Data Worlds of Puget Sound's nearshore ecosystem

Making sense of middle-spaces in multiorganizational decision environments

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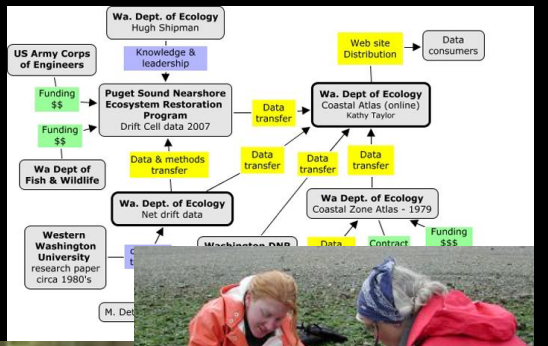
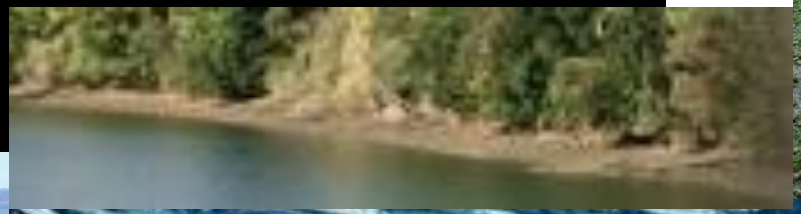
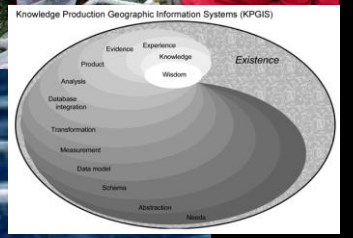






What this presentation is about

Knowledge Production GIS (KPGIS)

The research subjects of this study are GIS situated in postmodern science

Data Worlds theory/method conceptual frame

An approach to trace the constitution and change of social and technical practices that handle and apply spatial data.

Puget Sound nearshore

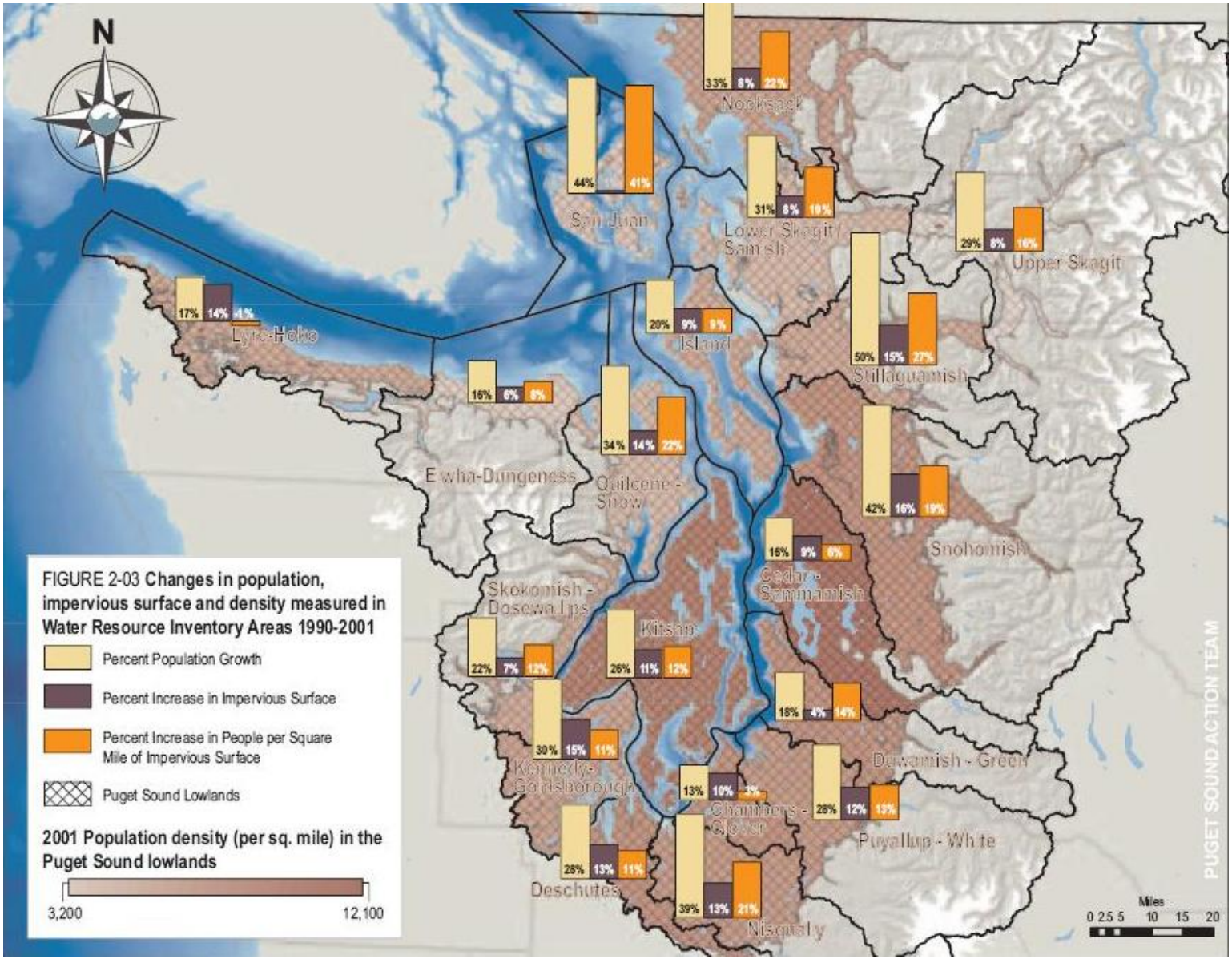
A case study for these constructs

The Puget Sound

"Puget Sound is ecologically delicate and its symptoms of environmental distress are undeniable and getting worse."

Gov. Gregoire

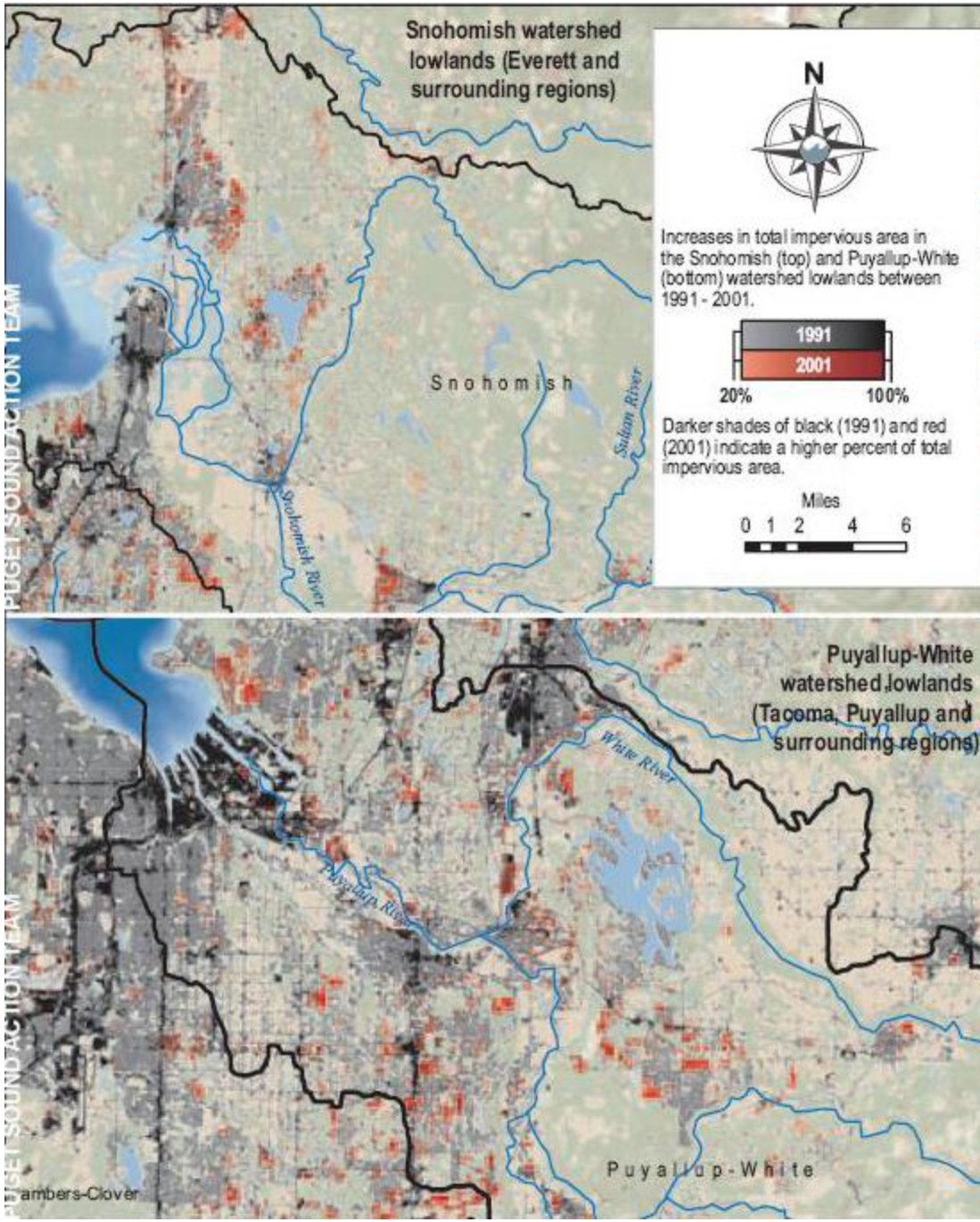
1990-2001 population and impervious surface change



Change in impervious surfaces: 1991-2001

"Stormwater runoff flushes at least 52 million pounds of petroleum, toxic metals and other pollutants into the Sound every year."

