

GIS and SDI for Scientific Research Special Interest Group Exploratory Session



2007 ESRI International User Conference
San Diego, CA
June 19, 2007

Agenda

- | | |
|----------------|------------------------------|
| 5:30 – 5:45 pm | Introductions |
| | Overview Presentation / ASDI |
| 5:45 – 6:45 pm | Panel Discussion |
| 6:45 – 7:00 pm | Final thoughts, next steps |

Sign Up



The Society for Conservation GIS

Arctic Spatial Data Infrastructure (ASDI) to Support Arctic Science

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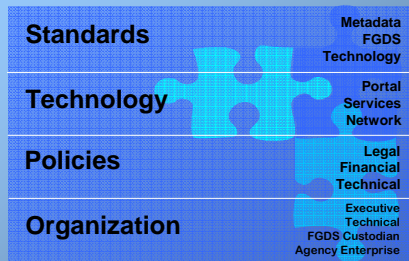
International Polar Year (March 2007-2009)

- A large scientific program focused on the Arctic & Antarctic
- 200 projects
- 60 nations
- thousands of scientists
- wide range of physical, biological and social research topics.

IPY Data Policy

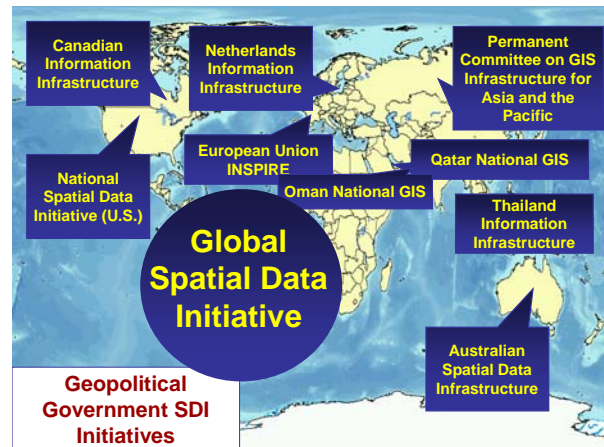
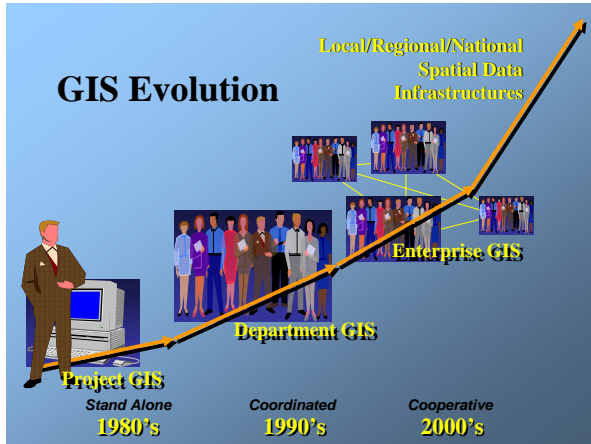
In order to meet it's objectives of interdisciplinary and international collaboration and to ensure a lasting legacy IPY is committed to ensuring full, **free and open access to IPY data.**

SDI is a Framework.....



...for sharing
geospatial
data

GIS Evolution

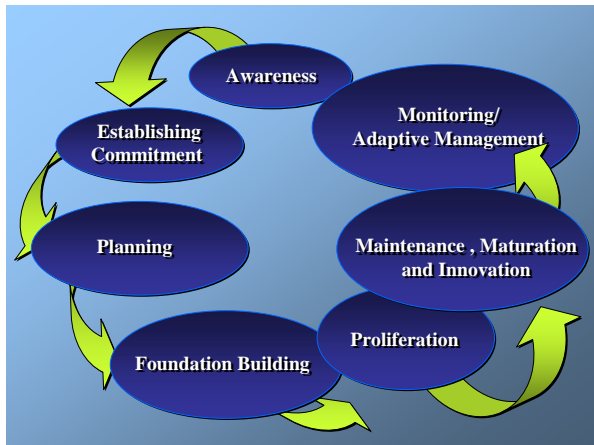
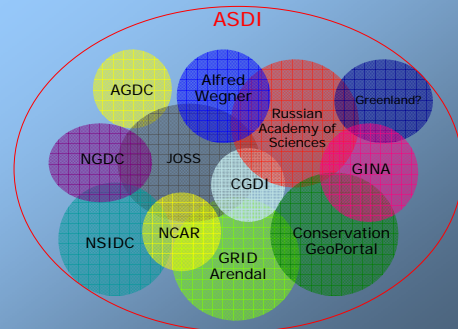


Arctic Spatial Data Infrastructure

Common framework of standards, securities, policies, procedures, and technology to support the effective acquisition, coordination, dissemination and use of *geospatial data* by multiple and distributed stakeholder and user groups.

