

Traditional fisheries practices and adaptation to environmental change: case studies from Alaska and Brazil

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Traditional Fisheries

- Usually small scale, but not always
- Usually outside economic mainstream
- Often have little political power



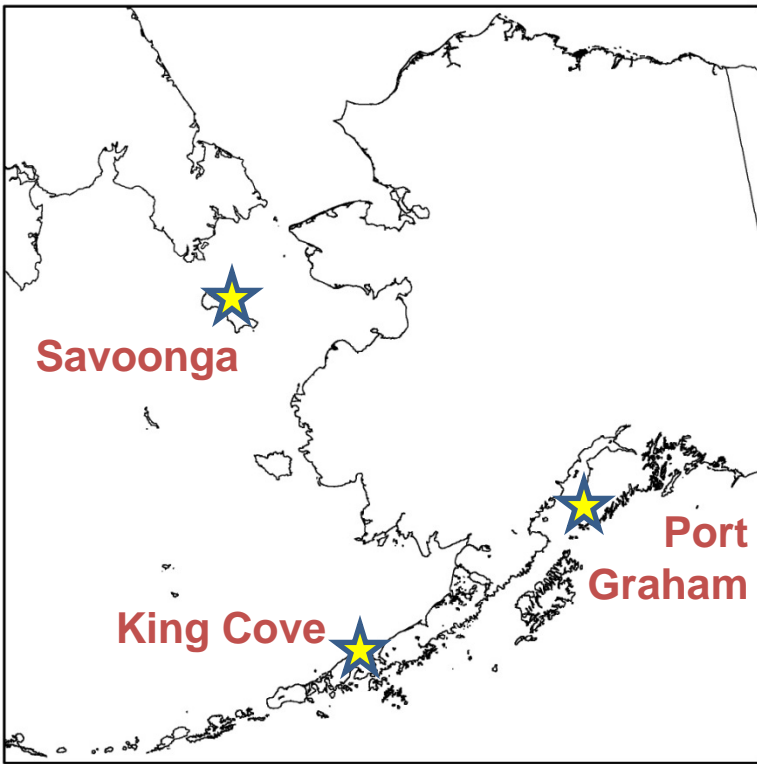
- May compete with other users, interests
- Often done by indigenous peoples

Environmental Change

- Climate change
- Pollution
- Dams and other habitat change
- Changes in human use patterns



