SURVEYS OF NON-INDIGENOUS SPECIES IN THE COASTAL WATERS OF CALIFORNIA

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Main Points

1) Purpose of our program
2) Most recent surveys and results
3) Most invaded areas of the California Coast
4) Most common vectors
5) Accessing our data

Purpose of Marine Invasive Species Program

Ballast Water Act of 1999:

Directed DFG to Conduct Biological Surveys to Identify Non-indigenous Species (NIS)

Main Questions:

1) To what extent has the California coast been invaded?

2) Which NIS have arrived in California via Ballast Water?

Marine Invasive Species Program

To answer these questions:

- **Initiated several baseline field surveys of ports and bays along CA Coast in 2000/2001.**
- **Submitted report to legislature detailing results in 2002.**
- **http://www.dfg.ca.gov/ospr**

More Legislation…

1) Removed sunset date

2) Expanded the scope of our study

3) Requires a Legislative report January 1st 2009 and updates every 3 years.

Four Categories of Taxa

Recent Surveys

1) Bays and Harbor Survey (2006)

2) Outer Coast Survey (2005 & 2008)

3) SF Bay Survey (2005)

Bays and Harbors Survey

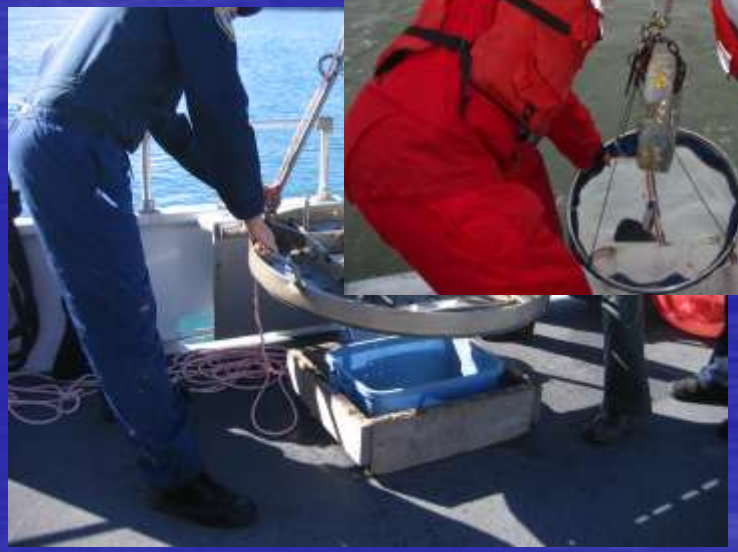
Sampled Major Ports and Small Harbors


BAYS AND HARBORS
SAMPLING SITES
Major Ports
Smaller Bays
Humboldt Bay
Port of Sacramento
Tomales Bay
Bodega Bay
Port of Stockton
Elkhorn Slough
Monterey Bay
Morro Bay
Santa Barbara Harbor
Port Hueneme
Ventura Harbor
Marina del Rey
LA-LB Harbor
Newport Harbor
Dana Point
Avalon Harbor
Oceanside Harbor
Mission Bay
San Diego Harbor
0 30 60 120 180
Miles

