Overview and Update of the Comprehensive Evaluation of Project Datums (CEPD)

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U.S. Army Corps of Engineers

September 6, 2012

Pacific Chapter WEDA

US Army Corps of Engineers
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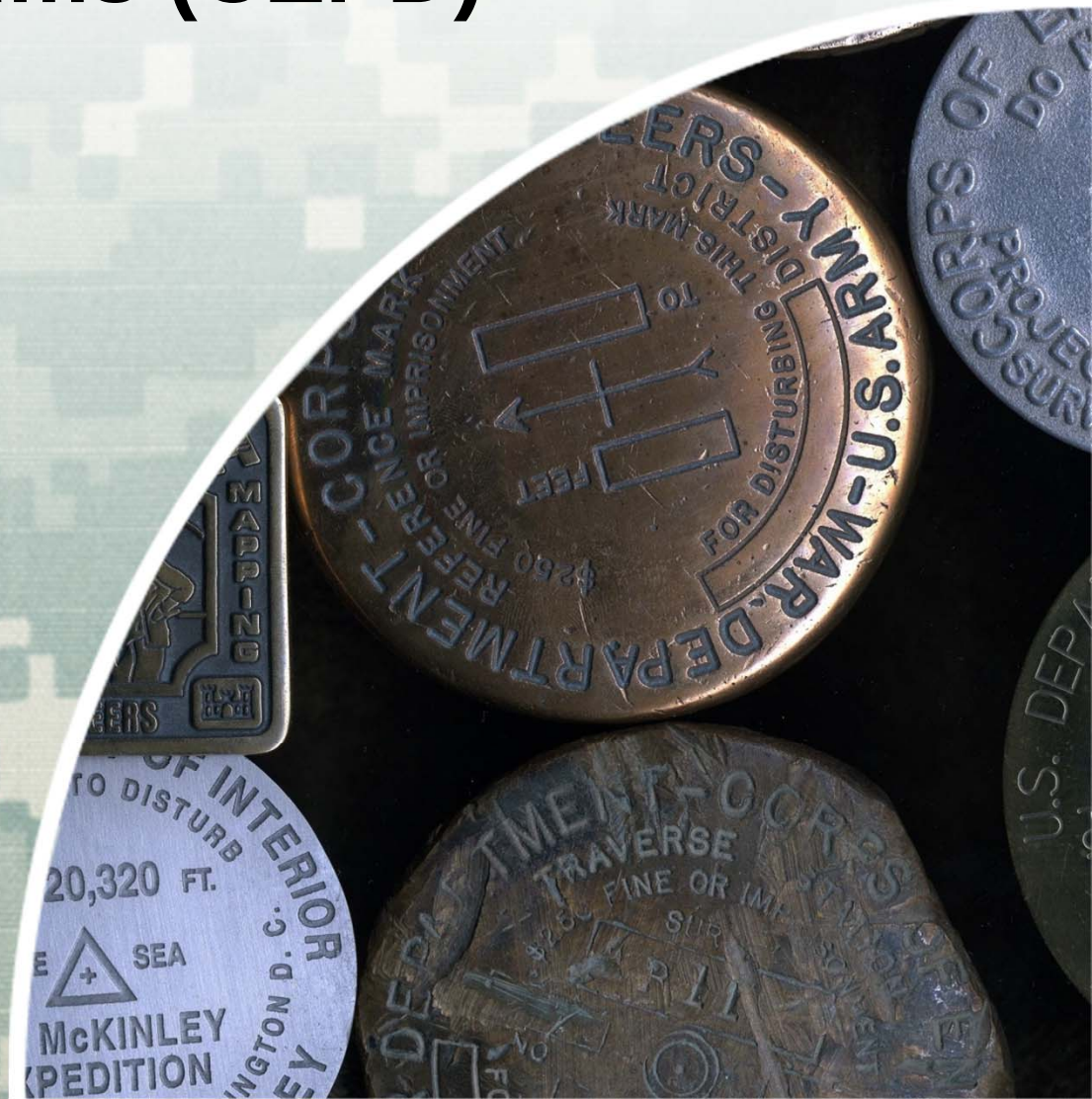
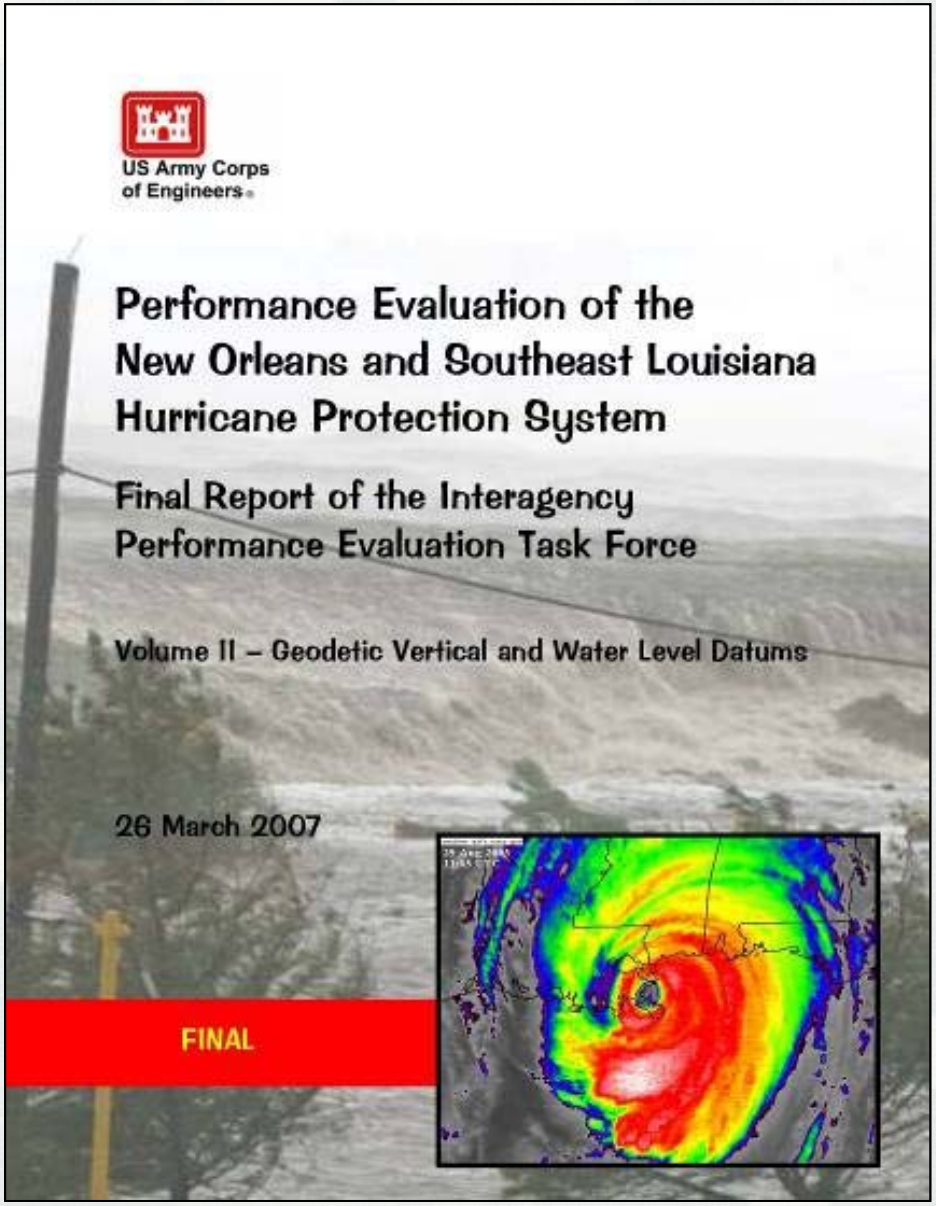
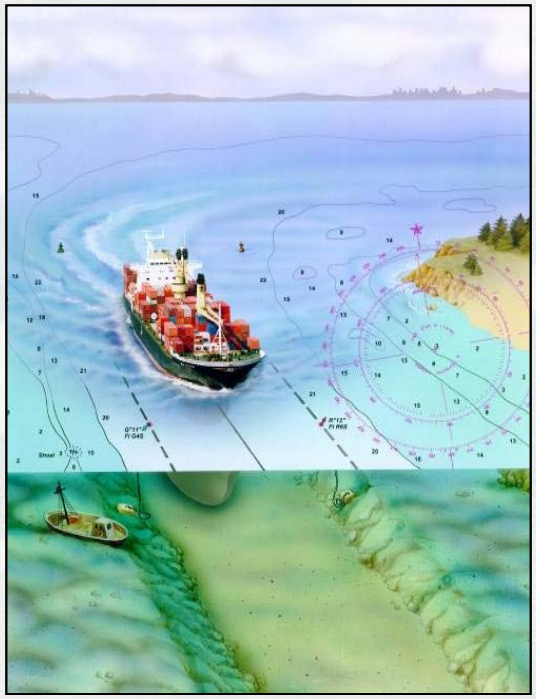



