

# 'Best Practice' Management of Trawling Effects

Bob McConnaughey  
NOAA Alaska Fisheries Science Center  
Seattle, Washington U.S.A.

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# Overview

1. Perspectives
2. Phase 5 objective
3. Best Practice concept
4. Current EoT management practices
5. Discussion

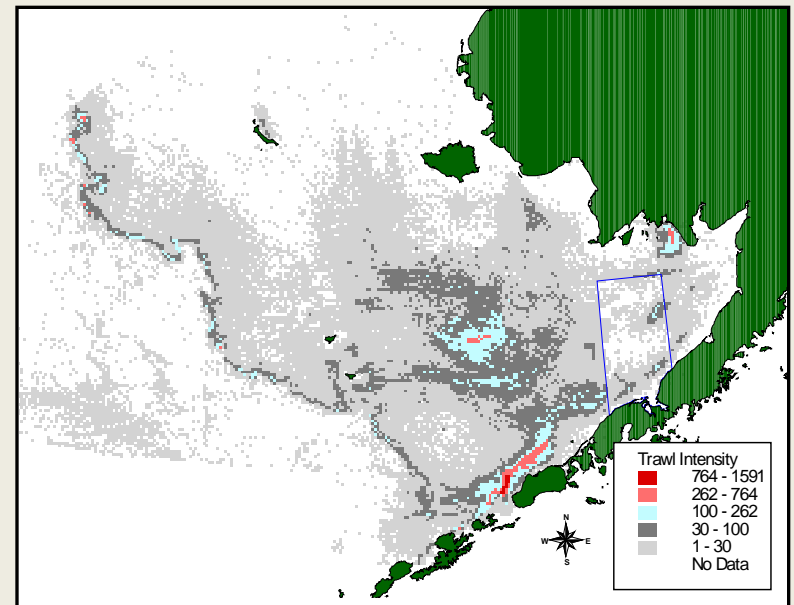
Questions any time

# Trawling Effects Are Inevitable

## Design Characteristics

- Mobile gear affects large areas
- Maintain direct contact with seafloor
- Efficiently remove organisms
- Highly adaptable for use in diverse habitat types

## Widespread Use



Widespread, recurring, spatially variable & *manageable* form of disturbance

# Do We Know Enough to Manage Trawling Effects?

## 3 Distinct Phases

1. Investigative: identify effects
2. Interpretive: ecological consequences
3. Decision-making: cost-benefit analyses

100s of investigative studies worldwide;

Very little interpretive work;

Benthic inverts – poorly understood life histories, auto- & synecology

# EoT Project – Phase 5

“Identify and **test** a range of management options and industry practices that may **improve** the **environmental performance** of **trawl** fisheries; with a view to defining ‘**best practice**’. For each option or practice, the **impact** on **biota**, sustainable food production, ecosystems and ecosystem services will be evaluated, along with changes in fuel consumption and **other** costs and impacts.”

Trawling proposal for circulation to stakeholders.pdf (Wordpress site, 6/10/13)

## Discussion

1. Trawl = all mobile fishing gear or a subset?
2. Impact = negative effect or change *per se*?
3. Biota = benthic inverts or managed populations?
4. Environmental performance = fishery harvests or benthic invert biomass/diversity?
5. Improve = any increase or ecologically meaningful?
6. *Other terms/topics?*

# “Best Practice”

Definition: a **best practice** is a method or technique that has **consistently** shown **results superior** to those achieved with other means, and that is used as a benchmark. <sup>1</sup>

## Some issues

- A BP can evolve to become better as improvements are discovered or circumstances change.
- Unlikely to be a BP for all cases. “Best” will vary with the context (“Contextual Practice”).
- The work necessary to determine and practice the *best* is rarely done.

## Discussion

1. BP = overhaul existing management system (new paradigm) or fill gaps?
2. How specific should the recommendation be (given spatial & temporal variability)?
3. Include an adaptive process to monitor performance & allow for a BP evolution?
4. *Other topics/issues?*

<sup>1</sup> From Wikipedia, the free encyclopedia

# Evidence-Based Practice

Evaluate options & implement what works based on a foundation of empirical research => more defensible / less arbitrary results than simple BP approach.

