



# **2012 Recreational Water Quality Criteria**

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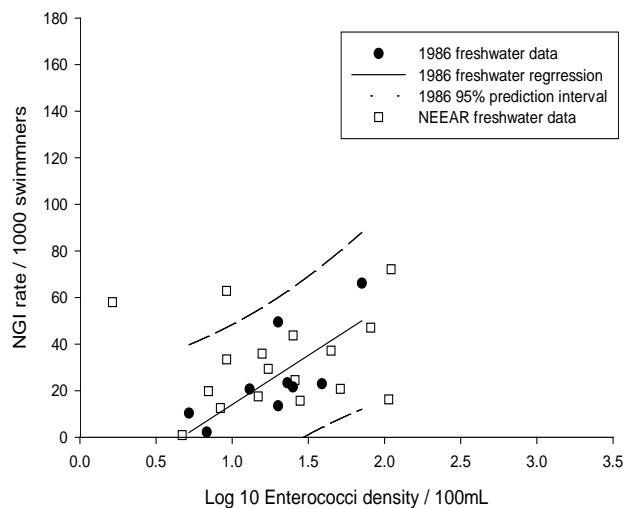
# Overview- The 2012 RWQC

- Background
- How 2012 RWQC are More Protective
- Criteria Components
- Supplemental Elements
  - qPCR and BAVs for beaches

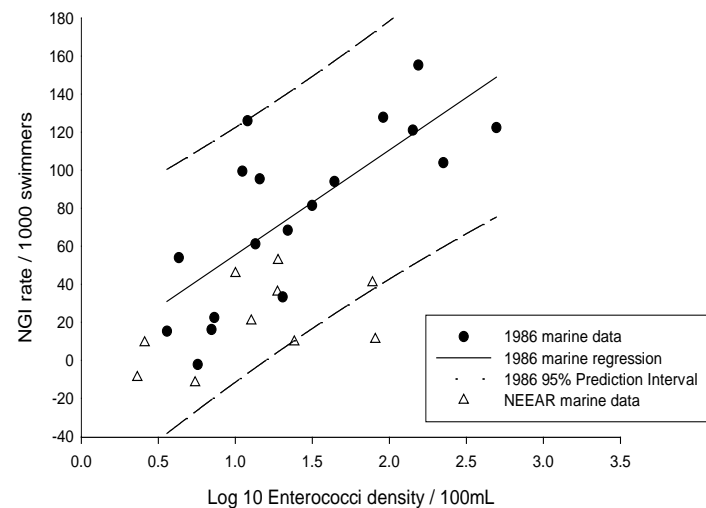
# Background-NEEAR Epi Studies

- EPA conducted 9 epidemiological studies between 2003 and 2010.
- National Epidemiologic and Environmental Assessment of Recreational Water (NEEAR) studies.
  - 4 fresh water (wastewater treatment plant (WWTP) impacted)
  - 3 marine water (WWTP impacted)
  - 1 tropical water (WWTP impacted)
  - 1 marine water (not WWTP impacted)
- Goals of the studies were to evaluate new rapid methods and to collect health and water quality data to support the 2012 RWQC.

# Determining Culture Criteria Values (1)



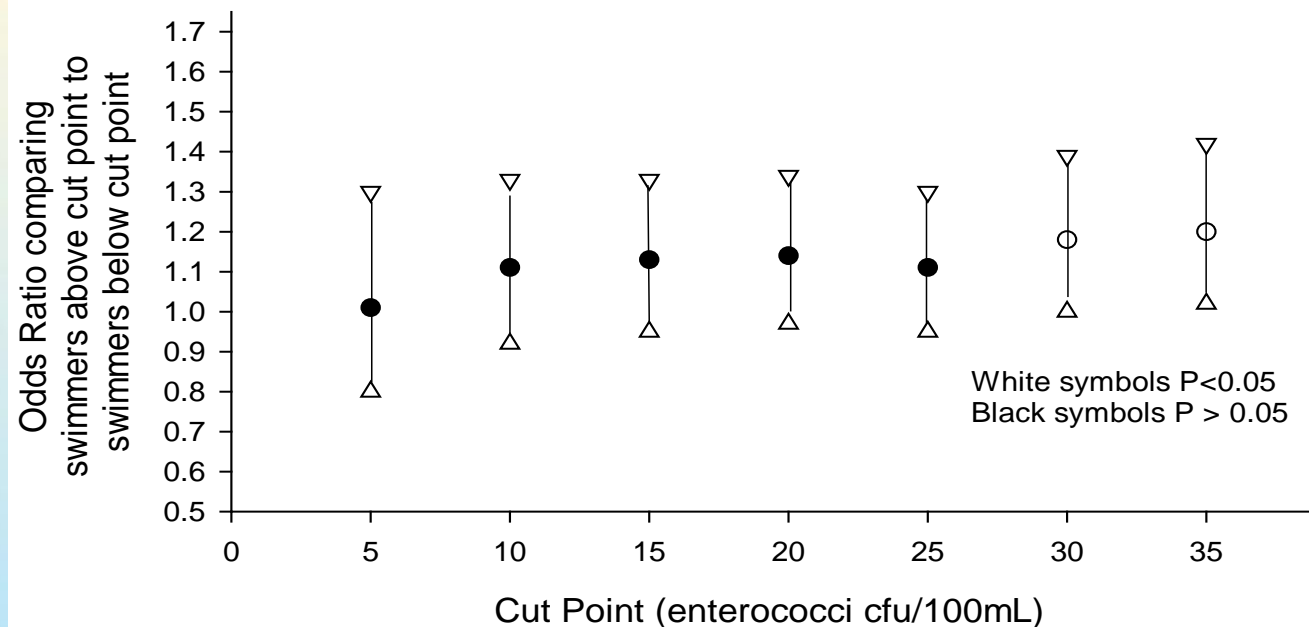
(a)



(b)

NEEAR study culture data aggregated by similar water quality and 1986 criteria data for (a) fresh water beaches and (b) marine water beaches.

