

Investments, Incentives, & Innovative Finance in Biodiversity Conservation

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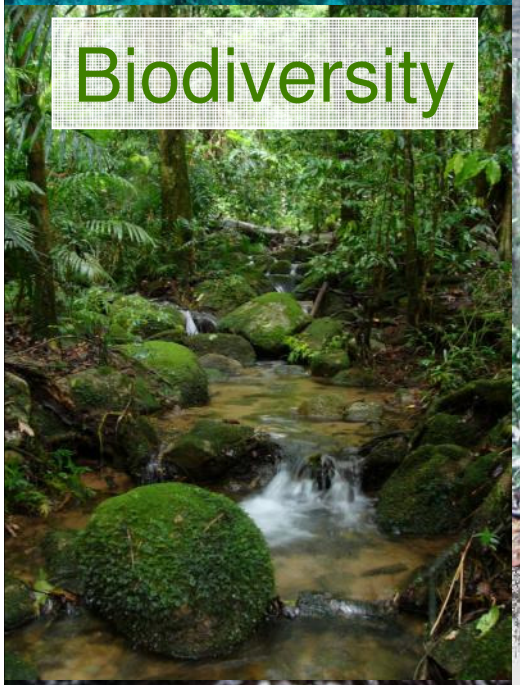
ADVANCED CONSERVATION STRATEGIES

Innovative. Self Sustaining. Economically Efficient.

Idaho wolf found shot April 3, 2008

Biodiversity



Incentives

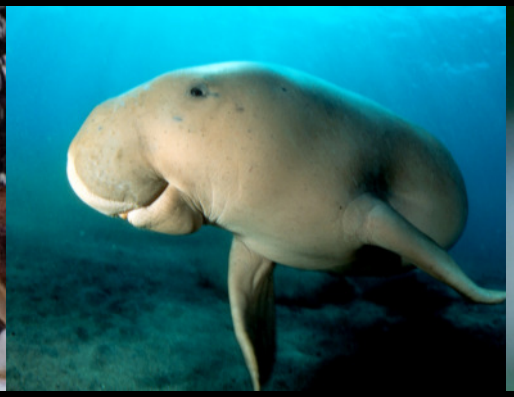
Livelihoods

Idaho wolf found shot April 3, 2008


Global Existence Values
Value Transfer Mechanism
Biodiversity
Local Extractive Values
Incentives
Livelihoods
Idaho wolf found shot April 3, 2008

Investments, Incentives & Innovative Finance in Biodiversity Conservation






- Biodiversity Conservation is a low priority
- Why we need innovative financing
- Investments in biodiversity conservation
- Governments, environmental costs, & market-based tools
- Examples across different socio-political scenarios

- Funding for biodiversity conservation traditionally comes in the form of grants, donations, concessional loans, government budgets
- Multi-laterals (e.g., GEF), NGOs, and foundations
- Low priority for governments, institutions, and individuals compared to other social and political issues

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In 2008: $504 mm of funding by bilateral donors for biodiversity conservation
— equal to 0.32% of total development assistance ($157 billion).

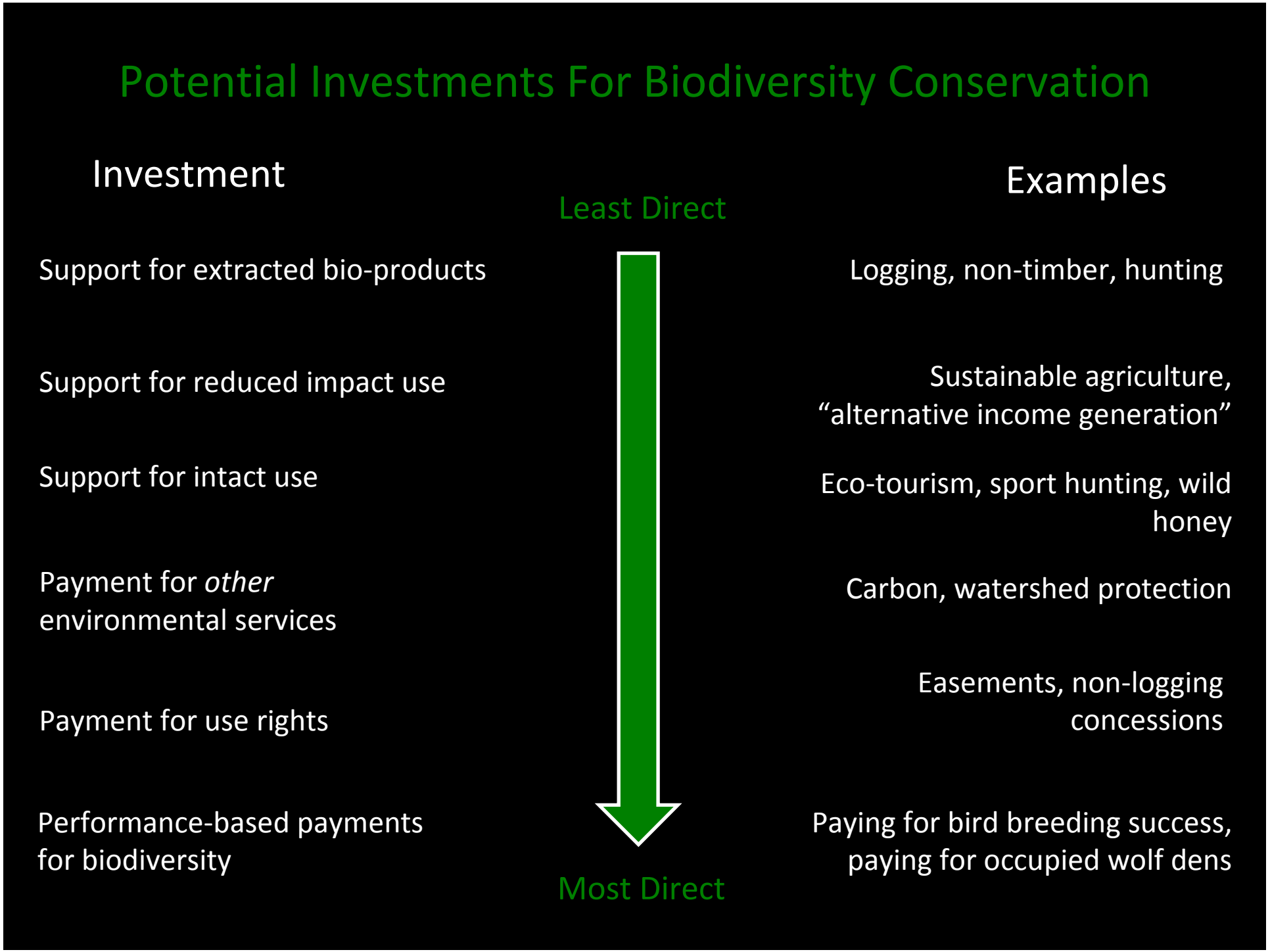
Budgets for Protected Areas in developing countries are short >$2 billion.

In 2005: U.S. households worth >$50 mm gave an average of $1.1 mm to charities—the average giving to environmental initiatives was <$60,000.

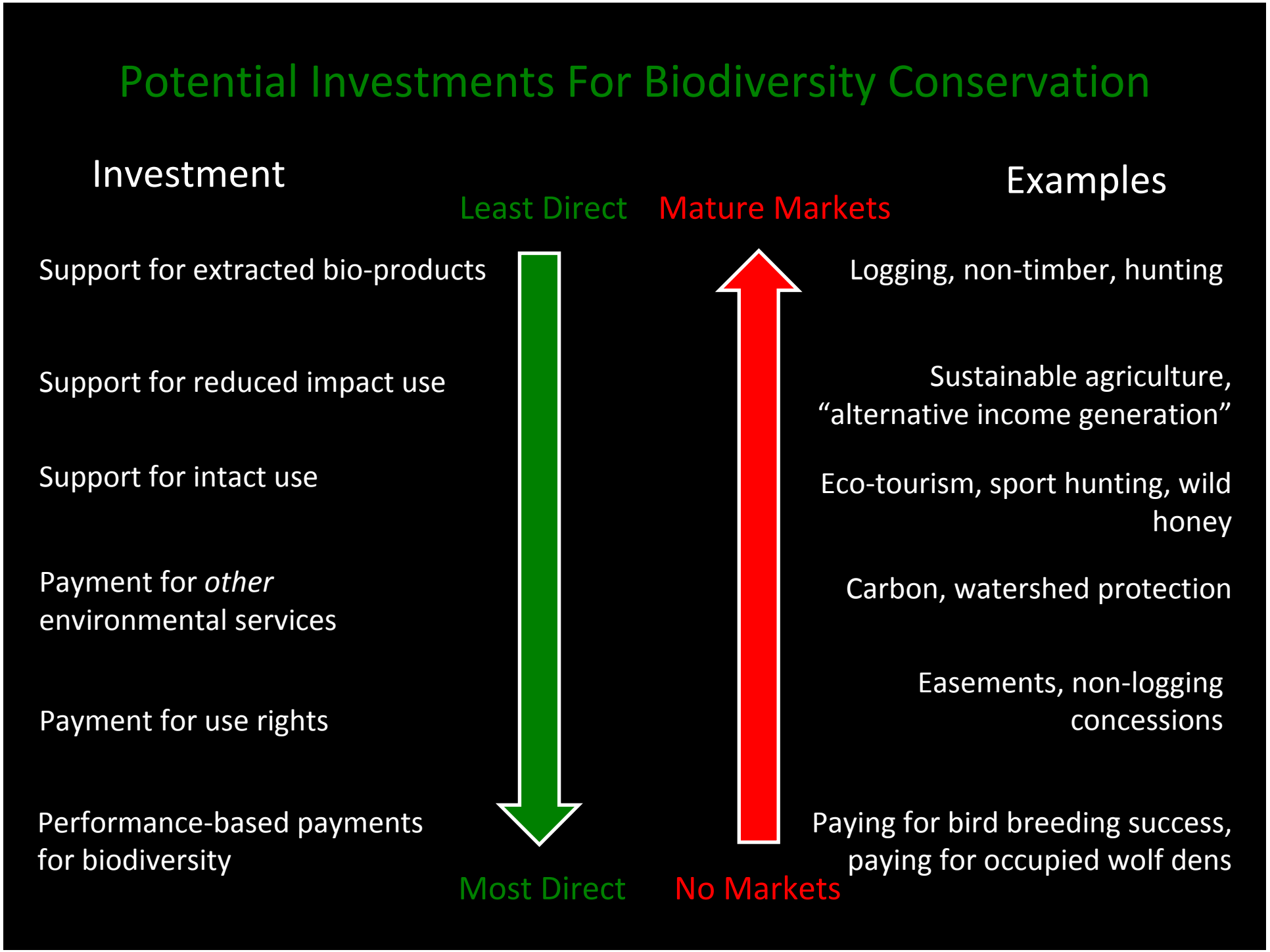
Environmental sector stands to gain the most from developing and implementing innovative finance approaches

Innovative Finance: the use of financial engineering to generate *new* sources of funding or *increase the return on investment* from current funding sources.

Potential Investments For Biodiversity Conservation



Potential Investments For Biodiversity Conservation



How much for those dugongs?

Should we assign economic values to biodiversity?

Counterfactual:

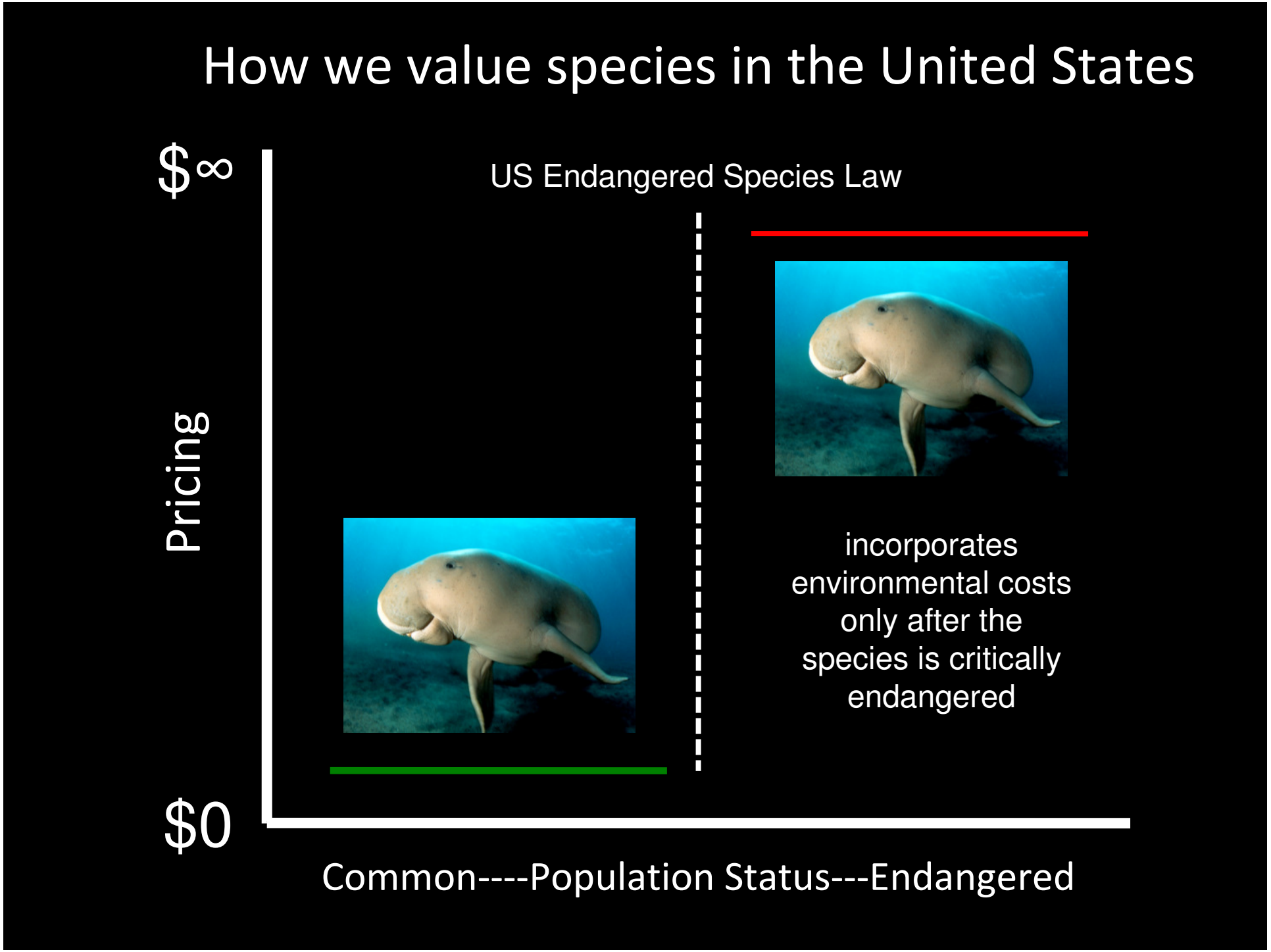
- Concerned with the welfare of a few species
- Drive many more to extinction
- Ignore the majority

Two Approaches

Contingent Valuation: a survey-based economic method for the valuation of non-market resources.

