Open Web Mapping
for
Local Units of Government

Developing a Sustainable Framework
for
Small Townships and Villages

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Project Proposal for Peer Review
Advisor – Dr. Ian Turton

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Project Goals

- Assist small, resource-strapped Local Units of Government (LUGs) establish a basic in-house GIS capability to create local spatial information products;
- Determine how such LUGs can *easily* and *sustainably* create and maintain web mapping applications created using such products (maps, databases, etc.)

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Overview

- Overview of Michigan LUGs
- What's in a LUG Web Map?
- Open Source Strategy
- Sustainability
- Deliverables, Tasks, and Timeline

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> LUG Overview

Local Units of Government

- 83 counties in Michigan, containing:
  - 1,242 townships
  - 274 cities
  - 259 villages

- Township, cities, & villages: LUGs
- Population: < 100 to 910,000 (Detroit)

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LUGs can provide …

- Planning, zoning, and (property) tax assessment, property tax collection
- Police and emergency mgmt services
- Utilities and other services
- Elections and political representation at LUG level

Custer Township Hall
Custer Twp, Antrim County, MI
Est. 2009 Pop: 1,052

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> LUG Overview

Local Units of Government

- Often assume onus of local land-use planning
- Depend on citizen groups to advise elected officials in planning, park and asset management, etc.
- Often do not have access to planning resources such as GIS and web-based mapping

A form of "Public Participation GIS" at local township halls as part of regional transportation planning exercise, Antrim and Grand Traverse Counties, 2007-2008

Photo Source: The Grand Vision

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> LUG Overview

Helping with GIS and Web-based Information Dissemination

- Basis for informed decision making by LUGs and their constituent citizenry
- Help establish in-house desktop GIS capabilities to create spatial data products (maps, DBs)
- Disseminate such info to general public via LUG website:
  - Static maps and info documents (PDF files)
  - Interactive web mapping applications

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Selecting LUGs for My Project

- LUGs with populations ≥ 1,000 and < 5,000 usually have permanent office and staff, but not full-time professional planners and technical staff
- LUGs with populations ≥ 5,000 tend to have professional planners and technical specialists among full-time staff, with probability being much higher for larger populations
- Target LUGs for this project will have populations around 5,000: permanent office and staff, but probably no full-time technical specialists

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> LUG Overview

Capstone Project LUGs

(Start with two, later add some more [Whitewater, Blair and Clearwater Twps?])

Acme Township

Grand Traverse County, MI

Village of Elk Rapids

Antrim County, MI

Est. 2009 Populations:

