

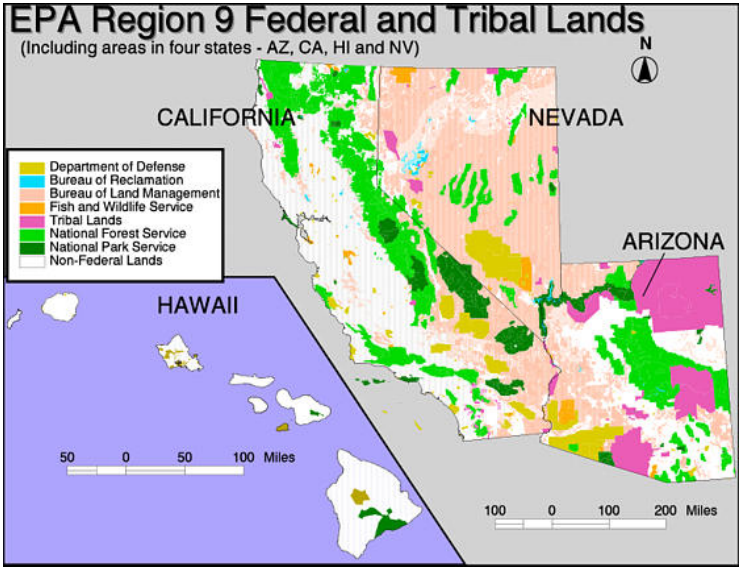
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NOAA Harmful Algal Bloom Program