- David Dicks,Executive Director of the Puget Sound Partnership



Predicted population increase: 2005-2025

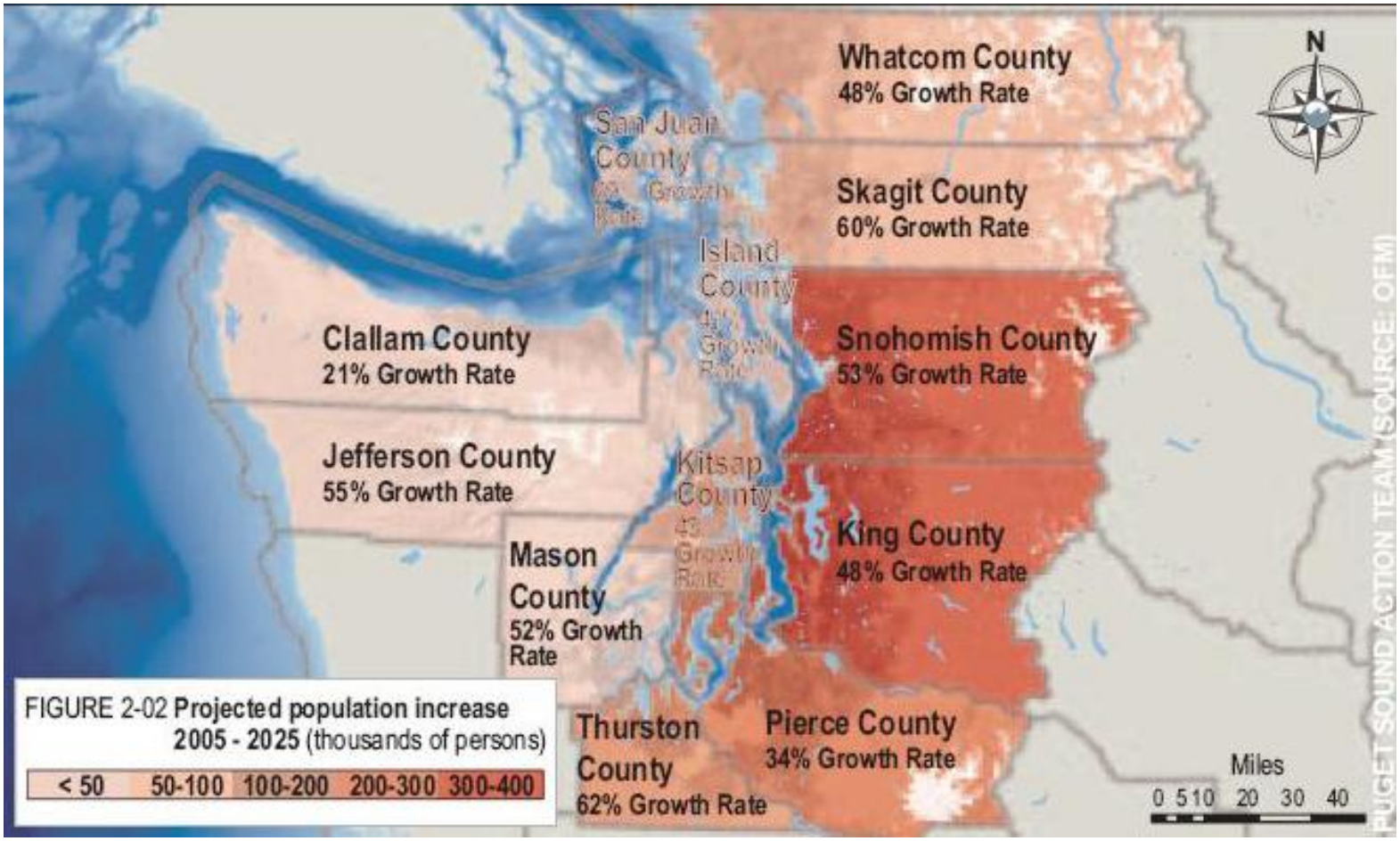


FIGURE 2-02 Projected population increase 2005 - 2025 (thousands of persons)

State and federal threatened or endangered species

e and federal listed species in Puget Sound
of October 2006[1]

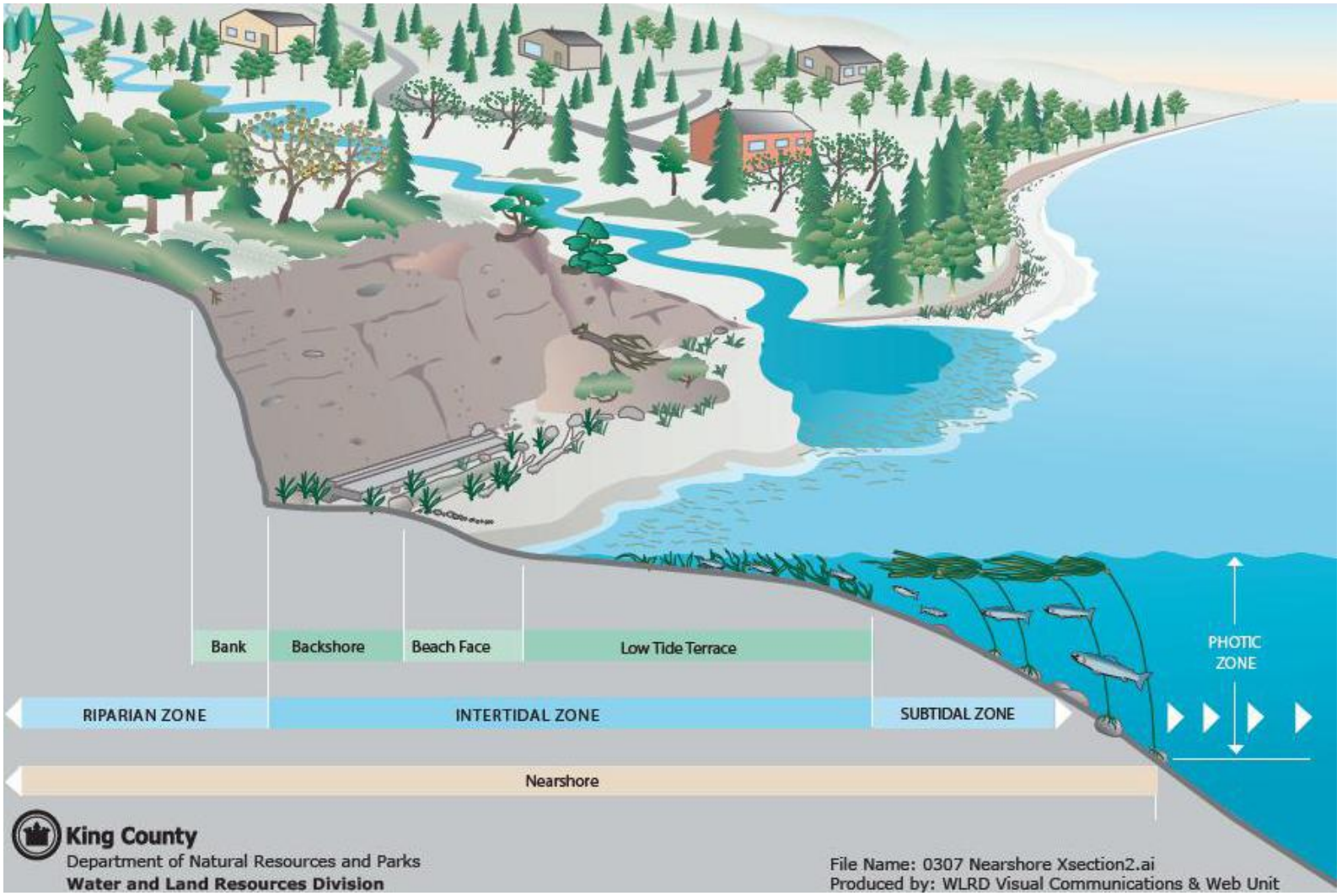
GROUP	COMMON NAME	STATE STATUS	FEDERAL STATUS
MARINE AND ANADROMOUS FISHES	Chinook Salmon (Puget Sound)	C	T
	Chum Salmon (Hood Canal/ E. Strait of Juan de Fuca)	C	T
	Coho Salmon (Puget Sound/ Strait of Georgia)		C
	Bull Trout (Coastal/Puget Sound)	C	T
	Pacific Hake	C	C
	Pacific Cod	C	
	Walleye Pollock (South Puget Sound)	C	Co
	Pacific Herring (Cherry Point/ Discovery Bay)	C	C
	Brown Rockfish	C	
	Copper Rockfish	C	
	Greenstriped Rockfish	C	
	Widow Rockfish	C	
	Yelloweye Rockfish	C	
	Quillback Rockfish	C	
	Black Rockfish	C	
	China Rockfish	C	
	Tiger Rockfish	C	
	Bocaccio Rockfish	C	
	Canary Rockfish	C	

