Planning for Arctic GIS and Geographic Information Infrastructure

Sponsored by the
Arctic Research Support and
Logistics Program

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Seattle, Washington

Arctic GIS and GII Development

Brainstorm on Key Questions for Further Arctic GII Development

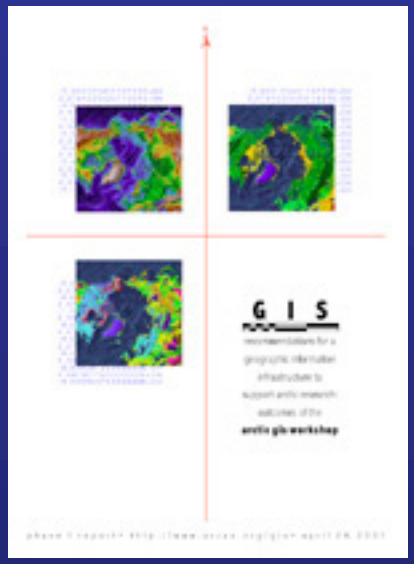
- Past and present developments in Arctic GIS and GII
- Needs and goals for Arctic GIS and GII
- Possible approaches to implementation

Meeting Goals

1. Gather input on priorities for the development of Arctic GIS and GII
2. Discuss approaches and capable groups for doing the work
3. Identify individuals interested in continuing to advise NSF on the project

Status of Arctic GIS and GII Development by NSF

- Arctic GIS Workshop January 2001
  - Broad participation of over 100 people
  - Identified users, data, possible structure



2001 Workshop Questions

- Which Arctic science questions would benefit from improved, internet-based GIS capability?
- What strategies could be used to implement enhanced GIS capability for the Arctic?
- What are the anticipated impacts in terms of research and societal benefits?

Research Benefitting from GIS

- global warming and arctic climate impact assessment;
- sea ice dynamics and change;
- terrestrial and atmospheric dynamics and trends;
- permafrost change;
- geotechnical dynamics;
- social systems and interactions;
- marine and terrestrial environments and interactions;
- ocean and terrestrial habitat assessment;
- identification and characterization of environmental hazards;

Research Benefitting from GIS

- pollution and contaminant assessment;
- coastal erosion;
- disaster or emergency management and response;
- resource management;
- urban and regional planning and sustainable development;
- economic development;
- epidemiology;
- wildlife health and disease;
- fisheries assessment;
- policy analysis

Value-added of Arctic GIS (GII)

1. logistical support for field data or sample collection;
2. infrastructure for data management;
3. expanded tools for data analysis;
4. vertical integration between disciplines; horizontal integration across disciplines; and
5. effective communication for outreach, education, and policy making.

Needs:

- Framework layers across disciplines and scales
- Comprehensive metadata and data clearinghouse(s)
- Distributed nodes within a network, but with centralized coordination
- Tools for data access, online analysis, and visualization

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Arctic GIS and GII Development Continues

- Spatial data continue to be collected, archived, to some extent made available
- NSF's needs for spatial data display

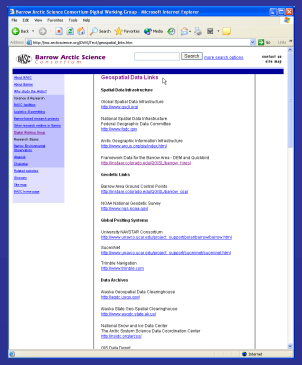
  Visualize research sites and retrieve basic project information

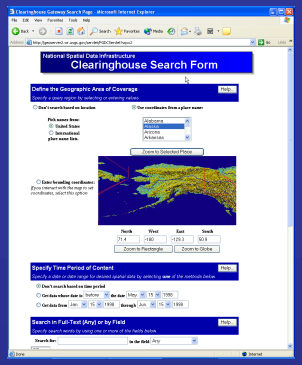
  Interactive Maps

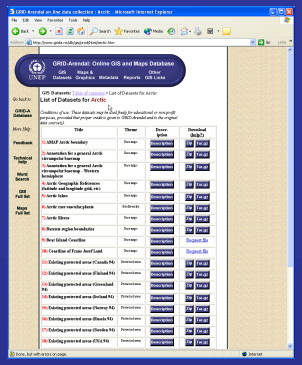
Topics for Discussion Today

- Functions needed and desired
- Format of the user interface
- Data layers to include
- Access to data and metadata
- System security and access to data
- Organizations and individuals who should be involved, level of involvement
- Additional considerations

