



Dynamic Under Keel Clearance (UKC) Project for the Port of Long Beach

Hydrographic Services Review Panel
5 March 2024

Julie Thomas, Capt Kip Louttit, Capt Tom Jacobsen, Jeff Ferguson, Ryan Kittell, Dr. James Behrens, Karsten Uil, Capt Thomas MacKrell



Challenge: Very Large Crude Carriers (VLCCs) entering POLB



M/V GEM 2 entering POLB 8 April 2017

1,082' LOA

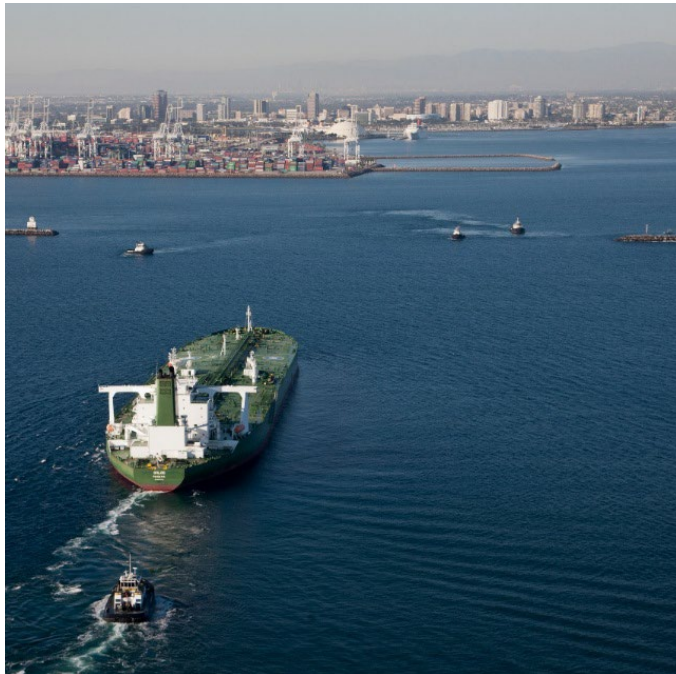
198' Beam

302,783 DWT

66' Draft

Ports of Los Angeles & Long Beach

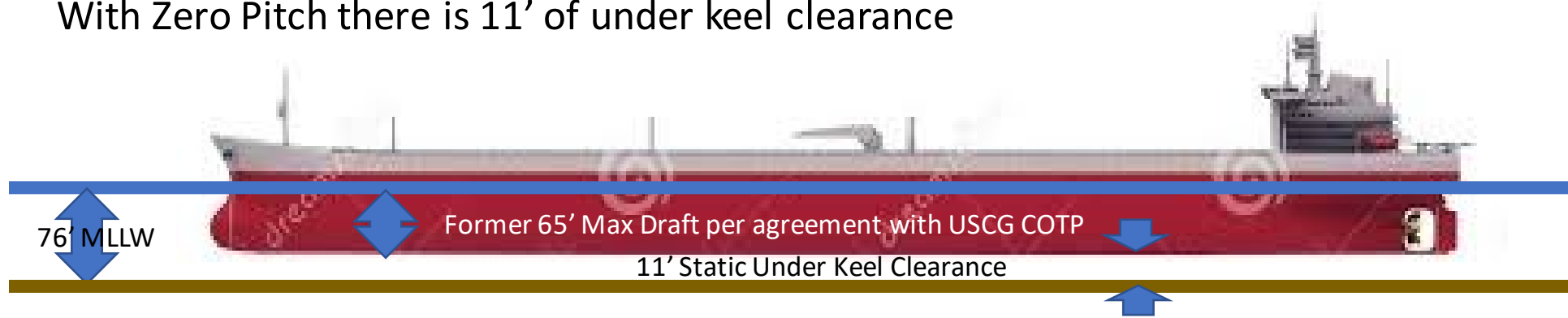
- 50% of California's oil
- Only 5-day supply of oil ashore
- Long Beach Pier T-121 is the only VLCC berth on the West Coast



