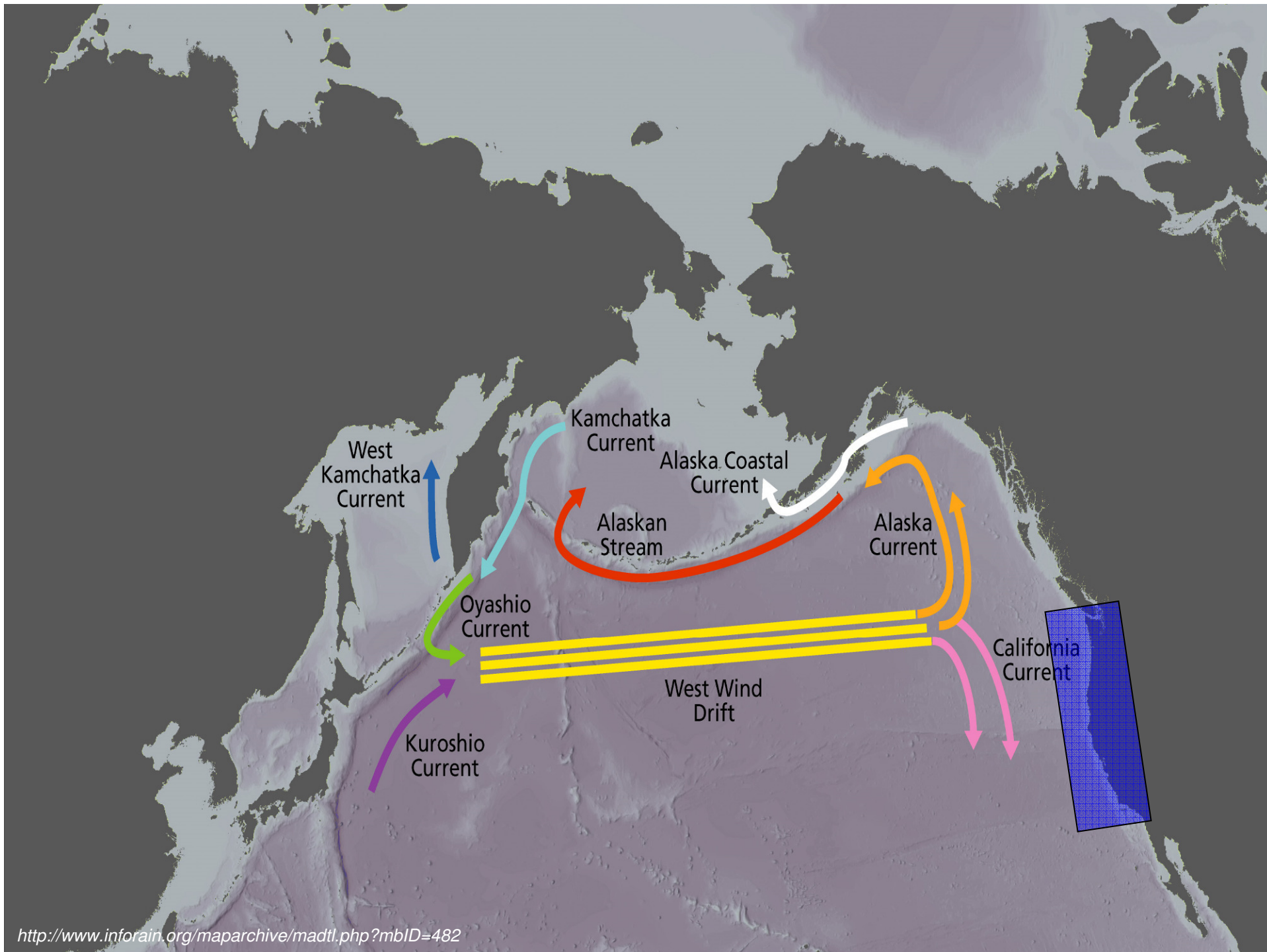


Confronting spatial structure in the analysis and management of US west coast groundfish stocks

