Sunset Harbour / Huntington Harbour Maintenance Dredging and Waterline Installation Project

CMANC

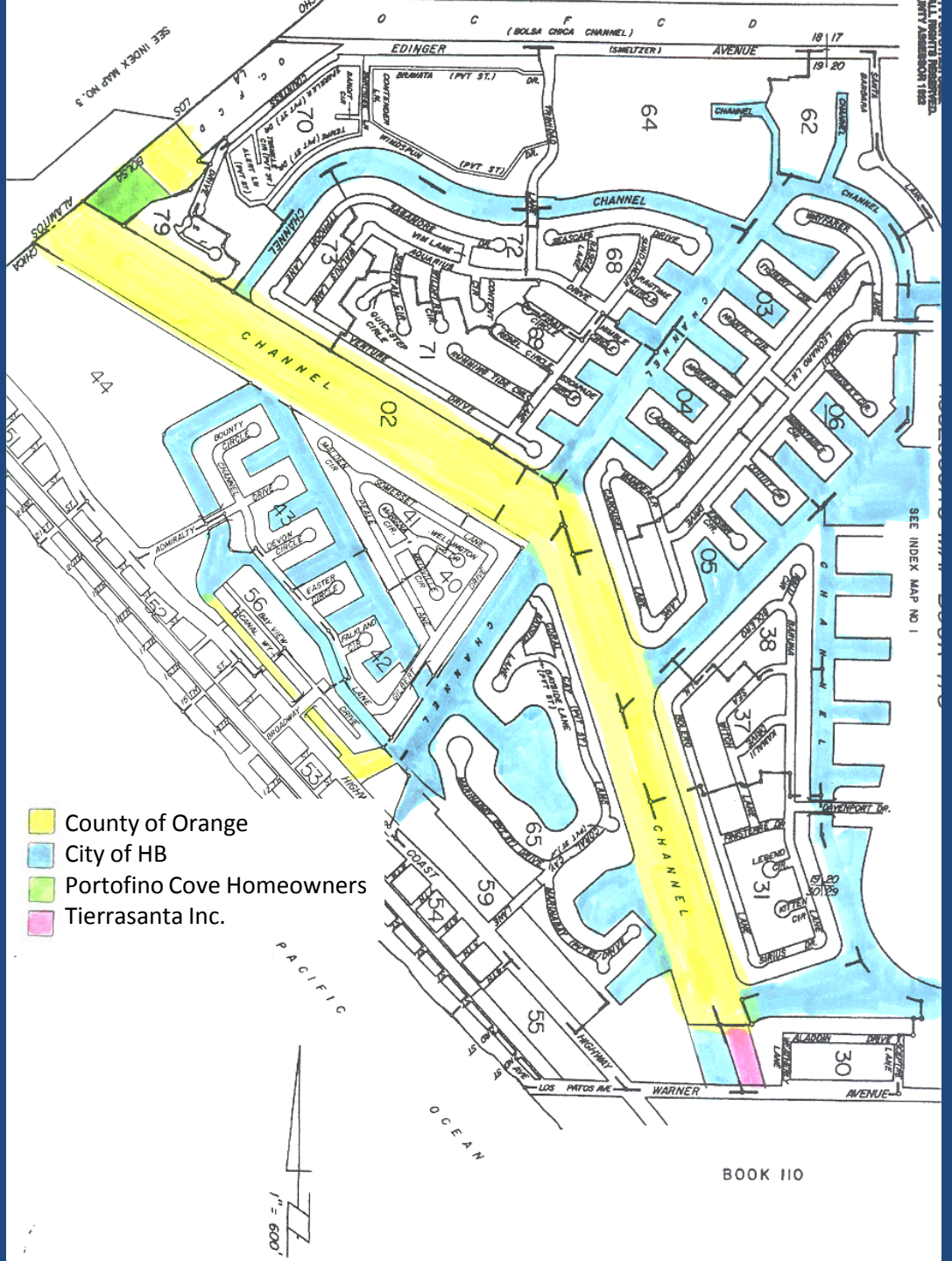
21 January 2016

County of Orange Footprint

Huntington Harbour Operational and Dredging Cost Sharing Agreements

- Board and City Council approved Agreement D85-144 which provides for joint City/County administration of maintenance and operations of the harbor.
- Agreement delineates responsibilities for law enforcement, fire protection, aids to navigation, anchorages, moorings, piers, docks, bulkheads, lifeguard services debris control and dredging.
- Specifically related to dredging : County “shall have responsibility for maintenance dredging within Huntington Harbour main channel for purposes of maintaining channel depths. City shall be responsible for maintenance of all other waterways.”

