GPS Across the Department of the Interior

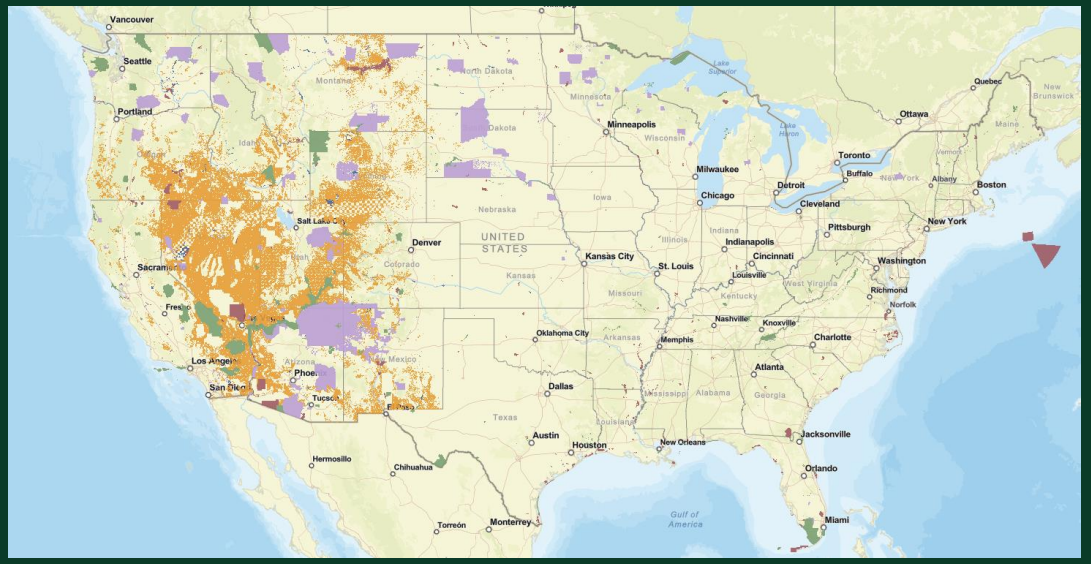
- Precision, Stewardship, and Science
- David Carter, CDO