US Army Corps
of Engineers
Performance Evaluation of the
New Orleans and Southeast Louisiana
Hurricane Protection System
Final Report of the Interagency
Performance Evaluation Task Force
Volume II – Geodetic Vertical and Water Level Datums
26 March 2007
FINAL

Key Points

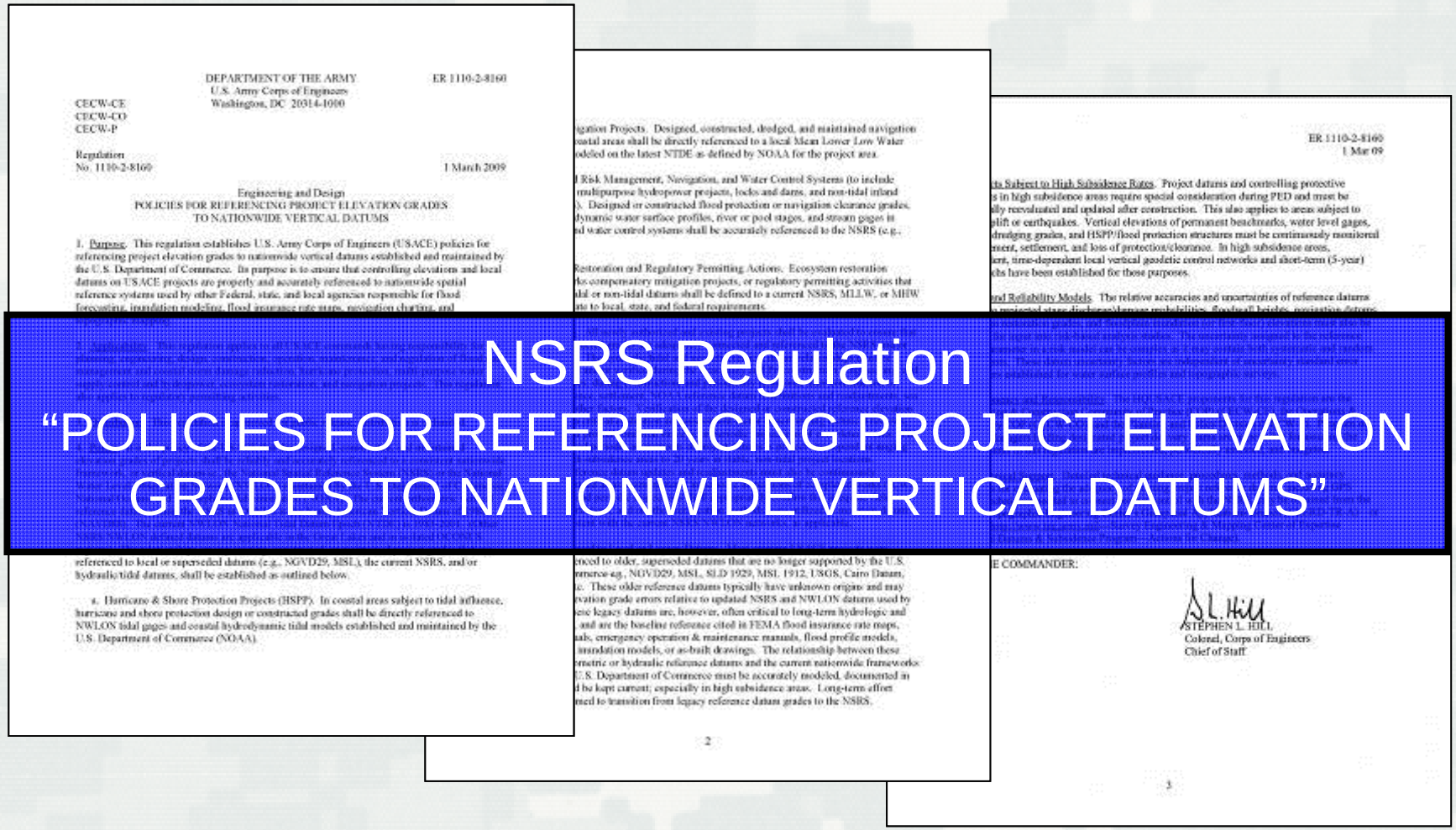
- **Interagency Performance Evaluation Task Force (IPET)**
  - **Little Or No Metadata On Design Documents**
  - **Use Of Datums Was Inconsistent**
  - **Designed To Water Surface – Built To NGVD29**



- **Comprehensive Evaluation of Project Datums (CEPD)**
  - **New Orleans Is Not The Only District With Problems**
- **NSRS Regulation (ER 1110-2-8160)**

  “Policies For Referencing Project Elevation Grades To Nationwide Vertical Datums”

ER 1110-2-8160



DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-1000

ER 1110-2-8160

CECW-CE
CECW-CO
CECW-P

Regulation
No. 1110-2-8160

1 March 2009

Engineering and Design
POLICIES FOR REFERENCING PROJECT ELEVATION GRADES
TO NATIONWIDE VERTICAL DATUMS

1. Purpose. This regulation establishes U.S. Army Corps of Engineers (USACE) policies for referencing project elevation grades to nationwide vertical datums established and maintained by the U.S. Department of Commerce. Its purpose is to ensure that controlling elevations and local datums on USACE projects are properly and accurately referenced to nationwide spatial reference systems used by other Federal, state, and local agencies responsible for flood

ER 1110-2-8160
1 Mar 09

E COMMANDER:

STEPHEN L. HILL
Colonel, Corps of Engineers
Chief of Staff

NSRS Regulation
"POLICIES FOR REFERENCING PROJECT ELEVATION GRADES TO NATIONWIDE VERTICAL DATUMS"

"We have a professional and ethical obligation…to ensure that they [our projects] are correctly designed, constructed, and maintained on the proper vertical datums to compensate for subsidence/sea level rise in order to provide appropriate flood and hurricane protection and navigation depths."

