NOAA Coastal Inundation Mapping – Detailed Course Outline
2 Day Class
NOAA Office for Coastal Management

Module 1 - Course Introduction
1. What is inundation?
2. Why is understanding and predicting inundation important?
3. Why map inundation?
4. Mapping vs. Modeling
5. Types of Inundation

Module 2 - Coastal Inundation Products
1. Coastal Inundation Models
2. Probability Based Products (Coastal FIRMs, FEMA Flood Data, Hurricane Storm Surge Mapping, Tsunami Inundation Modeling / Mapping)
3. Event-Based Products (Coastal Recovery Maps, Coastal A-Zones)
    a. *Exercise 1 – View Risk-Based and Event-Based Flood Data, ArcGIS Server*
4. Scenario-Based Products (SLOSH, ADCIRC, MOST , SIFT)
    a. *Exercise 2 – Migrating SLOSH storm surge model data into ArcMAP*

Module 3 – Mapping Fundamentals – Datums, Projections, and Transformations
1. Why integrate elevation data?
2. What to consider when integrating elevation data?
3. Datums
4. Ellipsoids
5. Horizontal Datums
6. Vertical Datums
7. National Spatial Reference Center (NSRS)
8. Types of Vertical Datums (ellipsoidal, orthometric, tidal)
9. Commonly Used Vertical Datums
10. NAVD88 and NGVD29
11. National Tidal Datum Epoch
12. Tidal Benchmarks
    a. *Exercise 3 – Explore Vertical Datum Information*
13. Vertical Datum Transformation Methods
14. NGS Tidal and Orthometric Elevations Toolkit
15. Geodetic Tie to Tidal Datums
16. VDatum
17. Vertical Datum transformation Roadmap
    a. *Exercise 4 – Tidal Datum Transformations Using VDatum*

Module 4 – The Base Map –Understanding Elevation Data for Coastal Inundation Mapping
1. Coastal Inundation Data Inputs
2. Defining Elevation Data (bathymetry, topography)
3. Why is elevation data important for coastal inundation mapping?
4. Data Collection Techniques (LiDAR, IFSAR, SONAR)
5. Digital Elevation Models (DEMs)

6. Spatial Accuracy
7. Spatial Resolution
8. Vertical Accuracy and Horizontal Resolution
9. Elevation Breaklines
10. FEMA Accuracy Standards
11. Elevation Data Sources (USGS, NGDC, NOAA, NOS, etc.)
12. Topo/Bathy Data
13. Raster Data Format
14. ArcGIS Spatial Analyst
15. Projections and Transformations
    a. *Exercise 5 – Manage Existing Digital Elevation Models*
16. Data Collection Sources (CLICK, DAV, CHARTS, JALBTCX)
17. ArcGIS Conversion Tools
    b. *Exercise 6 – Create a Hydro-flattened DEM using Lidar Data*
19. Water Level Data
20. National Water Level Program (NWLP)
21. National Water Level Observation Network (NWLON)
22. Extratropical Storm Surge Forecasts (NWS)
23. Water Surface Data
24. USGS National Water Information System
25. NWS Flood Severity Inundation Mapping
    a. *Exercise 7 - Obtain Water Level Data from CO-OPS*

Module 5 – Coastal Inundation Mapping

1. Mapping Water Surfaces
2. Spatial Interpolation
3. Linear Interpolation
4. Sample Importance
5. Natural Neighbors
6. Controlling Sample Points
7. Inverse Distance Weighted
8. Spline / Minimum Curvature Modeling
9. Choosing a Spline Type
10. Comparing Interpolation Methods
11. Map Algebra
    a. *Exercise 8 – Create Surge Zone using SLOSH Display Program Output*
12. Surge Zone Development
13. Using High Water Marks
    a. *Exercise 9 – Create Surge Zone using Event High Water Marks*
14. Sea Level Rise Mapping – Tool Demos
15. Sea Level Rise and Coastal Flooding Impacts Viewer Demo
    a. *Exercise 10 - Sea Level Rise Mapping Part 1*
        i. *Creating a MHHW Tidal Surface*
    b. *Exercise 10 – Sea Level Rise Mapping Part 2*
        i. *Hydrologic connectivity, Low-Lying Areas, and Sea Level Rise*

Course Wrap-Up and Discussion