Conservation Banking as a Market-Based Incentive for Recovery of T&E Species

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The Katoomba Group
“Markets for Carbon and Ecosystem Services: The Business Case”

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Introduction

- Ecosystem Services theory, in practice
  - Supply and demand = financial value
  - However: ‘demand’ by private parties for ‘public goods’ is mediated primarily by law (to a lesser extent by strategy and ethics)
  - Therefore: Financial value depends on policy and enforcement

- Opportunities
  - Wetlands and stream mitigation
  - Carbon sequestration
  - Conservation Banking for T&E species
Workshop on Ecosystem Services

For today…

- A bit on Conservation Banking
- A bit on the STREAM economic model
- An example of a real deal
- Some observations
“Eco-assets” are environmental features that provide financial value to private landowners when they are maintained in, or restored to, their natural state.

- Wetlands
- Forests
- Endangered species
- Rivers & watersheds
- Riparian and upland habitat
Endangered Species Act issues

- 1982 amendments to ESA provided for an “incidental take” of listed species, if “a landowner provides a long-term commitment to species conservation through the development of a Habitat Conservation Plan (HCP).”

- Incidental take permits are applied for under Section 10(a)(1)(B) of the ESA. (Section 7 applies to Federal lands.)

- As of April 10, 2003, 541 HCP’s have been approved, covering approximately 38 million acres and protecting more than 525 endangered or threatened species.
“Land containing natural resources, which is conserved and managed in perpetuity for specified listed species and used to offset impacts occurring elsewhere to the same natural resource values on non-bank lands.”

A private party requesting an incidental take permit from FWS can purchase “species credits” from pre-established conservation banks, to provide mitigation for the take.
What is Conservation Banking? (2)

- FWS issued conservation banking guidance on May 2, 2003, to help FWS personnel:
  - Evaluate the use of conservation banks to meet the conservation needs of listed species;
  - Fulfill the purposes of the ESA; and
  - Provide consistency and predictability in the establishment, use and operation of conservation banks.

- There were 10-15 banks in U.S. prior to guidance.
- CA issued banking guidance in 1995. There are approximately 50 conservation banks in CA.
Conservation Bank Components

- Credit unit: Individuals, breeding pairs (RCW), acres (vernal pools), nest site, family unit.

- Service area: Area over which the credits can be bought or sold. May be entire species range, a portion of the range or a watershed.

- Long-term assurances:
  - Establish a conservation easement or transfer fee title so that land is put into conservation in perpetuity, even after credits are sold or species is delisted.
  - Must have a long term management and monitoring plan, and funding assurances to ensure habitat is maintained for species use.
FWS Requirements for Conservation Banks

- Credit issuance: “Must be expressed and measured in the same manner as the impacts of the development projects that will utilize the bank”
  - Acres for acres
  - Breeding pairs for breeding pairs
  - Intact populations for intact populations
- Service territory: Area in which bank credits may be used to offset project impacts
  - Based on conservation needs of species being conserved
  - Existing FWS ‘recovery areas’ from recovery plans
  - Credits may be sold to projects outside of recovery areas if they impact the same species
STREAM Model Purpose (1 of 2)

- To analyze and compare on a **financial basis** different land management options, including eco-assets development.

- STREAM 2.0 can analyze three types of eco-asset investment projects, and compare each to a “base case.”
  - Forest carbon sequestration
  - Wetland & stream mitigation
  - Endangered species conservation “banking”
STREAM Model Purpose (2 of 2)

STREAM 2.0 is:

- A computer simulation model that can be used to conduct cash-flow and financial risk analysis of proposed eco-asset investment projects.
- A sophisticated land management planning tool that can help electricity utilities and others to optimize land management activities.