= Science Infrastructure

ASDI is a Process, not a Product



Benefits to Science

Rank	Benefits	Total	Individual PI	Science Project	Science Community	Public
1	Data Sharing	51	X	X	X	X
2	Interdisciplinary Results	48	X	X	X	X
3	Synthesis	47	X	X	X	X
4	Improved Productivity	45	X	X		
5	Collaboration (Science)	44	X	X	X	
6	New Analyses	42	X	X	X	
7	Communication and Networking	41	X	X	X	X
8	Collaboration (Institutional and International)	40			X	X
9	Natural Resource Management	39				X
10	Data Model Comparisons	37		X	X	
11	Education	36				X
12	Reduced Redundancy	36		X	X	
13	Temporal Baselines	35		X	X	
14	Serendipity	33	X		X	
15	Cost Savings	32		X		
16	Policy Guidance	32			X	X
17	Logistical Planning	32	X	X		
18	Local Involvement	30	X			X
19	Outreach	30			X	X
20	Guidance for PIs	28	X			

Recommendations for a Geographic Information Infrastructure to Support Arctic Research: Outcomes of the Arctic GIS Workshop, 22-24 January, 2001

Interoperable Standards

- Open Geospatial Consortium standards (WMS, WFS, WCS, Z39.50, etc...)
- Metadata Standards (FGDC/ISO 19115)
- ESRI Data Models (Atmospheric, Basemap, Marine, Geology, Hydro, Historic Preservation and Archaeology, National Cadastre, Raster, etc.)

Metadata is key for connecting users with data



Conceptual Architecture

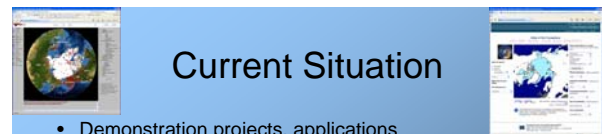


Fundamental Geographic Data Sets



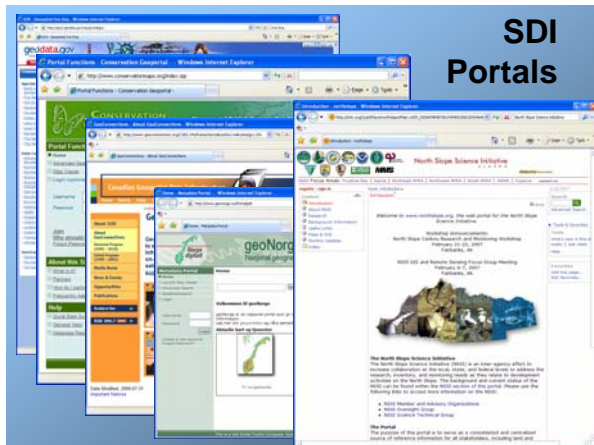
- bathymetry and topography
- geodetic control
- sea ice coverage
- ocean currents
- atmospheric currents
- permafrost

- social (census, traditional use patterns, etc.)
- place names
- populated places
- human infrastructure (roads, pipelines, sea routes, power distribution lines, landing strips, etc.)
- land use and land cover
- marine and terrestrial habitats
- satellite remote sensing data
- coastline
- cadastral (land ownership and rights, including mineral rights)
- geology (surface and subsurface)
- soils
- benthic types
- meteorological (station locations and data)
- hydrology and glacial
- contaminant distributions
- protected areas
- political and administrative boundaries
- physiographic boundaries and eco-regions
- study locations



Current Situation

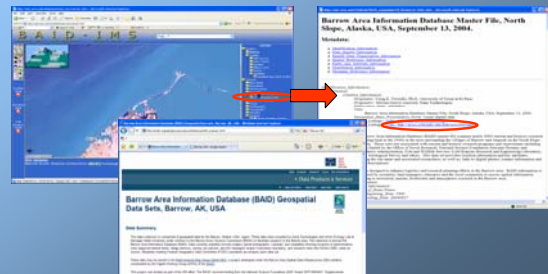
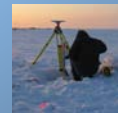
- Demonstration projects, applications
- Arctic focused OGC services (GINA's Alaska Mapped Imagery and metadata service, NSIDC Atlas of the Cryosphere)
- Acceptance of polar projections by EPSG
- IPY Data Policy
- Collaboration in developing framework data (ACD, IBCAO, Circumarctic Botanical Atlas, observation networks)
- Data mining tedious



SDI Portals

Barrow SDI – a common framework for scientists

- Technology (hardware, software, DGPS base station)
- Capacity building (metadata outreach; DGPS training)
- Standards for base mapping (Projection and Datum)
- Data Policies
- IMS Portal to increase access to data



Special Needs, Issues, Challenges

8 Arctic nations (United States, Canada, Russia, Iceland, Finland, Norway, Sweden and Denmark) with many cultures, languages, different license distribution policies and varying levels of technical capacity.

What's different about supporting scientific communities in the Arctic?

- Logistics
- IT Resources
- Lack of a common voice
- Focus on grant funding cycle, short term projects
- Lack of integrated COTS for data modeling, simulation, volumetric and time series analysis

Human Factors in Institutionalizing ASDI

- Publish or Perish against the grain for data sharing
- Scientists not explicitly educated in IT or informatics



Needs Assessment and Portal Prototype Development for ASDI

- (1) **Convene a Community Advisory Committee (CAC)** to provide expertise regarding issues of content, focus, and implementation of the community assessment as well as design and functionality of the prototype web mapping portal;
- (2) **Create an ASDI Website and Online Communication Tools** with information on project activities and results, outreach materials, and communications tools (e.g., bulletin boards);
- (3) **Develop an Initial Mapping Portal Prototype** to demonstrate the purpose and function of an arctic geospatial one-stop portal technology and to solicit community input on design and function;
- (4) **Undertake a Community Needs Assessment** via in-depth phone surveys, questionnaires, and online input on topics such as functionality, data needs, standards, and cooperative partnerships;
- (5) **Convene a Community Leaders Workshop** to discuss community assessment results and recommendations and to provide orientation and leadership training to the prototype web mapping portal; and
- (6) **Compile and Develop a Community Assessment Report** to guide the research community and funding agencies in the design and implementation of a robust ASDI.