Case studies



Alaska

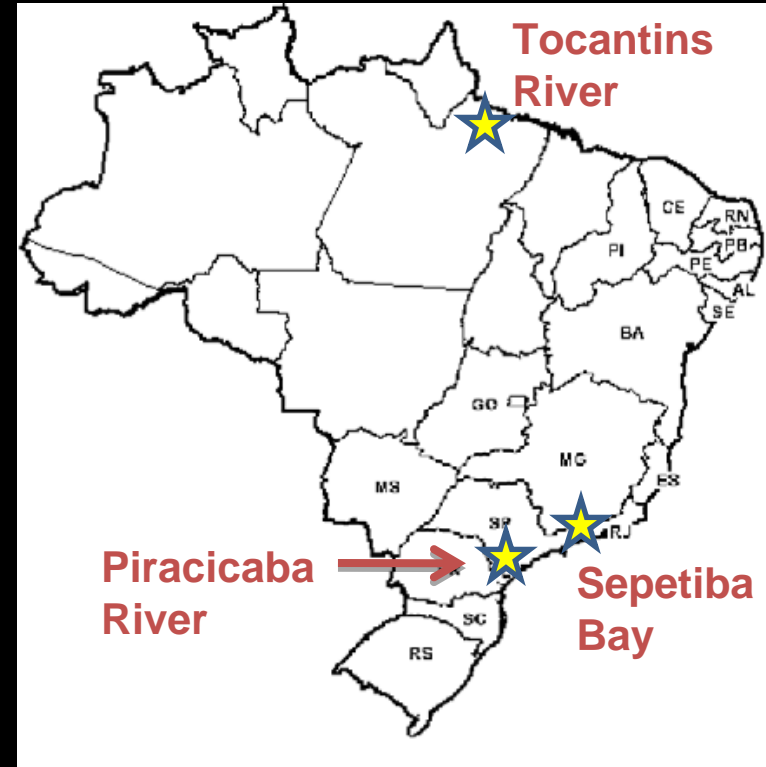
Driver(s) of change

Environmental effects

Response by fishers

Adaptive features

Limiting features



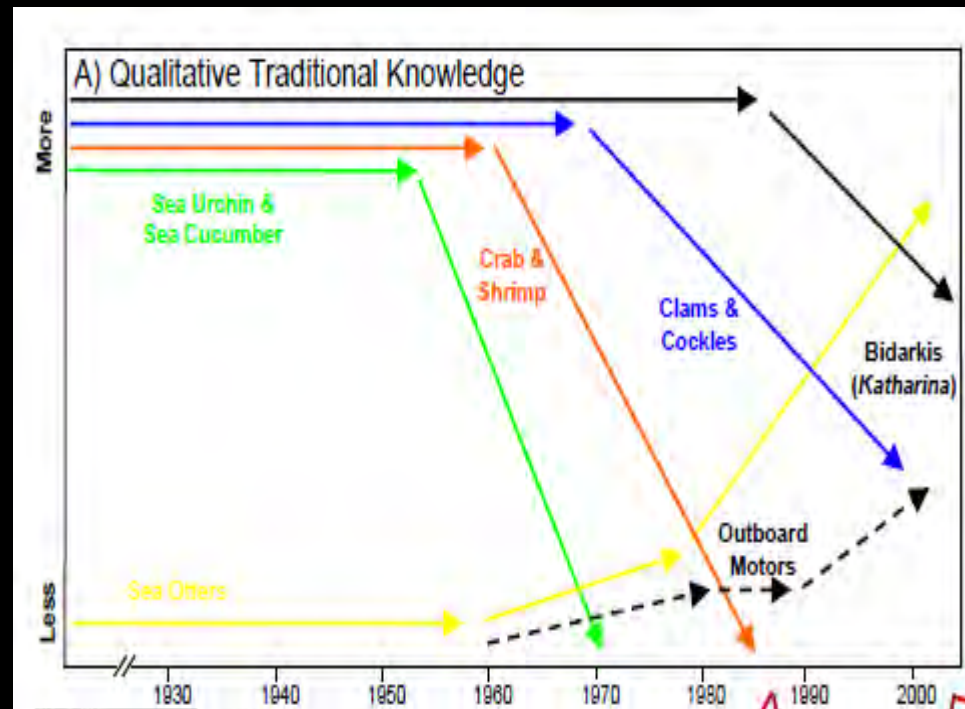
Brazil

Port Graham: invertebrates

- Earthquake, overexploitation, sea otters, oil spill, technology
- Serial decline of intertidal invertebrates
- ***Tribal harvest restrictions/social pressure***
- No competition
- Ability to self-regulate?