Responsibilities Map



Dredging History

- Last dredging completed 2001
  - Disposal at LA-2
  - Plans and permits for 106,400 cy
  - Actual dredging was 96,000 cy
- 1987 – 110,000 cy
- 1983 – 50,000 cy
- 1979 – 100,000 cy

Total of 197,000 cubic yards (cy).

Dredge volumes with one-feet overdepth allowance.

Design depths based on MLLW vertical datum.

Disposal Locations

- Open Ocean (LA-2) – 129,300 cy
- Beach Nourishment – Surfside/Sunset Beach – 47,000 cy
- Marsh Restoration – 13,500 cy
- Waterline Trench Cut and backfill – 7,000 cy

- Total = 197,000 cy

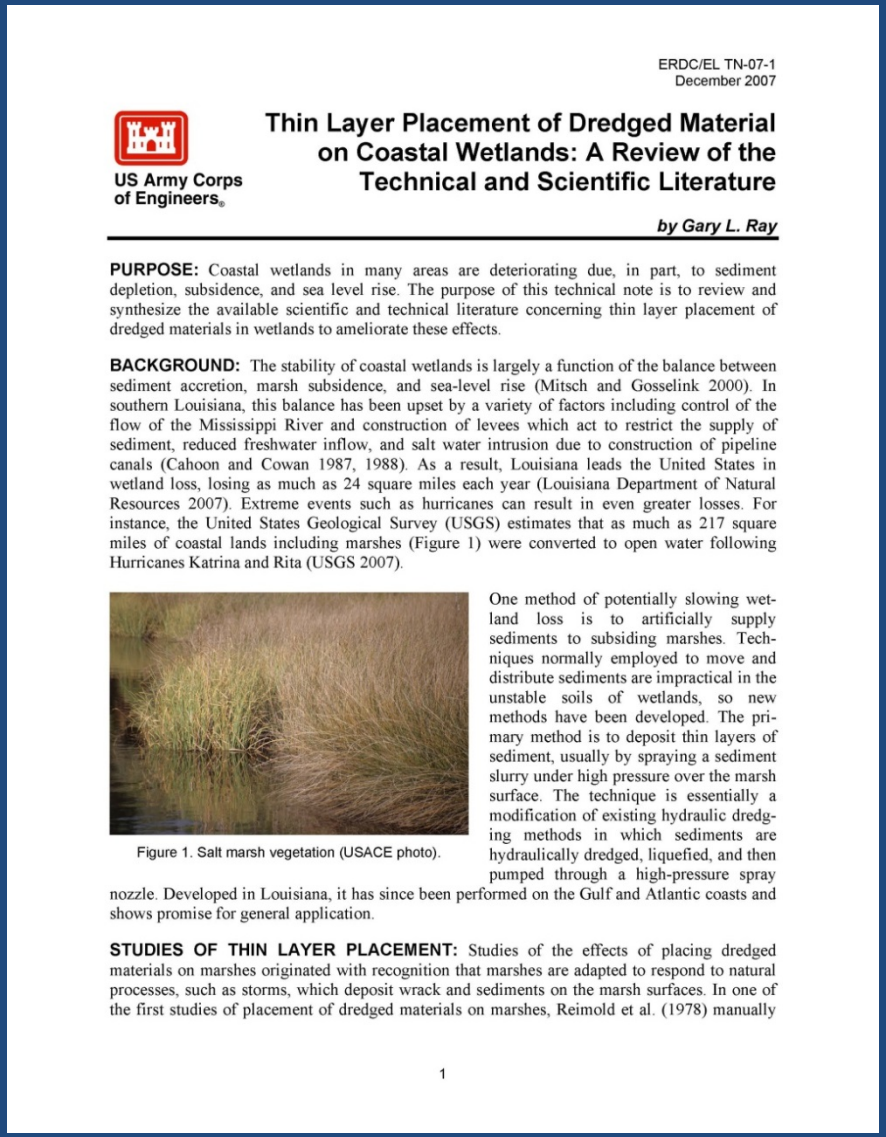
Seal Beach National Wildlife Refuge
Thin Layer Salt Marsh Sediment Augmentation Project

