

Artificial Reef Development for the Montrose Settlements Restoration Program

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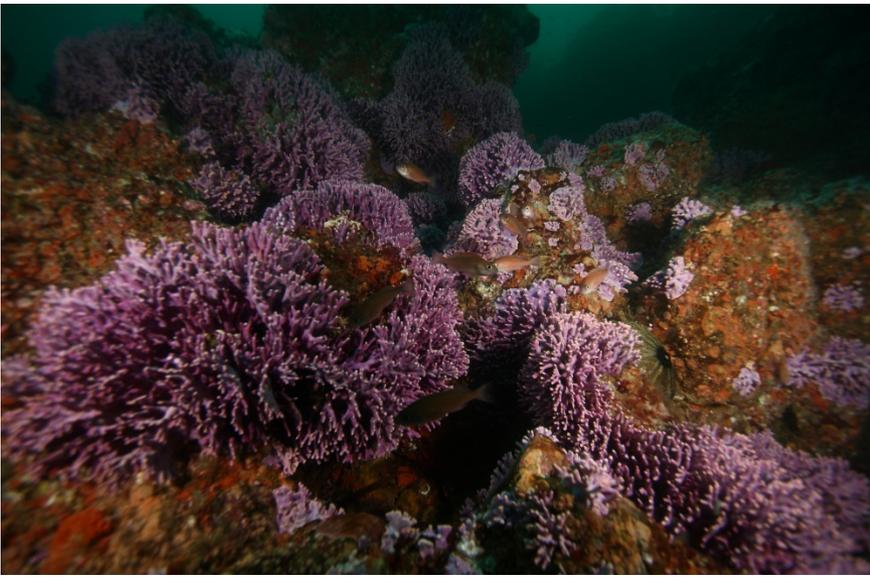


MONTROSE SETTLEMENTS RESTORATION PROGRAM



- A Few Comments Regarding Natural Reefs.
- Why are artificial reefs constructed?
- Brief Overview of the Montrose Program
 - Why is MSRP interested Artificial Reefs?
 - Summary of the Montrose Artificial Reef projects.

Rocky Reef Habitat is an Important Resource in California



Rocky Reef Habitat is an Important Resource in California

- **Ecologically Important**
 - Essential Fish Habitat
 - High Species Diversity
 - Biological Production
- **Economically Important**
 - Recreational Fishing and Diving
 - Commercial Fishing



Artificial Reefs: why should anybody build one?

