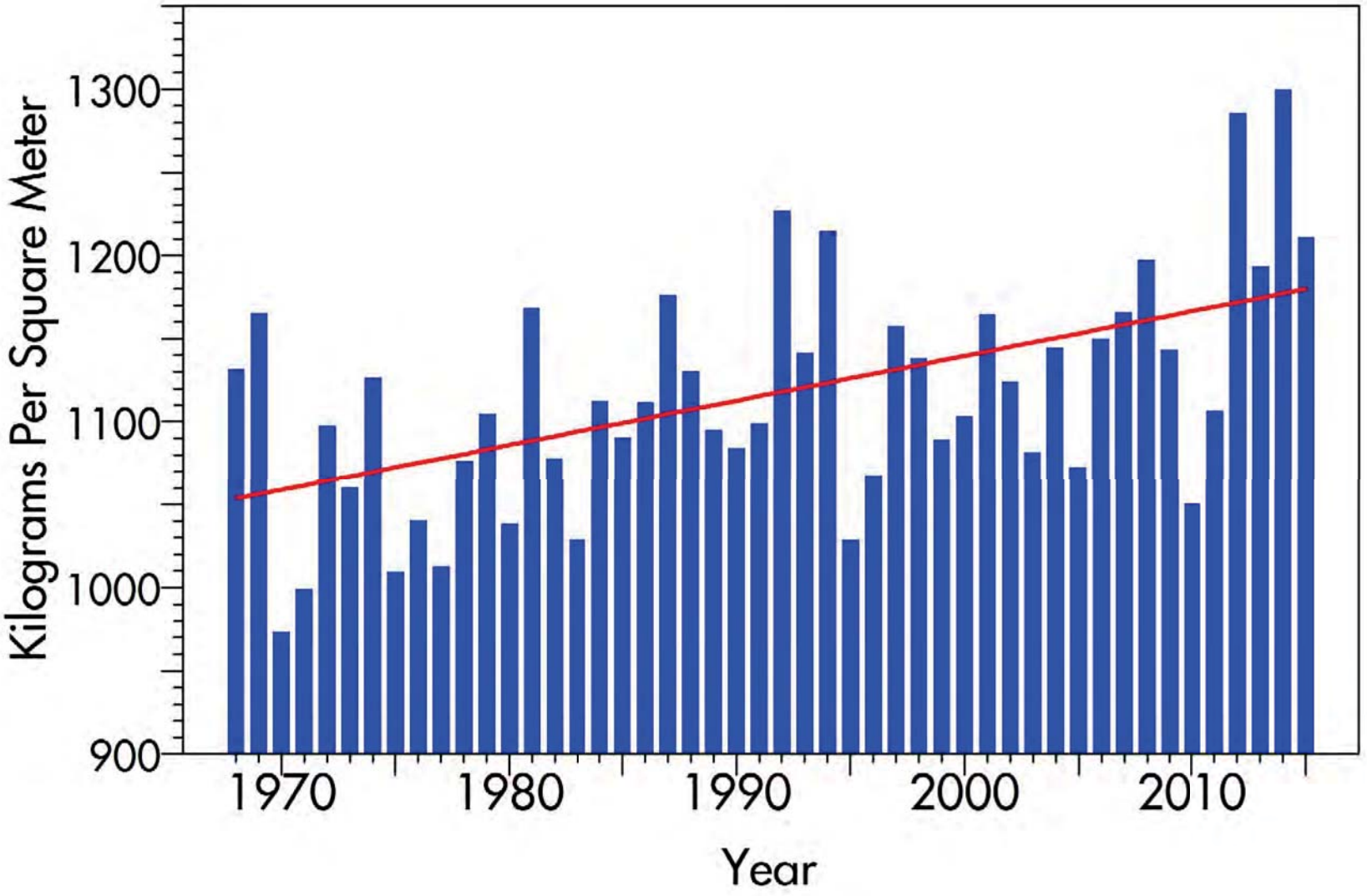
UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

