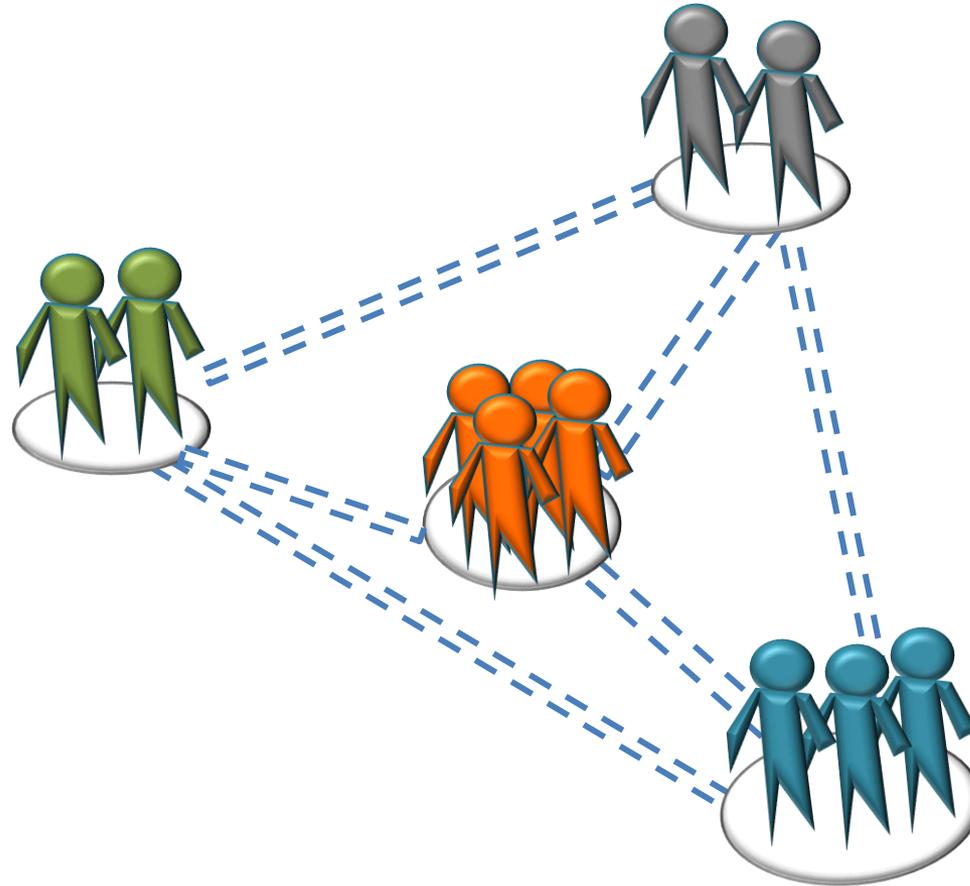


SOCIO-ECONOMIC SETTINGS

CE 766 LECTURE 7



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Today we will cover* ...

- Role of social sciences in catchment management
- Information flow pathologies
- Role of institutional arrangements

*All material sourced from: Chapter 4 in Naiman, unless other specified.



ROLE OF SOCIAL SCIENCES IN CATCHMENT MANAGEMENT

*Symbiotic relationships mean creative partnerships. The earth is to be seen neither as **an ecosystem to be preserved** unchanged nor as a **quarry to be exploited** for selfish and short-range economic reasons, but as a garden to be cultivated for development of its own potentialities of the human adventure.*

Think Globally, Act Locally

Rene Dubos (1976)

Dubos is a microbiologist, and has won the Pulitzer prize General Non-Fiction.



