

Marine Aquaculture in California

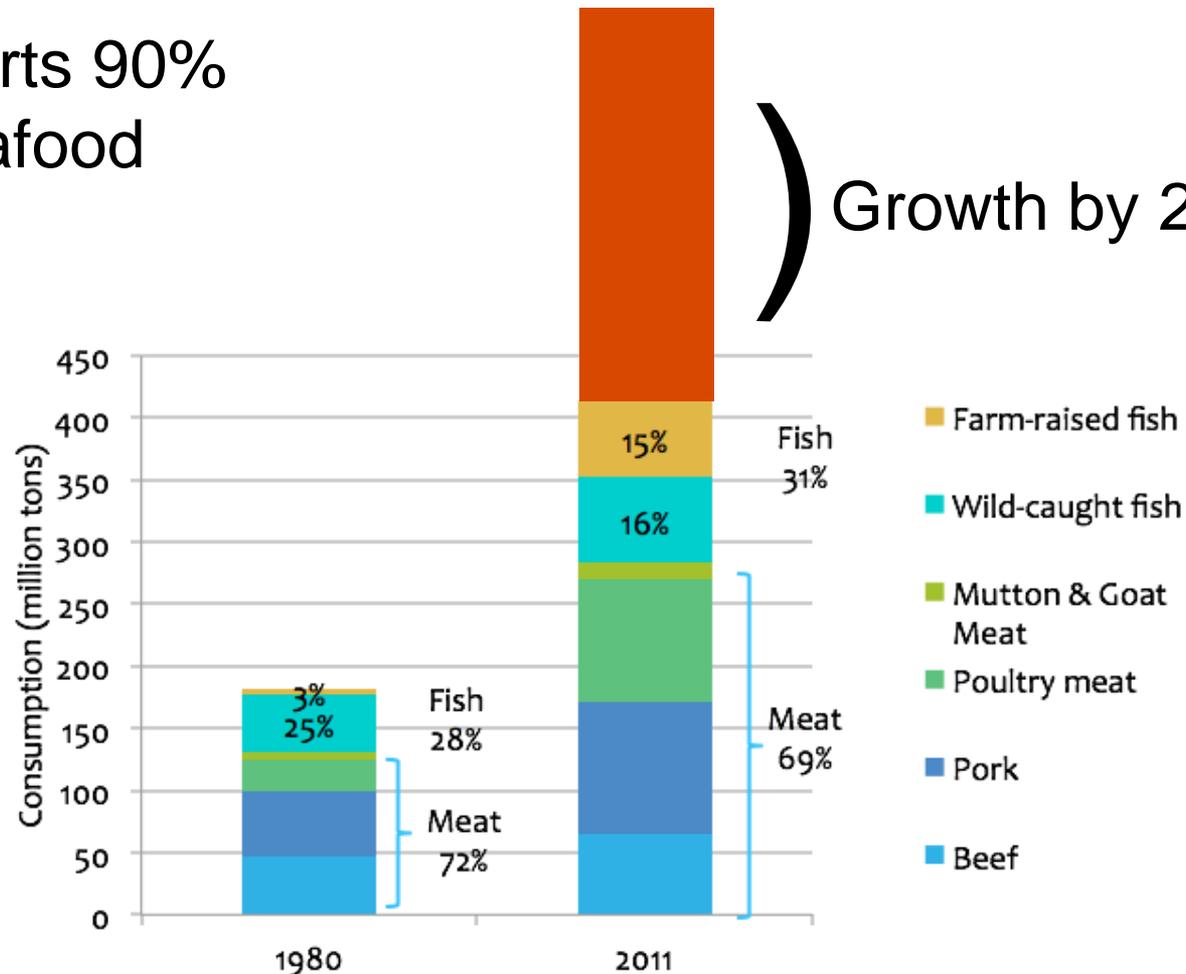


**Steve Gaines, Rebecca Gentry, Sarah Lester, Dave Tilman
Bren School of Environmental Science and Management
University of California Santa Barbara**

