North Slope Science Initiative Science Technical Group GIS Study

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Existing North Slope Geographic Information Systems

Comprehensive list of GIS – Methodology

- ARCUS/GIS (Arctic Research Consortium of the United States) GIS list used as a beginning compendium of GIS for North Slope/Alaska
  - List categorized by type and geographical scope:
    - Interactive Online (Arctic-focused, State/National/Global)
    - Static Maps (Arctic-focused. State/National/Global)
    - GIS data & metadata (Arctic-focused, State/National/Global)
    - General/Non-GIS Data (potential GIS data development)

- Primary search methods
  - Internet search efforts utilizing Google search engine.
    - Key words (North Slope, Alaska, GIS, ArcIMS, data, IMS, maps, viewer, etc.)
  - In-house Alaska GIS data layers metadata searched for agencies not on list

- ARCUS list appended with additional GIS sites found not on list. List currently in MS-Word format with each entry having hyperlink to URL

Examination of Preliminary GIS Baseline Data Layers

North Slope Baseline Data Layer List

- A preliminary list of North Slope Baseline GIS Data Layers was generated during the March 2006 North Slope Data Management Meeting (hosted by GINA)

- Meeting participants represented a diverse set of North Slope stakeholders and expertise (UAF-GINA, EVOSTC, USGS, ADNR, BLM-NSTC, BLM-FDO, BLM-ASO, UAF-Toolik Lake, MTRI (formerly Altarum), Resources Data, Inc., ConocoPhillips, NSSI)

- The list that resulted from this meeting has been expanded and reorganized (see attached document)

- Baseline data layers list has be reorganized using the ISO (International Organization for Standardization) 19115 for Geographic Information Metadata Topic Category Code List
  - A high-level geographic data thematic classification
  - Contains metadata topic category code listing to assist in the grouping and search of available geographic data sets

- Additions to the North Slope baseline data layers list were the result of inputs from GIS professionals

Unresolved Issues

- Is the baseline data layers list complete? Which layers are the most useful?

- For a central GIS repository, would we be able to integrate the data from the disparate sources and get the different organizations to participate? Alternative – greater coordination of distributed data holdings?

- Data issues
  - Condition/completeness
  - Relevance
  - Ownership

- Who would be the stewards of the data?
  - Updates to database as new information becomes available
  - Distribution of data (though IMS, data downloads, web services, etc.)
 - Hardware/software

Suggested Distributed Data Architecture

Distributed Data Architecture

- A data system that allows for distributed dataset hosting decreases the cost and effort needed to create, maintain, and share geographic datasets

- The content and metadata of each dataset is maintained by the dataset's owner. Dataset owners provide their dataset to users by
  - Providing access through web services
  - Providing copies of the dataset

- Example: USGS DOQQ imagery
  - Web Service Access
    - TerraServer USA (http://terraservice.net/webservices.aspx)
  - Dataset downloads
    - Earth Explorer (http://edcsns17.cr.usgs.gov/EarthExplorer/)

Geographic Web Services

- Enable organizations to share their geographic datasets using established standards

- Data exchange standards enable aggregations of geographic data from multiple sources

- Web service specifications are developed by the Open Geospatial Consortium (OGC). Important OGC specifications include:
  - Web Map Service (WMS)
  - Web Feature Service (WFS)
  - Web Coverage Service (WCS)
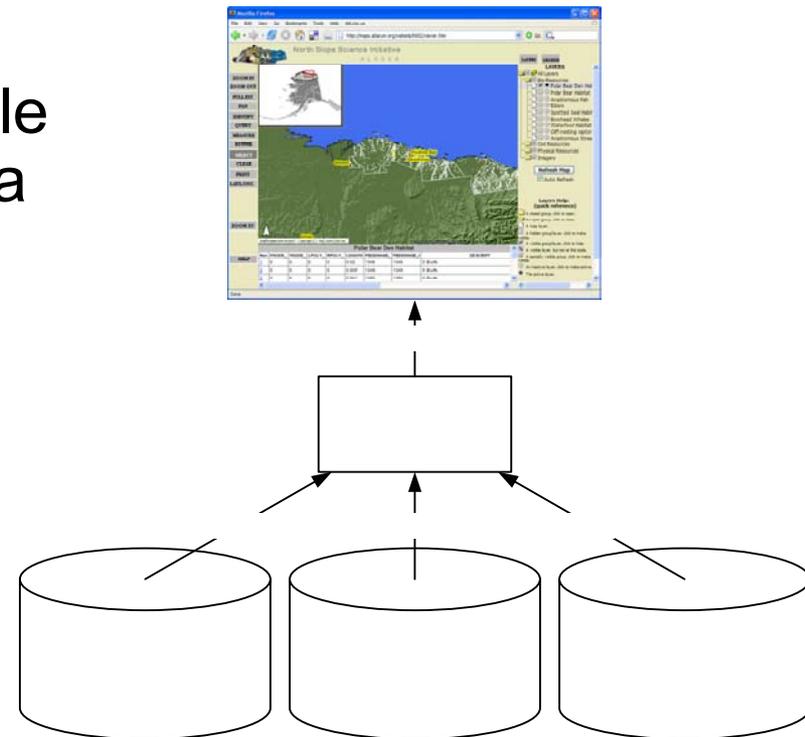
Open Geospatial Consortium

- Open Geospatial Consortium (OGC) is an international voluntary consensus standards organization. OGC encourages the development and implementation of standards for geographical content and services, GIS data processing, and exchange.

- OGC publishes: technical specifications, best practices documents, and discussion papers

- http://www.opengeospatial.org/

Issues Related to Distributed Data Systems

- Storage capacity need is reduced, since datasets accessed through web services do not need to be copied.

- Data access to data through web services is generally slower, due to network speeds. High bandwidth connectivity between user groups is beneficial.

- Client applications need to be tolerant of 'unavailable' datasets, due to network or other issues.

- Not all client applications currently support OCG Web Services as data sources.