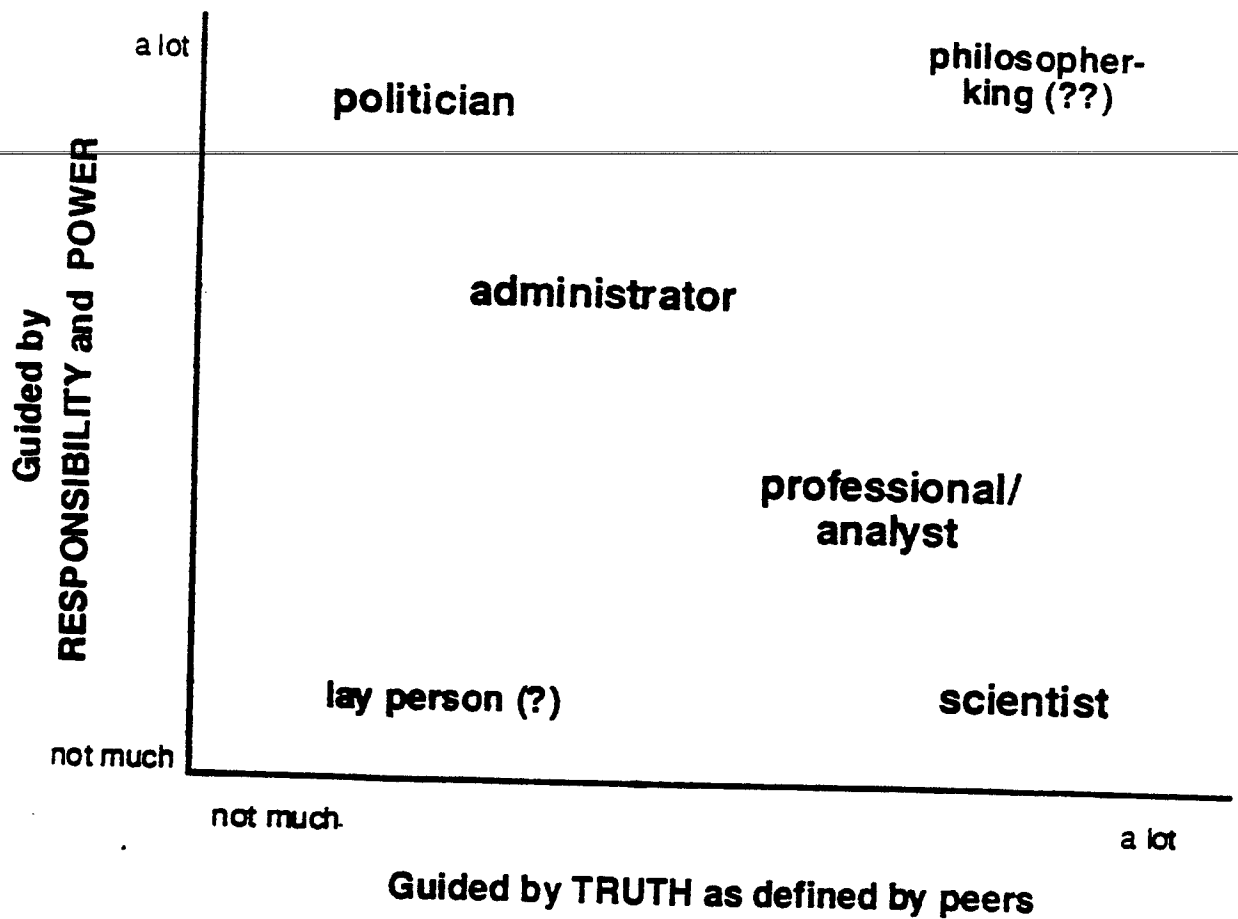


The spectrum from Truth to Power



Preferences about outcomes

agree

disagree

Computation
in
bureaucratic
structure

Bargaining
in
representative
structure

Beliefs about causation