Jason Cope



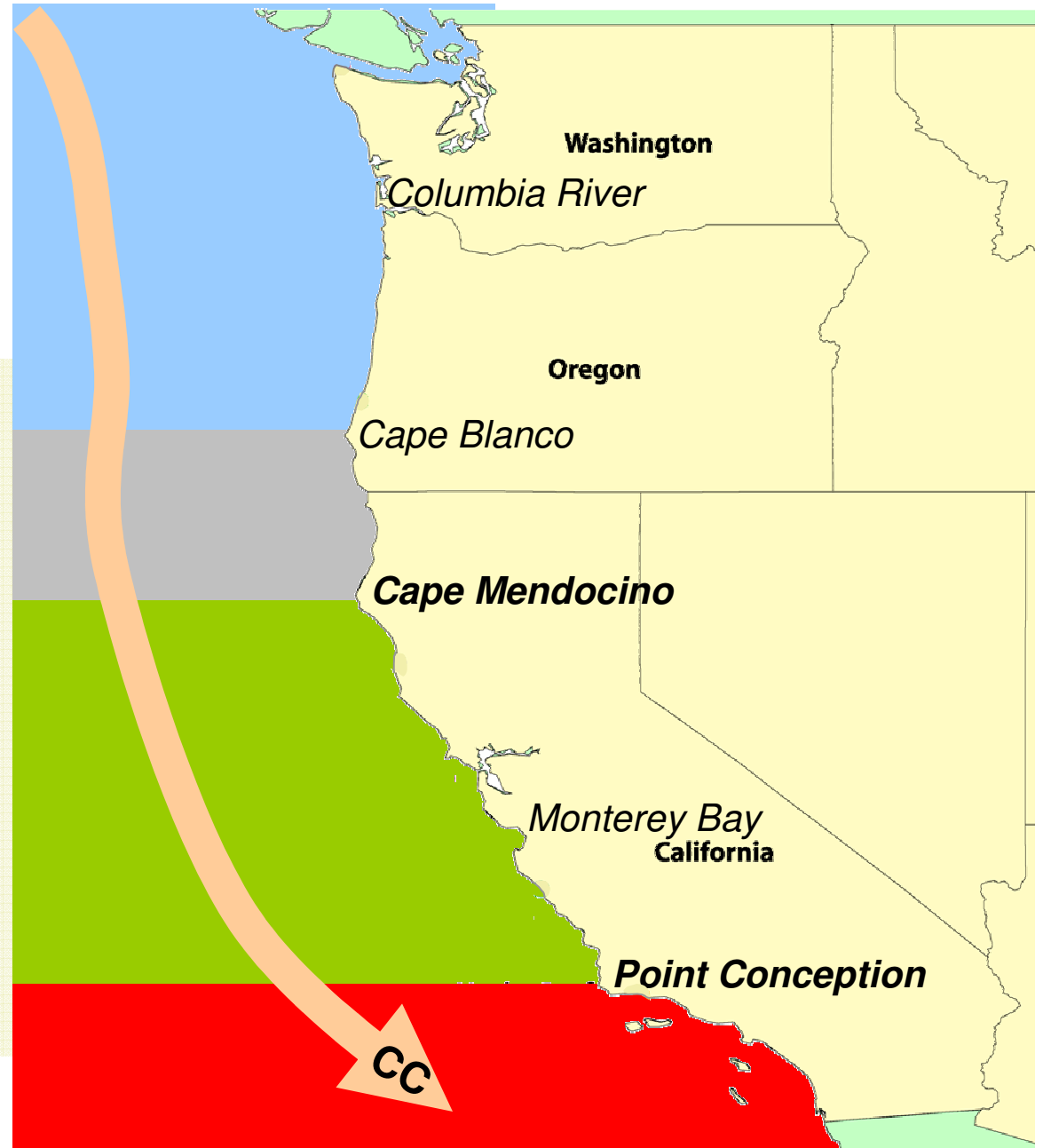


U.S. West Coast

- \approx 1300 miles of coastline
- 16.5° of latitude

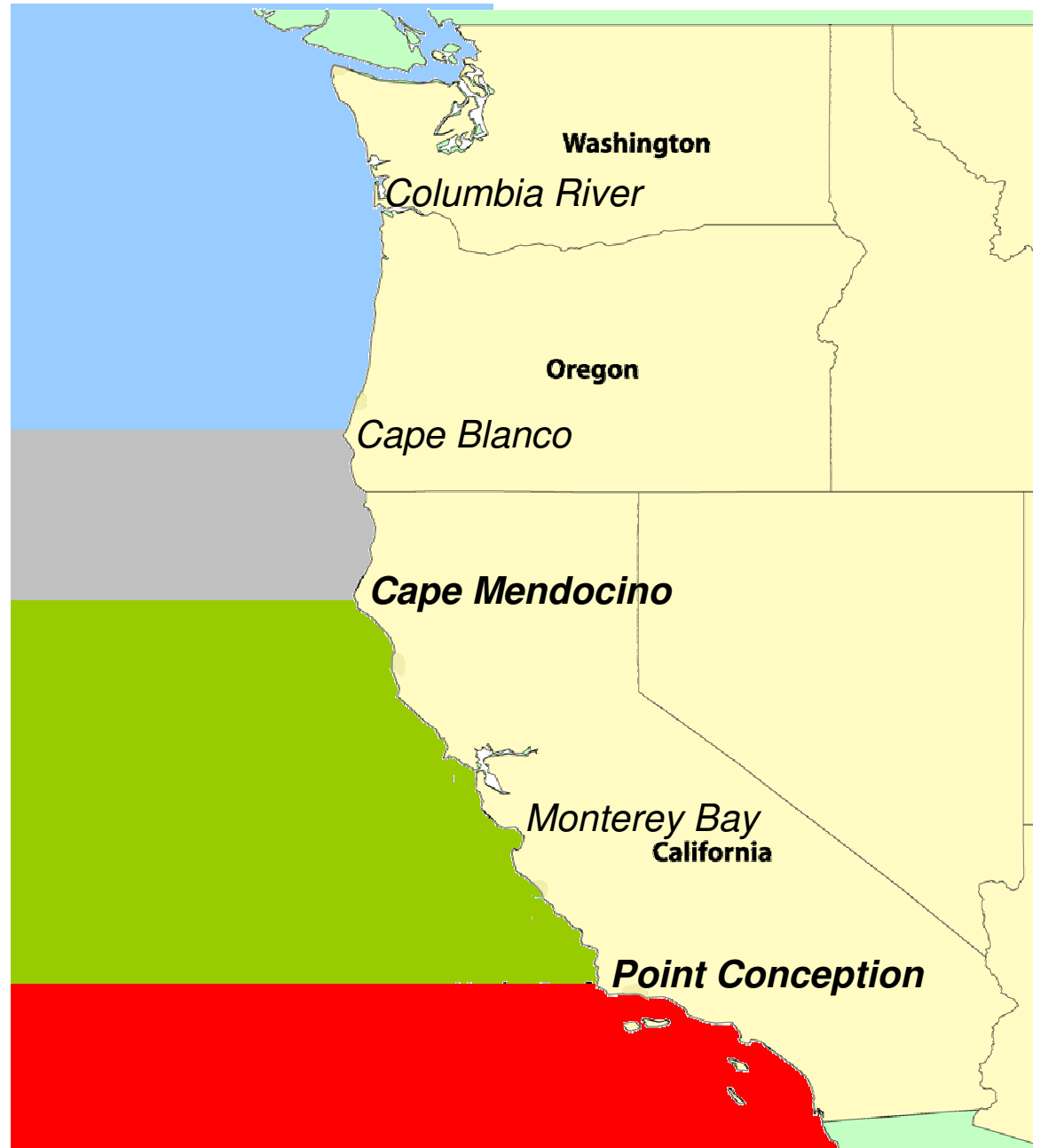
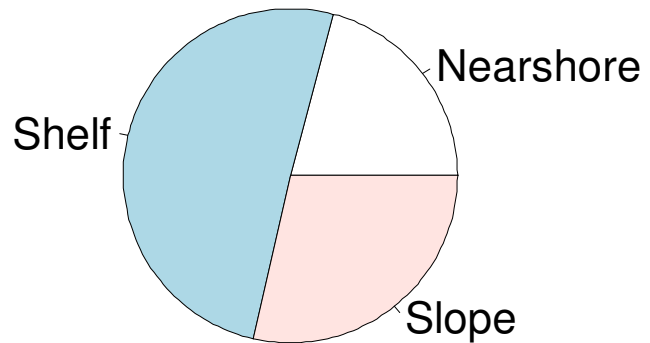
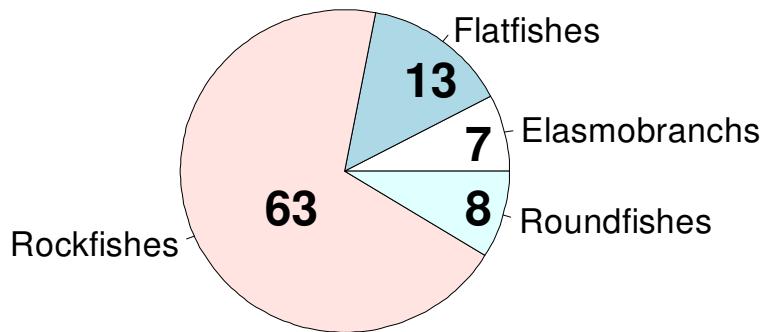
4 oceanographic regions

