Water and Economic Development in Indiana

Michiana Irrigation Association Meeting

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Questions

• Where do we have water?
• How are we using water?
• Is current and future use sustainable?
• Why is this a concern for Indiana?
• What are other states doing?
• Does this affect the interests of the Michiana Irrigators Association?
WHERE DO WE HAVE WATER?
Available Surface Water

7Q2 - Stream Flows - major streams

Reservoir Storage (dots)
Maximum Yield from Unconsolidated Aquifers

For individual wells
Groundwater availability in unconsolidated aquifers
Estimated Groundwater Storage
Equivalent Depth of Groundwater Storage by County
Where are we using water and for what purpose?

HOW ARE WE USING WATER?
Surface Water Users

Agriculture

Industrial

Public Supply

Mining and Power
Irrigation Water Use by County

Irrigation (MGD)

- 0 - 1
- 2 - 3
- 4 - 5
- 6 - 8
- 9 - 10
- 11 - 15
- 16 - 20
- 21 - 30

Data Source: Indiana Department of Natural Resources

2012 Indiana Irrigation Water Use By County

Projection: UTM Zone 16
Coordinate System: NAD 1983

Miles

NORTH 0 5 10 20 30 40
How much will we need where?

FORECASTING FUTURE USE
Hamilton County Example

Hamilton County

- Energy/Mining
- Industry
- Irrigation
- Misc.
- Public Supply
- Rural
- Total

MG / Month

1989 1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011

MG / Month

1989 1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011
Hamilton

### Annual Withdrawal Data

<table>
<thead>
<tr>
<th>County</th>
<th>Energy</th>
<th>Industry</th>
<th>2012</th>
<th>2020</th>
<th>2030</th>
<th>2040</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamilton</td>
<td>1,000</td>
<td>11,000</td>
<td>28,000</td>
<td>33,000</td>
<td>38,000</td>
<td>43,000</td>
<td>48,000</td>
</tr>
</tbody>
</table>

*values are in Million Gallons per Year

### Annual Total w/ Forecast

### Annual Total (without Energy or Industrial Uses)

$r^2 = 0.2$

# years = 24

$r^2 = 0.93$

# years = 24
2050 Water Demand
MG/yr

2050 Use -2012 Use

- No Change
- < 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- > 10,000
What drives future demand?
Are we using more than is available?

IS WATER USE SUSTAINABLE?
WATER AVAILABILITY

Precipitation → Evapotranspiration

Reservoir storage

Precharge

Shallow local recharge → Q_runoff

Deep regional recharge

Aquifer storage

AQUIFER

Q_shallow → Q_baseflow → Streamflow
WATER AVAILABILITY

Precipitation

Evapotranspiration

Q_runoff

Q_shallow

Q_baseflow

Reservoir storage

Shallow local recharge

Deep regional recharge

Aquifer storage

AQUIFER

Pumping withdrawals
GW Recharge Map

Legend

Recharge (MGD)  
>200
100 - 200
50 - 100
25 - 50
<25

No Withdrawals
County
Is this a problem?

WHY SHOULD WE CARE?
WHAT ARE OTHER STATES DOING?
<table>
<thead>
<tr>
<th>State</th>
<th>2013 Population</th>
<th>2012 GDP</th>
<th>Funding Source and Amount</th>
<th>Responsibility</th>
<th>GDP growth</th>
</tr>
</thead>
</table>
| Texas        | 26,060,000      | $1.397 T | • $539 M  
• Conservation fees  
• Utility water sales tax  
• Water rights fees  
• New development impact fee | TWDB                    | 4.8%       |
| Minnesota    | 5,380,000       | $295 B   | • $60 M  
• 0.125% sales tax  
• Clean Water Fund | University             | 3.5%       |
| Florida      | 19,310,000      | $777 B   | • $1 B  
• ad valorem taxes  
• state appropriations  
• (~3,000 employees) | Water Management Districts | 2.4%       |
| Virginia     | 1,850,000       | $69 B    | • $200 K  
• no state funding anticipated  
• (~5 people federally funded) | WV DEP                  | 3.3%       |
| West Virginia|                |          | • $1 M  
• water shortage response plans (county scale) | KY DNR                  | 3.4%       |
| Kentucky     | 4,395,000       | $173 B   | • $10 M  
• state funding of regions  
• (~15 employees) | GA EPD                  | 2.1%       |
| Virginia     | 8,185,000       | $446 B   | • $2 M  
• state appropriations  
• (~15 employees) | VA DEQ                  |            |
| Georgia      | 9,992,000       | $374 B   | • $10 M  
• state funding of regions | GA EPD                  | 2.1%       |
| Indiana      | 6,570,000       | $298 B   | • none |                                        | 3.3%       |
Why worry about water resources?
Growth

- Municipalities
- Manufacturing
- Agriculture
Indianapolis population surging since 2010

Indiana Population
1800 - 2013

2050 projection
What about us?

DOES THIS AFFECT THE MICHIANA IRRIGATION ASSOCIATION?
Irrigation needs to be understood in order to plan and advocate.

• Create awareness for the need for Irrigation
• Develop methods and data to manage the aquifers
• Reduce conflict
• Identify possible impacts
• Time withdrawals
CONTACT

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