

A Performance Bond Approach to Endangered Species Conservation



US Endangered Species Act

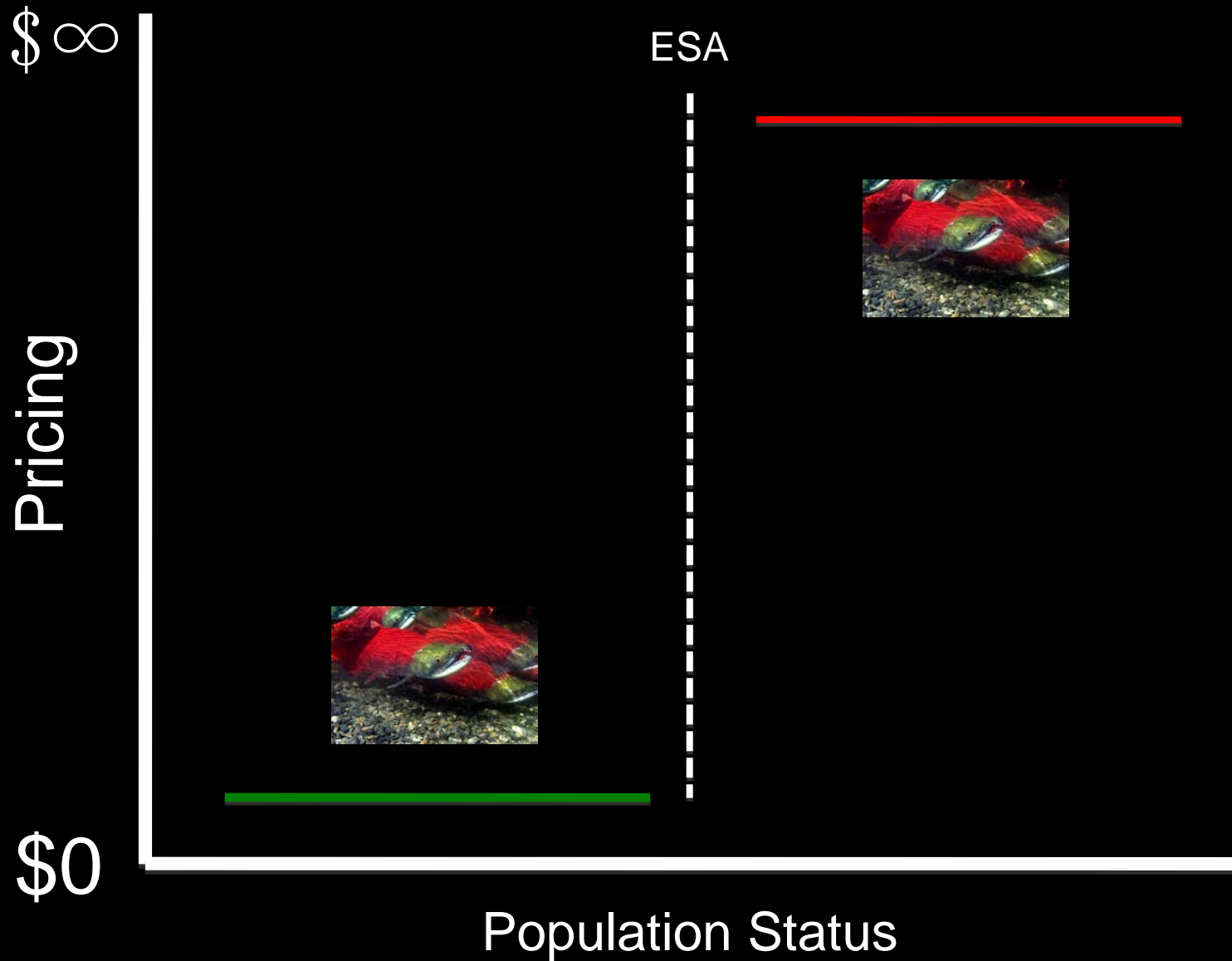


- Has been a clear success: $\frac{1}{2}$ of the listed species have benefited
- Implementation has been inefficient
 - Focuses on species that are already distressed
 - Stakeholder's interest are not aligned