National and Regional Perspectives

EPA Region 9 HAB Meeting
April 25-27, 2017



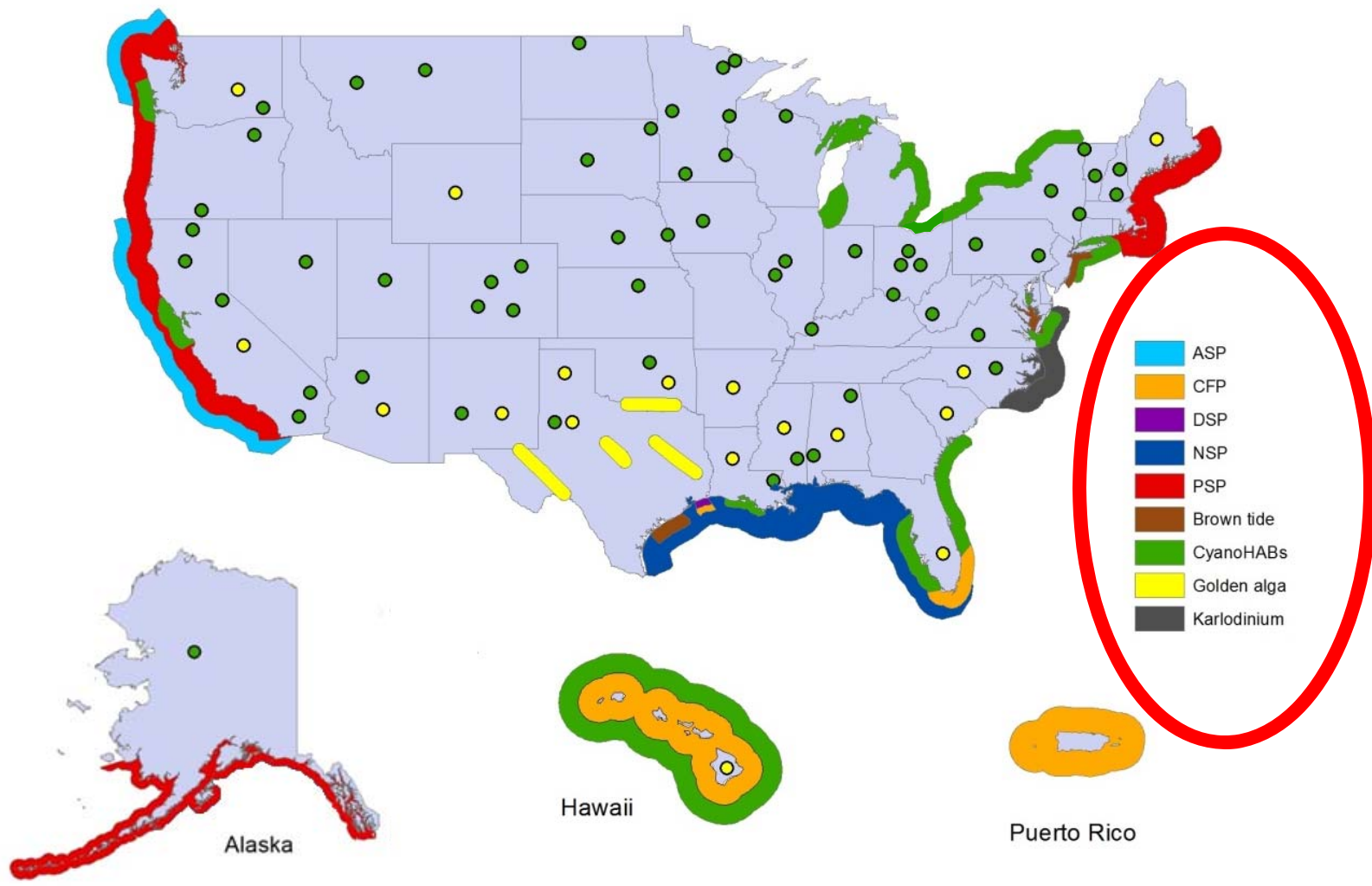
Marc Suddleson

Manager, MERHAB Sponsored Research Program
Co-manager, HAB Rapid Response



Sponsored Coastal Ocean Research
NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE
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Harmful Algal Blooms – A National Problem



Harmful Algal Booms - Impacts



Name	Human & Animal* Poisoning	Fish Kills	Water Discoloration
Amnesic Shellfish Poisoning (ASP)	Yes**	No	No