GROUP	COMMON NAME	STATE STATUS	FEDERA STATUS
MARINE MAMMALS	**Northern Pacific Humpback Whale**	E	E
	Steller Sea Lion	T	T
	Orca	E	E
	Pacific Harbor Porpoise	C	
	Northern Sea Otter	E	Co
BIRDS	Bald Eagle	T	T*
	Canada Goose, Aleutian	M	Co
	Golden Eagle	C	
	Marbled Murrelet	T	T
	Tufted Puffin	C	Co
	Brandt's Cormorant	C	
	Cassin's Auklet	C	Co
	Common Murre	C	
	Western Grebe	C	
	Snowy Plover	E	T
INVERTEBRATES	Olympia Oysters	C	
	Newcomb's Littorine Snail	C	Co
	Pinto (Northern) Abalone	C	

State and Federal Status

E – Endangered
T – Threatened
C – Candidate
Co – Concern
M - Monitor

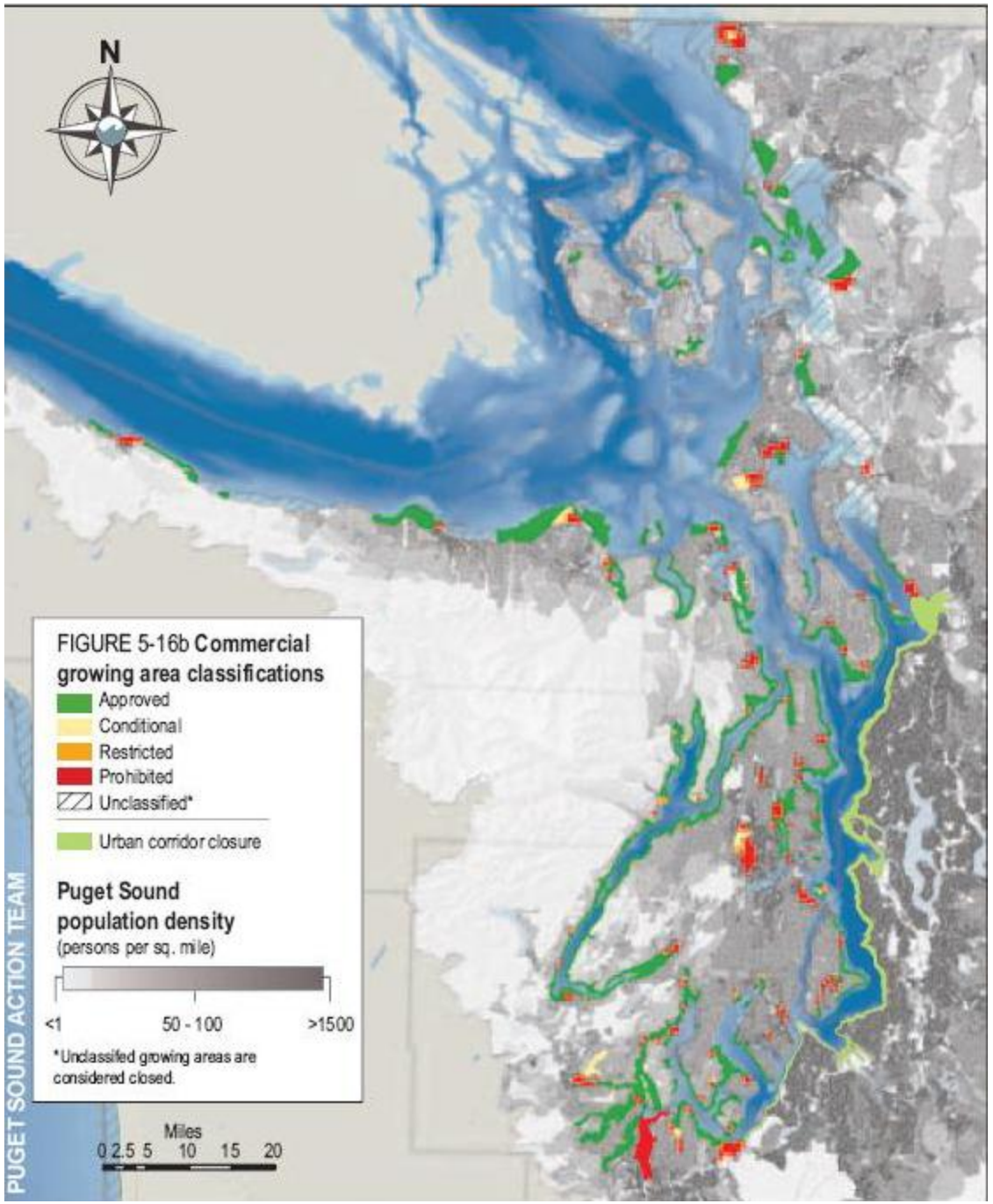
The nearshore



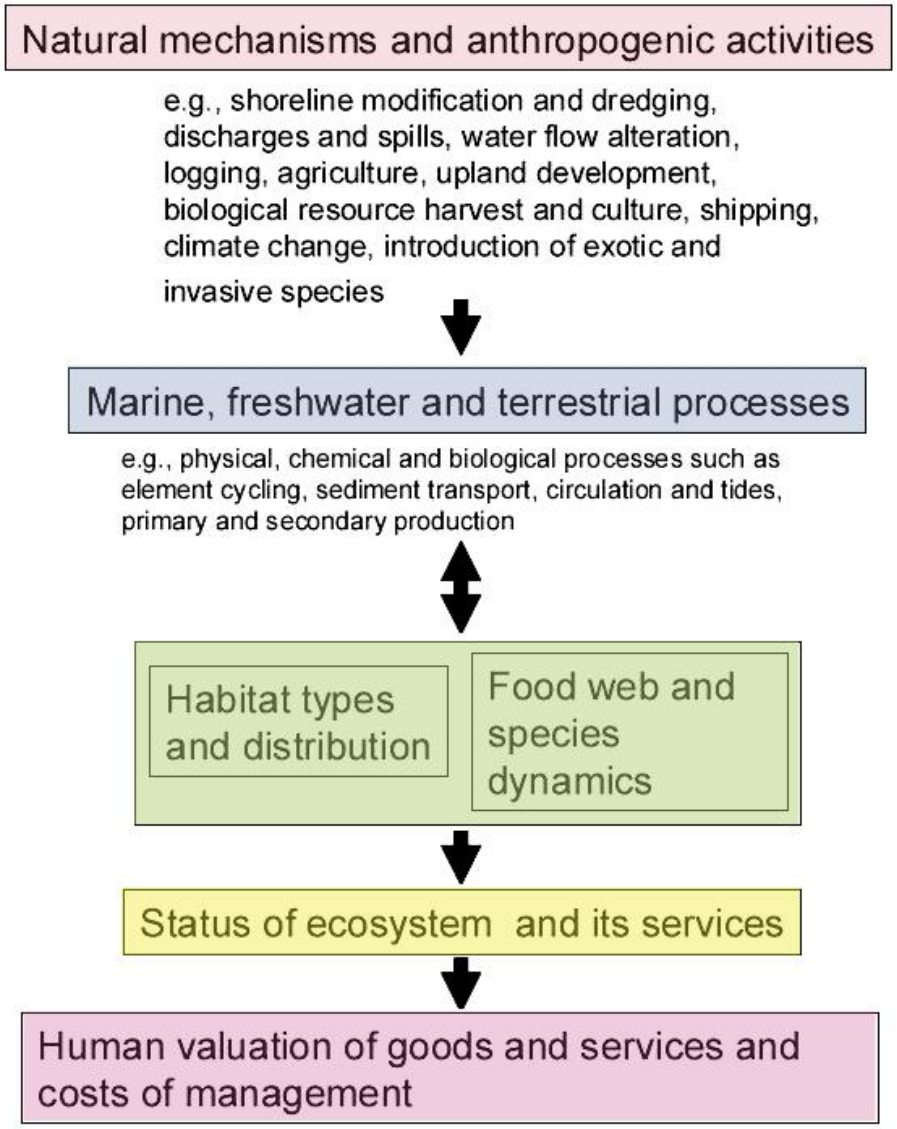
& more nearshore

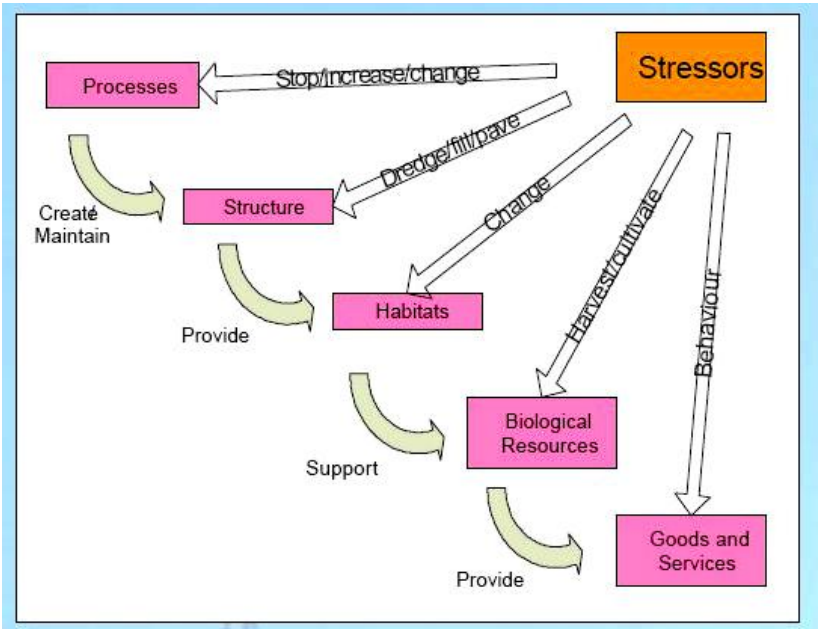
Shellfish harvest area closures 2007

Loss of ‘goods and services



Environmental goods and services worldview





NOAA 2006 Sound Science: Synthesizing Ecological and Socio-economic Information about the Puget Sound Ecosystem http://www.nwfsc.noaa.gov/research/shared/sound_science/documents/sound_science_draft4_21_06.pdf

