GCMRC’s Online Mapping and GIS Resources

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GIS – Admin background

- Previously under DASA, 2005 – 2012 and GCMRC IT Program 2000 - 2004


- Added 1.5 FTE to GIS Project at beginning of FY2015.
  - Current work force has 2 FTEs, 2 ½ time FTEs.
GIS – Role in current work plan

- Balance between Center-wide GIS support and specific, project-level involvement

- ½ time devoted to GCMRC Projects
  - Worked with PIs to develop role of GIS in projects for TWP
  - In some cases, GIS Lead listed as Co-PI for certain project elements (see Projects 3 & 10)

- ½ time reserved for Center-wide support
Project Support – FY15

- **Fisheries**
  - Natal Origins, Downstream Fish Monitoring (ADGF), Lees Ferry Fisheries, Little Colorado River Fish Monitoring (USFWS and GCMRC), Humpback Chub Mainstem Monitoring

- **Other Biological**
  - Aquatic Foodbase Monitoring, Vegetation Monitoring

- **Physical**
  - Geomorphology, Surveying
GIS Support – Fish

- **Fish Sampling Units**
  - Glen Canyon Dam to Pearce Ferry
  - 250-meter set units

- **Cross-Reference System**
  - Consistent framework for relating prior fish efforts

- **Units used in Fish Database**
GIS Support – Geomorphology

- Channel Mapping efforts
  - Field support, data processing, applying finished data to other projects.

- Sandbar Monitoring Sites
  - Triangulated Irregular Network (TIN) Processing Script for calculating volumes
  - Maintaining GIS layers
  - Photogrammetry of historic photography
GIS Support – Geomorphology

- 1984 Sandbar Digital Terrain Extraction
  - GIS-lead project element
  - Photogrammetry of 1984 B&W aerial photography
  - Digital Terrain Model (DTM) extraction
    - 3D model development
    - Volumetric calculation of sandbars in 1984
1984 Photogrammetry of sandbars
1984 Photogrammetry of sandbars

Triangulation Results

Ground Control and Tie Points in block adjustment
1984 Photogrammetry of sandbars

2009 Imagery & Ground Control Points (GCP)  1984 DTM Points
1984 Photogrammetry of sandbars
1984 Photogrammetry of sandbars

Explanation

**Stage-Discharge**

Cubic Feet per Second

- 8000
- 20000
- 25000
- 31000
- 41000
- 45000
1984 Photogrammetry of sandbars

1984 Area above 8,000 CFS

1984 Volume above 8,000 CFS

22-Mile

(Joe Hazel, Northern Arizona University. Preliminary data, do not cite.)
1984 Photogrammetry of sandbars

1984 Area above 8,000 CFS

1984 Volume above 8,000 CFS

30-Mile

(Joe Hazel, Northern Arizona University. Preliminary data, do not cite.)
GIS Support – Project 10

- Mosaic data sets from Overflight and Channel Mapping (Project 3)

- Determine appropriateness of combining / interpolating between data sets

- Pre-processing work: Vegetation removed from Digital Surface Models (DSM), Water masked out
GIS Support – Project 10

Channel Map Data

Diff Z = 0.117065 m

Channel Map and DSM Data

Diff Z = -0.010376 m
Project 14. Geographic Information Systems, Services and Support

- GIS Process and Data Set Documentation
- Geospatial Data Management
- Access to Geospatial Holdings
GIS Process and Data Set Documentation

- GCMRC River Mile System Open File Report
  - Recently edited river centerline and miles below RM 260 to more accurately follow channel
  - Previously cited as “Spatial Database” by other works
  - Open-File report needed for others to cite.

- Metadata Development, “How-To” Docs, etc.
Project 14. Geographic Information Systems, Services and Support

- Geospatial Data Management
  - File-based data sets (e.g. ESRI Geodatabases, Shapefiles, ASCII text files, etc.)

- Oracle Spatial Database – enterprise database designed for storing and serving geospatial data.
Access to Geospatial Data Holdings

- GIS Services hosted by GCMRC
  - Web page with links to GCMRC Geospatial Services
  - Pages for ArcGIS Server versions 10.0 and 10.2.2
  - Designed for GIS users (ESRI, OpenSource, Google Earth)

Access to Geospatial Data Holdings

- Geospatial data using ArcGIS Online (ESRI)
  - Industry-standard platform for hosting web maps and applications
  - Searchable platform of web-based geospatial data sets, maps, applications, etc.
  - http://www.arcgis.com/features/
ESRI Maps for Office

- Consume map services into Microsoft Office applications (PowerPoint & Excel)

- Add-In that needs to be installed

- Can leverage ArcGIS Online content or services from another Portal
Access to Geospatial Data Holdings

- **ScienceBase Data Catalog (USGS)**
  - Open to the public
  - Fulfills DOI-mandated initiatives to make data more accessible
  - [https://www.sciencebase.gov/catalog/item/55366b07e4b0b22a15807caf](https://www.sciencebase.gov/catalog/item/55366b07e4b0b22a15807caf)
Access to Geospatial Data Holdings

- GCMRC Website ➔ Maps and Data Portal
  - Links to custom, web-based applications that highlight GCMRC science
    - Ex. Discharge, QW and Sediment Data, Geomorphology, Campsites, Aquatic Foodbase, Lake Powell monitoring

- Web Accessible Folder for downloading
Access to Geospatial Data Holdings

- GCMRC Website → Beta projects

  - **Sandbar Remote Cameras**
    - Began in 1990s as part of sandbar monitoring
    - 40+ Sites monitored

  - **Campsite Photos (Adopt-A-Beach)**
    - Approximately 200 campsites monitored since 1996
    - Includes Weeden Inventory photos from 1970s and associated repeat photography from 2007
GCMRC GIS & Online Mapping

- Questions?
THANK YOU!