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



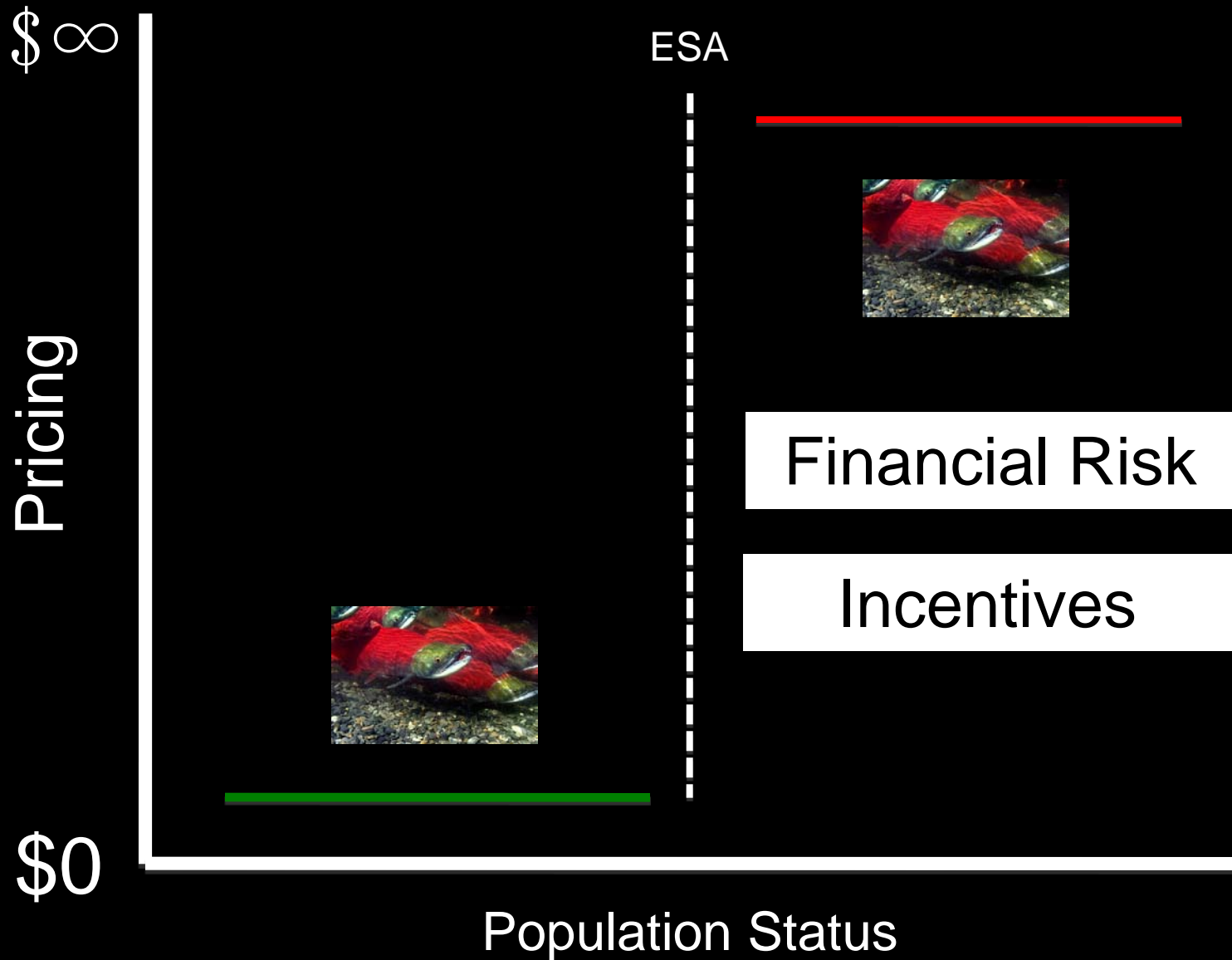
Shoot, Shovel, and Shut-up



Incentives Are Misaligned



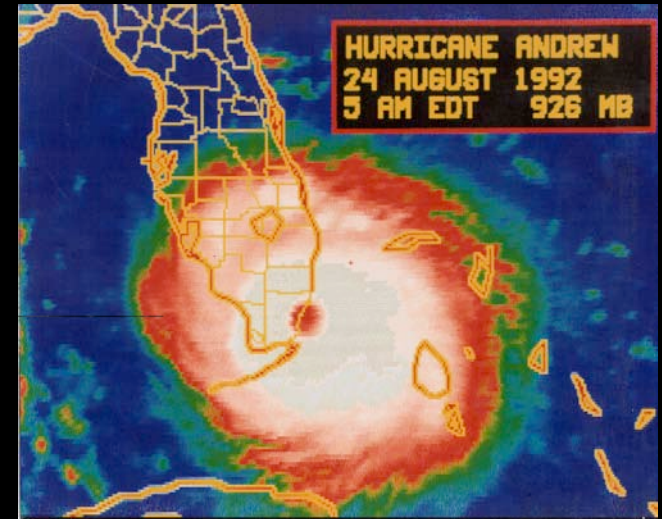
Idaho wolf found shot April 3, 2008



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 use principal to pay claims.



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