## Basic principles

- Decisions should be based on empirical research studies that are selected and interpreted according to **specific norms**. For example: (1) disregard theoretical and qualitative studies and (2) consider quantitative studies according to a narrow set of methodological & analytical **criteria** about what constitutes evidence (otherwise = “research based-practice”).
- To be defined as evidence-based, a practice must undergo sufficient scientific evaluation to be **proven effective** (e.g., strongly linked to a desired outcome).

## Iterative process

1. **ASK** client-oriented, relevant, and answerable questions about the issue.
2. **ACQUIRE** the best available evidence to answer the questions.
3. **APPRAISE** the evidence critically for validity & applicability to the problem.
4. **APPLY** the evidence through collaborative decision making with stakeholders.
5. **ANALYZE** the new practice and **ADJUST** it accordingly. Evaluate implications for future decision-making, disseminate the results, and identify needed evidence.

## Discussion

1. Define the norms & criteria for selecting and interpreting information.
2. What analytical criteria for comparing performances of the options being considered?
3. What metrics for evaluating success of the recommended practice?
4. *Other topics?*

# Current EoT Management Practices (Direct & Indirect)

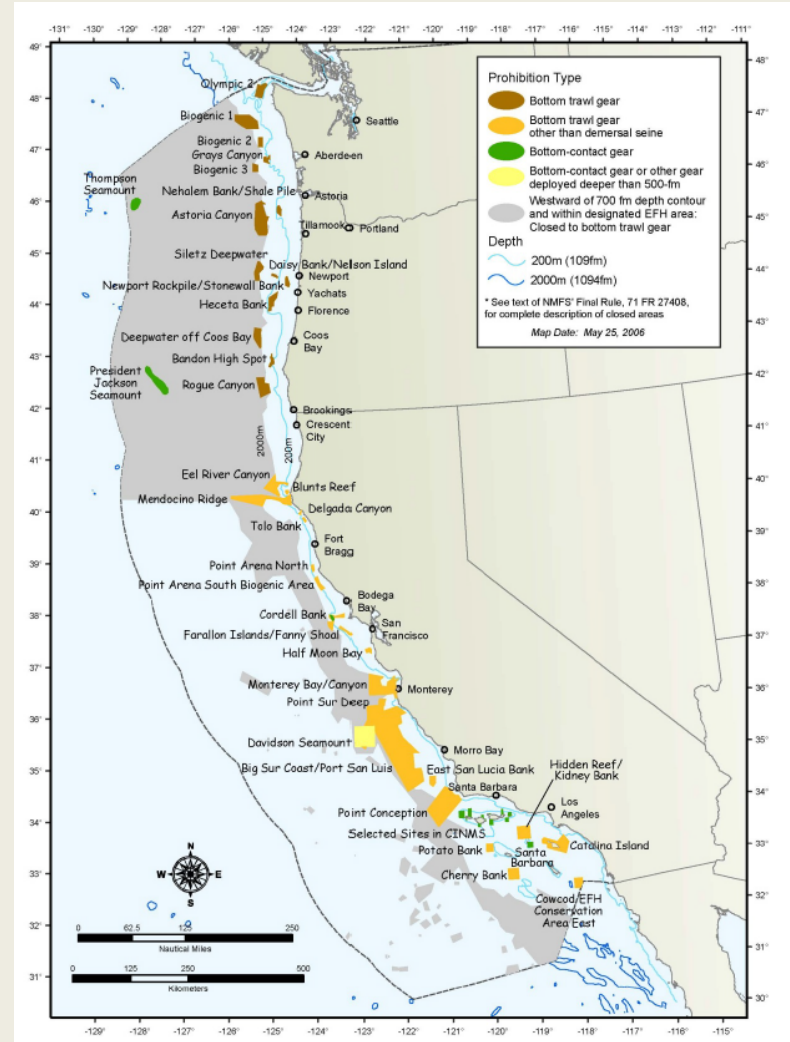
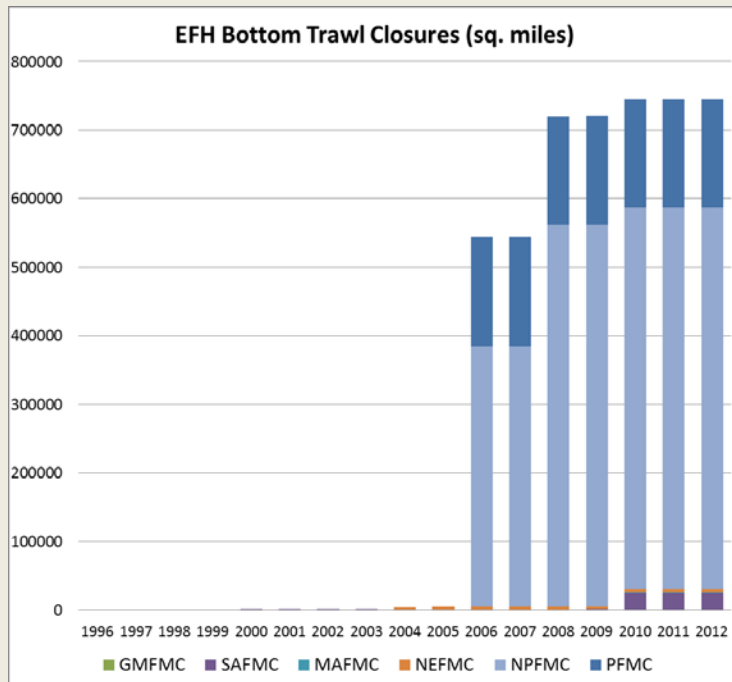
- **Fishing area restrictions**: control bycatch of prohibited species, impact on protected species (ESA), and protect sensitive benthic habitat from potential impacts due to fishing. Areas may be off-limit to certain gear types or all gear types. Some area restrictions are seasonal, whereas others have been year-round or closed when a pre-specified level of bycatch is reached.
- **Gear (footrope) restrictions**: reduce bycatch of crabs and other invertebrates by elevating the footrope.
- **Habitat protection measures**: designate important habitats to prevent decline of sustainable fisheries (EFH, HAPC), to conserve representative habitats and culturally significant sites (sanctuaries, reserves).
- **Truly precautionary**: freezing the trawl-fishery footprint, pre-emptive closures.
- Discussion – other practices to consider?