# Determining Culture Criteria Values (2)



Adjusted odds ratios of GI illness for swimming above specific cut-points in NEEAR marine and fresh water study sites.

# Recreational Water Quality Criteria (RWQC)

- EPA's recommendations intended for use by states in adopting water quality standards to protect the designated use of primary contact recreation (includes swimming, bathing, surfing, or similar water contact activities).
- Recommendations are based on protecting swimmers from exposure to water containing bacteria that indicate fecal contamination.
  - *E. coli* (freshwater), enterococci (freshwater and marine).
- State water quality standards are used to derive National Pollution Discharge Elimination Systems (NPDES) permit limits, make listing decisions, develop Total Maximum Daily Loads (TMDLs) and support beach notification programs.

# 2012 RWQC (1)

- **RWQC are 304(a) national recommendations for all waters.**
  - **All states (coastal and non-coastal), territories, and tribes.**
  
- **All waterbody types designated for the primary contact recreational use.**
  - **States designate the majority of waters for primary contact.**
  - **RWQC does not address secondary contact recreational uses.**

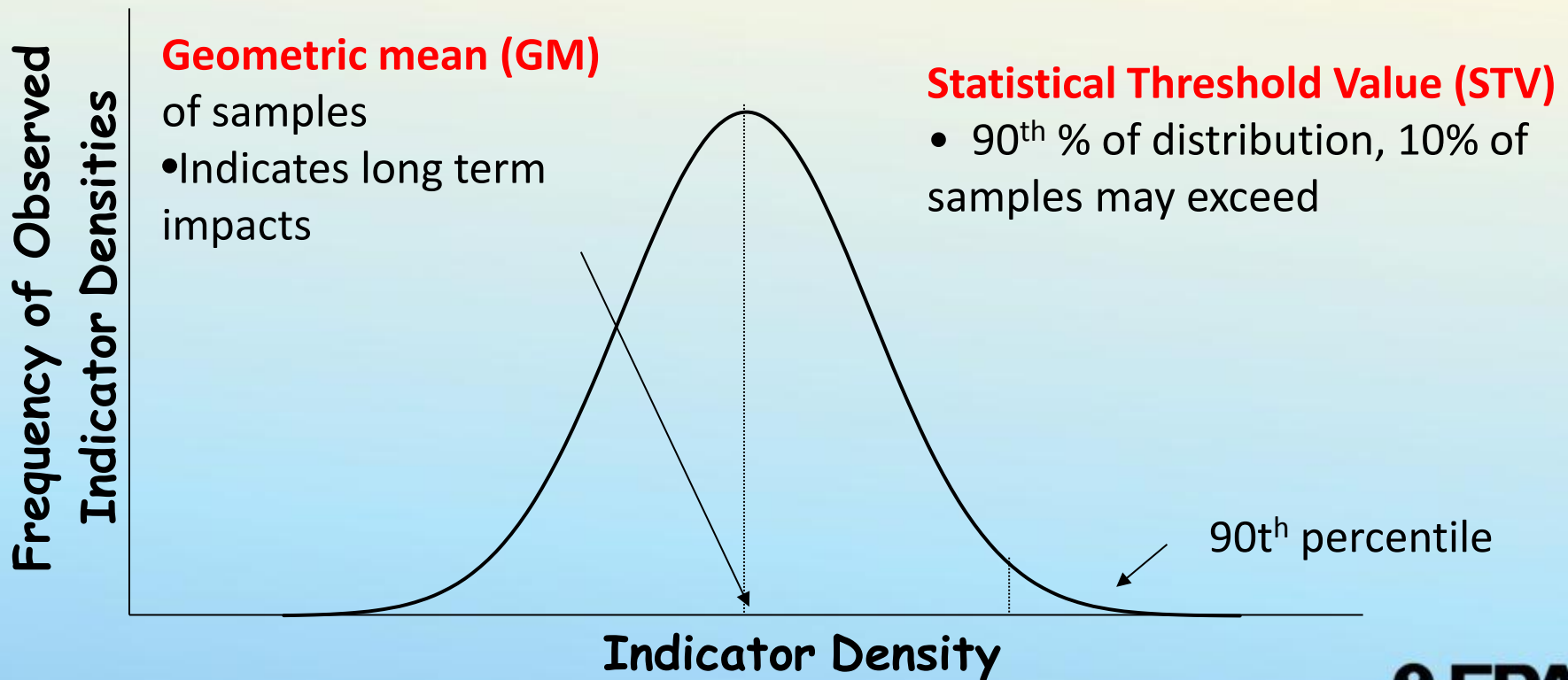
# 2012 RWQC (2)

- RWQC recommendations consist of **magnitude, duration, and frequency of exceedance** of the pollutant; in this case fecal contamination as measured by fecal indicator bacteria.
- 2012 RWQC provides **two sets** of recommended criteria, each of which corresponds to a different illness rate.



