STUCK IN THE MUCK: COMPARING HOW AGENCIES AND LOCAL COMMUNITIES SEE BEACH MUCK IN THE GREAT LAKES

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BEACH MUCK IN BAY CITY

Image: Jeff Kart
RESEARCH OBJECTIVES

Explore mental models of agencies and citizens

- Causes
- Aesthetic, Recreational, Economic Impacts
- Management Solutions

Highlight areas of agreement and disagreement
METHODS

How did we explore mental models?

- Conceptual Content Cognitive Mapping (3CM) Exercise
  - 11 Agency Reps & Great Lakes Researchers
  - 10 Citizens

- Co-Orientation Surveys
  - 31 Agency Reps & Great Lakes Researchers
  - 650 Citizens
Imagine someone you know recently heard about beach muck. Since you’re familiar with the issue they are interested in getting your perspective. What things would you be likely to mention when discussing this issue?
MAPS: CAUSES

CITIZENS

Causes

- Algae
  - Agricultural runoff
  - Leaking septic
  - Fertilizer
  - Nutrient loading
  - Phosphorus Levels
  - Water clarity
  - Nitrogen
  - Water pollution
  - Invasive mussels
  - Regulation of runoff
  - Water Temperature
CO-ORIENTATION SURVEY

Causes and Impacts

- What do you think?
- What does other group think?
<table>
<thead>
<tr>
<th>PERCEIVED AGREEMENT</th>
<th>ACTUAL AGREEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>TRUE CONFLICT</td>
</tr>
<tr>
<td></td>
<td>FALSE CONFLICT</td>
</tr>
<tr>
<td>YES</td>
<td>FALSE CONSENSUS</td>
</tr>
<tr>
<td></td>
<td>TRUE CONSENSUS</td>
</tr>
</tbody>
</table>
CAUSES OF MUCK

- Wastewater
  - 1 (not at all)
  - 2 (slightly)
  - 3 (somewhat)
  - 4 (a lot)
  - 5 (extremely)

- Nutrient Loading
  - 1 (not at all)
  - 2 (slightly)
  - 3 (somewhat)
  - 4 (a lot)
  - 5 (extremely)

- Ecosystem Factors
  - 1 (not at all)
  - 2 (slightly)
  - 3 (somewhat)
  - 4 (a lot)
  - 5 (extremely)
CAUSES OF MUCK

Wastewater

Nutrient Loading

Ecosystem Factors

1 (not at all)  2 (slightly)  3 (somewhat)  4 (a lot)  5 (extremely)

Citizens
Agencies’ view of Citizens
Agencies
Citizens’ view of Agencies
CAUSES OF MUCK

Wastewater

Nutrient Loading

Ecosystem Factors

1 (not at all)  2 (slightly)  3 (somewhat)  4 (a lot)  5 (extremely)

Citizens
Agencies’ view of Citizens
Agencies
Citizens’ view of Agencies
CAUSES OF MUCK

1. Wastewater
   - Citizens (not at all)
   - Agencies’ view of Citizens (slightly)
   - Agencies (somewhat)
   - Citizens’ view of Agencies (a lot)
   - (extremely)

2. Nutrient Loading
   - Citizens (not at all)
   - Agencies’ view of Citizens (slightly)
   - Agencies (somewhat)
   - Citizens’ view of Agencies (a lot)
   - (extremely)

3. Ecosystem Factors
   - Citizens (not at all)
   - Agencies’ view of Citizens (slightly)
   - Agencies (somewhat)
   - Citizens’ view of Agencies (a lot)
   - (extremely)
CAUSES OF MUCK

- Wastewater
- Nutrient Loading
- Ecosystem Factors

True Conflict

1. (not at all)
2. (slightly)
3. (somewhat)
4. (a lot)
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Agencies’ view of Citizens
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CAUSES OF MUCK

Wastewater
Nutrient Loading
Ecosystem Factors

True Conflict

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Wastewater

True Conflict

Nutrient Loading

False Conflict

Ecosystem Factors

Citizens' view of Agencies

Agencies' view of Citizens

Agencies

Citizens' view of Agencies

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False Conflict

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2 (slightly)
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5 (extremely)
IMPACTS OF MUCK

WATER CENTER ANNUAL MEETING 2015
IMPACTS OF MUCK

- Economic
- Less Attractive Beach
- Bad Smell

1 (not at all)   2 (slightly)   3 (somewhat)   4 (very)   5 (extremely)

Citizens
Agencies’ view of Citizens
Agencies
Citizens’ view of Agencies
IMPACTS OF MUCK

1. Economic
   - Attractive Beach
   - Bad Smell

2. Less Attractive Beach

3. Bad Smell

4. Agencies' view of Citizens
   - Citizens' view of Agencies

5. Agencies
IMPACTS OF MUCK

True Conflict

Economic

Less Attractive Beach

Bad Smell

1 (not at all)
2 (slightly)
3 (somewhat)
4 (very)
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IMPACTS OF MUCK