Acme Township: 4,579

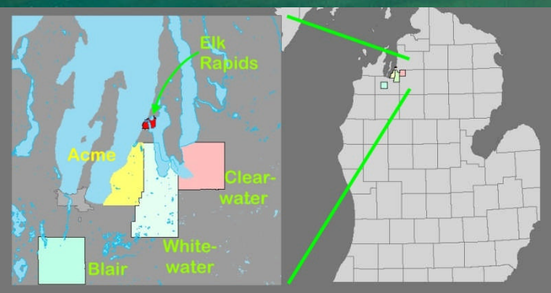
Village of Elk Rapids: 1,650

Whitewater Township: 2,899

Blair Township: 6,952

Clearwater Township: 2,382

--- U.S. Census Bureau, June 2010



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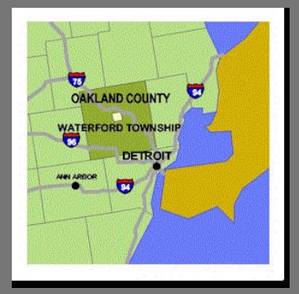
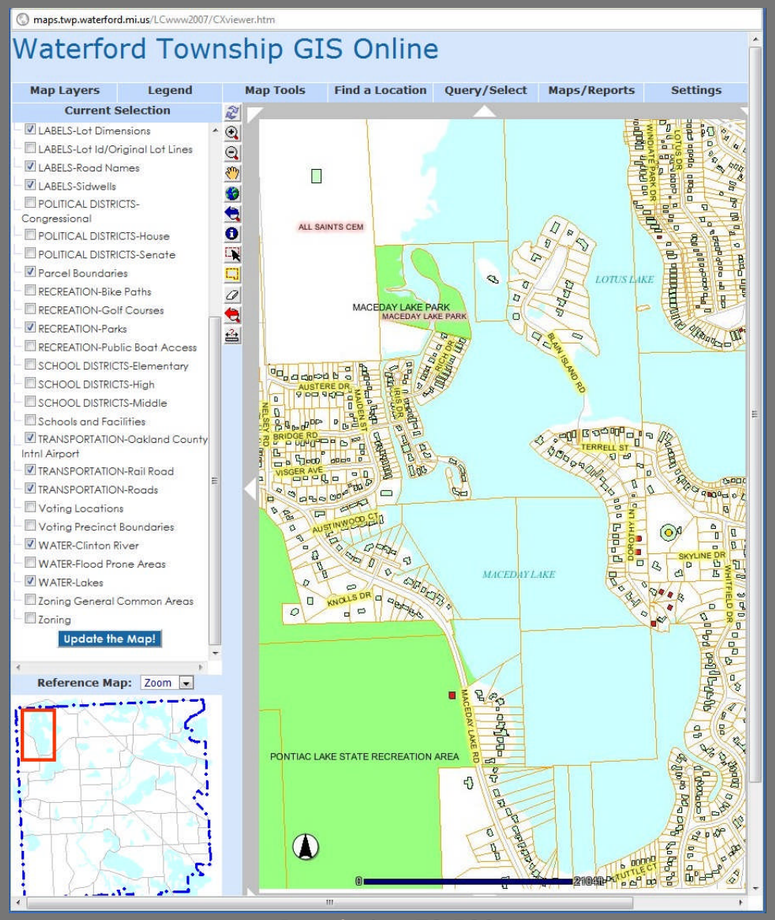
> LUG Web Maps

Waterford Township



- ✓ Sophisticated system maintained by professional GIS Department
- ✓ Rec facilities, political boundaries (voting and school), parcel data, aerial DOQs, educational facilities, etc.



Population 73,500

34 lakes and numerous hi-valued properties

(http://maps.twp.waterford.mi.us)

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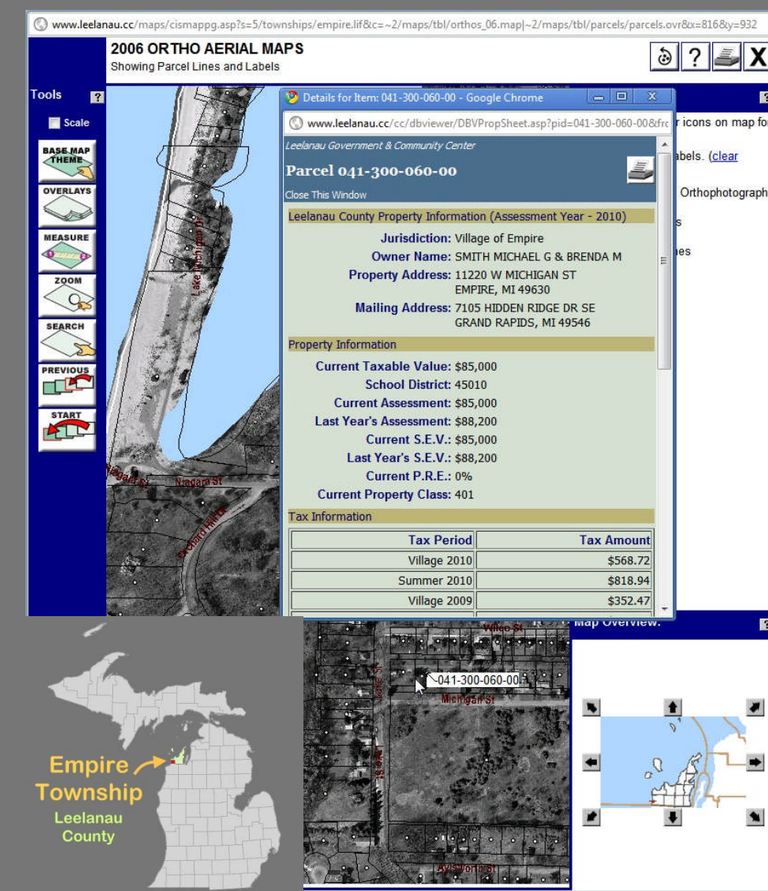
> LUG Web Maps

What interactive layers are in the LUG Web Maps?

- ✓ **Parcel data** (tax info, assessment and sales info, ownership)
- ✓ Base layers of aerial photo DOQs, USGS topos, historical maps
- ✓ USDA Soil Survey use suitability layers;
- ✓ FEMA flood insurance layers;
- ✓ EMS, 9-1-1 street addresses, and utility lines, and zoning;
- ✓ Ag land preservation and nat'l resource conservation ;
- ✓ Local POIs
- ✓ Just about any layer!!