# Magnitude of the 2012 Criteria

- *E. coli* and enterococci magnitude values are expressed by both:
  - Geometric mean (GM), and
  - Statistical Threshold Value (STV).



# Duration and Frequency

- **Duration and Frequency:**
  - **GM concentration should not be greater than the selected GM magnitude in any 30-day interval (zero excursion).**
  - **STV no more than 10% excursion frequency (1/10 samples) of the selected STV magnitude in the same 30-day interval.**
- **Duration can be either static or rolling.**
- **The 30-day duration coupled with limited excursions above the STV, allows for the detection of transient fluctuations in water quality in a timely manner.**

# 2012 RWQC

**Table 4. Recommended 2012 RWQC.**

Criteria Elements	Estimated Illness Rate (NGI): 36 per 1,000 primary contact recreators		OR	Estimated Illness Rate (NGI): 32 per 1,000 primary contact recreators	
	Magnitude			Magnitude	
Indicator	GM (cfu/100 mL) <sup>a</sup>	STV (cfu/100 mL) <sup>a</sup>		GM (cfu/100 mL) <sup>a</sup>	STV (cfu/100 mL) <sup>a</sup>
Enterococci – marine and fresh	35	130		30	110
OR					
<i>E. coli</i> – fresh	126	410		100	320

**Duration and Frequency:** The waterbody GM should not be greater than the selected GM magnitude in any 30-day interval. There should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day interval.

<sup>a</sup> EPA recommends using EPA Method 1600 (U.S. EPA, 2002a) to measure culturable enterococci, or another equivalent method that measures culturable enterococci and using EPA Method 1603 (U.S. EPA, 2002b) to measure culturable *E. coli*, or any other equivalent method that measures culturable *E. coli*.

# 2012 RWQC – Beach Monitoring

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# How are the 2012 RWQC more protective than 1986 criteria? (1)

1. Similar protection for fresh and marine waters: The EPA used an analysis of National Epidemiological and Environmental Assessment of Recreational (NEEAR) Water Study data to refine the illness rate estimate for the recommended marine criterion for enterococci.
2. No “use intensities” – All criteria values apply regardless of beach usage.
3. A new measurement term– Statistical Threshold Value (STV) is recommended to be used in conjunction with the recommended geometric mean (GM).
  - Using both a GM and an STV together provides a more accurate picture of the overall health of the waterbody.

# How are the 2012 RWQC more protective than 1986 criteria? (2)

4. Two sets of recommended criteria. EPA believes both criteria sets are protective of the designated use of primary contact recreation.
  - The criteria that correspond to an illness rate of 36 (NGI) NEEAR gastrointestinal illness per 1,000 primary contact recreators correlate to water quality levels associated with the 1986 criteria.
  - The criteria that correspond to an illness rate of 32 NGI per 1,000 primary contact recreators would encourage an incremental improvement in water quality.
5. Duration and frequency. The waterbody GM should not be greater than the selected GM magnitude in any 30-day interval **AND** there should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day (fixed or rolling) interval.

# Supplemental Elements that Could Increase Protection

Rapid test method: *Enterococcus* qPCR Method 1611 can detect and quantify enterococci more rapidly than the culture method.

- EPA is encouraging the use of this new indicator-method combination on a site-specific basis, particularly for heavily used beaches.
- Can be used to provide an early alert to beach goers, including families with children.

Optional Beach Action Values (BAVs) that are precautionary.

- Providing additional information for beachgoers, including families with children.

# qPCR Criteria for Beaches

- **What are the available values?**
- **When should qPCR be used?**
- **qPCR for beach monitoring**
- **Other tools to use with qPCR**



# Rapid test method: *Enterococcus*

## qPCR Method 1611

- EPA is encouraging the use of this new indicator-method combination on a site-specific basis, particularly for heavily used beaches.
- Can detect and quantify enterococci in less than 4 hours for increased public health protection by facilitating same day beach notification.
  - Can be used to provide an early alert to beach goers, including families with children.
  - EPA encourages a site-specific analysis of the method's performance prior to use for making beach notification decision or adoption into WQS.
  - Do not need to be adopted into WQS.
  - Not recommended for NPDES use.

# qPCR GMs and STVs

- RWQC provides GM and STV values for states interested in adopting *Enterococcus* qPCR Method 1611 into their WQS.

**Table 6. Values for qPCR in marine and fresh waters.**

Element	Estimated Illness Rate (NGI): 36/1,000 primary contact recreators		OR	Estimated Illness Rate (NGI): 32/1,000 primary contact recreators	
	Magnitude			Magnitude	
	GM (cce per 100 mL)	STV (cce per 100 mL)		GM (cce per 100 mL)	STV (cce per 100 mL)
qPCR <sup>a</sup>	470	2,000		300	1,280
<p><b>Duration and Frequency:</b> The waterbody GM should not be greater than the selected GM magnitude in any 30-day interval. There should not be greater than a 10 percent excursion frequency of the selected STV magnitude in the same 30-day interval.</p>					

<sup>a</sup> EPA *Enterococcus* spp. Method 1611 for qPCR (U.S. EPA, 2012b).

