

# Status Update: Implementation of Strategy for a Healthy San Diego Bay

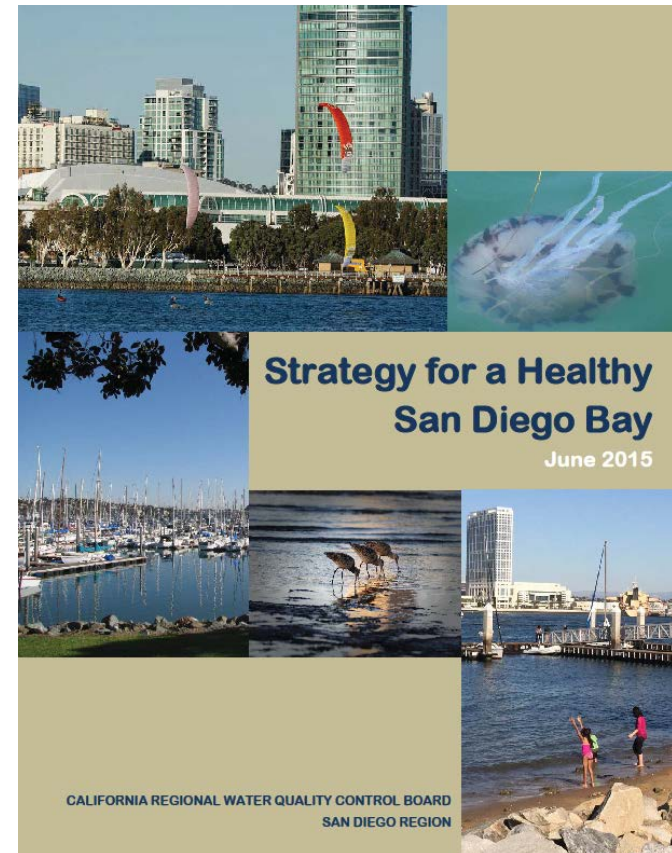
Item 9

August 9, 2017



# The Strategy's seven iterative steps to ensure our Bay work is aligned with the most important goals and highest priorities:

1. Identify key beneficial uses and key areas;
2. Conduct assessments;
3. Set priorities;
4. Set measurable goals;
5. Realign work;
6. Track progress; and
7. Periodically reevaluate priorities.



# Key Beneficial Uses

Key beneficial uses are categories of water quality-dependent uses that are most critical to consider.

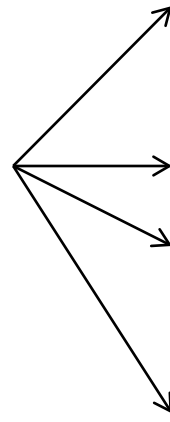
Key beneficial uses of the Bay are:

1. Water recreation; contact and non-contact
2. Human consumption of fish and shellfish; and
3. Habitats and ecosystems.



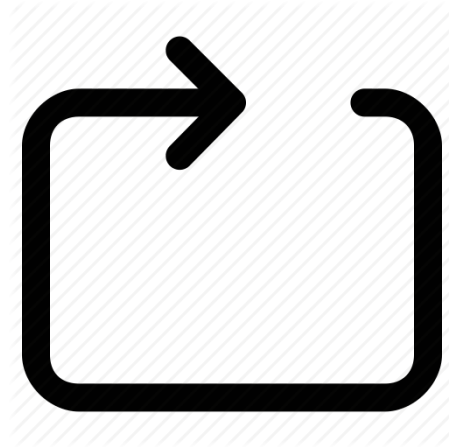
# Strategy Steps

- ✓ 1. Identify key beneficial uses & key areas;
- 2. Conduct assessments;
- 3. Set priorities;
- 4. Set goals;
- 5. Realign work;
- 6. Track progress; and
- 7. Reevaluate priorities.

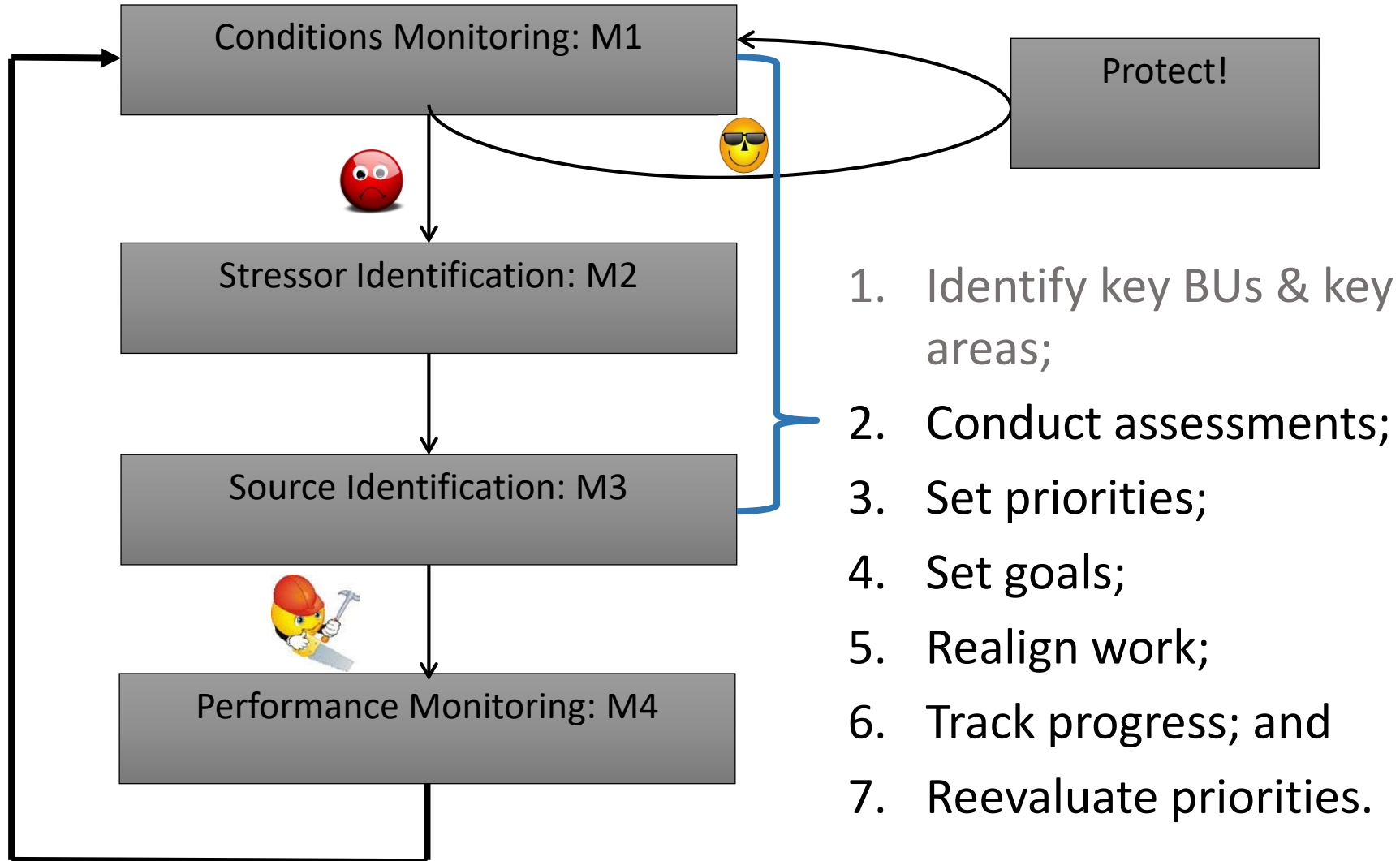


# Status Update

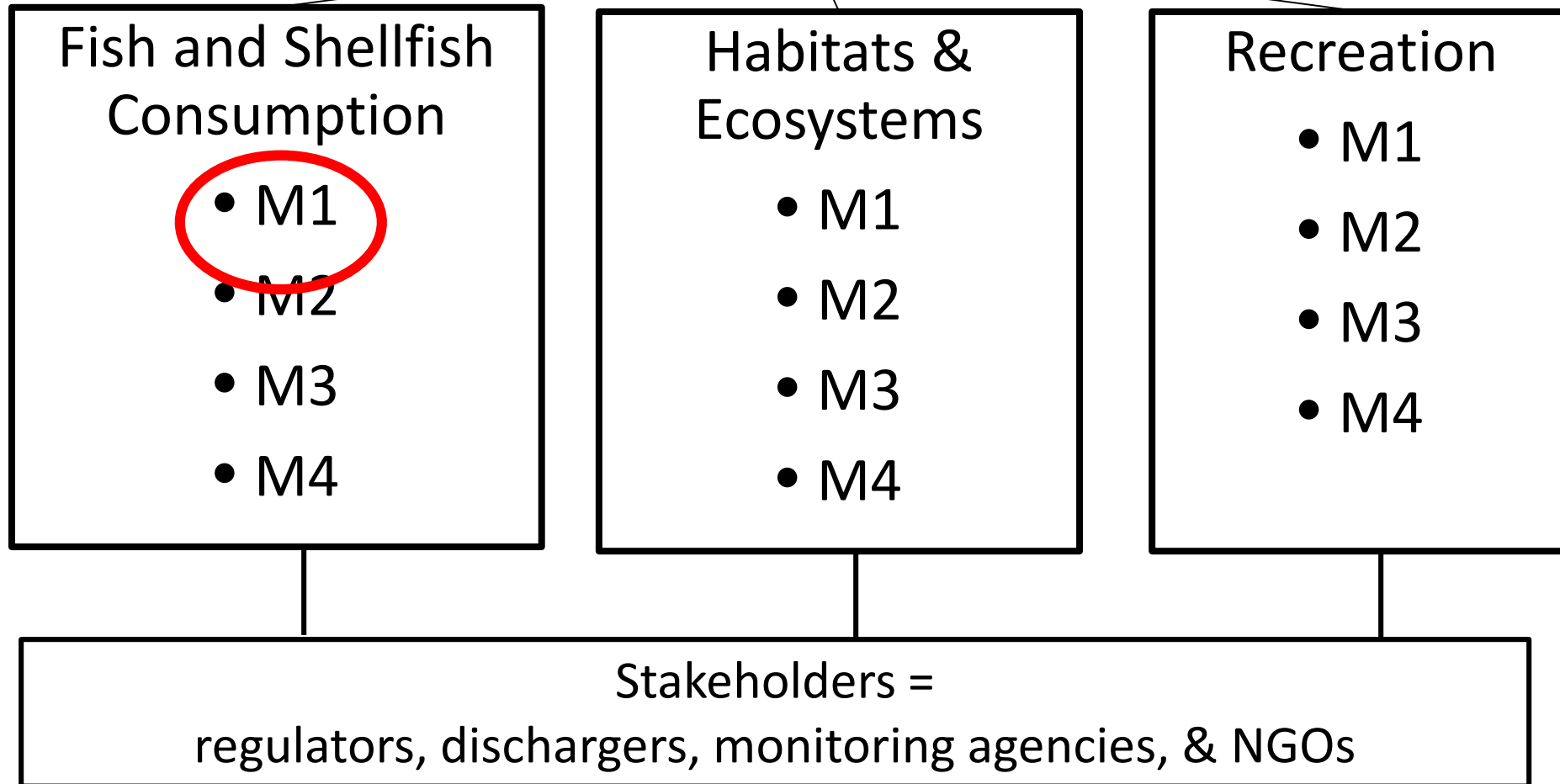
- 1. Fish and Shellfish Consumption ✓
- 2. Contact Water Recreation ✓
- 3. Non-Contact Water Recreation ✓
- 4. Ecosystem Health



# Monitoring & Assessment Framework



# Bay Unified Monitoring



# 2017 Objectives

1. Assemble FSC Workgroup
2. Develop M1 Monitoring Plan
3. Discuss Implementation Framework

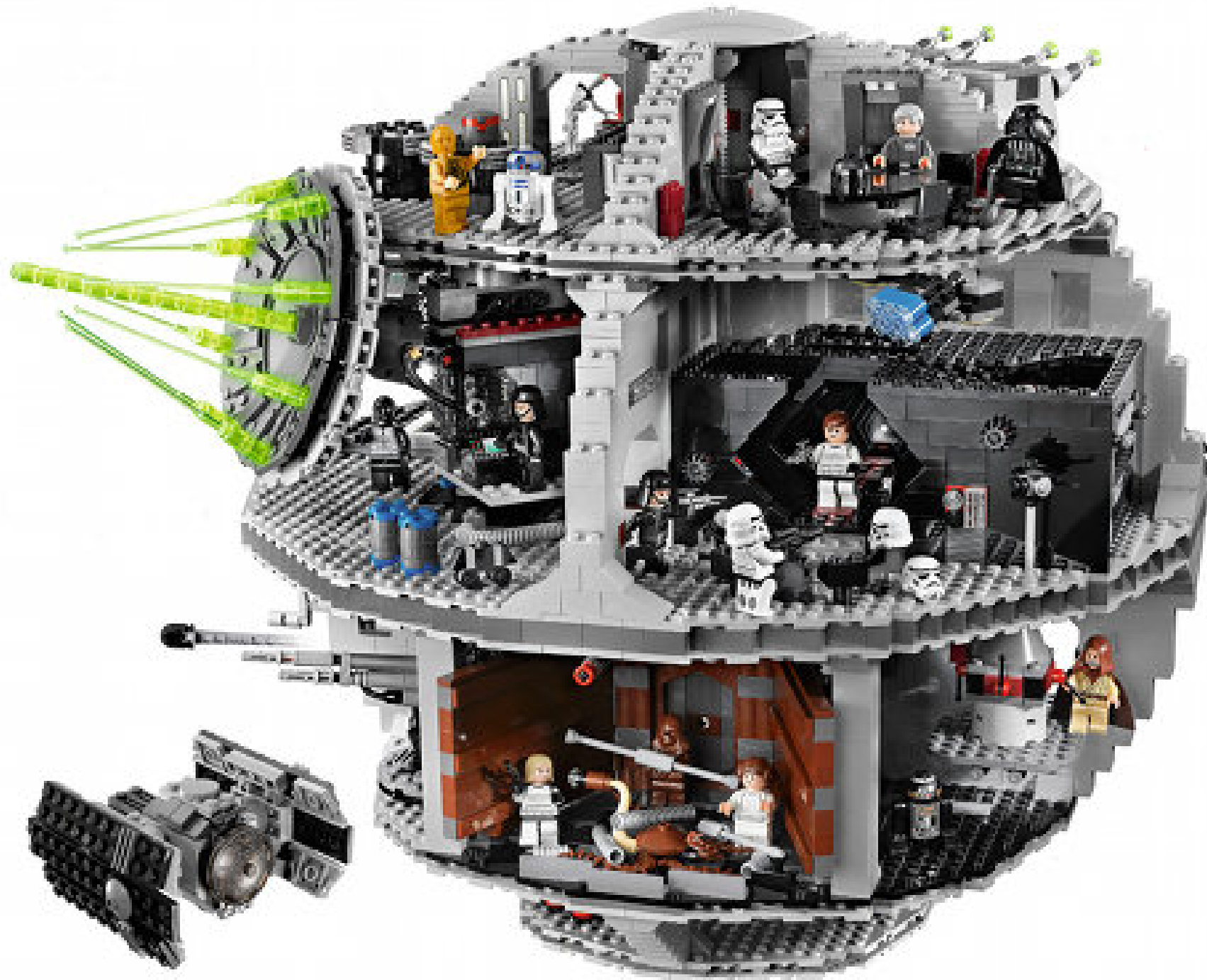


# Next Steps- long term

1. Engage stakeholders;
2. Memorialize FSC monitoring;
3. Revise permits as necessary;
4. Repeat effort for Recreation and Ecosystem Health
5. Evolve M2-M4 through Stakeholder Groups









**Assessing the REC-2 Beneficial Use  
in (& around) San Diego Bay**



# What We'll Cover

- What's REC-2 & major challenges to monitoring?
- Examples of existing data sources in SD Bay, & insights gained
- New resources available for REC-2 monitoring
  - *help inform how to craft unified monitoring program*

# What is the REC-2 Beneficial Use?

Non-contact Water Recreation (REC-2): uses of water for recreational activities involving **proximity to water**, but not normally involving body contact with water, where ingestion of water is reasonably possible.



- picnicking
- sunbathing
- hiking
- beachcombing
- camping
- boating
- tidepool & marine life study
- hunting
- sightseeing
- aesthetic enjoyment in conjunction with the above activities

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# Examples of Stressors to REC-2





# Trash can harm wildlife, too

*...but that's not our topic today  
(to be addressed next round)*





# Challenges to Monitoring Trash for REC-2

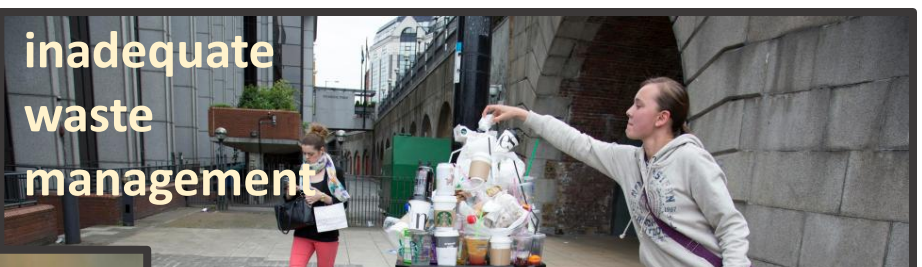
- Trash presents a unique situation:
  - widespread effects: everyone can be directly affected by it
  - diffuse sources: everyone can contribute to it
    - can move through environment by water, *but also by wind*
- Unclear how to best quantify (& standardize effort, & classify...)
  - count
  - weight
  - volume
  - other?
- Unclear how to best set targets/determine attainment
  - *What is an acceptable level of trash?*





# Potential Sources – some pretty tough to control...

**inadequate waste management**



**littering (onshore & offshore)**

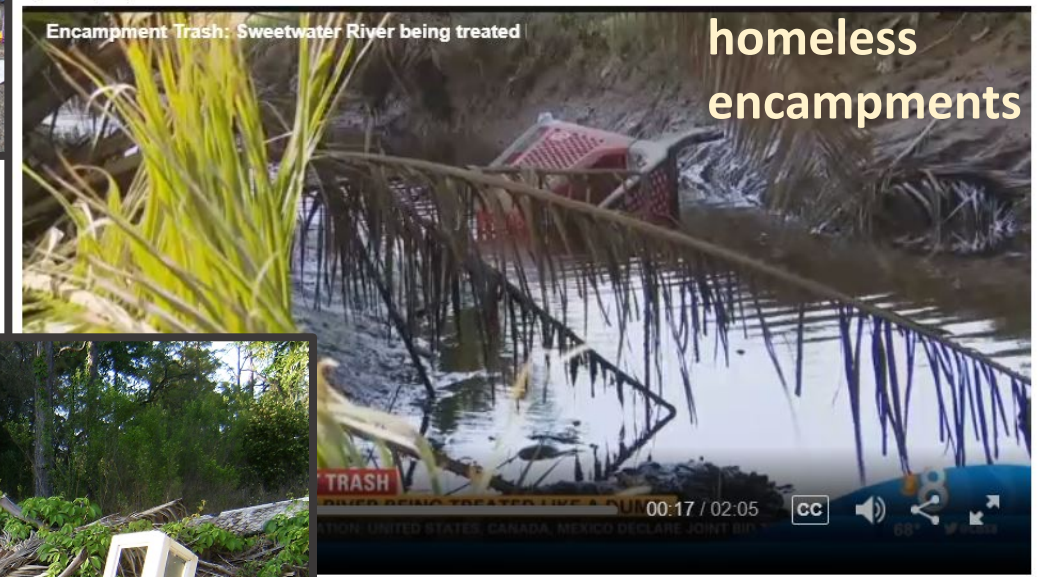


**dumping**



**Encampment Trash: Sweetwater River being treated like a dump**

Posted: Apr 10, 2017 6:11 PM PDT  
Updated: Apr 10, 2017 6:24 PM PDT



**homeless encampments**

SAN DIEGO (CBS 8) - The Sweetwater River's South Bay river walk is being trashed, apparently by the homeless, and in this *Your Stories* report, a CBS News 8 viewer wants to know when the trash will be cleaned up.