- **Lieutenant General Carl A. Strock, Memorandum For Major Subordinate Commands, December 2006**

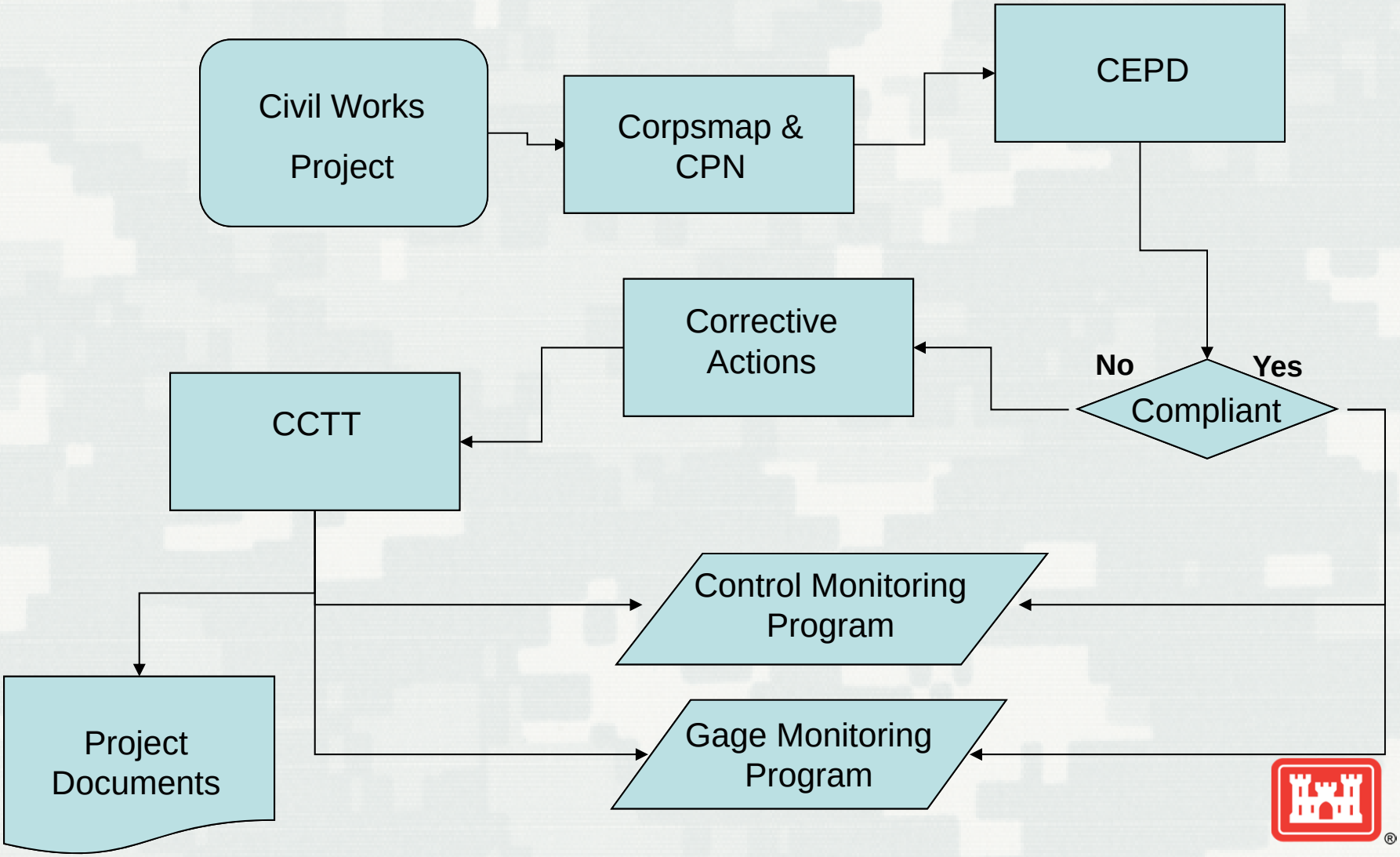
CEPD Purpose & Objective

- **Implements lessons learned from Hurricane Katrina IPET Report … reference CG memo dated 4 Dec 06**
- **Evaluate:**
  - **Accuracy of flood protection system and navigation project elevations**
  - **Adequacy of elevation connections with US Dept of Commerce (NOAA) federal geodetic & water level reference systems**
- **Provide HQUSACE with report on results and estimated cost & date to correct deficiencies**
- **Support National Levee Database Inventory**

CEPD Project Requirements

- **All Tidal Projects Vertical Datums must be updated based on current published NOAA/NOS datum and referenced to MLLW based on the 1983-2001 tidal epoch.**
- **All Project Horizontal Control must be based on NAD83 holding published NGS/NSRS values.**
- **All Projects must have a Minimum of Two Primary Control Points with elevations based on NAVD88 holding published NGS/NSRS values.**