Two Motivations: Trade & Demand

US Imports 90%
of Seafood

) Growth by 2050

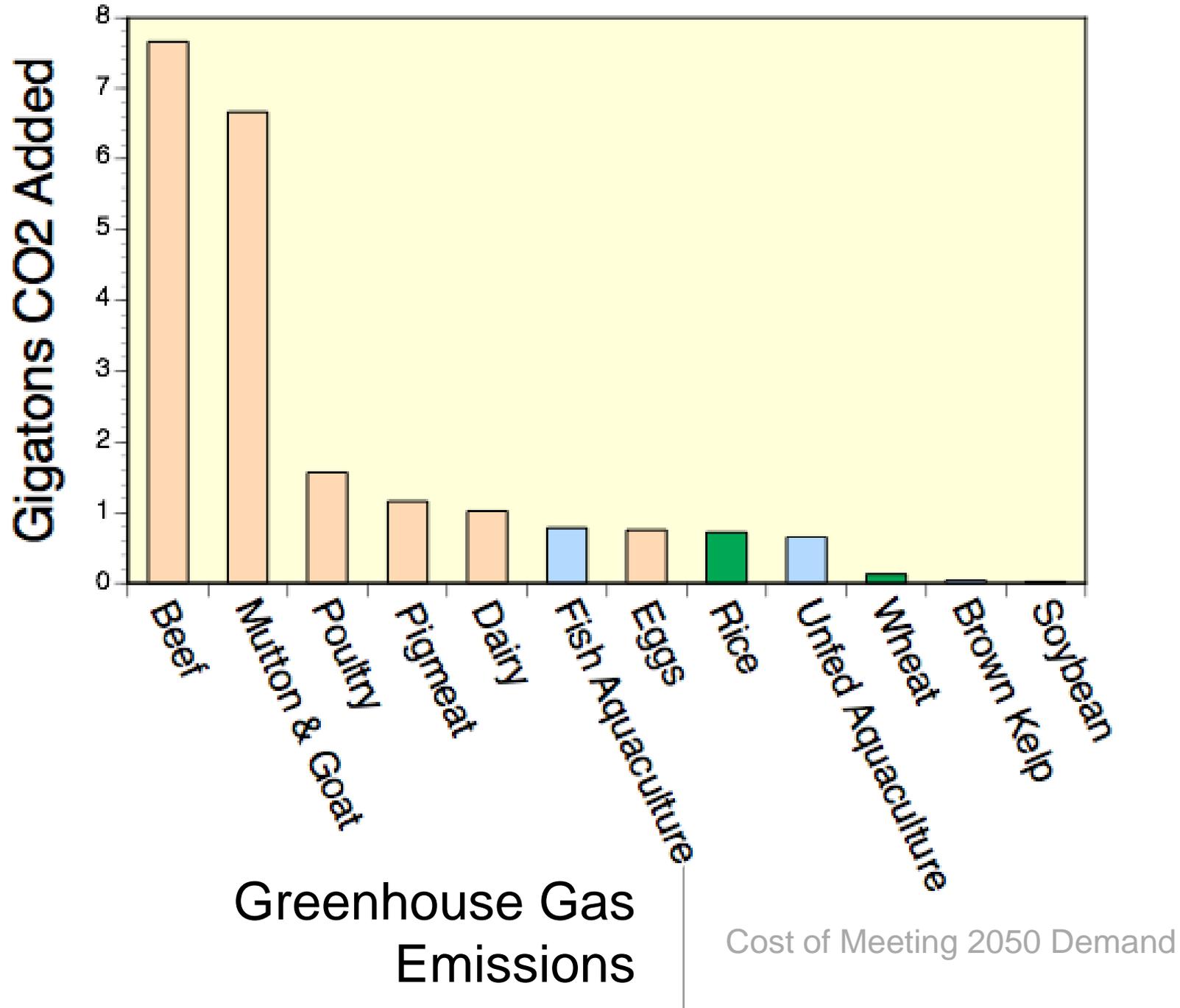


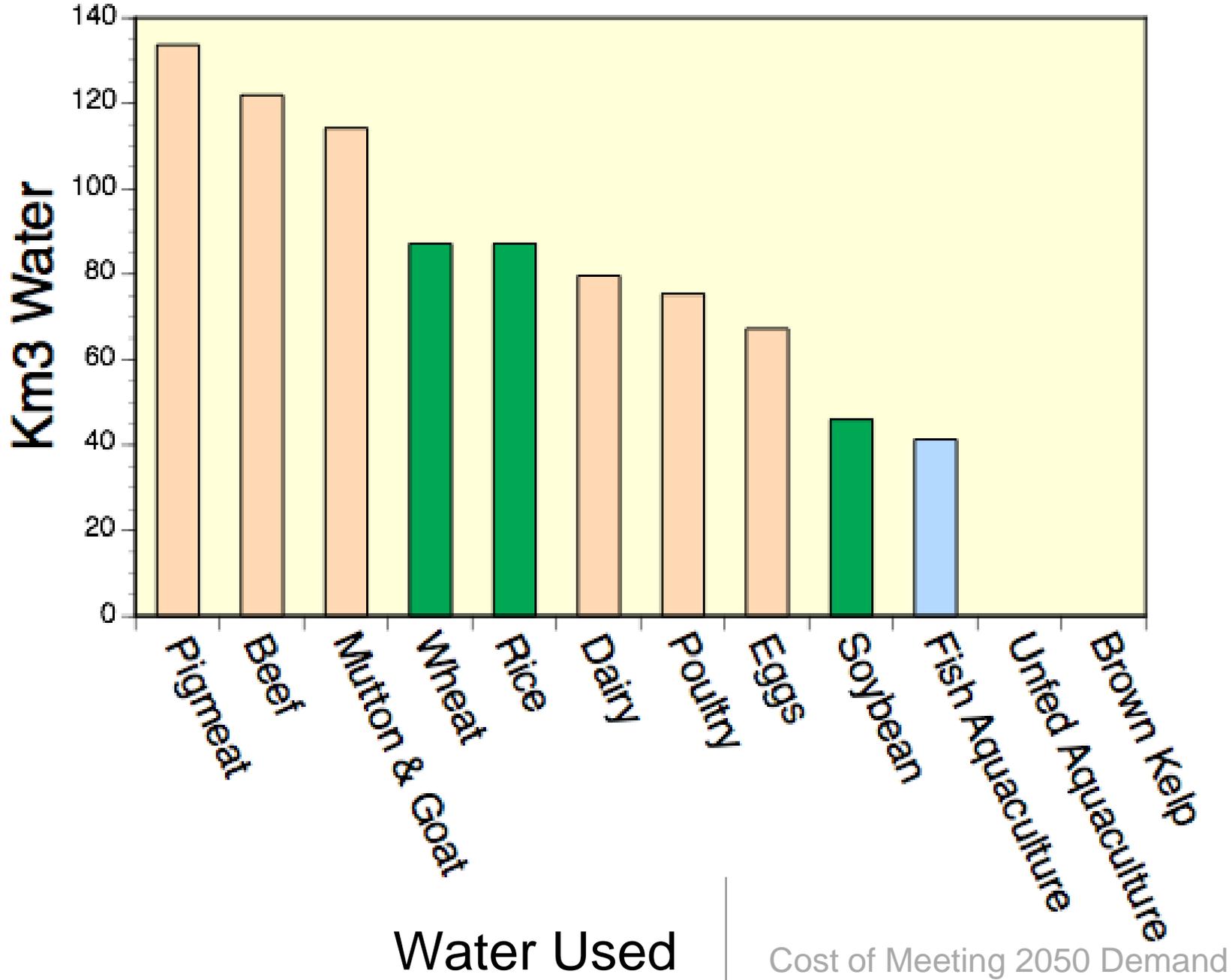
Emissions and Waste

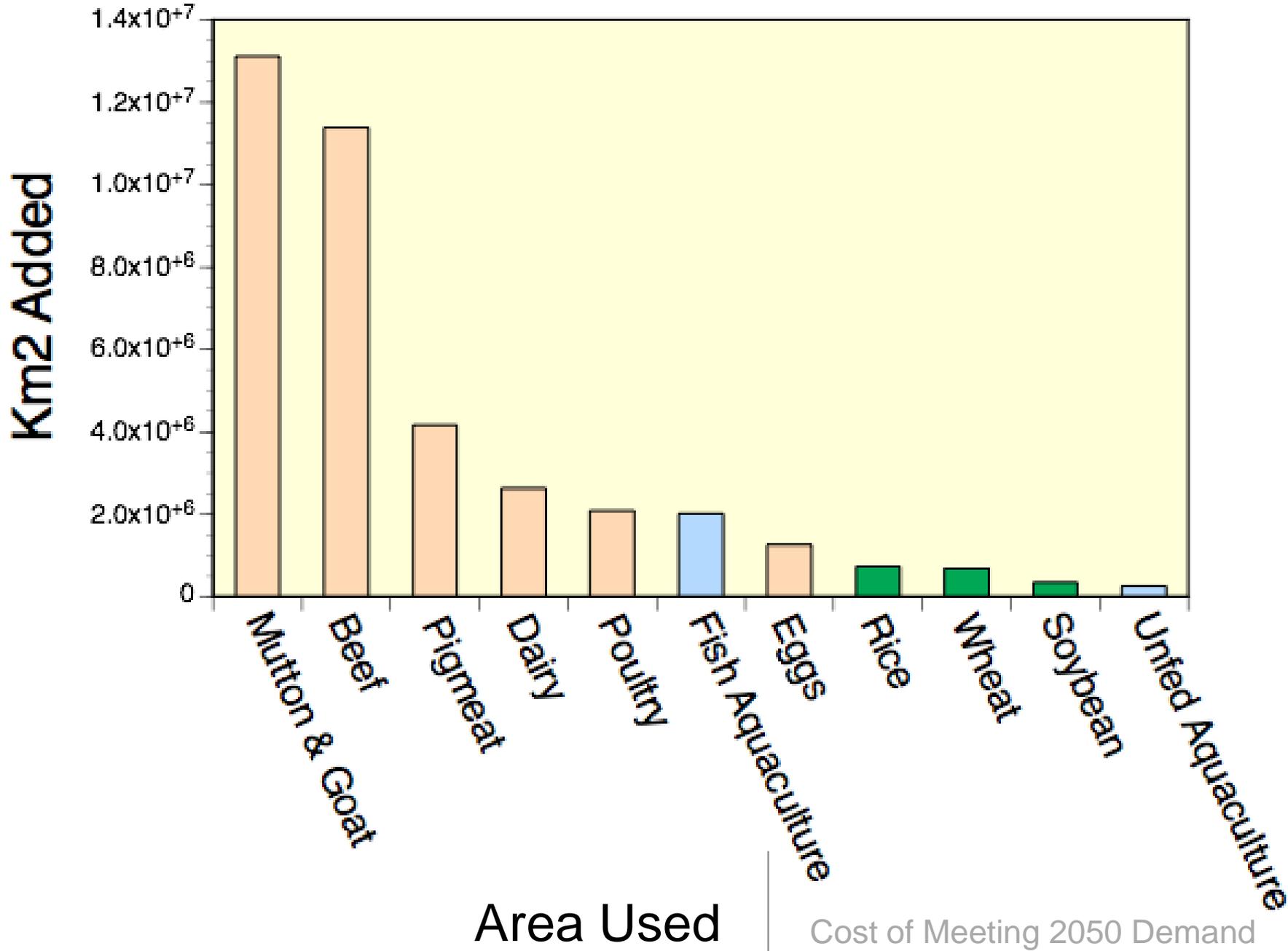
Life Cycle Phases



Energy and Resources







Coastal protection



Shipping



Fisheries



Offshore oil



MPAs



Marine Spatial Planning (MSP)