agree

disagree

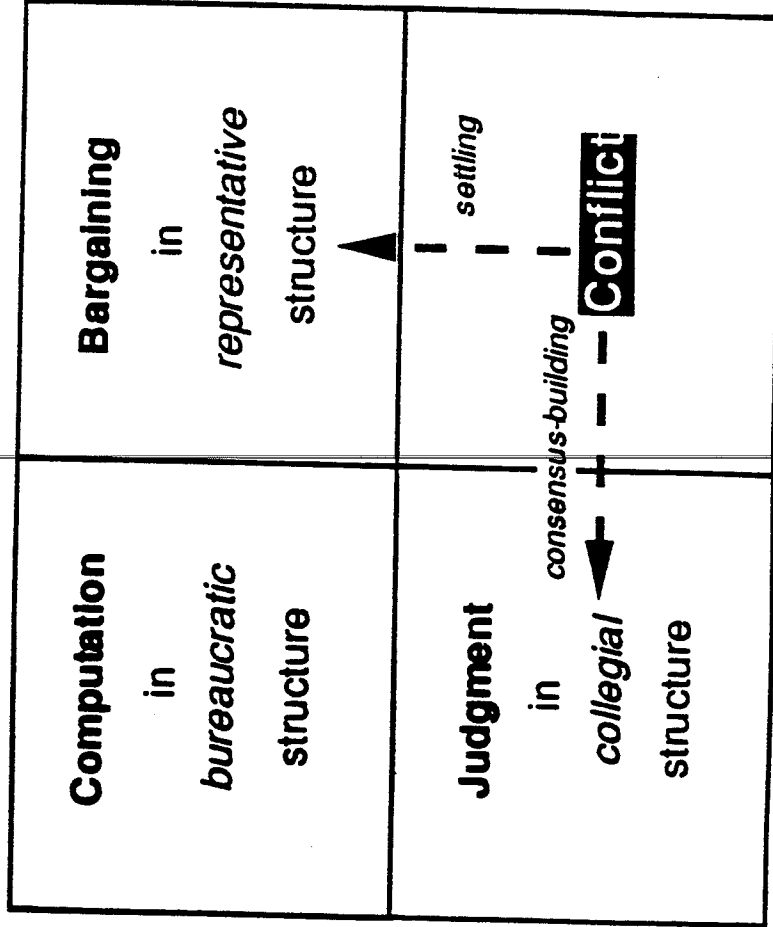
Judgment
in
collegial
structure

consensus-building

Conflict

settling

▲



Three responses to scale mismatch

Co-management. Power sharing in resource decisions.

