

Humboldt Bay Vertical Reference System (HBVRS)

Draft Science Plan Outline Oct-29-2010

Goal(s) of Project

- ◇ Study vulnerability of southern CSZ Deformation Zone
- ◇ Improve vertical reference accuracy in southern CSZ region

Project Benefits and Management Applications

- ◇ Foundational information for all sea level rise predictions
 - Downscaling of global models to local and regional areas
 - Remove significant tectonic impacts to SLR predictions
 - Geoid rectification
- ◇ Pre-disaster (tsunami, flood) mitigation planning
 - Establish pre-seismic baseline survey to assure accurate and timely post-earthquake survey results
 - Use vertical tectonic rates to estimate future co-seismic subsidence & inundation from Cascadia subduction zone
 - Improve flood modeling
 - Quantify uncertainty
 - Analyze potential changes to roads, navigation channels, and mariculture environment due to tectonic uplift/subsidence
- ◇ Contribute updated leveling data to NGS NAVD88 bench marks
- ◇ Contribute GPS data to NGS Height Modernization Program

Framework

- ◇ Collaborators
 - Expertise of each
 - Role/research of each
 - Contact West Coast Governors Agreement Action Coordination Team members
 - Compare & align project benefits with WCGA directives (examples below)
 - Climate Change; SLR, shoreline changes, coastal hazards
 - Integrated Ecosystem Assessment; HBI as EBM partner
 - Sustainable Coastal Communities; support local planning to sustainable fisheries and infrastructure
 - Seafloor Mapping; map habitat of tidelands
- ◇ Budget estimate
 - Number of people/students
 - Estimate time/resources
 - Equipment needs
 - Transportation needs
 - Other budget items

Project Scope

- ◇ Geographic
 - Shelter Cove, Eel Delta, Humboldt Bay, Trinidad, Klamath, Crescent City
 - Pt. Arena/Arena Cove?
- ◇ Tide gages & water levels
 - How many; 7 new tide gages: 1 Shelter Cove, 1 Eel Delta, 3 Humboldt Bay, 1 Trinidad, 1 Klamath
 - Re-occupy all NOAA temporary historic tide gage locations (#?) in Crescent City, Trinidad, and Eureka.
 - CENCOOS upgrade for water level measurements
 - Stationary gage with vented system and external data logger; tie gage height to leveled bench marks
 - Stream gage stations
 - USGS Mad River bridge Arcata- tie to NAVD88
- ◇ Leveling line surveys
 - Level survey training of students/personnel; Univ. of Oregon/HSU collaboration
 - Equipment
 - Ray Weldon
 - Humboldt County Surveyors Office
 - Cal Trans
 - Personnel
 - Univ of Oregon & HSU
 - Caltrans
 - Humboldt County Surveyors Office
 - Private sector surveyors
 - Evaluate proposed bench marks to be included in survey
 - Re-level 1988 level lines; tie to 1931, 1944, & 1967 where possible
 - Analyze vertical rates (1931, 1944, 1967, 1988, present)
 - Local survey controls – other opportunities to re-level and tie to
 - Public
 - Humboldt County – New Navy Base Rd
 - NRCS – Eel Delta
 - CalTrans – Various project leveling
 - Private
 - Northern Hydrology – Mad River slough, Jacoby Creek
- ◇ Height Modernization Program
 - Collect new GPS horizontal control data to NGS Height Mod. Standards
 - Occupy bench marks with gravimeter to improve local geoid values
- ◇ Data processing/archiving/dissemination/modeling – support some endusers
 - Analyze and difference historic level line elevations
 - Identify expert to 'Blue Book' new level data – submit to NGS to publish updates in NGS database
 - Process all available GPS observations 1993-present.

- Bring new tide gage and CGPS data online for daily downloads and real time data stream
 - Test new leveling and tide data in local hydrologic/circulation models
 - Model observed vertical rates with most current subduction zone model
 - Model eel grass and mariculture habitat changes change due to tectonic uplift/subsidence
 - Model horizontal and vertical data across all mapped faults
 - Others
- ◇ Monitoring/maintenance of reference network
- Budget to resurvey with levels and GPS after large earthquake
 - Budget for initial re-level plus 25%(?) to re-level as deemed necessary
 - Update bench mark elevations and determine relative baseline measurements to nearby CGPS stations through repeated GPS surveys
 - QA/QC and periodically analyze data from tide gages and any new CGPS
 - Add, replace, or make effort to preserve bench marks as deemed necessary
 - Maintain power/communications at new tide gage and CGPS locations