Ciguatera Fish Poisoning (CFP)	Yes	No	No
Diarrhetic Shellfish Poisoning (DSP)	Yes	No	No
Neurotoxic Shellfish Poisoning (NSP)	Yes**	Yes	Yes
Paralytic Shellfish Poisoning (PSP)	Yes**	Yes	Yes
Brown Tide	No	Yes	Yes
CyanoHABs	Yes**	Yes	Yes
Golden Alga	No	Yes	Yes
<i>Karlodinium</i>	No	Yes	Yes

*Mammals, birds, turtles, often protected species

**Can cause human or animal deaths



Harmful Algal Booms - Impacts



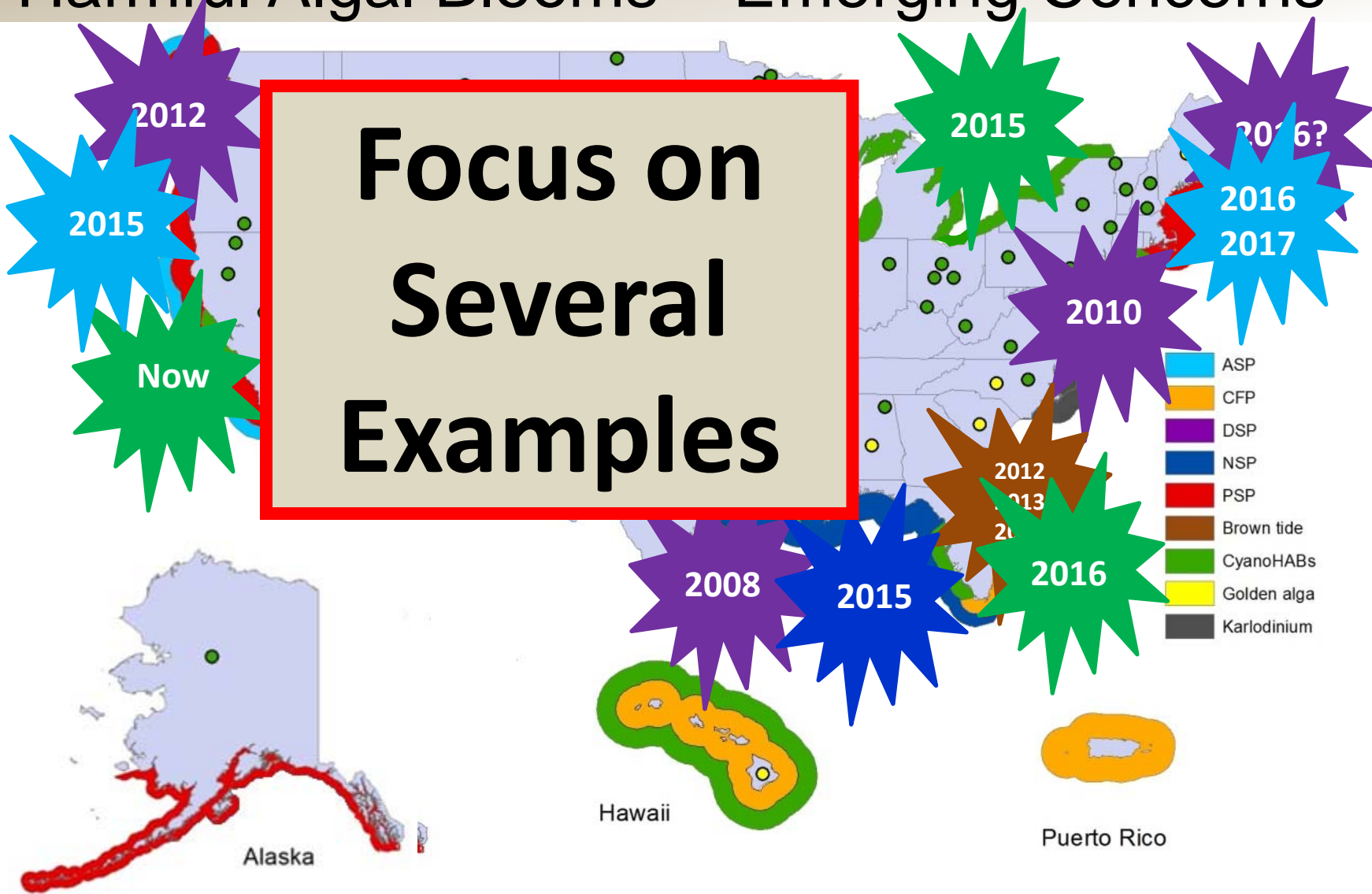
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Economic Impact ~\$100M/Yr