Replacement Cost: the cost of maintaining (or restoring) a population of 500 dugongs.

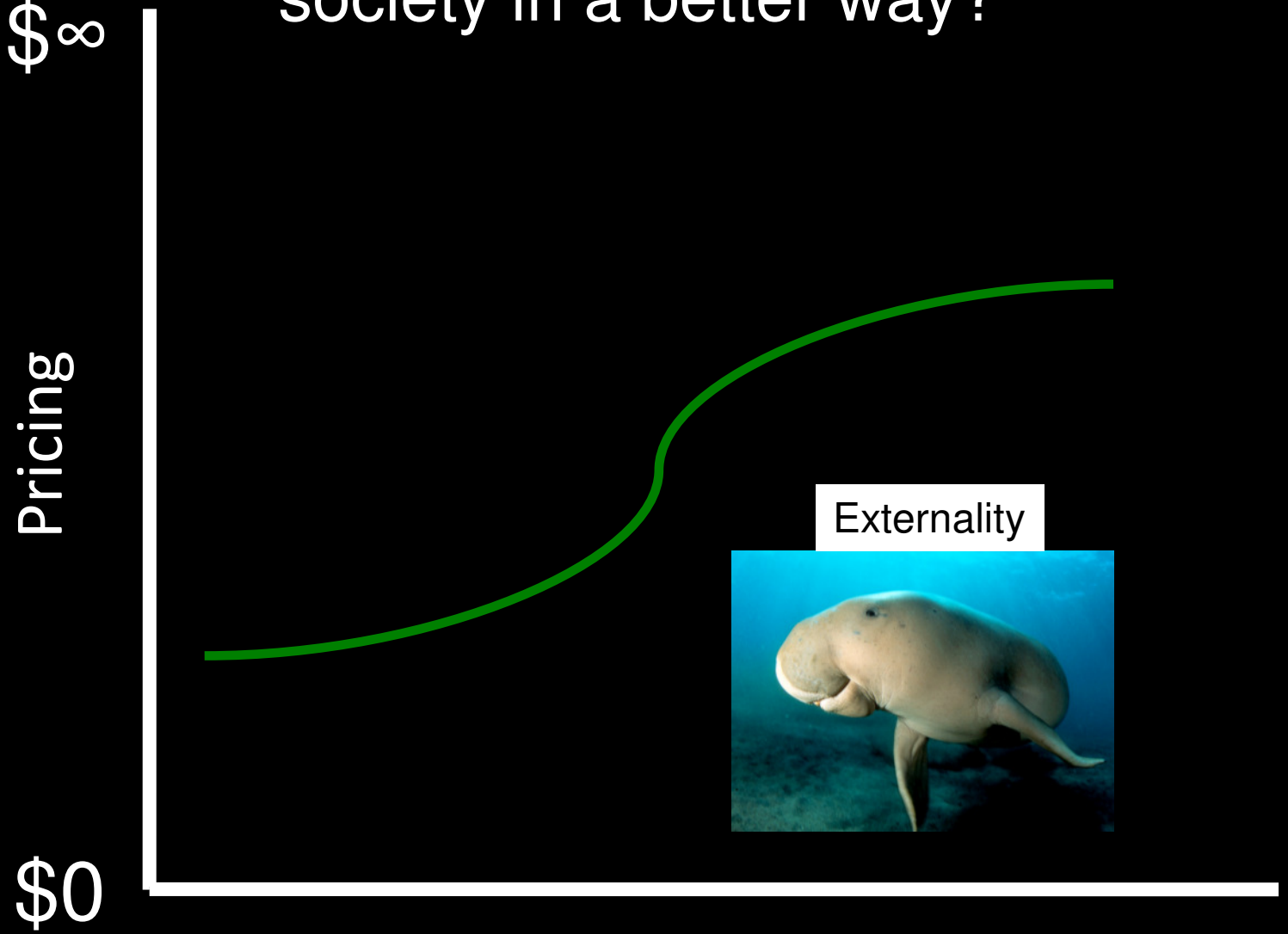
How we value species in the United States



Shoot, Shovel, and Shut-up

Incentives Are Misaligned

How do we incorporate environmental costs into society in a better way?



How do governments incorporate externalities (environmental impacts)?

Direct Regulation or

Market-based Instruments

Taxes: A fee on the production that raises the cost directly

Environmental Assurance Bonds: A fee imposed if social costs are high

Cap and Trade Systems: A fixed and tradable total amount, scarcity drives cost

Offsets: An “in kind” fee, i.e. compensation with a equivalent environmental asset

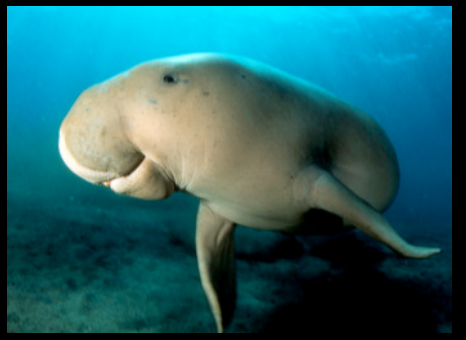
Payment for environmental services: A positive incentive, attempting to reduce the social cost to zero

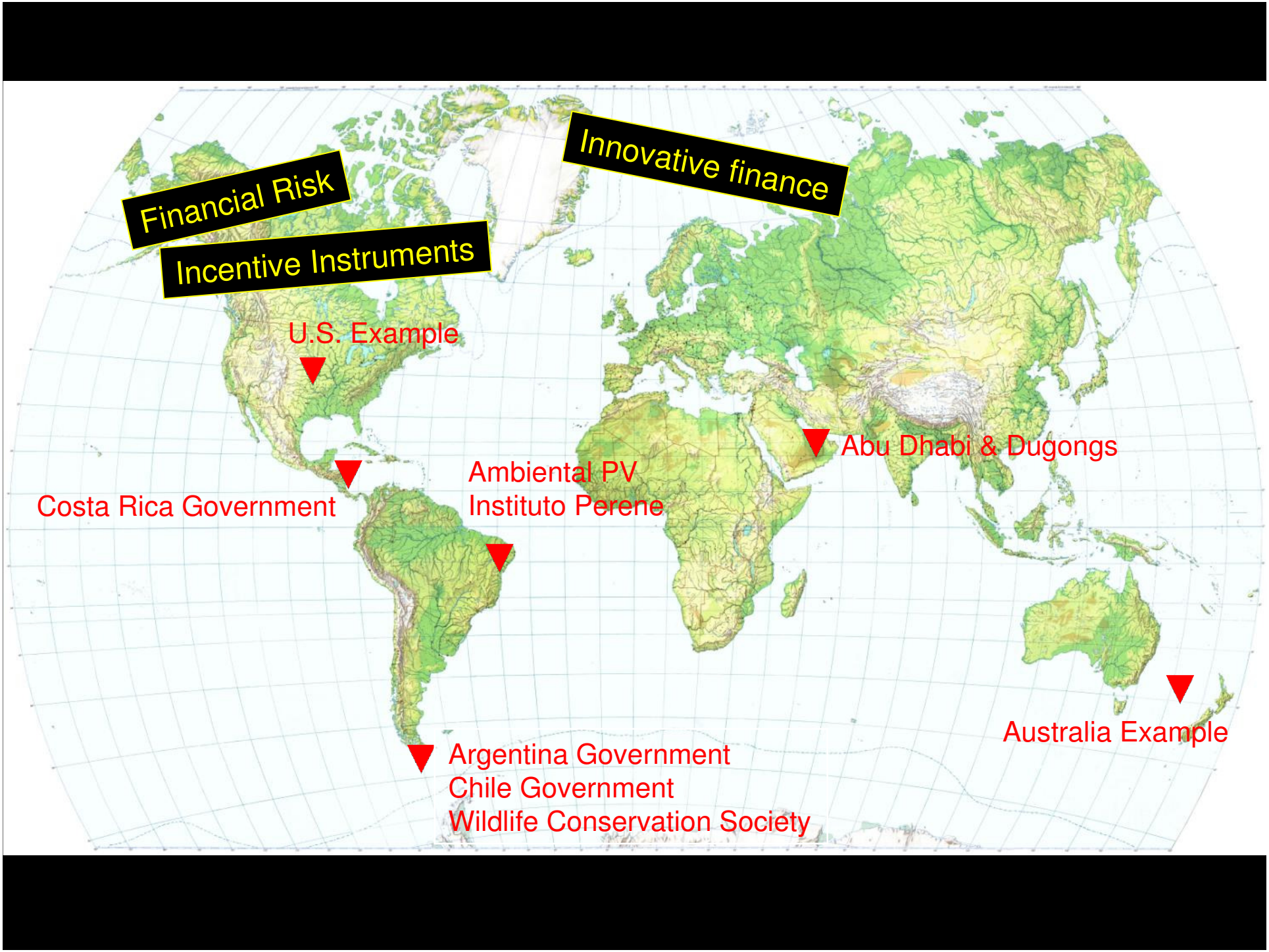
Advantages, challenges, and requirements for each approach

How do governments incorporate externalities (environmental impacts)?

Direct Regulation or

Market-based Instruments




Financial Risk
Incentive Instruments
Innovative finance
U.S. Example
Costa Rica Government
Ambiental PV
Instituto Perene
Abu Dhabi & Dugongs
Australia Example
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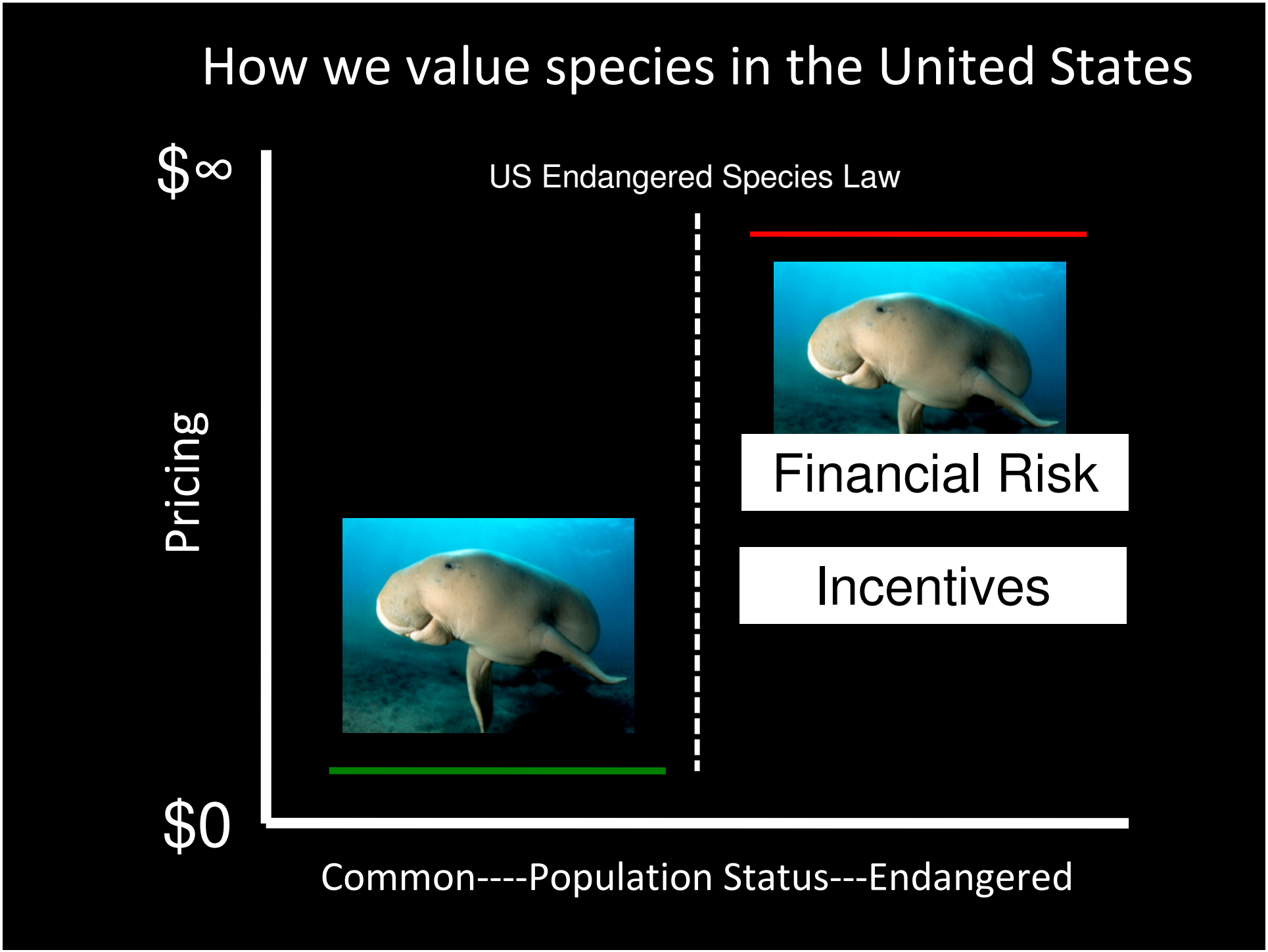
Wildlife Conservation Society

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 and last-minute recovery actions
- Costs of species recovery are sometimes ignored

How we value species in the United States

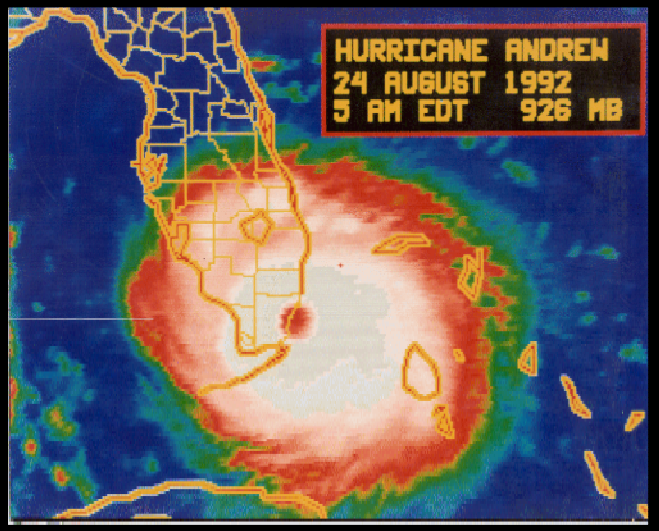


Financial Risk

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.

Financial Risk

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.

Financial Risk

Humanitarian Insurance

Rainfall in Ethiopia is directly linked to crop failure, which is linked to famine.

UN WFP faces uncertainty and risk with famine relief, leading to inefficiencies and high costs.

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

Paris RE buys the derivative at a discount in exchange for face value if the “event” does not occur. Otherwise, the Paris RE loses.