# Time - Area Closures

## Direct Measures

Protect benthic habitats from fishing gear  
 700,000 mi<sup>2</sup> protected from bottom trawling since 2005 (nationwide)  
 Ecosystem-scale, precautionary approach



# Time - Area Closures

## Indirect Measures

### Prohibited Species Catch Limits

Scope: salmon, halibut, crab

Purpose

- Limit bottom-trawl bycatch
- Minimize adverse local economic impacts

Management

- PS catch cannot be retained
- Onboard observers monitor bycatch
- Close fishery or specific high bycatch area to bottom trawling for remainder of season when PSC limit is taken

### Protected Species Conservation

Scope: threatened/endangered species (*e.g.*, marine mammals, seabirds)

Purpose

- Avoid incidental take or disturbance
- Prevent competition between fishery & PS

Management: seasonal, spatial restrictions on bottom trawling effort

Conservation & allocation measures may also limit potentially damaging activities or reduce access to sensitive areas.

# Gear Modifications to Reduce Habitat Impacts

Reduce the bottom-contact footprint/disturbance and invertebrate bycatch

## Bottom trawls:

- Proportion of the trawl contact footprint by each of the components is important (doors, footrope, bridles/sweeps).
- Elevating most of the footrope above the seabed reduces damage to netting/seafloor and bycatch of crabs and other invertebrates.
- Large-diameter rubber bobbins are separated by sections of small-diameter disks, creating openings under the footrope.

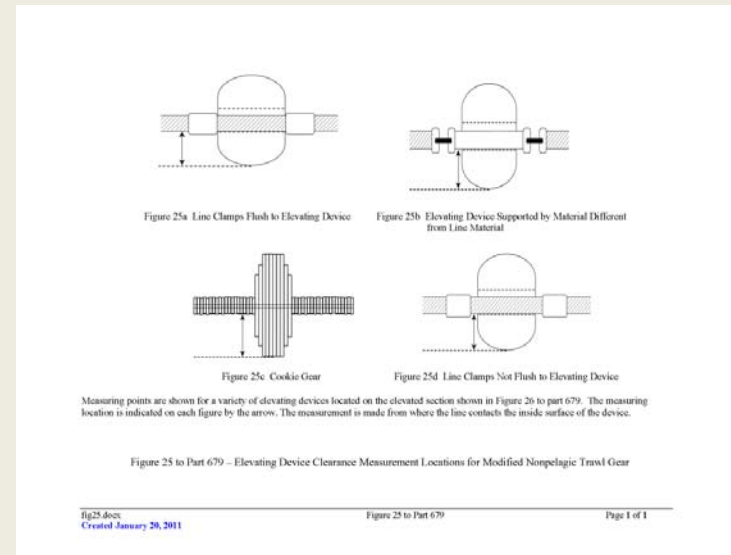


## Pelagic trawls:

- Pelagic trawls are frequently fished on the bottom in areas with smooth floors. Very large meshes are required for escape of bycatch species.
- Seafloor contact is discouraged by prohibiting devices that protect trawl footropes .