# Challenges to Monitoring Trash for REC-2

- Trash presents a unique situation:
  - widespread effects: everyone can be directly affected by it
  - diffuse sources: everyone can contribute to it
    - can move through environment by water, *but also by wind*
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  - count
  - weight
  - volume
  - other?
- Unclear how to best set targets/determine attainment
  - *What is an acceptable level of trash?*



# Worth Remembering...

- Ultimate goal: reduce trash levels to where they don't impact beneficial uses
- Monitoring is but a tool to determine whether our efforts are succeeding... *and, if not, to help us understand what needs to change*





# Examples of Recent/Current Trash Monitoring in San Diego Bay/Watershed

- Citizen monitoring
  - I love a Clean San Diego
  - Ocean Conservancy
  - San Diego Coastkeeper
- Research
  - San Diego Water Board
  - Amec Foster Wheeler
  - SCCWRP
  - Sea Grant
- Regulatory (co-permittees)/Institutional
  - Port of San Diego
  - Port Tenants Association
  - Navy
  - Cities of
    - San Diego
    - Chula Vista
    - National City
    - Imperial Beach

# San Diego Bay Debris Study



## Goals:

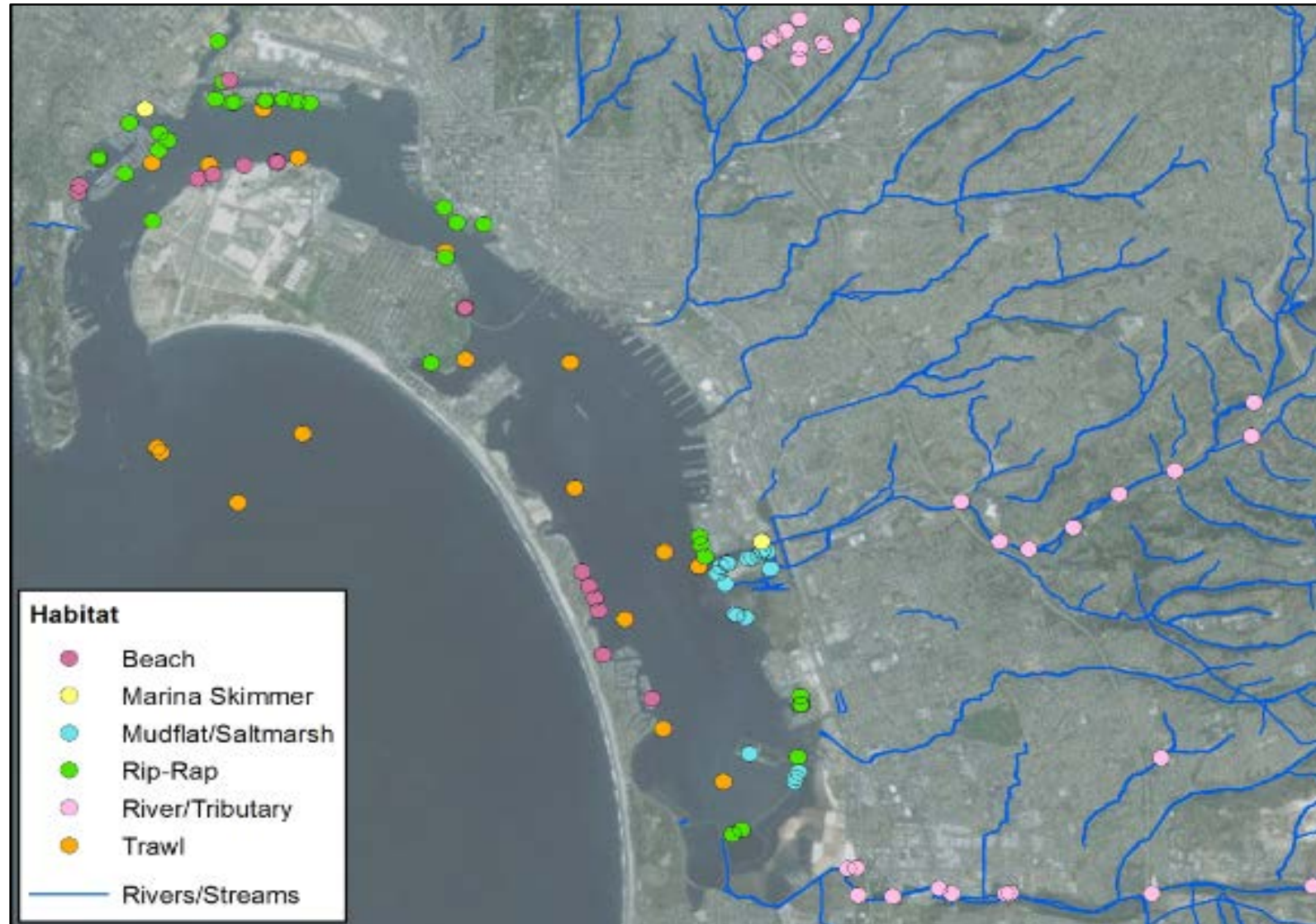
- Complete 1<sup>st</sup> comprehensive survey of *plastic* trash in Bay/watershed receiving waters (Apr 2014 – Oct 2016)
- Establish a baseline to assess against future changes
- Assist municipalities in prioritizing locations for future trash controls



# Debris Study Questions

- (Status) How do the quantities and types of debris in different habitats vary during dry and wet season?
- (Transport) What types of riverine debris do wet weather flows transport to the bay?
- (Fate) What species caught in the bay has ingested plastic pieces? [*...will discuss in ecosystem assessment*]

# Debris Study Sampling Locations



## Hot spots:

- **5/29** sites in rivers (58% of trash abundance)
- **16/71** sites in intertidal (14 of which were mudflat and saltmarsh habitat – 80% of trash abundance)

# Debris Study Intertidal Trash Survey Method

...based on NOAA Shoreline Survey Method

- Select sites (probabilistically) in sandy beaches, mudflat/saltmarsh, & riprap
- Set up 2 side-by-side transects at each site: 30m x 5m
- Count/volume all “macro-debris” (>25cm) within transect
- Count/volume all “meso-debris” (25 cm - 4.75 mm) within 5, 1m<sup>2</sup> plots (objectively selected) per transect

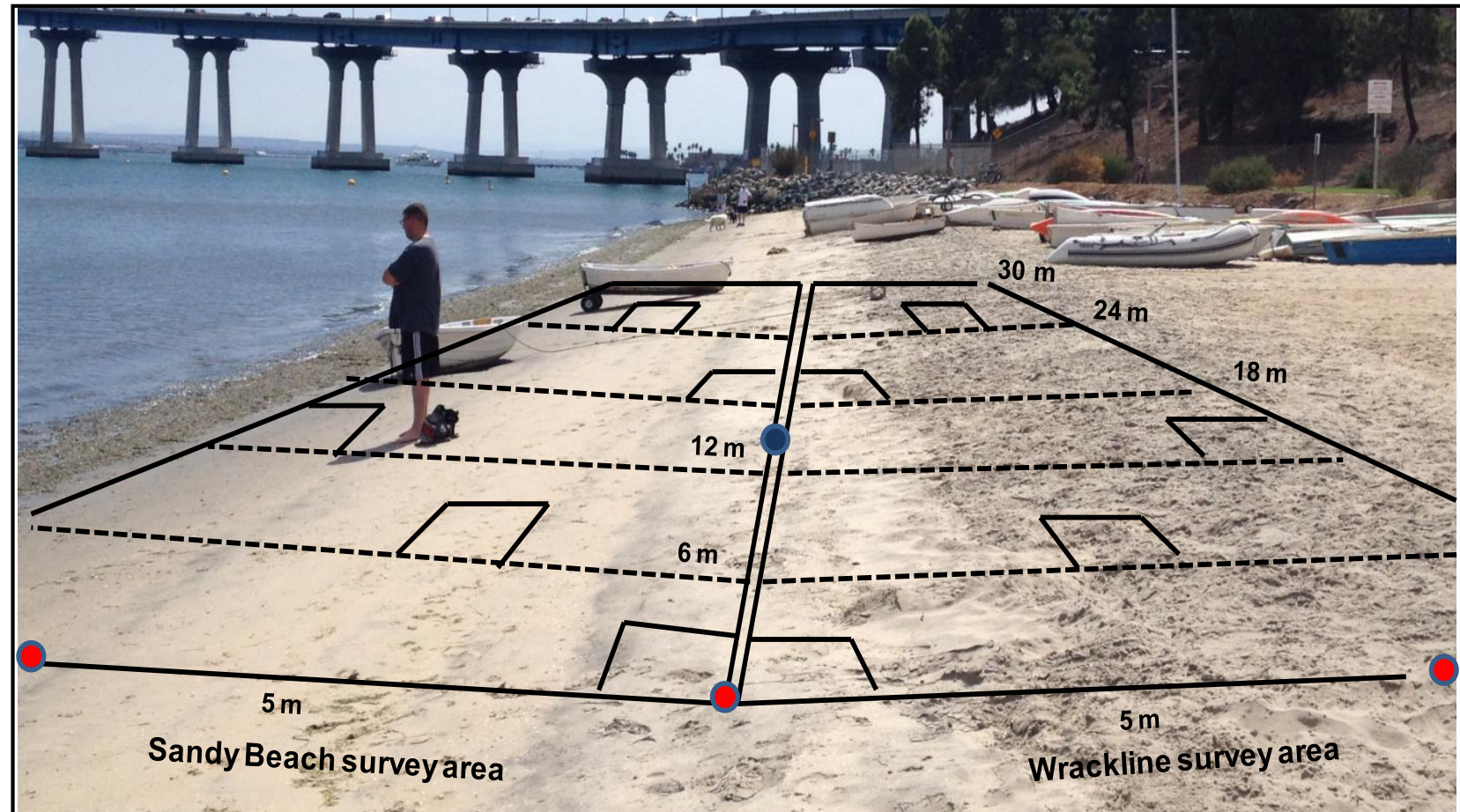


Photo: Amec Foster Wheeler

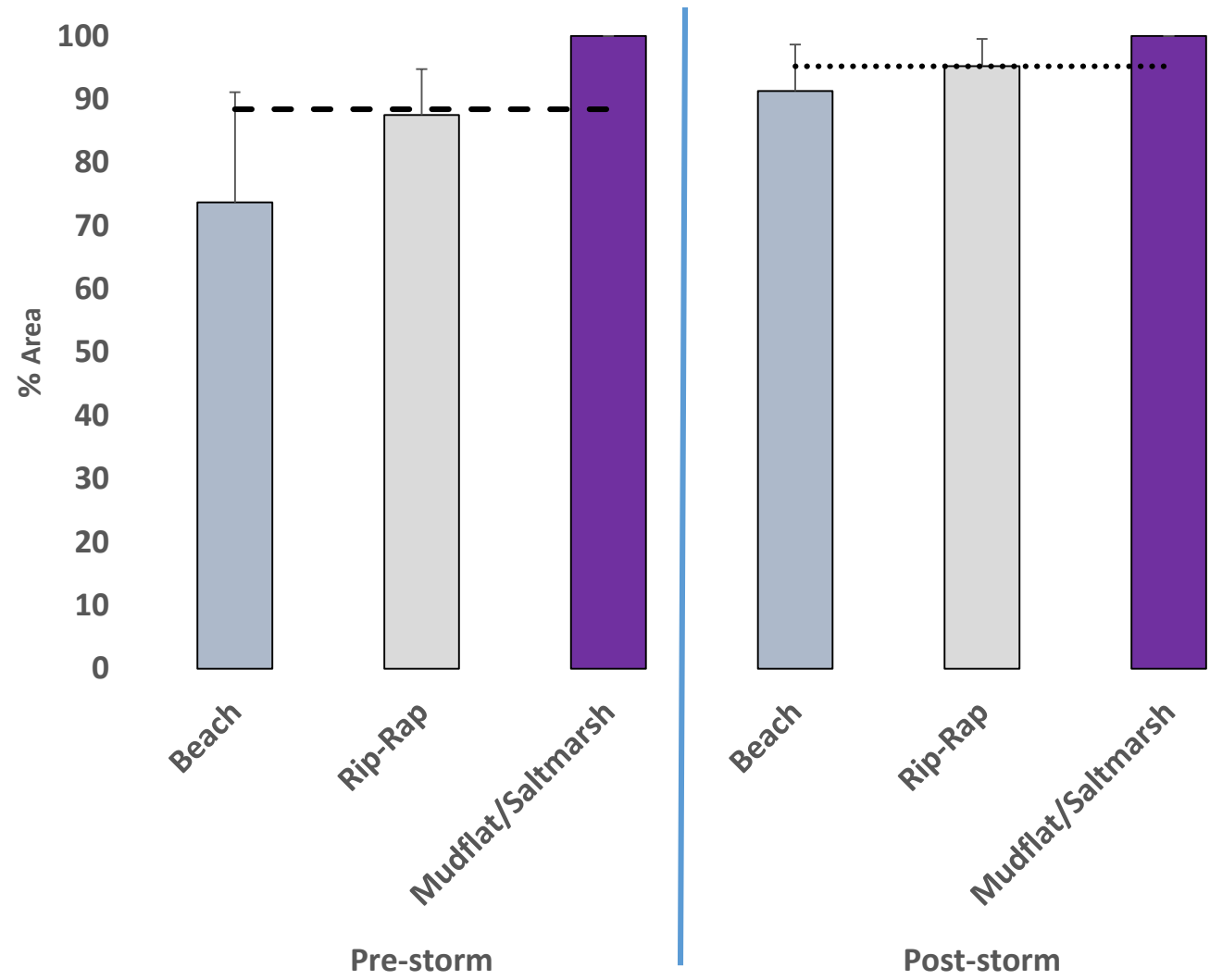




# Trash Characterization within SDB Intertidal Zone

## *pre- vs. post-storm*

***Extent of SD Bay Intertidal Area Covered by  $\geq 1$  Plastic Pieces (meso- + macro-debris; micro-debris not included in estimates)***

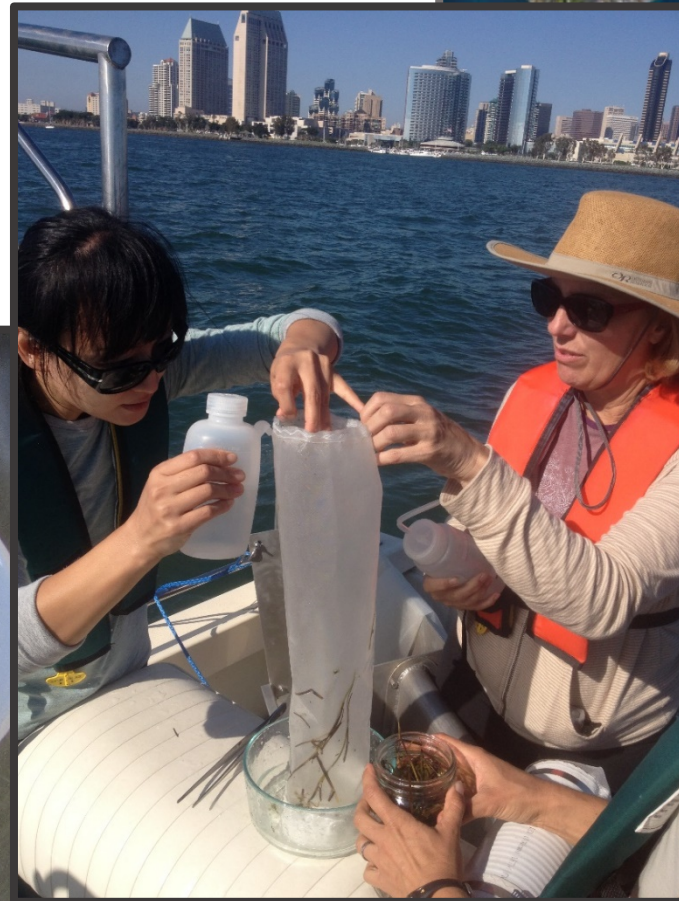


--- Entire Bay (Pre-Storm)  
..... Entire Bay (Post-Storm)

