COASTS, PEOPLE AND THE COMMONS: FORGING A NEW INTERDISCIPLINARY SCIENCE

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Building an interdisciplinary science of governance for coastal and marine environments

- Eight areas of emphasis in *Coasts for People*:
  - Resilience of social-ecological systems
  - Commons, shared resources
  - Co-management, sharing power and responsibility
  - Conservation and marine protected areas
  - Restoring coastal zone ecosystems
  - Coastal community livelihoods and well-being
  - Increasing the range of knowledge used
  - Ecosystem-based management

Social-ecological resilience

- A higher-order management objective
- Coastal resources need to be managed, not for commodities but for resilience
  (the capacity of a system to absorb disturbance and reorganize while undergoing change)
- Resilience thinking considers change as a 'given', and multiple equilibria and multiple **stable states** as a common condition
- The management task, therefore, is to build or strengthen resilience to stay in a desirable state
- Or to navigate transformation from one state to another (eg fishing economy to tourism economy)

Resilience study example:
The Gulf of Maine (USA) as a lobster pond


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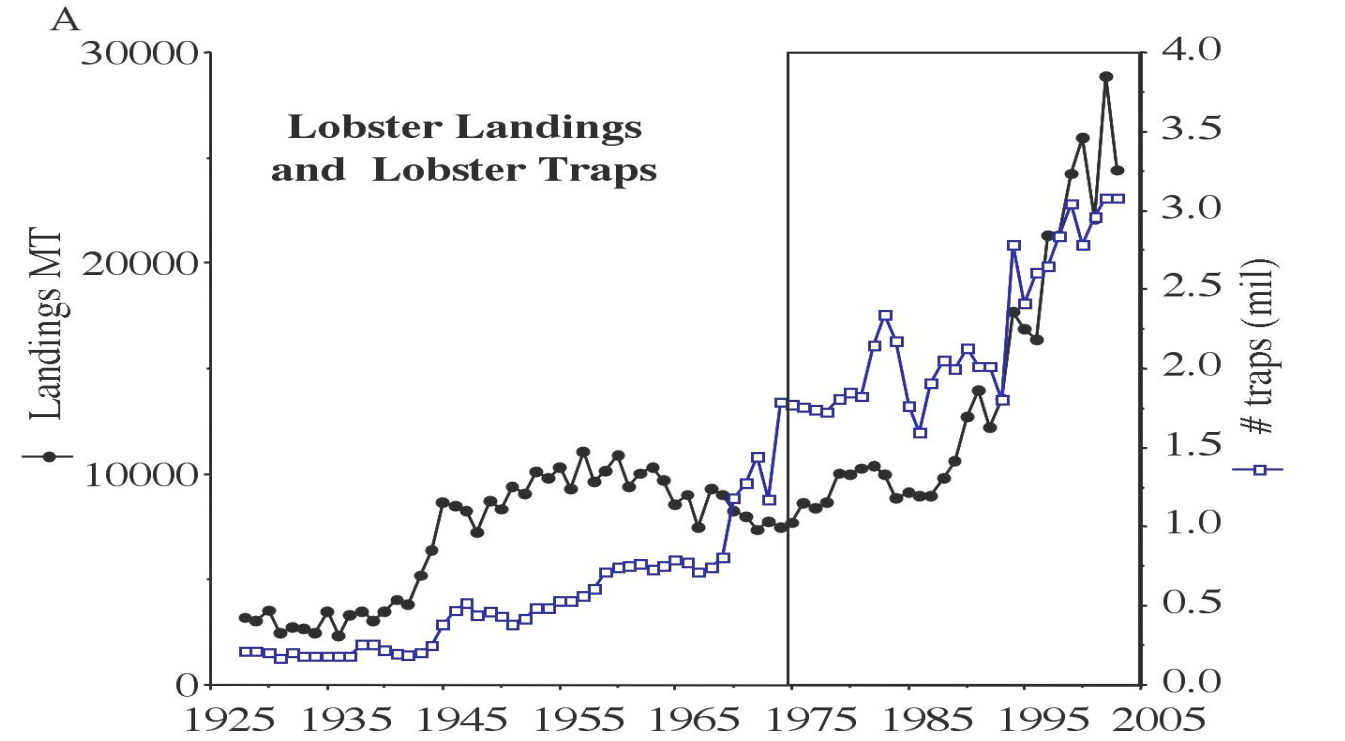
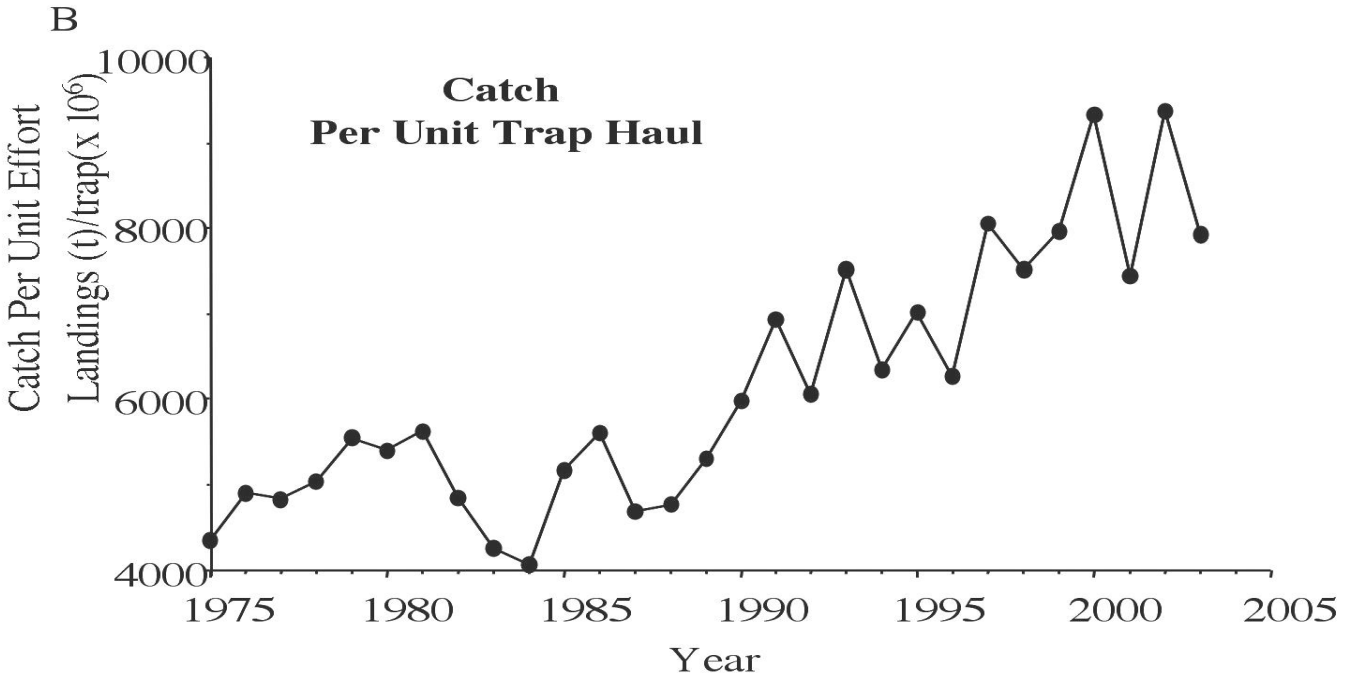
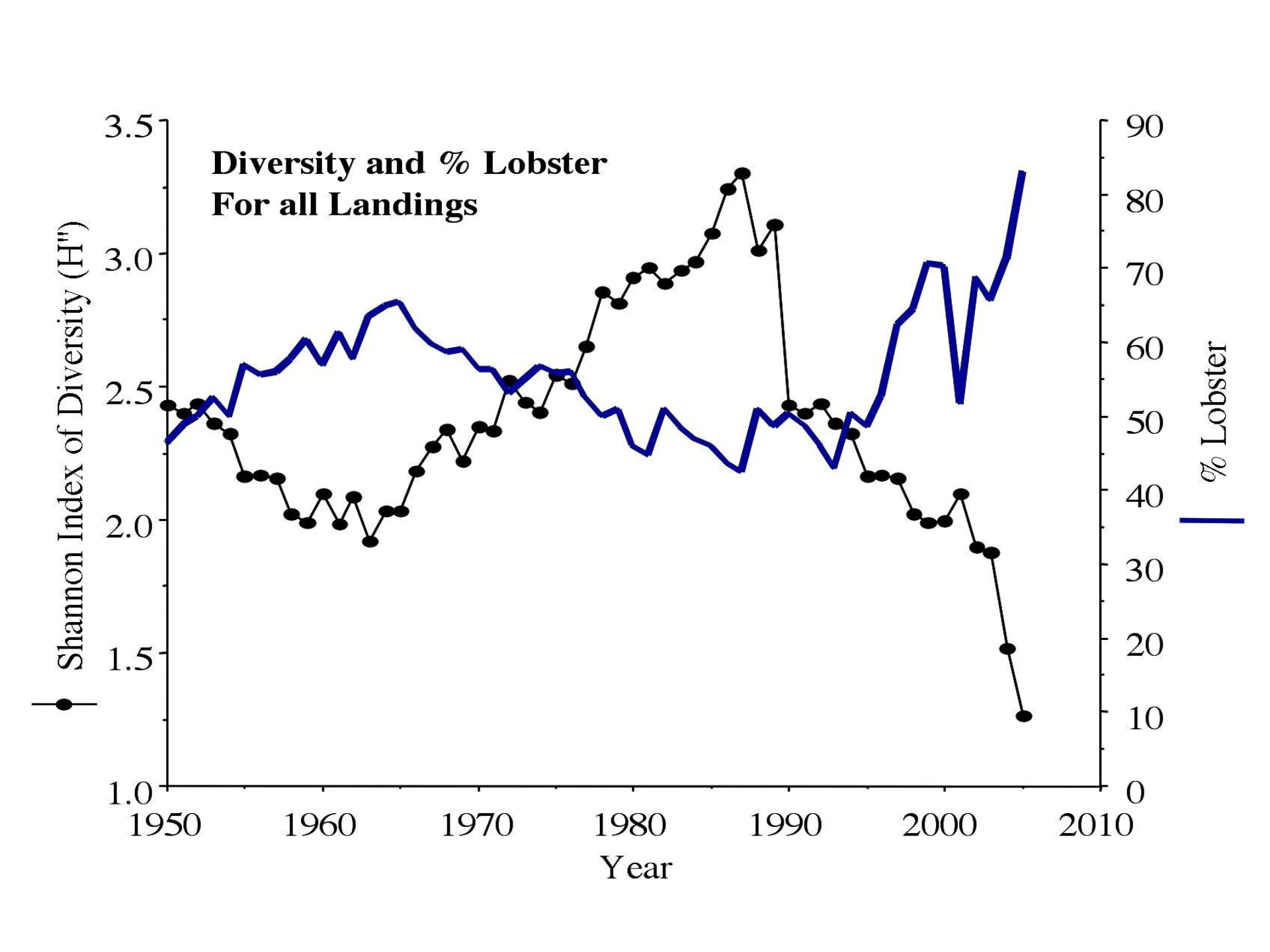