# Optional Beach Action Values (BAVs)

- Provide a precautionary threshold for beachgoers, including families with children.
- BAVs are used for making beach notification decisions only.
- BAVs correspond to the 75<sup>th</sup> percentile of the recommended RWQC water quality distribution, thus providing an early warning to beachgoers before the WQS would be exceeded.
- Not a part of WQS

# BAVs for All Indicators

**Table 5. Beach Action Values (BAVs).**

Indicator	Estimated Illness Rate (NGI): 36 per 1,000 primary contact recreators	OR	Estimated Illness Rate (NGI): 32 per 1,000 primary contact recreators
	BAV (Units per 100 mL)		BAV (Units per 100 mL)
Enterococci – culturable (fresh and marine) <sup>a</sup>	➡ 70 cfu		➡ 60 cfu
<i>E. coli</i> – culturable (fresh) <sup>b</sup>	➡ 235 cfu		➡ 190 cfu
<i>Enterococcus</i> spp. – qPCR (fresh and marine) <sup>c</sup>	➡ 1,000 cce		➡ 640 cce

<sup>a</sup> Enterococci measured using EPA Method 1600 (U.S. EPA, 2002a), or another equivalent method that measures culturable enterococci.

<sup>b</sup> *E. coli* measured using EPA Method 1603 (U.S. EPA, 2002b), or any other equivalent method that measures culturable *E. coli*.

<sup>c</sup> EPA *Enterococcus* spp. Method 1611 for qPCR (U.S. EPA, 2012b). See section 5.2.

# 2012 RWQC – Beach Monitoring

**Table 4. Recommended 2012 RWQC.**

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**Duration and Frequency:** The waterbody GM should not be greater than the selected GM magnitude in any 30-day interval. There should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day interval.

<sup>a</sup> EPA recommends using EPA Method 1600 (U.S. EPA, 2002a) to measure culturable enterococci, or another equivalent method that measures culturable enterococci and using EPA Method 1603 (U.S. EPA, 2002b) to measure culturable *E. coli*, or any other equivalent method that measures culturable *E. coli*.

# Other CWA Uses

Water quality-based effluent limitations (WQBELS) for NPDES permits, identification of impaired and threatened waters and TMDLs are based on State WQS (i.e., recreational water quality standards (RWQSs)).

- NPDES permitting for RWQS
  - Permitting for continuous dischargers should consider both the GM and STV in the limit calculations.
  - Approaches and information available winter 2013.
- Identification of impaired and threatened waters for RWQS.
  - States would consider both the GM and the STV as part of a revised WQS and recommend as part of the water quality attainment determination.

# For More Information

- 2012 RWQC
  - <http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/index.cfm>
  - List of implementation documents  
<http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/upload/2012-RWQC-Implementation-Materials.pdf>
  
- EPA's Beach Web Pages
  - <http://water.epa.gov/type/oceb/beaches/index.cfm>
  
- Fecal Indicator Methods  
<http://water.epa.gov/scitech/methods/cwa/index.cfm>
  
- Sharon Nappier at (202)566-0740 or [nappier.sharon@epa.gov](mailto:nappier.sharon@epa.gov);  
or Tracy Bone (202)564-5257 or [bone.tracy@epa.gov](mailto:bone.tracy@epa.gov).

# Questions?







# California's Areas of Special Biological Significance

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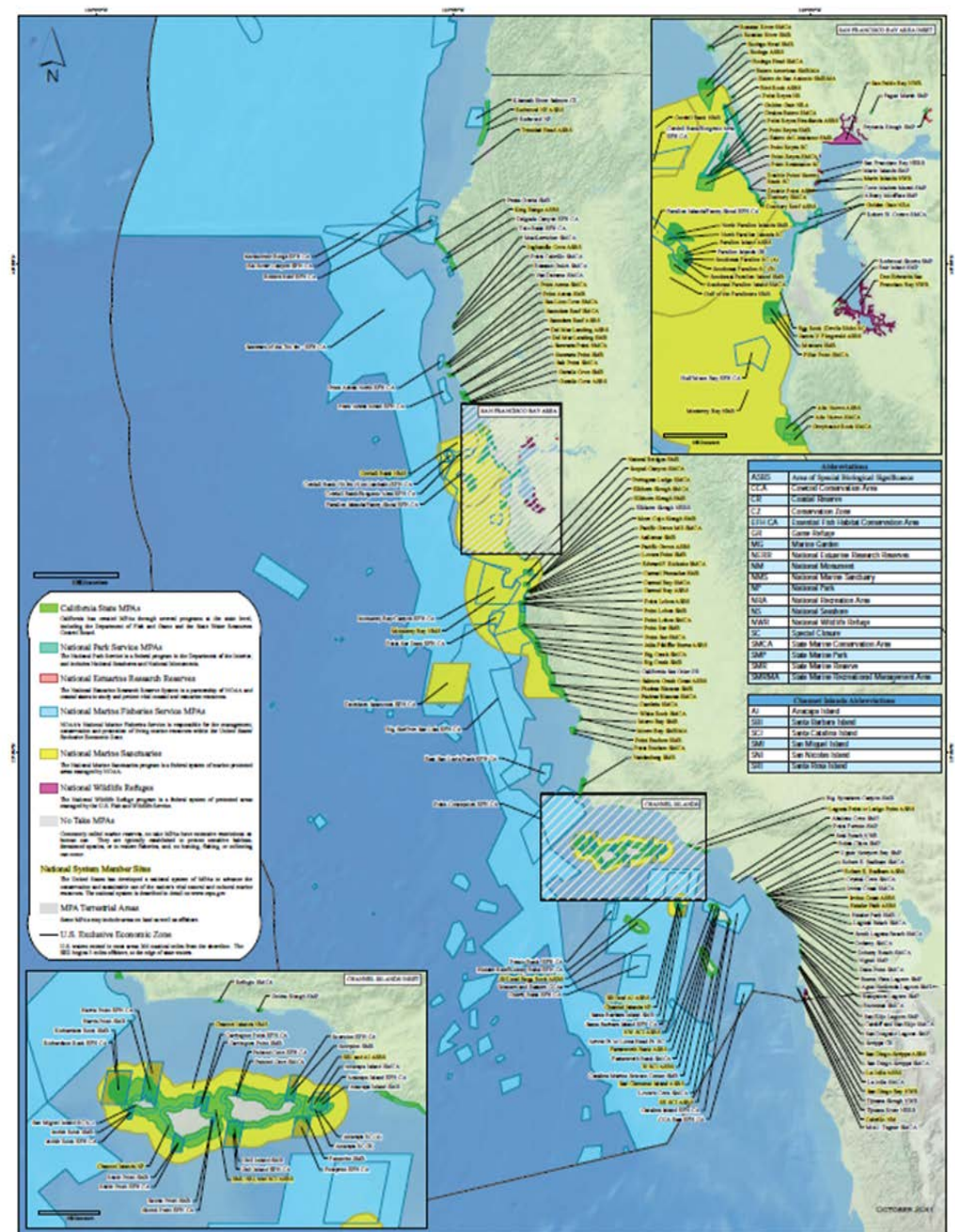
California State Water Resources Control Board