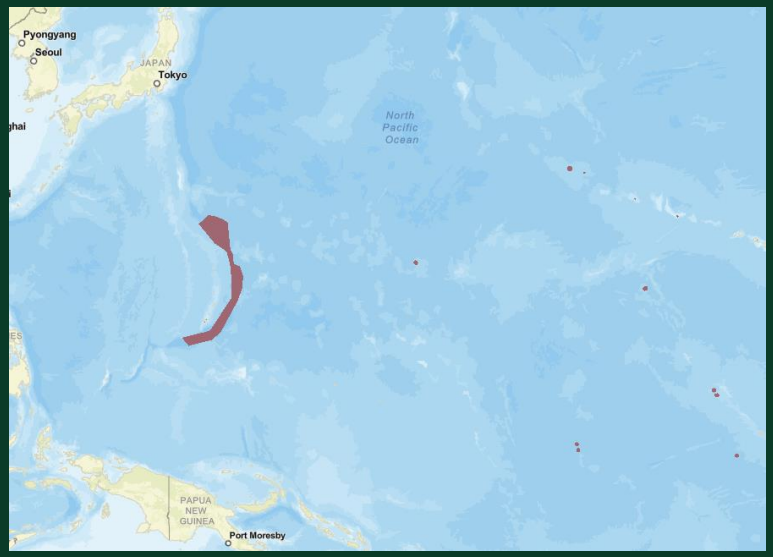
The Department of Everything Else

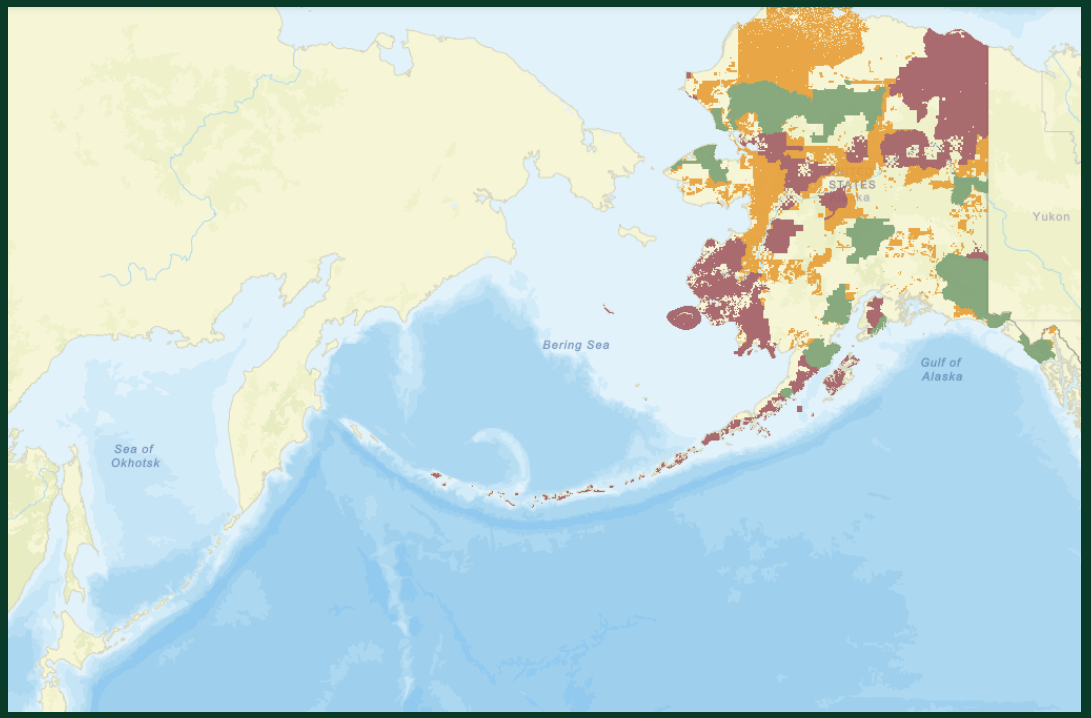
- 67,000 employees
- 2,400 locations in the US and territories
- 433 Park Units
- 544 National Wildlife Refuges
- 42,000 Native American students in elementary and secondary schools
- 58 Hydroelectric plants

Location Matters to DOI

- Covers 11 time zones
- Manages 20% of U.S. land
- Location and timing enable data-driven decisions





