



Alaska Ocean Observing System

Coastal Hazards Workgroup

December 18, 2013 8-10am

A O O S Office in Anchorage

**Meeting Participants and Affiliations:**

In Anchorage: Aimee Fish (NWS-NOAA), Amy Holman (NOAA AK Region), Matthew Forney (OCS-NOAA), Michael Burgy (TWC- NOAA), Tahzay Jones (NPS), Ruth Carter (DOT), Nathan Wardwell (JOA Surveys), Ellen Tyler (AOOS), Molly McCammon (AOOS).

On the phone: Karen A Murphy (Western Alaska LCC), Li Erikson (USGS), Ann Gibbs (USGS), Nic Kinsman (ADGGS), Seth Danielson (UAF), Tom Ravens (UAA), Joel Cusick (NPS), Michael Shephard (NPS), Orson Smith (UAA), Doug Burn (ABSI LCC).

*Meeting notes by Ellen Tyler*

**Meeting Overview:**

This meeting updated partners on progress since a joint AOOS/Western Alaska LCC (WALCC) Coastal Hazards workshop held in May 2012. In addition to general updates, Michael Burgy from NOAA's National Tsunami Warning Center (NTWC) gave an overview of the instruments that the NTWC uses to monitor sea level and waves. There was interest in taking advantage of these measurements and the potentially low(er) cost installations that the NTWC might provide.

**Agenda:**

Welcome/Introductions

Brief Updates:

- Karen Murphy, Western Alaska LCC
  - Update on coastal-related projects & efforts
- Tom Ravens, UAA
  - Modeling Storm-Induced Inundation on the Yukon Kuskokwim Delta for Present and Future Climates
- Ann Gibbs & Li Erikson, USGS
  - Update on North Slope shoreline change study
- Aimee Fish & Amy Holman
  - Updates from NOAA

Guest Presentation: Michael Burgy: Tsunami Warning Center Sea Level Monitoring

Discussion

**Karen Murphy** started the meeting off with an overview of the WALCC Science Strategy, which rotates focus among coastal, terrestrial and freshwater topics. WALCC will finish the first round of “coastal topics” through 2015, with the next set of “coastal topics” to begin in 2019. A schematic of this plan is included in Karen’s PPT.

#### **4 Primary Recommendations from the May 2012 Coastal Hazards Workshop**

Karen reviewed the 4 major recommendations that came out of the last Coastal Hazards Workshop and updated the group on efforts within WALCC that have addressed these. Her PPT summarizes these and is available on the website with these meeting notes. Since many of the updates shared from additional partners also fit under these recommendations, Ellen compiled these into a table. If you have additional updates to add to this, please contact her directly at [tyler@aos.org](mailto:tyler@aos.org).

{Table at end of notes}

Karen noted that although no sentinel sites have been established, WALCC has been synthesizing coastal change projects with help from ACCAP. Amy Holman noted that there are several products that are finishing up (or finished) and asked how these products will be shared with the larger community. Karen shared that there will be a series of WALCC PI webinars in 2014. The webinars will be announced here once scheduled: <https://westernalaskalcc.org/projects/SitePages/webinars.aspx>. Molly shared that AOOS will be looking to hold another workshop like the one last May in about a year to inform and direct the next 5-year AOOS work-plan. This timing will work well to leverage this synthesis effort.

Nic Kinsman shared that Yuri Gorokhovich, Anthony Leiserowitz, and Darcy Dugan produced a study on Integrating Coastal Vulnerability and Community-Based Subsistence Resource Mapping in Northwest Alaska. This will be published in the Journal of Coastal Research (In-Press) and is available: <http://www.jcronline.org/doi/abs/10.2112/JCOASTRES-D-13-00001.1>

**Tom Ravens** updated the group on progress in *Modeling Storm-Induced Inundation on the Yukon Kuskokwim Delta for Present and Future Climates*. He started with a disclaimer that this project is now complete, but his slides are not updated. Those slides are available on the AOOS website at: <http://www.aos.org/workshops-and-reports>.

The research goal for this project was to determine the likely change in YK Delta ecology due to storm surges that are enhanced by sea level rise. Because significant portions of the delta are low-lying (with elevations around 2m above the mean seal level), this area currently experiences routine flooding. Tom’s group investigated a series of historic storms (chosen from USACE records and calculated using ADCIRC (course grid) and DELFT3D (fine grid) models) and then re-ran the models with a “future” .4m increase in mean sea level to make predications about future inundation extents and duration. .8m, 1m and 1.2 meter scenarios were also run. The outputs of these model runs are

reported in “meter days,” which captures both depth and time inundated in one index. In addition to inundation, Tom found a strong correlation between annual inundation indices and the presence of different types of vegetation. As a result, he mapped his projections of future inundation to expected vegetation type as well.

Amy Holman asked Tom, Ruth Carter (ADOT) and Aimee Fish if and how projections of inundation influence their planning. Aimee responded that the National Weather Service is required to know what will flood and that this information is helpful for forecasters. Tom cautioned that models like his, which are based on past flood events, may not necessarily accurately predict what will happen in the future, given that other variables besides sea level alone will be different. Ruth shared that the Department of Transportation may not include anything “speculative” for planning; however, if a community is already relocating, for example, DOT would be interested in considering all available information.

