

National Tidal Datum Epoch Workshop

Questions + Answers

Intro to NTDE

1. Is there a mechanism that can calculate projected rise on land? I guess, net zero to where you are standing on land?
 - a. *The CO-OPS [sea level trends website](#) shows the detrended data for relative sea level trend, but it does include the terrestrial movement at that location. A local relative sea level trend as published by CO-OPS can only be a relative value, not an absolute value for sea level since. This also includes terrestrial movement.*
2. Where can I find contact information for NH, MA, CT? Who do I contact for each state?
 - a) *From the National Geodetic Survey, Dan Martin is the Regional Geodetic Advisor for the Northeast. Regarding NGS contacts for all of the U.S., please see: <https://geodesy.noaa.gov/ADVISORS/index.shtml>.*
 - b) *For CO-OPS, you can reach out to tide.predictions@noaa.gov with questions.*
3. With today's computational abilities, once the epoch program is set up for 5th year calculations, would it be untenable to continue the calculations by truncating the first year and adding a last year, effectively providing a "running-average" type of result?
 - a. *We do not currently have the resources to accomplish this internally, however, if you need this information for your use, please use the [NOAA tidal datum calculator](#) to obtain this information.*
 - b. *Note that this is not the official federally defined datum for your region, but it can be used to adjust your water levels for the time of interest for use. Review the technical documentation associated with the tool to know its limitations and accuracy.*
4. It was very interesting to see how the geodetic datums have changed over time. Does that imply that, for example, the offsets from NAVD88 <--> (STND and tidal datums) may vary over time, even without shifts to a new epoch? Relatedly, is the relationship between the station datum and the tidal datums generally constant over time (aside from shifts to new epochs)?
 - a. *NOAA defines datum relationships based on the current accepted National Tidal Datum Epoch for both tidal and geodetic. Contact the NOAA National Geodetic Survey per the geodetic datums aspect of the question: ngs.infocenter@noaa.gov.*
 - b. *For CO-OPS, all of our published datums are set to the current National Tidal Datum Epoch unless there is not a suitable control station where they will be*

considered to be an EPOCH-less datum. As time changes, so does the relationship between the tidal datums and the station datum at each location. This is because station datums are maintained as a permanent zero reference point, and are considered not to move relative to the local terrestrial frame for active stations.

5. What about the special case and considerations in the Great Lakes?
 - a. The Great Lakes has its own datum based on a 7-year EPOCH. Non-tidal datums are not computed nor related to tidal datums since there is not a tidal effect defining them, including the aspects of global sea level change.

Using the Datum

1. Would you be able to discuss a little how this will impact the FEMA flood maps? Often that is what municipalities want shown for flood elevation.
 - a. *For an explanation of the impacts of National Spatial Reference System modernization on FEMA's Flood Insurance program, please see the use case focused on this topic included in [NOAA Technical Report NOS NGS 67 Blueprint for the Modernized NSRS, Part 3: Working in the Modernized NSRS](#), pages 68-76.*
 - b. *FEMA has its own requirements and regulations for defining the flood elevations. NOAA cannot speak to their requirements and plans to update floodplain maps. Please contact FEMA directly to get this information.*
2. Can you discuss the difference between High Water Marks and MHW? They are not the same. Regarding Storm Surges, does this require individual long term studies over waterways?
 - a. *High Water Mark's are associated with a maximum surge level associated with a specific storm. They are based on observed water levels or on levels in wrack lines. MHW is the average of all high and higher tide observations over the EPOCH time, so the High Water Marks would be included in the computation but are muted out with all the non-storm related extremes. These levels can be viewed for all stations that have long term observations on CO-OPS website, for example: https://tidesandcurrents.noaa.gov/est/est_station.shtml?stnid=8761724*
3. FEMA flood maps will continue on the same public acceptance process. What is needed is for the local officials to have and use the 5-year updated adjusted Reference Epoch Coordinate information for structural projects submitted for building permits? What steps are underway to educate and share the website with these local and State officials?
 - a. *NGVD and the future NAPGD 2022 are part of NGS requirements and definitions. CO-OPS cannot speak to this – please review and contact NGS directly for the geodetic datum updates: <https://geodesy.noaa.gov/datums/newdatums/index.shtml>*