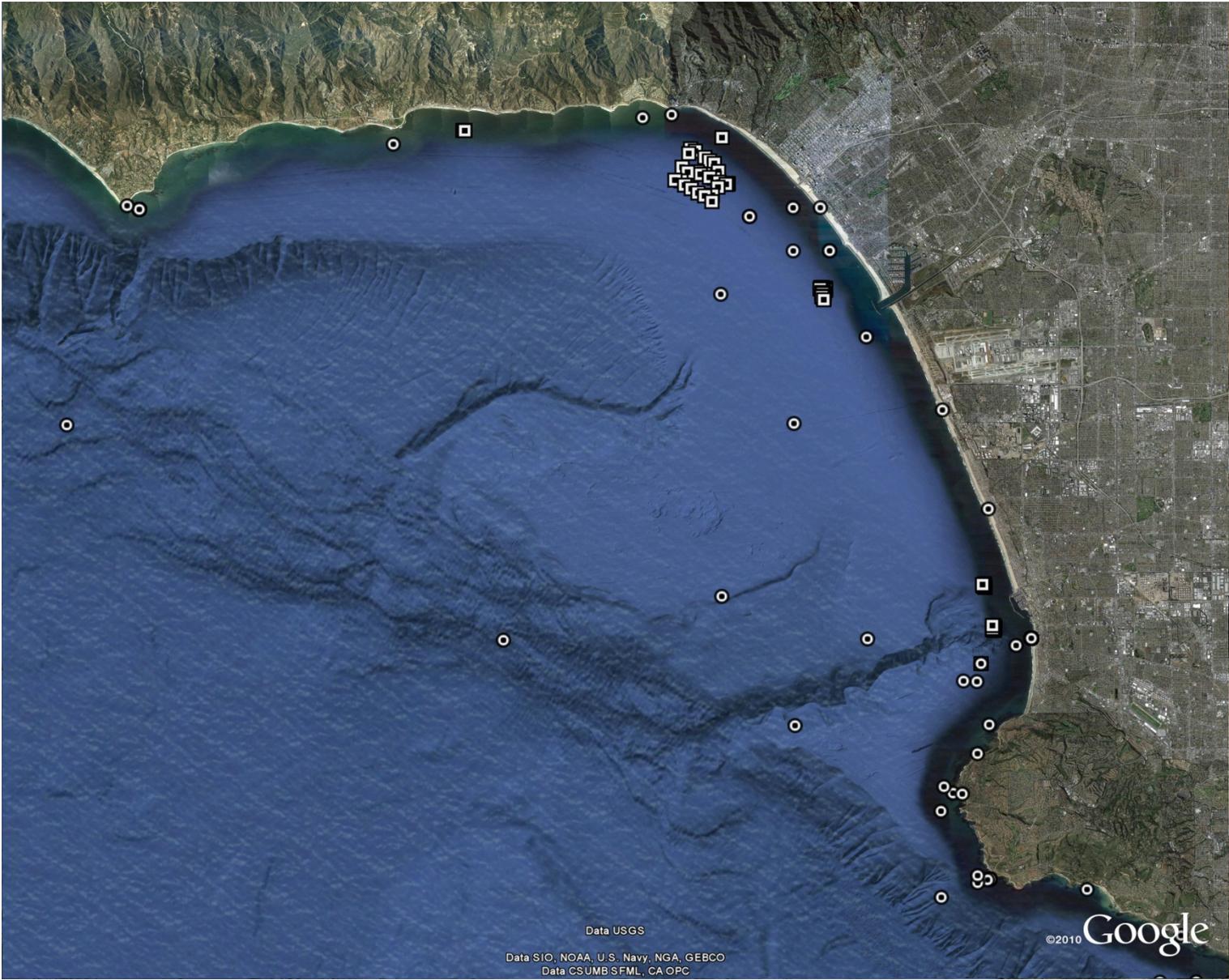
- Relatively Easy to Create Reef Habitat (in concept)
- Logistically Difficult
- Expensive



- Mitigation for Lost Habitat
 - SONGS Reef
- Creating Opportunities for Recreation
 - CDFG Artificial Reef Program (fishing reefs)
 - Yukon Project (Diving Reef)
- Restoration of Impaired Natural Reefs



California Artificial Reef Program



Brief History of the Montrose Case

- Large diverse insect problem
- Global demand
- Minimal environmental regulations

- Increase in awareness of impacts (“Silent Spring”)
- Shifts in public opinion
- Laws & Regulations

"DDT is good for me-e-e!"

The great expectations held for DDT have been realized. During 1946, exhaustive scientific tests have shown that, when properly used, DDT kills a host of destructive insect pests, and is a benefactor of all humanity.

Pennsalt produces DDT and its products in all standard forms and is now one of the country's largest producers of this amazing insecticide. Today, everyone can enjoy added comfort, health and safety through the insect-killing powers of Pennsalt DDT products... and DDT is only one of Pennsalt's many chemical products which benefit industry, farm and home.

GOOD FOR STEERS—Beef grows smaller, carcasses... it's a scientific fact that... compared to untreated cattle—beef steers gain up to 20 pounds extra when protected from horn flies and many other pests with DDT insecticides.

GOOD FOR THE HOME—helps keep your home healthier... keeps your family from dangerous insect pests. Use Knot-Out DDT Powders and Sprays... these watch the bugs "bite the dust!"

GOOD FOR DAIRIES—Up to 20% more milk... more butter... more cheese... from greater milk production... from the absence of many insects with DDT insecticides like Knot-Out Stink and Barn Spray.

GOOD FOR SOY CROPS—25 more barrels of soybeans per acre... actual DDT tests have shown crop increases like that! DDT dusts and sprays help truck farmers gain these gains along to you.

GOOD FOR INDUSTRY—Food processing plants, laundries, dry cleaning plants, hospitals, stores of industries... give effective bug control, more pleasant work conditions with Pennsalt DDT products.

PENNSALT CHEMICALS
87 Years' Service to Industry • Farm • Home
PENNSYLVANIA SALT MANUFACTURING COMPANY
WIDENER BUILDING, PHILADELPHIA 7, PA.