***Similar results for amount of trash (counts & volumes)***

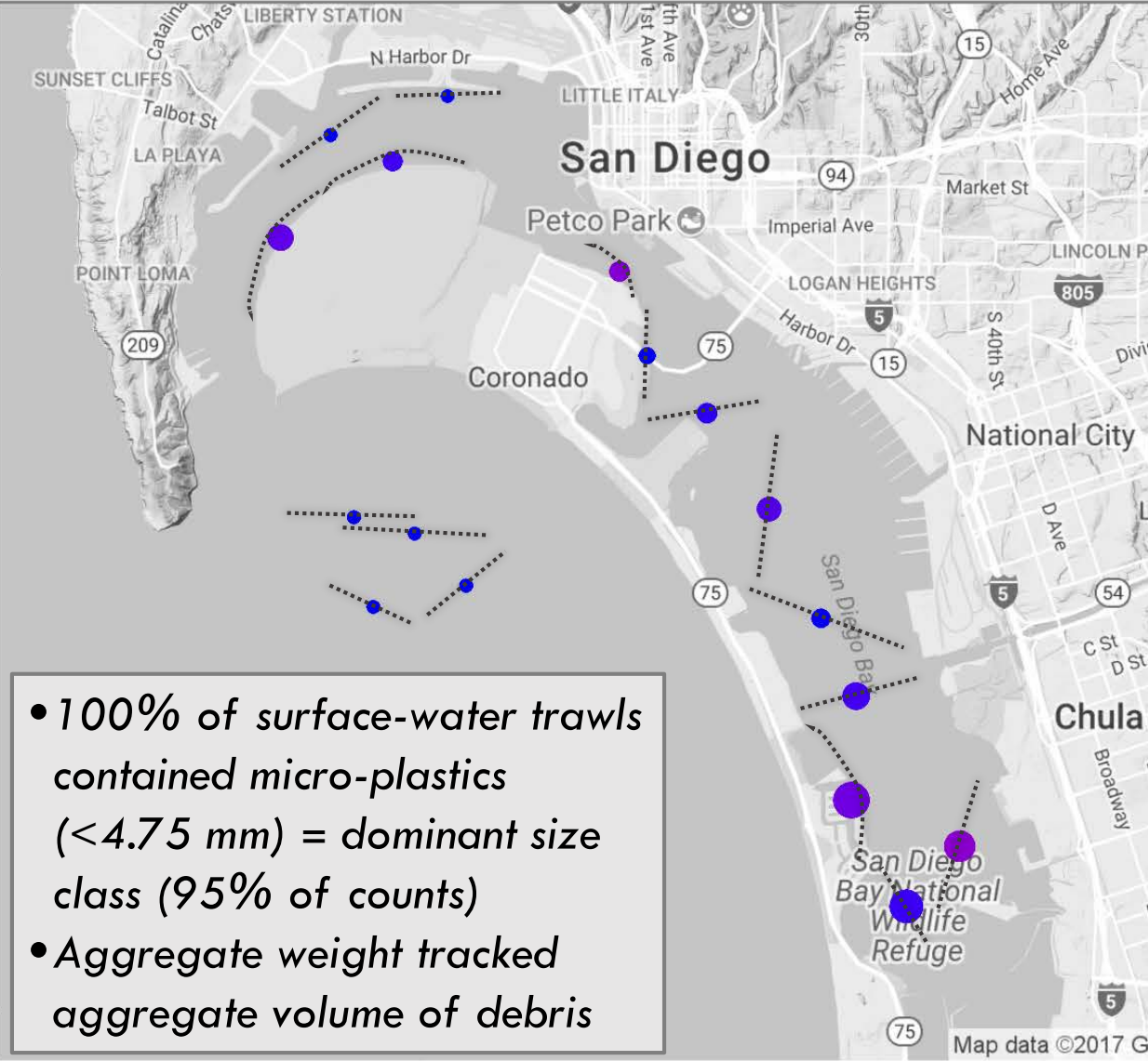
# SDB Debris Study: Surface Trawls

- ~1,000 m transects w/ manta trawl
- 1x sampling each, dry + wet weather

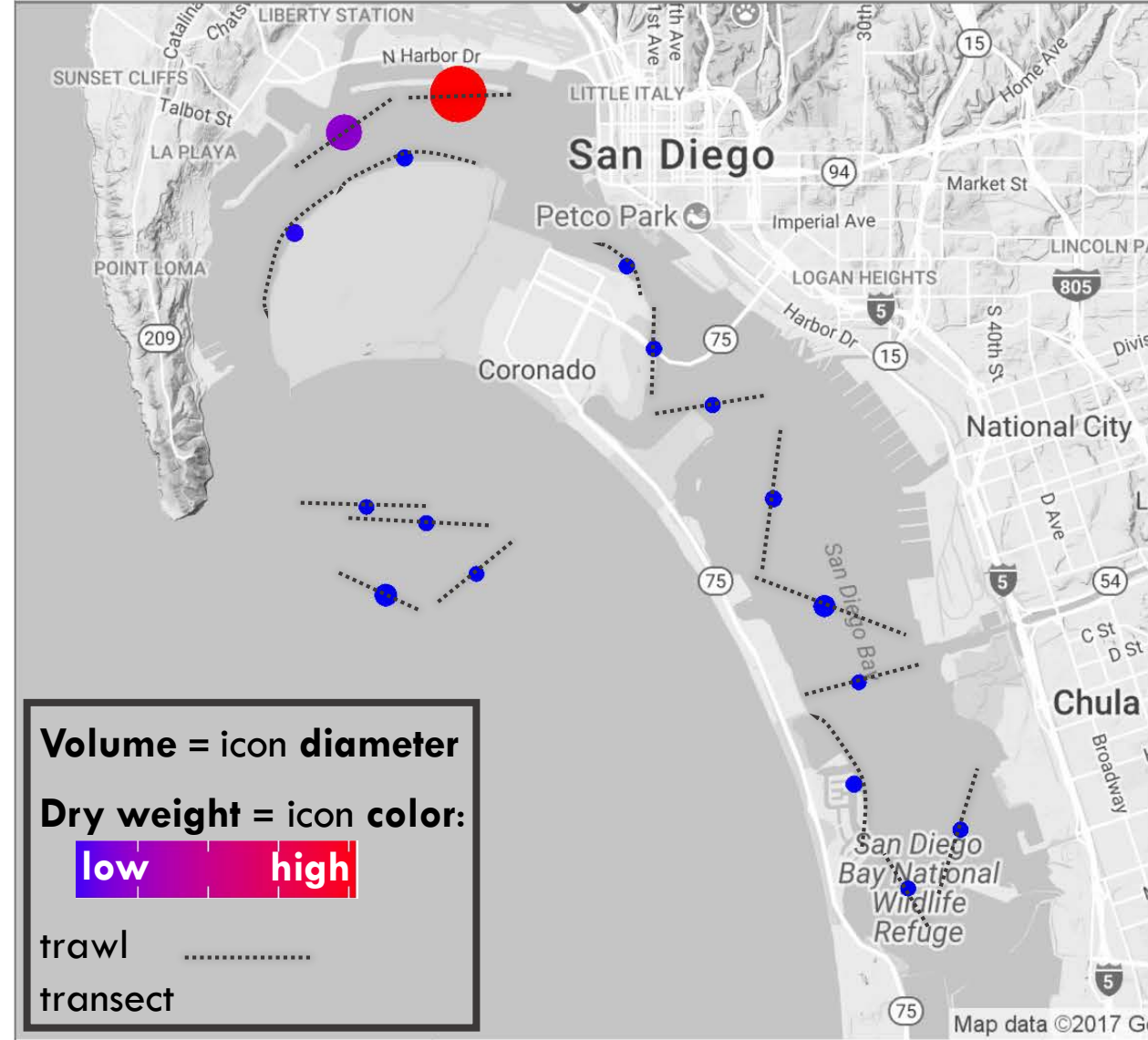


# Floating Trash – Volume & Weight Results

## dry weather – 2014



## wet weather – 2015

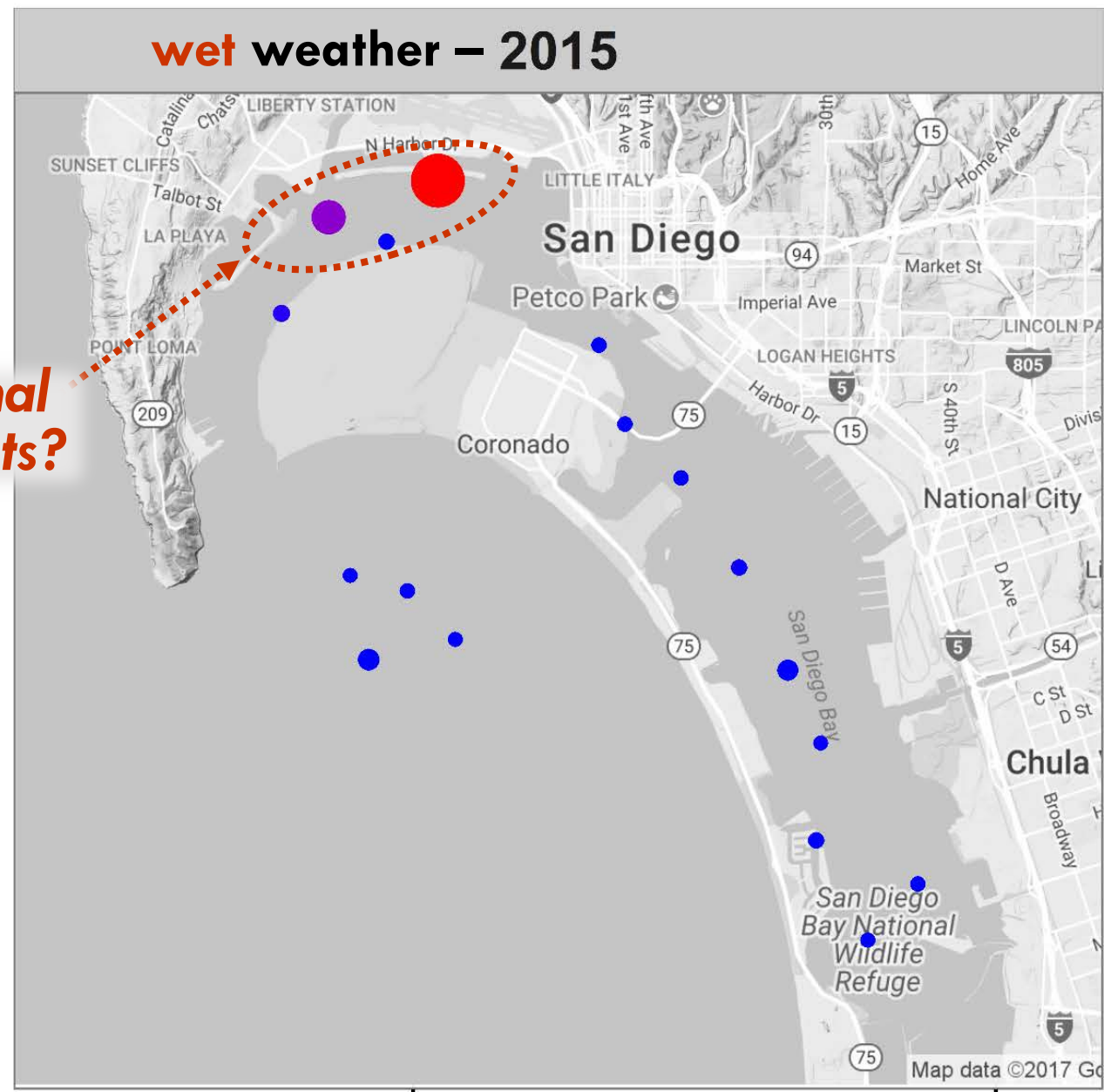
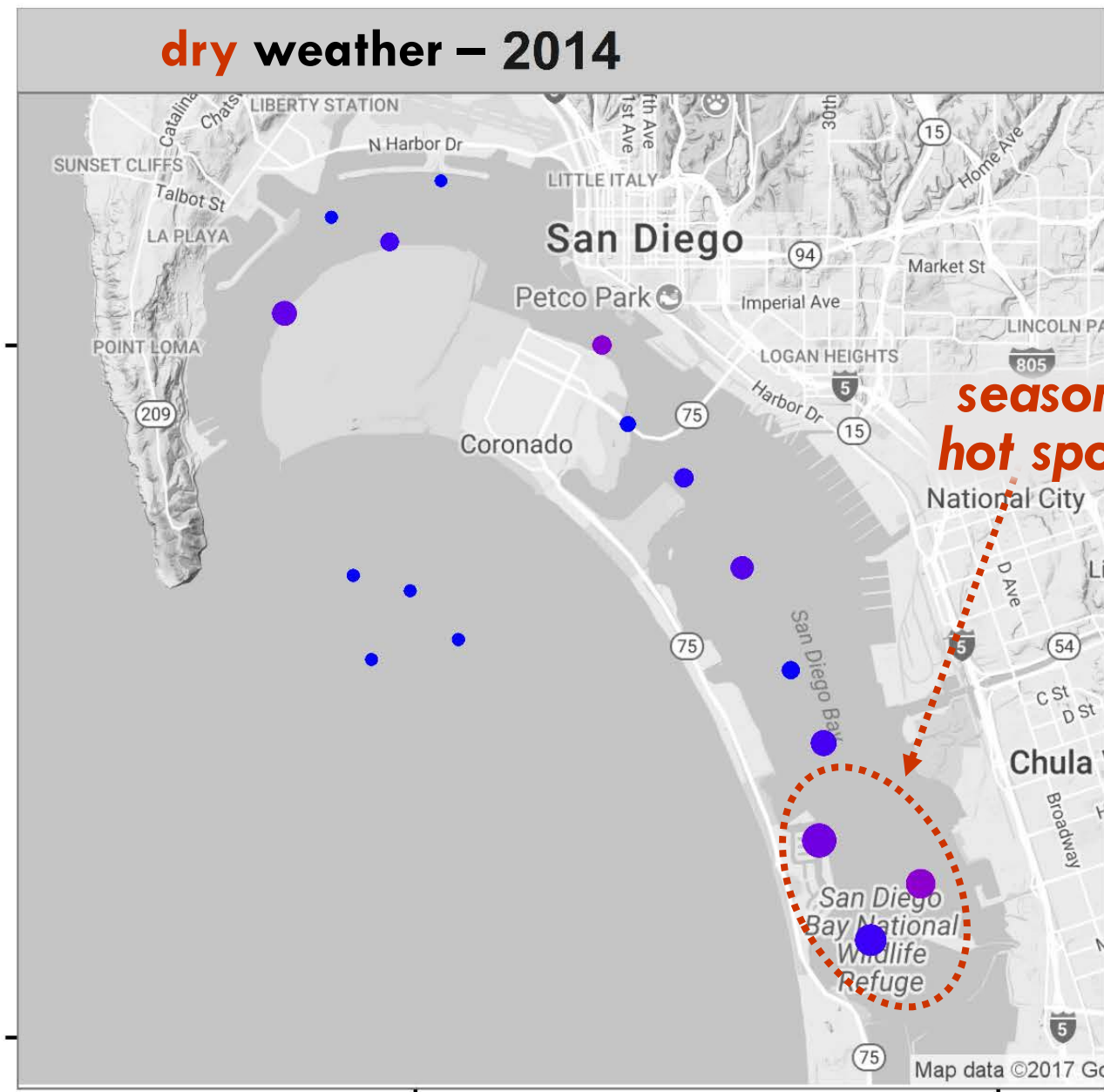


# Floating Trash – Volume & Weight Results

**dry** weather – 2014

**wet** weather – 2015

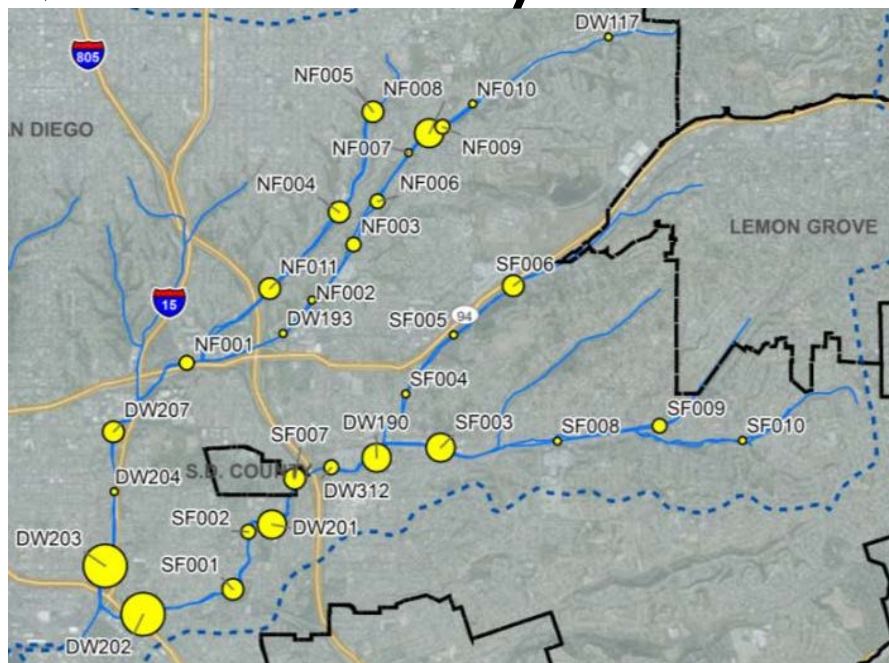
*seasonal hot spots?*



# Trash Characterization in Chollas Creek

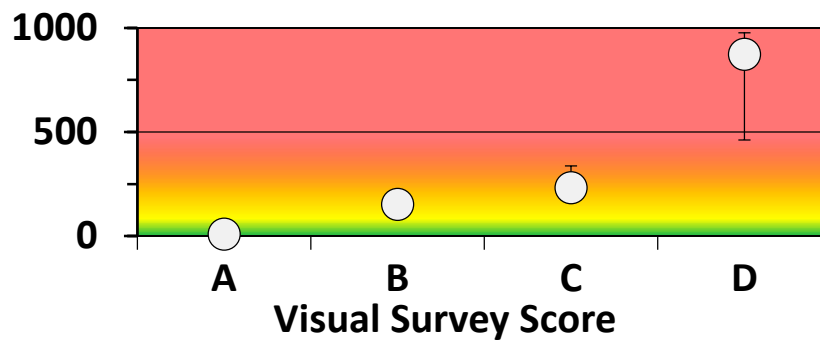


## Quantitative Survey

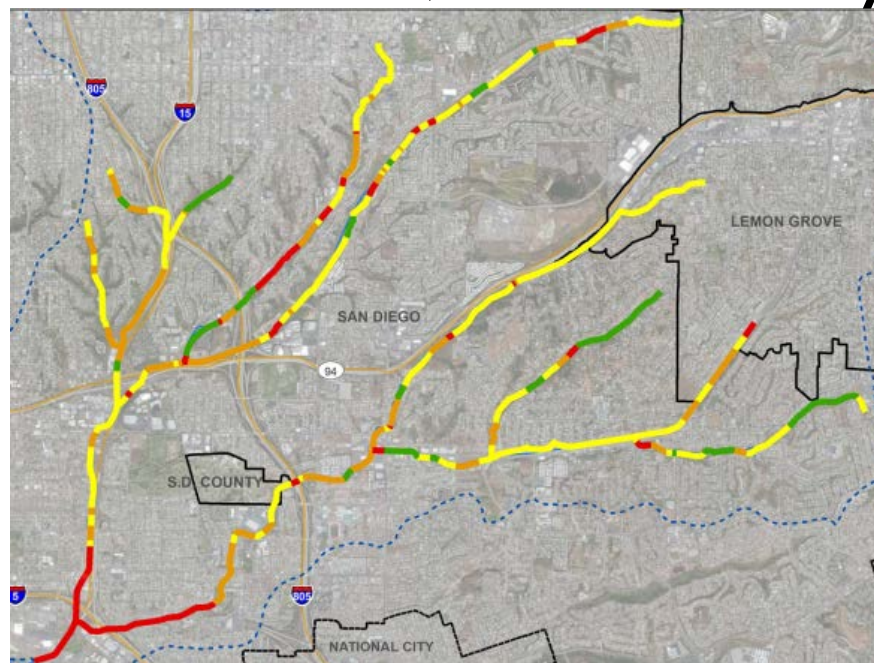


30 sites

SWAMP RTA  
Mean Counts



## Qualitative Survey



28 miles

Green (Clean)	<b>A</b>
3.85 miles (14.1%)	
Yellow (Few Pieces)	<b>B</b>
13.21 miles (48.5 %)	
Orange (Small to Moderate)	<b>C</b>
6.75 miles (24.8 %)	
Red (Moderate to High)	<b>D</b>
3.43 miles (12.6 %)	

# San Diego Bay Debris Study

San Diego Bay Debris Study  
Special Study Plastic Debris Monitoring Report

Prepared by:  
San Diego Bay Debris Study Workgroup

Prepared for:  
Surface Water Ambient Monitoring Program of the  
State Water Resources Control Board  
and  
Southern California Bight 2013 Regional Marine Monitoring Survey  
Bight '13 Debris Planning Committee

October 2016



amec  
foster  
wheeler



SAN DIEGO  
COASTKEEPER



[https://www.waterboards.ca.gov/sandiego/water\\_issues/programs/sdbay\\_strategy/doc/FINAL San Diego Bay Debris Study Oct2016.pdf](https://www.waterboards.ca.gov/sandiego/water_issues/programs/sdbay_strategy/doc/FINAL_San_Diego_Bay_Debris_Study_Oct2016.pdf)



# Trash: A Priority Stressor in the San Diego Bay Water Quality Improvement Plan

Table ES-1  
San Diego Bay Watershed Summary of Highest and Focused Priority Conditions

HU	Condition	Pollutant/ Stressor	Geographic Extent (HU/HA)	Responsible Parties
Pueblo (908)	Water Quality <sup>1</sup>	<b>Bacteria; Dissolved copper, lead, and zinc</b>	<b>Chollas Creek (908.22)</b>	<b>City of La Mesa City of Lemon Grove City of San Diego County of San Diego Port of San Diego Caltrans</b>
	Water Quality	Copper and zinc (Wet Weather)	Airport Authority jurisdiction within HA 908.21	Airport Authority
Sweetwater (909)	Riparian Area Quality	Various	Paradise Creek—lower Sweetwater, HA 909.1 <sup>2</sup>	City of National City
	Physical Aesthetics	<b>Trash</b>	The western portion of the City of Chula Vista within HA 909.1	City of Chula Vista Port of San Diego
Otay (910)	Swimmable Waters (Beaches)	Bacteria	Applicable RP jurisdiction within HA 910.1	City of Coronado Port of San Diego
	Physical Aesthetics	<b>Trash</b>	Applicable RP jurisdiction in HA 910.2	City of Chula Vista City of Imperial Beach Port of San Diego

**Notes:**

HA = Hydrologic Area; HU = Hydrologic Unit; RP = Responsible Party

1. **The conditions in bold are the Highest Priority Conditions for the San Diego Bay Watershed.** Pollutants in regular font are the Focused Priority Conditions.
2. For the purposes of the Water Quality Improvement Plan, Paradise Creek is considered to be part of the lower Sweetwater area, for which the San Diego Bay priority condition analysis has identified potential impacts to beneficial uses such as habitat and non-contact recreation.



# Port of San Diego outfall and receiving water monitoring: # of pieces of trash



PORT OF SAN DIEGO  
ENVIRONMENTAL SERVICES DEPARTMENT  
3165 PACIFIC HWY, SAN DIEGO, CA 92101  
(619) 686-6254

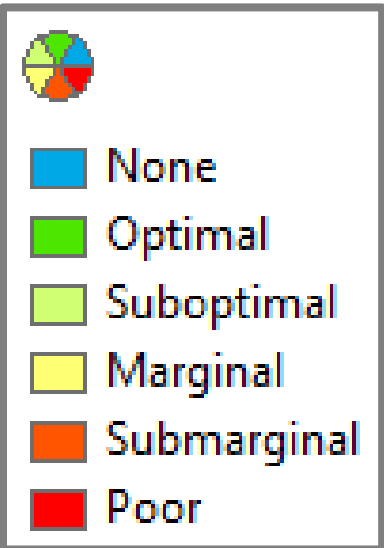
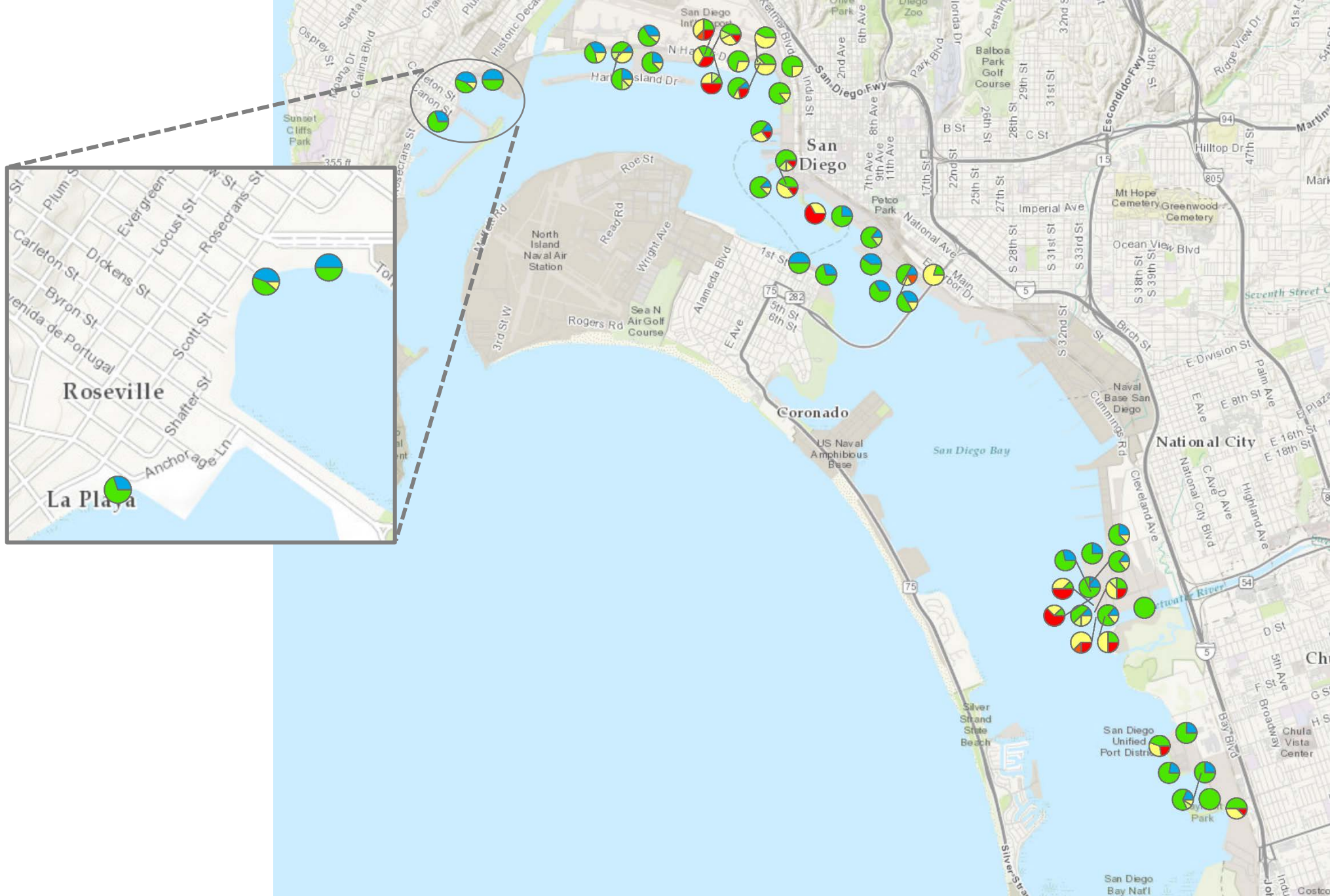
## Trash Assessment Form

SITE ID: _____	DATE: _____
HU/HA: _____	LAT/LONG: _____
TIME: _____	OBSERVERS: _____

### 1 SITE CHARACTERISTICS

Rating	Description (# of pieces)
<b>None</b>	<b>No trash</b> visible
<b>Optimal</b>	On first glance, no trash visible. Little or no trash ( <b>1-10 pieces</b> ) evident when evaluated area is closely examined for litter and debris.
<b>Suboptimal</b>	On first glance, little or no trash visible. After close inspection small levels of trash ( <b>~10-50 pieces</b> ) evident in evaluated area.
<b>Marginal</b>	Trash is evident in low to medium levels ( <b>~51-100 pieces</b> ) on first glance. Evaluated area contains litter and debris. Evidence of site being used by people: scattered cans, bottles, food wrappers, blankets, or clothing present.
<b>Submarginal</b>	Trash distracts the eye on first glance. Evaluated area contains substantial levels of litter and debris ( <b>&gt;100- 400</b> ). Evidence of site being used frequently by people: many cans, bottles, food wrappers, blankets, or clothing present.
<b>Poor</b>	Site is significantly impacted by trash. Evidence of trash accumulation behind a constriction point or evidence of excessive dumping. Evaluated area contains substantial levels of litter and debris ( <b>&gt;400 pieces</b> ).