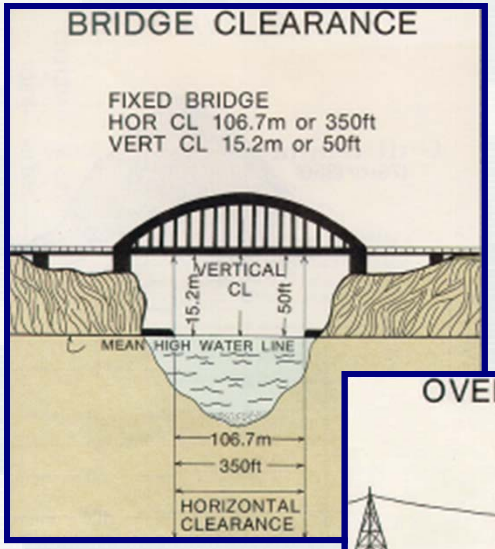
CEPD Work Flow

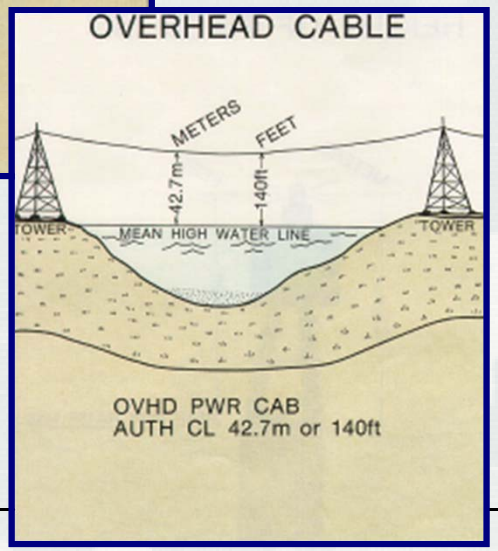


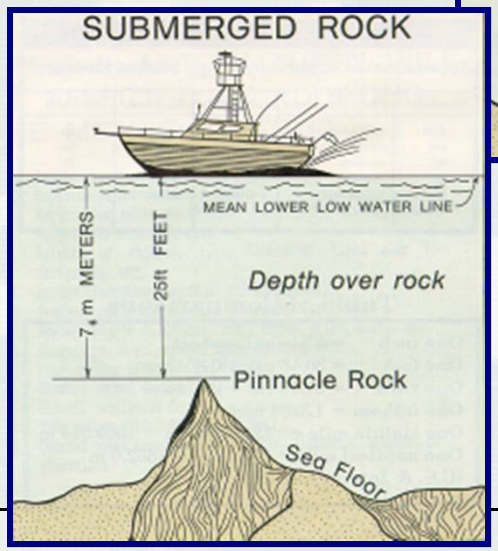
Tidal Datum Significance?

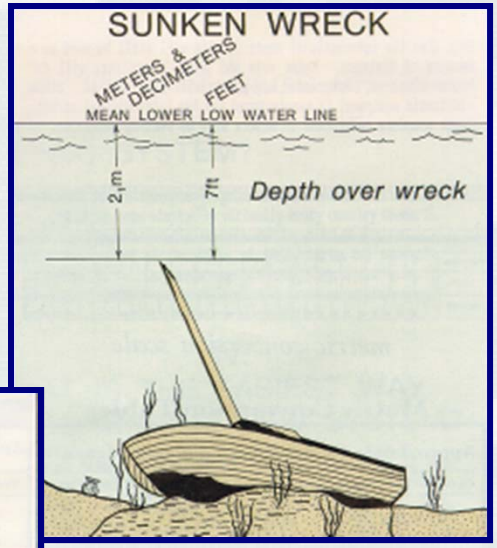
Subsidence and uplift both affect the relationship between the water surface and structures and hazards.

