The Value of Regulation

A Return on Investment Analysis of Pierce County Flood Risk Management Regulations

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Ecosystem Services
Leveraging Capital for 21st Century Solutions

Built Capital
Social Capital
Human Capital
Natural Capital

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Leveraging Capital for 21st Century Solutions

- Dams, Bulkheads, Levees, Roads
- Regulatory Policy, Government
- People, Ideas
- Riparian Services
Case Study: Pierce County

16 Ecosystem services
6 Land cover types
Pierce County Goals

1. Determine whether or not well-formulated land-use regulations reduce public and private costs by preventing or mitigating damage from flooding.

2. Demonstrate measureable benefits to enforcing those land-use regulations by examining real-life case studies.

3. Inform future mitigation project implementation to achieve the best possible value at the lowest cost for Pierce County residents.
2006 Flooding
Carbon River Road

Photo credit: National Park Service
2006 Flooding - Neadham

Photo credit: Pierce County
#1 Channel Migration Zones

Photo credit: Pierce County
Floodway Regulations

Source: Dennis Dixon

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Regulations

#3 Compensatory Storage Requirements

Source: City of Lincoln, NE
Neadham Road
Levees (left)
Flood Hazard Areas (right)

Maps: Pierce County

Legend
- Channel Migration Zone Floodway
- Deep Fast Flowing Floodways
- County 100 Yr. Floodplain

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Flooding at Neadham Road – November 2006

Photo credit: Pierce County
Land Uses Examined at Alward and Neadham Roads

- Forest
- Grassland
- Rivers
- Riparian Buffer
- Shrub/scrub
- Wetlands
Ecosystem Services Lost at Neadham Road

High $174.2 Million

Low $1.8 Million

4% Discount Rate over 50 Years
## Public Cost of Development at Neadham Road

<table>
<thead>
<tr>
<th>Investment Required</th>
<th>Estimated Cost</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levee Construction of 8900 l.f.</td>
<td>$8,900,000</td>
<td>1960s</td>
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<tr>
<td>Orville Rd Levee Damage</td>
<td>$4,299,252</td>
<td>1990-2009</td>
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<tr>
<td>Neadham Rd Levee Damage</td>
<td>$5,131,748</td>
<td>1990-2009</td>
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<tr>
<td>Property Acquisition</td>
<td>$1,531,636</td>
<td>1994-2000</td>
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<tr>
<td>Capital Improvement Project</td>
<td>$8,100,000</td>
<td>unknown</td>
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</tbody>
</table>

**Total Public Cost:** $27,962,636
Estimated Cost of Developing Neadham Road

High $202.2 Million

Low $29.8 Million

4% Discount Rate over 50 Years
Alward Road - 1931
Legend

- Channel Migration Zone Floodway
- Deep Fast Flowing Floodways
- County 100 Yr. Floodplain

Alward Road
Flood Hazard Areas (above)
Levees (below)

Maps: Pierce County

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Levee Breach at Alward Road – November 2006

Photo credit: Pierce County
Ecosystem Services Lost at Alward Road

High: $153.8 Million
Low: $720,000

4% Discount Rate over 50 Years
## Public Cost of Development at Alward Road

<table>
<thead>
<tr>
<th>Investment Required</th>
<th>Estimated Cost</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td>Levee Construction of 9,150 l.f.</td>
<td>$9,150,000</td>
<td>1960s</td>
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<tr>
<td>Water Ski Levee Damage</td>
<td>$3,859,570</td>
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<tr>
<td>Alward Rd Levee Damage</td>
<td>$6,041,430</td>
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<tr>
<td>Property Acquisition</td>
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<td>Capital Improvement Project</td>
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<td>unknown</td>
</tr>
</tbody>
</table>

**Total Public Cost:** $49,968,919
Estimated Cost of Developing Alward Road

High: $203.7 Million

Low: $50.7 Million

4% Discount Rate over 50 Years

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Clover Creek

Map & Photo credit: Pierce County

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The Added Value of Restoration

High: $1.2 Million
Low: $23,000

4% Discount Rate over 50 Years

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Conclusions and Next Steps

1. Regulations are extremely valuable to the residents of Pierce County.

2. The value generated by regulations depends on decision makers who decide whether or not to enforce them.

3. There is much work to be done in record keeping for flood and disaster-related costs.

4. Once one of the proposed projects is completed, before and after monitoring must be done to demonstrate the effectiveness of floodplain restoration on reducing both direct and indirect flooding.
Thank You!

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