Planning and Paying for Nature's Benefits: Science to Action

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The Natural Capital Project

Stanford University /The Nature Conservancy/

World Wildlife Fund/University of Minnesota

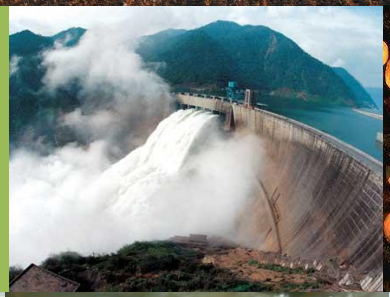
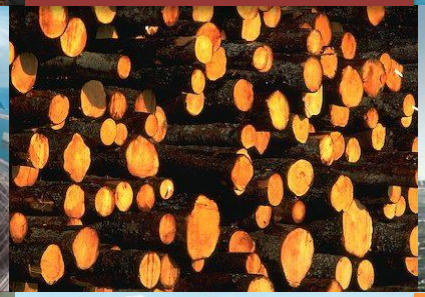
Accounting for multiple ecosystem service values in decisions


food

happiness

water

livelihoods



energy


protection

Assessments of Ecosystem Services

GLOBAL, SYNTHETIC:

60% of global ES in decline (MA)

www.naturalcapitalproject.org

NEEDED:

- region/landscape scale
- spatially explicit
- multiple services
- flexible, transferable

LOCAL, SPECIFIC:

2 forest patches: $60K/year for pollination of nearby coffee plantations (Ricketts et al. 2004. PNAS)

Guiding ecosystem investments to secure clean, ample water and livelihoods

What level of investments, in which activities, and where?

Objective:
Maintain consistent water flows necessary for drinking water, biodiversity and agriculture through a coordinated strategy

Decision makers:
Watershed Associations
Sugar Cane Associations
The Nature Conservancy
Vallenpaz (local NGO)

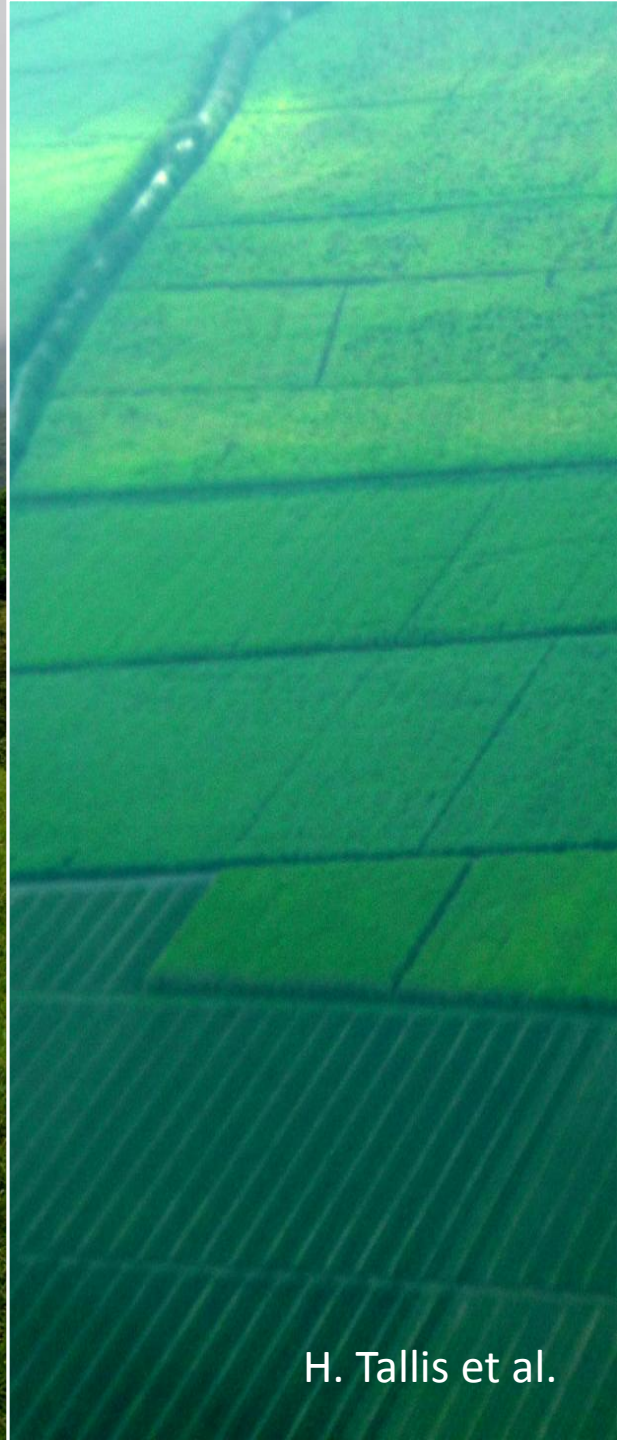
Water Funds in Colombia

public-private investment fund

How should $10 M be spent?

What activities?

Where?