helps balance multiple ocean uses

Wave energy



Coastal property



Recreation



Wind energy



Aquaculture



Aquaculture scenarios

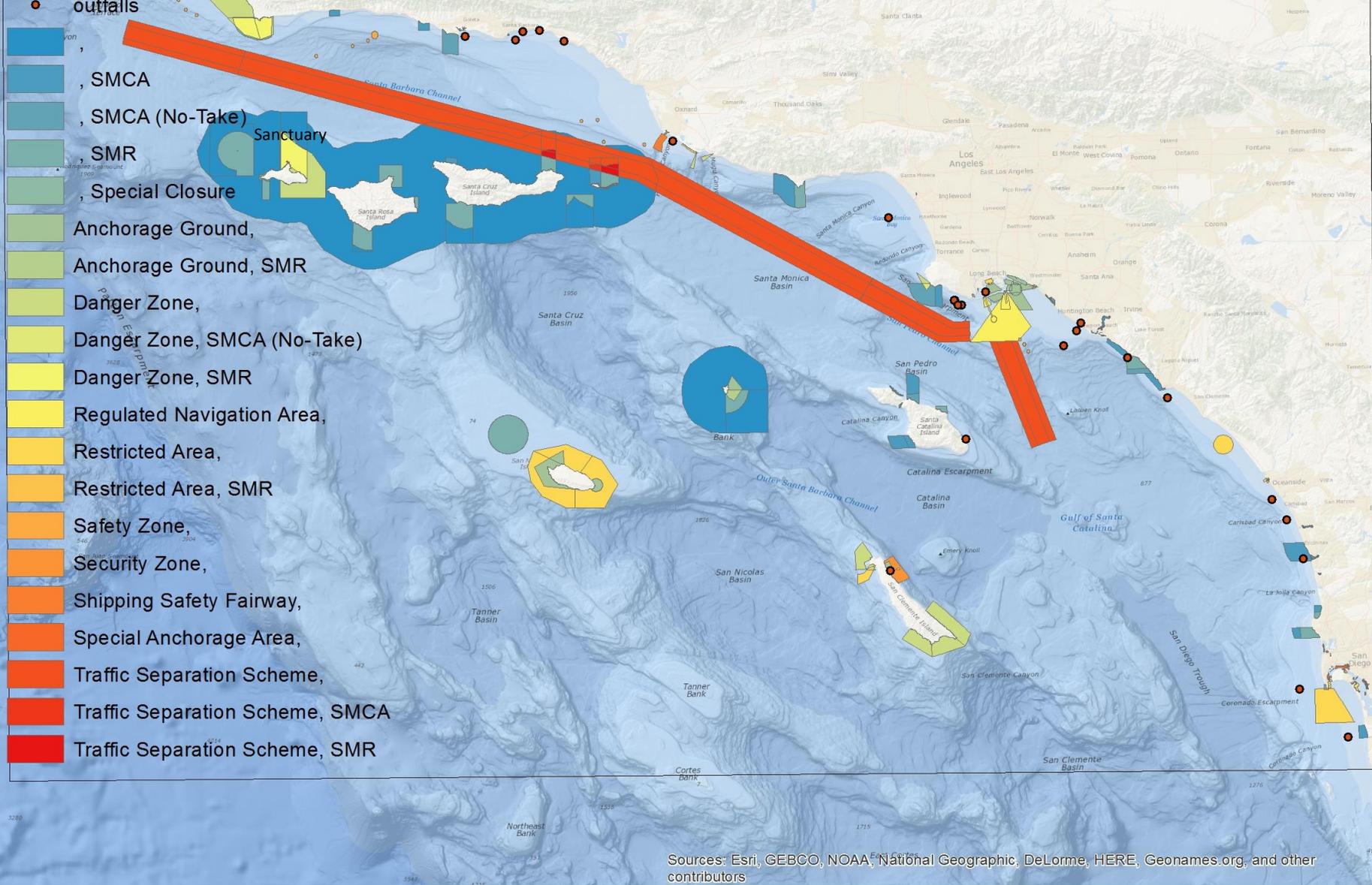
- Finfish net pens (striped bass)
- Bivalve long lines (Mediterranean mussel)
- Seaweed long lines (sugar kelp)



Legend

- study_area
- outfalls
- SMCA
- SMCA (No-Take)
- Sanctuary
- SMR
- Special Closure
- Anchorage Ground
- Anchorage Ground, SMR
- Danger Zone
- Danger Zone, SMCA (No-Take)
- Danger Zone, SMR
- Regulated Navigation Area
- Restricted Area
- Restricted Area, SMR
- Safety Zone
- Security Zone
- Shipping Safety Fairway
- Special Anchorage Area
- Traffic Separation Scheme
- Traffic Separation Scheme, SMCA
- Traffic Separation Scheme, SMR