Empire Township, Leelanau County, Michigan
Population 1,463 --- Sleeping Bear Dunes Nat'l Lakeshore
http://www.leelanau.cc/maps

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Web Map Implementation

Two-step Strategy

- Create a GIS map/web app prototype at LUG using open source software (QGIS) --- also create static PDF for download
- Create web map from QGIS project using :
  - Google or Bing Map Mashups, *and/or*
  - Thin web client (OpenLayers) using GIS layers served from a dedicated map server

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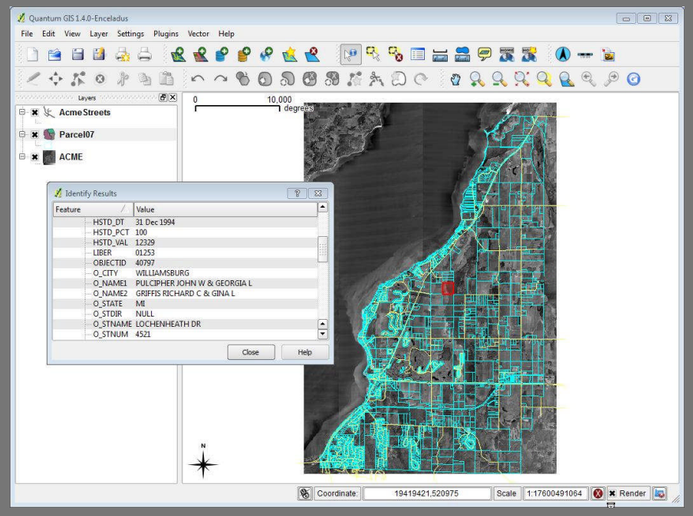
> Open Source Web Map Strategy

Outfitting LUGs with QGIS software

(open source)

- Huge variation degree of in PC- and GIS- savviness in LUGs, may need much (or very little) tutoring
- QGIS is readily available from www.qgis.org, reasonable amount of support in forums, frequent updates



QGIS screen showing Acme Twp parcel data from attribute table (shape file obtained from Grand Traverse County)

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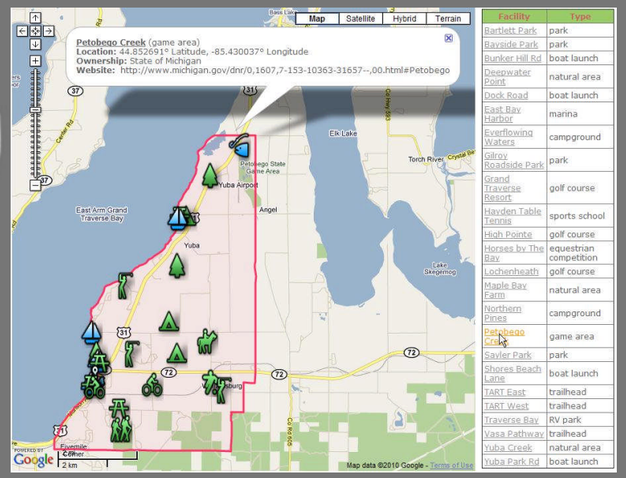
> Open Source Web Map Strategy

Two Kinds of Web Maps

QGIS “projects” can be transformed into:

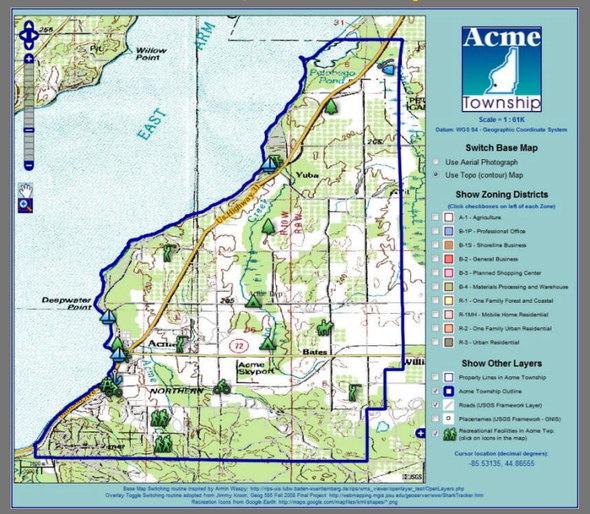
Google/Bing-type Map Mashups



Facility	Type
Bartlett Park	park
Bayside Park	park
Bunker Hill Rd	boat launch
Deepwater Point	natural area
Dock Road	boat launch
East Bay Harbor	marina
Everflowing Waters	campground
Gilroy Roadside Park	park
Grand Traverse Resort	golf course
Hayden Table Tennis	sports school
High Pointe	golf course
Horses by The Bay	equestrian competition
Lochenheath	golf course
Maple Bay Farm	natural area
Northern Pines	campground
Petobego Creek	game area
Sayler Park	park
Shores Beach Lane	boat launch
TART East	trailhead
TART West	trailhead
Traverse Bay	RV park
Vasa Pathway	trailhead
Yuba Creek	natural area
Yuba Park Rd	boat launch

Geog 497J

OpenLayers thin client with GeoServer/QGIS-Mapserver



Geog 585

Note the different Acme Twp shapes in the two maps! Google Maps uses Mercator Projection (WGS 84 datum) while the thin client in this case (using layers served by GeoServer and by a USGS map server) uses GCS (WGS 84).