A
Lobster Landings
and Lobster Traps
Landings MT
traps (mil)
30000
20000
10000
0
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1925 1935 1945 1955 1965 1975 1985 1995 2005


B
Catch
Per Unit Trap Haul
Catch Per Unit Effort
Landings (t)/trap(x 10^6)
10000
8000
6000
4000
1975 1980 1985 1990 1995 2000 2005
Year


Diversity and % Lobster
For all Landings
Shannon Index of Diversity (H")
% Lobster
Year
3.5
3.0
2.5
2.0
1.5
1.0
90
80
70
60
50
40
30
20
10
0
1950
1960
1970
1980
1990
2000
2010

Gulf of Maine: a resilient SES?

- Economically and biologically successful
- But the diversity of the system extremely low ("lobster pond"); no flexibility
- System vulnerable to disease and other disturbances and may collapse
- Policy options to the present state
  - An alternative resource-based stable state (eg, a cod and groundfish dominated marine ecosystem)
  - An alternate stable state (eg a tourism and recreation dominated SES)

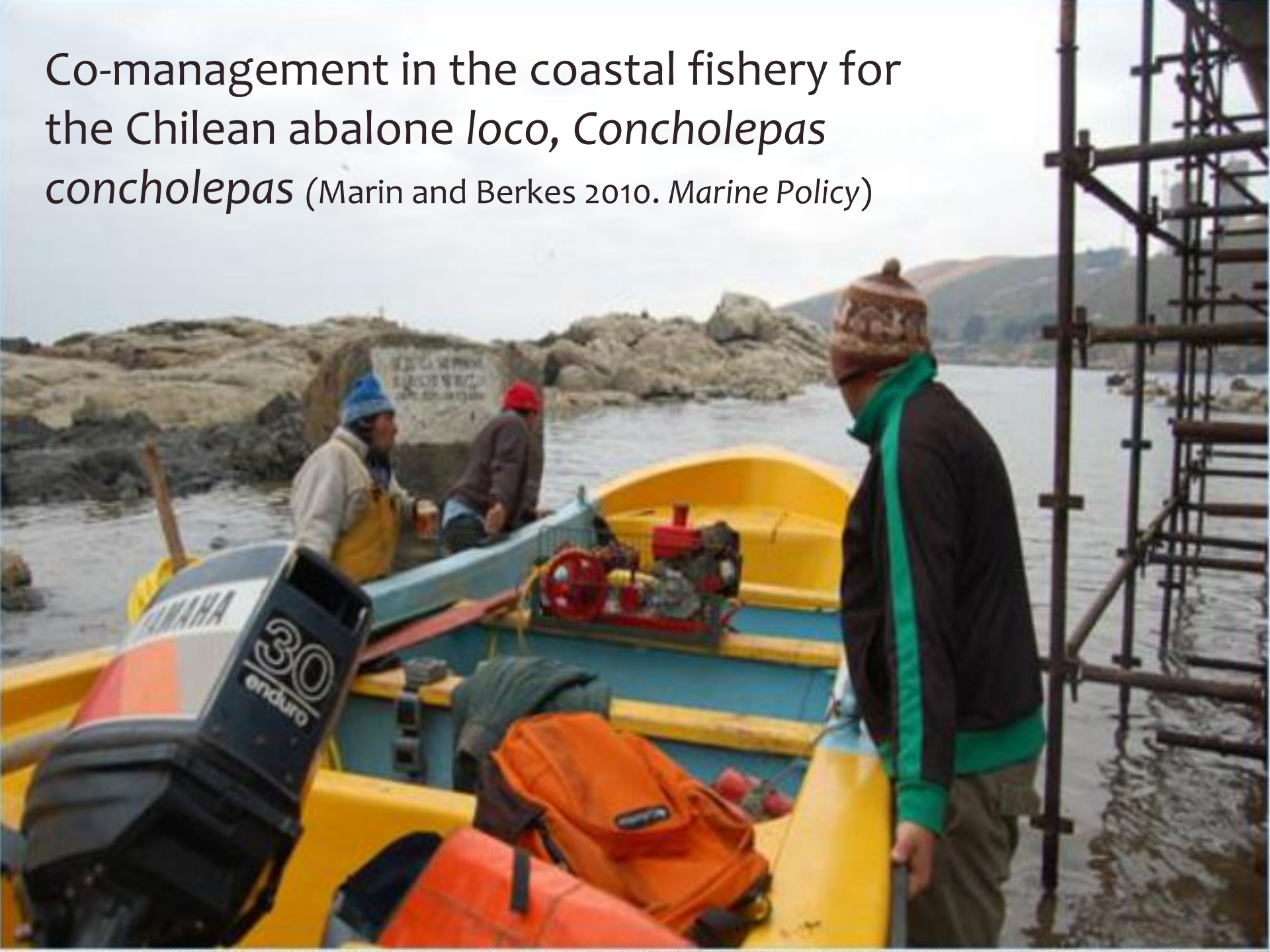
Commons – Shared resources

- Commons are about resources in which (1) it is difficult to control outsiders, (2) difficult to share with insiders (Ostrom et al. 1999. *Science*)
- Historically, coastal communities devised a diversity of solutions to deal with these two problems
- Governments have formal rules-in-use for commons
- Three potential solutions: (1) community-based ones, (2) government control, (3) market regulation
- Issue: which of these three works best (or a mix) for a particular case (re: the Roving Bandits

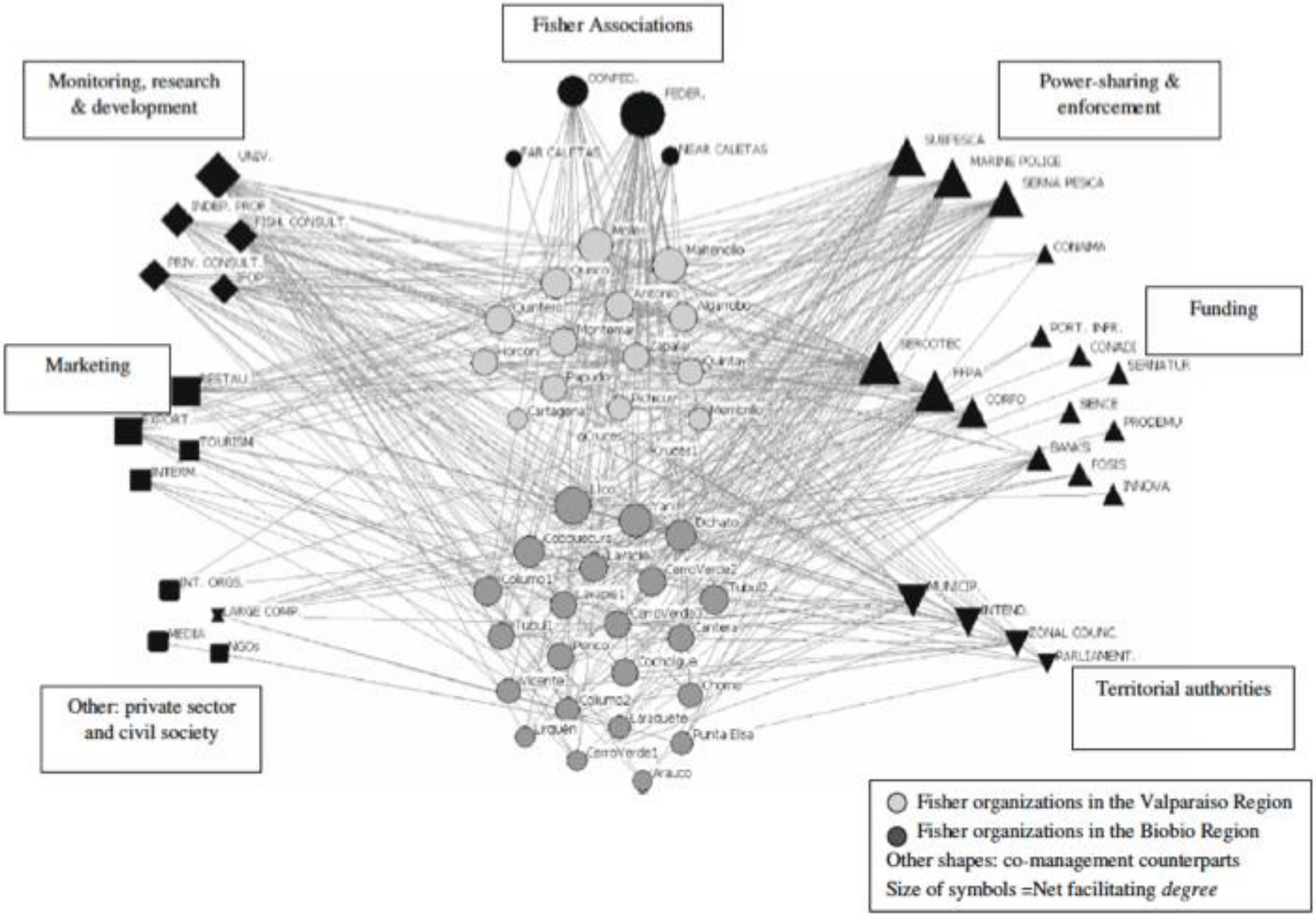
Co-management: sharing power and responsibility

- Pure community-based management is not possible in today's globalized world
- By definition co-management involves **vertical linkages** between at least two levels, such as the local level and one or more government levels
- The essence of co-management is **social learning** and joint problem solving through multiple linkages in the form of **networks**
- Hence, partnerships and networks are critically important

Co-management in the coastal fishery for the Chilean abalone *loco*, *Concholepas concholepas* (Marin and Berkes 2010. *Marine Policy*)