1. Weaker upwelling, strong winter storms
2. Transition zone, high winds
3. Strong upwelling
4. Warm waters, persistent gyre

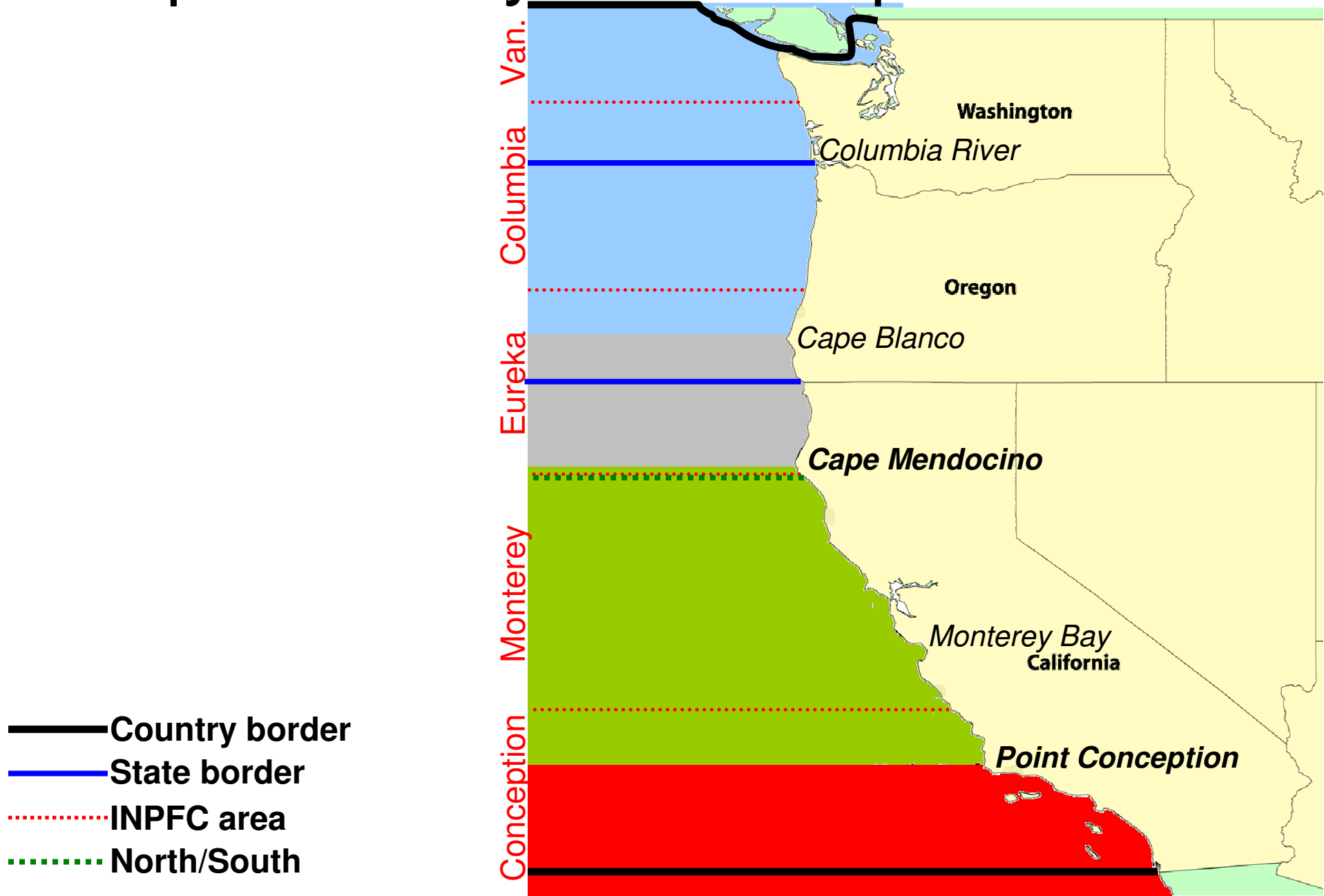


PFMC US Groundfish FMP

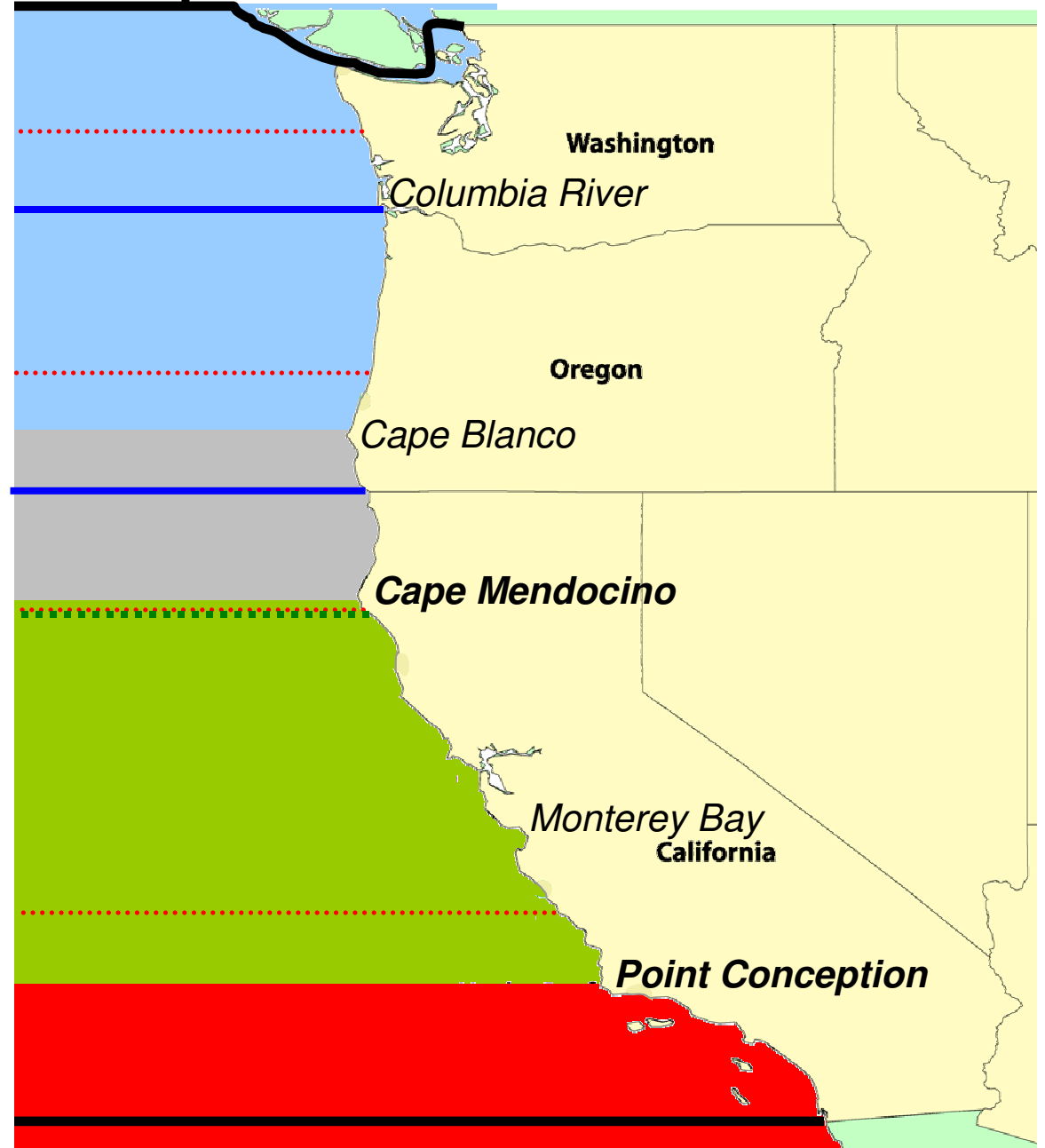
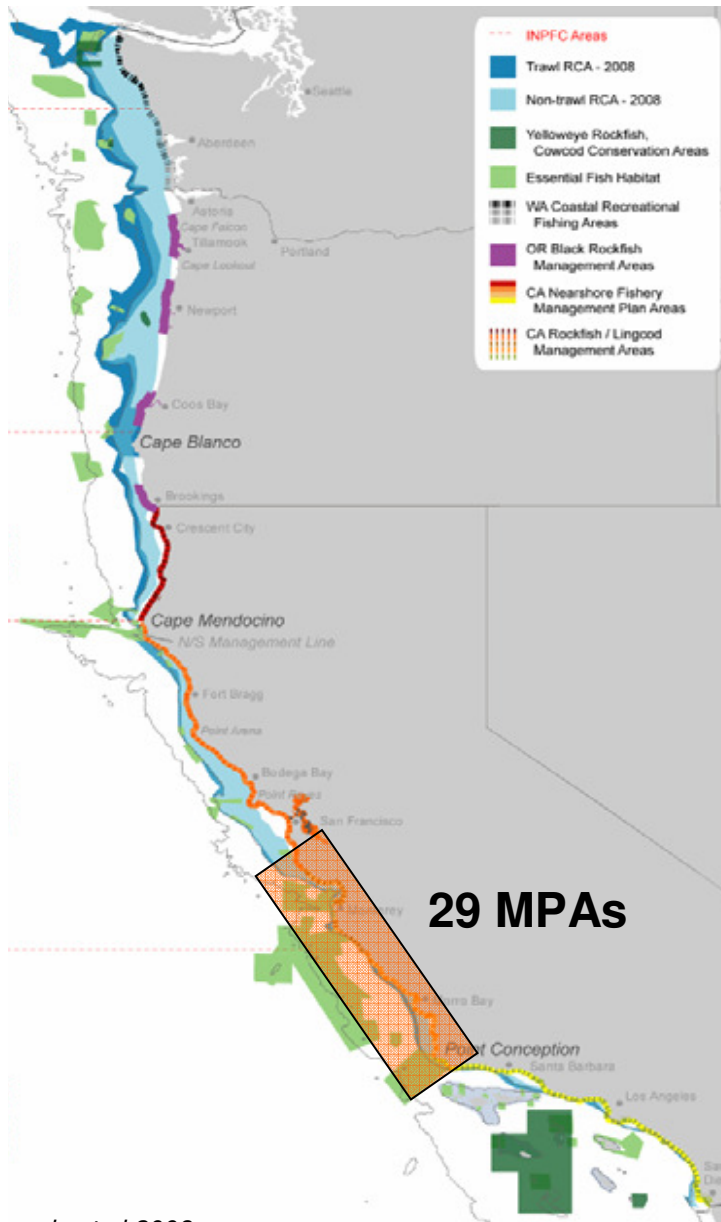
91 species