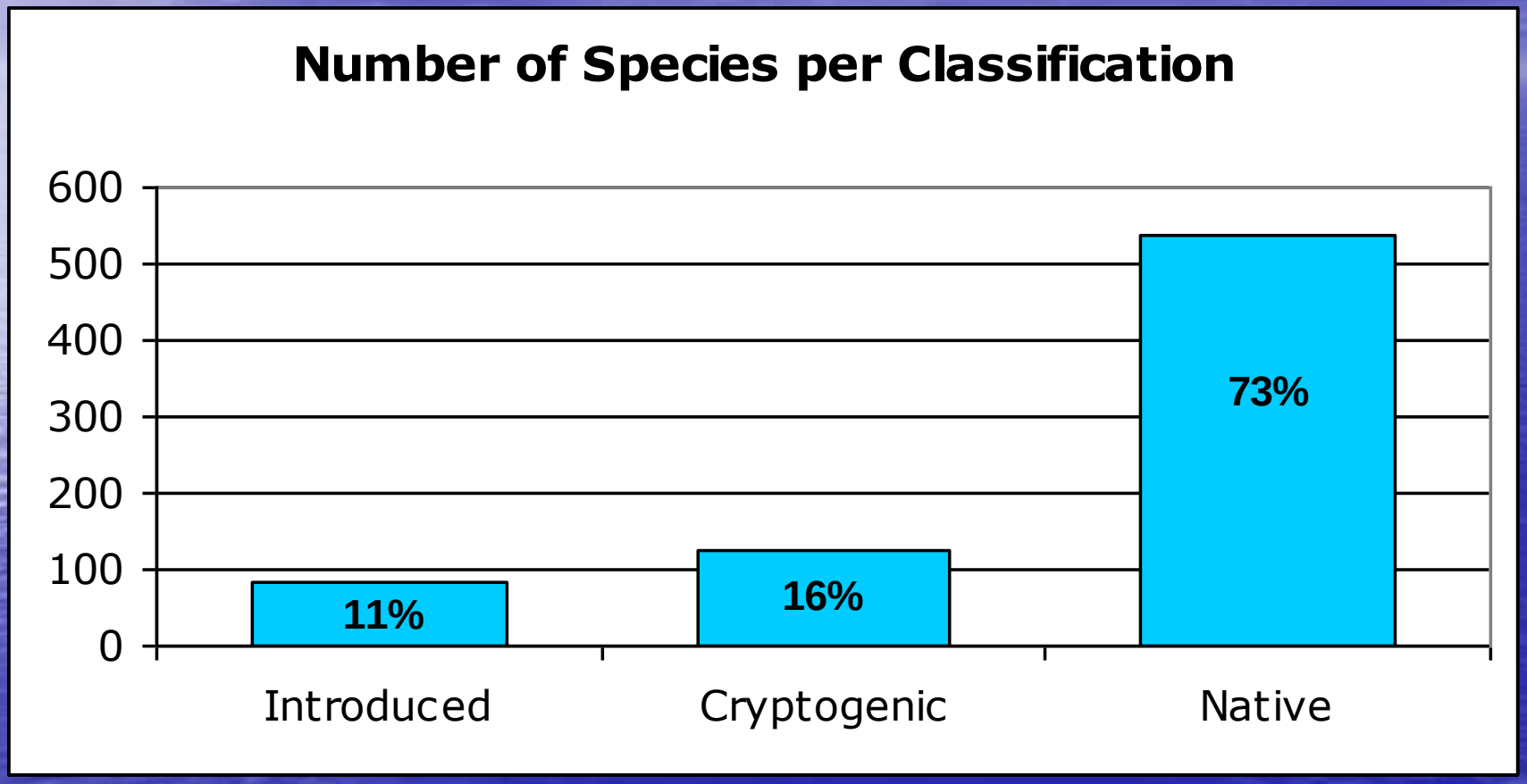
Bays and Harbors Survey

- Three Main Habitats

  1) Rocky Epifaunal
  2) Sandy Infaunal
  3) Water Column



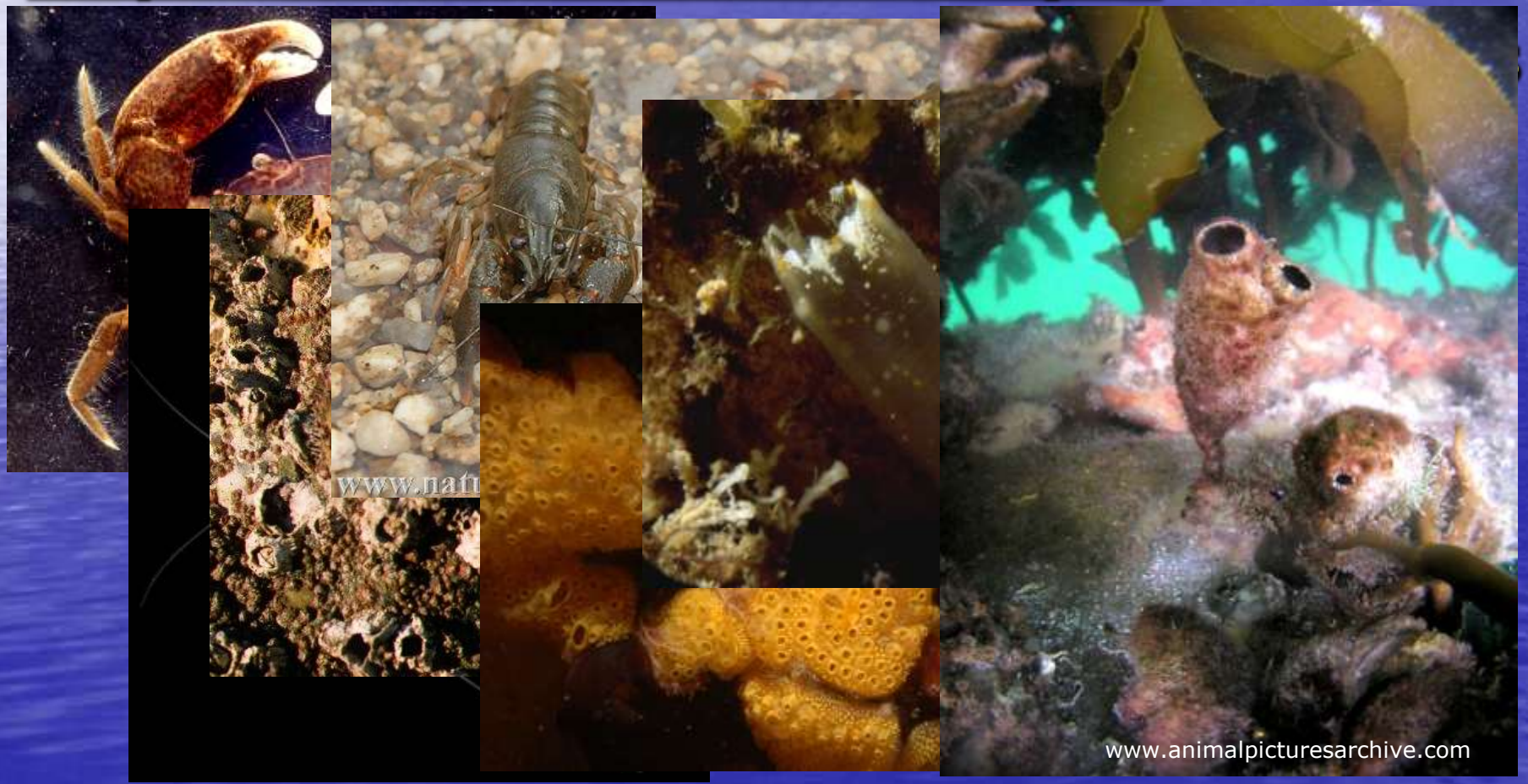
Bays and Harbors Survey



