

16th Lme

Meeting with
Coastal Partners

Paris (FR) 8 - 11 July 2014



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Knowledge and tools for ecosystem based management
9 July 2014





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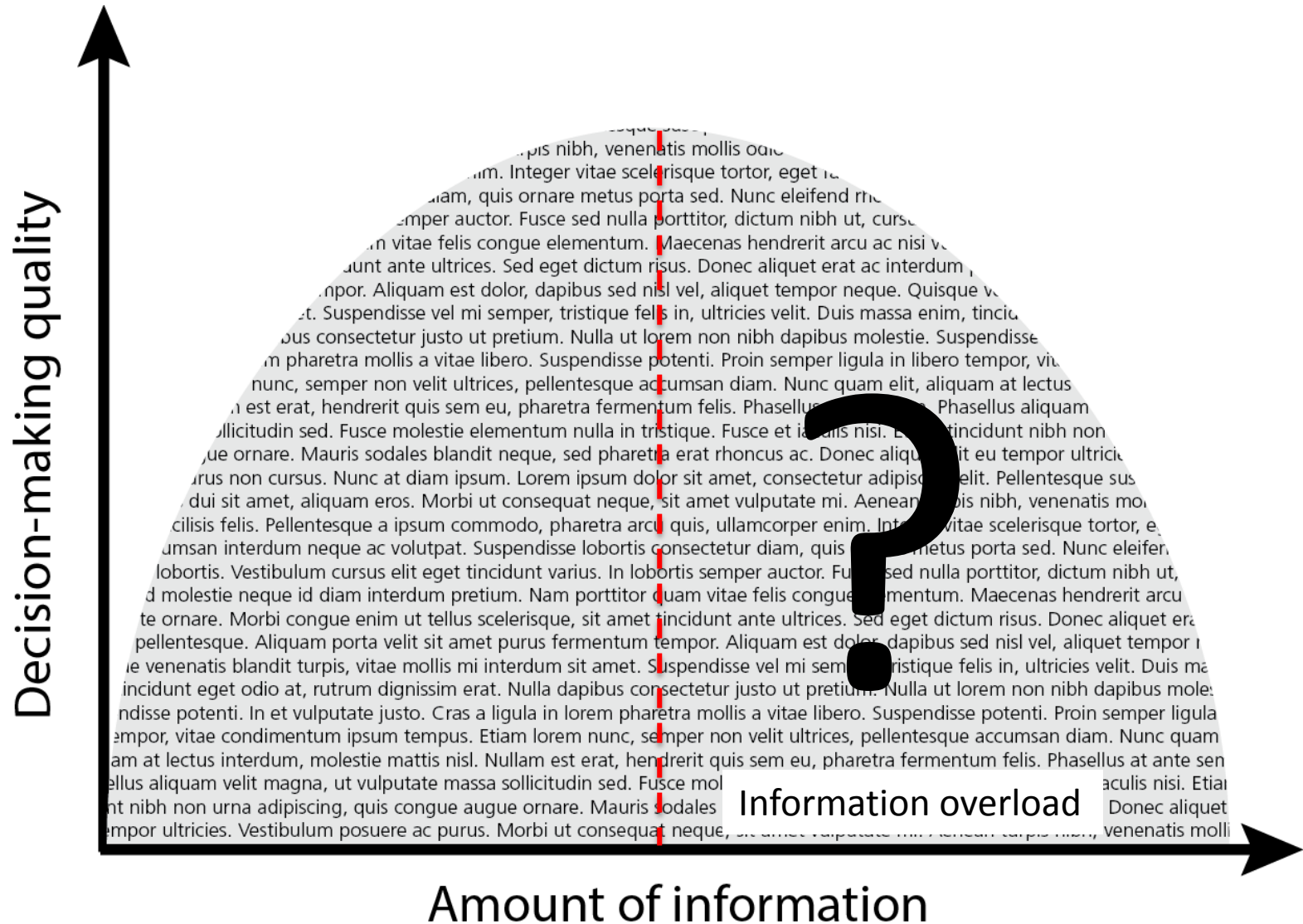