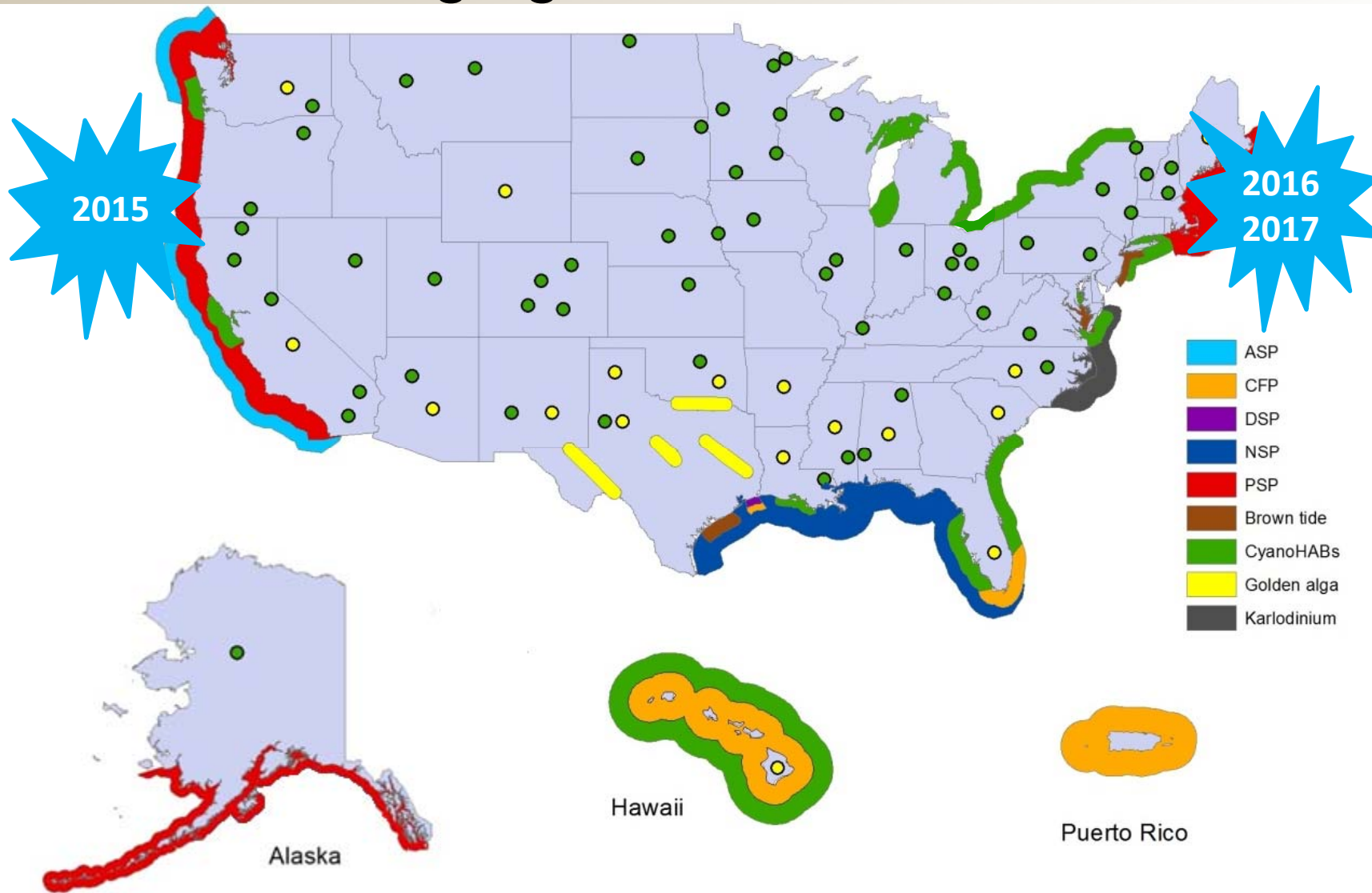


Harmful Algal Blooms – Emerging Concerns

**Focus on
Several
Examples**



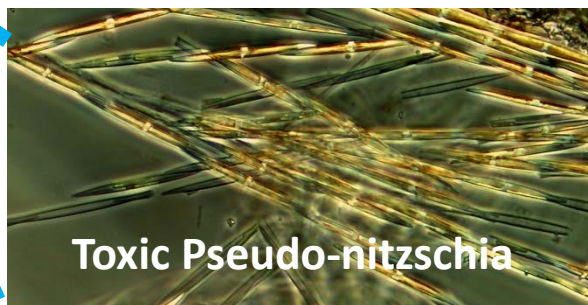
HABs – Emerging Concerns - ASP



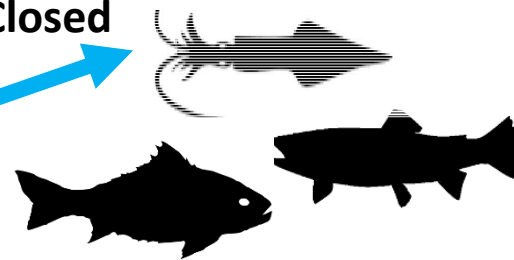
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2015 West Coast ASP HAB Event Impacts