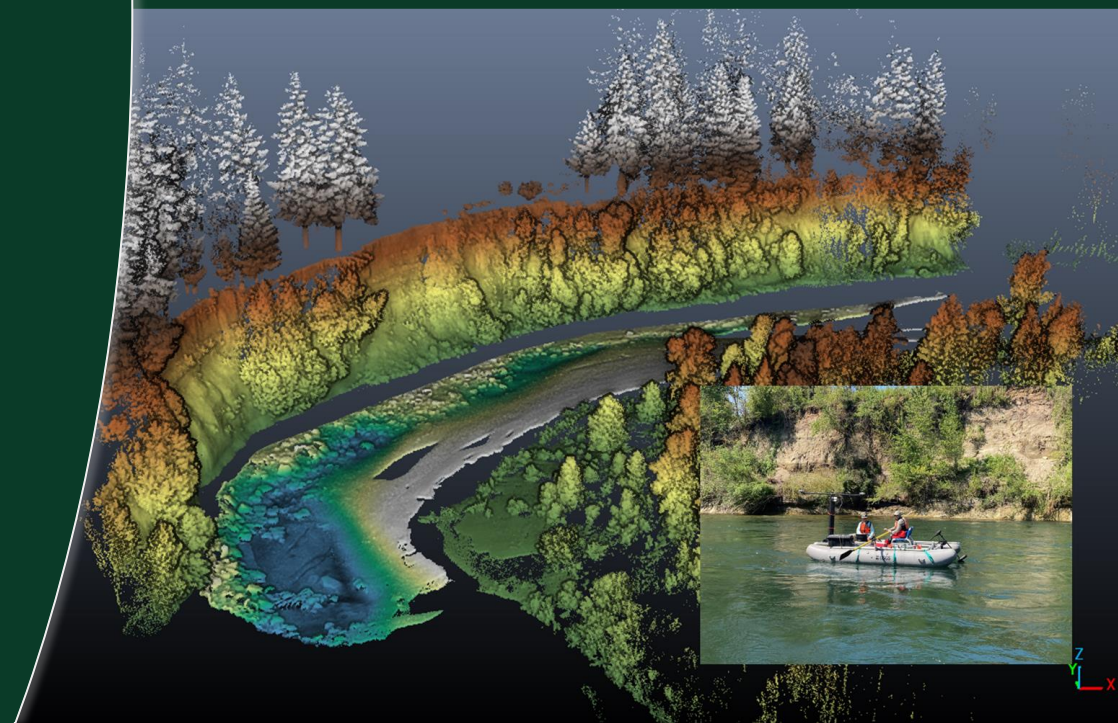


US Wildland Fire Service

- Established in January 2026
- Location sharing
- Accurate perimeters for tactical decisions
- Vegetation and fuel mapping for fire behavior modeling
- GPS-referenced damage and severity mapping (MTBS)
- DOI-wide GNSS networks enabling consistent, centimeter-level data

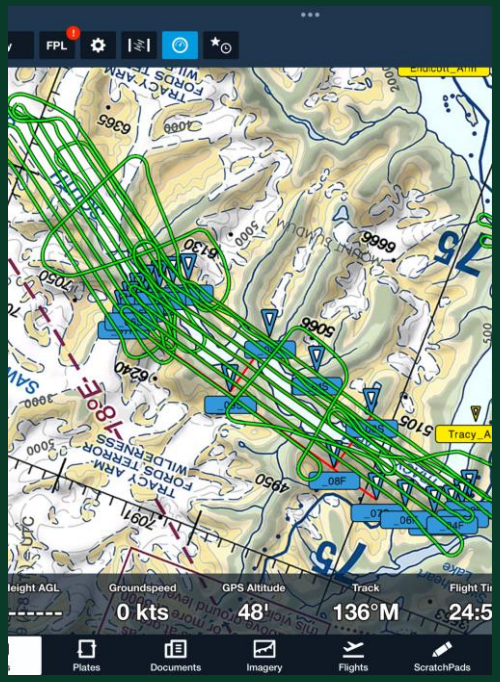
USGS and Topographic Mapping

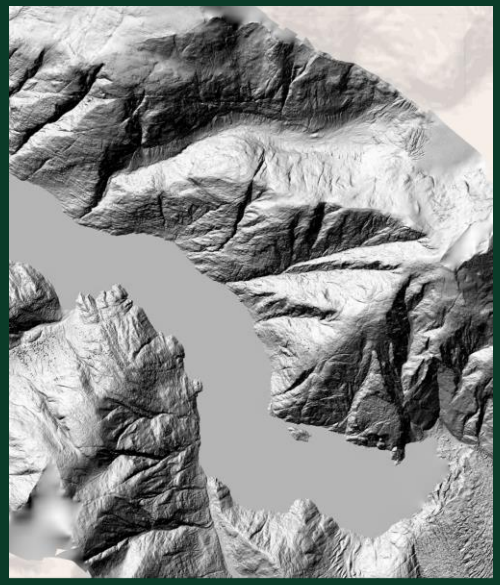
- GPS/GNSS in USGS Topographic Mapping (3DEP)
- Provides high-accuracy ground control for 3DEP data products
- Calibrates lidar, imagery, and elevation datasets for consistent national mapping
- Enables reliable flood, hazard, and terrain-change modeling through precise elevation reference
- Supports creation of high-resolution DEMs by aligning GPS-referenced LiDAR with the National Spatial Reference System