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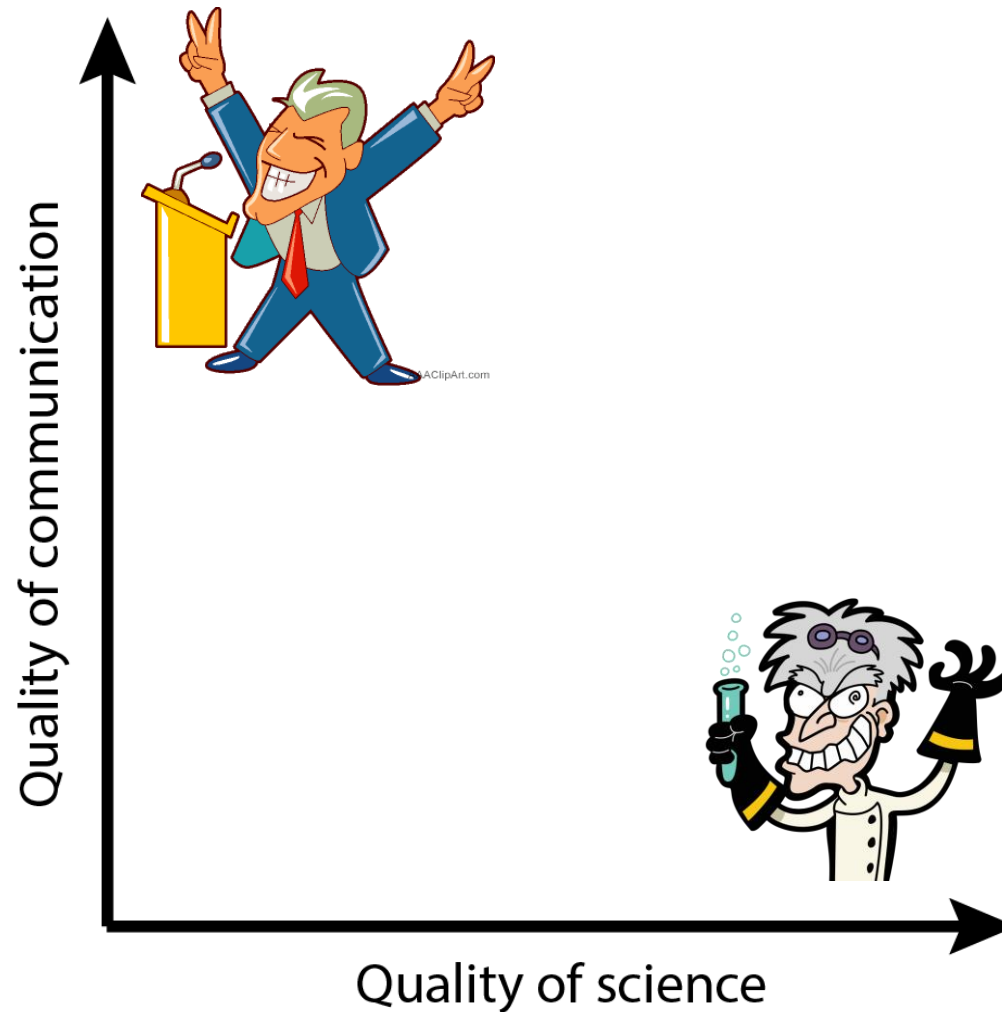
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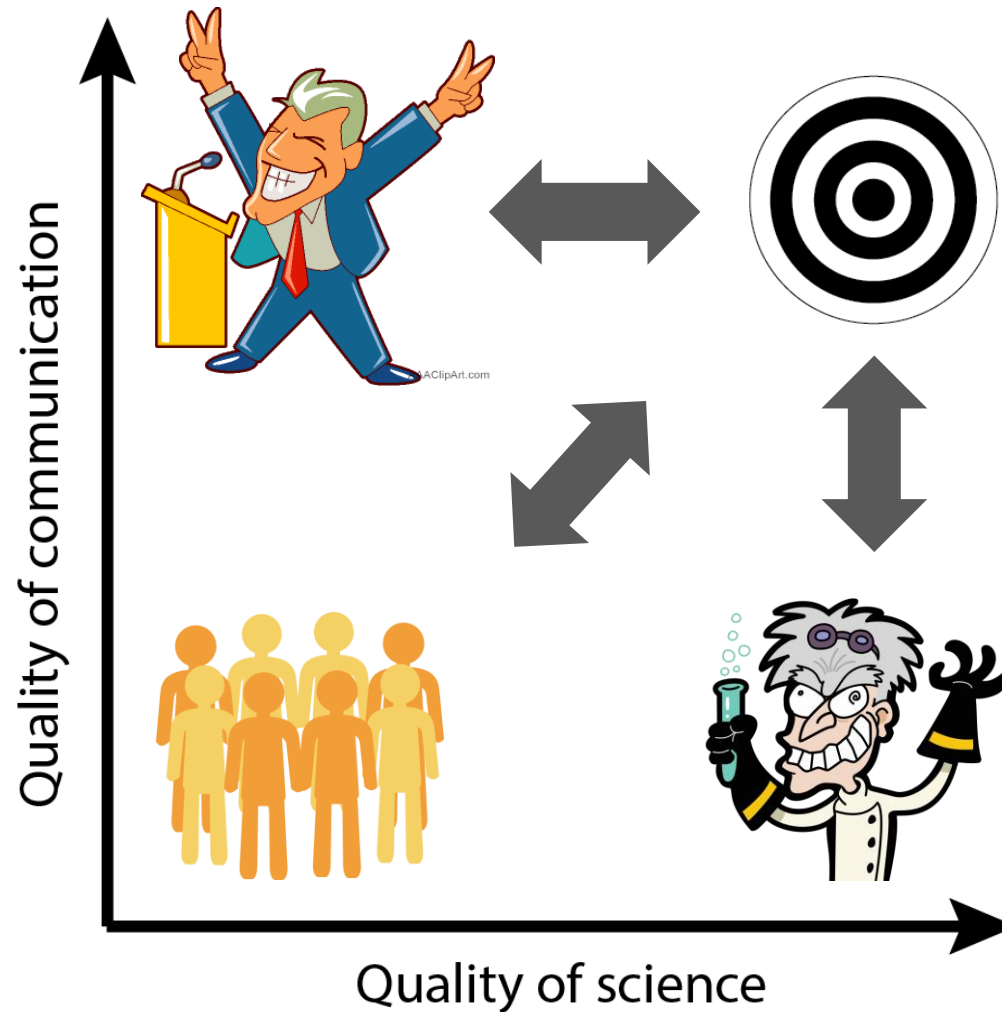
Information vs. decision-making



Bridging the divide



Bridging the divide



COASTAL MARINE EUTROPHICATION: A DEFINITION, SOCIAL CAUSES, AND FUTURE CONCERNS

Scott W. Nixon
Graduate School of Oceanography,
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ABSTRACT

There is a need in the marine research and management communities for a clear operational definition of the term, eutrophication. I propose the following:

eutrophication (noun) – an increase in the rate of supply of organic matter to an ecosystem.

This definition is consistent with historical usage and emphasizes that eutrophication is a process, not a trophic state. A simple trophic classification for marine systems is also proposed:

	Organic Carbon Supply g C m ⁻² y ⁻¹
oligotrophic	< 200
mesotrophic	200-500
eutrophic	500-1000
hypertrophic	> 1000

Various factors may increase the supply of organic matter to coastal systems, but the most common is clearly nutrient enrichment. The major causes of nutrient enrichment in coastal areas are associated directly or indirectly with meeting the requirements and desires of human nutrition and life. The distribution of organic matter is related to the atmosphere as a consequence of Earth's

Coastal eutrophication: recent developments in definitions and implications for monitoring strategies

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Communicating editor: R.J. Flors

The word 'eutrophication' has in the past been used to describe both the process and the state of an ecosystem. The word 'eutrophication' is used here to describe the process of nutrient enrichment. The word 'eutrophic' is used here to describe the state of an ecosystem. The word 'eutrophication' is used here to describe the process of nutrient enrichment. The word 'eutrophic' is used here to describe the state of an ecosystem.