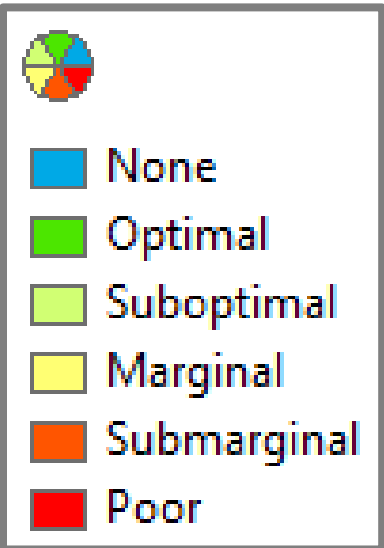
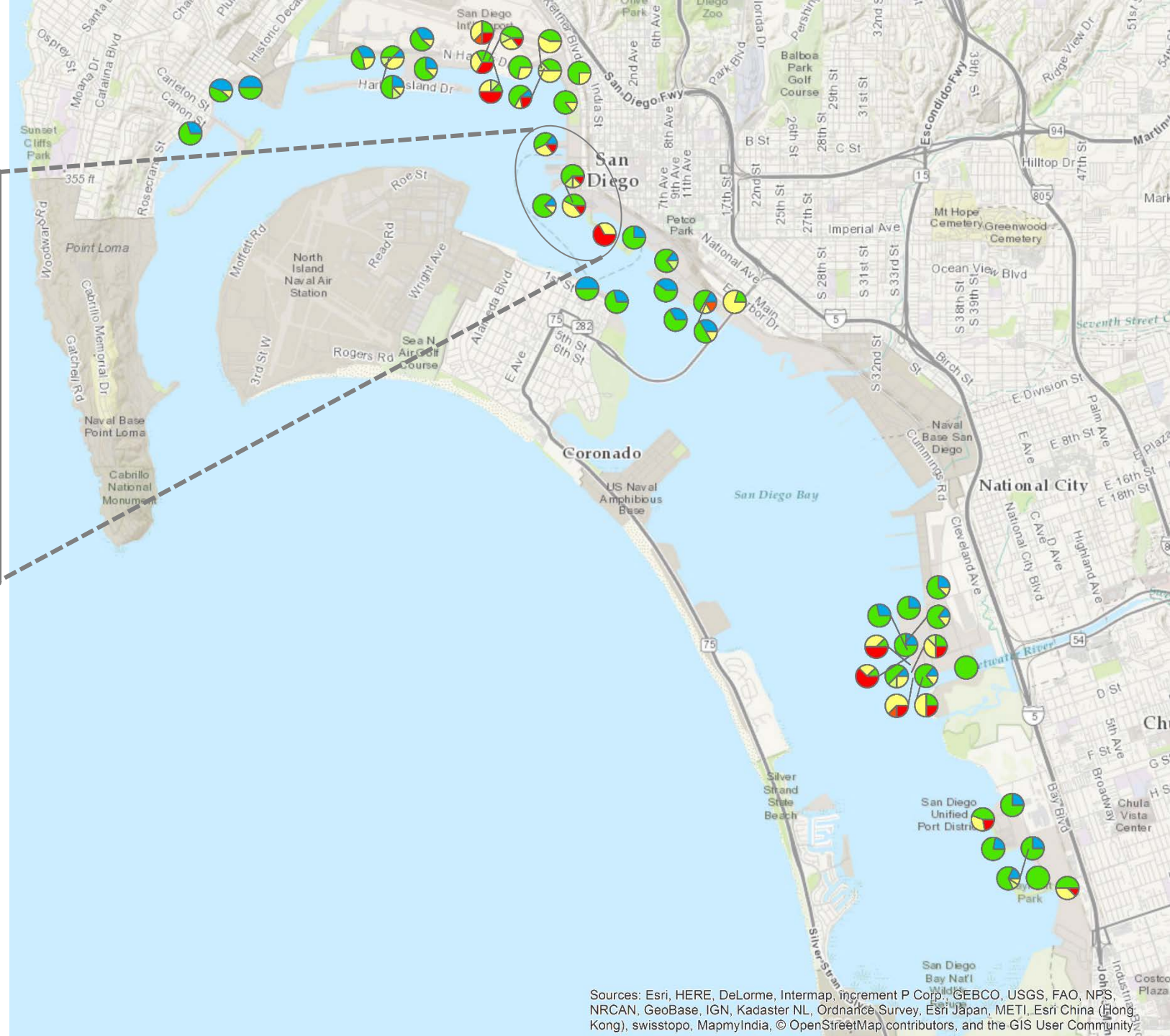
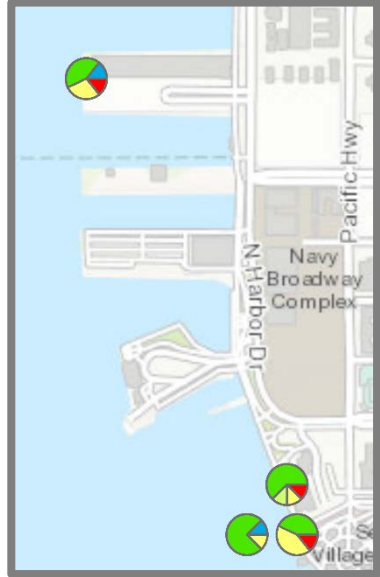


**Pie slices = % site visits, 2013 to present**

**Courtesy of:**



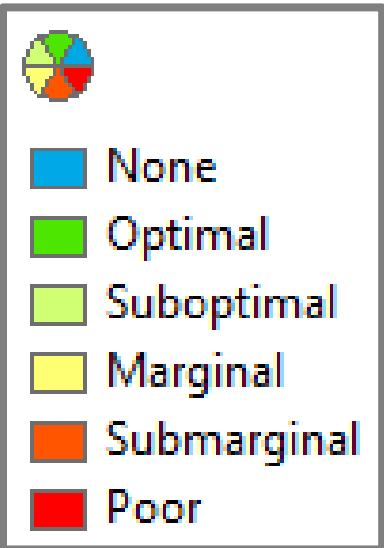
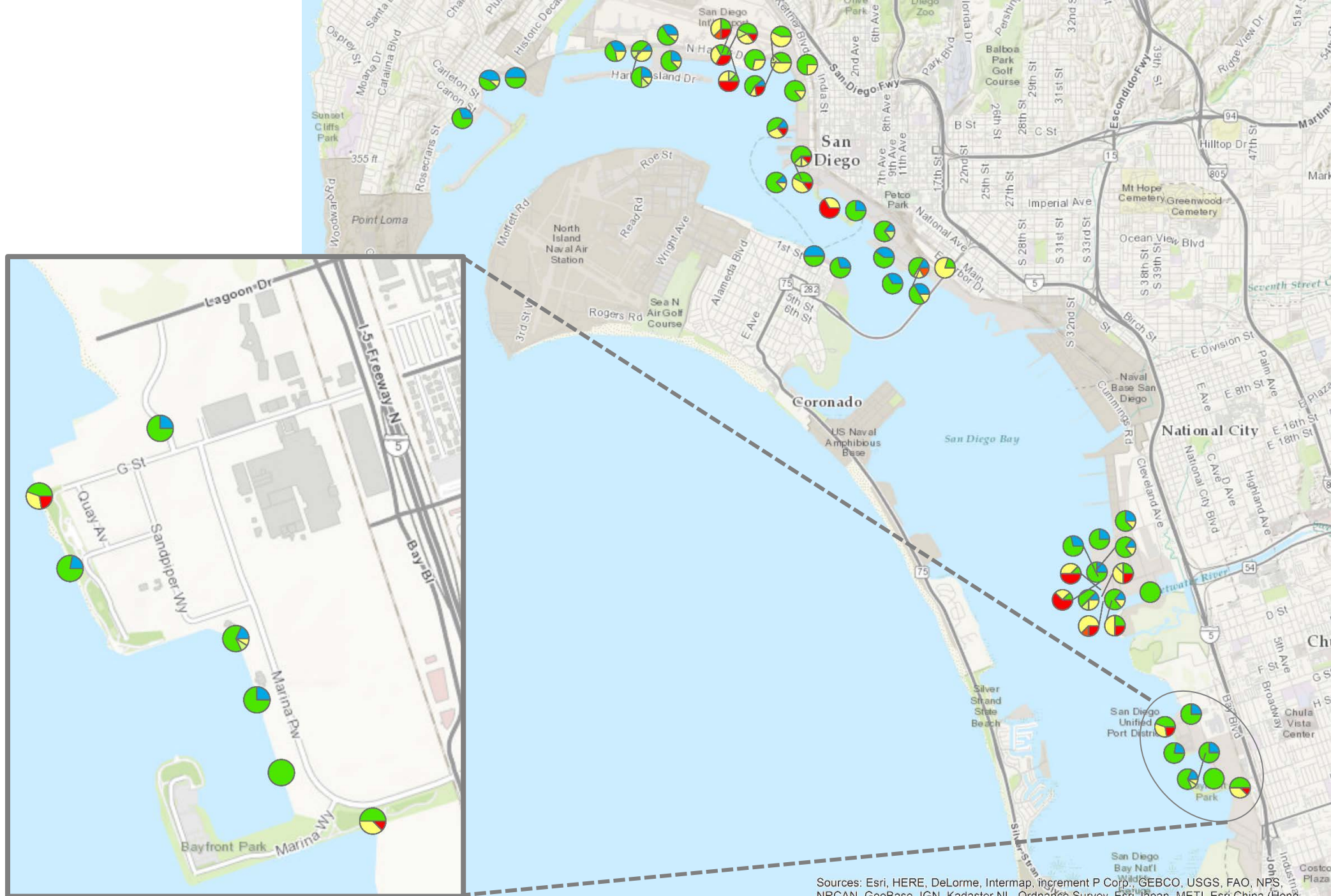
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



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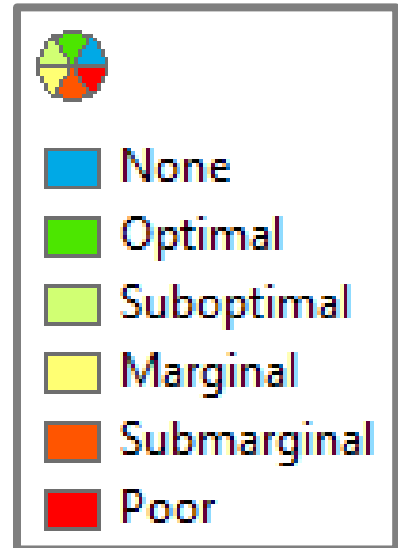
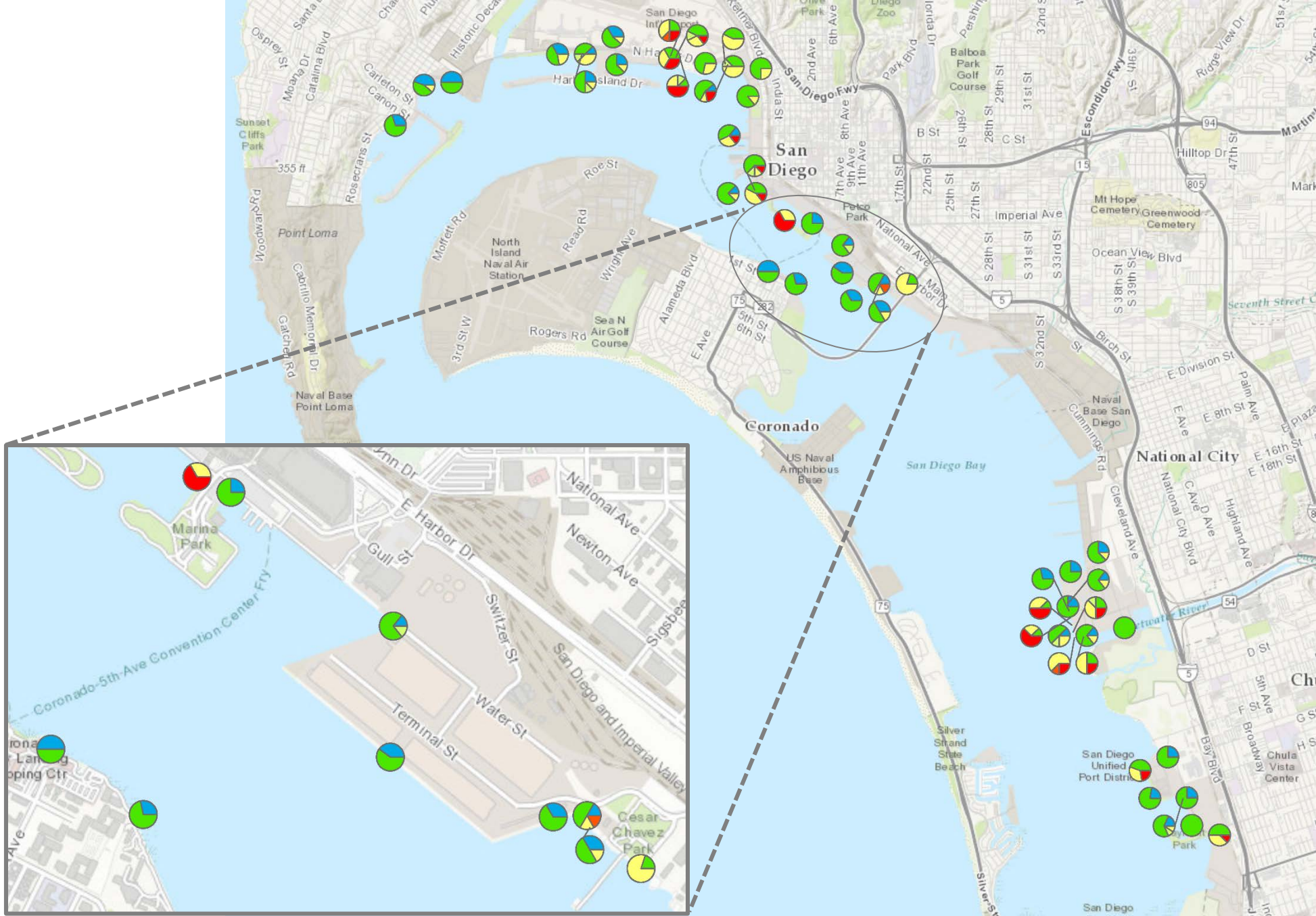




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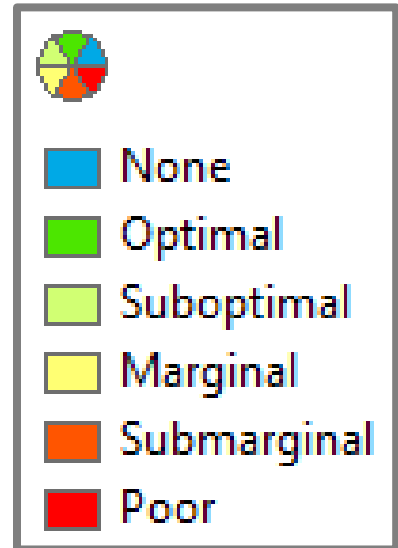
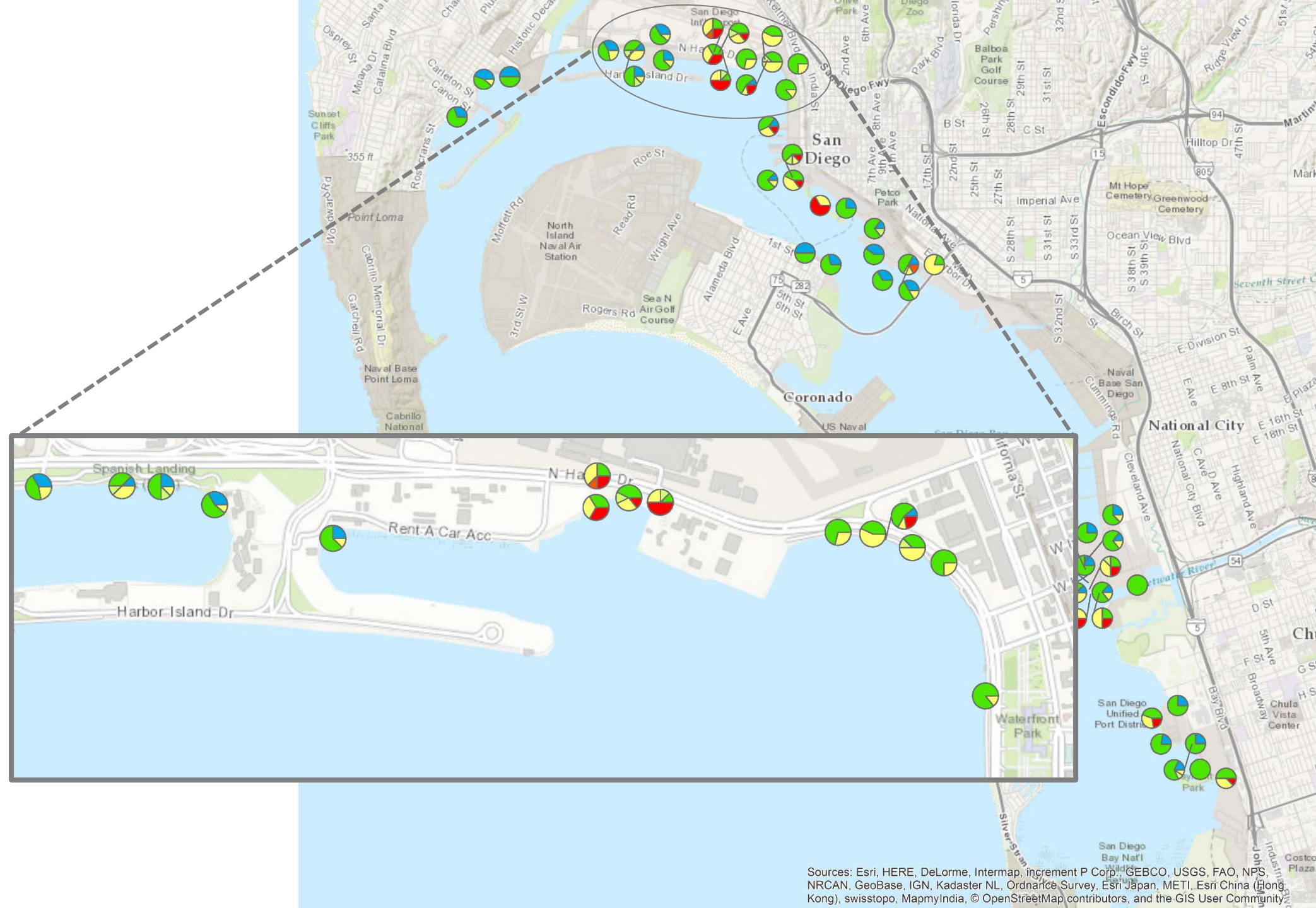




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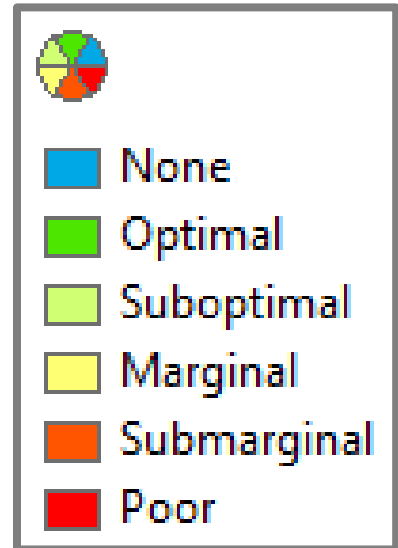
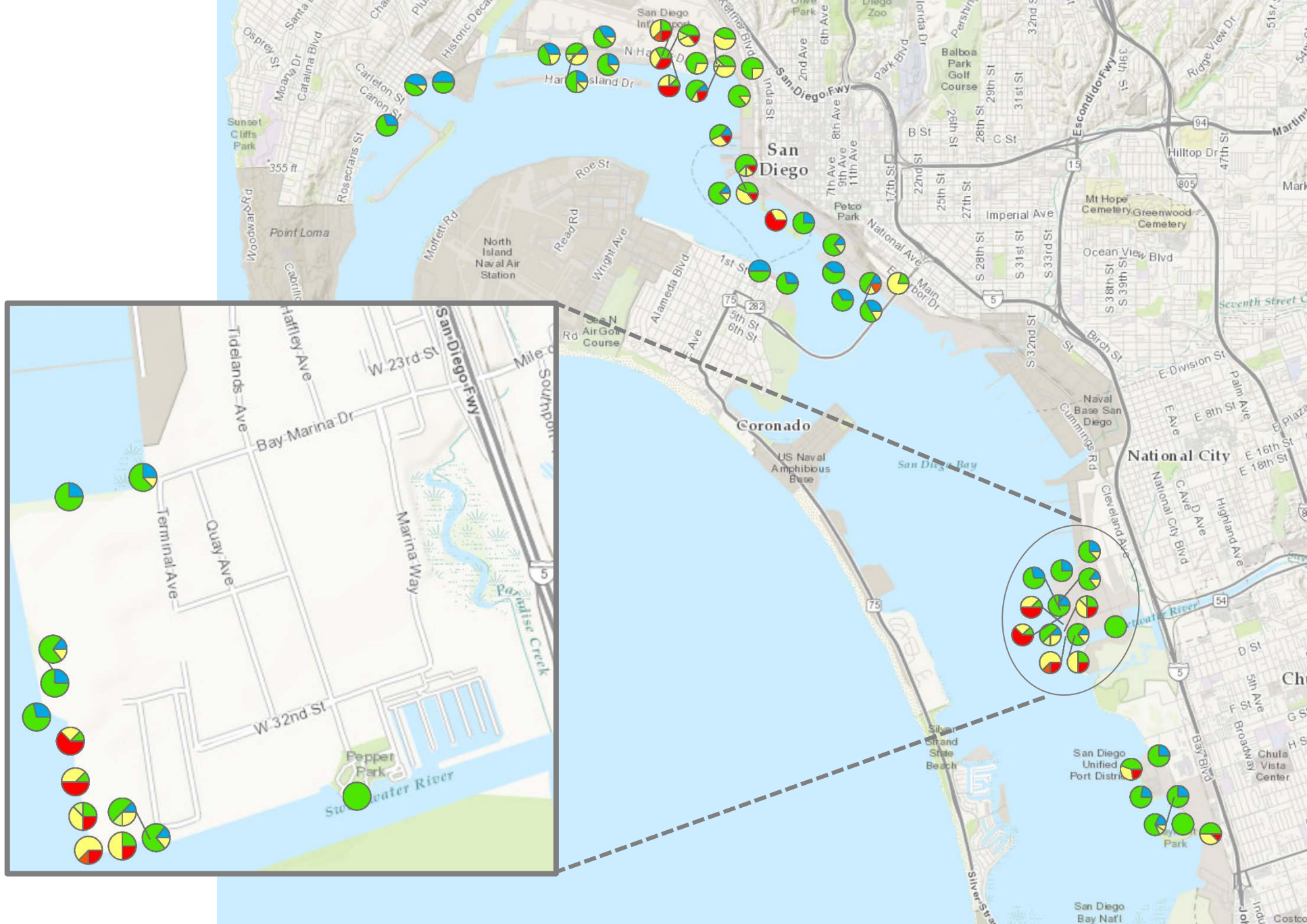
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# OPERATION Clean Sweep