STREAM 2.0 is not:

- An eco-asset production model that can be used to estimate physical eco-asset production, such as the amount of carbon sequestered in a forest over time.
Assumptions & Input Data

- **Assumptions**
  - Corporate Financial
    - Discount rate(s)
    - Effective corporate tax rates
  - Analytic Assumptions
    - Sensitivity analysis parameters
    - Scenario definitions
    - Optionality parameters
    - Market opening values & parameters

- **Project-level Input Data**
  - Financial
    - Eco-asset “credit” prices and risk
    - Commodity prices
    - Annual capital & O&M costs
    - “Optional” eco-asset management
  - Eco-asset & related commodity production
    - Expected timing
    - Expected production quantities
STREAM 2.0 Features

Risk & Uncertainty

- Automated *sensitivity analysis* of critical variables
  - Real discount rate
  - Initial eco-asset prices
  - Price uncertainty
  - Annual real appreciation rate
  - Expected eco-asset production levels

- Automated *scenario analysis* compares a “default” scenario with three user-defined alternatives

- *Monte-Carlo simulation* for uncertain variables
  - Key variables can be defined as probability distributions rather than single “best guess” estimates
  - Results are shown as ranges of forecast values
  - Simulations include 1,000’s of individual trials
Model Demonstration

Carbon Stocks and Flows

Net Project Carbon Storage

- Annual CO2e
- Cumulative CO2e

Tons CO2e

Project Year
Projected Cash Flow

Pre-Tax Cash Flow

- $6,000,000
- $4,000,000
- $2,000,000
$0
$2,000,000
$4,000,000
$6,000,000
$8,000,000
$10,000,000

Project Year

Pre-Tax ($)

Net Cash Flow - - - - Cumulative Cash Flow

Model Demonstration

Projected Cash Flow
## Summary Results - Carbon

### Economic Benefits

<table>
<thead>
<tr>
<th></th>
<th>Pre-Tax Analysis</th>
<th>Levelized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present Value</td>
<td>Present Value</td>
</tr>
<tr>
<td></td>
<td>($)</td>
<td>($ / acre)</td>
</tr>
<tr>
<td><strong>Timber</strong></td>
<td>$103,855</td>
<td>$34.62</td>
</tr>
<tr>
<td><strong>Carbon Storage</strong></td>
<td>$989,050</td>
<td>$329.68</td>
</tr>
<tr>
<td><strong>Total Benefits</strong></td>
<td><strong>$1,092,905</strong></td>
<td><strong>$364.30</strong></td>
</tr>
</tbody>
</table>

### Economic Costs

<table>
<thead>
<tr>
<th></th>
<th>Forestry</th>
<th></th>
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<tbody>
<tr>
<td><strong>Land Acquisition</strong></td>
<td>$0</td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>Forest Establishment</strong></td>
<td>$864,603</td>
<td>$288.20</td>
</tr>
<tr>
<td><strong>Forest Management</strong></td>
<td>$39,421</td>
<td>$13.14</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>$904,024</strong></td>
<td><strong>$301.34</strong></td>
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</tbody>
</table>

### Carbon Management

<table>
<thead>
<tr>
<th></th>
<th><strong>Optionable</strong></th>
<th><strong>Non-Optionable</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>$0</strong></td>
<td><strong>$31,316</strong></td>
<td><strong>$10.44</strong></td>
<td><strong>$0.17</strong></td>
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<tr>
<td><strong>Subtotal</strong></td>
<td><strong>$31,316</strong></td>
<td><strong>$10.44</strong></td>
<td><strong>$0.17</strong></td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th><strong>Total Costs</strong></th>
<th><strong>Total Net Benefits</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>$935,340</strong></td>
<td><strong>$157,565</strong></td>
</tr>
<tr>
<td><strong>$311.78</strong></td>
<td><strong>$52.52</strong></td>
<td><strong>$0.86</strong></td>
</tr>
</tbody>
</table>
Model Demonstration

Summary Results - Carbon (2 of 2)

Pre-Tax Project Costs & Benefits

- Total Costs: $1,092,905
- Total Benefits: $935,340
- Total Net Benefits: $157,565

Legend:
- Total Benefits
- Total Costs
- Total Net Benefits
Model Demonstration

Sensitivity Analysis

Sensitivity Analysis
Real Discount Rate; Pre-Tax

<table>
<thead>
<tr>
<th>Economic Benefits</th>
<th>Economic Costs</th>
<th>Net Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>$-500,000</td>
<td>$0</td>
<td>$500,000</td>
</tr>
<tr>
<td>$1,000,000</td>
<td>$0</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>$1,500,000</td>
<td>$0</td>
<td>$1,500,000</td>
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<td>$0</td>
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</tr>
<tr>
<td>$3,000,000</td>
<td>$0</td>
<td>$3,000,000</td>
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</tbody>
</table>

