A spatial assessment of land owner preferences toward wildlife management in exurban landscapes of the Yellowstone Rockies.

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Outline

- Exurban development overview
- Why understand landowners perceptions?
- Study Areas
- Methods
- Spatial assessment results
- Next steps
Exurban Development

- Low-density residential development
- 5-40 acres per single unit
- 10x > land use change vs. urban & suburban development in the U.S. (USDA NRI 2003)
Impacts

- Ecosystem **fragmentation**
- Edge effects and nest predation
- Disruption of movement, dispersal
- Source-sink dynamics
- Altered community structure, composition
- **Roads**
- Recreation
- Domestic pets
- Human-wildlife conflicts
- Cumulative impacts
Land Owner Input

• Science has relatively clear recommendations for conservation goals.
• Decision-making process is a social process.
• Understanding attitudes is a first step.
Study Areas
Survey Methods

• Informational Interviews
  – 3-4 in each community

• Mail Questionnaire
  – Mailed 1800:
    • Big Hole 278
    • Island Park 678
    • Big Sky 844
  – 4-wave design
  – Non-respondent calls

• Survey Data
  – Socio-demographics
  – Activities, behaviors, attitudes toward wildlife and land use management
  – Spatial opinions about future land management
Study Questions

- Do **spatial patterns** exist to provide insight on the attitudinal differences across the landscapes?
  - RD: Open space areas to restrict development
  - WA: Most important wildlife use areas
  - X: Controversial locations for development & conservation
  - D: Developable locations appropriate for new development
12. For each statement below, circle the number that best reflects your opinion.
(Please circle one number for each item)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shorthanded farms</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I am in favor of programs that promote:</td>
<td></td>
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</tr>
<tr>
<td>a. land conservation in Greater Yellowstone.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. land conservation elsewhere in the United States.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. wildlife conservation in Greater Yellowstone.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d. wildlife conservation elsewhere in the United States.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

13. For each statement below, circle the number that best reflects your opinion based on your experiences in Madison or Gallatin County.
(Please circle one number for each item)

<table>
<thead>
<tr>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>In general, to what extent do you agree with the policies and programs of:</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>a. your local government in Madison or Gallatin County?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b. your local planning board in Madison or Gallatin County?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c. Montana Fish, Wildlife, and Parks?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d. the U.S. Fish and Wildlife Service?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e. the U.S. Forest Service?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>f. the Bureau of Land Management?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>g. Yellowstone National Park?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>h. non-governmental environmental organizations?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

14. When did you last speak with a person from Montana Fish, Wildlife, and Parks?
- within the past month
- more than one year ago

15. When did someone from Montana Fish, Wildlife, and Parks last visit your property?
- within the past month
- more than one year ago

16. Referring to the map and the key showing which land is available for development, please mark the following four items on this map of Big Sky.

- Please circle the area(s) of developable land that in your opinion should be restricted from development and maintained as open space.
- Please put an "X" on the area of developable land that in your opinion is the most appropriate for accommodating new development.
- Please put an "O" on the area of developable land that is the most controversial for development and conservation.
- Please lightly shade the area of developable land with dots or lines that, in your opinion, provides the best or most important area for wildlife.
GIS Mapping Methods

• Digitizing responses
• Spatial overlays
  – Areal feature summaries
  – Point density grids
• Biophysical landscape assessment
Digitizing
Areal Overlays
Feature Results Summary

- **Big Hole**
  - 52% map response rate
  - 10% noted contentious points

- **Big Sky**
  - 41% map response rate
  - 39% noted developable points

- **Island Park**
  - 72% map response rate
  - 67% noted restricting development areas
Big Hole Valley
Big Sky
Big Sky
Big Sky
Island Park
Island Park
Biophysical Landscape

- **Island Park**
  - Elevation
  - Land Cover
  - Water Features (distance):
    - Rivers
    - Streams
    - Lakes
  - Wildlife Habitat (distance):
    - Elk
    - Mule Deer
    - Sage Grouse
    - Wolverine
Biophysical Landscape

• Significant factors from group statistics:
  – Wildlife areas noted in higher elevations
  – Restrictions on development noted in elk and wolverine habitat

• Bivariate correlation statistics:
  – Developable points in lower elevations
  – Controversial points at higher elevations
Summary

• Community perceptions vary
• Land-owner spatial specification
• GIS as a tool
  – Identifying
  – Predicting
  – Informing
  – Planning
Next steps

• Biophysical landscape improvements
  – Assess effects of parcel location
  – Additional biological datasets

• Assess private conservation practices
  – Relate to survey responses
  – Activities, behaviors, attitudes toward wildlife and land use management
Acknowledgements:
Brainerd Foundation
WCS Yellowstone Rockies Staff
Human Dimensions Research Unit at Cornell
<table>
<thead>
<tr>
<th>Community</th>
<th>Response Rate</th>
<th>% Male</th>
<th>% Permanent</th>
<th>% Income &gt; $100K</th>
<th>Years Owned Land or Property</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Hole</td>
<td>35.6%</td>
<td>70.7%</td>
<td>40.7%</td>
<td>40.1%</td>
<td>25</td>
<td>61</td>
</tr>
<tr>
<td>n=87</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Island Park</td>
<td>42.2%</td>
<td>74.8%</td>
<td>7.8%</td>
<td>45.1%</td>
<td>20</td>
<td>61</td>
</tr>
<tr>
<td>n=268</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big Sky</td>
<td>33.3%</td>
<td>65.8%</td>
<td>18.6%</td>
<td>82.3%</td>
<td>12</td>
<td>58</td>
</tr>
<tr>
<td>n=243</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Land-use Questions

• Local landowner practices
  – Trails
  – Farm animals
  – Trash outside
  – Birdfeeders

• Socio-demographics
  – Age, Gender, Income
  – Seasonal/Permanent
  – Longtimer/Newcomer
  – Urban/Rural Background

• Attitudes

• Conservation and Land-Use Planning

• Support for land and wildlife protection