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Economics of Coastal Blue Carbon

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The Blue Carbon Story



Salt marshes



Mangroves



Sea Grasses

Soil Carbon Loss from Habitat Change

Habitat area

Habitat Loss

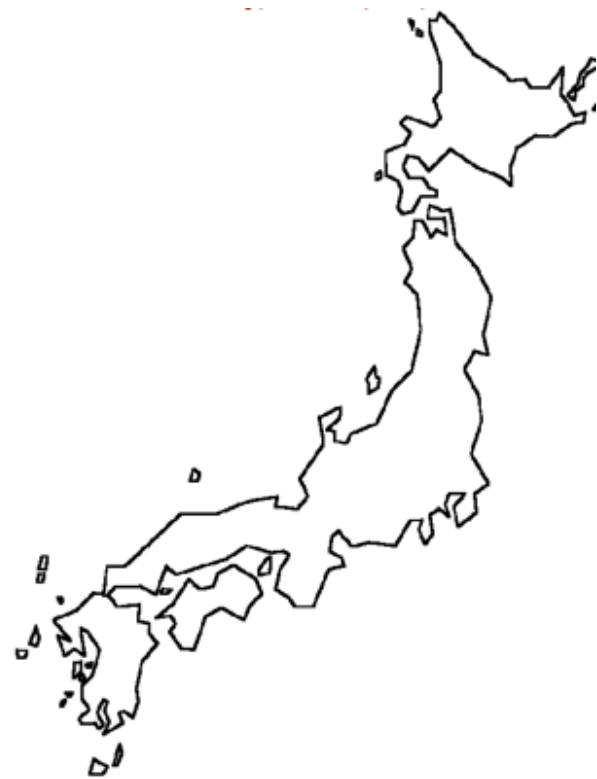
Carbon in top meter

Social Cost of Carbon (\$41/mt)



Photos from UNEP GRID Arendal,
data: Pendleton et al. 2012, PLoS One

Ecosystem	Carbon emissions (Pg* CO₂ yr⁻¹)	Economic cost (Billion US\$ yr⁻¹)
Tidal Marsh	0.02 – 0.24 (0.06)	0.64 – 9.7 (2.6)
Mangroves	0.09 – 0.45 (0.24)	3.6 – 18.5 (9.8)
Seagrass	0.05 – 0.33 (0.15)	1.9 – 13.7 (6.1)
Total	0.15 – 1.02 (0.45)	6.1 – 41.9 (18.5)
* = billion tonnes		