- b. To get the word about the modernization of the National Spatial Reference System out to Federal, State and local officials, NGS has been holding regular [Geospatial Summit events](#) since 2010. This includes publishing a quarterly [NSRS Modernization Newsletter](#) since 2015, holding [monthly webinars](#), speaking at dozens of conferences around the country every year, updating Federal partners through the Federal Geodetic Control Subcommittee meetings, maintaining our [website](#) with updated information, providing free [online](#) and [in-person technical training](#), working with [geospatial software and hardware developers](#) to incorporate our new models and tools into their consumer products, and sharing regular updates to over 6,000 subscribers to our [NGS News listserve](#).*
4. Can you talk about the Limitations of VDATUM software in Bay Areas, partially locked in waterways and going long distances above the mouth of rivers.
 - a. The VDatum tool looks at all aspects of tidal / geodetic relationships and uses models to best represent the changes in the tidal and geodetic dynamics. If we do not have actual observations, the model will not cover the area. Note that each of the model basins have an error associated with them and is defined by the VDatum tool so uncertainties in the region are defined via the model. The limitations are all based on the lack of data – bays, rivers, estuaries. Therefore, if we do not have actual observations in the region the model will not extend to those areas.*
5. Many current studies are showing that the linear progression previously used should be replaced with exponential progression based on current information. Let's look at Sea Level Trends 1920 to 1960. How does one decide on being conservative or more aggressive?
 - a. NOAA only provides information on the observed data. Our [Sea Level Change website](#) looks at the actual variance in water levels over time and looks at the 95% confidence interval for the data.*
 - b. A linear trend is only a reasonable representative of the sea level change in the past. Linear trends should not be used when planning for future sea levels.*
 - c. Please see the 2022 [SLR Tech Report](#).*
 - d. Please also see Nasa's tool on SLR:
<https://sealevel.nasa.gov/task-force-scenario-tool>*
6. Are CORS ever considered for the tidal epochs? Grand Isle gauge is a few tens of feet from a CORS operating since at least 2005.
 - a. CO-OPS is currently working to include ties to the CORS network as well as installing Continuous GNSS sensors at our stations to be able to define the terrestrial movement at these locations. This is a future project that is being worked on, but we do not have a current assessment of when it will be implemented.*

Product Needs for the new Datum

1. So the form will get you the info for the closest station? If you are close to two stations how do I determine which one to use?
 - a. *It is recommended that you use the VDatum tool to get this information since it is a modeled data relationship that takes into account local hydrological and bathymetric effects on the water level. This will affect the data and is not directly associated with the distance from active stations.*
2. Are there plans to work with Canadian Hydro Service to provide tidal datum conversion between CHS datums and US datums?
 - a. *At this time there is no discussion for connection of tidal datums between the U.S. and Canada. We have a bi-national partnership in the Great Lakes so that system is on the same zero, but for the tidal areas we do not have a committee to link the two.*
3. CT has published tidal elevation data on NAVD 88 for jurisdictional limits. Is it a reasonable assumption that the new NTDE can be a lineal proration of heights between control stations?
 - a. *Each station will have its own variance with the new NTDE. The change in heights will vary along the coast, so you will have to rely upon the new changes and variations once the datum is published.*
4. What is the decision making process for selecting new bench mark locations? Any chance some could be placed at the public boat launches in the Great Lakes?
 - a. *Location is based on proximity to the water level station and their ability to be set with a class of a mark that is able to maintain stability over time. If there is a need for a new mark to be set that will support partner needs a message should be sent to CO-OPS at both nos.coops.oetteam@noaa.gov and Tide.Predictions@noaa.gov with a location and a requirement for the addition of an additional mark. Due to cost and resource time to set and level to new marks, these requests will be assessed based on the importance for the community.*
5. Any chance you can get local input as to locations of marks?
 - a. *Tidal benchmark information is located on the [published benchmark sheets](#) for locations with published marks.*
 - b. *In addition you can obtain this information through the [CO-OPS MetaData API](#).*
 - c. *Example: [Benchmarks for 9414290 San Francisco](#).*
6. How will updates impact planning for sea level rise and how is this info reaching organizations and the public?
 - a. *Publication of a new NTDE will update local mean sea level values based on the new EPOCH period. For planning purposes for sea level change it is best to use*

the [NOAA sea level change website](#), which can provide you information on relative sea level trends that can be used for planning purposes. Per outreach, we do a periodic update and technical documentation on sea level changes that is published and sent out to the public for planning purposes as well as maintaining the above website. The two technical reports are listed below.