Spatial analysis: Line upon line...



...RCA upon MPA



Ingredients for making spatial assessments

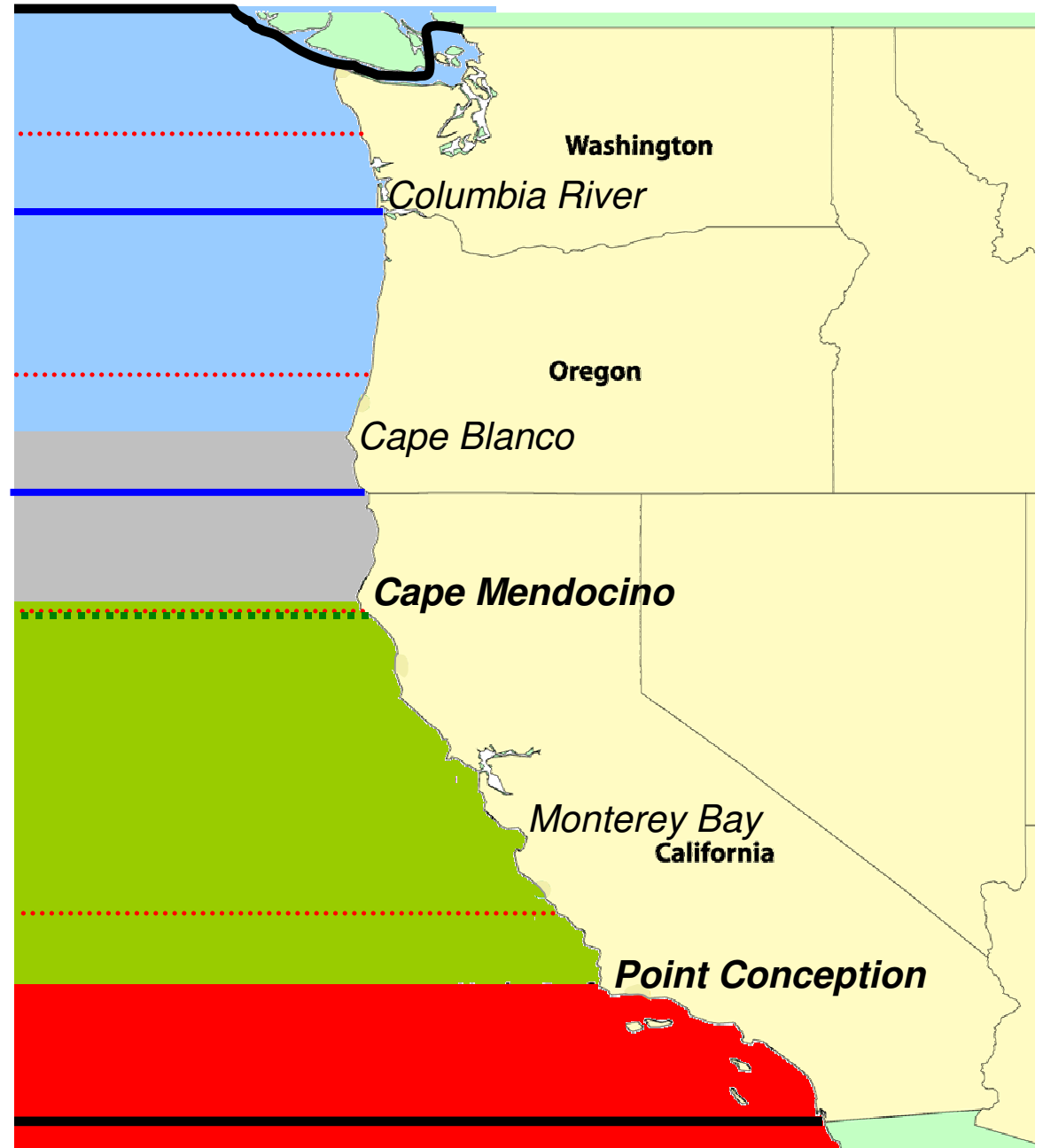
- **Biology**

- Dispersal
- Distribution/density
 - Size/age
- Life history
- Mortality schedule

