



Applying an Innovative Approach and Methodology to Reduce a Dangerous Shoal at Bullshead Reach Within the San Francisco Bay to Stockton Ship Channel in 2011. Or 'The Incredible Reappearing Shoal!'

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USACE Navigation Mission

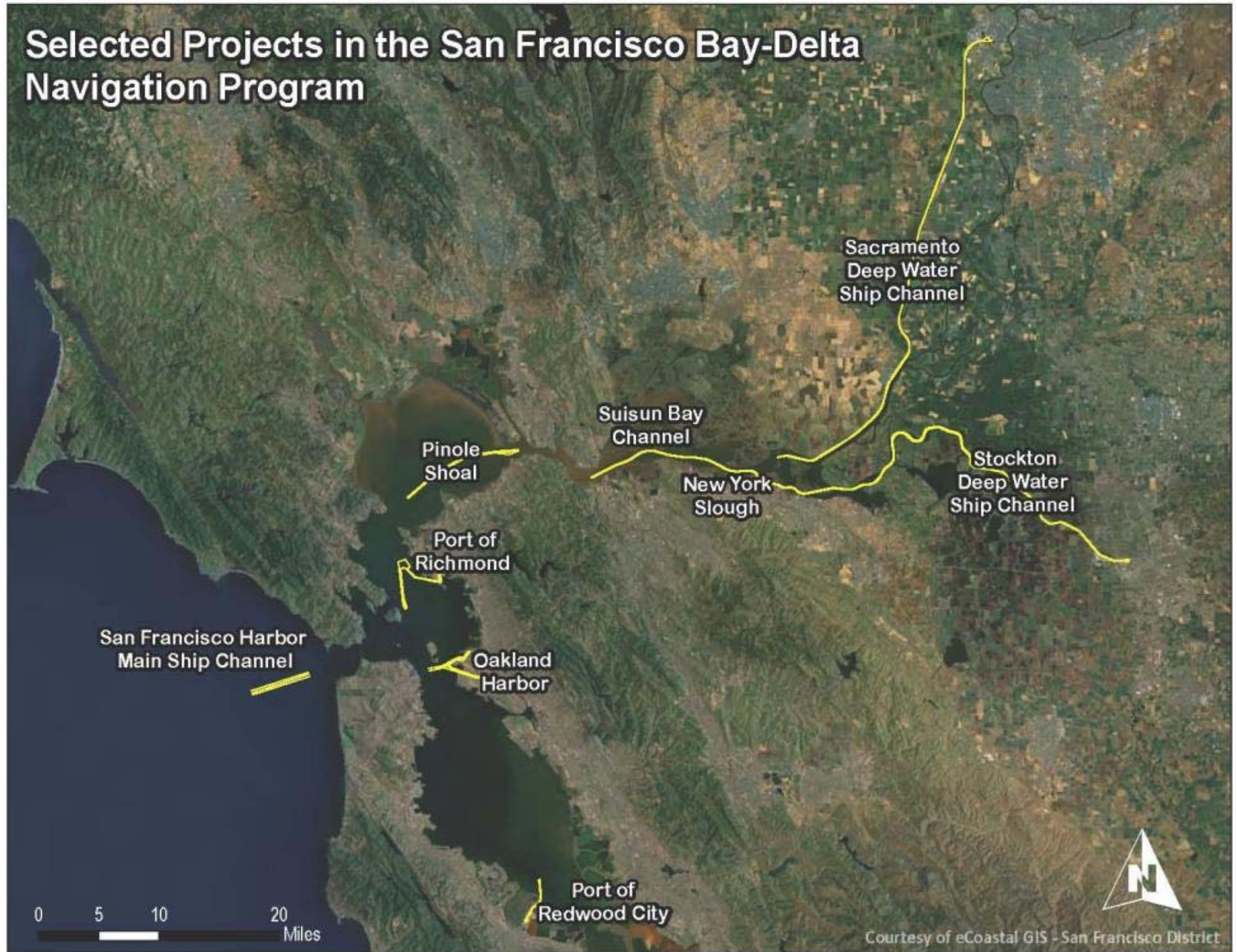
To provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for the movement of commerce, national security needs and recreation.