- i. https://tidesandcurrents.noaa.gov/publications/Tech_rpt_53.pdf*
- ii. https://tidesandcurrents.noaa.gov/publications/EastCoastSeaLevelAnomaly_2009.pdf*

7. Are there any plans to "clean up" the NGS benchmark database to remove old/missing marks?
 - a. NGS supports an ongoing crowd-sourced data collection effort to update information about passive control marks in our database. NGS provides a [Survey Mark Recovery Form](#) for people to submit recovery reports, and a [Mark Recovery Dashboard](#) to display where marks are being recovered and what information is being updated. To report a mark as destroyed, physical evidence of the destroyed mark must be presented to NGS, otherwise it is recorded as "Mark Not Found" and can be accompanied by text describing what happened in the area where the mark had been.*

VDatum

1. How will this look for global coverage?
 - a. Currently VDatum is only looking to provide coverage for the EEZ of the U.S. States and Territories associated with tidal conversions.*
2. How will NOAA conduct shoreline mapping and bathymetric modeling in the areas needed to complete the hydrodynamic modeling in Alaska? Is there a plan in place to ensure that surveys can be conducted in the areas needed prior to FY25? Is NOAA's NGS working with the Alaska Mapping Executive Committee to ensure that data gaps have been conveyed as priority areas or will these surveys be conducted internally by NOAA?
 - a. NOAA will continue to conduct surveys as they have had in the past until statewide VDatum coverage is available. This may include installation of observational data to control local surveys. Data (such as lidar) may be collected on the ellipsoid and can then be further utilized in the future when VDatum coverage is available for transformations to tidal datums, beyond that of local control. Data gaps are being provided (Seasketch, bathy gaps) and presented on at several venues, to enhance collaboration and decrease duplication.*
3. Are the SVU grids available to the public?
 - a. Yes, SVU GTX grids can be found within each regional model's folder.*

4. As vertical datums are updated, are projects being reviewed for rational impacts, e.g. project depths for dredging may have potential contractor windfalls and accompanying taxpayer burden. Dredged channels and basins may be based on past industry uses that have ceased for decades; will USACE update project definitions so unnecessary dredging is not performed?
 - a. *Please contact USACE for more information.*

Resources

1. NTDE Video: <https://www.youtube.com/watch?v=9qHdXDx5J6Y>
2. Tidal Analysis Datum (TAD) Calculator: <https://access.co-ops.nos.noaa.gov/datumcalc/>
3. Tidal Harmonic Constants are available through the CO-OPS MetaData API. Example: MetaData API for harmonic constants at 9414290.
<https://api.tidesandcurrents.noaa.gov/mdapi/prod/webapi/stations/9414290/harcon.xml?units=english>
4. NGS now relies on local stakeholders to help us keep information about our marks up to date. Please consider submitting mark recovery reports through the NGS Mark Recovery Tool: <https://geodesy.noaa.gov/surveys/mark-recovery/index.shtml>
5. US Mapping Coordination SeaSketch project is available here:
<https://www.seasketch.org/#projecthomepage/5272840f6ec5f42d210016e4/about>
6. Link to new White House State of the Science report, with notable call out for the importance of datum epochs, especially in areas of vertical land motion:
<https://www.whitehouse.gov/wp-content/uploads/2023/03/Federal-Flood-Risk-Management-Standard-Climate-Informed-Science-Approach-CISA-State-of-the-Science-Report.pdf>

Contacts

1. CO-OPS Stakeholder Services Branch email: tide.predictions@noaa.gov
2. NGS email: ngs.infocenter@noaa.gov
3. The Regional Geodetic Advisors contact:
<https://geodesy.noaa.gov/ADVISORS/index.shtml>
4. USACE contact: <https://www.usace.army.mil/contact/>