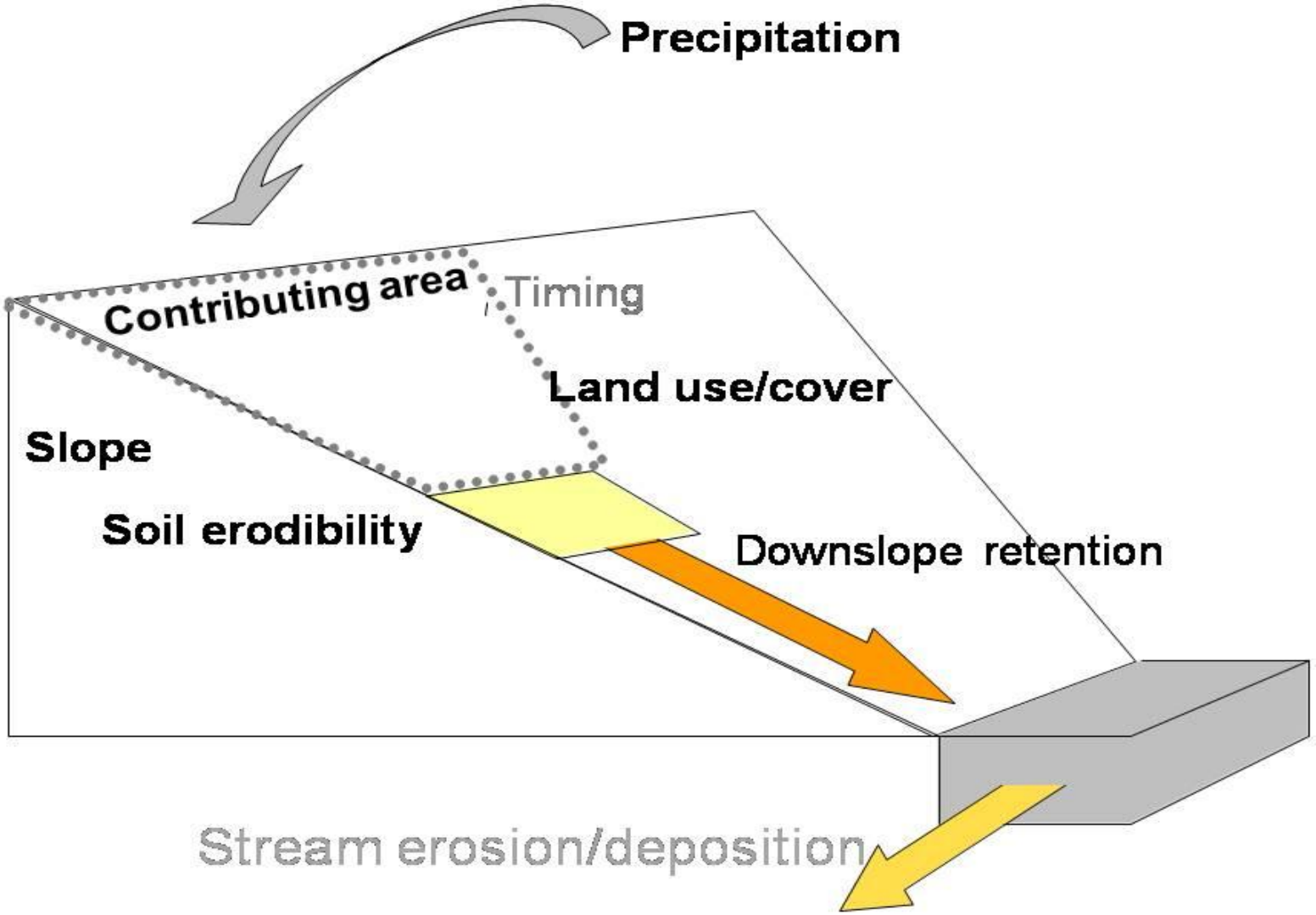
H. Tallis et al.