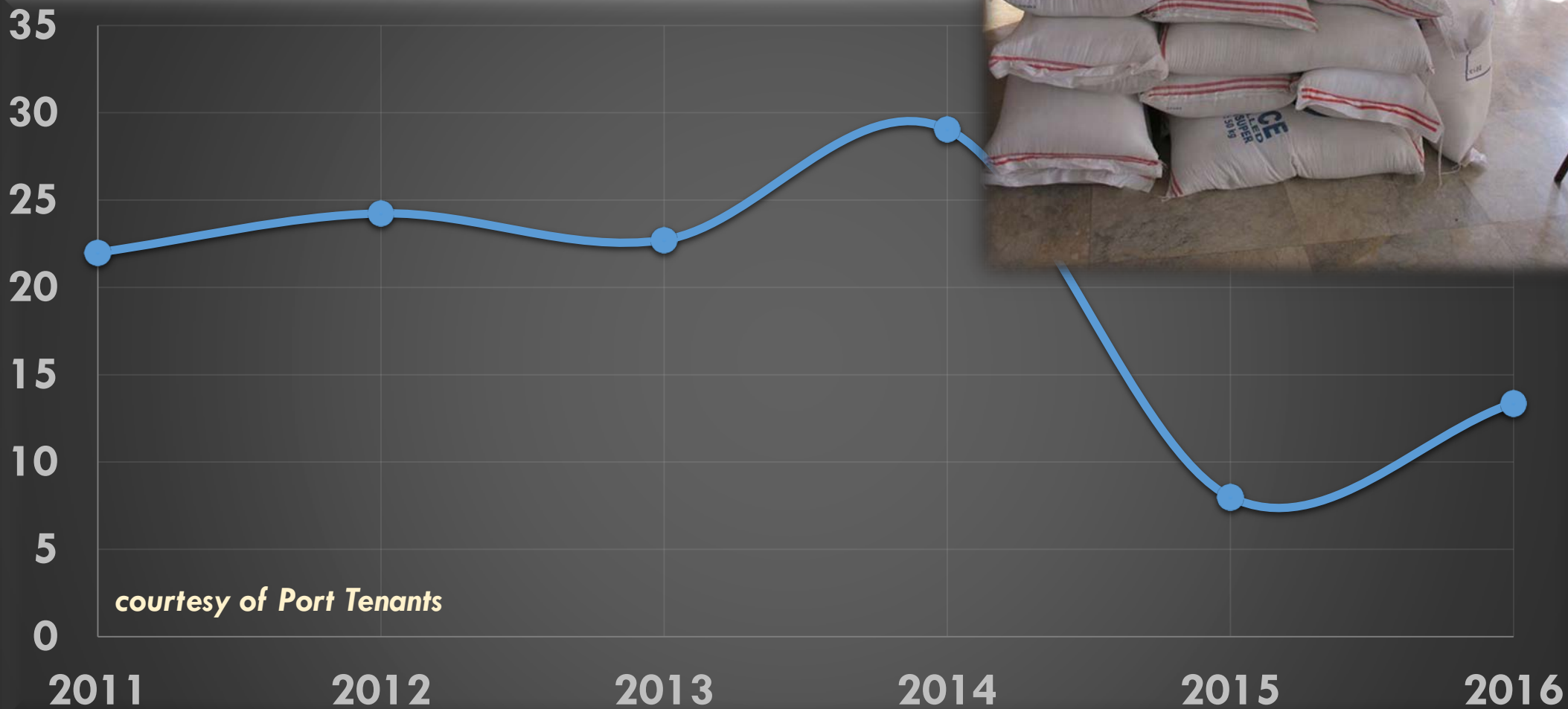
- San Diego Bay & shoreline
- summertime, yearly
- volunteers (civilian, military) onshore, & Harbor Police divers
- sponsored by:
  - San Diego Port Tenants Association (SDPTA)
  - Port of San Diego
  - Navy Region Southwest
  - SDG&E
  - US Coast Guard Sector San Diego
  - EDCO Disposal
  - dozens of SDPTA member businesses



# OPERATION Clean & Sweep

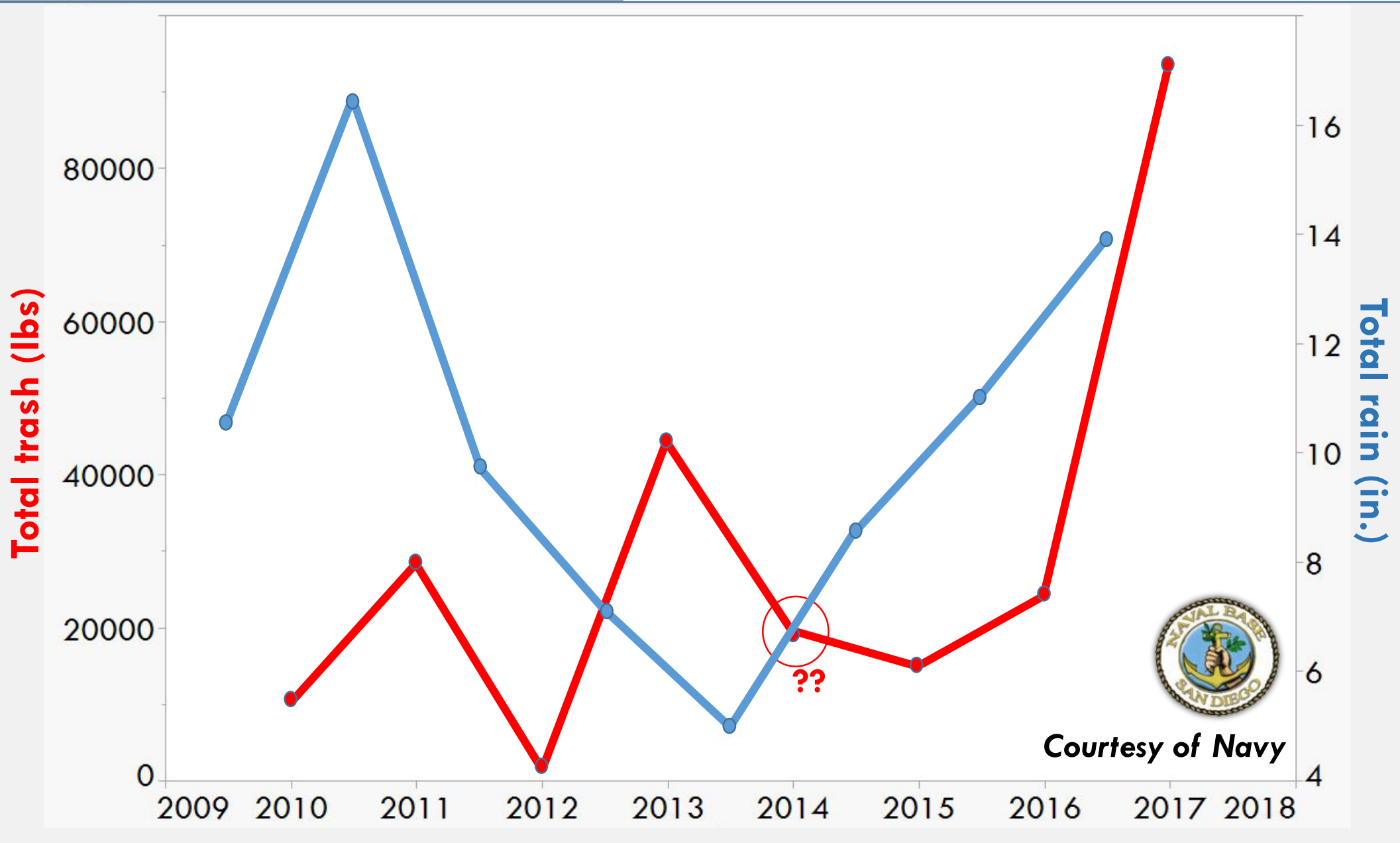


US tons of trash (total)





# Chollas Creek Discharge — Trash Boom



A painting of a white egret with a cigarette in its beak, standing on a grassy field. The text "Cig Egret" is written in the bottom left corner of the painting.

# California Coastal Cleanup Day

San Diego County

Saturday, September 16, 2017 from 9AM - 12noon

I Love a Clean  
San Diego



Ocean Conservancy

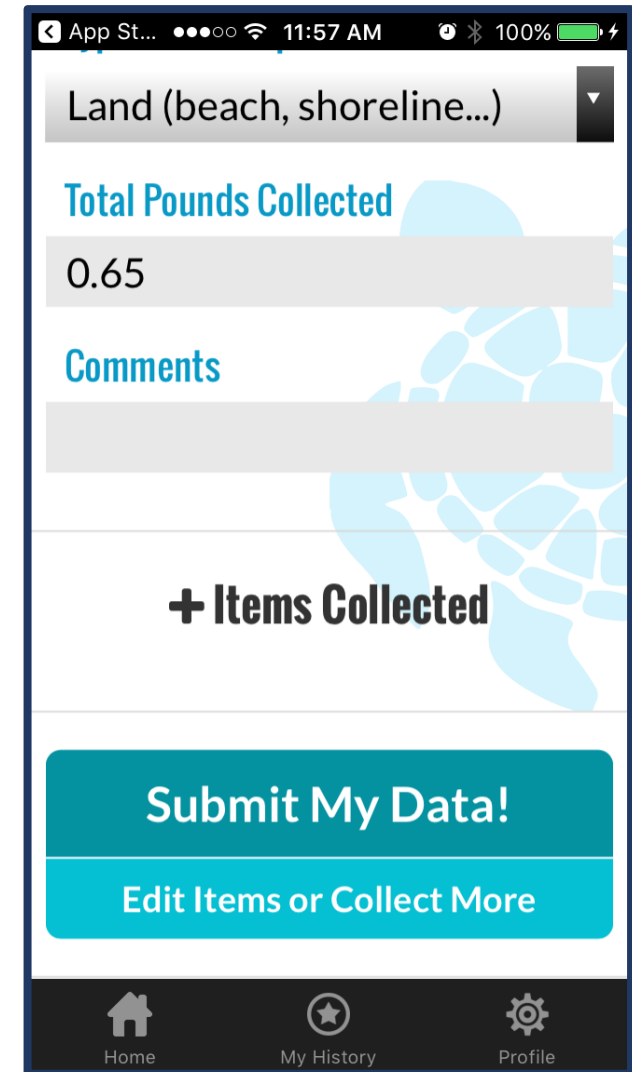
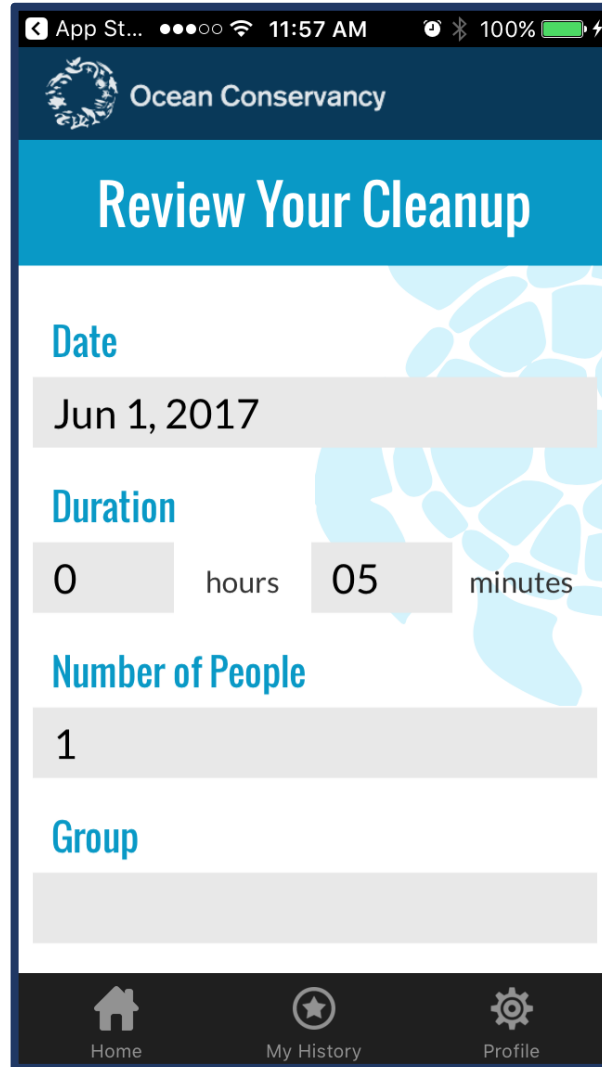


...and local municipalities

- waterway cleanups (beach, coastal, inland)
- part of ***International Coastal Cleanup***  
(facilitated by The Ocean Conservancy)
- volunteers record debris types & counts on data cards or phone app
- The Ocean Conservancy compiles, analyzes, & tracks the data



# Ocean Conservancy - "Clean Swell" app

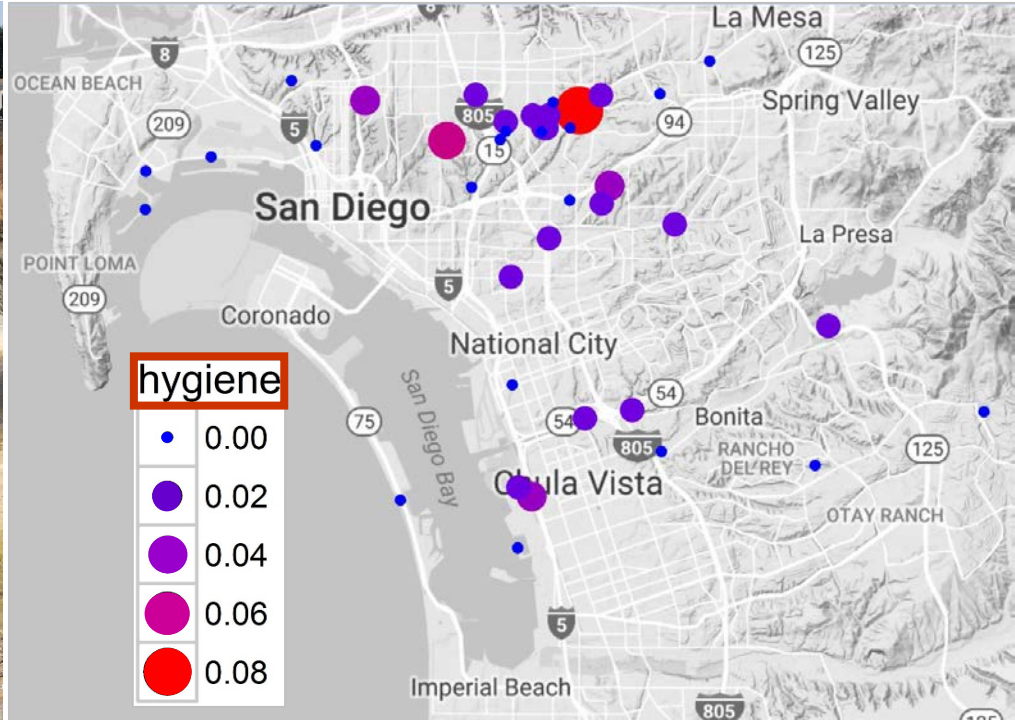
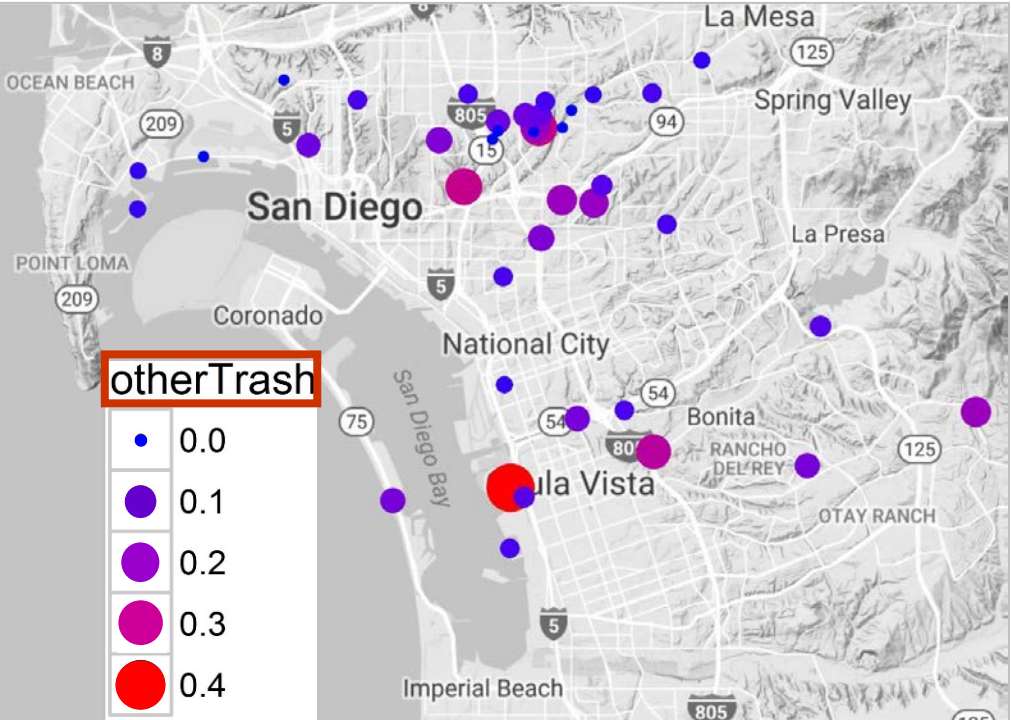
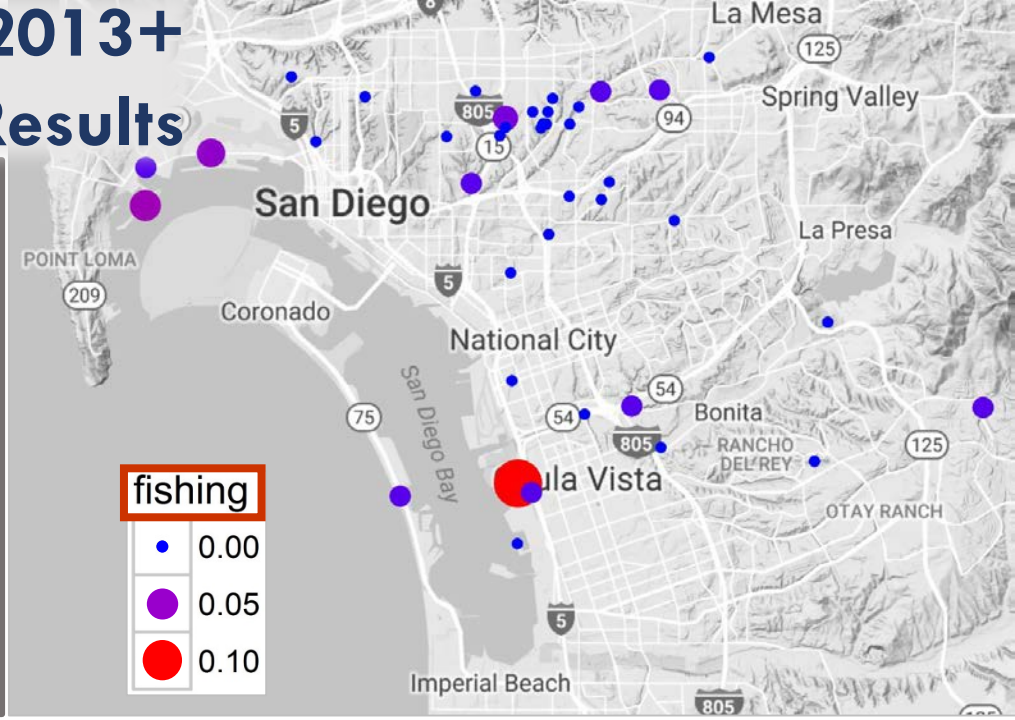
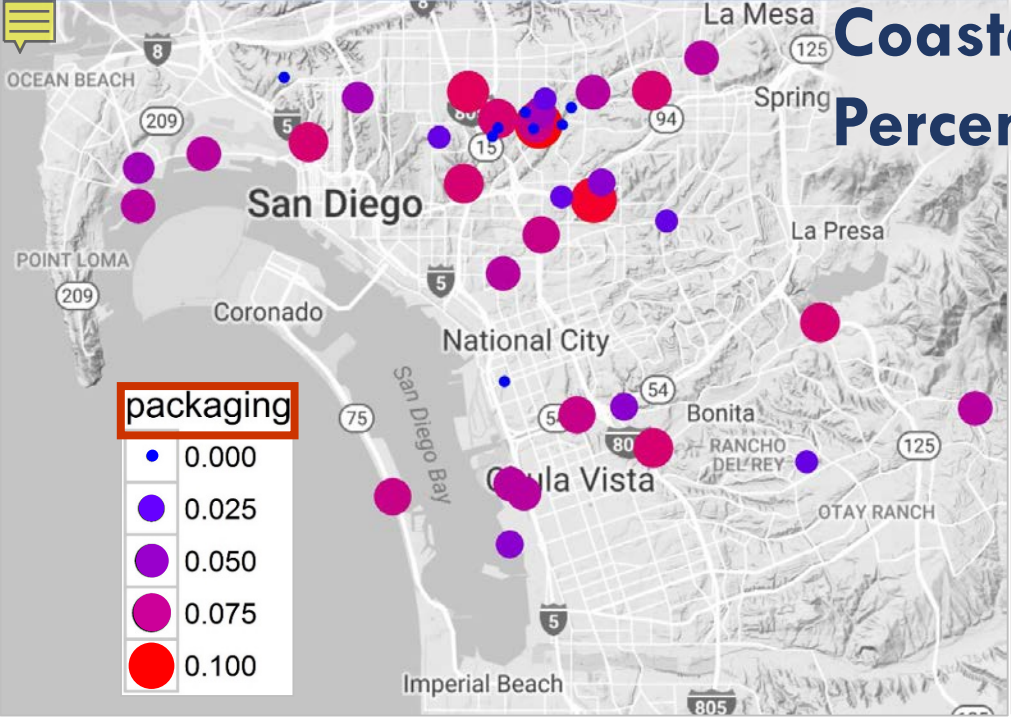


