MiCAMP – GIS Cost / Benefit Analysis

Valdis Kalnins – Allegan County LIS Director

September 23rd, 2010

Allegan County LIS Department
Cost / Benefit Analysis

Why?
- Justify initial investment for GIS startup
- Request additional general or specific funding
- Maintain funding allocation in tough times
- Strategic development / project management

Why Not?
- Difficult to do well
- Takes time and resources
- Needs to be planned ahead of time
The City of Durham / Durham County, NC entered into a joint mapping project that includes digital orthophotos, planimetric and topographic mapping and cadastral maps. The City is using the digital plan/topo to manage its new impervious surface permitting program. The County is using the parcel and zoning layers to better manage growth.
Cost / Benefit Analysis

Net Present Value =

\[
(B_0 - C_0) + \frac{(B_1 - C_1)}{(1 + r)} + \frac{(B_2 - C_2)}{(1 + r)^2} + \frac{(B_3 - C_3)}{(1 + r)^3}
\]
The LIS Mission

Enable better planning, quality decision-making, improved resource management and overall efficiency within Allegan County by managing the coordinated development and pragmatic application of the county’s geographic information system (GIS).
The LIS Vision

GIS
Virtual Model of the County

Value
Better Decision Making
More Effective Planning
Improved Communication

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Increased Productivity
Cost Avoidance
Map Products
External Revenue
OUR CEO ASKED EACH MANAGER TO DESCRIBE HIS GROUP’S FUNCTION ON ONE SLIDE.

I DON’T SEE HOW I CAN FIT ALL OF OUR VARIOUS FUNCTIONS ON ONE POWERPOINT SLIDE.

YOU COULD SAY, “WE SPEND ALL OF OUR TIME TRYING TO CONVINCE OTHERS THAT WE HAVE VALUE.”
What are the Department’s Core Services?

1. Made a long list of activities.
2. Tracked hours performing tasks within each activity.
3. Grouped similar activities into like categories of services.
4. Gave each group of activities a core service name.
5. Rinsed and repeated until pared down to 10 or less core services that made sense.

<table>
<thead>
<tr>
<th>Staff</th>
<th>EXAMPLE 1</th>
<th>EXAMPLE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Task</td>
<td>Add new addresses</td>
<td>Create map for paving bid</td>
</tr>
<tr>
<td>Activity</td>
<td>Address Data</td>
<td>Map Request</td>
</tr>
<tr>
<td>Service</td>
<td>GIS Maintenance</td>
<td>Internal Services</td>
</tr>
<tr>
<td>Client</td>
<td>GIS</td>
<td>Facilities</td>
</tr>
</tbody>
</table>
LIS Service Areas

Distribution of Total Service Hours Among All Service Areas

Allegan County LIS Department

INTERNAL SERVICES
- Internal Solutions 19.4%
- Local Government Services 7.5%
- Other External Services 3.3%
- Private Sector Services 2.1%

EXTERNAL SERVICES
- GIS Asset Management & Development 29.1%
- Internal Services 17.9%
- Floodplain Mapping 6.8%
- County Products 7.8%
- Information Requests 5.7%
- General Public Services 0.6%
- External Services 3.3%
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- Internal Services 17.9%
- Floodplain Mapping 6.8%
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- Count
GIS Maintenance and Development 29.1%

Distribution of Total Service Hours Among All Service Areas

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INTERNAL SERVICES
EXTERNAL SERVICES

Net Benefit
Net Cost
GIS Maintenance and Development

29.1%

- 2009 Imagery
- 29 Local Partnerships
- State Partnership
## Cost Reduction – Orthoimagery Partnership

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imagery Cost for 6” pixel color for 840 square miles</td>
<td>$75,000</td>
</tr>
<tr>
<td>29 Township and City Contributions (ranging from $700 to $2,250)</td>
<td>- $50,000</td>
</tr>
<tr>
<td>State Imagery Program Contribution</td>
<td>- $11,150</td>
</tr>
<tr>
<td>Estimated Revenue from Data Sales $1,500 to $2,500 annually (5 year cycle)</td>
<td>- $10,000</td>
</tr>
<tr>
<td>County Cost Balance Payment</td>
<td>$3,850</td>
</tr>
<tr>
<td>County Cost Acquisition Management Labor (275 hours)</td>
<td>$9,000</td>
</tr>
<tr>
<td><strong>Total County Cost ($15.30 / sq mi)</strong></td>
<td><strong>$12,850</strong></td>
</tr>
</tbody>
</table>

**Compare to BING Imagery:**

6-inch for $89,880 or 1-foot for $23,520
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- Private Sector Services 2.1%
- Internal Solutions 19.4%

