



# Bight '18 Harmful Algal Blooms

Presentation to Commission  
December 10, 2021

# Impacts from Harmful Algal Blooms

- **Toxins:** wildlife health, drinking water, recreation, agriculture
- Impaired ecosystem function (e.g. fish kills)
- Aesthetics
- Taste and odor compounds



Photo: NOAA



<https://dogtrekker.com/usearfiles//GreenDogCCJillSiegrist.gif>



Photo: Five Cities Gazette



Photo: T Work



# Causes of Harmful Algal Blooms?

- Blooms are caused by environmental changes that favor growth
- Sometimes related to natural processes (e.g. upwelling)
- Evidence that eutrophication and climate change can increase the extent and magnitude of blooms

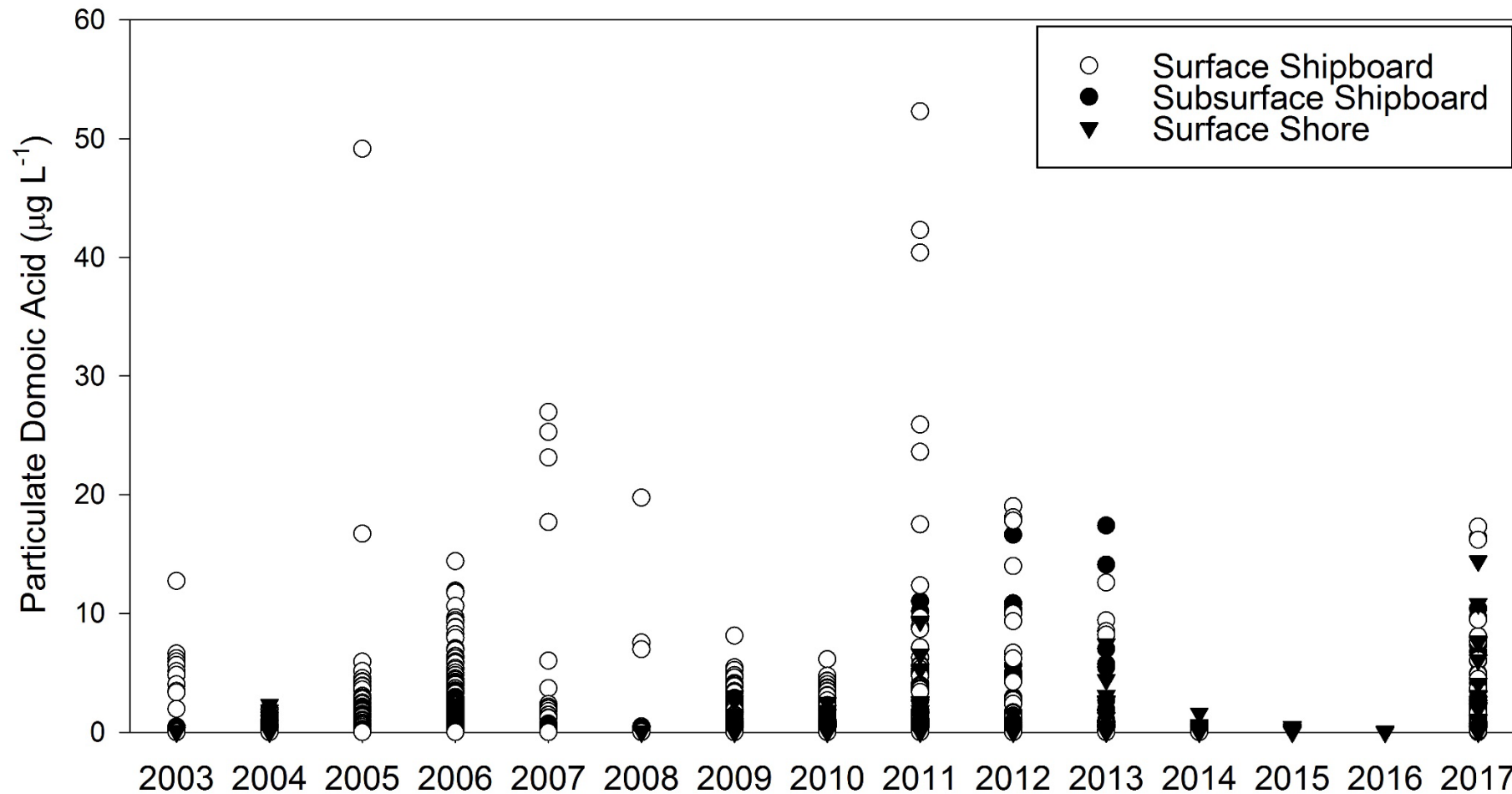


# HABs in the Bight

- Domoic acid (DA) is a potent neurotoxin produced by *Pseudo-nitzschia*
- Causes Amnesic Shellfish Poisoning in exposed humans and wildlife