<http://archive.coastalcleanupdata.org/datacollection/index.php?event=locationDashboard&>

# Coastal Cleanup Day Results: *Chronically Most Commonly Encountered Items*

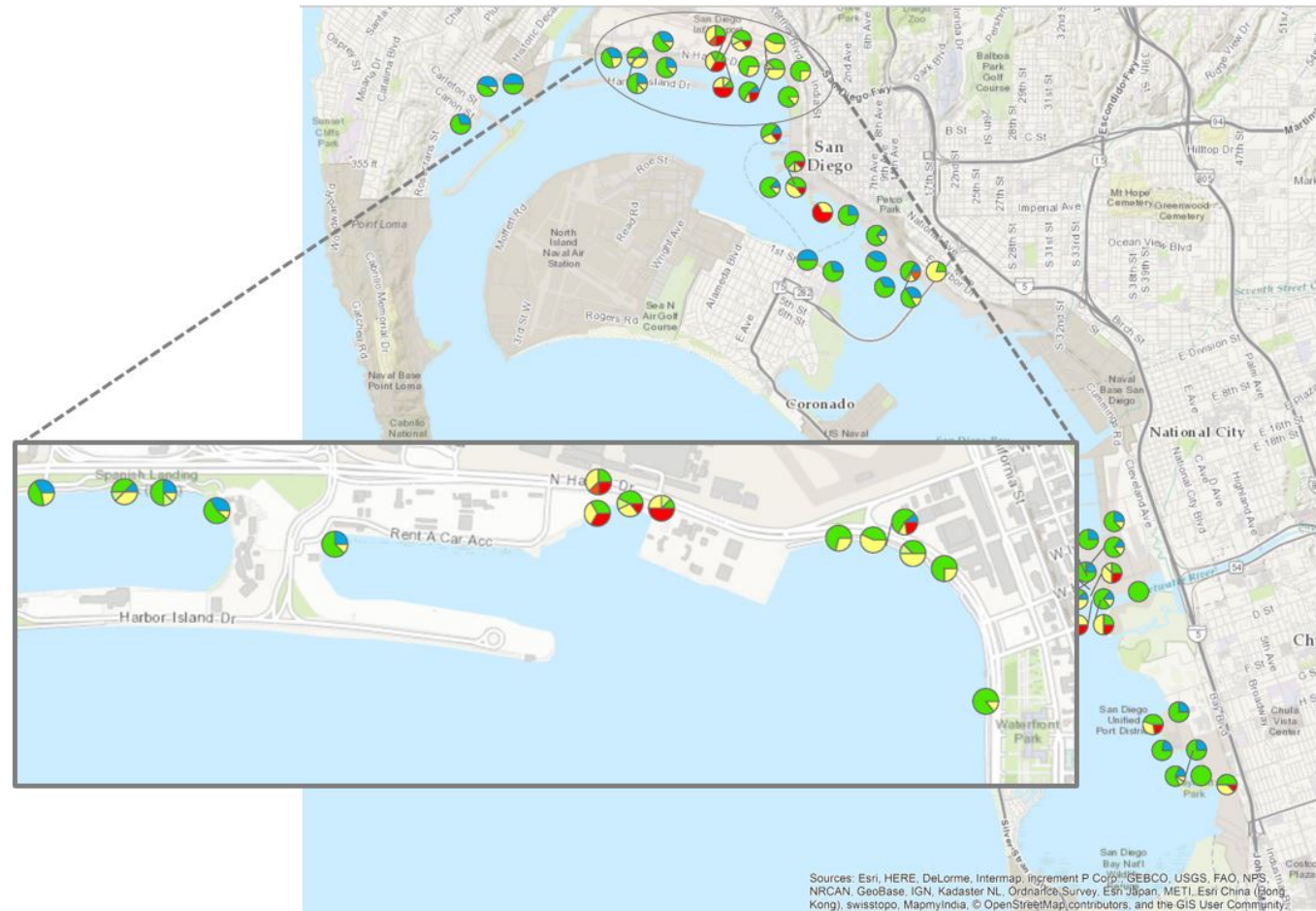
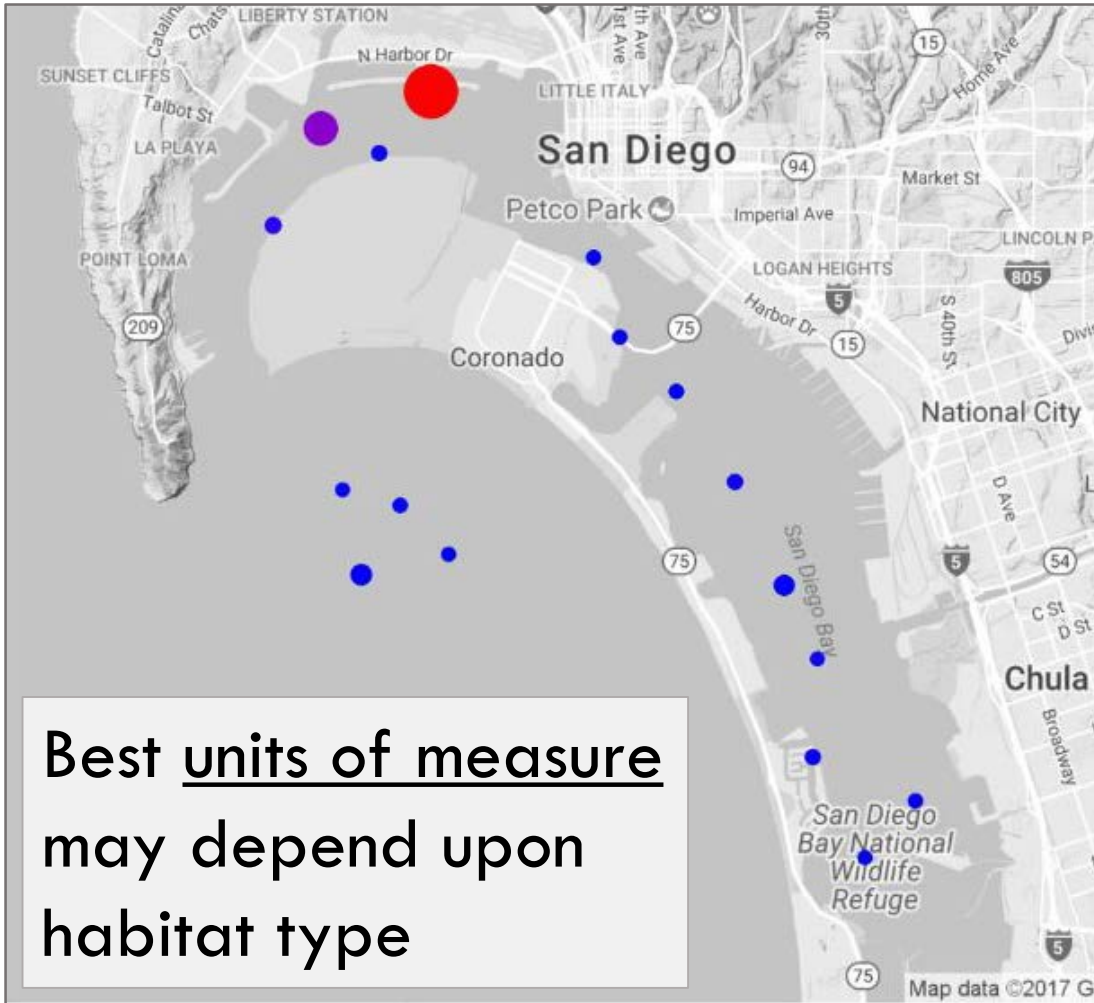


# Coastal Cleanup Day, 2013+ Percentage-of-Counts Results



# Recap: *Insights from Monitoring Efforts to Date*

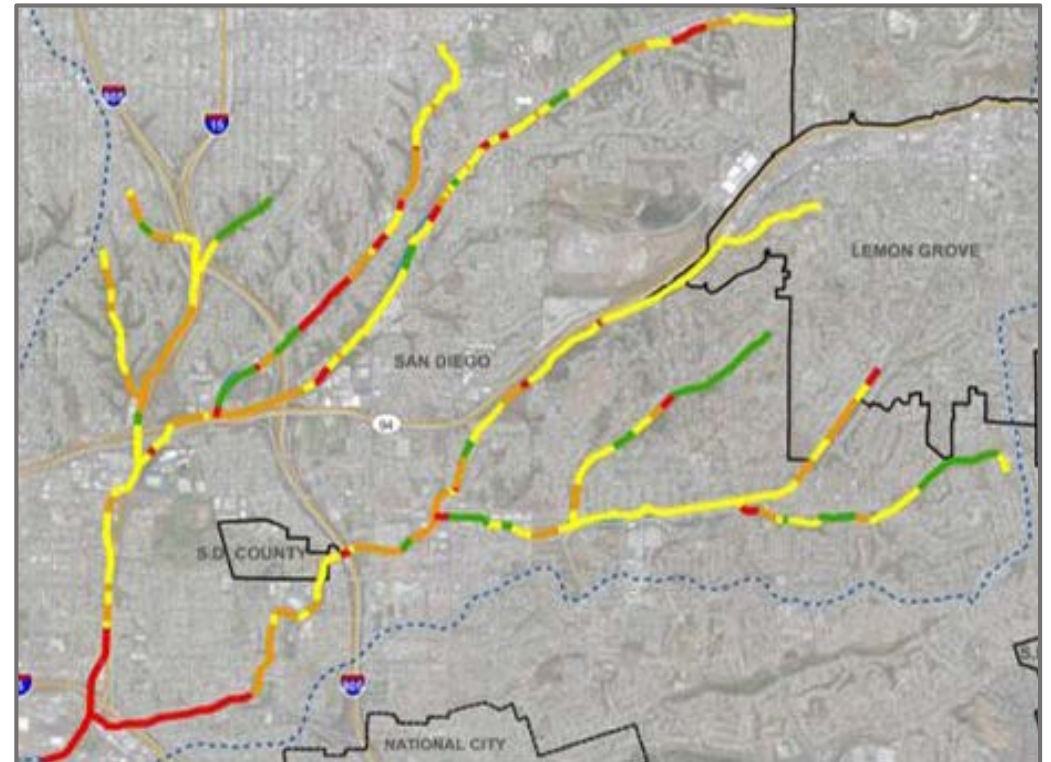
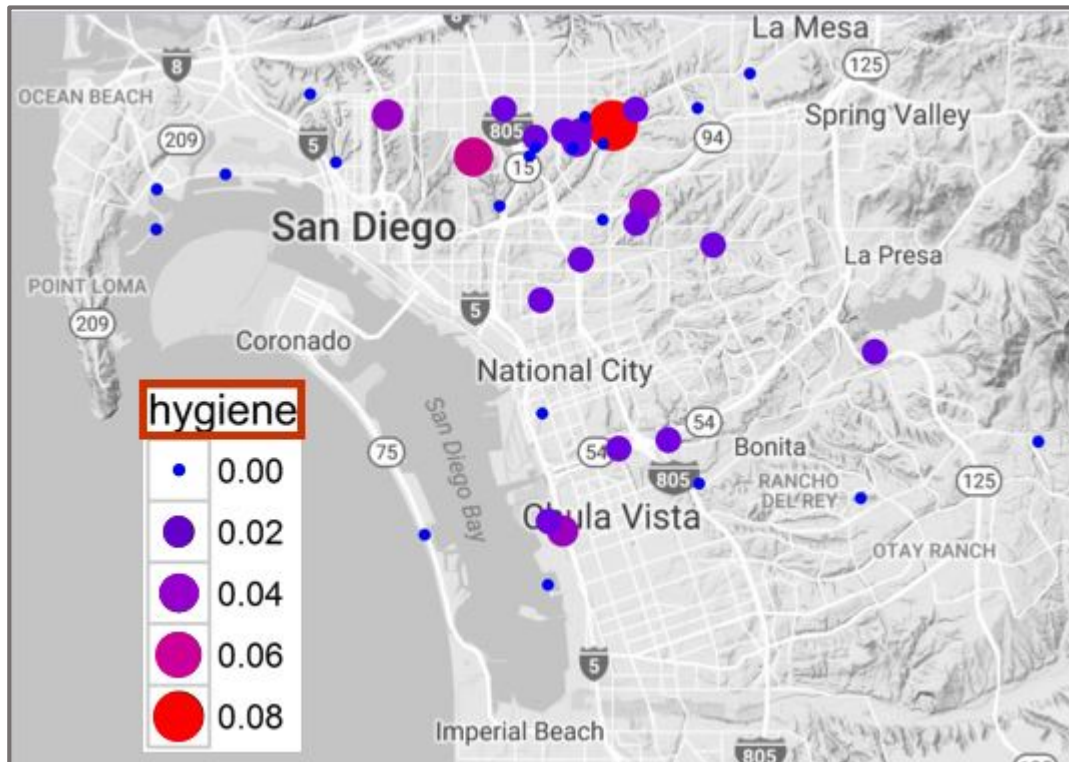
Candidate hotspots in/around Bay → where to focus cleanup/prevention efforts and/or plan future targeted monitoring



# Recap: *Insights from Monitoring Efforts to Date*

Pros/cons of varying levels of standardization & effort:

- crowd-sourced data (volunteers) is generally coarse, but can be useful
- rapid surveys can be almost as informative as more detailed/costly ones



# Recap: *Insights from Monitoring Efforts to Date*

## Insights into sources:

- classifying trash suggests origin → helps with strategizing for source control
- strategic timing and/or siting of sampling spots can reveal trash movement via water

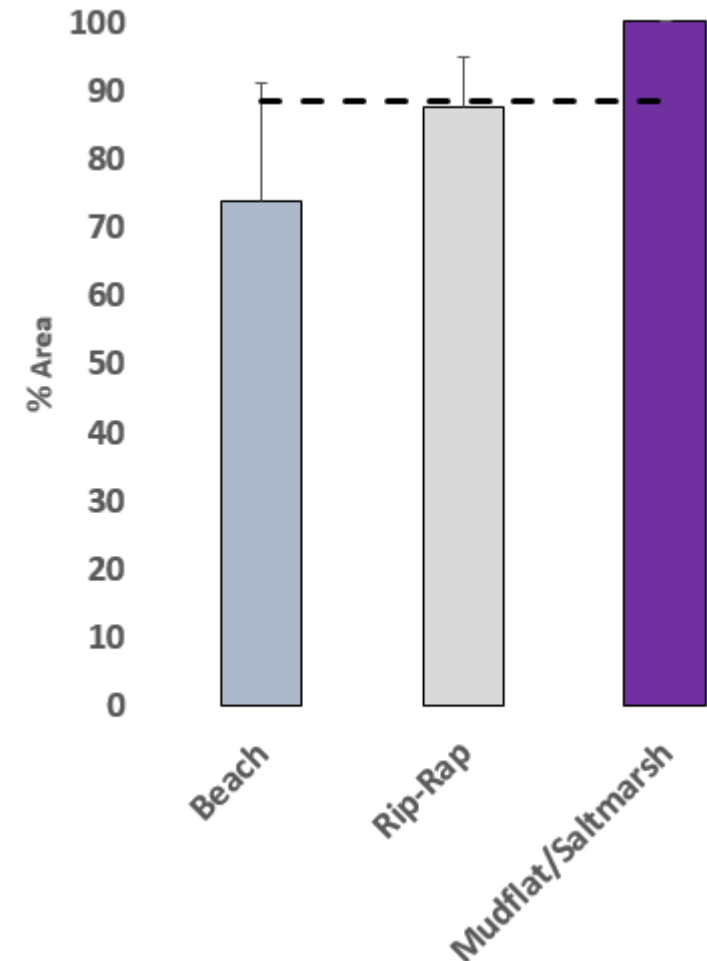




# Recap: *Insights from Monitoring Efforts to Date*

We saw what probability data look like, for trash in different habitats...  
*some food for thought:*

- Is this the best approach for REC-2, or is targeted better?
- What about ecosystem health?
  - is it worth including micro-debris, too (especially for wildlife)?





# Quick Note on *The Trash Amendments*

- statewide Ocean Plan & ISWEBE Plan - April 2015
- discharge prohibition:

*“The discharge of trash to surface waters of the State or the deposition of trash where it may be discharged into surface waters of the State is prohibited.”*

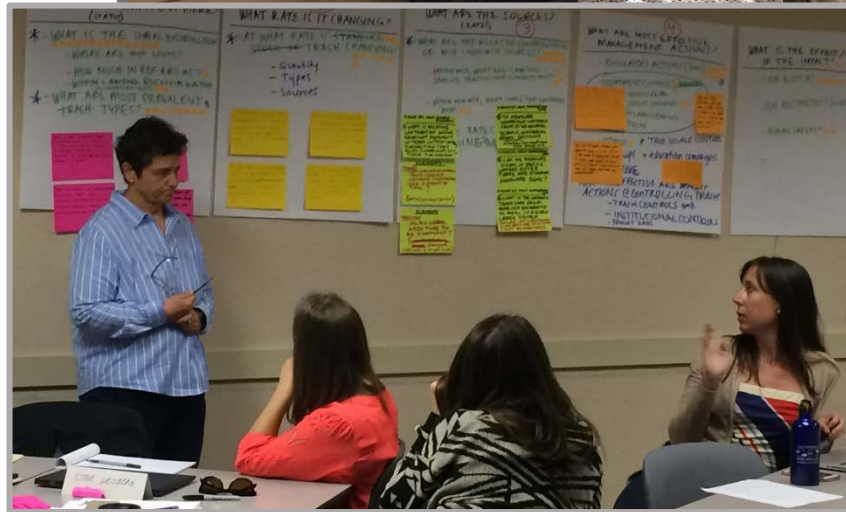
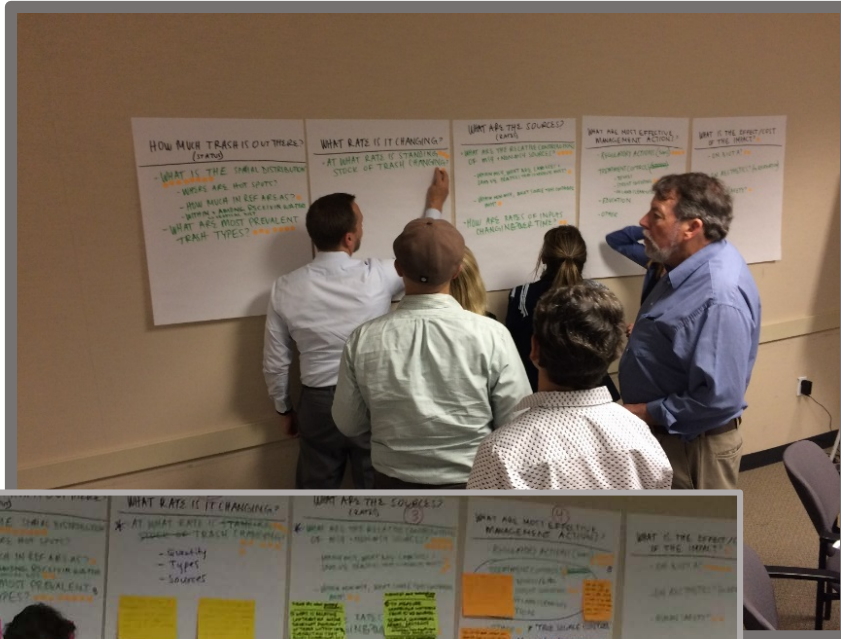
- narrative water quality standard for trash, all state waters:

*“Trash shall not be present in [state] waters, along shorelines or adjacent areas in amounts that adversely affect beneficial uses or cause nuisance.”*

- monitoring requirement contingency (→ *further impetus for unified monitoring*)

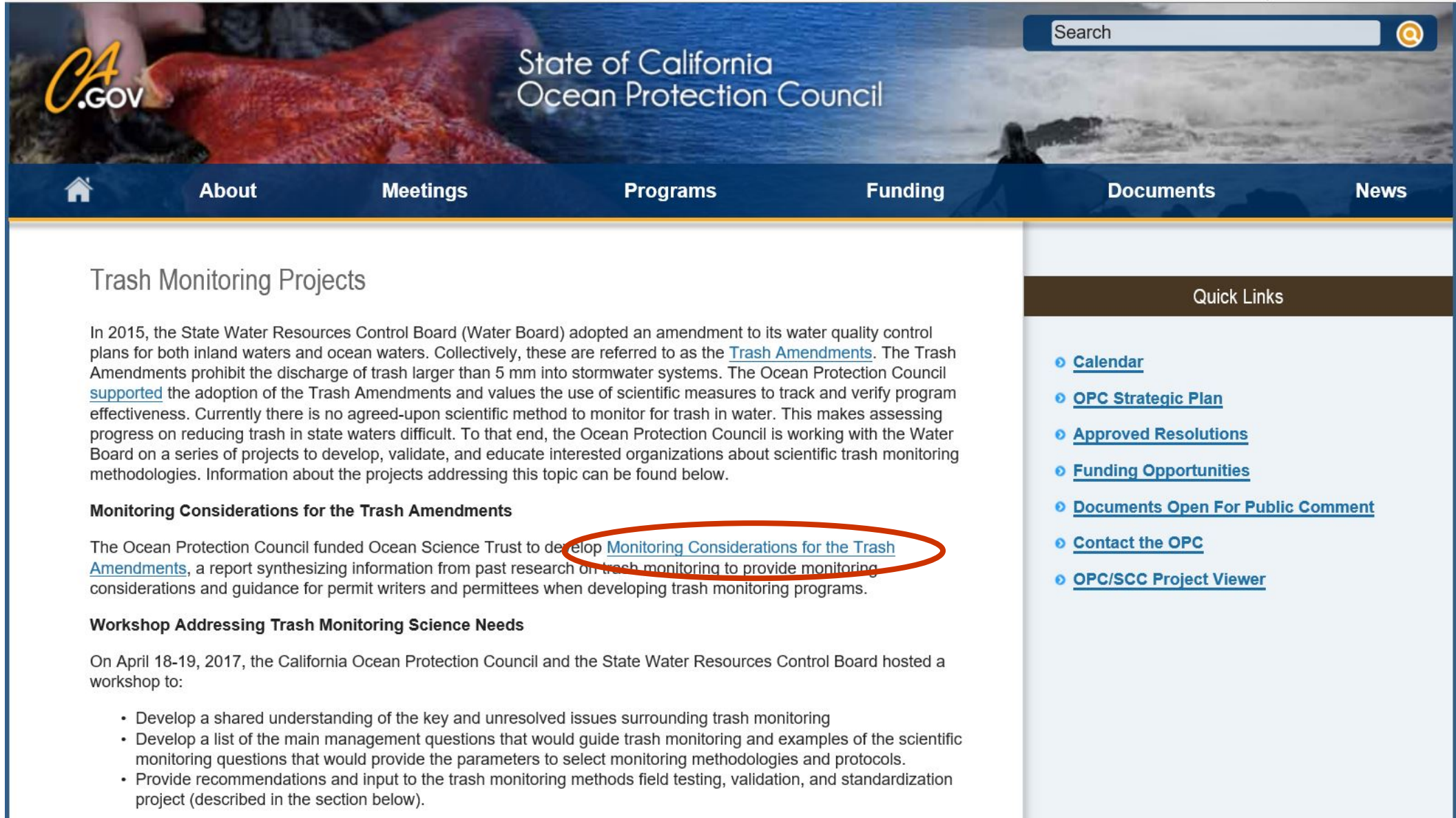
# Trash Monitoring Workshop – April 2017

State Water Board & California Ocean Protection Council & Ocean Science Trust



- experts develop a conceptual model to inform trash monitoring efforts
- identify key unresolved issues/tradeoffs
- articulate management questions into scientific monitoring questions
- provide recommendations for future field testing efforts

# New Trash Monitoring Webpage @ OPC



CA .GOV State of California Ocean Protection Council

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## Trash Monitoring Projects

In 2015, the State Water Resources Control Board (Water Board) adopted an amendment to its water quality control plans for both inland waters and ocean waters. Collectively, these are referred to as the [Trash Amendments](#). The Trash Amendments prohibit the discharge of trash larger than 5 mm into stormwater systems. The Ocean Protection Council [supported](#) the adoption of the Trash Amendments and values the use of scientific measures to track and verify program effectiveness. Currently there is no agreed-upon scientific method to monitor for trash in water. This makes assessing progress on reducing trash in state waters difficult. To that end, the Ocean Protection Council is working with the Water Board on a series of projects to develop, validate, and educate interested organizations about scientific trash monitoring methodologies. Information about the projects addressing this topic can be found below.

### Monitoring Considerations for the Trash Amendments

The Ocean Protection Council funded Ocean Science Trust to develop [Monitoring Considerations for the Trash Amendments](#), a report synthesizing information from past research on trash monitoring to provide monitoring considerations and guidance for permit writers and permittees when developing trash monitoring programs.

### Workshop Addressing Trash Monitoring Science Needs

On April 18-19, 2017, the California Ocean Protection Council and the State Water Resources Control Board hosted a workshop to:

- Develop a shared understanding of the key and unresolved issues surrounding trash monitoring
- Develop a list of the main management questions that would guide trash monitoring and examples of the scientific monitoring questions that would provide the parameters to select monitoring methodologies and protocols.
- Provide recommendations and input to the trash monitoring methods field testing, validation, and standardization project (described in the section below).

### Quick Links

- ◊ [Calendar](#)
- ◊ [OPC Strategic Plan](#)
- ◊ [Approved Resolutions](#)
- ◊ [Funding Opportunities](#)
- ◊ [Documents Open For Public Comment](#)
- ◊ [Contact the OPC](#)
- ◊ [OPC/SCC Project Viewer](#)

<http://www.opc.ca.gov/programs-summary/land-based-impacts/trash-monitoring-projects/>

# Workshop Report: *Monitoring Considerations for Trash Amendments*



**Table 1.** The pros and cons of qualitative, semi-quantitative, and quantitative trash assessment approaches.

Measurement Type	Pros	Cons
<b>1. Qualitative</b>	<ul style="list-style-type: none"> <li>Helps to identify sources of trash</li> </ul>	<ul style="list-style-type: none"> <li>May be less accurate than other measurement types (or "the least accurate method")</li> </ul>
1.1 Trash Characterization	<ul style="list-style-type: none"> <li>Helps to identify sources of trash</li> <li>May be required for assessment of product bans</li> </ul>	<ul style="list-style-type: none"> <li>Time consuming to implement</li> <li>Weathering of debris can make it difficult to identify trash type and may result in under- or mis-classification</li> </ul>
1.2 On-Land Visual Assessment	<ul style="list-style-type: none"> <li>Requires less time to implement</li> <li>Reduced sampling time enables more sites to be monitored for a given effort</li> <li>Logistically easy to implement, particularly for sampling locations that are challenging to access</li> <li>Measurement error is relatively low, with sufficient training</li> </ul>	<ul style="list-style-type: none"> <li>Limited application and validation in receiving waters</li> <li>Requires an initial paired quantitative assessment in order to develop a conversion factor from qualitative scores to quantitative values</li> <li>Categorical score definitions need to be consistent in order for data to be comparable to other OLVA monitoring programs</li> <li>With out established conversion factors, OLVA data alone prevent the calculation of a percent change in the amount of trash over a given time period</li> </ul>
<b>2. Semi-quantitative</b>	<ul style="list-style-type: none"> <li>Cost-effective compromise if quantitative methods are infeasible</li> </ul>	<ul style="list-style-type: none"> <li>Less accurate and lower data comparability than quantitative assessments</li> </ul>
2.1 Rapid Trash Assessment	<ul style="list-style-type: none"> <li>Provides a systematic approach for non-catchment systems (e.g., streams and shorelines)</li> <li>Examines types of trash and identification of sources</li> <li>Can generate consistent and comparable results</li> <li>Most useful for identifying site-specific management actions to reduce trash loading in streams</li> </ul>	<ul style="list-style-type: none"> <li>Risk of observer bias</li> <li>Does not measure loading of trash downstream</li> </ul>
<b>3. Quantitative</b>	<ul style="list-style-type: none"> <li>Precise</li> <li>Higher data comparability</li> <li>Amenable to statistical analyses</li> </ul>	<ul style="list-style-type: none"> <li>Can be time consuming, difficult to implement, or may require technical training</li> </ul>
3.1 Counts	<ul style="list-style-type: none"> <li>Easy to train staff and other volunteers</li> <li>Established protocols developed</li> <li>A common assessment type, particularly for marine habitats</li> <li>Method more informative relative to weight for light items (e.g., styrofoam and plastic bags)</li> </ul>	<ul style="list-style-type: none"> <li>Time consuming</li> <li>Many trash items break apart during the collection process (e.g., Styrofoam), introducing measurement error and/or bias into measurements</li> <li>Small items are weighted equally to large items, unless the method categorizes counts by litter size</li> </ul>
3.2 Weight (dry)	<ul style="list-style-type: none"> <li>Reduces bias due to trash water absorption</li> </ul>	<ul style="list-style-type: none"> <li>Limited application</li> <li>Trash items vary significantly in weight (heavy items are less mobile, lights materials are more mobile and, generally, pose a higher risk to species)</li> </ul>



## Upcoming Project:



# Field Test & Validate Trash Monitoring Methods

R & D of trash monitoring methods to effectively implement the trash amendments:

- 3 years
- Goal: develop, validate, & field test scientific trash monitoring methods in water and stormwater channels
  - Convene technical advisory committee
  - Field test ~4 methods to monitor trash in receiving waters
  - Communicate with stakeholders & provide opportunity for co-permittees to learn how to effectively monitor receiving waters
- Stakeholder meeting — Fall 2017
- Contact: Holly Wyer, Program Manager @ OPC  
([Holly.Wyer@resources.ca.gov](mailto:Holly.Wyer@resources.ca.gov))

# Next Steps

- complete REC-2 status sheet for SD Bay (provide data-sharers opportunity to review 1<sup>st</sup>; October '17)
- finish preparing supporting documentation about analysis (December '17)
- convene stakeholders to plan unified monitoring

**ASSESSING BACTERIA LEVELS IN SAN DIEGO BAY**  
MONITORING & ASSESSMENT  
SAN DIEGO WATER BOARD  
February 2017

Are ecosystems healthy? **IS IT SAFE TO SWIM?**  
Are fish and shellfish safe to eat? **Is water safe to drink?**

This "status sheet" reports on current conditions of San Diego Bay in terms of its ability to support water-contact recreation (i.e., the "REC-1" beneficial use). Water quality standards are commonly used to determine if waters are safe for human contact. Fecal indicator bacteria such as *Enterococcus* have been linked to various pathogens commonly associated with sewage (or fecal matter). When *Enterococcus* levels in water exceed standards deemed safe for human water contact, the potential risk of contracting a water-borne illness increases.

**SAN DIEGO BAY: A RESOURCE OF MANY USES**  
San Diego Bay is an important water body in the San Diego region due to its ecological value and because it supports tourism; commercial, recreational, and subsistence fishing; and a variety of recreational, maritime, industrial, commercial, and military uses. For this reason, the San Diego Water Board endorsed a "Strategy for a Healthy San Diego Bay" via Resolution No. R9-2015-0086 in June 2015. The Strategy identified the key beneficial use categories of the Bay as:

- Recreation (water contact ("REC-1") and non-water-contact ("REC-2"));
- Human consumption of fish and shellfish; and
- Habitats and ecosystems

A primary goal of the Strategy is to use monitoring data to assess attainment of these key beneficial uses, as well as changes in their status over time, and to communicate findings to the public.

Beach advisories are posted when bacteria levels are above the water quality standards and swimming is not advised. **SD County Department of Environmental Health** routinely monitors swimming areas to evaluate bacteria levels. In San Diego Bay, weekly samples are collected at six beaches between April 1st and October 31st of each year. In some cases (such as at Shelter Island Shoreline Park in 2015), monitoring continues through the winter months. This monitoring of bacteria levels allows for evaluation of how often each beach met or did not meet safe swimming water quality standards during the "dry" season (May through September) and "wet" season (October through April).

**CONTACT:**  
Betty Fetscher, Ph.D., Senior Environmental Scientist  
Betty.Fetscher@waterboards.ca.gov

**Project partners:**

**ASSESSING CONTAMINANTS IN FISH & SHELLFISH IN SAN DIEGO BAY**  
MONITORING & ASSESSMENT  
SAN DIEGO WATER BOARD  
February 2017

Are ecosystems healthy? **IS IT SAFE TO SWIM?**  
Are fish and shellfish safe to eat? **Is water safe to drink?**

Fishing is a key recreational and subsistence activity in San Diego Bay. Several contaminants exist in bay sediments that can become incorporated into fish and shellfish tissue, via bioaccumulation and biomagnification, potentially posing a threat to humans consuming the seafood.

The **California Office of Environmental Health Hazard Assessment (OEHHA)** conducts scientific evaluations of risks to public health. In 2013, OEHHA released an **advisory** for San Diego Bay identifying the weekly number of servings of select fish species considered safe to eat, based on contaminant levels measured in fish tissue that could affect human health. The 2013 OEHHA advisory relies on contaminant-concentration data in fish tissue collected from 1999 through 2010. Since that time, additional data from several efforts have become available.

**SAN DIEGO BAY: A RESOURCE OF MANY USES**  
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**DATA AVAILABLE FOR ANALYSIS SINCE THE 2013 OEHHA ADVISORY**

- SCCWRP Right Regional and Regional Harbor Monitoring Programs and City of San Diego Shallow Water Habitat Survey (Fish Tissue, 2013-2014)
- San Diego Water Board Surface Water Ambient Monitoring Program (Lobster Tissue, 2014-2015)
- NOAA Mussel Watch Program (Mussel Tissue, 2010-2015)
- CDPH Marine Biotinix Monitoring Program (Clam and Mussel Tissue, 2011-2016)
- San Diego County DEH Beach and Bay Monitoring Program (Water Quality, 2014-2016)

This "status sheet" presents analyses of more recent data collected by federal, state, and local agencies. Data analyzed included contaminant levels in fish, lobster, and mussel tissue, marine biotoxins in clam and mussel tissue, and levels of fecal indicator bacteria in water where bivalve shellfish may be harvested by the public. This information is not intended as a consumption advisory; rather, the goal is to evaluate whether the key beneficial use category of "safe to eat" is being met. This information can be used to educate the public and to prioritize efforts for achieving healthy waters in San Diego Bay.

**Common Fish and Shellfish Analyzed**

- Pacific Chub Mackerel
- Spotted Sand Bass
- California Spiny Lobster
- Mussel
- California Halibut
- Topsmelt
- Round Stingray
- Pismo Clam

**CONTACT:**  
Betty Fetscher, Ph.D., Senior Environmental Scientist  
Betty.Fetscher@waterboards.ca.gov

**Project partners:**

**ASSESSING THE CONDITION OF SAN DIEGO BAY FOR NON-WATER-CONTACT RECREATION**  
MONITORING & ASSESSMENT  
SAN DIEGO WATER BOARD  
February 2017

**TYPICAL USE RELATION IN SAN DIEGO BAY**  
This Strategy identifies the key beneficial use categories of the Bay as:

- Recreation (water contact ("REC-1") and non-water-contact ("REC-2"));
- Human consumption of fish and shellfish; and
- Habitats and ecosystems

A primary goal of the Strategy is to use monitoring data to assess attainment of these key beneficial uses, as well as changes in their status over time, and to communicate findings to the public.

**WATERWAYS IMPACTING RECREATION**  
The Strategy identifies the key beneficial use categories of the Bay as:

- Recreation (water contact ("REC-1") and non-water-contact ("REC-2"));
- Human consumption of fish and shellfish; and
- Habitats and ecosystems

A primary goal of the Strategy is to use monitoring data to assess attainment of these key beneficial uses, as well as changes in their status over time, and to communicate findings to the public.

**IN PROGRESS**

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**Project partners:**



# ***Wanna talk trash?***

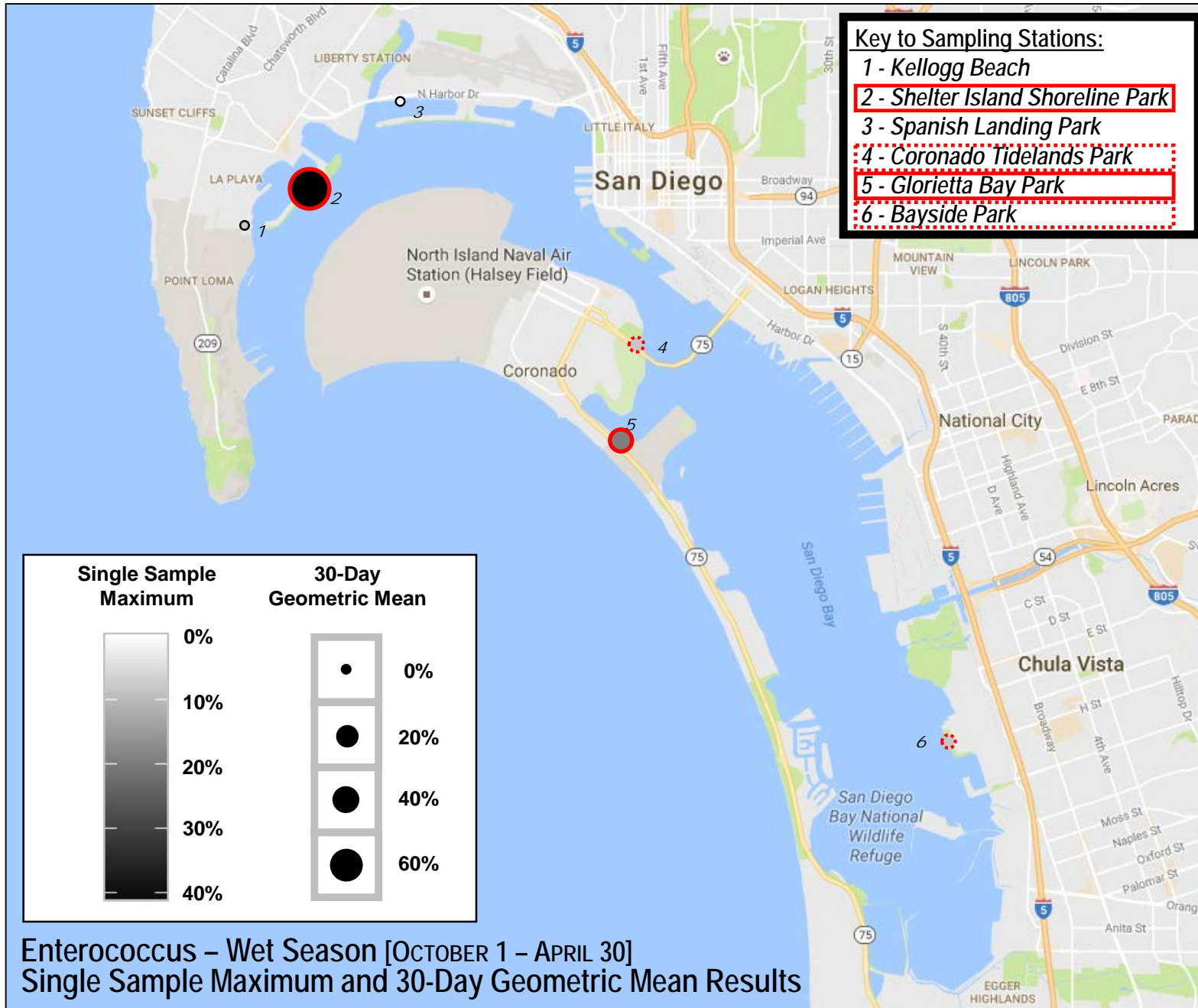
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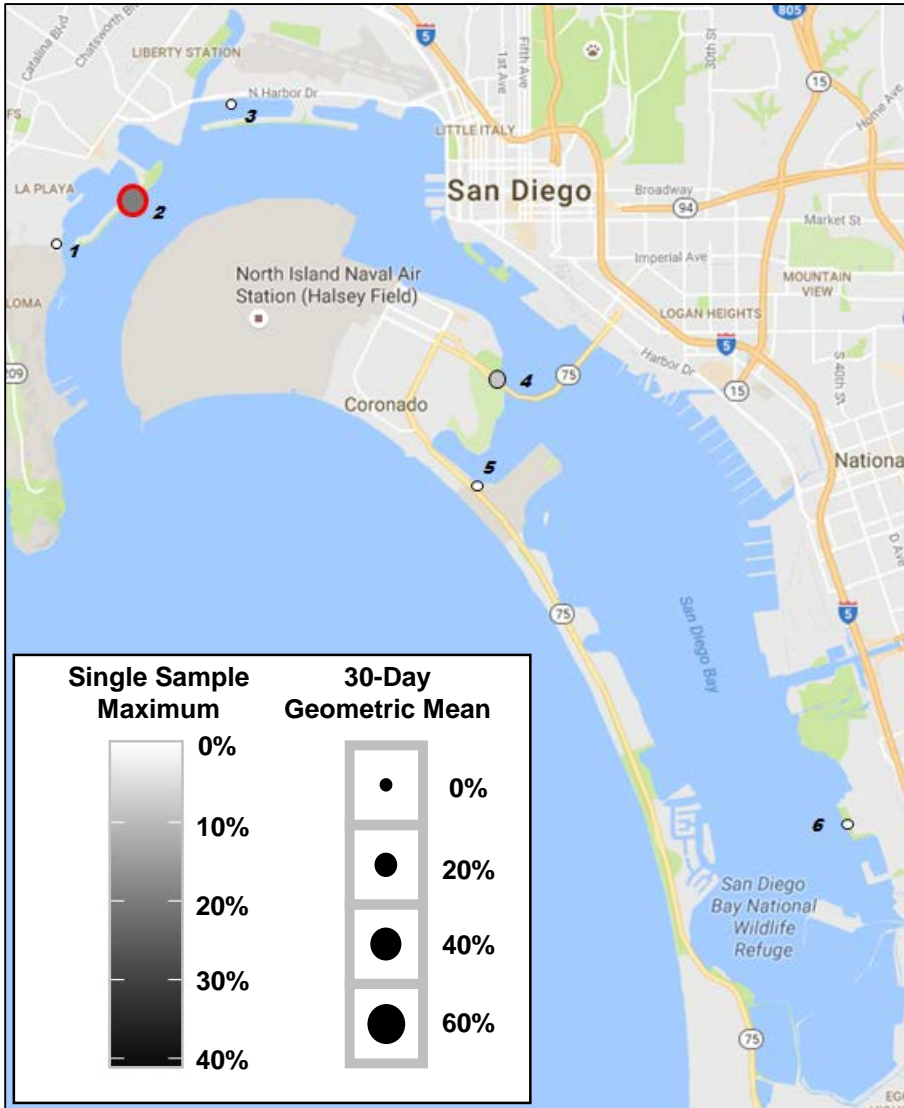
Betty Fetscher