# Objectives

- What are:
  - California's Marine Managed Areas?
  - State Water Quality Protection Areas?
- How is water quality protected in State Water Quality Protection Areas?





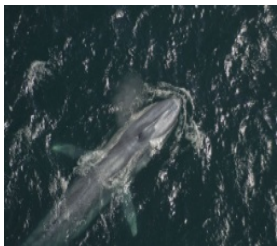
- Diverse and biologically rich marine ecosystems.
- Threats from overfishing, degraded water quality, vessel traffic, and climate change.
- Leader in ocean protections.
  - National Marine Sanctuaries
  - National Parks
  - State Marine Managed Areas
- Large network Federal and State protected areas.

# California's Marine Managed Areas

- Marine Managed Areas Improvement Act of 2000
  - Establish consistency among the state agencies.
- Six Categories:

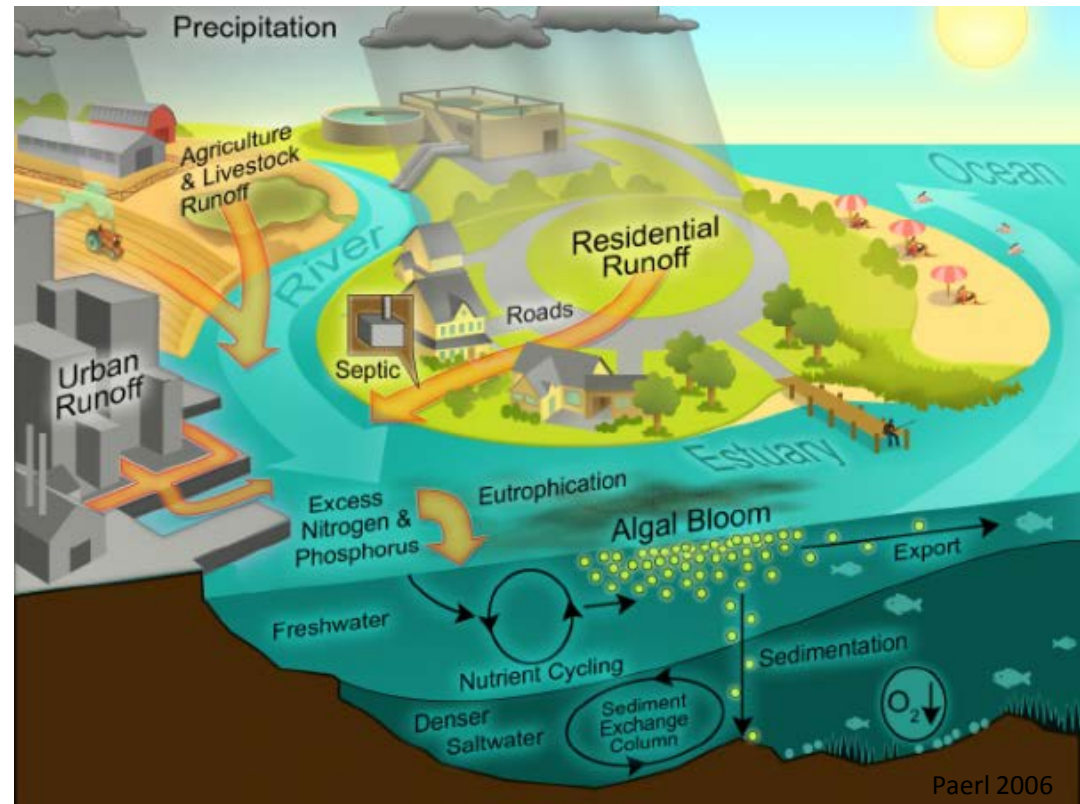
- State Marine Reserves
- State Marine Parks
- State Marine Conservation Areas
- State Water Quality Protection Areas
- State Marine Cultural Preservation Areas
- State Marine Recreational Management Areas