The solution is…
A new state agency:

Puget Sound Partnership
our sound, our community, our chance

"The legislature therefore creates a new Puget Sound partnership to coordinate and lead the effort to restore and protect Puget Sound, and intends that **all governmental entities, including federal and state agencies, tribes, cities, counties, ports, and special purpose districts,** support and help implement the partnership's restoration efforts."

The PSP's five mandates:

- **Prioritize** cleanup and improvement projects
- **Make decisions** on science
- **Coordinate** federal, state, local, tribal and private resources
- Hold people and organizations **accountable for results**
- **Create a roadmap** to make Puget Sound healthy again

The first partners

Washington's Departments of:

- Natural Resource
- Ecology
- Fish & Wildlife

Tribal representatives:

- Northwest Indian Fisheries Commission

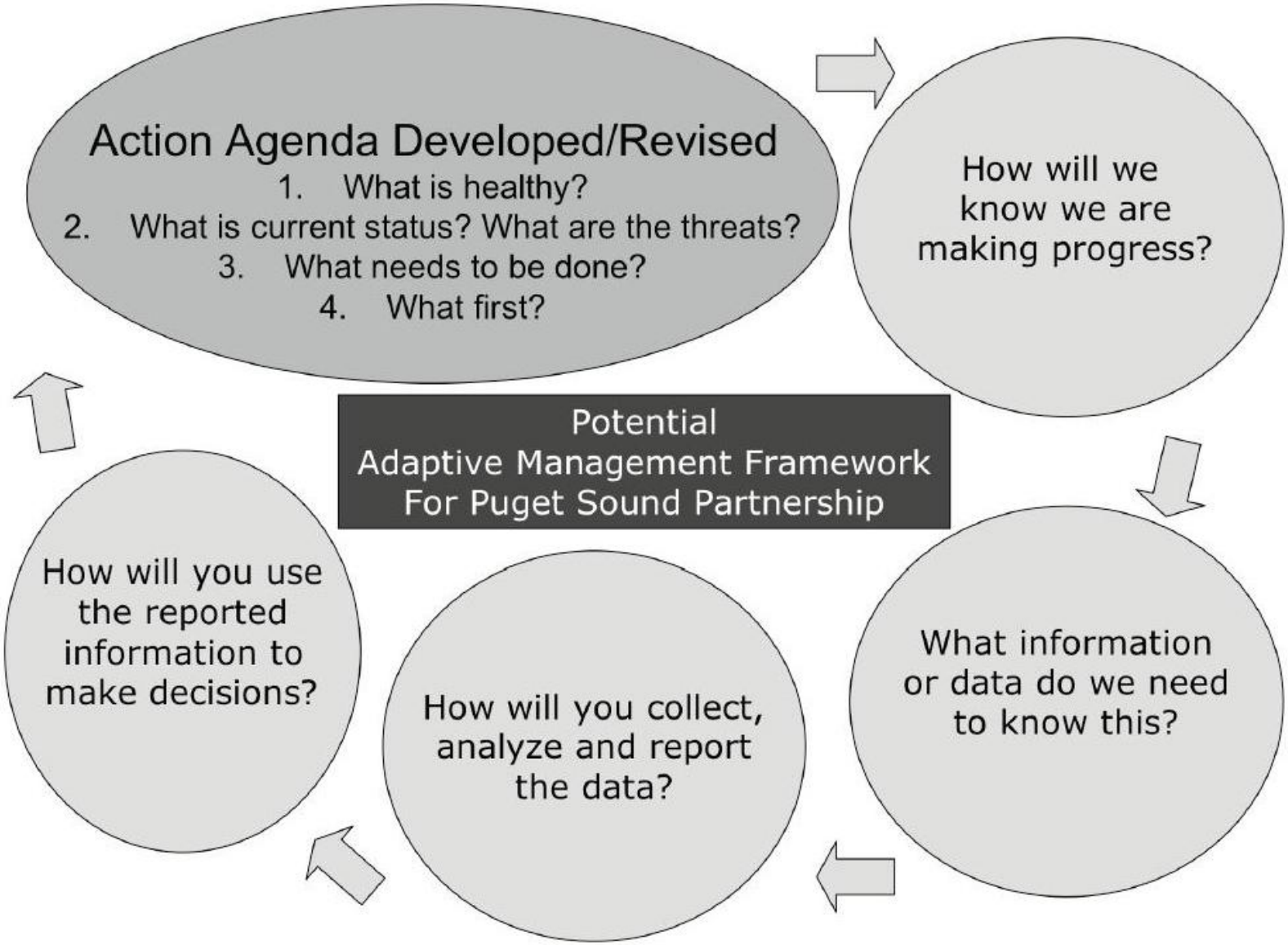
Non-Profit:

- People for Puget Sound

Federal:

- United States Army Corps of Engineers
- United States EPA
- NOAA

The PSP 'Action Agenda' process diagram



PUGET SOUND nearshore PARTNERSHIP

A partnership among local, stat ineers and other federal agencies, in

Sea Grant Washington

WASHINGTON STATE DEPARTMENT OF Natural Resources

In partnership with Northwest Indian Fisheries Commission

Stillaguamish Tribe of Indians Natural Resource Department

PRISM PUGET SOUND REGIONAL SYNTHESIS MODEL

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

SSHIAP Salmon and Steelhead Habitat Inventory and Assessment Program

FRIENDS OF THE SAN JUANS

NED NORTHWEST ENVIRONMENTAL DATA-NETWORK

DEMOS & QUICKSTARTS

US Army Corps of Engineers®

Department of Ecology Shoreline Management

Jefferson County Marine Resources Committee

MARINE RESOURCES COMMITTEE SAN JUAN COUNTY WASHINGTON

ISLAND COUNTY MARINE RESOURCES COM SCIENCE • EDUCATION • STEWA

San Juan ISLANDER

Salmon Recovery Funding Board

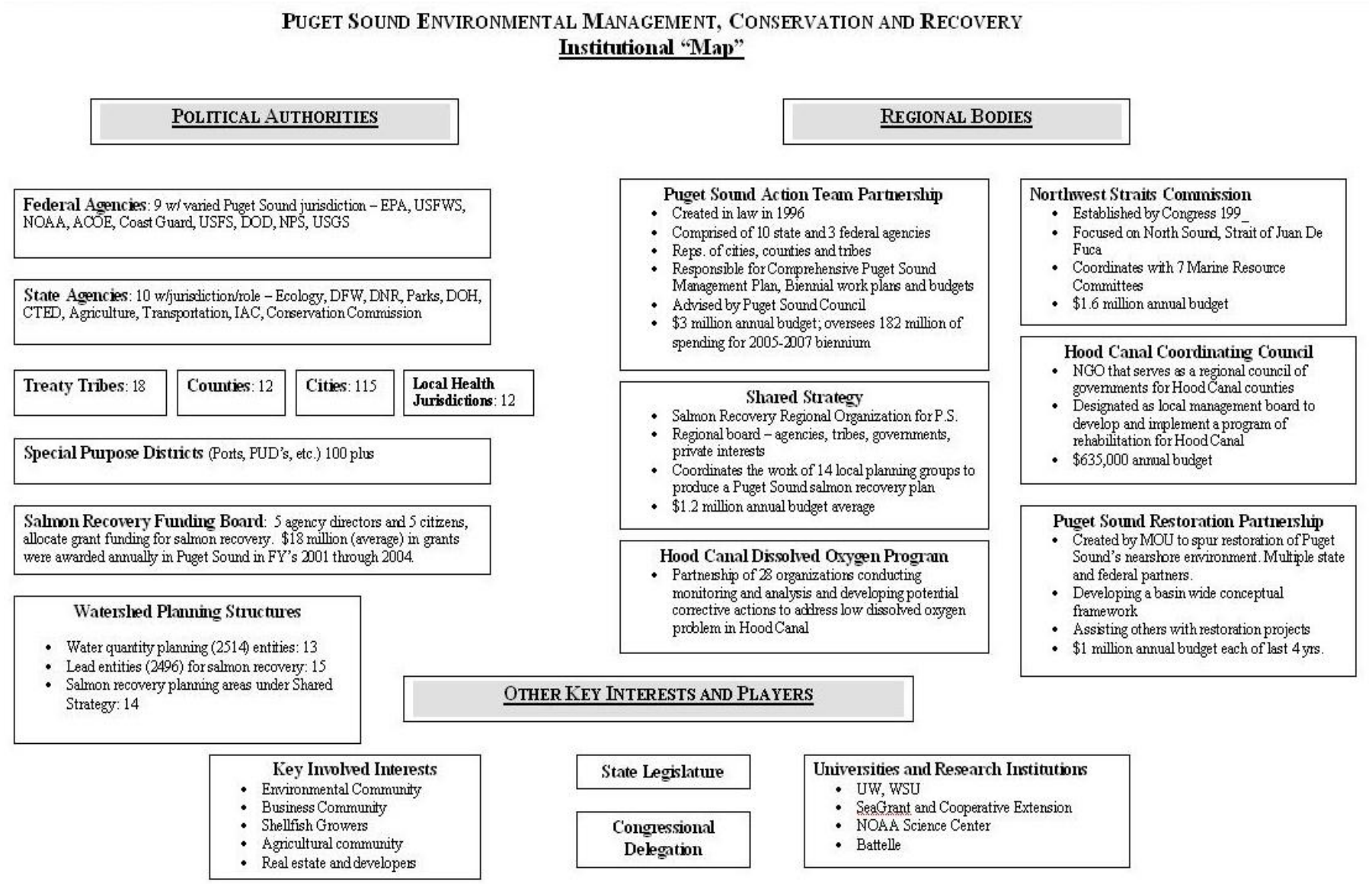
NORTHWEST STRAITS marine conservation initiative

Organizations want to make, transfer and reuse data for multiple purposes

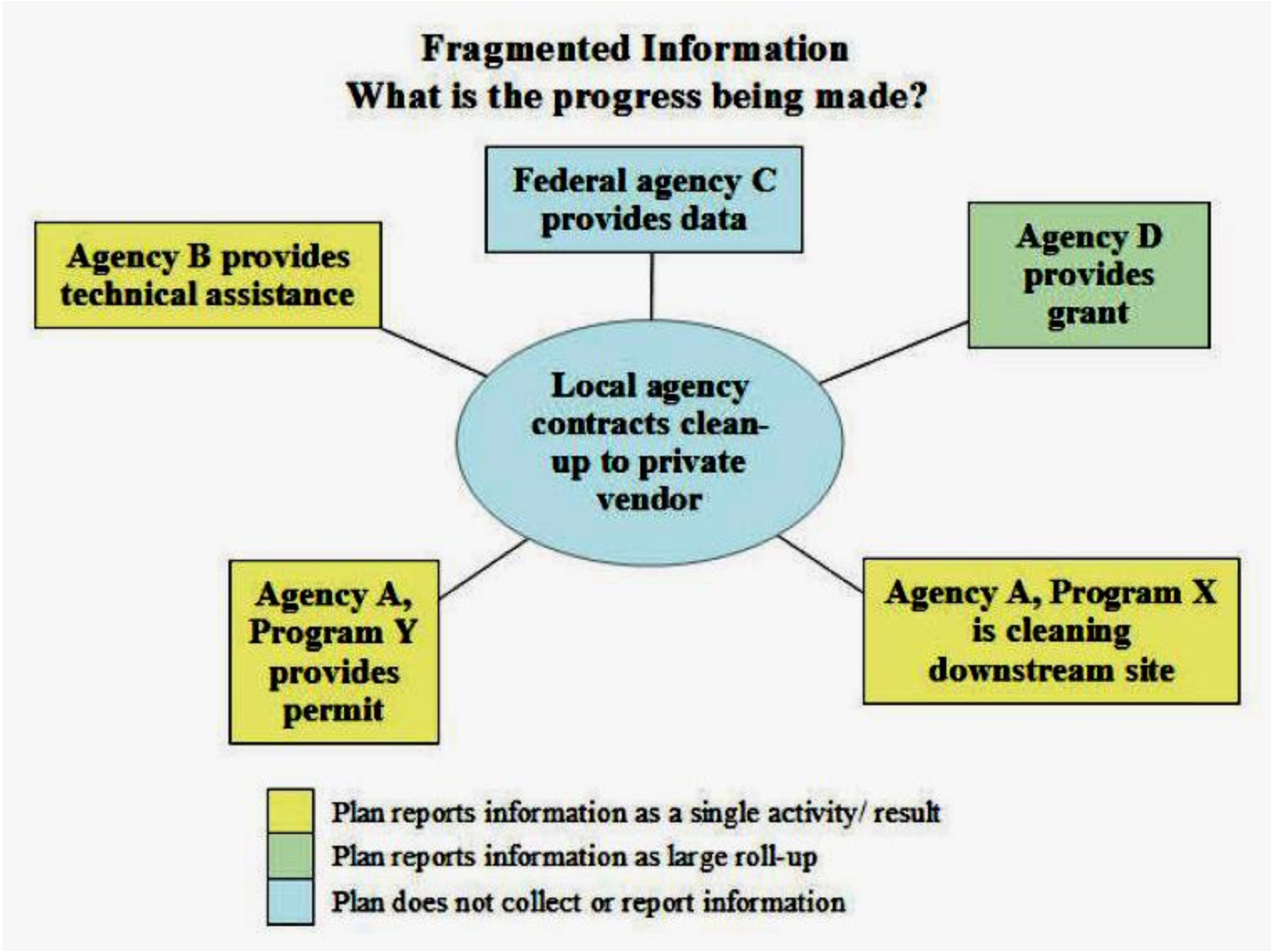
UNIVERSITY OF WASHINGTON

Access Washington® Official State Government Web Site

Is this any better?



Hierarchy and accountability is inconsistent



A difficult environment for GIS?

- Interorganizational coordination
- Granularity of organizational hierarchy and mandate
- Inconsistent & incompatible data
- Standards? Everyone has some
- Recognized data gaps
- Need for best available science
- Budget uncertainty
- When will enough be known to make decisions?
- Will others agree that decisions made are the best choices?