- Managed by USFWS
- Improve habitat quality within cordgrass salt marsh habitat to support endangered light-footed Ridgway's rail
- Raise elevation 6-10" over 10 acres
- Elevation loss due to:
  - Reduction or loss of sediment inputs
  - Land Subsidence – subterranean fluid extraction and tectonic action
  - Sea Level Rise

Light-footed Ridgway's rail

Beneficial Use of Dredge Material by Thin Layer Placement

- First Study – 1978 Georgia
- Many applications since - TX, LA, GA, NC, MD
- Often used where natural systems of sediment deposition have been altered
- 2015/2016 – Seal Beach NWR - First thin layer addition project on west coast of US?



ERDC/EL TN-07-1
December 2007

US Army Corps of Engineers

Thin Layer Placement of Dredged Material on Coastal Wetlands: A Review of the Technical and Scientific Literature

by Gary L. Ray

PURPOSE: Coastal wetlands in many areas are deteriorating due, in part, to sediment depletion, subsidence, and sea level rise. The purpose of this technical note is to review and synthesize the available scientific and technical literature concerning thin layer placement of dredged materials in wetlands to ameliorate these effects.

BACKGROUND: The stability of coastal wetlands is largely a function of the balance between sediment accretion, marsh subsidence, and sea-level rise (Mitsch and Gosselink 2000). In southern Louisiana, this balance has been upset by a variety of factors including control of the flow of the Mississippi River and construction of levees which act to restrict the supply of sediment, reduced freshwater inflow, and salt water intrusion due to construction of pipeline canals (Cahoon and Cowan 1987, 1988). As a result, Louisiana leads the United States in wetland loss, losing as much as 24 square miles each year (Louisiana Department of Natural Resources 2007). Extreme events such as hurricanes can result in even greater losses. For instance, the United States Geological Survey (USGS) estimates that as much as 217 square miles of coastal lands including marshes (Figure 1) were converted to open water following Hurricanes Katrina and Rita (USGS 2007).

Figure 1. Salt marsh vegetation (USACE photo).

One method of potentially slowing wetland loss is to artificially supply sediments to subsiding marshes. Techniques normally employed to move and distribute sediments are impractical in the unstable soils of wetlands, so new methods have been developed. The primary method is to deposit thin layers of sediment, usually by spraying a sediment slurry under high pressure over the marsh surface. The technique is essentially a modification of existing hydraulic dredging methods in which sediments are hydraulically dredged, liquefied, and then pumped through a high-pressure spray nozzle. Developed in Louisiana, it has since been performed on the Gulf and Atlantic coasts and shows promise for general application.

STUDIES OF THIN LAYER PLACEMENT: Studies of the effects of placing dredged materials on marshes originated with recognition that marshes are adapted to respond to natural processes, such as storms, which deposit wrack and sediments on the marsh surfaces. In one of the first studies of placement of dredged materials on marshes, Reimold et al. (1978) manually

1

Project Goals

1.Cordgrass - Within 2 years of sediment augmentation, achieve cordgrass stem lengths equivalent to pre-project conditions and achieve terminal cordgrass elevations higher than pre-project conditions.