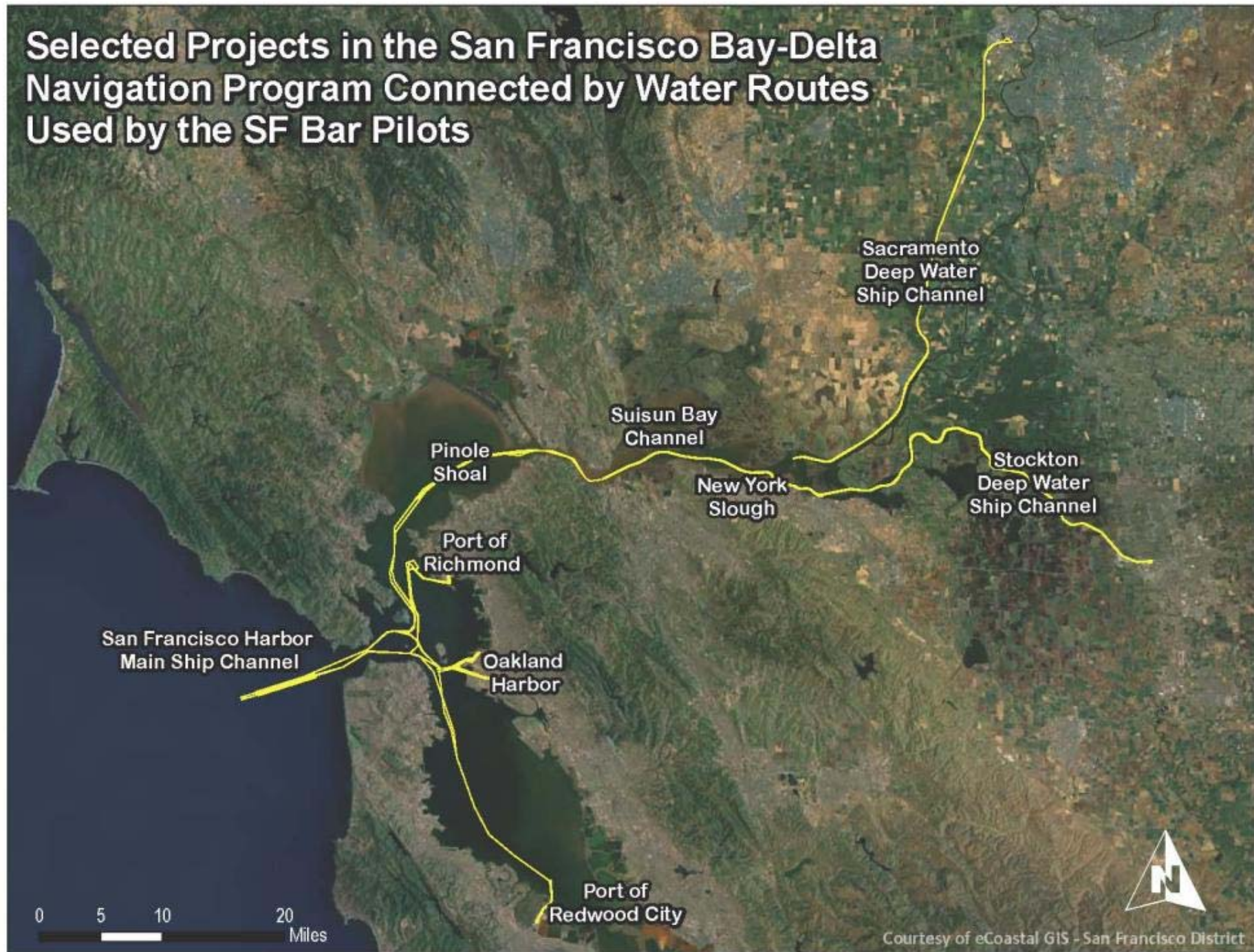


Importance of the San Francisco to Stockton Ship Channel to the San Francisco Bay Area's family of ports and terminals

Selected Projects in the San Francisco Bay-Delta Navigation Program



Selected Projects in the San Francisco Bay-Delta Navigation Program Connected by Water Routes Used by the SF Bar Pilots





Port of Stockton

- 70 miles east of Golden Gate
- 2000 Acres
- 35' draft
- Bulk and Break-Bulk Port
- Adjacent to I-5, Hwy 99, BNSF and UP Railroads
- Key Port for Agriculture in California's Central Valley
- Support approximately 4,500 jobs