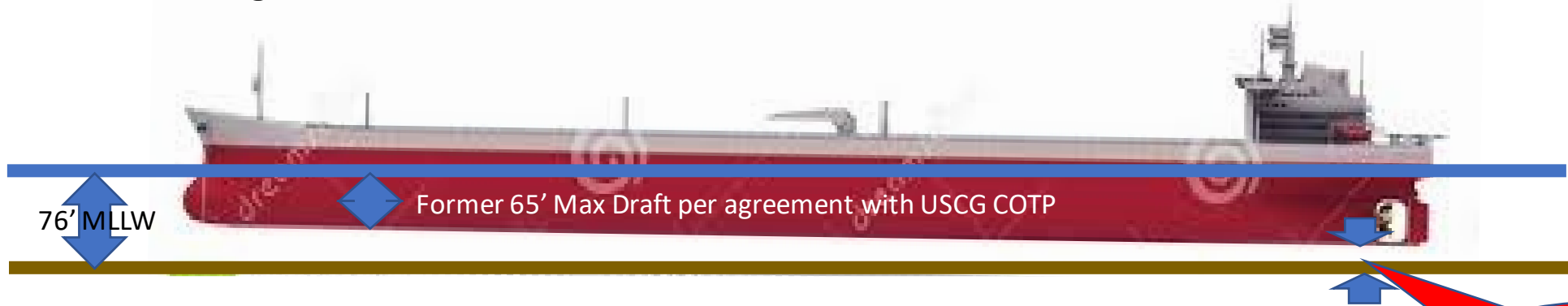
- Approach to POLB Channel dredged to 76 feet
- Area of concern:
 1. Approach channel
 2. Turn at breakwater,
 3. Little bit after the turn

The Pitch Problem in a Long Period Southerly Swell

With Zero Pitch there is 11' of under keel clearance



With 1 degree of Pitch there is a 10' increase in draft for a 1,100 foot tanker:



1 degree of pitch reduces the UKC to 1 foot.

1' UKC!!

How can we predict this pitch motion and ensure a safe passage?

The Past:

GO/NO GO decision made using:

- ✓ CDIP Swell Warnings
- ✓ CDIP Buoy Reports
- ✓ Experience
- ✓ Seaman's Eye
- ✓ Observed pitch & roll far enough offshore to permit "bail-out" before committing to channel

Swell Warning - current conditions Mon 2/19/2024 11:39 PM

UE uproc@model-e.cdip.ucsd.edu
To cdipsw@cdip.ucsd.edu; [Kip Louttit](#); [Vessel Traffic](#); [vts-sup](#); Swell-alert@jacobsenpilot.com; [Captain W. Thomas Mack](#)