Dredges: minimum ring size diameter to allow undersized scallops (and invertebrate) bycatch to escape.

Pots: regulations require that each pot has its own buoyed line, so there are no underwater lines connecting adjacent pots (longlining). Minimizes dragging disturbances during setting and retrieval.



# Habitat Management – *Essential* Fish Habitat

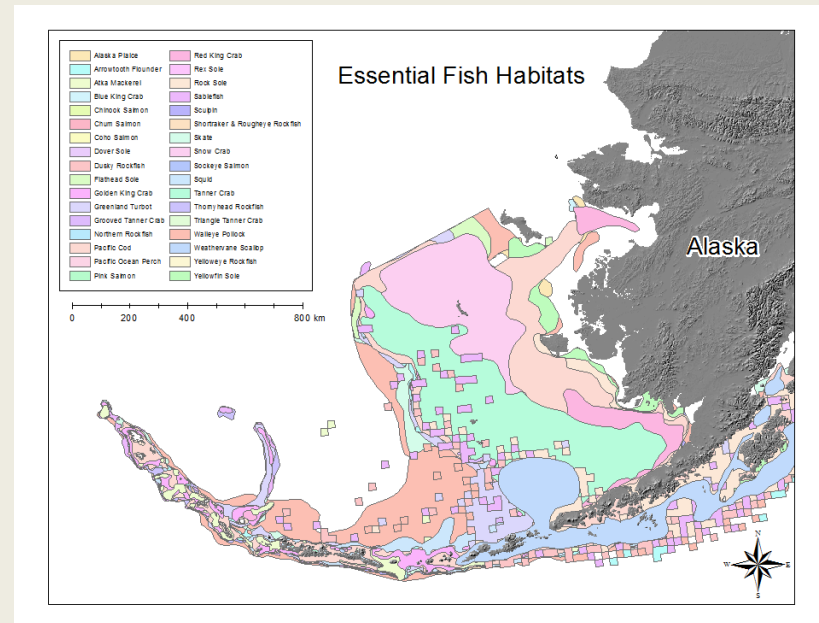
*“those waters & substrate necessary to fish for spawning, feeding or growth to maturity”*



Sutter & Hourigan, MONF-3, 5/8/13

Designations required for all managed species and all life history stages.

Minimize adverse impacts “to the extent practicable”.



<http://www.alaskafisheries.noaa.gov/habitat/efh/efhshp/default.htm>

Limited utility when everywhere is EFH

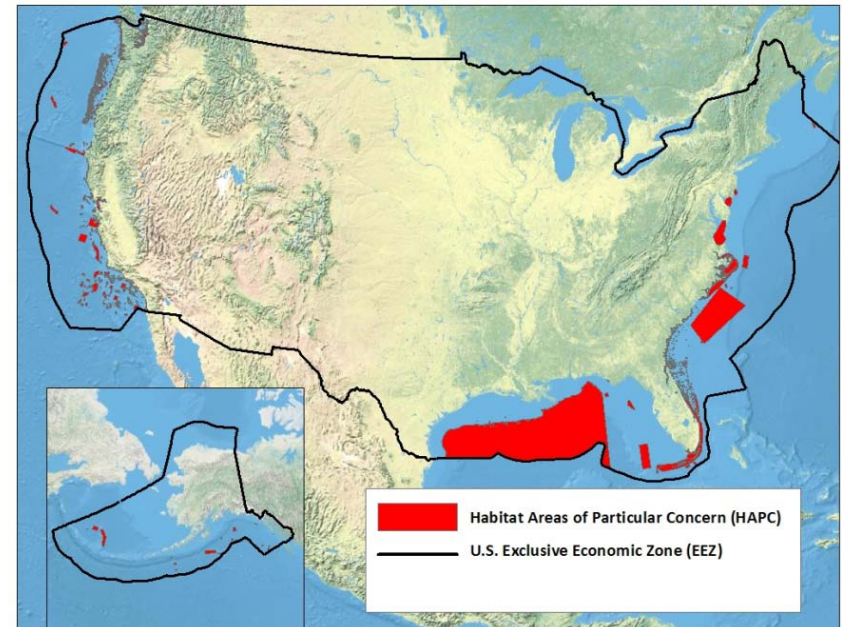
# Habitat Management – Habitat Areas of Particular Concern

