Providing GIS Data Services in a Distributed Environment

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NCSU Libraries
Overview

• Background: GIS Services at NCSU
• GIS Service Models
• Data Collection Building
• Data Discovery Tools
• Marketing, Partnerships & Outreach
• New Delivery Models
• Problems of Unmediated Access
• Conclusion
I. Overview of Services GIS at NCSU Libraries
Background - GIS at NC State

- Large Technical University (27,000+ Students) - Engineering, Natural Resources, Ag Focus
- No Geography or City/Regional Planning Department
- Over 35 Academic Departments Using GIS
NCSU Libraries GIS Services

• Service orientation:
  – *Not A GIS Lab*
  – Focus on providing services (data & support) to users across the network in their own environments (where all their other stuff is)

• GIS data service rather than digital mapping service
Time & Location Independent Access to GIS Resources

- Classes/Training
- Online Data
- Ref/Tech Support
- Software Licenses
Libraries GIS Data Servers

Netware Server

Windows 2000 Server

Data Access

Mapped Drive

FTP

HTTP

Web Mapping

HTTP
II. GIS Data Service Models
General Service Design

- Service models
  - GIS data service
    - network access to data
    - wide range of data to choose from
    - data documentation
  - Digital mapping service
    - hands-on map-making assistance
    - emphasis on pre-selected & reprocessed data
    - canned maps and/or Web mapping
- Balance one-on-one service with infrastructure development (!)
- High-tech vs. High touch
General Service Design Issues

• Mapping only or all GIS uses?
  – GIS is not just about mapping -- it’s about analysis, extraction, charting, statistical processing, etc. -- maps are just one of possible outputs

• Depository management or all GIS data
  – Most GIS data is government data and most GIS data is not part of a depository program

• Physical vs. Virtual Collection
  – Many data resources are freely available on the Web, but not easily discoverable
  – … but often come and go quickly
III. Data Collection Building
NCSU: Data Acquisition

- $20,000/year data acquisition budget
- Partnerships for free access to government data (state/regional/local)
- Partnerships with academic units on acquisition/processing
- Extensively documenting Web-based data, capturing as needed
- University Extension Grant to acquire local government geodata
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</tbody>
</table>
Data Issues: Scale & Positional Accuracy
Data Issues: Image Resolution
Tracking Derivatives: 1993 Orthophotos

- Und. Systems State Plane (f) BMP
- NCDOT TIFF State Plane (m) Clipped
- NCDOT JPEG State Plane (m) Clipped
- NCDOT MrSID State Plane (m) County Mosaics
- USGS Unclipped BIP UTM
- USGS JPEG Unclipped UTM
- NCSU Libraries MrSID UTM Unclipped
- US Forest Service MrSID UTM County Mosaic

Colors:
- Orange: BIP
- Purple: MrSID
- Pink: TIFF
- Green: BMP
- Blue: JPEG
Tracking Data Derivatives

Example: Census 2000

National Level

State & Local Level
Value Added Derivatives: TIGER

Raw TIGER: County Tiles
Value Added Derivatives: TIGER

State Govt. Derivative: State Tiles
Local Government Data

Acquired from counties, cities, councils of government, metropolitan planning organizations
Infrastructure, cultural and environmental data
Rapidly changing, current data
Very detailed (large scale) and accurate
Long-term preservation needs
Difficult to acquire
100 counties = 100 acquisition methods
licensing/legal complications
Local Government Data

Elevation
Local Government Data Acquisition Plan

Acquisition Plan
- Red: Stage 1
- Light Pink: Stage 2
- White: Stage 3
Tips on Acquiring Data

- See what academic units already have
- Partner creatively with state/local agencies
- Expect a certain amount of redundancy (same data in different format, projection, tiling scheme)
- Make reference interviews bi-directional—what data have users already found?
- See what data is incorporated in thesis/dissertations
Tips on Acquiring Data (Cont.)

- Decide: are you managing Depository data or any data that is useful to users
- Buy commercial versions of free or depository data if that’s what users need
- Treat Web-based resources as if you’d paid for them (catalog, document, ‘own’)
- ‘Digital Rescue’ - download & archive time snapshots, at-risk data
- Things that are very expensive often turn out to be free later
IV. Data Discovery Tools
Data Collection Pages

ArcAtlas: Our Earth

Overview | Data Layers | Data Access | Projections | Using the ArcView Projects | Documentation

(morphological structure in Eurasia)
Thesaurus and Metadata-based Access

GIS Lookup: Thesaurus Term List

Select a term to find relevant data resources and link to broader, narrower and related terms. Links to networked data, metadata, and Web-based mapping utilities are provided. Use available metadata to evaluate and select data resources.