## State Marine Protected Areas



# Why Water Quality?

- Building block for ecosystem and marine life health.
- Safety of human health in recreation and seafood consumption.
- Threats:
  - Point source discharge: i.e. wastewater treatment facilities and power plants
  - Non-point sources: i.e. Storm water, agriculture, and vessels



# State Water Resources Control Board

- *Preserve, enhance and restore* the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.
- Clean Water Act & Porter-Cologne Water Quality Control Act
  - Water Quality Control Plans
  - Total Maximum Daily Loads (TMDLs)
  - National Pollutant Discharge Elimination System (NPDES) permits



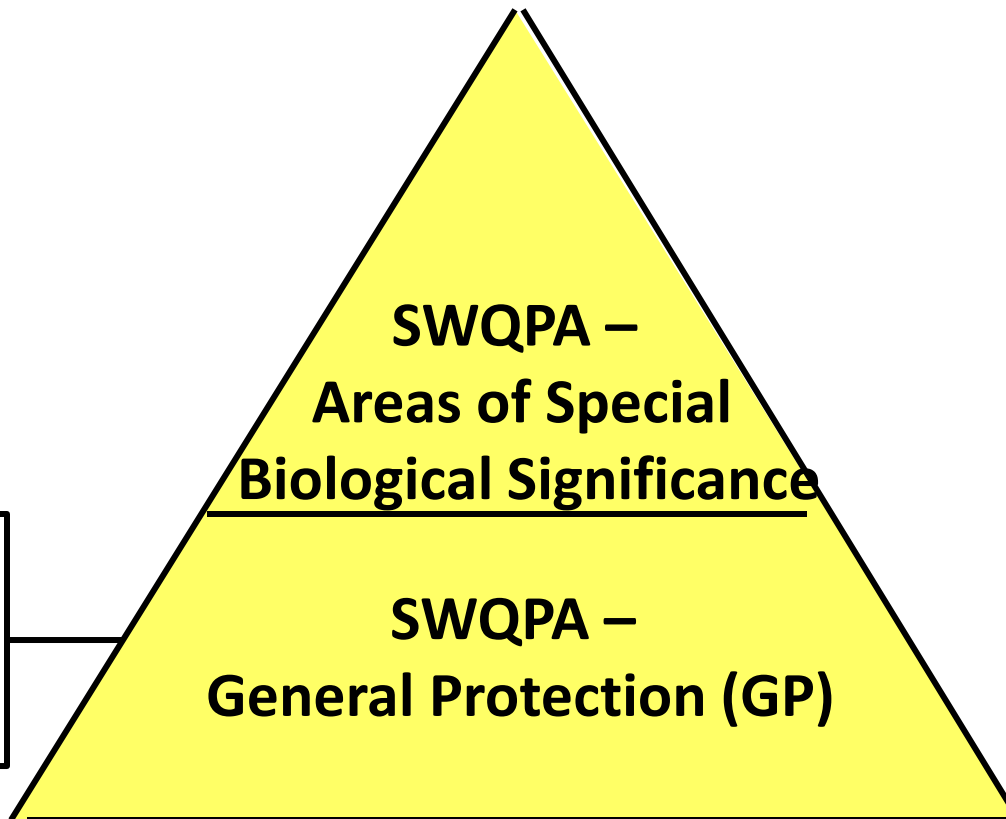
# California Ocean Plan

- Establishes *water quality objectives* for California's ocean waters.
- Provides the basis for regulation of *wastes discharged* into California's ocean waters.
- Applicable to both *point and non-point source discharges*.
- Establishes *State Water Quality Protection Areas*.