Networks in Chile's coastal benthic fishery co-management



Social and institutional learning in co-management

- Co-management often proceeds through multi-level social learning in networks

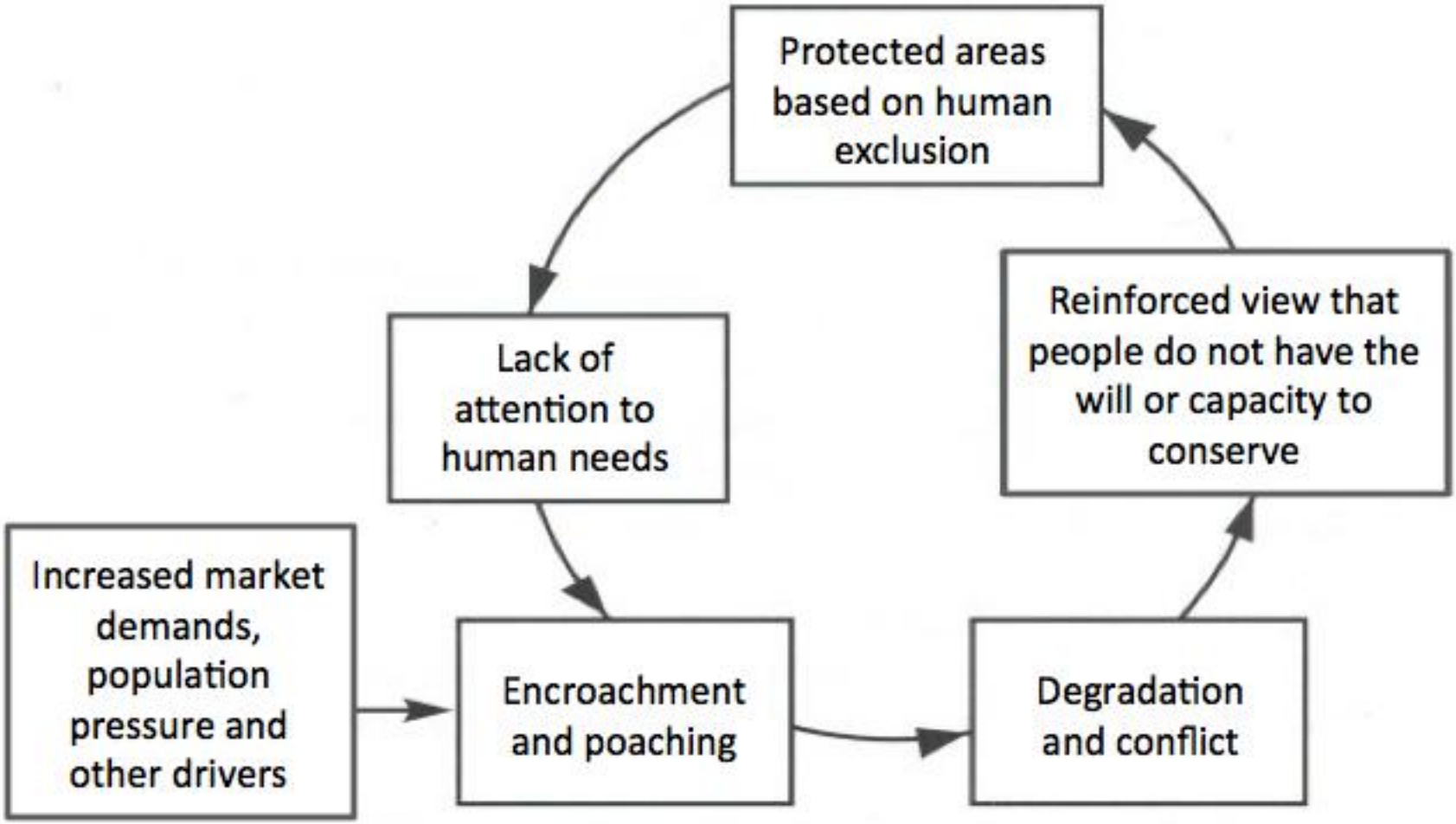
  "Management is not a search for the optimal solution to one problem but an ongoing learning and negotiation process where a high priority is given to questions of communication, perspective sharing, and the development of adaptive group strategies for problem solving".

  - Pahl-Wostl and Hare, *J Community & Applied Social Psych* 2004, p. 193

- In the process, social learning may proceed from simple, **single-loop learning** to **double-loop learning** (learning-to-learn) that characterizes adaptive co-management

Conservation & marine protected areas (MPAs)

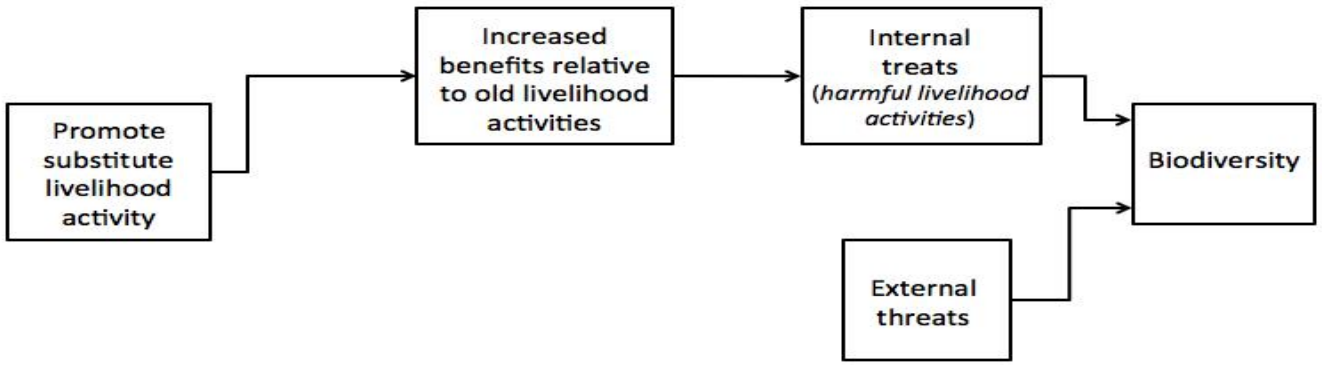
- On the one hand, an urgent international need for increased conservation
- On the other, the reality: coastal waters are fully used
- Increasing **contestation,** with new uses (eg aquaculture) impacting existing uses (eg small-scale fisheries)
- There are very few examples of large well governed MPAs (eg Australia's Great Barrier Reef Marine Park)
- The vast majority of MPAs throughout the world are "paper parks"
- Conservation without attention to livelihood needs and well-being creates encroachment and poaching


Protected areas based on human exclusion
Lack of attention to human needs
Reinforced view that people do not have the will or capacity to conserve
Increased market demands, population pressure and other drivers
Encroachment and poaching
Degradation and conflict