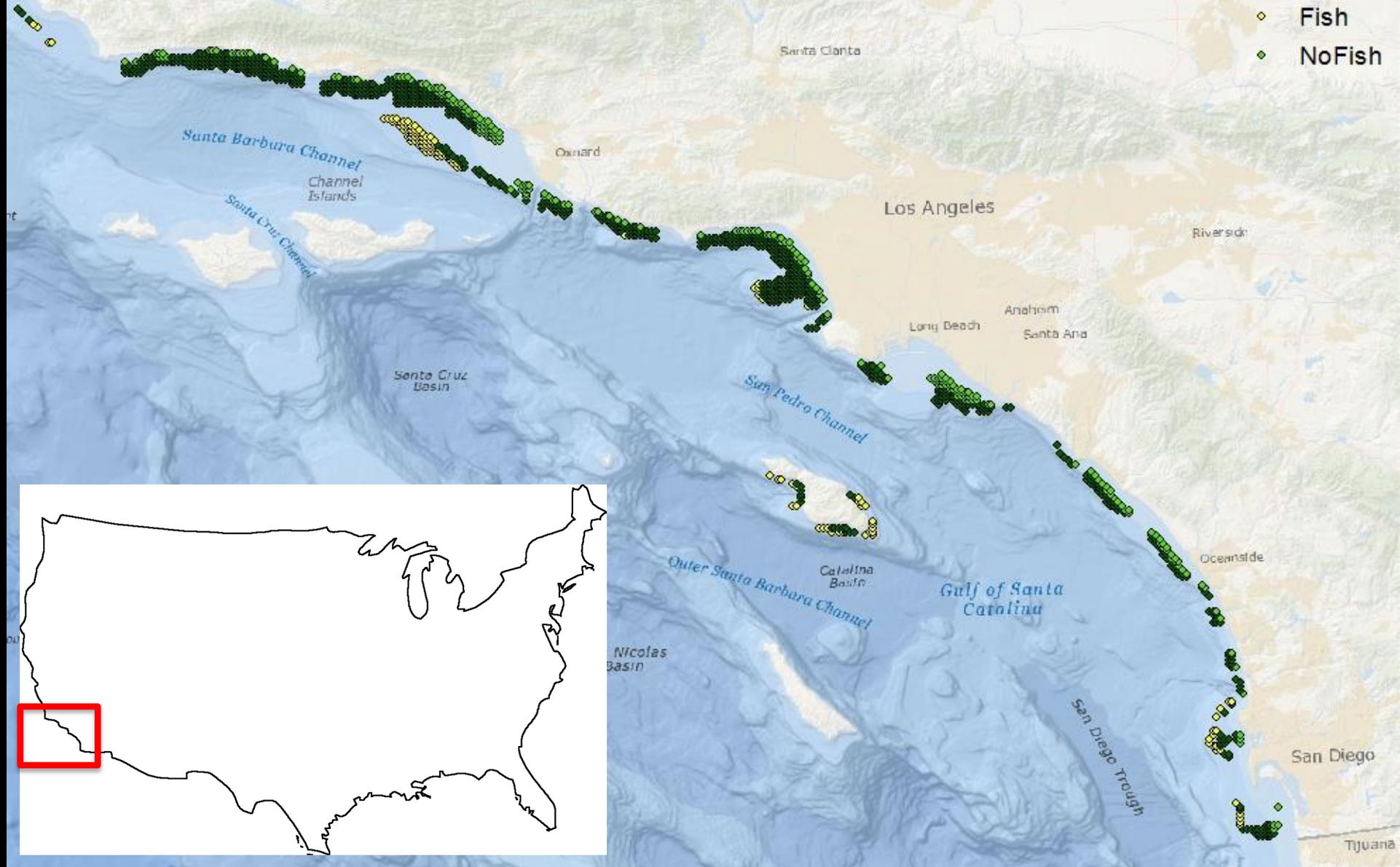
Constraints



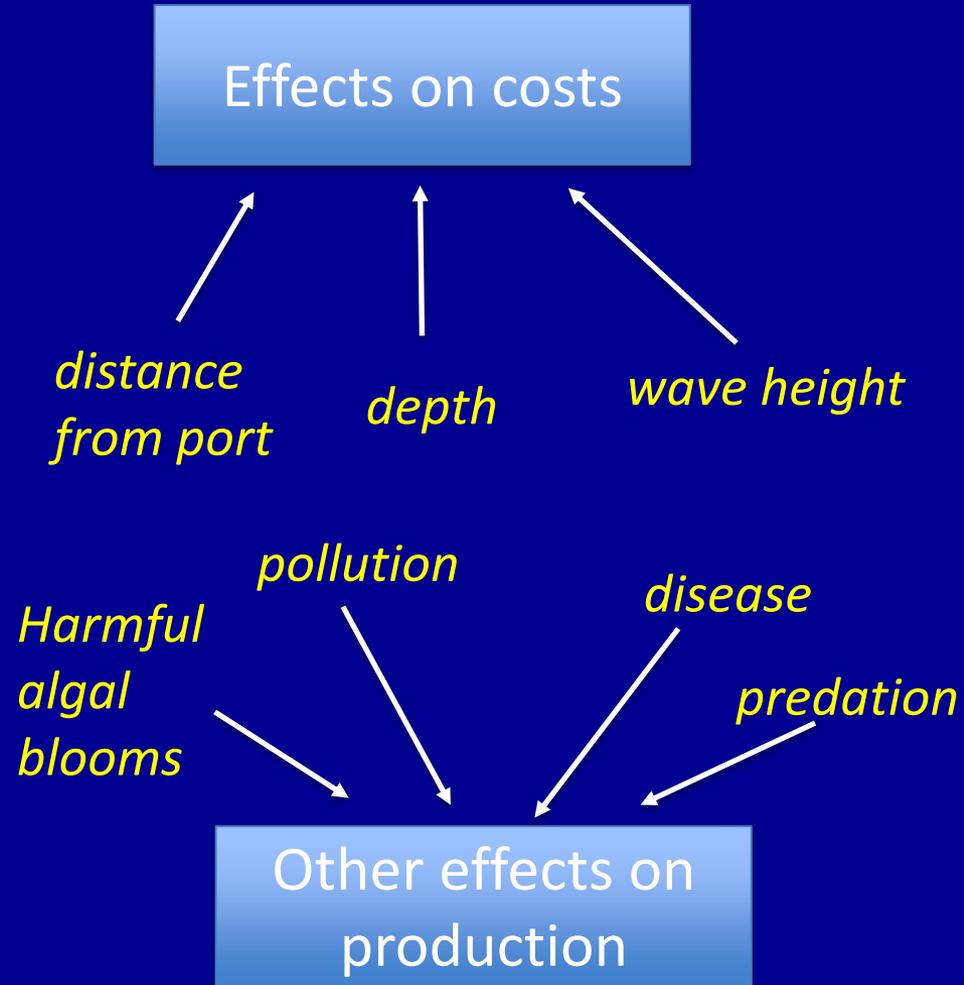
