# *Present Ocean Monitoring Activities Surrounding the South Bay Ocean Outfall*

USIBWC Citizens Forum

February 16, 2012

*Timothy D. Stebbins, Ph.D.*

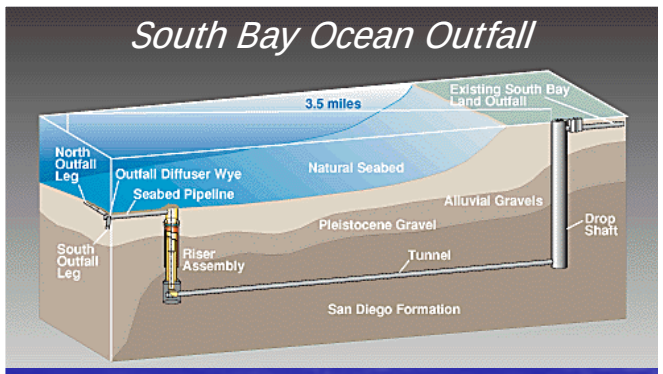
*Sr. Marine Biologist, City of San Diego Ocean Monitoring Program*

*Public Utilities, Environmental Monitoring & Technical Services Division*

City of San Diego
PUBLIC UTILITIES
Water & Wastewater

# City Ocean Monitoring Program

- Governed by NPDES regulatory permits
  - *Two outfall regions*
  - *Total area ~340 mi $^2$ (880 km $^2$)*
- Point Loma Ocean Outfall program
  - *Pt. Loma Wastewater Treatment Plant*
- South Bay Ocean Outfall program
  - *International Wastewater Treatment Plant*
  - *South Bay Water Reclamation Plant*
- Primary program components
  - *Core monitoring*
  - *Regional monitoring*
  - *Special studies & other activities*




- IWTP discharge began in 1999 at APT, upgraded to II$^0$ treatment in 2010 (25 mgd capacity)
- SBWRP discharge began in 2002 at II$^0$/tertiary treatment (15 mgd capacity)
- SBOO terminates ~3.5 mi offshore, 90 ft deep (~5.6 km, 27 m)
- Current discharge ~25+ mgd