[betty.fetscher@waterboards.ca.gov](mailto:betty.fetscher@waterboards.ca.gov)

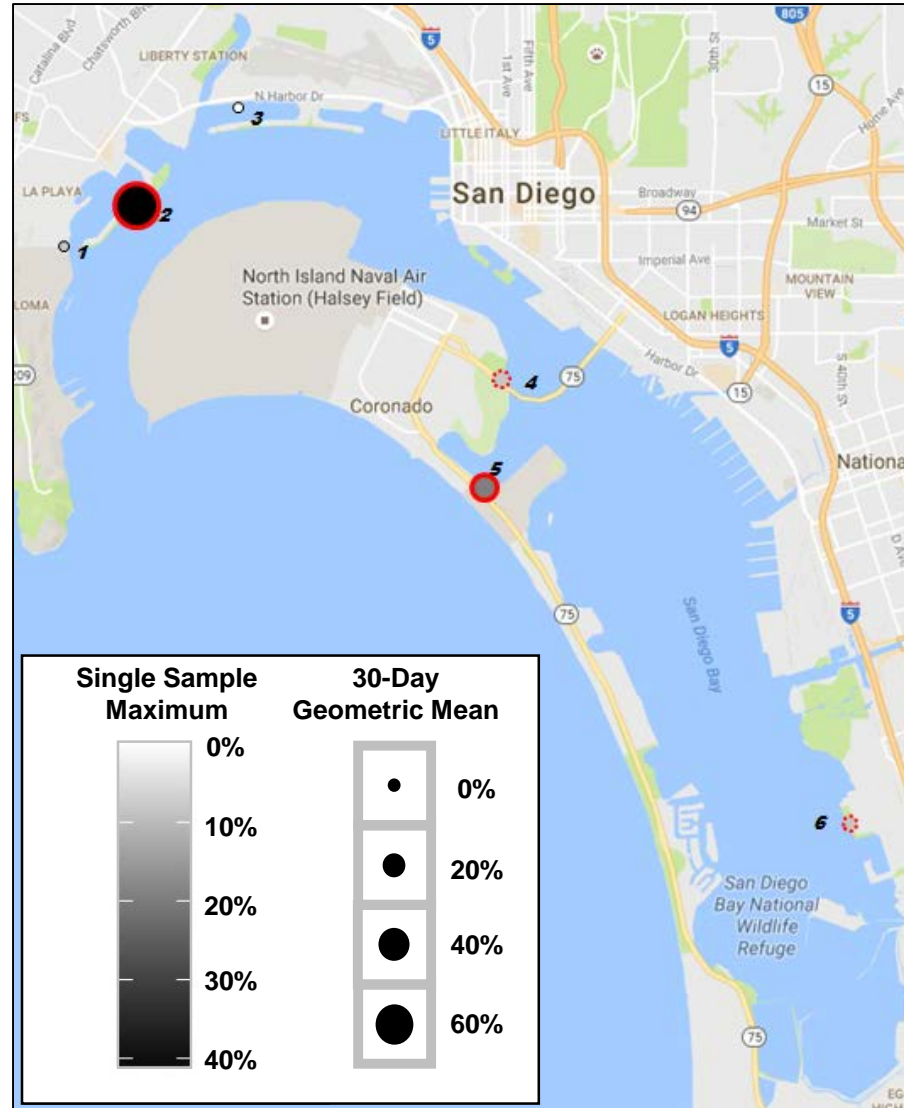
619.521.3358







**Dry Season Results**  
 MAY 1, 2014 – SEPTEMBER 30, 2014  
 MAY 1, 2015 – SEPTEMBER 30, 2015



**Wet Season Results**  
 OCTOBER 1, 2014 – APRIL 30, 2015  
 OCTOBER 1, 2015 – APRIL 30, 2016

These uses of water serve to promote our tangible and intangible economic, social and environmental goals. Habitats & ecosystems is the key beneficial use for which protection and restoration of the health of waters is most complicated and difficult. They span from the ocean to ephemeral headwater streams.

### 1. KEY BENEFICIAL USES

Key beneficial uses are the beneficial uses that are most critical to protecting human and environmental health.

### 2. KEY AREAS

Key areas are the places where protection and restoration of the chemical, physical, and biological integrity of waters is most important for a key beneficial use.

### 3. APPLYING KEY BENEFICIAL USES AND KEY AREAS

Where the Board has flexibility, such as efforts to restore degraded waters, the key beneficial uses / key areas concept can help the Board decide which work to undertake. In programs with less flexibility, such as permitting, the concept can help the Board decide which aspects of that work warrant greater attention.

Drinking Water Supply

Fish & Shellfish Consumption

Recreation

HABITATS & ECOSYSTEMS

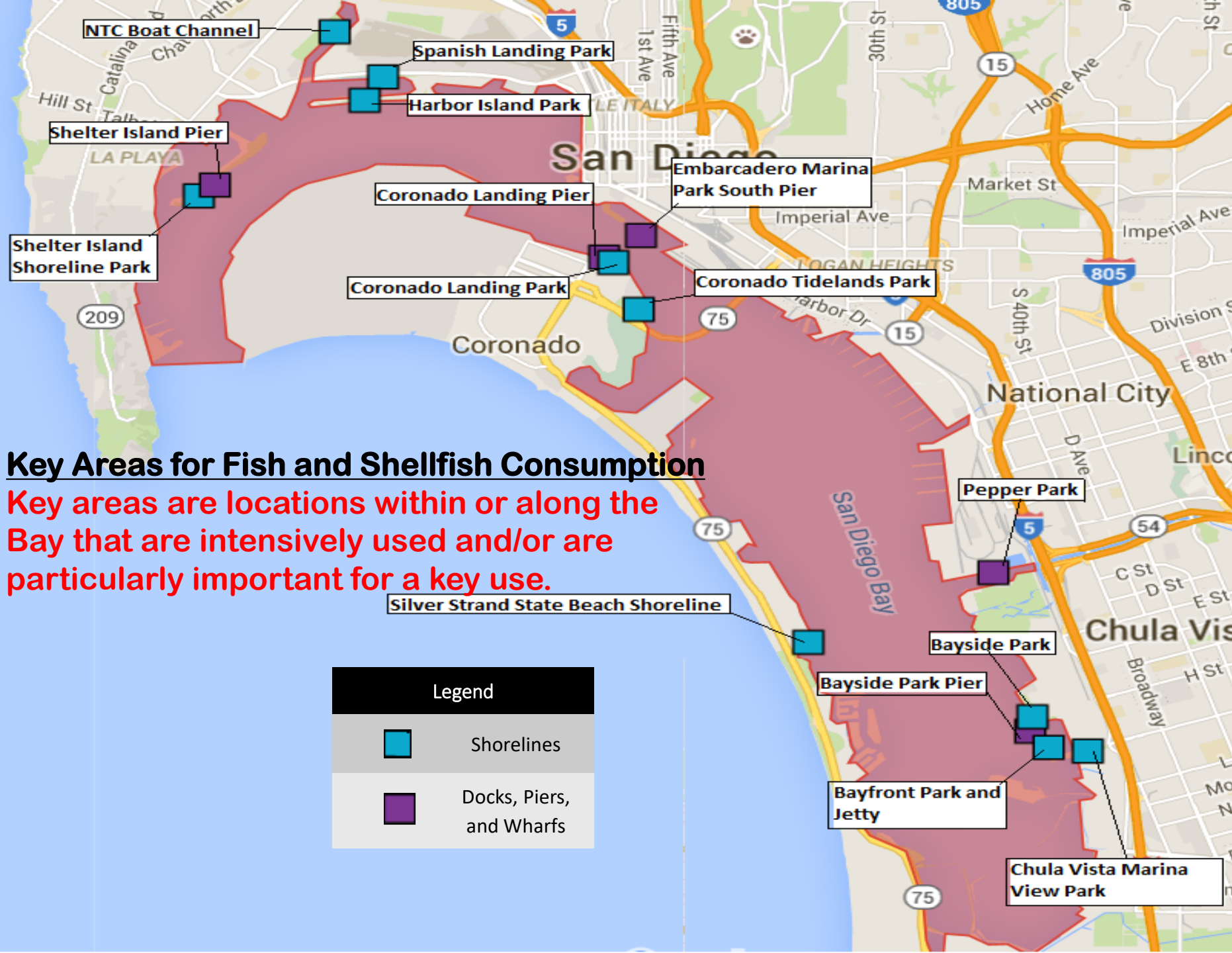
## KEY AREAS in the San Diego Region for HABITATS & ECOSYSTEMS

KEY WATER BODIES	First (highest) Rank	Ocean San Diego Bay Lagoons & Estuaries Stream Systems
	Second Rank	Mission Bay Stream Mouths
	Third Rank	Ponds Harbors

AREAS OF SPECIAL IMPORTANCE	Areas with habitats or ecosystems of special importance (or where such areas could be restored)	Areas used (or potentially used) by a special status or vulnerable native species	Designated areas with extra protection for habitats & ecosystems
	<ul style="list-style-type: none"> <li>e.g., areas with</li> <li>Vernal pools</li> <li>Wetlands</li> <li>Seagrass beds</li> <li>Rocky intertidal</li> <li>Subtidal rocky reefs, including kelp forests</li> </ul>	<ul style="list-style-type: none"> <li>e.g., areas used by</li> <li>Endangered, threatened, rare, or special concern species</li> <li>Bird species protected under federal Migratory Bird Treaty Act</li> </ul>	<ul style="list-style-type: none"> <li>e.g.,</li> <li>National wildlife refuges</li> <li>National monuments</li> <li>National estuarine research reserves</li> <li>Critical habitat pursuant to federal Endangered Species Act</li> <li>National Forests</li> <li>Wilderness areas pursuant to federal Wilderness Act</li> <li>State marine reserves</li> <li>State marine conservation areas</li> <li>State ecological reserves</li> <li>State wildlife areas</li> <li>State natural preserves &amp; reserves</li> <li>State beaches &amp; parks</li> <li>State water quality protection areas</li> <li>University protected areas</li> <li>County, JPA, special district, &amp; city protected areas</li> <li>Natural community &amp; habitat conservation areas</li> </ul>
	<p>For examples of specific key areas, please see Tables 11 and 12 in the Report: <a href="#">Key Beneficial Uses and Key Areas: Focusing on What is Most Important (2017)</a>.</p>		



Identifying key beneficial uses and key areas is the beginning of helping the Board focus on what is most important. For more information see:

- Practical Vision: Healthy Waters, Healthy People (2013)
- Key Beneficial Uses and Key Areas: Focusing on What is Most Important (2017)

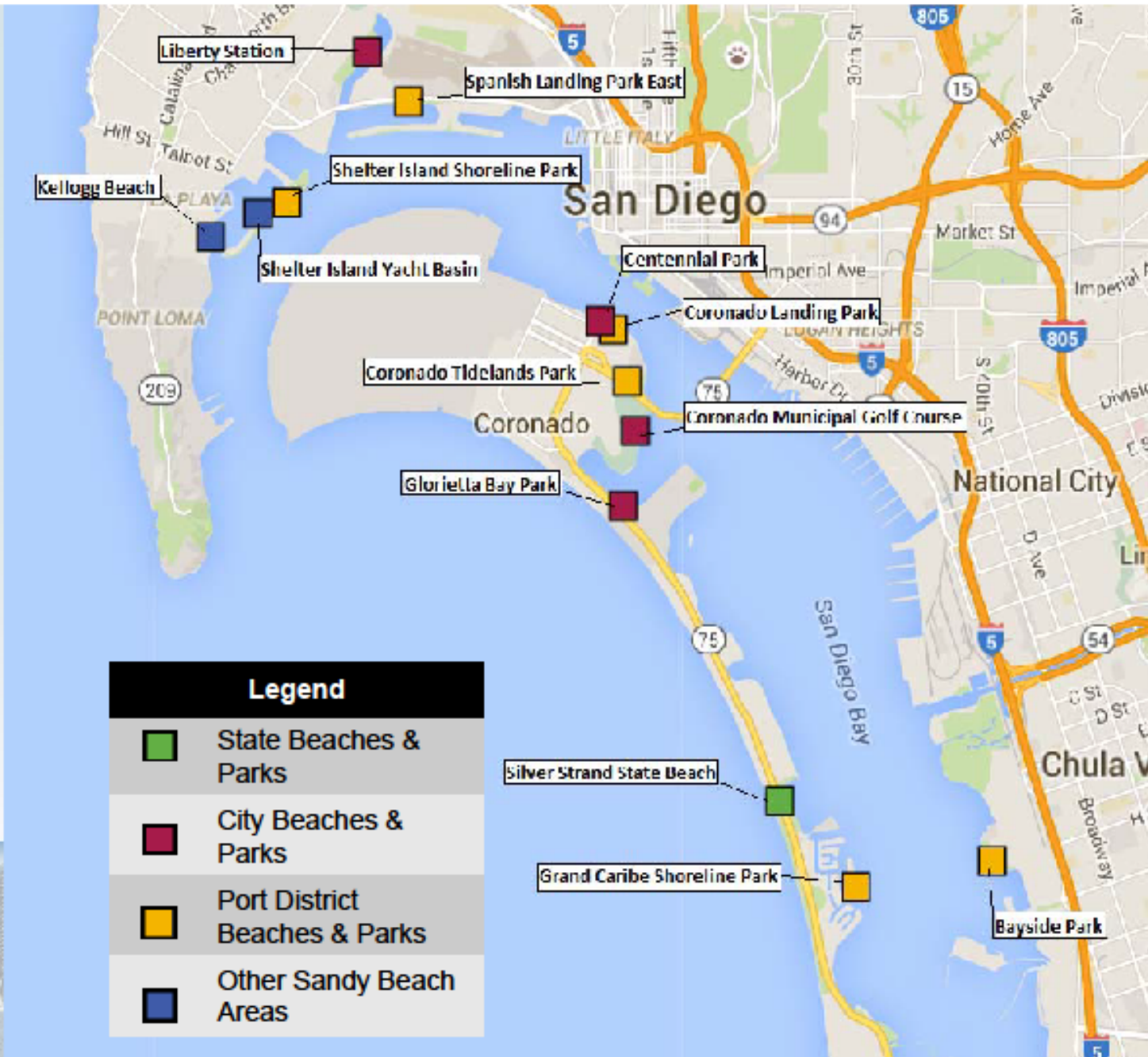


**Key Areas for Fish and Shellfish Consumption**

Key areas are locations within or along the Bay that are intensively used and/or are particularly important for a key use.

Legend	
	Shorelines
	Docks, Piers, and Wharfs

# Key Areas- Contact Recreation





# Trash Implementation Plan Requirements

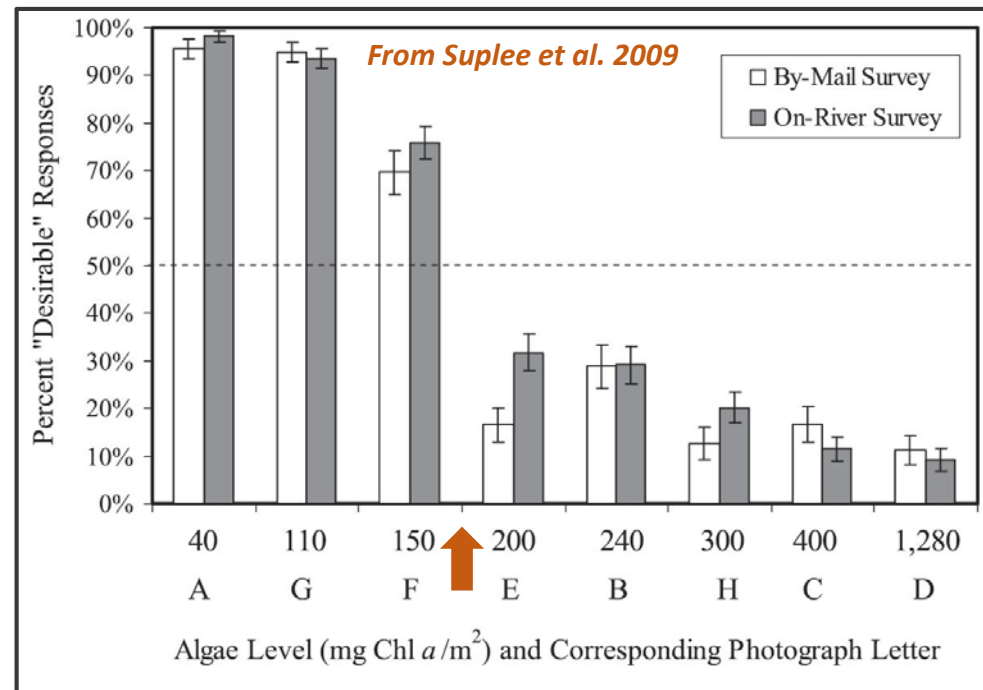
Compliance may be demonstrated through either:

- Track 1: Permittees install, operate, and maintain a network of certified Full Capture Systems (FCS) to capture trash in the storm drains, located in priority land use areas for municipal systems, and the entire facility for industrial and commercial permit holders
- Track 2: Permittees install, operate, and maintain any combination of controls (structural and/or institutional) anywhere in their jurisdiction as long as they can demonstrate that their system performs as well as Track 1 (e.g., Full Capture System Equivalency)

Permittees shall also demonstrate interim milestones, such as average load reductions of 10% per year or other progress to full implementation

# Determining Attainment of REC-2 *Vis-à-vis* Trash

Knowing when we've achieved REC-2 may require identifying "acceptable" amounts of trash, as was done with algae in Montana



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AMERICAN WATER RESOURCES ASSOCIATION

February 2009

## HOW GREEN IS TOO GREEN? PUBLIC OPINION OF WHAT CONSTITUTES UNDESIRABLE ALGAE LEVELS IN STREAMS<sup>1</sup>

*Michael W. Suplee, Vicki Watson, Mark Teply, and Heather McKee<sup>2</sup>*

**ABSTRACT:** A public opinion survey was carried out in Montana to ascertain if the public identifies a level of benthic (bottom-attached) river and stream algae that is undesirable for recreation. The survey had two parts; an On-River survey and a By-Mail survey. The On-River survey was conducted via 44 trips randomly scheduled throughout the state during which recreators were interviewed in-person at the stream. Selection of stream segments and survey dates/times was based on known, statewide recreational use patterns. By-Mail survey forms were sent to 2,000 individuals randomly selected from Montana's Centralized Voter File (CVF) available from the Montana Secretary of State. The CVF was current through 2004 and represented over 85% of the state's eligible voting population. In both surveys, eight randomly ordered photographs depicting varying levels of stream benthic algae were presented, and participants were asked if the algae level shown was desirable or undesirable for recreation. Survey form design, selection of photographs, and pretesting followed acceptable protocols that limited unintentional bias through survey execution. There were 433 returned forms (389 complete) for the By-Mail survey, while the On-River survey documented 563 interviews. In both surveys, as benthic algal chlorophyll *a* (Chl *a*) levels increased, desirability for recreation decreased. (Other measures of benthic algae biomass are presented as well.) For the public majority, mean benthic Chl *a* levels  $\geq 200$  mg/m<sup>2</sup> were determined to be undesirable for recreation, whereas mean levels  $\leq 150$  mg Chl *a*/m<sup>2</sup> were found to be desirable. Error rates were within the survey's statistical design criteria ( $\leq 5\%$ ). The largest potential error source was nonresponse in the By-Mail survey; however, the population represented by nonrespondents would have to exhibit profoundly different perceptions of river and stream algae to meaningfully alter the results. Results support earlier work in the literature suggesting 150 mg Chl *a*/m<sup>2</sup> represents a benthic algae nuisance threshold.

(KEY TERMS: rivers/stream; algae; environmental regulations; environmental impacts; public participation.)