HAPCs are meant to provide greater focus to conservation and management efforts and may require additional protection from adverse effects.

FMPs should identify specific types or areas of habitat within EFH as HAPCs based on one or more of the following considerations:

1. the importance of the ecological function provided by the habitat;
2. sensitivity to human-induced environmental degradation;
3. vulnerability to stress from development activities; or
4. the rarity of the habitat type.

>100 HAPCs designated



Sutter & Hourigan, MONF-3 (5/8/13)

Alaska: 22 locations (10,614 nm<sup>2</sup>) - no federally permitted vessel may fish with (mobile) bottom contact gear.

# Habitat Management – National Marine Sanctuaries and Marine National Monuments

## Conservation objectives

- Natural heritage: sustain, conserve, restore, and understand the protected area's natural biodiversity, populations, communities, habitats, and ecosystems.
- Cultural heritage – protect and understand submerged cultural resources.
- Sustainable production – support continued extraction of renewable living resources.

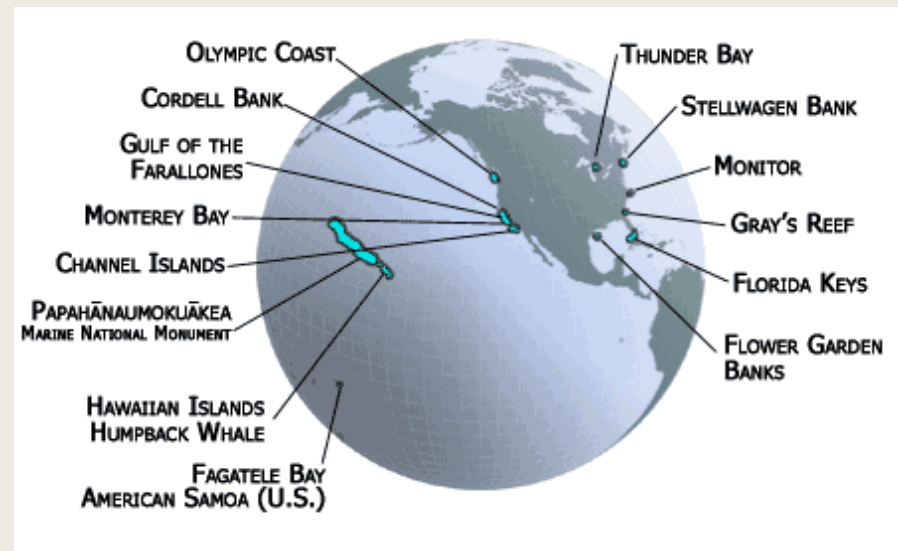
## Regulatory tools

Regulations, permitting, incident response and contingency planning, damage assessment and restoration, and enforcement.

## Levels of protection

- Uniform Multiple-Use
- Zoned Multiple-Use
- Zoned Multiple-Use With No-Take Area(s)
- No-Take
- No Impact
- No Access