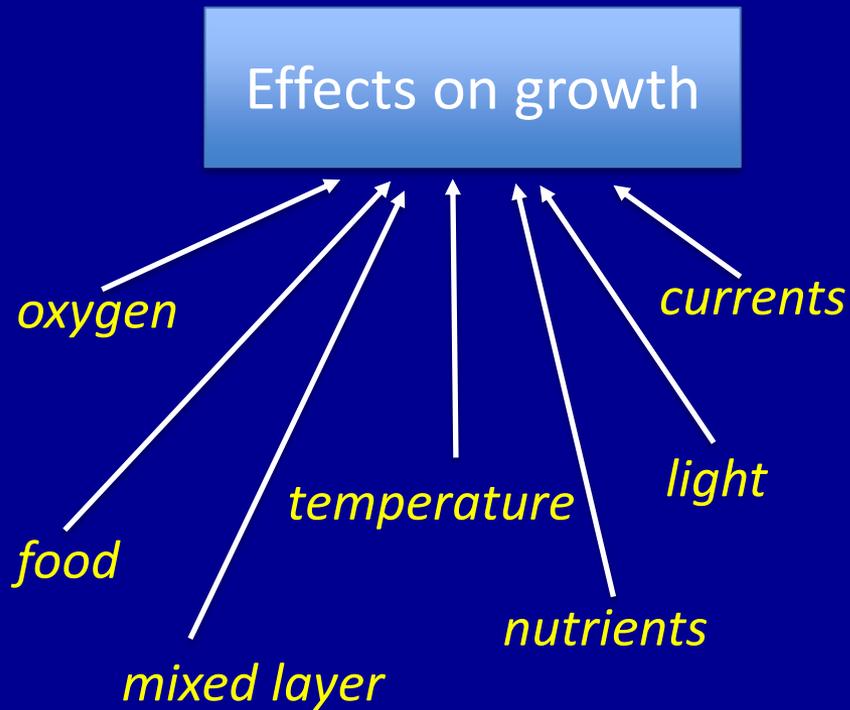
Developable areas

