Engaging Watershed Beneficiaries
Making the Business Case

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150 large corporations surveyed

39% - disruptions in operations, increasing expenses, and other detrimental impacts related to water

62% - recognized opportunities to reduce costs with efficiency gains and generate new business
Beneficiaries: Making the Business Case

• Need to know:
  – Who uses the water
  – How they use it
  – How they benefit from “clean” water
  – How they fit into a broadly-defined market framework

Map and Engage Beneficiaries
Buyer motivation in 32 surveyed PWS schemes

- Avoided Cost: 37%
- Pre-Compliance: 25%
- Risk Reduction: 22%
- Regulation: 13%
- Conservation Ethic: 3%

Source: Ecoagriculture Partners, 2011
Rwanda

Source: http://www.mapendanovoyages.com/rwanda.htm
Location on Landscape

- How do businesses’ locations affect perceptions of Park issues?
- What spatial scale is best for partnership/program efforts focused on various benefits/services?
### Estimation of the economic value of Nyungwe watershed protection services

<table>
<thead>
<tr>
<th>Watershed services</th>
<th>Price (USD)/Unit (m³) or ha</th>
<th>Description</th>
<th>Total value (Million USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water supply for industrial uses and domestic consumption</td>
<td>0.9</td>
<td>Cost of water consumption</td>
<td>2.9</td>
</tr>
<tr>
<td>Erosion Control</td>
<td>3000</td>
<td>Cost of soil conservation per ha (terracing)</td>
<td>303</td>
</tr>
<tr>
<td>Maintenance of water quality (sediment control)</td>
<td>0.09</td>
<td>Cost of removing suspended sediments in water</td>
<td>0.27</td>
</tr>
<tr>
<td>Flood control</td>
<td></td>
<td></td>
<td>16-86*</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>322-392</td>
</tr>
</tbody>
</table>

*Based on estimates of economic costs of 2007 flood in Nyabihu by the Stockholm Environment Institute, 2009) of 4-21 M USD.

*Given the size of Nyungwe at minimum the flood control benefits provided by Nyungwe represent 4 times those costs*
Erosion and Sedimentation Control

NNP’s forest is important for controlling soil loss:

- **Very low erosion within NNP** (0.5 t/ha/yr modeled)

--- v.s. ---

- **High erosion outside NNP** (300 – 700 t/ha/yr)
Watershed protection value estimates, Nyungwe Forest National park:

<table>
<thead>
<tr>
<th>Watershed Protection Components</th>
<th>Total Annual Value (US$/year)</th>
<th>Annual value (US$/ha/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water for domestic consumption</td>
<td>30,000</td>
<td>0.30</td>
</tr>
<tr>
<td>Water for hydropower production</td>
<td>3,715,432</td>
<td>36.68</td>
</tr>
<tr>
<td>Potential micro-hydro power supply</td>
<td>17,160,360</td>
<td>164.11</td>
</tr>
<tr>
<td>Tea production</td>
<td>81,536,000</td>
<td>804.9</td>
</tr>
<tr>
<td>Agriculture production</td>
<td>1,935,801</td>
<td>19.11</td>
</tr>
<tr>
<td>Flood prevention</td>
<td>13,915,345</td>
<td>137.37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>117,757,583</strong></td>
<td><strong>1,116</strong></td>
</tr>
</tbody>
</table>
Most respondents reported multiple uses of water but few appear to pay for it.

Reported *at least one* mode of water use: **83%**

Pay for water: **28%**

Encounter rates of snares, tree cutting, beehives and mining per kilometer in NNP

\[ y = 0.0009x + 0.3745 \]
\[ R^2 = 0.001 \]

\[ y = 0.0366x + 0.0164 \]
\[ R^2 = 0.7646 \]

Encounter rates per kilometer

Years of monitoring

Poaching
Tree cutting
Beehives
Mining

Felix et al. 2011, 5-Year Ranger-based Monitoring Comparison Report 2006 to 2010
Every single business surveyed...

- Is interested in helping to protect the Park in some way

AND

- Would be interested in learning more about investing resources in the improved management of the Park

> 60% of businesses explicitly stated that they are interested because Nyungwe National Park benefits their business
Summary financials of green vs. gray infrastructure approaches for securing clean drinking water (Portland, ME)

Present value of investments over 20 years, USD millions

<table>
<thead>
<tr>
<th>Infrastructure Type</th>
<th>Investments (USD millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray infrastructure upgrade (membrane filtration)</td>
<td>101.8</td>
</tr>
<tr>
<td>Green infrastructure investments</td>
<td>33.6</td>
</tr>
</tbody>
</table>

67% savings

Detailed financials of green vs. gray infrastructure approaches for securing clean drinking water (Portland, ME)

Present value of investments over 20 years, USD millions

<table>
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<tr>
<th>Conservation easements</th>
<th>Afforestation/reforestation</th>
<th>Riparian buffers</th>
<th>Culvert upgrades</th>
<th>Forest certification</th>
<th>Total green</th>
<th>Savings</th>
<th>Membrane filtration (gray)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.0 acres</td>
<td>12.8 acres</td>
<td>5.9 acres</td>
<td>1.7 acres</td>
<td>0.2 acres</td>
<td>33.6 acres</td>
<td>68.2</td>
<td>101.8</td>
</tr>
<tr>
<td>13,200 acres</td>
<td>9,400 acres</td>
<td>367 acres</td>
<td>44 units</td>
<td>4,700 acres</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ancillary/Co-Benefits

- Clean Air
- Carbon Storage
- Sustainable Wood Products
- Wildlife Habitat
- Recreation
- Clean Water
- Wetland & Stream Restoration
Investing in Green Infrastructure for Source Water Protection

- Characteristics of watersheds “ripe” for green infrastructure investment
- Scientific foundation underlying green infrastructure investment
- How to make the business case for green infrastructure
- Key players and elements of the stakeholder engagement process
- Emerging finance mechanisms
- Key takeaways from success stories

Expected publication release: Spring 2013
Questions and Discussion

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Source: Margaret Munford, American Forest Foundation