Scenario Development

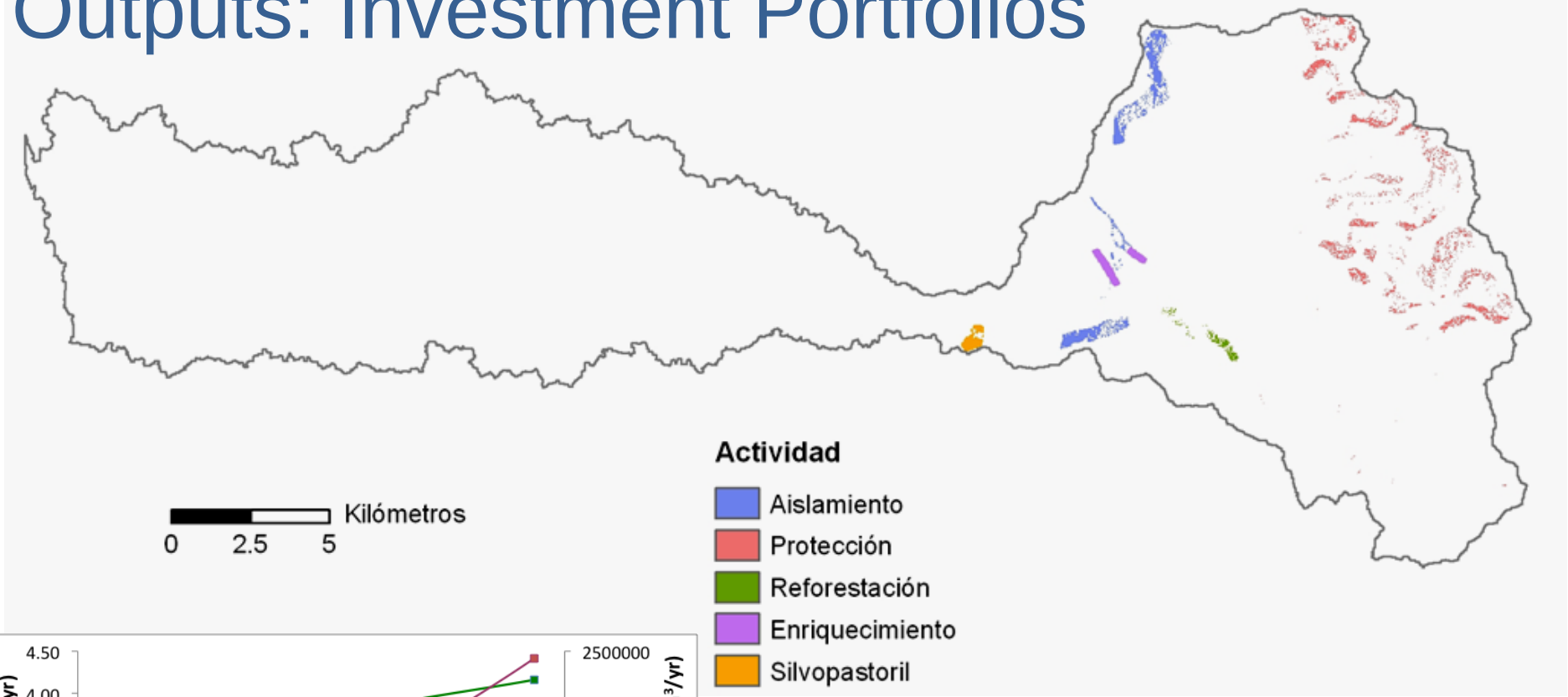
Inputs:
spatially explicit land uses

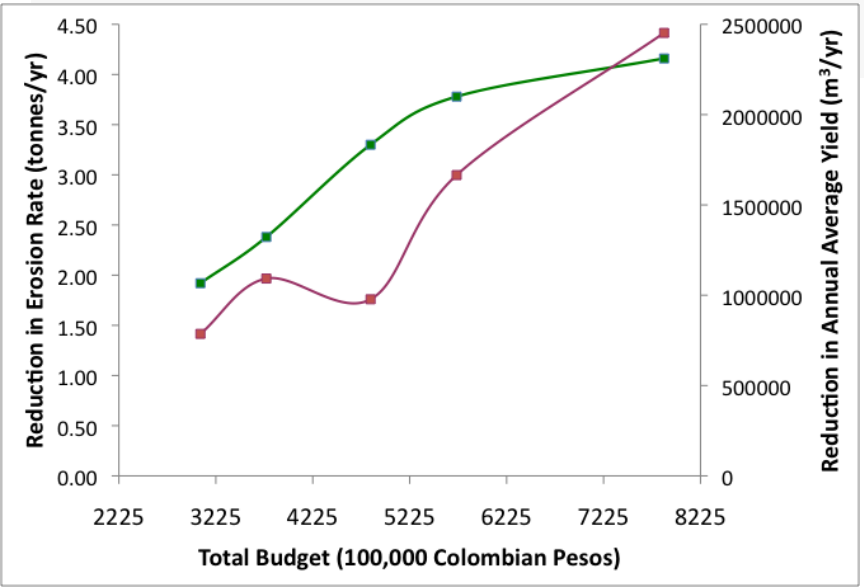
Costs of activities eligible for investment: agricultural and silvicultural practices, restoration, protection