402 Unresolved Species: not identified to species level

Bays and Harbors Survey

Top Two Introduced Phyla:



Outer Coast Survey

- Design was adapted from Bays and Harbor survey
- 22 Sites Sampled

- <u>Focused on:</u>
  - Whole community structures
  - Areas around prominent coastal headlands
  - Areas impacted by ballast water

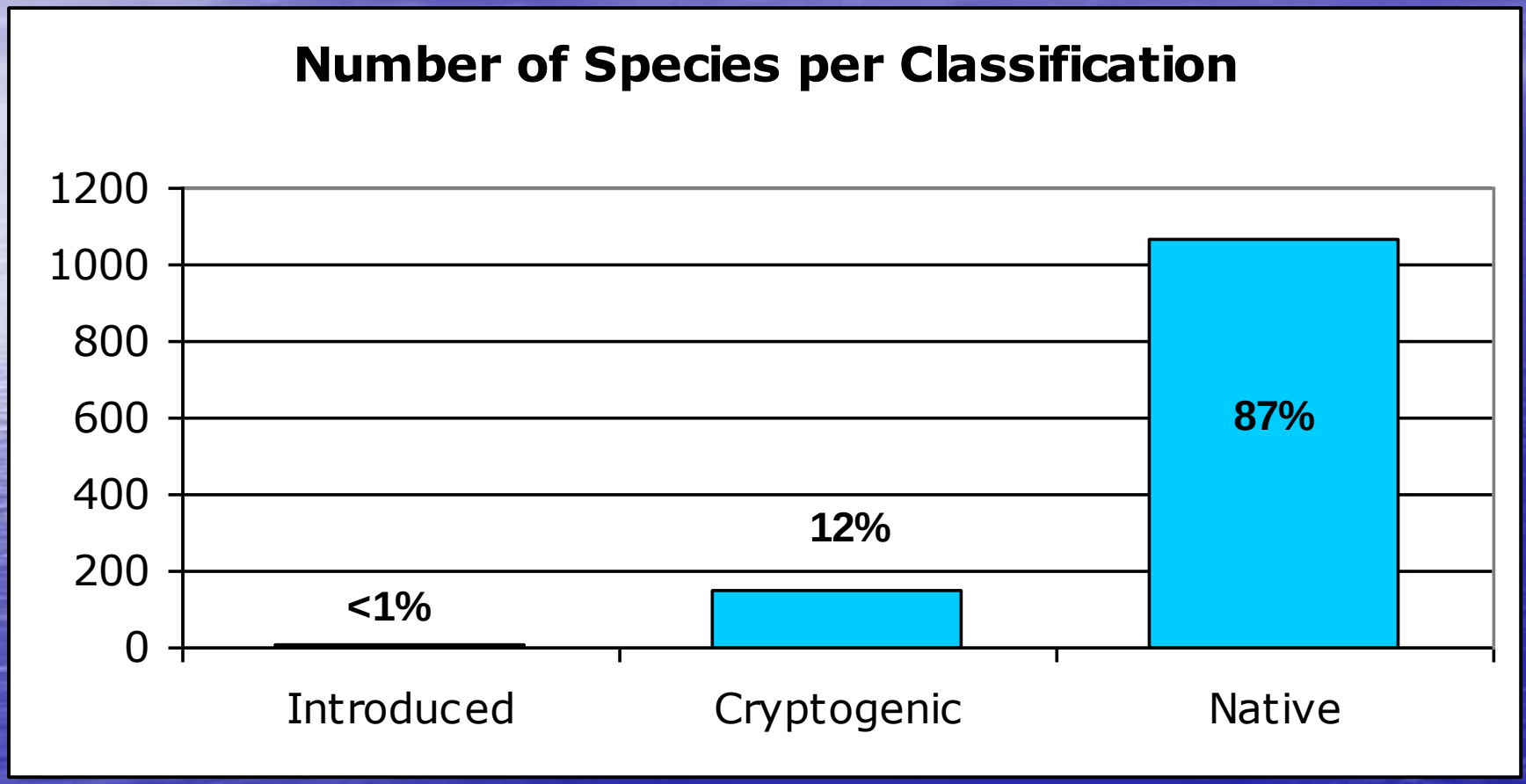
- Initial Sampling Completed in 2005. Follow-up Sampling was Completed in 2008