Net Benefit
Net Cost
Increased Productivity – Drain Assessment

2009 Assessments
- 37 Districts
- 20% of the County
- 8,860 Parcels
### Increased Productivity – Drain Notification

<table>
<thead>
<tr>
<th>GIS METHOD</th>
<th>VS.</th>
<th>TRADITIONAL METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select a segment of drain, buffer by 150 feet and select all properties that intersect the buffer.</td>
<td>vs.</td>
<td>Look through plat maps that have drains drawn in and make a paper list of parcels to notify.</td>
</tr>
<tr>
<td>Save into a template access database.</td>
<td>vs.</td>
<td>Key in list of parcel IDs to software system.</td>
</tr>
<tr>
<td>Edit and print form letters from Access report.</td>
<td>vs.</td>
<td>Copy Print labels.</td>
</tr>
<tr>
<td>Use stuffing machine to stuff letters into window envelopes.</td>
<td>vs.</td>
<td>Manually affix labels.</td>
</tr>
<tr>
<td>Group by address to save postage.</td>
<td>vs.</td>
<td>Affix multiple labels to letter where multiples noticed.</td>
</tr>
</tbody>
</table>
**Increased Productivity – Optimized Routing**

<table>
<thead>
<tr>
<th>Routing Times</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>From Field Test</td>
<td>83.16 min</td>
</tr>
<tr>
<td>Using County GIS Data</td>
<td>91.81 min</td>
</tr>
<tr>
<td>Using Commercial GIS Data</td>
<td>113.55 min</td>
</tr>
</tbody>
</table>

- If **21.74 minutes of every 113.55** are not needed, this equals **11** lost minutes of travel time per hour.

- Based on 7 operational hours per bus per day, this means that an additional **80 minutes per day per bus** can be scheduled.

- Given **24 buses and 260 operational days**, this **totals 8363 hours per year** in gained transportation services, reduced operational costs or a bit of both.

- **Allegan County LIS Department**
Increased Productivity – Tax Certification

- Created a parcel mapping tool that is used by Treasury to map legal descriptions in order to certify that no taxes are due on the parcels id’s associated with land transfers.

- Failed to document/benchmark average time it took to manually do this using hardcopy map books.

- Save mapped parcel outlines and auto attribute date, closure and time to draw.

- Average time to map legal description is around 50 seconds.
Increased Productivity – Tax Certification

- Treasury spends 25 hours per year mapping parcels.
- Cost avoidance - No more annual printing and assembly of tax books

<table>
<thead>
<tr>
<th>YEAR</th>
<th>PARCELS</th>
<th>DAYS</th>
<th>PARCELS / DAY</th>
<th>HOURS PER YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>1987</td>
<td>196</td>
<td>10.1</td>
<td>33.1</td>
</tr>
<tr>
<td>2008</td>
<td>1239</td>
<td>219</td>
<td>5.7</td>
<td>20.7</td>
</tr>
<tr>
<td>2009</td>
<td>1305</td>
<td>214</td>
<td>6.1</td>
<td>21.8</td>
</tr>
<tr>
<td>2010 YTD</td>
<td>881</td>
<td>139</td>
<td>6.3</td>
<td>+/- 23</td>
</tr>
</tbody>
</table>
Increased Productivity – Tax Certification
Increased Productivity – Forfeiture Notification

- Average of 35 sites visited per day.
- What was the previous average?
- Added discussion ate away large portion of first year benefit.
- Likely cut about 2 weeks of the process annually
INTERNAL SERVICES

- Internal Solutions 19.4%
- Local Government Services 7.5%
- Other External Services 3.3%
- Private Sector Services 2.1%
- Floodplain Mapping 6.8%
- General Public Services 0.6%

EXTERNAL SERVICES

- Internal Services 17.9%
- County Products 7.8%
- Information Requests 5.7%

Distribution of Total Service Hours Among All Service Areas

Net Benefit
Net Cost

Allegan County LIS Department

17.9%
Allegan County LIS Department

Internal Services

17.9%
Allegan County LIS Department

Internal Services 17.9%

D.K.W.
MEETINGS

Board of Commissioners
Facilities Planning
Emergency Planning
Economic Development
Brownfield Authority
Planning Commission

Allegan County LIS Department
Service Hours Among County Depts. 37.3%

Combined Internal Services
Distribution of Service Hours among County Departments

- Drain Commission
- Central Dispatch
- Administration
- Senior / Veterans
- Parks and Tourism
- Sheriff
- Emergency Management
- Planning Commission
- Treasury
- Health/Environmental Health
- Transportation
- Clerk
- All Others*