- Effects mainly linked to food web transfer and exposure via consumption



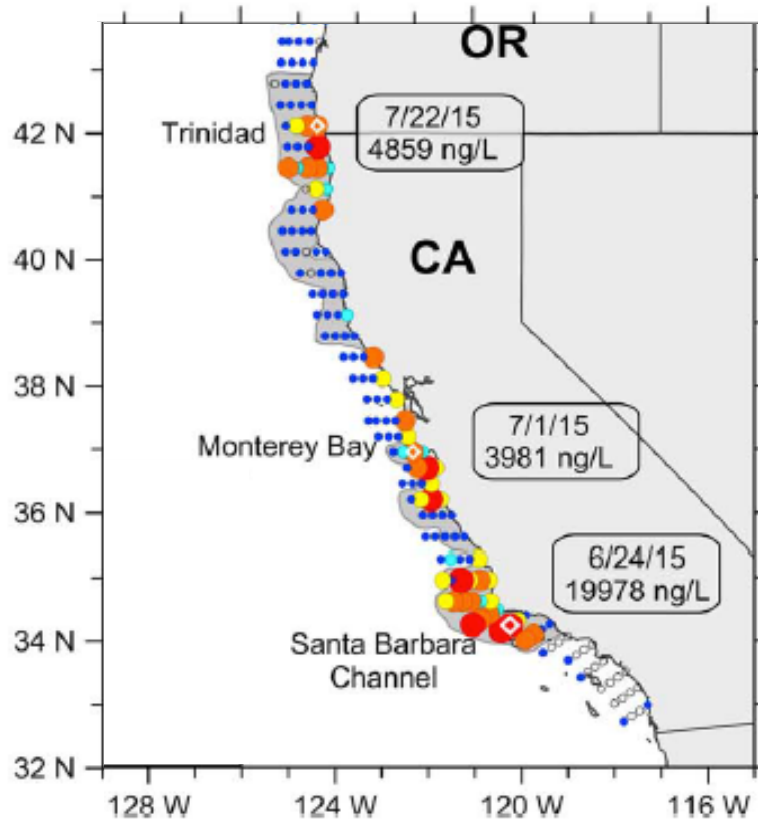
# History of Domoic Acid in the Water Column in the Bight



# Evidence that DA persists in benthic environments & causes problems

Summer 2015 – Domoic Acid

~12 Months Later in May 2016



## Federal Government Declares 2016 Crab Season A 'Disaster'

A new law could provide crab fishermen with \$138 million in relief.

By Neal McNamara (Patch Staff) - January 20, 2017 9:58 am ET | P |

- Long term closure of key benthic fisheries
  - CA economic losses estimated at **\$49 million**

# Bight 2018 HABs Study

Study designed to assess the following questions:

- 1) What is the extent and magnitude of DA in the continental shelf sediments of the Bight?
- 2) Is DA persistent in sediments within the Bight?
- 3) Does DA bioaccumulate in benthic infauna?