Prediction site: SP018

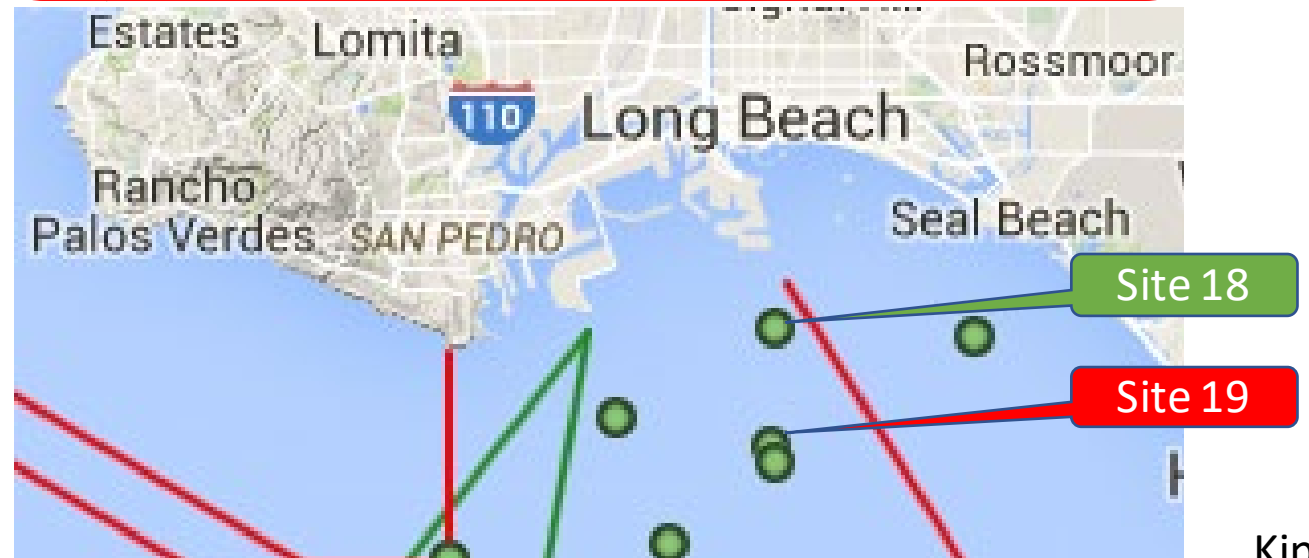
Date (PST)	14+ Hs (ft)	14+ Tp (secs)	14+ Dp (deg T)	Tot Hs (ft)	Tot Tp (secs)	Tot Dp (deg T)
2024-02-19 06:00 pm	4.79	16.67	232	5.87	16.67	232
2024-02-19 07:00 pm	5.02	16.67	232	6.07	16.67	232
2024-02-19 08:00 pm	5.09	16.67	232	6.10	16.67	232
2024-02-19 09:00 pm	5.18	15.38	232	6.20	15.38	232
2024-02-19 10:00 pm	5.15	15.38	232	6.23	15.38	232
2024-02-19 11:00 pm	5.28	16.67	232	6.40	16.67	232

Link: https://cdip.ucsd.edu/mops/?moplist=San_Pedro_Harbor&xitem=fc_swell&mop=SP018&xperiod=14&tz=PST&units=english

Prediction site: SP019

Date (PST)	14+ Hs (ft)	14+ Tp (secs)	14+ Dp (deg T)	Tot Hs (ft)	Tot Tp (secs)	Tot Dp (deg T)
2024-02-19 06:00 pm	7.42	16.67	241	9.02	16.67	241
2024-02-19 07:00 pm	7.78	16.67	242	9.48	16.67	242
2024-02-19 08:00 pm	8.01	16.67	242	9.74	16.67	242
2024-02-19 09:00 pm	8.33	15.38	243	10.04	15.38	243
2024-02-19 10:00 pm	8.24	15.38	243	10.04	15.38	243
2024-02-19 11:00 pm	8.33	15.38	242	10.30	15.38	242

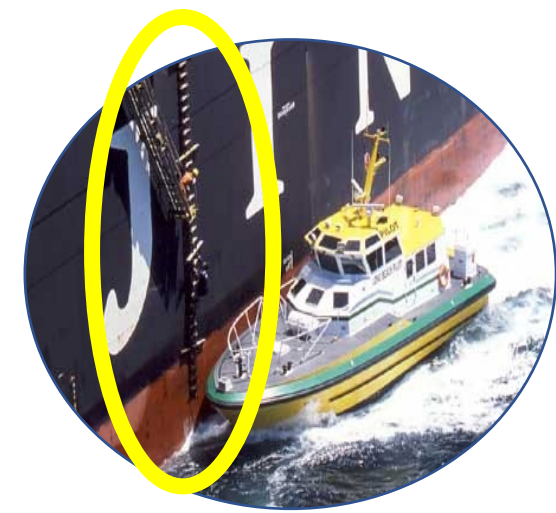
Link: https://cdip.ucsd.edu/mops/?moplist=San_Pedro_Harbor&xitem=fc_swell&mop=SP019&xperiod=14&tz=PST&units=english



The Present: PROTIDE

Safer & More Efficient Ship Movements based on precision Science & Technology

- Jacobsen Pilot Service (Long Beach Pilots) Team Piloting Procedures enhance safety
- Protide enhances safety & efficiency:
 - Provides input to pilot and ship's captain for go/no go decision
 - Reduces or eliminates the number of aborted runs
 - If a very deep draft tanker is out of limits to enter the POLB, a smaller tanker may be able to enter