*Includes Facilities, Equalization, Prosecutor, Courts, Information Services, and the Road Commission.
Distribution of Total Service Hours Among All Service Areas

INTERNAL SERVICES
- GIS Asset Management & Development: 29.1%
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- General Public Services: 0.6%

EXTERNAL SERVICES
- Floodplain Mapping: 6.8%
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Net Benefit
Net Cost
Floodplain Mapping

Allegan County LIS Department
Allegan County LIS Department

Distribution of Total Service Hours Among All Service Areas

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  - General Public Services: 0.6%

- **EXTERNAL SERVICES**
  - Floodplain Mapping: 6.8%
  - County Products: 7.8%
  - Information Requests: 5.7%
  - Other External Services: 3.3%
  - Private Sector Services: 2.1%

Net Benefit vs. Net Cost

County Products: 7.8%
County Products

Allegan County Official Road Map 2009-2010

Issued by Allegan County and the Allegan County Road Commission Prepared by the Allegan County Land Information Services Department.

Parcel Atlas and Gazetteer

Allegan County LIS Department
Fee Structure:

Cost Recovery vs. Profit Philosophy

0 - 30% for broad general benefit
30 – 70% for narrower benefit
70 – 100% for individualistic benefit

- Road Map
- Tax Maps
- Plat Book
  - Formula was based on sales of 1,000 books
  - Loss of intern labor for printing, binding & distribution
Information Requests

Distribution of Total Service Hours Among All Service Areas

- **Internal Solutions**: 19.4%
- **Internal Services**: 17.9%
- **Local Government Services**: 7.5%
- **Other External Services**: 3.3%
- **Private Sector Services**: 2.1%
- **Floodplain Mapping**: 6.8%
- **County Products**: 7.8%
- **General Public Services**: 0.6%
- **Information Requests**: 5.7%

Net Benefit

Net Cost

Allegan County LIS Department
Information Requests

Distribution of Service Hours Among Requestors

- Local Government: 16%
- Private Sector: 26%
- General Public: 32%
- Other External*: 16%
- County Department: 10%
- Other External*: Federal, state, other counties, schools, agencies, non-profits, and emergency services.

5.7%
Allegan County LIS Department

Local Services

7.5%

Distribution of Total Service Hours Among All Service Areas

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Net Benefit

Net Cost
Local Services

7.5%

Zoning Analysis

Grant Application

Impact Assessment
Local Services

Delivery of Local Services
Distribution of Service Hours among Local Units of Government

Allegan City
Trowbridge Twp
Hopkins Twp
Douglas City
Laketown Twp
Allegan Twp
Plainwell City
Wayland Twp
Monterey Twp
Leighton Twp
Salem Twp
Heath Twp
Dorr Twp
Fillmore Twp
Watson Twp
Casco Twp
Saugatuck City
Martin Twp
Overisel Twp
Fennville City
Saugatuck Twp
Manlius Twp
All Others

Slight Graph

7.5%
External Services

3.3%

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Net Benefit

Net Cost
External Services

3.3%

Allegan County LIS Department
Allegan County LIS Department

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Net Benefit
Net Cost

INTERNAL SERVICES
EXTERNAL SERVICES
Private Sector Services 2.1%

- 57 Invoiced Requests
- 85 maps printed
- 435 square miles of GIS data
- 1 county wide parcel purchase
Distribution of Total Service Hours Among All Service Areas

- **Internal Services**
  - Internal Solutions: 19.4%
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- **External Services**
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Net Benefit vs. Net Cost
General Public Services

- 22 Invoiced Requests
- 92 Maps Printed
GIS Cost / Benefit

COSTS
- Personnel
- Operations (hardware, software, supplies)
- Capital / special projects / contract work

BENEFITS
- Sales revenue / fees (internal / external)
- Contractual services
- Partnership funds (imagery, parcel mapping)
- Grants (GIS or as part of something else)
- Increased productivity (FTE cost realized and unrealized)
- Cost avoidance
- Geospatial assets
GIS Cost / Benefit Graph

Cumulative GIS Cost/Benefit Graph

- CUMULATIVE BALANCE
- Revenues + FTE Savings
- Expenses

Allegan County LIS Department
Final Thoughts

“The key to long term GIS funding of a GIS is to create outstanding data about the processes prior to implementation, so the savings can be accurately measured.”

Meehan, GIS World 2005

Enterprise GIS – If you build it, it will fund
Areas to focus on to enhance your GIS benefits:

• Information retrieval – integration potential

• Results from improved asset management – need trend

• Cost of maintenance (sharing…)

• Align projects to community goals if they are articulated by your elected officials / administrator