WFP

PARIS RE

Incentives

Employee Stock Options

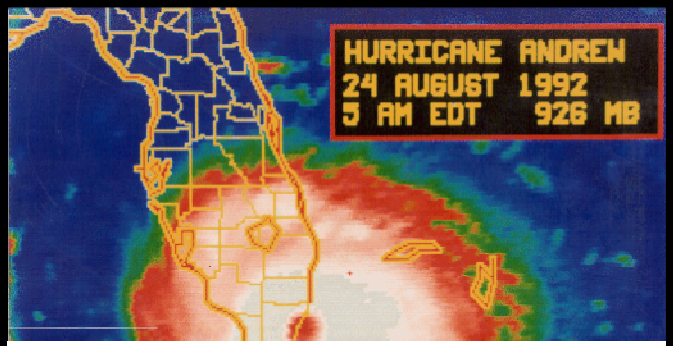
ESOs give employees the potential for future ownership of the company for which they work.

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 Contracts



Reduce Risk

Align Incentives

Biodiversity Contracts: 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 (e.g., $100 for $90) 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

"Investors" Are Rewarded

Population Viability

Bond Forfeiture

ESA Listing Trigger

Species undergoes unpredicted decline
Investors forfeit their investment
Money is available for 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

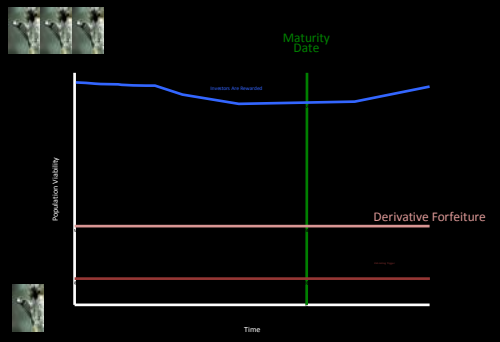
Biodiversity Contract: What about the costs?

Current Approach: Very Expensive

- $4.4 million per year: cost of meeting ESA's goal of 500 active groups

A Biodiversity Contract 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

A Second Example: Species Swap

Government And/Or Private-party

Pays an annual fixed rate based on number of tortoises (i.e., agreed upon proxy and methodology) on the land at the time of project initiation

10 tortoises @ $1
$10 total

Government And/Or Private-party

Pays an annual fixed rate based on number of tortoises (i.e., agreed upon proxy and methodology) on the land at the time of project initiation

10 tortoises @ $1
$10 total

Government And/Or Private-party

Pays an annual floating rate based on number of tortoises (i.e., agreed upon proxy and methodology) on the land every year after

10 tortoises @ $1
$10 total

YEAR 1

Pays an annual fixed rate based on number of tortoises (i.e., agreed upon proxy and methodology) on the land at the time of project initiation

10 tortoises @ $1
$10 total

Government And/Or Private-party

Nets $5

Pays an annual floating rate based on number of tortoises (i.e., agreed upon proxy and methodology) on the land every year after

5 tortoises @ $1
$5 total

YEAR 2

Pays an annual fixed rate based on number of tortoises (i.e., agreed upon proxy and methodology) on the land at the time of project initiation

10 tortoises @ $1
$10 total

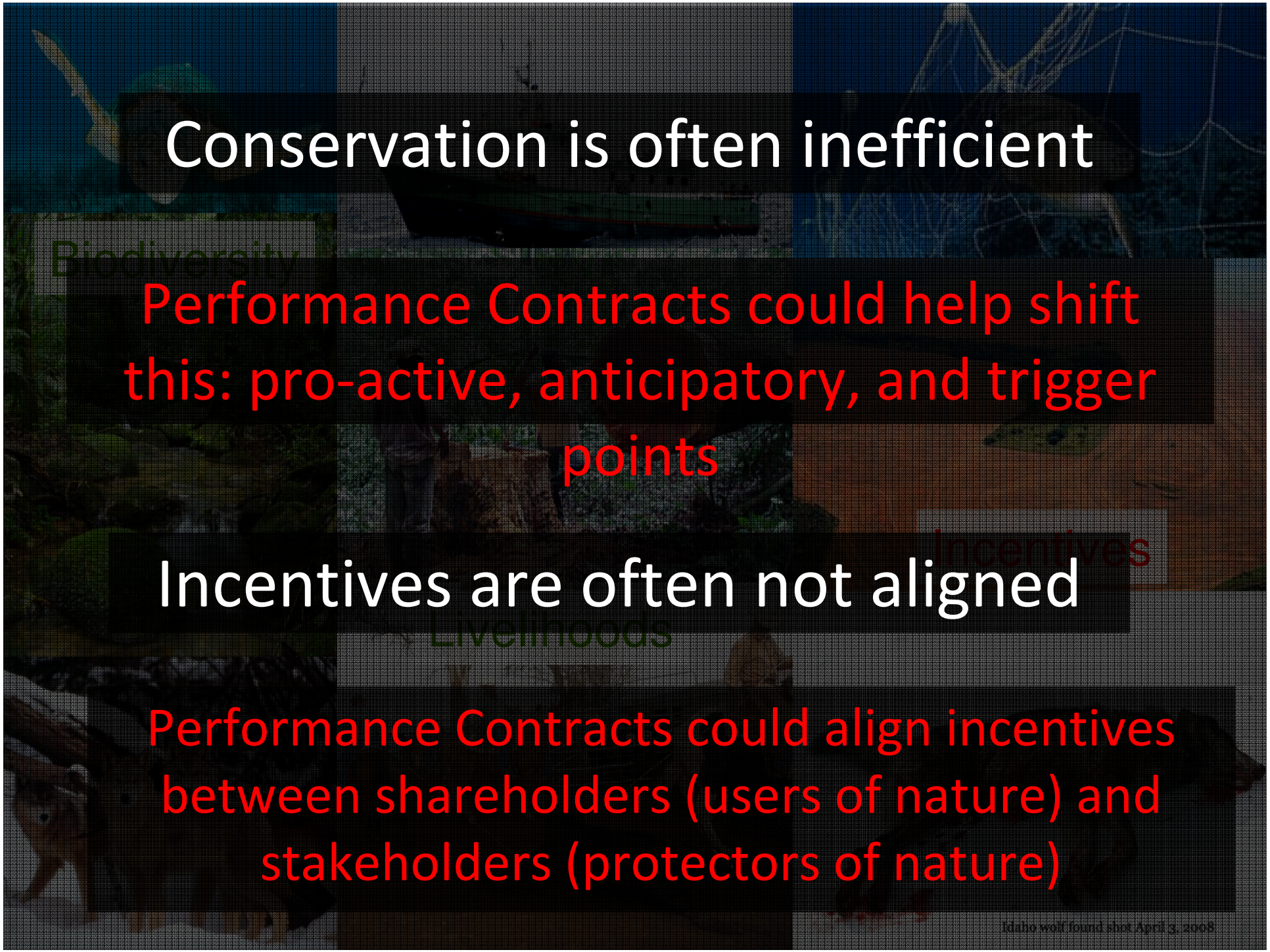
Nets $5

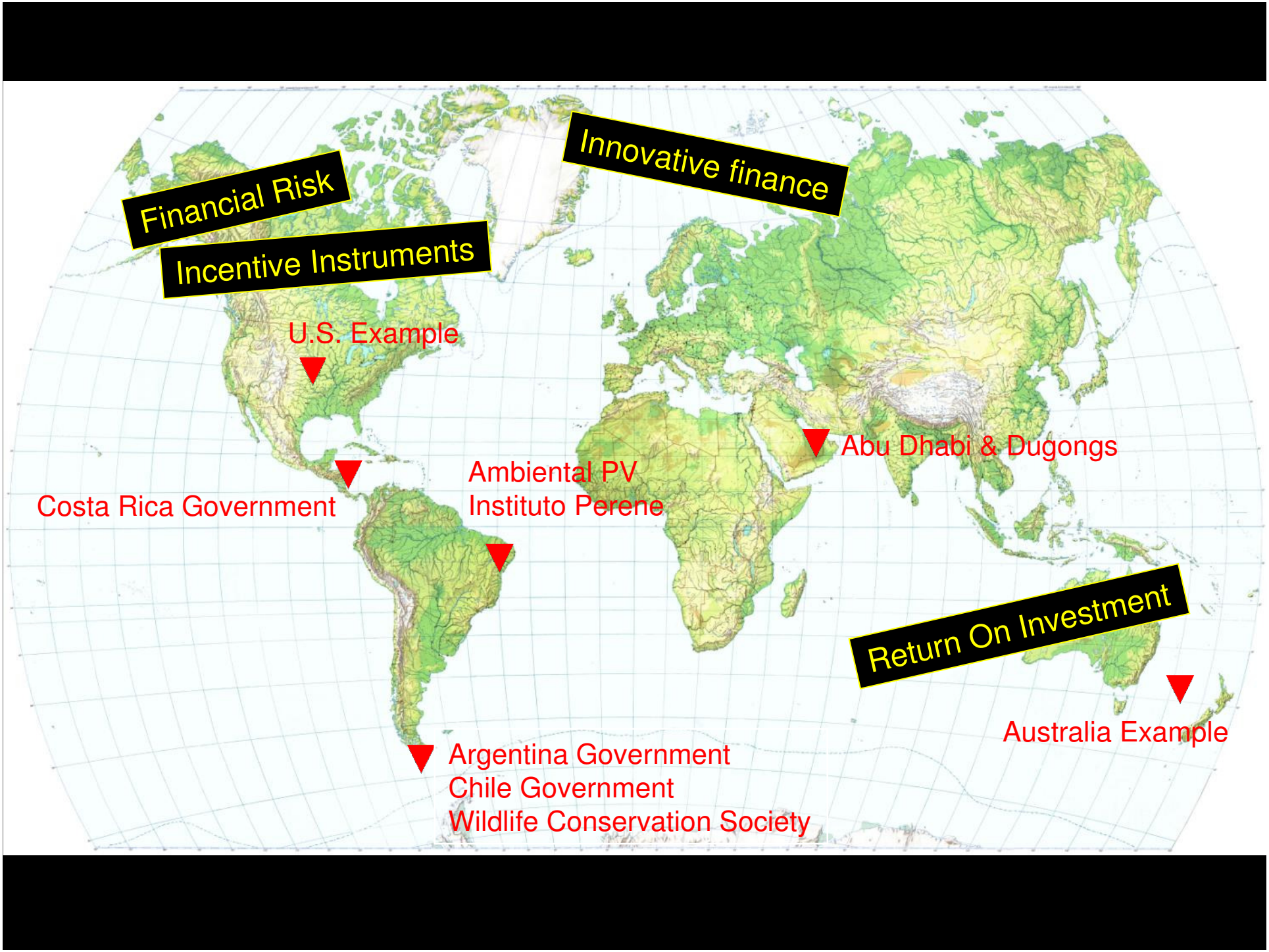
Government And/Or Private-party

Pays an annual floating rate based on number of tortoises (i.e., agreed upon proxy and methodology) on the land every year after