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

Com
hea
deri
extr

A ce
day
tem



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

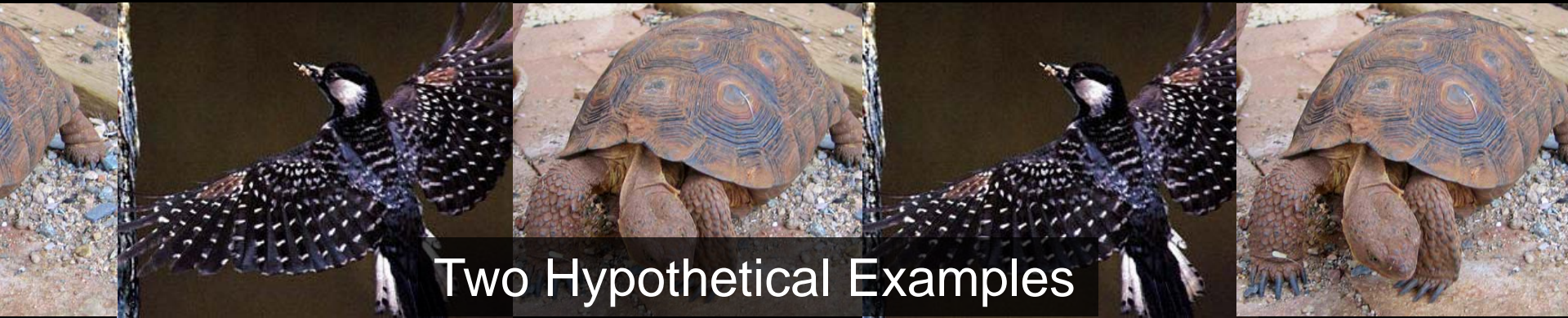
ESOs give employees the potential for future ownership of the company for which they work. Employees are motivated to manipulate the underlying asset: the success of the company.

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).