Conceptual separation of human and natural systems

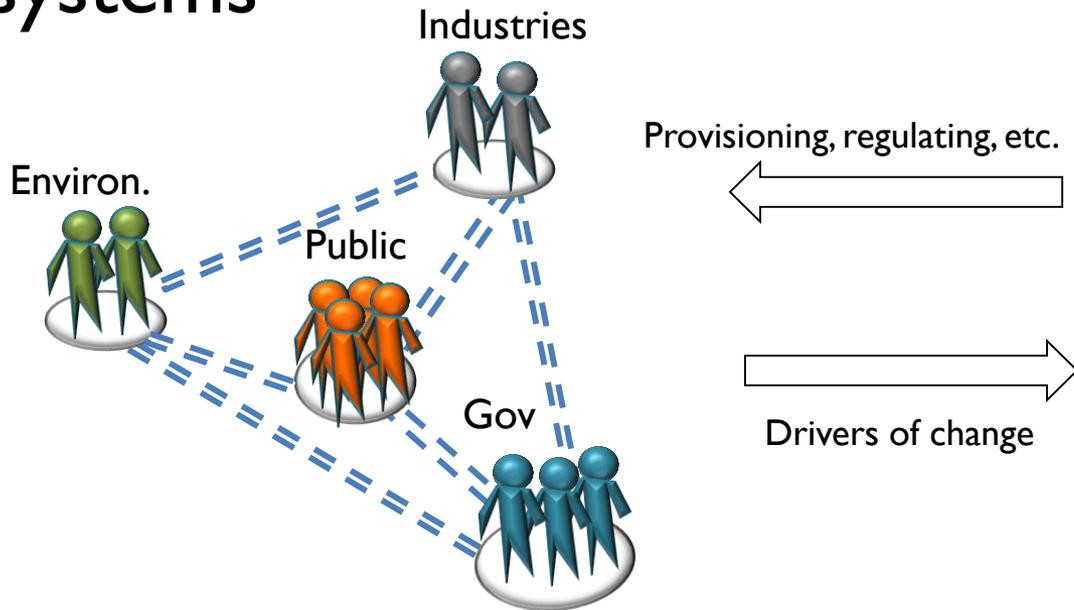


Photo credit: <http://www.state.nj.us/dep/wms/bfbm/lakes.html>

Human system

1. Institutions
2. Socio-Economic settings
3. Concerns: maintain lifestyle, equity

Natural system

1. Separate from the human system
2. Provides for the human system

Our past approach to most natural resource management problems, including forestry, wildlife management, fisheries, range management and watershed management.

Example: definition of sustainability

(in the context of management of biologically renewable resources)

Using no more than the annual increase in the resource without reducing the physical stock...using the interest earned from a savings account but leaving the principle invested to continue to generate interest in the future.

A biologically determined harvest rate called the maximum sustainable yield was assumed to continue indefinitely with the adoption of appropriate harvest and regeneration practises.

But

These concepts are too simple to guide policy development and implementation.

Questions of social and individual welfare are unanswered.