Situated GIS and ‘middle spaces’

Knowledge

History

Culture

Practice

Society

Technology

Conflict

Funding

Legitimacy

Credit

Ownership

Publication

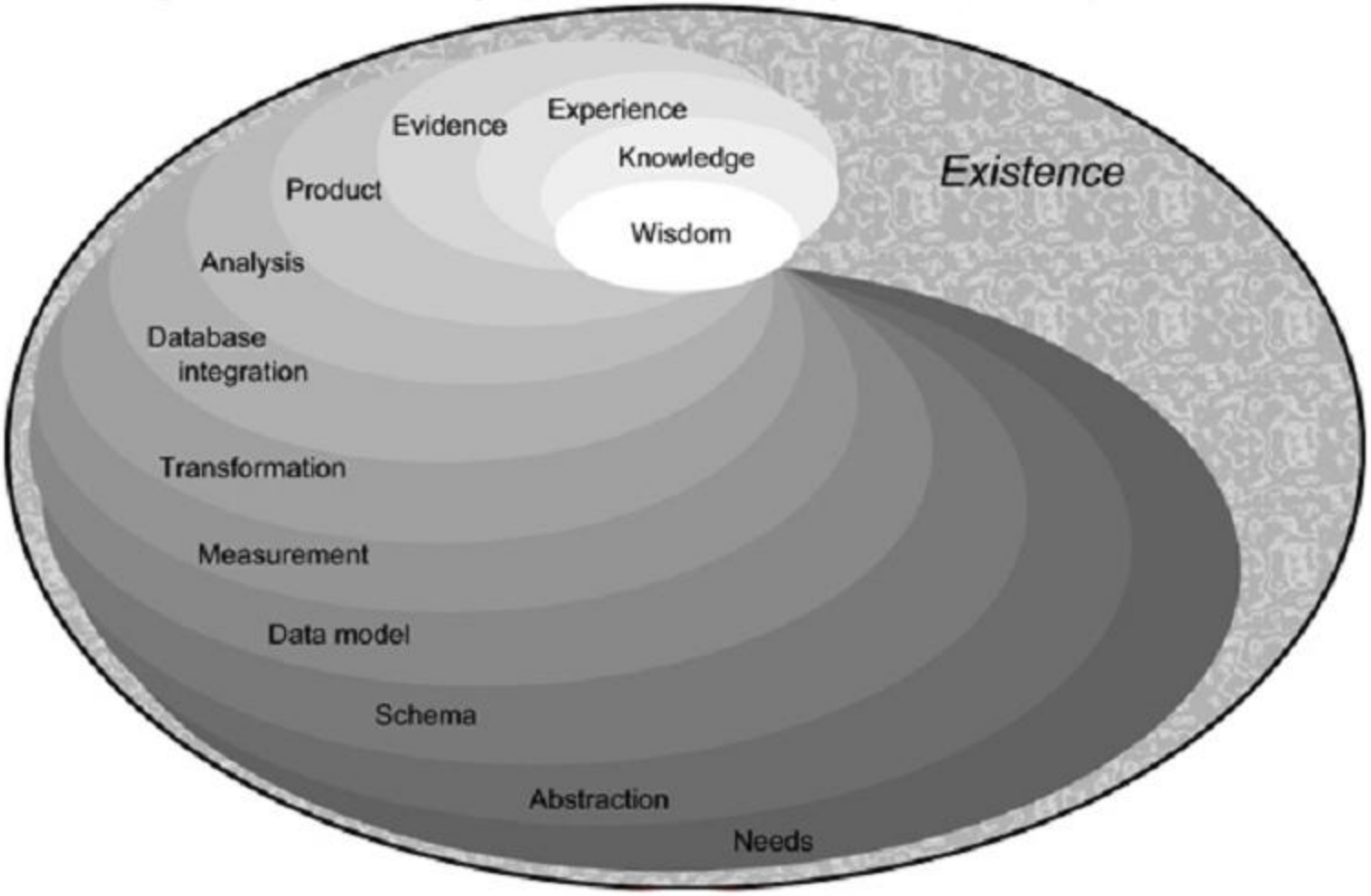
Power

Data

Measurement

Metadata

The research subjects are situated Knowledge Production GIS (KPGIS):



‘Data Worlds’ conceptual framework - Part 1

Data Actor-Networks:

A heterogeneous collection of human, nonhuman and hybrid human/nonhuman actors participating in some collective activity for a period of time. (Latour, Callon, Law)

Almost everything GIS is connected to data like fly-paper. What’s stuck to the data?

Network intermediaries

- Any interaction that produces mutually influential negotiation among actors
- Interaction with intermediaries that exert ‘power at a distance’
- Popular favorites: Money, power, technology, ownership, practice, hierarchy, mandates, knowledge, technology and artifacts for example.

‘Data Worlds’ conceptual framework – Part 2

Social Worlds

…are loosely or rigid structured units in which people share resources and information. They are characterized by a commitment fo common assumptions about what is important, and what should be done. (Clarke, Fujimura and Star)

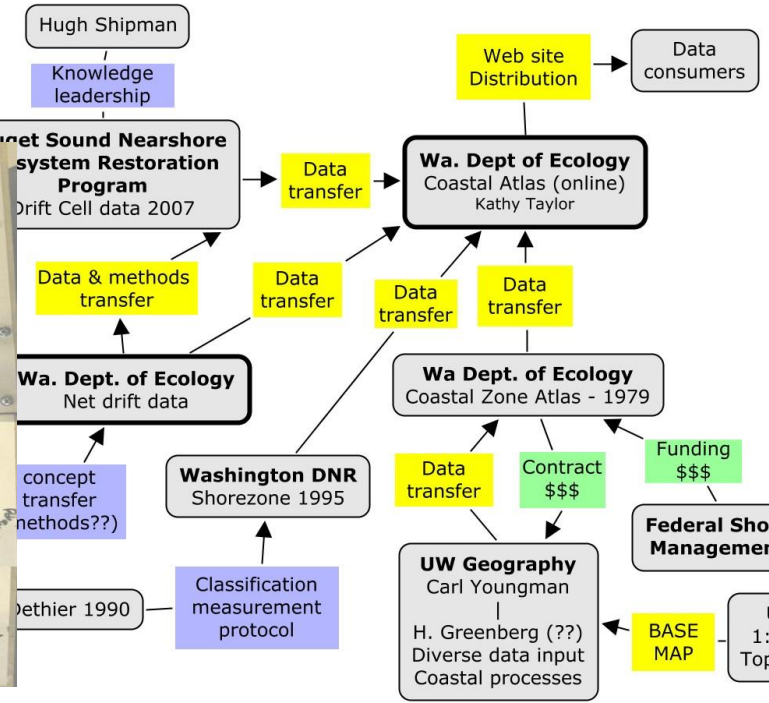
People cluster around discourses that negotiate and share knowledge and facts. How does interaction create order?

What creates or inspires order?

- Bandwagons: Events or movements that require or inspire a response or choices that create common understanding and order among worlds.
- Mavericks: Entities, often people, who emerge or take action that suddenly changes the discourse.
- Knowledge as part of discourse
- Do-able problems

How are these concepts deployed?

1. Identify the issues and organizations involved
2. Seek representatives who will discuss their work, organizations and perspectives on happenings
3. Work with them to articulate and document their worldviews
4. Triangulate informants' contributions to identify stabilized Data Worlds interactions and conflicts
5. Map relationship diagrams from multiple perspectives



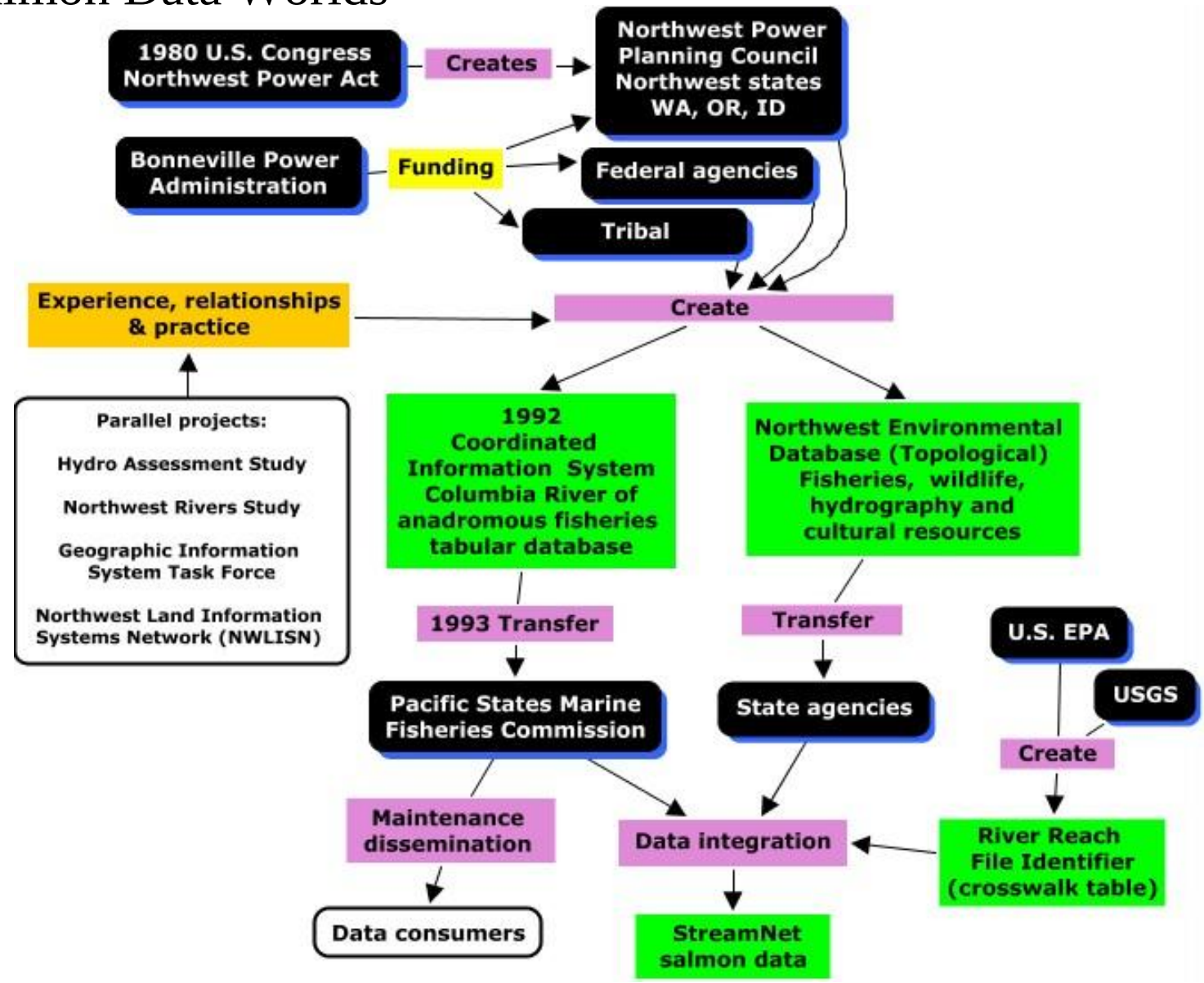
The PSP is a ‘do-able problem’ with a history