Legend

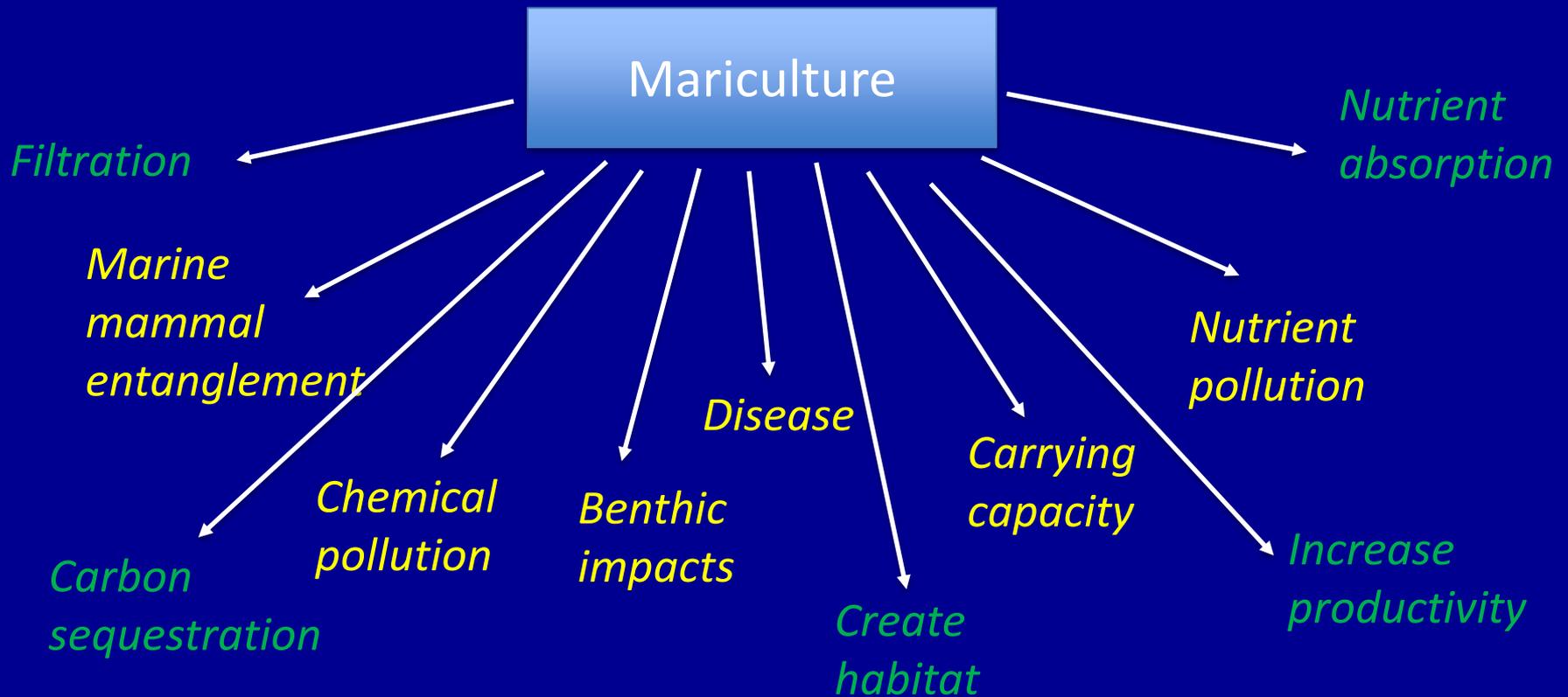
- ◆ All
- ◆ Fish
- ◆ NoFish



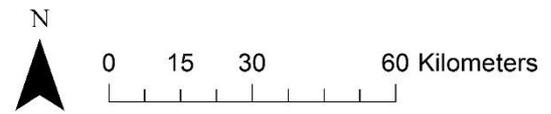
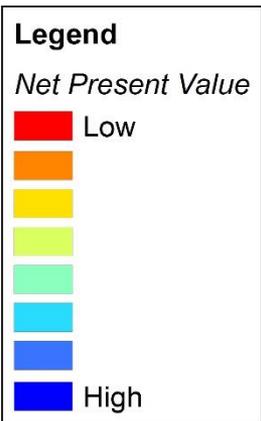
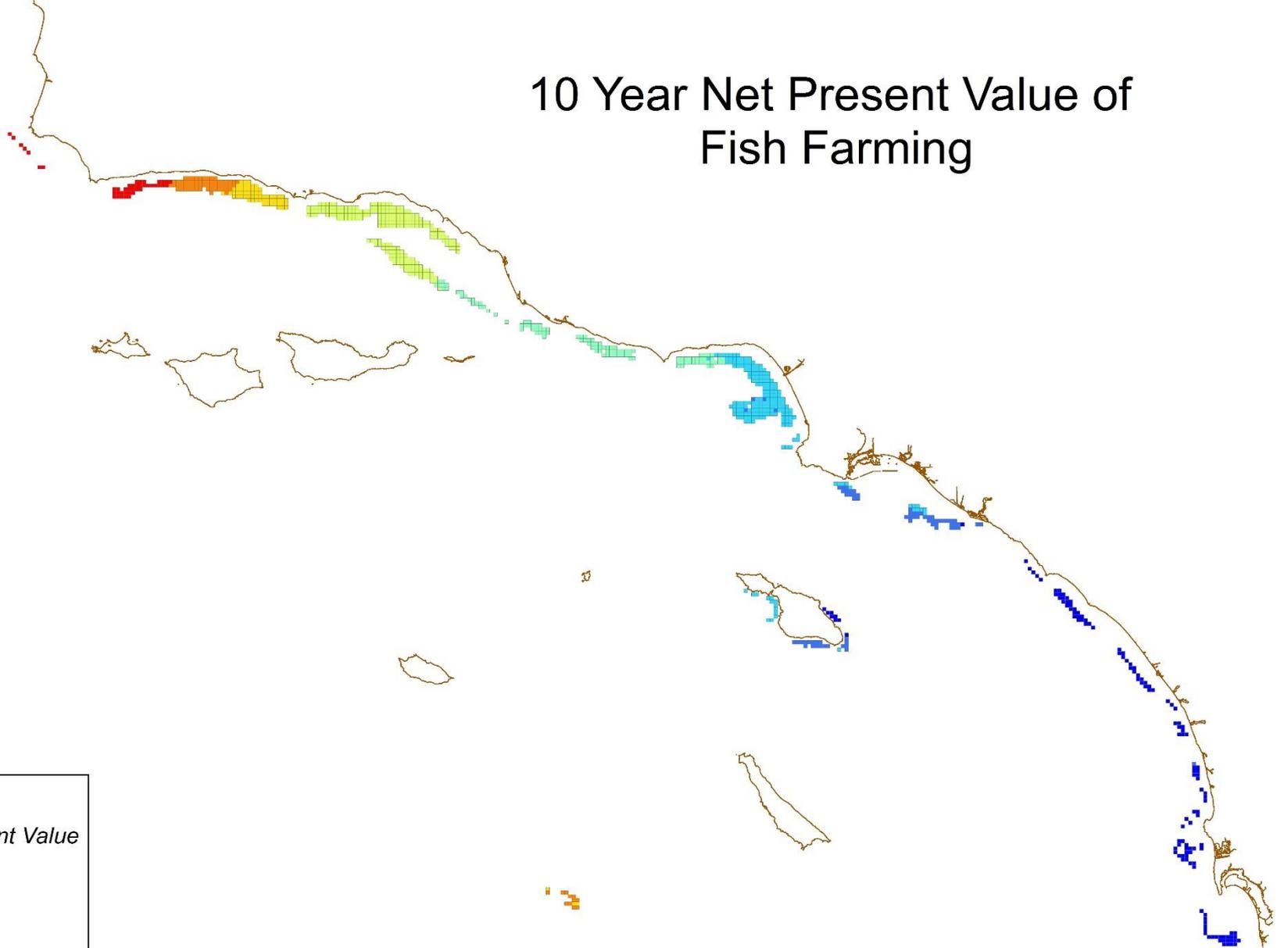
Effects of the environment on mariculture