15 tortoises @ $1
$15 total

YEAR 2


Conservation is often inefficient
Performance Contracts could help shift this: pro-active, anticipatory, and trigger points
Incentives are often not aligned
Performance Contracts could align incentives between shareholders (users of nature) and stakeholders (protectors of nature)
Idaho wolf found shot April 3, 2008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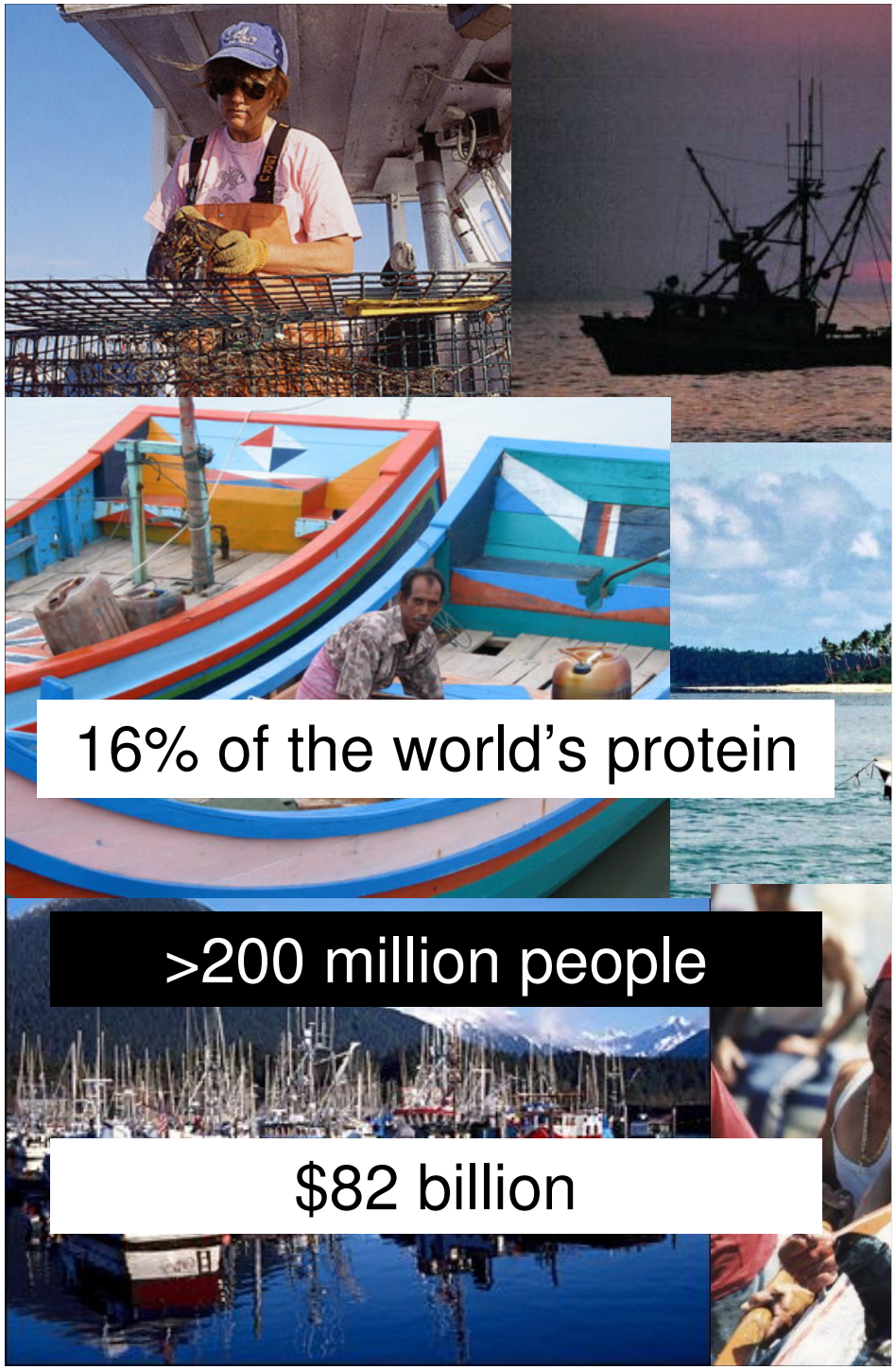
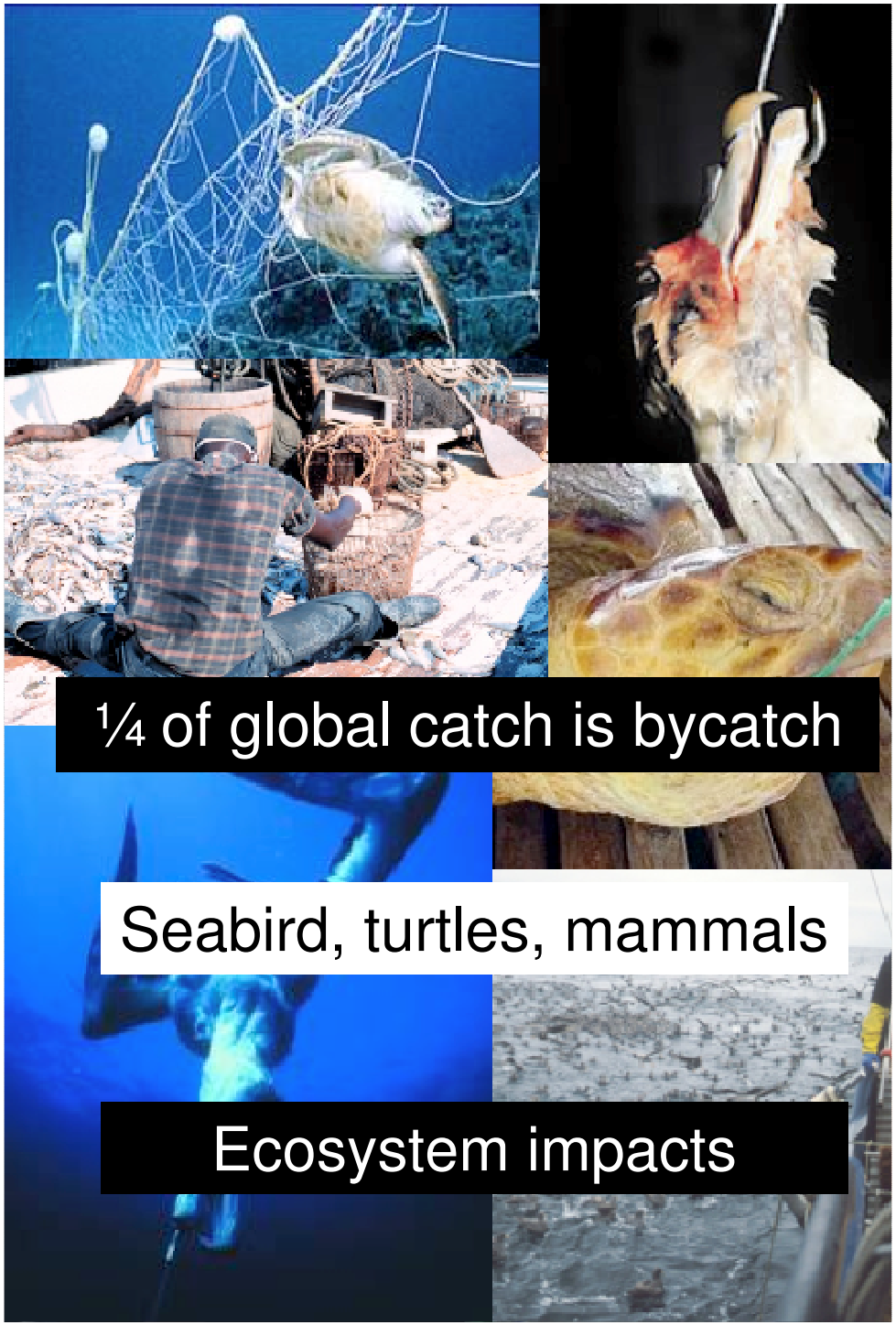
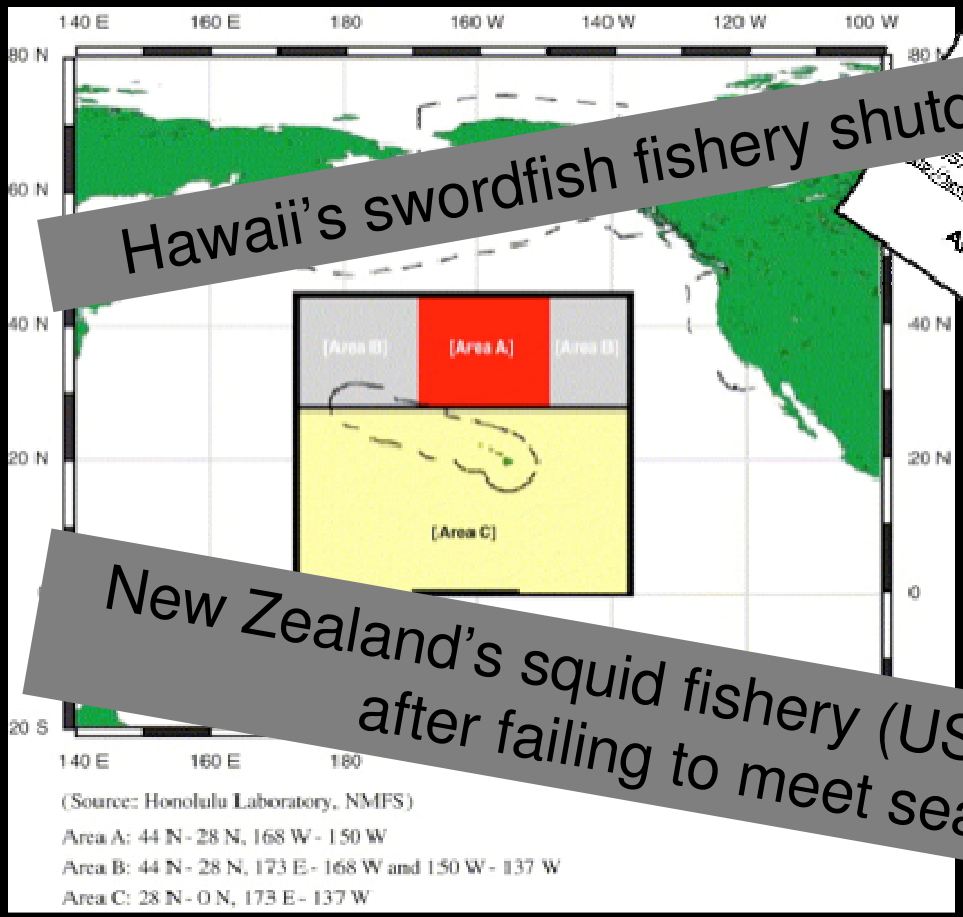
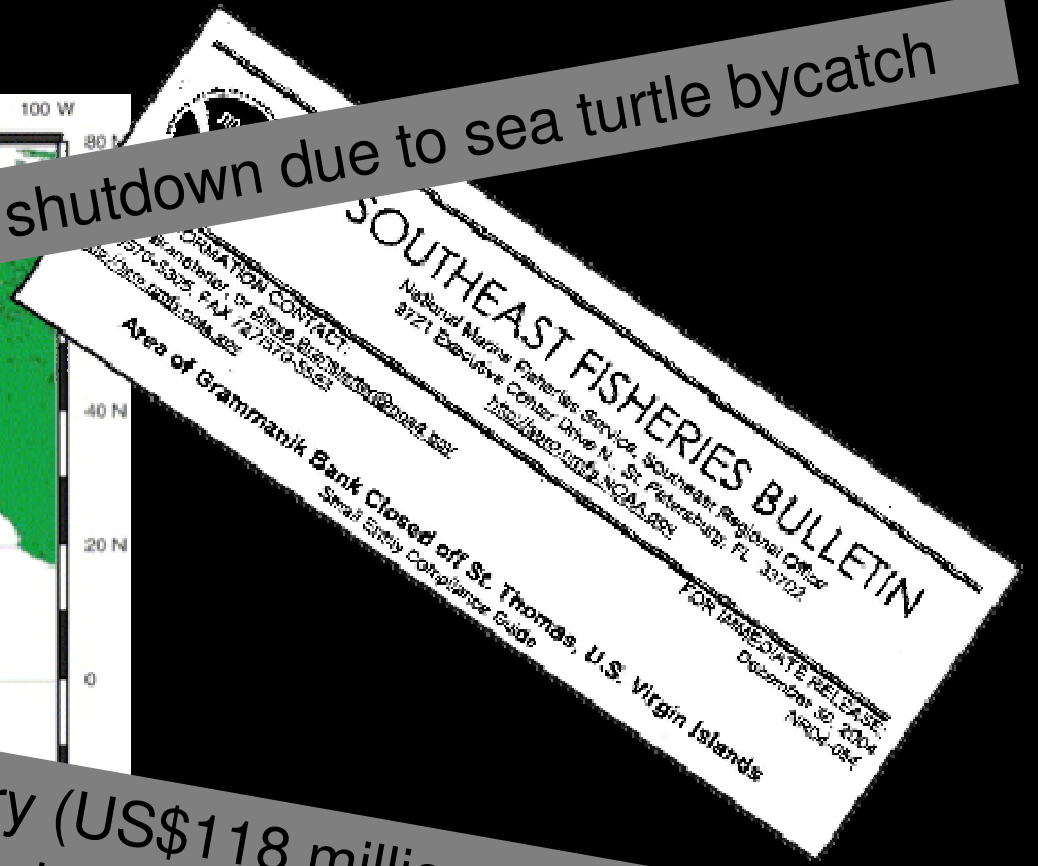

16% of the world's protein
>200 million people
$82 billion


¼ of global catch is bycatch
Seabird, turtles, mammals
Ecosystem impacts

The social and economic importance of fisheries and the biological realities of overfishing and bycatch result in major tensions over ocean resources



Hawaii's swordfish fishery shutdown due to sea turtle bycatch



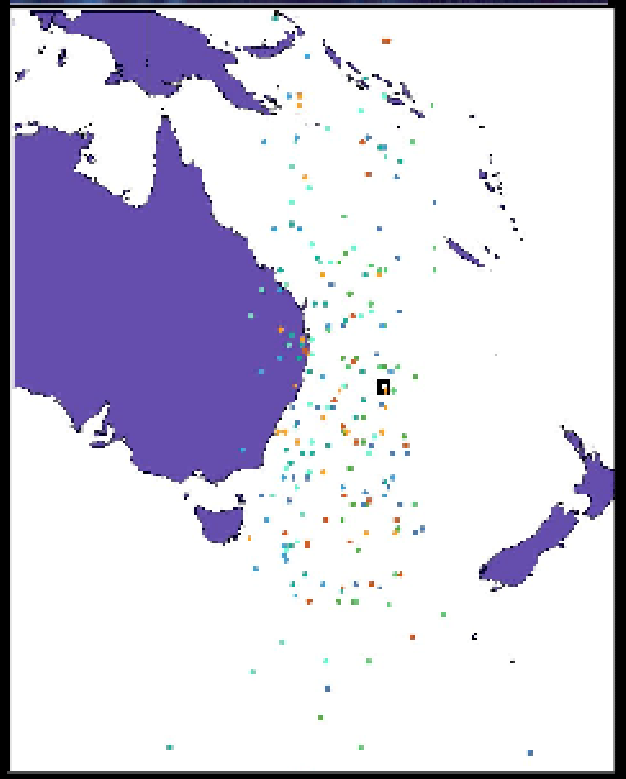
New Zealand's squid fishery (US$118 million / year) sent home after failing to meet seabird bycatch quotas

Flesh-footed Shearwaters

Breed on Lord Howe Island

Invasive rats are present

Overlap entire fishery

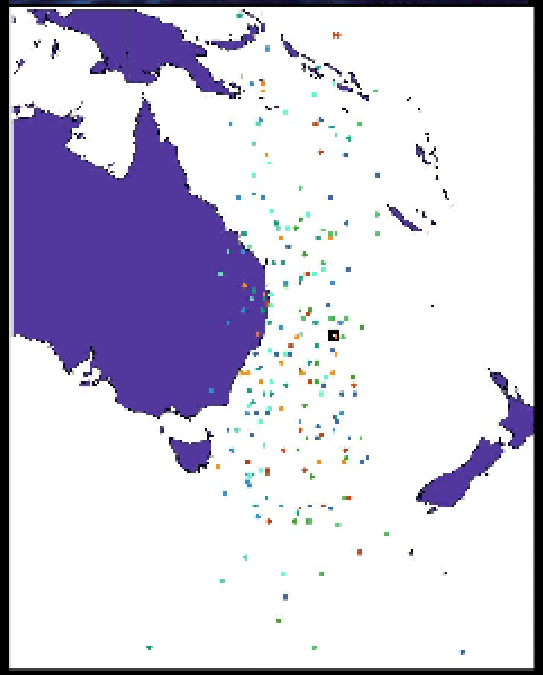


Australia's Eastern Tuna & Billfish Fishery

- $30-70 million annually
- Regulated and responsible
- Gear modifications are not effective for some species
- Facing closure with new regulations

Flesh-footed Shearwaters: Mortality Portfolio

eggs	rat predation / habitat loss
chicks	rat predation / plastic
juveniles	rat predation / bycatch
adults	bycatch

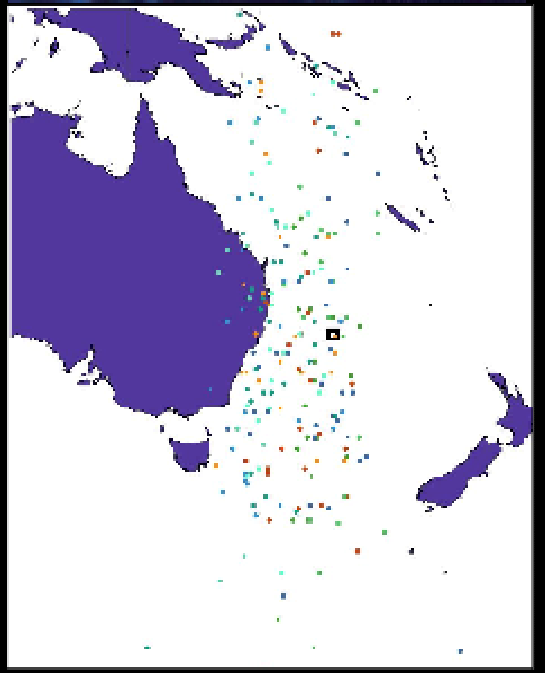


A Return On Investment Approach

Goal: compare cost-effectiveness of fishery closures and eradication program for rats

Demographics (% change in λ)

- age structured population model
- fishery observer / necropsy data
- rat impacts



Economics (net present value @ 5% inflation)

- estimated $ of closure around L. H. Island to meet mandated levels - value of catch as the opportunity cost
- cost of rat eradication

