NOAA, National Geodetic Survey
HEIGHT MODERNIZATION COORDINATION MEETING
DRAFT NOTES
SSMC3, Room 8836

Date: Thursday, May 9, 2013
Time: 2:00-3:30 pm East Coast time

Attendees:
Call-ins from: CA (John Canas), IL (Mike Blumhoff, Amy Eller); MT (Steve Zabriskie; NC (Gary Thompson), NGS (Vicki Veilleux, Dan Callahan, Kevin Jordan, Dan Winester, Jim Richardson), WI (David Moyer, Leonard Perfetti); CO-OPS (Jeff Oyler, Colleen Roche); NPS (Tim Smith); USGS (Larry Hothen)

Silver Spring: NGS (Christine Gallagher, Philippe Hensel, Brett Howe, Courtney Lindo, Ross Mackay, Joe Evjen, Neil Weston, Aida Polite); CO-OPS (Michael Michalski, Tom Landon)

Advisors/Coordinators: Dave Conner (OH), Ed Carlson (HI), Denis Riordan (MS), Scott Lokken (NC), Mark Armstrong (OR), Dan Prouty (TX), Dan Martin (VT); John Ellingson (WI); Bill Stone (SW Region)

Note:
It is NGS' habit to only capture names of attendees who speak up at the initial roll call or during the meeting. We respect those who may wish to attend anonymously. If you want your name captured in the recorded notes, and you do not see it listed here, email Christine.Gallagher@noaa.gov, or ngs.htmod@noaa.gov.

1. NGS/CO-OPS Updates – e.g. budget, projects, outreach

- **Height Mod Partner Meeting (Gallagher)**
  - The meeting on Apr 30 and May 1 in Frankfort, KY went well. Between in-person and remote participation options, over 40 people joined the meeting.
  - Final meeting report will be distributed for review on May 10, all presentations are currently on Christine's ftp site, and the presentations will ultimately be posted online (http://www.ngs.noaa.gov/heightmod/PartnerMeetingPresentations.shtml)

- **CO-OPS Sentinels of the Coasts installed (Landon)**
  - These sites in Mississippi and Louisiana (Waveland, Shell Beach, Amerada Pass, and Calcasieu Pass) are hardened platforms to withstand hurricane force winds (Cat IV). The platforms are driven 80-100 ft into ground, and they are less than 60 meters offshore to allow leveling observations to platform.
  - The Gulf Coast Geospatial Center and the Louisiana Spatial Reference Center partnered with CO-OPS to install the GPS receivers.

- **NGS and CO-OPS train non-traditional partners (Hensel)**

- NGS and CO-OPS trained non-traditional/coastal partners for use of GPS, leveling, and RTK. The audience was primarily from the National Estuarine Research Reserves (NERRS) in the northeast, but employees from NPS and USGS also attended. This effort is in support of sentinel sites to monitor sea level change impacts.
- NGS and CO-OPS is finalizing a guidelines document to establish geospatial infrastructure at sea level change sentinel sites.
- NGS, CO-OPS and NERRS will be testing user contributed software from CA that could assist in computation of tidal datums for non-traditional users.

- **IGLD update (Conner)**
  - The Great Lakes Commission (GLC) met recently and decided that the IGLD update will be postponed until 2020. GPS campaign surveys were completed in 2010, and they will be completed again in 2015 and 2020. NGS and CO-OPS attended on behalf of the U.S. federal government, but OCS, USGS, and USACE will also have a role in this project.
  - Mike Blumhoff added that IL is completing leveling in the area, and is coordinating with USACE and the City of Chicago
  - Jeff Oyler added that the Canadians will be changing to a geoid-based vertical datum later this year (Nov 2013), but the IGLD update should nearly match the U.S. switch to a geoid based vertical datum (2022).

2. Updates from States – e.g. projects, outreach

none

3. Monthly presentation

Presentation, to start at approximately 2:10 PM:

Examining Vertical Stability of Deep Rod Marks in Marshes
Dr. Philippe Hensel, National Geodetic Survey

Many wetland marks do not meet NGS specifications for deep rod marks, but researchers and managers want to know if they can use existing marks for both Surface Elevation Table (SET) data sets and local vertical control. NGS partnered with Waquoit Bay National Estuarine Research Reserve to test how rod driving technique and length of rod(s) inserted effect vertical stability, if at all.