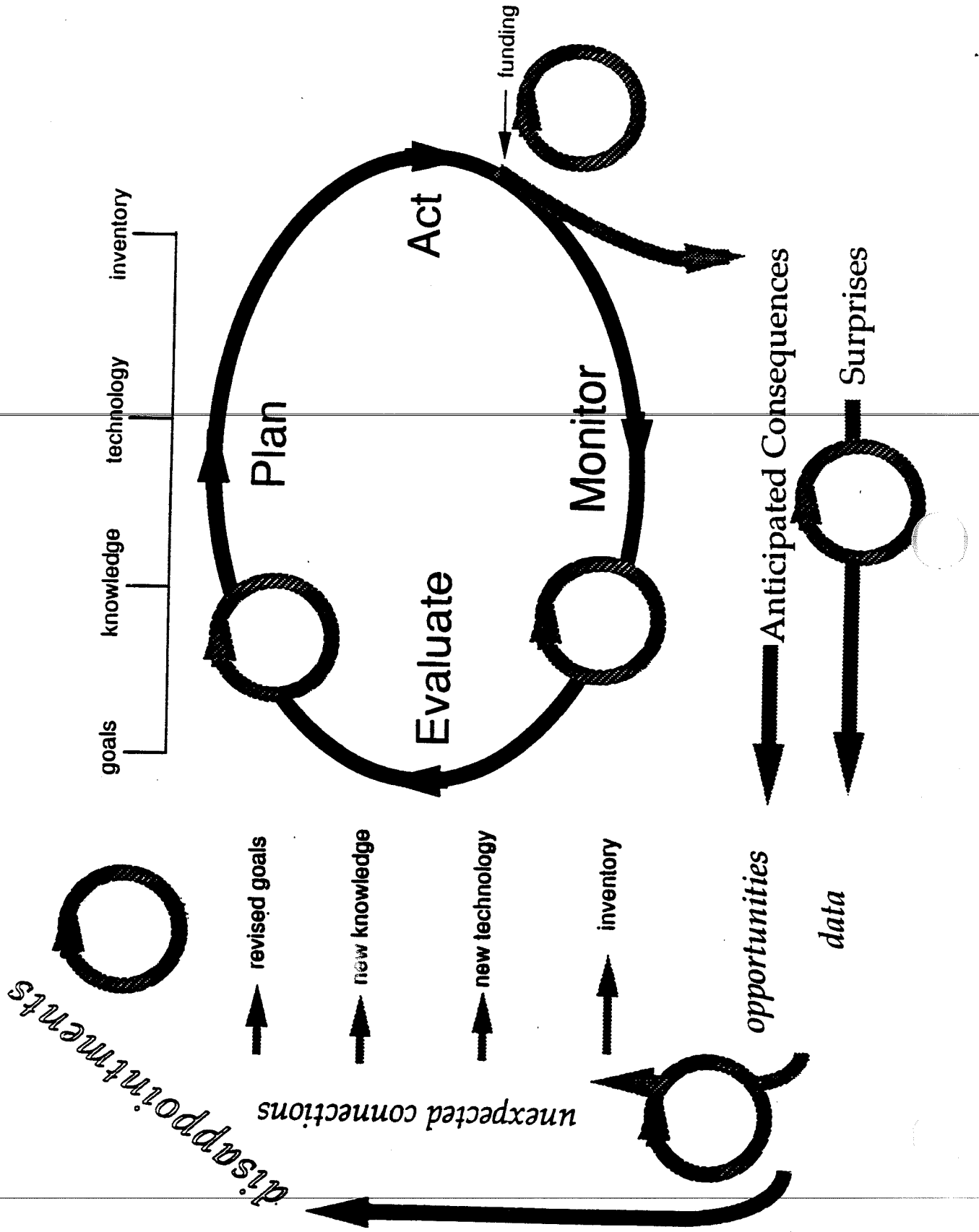
Bioregionalism. Match spatial responsibilities to natural boundaries.

Adaptive management. Learn from experience. Policies are *experiments*.