2.Light-footed Ridgway's rails & Migratory Birds - Within 1 year of sediment augmentation, provide foraging opportunities for migratory birds, and within 2 years provide foraging and nesting opportunities for light-footed Ridgway's rail.

3.Sediment - Within 2 years of sediment augmentation, achieve a minimum 3 inch increase in the marsh plain elevation over pre-project conditions. Note: A 10" sediment layer will be applied during the application process.

4.Invertebrates - Within 2 years of sediment augmentation, achieve a diversity and abundance of invertebrates within the project sediments that is similar to the selected reference site.

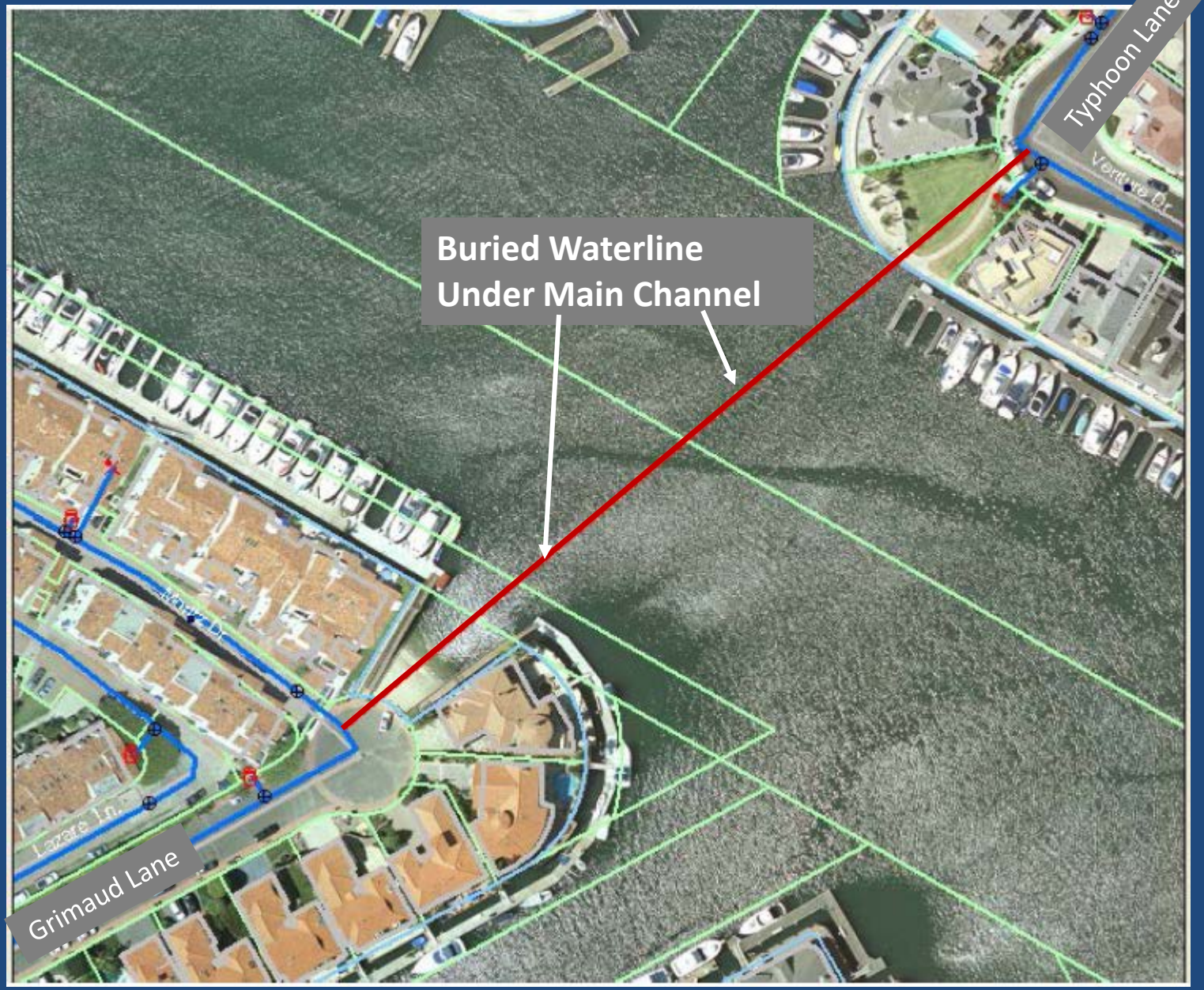
5.Carbon Sequestration – Determine how the carbon storage capacity of the project site changes after sediment augmentation.

