Geospatial Products of the USGS National Geospatial Program for Lake and Watershed Management
Geography underpins water science and management
<table>
<thead>
<tr>
<th>Area of National Leadership</th>
<th>Program Emphasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-16 Co-Lead for Terrestrial Elevation</td>
<td>3D Elevation Program (3DEP)</td>
</tr>
<tr>
<td>A-16 Co-Lead for Inland Waters (Hydrography)</td>
<td>National Hydrography Dataset (NHD) Watershed Boundaries Dataset (WBD)</td>
</tr>
<tr>
<td>National Coverage of Topographic Maps</td>
<td>U.S. Topo and Alaska Mapping</td>
</tr>
</tbody>
</table>
3D Elevation Program (3DEP)

- Applies lidar technology to acquire and distribute three-dimensional data of bare earth, vegetation and structures at centimeter-level accuracy
- Increases the quality level of lidar being acquired to enable more accurate understanding, modeling, and prediction
- Goal to acquire national coverage in 8 years to serve a broad range of critical applications
3DEP Data Quality
Improves and Enables Applications
Enable: Flood Risk Management

Centimeters Matter!

- Red River, MN lidar shows changing river morphology
- QL2 provides 10 cm of additional accuracy over QL3 – critical to flood risk management, particularly in areas of low relief

Image from Fugro Geospatial
Enable: Fire Disturbance Assessment

Hayman Fire, CO

Pre-fire

Post-fire
As of 3/31/2016

3D Elevation Program - FY16 Proposed Body of Work
(Selections as of March 31, 2016, Selections On-going)

For more on the 3D Elevation Program (3DEP) visit:
http://www.nationalmap.gov/3DEP

Visit the US Interagency Elevation Inventory (USIEI) at:
http://coast.noaa.gov/inventory

Map shows extent of projects selected for award from the 3D Elevation Program (3DEP) FY16 Broad Agency Announcement (BAA) as of March 31, 2016. The evaluation and selection of awards is ongoing; the map will be updated as new selections are identified.

3DEP Specifications:
- Quality level 2 or better lidar data
  (Ifsar in AK)
- Publicly available
- 8 years old or newer as of 2016

3DEP FY15/16 Broad Agency Announcement
USIEI data from October 2015

EXPLANATION
- Data Acquisition Partnership Opportunities Selected
- In Progress and Existing Data that Meet 3DEP Specification
- Planned Funded Data that Meet 3DEP Specification
- Data that Do NOT Meet 3DEP Specification

Sources:
US Department of Interior
US Geological Survey
Hydrography

- National Hydrography Dataset (NHD)
- Watershed Boundary Dataset (WBD)
- NHDPlus (1:100K, with 1:24K or better coming soon)
Hydrography near Tampa
NHDPlus High Resolution

Integrating the Landscape with the Stream Network at 24K

- Builds on success of NHDPlus Medium Resolution (1:100K-scale)
  - Integrates NHD, NED, and WBD

- Addresses need for a single hydrographic frame of reference
  - User community currently divided:
    - NHDPlus (100K) regional/national applications
    - NHD HiRes (24K or better) local/state applications
  - NHDPlus HiRes provides both higher resolution data and ability to generalize to many different scales so that all users can link their data to the same core network

- Initial timeframes
  - Tools and procedures — Plan to have operational in Q3 FY16
  - Production will proceed by Sub-region, from upstream to downstream
  - FY 16 Goal: 1/4 of CONUS done (6 Regions)
StreamStats

Peak-Flow Statistics Parameters [100.00 Percent Peak Flow Statewide SIR2008 S206]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Min Limit</th>
<th>Max Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage Area</td>
<td>33.87</td>
<td>0.7</td>
<td>1290</td>
</tr>
<tr>
<td>Mean April Precipitation</td>
<td>4.898</td>
<td>2.79</td>
<td>6.23</td>
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<tr>
<td>Stream Slope 10 and 85 Method</td>
<td>148</td>
<td>5.43</td>
<td>543</td>
</tr>
<tr>
<td>Percent Wetlands</td>
<td>0.7821</td>
<td>0</td>
<td>21.8</td>
</tr>
</tbody>
</table>

Peak-Flow Statistics Flow Report [100.00 Percent Peak Flow Statewide SIR2008 S206]

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
<th>Unit</th>
<th>Prediction Error</th>
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</thead>
<tbody>
<tr>
<td>2 Year Peak Flood</td>
<td>2190</td>
<td>ft³/s</td>
<td>30.1</td>
</tr>
<tr>
<td>5 Year Peak Flood</td>
<td>3660</td>
<td>ft³/s</td>
<td>31.1</td>
</tr>
<tr>
<td>10 Year Peak Flood</td>
<td>4850</td>
<td>ft³/s</td>
<td>32.3</td>
</tr>
<tr>
<td>25 Year Peak Flood</td>
<td>6360</td>
<td>ft³/s</td>
<td>34.3</td>
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<tr>
<td>50 Year Peak Flood</td>
<td>7580</td>
<td>ft³/s</td>
<td>36.4</td>
</tr>
<tr>
<td>100 Year Peak Flood</td>
<td>9030</td>
<td>ft³/s</td>
<td>38.6</td>
</tr>
<tr>
<td>500 Year Peak Flood</td>
<td>12300</td>
<td>ft³/s</td>
<td>44.1</td>
</tr>
</tbody>
</table>
Measured velocity

Discharge, cubic feet per second
Most recent instantaneous value: 41,200 01-13-2014 11:00 EST

Model velocity

Critical Customers: Schools
Critical Customers: Hospitals
HAZMAT: Risk Management Plan
HAZMAT: Toxic Chemical Releases
HAZMAT: Hazardous Waste Sites
Dischargers: Municipal & Industrial

Discharge, cubic feet per second
Most recent instantaneous value: 41,200 01-13-2014 11:00 EST

Model velocity

Measured velocity
Operational Benefits Example

Cost Savings by Prioritizing Field Efforts

- Evaluation of mercury sampling sites, fish mercury concentrations, and upstream gold and mercury mines
- Visualizes possible relationships between mercury concentration and drainage patterns
- Can be used to prioritize additional sampling locations and analyses prior to field visits
Operational Benefits Example

TX Reservoir Sedimentation Analyses

- Texas Water Development Board study of 194 major reservoirs at risk for sedimentation
- Annual loss of 90,000 acre-feet due to sedimentation exceeds projected increases from new reservoirs
- Reservoirs scored based on sedimentation weighting based on watershed area, slope, soil type, stream length and density, precipitation, reservoir characteristics, etc.
- Most at-risk reservoirs identified for watershed protection planning
Customer Service Benefits Example

Connecticut River Watershed Atlas

- Web-based tools using NHDPlus as spatial framework
- PDF reports with maps and attributes delivered based on user selections from 12,500 stream segments in Connecticut River watershed
- Customers can perform own analyses on-the-fly
Customer Service Benefits Example

EPA Impaired Waters and TMDLs Datasets

- Supports widespread interest in GIS data on impaired waters
- On-line public access to spatial and tabular data for viewing or download
- Over 40,000 tracked waters consolidated from state listings of impaired waters and TMDLs indexed to the NHDPlus
- Linked to other EPA on-line documents and tools including WATERS

Impaired Waters

TMDLs
Cartographic products
Questions?

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