Very Toxic
Sardines &
Anchovies
Fishery Closed

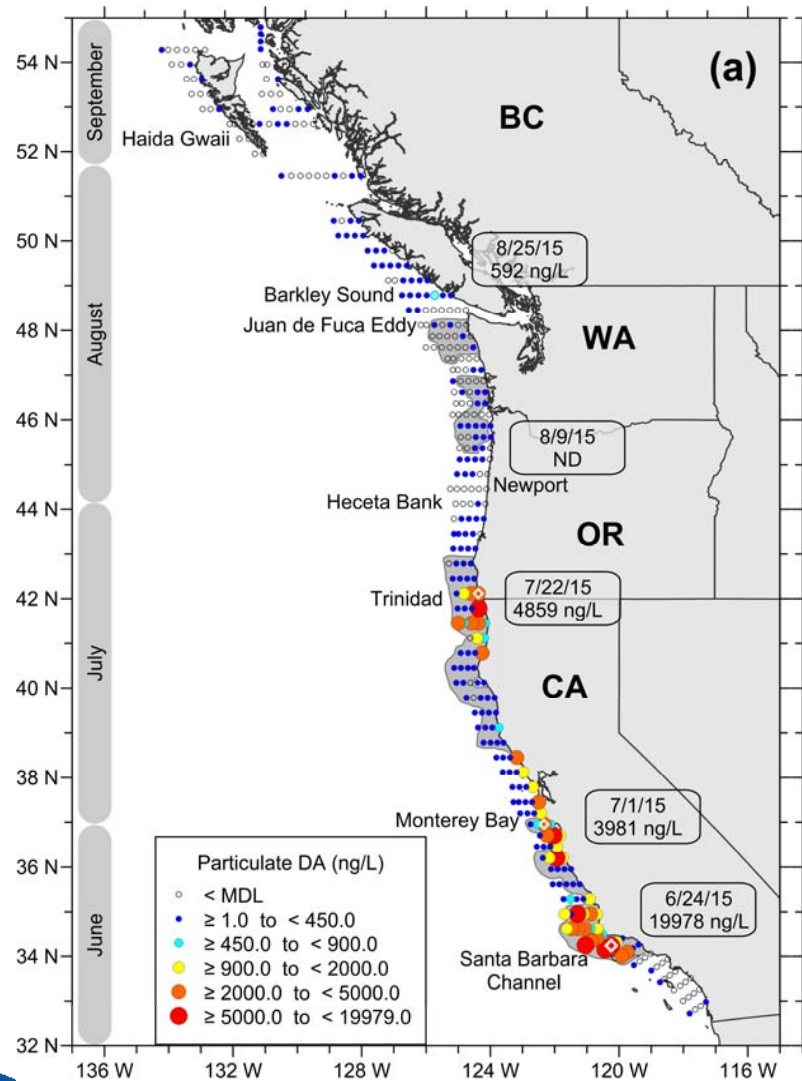


Other Fish Slightly Toxic

Linked to Warm Blob



NOAA Response - 2015 West Coast ASP event



• Prior to bloom

- Develop routine HAB monitoring

- HAB Forecast: WA, OR, CA

• During bloom

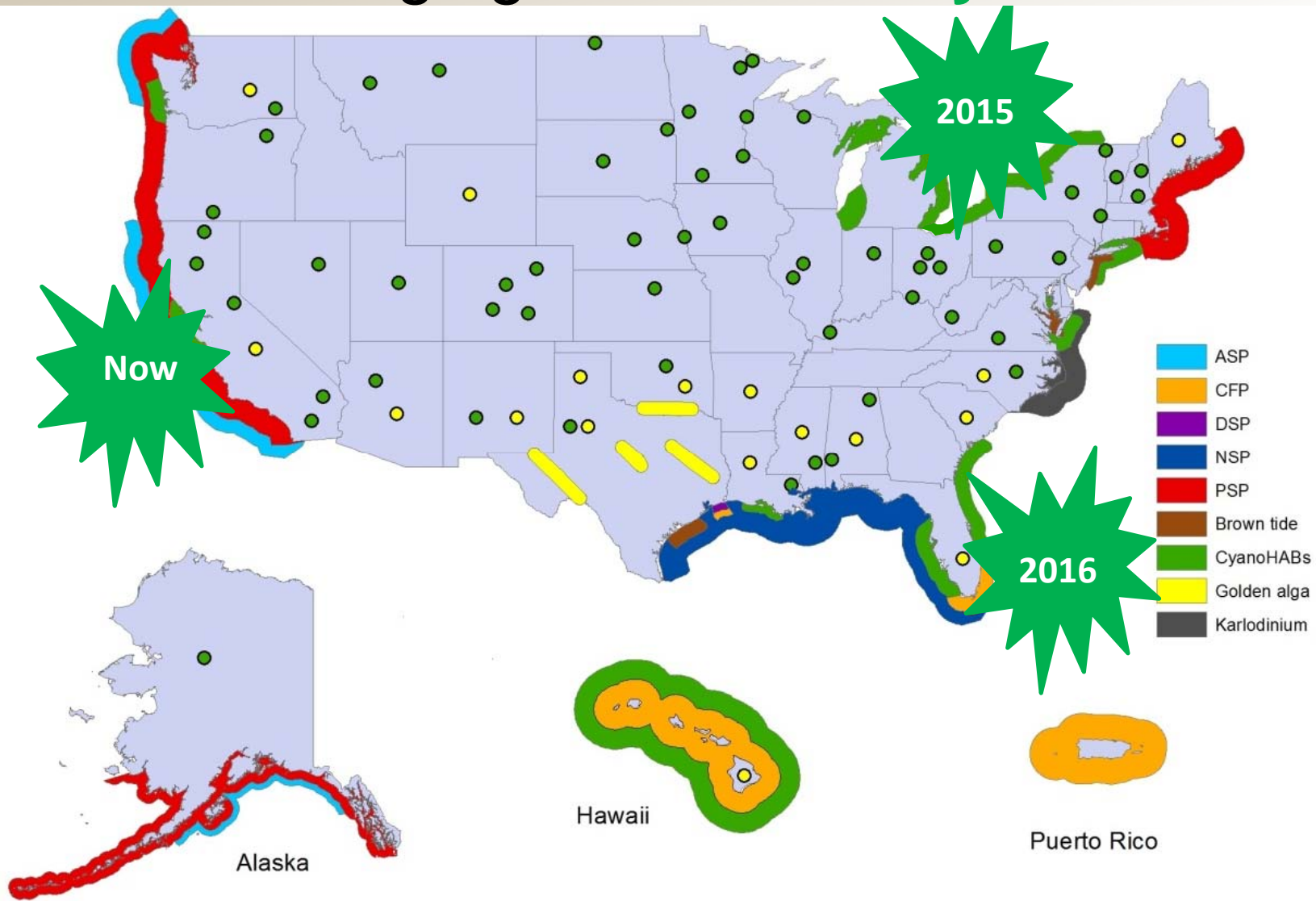
- Map bloom & impacts

- Determine cause

- Assist states & tribes



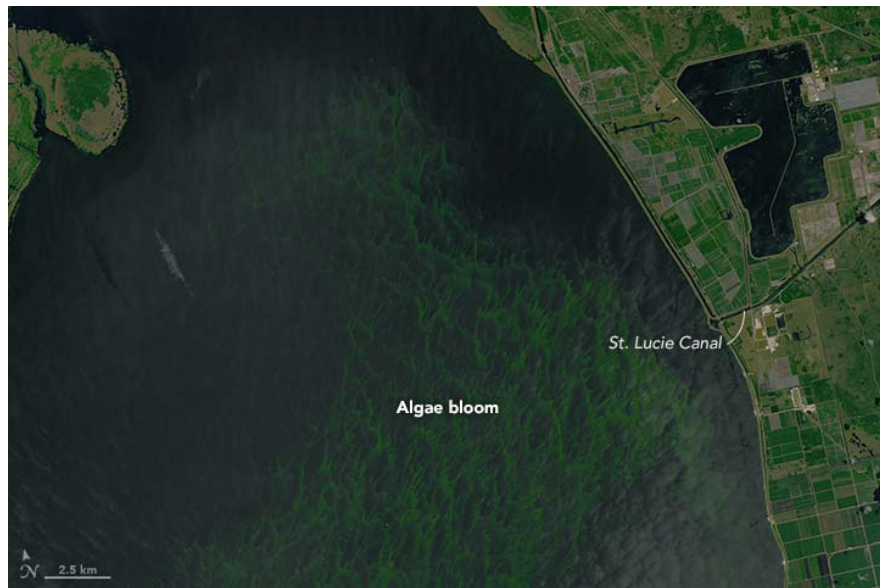
HABs – Emerging Concerns - CyanoHABs



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2016 **CyanoHABs** in St. Lucie Estuary, FL



