



Natural Resource Damage Assessment (NRDA)

The Nexus Factor in Selection of Restoration Actions

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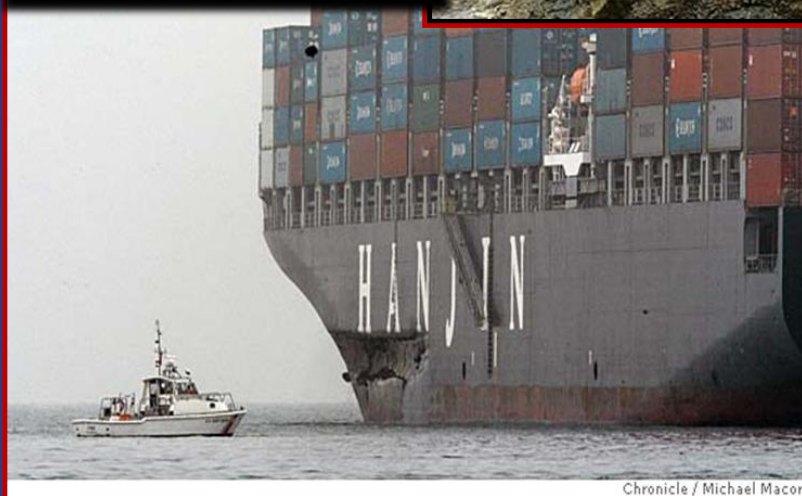
August 3, 2011

Law Provides for

Clean-Up



Restoration (NRDA)