Price vs. Value

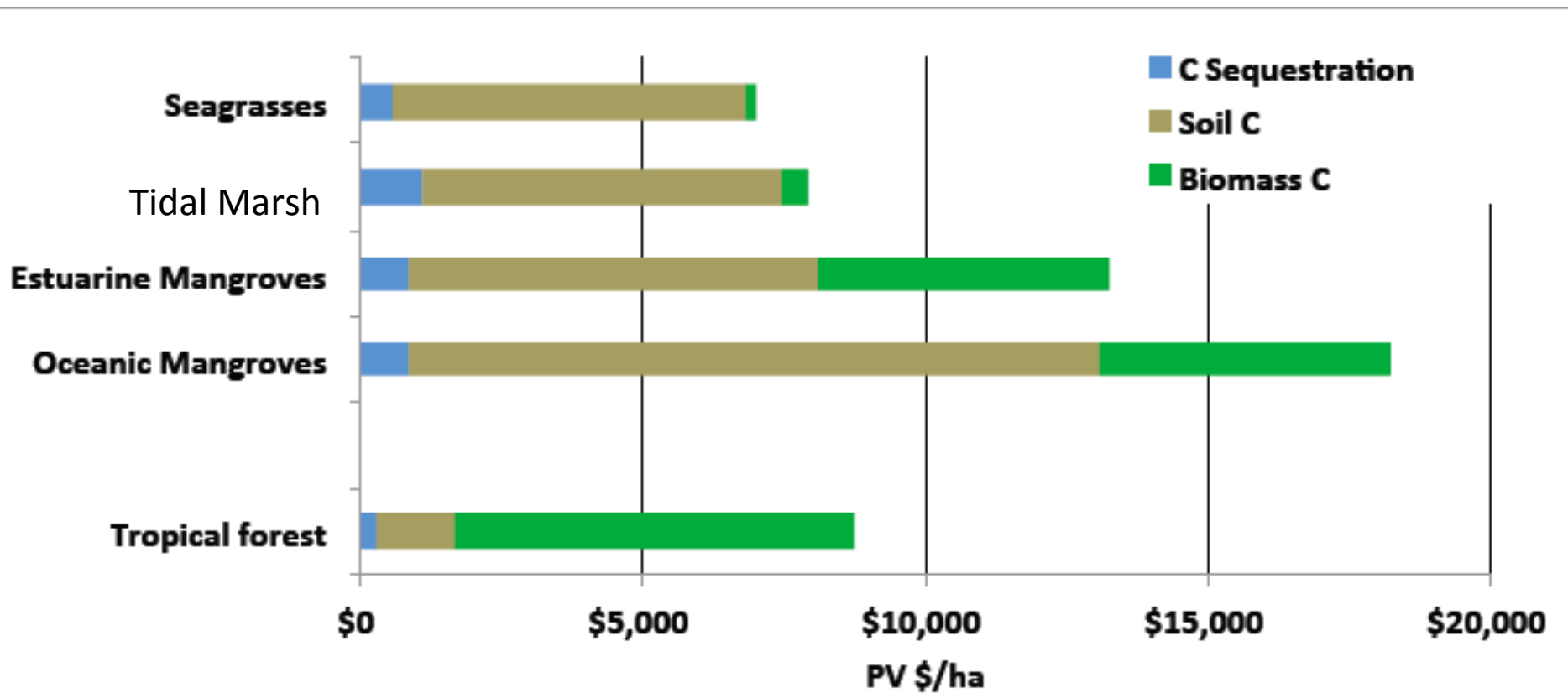
CO2 Loss



Potential Credit Source	Time Period	Ecosystems
Avoided Loss of Sequestration Flux	Perpetuity*	Seagrasses Tidal Marsh Mangroves
Avoided Emissions from Soil Carbon	Several Years to Decades	Seagrasses Tidal Marsh Mangroves
Avoided Emissions from Biomass (REDD)	Immediate	Mangroves