INTRODUCTION

Eutrophication of coastal waters has been considered one of the major threats to the health of marine ecosystems.

variable use of water while progressively decreasing or eliminating discharges, losses and emissions of pollutants and other parameters for the long-term protection and

- Providing scientific context (references)
- Text > graphics
- Authorship exclusive
- Focus on results & interpretation

Scientific writing

- Providing societal context (examples)
- Text ≈ graphics
- Authorship inclusive
- Focus on conclusions & recommendations

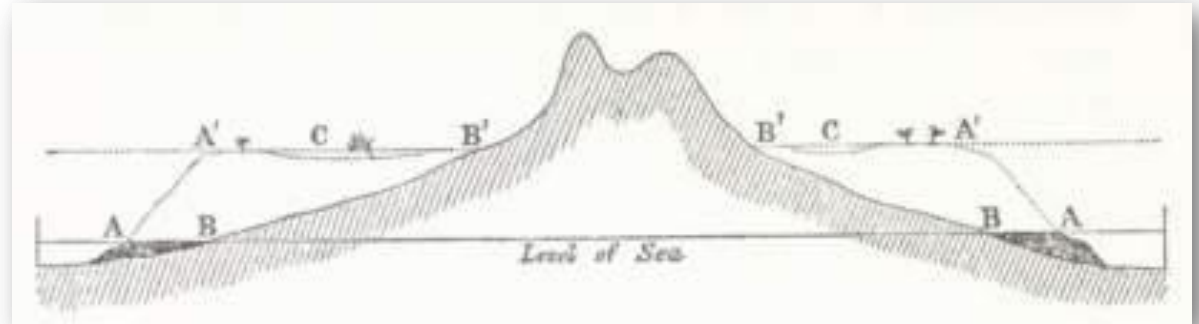
Science communication



The great scientists are/were also great communicators



Charles Darwin:
119 published books &
papers



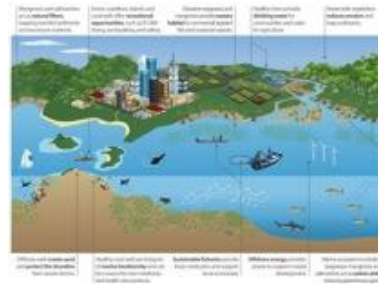
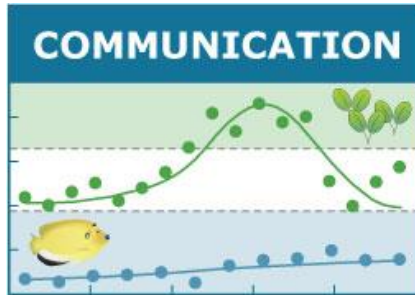
The Structure and Distribution of Coral Reefs
Charles Darwin, 1874 2nd Edition,
revised 1842 1st Edition