e.g., Sediment Retention Model



Outputs: Investment Portfolios

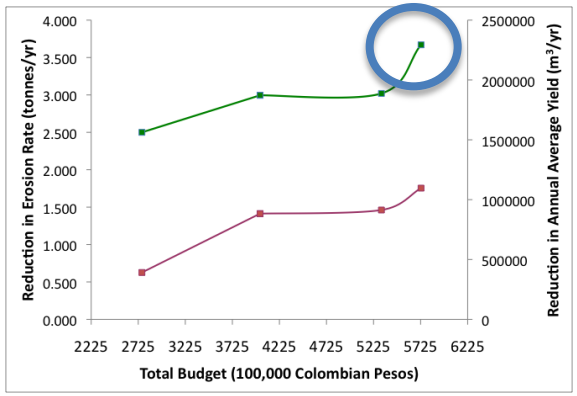


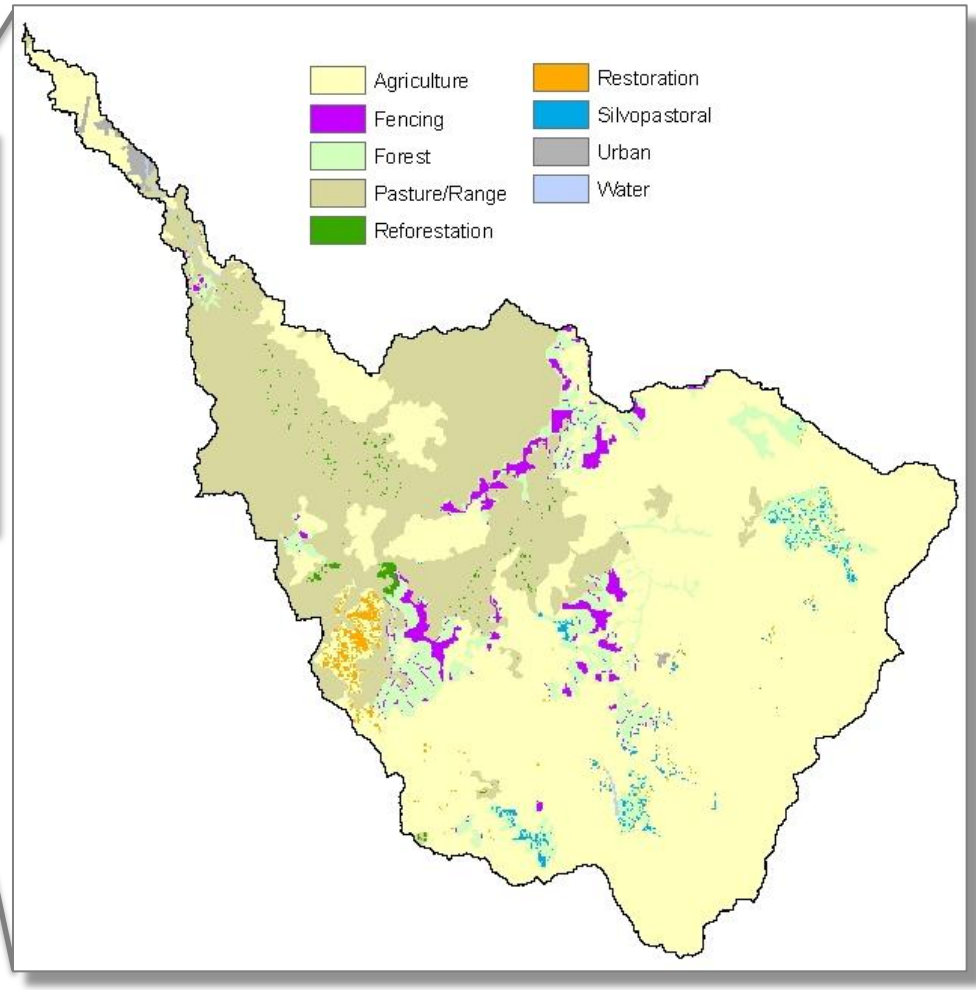


ROI curves

Investment Portfolios

Tulua River Watershed