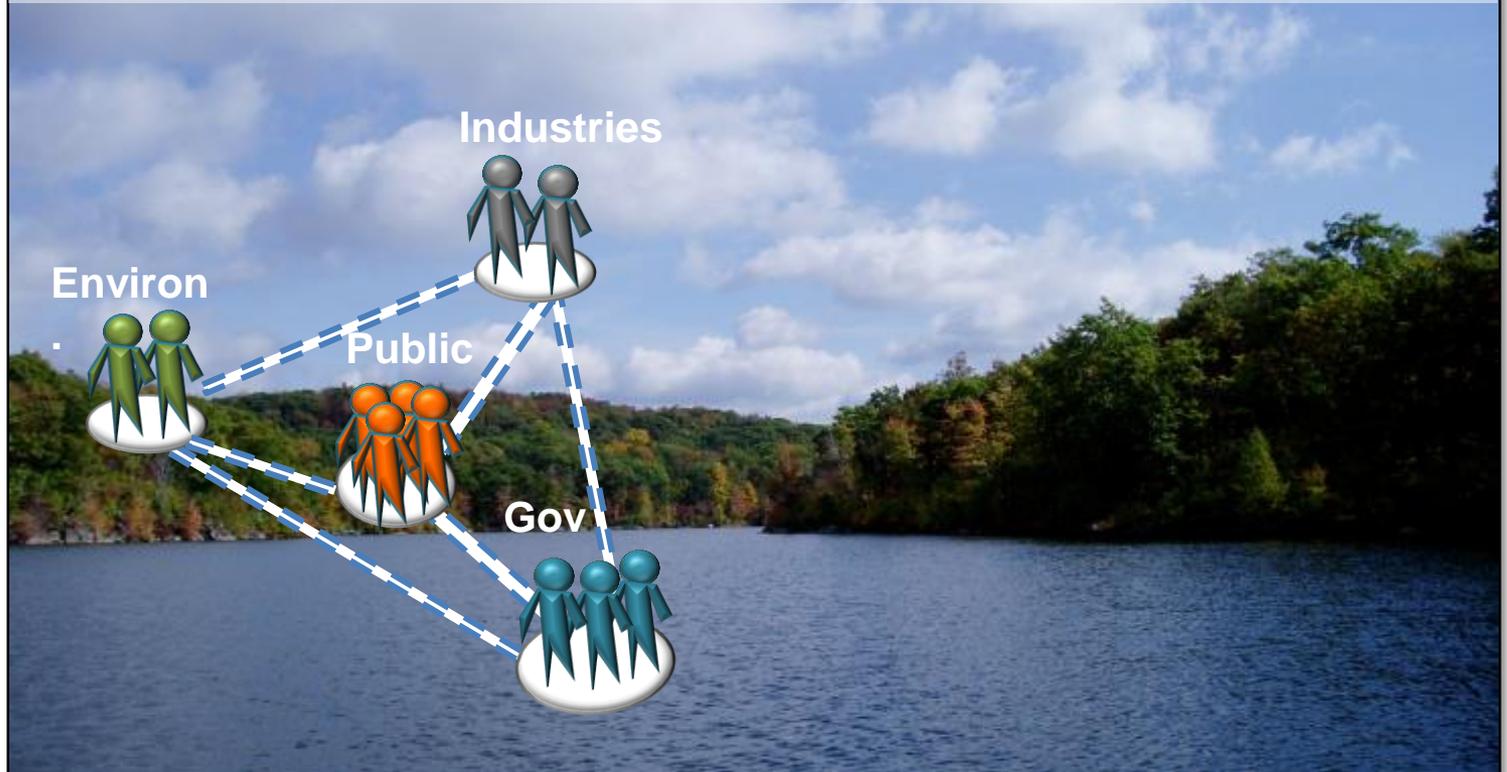
Who will benefit and when?

How will benefits be distributed between groups today and in the future?

Intergenerational and intra-generational justice.

Reality:

Humans, including their industrial activities, are considered to be integral parts of the biosphere.



Sustainability is fundamentally a problem of human social organization and technology, not simply management of the physical environment and its biological processes.

Photo credit: <http://www.state.nj.us/dep/wms/bfbm/lakes.html>

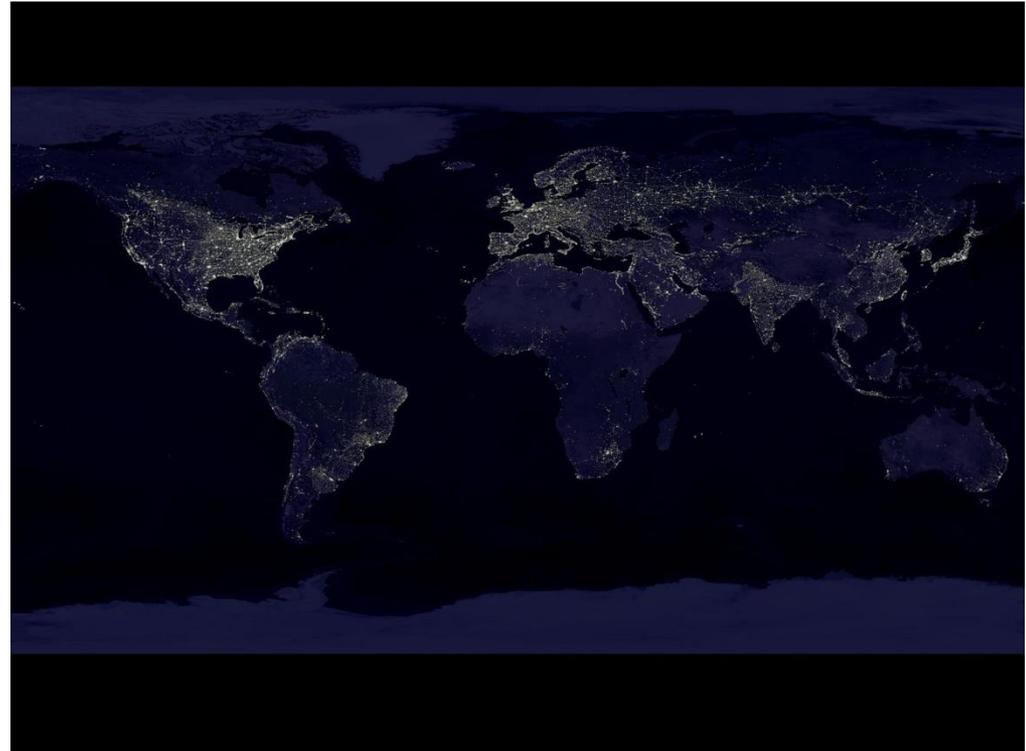
What is needed?