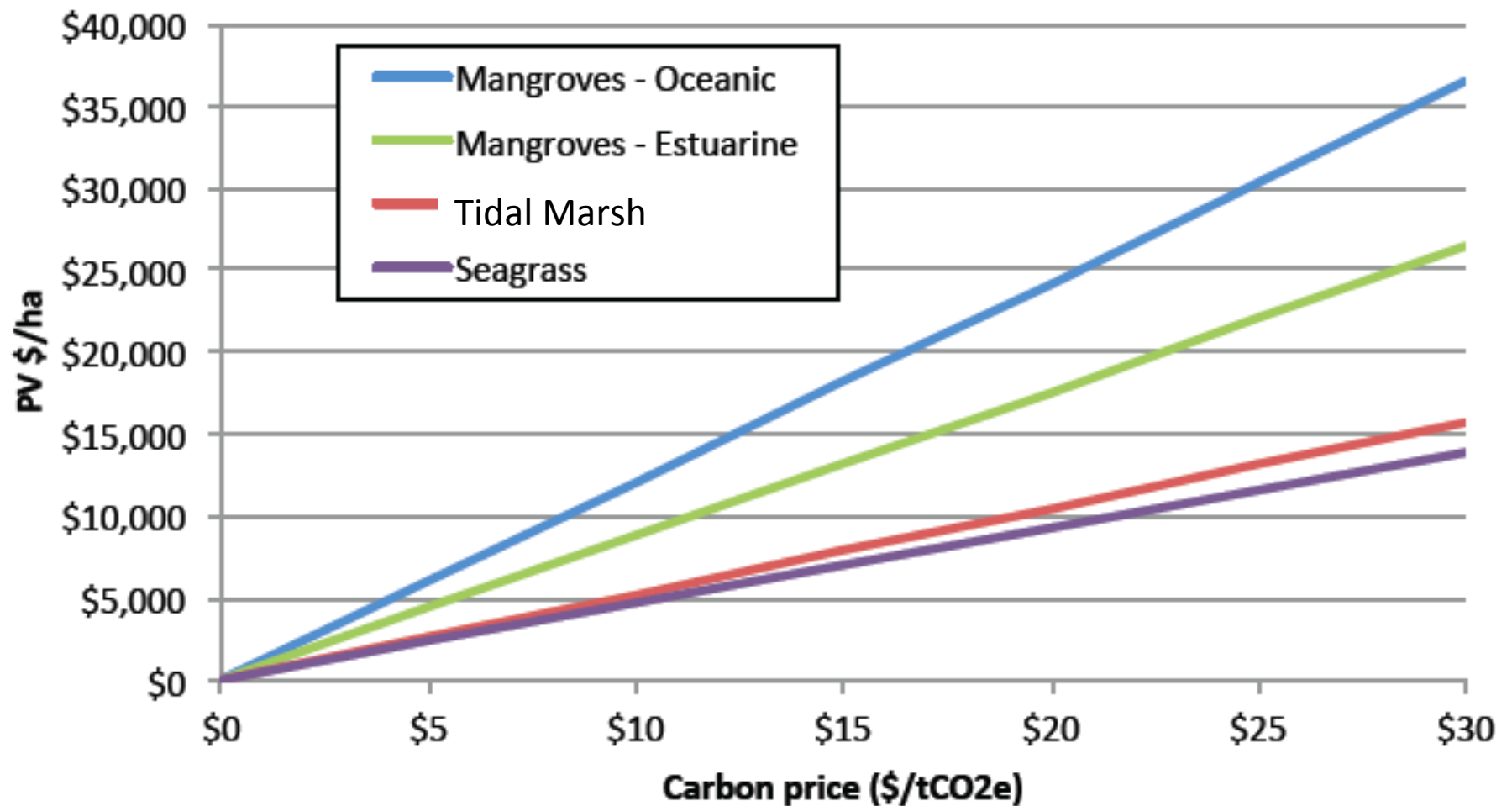
* Based on input from science team that blue carbon systems continue to sequester without saturation

Potential Carbon-Credit Values



Source: Authors:

Gross Financial Returns

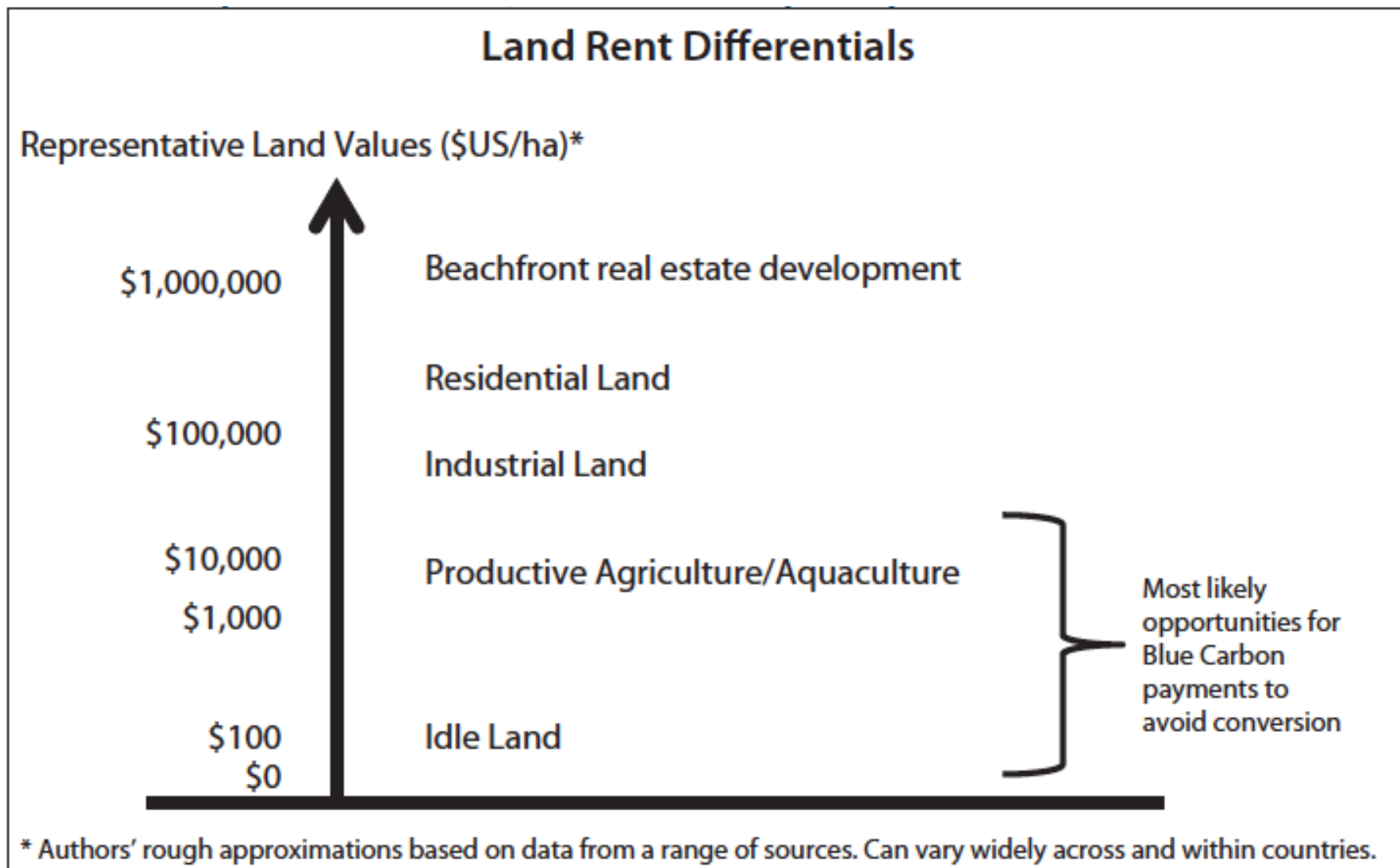


CREDIT?