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**DA detected in infauna tissues and was persistent over time**

# Bight-wide Sampling Efforts

Areal Extent in sediment:

■ **Summer 2018** (leveraged sed quality)

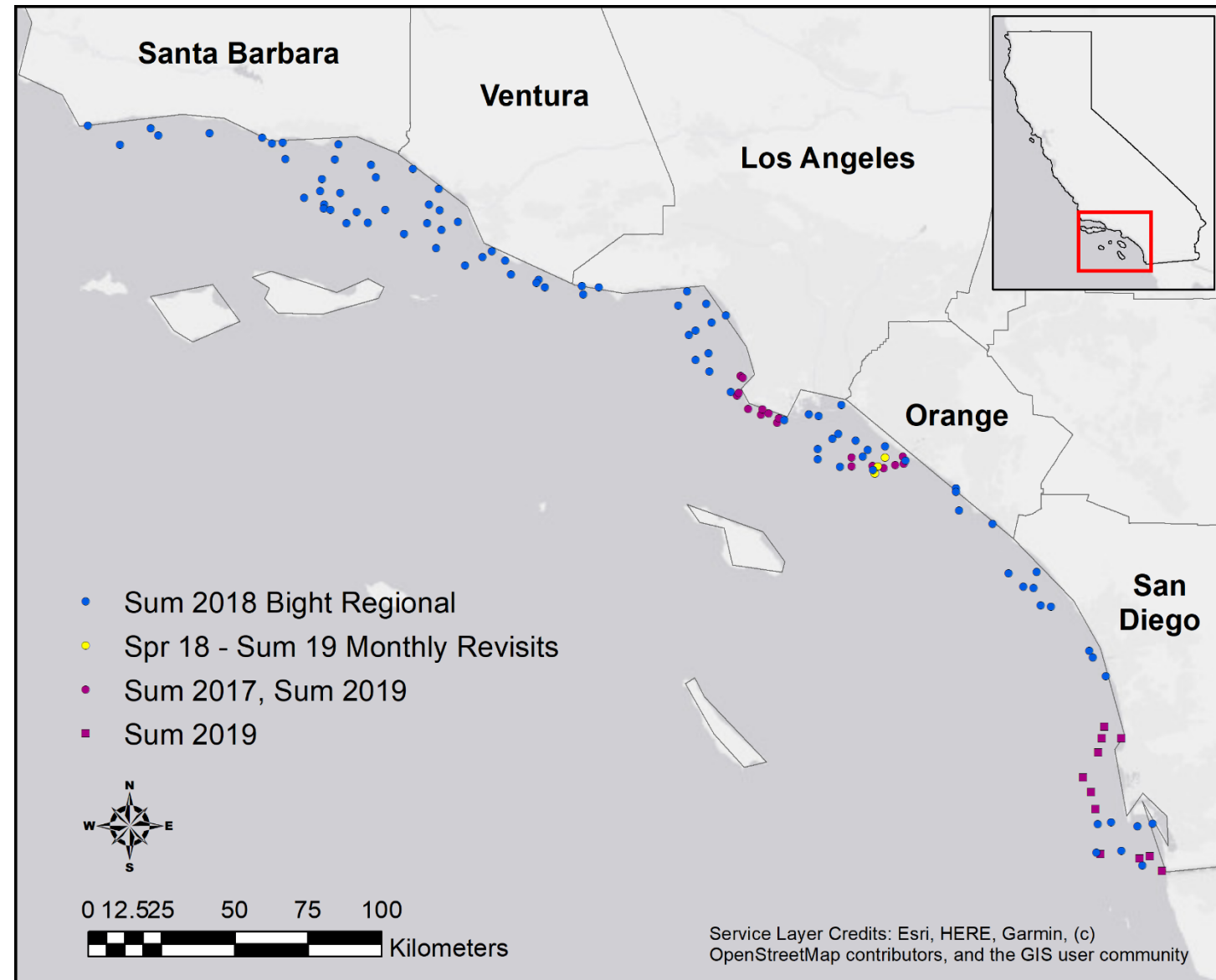
Temporal Trends in sediment:

■ **Summer 2017 & 2019**

■ **Spring 2018 – Summer 2019**

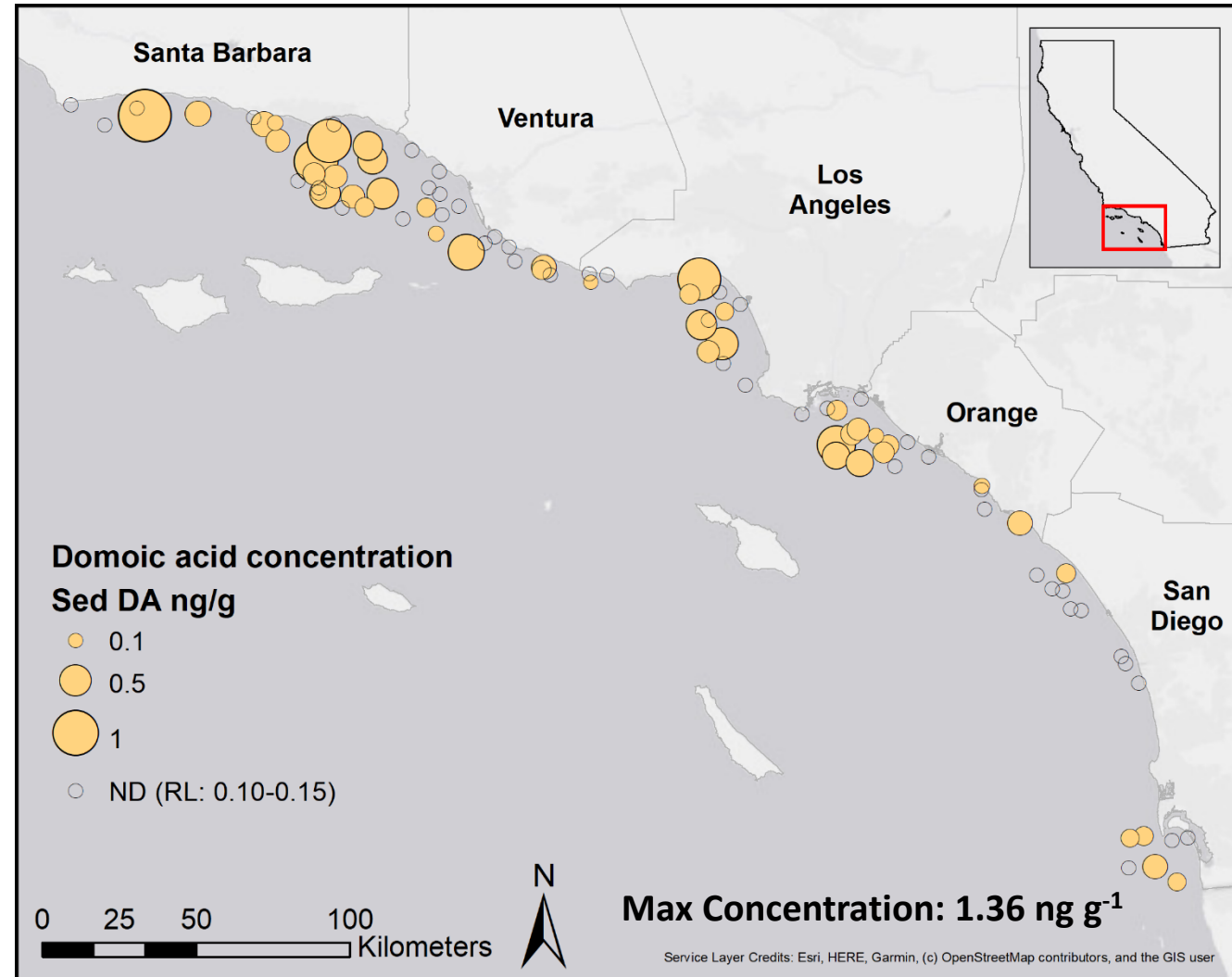
Bioaccumulation

■ **Spring 2018 – Summer 2019**



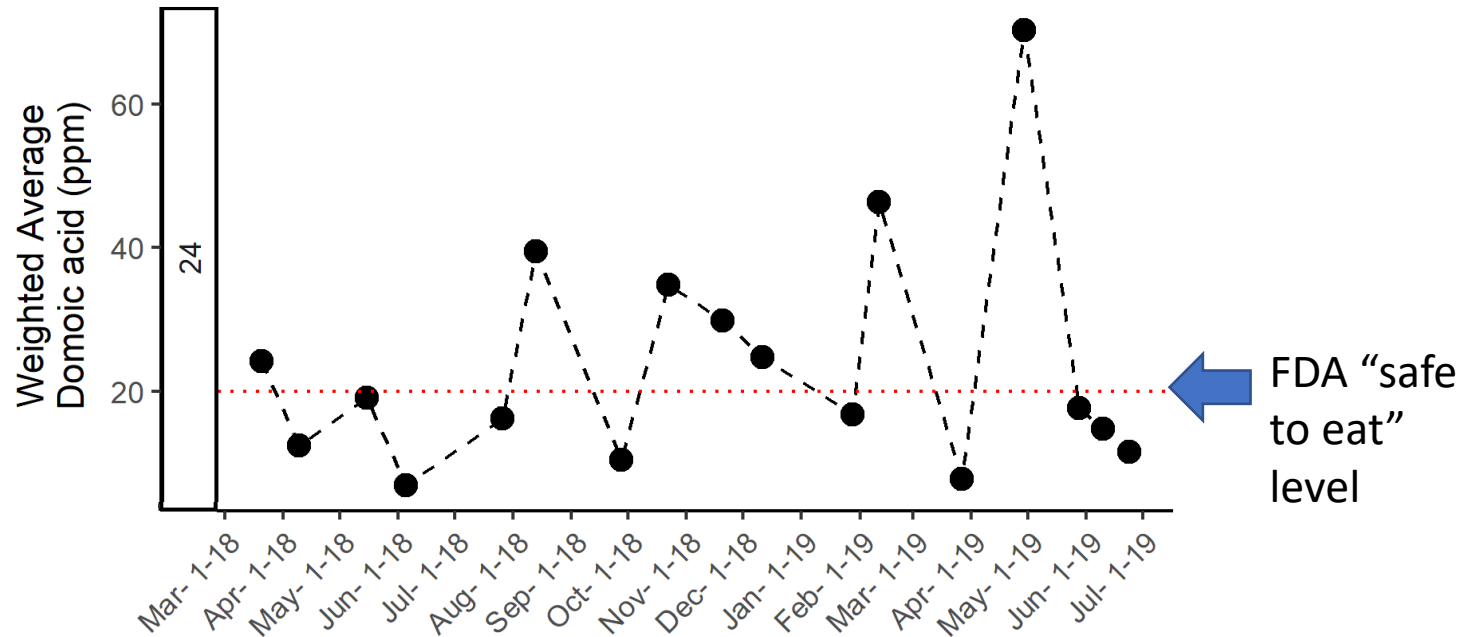
# Spatially Widespread DA in Sediments in 2018

- Detectable DA in summer 2018, ~1 year after last large water column bloom in spring 2017
- DA widespread on shelf sediments (54% of area), most prevalent in mid-shelf strata





# Temporally persistent DA bioaccumulation in benthic infauna...risks to higher trophic levels



- Persistent DA bioaccumulation infauna tissue even without detectable DA in co-located sediments
- Concentrations in some samples above FDA "safe to eat" levels

# Future Directions for Bight 2023

- DA Risk Assessment: Characterize DA bioaccumulation in key species
  - Key benthic infauna species
  - Higher trophic levels
    - Key benthic and/or pelagic fish and inverts
    - Marine mammals and birds
- Examine 'emerging' HAB issues within the Bight
  - Regional emerging algal toxin/cyanotoxin survey using shellfish and/or passive samplers

# Questions?

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