<u>This relationship should be monitored and documented!</u>









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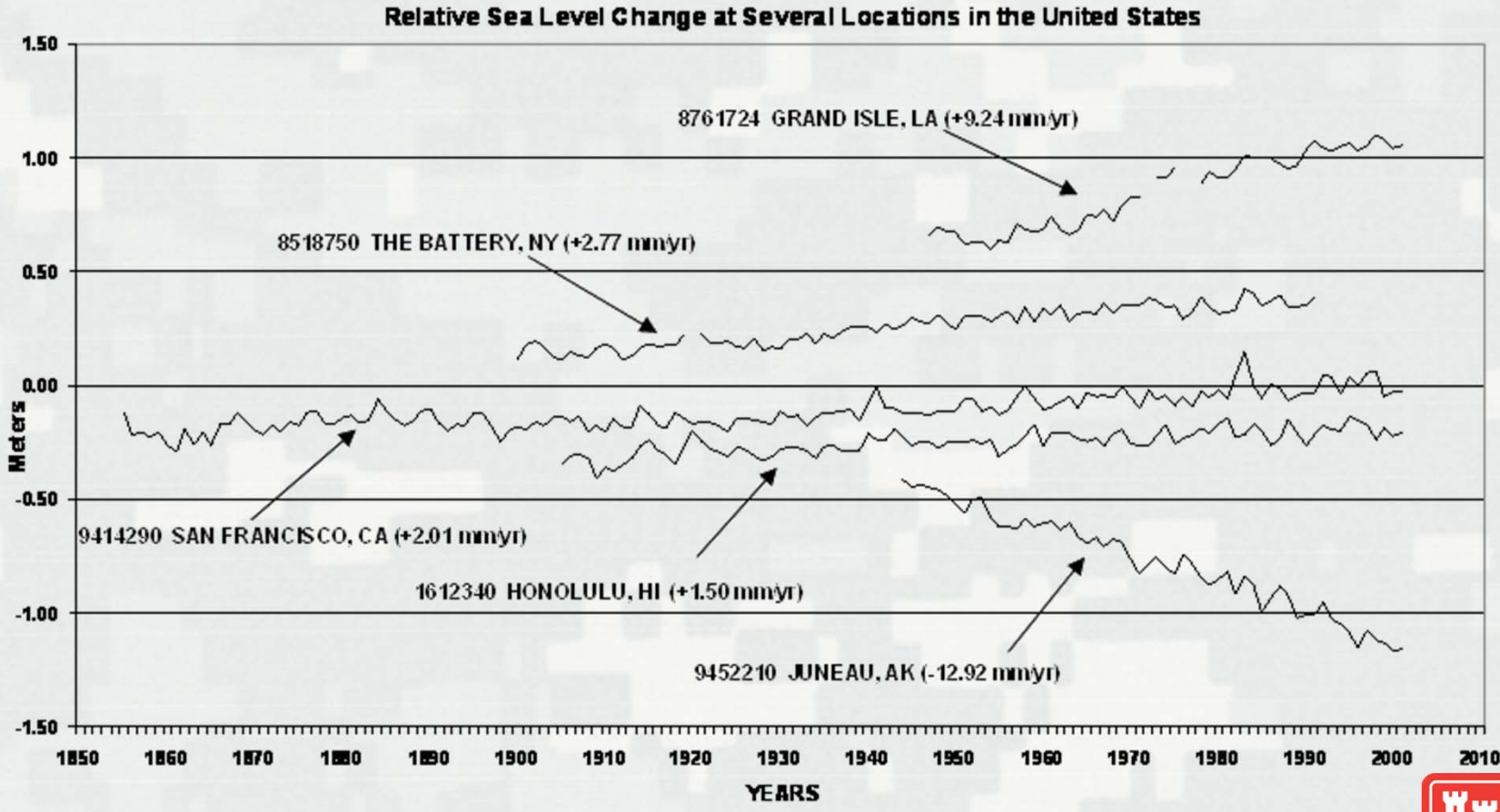
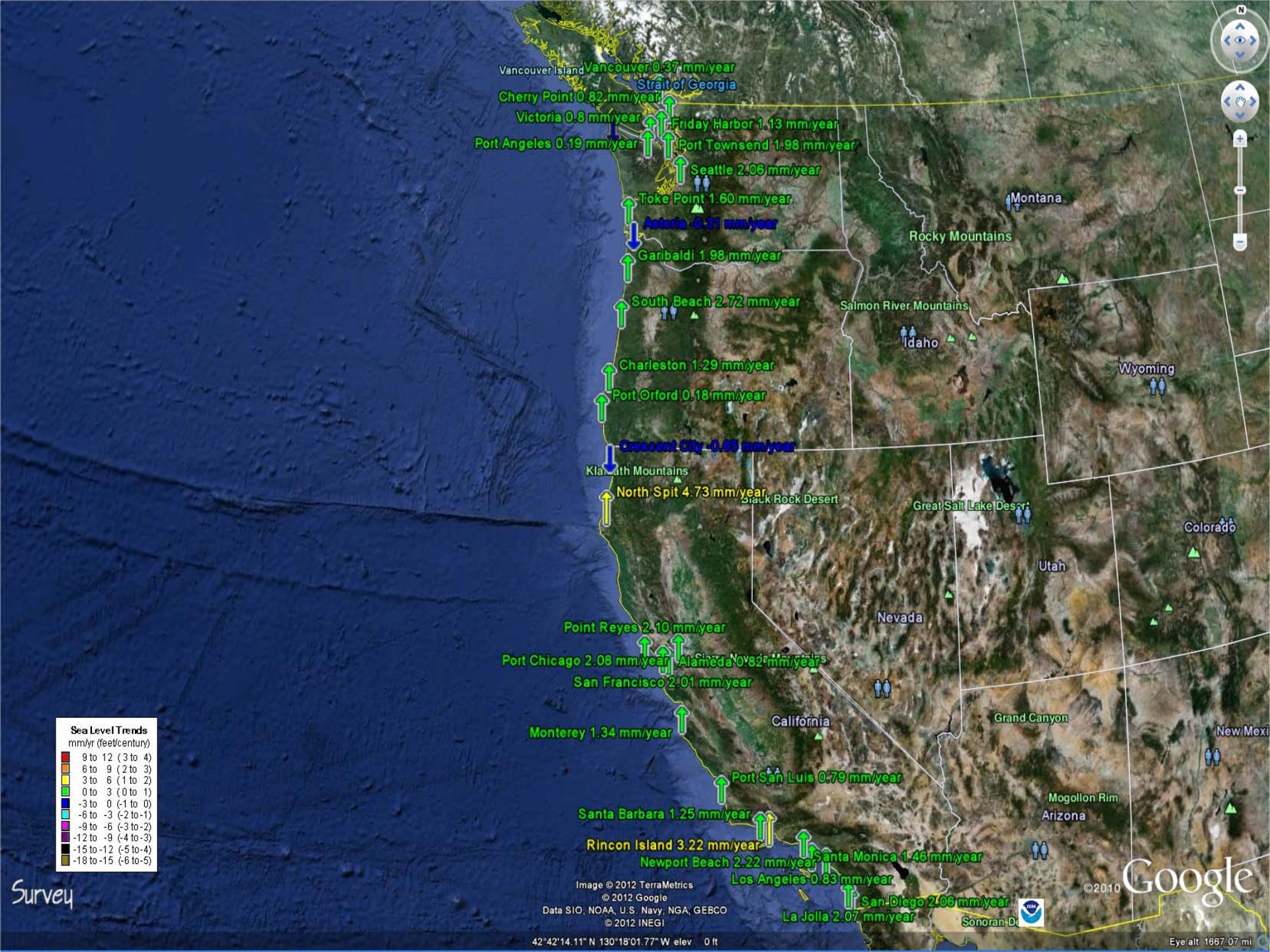
Relative Sea Level Change