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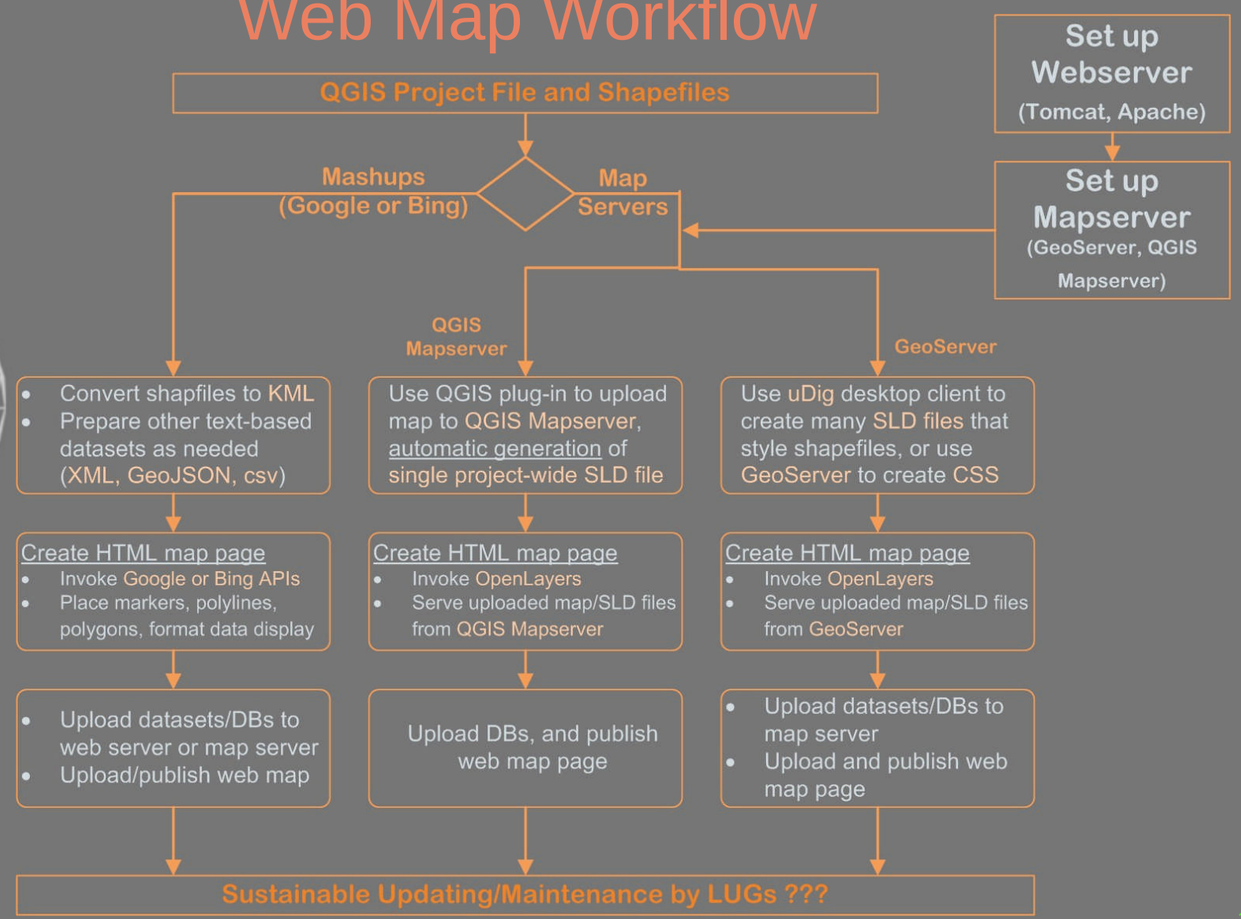
> Open Source Web Map Strategy