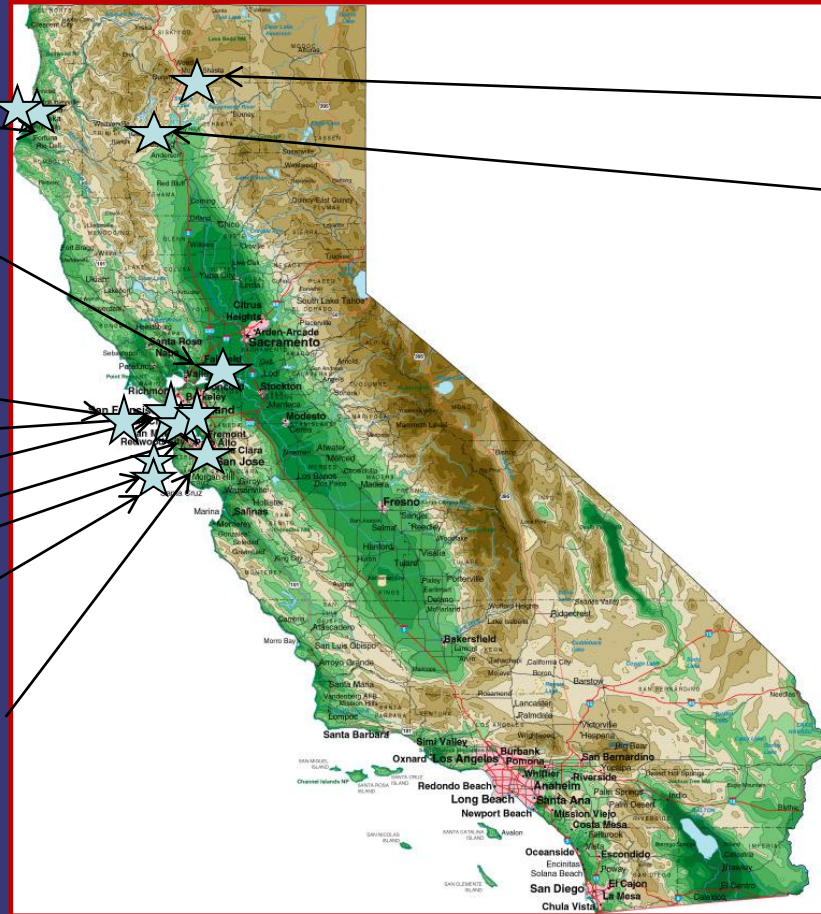
Northern California NRDA

Stuyvesant
Kure

Cantara Loop
Iron Mtn Mine

K.M. Suisun Marsh

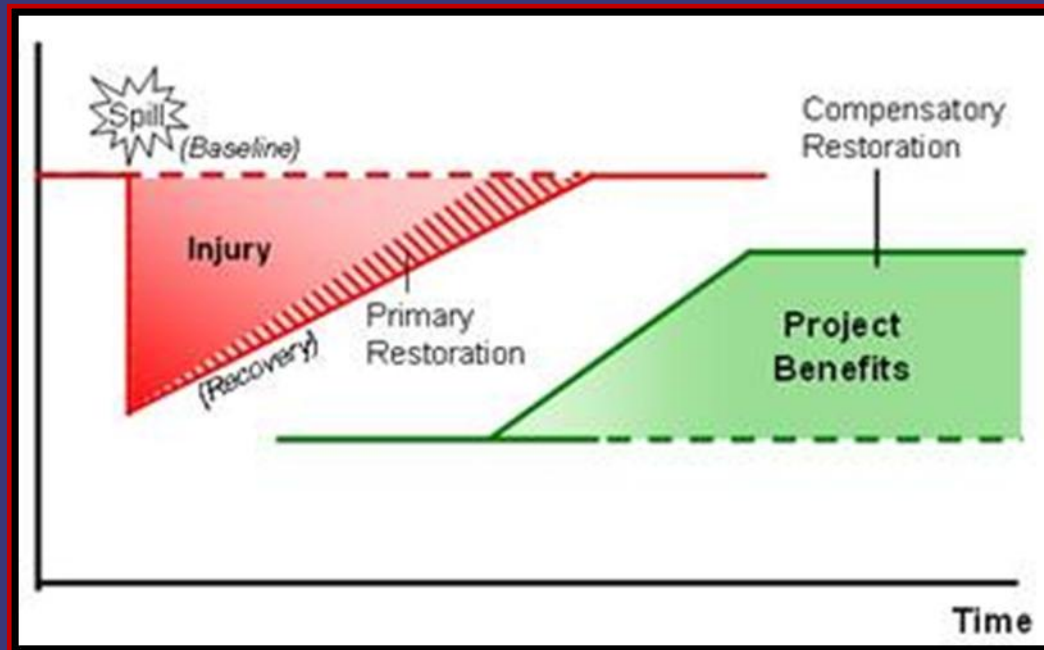
Luckenbach
Cape Mohican
Cosco Busan
Castro Cove
Command
Apex Houston
New Almaden Mine



>\$80 Million for Restoration

Goal of NRDA:

*“restore, rehabilitate, replace,
and/or acquire the equivalent” 43 CFR 11.82*

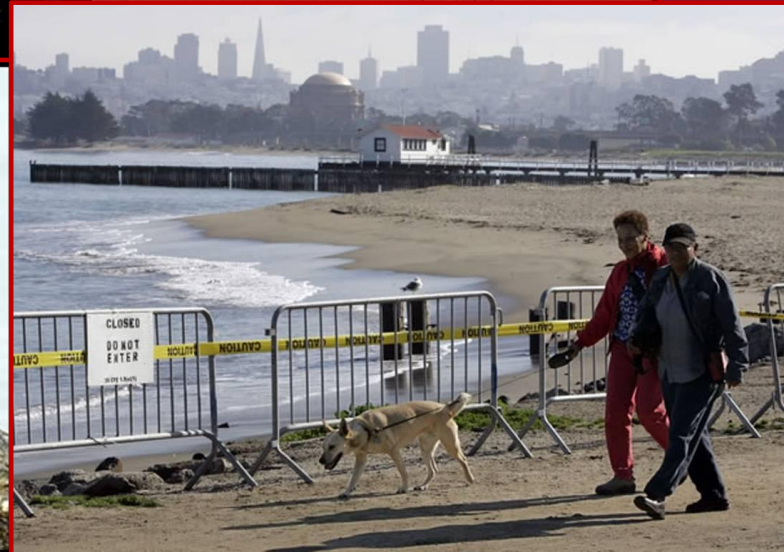
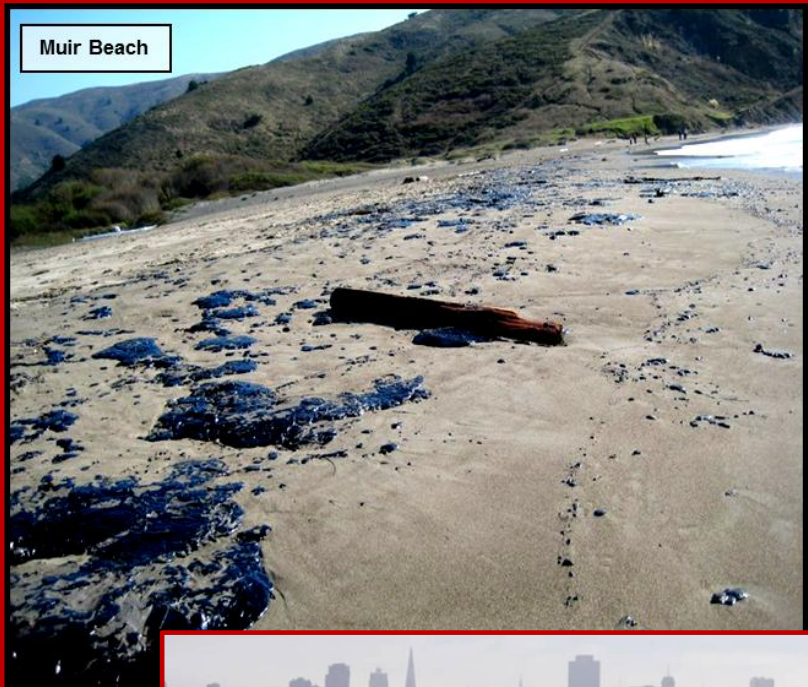


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Common Injury Categories

- Birds
- Fish
- Marine Mammals
- Listed Species
- Aquatic Resources
- Recreational Use
- Habitats
 - marshes
 - beaches
 - rocky intertidal
 - tidal flats
 - wetlands
 - riparian



Types of Restoration Actions

- Land acquisition and Easements
- Wetland restoration
- Invasives removal
- Habitat enhancement (nesting)
- Reintroduction of Species
- Recreation/Human use



Apex Houston

- One of First Cases in California
- High Mortality to Common Murres: Thousands Dead
- Mortality to Marbled Murrelets
- Restoration to Benefit Both



Restoration at Devil's Slide

Rock:

Nexus Factor: High

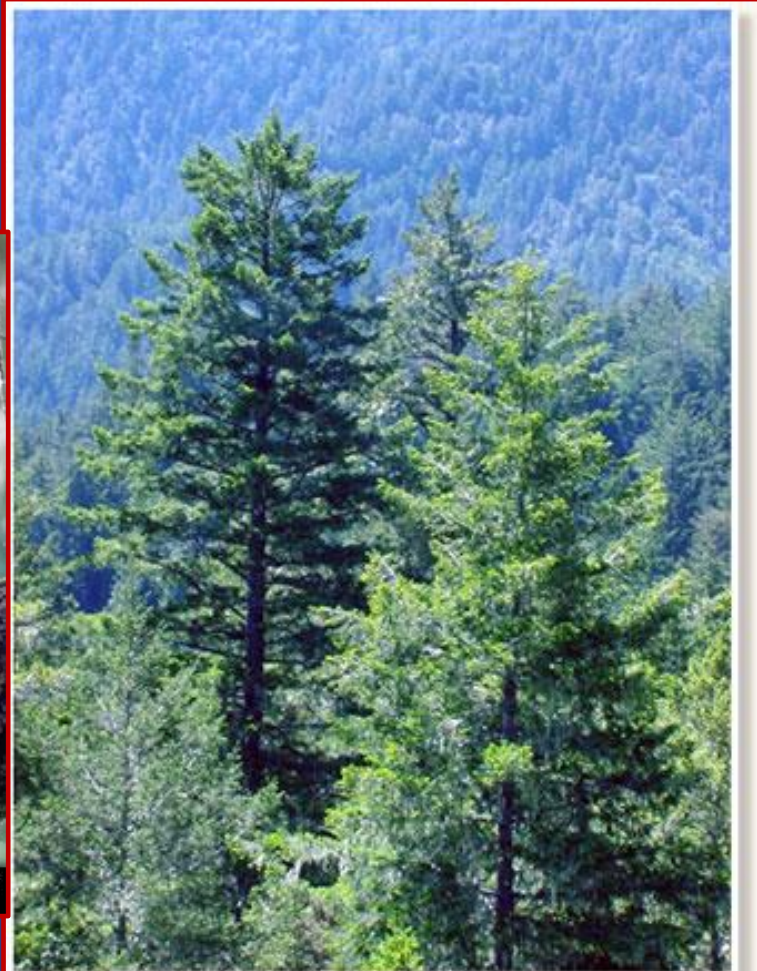


Marbled Murrelet

- Gazos Creek Redwood Habitat
- 120 acres



Photo Credit: Thomas Hamer
Hamer Environmental LP.



Acquisition/Conservation Easements of Redwood Forest

- Protection of over 800 acres
 - **Command** 80 acres: Girl Scout Creek
 - **Apex Houston** 120 acres: Gazos Creek:
 - **Stuyvesant** 357 acres: Miracle Mile
 - **Kure** 285 acres: Big Mynott/E.F. Hunter
 - **Luckenbach** (soon) 80 acres: Santa Cruz Mountains
 - **Cosco Busan**: future



Stuyvesant Oil Spill

Injury

1. Grebes and Loons
2. Pelicans, Cormorants, and Gull
3. Rocky Seabirds
4. Marbled Murrelets
5. Wetland birds
6. Water Column
7. Rocky Intertidal Habitat
8. Human Recreational Use
9. Sandy Beach Habitat

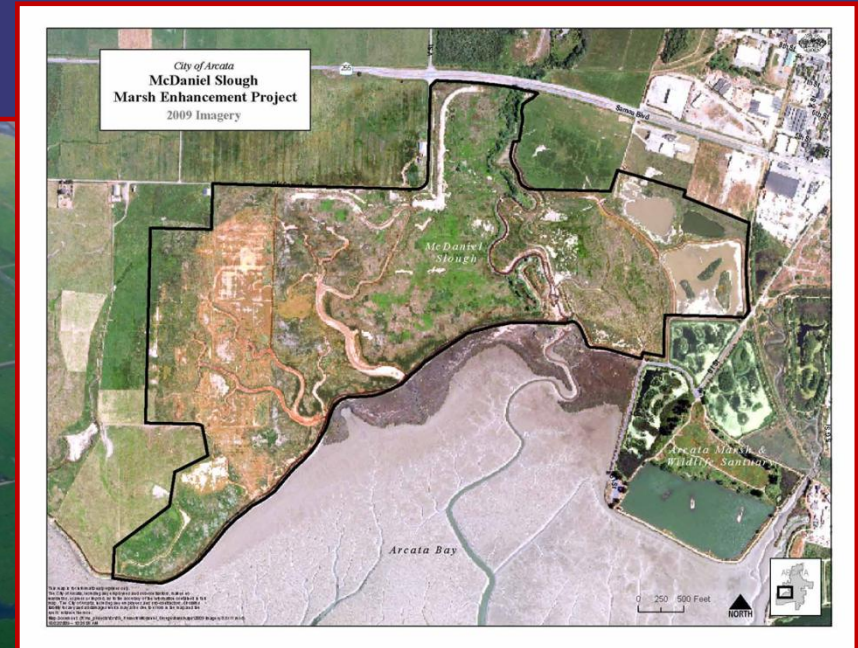
Restoration

1. Grebe/Loon Nesting Habitat
2. Cormorant/Pelican Roosting Habitat
3. Common Murre Project
4. Marbled Murrelet Project
5. Wetlands Project (McDaniel Slough)
6. Palmer's Point
7. Dune/Snowy Plover Project (Little River State Beach)



McDaniel Slough

212 Acres Returned to
Tidal/Brackish Marsh



Command Case

- Oil Spill in San Francisco Bay Area
- Injury Through Oiling to a Variety of Birds and Human Uses:
 - Common Murre: Seabird Protection
 - MAMU: Old Growth Acquisition
 - Sooty Shearwaters: Restoration in New Zealand