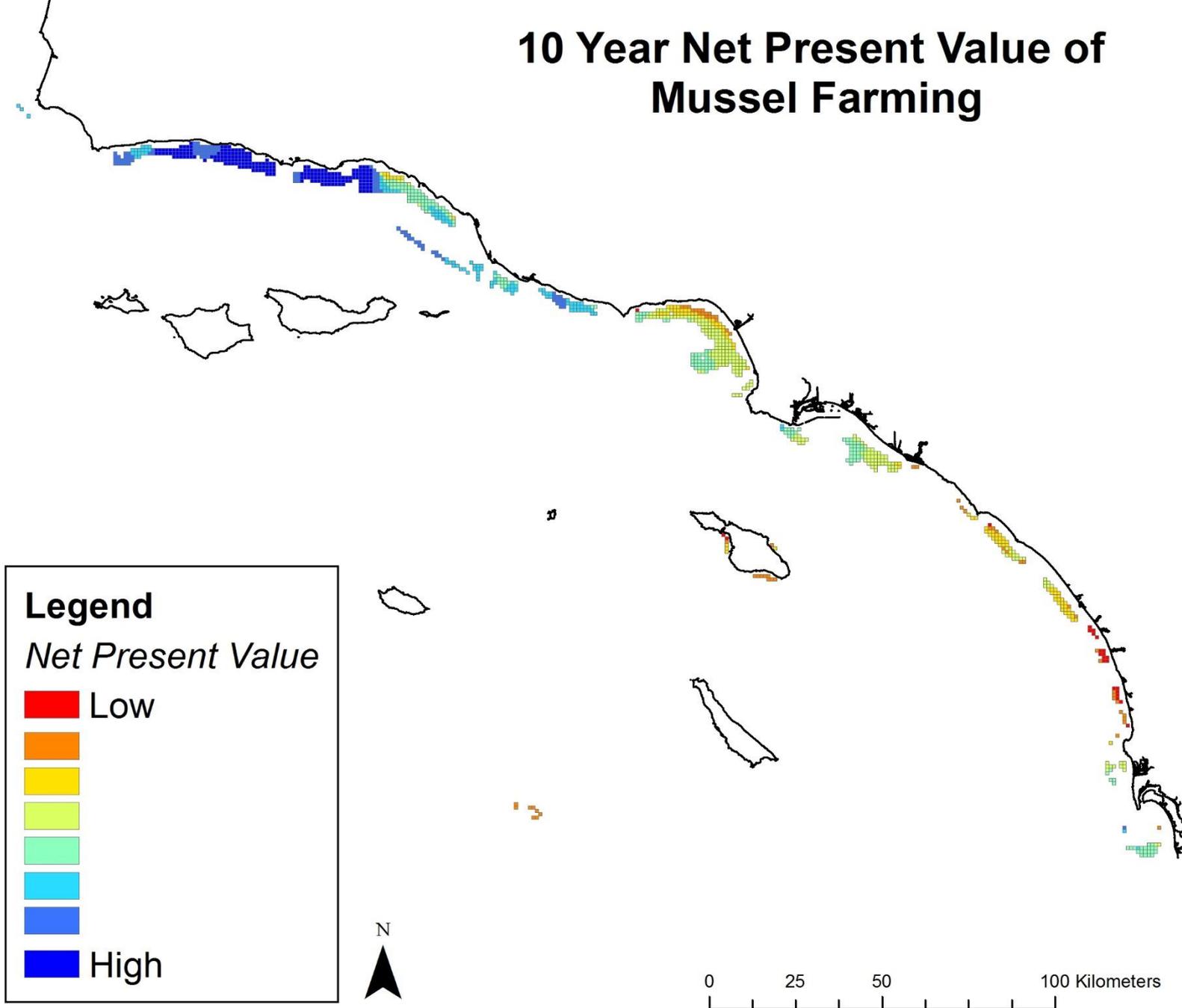
Effects of Mariculture on the Environment



10 Year Net Present Value of Fish Farming



10 Year Net Present Value of Mussel Farming



A Final Thought

By driving aquaculture to other countries that have lower environmental standards or by driving consumption to land based protein, the environmental impacts of our future protein production increase substantially. California can lead the nation and demonstrate to the world how to reduce the impact of increasing global food production.



**SUSTAINABLE
FISHERIES GROUP**

Sea Grant



**DONALD BREN SCHOOL OF
ENVIRONMENTAL SCIENCE & MANAGEMENT**
UNIVERSITY OF CALIFORNIA, SANTA BARBARA