# State Water Quality Protection Areas

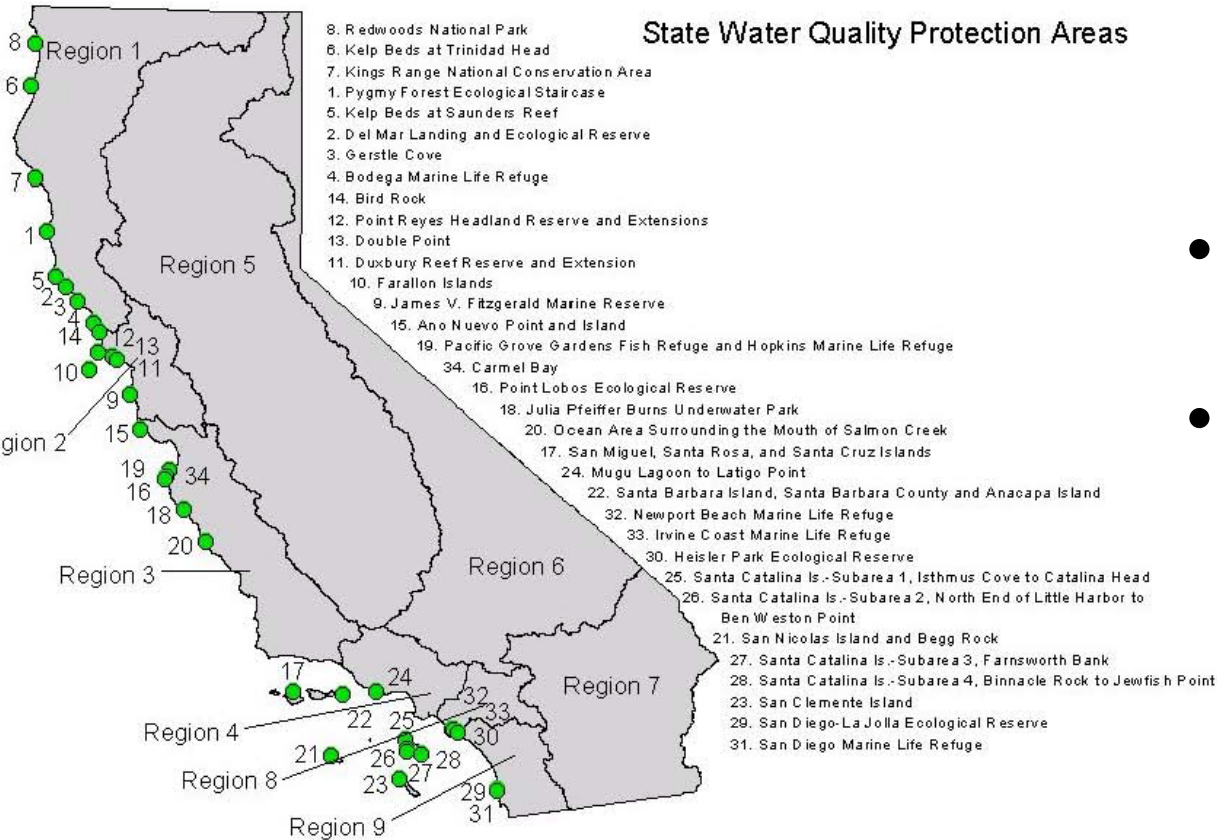
Nonterrestrial marine or estuarine areas designated to protect marine species or biological communities from *an undesirable alteration in natural water quality*.





# Areas of Special Biological Significance

State Water Quality Protection Areas



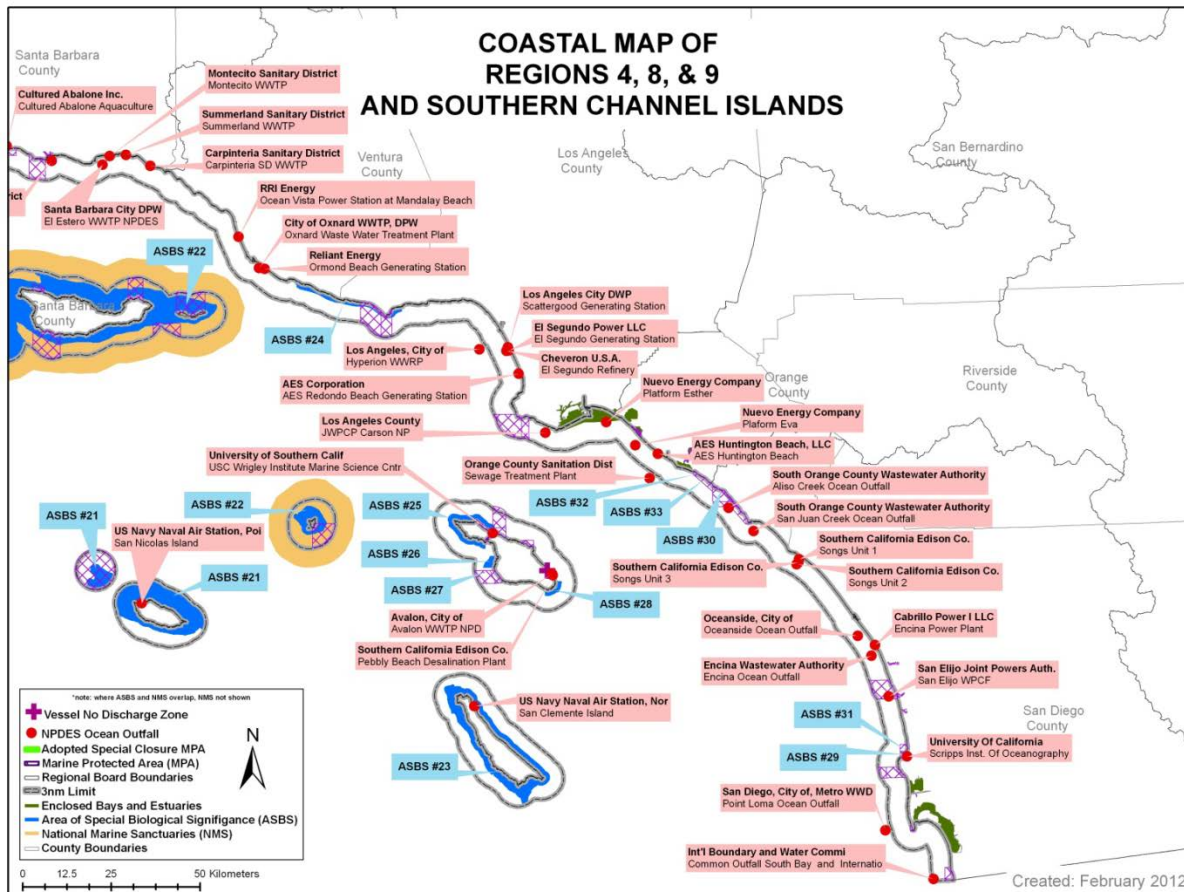
- **34 ASBS** designated in 1974 & 1975.
- ~ 500 miles (32%) of coastline.