OUTER COAST
SAMPLING SITES
Point Saint George
Cape Mendocino
Shelter Cove
Point Arena
Bodega
Point Reyes
Fitzgerald
Pigeon Point
Ano Nuevo
Point Sur
Point Sierra Nevada
Diablo Canyon
Purisima Point
Point Conception
Arroyo Hondo
Carpinteria
Point Dume
Point Fermin
Pin Rock
Dana Point
Point La Jolla
Point Loma
0 30 60 120 180
Miles

Outer Coast Survey

- **4 Main Habitats**
  1) Rocky Intertidal
  2) Sandy Intertidal
  3) Rocky Subtidal
  4) Sandy Subtidal

Outer Coast Survey



650 Unresolved Species: not identified to species level

Outer Coast Survey

Top Two Introduces Phyla:

San Francisco Bay Survey

- One of the most invaded ecosystems in the world?

- Field and laboratory studies complimented by literature and data reviews.

San Francisco Bay Survey

4 Sub-regions:

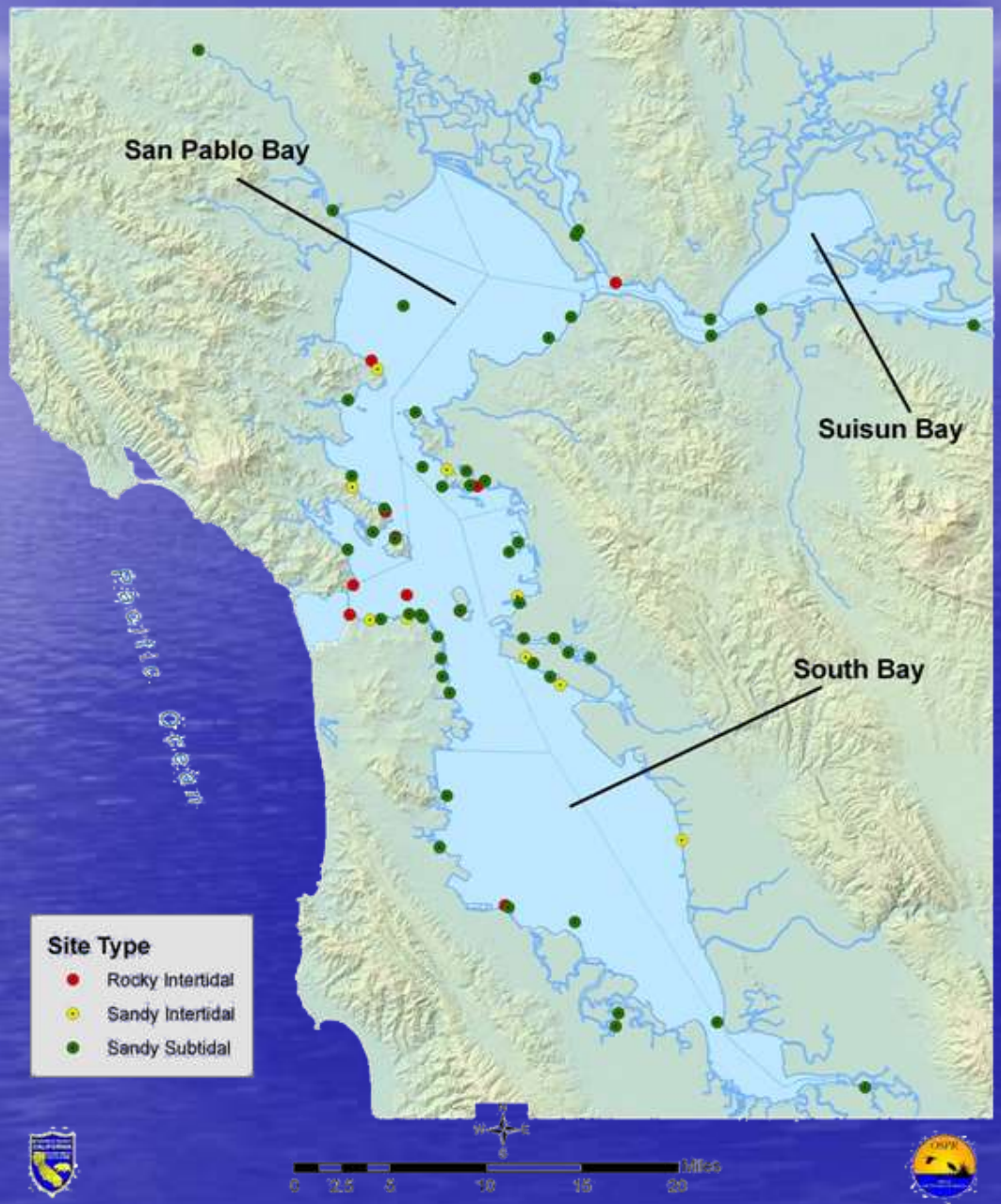
1) Central Bay

2) San Pablo Bay

3) Suisun Bay

4) South Bay

San Francisco Bay Sampling Sites