100k Quad Neatlines (See: Quad Neatlines)

24K Quad Neatlines (See: Quad Neatlines)

250k Quad Neatlines (See: Quad Neatlines)

3 Digit Zip Codes

5 Digit Zip Code Boundaries

5 Digit Zip Code Centroids

5 Digit Zip Codes

9 Digit Zip Code Centroids
**GIS Lookup ---- Wetlands**

SEE ALSO: Narrower Terms: [National Wetlands Inventory](#), [Potential Wetlands Restoration and Enhancement Sites](#), [Broader Terms: Surface Hydrography](#), [Related Terms: Wildlife Habitat, Lakes, Streams, Estuaries, Marine Sanctuaries](#)

**Click on Title to See Full Record**

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<tr>
<th>Title</th>
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<td>CGIA: Potential Wetlands Enhancements &amp; Restoration Sites</td>
<td>NCCGIA</td>
<td>Polygon</td>
<td>ARC/INFO</td>
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<td>DCW: Land Cover Layer (Polygon) - By Country</td>
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<td>1:1m</td>
<td>World</td>
</tr>
</tbody>
</table>
FEMA Q3 Flood Data

**ID:** 643  **Source:** Federal Emergency Mapping Agency

Libraries FEMA Q3 Flood Data Page:
http://www.lib.ncsu.edu/stacks/gis/fema.html

**Format:** ARCGIS  **Scale:** 1:24,000  **Type:** Polygon  **Date:** 1998

**Restrictions:** None  **Spatial Extent:** NC, GA, VA, SC

**Projection:** Geographic Coordinates  **Map Units:** decimal degrees  **Datum:** NAD27

**Themes:** Coastal Barrier Resources Act Areas, Flood Insurance Rate Maps, FEMA Flood Zones, Flood Zones  (Click on terms to see related data resources)

**File Name:** varies  **Tiled by:** County

**Metadata:** http://www.fema.gov/msc/specs.htm

**Online Documentation:** http://www.fema.gov/msc/q3users.htm

**Live Web Mapping:** http://www.esri.com/data/online/fema/index.html

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**NCSU Access**

**RPP Netware Location:** /fema/  **Unity Location:** n/a

**FTP Location (NCSU Only):** ftp:/rpp.lib.ncsu.edu/fema/

**Local Metadata:** ftp:/rpp.lib.ncsu.edu/fema/
GIS Data & Federated Searching

- Geospatial Data Collection
- OPAC
- Other Collections

Gateway

User
Data Discovery Challenges

- Linking data resources with services that act upon them
  - map servers
  - numeric data analysis/extraction systems
- Connecting related and derivative data resources
  - traversing forward through derivatives
- Handling local administrative metadata
  - refreshing externally-acquired metadata without losing local additions
- Unmediated access & information literacy
V. Marketing, Partnerships and Outreach
Partnering

- $2+2 = 22 \quad 2+2+2 = 222$
- Become active in campus GIS community
- Partner on data acquisition, conversion and delivery
- Partner with state and local agencies
- Save $$ and learn about all the hidden data resources
- Match resources with opportunities (*neither of which necessarily being in the library*)
Outreach

Cultivate Contacts in Campus Units
  Commit lots of time up front
  Marketing avenue
  Gather unit ‘intelligence’ (visit on site)
  Cultivate ‘go to’ person in unit, many liaisons

Build Campus Relationships
  Attend/present at faculty seminars
  Attend grad seminars, create ‘face time’ opportunities

State & Local Government
  Attend meetings, get on committees
  Favors up front, payoffs later
  Become ‘go to’ person on GIS happenings
Marketing

Listservs
announcement
discussion
Web presence
Campus contacts
cultivated contacts or liaisons
Library newsletters
Reference Librarians
provide with basic GIS overview
enable them to ID possible GIS reference questions
Library catalog
FGDC Metadata >> MARC

GIS Users
- GIS Index
- Metadata Record

Accidental Users
- OPAC
- MARC Record

Deliberate Access
Marketing
Crosswalk

Electronic Access: View NCSU Libraries' online guide to NC CGIA GIS Data Resources Instruction on data download
Live Web Mapping: View FGDC metadata (select title from alphabetical list)

Published: Morehead City, NC : Dept. of Environment, Health, and Natural Resources, Division of Marine Fisheries, 1998.

Subject(s): Anadromous fish $z North Carolina--Databases.
Fishes--Spawning--North Carolina--Databases.
anadromous fish
fresh water
upstream
tish spawning
Coastal
North Carolina

Other titles: Also known as: CGIA: Anadromous Fish Spawning Areas
Anadromous fish spawning areas

Other Authors/Titles: North Carolina. Division of Marine Fisheries.
VI. Workshops and Training
Workshops/Training Objectives

• Primary
  – Educate Users About GIS Concepts
  – Teach Hands-on GIS
  – Teach Users About Finding and Selecting Data

• Secondary
  – Get to Know Users
  – Show Users Where to Go Next
  – Promote/Market Organizational (Campus?) Resources
ESRI Virtual Campus

- Free to NCSU faculty, staff, students
- 30+ courses (e.g. ‘Spatial Analysis in Agriculture’ and ‘Spatial Hydrology’)  
- 18-24 hours per course
- Home version of ArcView for ‘Intro to ArcView’
- All needed data provided
- Certificate for course completion
- Funding: textbook & distance learning money
- http://www.lib.ncsu.edu/stacks/gis/virtcamp.html
Virtual Campus Results