# *Core Receiving Waters Monitoring*

South Bay Outfall Monitoring Program

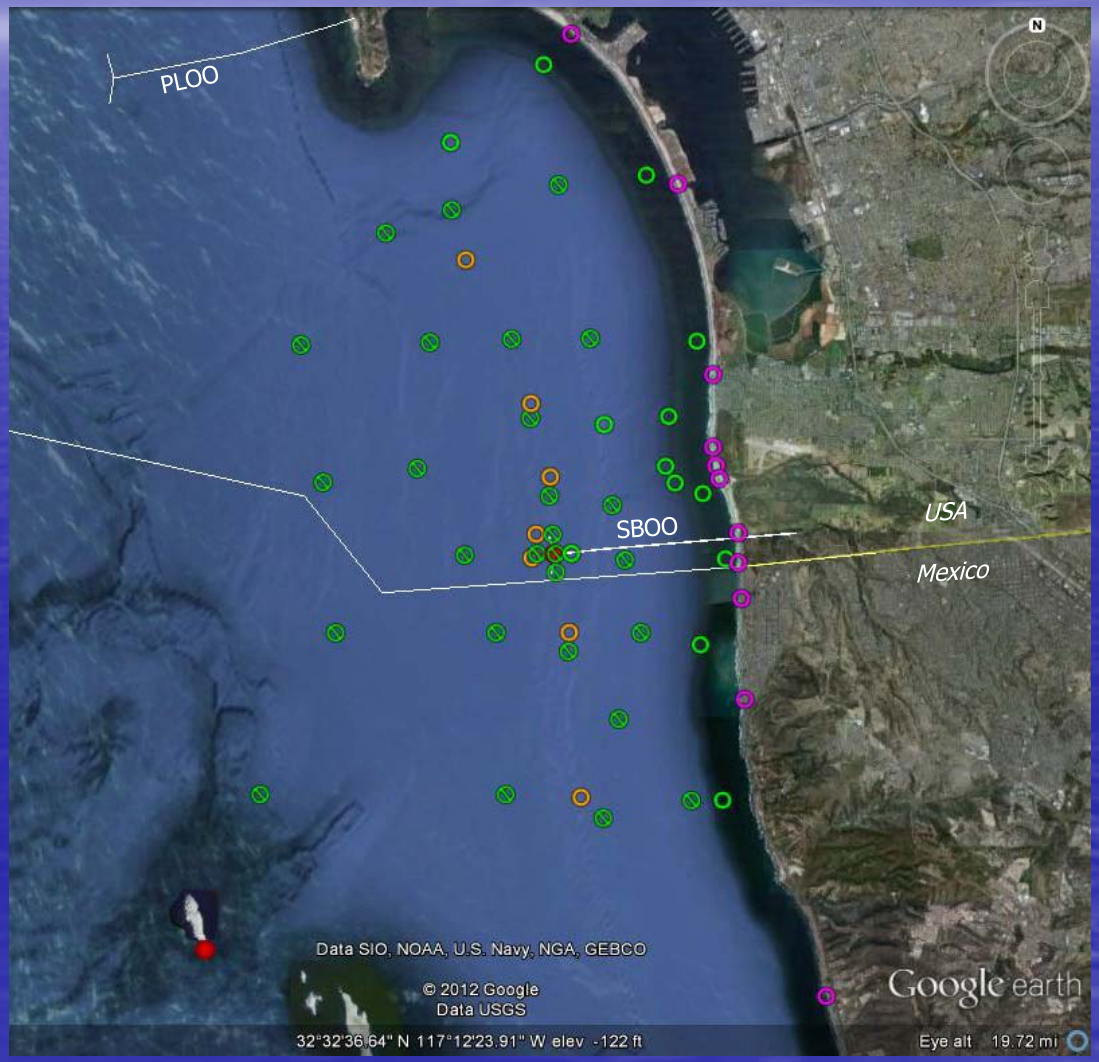
- Water quality (shore, kelp beds, offshore)
  - *Indicator bacteria, oceanographic conditions*
  - *51 fixed stations (~6,036 FIB samples & 624 CTD casts/year)*
- Benthos (offshore)
  - *Sediment quality, benthic infaunal communities (macrofauna)*
  - *67 stations (27 fixed, 40 random) (94 SQ & 148 BI grabs/year)*
- Demersal fishes & invertebrates (offshore)
  - *Bottom dwelling fish & invertebrate communities*
  - *7 fixed stations (28 trawls/year)*
- Bioaccumulation of contaminants in fishes (offshore)
  - *Liver or muscle tissues*
  - *9 fixed stations (54 composite samples/year)*

# Core Monitoring

## *South Bay Outfall Monitoring Area and Stations*

### *SBOO Region*

- Total area (fixed sites)
  - *~132 mi $^2$ (342 km $^2$)*
- Monitoring stations
  - *Shore WQ (pink)*
  - *Offshore WQ (all green)*
  - *Benthic (slashed green)*
  - *Trawl (orange)*
  - *Rig fishing (solid red)*

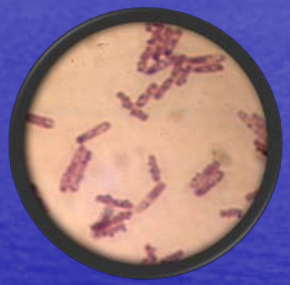


# Core Monitoring
## *Water Quality*

- Water samples collected to measure levels of fecal indicator bacteria (FIB), suspended solids, and oil & grease
  - *Hand collected along shore (FIB only)*
  - *Van Dorn or Niskin bottles at sea (FIB, SS, O&G)*
- CTD lowered thru water column to measure physical and chemical parameters:
  - *Temperature, depth, light transmittance*
  - *Dissolved oxygen, pH, salinity*
  - *Chlorophyll a*

*Oceanus deploying carousel sampler*

*Collecting water samples along Coronado shore*



*FIB*

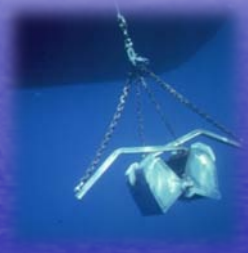
*Van Dorn bottle*

*CTD*

*Carousel sampler (Niskin bottles + CTD)*

# Core Monitoring
## *Benthic Sediments and Infauna*

- Sampling Device
  - *Van Veen grab (0.1 $m^2$)*
- Sediment Quality
  - *Grain size distribution*
  - *Chemistry (total organic carbon, nitrogen, sulfides, metals, organics, pesticides)*
- Macrobenthic Invertebrates
  - *Species ID and abundance*
  - *Community analysis*