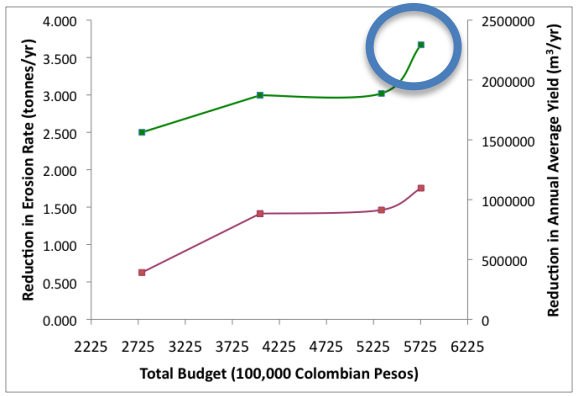


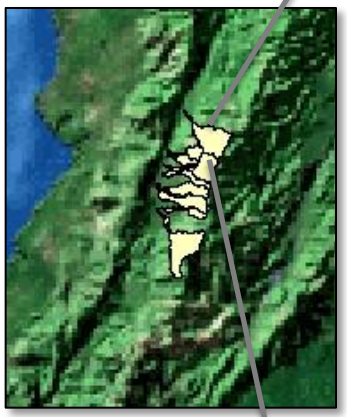


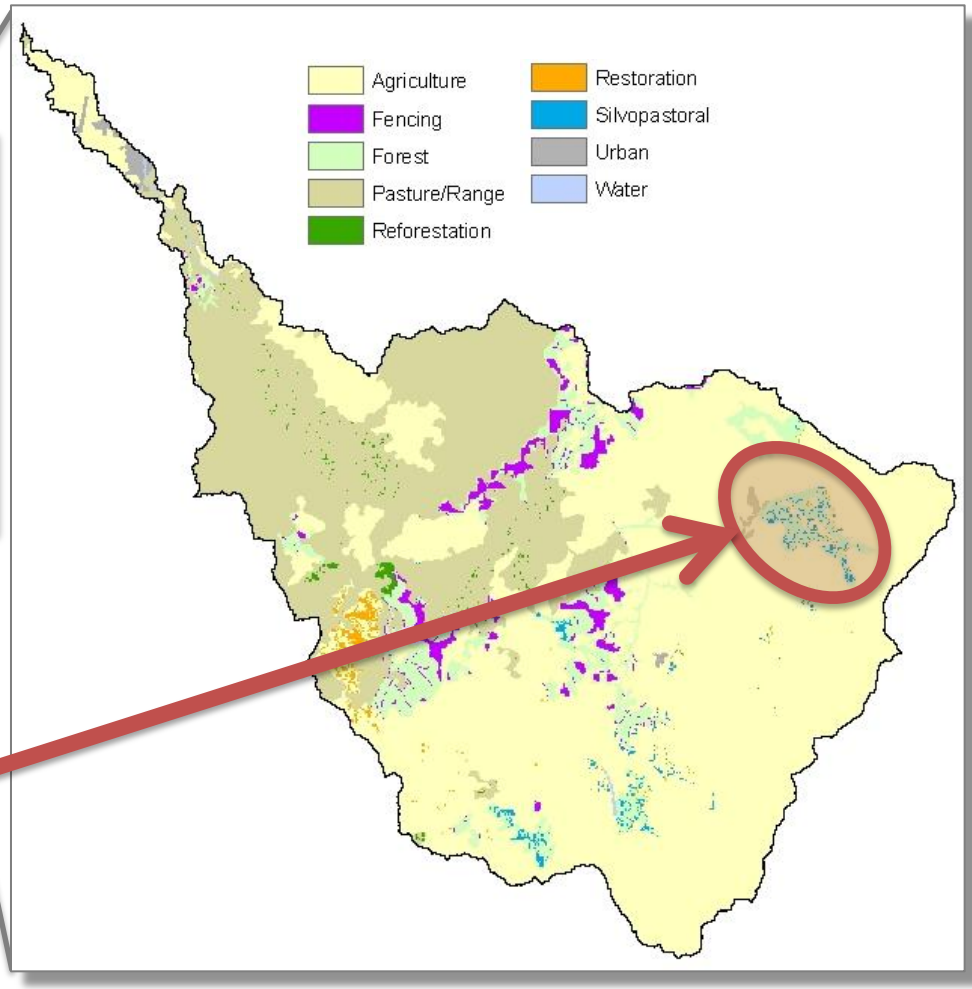
Mapped Output:
Where should protection, restoration activities occur for a given investment?