Cost-effectiveness of Interventions

Country A

Commercial Fishery

Land-based User

Country B

Artesanal Fishery

Marine-based User

Convention on Biological Diversity & Bycatch

1. Avoid

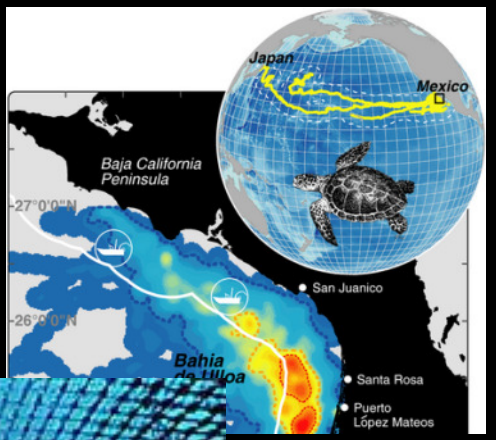
Fleet communication systems

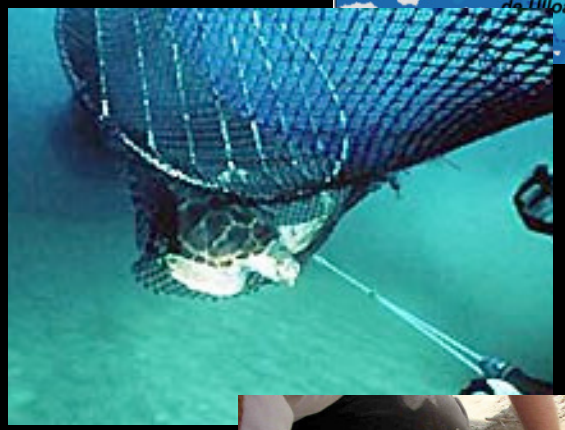
2. Mitigate

Tori poles, circle hooks, weighted lines

3. Offset

Funding measurable conservation interventions





Convention on Biological Diversity & Bycatch

3. Why Offset?

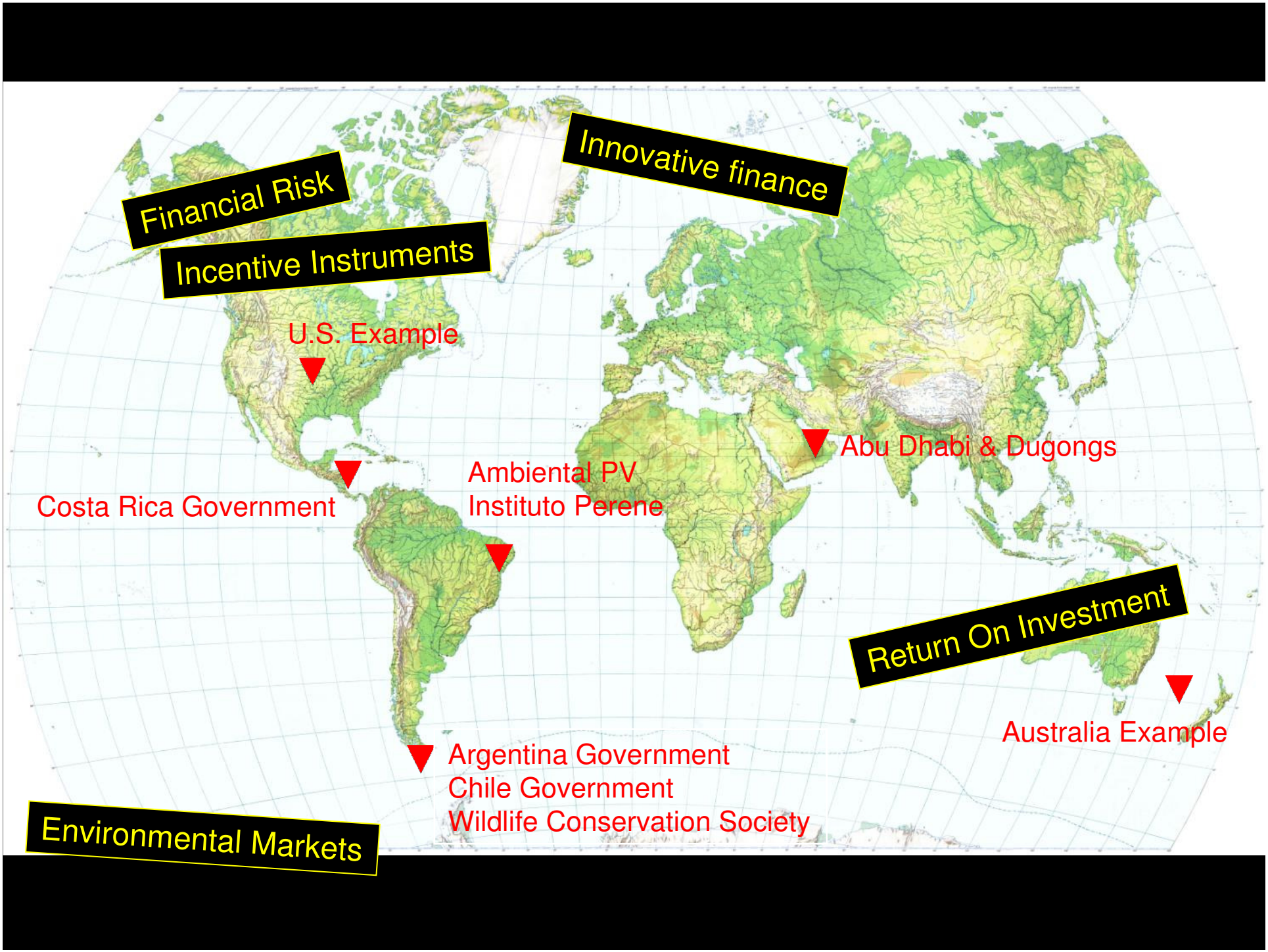
Funding measurable conservation interventions

Opportunities for conservation gains

- Cost-effective

Opportunity for net neutral impact

- Business case: market access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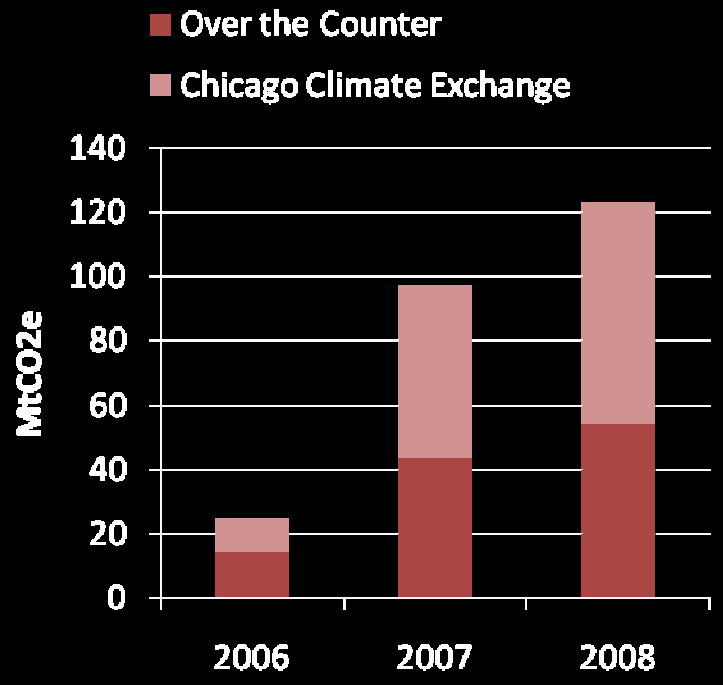
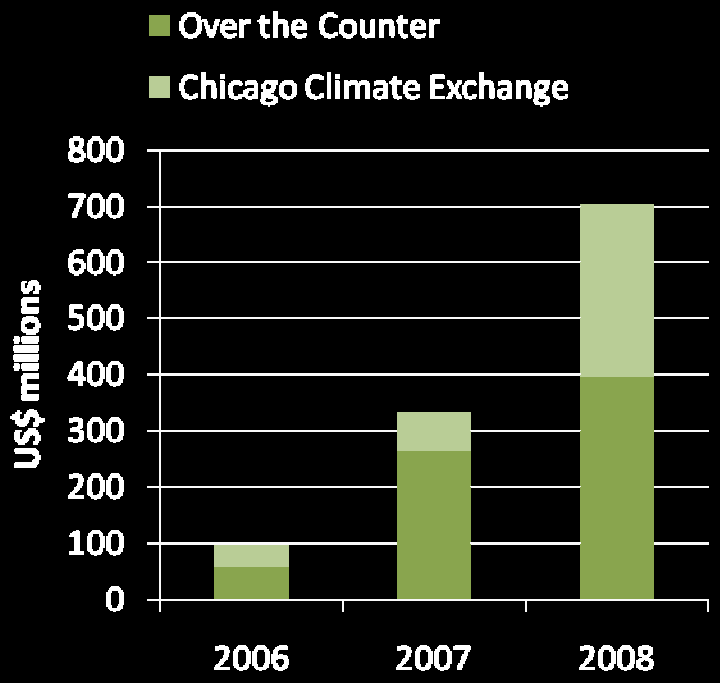
Environmental Markets

In 2008:

- The global carbon market was worth $120 billion.
- The voluntary carbon market was worth $700 million.
- Reforestation, Forest Management & Avoided Deforestation: 3% of transactions on the voluntary carbon market.
- Middle East: 15% transactions on the voluntary carbon market.





Beavers in Tierra del Fuego

>7 million ha (27,000 km^2 waterways

Colonized the mainland

Degrading biodiversity & ecosystem services and threaten the economy

Feasible to remove but unprecedented

Cost >US$30 mm

All approved Chile GEF Biodiversity Projects since 1991: $29 mm

Remove Beavers

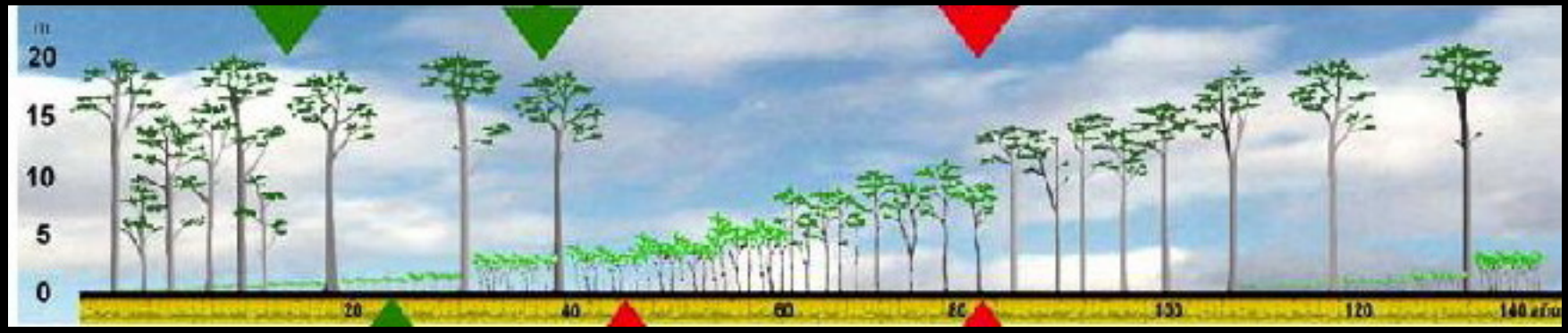
Potential for Carbon Financing?

Imagine the following scenario…

Riparian Forest	1 hectare
Estimated 30-year Carbon storage	36.3 tonnesCO_2
Gross revenue @ $2.00 per tonne CO_2	$72.60
Gross revenue @ 16.00 per tonne CO_2	$580.80

Are restoration costs (eradication + reforestation) less than potential carbon revenue?

75% of TDF+Riparian Area (± 30m)	90,000 hectares
Estimated 30-year Carbon storage	3,269,970tonnes CO_2e



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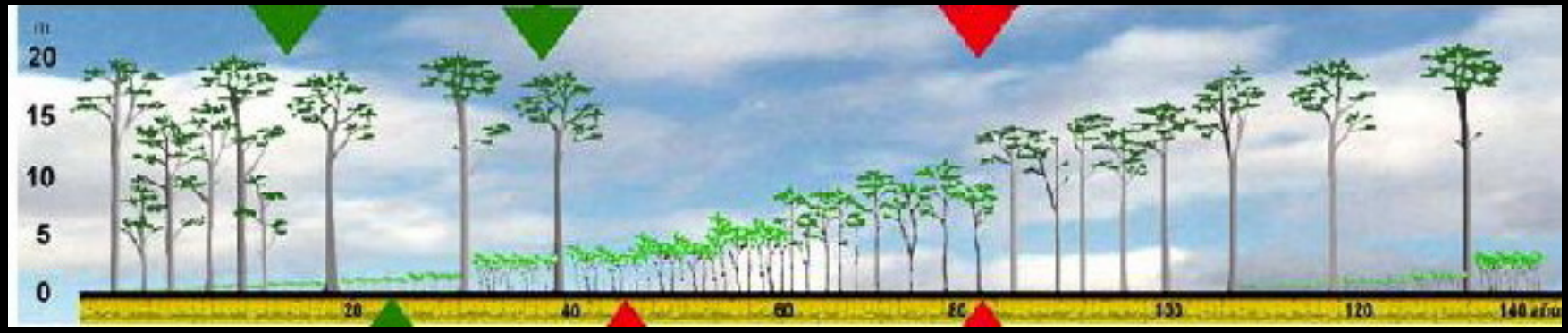

How much carbon is that?

- USA 2006: 5.7 billion
- UAE 2006: 110 million
- Chile 2006: 6 million

Annual CO_2e emissions:

- BHP Billiton: 382,000
- British Petroleum: 595,000
- Rio Tinto: 710,000
- Coca Cola Company: 5,000