- 1985: Puget Sound Water Quality Authority
- 1996: Puget Sound Action Team and the
- 2002: Puget Sound Assessment and Monitoring Program
- 2005 Puget Sound Partnership
- 2008 PSP Action Agenda released

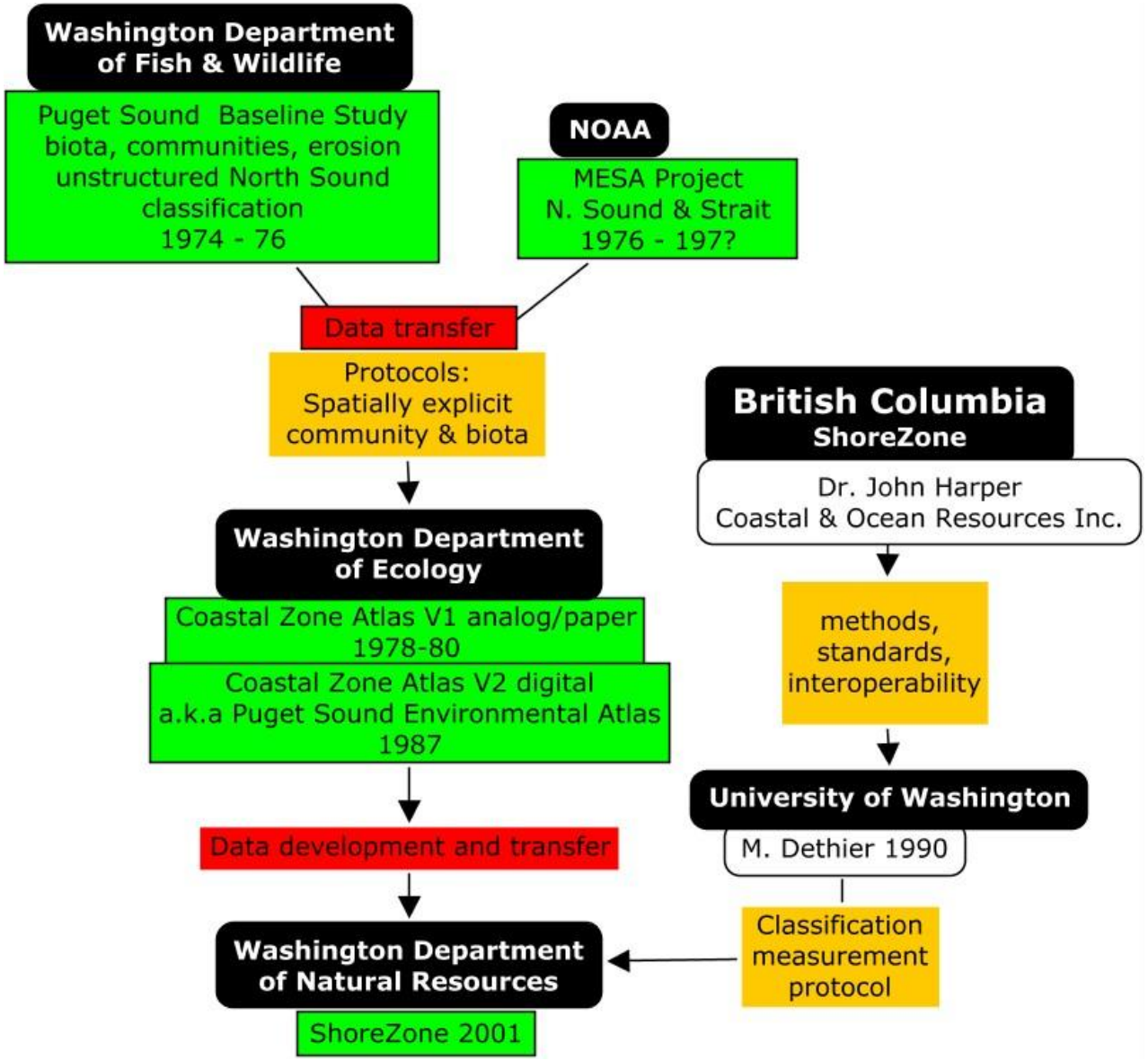
Pre-PSP bandwagon and maverick events

- 1850 Tribal treaties with the state
  - Reservations and half of the salmon harvest
- 1972 Salmon use of the nearshore is identified
- 1973 USEPA Endangered Species Act
- 1974 Judge Boldt Decision
  - Ratifies the Tribes' rights to salmon and management
- 1978 Coastal Zone Atlas published
- 1990s Drastic reduction of herring populations
- 1999 Salmon species are ESA listed