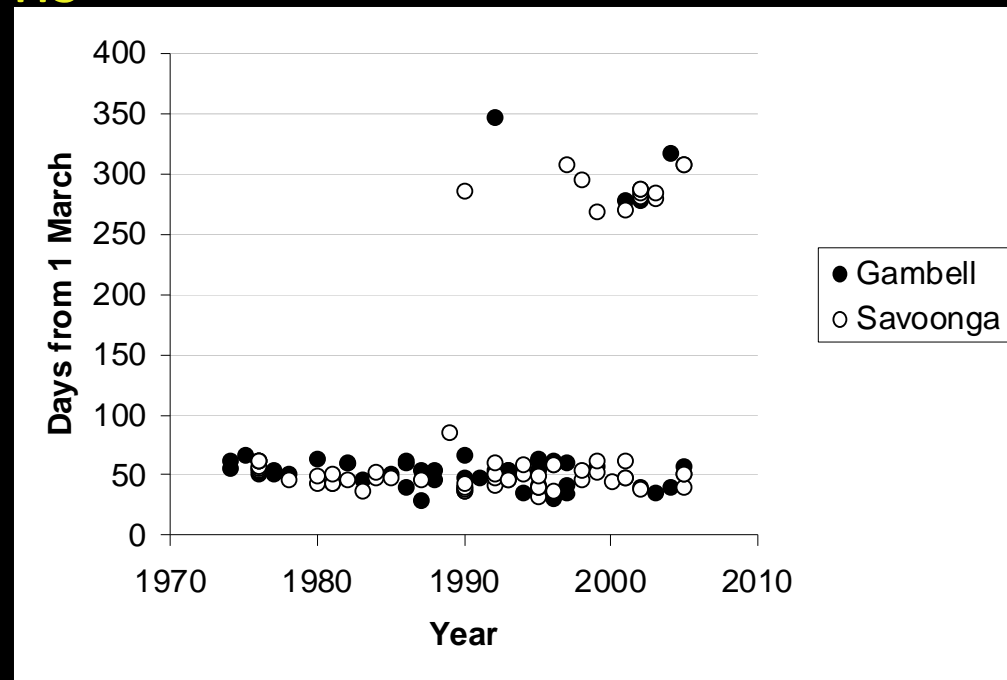
*Serial Decline of Intertidal Invertebrates
and Other Ecological Factors, Port
Graham Bay*

Salomon et al. 2007



Savoonga: marine mammals

- Climate change, reduction of sea ice
- Changing access to bowhead whales, walrus
- Shifting seasonal patterns
- **Cultural flexibility, regulatory flexibility**
- Potential for new regulations (e.g., walrus), cost of gasoline



Timing of bowhead whale harvest on St. Lawrence Island

King Cove: commercial fishing

- Climate change, regime shift, ecosystem changes
- Change in target fish abundance, distribution
- Change target fish, purchase new fish quotas
- Regulatory flexibility, versatility of gear, infrastructure
- **Regulatory inflexibility, market forces, infrastructure**

Commercial salmon fishing, Alaska



Sepetiba Bay: artisanal fisheries

- Industrial and organic pollution
- Diminishing catches
- Increasing effort in aquaculture
- ***Ability to pursue other economic activities***
- Opposition to aquaculture, pollution affecting cultured species



*Fishers in
Sepetiba
Bay*

*Begossi
1995, 2001*



Tocantins River: artisanal fisheries

- Habitat and migratory fragmentation by a large dam
- Changes in fish abundances, distribution
- Shift to target species that do better in a reservoir
- Seasonal variation in fishery practices, co-management efforts
- ***Lower value of new fish, lack of government support for local management***

Primary fishes caught in the lower Tocantins River



Piracicaba River: artisanal fisheries

- Pollution, fragmentation (dam), introduced species
- Changes in fish abundance, distribution, value
- ***Switches in target species, pursuit of exotics, avoidance of polluted fishes, use of reservoir***
- Ability to change fisheries practices
- New fish lower in economic value, impacts of new fishes, pollution

Fish vendor, who buys fish from the Piracicaba River fishers and sells in nearby cities