- **Political lines**

- **Data**

- **Pop. dynamics**



...with a dash of spatial management

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Sablefish	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 5,000 lb/ 2 months		300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 3,000 lb/ 2 months		CLOSED	
Thornyheads	CLOSED					

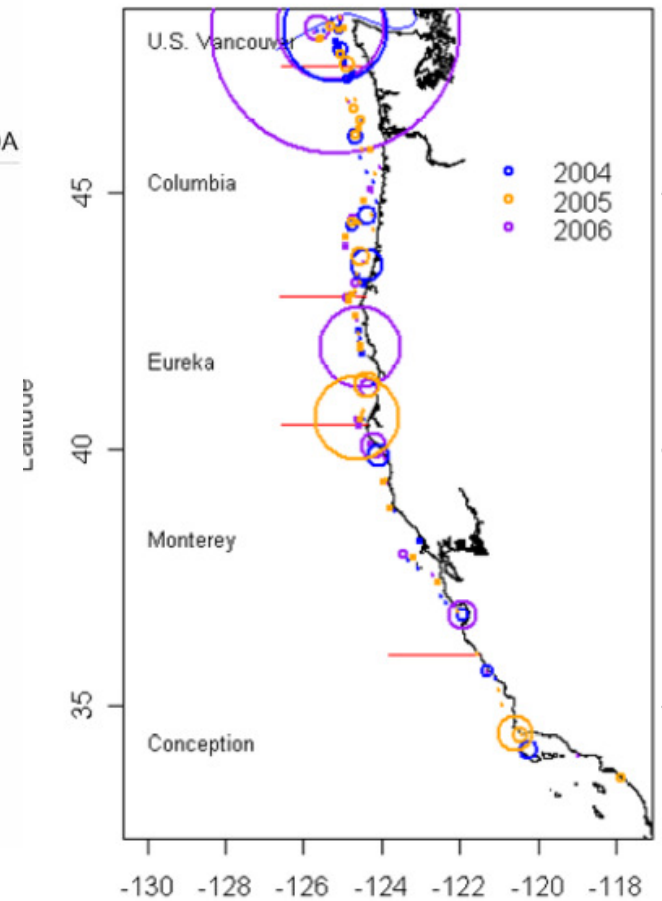
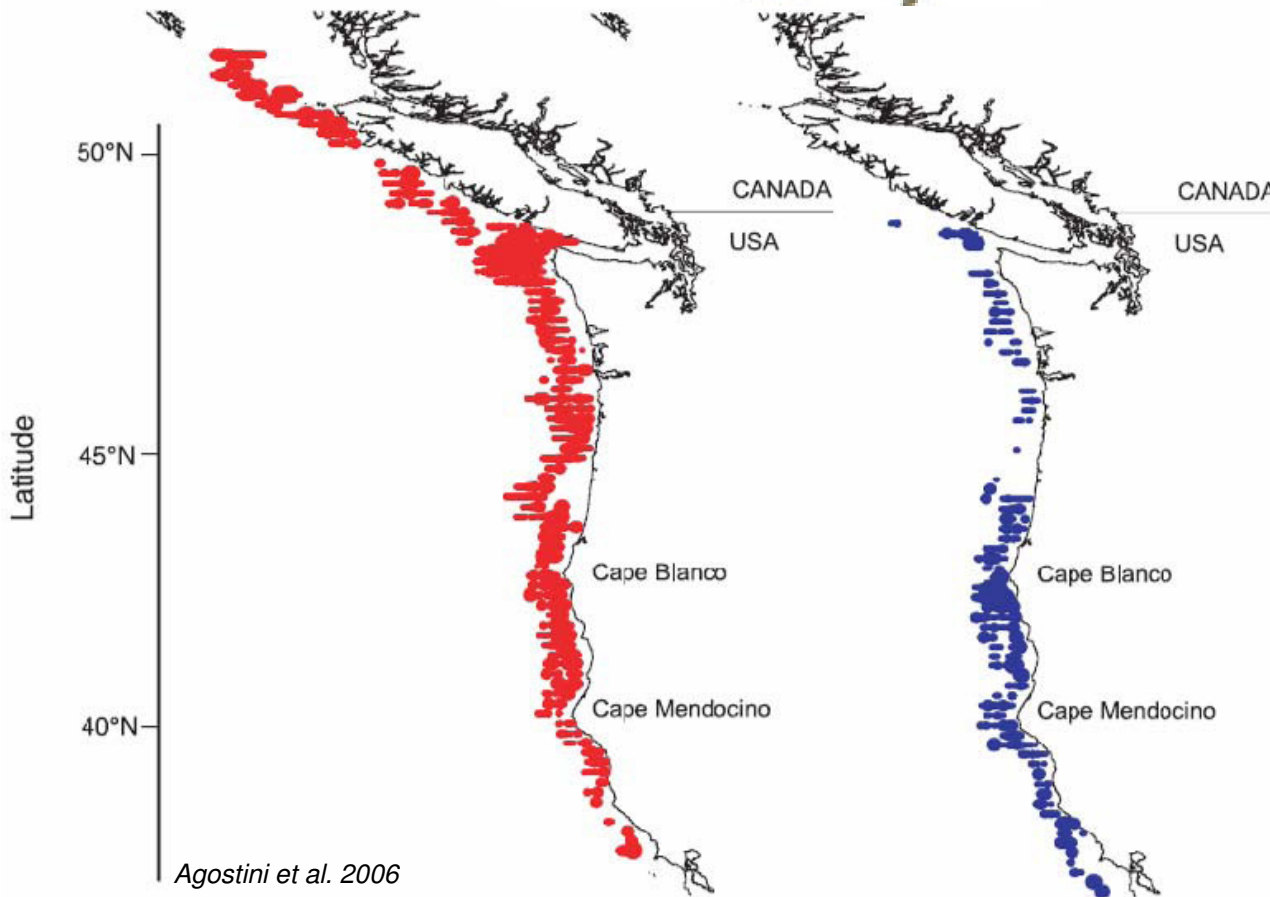
40°10'