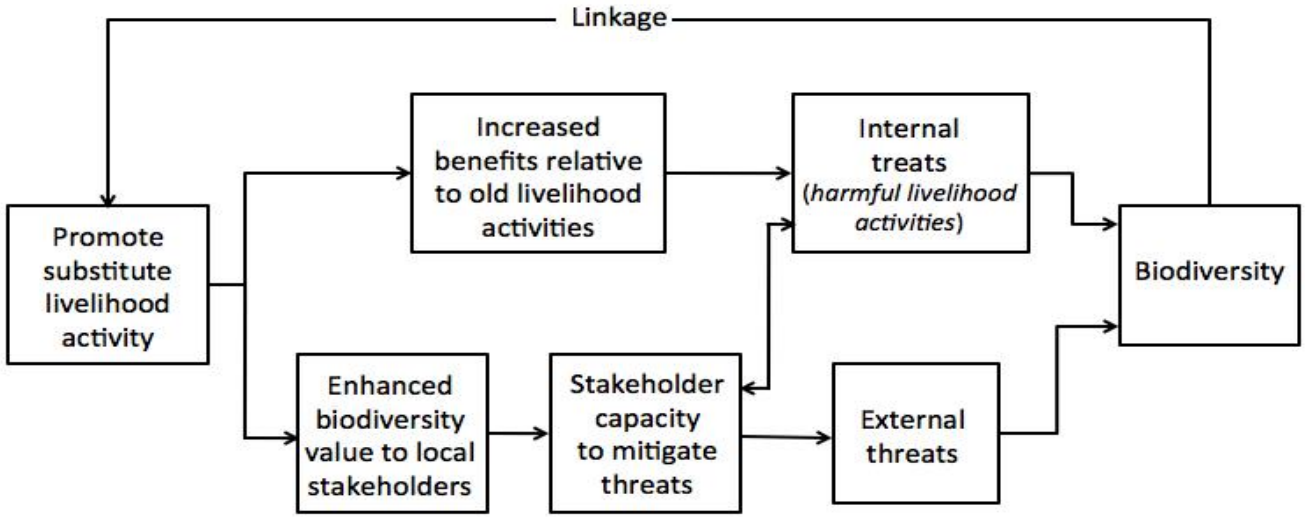
Search for effective conservation strategies

- **Substitution strategies**: attaining conservation by providing a substitute activity for a community
- **Linked incentive strategies**: biodiversity conservation promotes livelihoods (Salafsky and Wollenberg 2000. *World Development*)
- **Community-based conservation** "by, for, and with the local community" (Western and Wright 1994. *Natural Connections*)
- has the advantage that conservation benefits can be directly linked to livelihood benefits, thus creating incentives for stewardship

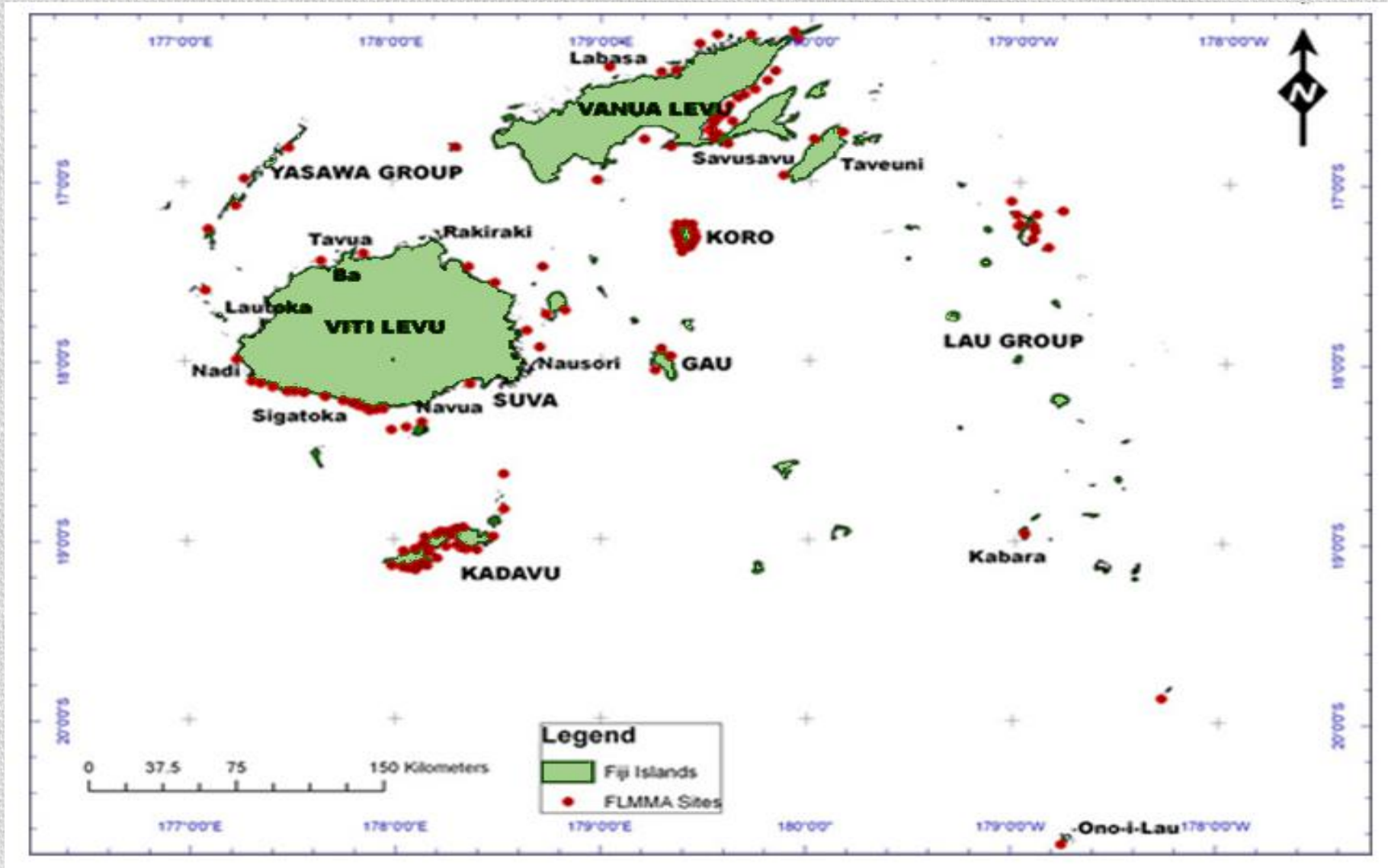
(a) Indirect Linkage: Substitution Strategy



(b) Direct Linkage: Linked Incentives Strategy



MPA networks and community-based conservation “by, for, and with the local community”: Fiji’s Locally Managed Marine Areas (LMMAs)