Time Magazine 30 June 1947

DO NOT EAT WHITE CROAKER
NO COMA WHITE CROAKERS

Catalina Egg
Healthy Egg

PALOS VERDES
Point Vicente
Point Farinos

A Timeline of DDTs and PCBs in Southern California

1929
First commercial production of PCBs in the United States.

1937
A Harvard University study finds that prolonged exposure to PCBs could cause liver damage and a rash called chloracne.

1939
Paul Herman Müller first discovers the effect of DDT on insects.

1947
Montrose Chemical Corporation begins manufacturing DDTs.

1948
Müller receives the Nobel Prize in Physiology / Medicine for his discoveries concerning DDT.

1953
City of Los Angeles issues a permit to Montrose to discharge waste products into the sewer.

1962
Rachel Carson publishes the book *Silent Spring*.

1976
U.S. EPA begins phase-out of PCB production and use in the United States.

1972
Congress bans use (but not production) of DDTs in the United States.

1980
Congress passes the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), also known as the "Superfund Law."

1982
Montrose Chemical Corporation ceases manufacturing DDTs; closes down.

1990
U.S. Justice Dept. and California Attorney General sue Montrose Chemical Corp. et al.

1996
U.S. EPA designates the ocean floor off of southern California as a Superfund site.

Fishing bans instituted in the Los Angeles area.

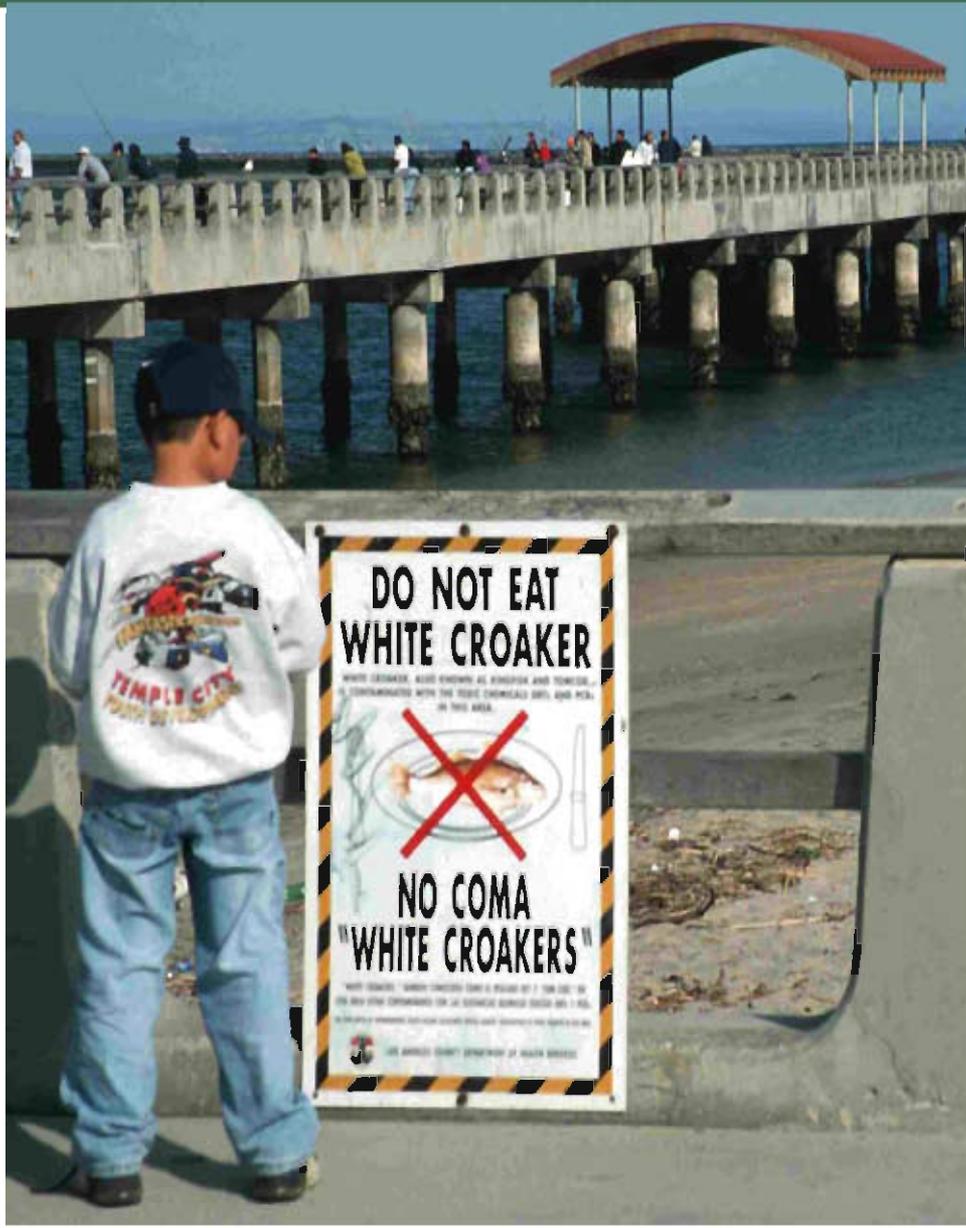
2001
Final consent decree for U.S. and CA v. Montrose et al.