- Understand the bio-physical processes and how they affect resource availability, AND,
- Use ecological knowledge to guide decision making
 - What goes wrong?
- Control human activities in response to ecological knowledge

INFORMATION FLOW PATHOLOGIES



*Humans react ‘not to real world in real time, but to a cognized environment filtered through **expectations** and a world view which may or may not value close tracking of local environmental indicators’*



Even the most advanced technologies have difficulties maintaining adequate information on the state of ecological systems, including problems of maintaining current, accurate, and properly scaled (localized) information.

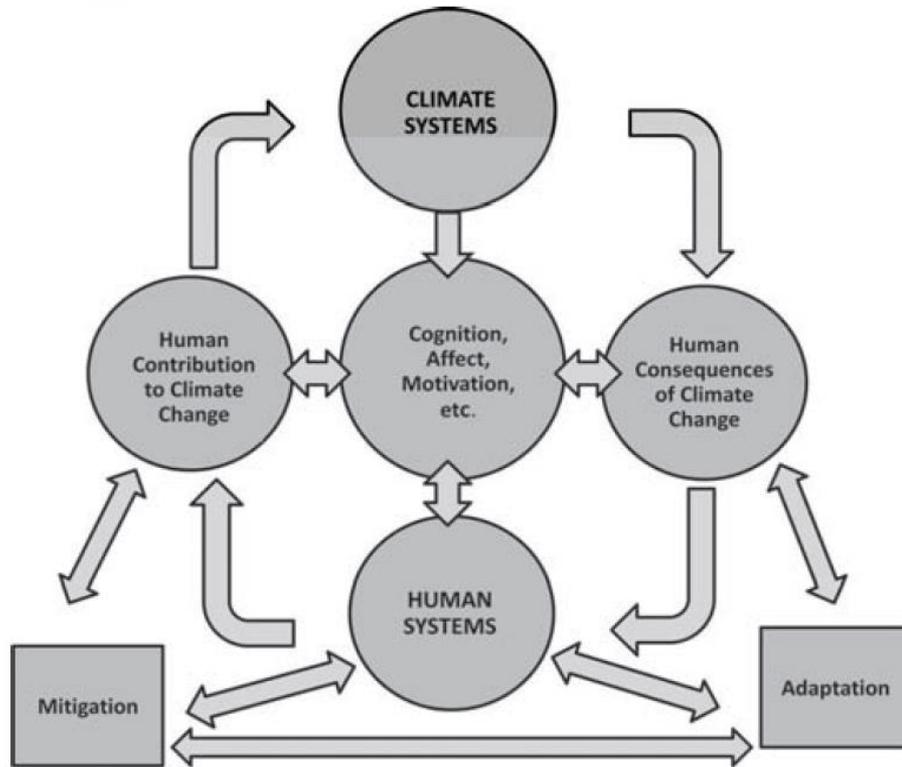
Image: https://www.nasa.gov/centers/goddard/images/content/638831main_globe_east_2048.jpg (left)
https://www.nasa.gov/sites/default/files/images/324350main_11_full.jpg (right)



Why are cognitive models important?