Stakeholder Feedback

Tulua River Watershed

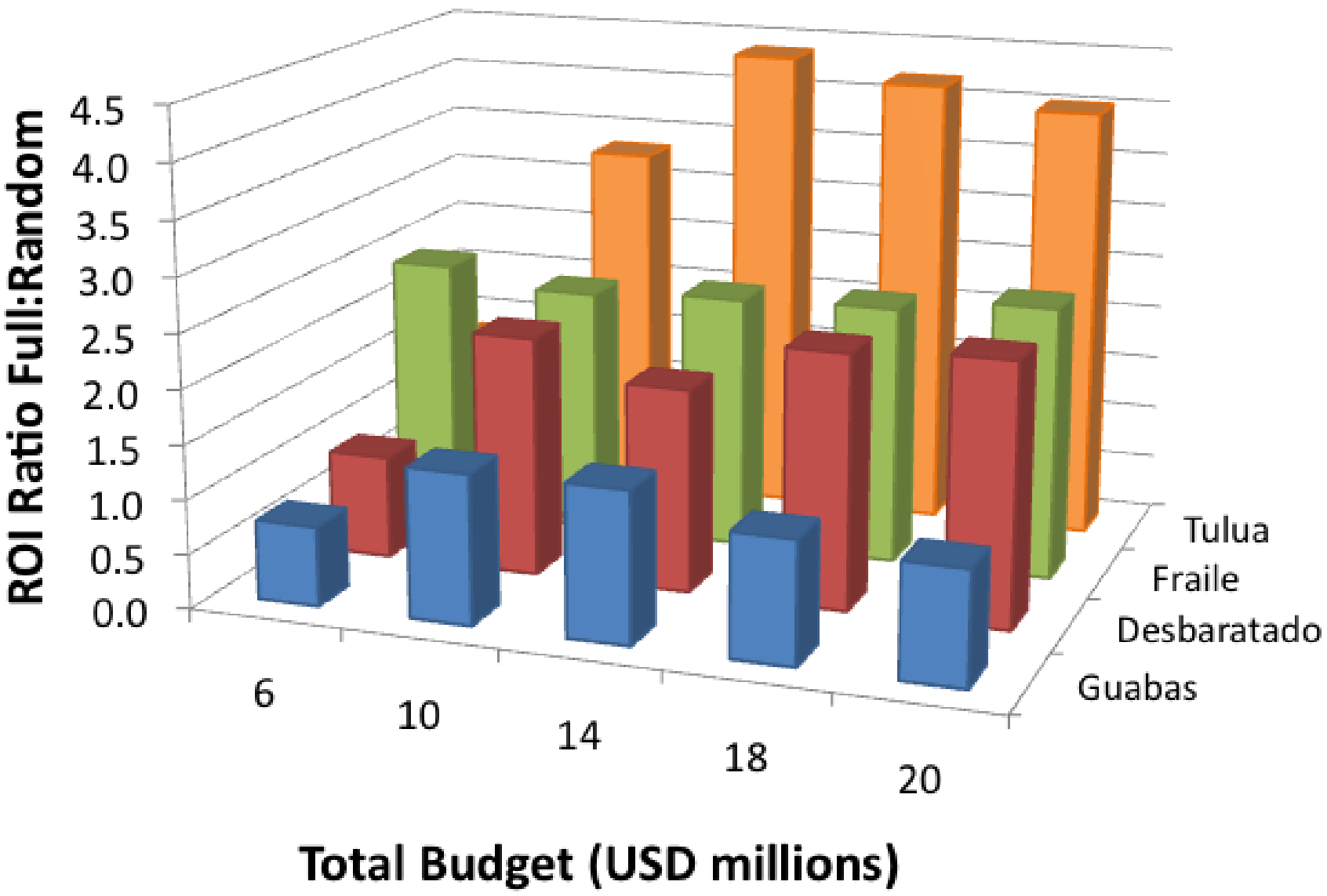






Not Feasible:
Guerilla Activity

Science is Probably Worth It!



Scaling up…

>30 new funds established in next 5 years

TNC-led process

Developing & testing standard approach (specialized tool)

Tallis, Vogl, Sharp, Wolny et al

Lessons learned

What works…

•Iterative science-policy process from the beginning
•Simple, modular accounting tools
•Science (maps, etc) products help with prioritization, accountability
•Generalizability for scaling up

What needs work….

•Testing--easy monitoring protocols for BES and HWB outcomes
•Impact analyses—what information is most useful, important?
•Growing academic collaborations

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Building a body of evidence: testing