...because power and authority are fragmented

...because economic activity is complex, so that

surprise and uncertainty are frequent



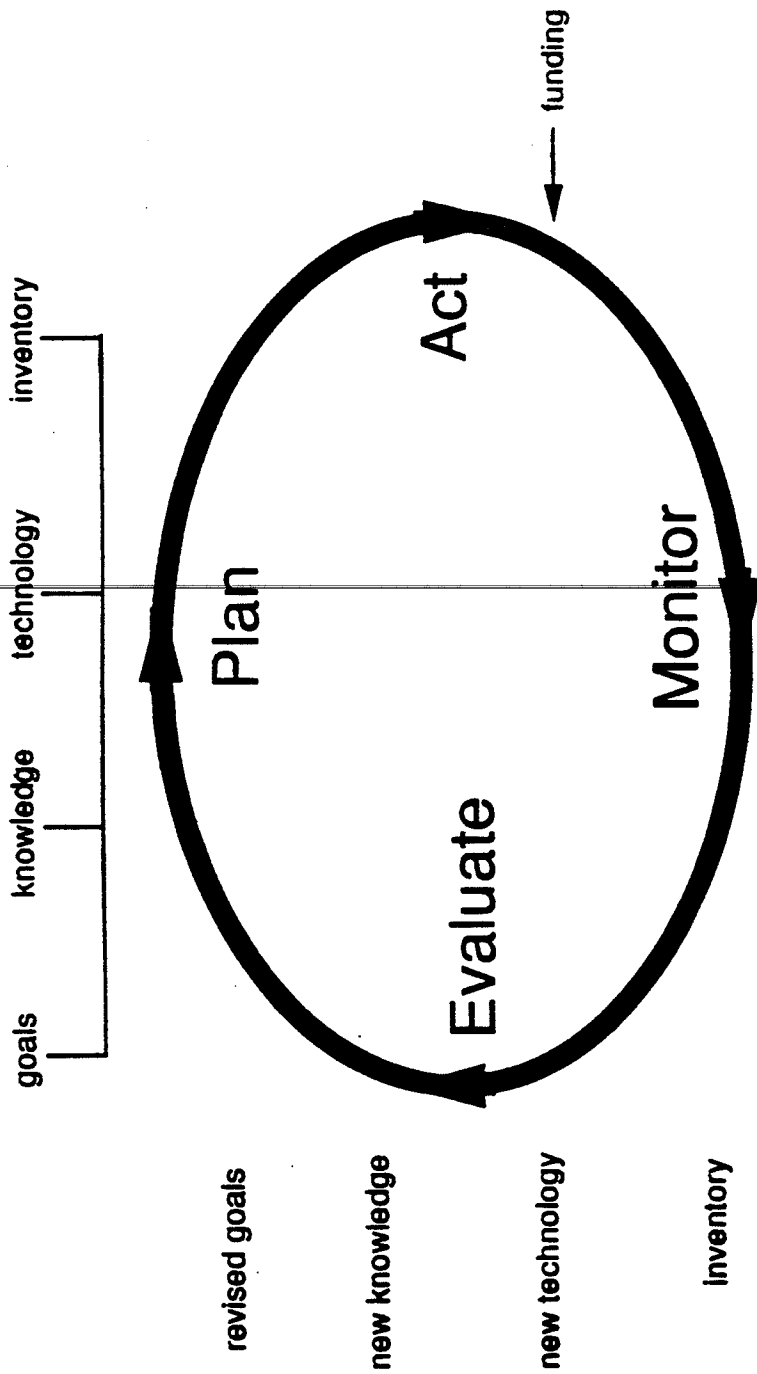
Learning under adaptive management

Patience — decades, perhaps longer.

Record-keeping — systematic monitoring, but also economically sustainable.

Collaboration with resource users.

Political conflict continues, but is changed.



Adaptive management

Hypothesis	<i>specific expectations</i>
Observation	<i>tested against measurements</i>
Controls	<i>under known conditions</i>
Replication	<i>checked for reliability</i>
Learning at full scale	Adaptive learning is faster and lower in cost than trial-and-error

each mode of learning

...that accumulate into usable knowledge

makes observations... and combines them... to inform activities...

example

EXPERIMENTATION	controlled observation to infer cause	replicated to assure reliable knowledge	enabling prediction, design, control	theory (it works, but range of applicability may be narrow)	molecular biology & biotechnology
ADAPTIVE MANAGEMENT	systematic monitoring to detect surprise	integrated assessment to build system knowledge	informing model-building to structure debate	strong inference (but learning may not produce timely prediction or control)	global climate modeling & earth observation
TRIAL & ERROR	problem-oriented observation	extended to analogous instances	to solve or mitigate particular problems	empirical knowledge (it works but may be inconsistent & surprising)	fish hatcheries to replace habitat
UNMONITORED EXPERIENCE	casual observation	applied anecdotally	to identify plausible solutions to intractable problems	models of reality (test is political, not practical, feasibility)	most public policy