- About 1,000 registrations
- Over 20,000 individual/instruction hours
- Over 400 unique users
- Users from 35 academic departments in 9 colleges
- Required for 12 courses in 5 colleges
- Less than 25 problem cases
- *Hugely popular*
- Service provided to date at no cost to NCSU Libraries
Virtual Campus Benefits

- Entry-level GIS training in campus units without strong GIS presence
- Partially remove entry barriers to GIS
- Advanced GIS training for students who have finished beginning and intermediate levels
- Facilitate inclusion of GIS component in departmental courses
- Time- and location-independent access to training in area of choice
- “Just-in-time learning”
- Low maintenance overhead, few problems
VII. New Delivery Models
Web-based Mapping

- Interact with GIS data via Web browser
- GIS access for those without:
  - Expensive GIS software
  - GIS-capable computer equipment
  - GIS expertise
  - High network bandwidth
  - Data storage space
History: Geospatial Information Services

- Map Collections
  - Paper Maps
- Data Collections
  - CD-ROMs, File server & FTP access
- Map Servers
  - Integrate collected data, Web-based mapping
- **Coming:** Map Portals
  - Front end to distributed, streaming data (OpenGIS)
Introduction

Welcome to the Chatham County, North Carolina Tax Parcel Information System. Through this system, you can view, create, and print maps, search and view tax parcel data, and print property cards. Our tax parcel data changes daily, and the data found on this site is updated monthly. So, due to the dynamic nature of this data, the information found on this site is not necessarily current.

To get started with your research, try clicking the "search" button above. This will present you with the search options currently available on our system. You can also locate parcels using the map on the right. Use the cursor tools to zoom in, zoom out, or pan until you have located the parcel you are interested in. Then, choose "identify" from the cursor tools and click on the parcel.

In addition to the parcel data, we have many other map layers available for viewing. To see what's available, click the "layers" button above. From there, you can select and view different types of data integrated into the map.
Federal Government Map Server
Federal

State

Local

OpenGIS Client
Web Mapping Link in Catalog Record


Electronic Access: View NCSU Libraries' online guide to NC CGIA GIS Data Resources Instruction on data download

Live Web Mapping: View FGDC metadata (select title from alphabetical list)

Published: Morehead City, NC : Dept. of Environment, Health, and Natural Resources, Division of Marine Fisheries, 1998.

Subject(s): Anadromous fish $z North Carolina--Databases, Fishes--Spawning--North Carolina--Databases, anadromous fish, fresh water, upstream, fish spawning, Coastal North Carolina

Other titles: Also known as: CGIA: Anadromous Fish Spawning Areas Anadromous fish spawning areas

Other Authors/Titles: North Carolina. Division of Marine Fisheries.
Map Servers vs. Map Portals

- **Library Map Server Problems**
  - Data producers now running their own map servers
  - Volatile data (e.g. local government), requirements for frequent update
  - Project partners can be more interested in rollout than in continued maintenance

- **Map Portal Problems**
  - Technology not yet mature
  - Current map servers are by and large ‘data islands’

- **Developments to Watch**
  - OpenGIS, WMS, WFS, ArcIMS image/feature servers
VIII. Unmediated Access: Problems and Challenges
Unmediated Access Issues

- Users increasingly accessing resources and tools without librarian intervention, from off site, at all hours of night and day
- How do we educate users about information literacy issues if we do not communicate directly with them?
- The importance of developing relationships
- How do we provide 24x7 specialist expertise in a 24x7 reference environment?
Data Selection Wizards

Digital Topographic Map Finder

Select Scale

- 1:24,000 Scale
- 1:100,000 Scale
- 1:250,000 Scale

About Selecting Scale:

The scales indicated refer to the ratio of map units to the ratio of real world units. A smaller denominator (e.g., 24,000) indicates a larger scale. Larger scale data will tend to be more detailed and more positionally accurate. File sizes will also tend to be much larger—or more files will be required to cover an equivalent area.

Click on image to see map index
Data Selection Wizards

Help users find online data, map servers in a time and location independent manner
Walk users through a reference interview
Educate users about data questions
Present users with suitable data resources
Indicate why other resources are not recommended
Provide 24 x 7 access to specialized reference expertise
IX. Conclusion
Planning Issues: Ways to Let Time Work Against You

- Spend a lot of time mass converting data that is subject to update
- Commit heavily to technologies that are soon to be superceded
- Assume data are static -- neglect time series
- Spend a lot of time learning, in detail, things that you might use at some undefined future time
Planning Issues: Ways to Let Time Work For You

- Put off purchase of expensive data with restrictive licensing
- If significant barriers, delay application deployment until technology improves -- do something else instead
- Plant seeds (e.g. outreach) and wait for results
- Master the art of *just-in-time learning*
Contact Information

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