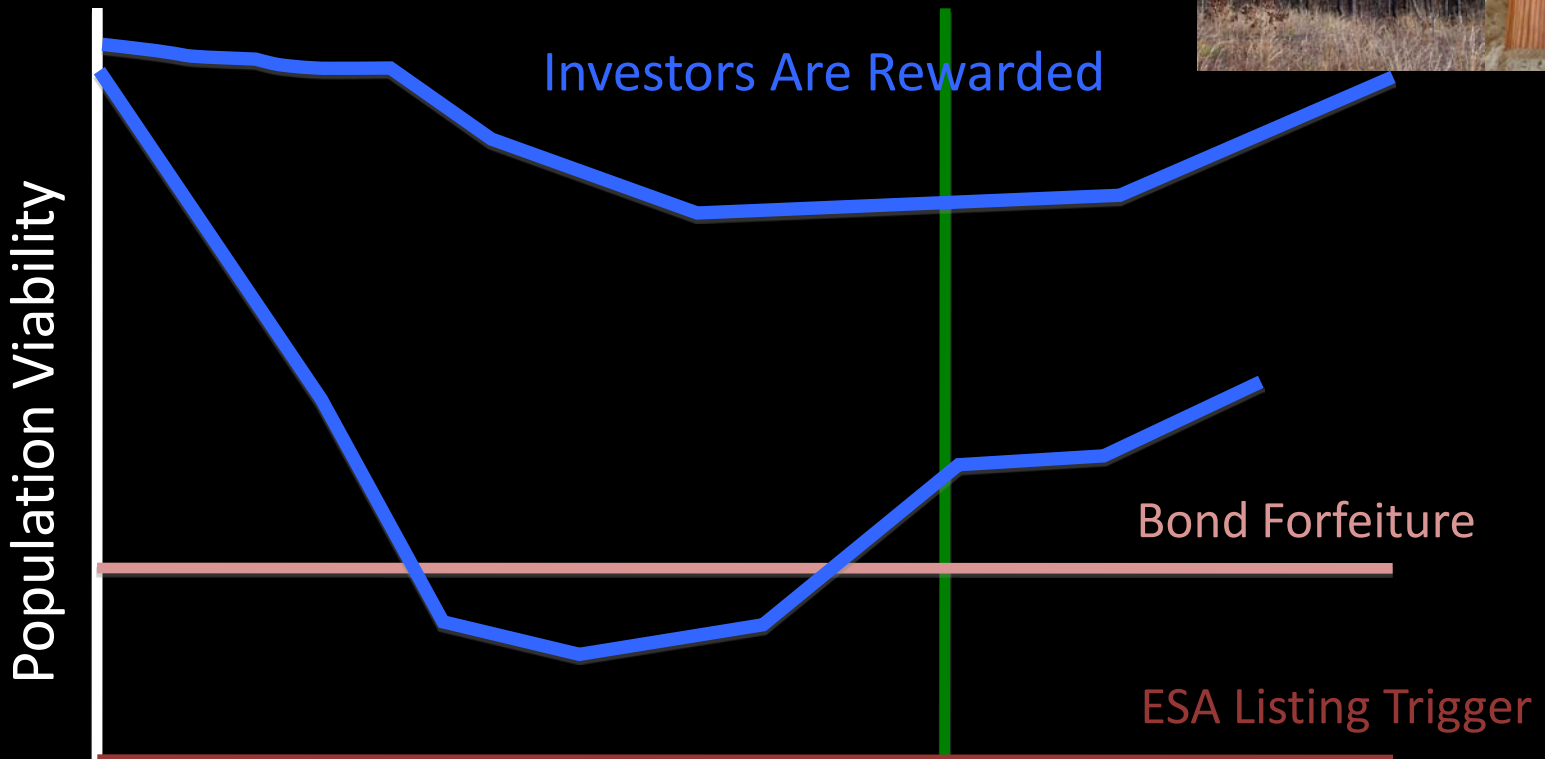
“Investors” buy bonds at a discount in exchange for face value if the trigger point is not reached. Otherwise, the investor loses.

If the trigger point is reached, capital is immediately available for species recovery efforts.