Sablefish													
	40°10' - 36° N. lat.	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 5,000 lb/ 2 months		300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 3,000 lb/ 2 months		CLOSED							
	South of 36° N. lat.	350 lb/ day, or 1 landing per week of up to 1,050 lb						500 lb/ day, or 1 landing per week of up to 1,050 lb		300 lb/ day, or 1 landing per week of up to 1,050 lb, not to exceed 3,000 lb/ 1 month			
Thornyheads													
	40°10' - 34°27' N. lat.	CLOSED											
	South of 34°27' N. lat.	50 lb/ day, no more than 1,000 lb/ 2 months											

Challenges of making space in west coast groundfish populations

- Widely distributed, highly connected species with structure being imposed
 - Canary rockfish (*Sebastes pinniger*)
 - Pacific hake (*Merluccius productus*)
- Non-detected structure in spatially structured species
 - Nearshore species

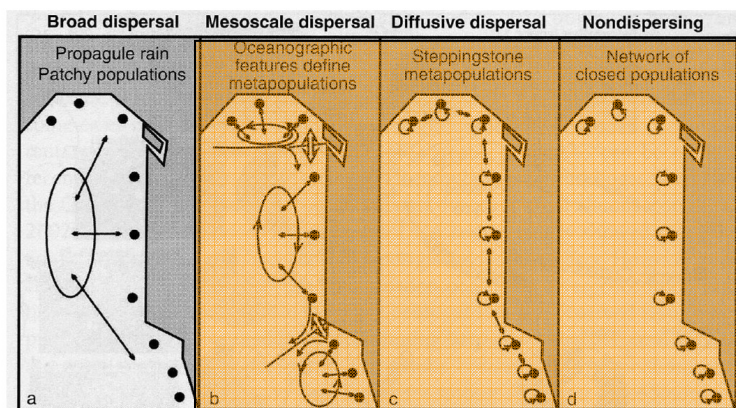
Structure implied



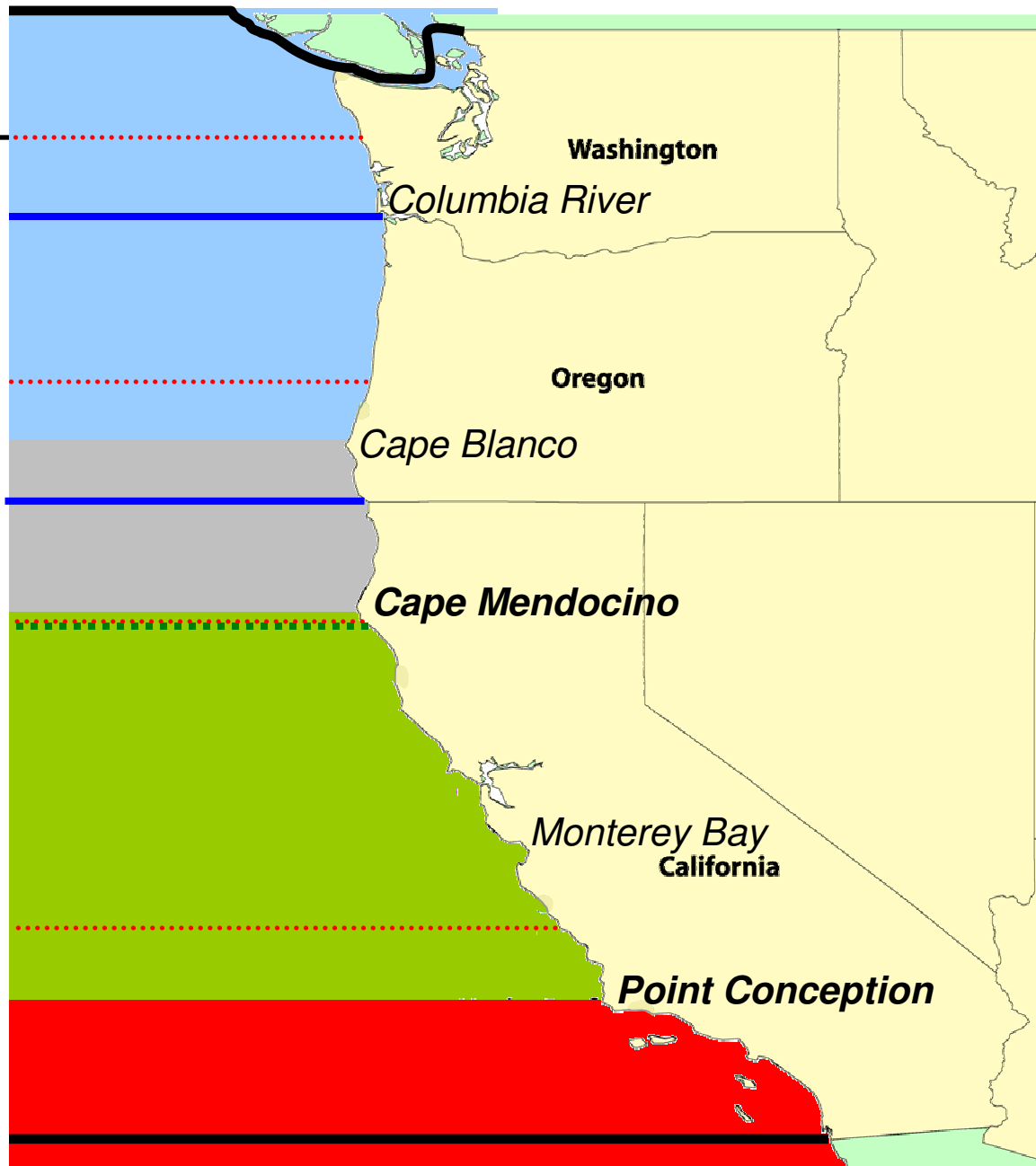
Structure denied

What is nearshore?

- Rocky reef/kelp forests
- High human interaction
- Diverse ecology



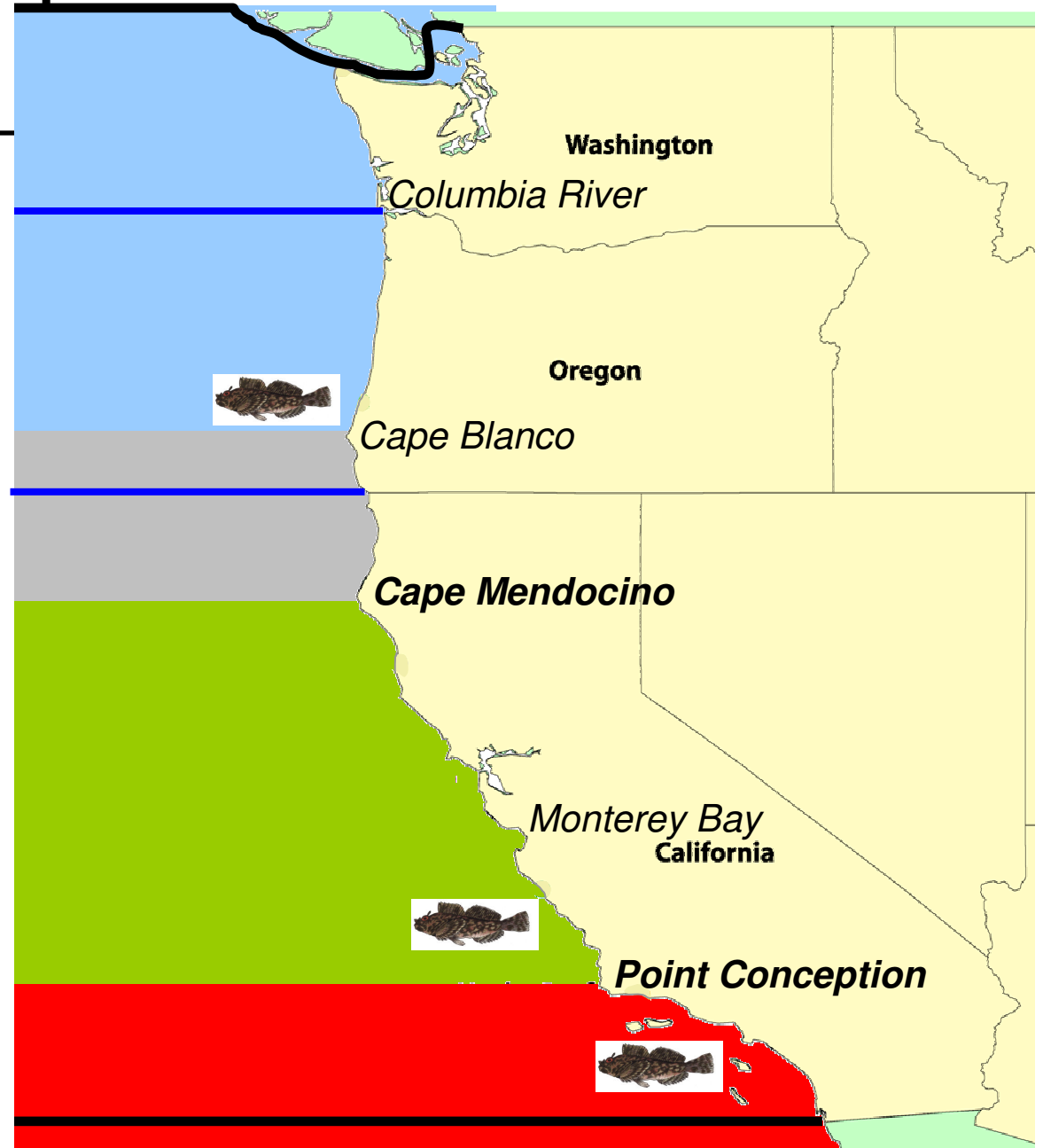
- Data-limited



Example: cabezon

Scorpaenichthys marmoratus

- Range from Baja to Alaska
- At least two stocks (based on dynamics)
- Up to 8 stocks (based on preliminary genetics)
- 2008 assessment will include Oregon



Confronting space in the U.S. west coast groundfish fishery

- Resolving spatial scales still evolving
- No magic solution; no one method
- Case-by-case considerations add complications
- Cooperation needed from all involved