Developing on-line mapping applications:
Lessons learned the painful way

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Gap Analysis

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The Protected Areas Database of the United States
(PAD-US).

<table>
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<tr>
<th>Name</th>
<th>Owner</th>
<th>Ownership Type</th>
<th>GAP Status</th>
<th>IUCN Category</th>
<th>State</th>
<th>Acres</th>
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<td>Federal Land</td>
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<td>Private Conservation Easement/Conservation Deed Restriction</td>
<td>Private Land</td>
<td>4 - No known mandate for protection</td>
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<td>State Land</td>
<td>2 - Permanent Protection — ecological disturbance events suppressed</td>
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<tr>
<td>Autauga County Community Hunting Area</td>
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Development lifecycle

Plan

Analyze

Design

Implement

Test

Maintain
Usability testing

Before

After

University of Idaho
What is usability testing

- an essential element of quality assurance
- a true test of how people actually use a website
- easy when you know how
- extremely cheap when you do it yourself.
Why test?

- Determines if average users can effectively use the site
- Provides evidence-based data for improvements
- Provides "Real Users" input
- Ensures user satisfaction
- Serves as a pre-release promotional activity
What are we measuring?

- Ease of learning
- Efficiency of use
- Memorability
- Error frequency and severity
- Subjective satisfaction
How to test

- Develop a test plan
- Choose a testing environment
- Find and select participants
- Prepare test materials
- Conduct the sessions
- Debrief with participants and observers
- Analyze data and observations
- Create findings and recommendations
What are you testing for

In a general test you want to know:

• how do users interact with your web site?
• what is difficult for people to do?
• where do they get lost?
• what makes sense to them?
• what do they like and what do they hate?
Finding participants

• Invitations to take part in the test were sent to NBII partners from the stakeholder groups
• Social media was leveraged for recruiting participants
• Finding the right balance
How many to test?

Small sample is sufficient for revealing most of usability problems.
Criteria for screening participants

- Representative of one of the identified target user groups
- Age
- Computer skills
- Familiarity with web-based GIS applications
- Familiarity with the subject area
PAD_US test participants

1. USGS program coordinator/ user group “application developers”
2. USGS program coordinator/ user group “scientists”
3. USGS web content manager and digital librarian/ user group “information support staff for scientists and planners”
4. AFWA Science and Research Liaison/ “planner”
5. Congressional Research Service specialist in natural resources/”information support for planners”
6. NBII project volunteer/”citizen scientists”
7. NBII project staff, recent graduate with BS in ecology/ “students/young scientists”
PAD-US testing scenarios

• **find out** the area (acres) of a local park.
• **determine** where any existing protected areas are in your congressional district.
• **locate** parks in your county.
• **discover** who manages the land around a small preserve.
• **learn** about the land cover of Big Bend National Park, and print out hiking trails.
• **print** out a map of protected areas in your state.
Land cover viewer test scenarios

- **print** a detailed land cover map of the county you currently inhabit for a report you are writing.
- **download** data for your own GIS project for MRLC map zone 36
- **find** out what percent of Passaic County New Jersey, is currently classified as developed.
Analyzing results

- Mostly qualitative results with observations
  - Identify problems
  - Prioritize problems
  - Include recommendations
- Only descriptive statistics
- Were focusing on finding UI design bugs
- Generalized and sorted out problems by categories
- Assigned a severity index
What did we learn?

PAD-US Viewer

Generally users found it confusing because of:

• Too many layers
• Not enough status feedback for users
• Not enough information about functionality
• Not enough prompts/tips
• Too many controls spread around the screen
What did we change?

- Got rid of the buttons,
- Grouped all of the controls in the same place
- Did away with most of the layers
- Improved controls
- Changed wording on controls
- Changed initial extent
- Improved/clarified results table headings
- Changed icons
What we ended up with

http://gapanalysis.nbii.gov/padus
What did we learn

Land cover viewer

• Confusing wording
• Confusing base maps
• Tools not intuitive
• More “help” and tool-tips needed
Conclusions

1. On display and functionality
   • Less is more.
   • Status is everything.
   • No surprises.

2. On the process
On display and functionality

Before

After
Real Development Lifecycle

Plan

Analyze

Design

Implement

Test

Maintain
Conclusions

1. On display and functionality
   • Less is more.
   • Status is everything.
   • No surprises.

2. On the process
   • To lessen the “pain” incorporate the user-centric approach at every stage of the product cycle.
Resources used

For Usability testing
• Morae software at the HHS usability lab
• WebEx, USGS “Audio Bridge” teleconferencing system
• Reference websites: Usabiity.gov, WebContent.gov

For PAD-US
• ArcSDE 9.3.1, Eclipse Ganymede, Direct Web Remoting, Java 5, Open Layers 2.7, ArcGIS Server 9.3 and Tomcat 6.0, Google Base Maps

For Landcover Viewer
• Developed by AppGeo
• ArcGIS Server 9.3.1 and the ESRI Javascript API
• ERDAS Imagine