Restoring coastal zone ecosystems

- The issue is often not conservation but restoration
- Bringing coastal communities actively into management requires **good governance** (collaboration, transparency, accountability etc)
- Fundamentally different from command-and-control
- Increasingly communities are initiating action and engaging government, NGOs and universities
  - Mangrove restoration (Thailand)
  - Coral reef restoration (Bali, Indonesia)
  - River and delta restoration (Washington State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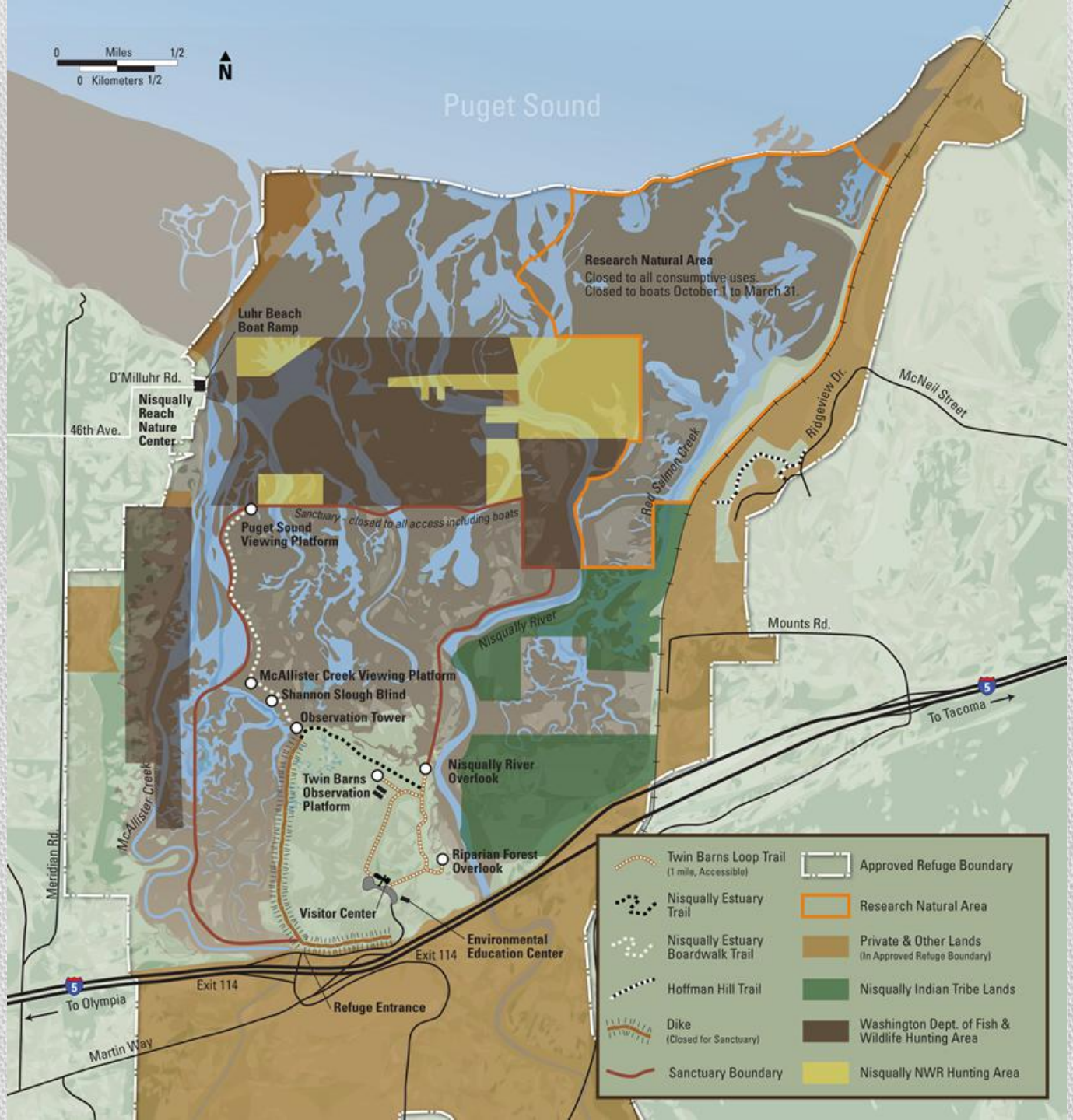
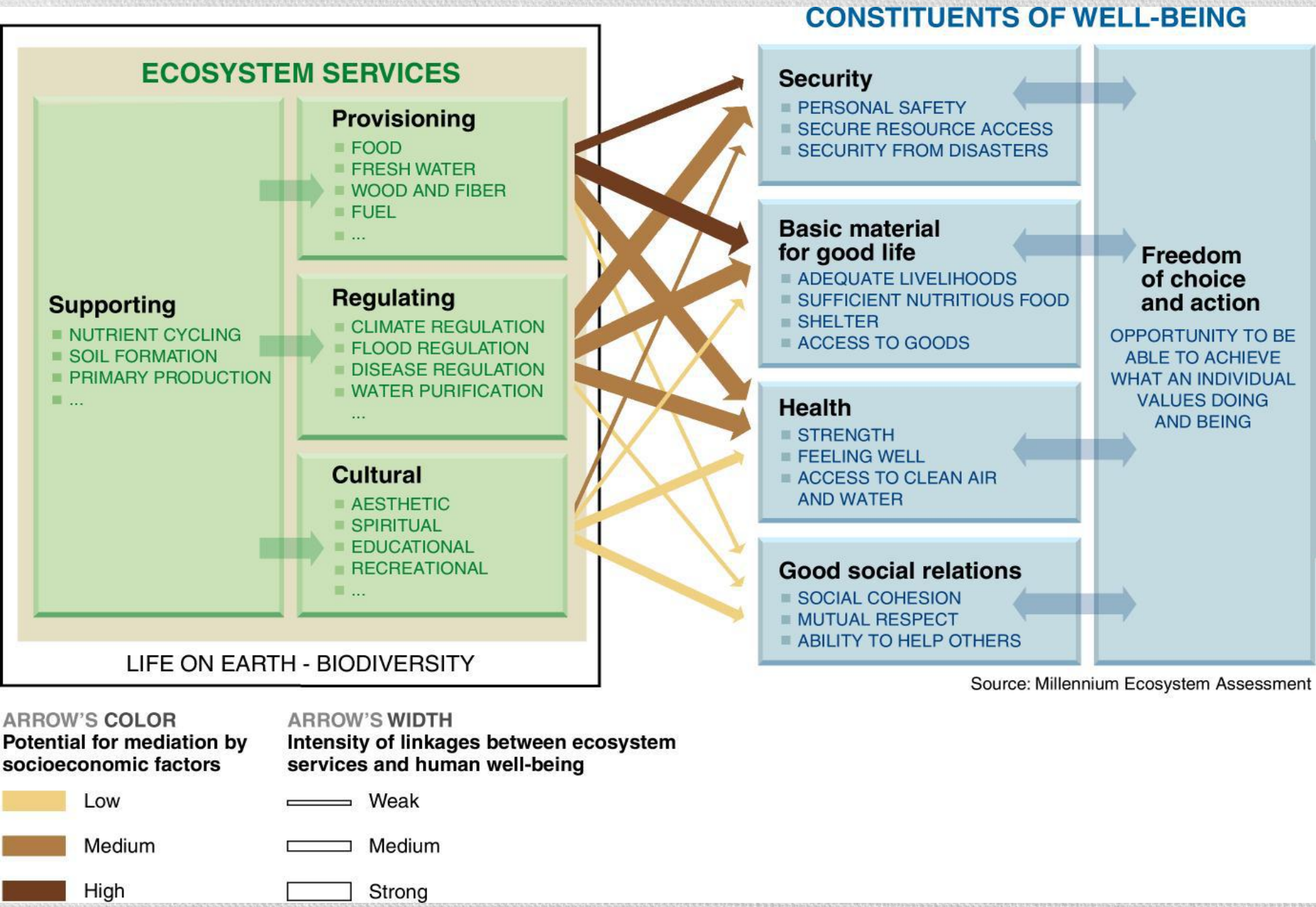
Delta of the Nisqually River, Pacific USA, had been drained and converted into farmland. It is being bought back by the Tribe and the delta restored, re-creating habitat for young salmon
(Source: Nisqually Delta Restoration Project)