Albert Einstein:
248 published books &
papers

*"Make everything as simple as possible,
but not simpler."* A. Einstein

IAN has three main focus areas



Science communication services

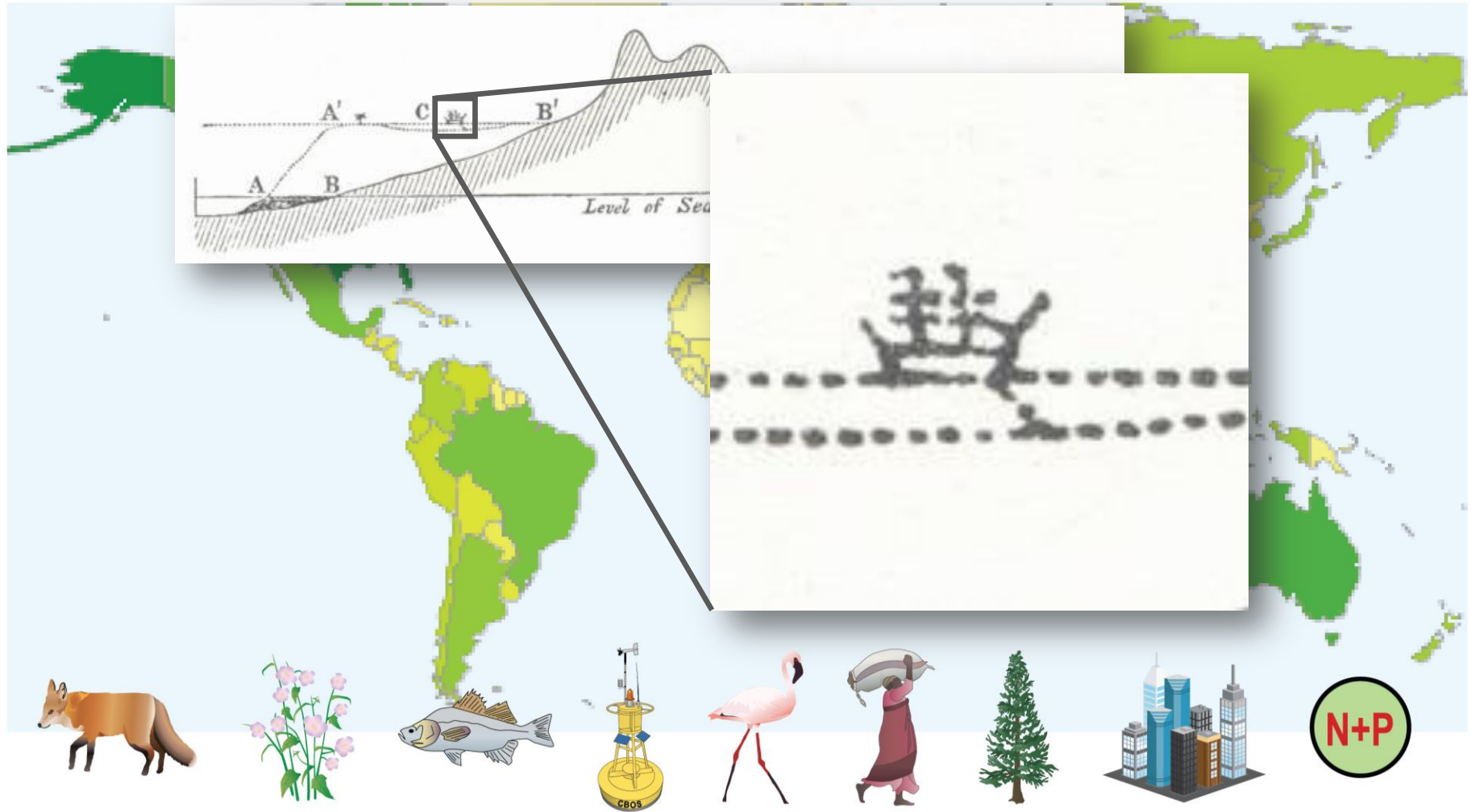


Environmental report cards & integrated assessments