The Nature Conservancy

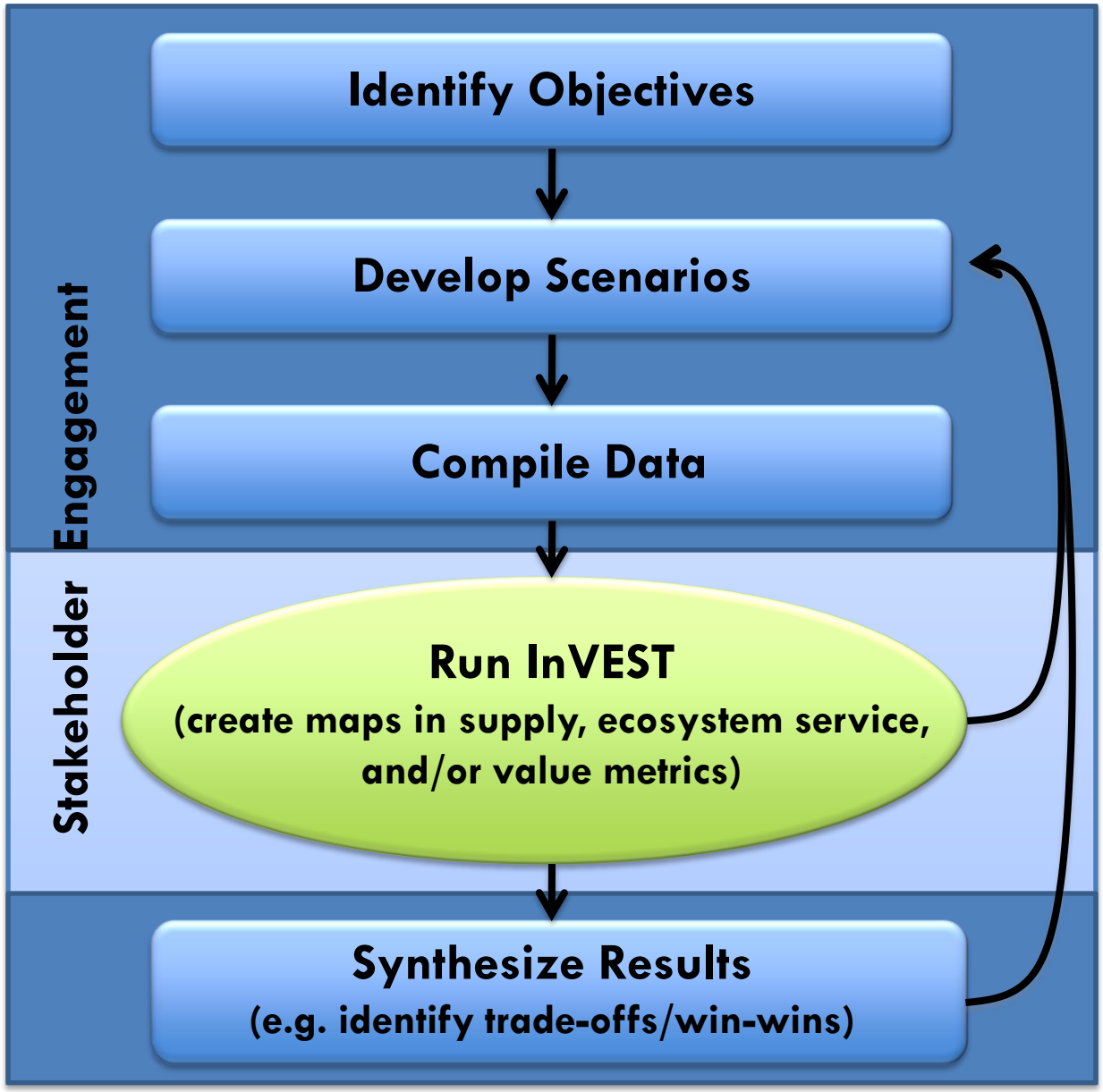
STANFORD UNIVERSITY

UNIVERSITY OF MINNESOTA

WWF

Testing many kinds of decision contexts

Decision Context	Geography
Spatial Planning	Tanzania, Indonesia, British Columbia, Hawai'i, China, Belize
Ecosystem-based management (terrestrial-marine links)	Puget Sound, Galveston Bay, Chesapeake Bay
Climate adaptation (ecosystem-based adaptation)	Galveston Bay, Monterey Bay
Return on restoration investments	Colombia water funds, Gulf of Mexico, Indonesia
Impact assessment, permitting, licensing	Colombia mining concessions, agricultural practices in US
Business (life cycle analyses, securing investments)	US, Brazil, global


Identify Objectives
Develop Scenarios
Compile Data
Engagement
Stakeholder
Run InVEST
(create maps in supply, ecosystem service, and/or value metrics)
Synthesize Results
(e.g. identify trade-offs/win-wins)

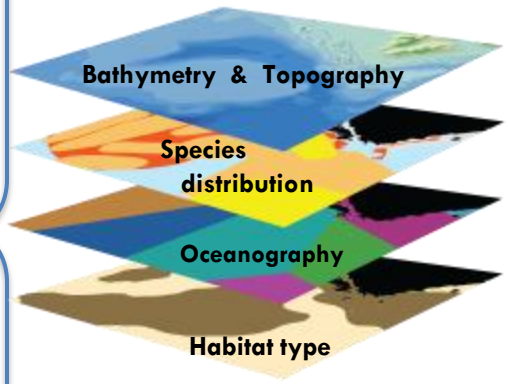
Input Data (reflect scenarios)

Marine InVEST Models

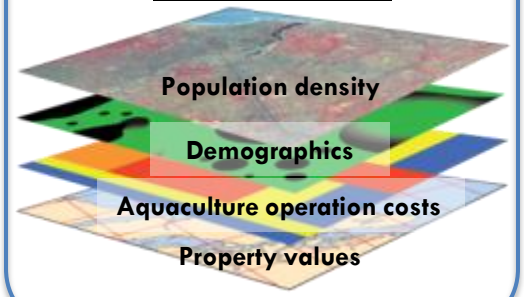
Model Outputs (ecosystem services & values)