NOAA Response

- **Assist local counties**
- **Improve remote sensing**
- **Research to understand bloom & toxin production**



CyanoHAB Toxins in Many U.S. Estuaries



Sea Otter
California's CyanoHAB
Sentinel

Emerging Issue

How widespread?

Is it a human health threat?

No guidance for toxins in shellfish!

NOAA Response

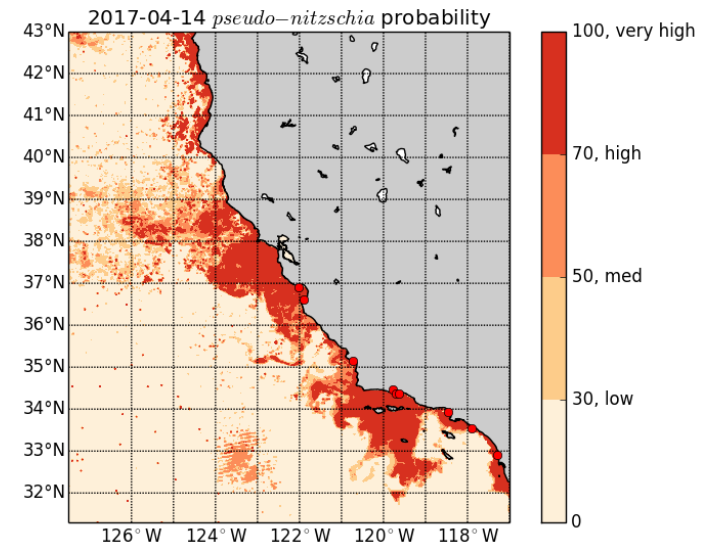
- Assess magnitude of problem in California estuaries
- Fund state, tribes, feds (USGS and EPA) partnership
- Adapt new monitoring tools (SPATT)