Training & capacity building

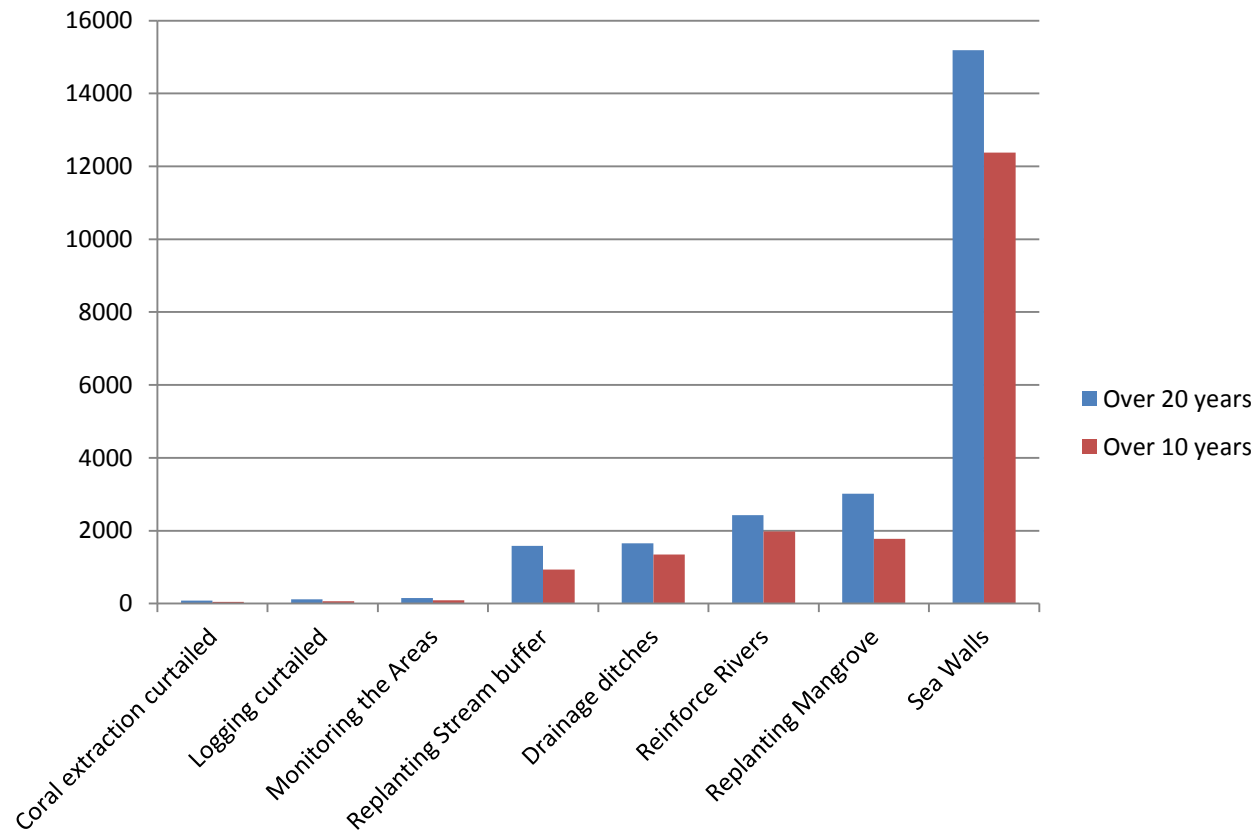
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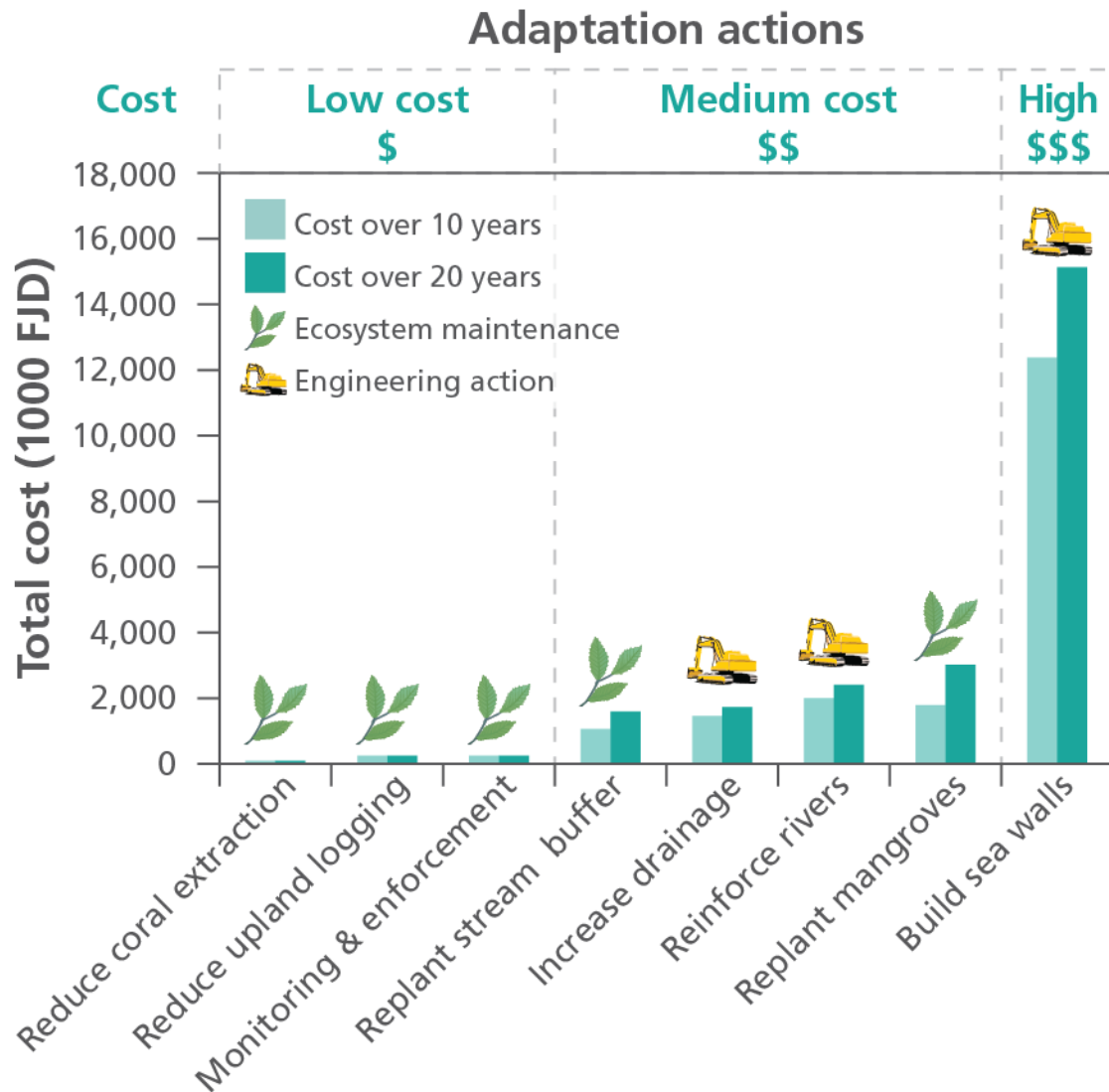
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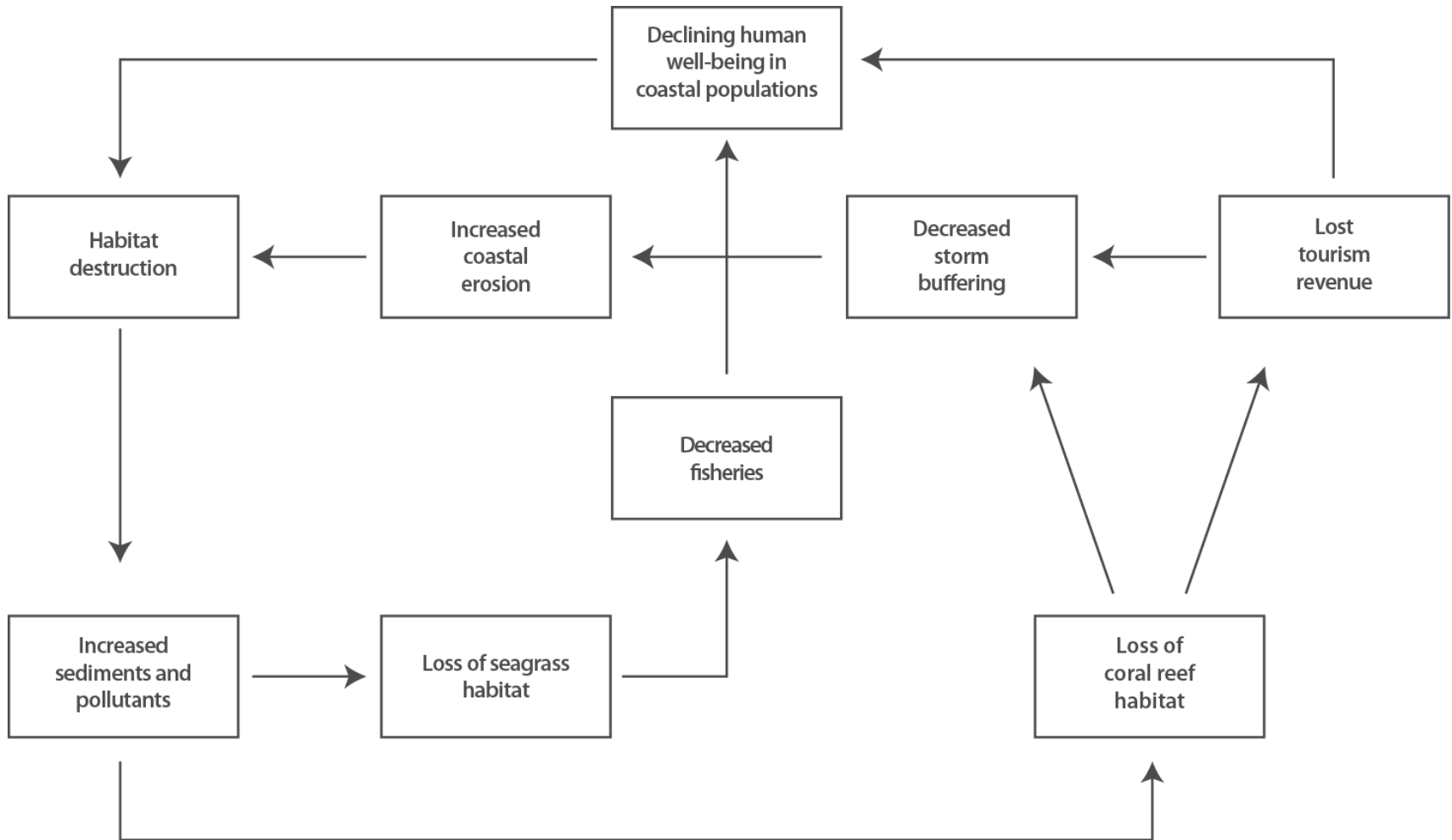
Transforming graphs