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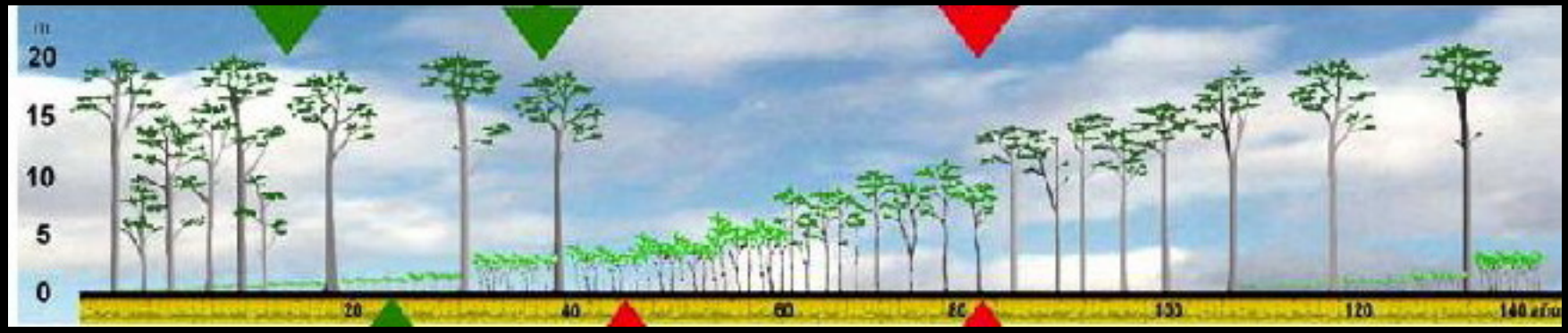
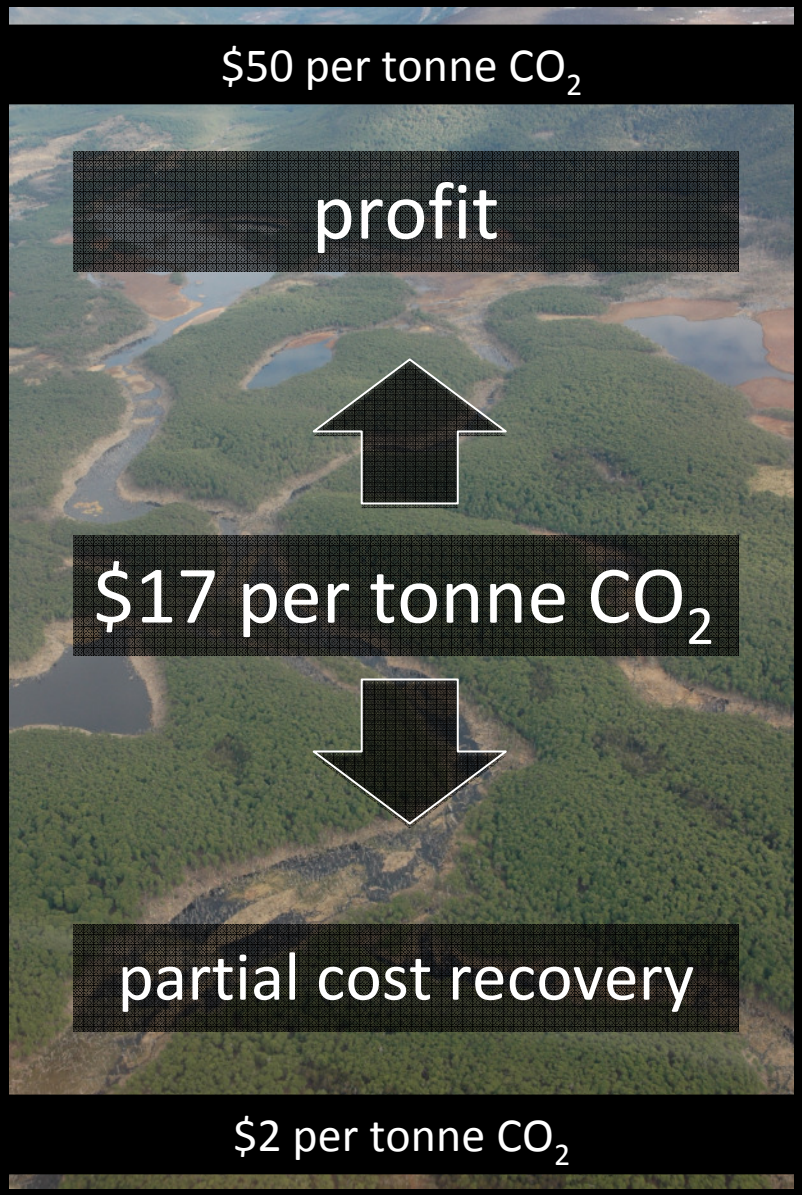


Estimated Eradication Cost	$32.0 million
Estimated Reforestation Costs ($93 ha^{-1})	$8.4 million
Fencing for Guanaco ($201 ha^{-1})	$18.1 million
Total Restoration Costs	**$58.5 million**

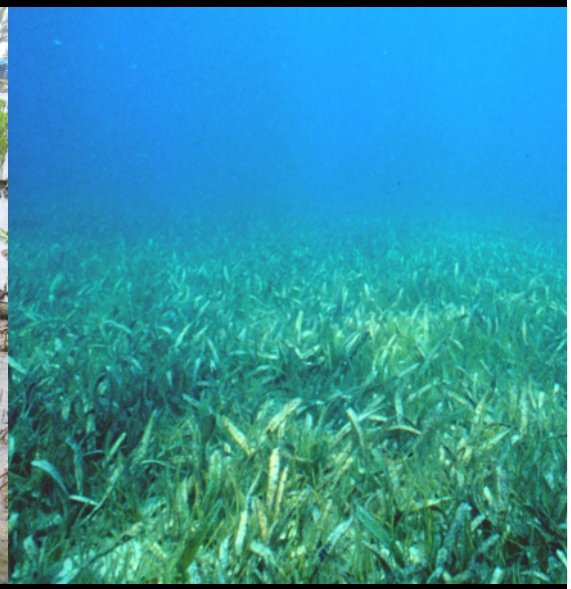
Are restoration costs less than potential carbon revenue?



Price on the carbon market(s) that would pay for the entire project ($58.5 mm)

Opportunities for Blue Carbon?

Riparian Forest	1 hectare
Estimated 30-year Carbon storage	36.3 tonnesCO_2
Mangroves	56.7tonnesCO_2
Salt March	71.1 tonnesCO_2
Sea Grass	41.1 tonnesCO_2

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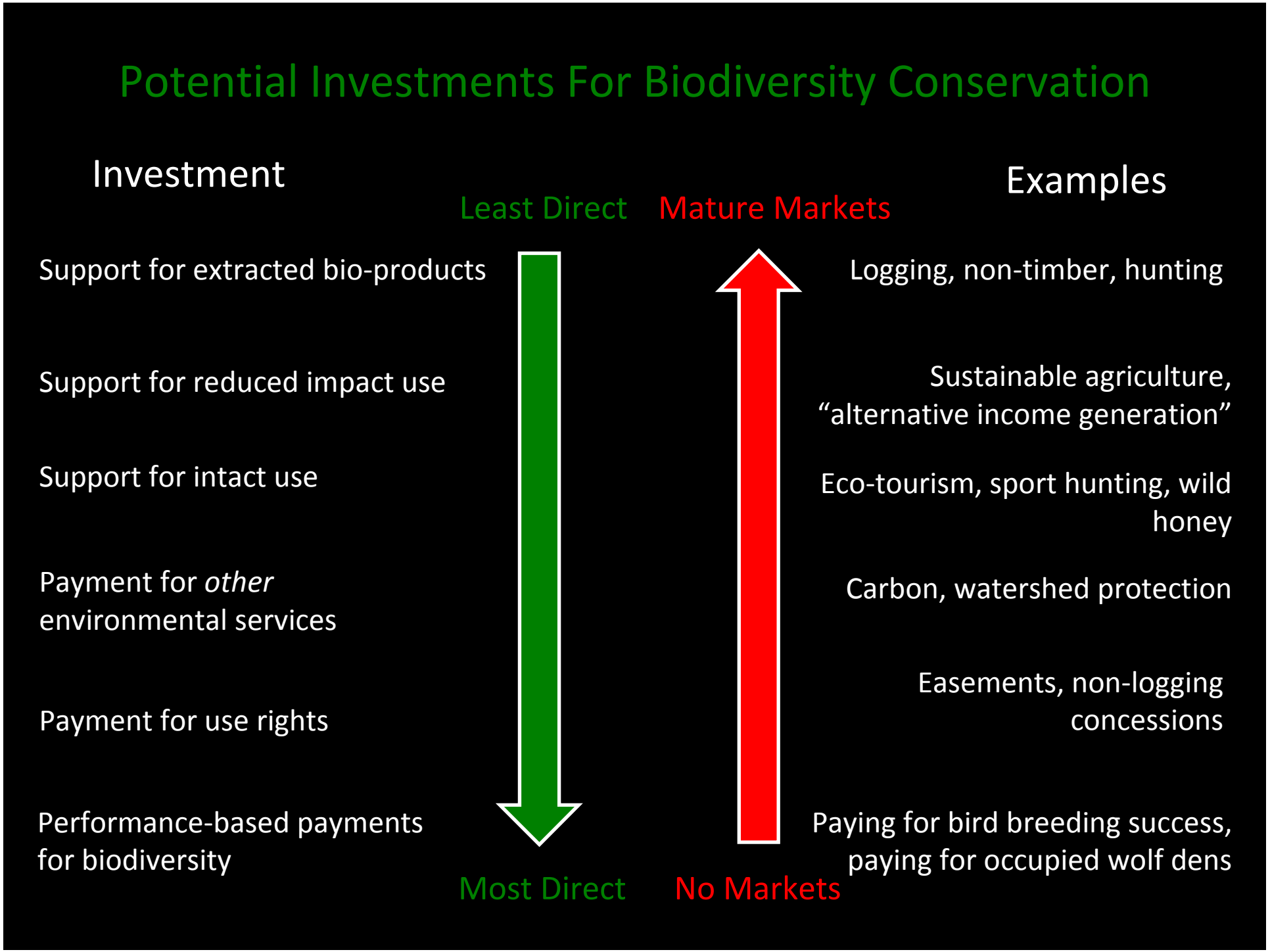
Potential Investments For Biodiversity Conservation



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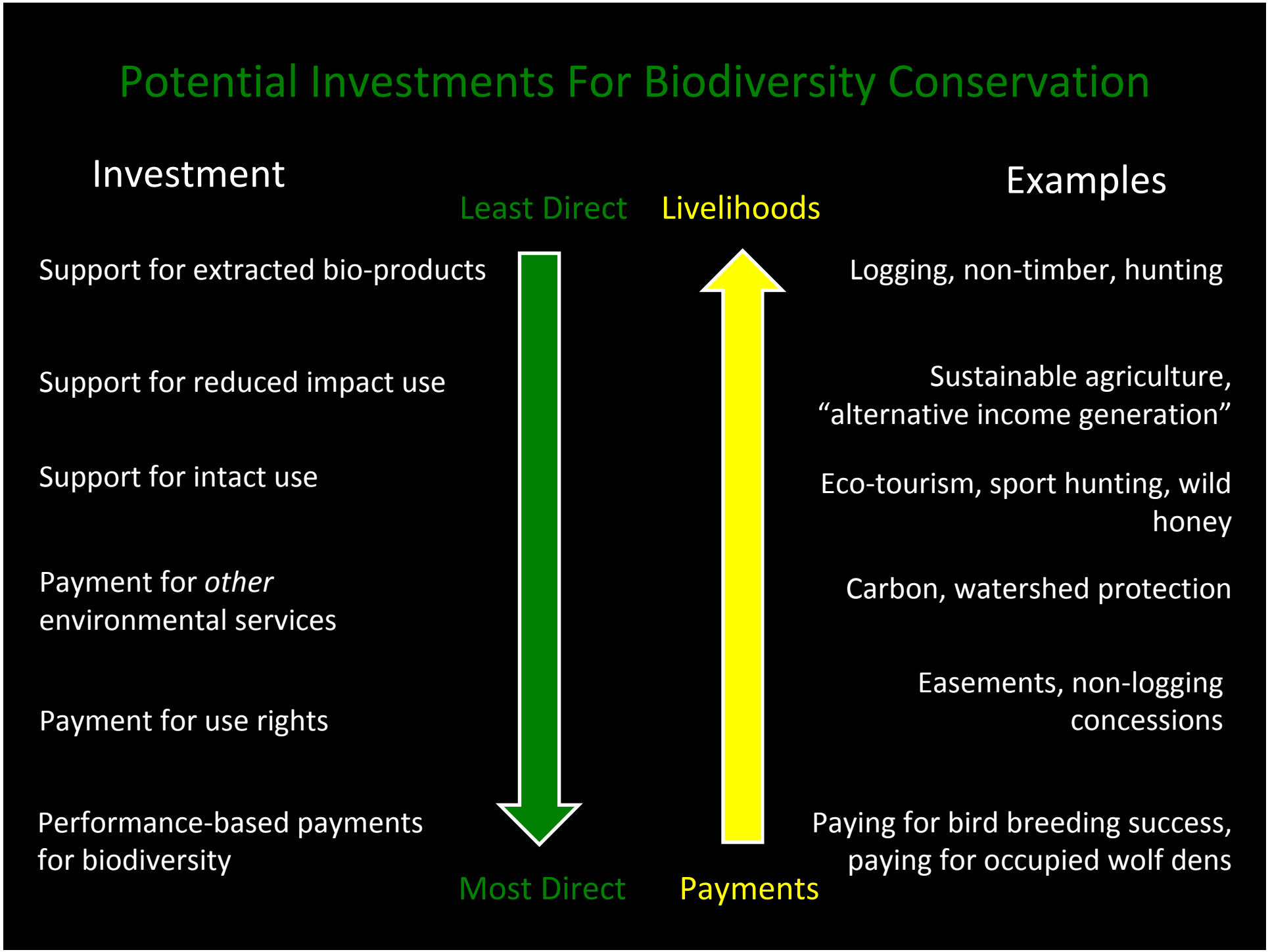