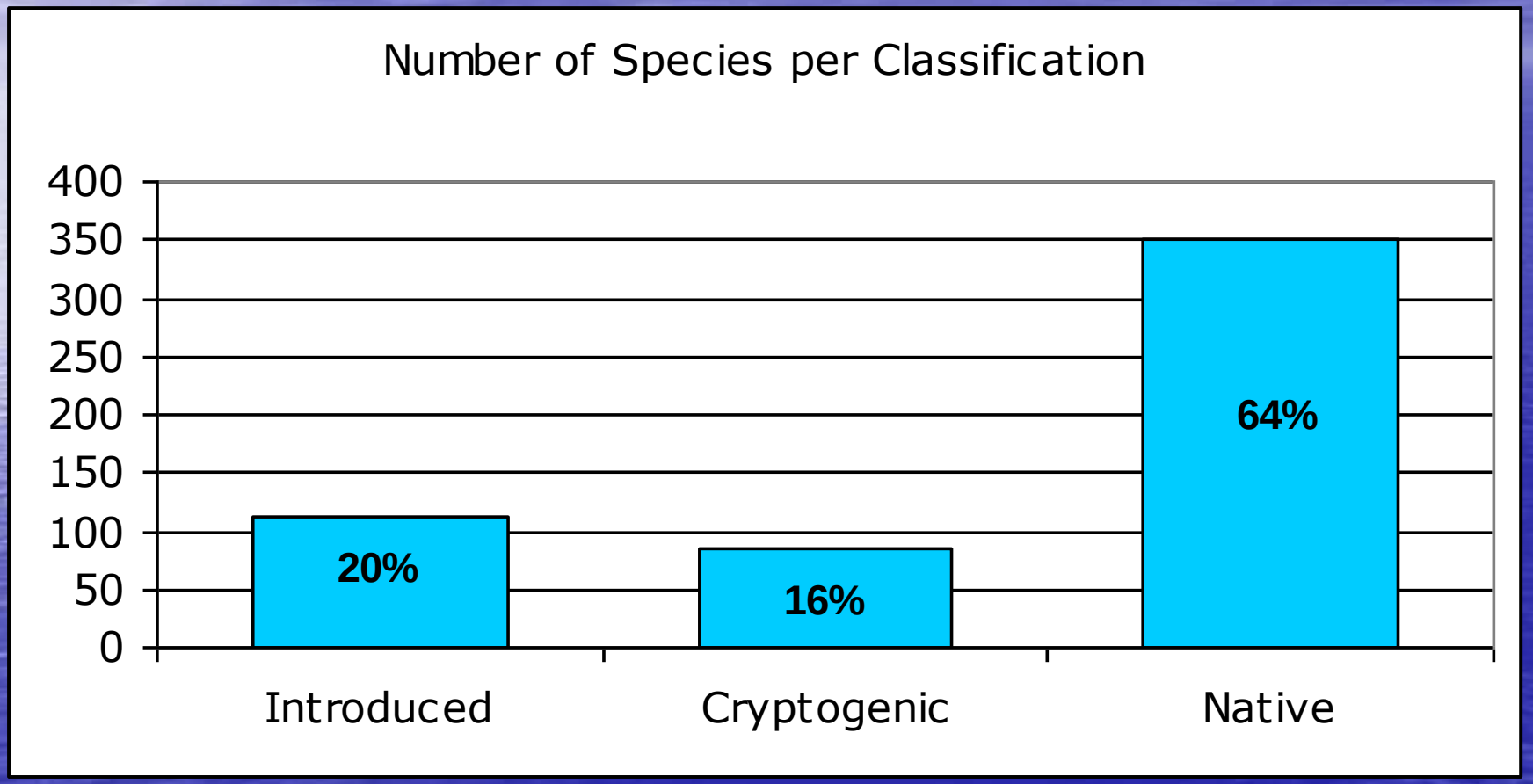


San Francisco Bay Survey

Three Main Habitats

1) Epifaunal Intertidal
2) Sandy Intertidal
3) Infaunal Subtidal

San Francisco Bay Survey

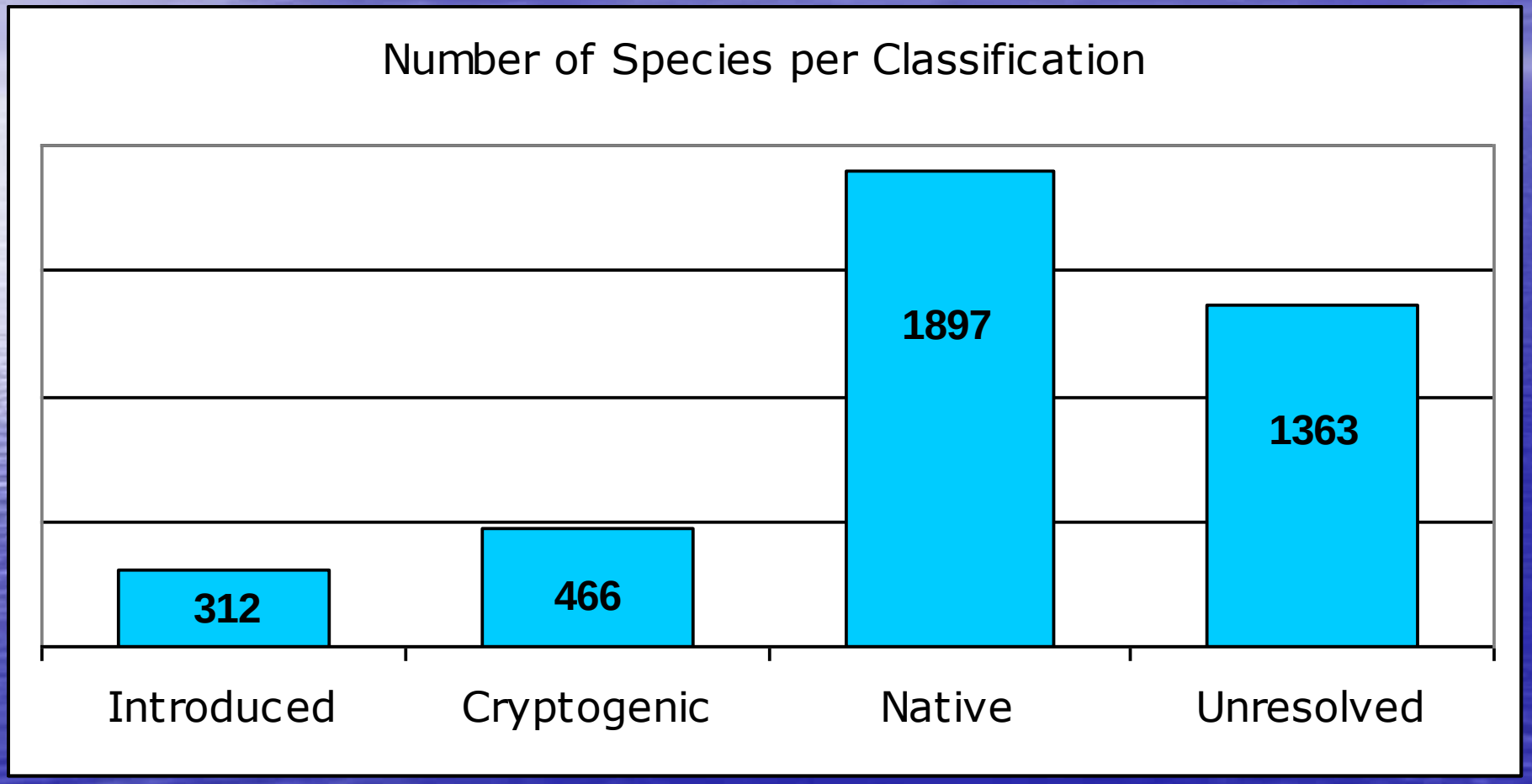


293 Unresolved Species: not identified to species level

San Francisco Bay Survey

Top Two Introduced Phyla:

Statewide Results



Vector Study

What is a Vector?

A means to transport aquatic invasive species from their region of origin to a non-native region