Figure 1

Human and Psychological Dimensions of Climate Change



Note. Adapted from Figure 4-1 (p. 106) in *Global Environmental Change: Understanding the Human Dimensions* (by National Research Council, 1992, Washington, DC: National Academy of Sciences. Copyright 1992 by National Academy of Sciences.) and Figure 1 (p. 273) in "Psychological Dimensions of Global Environmental Change" (by P. C. Stern, 1992, *Annual Review of Psychology*, 43, 269–302. Copyright 1992 by Annual Reviews, Inc.).

Swim, J.K., Stern, P.C., Doherty, T.J., Clayton, S., Reser, J.P., Weber, E.U., Gifford, R. and Howard, G.S., 2011. Psychology's contributions to understanding and addressing global climate change. *American psychologist*, 66(4), p.241.

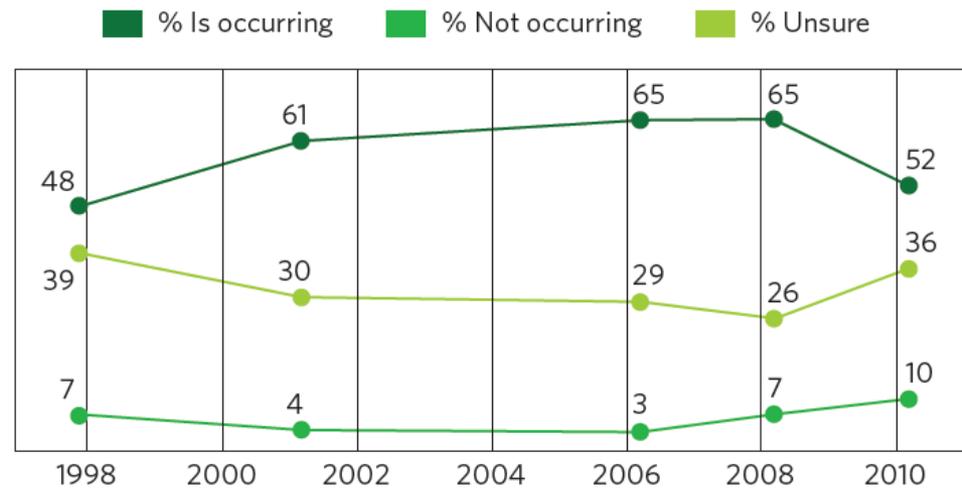
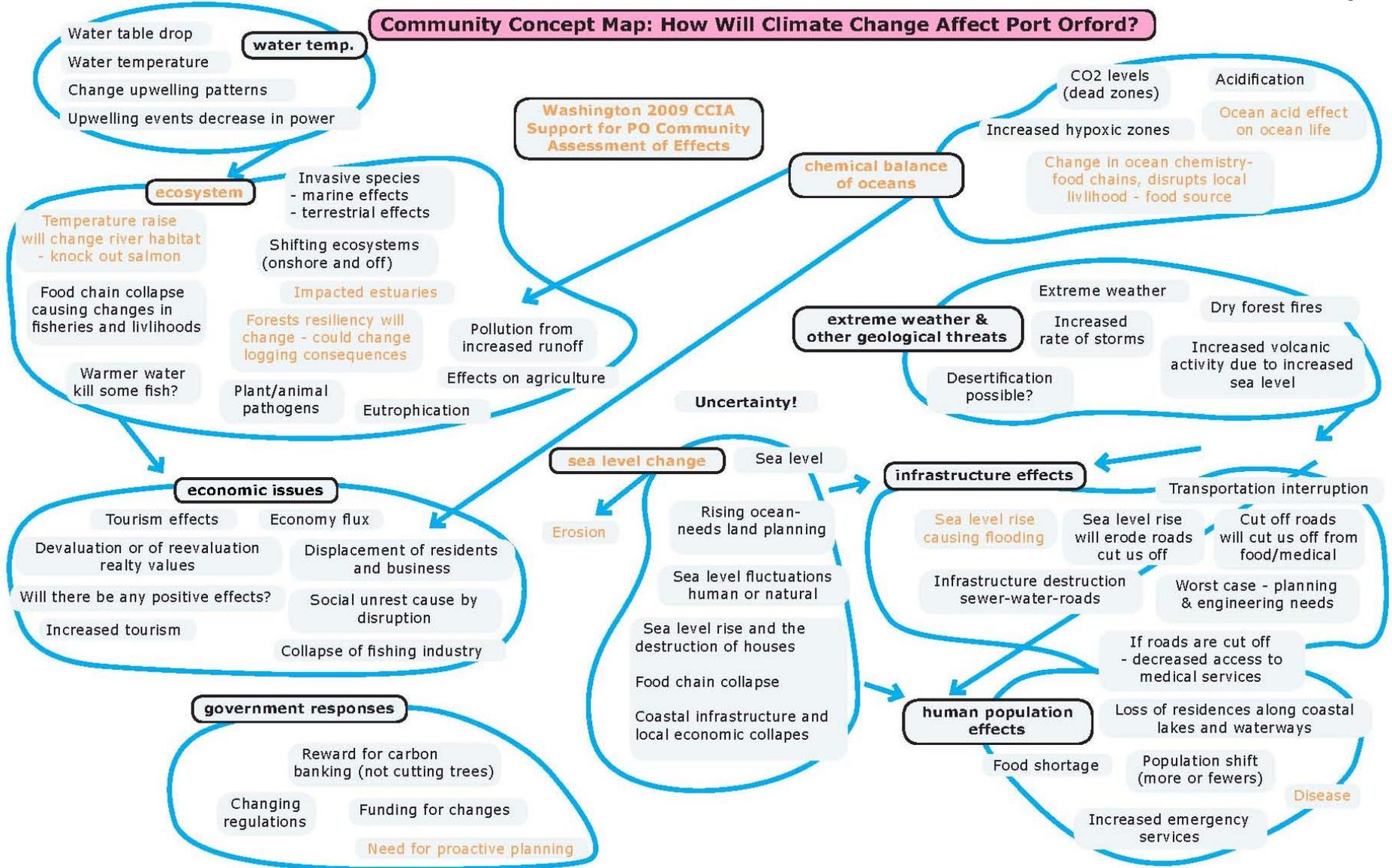