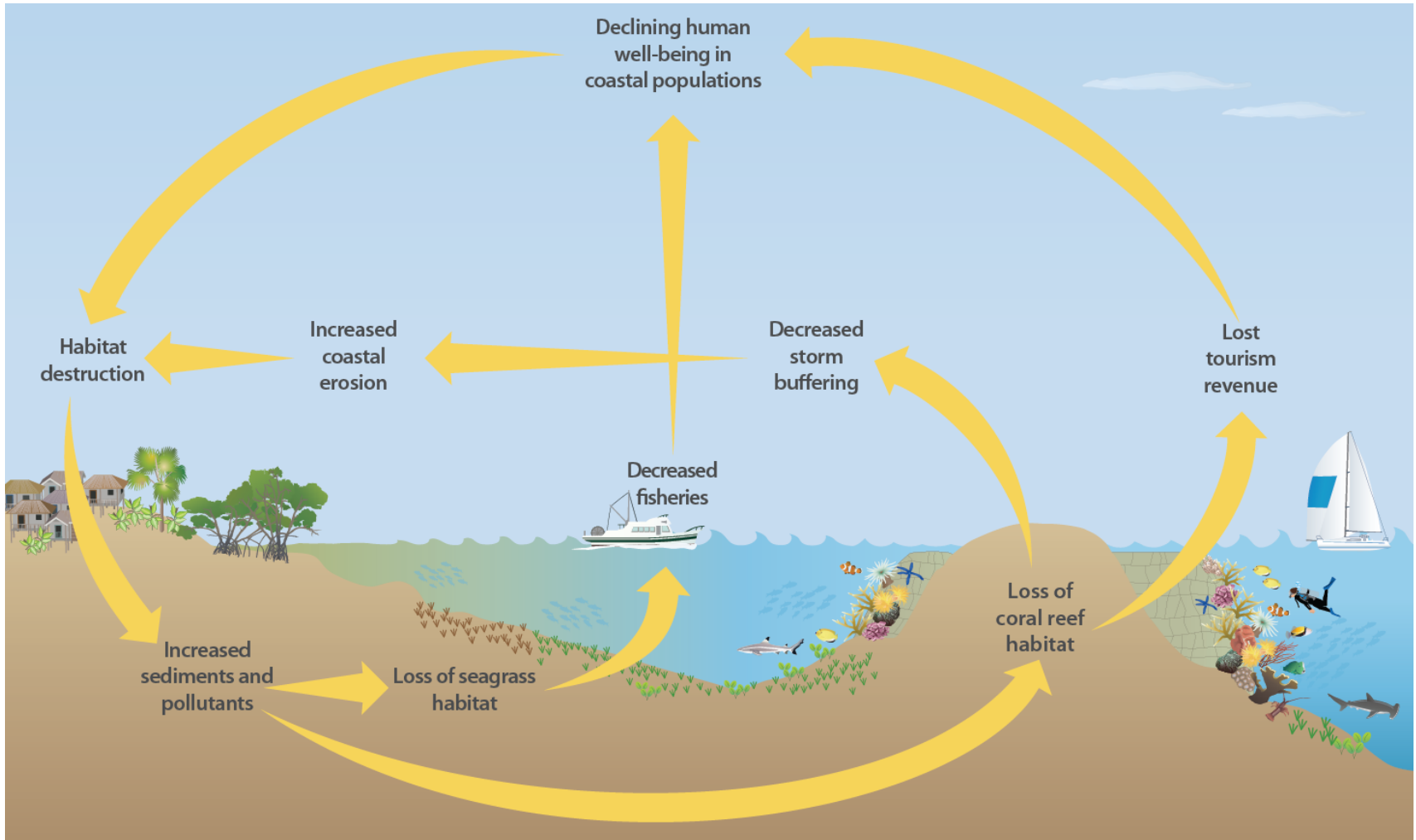
Transforming graphs



Transforming flow charts



Transforming flow charts



Synthesizing text

Cumulative impacts

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Synthesizing text

Cumulative impacts

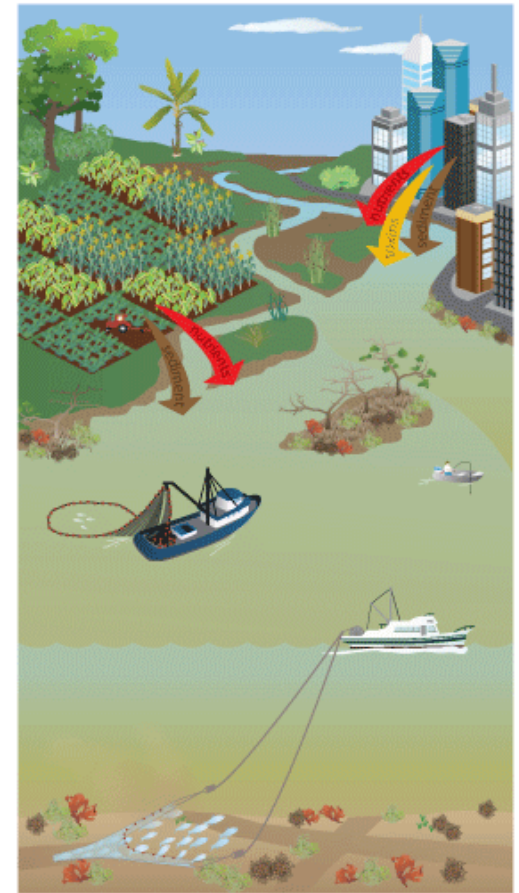
Intensive Fishing



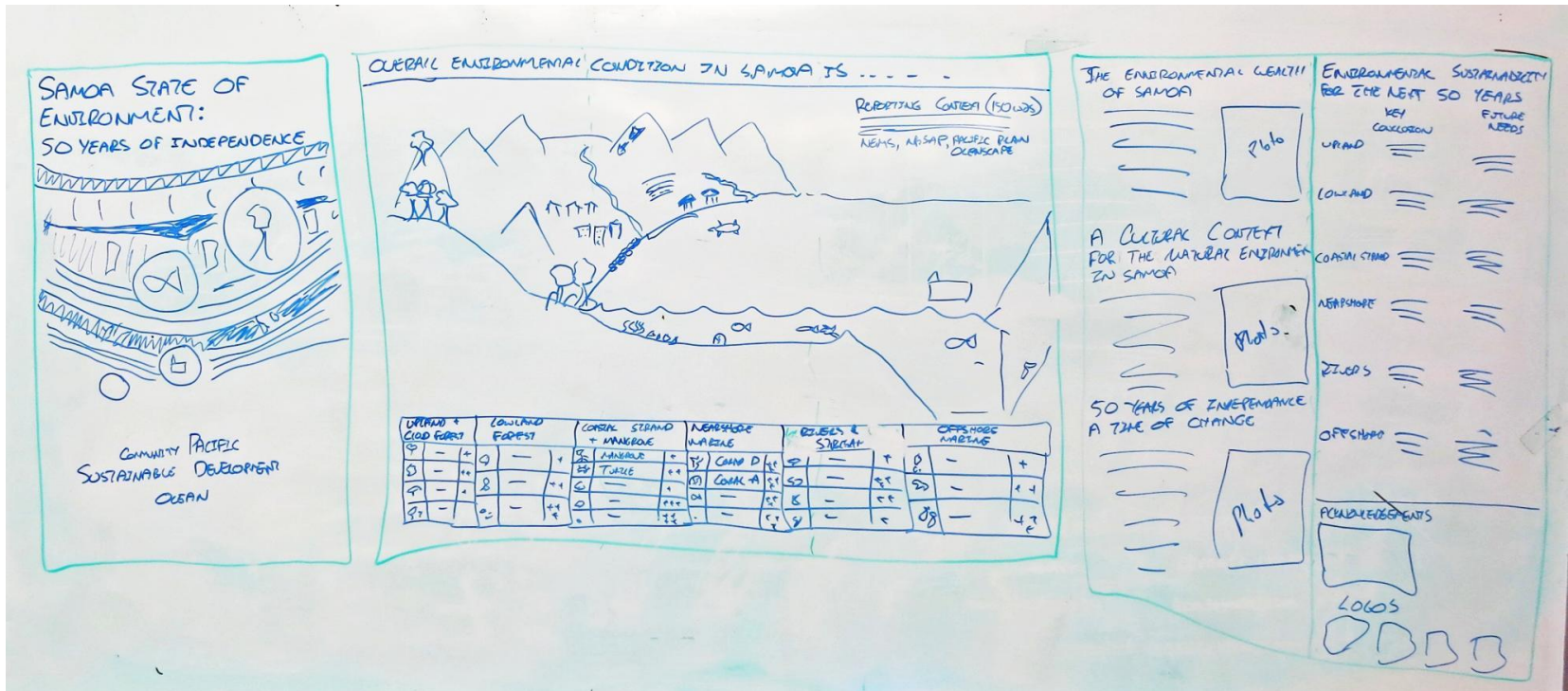
Intensive Fishing + Agriculture



Intensive Fishing + Agriculture + Development

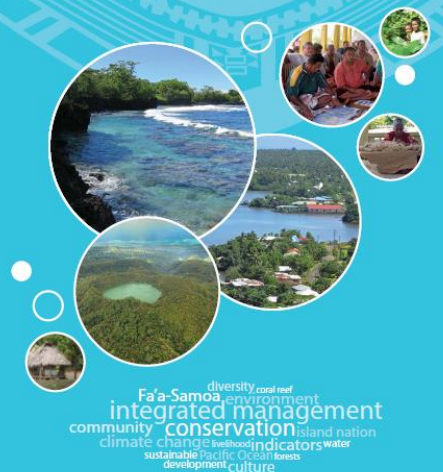


Storyboarding



Storyboarding

Samoa 2012 Environmental Outlook Developing a vision for the next 50 years



Celebrate

Untouched cloud forest
Samoa's cloud forest provides habitat for a wide variety of species that are important for Samoan culture, including *nu'ono'ono* (a flying fox), and *manuasa*. Intact forests are Samoa's lungs, absorbing carbon dioxide and pollutants from the air and giving off the oxygen we breathe. This habitat is globally rare and needs our protection.

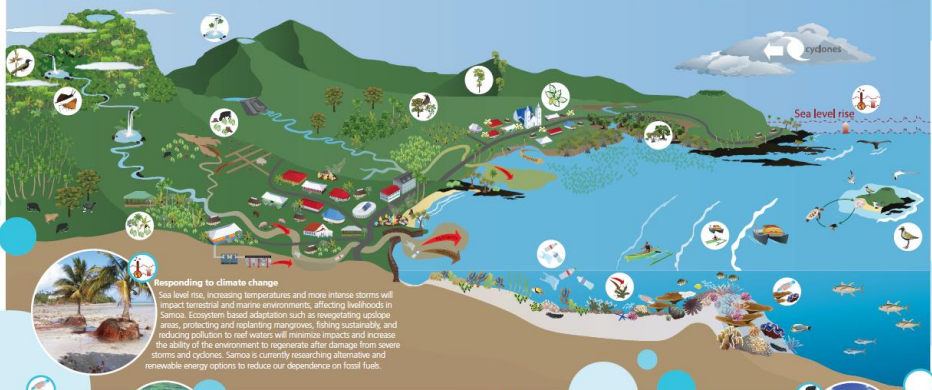
Waterfalls and crater lakes
Upland waterfalls are an important feature of the Samoan landscape, and are rare for Polynesian islands. Lake Lanoto'o is listed as a wetland of international importance.

Use of indigenous species
Samoan culture is closely tied to the environment, most notably through the use of plants and animals, including medicinal plants such as *nonu*, plants for construction or for making handicrafts such as *ifilele*, and traditional foods.

Traditional mixed agriculture
Many Samoan villages continue to practice mixed agriculture as they have for thousands of years. Our land-based resources need to be protected as they support crops and livestock, as well as productive and diverse forests and grasslands.

Rich biodiversity
Did you know there are 64 species of land snails and 50 species of moths and butterflies, over half of which only occur here? Samoa also has 215 native fern species, including *laugalelei*, commonly used for medicinal purposes and in traditional events. The smallest spider in the world, *Pau maripies*, is found in the montane forest of Upolu.

Samoa's unique habitats and culture



Protected areas