Speaker bio:

Philippe Hensel is a physical scientist with the NGS Ecosystems and Climate Operations (ECO) Team since 2009. Previous experience includes adjunct faculty at Johns Hopkins University (wetlands ecology & management), post-doctoral appointment as a wetlands ecologist with the US Geological Survey, resident faculty with the Organization for Tropical Studies (Duke University in Costa Rica), and a Fulbright Scholar in Costa Rica. Philippe holds degrees in coastal & estuarine sciences, applied statistics, and biology. His interests include coastal vertical dynamics, and how to reduce uncertainties in both field procedures and quantitative analyses.

Presentation summary:

- Deep rod marks are traditionally installed where leveling will be used to transfer elevations into a new or existing network. Generally, this means deep rod marks are NOT installed in unstable soils like marshes and wetlands. Sea level change "sentinel sites" is a recent concept that is rapidly gaining in popularity as a mechanism to accurately monitor changes in local water levels and the resulting impacts to coastal habitats.

- The concept as elaborated in the National Estuarine Research Reserve System (NERRS) relies on high accuracy vertical connections between local water level recorders (tide gauges) and coastal ecosystem monitoring infrastructure such as Surface Elevation Tables (SETs), permanent vegetation transects and ground water wells. Since many of these observing systems are located in isolated wetlands, there is a need to establish vertical control networks in marshes – which can mean setting deep rod marks in the mud. In addition, SETs are currently using deep rod mark technology as their vertical point of reference. For these and other reasons, we wish to better understand the stability of deep rod marks in wetland settings.

- Study Problem Statements:
    - Wetland elevation change data using Surface Elevation Tables (SETs) rely on *in situ* vertical reference marks. SET marks have varied over the past decade (pipes, rods), as have their installation methods (by hand, vibracorer, impact hammer, jackhammer). Does installation method result in different vertical stability?
    - Sea level change "Sentinel Sites" rely on a high accuracy local vertical control network. Vertical control networks hard to find in marshes. Wetland elevation change study sites contain SET marks. Can SET marks be used as part of local vertical control networks? And how often should one re-establish vertical connections to maintain network integrity?

- Preliminary Conclusions
    - Different rod insertion techniques yield significantly different insertion lengths
    - No clear evidence of initial settling
    - No clear trend in (in)stability among insertion lengths
    - Apparent movement of all marks within a section the result of site-specific movements or epoch-based measurement biases?

Comment (Martin): Similar studies were completed in Vermont to see the impact of frost heave on concrete marks. The results were similar, and it was suggested that small error in each leveling session could explain some of the data trends.

Comment (Armstrong): Similar studies were completed in Oregon focusing on driving bridge pilings in marshes. The piles were inserted at lengths of 50, 60, and 80 feet. Ultimately, the entire piling was greased.

Q (Roche): Were the leveling loops consistent?
A (Hensel): Yes

Q (Carlson): Was the same equipment used? Was the same observer always collecting the data? If yes, then that could lead to some of the data trends seen in the preliminary results. If you would like to see an analysis of weather effects (e.g. the difference, if any, when thermistors are not used), see a presentation from Ajit Singh at an earlier NGS convocation.

Q (Roche): Could the data be compared to SET data?
A (Hensel): Not yet because SET data collection has just started.

Q (Winester): Have you explored other leveling techniques to check besides full level line runs?
A (Hensel): Another NERRS is exploring use of "cut and fill" technique.

4. **Other Business**

Important Links: Previous months' meeting notes and a list of future meeting presentations can be found at: http://www.ngs.noaa.gov/heightmod/MeetingNotes.shtml

Next meeting: June 13, 2013
Guest Presentation: NOAA Budget Outlook and Program Planning

Recent Events

April 24-26, 2013, Prescott, AZ- Arizona Professional Land Surveyors 2013 Conference

April 30 - May 1, 2013, Frankfort, KY-2013 Height Modernization Partner Meeting

Upcoming Events

May 21, 2013, New Britain, CT -Evolution of the National Spatial Reference System & NGS Products and Services

Sept 16-19, 2013, Providence, Rhode Island – GIS-PRO '13 (URISA Annual Conference)