Montrose Settlements Restoration Program (MSRP) created to administer restoration planning and implementation.

2006
MSRP restoration implementation begins.

2010
Phase II of MSRP restoration set to begin.

- NOAA
- US Fish and Wildlife Service
- National Parks Service
- California Department of Fish and Game
- California State Lands Commission
- California Department of Parks and Recreation



**DO NOT EAT
WHITE CROAKER**

WHITE CROAKER, ALSO KNOWN AS KINGFISH AND TOMCOKE,
CONTAMINATED WITH THE TOXIC CHEMICAL DDT, AND PCB,
IN THIS AREA.

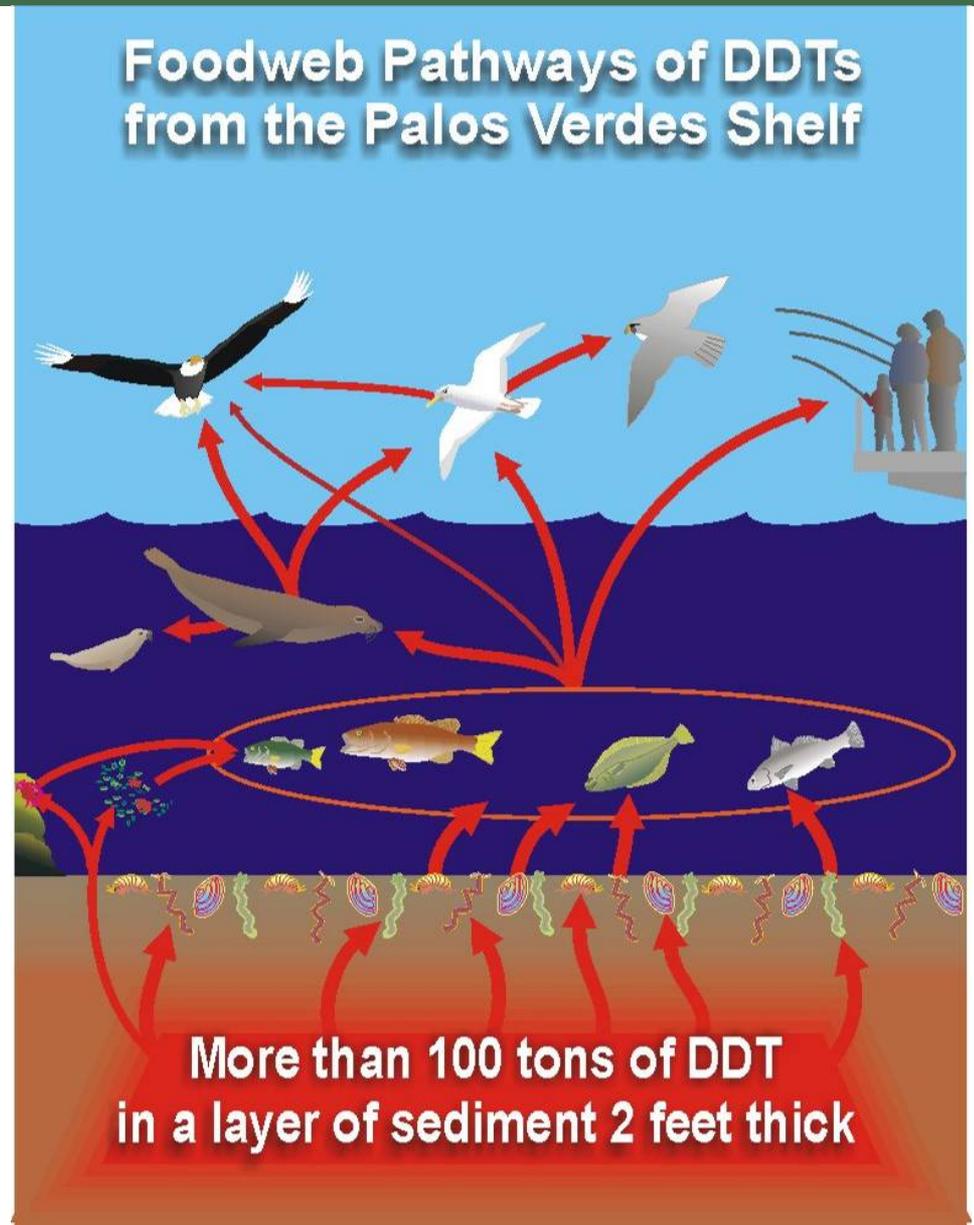


**NO COMA
"WHITE CROAKERS"**

WHITE CROAKER, "KINGFISH" SHOULD ONLY BE EATEN IF IT IS FRESH AND
HAS BEEN PROPERLY COOKED FOR AT LEAST 10 MINUTES. DURING THIS TIME,
IT SHOULD BE KEPT AT A TEMPERATURE OF 140°F OR HIGHER.

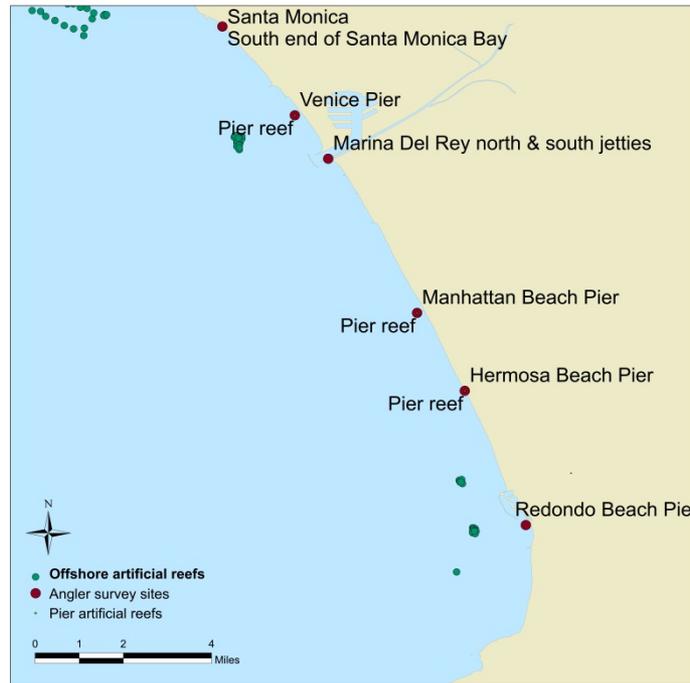
 SAN DIEGO COUNTY DEPARTMENT OF HEALTH SERVICES

Fish Services – injured because Fish transporter contaminants to Higher parts of the food chain, including humans (sport & subsistence fishing injury)