Real Annual Discount Rate

- - Economic Benefits
- - Economic Costs
- - Net Benefits
### Scenario Analysis

- Define model scenarios

<table>
<thead>
<tr>
<th>Analysis Variables</th>
<th>Default</th>
<th>Alt 1</th>
<th>Alt 2</th>
<th>Alt 3</th>
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</thead>
<tbody>
<tr>
<td>Discount Rate</td>
<td>7.6%</td>
<td>7.6%</td>
<td>5.0%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Carbon Price</td>
<td>$5.00</td>
<td>$10.00</td>
<td>$15.00</td>
<td>$20.00</td>
</tr>
<tr>
<td>Price Risk</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
</tr>
<tr>
<td>Appreciation Rate</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
</tr>
<tr>
<td>Buyback Fraction</td>
<td>1.00</td>
<td>1.00</td>
<td>0.75</td>
<td>0.50</td>
</tr>
<tr>
<td>Carbon Production</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Note: Values shown in red represent changes from the “default” values.
Monte Carlo Simulation (1 of 2)

- Key variables can be defined in probabilistic terms
Model results are shown as a range of outcomes.

Certainty is 90.00% from ($617,790) to $1,288,229.

Mean = $188,869

Forecast: Pre-Tax Net Benefit

1,000 Trials

Certainty is 90.00% from ($617,790) to $1,288,229.

Mean = $188,869

Model Demonstration

Monte Carlo Simulation (2 of 2)
Endangered Species Project

Description

- Potential habitat for Indiana Bat: Approximately 12,000 acres
- Provides summer habitat
- Requires development of Habitat Conservation Plan
- Requires revisions to existing forest management regime
Project Assumptions

- Project Duration = 70 Years
- Number of Credits = 1,200
- Credit Price = $50,000/credit
- Credit sales phased over life of project, based on tree development
Indiana Bat Credit Estimation Methodology

- Credit is defined as one primary roost tree, supporting 30-400 female members
- Density of roost trees assumed to be 1 per 10 acres
- Total suitable habitat = 12,000 acres
- Roost trees assumed to be 70+ years old, credits awarded as forest matures
Project Results

- PV Costs = $948,666 ($77/acre)
- PV Revenues = $1,895,563 ($158/acre)
- PV Net Income = $976,896 ($81/acre)
### Per-Acre Comparison of Eco-Asset Projects

<table>
<thead>
<tr>
<th></th>
<th>Pasture</th>
<th>Carbon Sequestration</th>
<th>Creek</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost/acre</strong></td>
<td>$7</td>
<td>$294</td>
<td>$2,181</td>
<td>$77</td>
</tr>
<tr>
<td><strong>Revenue/acre</strong></td>
<td>$83</td>
<td>$244</td>
<td>$3,028</td>
<td>$158</td>
</tr>
<tr>
<td><strong>Net Income/acre</strong></td>
<td>$76</td>
<td>$-53</td>
<td>$846</td>
<td>$81</td>
</tr>
</tbody>
</table>
Value to Private Landowners

- Time to permit/Cost to permit
- Maximize value of under-utilized commercial real estate assets
- Strategic approach to land disposition issues
- Improve interactions between land managers and corporate financial/strategic planning staff
- Evaluates the financial impacts of investing in eco-asset projects
Bank is established in advance of impacts to the species.
Provides incentive for conservation actions on private lands.
Aligns profit making motivation with species conservation; turns species “liabilities” into “assets”.
Facilitates exchange or conversion of many small pieces of habitat for large, contiguous tracts of land.
Conservation Banking Pitfalls

- Need to ensure good science is applied to bank establishment – “Recovery plan should guide development for conservation bank.”
- Timing of credit vesting - Need to ensure that habitat is preserved and species occupy habitat.
- Without ESA enforcement, there is no market driver.
Conclusions

- Conservation Banking is an imperfect example of ‘Applied Ecosystem Services Theory’
- Still, “The best is the enemy of the good”.
- Federal conservation banking guidance will facilitate development of conservation banking, similar to wetland banking guidance.
- A disciplined approach to investment is necessary: caveat emptor.
- New flexible mechanisms like conservation banking are more than ‘compliance programs’; they set a precedent and establish a principle: “Conservation is valuable”.

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