Figure 1 | Shifting public opinion. Opinion polling in America shows how people became more sure that climate scientists believed in global warming over the period 1998–2006. But more recently views are less certain, a phenomenon also seen in Britain and Europe. The reasons for this recent trend are complex and probably include a response to politicization of climate policy, as well as the impacts of the East Anglia e-mails controversy. The question asked which one of the following statements do you think is most accurate — most scientists believe that global warming is occurring, most scientists believe that global warming is not occurring, or most scientists are unsure about whether global warming is occurring or not? Data from Gallup.

Pidgeon, N. and Fischhoff, B., 2011. The role of social and decision sciences in communicating uncertain climate risks. *Nature Climate Change*, 1(1), p.35.



Community Concept Map: How Will Climate Change Affect Port Orford?



Maladaptive information flow: factors

1. False analogy: the manager's cognitive model of ecosystem characteristics (potential productivity, resilience, and stress signals) is derived from another ecosystem, whose surface similarities mask critical threshold differences from the managers' ecosystem
2. Insufficient detail: The manager's cognitive model is overgeneralized, and does not adequately allow for the range of spatial variability in an ecosystem whose patchiness is better measured in resilience than in initial abundance.
3. Short observational series: The managers lack a sufficiently long memory of events to track or predict variability in key environmental factors over a multi generational period, and are subject to chronic inability to separate short term and long term processes.



Maladaptive information flow: factors

4. **Managerial detachment:** The managers are socially and spatially detached from agricultural producers who carry out managerial decisions at the lowest level and are normally in closest contact with local-scale environmental feedbacks.
5. **Reactions out of phase:** Partly as a result of short observational series and managerial detachment, the managers' attempts to avert unfavourable impacts are too little and too late, or they apply the wrong remedy.
6. **S.E.P (Someone Else's Problem):** Managers at many levels may perceive a potential environmental problem but feel no obligation to take action, since their own particular short-term interests are not immediately threatened.