WATER CENTER ANNUAL MEETING 2015

Citizens' view of Agencies

Agencies

Agencies' view of Citizens

True Conflict

Economic

Less Attractive Beach

Bad Smell

1 (not at all)

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4 (very)

5 (extremely)
IMPACTS OF MUCK

WATER CENTER ANNUAL MEETING 2015

Citizens
Agencies’ view of Citizens
Agencies
Citizens’ view of Agencies

True Conflict

Economic

Less Attractive Beach

Bad Smell

1 (not at all)
2 (slightly)
3 (somewhat)
4 (very)
5 (extremely)
IMPACTS OF MUCK

1. Economic
- Less Attractive Beach
- Bad Smell

2. True Conflict

3. False Conflict for Citizens

4. True Consensus for Agencies

5. (not at all) 2 (slightly) 3 (somewhat) 4 (very) 5 (extremely)
IMPECTS OF MUCK

- Economic
  - True Conflict
  - False Conflict for Citizens
  - True Consensus for Agencies

- Less Attractive Beach

- Bad Smell

1 (not at all) to 5 (extremely)
IMPACTS OF MUCK

WATER CENTER ANNUAL MEETING 2015

Citizens
Agencies’ view of Citizens
Agencies
Citizens’ view of Agencies

True Conflict
False Conflict for Citizens
True Consensus for Agencies

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IMPACTS OF MUCK

Economic

True Conflict

Less Attractive Beach

False Conflict for Citizens
True Consensus for Agencies

Bad Smell

False Conflict for Citizens
True Consensus for Agencies

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Citizens
Agencies
Agencies’ view of Citizens
Citizens’ view of Agencies

WATER CENTER ANNUAL MEETING 2015
CO-ORIENTATION SURVEY

Causes and Impacts
- What do you think?
- What do agencies/citizens think?

Management strategies
- How effective?
- How practical?
CONCLUSIONS: WHAT DO THESE RESULTS TELL US?

- Citizens are more knowledgeable than they are given credit for.
- Agencies are more concerned than they are given credit for.
  
  ...but there are important differences.
CONCLUSIONS: WHY USE THESE TECHNIQUES?

Benefits to Agencies

Benefits to Both

Benefits to Citizens
THANK YOU!

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MAPS: MANAGEMENT — EXPERTS

Management

Education/Outreach
- Education about the bay
- Outreach/communication efforts
  - Public meetings

Removal
- Cost/feasibility of removal
  - Beach grooming
  - Physical removal of muck
  - Muck filtering machine/device
  - Disposal of muck

Other management approaches
- Alternative strategies
  - Working with other communities
  - Increase of muck over time
  - Physical barriers
  - Commercial pier
  - Park management
- Protection
  - Scientific research on muck
  - Wetlands protection
  - Preservation of natural resources
  - Harm to native species/wildlife
- Regulatory Challenges
  - Complexity of problem
  - Lack of clear solutions
  - DNR/DEQ response to muck
  - Regulation of runoff
MAPS: MANAGEMENT — CITIZENS

Management

Removal
- Beach grooming
  - Physical removal of muck
  - Muck filtering machine/device
  - Disposal of muck

Other management approaches
- Regulation
  - Nearby land management practices
    - Pristine beachfront
    - Cost/feasibility of removal
    - Preservation of natural resources
- Wetlands protection
- Agency Response
  - DNR/DEQ response to muck
    - Lack of clear solutions
    - Complexity of problem
- Park management
- Education/Outreach
  - Scientific research on muck
  - Outreach/communication efforts
  - Education about the bay
  - Public meetings
CAUSES OF MUCK

Perceived Causes of Muck

- Sewage
- Nitrogen
- Leaking Septic
- Water Pollution
- Lower Water Levels
- Water Temp
- Invasive Mussels
- Fertilizer Runoff Farming
- Phosphorus
- Fertilizer Runoff Residential
- Wind Wave Action
- Climate Change
- Algae
- Water Clarity
- Natural Processes

Citizens
Citizens view of Experts
Experts
IMPACTS OF MUCK

Perceived Outcomes of Muck

- ReducedEcon
- LowerQualLife
- ImpactsWildlife
- UglierBeach
- ReducedTourism
- LowerParkAttendance
- LessEnjoymentBCSRA
- BadSmell
- HealthRisks

Citizens view of Experts
Experts

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MANAGEMENT STRATEGIES

Management of Muck

1. DredgeSwimmingAreas
2. RemoveAlgae
3. FilterMachine
4. RelaxWetlandRegulations
5. Pier
6. RegulateAgRunoff
7. Grooming
8. PermanentBarriers
9. FloatingDocks
10. RemovableBarriers

Rating Scale:
- Citizen Effective
- Citizen Practical
- Expert Effective
- Expert Practical
Desirable, but often difficult to implement

- Agencies and citizens have different mental models
- Curse of expertise