Exports & Imports

July 2011 to June 2012

Exports

| | |
|----------------|------------------|
| ● Iron Ore | 1,024,831 |
| ● Sulfur | 245,682 |
| ● Rice | 89,354 |
| ● Coal | 60,694 |
| ● Beet Pellets | 88,248 |
| ● Other | <u>31,827</u> |
| | 1,540,636 |

Imports

| | |
|----------------------|------------------|
| ● Fertilizer | 831,306 |
| ● Molasses | 255,752 |
| ● Bulk Cement / Slag | 94,050 |
| ● Cottonseed | 60,188 |
| ● Barite | 31,976 |
| ● Other | <u>153,521</u> |
| | 1,426,793 |



Dredging Equals Dollar\$

Every foot of draft lost costs roughly \$200,000 per vessel per trip.

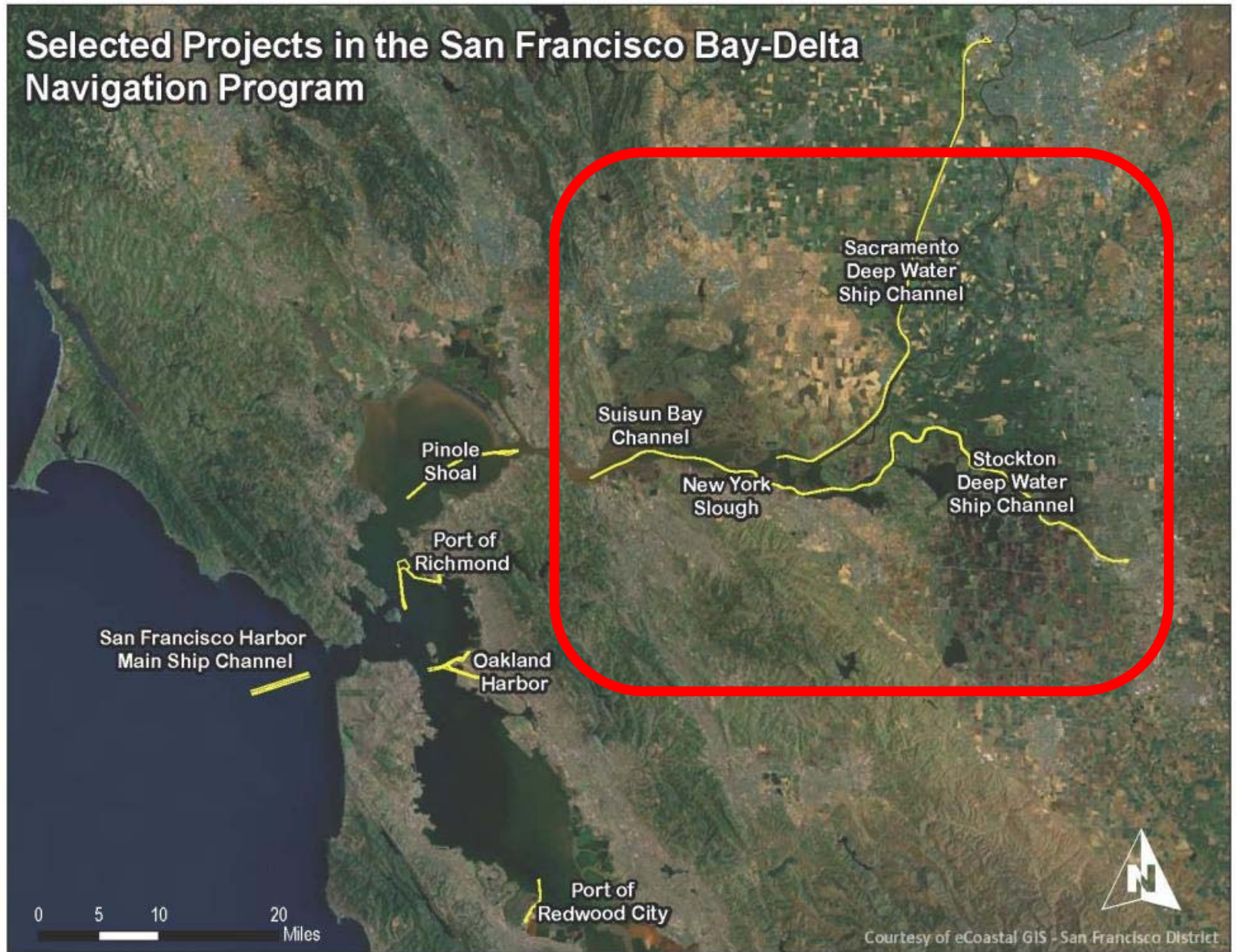


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So, What's the Problem?