0 Miles 1/2
0 Kilometers 1/2
N
Puget Sound
Research Natural Area
Closed to all consumptive uses.
Closed to boats October 1 to March 31.
Luhr Beach Boat Ramp
D'Milluhr Rd.
Nisqually Reach Nature Center
46th Ave.
Sanctuary - closed to all access including boats
Puget Sound Viewing Platform
Red Salmon Creek
Ridgeview Dr.
McNeil Street
Nisqually River
Mounts Rd.
McAllister Creek Viewing Platform
Shannon Slough Blind
Observation Tower
Nisqually River Overlook
Twin Barns Observation Platform
McAllister Creek
Meridian Rd.
Riparian Forest Overlook
Visitor Center
Environmental Education Center
Exit 114
Exit 114
To Olympia
To Tacoma
Refuge Entrance
Martin Way
Twin Barns Loop Trail
(1 mile, Accessible)
Nisqually Estuary Trail
Nisqually Estuary Boardwalk Trail
Hoffman Hill Trail
Dike
(Closed for Sanctuary)
Sanctuary Boundary
Approved Refuge Boundary
Research Natural Area
Private & Other Lands
(In Approved Refuge Boundary)
Nisqually Indian Tribe Lands
Washington Dept. of Fish & Wildlife Hunting Area
Nisqually NWR Hunting Area

Coastal community livelihoods and well-being

- Resource-based communities: the link between ecosystem services and human well-being (MA 2005)
- The broader issue: human development and poverty; **capacity development**
- Vast majority of fishers in the world are not full-time. Fishing is often part of a complex of livelihood activities, even in Western countries
- The availability of livelihood **options** outside of fisheries, and the flexibility to follow a seasonal round are necessary for **livelihood resilience**



Source: Millennium Ecosystem Assessment

ARROW'S COLOR
Potential for mediation by socioeconomic factors

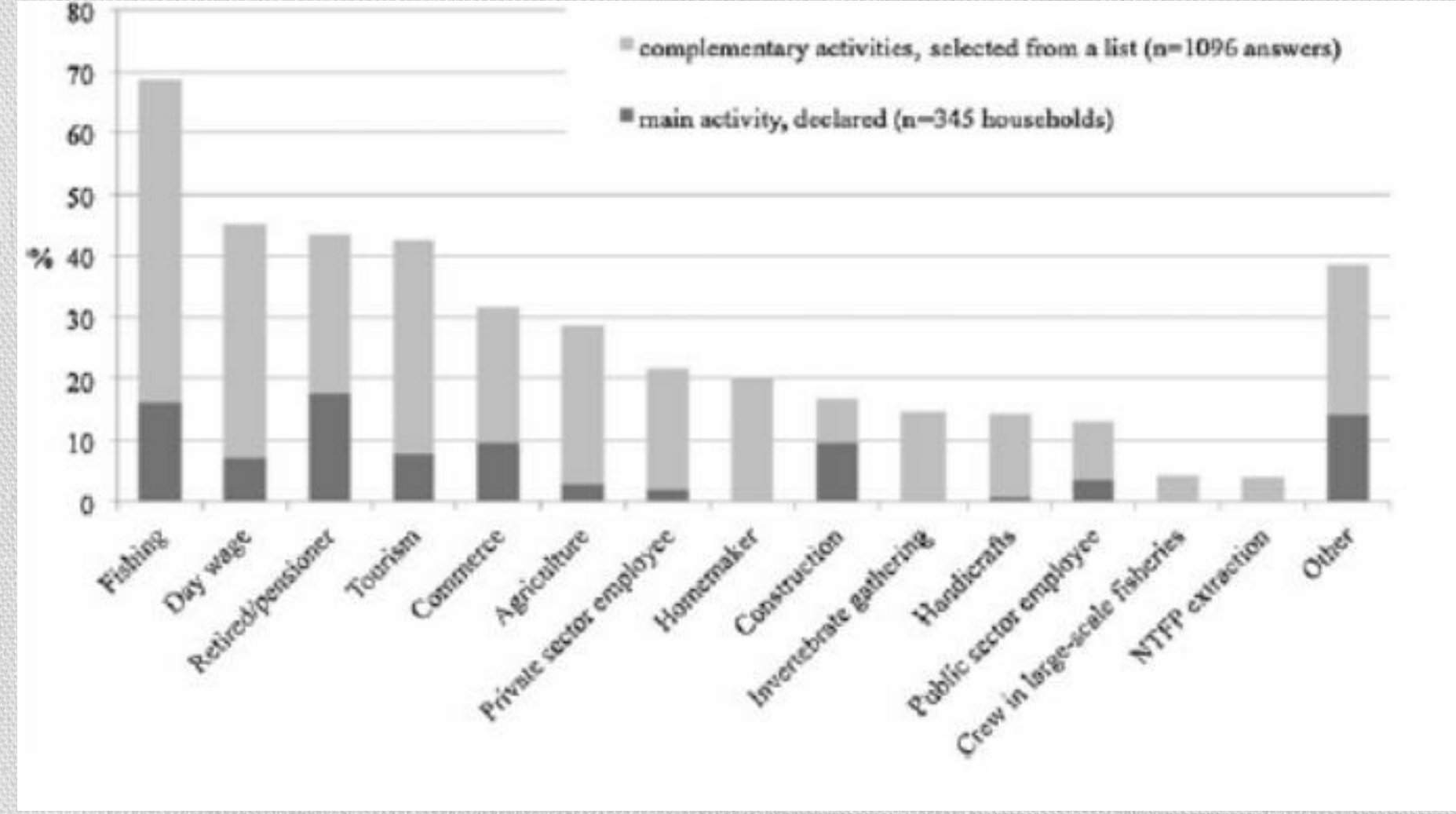
- Low
- Medium
- High

ARROW'S WIDTH
Intensity of linkages between ecosystem services and human well-being

- Weak
- Medium
- Strong

Paraty, Brazil: Livelihood diversification

Distribution of fish catch in households that reported fishing activity (Hanazaki et al. 2013. *Human Ecology)*



Increasing the range of knowledge used

- Governance can be improved by improving the **range and quality of knowledge** used
- More and better science is obviously desirable, but science is not the only source of knowledge
- **Local and traditional knowledge** of coastal people is an underutilized source of know-how
- A dialogue of science and local knowledge helps increase management capabilities
- **Multiple evidence base approach** emphasizes the advantages of combining different kinds of knowledge to solve problems (Tengö et al. 2014. *Ambio*)

Bridging knowledge
Enriching knowledge
Co-producing knowledge
Local knowledge - 1
Indigenous knowledge - 1
Local knowledge - 2
Indigenous knowledge - 2
Transdisciplinary knowledge
Social science knowledge
Natural science knowledge
Technical knowledge