# Areas of Special Biological Significance



- **No** waste discharges into an ASBS.
- Maintenance of *natural water quality*.

# Areas of Special Biological Significance



- Watersheds are **Critical Coastal Areas.**
- 23 co-located with 41 state **MPAs.**

# Existing Point Discharges to an ASBS

- Grant an Individual Exception
  - Telonicher Marine Laboratory (Humboldt State University)
  - Hopkins Marine Station (Stanford University)
  - Monterey Bay Aquarium
  - Bodega Marine Laboratory (University of California at Davis)
  - Wrigley Marine Science Center (University of Southern California)
  - Scripps Institution of Oceanography (University of California)
  - U.S. Dept. of Defense, Navy, San Clemente Island
  - U.S. Dept. of Defense, Navy, San Nicholas Island



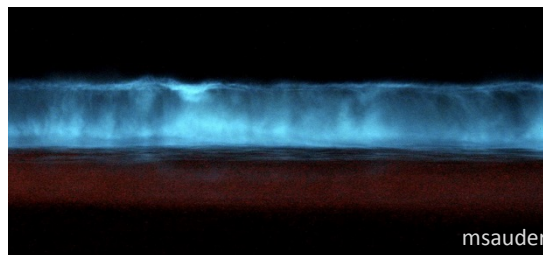
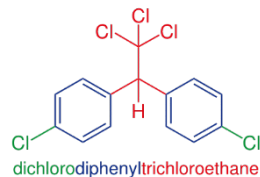
# Other Discharges to an ASBS

- 2003 survey found 1,658 outfalls.
  - Storm water and nonpoint sources
- State Water Board initiated a regulatory process to control and eliminate waste discharges.
  - Natural Water Quality Committee
  - General Exception



# Natural Water Quality Committee

- Goal define “natural water quality”.
- The sum total of all chemical, physical and biological components in ocean water and sediments that sustain marine ecosystems, in the absence of:
  - Synthetic anthropogenic constituents
  - Other chemical, physical and biological constituents at concentrations elevated due to man’s activities above those resulting from naturally occurring processes, and
  - Non-indigenous biota that are introduced either purposely or accidentally by man



# General Exception

- **General Exception** to the California Ocean Plan for Areas of Special Biological Significance Waste Discharge Prohibition for Storm Water and Nonpoint Source Discharges, with Special Protections (March 20, 2012).
- **Goal: Ensure that marine life and beneficial uses of the ASBS waters are protected.**
- 27 Applicants: Variety of Dischargers
  - Phase I and Phase II Municipalities (cities and counties)
  - State Parks
  - U.S. Dept. of Interior
  - U.S. Dept. of Defense
  - Tribes (Trinidad Rancheria)

# General Exception: Road Map



Bioswale – Fitzgerald ASBS

Establishes compliance provisions for permitted discharges.



Monitoring for 2 wet weather seasons:

- Discharges
- Receiving Water
- Reference



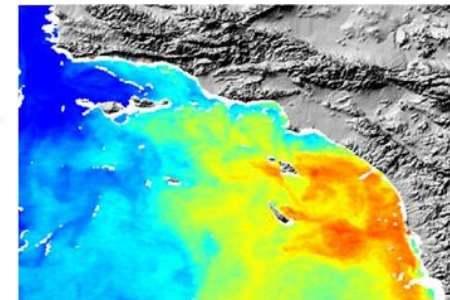
Compliance with provisions through Structural Controls and Best Management Practices (BMP).





# Southern California Bight Regional Monitoring

- Regional Monitoring effort coordinated by the Southern California Coastal Research Project (SCCWRP) and Bight Dischargers
  - 1994, 1998, 2003, 2008, and 2013
- Topics
  - **ASBS**
  - Marine Debris
  - Sediments
  - Nutrients and Offshore Water Quality
  - Rocky Reef
  - Microbiology
  - Coastal Ecology



# City of Malibu ASBS Outreach



Ocean Friendly Landscaping

Coming Soon with Prop 84 Funds:

- Broad Beach Biofiltration Project
- Wildlife Road Treatment

Ever wonder where all this goes?



Now you know.



Remember: Everything that goes down a storm drain goes straight to the ocean.

City of Malibu Environmental Sustainability Dept.

[www.malibucity.org](http://www.malibucity.org) (310) 456-2489

Find us on Facebook and Twitter @MalibuEnviroDpt



# Areas of Special Biological Significance

- Basic building blocks for a sustainable, resilient coastal environment and economy.
- Collaborations between regulator community, discharger community, environmental groups, scientists, and general public.
- Key support to California's network of Marine Protected Areas.

# Thank You!

## For More Information:

[http://www.waterboards.ca.gov/water\\_issues/programs/ocean/asbs.shtml](http://www.waterboards.ca.gov/water_issues/programs/ocean/asbs.shtml)

## Contact:

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