Vancouver Island
Vancouver 0.37 mm/year
Strait of Georgia
Cherry Point 0.82 mm/year
Victoria 0.8 mm/year
Friday Harbor 1.13 mm/year
Port Angeles 0.19 mm/year
Port Townsend 1.98 mm/year
Seattle 2.06 mm/year
Toke Point 1.60 mm/year
Montana
Astoria -0.31 mm/year
Rocky Mountains
Garibaldi 1.98 mm/year
South Beach 2.72 mm/year
Salmon River Mountains
Idaho
Charleston 1.29 mm/year
Wyoming
Port Orford 0.18 mm/year
Crescent City -0.65 mm/year
Klamath Mountains
North Spit 4.73 mm/year
Black Rock Desert
Great Salt Lake Desert
Colorado
Utah
Nevada
Point Reyes 2.10 mm/year
Port Chicago 2.08 mm/year
Alameda 0.82 mm/year
San Francisco 2.01 mm/year
California
Grand Canyon
Monterey 1.34 mm/year
Port San Luis 0.79 mm/year
Mogollon Rim
Arizona
Santa Barbara 1.25 mm/year
Rincon Island 3.22 mm/year
Santa Monica 1.46 mm/year
Newport Beach 2.22 mm/year
Los Angeles 0.83 mm/year
San Diego 2.06 mm/year
La Jolla 2.07 mm/year
Sea Level Trends
mm/yr (feet/century)
9 to 12 (3 to 4)
6 to 9 (2 to 3)
3 to 6 (1 to 2)
0 to 3 (0 to 1)
-3 to 0 (-1 to 0)
-6 to -3 (-2 to -1)
-9 to -6 (-3 to -2)
-12 to -9 (-4 to -3)
-15 to -12 (-5 to -4)
-18 to -15 (-6 to -5)
Survey
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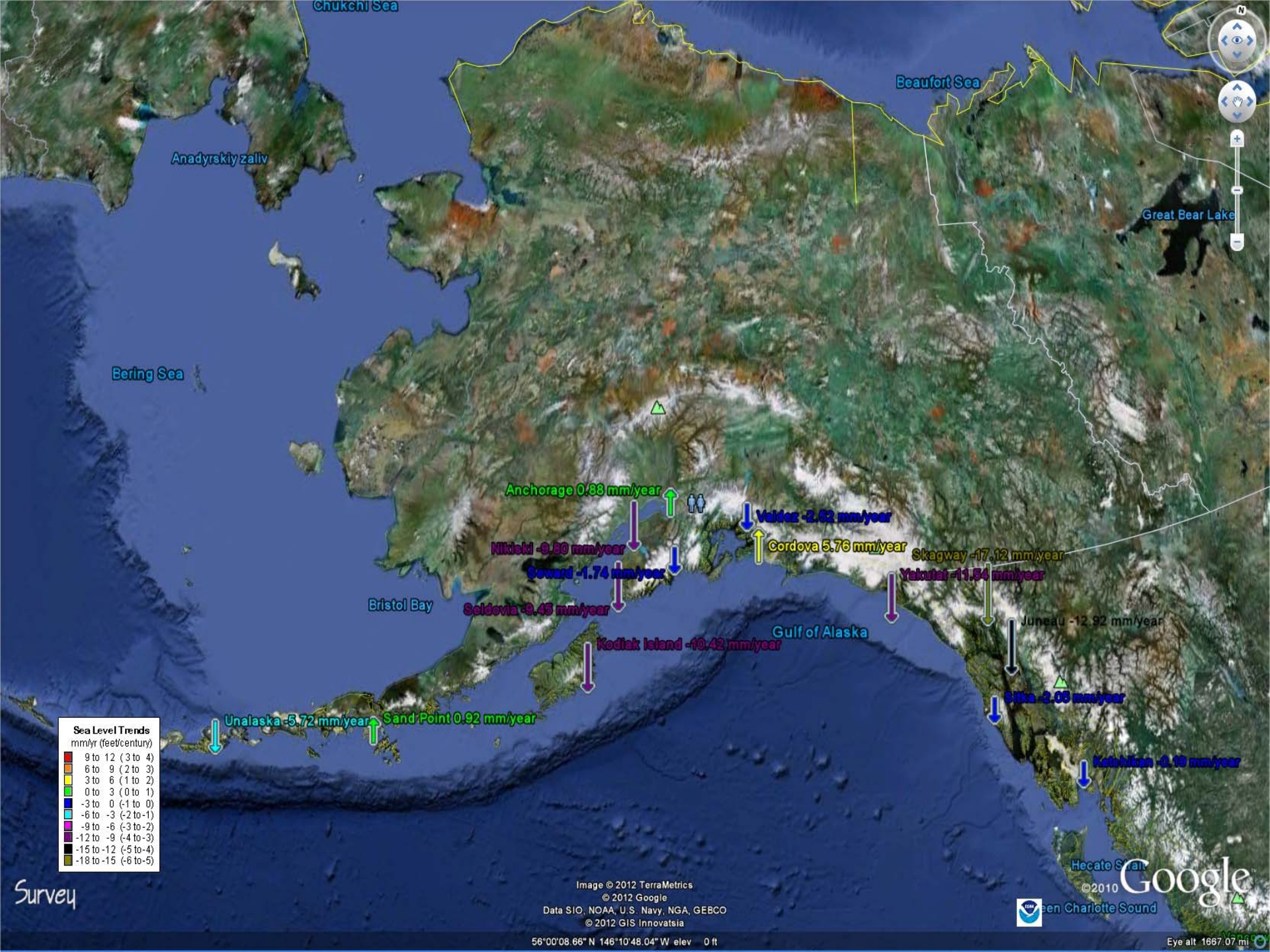
42°42'14.11" N 130°18'01.77" W elev 0 ft
Eye alt 1667.07 mi