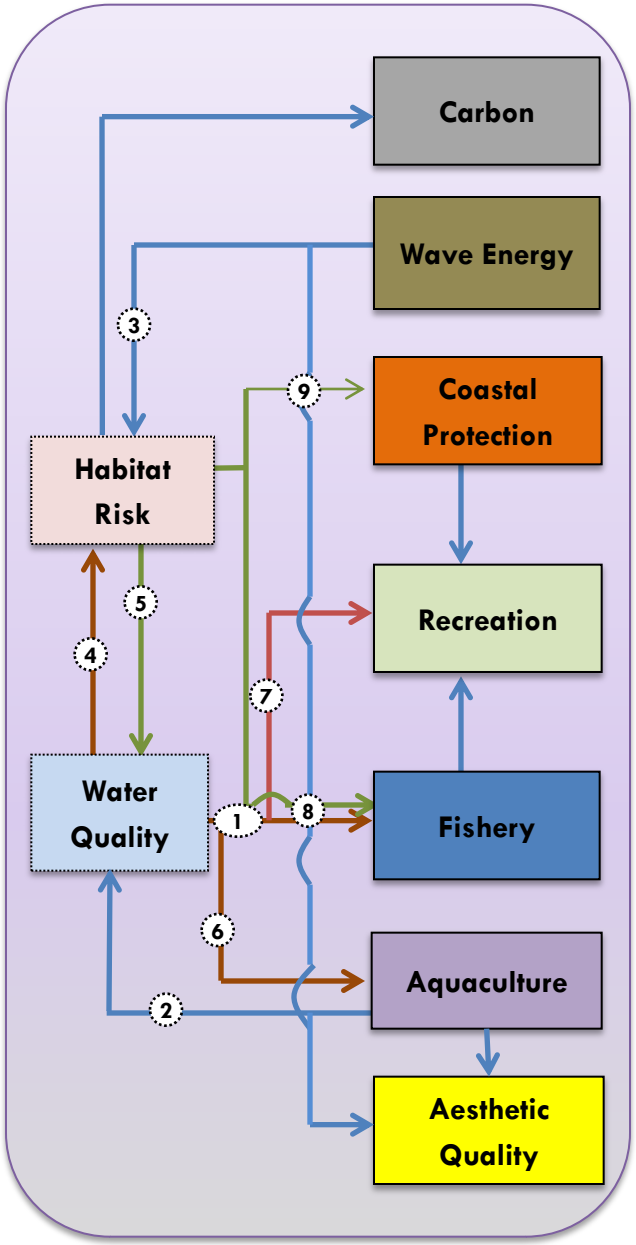
SCENARIOS

BIO-PHYSICAL



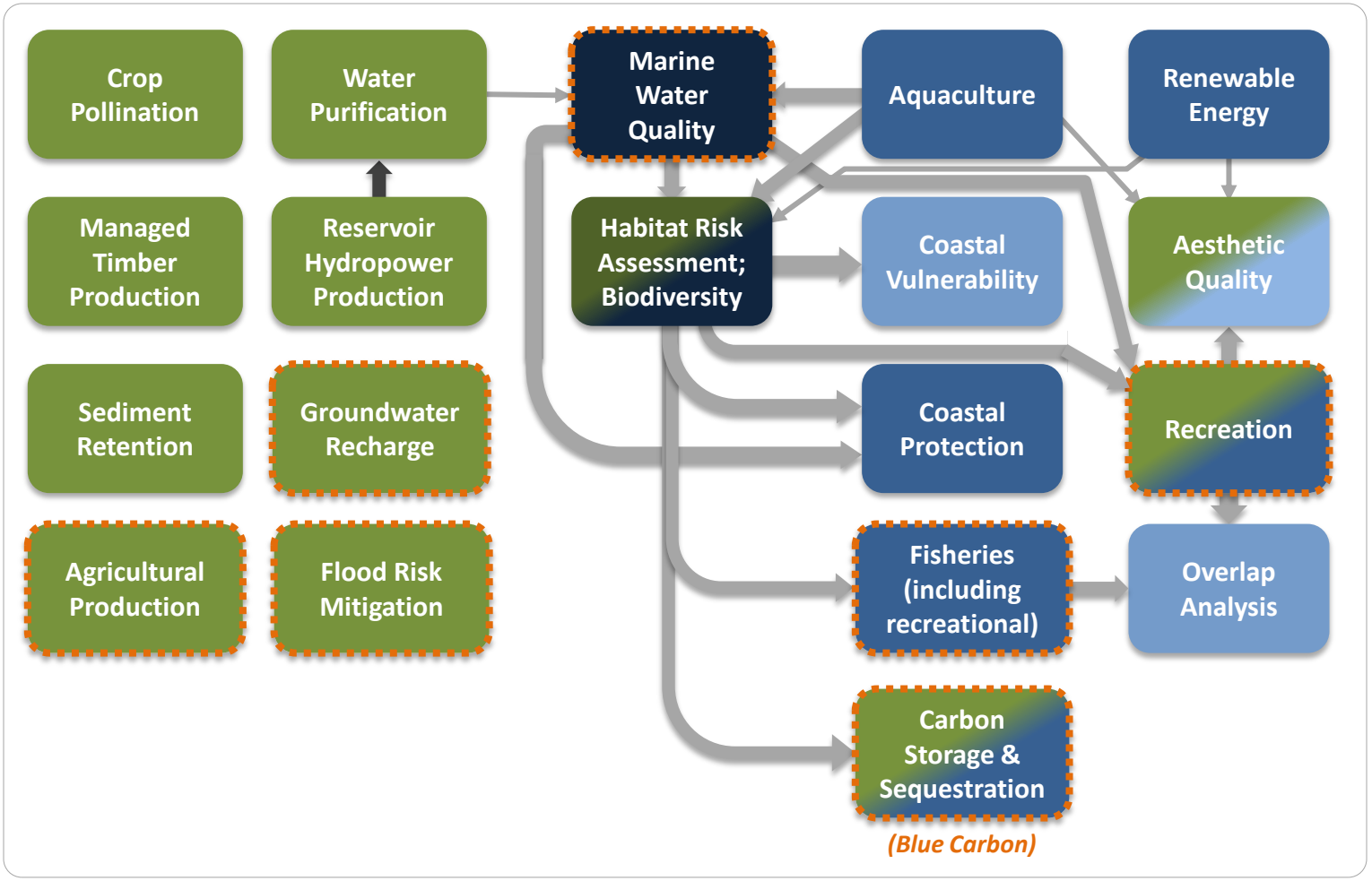
SOCIO-ECONOMIC





ECOSYSTEM SERVICES	VALUATION e.g.
Carbon Sequestered	*Value of carbon sequestered*
Energy Captured	*Value of captured wave energy*
Avoided Area Flooded/Eroded	*Value of avoided damages*
Visitation Rates	*Expenditures due to recreation activity*
Landed Biomass	*Net present value of finfish and shellfish*
Harvested Biomass	

InVEST Models & Linkages



Terrestrial/freshwater model: Tier 1 supporting service

Terrestrial/freshwater model: Tier 1 that quantifies service

Marine model: Tier 1 supporting service

Marine model: Tier 1 that quantifies service

Marine model: Tier 0

Model coming soon!

Optional model linkage, no sequencing

Required/optional model linkage, sequencing needed

Who Downloads InVEST?

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- Breaking down **InVEST 2.2.0** downloads per country for those > 3%

Country	Percent of InVEST 2.2.0 Downloads
United States	23.99%
China	22.61%
Brazil	4.27%
South Korea	4.04%
Mexico	3.69%
South Africa	3.34%