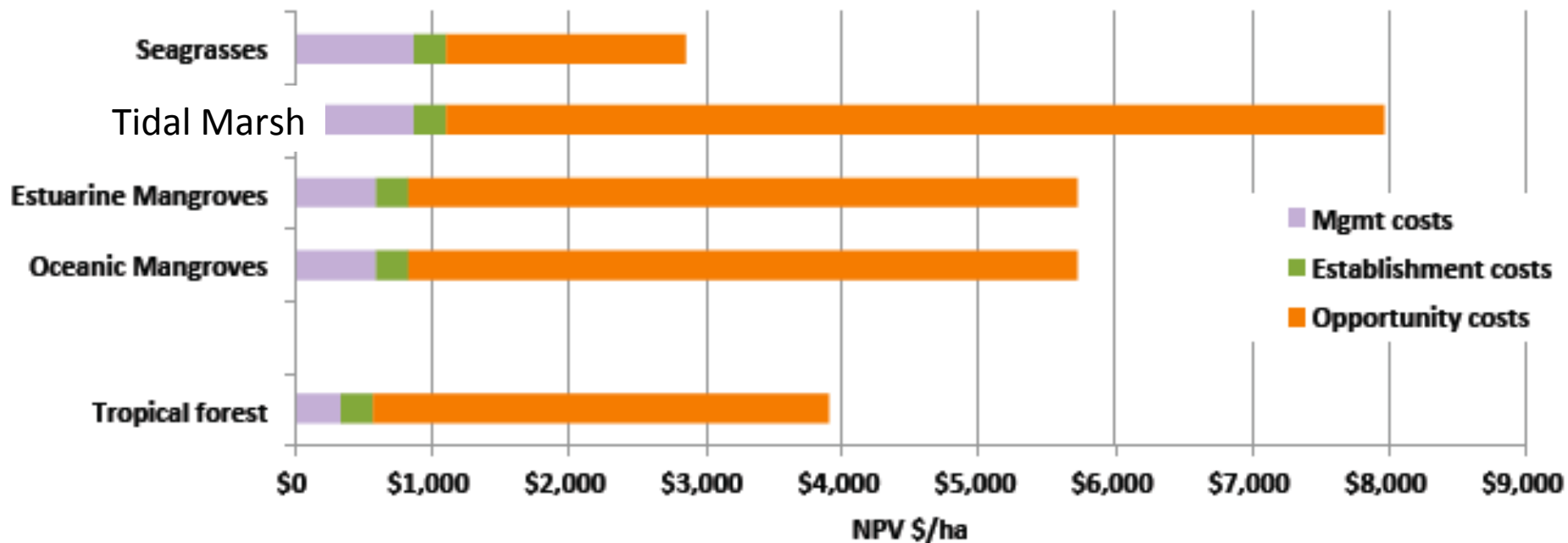
Additionality

What Do You Have to Do to
Protect Carbon = Costs

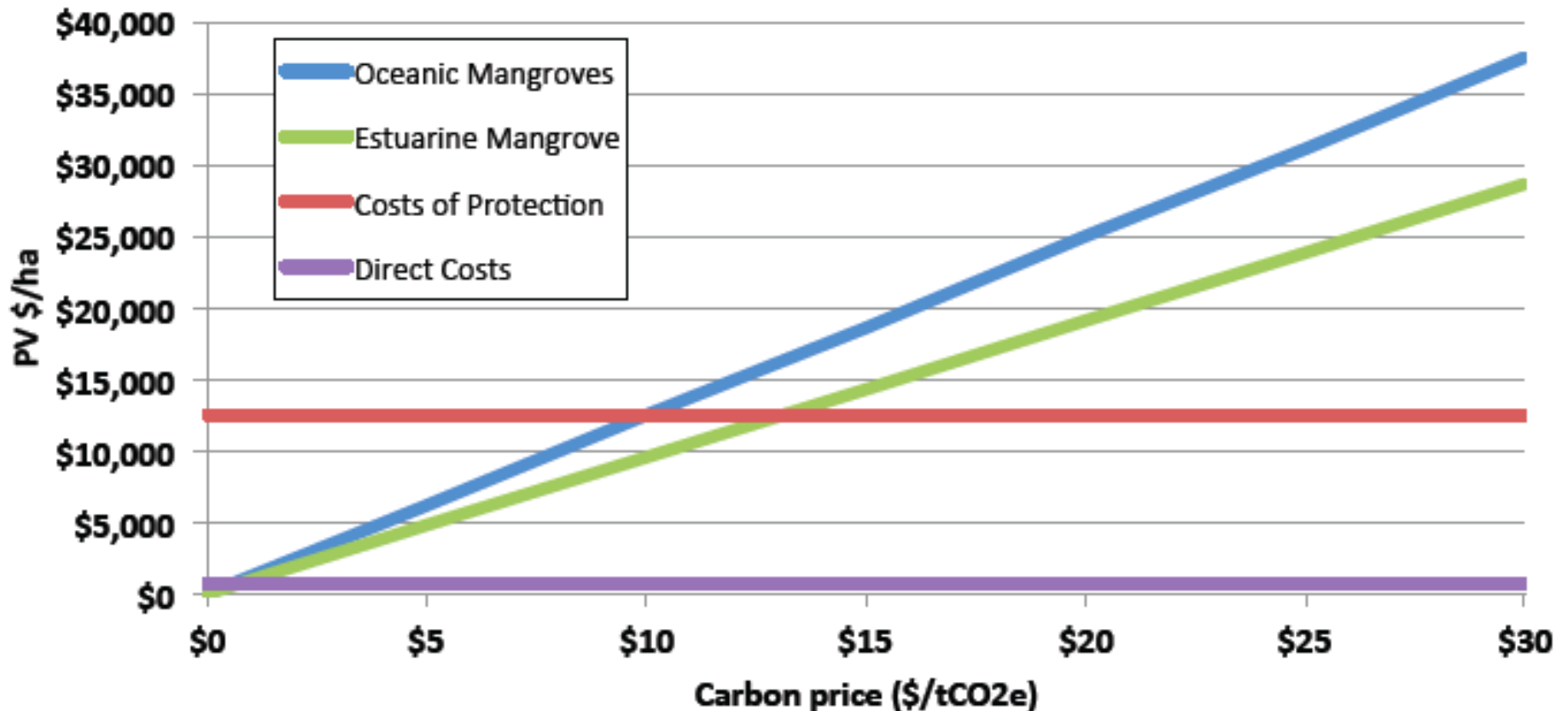
Opportunity Cost



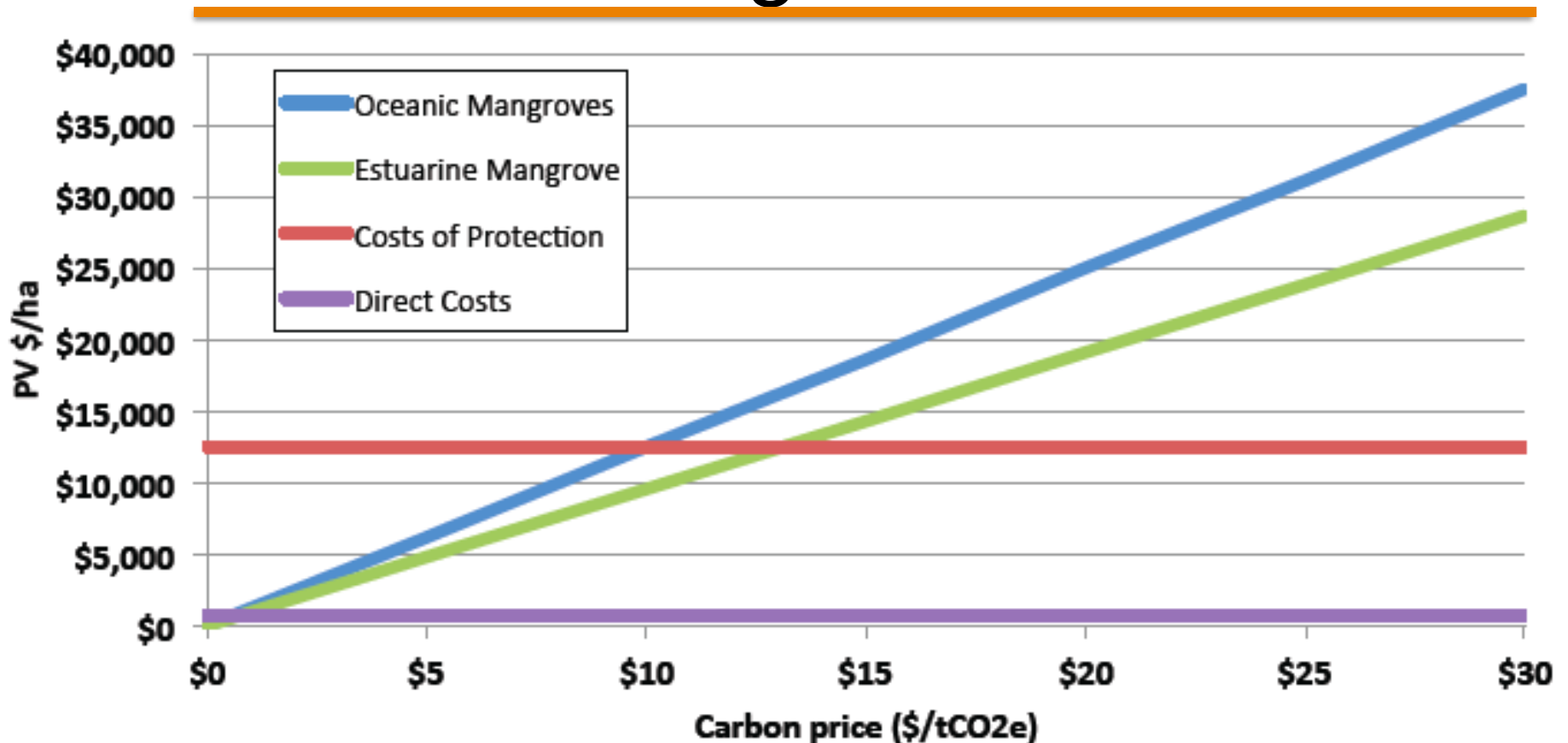
Cost of Protection



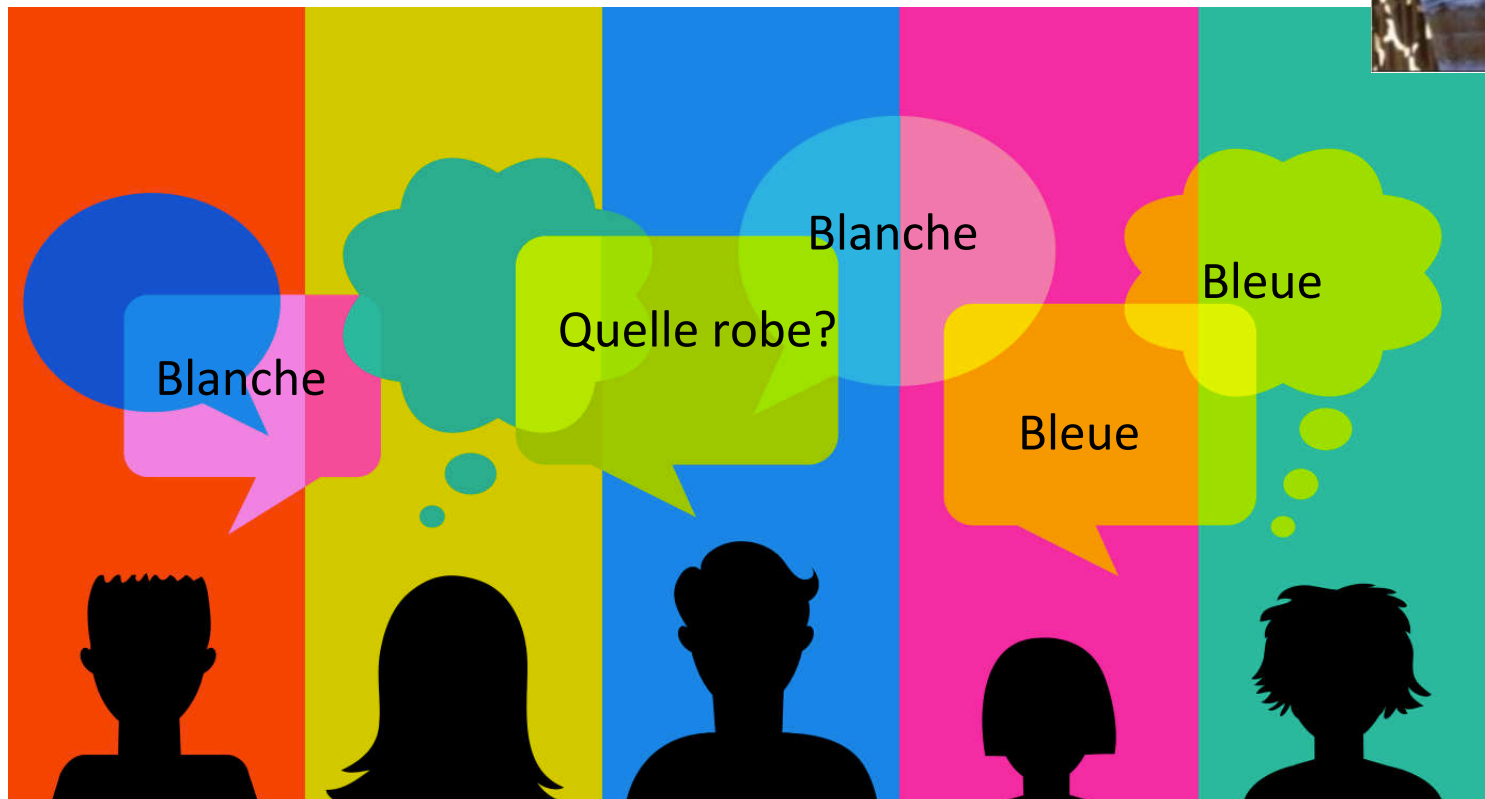
Net Revenue of Blue Carbon: mangroves



Net Social Benefits of Blue Carbon: mangroves