Web Map Workflow



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Sustainable Web Map Ideas

QGIS projects – Data Files and Datastores- HTMLs

- Strive for simplicity, not computational efficiency or elegance --- e.g., if updating a text file is easier than updating a powerful geodatabase, go for text file
- Use tools familiar to LUG staff --- word processors and spreadsheets rather than desktop databases:
  - VBA macros for Excel and Word
  - Excel concatenation functions in spreadsheet cells
  - available web-based tools (“Mr. Data Converter,” etc.)
- Ultimately depends on computer skill level of LUG staff.
- Bing API rather than Google: Michigan’s contract with MS for Bing Enterprise

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Project Deliverables

- Web map applications for participating LUGs
- Documentation of various methods used to effectively and simply update web map components
- A “lessons learnt” document/paper at end of project for use as guidance document by LUGs --- continually update document
- Present paper at FOSS4G conference

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Key Tasks and Timetable

Task	Timetable
Creation of QGIS Projects by LUG (at least two from each LUG – one mashup, one thin client)	Ongoing, through January/February 2011
Set up, operate web servers, map servers, and datastores on PC and on Linux-based Map Server machine	Setup in October 2010, operate through project life (and possibly beyond)
Conversion of LUG QGIS Projects to Web Maps (mashup and thin client)	Oct/Nov 2010 – March 2011 (possibly beyond)
Design and operate trial "sustainable" web map update/maintenance procedures	Nov 2010 – April 2011
Compile "Lessons Learnt" guidelines for web map creation from QGIS and for map update/maintenance	April 2011
Submit conference abstract	April 2011
Complete/submit conference paper	July 2011
Present at FOSS4G Conference, Denver CO	Sept 2011

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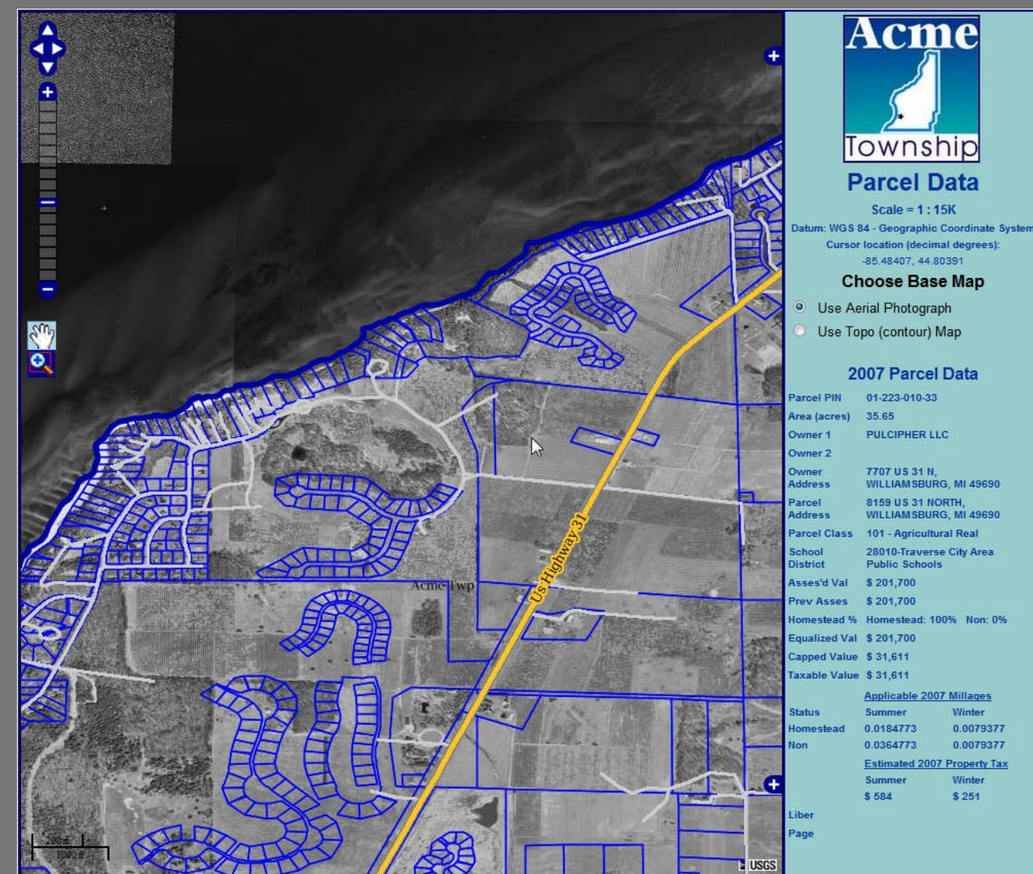
> Whew!

We're done! Questions?



Prototype Township Parcel Data Web Map

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