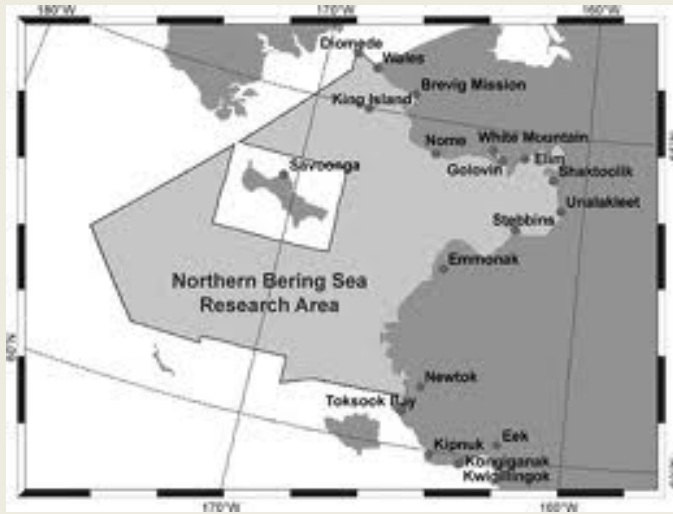
## 14 sites designated



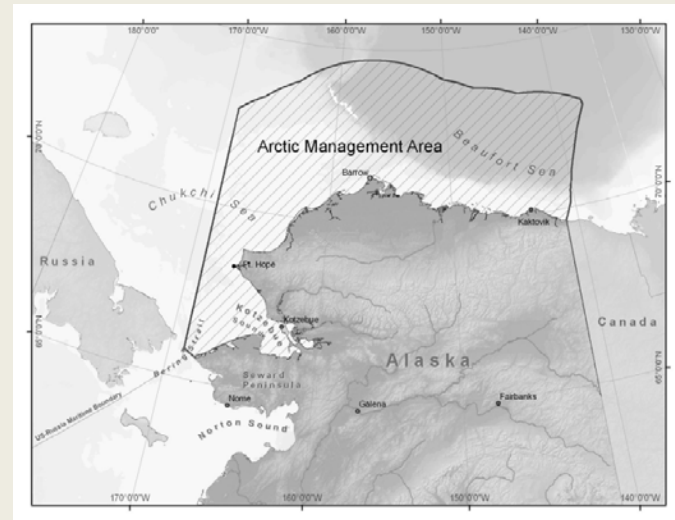
<http://sanctuaries.noaa.gov>

**De facto MPAs:** established for reasons other than conservation or natural resource management (e.g. safety, navigation) but limit potentially damaging activities or reduce access to sensitive areas (1,234 DFMPAs = 3% U.S. waters in 2005).

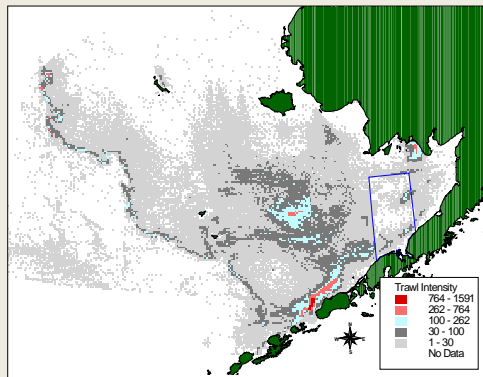
# Habitat Management – Truly Precautionary



NBSRA closed to bottom trawling (2008); research plan developed to inform future decisions about bottom trawling there.