*Single & double grab samplers*

*Sorting at sea*

*Identifying species in the lab*

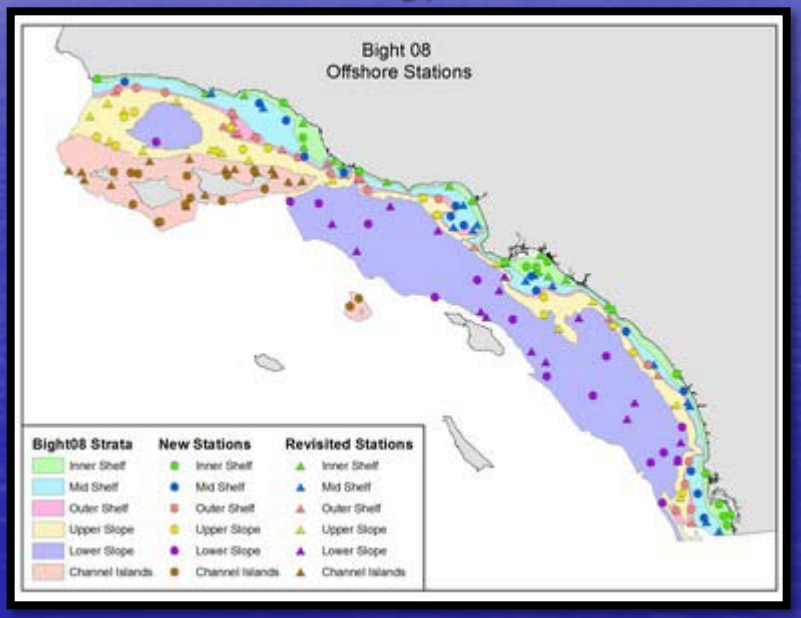
# Core Monitoring
## *Fishes & Large Invertebrates*

- Sampling Method
  - *Otter trawls*
  - *Rig fishing (hook & line)*
- Community Assessment
  - *Trawl-caught species identified, counted, and weighed at sea*
  - *Bottom dwelling (demersal) fishes*
  - *Megabenthic invertebrates*
- Bioaccumulation of Contaminants
  - *Target fish species collected , returned to lab for processing and analysis*
  - *Muscle or liver tissues analyzed for contaminant levels*

# Regional Monitoring
## *SCB Regional Monitoring Programs*

- Multi-agency/multi-component projects spanning entire So. Calif. Bight
  - *Conducted ~ every 5 years (1994, 1998, 2003, 2008)*
- Current project (Bight'08)
  - *Began summer 2008, ~ 60 agencies*
  - *Coastal Ecology*
  - *Shoreline Microbiology*
  - *Offshore Water Quality*
  - *Areas of Special Biological Significance*
  - *Rocky Reefs*
  - *Coastal Wetlands & Estuaries*