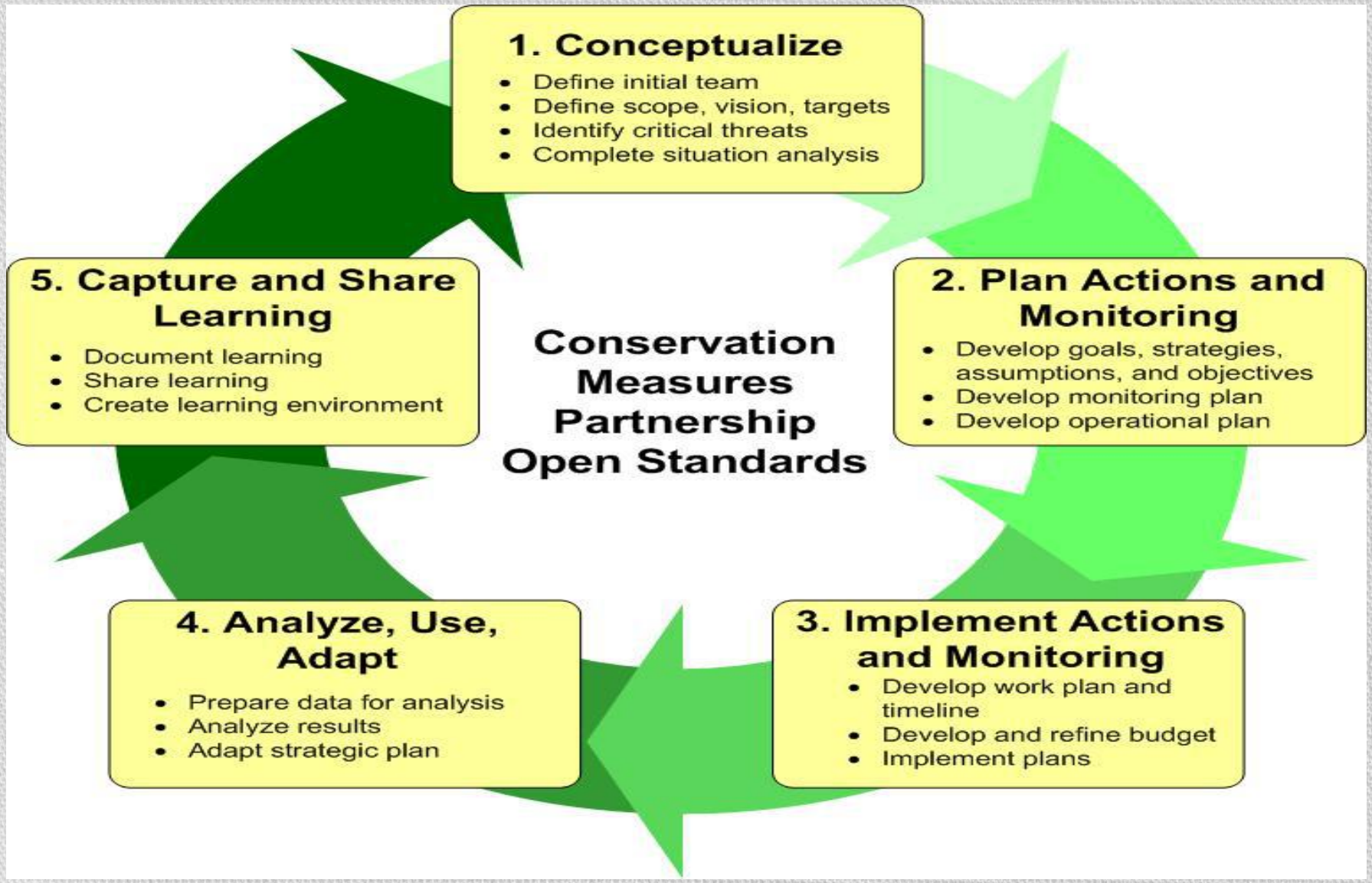
Ecosystem-based management (EBM)

- EBM "…adaptive, specified geographically, takes into account ecosystem knowledge and uncertainties, considers multiple external influences, and strives to balance diverse social objectives" (NOAA 2005)
- It is an approach, as opposed to a methodology
- Different kinds of EBM exist: eg **marine spatial planning** -- from a single sector focus to multiple
- The scope can be (needs to be) expanded
  - From ecosystem-based management to SES-based management
  - From single to multiple disciplines
  - From management to governance

Operationalizing EBM

- **Negotiation** and **deliberation** are important for developing working partnerships
- Deliberation used in scenario-building, learning networks and adaptive management
- **Scenario-building**: to consider future options
- **Learning networks** use the idea of learning-as-participation to create problem solving partnerships
- **Adaptive management** recognizes, as a starting point, that information will always be imperfect
- Uses a planning cycle approach in which policies can be used as experiments from which managers can learn (Holling 1978. *Adaptive Management*)

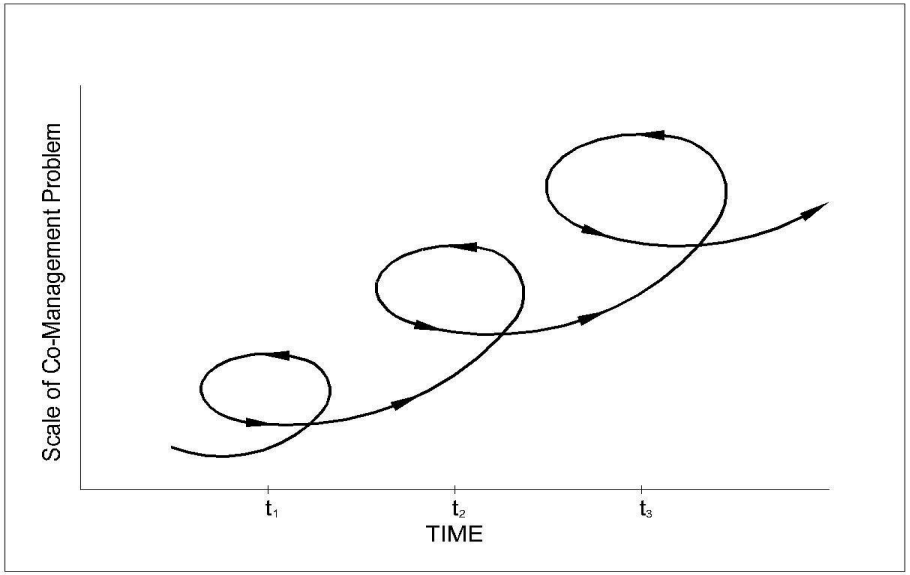
Adaptive management (learning-by-doing)



Learning networks

- Learning-by-doing
- **Social learning**: iterative action, reflection and deliberation of groups engaged in sharing experiences to collaboratively resolve complex challenges
- Learning-as-participation results in trust, builds capacity to tackle problems at increasingly greater scales

Learning-as-participation:
Each loop goes through observation-planning-action-outcome phases, followed by a period of reflection



Berkes 2009. *J Env Mgmt*

Conclusions: Building an interdisciplinary science of ocean and coastal governance

- International experience indicates eight important areas to build a new interdiscliplinary science:

- Resilience of social-ecological systems
- Commons, shared resources
- Co-management, sharing power and responsibility
- Conservation and marine protected areas
- Restoring coastal zone ecosystems
- Coastal community livelihoods and well-being
- Increasing the range of knowledge used
- Ecosystem-based management

Conclusions II

- Decline of coastal resources and ecosystems is not inevitable
- There is a body of theory and practice that should allow us to improve on the record of the last half century or so
- However, solutions are not clear-cut and there are no global blueprints or widely applicable recipes to follow (Ostrom 2007. *PNAS*)
- More likely, solutions need to be worked out case by case, collaboratively and adaptively