Marine Spatial Data for Marine Spatial Planning

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What is Marine Spatial Data?

- Seabed surveying to generate digital maps
- Oceanographic measurements
- Coastal Zone surveying and analysis
- Digital Database to generate maps, Google Earth/Ocean images
- Seabed/Coastal Visualization in a digital domain
Seafloor Mapping Examples
Measuring Metocean Conditions

- Current speed and direction
- Wind speed and direction
- Air and water temperature
- Water salinity
- CTD profiles
- Air pressure
- Tidal elevation
- Directional waves
- Tsunami early warning buoys
How does Marine Spatial Data support Marine Spatial Planning?

“The need is essentially a land use planning effort in the coastal waters, to survey and ultimately generate maps of existing resources and usage, and use this as a basis to sort out where things should and should not be allowed, to avoid ‘conflicting uses.’”

“In order to Manage something, you must to be able to measure it”

Map once, use many times.
What’s a typical day, today?

- Navigational safety issues
  - Shipping lanes, ferry routes
  - Recreational boating/sailing
- Impacts commercial fishing industry
  - Recreational fishing interests
- Military use needs

- Recreation and tourism
  - Cruise industry, whale watching, eco-tourism, surfing, viewshed
- Oil and gas production and exploration activities
- Offshore sand borrow areas
  - Beach replenishment/beach erosion
- Fisheries Habitats, Marine Protected Areas, Sanctuaries
- New and emerging uses
  - Aquaculture, renewable energy (i.e. Windfarms), de-salination plants
- Municipal waste disposal areas
- Native American subsistence and traditional-use areas
- Seabed cables
  - Telecommunications, power and military
- USACE projects
- Coastal Development; Liquid Natural Gas Facilities, housing, ports/ harbors
California Mapping Project (CMP)

- Goal is to establish a Marine Spatial Database
  - Support the understanding of seabed conditions as listed previously
  - Specifically targeted for MPAs, Benthic Habitats, Sciences
  - Dozens of Stakeholders and end-users

- Partnership of Agencies (State and Federal), Academia and Industry

- Regional Applications
  - Meets the goals of the West Coast Governors’ Agreement on Ocean Health
  - Supports the scientific studies of the California Current Large Marine Ecosystem (CCLME)
  - Includes coastal surveying to generate digital maps on climate change, sea-level rise, estuaries, flood-plain information
Seabed Trend of San Andreas Fault
Whale Feeding Scars?
USACE-National Coastal Mapping Program

- Hydro – waterline to 1,000 m @ 4 m spacing
- Topo – waterline to 500 m @ 1 m spacing
- Imagery @ 20 cm resolution
- Hyperspectral – 1m resolution

(1,000 m)..............Hydro & Topo...........(500 m)
Reflectance imagery from Bathy Lidar overimposed on DEM

Joint Airborne Lidar Bathymetry Technical Center of Expertise

Images contain preliminary LiDAR data provided courtesy of the JALBTCX and USACE NCEM.
Combined Bathy Lidar, Topo Lidar and Multibeam Sonar Bathy
Orange County coastline between Dana Point and Laguna Beach

Image contains preliminary LIDAR data provided courtesy of the JALBTCX and USACE NCMP

Join Airborne Lidar Bathymetry Technical Center of Excellence
...We Are Doing Marine Spatial Planning Everyday
Active Marine Spatial Planning

MSP in Southern California Area

**Industry and Military**
- Oil Platforms
- Nuclear Power Plant
- Camp Pendleton
- Outfalls/Intakes
- Commercial Fishing, Sport Fishing
- Alternative Energy Siting, Saltwater /Freshwater Conversion Plants

**Natural**
- Newport-Inglewood Fault
- Mudslides
- Brush Fires
- El Niño
- Beach Erosion
- Red Tides

**Human**
- Dense Population
- Surfing, Beach Uses
- High Value Real Estate
- Tourism, Boating, Sailing, Watching Sunsets

- MPAs and Fisheries Habitats
- Tsunami inundation planning
Seabed/Coastal Visualization in a Digital Domain

Port Isabel, Texas

2m CIR orthoimage (ADS40)
Seabed/Coastal Visualization in a Digital Domain

Port Isabel, Texas
Horry County, SC

LULC Mapping from ADS40 imagery
Seabed/Coastal Visualization in a Digital Domain
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