Maladaptive information flow: factors

7. Ideological Beliefs: Managers conform to ideological beliefs shared by generalized publics and overlook particular ecological details and management practises. Unquestioned moral commitments to the principles of capitalism, socialism, environmentalism, and other ideologies can divert the manager's attention from the problems of attending to particular ecological conditions.



Information flow pathologies:

- False analogy, insufficient details, and short observational series: these issues dominate when people first colonize a region, can diminish as they learn about the new ecosystem
- Managerial detachment, reaction out of phase, and S.E.P: appear most often in highly differentiated societies with complex public or private institutional arrangements for managing ecosystems
 - can be reduced by altering institutional arrangements to make decision makers more responsive to localized ecological conditions.



Information flow pathologies:

- Ideological beliefs may result in maladaptive information flow in societies at all stages of development, but is frequently revealed in the behavior of large public land management bureaucracies in contemporary societies.
 - effects can be diminished by increasing the authority and responsibility (including real accountability) of localized ecosystem managers and improving the integration of scientific learning with decision making.



INSTITUTIONAL ARRANGEMENTS AND MANAGEMENT OF CATCHMENT ECOSYSTEMS



Institutionalization of behavior in relation to ecological processes

- Institutionalization involves the development of persistent patterns of human behavior expressed as formalized rules, laws, or customs or as informal rituals and patterns of social interaction or interaction with the nonhuman environment.
- Whenever ecological processes are appropriated and patterned by human society, we can refer to them as institutionalized ecological processes. This term refers to the ways in which humans regulate structural components of ecosystems or alter the flow of energy or cycling of materials.



Shifting cultivation: over many years, the practice of crop rotation was developed and cropping cycles were adapted to local ecological conditions. The general pattern of rotational cropping was institutionalized with flexibility to adapt to local conditions



Institutionalization of industrial wood production constrained learning to economic considerations and may have prevented an adequate flow of information on how best to adapt to ecological conditions (longer-term ecological adaptability was ‘someone else’s problem’)



On institutionalization

- The concept of institutionalization helps us understand how regulated ecological processes are stabilized and persist relatively unchanged for long periods
 - Societies motivate people to work for objectives that would not be realized during their lifetimes

Dimensions of institutional arrangements for regulating ecological processes

- Divisibility of institutionalized process
- Private and public ownership



Ecological processes are institutionalized at different scales

- Divisible ecological function: regulation of ecological function is insensitive to scale
 - Building a house, planting a tree: can be done by one or many
- Indivisible ecological functions: some spatial threshold exists below which it is not possible to regulate the ecological process
 - Regulation of atmospheric carbon is highly indivisible as it involves global cycling driven by atmospheric processes



Conventional patterns of social, economic, and political behavior affect the degree of divisibility in the regulation of ecological processes

- Divisibility: of ecological function and institutional patterns
- Divisibility is relatively high in societies that have retained an autonomous ecological role for families and small communities
- This is in contrast with centralized command economies where state regulation has replaced localized decision-making authorities



Private and public goods

- A good is private if its benefits can be captured by the owners and denied to all other members of the community
 - Timber production, home ownership
- A good is public (or collective) if benefits cannot be denied to people who do not invest in producing it
 - Scenery, clean air
 - fish habitat enhancement, river system planning
 - The easiest way of limiting access to a resource is to atop institutional arrangements that make it possible to restrict benefits to those who contribute



Together divisibility and nature of goods combine to define institutional arrangements

Type of good	Divisibility of space		
	High (small scale)	Moderate (medium scale)	Low (large scale)
Private	1 Trees Homesites	2 Individual tree farm Subdivision	3 Corporate tree farm Private utility
Public	4 Silt dam Fishing and hunting access	5 Fisheries habitat enhancement Community resource management	6 River basin planning National forest management

Table 4.1 in Naiman. Alternative institutional arrangements in watershed management.



Conservation behavior requires at least two conditions:

1. Individuals must internalize values
2. These values must be articulated socially in ways that motivate conformity; that is,, they must be both expedient (gainful for the individual or group) and psychologically satisfying (maintain self-esteem and group identification) – in short, the must be institutionalized

Values that do not become institutionalized in the form of ongoing social relationships can have only an ideological status.

Values must be institutionalized before they can affect behavior.