O le Pupū Pū'a National Park was the first protected area in the South Pacific, while Palaeo Deep was the first marine reserve in the region. Protected areas are a refuge for threatened plant and animal species, which can then repopulate surrounding areas.

Responding to climate change
Sea level rise, increasing temperatures and more intense storms will impact terrestrial and marine environments, affecting livelihoods in Samoa. Ecosystem based adaptation such as revegetating upslope areas, protecting and replanting mangroves, fishing sustainably, and reducing pollution to reef waters will minimize impacts and increase the ability of the environment to regenerate after damage from severe storms and cyclones. Samoa is currently researching alternative and renewable energy options to reduce our dependence on fossil fuels.

Sediment and nutrient inputs
Sediment and nutrients from soil erosion caused by poor agriculture and land use practices, and nutrients from leaking septic tanks affect our rivers, decreasing water quality and making our water unsafe to drink. As the rivers flow into the ocean, these nutrients stimulate excessive algae to grow, smothering corals. We can help by minimizing erosion of soil and using well designed and maintained septic systems.

Changing land use
Much of our remaining forests are being cleared for agriculture and development. Key forest areas which are particularly rich in species and intact habitats have been identified in Samoa and are being targeted for conservation action.

Keep Samoa clean and beautiful
Where does your garbage go? Most goes to a landfill, but some of it is burned illegally, and lots ends up as litter in our streams, lagoons, and ocean. Garbage should be put out for collection, and not dumped where it can damage our forests, rivers and reefs.

Protect

Mangroves and reefs
Natural disasters such as cyclones, tsunamis, and severe storms impact reefs, forests, and wildlife, as well as human settlements and infrastructure. Mangroves and coral reefs are our first line of defense, helping to protect Samoa's shoreline from coastal erosion caused by these extreme events.