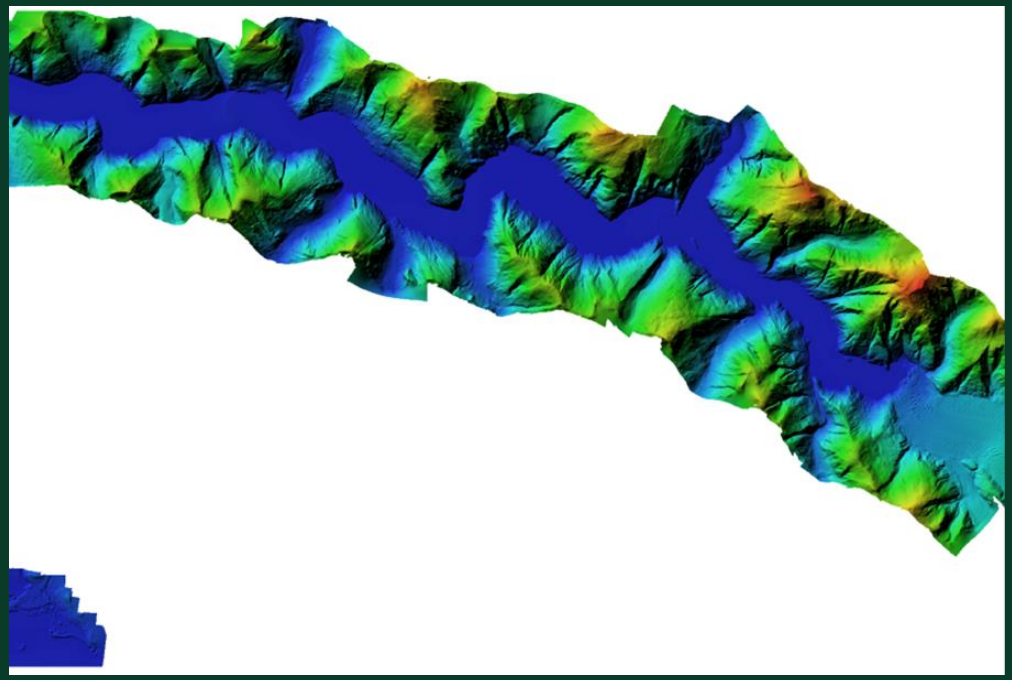


GPS/GNSS: Essential Ground Truth for National 3D Models

- High-precision ground control for DEM and geology model validation
- Confirms land deformation and terrain-change signals
- Improves hazard forecasting through accurate elevation reference
- Supports the National 3D Topography Model (3DNTM) integration of elevation and hydrography

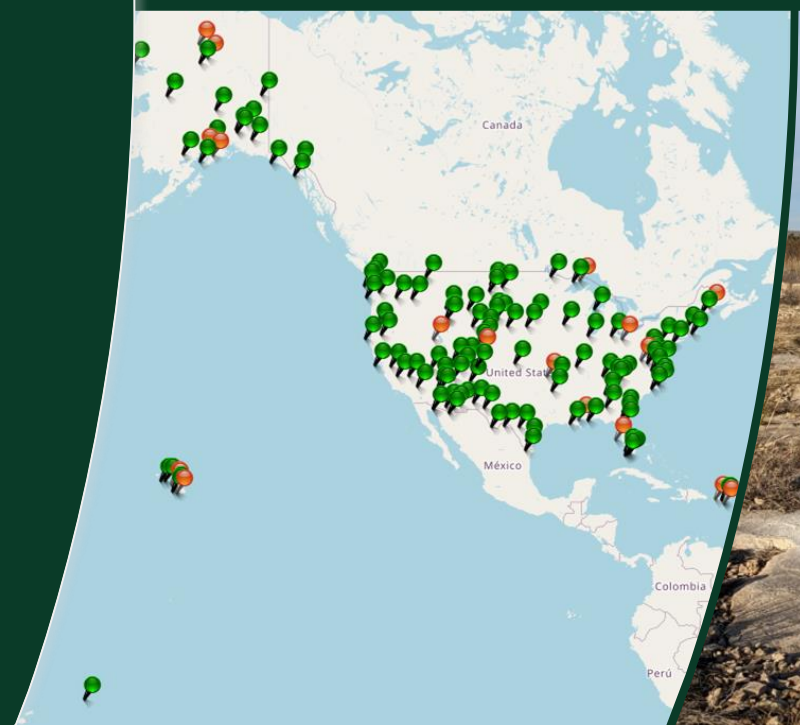






NPS Real-Time GNSS Correction Service (ntrip.nps.gov)