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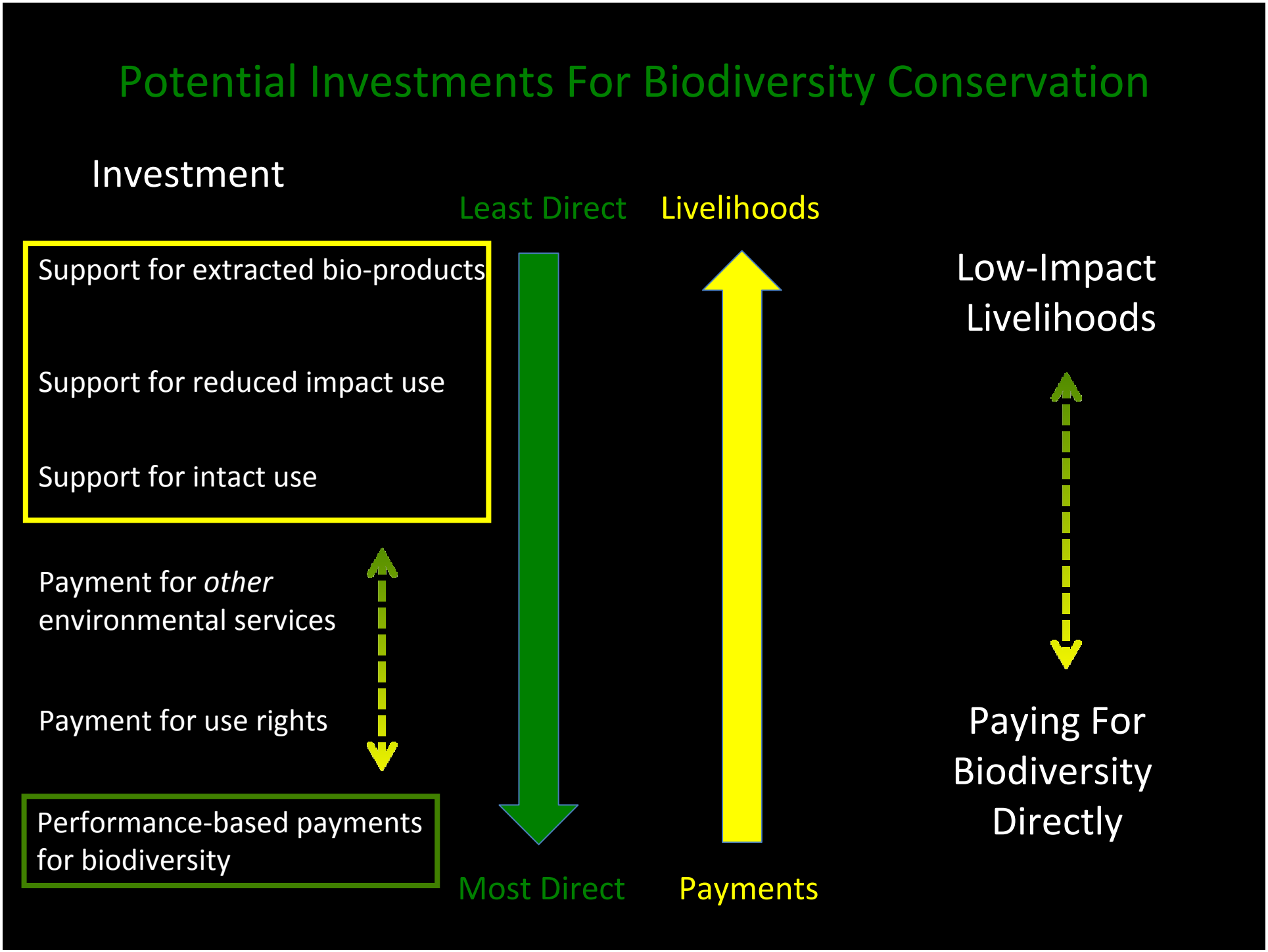
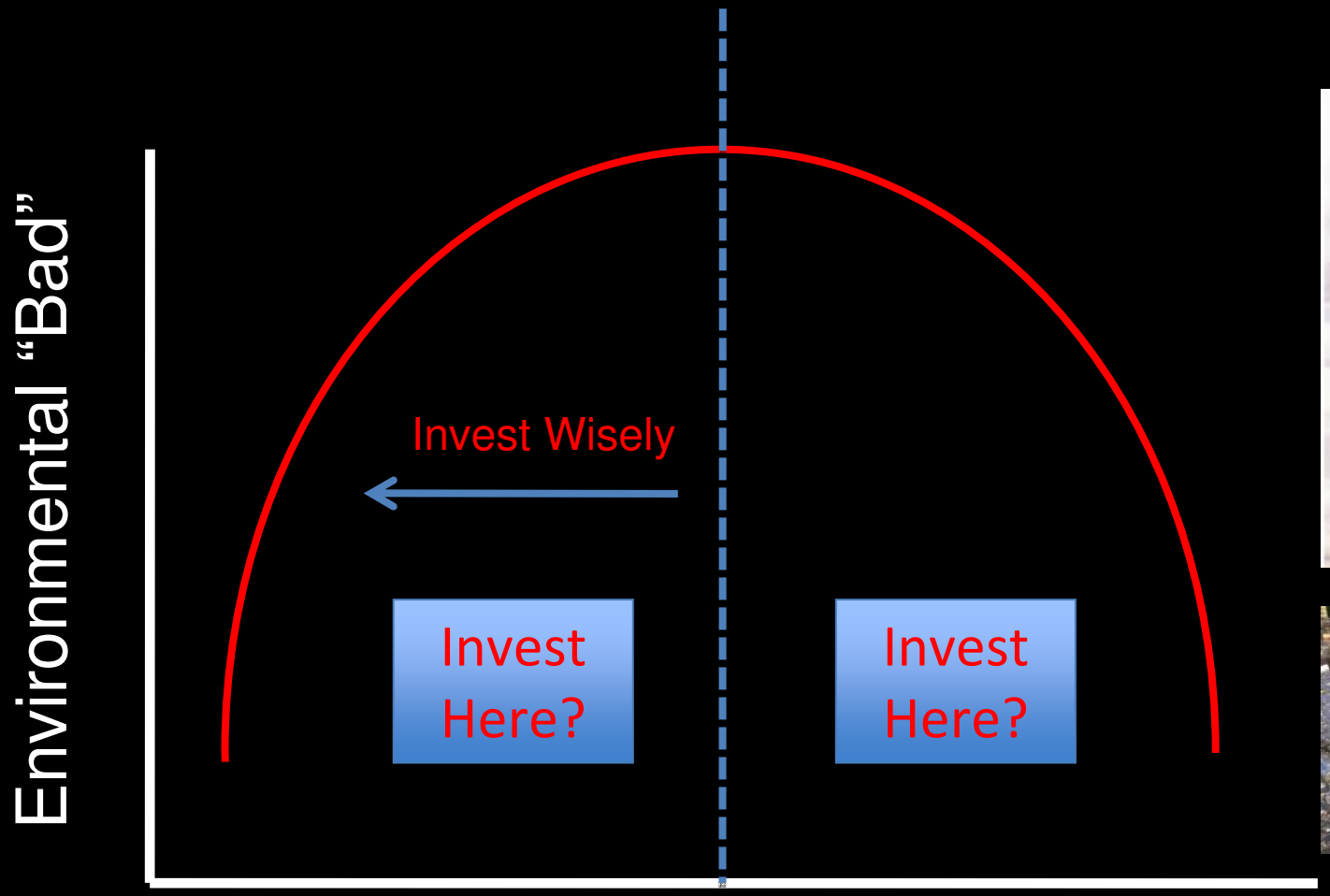
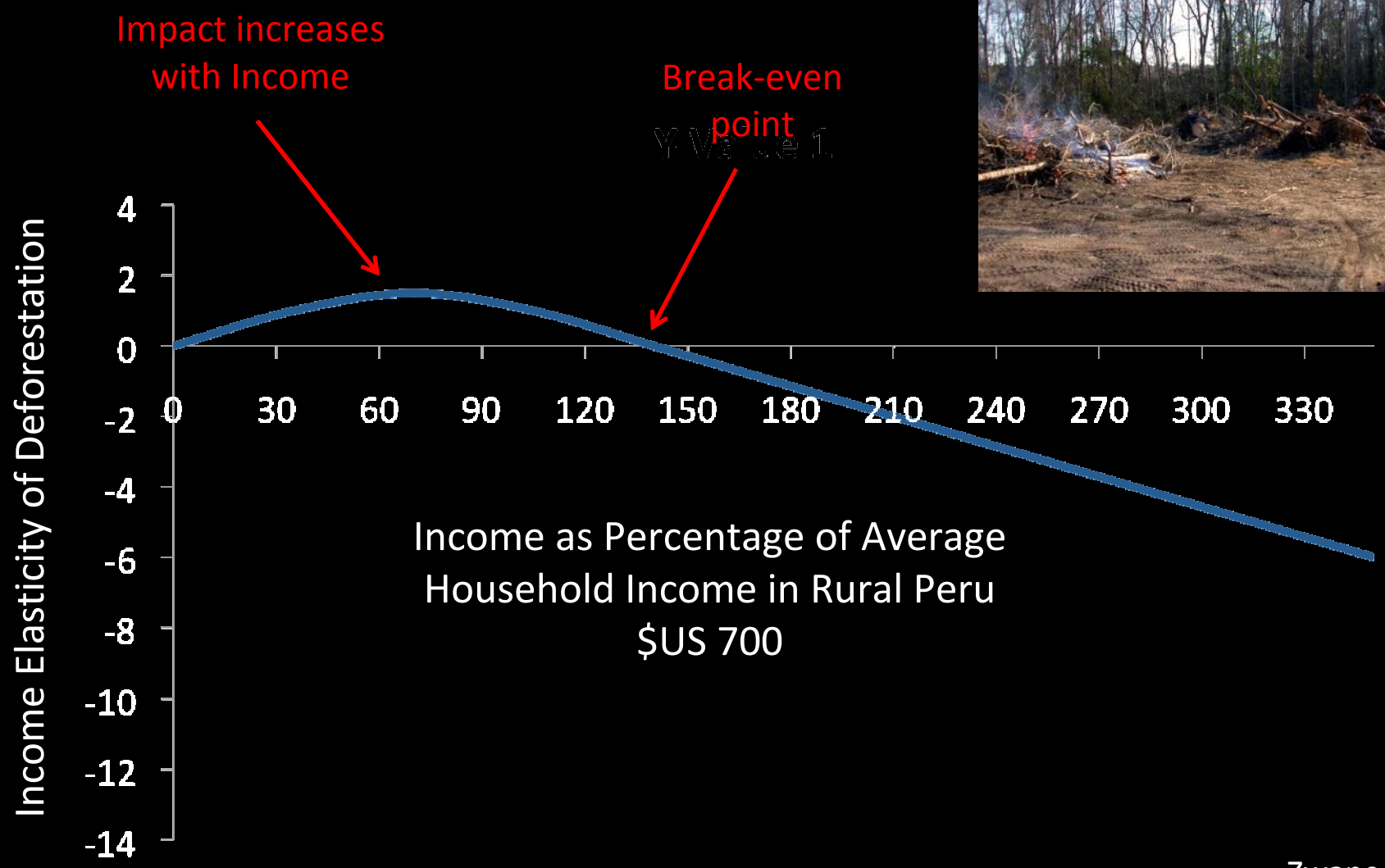


Biodiversity Investments Along The Environmental Kuznets Curve

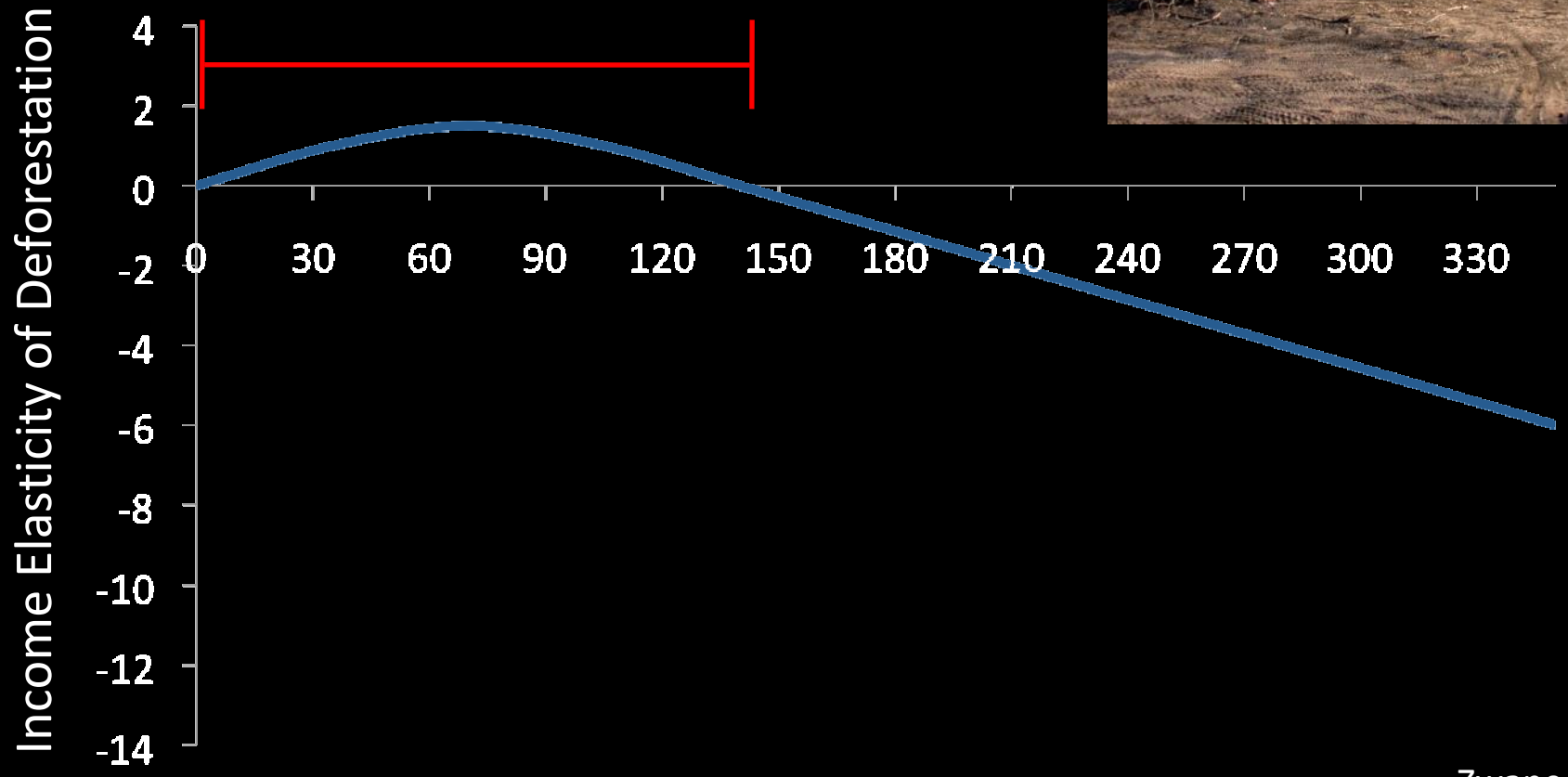


The Role of Income on Biodiversity Investments



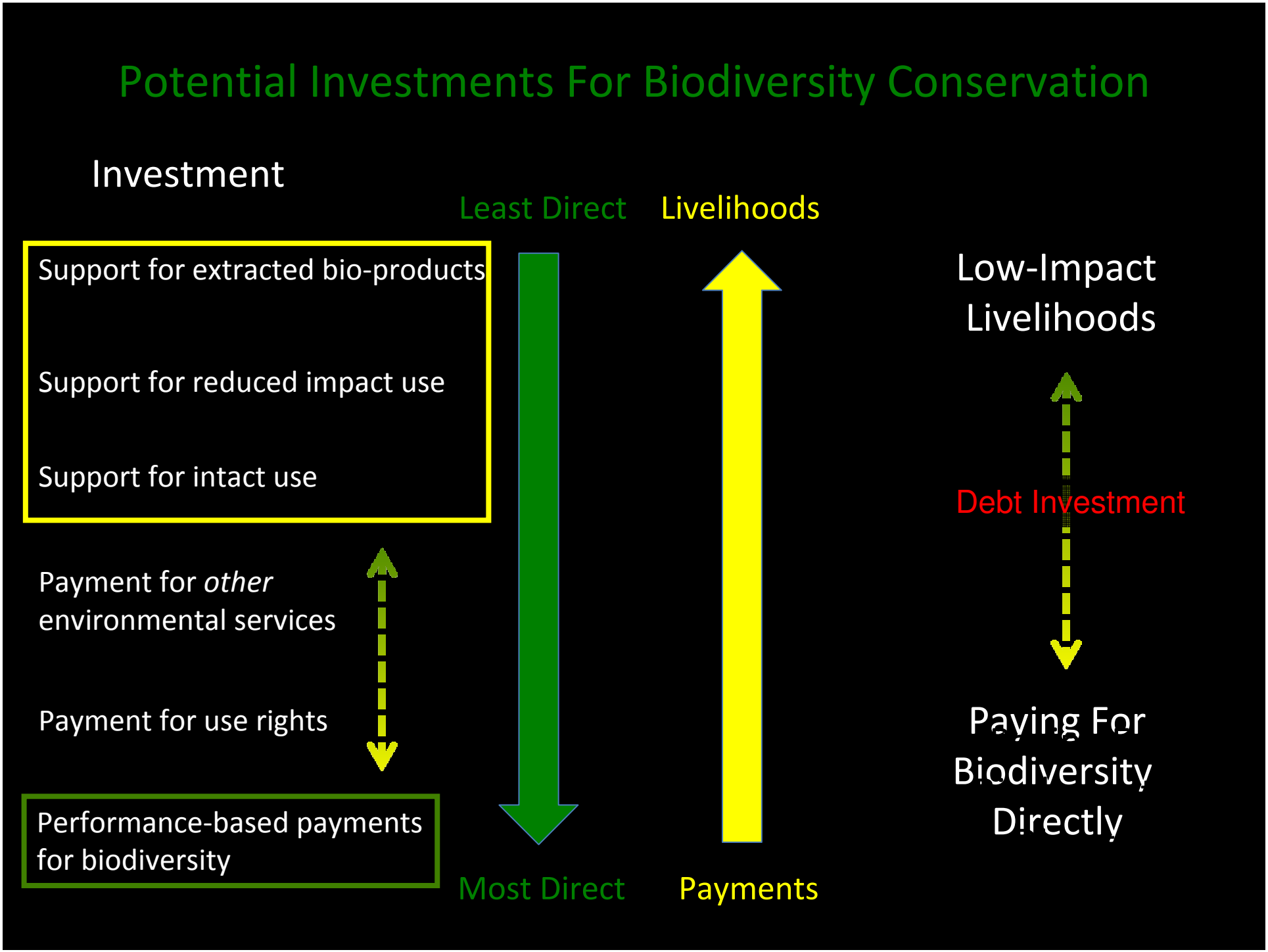
Zwane 2007

The Role of Income on Biodiversity Investments



Zwane 2007

Potential Investments For Biodiversity Conservation



Combining Microfinance & Environmental Stewardship

Microfinance Framework

•Tapping social capital to lend money

• High repayment rates under right social conditions

• Associated services (e.g., savings, business)

• Worldwide: 1,750 MFIs with $39 billion in loans and 76 million borrowers

Biodiversity Performance “Collateral”

•Loan is directly tied to an environmental asset

•↑asset = ↑higher line of credit

•↓asset = ↓lower line of credit and eventually lack of credit access

• Short-term incentive: credit access and/or reduced interest rate

• Long-term incentive: repeat credit access

Environmental Mortgages

How would it work?