Climate Mitigation vs Habitat Protection

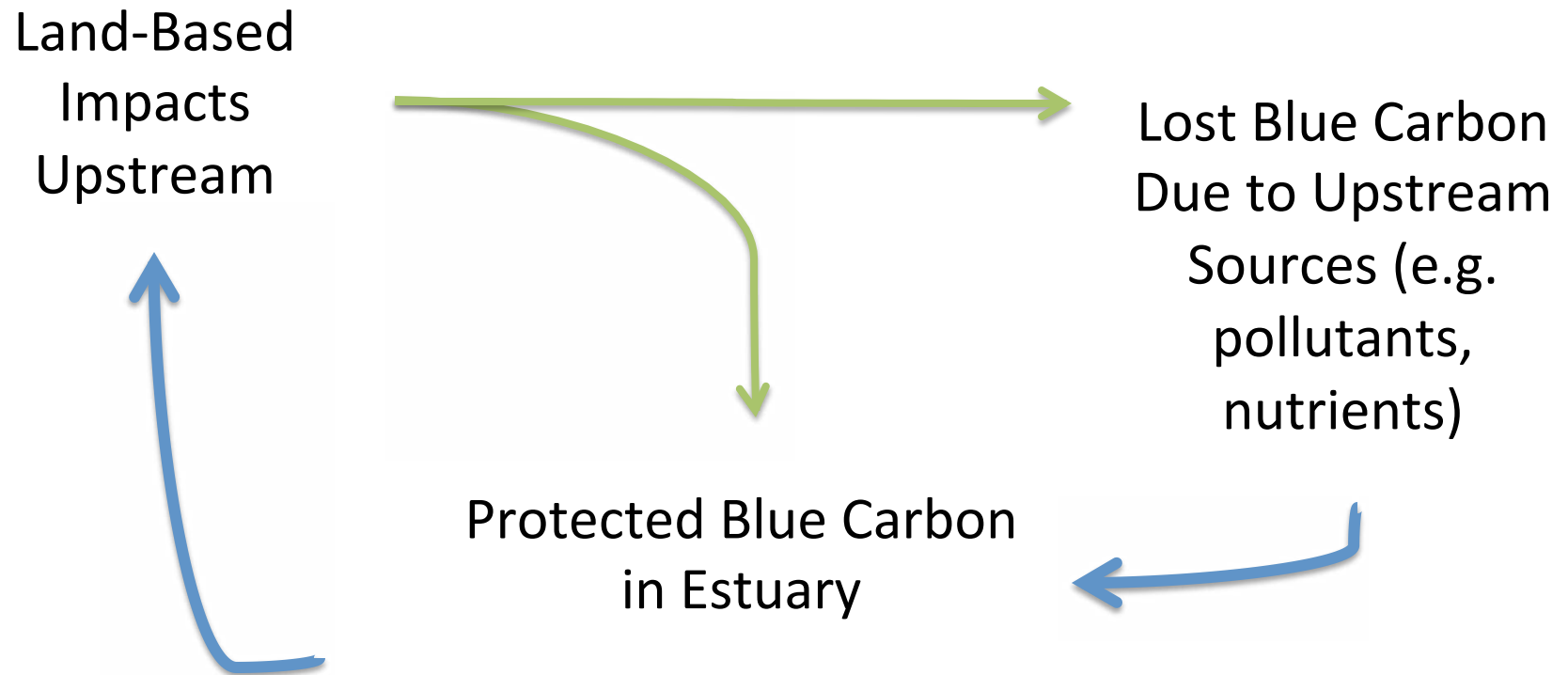


Restoration vs. Protection Mitigation?

Restoration: costs higher, benefits
lower

Protection: costs lower, benefits
higher

BC and Payments for Ecosystem Services could catalyze other markets



Will Environmental Markets Work for Coastal Carbon ?

Tropical Forest Offsets



Reduced
Emissions from
Deforestation
Degradation
+ Carbon stock enhancement
REDD+

Establishing Markets is Costly: REDD +

Planning and Institutional Capacity	\$1.6 billion
Pilots and Projects	\$234 million
Verified Emissions Reductions	~ \$97 million in credits sold

Voluntary Markets and Deals



Beyond Markets

Regulations, Laws, Actions

- Determine offsets for damages
- Determine fines
- Prioritize carbon-rich areas
(restoration, protection)

Lessons

- Societal value > financial value
- Payments of blue carbon ➔ conservation
 - Polluters pay for habitat protection
- Value of protection >> Value of restoration
- Policy and financial challenges remain
- Need to address external factors
- Don't need a market to make a deal