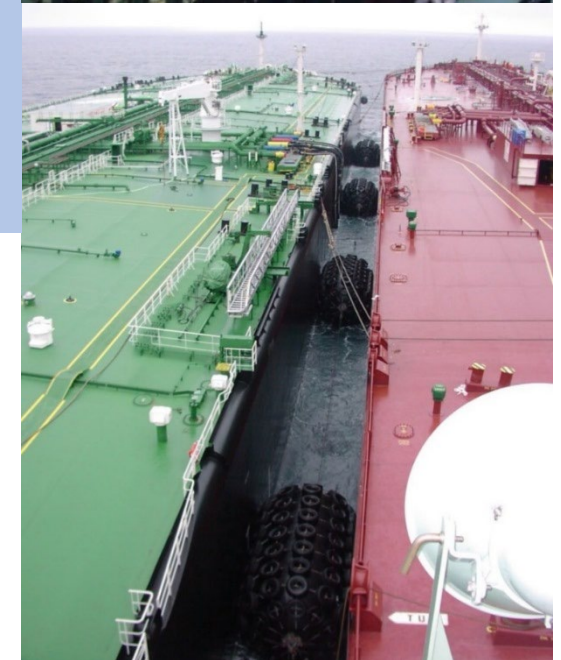
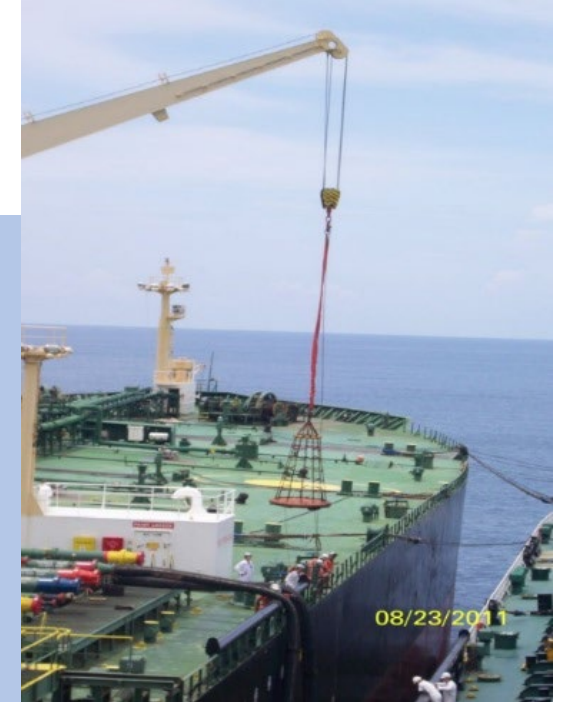
Goals of Dynamic Under Keel Clearance Project