Senator Begich expressed interest in this issue when he attended a meeting last fall at NOAA’s National Weather Service (NWS), Weather Service Office, in Nome, Alaska. Senator Begich was briefed by NWS officials on disaster recovery and the conversation included future infrastructure development given increasing hazards from coastal inundation along the west coast of Alaska.

**Ann Gibbs and Li Erikson** provided a brief update on USGS coastal studies along the northern coast of Alaska. Primarily they are working on a historical shoreline change analysis, but are also involved in modeling future coastal changes to winds, waves, and water levels under different scenarios of projected climate change. While Tom’s study (above) relied on LIDAR data for shoreline mapping, his analysis could be improved by applying this more accurate and precise topographic data, in progress now. USGS is starting out on the North Slope, but intends to continue collecting and mapping this information down the west coast as well. Historic data to be included in this synthesis includes: NOAA T-sheets, USGS CIR DOQQs, O&G Color Orthophotos and ANWR Quickbird Imagery. An open-file report will be available soon.

USGS deployed AWACs and Aquadopps to measure waves, currents and water levels in 2009 and 2011. This information was used to calibrate and validate numerical models describing past flood conditions.

Nic shared that through funding provided by AOOS she was able to collect tidal datum from a temporary tide gauge at Port Heiden in Bristol Bay. This generated a discussion around the possibility of collecting water level information at other locations, such as in Barrow, along plate-boundary observing stations, and along the North Slope and western Alaska, where Grav-D was flown for hydrographic surveys. Tying GIS information, Grav-D and Elipsoid information together to establish offsets and information were identified as necessary components for this type of mission.

Tom Weingartner is also being funded by AOOS to deploy several bottom-mounted pressure sensors capable of making year-round measurements of surface gravity waves, water column currents and temperature and salinity in the western Beaufort Sea to help guide the development and evaluation of wave-forecasting models, specifically to improve understanding and forecasting of wave activity in the fall, just before freeze-up.

**Amy Holman** reflected that one of the big takeaways for her from the record November 2011 storm was how few communities in western Alaska actually have established tidal references. Communities often know the tides with better accuracy and precision than is available from established sources of this information. Amy suggested that this group and maybe some others get together for a work session to look at where we have the best coastal data. Some layers that would be beneficial to look at in this exercise include:

- DCCD Community Maps of infrastructure
- O&G Color Orthophotos
- DEMs color-coded by elevation
- Possibly local observations

Molly commented that AOOS would have funding to help put this together.

**Aimee Fish** said that the November 2011 series of storms revealed some fundamental problems with the National Weather Service's storm surge models. Specifically, the US-Russia border created an artificial edge, imposing something like the wall of a bathtub, distorting the model projections for the Bering Strait. The NWS is now expanding these models to run basin-wide. In other parts of the country, topographical and inundation information are being incorporated into storm surge modeling.

**Matt Forney** updated the group on some recent NOAA/USCG collaborations to share marine data. USCG buoy tenders have submitted data to NOAA's Tides and Currents, and NOAA has partially accepted the data. The expectation is that this information will update Arctic Nautical Charts. Moving forward, the Coast Guard would like to have sensors to aid better data acceptance in the future.

#### **Guest Presentation: Michael Burgy, Sea Level Monitoring**

Michael Burgy, senior electronics technician from NOAA's National Tsunami Warning Center (NTWC) briefed the group on the work that he has been doing. The center's mission to provide timely identification and warning of tsunami hazards has led to the development of unique sea level monitoring solutions. Michael's presentation detailed several of these that are operational, or in development. Additionally, he identified several special considerations for sea level monitoring and instrumentation. His PPT, available at: <http://www.aos.org/workshops-and-reports>, describes the center's water level measurements, installations and sensor packages.

**Discussion and potential follow-up activities:**

Following this presentation, the conversation turned to data. Members of the workgroup wanted to know 1) where the sea level data collected by the NTWC goes and 2) how to tease out wave information and geographic positioning of sensors. Matt Forney asked if any of the instruments have gone through CO-OPS technology/support approval process. It was noted that this process takes a long time. It was noted that the AOOS data system could be another option for displaying and stewarding this data.

Nic mentioned that she will be meeting with CO-OPS in Silver Spring in April and could bring up a proposal for collaboration. Matt suggested that it may make sense for CO-OPS to fund NTWC to set up and install the primary installations, given the relatively low costs of what Michael presented. There was interest in taking advantage of these existing measurements and the potentially low(er) cost installations that the NTWC might provide for additional observations. The strategy to best leverage these efforts is emerging and it will be beneficial for key players (this group) to re-convene in advance of Nic's meeting in April.

To get the ball rolling, a good first step will be to fill out the table that Karen started Progress on Recommendations (by partner organization) from Coastal Hazards Workshop, May 2012. That table is at the end of these notes and you can send your additions to [tyler@aoos.edu](mailto:tyler@aoos.edu). Ellen will circulate that table in February and schedule this workgroup's next meeting at that time. The meeting to be scheduled in February will move forward with Amy Holman's suggestion to have a work session to look at where we have the best coastal data, and could be scheduled to coincide with one of the WALCC PI webinars depending on what the schedule looks like.

A longer-term action item will be hosting another workshop like the one last May in about a year.