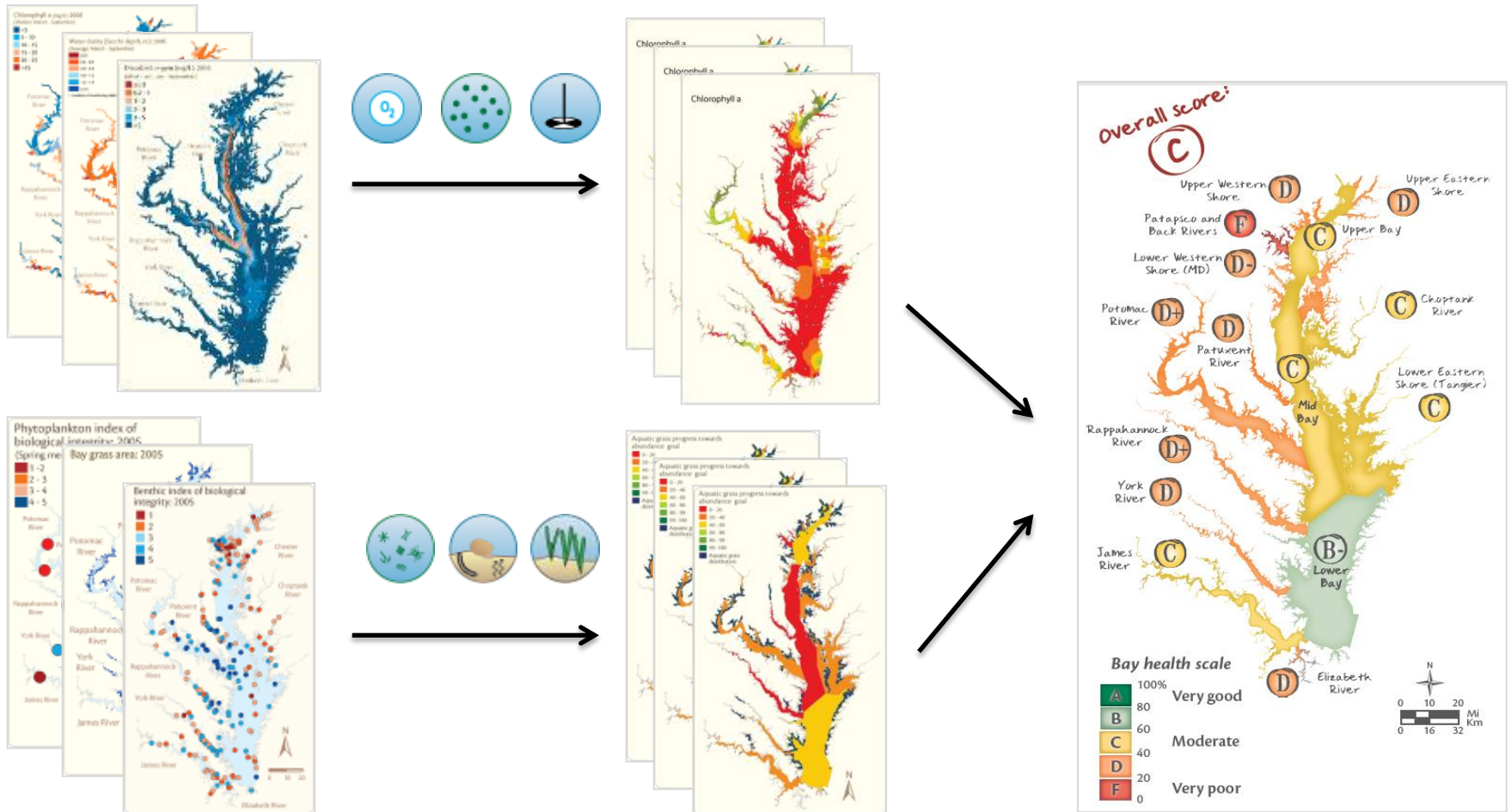
Invasives are taking over
Invasive species like the *lauhala* (mammal) and *fo space* (African tulip) grow quickly in disturbed areas and are causing declines in forest quality, while myna birds and rats threaten native birds. Marine invasives such as introduced algae, fish, and invertebrates also threaten our marine and freshwater environments. Careful management is needed to protect forest and coastal resources and preserve Samoa's biodiversity.

Where are all the big fish?
Bigger fish produce more offspring. Limiting the number and sizes of fish we catch, using sustainable fishing practices, and protecting mangrove and seagrass habitat for young fish will help ensure that local fishing remains part of the Samoan way of life.

Ifilele is becoming rare
Did you know the *ifilele* tree, used to produce *ava* bowls, is now becoming rare as a result of over harvesting? Seventy-five other marine and land species are currently at risk of extinction in Samoa. Conserving habitat, managing invasive species, and setting limits on use will keep *Fa'a-Samoa* alive by preserving culturally important species for future generations.

Report Cards

(data synthesis and communication)



20,000 data points each year

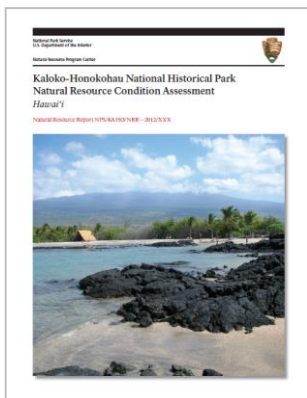
15 grades

Report Cards

- Delivery
 - Simple and concise
 - Most people can relate to them
 - Don't require instructions
- Effect
 - Can identify areas needing improvement
 - Results can be tracked over time
- Response
 - Provides incentive
 - Accountability
 - Mass media love it



Integrated Assessments



MARINE HABITAT



DEGRADED	INDICATORS	DESIRED
<p>High turbidity and sediment loading reduce water clarity and degrades seagrass communities. High crown of thorns abundance indicates a disturbed ecosystem. Low coral cover and richness indicates vulnerable coral communities. Low fish biomass and richness indicates unsustainable inshore fisheries.</p>	<div>low</div> <div>high</div> <p>Coral cover</p>	<p>Low turbidity and sediment loading support clear water and healthy and diverse seagrass communities. Low crown of thorns abundance indicates an intact ecosystem. High coral cover and richness indicates resilient coral communities. High fish biomass and richness supports sustainable inshore fisheries.</p>
	<div>low</div> <div>high</div> <p>Coral richness</p>	
	<div>low</div> <div>high</div> <p>Fish biomass</p>	
	<div>low</div> <div>high</div> <p>Fish richness</p>	
	<div>high</div> <div>low</div> <p>Sediment load</p>	
	<div>high</div> <div>low</div> <p>Turbidity</p>	

CURRENT CONDITION

GOOD		
	Coral cover	Good
	Coral richness	Good
	Fish biomass	Good
	Fish richness	Good

Training and capacity building

- Elements of science communication
- Use and production of conceptual diagrams
- Applied principles of layout design
- Oral presentations
- Report card production



Science making a difference