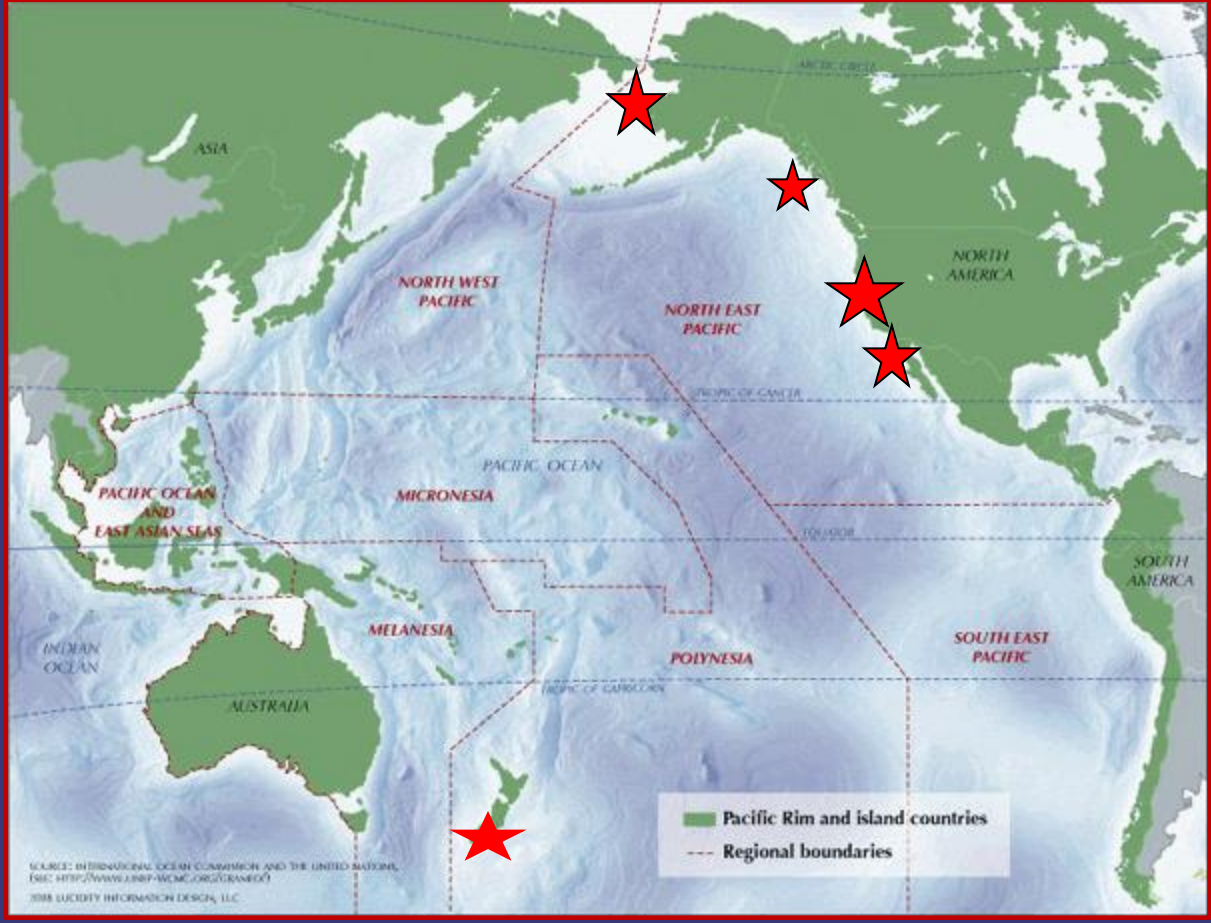
REALLY??

Yes! New Zealand

- 12 Sooty shearwaters collected in Spill
- Banded shearwater from New Zealand
- Nesting ground in New Zealand
- Ground nesting degraded due to non-native rats



Shaffer et al. 2006, Proc. Natl. Acad. Sci. USA 103



Nexus Factor

- Measureable Benefit to Injured Resource
- Consider Proximity: Particularly for Habitats
- Consider Species Life History
 - wintering/breeding grounds
 - species do not recognize political boundaries
 - species may spend different life stages in different habitats
- Research without Action on the Ground is not Restoration.