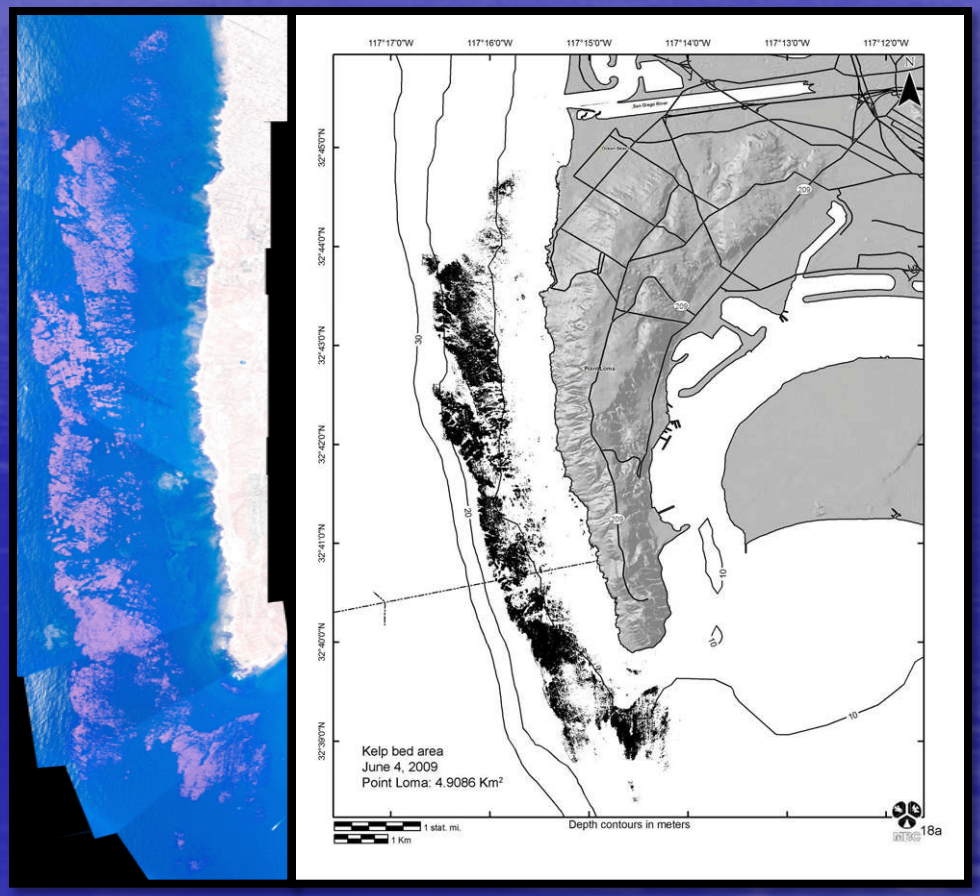
*B'08 "Coastal Ecology" Offshore Sites*



# Regional Monitoring
## *Aerial Kelp Surveys*

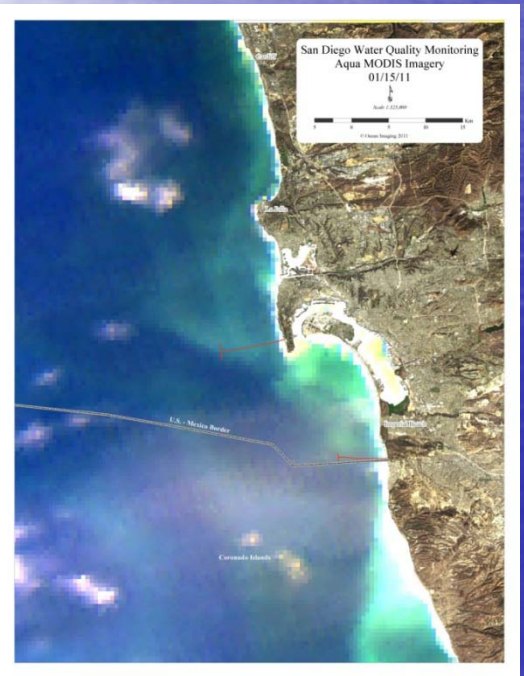
- San Diego & Orange County kelp beds (~1982-present)
- Region 9 Kelp Survey Consortium
  - *10 agencies, including City and IBWC*
- Project conducted by MBC Applied Environmental Sciences
  - *Quarterly aerial surveys of kelp canopy cover*
  - *Dive surveys as necessary*
  - *Annual "Status of the Kelp Beds" report*

*Point Loma Kelp Forest (2009)*



# Regional Monitoring
## *Remote Sensing of San Diego / Tijuana Region*

- Detect "plume" sources in South Bay & Pt Loma regions (2002-present)
  - *Conducted by Ocean Imaging, Inc. (funded by City & IBWC)*
- Satellite and aerial imagery: ~2-500 m resolution