Annual Average Lake Surface Temperature = 11.9° C

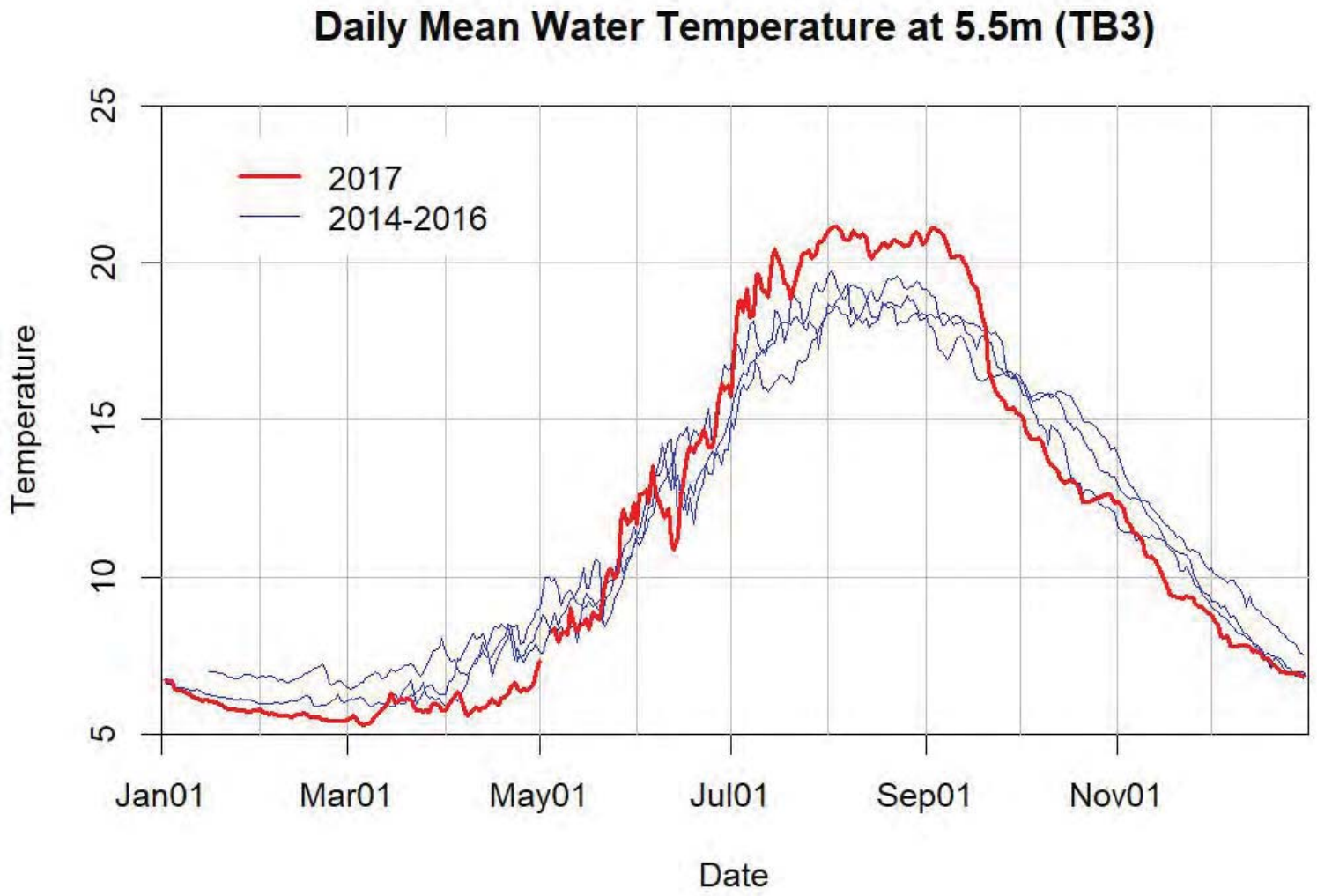


UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