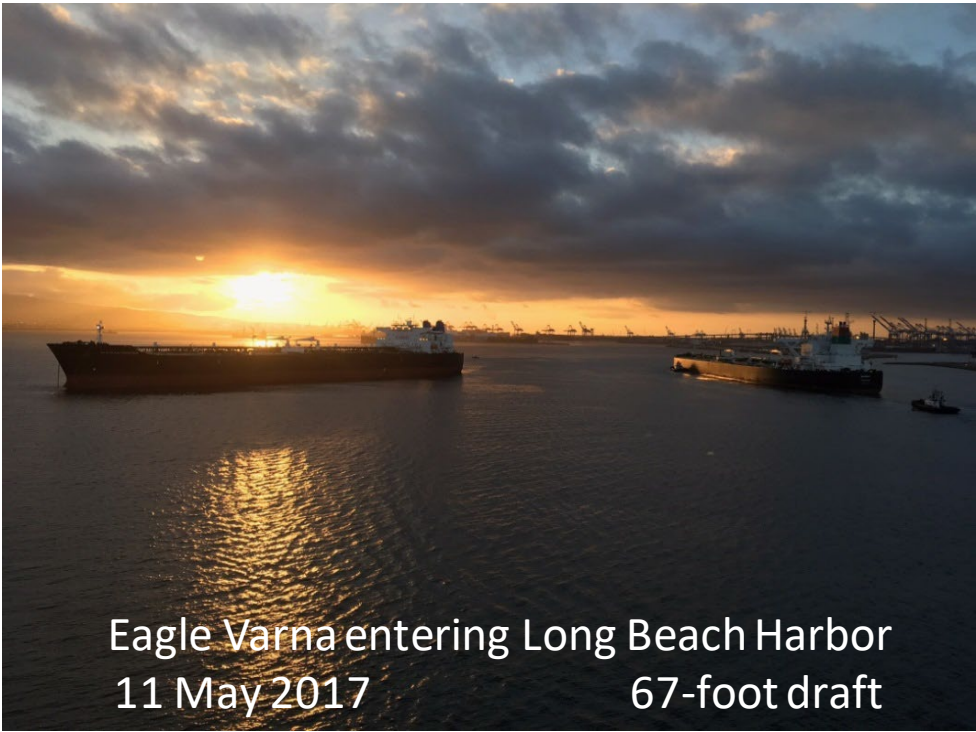
1. **Increase safety** by reducing the risk of an accidental grounding caused by the pitch or roll of a large vessel causing it to impact the bottom.
2. **Increase efficiency** by enabling ship owners and masters to adjust arrival times based on the pitch and roll program being able to predict when pitch and roll will be out of limits to enter port due to unacceptable under keel draft clearance.
3. **Reduce emissions** by enabling larger ships to carry more cargo to enter the POLB, which could reduce overall stack emissions per ton of cargo arriving at the port.

Benefit:

Reduce overall risk of transporting oil on West Coast

1. SAFETY - Reduced personnel exposure & injury
 - a. Line handlers
 - b. Reduces hours crews are in demanding ops
2. ECONOMICS - More efficient use of port infrastructure & tugs
3. ENVIRONMENT - Reduce oil spill risk
 - a. Fewer oil transfers
 - b. Transfers in protected harbors rather than offshore lightering
 - c. Reduced emissions due to less loitering and more barrels per movement





Eagle Varna entering Long Beach Harbor
11 May 2017 67-foot draft

As of Oct 2023, 139 tankers with draft greater than 65 feet have safely entered the Port of Long Beach

28 at 66'
48 at 68'

43 at 67'
20 at max of 69'



Bunga Kasturi Empat on first transit at 68-foot draft
15 November 2017

Goals:

1. Increase Safety
2. Increase Efficiency
3. Reduce Emissions

**OUR SUCCESS IN MEETING THESE GOALS
CONTINUES TO BE DEMONSTRATED**



Point of Contact:

CAPT Kip Louttit
USCG, Retired
Project Manager, Dynamic UKC Project

Executive Director, MX SoCal & VTS LA/LB
San Pedro, CA

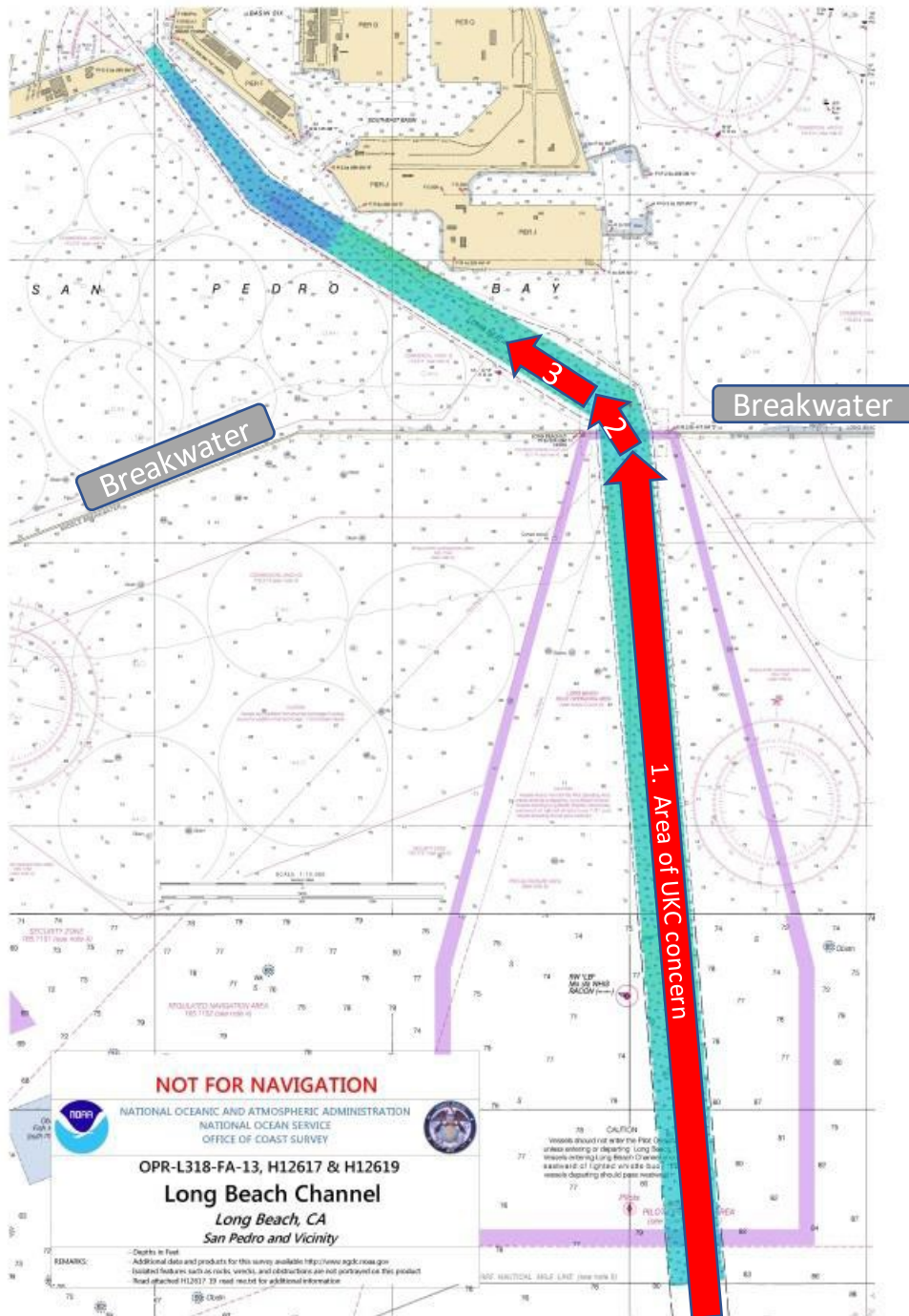
Work: 310-519-3127 Cell: 310-897-1714

klouttit@mxsocial.org



**US Army Corps
of Engineers®**

Backup



Approach to port of
Long Beach...

Channel dredged to
76 feet

Area of concern is:

1. Approach channel,
2. Turn at breakwater
3. Little bit after turn

Key Success Factor

UKC Feasibility Study *Memorandum of Understanding*

Signed Nov-Dec 2014

Interested Parties & Advisors



Participants

The Port of
LONG BEACH

Memorandum of Understanding
Feasibility Study for Dynamic Under Keel Clearance Assurance Program

I concur with the above:

<p>By: </p> <p>Name/Date: Jan S. Sauerberg For the Port of Long Beach 12/2/14</p>	<p>By: </p> <p>Name/Date: Michael P. Cahill, 12/5/14 For the Office of Oil Spill Prevention and Response</p>
<p>By: </p> <p>Name/Date: Thomas J. Jacobsen 11-24-14 For the Jacobsen Pilot Service</p>	<p>By: </p> <p>Name/Date: Rick D. Weyen Title: Vice President, Logistics For Tesoro Refining & Marketing Company LLC</p>

CALIFORNIA
DEPARTMENT OF FISH & WILDLIFE

OSPR
Office of
Oil Spill Prevention and Response

TESORO

& PIER 121 USERS

- ✓ Purpose, Goals, Definitions
- ✓ Study, Evaluation, Pilot, & Implementation Phases
- ✓ Desired Outcomes & Measures of Success
- ✓ Roles and Responsibilities
- ✓ \$\$ flows

Project Manager:



End