Selected Projects in the San Francisco Bay-Delta Navigation Program





Suisun Bay Channel



- Project Maintenance Depth: -35' MLLW
- ~175,000 cubic yards, annually
- Hydraulic Hopper Dredge or Clamshell
- Work Window: 1 August – 30 November
- In-Bay Placement:
 - Primary Suisun Bay Disposal Site (SF-16)
 - Secondary Carquinez Disposal Site (SF-9)

Delta Project Overview



Bullshead Shoal Is the Problem

- Aug 1-10, 2011: Routine Maintenance dredging by Essayons
 - -35' MLLW plus 2' O.D.
- Nov 14, 2011: Survey identified a shoal on centerline
 - -33.7' MLLW
- Navigation safety concern due to proximity to bridges.





Vessel in transit through Bullshead



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- Navigation safety concern due to proximity to bridges.
- Work Window closes on 30 November
 - 2 Weeks to act





Alternatives and Constraints

- Environmental Window closed 30 November
 - Coordination and approval by 5 agencies
- Alternatives explored:
 - Modification to existing contracts
 - Expedited procurement of new contract
 - Use of Government Dredge
 - Develop new capability on existing assets in San Francisco District





Dredging Creates a Strong Economy and a Cleaner Environment



Dragging / Knockdowns are not applicable in all situations!





Knockdown / Grading Equipment – Push boat with drag barge





Knockdown / Grading Equipment – Drag Barge





Knockdown / Grading Equipment – Drag beam deployed from barge





Survey during knockdown / grading operations





Dredging Creates a Strong Economy and a Cleaner Environment



Knockdown Operations at Bullshead

- 28 November – 16 December 2011
- Target Depth: -35' MLLW
- Environmental Protection Measures:
 - Volume limitation – 5,000cy
 - Limited days of operation, window extension
 - Knockdown only during ebb and slack tide
 - Post-knockdown reports





Drag beam and chain ready to deploy





Drag beam being deployed from crane





Operations during inclement weather – heavy fog





Bridge during knockdown operations

- GPS positioning of ship





Knockdown Operations at Bullshead

- 14 Nov 2011 Pre-knockdown: -33.7'
- 19 Dec 2011 Post-knockdown: -34.2'





Lessons Learned

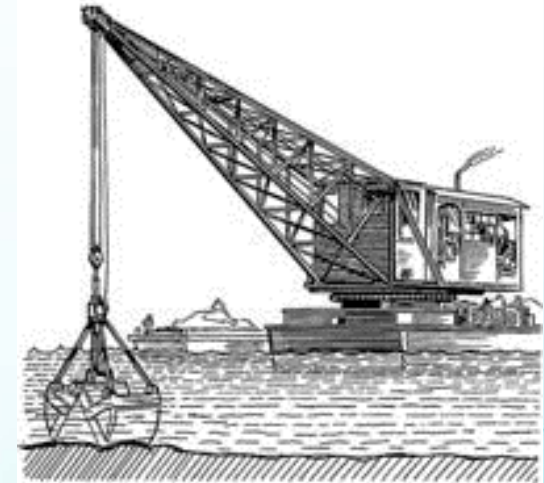
- Innovation
- Collaboration
- Adaptive management
- Resource / regulatory agency contact / coordination
- Planning for inclement weather
- Equipment / methodology testing
- Stakeholder involvement





Future actions / improvements

- Sediment fate and transfer modeling.
- The use of sediment sumps, in combination with advance maintenance, grading and knockdowns.
- Contract acquisition strategy (Indefinite Delivery / Indefinite Quality (IDIQ), base year with options, etc.)
- Programmatic consultation to extend windows for knockdowns.





Epilogue



The Incredible Reappearing Shoal!



- 20 April 2012: Survey identified shoal at -31.8'
- 22 May 2012: USCG declared shoal a hazard to navigation
- 24 May 2012: Knockdown part 2
 - Apparatus Adjustments
- 7 June 2012: Knockdown operations concluded with no change in channel depth
- 17-20 June 2012: 15,650cy dredged by YAQUINA



Questions?





Dredging Creates a Strong Economy and a Cleaner Environment