- Provides DOI-wide centimeter-level real-time positioning through a unified NPS/FWS/BLM base-station network
- Reduces the cost of high-accuracy GNSS from ~$50,000 to ~$5,000 per unit by eliminating the need for local base stations
- Lowers the technical barrier for field crews and short-term staff by simplifying access to high-precision GNSS
- Ensures all collected data aligns with the National Spatial Reference System (NSRS)
- Automates compliance with Geospatial Data Act geodetic accuracy requirements

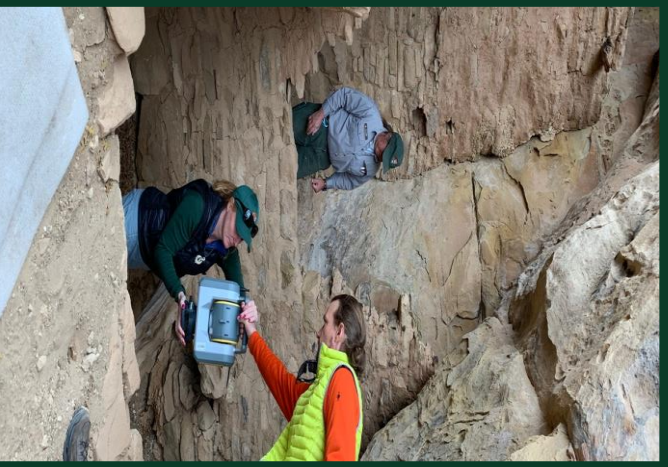


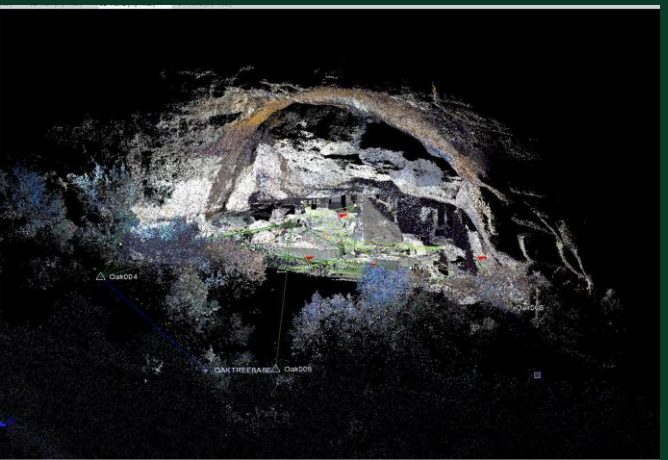
GPS Timing in Hydroelectric Powerplants

- Bureau of Reclamation is the 22nd largest utility by generation
- Millisecond timing required to protect systems
- Inter-range Instrumentation Group (IRIG-B)
- Aligns timestamps across devices
  - Protective relays
  - Fault recorders
  - SCADA systems

Coal Production

- DOI is responsible for surface coal production in the US
- Abandoned mile program
- Sub-centimeter accuracy used for 3D modeling of mine reclamation projects





How DOI Uses GPS to Protect Cultural Resources

- Supports accurate mapping and monitoring of cultural sites to protect sensitive and at-risk resources
- Detects and measures landscape change—including erosion, vegetation shifts, and post-fire impacts—over time
- Powers NPS Land Imaging workflows by integrating GPS-tagged field data with aerial and satellite imagery across 270+ parks
- Provides centimeter-level positioning for trail mapping, archaeological surveys, and habitat monitoring across DOI lands

Conclusion

- GPS is a requirement for DOI operations
  - Enables power production
  - Helps to coordinate wildfire fighting
  - Enables science
  - Locates archeological resources
  - Enables stewardship of public lands