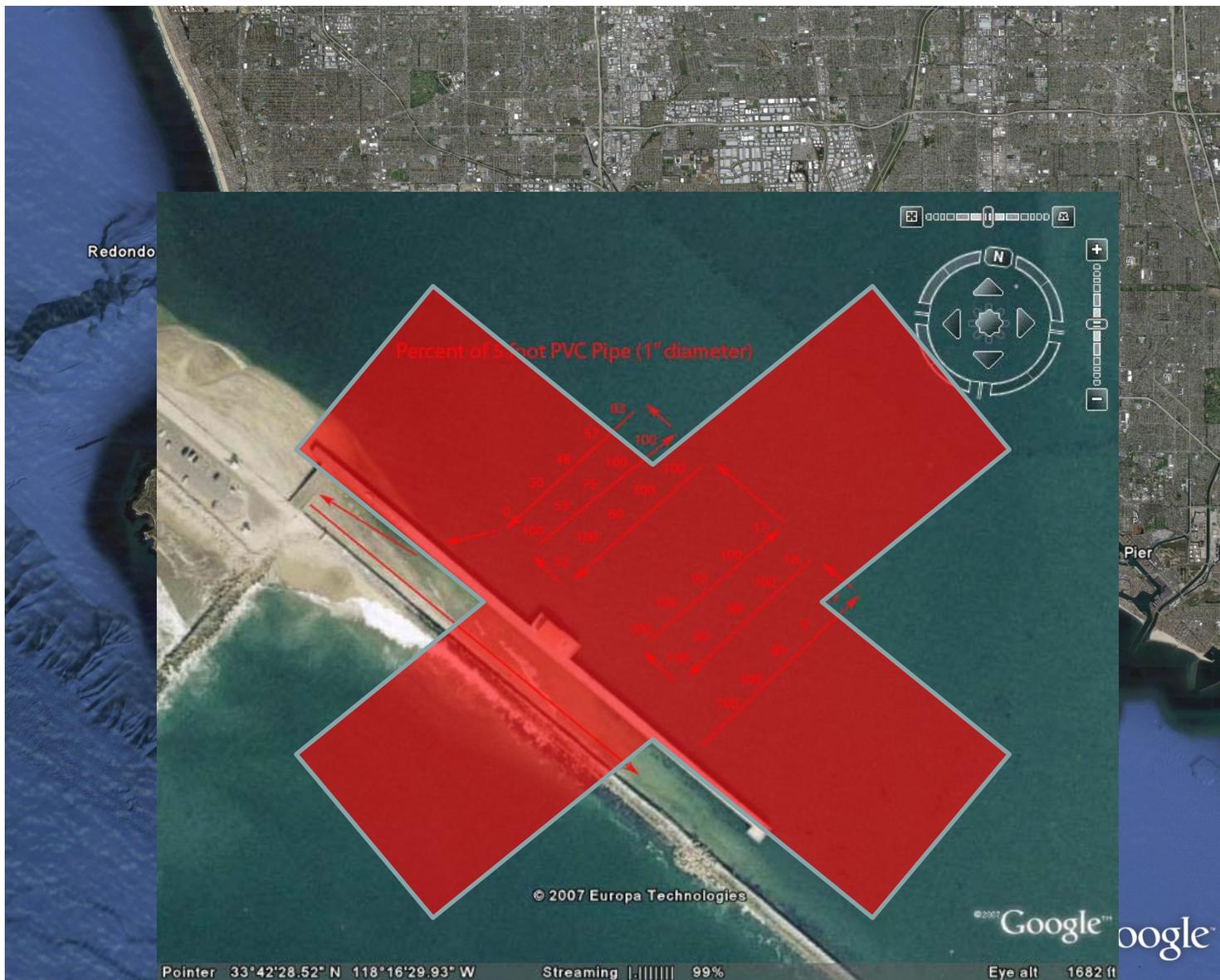


MSRP Artificial Reef Project Development

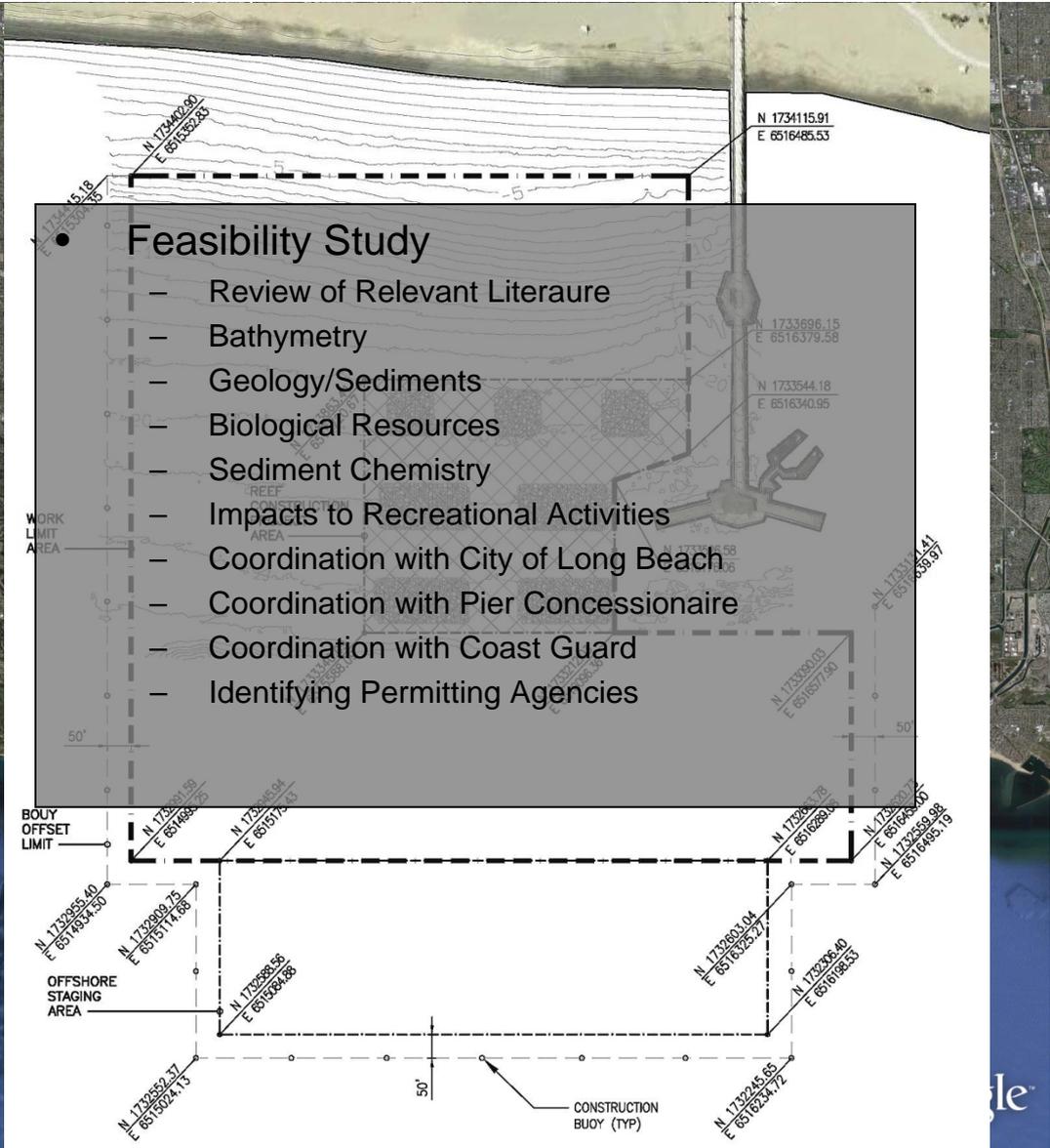
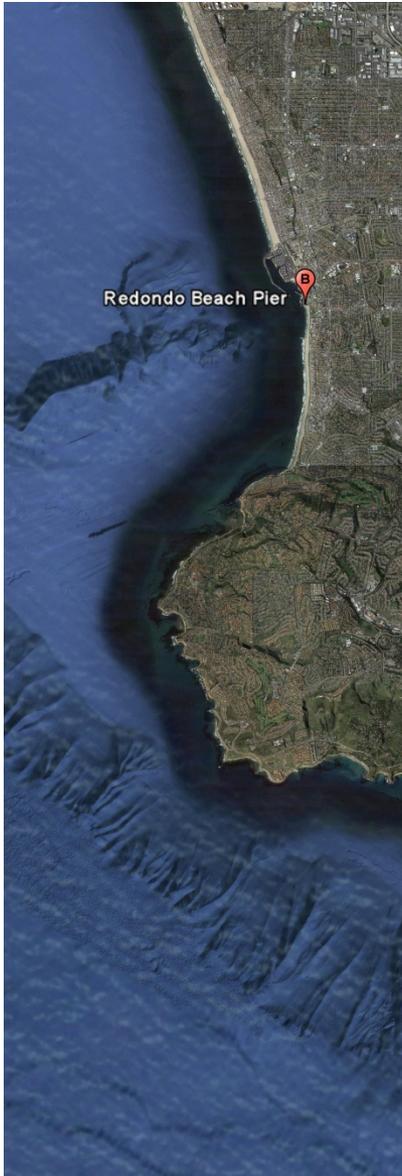
- Water depth
- Sediments
 - Composition
 - Contamination
 - transport
- Adjacent Reef
 - Artificial
 - Natural
- Current Dynamics
- Wave Dynamics
- Angler Use
- Proximity to Impacted Resources
- Baseline fish species composition
- Baseline fish contamination levels
- Pier condition – structural integrity, facilities, etc.
- Pier Users – anglers, surfers, boaters, tourists, vendors, others