NOAA HAB Response – National Mandate

Harmful Algal Bloom and Hypoxia Research & Control Act of 2014

- Improve interagency coordination
- **Conduct research**
 - Understand causes & impacts
 - Develop better monitoring, prediction and response
 - Understand roles of climate, nutrients
 - Toxins in foods and water
 - Methods for HAB suppression, control
- **Event Response**
- Reports to Congress

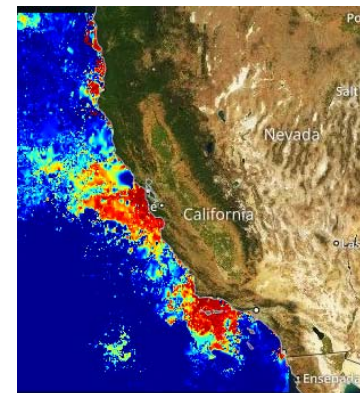


NOAA HAB Accomplishments – West Coast

- *California, OR, & WA - Pseudo-nitzschia and ASP*
 - Identified Hot Spots in Central and S. California
 - Determine how sources of nutrients foster HABs
 - Developed predictive models for HAB forecasts
 - Making models operational in NOAA, like weather forecasts

- Created HAB monitoring network (CalHABMAP)
- Deploy real-time HAB sensors—measure cells & toxins in real time

- *Hawaii*
 - Understand how sources of nutrients foster macro algae HABs
 - Assess ciguatera threat in native NWHI fisheries



Improving Future Regional HAB Responses?

Generate Info to Advance Research, Method Development, and Risk Assessments, Before HABs Occur

- Support state & tribal agencies
 - Work with ISSC to approve new toxin methods
 - Equipment and training to adopt new methods
- Support and expand non-traditional monitoring networks
 - Citizen and Industry monitoring
 - State & regional networks (e.g. CalHABMAP)
- Foster regional collaborations
 - Share toxin analysis capabilities
 - Promote research and response across region



*West Coast
Pseudo-nitzschia
ASP*



*U.S. HAB
ID Training
Course*



Implementing a statewide HAB network and forecasting system for California

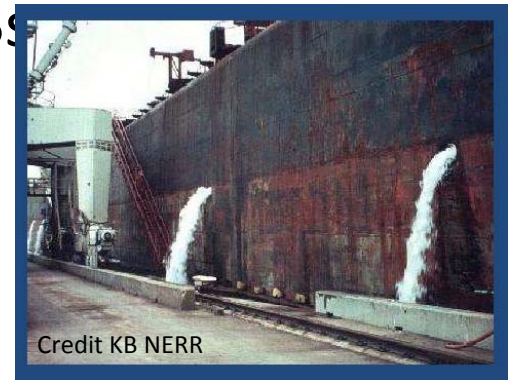


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How To Improve Response?

- Urge state participation in CDC One Health Harmful Algal Bloom System (OHHABS)
 - 1st national system to report HABs and associated human and animal health impacts
 - Voluntary
 - Track severity of problem to support efforts to prevent blooms and illnesses
- Reduce human activities that increase HABs
 - Reduce nutrient inputs
 - Prevent warming of water bodies
 - Be careful of hydrographic changes
 - Prevent HABs as invasive species