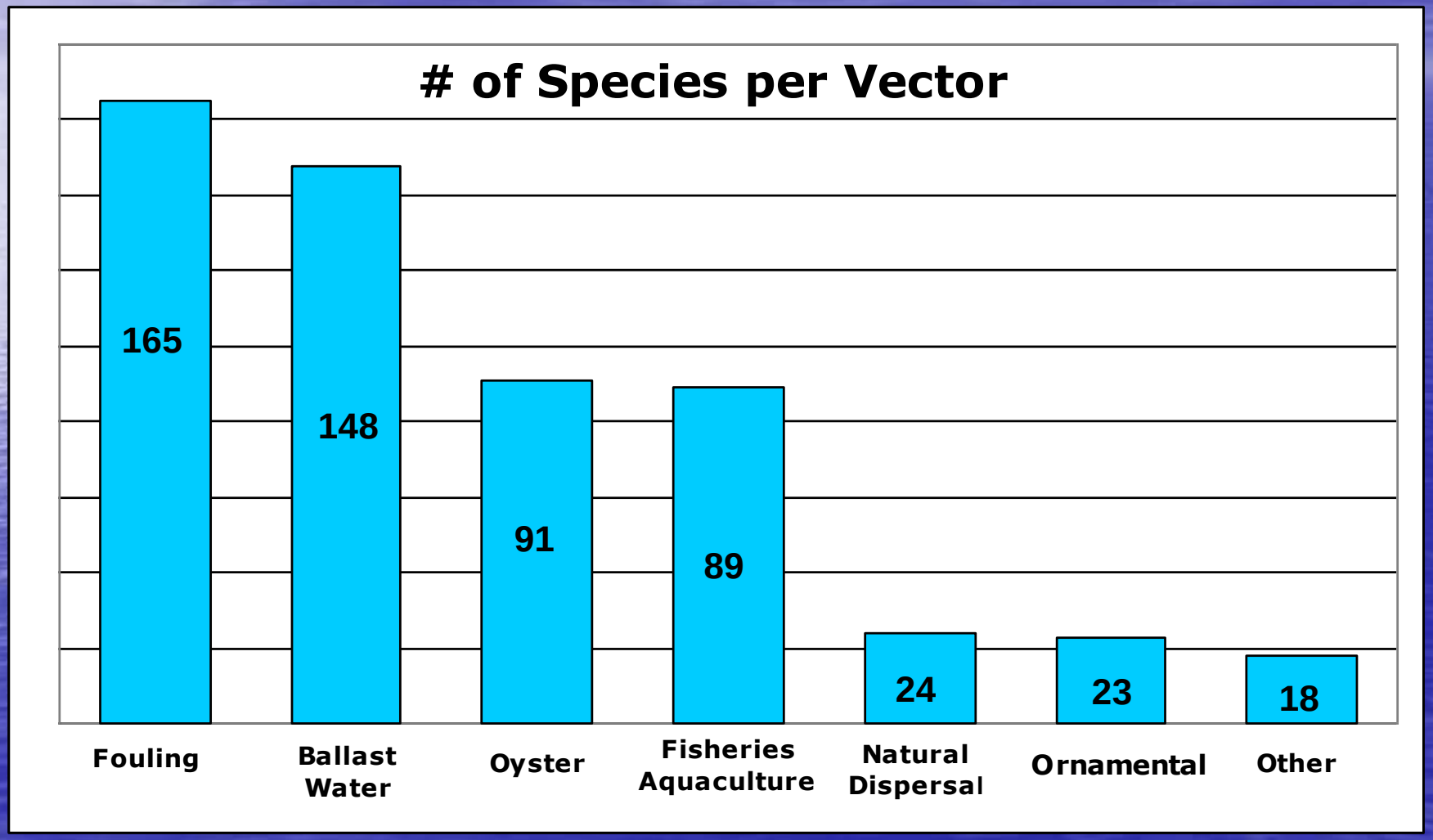
Vector Study

Types of Vectors:

Vector Study

- Introduced species were assigned a probable vector
- Vectors were summed
- Statewide totals were calculated
- Many species were assigned multiple vectors

Vector Study



Upcoming Projects

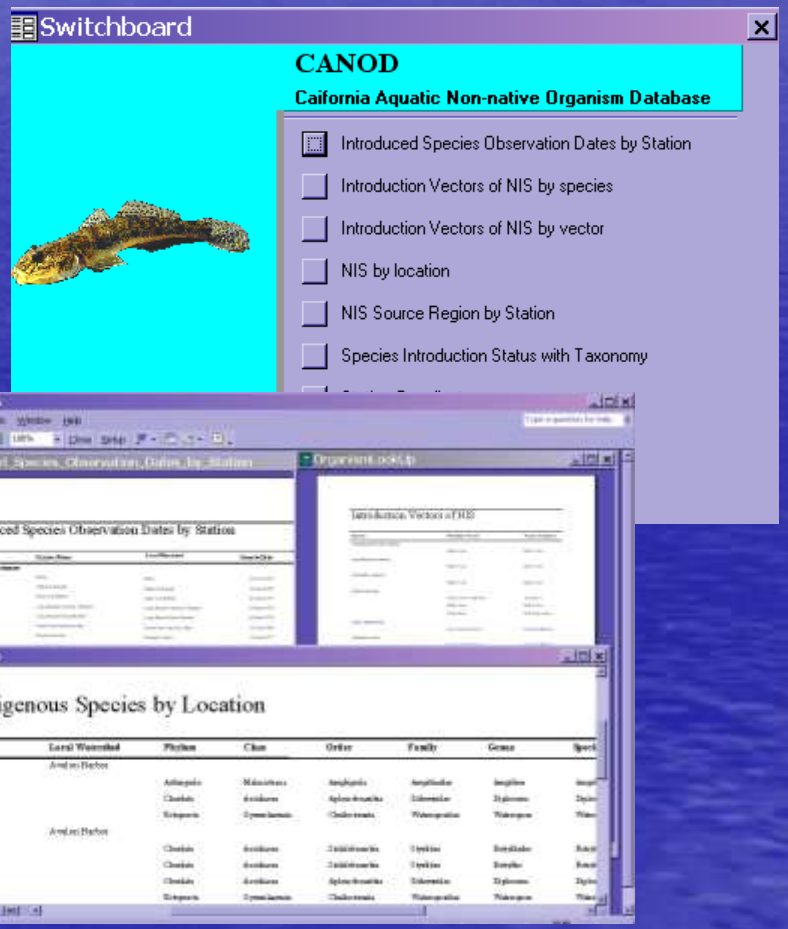
1) Legislative Report due January 2009

2) Create a long-term monitoring plan

- Is the rate of new introductions increasing?

Access to MISP Data

California Aquatic Non-native Organism Database (CANOD)



Includes:

- Name of species
- Location observed
- Date of introduction
- Vectors of introduction
- Native region

WWW.DFG.CA.GOV/OSPR
Link to "Invasive Species"

Summary

1) 312 introduced coastal aquatic species statewide;

2) Most invaded area of CA is SF Bay, while Outer Coast is the least invaded area;

3) Most common vector is fouling closely followed by ballast water;

4) Our database, CANOD, can be found at:

WWW.DFG.CA.GOV/OSPR
Link to "Invasive Species"

QUESTIONS?

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