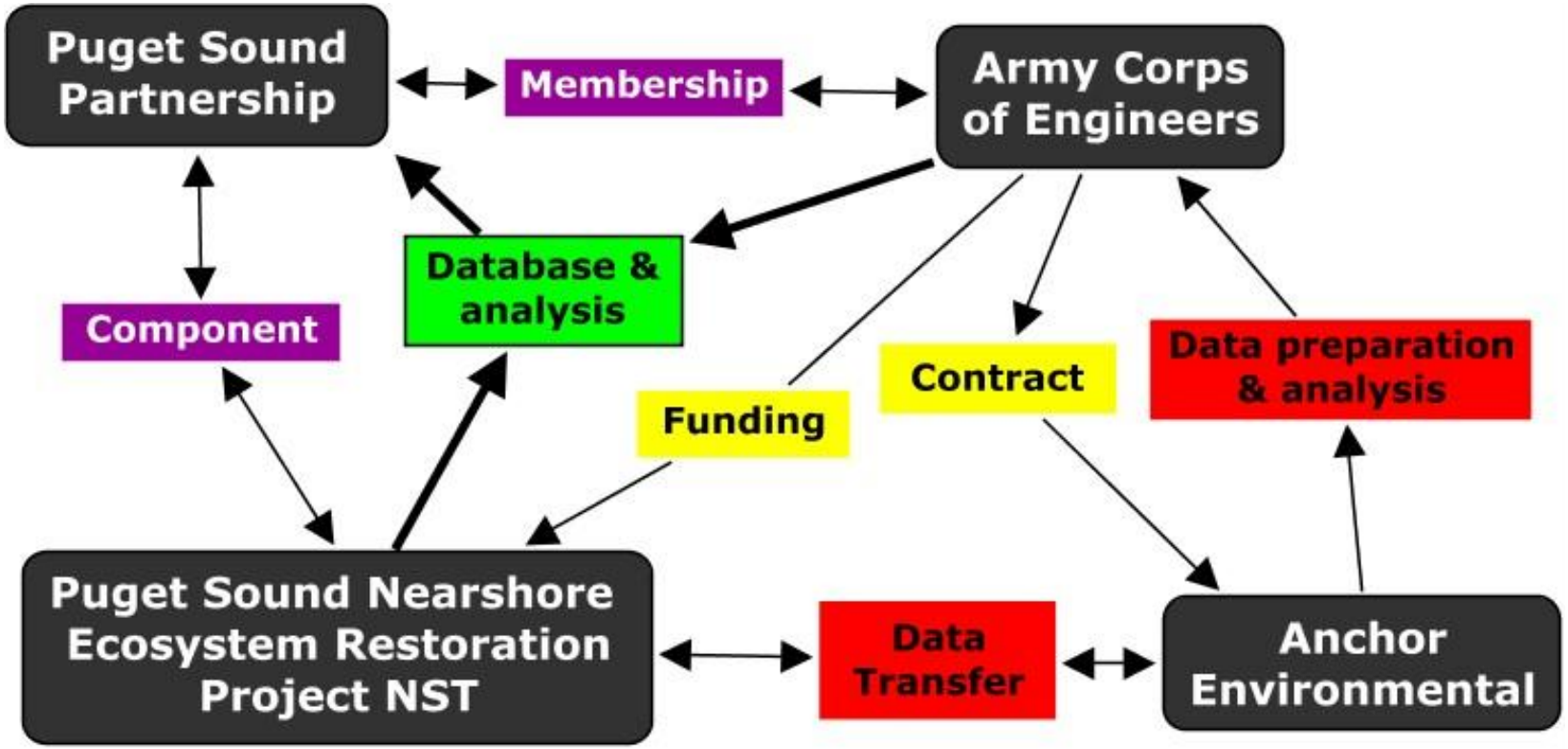
The first salmon Data Worlds



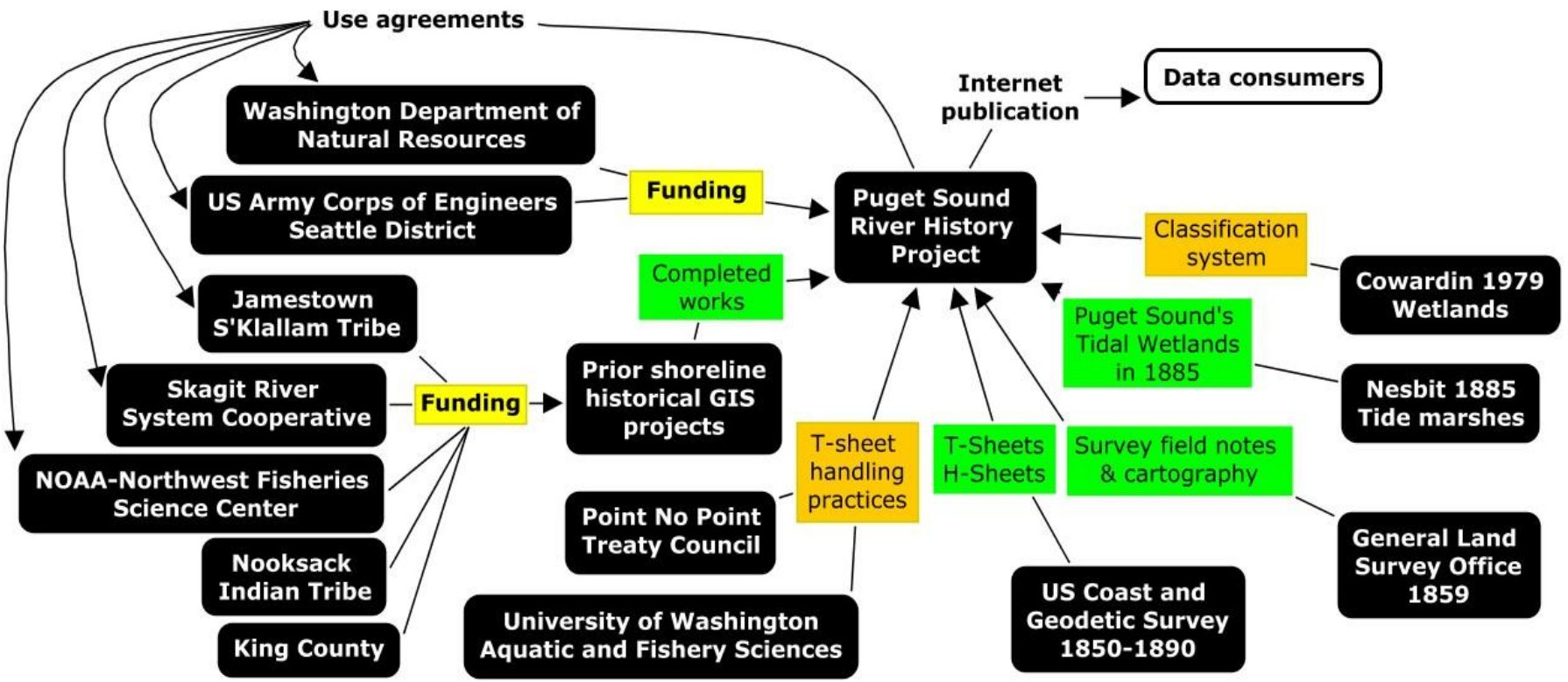
Coastal Zone Atlas Data Worlds 1974-2001



Change analysis project Data Worlds: top level



Puget Sound River History Project



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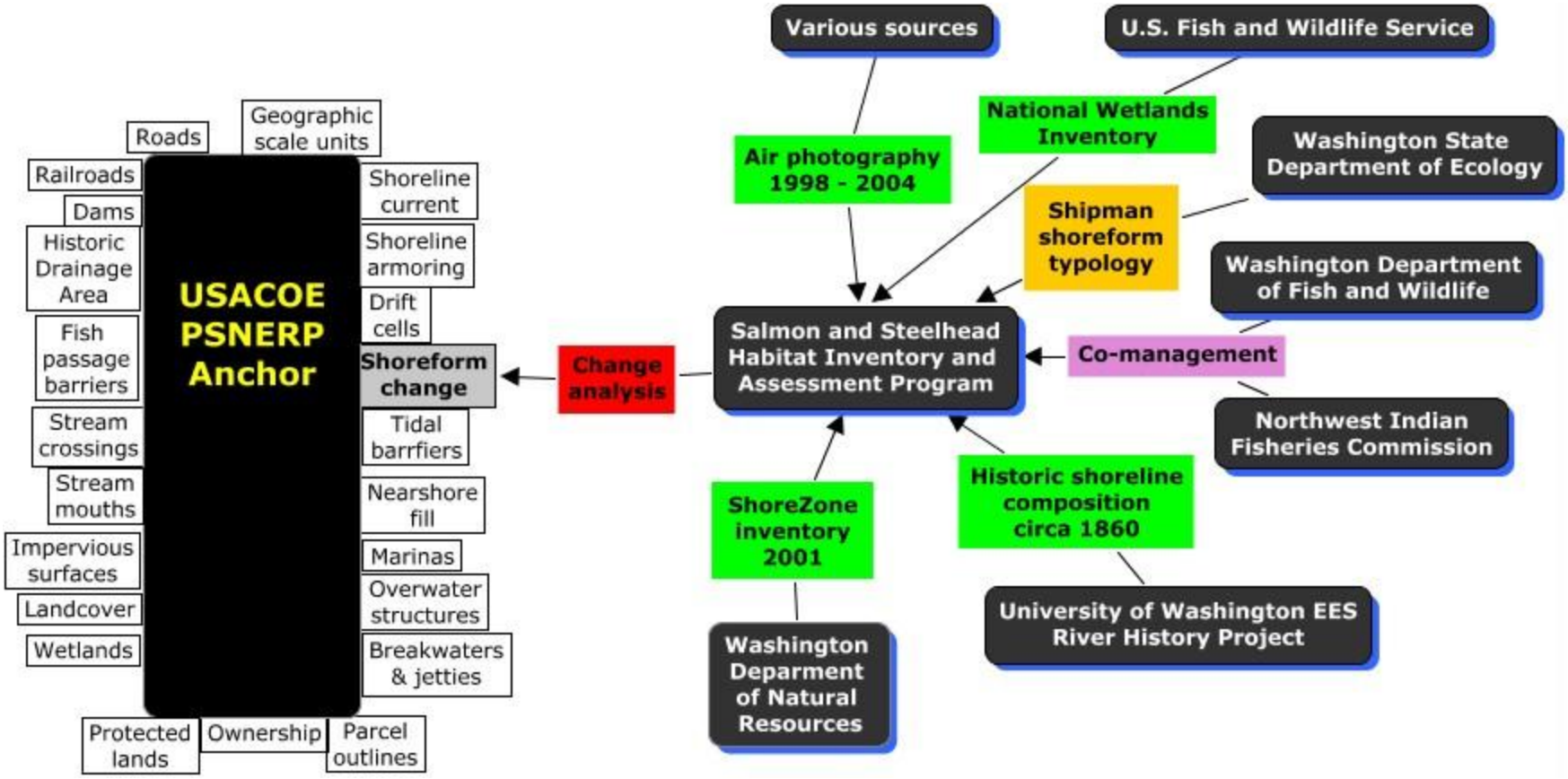

Conclusions

- Multi-organizational decision environments are shaped by stabilized relationships with data and knowledge production
- These relationships are not captured in metadata or reportable by individual informants
- The result of a Data Worlds investigation could be valuable ‘training’ tool for examination of interorganizational relationships
- People new to a decision making environment will benefit from a Data Worlds investigation