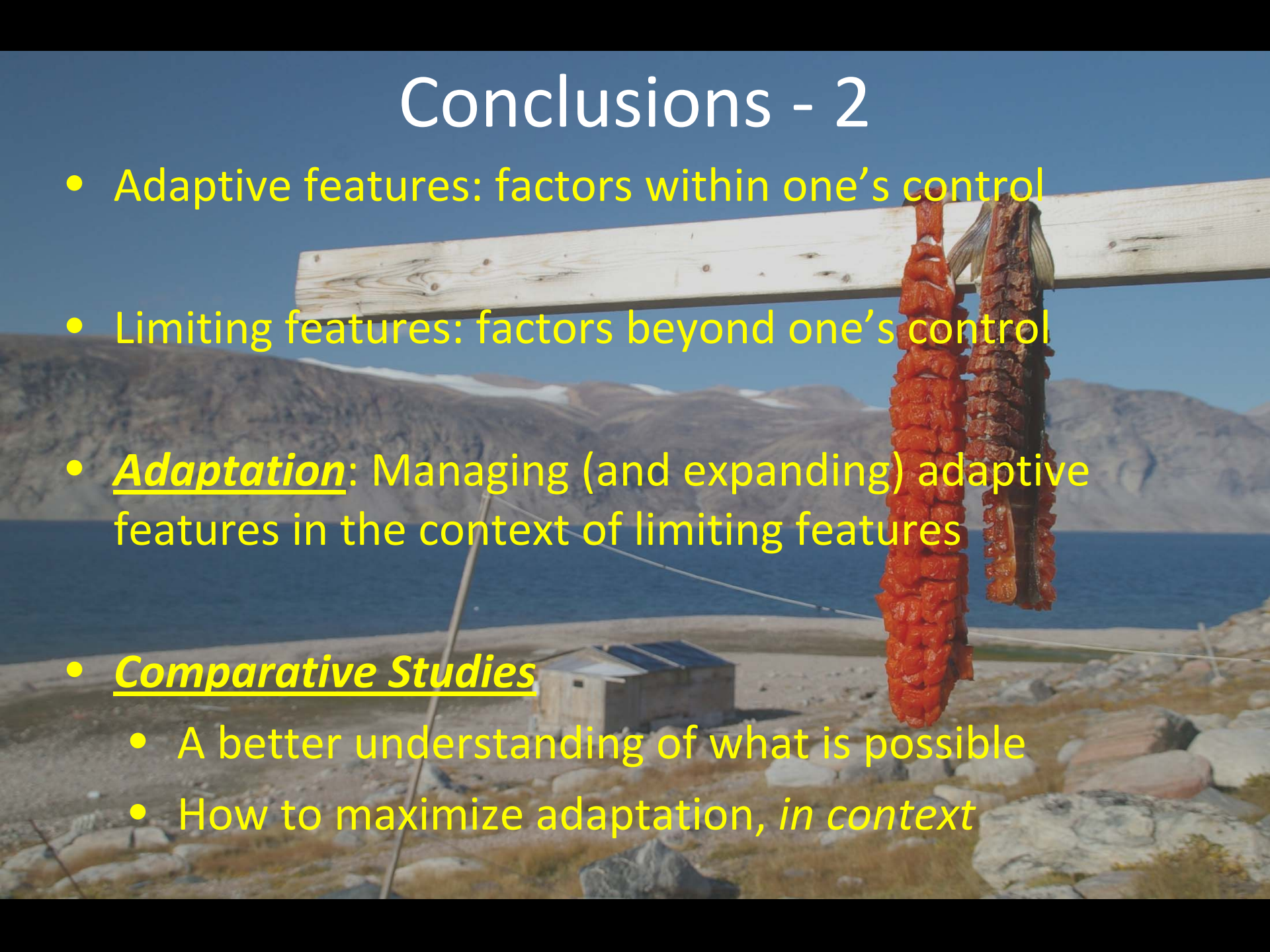
Conclusions - 1

- Common responses
 - Shifting target species, timing, location, relative harvest levels, etc.
- Common adaptive features
 - Harvest flexibility, regulatory flexibility, opportunity for local initiative, etc.
- Common limiting features
 - Regulations, capital & operating costs, pollution, social resistance, etc.



Conclusions - 2

- Adaptive features: factors within one's control
- Limiting features: factors beyond one's control
- **Adaptation**: Managing (and expanding) adaptive features in the context of limiting features
- **Comparative Studies**
 - A better understanding of what is possible
 - How to maximize adaptation, *in context*



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