• Scope low-income communities with legal or *de facto* control over high-value biodiversity assets and livelihood improvement options.

• Establish a community lending trust that gives low-interest livelihood loans tied to some environmental asset.

• The environmental asset is independently audited and drives the amount of future capital available to the community (e.g., the following year).

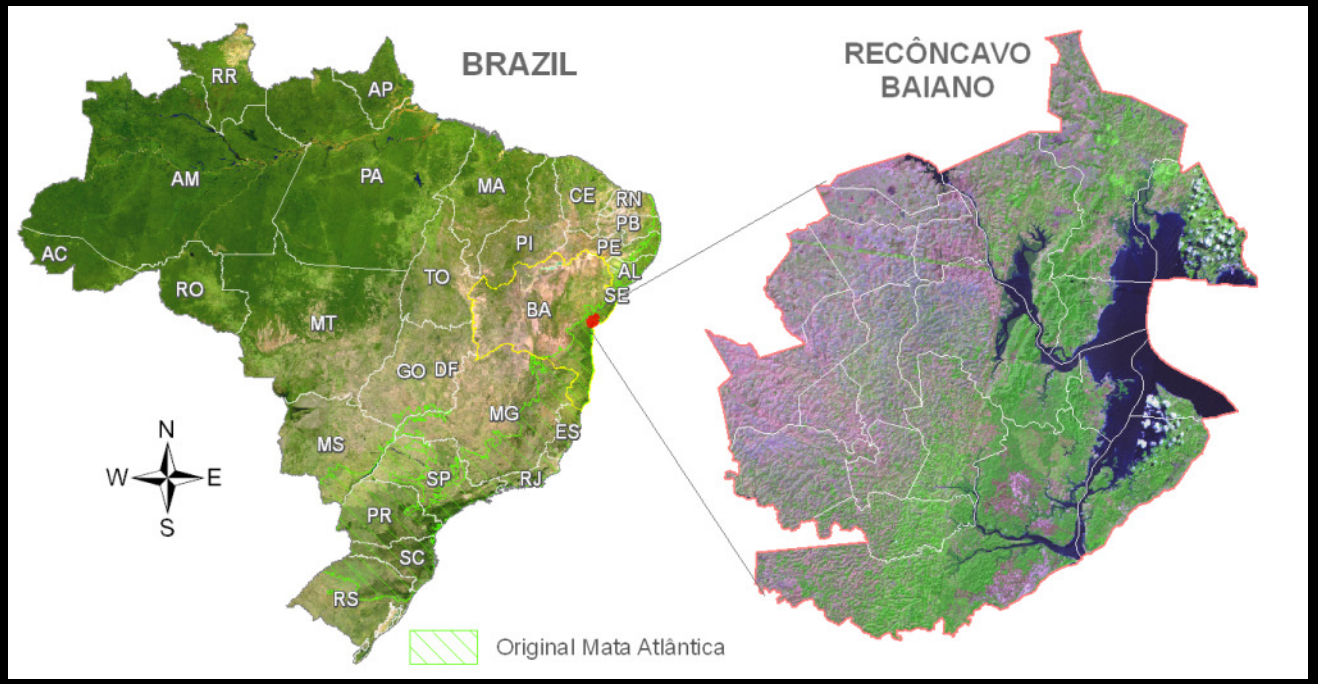
• Associated services would come with the loan.

The Recôncavo Carbon & Livelihoods Initiative

Atlantic Rainforest: historically covered 1/3 of Bahia. 9% remains today.

Recôncavo Baiano is a group of 25 municipalities.

Rural poor communities within a matrix of degraded and intact rainforest and mangrove ecosystems.



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AMBIENTALPV
Soluções em Sustentabilidade

The Recôncavo Carbon & Livelihoods Initiative

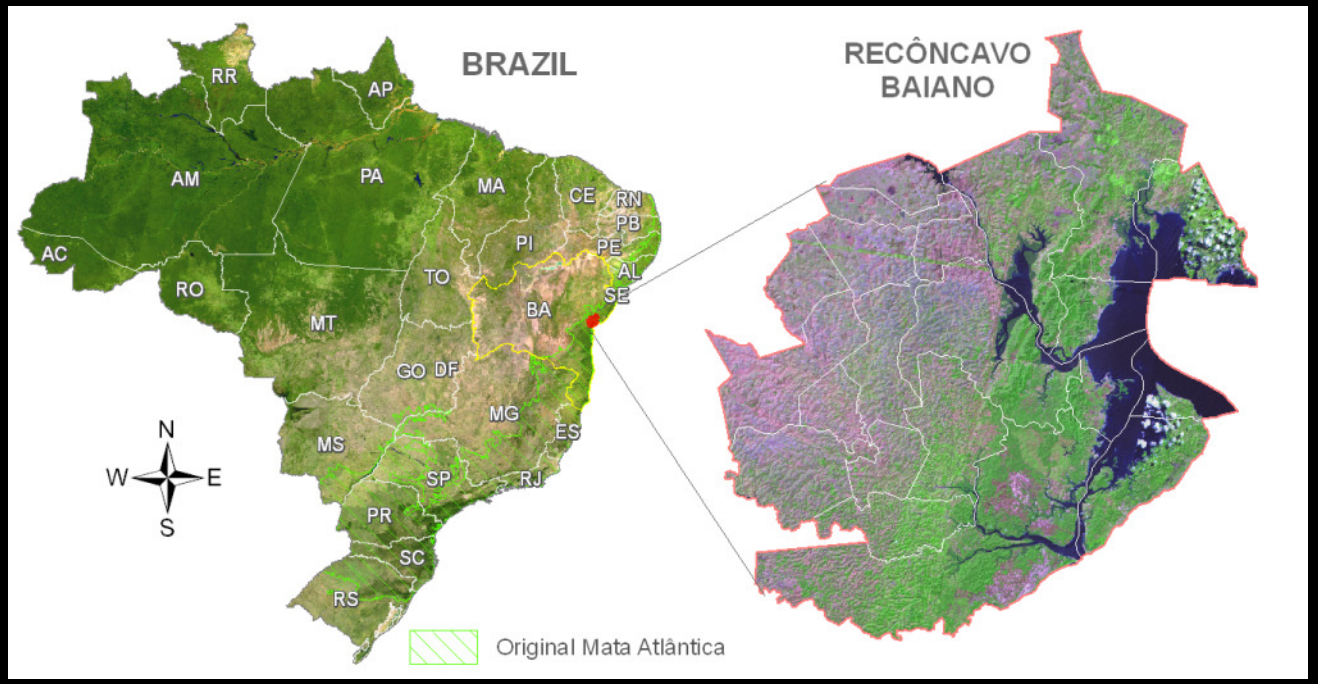
Project Goals:

Convert Recôncavo into an extensive carbon sink over the next 30 years (6mm tons).

Efficient stove substitutions, converting pastures back into rainforest, and reducing forest degradation.

Provide environmental health and biodiversity co-benefits.

Provide livelihood improvement via a lending trust to increase agricultural productivity.



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Soluções em Sustentabilidade

Efficient Stoves

- 18 tons CO_2 per unit (6 yrs)
- NaturaCosméticos buying the reduced carbon emissions
- Recôncavo: 15,000 units
- Bahia: 500,000+ units

Stage: Implementation

Forest Restoration

- 260 tons CO_2 per ha (30yr)
- Recôncavo: 10,000+ ha
- Bahia: 250,000+ ha

Stage: Community Engagement

REDD

- 250 tons CO_2 per ha
- Recôncavo: 25,000 ha
- Bahia: 3,000,000+ ha

Stage: Community Engagement

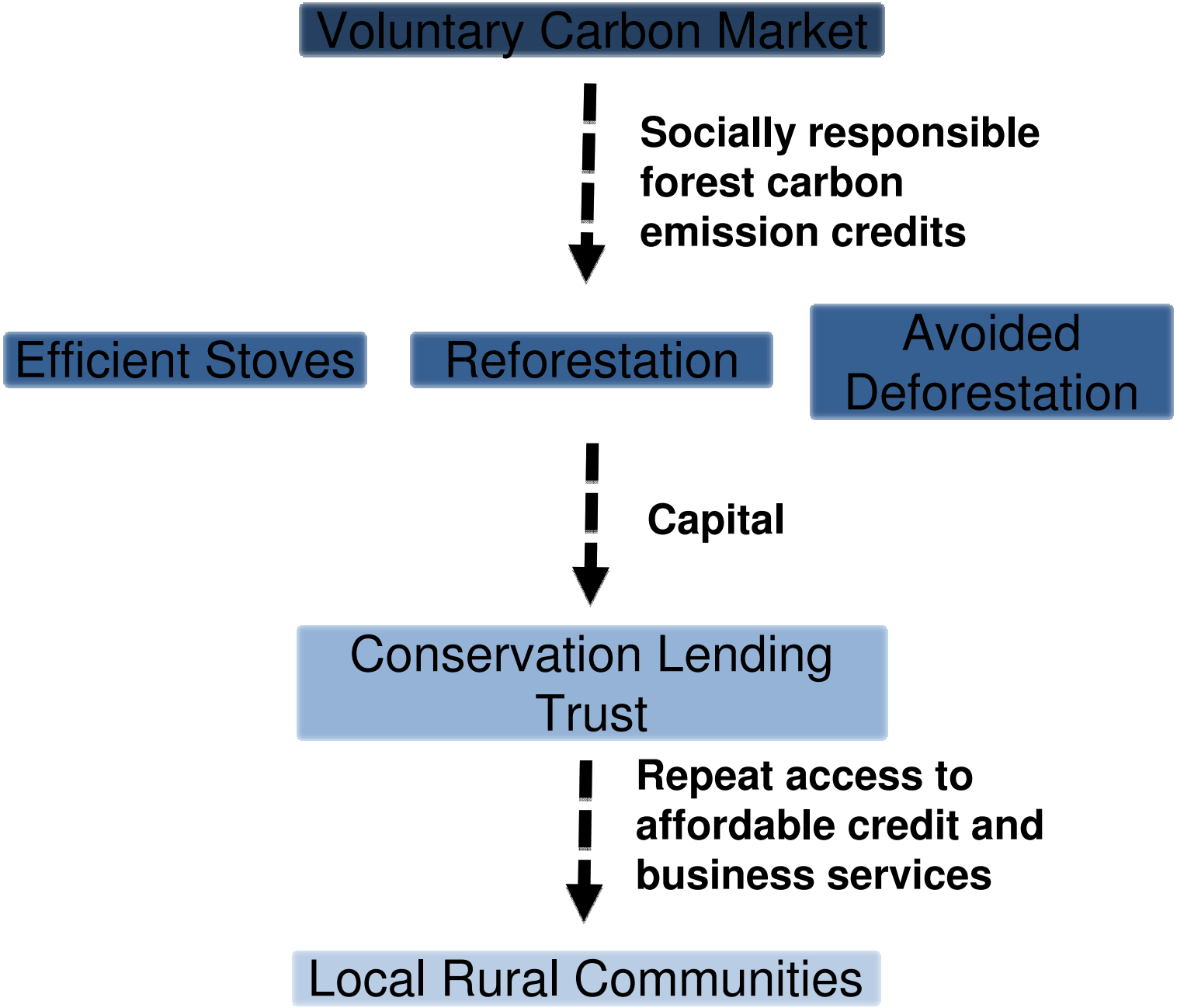
Opportunities

•Brazil: 37 MFIswith 810,000 borrowers with $520mm loan portfolio ($816).
• Community buy-in, largely result of a strong local presence and stove results.
• Proximity to Salvador.



Challenges

•Land tenure.
• Committed engagement from all stakeholders.

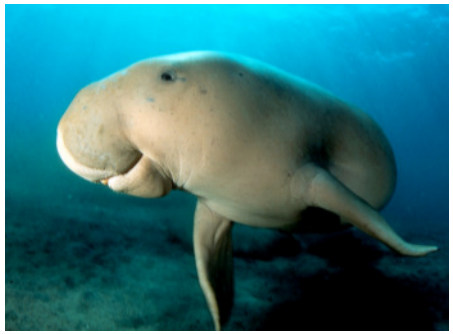

Voluntary Carbon Market
Socially responsible forest carbon emission credits
Efficient Stoves
Reforestation
Avoided Deforestation
Capital
Conservation Lending Trust
Repeat access to affordable credit and business services
Local Rural Communities

"Buyer" or Revenue Stream

Dugong Conservation Activity #1

Dugong Conservation Activity #2

Dugong Conservation Activity #3



Conservation Lending Trust

Local Rural Communities


Financial Risk
Incentive Instruments
Innovative finance
U.S. Example
Abu Dhabi & Dugongs
Costa Rica Government
Perene
Payment for Environmental Services
Livelihood Improvement
Return On Investment
Australia Example
Argentina Government
Chile Government
Wildlife Conservation Society
Environmental Markets

Scaling Up: Costa Rica's Payment for Environmental Services Program

- Pays forest owners for
  - watershed protection
  - carbon sequestration
  - landscape beauty
  - biodiversity protection
- 670,000+ ha under contract with 8,000+ landowners
- Paid for by a
  - fuel tax
  - agreements with private and public companies
  - World Bank / GEF funding
- Current annual budget: US$15 mm
- Delivering biodiversity and social outcomes

Financial Risk

Incentive Instruments

Innovative finance

U.S. Example

Abu Dhabi & Dugongs

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Ambi ntal PV

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Payment for Environmental Services

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Wildlife C

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Environmental Markets

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