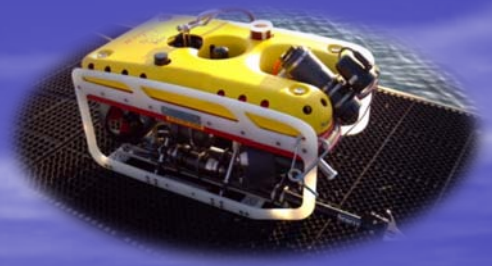



*MODIS Imagery*
*(500m res)*

*Landsat TM5 Imagery*
*(27m res)*

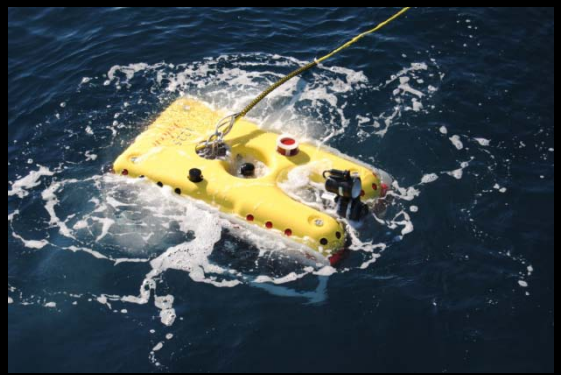
*Rapid Eye Imagery*
*(5m res)*

# Outfall Inspection



- Requirement of lease agreement with California State Lands Commission
- Remotely operated vehicle (ROV) video survey
  - *Most recent survey conducted by City staff April 20, 2011*
  - *Surveying visible exterior portions of:*
    - *riser assembly shield, main outfall barrel, and maintenance access hatches*
    - *outfall wye structure*
    - *north & south diffuser legs, and N&S termination structures*
- Comparison to 2003, 2009 and 2010 surveys

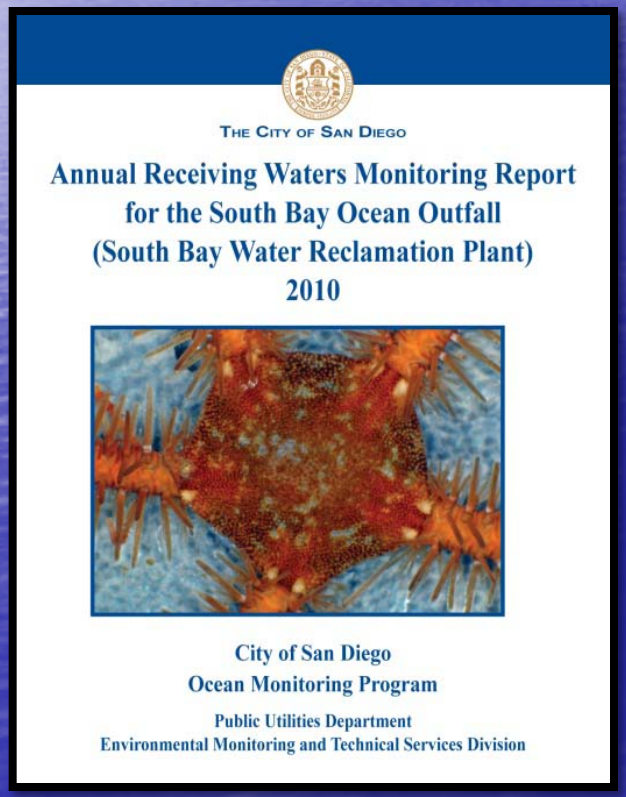
*Deployment and operation of ROV from MV Oceanus*

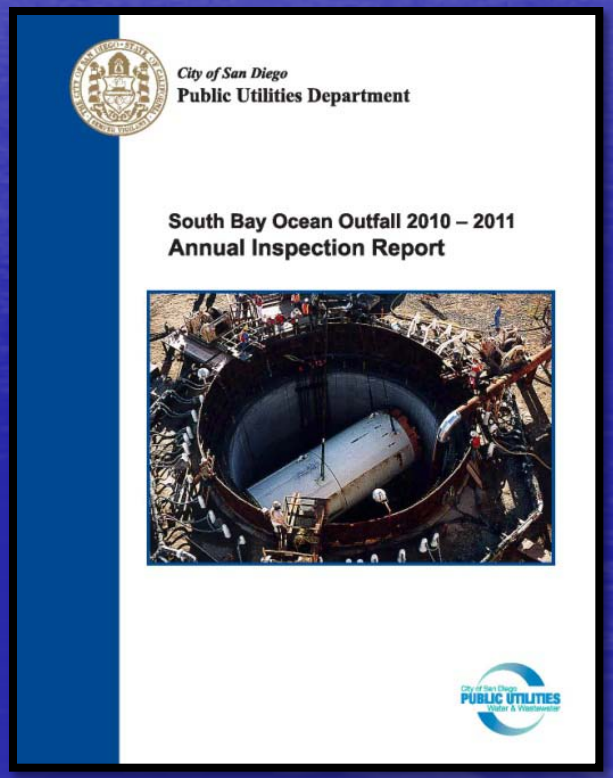


# *Wastewater discharge near end of south diffuser leg “2009 vs. 2011”*

# Reports

- Monthly Receiving Waters Monitoring Reports (data reports)
- Annual Receiving Waters Monitoring Report (assessment report)
- Annual Outfall Inspection Report




*www.sandiego.gov/mwwd/environment/reports.shtml*

# Questions

Tim Stebbins
*TStebbins@sandiego.gov*