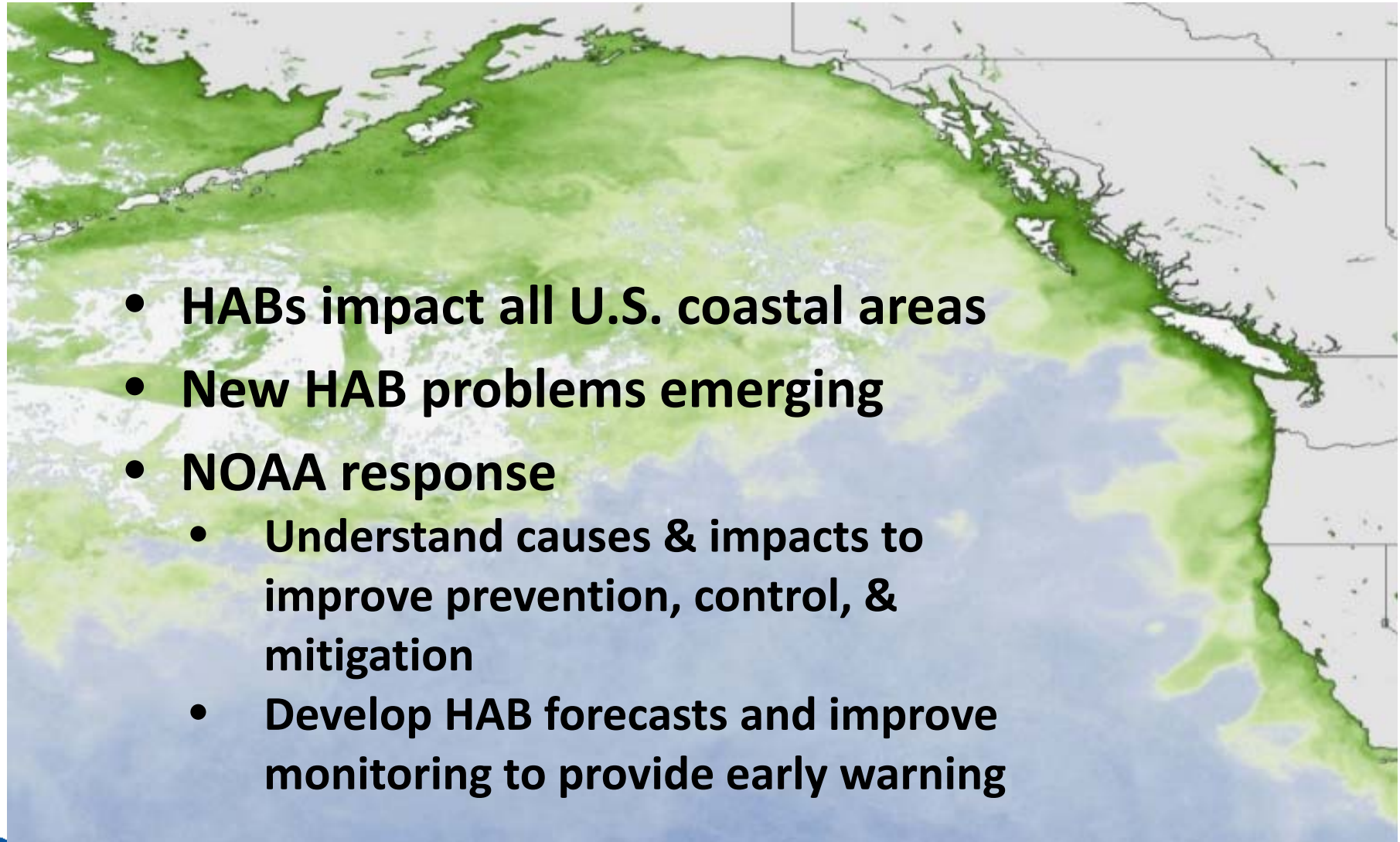


What can HAB impacted stakeholders do?

- Rally against cuts to state programs – common in years with no HABs.
- Encourage NOAA and Regional Associations (i.e., CeNCOOS) to add HAB sensors and display data in useful formats for managers and industry.
- Support NOAA Operational HAB Forecasting System to provide early warning for HABs useful to industry
- Educate federal aquaculture programs about HAB-related disruptions to the industry.
- Engage in monitoring networks and regional collaborations (e.g. CalHABMAP)



Conclusions



- **HABs impact all U.S. coastal areas**
- **New HAB problems emerging**
- **NOAA response**
 - **Understand causes & impacts to improve prevention, control, & mitigation**
 - **Develop HAB forecasts and improve monitoring to provide early warning**



For More Information

- NOAA HAB Programs
 - Research <https://coastalscience.noaa.gov/research/habs/>
 - HAB forecasting: <http://tidesandcurrents.noaa.gov/hab/overview.html>
 - Event Response <https://coastalscience.noaa.gov/research/habs/response/default>
- HABHRCA <https://coastalscience.noaa.gov/research/habs/habhrca>
- HAB National Office: <http://www.whoi.edu/redtide/>
- Northeast PSP: <http://www.whoi.edu/northeastpsp/>
- Interstate Shellfish Sanitation Commission: <http://www.issc.org/>
- IOOS Regional Associations: <http://www.ioosassociation.org/>
- NERACOOS: <http://neracoos.org/>
- US HAB Training at Bigelow <https://ncma.bigelow.org/training-courses>

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