Spectrum of Spatial Data Infrastructures





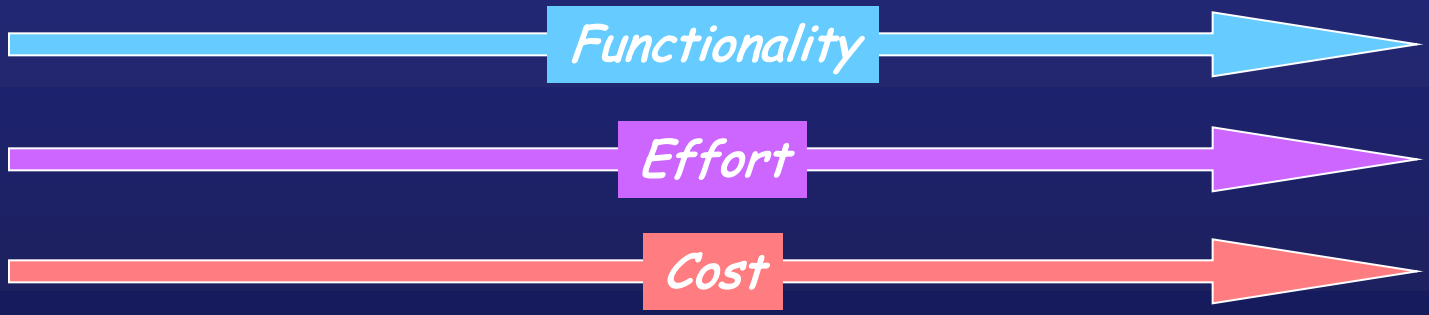


A few **web pages**, with links to:
- Agencies and organizations with common interests
- Data providers
- Metadata Clearinghouses (NSDI, GSDI, etc.)

Web Map Server (e.g., ArcIMS)
- visualize available layers
- create simple maps
- make simple analyses (queries)

Metadata Server
- FGDC and ISO metadata for viewing and downloading
- Clearinghouse node for searching and broad accessibility of metadata
- Linked to NSDI, GSDI, geography network, etc.

Data Server
- GIS and remote-sensing layers for downloading
- by ftp from web pages or direct links within metadata
- or more sophisticated web-map hosting for online analysis



Examples of Organized and Accessible Data

- **Geography Network**
  http://www.geographynetwork.com/
- **Canadian Geospatial Data Infrastructure – GeoConnections**

  http://www.geoconnections.org/CGDI.cfm/fuseaction/home.welcome/gcs.cfm
- **National Spatial Data Infrastructure**
  http://www.geo-one-stop.gov/
- **BAID-IMS**
  http://ims.arcticscience.org/
- **Quaternary GIS Laboratory**
  http://instaar.colorado.edu/QGISL/

A Possible Vision

Bottom up

Development of nodes of data and SDI through project grants

Top Down

Construction of a superstructure to organize, integrate, standardize Arctic GII and provide Arctic GIS

Approaches to Developing Arctic SDI

Funding avenues are open.

- Unsolicited proposals to NSF
  - *"…collection, management and dissemination of data…in the service of the broad arctic research community"*
- Special announcement(s)
- Under competitive contract through research support and logistics provider

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Sketch of Superstructure Development

- Organization: host infrastructure
  - Software
  - Hardware
  - Personnel (GIS expertise, web programmers, systems admin, liaison/coordinator)
  - Education/training component
- Arctic SDI Outreach
  - Working group
  - Arctic SDI workshop
- Data acquisition for framework layers
- Data coordination, portal formation