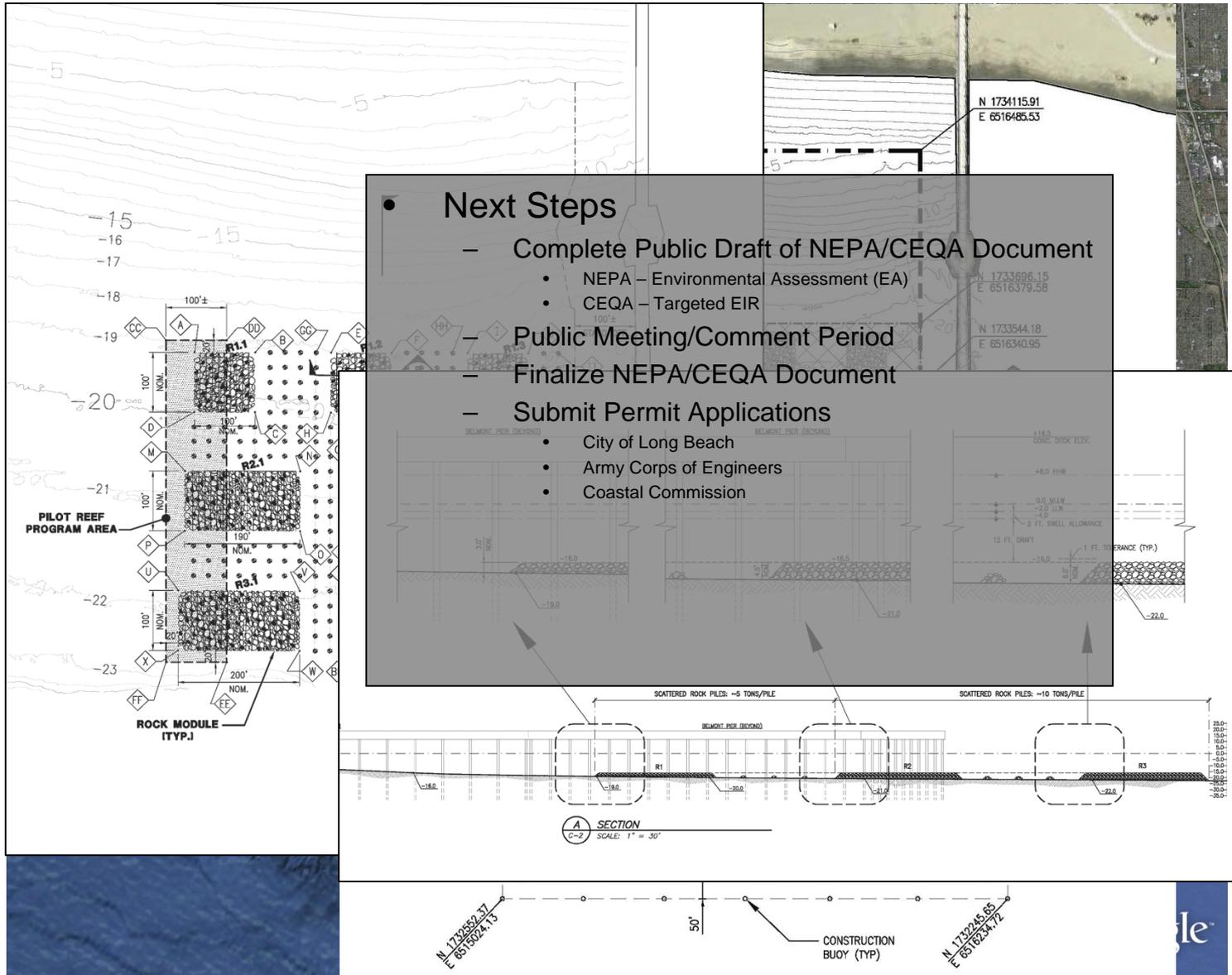
Initial Preferred Reef Sites



Initial Preferred Reef Sites



Initial Preferred Reef Sites



- Phase 2 Restoration Plan is in Progress
- Plan will include projects restoring:
 - Bald Eagles
 - Seabirds
 - Peregrine Falcons
 - Fish Habitat
- Public Review Draft Scheduled for October 2011

Restore Impacted Natural Reefs

- Large area (~250 acres) of buried reef
- Sediment Released From Portuguese Bend Landslide
- Recent management actions have stabilized landslide
- Low relief sections of reef remain buried



Restoration Approach

- Create Higher Relief Modules
- Resist burial
- Create turbulence that may restore surrounding low relief reef