A Performance Bond Approach to Endangered Species Conservation
US Endangered Species Act

• Has been a clear success: $\frac{1}{2}$ of the listed species have benefited

• Implementation has been inefficient
  • Focuses on species that are already distressed
  • Stakeholder’s interest are not aligned
US Endangered Species Act

• Litigation:
  • In 2003, 9$ million was appropriated to US Fish & Wildlife listing program
  • But, faced $8 million in court-related expenses to already listed species
• Result: listing delays and inadequate recovery actions
• Costs of species recovery are sometimes ignored
Shoot, Shovel, and Shut-up

Incentives Are Misaligned

Idaho wolf found shot April 3, 2008
Innovative | Self Sustaining | Economically Efficient
Catastrophe Bonds

Insurance companies lack capacity to meet all claims from a category V hurricane.

They sell catastrophe bonds to market investors, which pay an interest rate substantially higher than a risk-free rate.

Bondholders lose, insurance companies uses principal to pay claims.

Bondholders reap benefits of interest rate. Insurance company has insurance.

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Weather Derivatives

Companies whose business depends heavily on weather use weather derivatives to hedge against the risk of extreme weather.

A certain weather event (e.g., number of days in a month below a certain temperature) triggers a payout.

Being adopted in the fields of economic and social development, as a way to manage risk.
Weather Derivatives

Rainfall in Ethiopia is directly linked to famine.

Institution faces uncertainty and risk, leading to inefficiencies and high costs.

Institution sells that risk as a derivative tied directly to the amount of rainfall that induces famine.

Investor buys the derivative at a discount in exchange for face value if the “event” does not occur. Otherwise, the investor loses.
Employee Stock Options

ESOs give employees the potential for future ownership of the company for which they work. Employees are motivated to manipulate the underlying asset: the success of the company.

Does not hedge risk, but used to align incentives among stakeholders.

A company pays, in the form of ownership, to ensure that employees have the business’ best interest in mind.
Biodiversity Performance Bonds

Two Hypothetical Examples

Reduce Risk

Align Incentives
Biodiversity Bond: How would it work?

A species is declining, making it a likely candidate for threatened or endangered status.

Government (or other institution) faces uncertainty and risk, leading to last-minute responses, inefficiencies, and high costs.

Institution sells performance bonds tied directly to the viability of the species (i.e., trigger point).

“Investors” buy bonds at a discount in exchange for face value if the trigger point is not reached. Otherwise, the investor loses.

If the trigger point is reached, capital is immediately available for species recovery efforts.
Species undergoes unpredicted decline
Investors forfeit their investment
Money is available for research, remediation, and recovery
Species declines
Investors engage in preemptive actions
Species recovers and investors are rewarded
Biodiversity Bonds: What about the costs?

Current Approach: Very Expensive
- $250,000 on a single conservation plan
- Estimated protection on public timberlands: $9,000 per active group
- $4.4 million per year: cost of meeting ESA’s goal of 500 active groups

A Biodiversity Bond Approach
- Issued derivatives 10-20 years prior to ESA listing
- Cost of Insurance Policy (30% chance of listing): $307,000
- Cost of Insurance Policy (50% chance of listing): $717,000

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A Second Example: Species Swap

Government And/Or Private-party
Government And/Or Private-party

- Pays an annual fixed rate based on number of tortoises on the land at the time of project initiation.

- Pays an annual floating rate based on number of tortoises (or other currency) on the land every year after.
Pays an annual fixed rate based on number of tortoises on the land at the time of project initiation

• Insurance policy for one counterparty, and an incentive for stewardship for the other.
• More cost-effective and feasible than a “worst-case scenario” mitigation ratio.
• A worst-case scenario can be the foundation for a contract default.
• A carrot-and-stick approach which transfers risk and encourages innovation.
Spectrum of Pricing for Biodiversity Performance Bonds

Fully Subsidized
Maximizes Stakeholder Incentive
(e.g., stock option)

Fully Priced
Maximizes Insurance & Risk Transfer
(e.g., catastrop)
how does this fit into the ESA?
ephemeral incentives
biodiversity bonds as a grant program
standards & methodology
third-party verification