Chukchi Sea
Beaufort Sea
Anadyrskiy zaliv
Great Bear Lake
Bering Sea
Anchorage 0.88 mm/year
Valdez -2.62 mm/year
Nikiski -9.80 mm/year
Cordova 5.76 mm/year
Skagway -17.12 mm/year
Seward -1.74 mm/year
Yakutat -11.54 mm/year
Bristol Bay
Seldovia -9.45 mm/year
Juneau -12.92 mm/year
Gulf of Alaska
Kodiak Island -10.42 mm/year
Sitka -2.08 mm/year
Unalaska -5.72 mm/year
Sand Point 0.92 mm/year
Ketchikan -0.19 mm/year
Sea Level Trends
mm/yr (feet/century)
9 to 12 (3 to 4)
6 to 9 (2 to 3)
3 to 6 (1 to 2)
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-3 to 0 (-1 to 0)
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-12 to -9 (-4 to -3)
-15 to -12 (-5 to -4)
-18 to -15 (-6 to -5)
Survey
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©2010 Google
56°00'08.66" N 146°10'48.04" W elev 0 ft
Eye alt 1667.07 mi

CEPD Status

Alaska District:

53 District Projects Evaluated…

42 Navigation Projects

14 District Navigation Projects Compliant

Honolulu District:

76 District Projects Evaluated…

27 Navigation Projects

26 District Navigation Projects Compliant

CEPD Status

Los Angeles District:

68 District Projects Evaluated…
14 Navigation Projects
9 District Navigation Projects Compliant

Portland District:

40 District Projects Evaluated…
21 Navigation Projects
10 District Navigation Projects Compliant

CEPD Status

Sacramento District:

35 District Projects Evaluated…

2 Navigation Projects

0 District Navigation Projects Compliant

San Francisco District:

22 District Projects Evaluated…

16 Navigation Projects

0 District Navigation Projects Compliant

CEPD Status

Seattle District:

47 District Projects Evaluated…

23 Navigation Projects

5 District Navigation Projects Compliant

Questi  ns?