Monitoring Program

- Sediment elevations; thickness, and compaction rate of applied sediment
- Sediment movement and turbidity in adjacent channels
- Tidal creek status/formation/reformation post sediment application
- Vegetation monitoring/Plant community assessment – to include % cover, biomass, cordgrass terminal elevations, cordgrass stem length, cordgrass stem density, physiological plant condition
- Abiotic parameter description
- Eelgrass monitoring
- Infaunal invertebrate community structure
- Epifaunal community diversity
- General avian surveys – abundance & diversity
- Light-footed Ridgway's rail monitoring
- Carbon Sequestration Studies – Coring, Biomass, Methane & Nitrous Oxide Flux

Waterline Installation

- 16” diameter waterline under Main Channel to provide redundant fire emergency service to City of HB


Typhoon Lane
Buried Waterline
Under Main Channel
Grimaud Lane

Construction Cost

- Dredging - $7,191,092
- Waterline - $840,416

Grant Funding

- State Coastal Conservancy - $550,000 for monitoring
- USFWS – 2015 Cooperative Recovery Initiative - $350,000 for construction
- CDFW – Wetlands Restoration for GHG Reduction - $125,500 for construction

Schedule

- Advertise/Solicit Bids – September 2015
- Award Construction Contract – October 2015
- Begin Construction – December 2015
- Complete Construction – June 2016

Work Hours

- Waterside dredging work: Monday-Saturday, 7 a.m. to 7 p.m.
- Landside waterline work: Monday-Saturday, 8 a.m. to 5 p.m.
- Vessel transit to ocean disposal site: 24/7

Blackout (No Work) Dates

- December 12 and 13 (harbor boat parade)
- East end of main channel: December 16-23 (harbor cruise of lights)
- Federal holidays

Coordination with Navy at SDZ

Mitigation Measures

- Eelgrass restoration
- Biological monitoring (sea turtles, marine mammals, nesting birds, grunion)
- Turbidity
- Air quality
- Noise
- Traffic

Project Partners

- County of Orange (Dredge project manager & funding source)
- City of Huntington Beach
- U.S. Fish and Wildlife Service (Augmentation project manager & funding source)
- City of Seal Beach
- California Coastal Conservancy (Funding source)
- CA Dept. of Fish & Wildlife (Funding Source – Greenhouse Gas Reduction Program)
- USACE - San Francisco District (Funding source)
- Naval Weapons Station Seal Beach (Land owner)
- State Lands Commission (Land owner)
- Southwest Wetlands Interpretive Association (Contract manager)
- USGS – Western Ecological Research Center, Karen Thorne, Ph. D. (Research team)
- UCLA – Richard Ambrose, Ph.D. & Glen MacDonald, Ph. D. (Research team)
- CSU Long Beach – Christine Whitcraft, Ph.D. (Research team)
- Chapman University – Jason Keller, Ph. D. (Research team)
- Moffatt & Nichol (Engineering consultant)
- Curtin Maritime (Dredge contactor)