Maturity Date

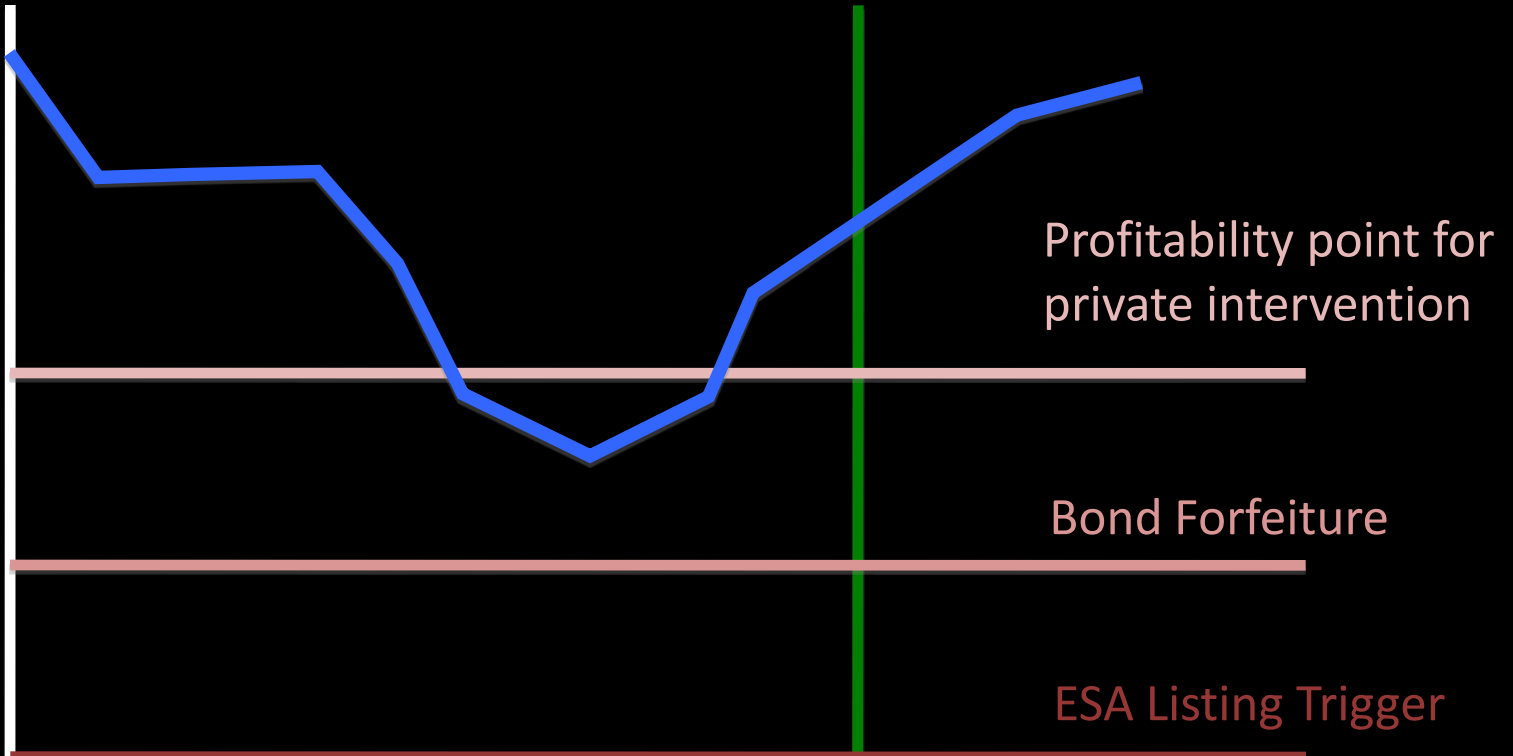


Species undergoes unpredicted decline
Investors forfeit their investment
Money is available for research, remediation, and recovery



Maturity Date

Population Viability



Profitability point for private intervention

Bond Forfeiture

ESA Listing Trigger

Species declines

Investors engage in preemptive actions

Species recovers and investors are rewarded



Biodiversity Bonds: **What about the costs?**

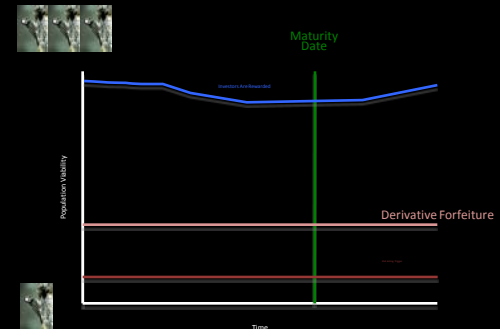
Current Approach: Very Expensive

- \$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



A Second Example: Species Swap



**Government
And/Or
Private-party**

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



**Government
And/Or
Private-party**

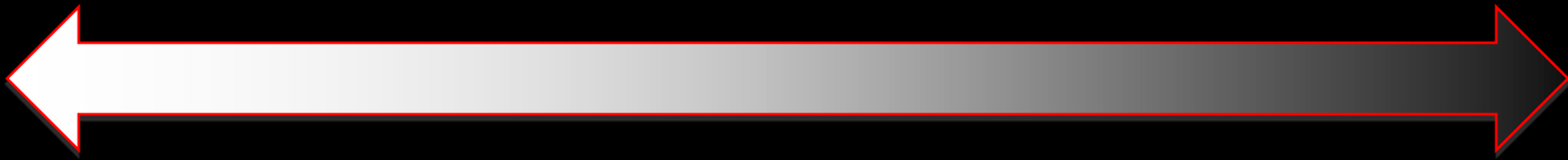
Pays an annual floating rate based on number of tortoises (or other currency) on the land every year after

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.

Pays an annual floating rate based on number of tortoises (or other currency) on the land every year after

Spectrum of Pricing for Biodiversity Performance Bonds



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

Fully Priced
Maximizes Insurance & Risk Transfer^x
(e.g., catastrop)



standards & methodology

ephemeral incentives

third-party verification

biodiversity bonds as a grant program

how does this fit into the ESA?