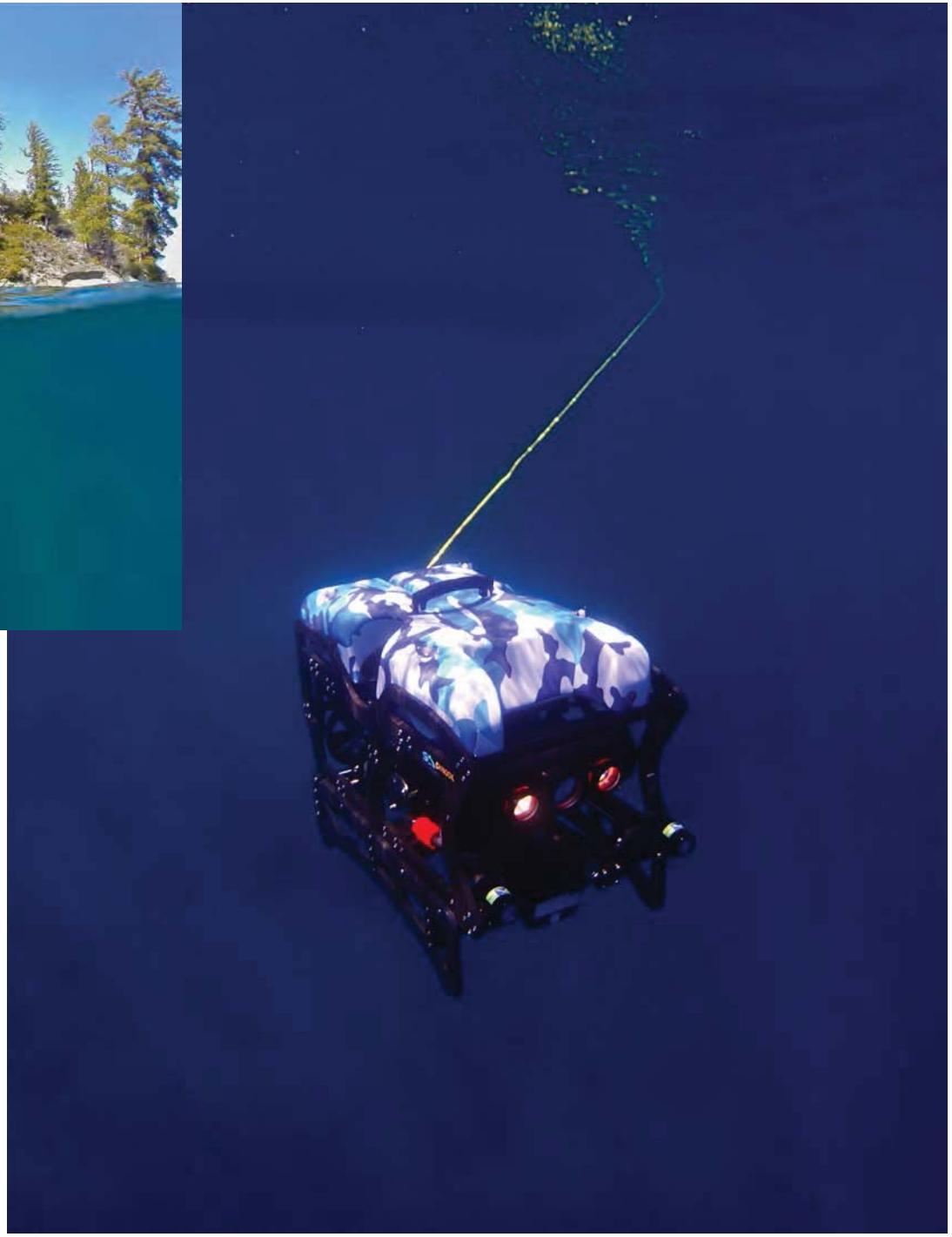
Increasing Lake Stability - Tahoe



UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

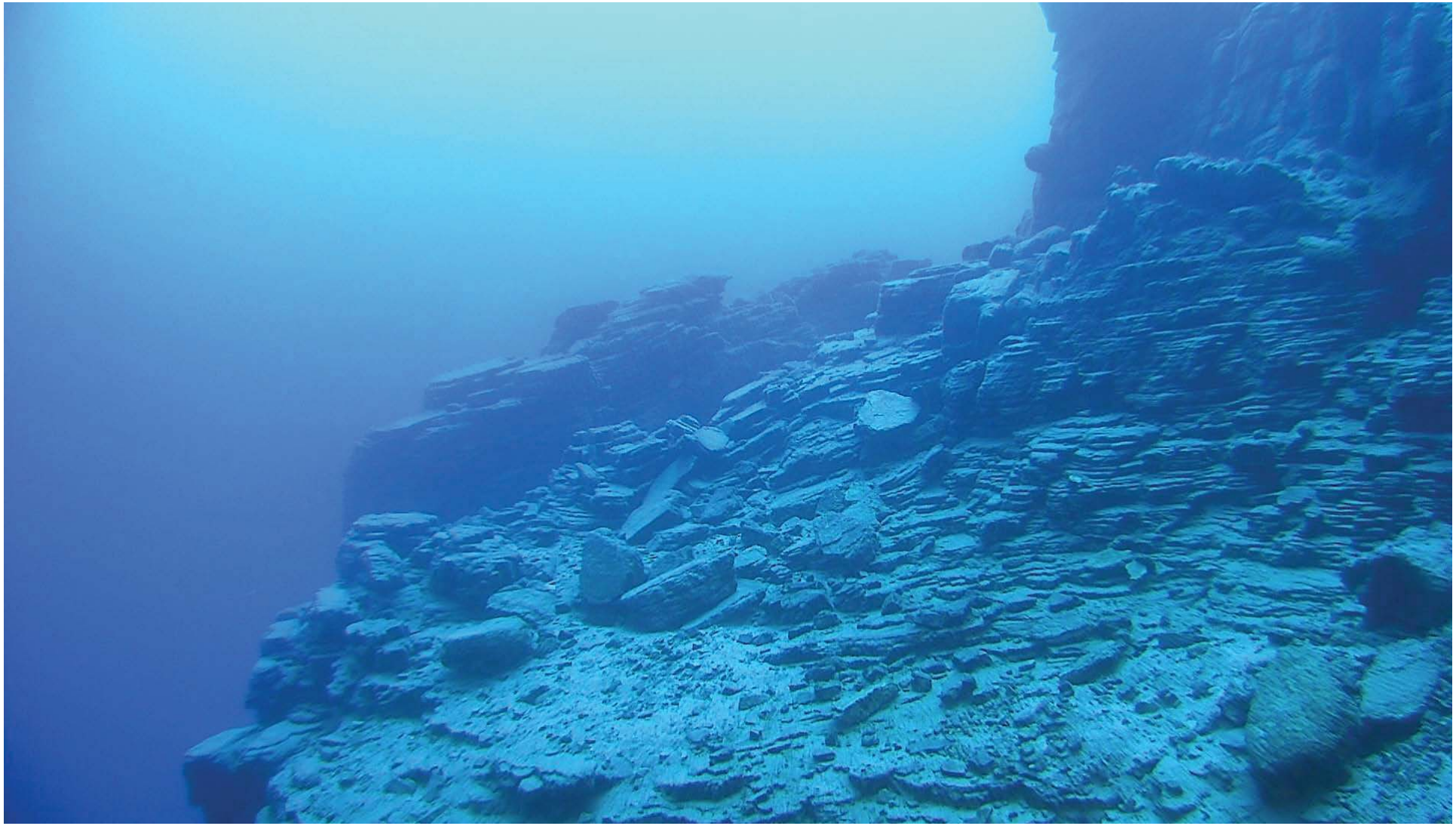


UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER



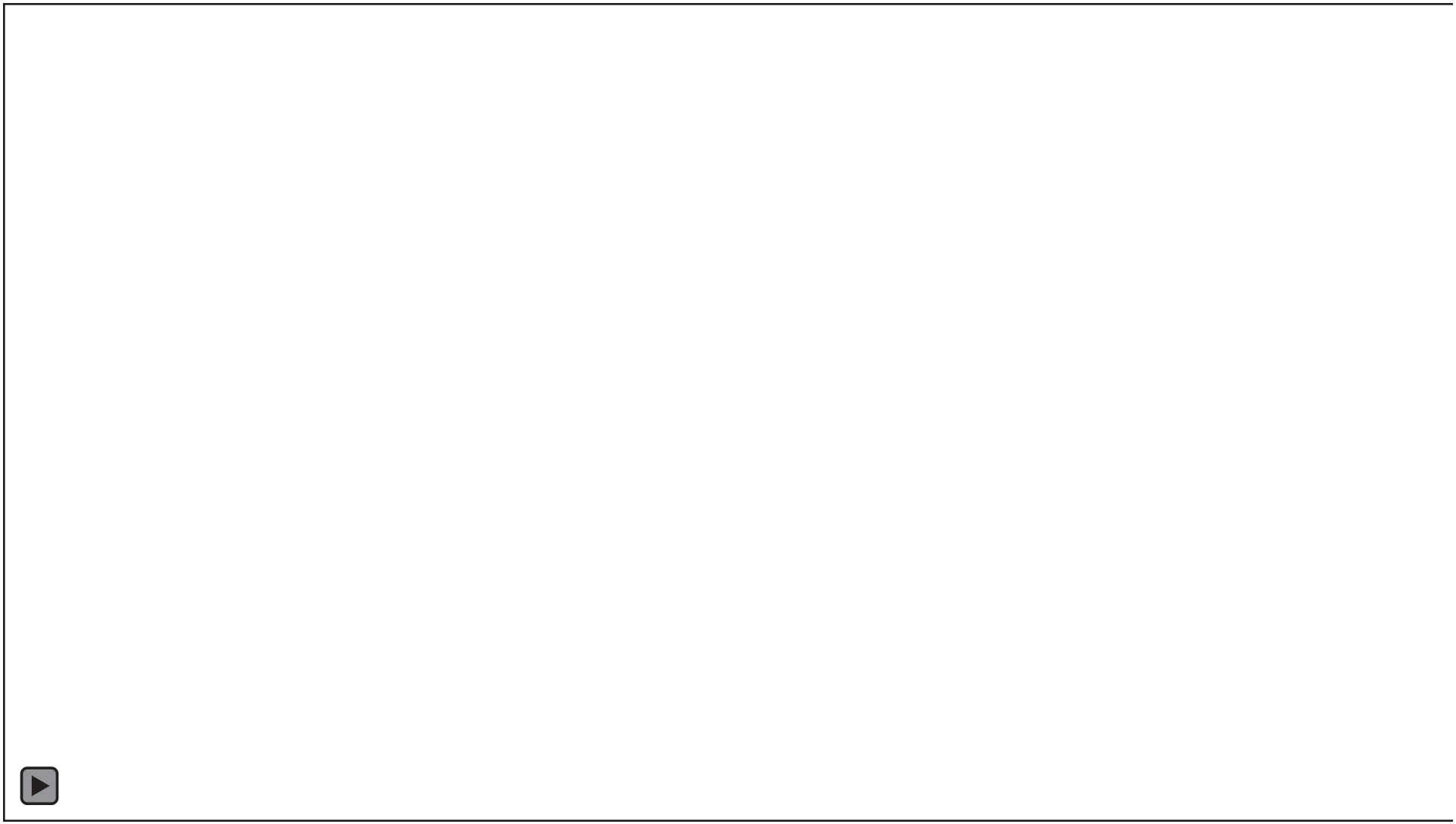
UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

“RUBICON CLIFFS” AT THE EDGESOF LAKE TAHOE



UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER

MYSIS SHRIMP AT THE BOTTOM OF LAKE TAHOE



UCDAVIS
TAHOE ENVIRONMENTAL
RESEARCH CENTER