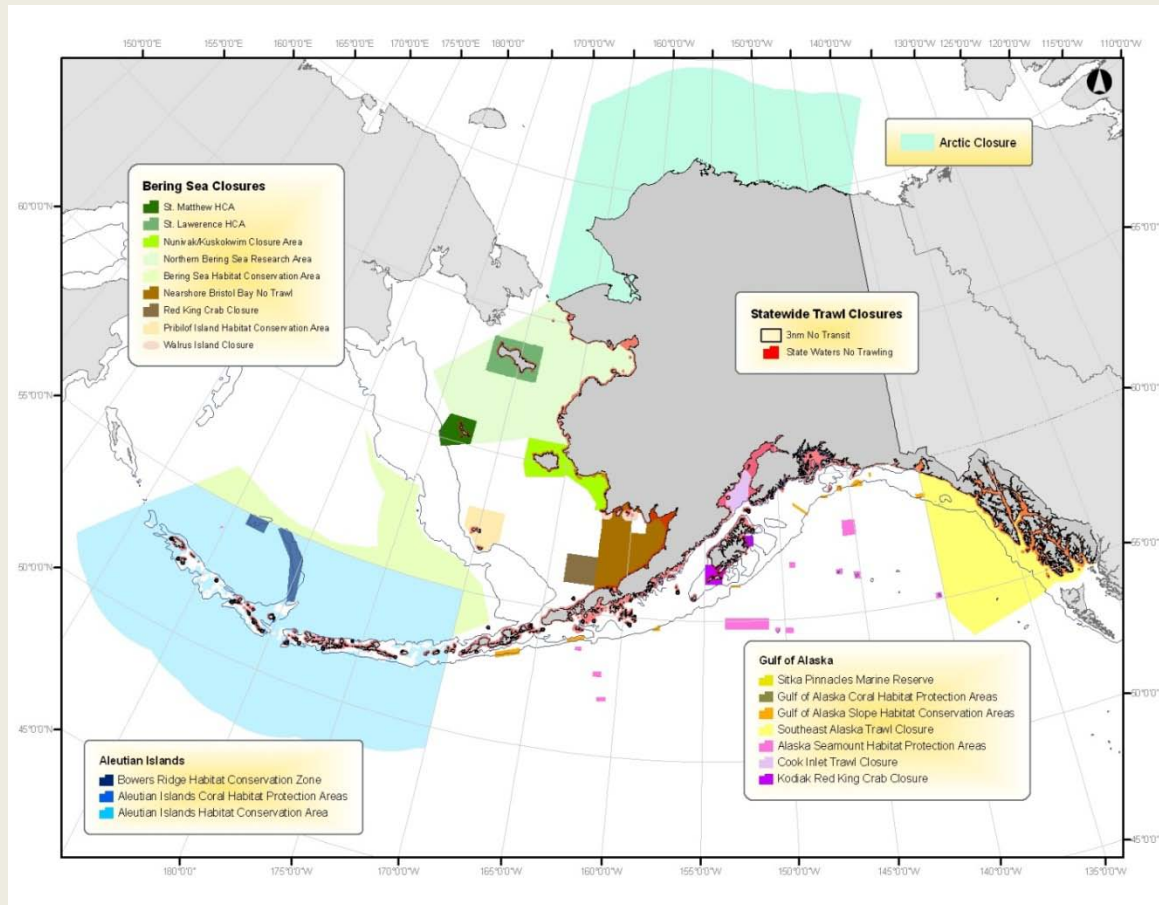


The Arctic Management Area closed to commercial fishing until info is available to plan for fishery development (2009).



Footprint of bottom trawling in Bering Sea frozen to conserve benthic fish habitat (2008).

# EFH Areas Protected from Fishing U.S. North Pacific



Very complex regulatory environment – diverse levels of protection over a variety of time scales with different degrees of effectiveness.



# Potential for Direct Incentives To Reduce Impacts

## Regulatory measures/tools

1. Increased quota?
2. Greater access?
  - Exempted Fishing Permits - issued to individuals for the purpose of conducting research (*e.g.*, testing modified gear) or other fishing activities using private vessels

## Voluntary measures

1. Market-based incentives (Costco agriculture example)
2. Industry programs
  - “Sea State” – use raw daily bycatch data from observers to identify hotspots and redirect effort
  - Provide specific guidance rather than blanket condemnations (TRAWLEX experience after 1996 F/T campaign)

# Discussion

### **Phase 5 goal SLIDE 5**

1. Terminology
  - a. Trawl = all mobile fishing gear or a subset?
  - b. Impact = negative effect or change *per se*?
  - c. Biota = benthic inverts or managed populations?
  - d. Environmental performance = fishery harvests or benthic invert biomass/diversity?
  - e. Improve = any increase or ecologically meaningful?
  - f. *Other terms/topics?*
2. Scope **SLIDES 4, 6**
  - a. Are we knowledgeable enough to manage EoTs?
  - b. BP = overhaul existing management system (new paradigm) or fill gaps?
  - c. How specific should the recommendation be (given spatial & temporal variability)?
  - d. Include a process to monitor performance & allow for adaptive evolution?
  - e. *Other topics/issues?*

### **Range of best practices to consider SLIDE 8**

1. Others direct/indirect management options to consider?
2. Exclude any in particular? (*e.g.*, gear modifications – minimize what??)
3. *Other topics?*

### **Methods for evaluation SLIDE 7**

1. BP or Evidence-Based Practice?
2. Define the norms & criteria for selecting and interpreting information.
3. What analytic criteria to compare performances of the options being considered?
  - a. How account for location, methodological, etc. differences?
  - b. What common currency for myriad +/- effects?
  - c. Use a scoring matrix – what weighting for the factors?
4. What metrics for evaluating success of the recommended practice (follow-up)?
5. *Other topics?*

### **Potential for direct incentives to reduce impacts SLIDE 17**

1. More ideas!

