

Economic Models

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Purpose of presentation

- To explain the role of economics in the TRT process
 - An economist's view of Take Reduction
 - Example for one species, one fishery

An Economist's View

- Economics links science and management
- Economics = tradeoffs
- Optimize for efficiency

White-sided Dolphins PBR=379, ZMRG=38

<u>Gear</u>	<u>Total Mortality</u>
Gillnet	24
Trawl	173
<u>Total Mortality</u>	<u>197</u>

White-sided Dolphins PBR=379, ZMRG=38

<u>Gear</u>	<u>Region</u>	<u>Total Mortality</u>
Gillnet	NE	24
Trawl	NE	131
	Mid-Atlantic	40
	GOM/GB	2
<u>Total Mortality</u>		<u>197</u>

White-sided Dolphins PBR=379, ZMRG=38

<u>Gear</u>	<u>Region</u>	<u>Fishery</u>	<u>Total Mortality</u>
Gillnet	NE		24
Trawl	NE	Bottom	130
		Mid-water	1
	Mid-Atlantic	Bottom	25
		Mid-water	15
	GOM/GB	JV Herr	2
Total Mortality			197

White-sided Dolphins PBR=379, ZMRG=38

<u>Gear</u>	<u>Region</u>	<u>Fishery</u>	<u>Total Mortality</u>	<u>81% Reduction</u>
Gillnet	NE		24	5
Trawl	NE	Bottom	130	25
		Mid-water	1	0
	Mid-Atlantic	Bottom	25	5
		Mid-water	15	3
	GOM/GB	JV Herr	2	0
Total Mortality			197	38

An Economist's View

Maximize the

Present Value of

Net Benefits

for Society

Subject to constraints

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An Economist's View

➤ What are Net Benefits?

$$\text{Net Benefits} = \text{Total Benefits} - \text{Total Costs}$$

An Economist's View

- What are the Benefits of a TRP?
 - Reduced takes of protected species
 - Valued by public
 - Non-use value
 - Hard to measure

An Economist's View

- What are the Costs of a TRP?
 - Need to consider:
 - Consumers and producers (industry)
 - Direct and indirect costs

An Economist's View

- What are the Costs of a TRP?
 - Need to consider:
 - Consumers and producers (industry)
 - Direct and indirect costs
 - Cost to producers is reduced profit
$$\text{Profit} = \text{Revenues} - \text{Variable Costs} - \text{Fixed Costs}$$
 - Focus on trip revenues and variable costs

An Economist's View

- Our objective

Max PVNB s.t. constraints

- Requires knowledge of the range of alternatives

An Economist's View

- What will we do?
 - Rank benefits
 - Focus on minimum cost for given reduction

An Economist's View

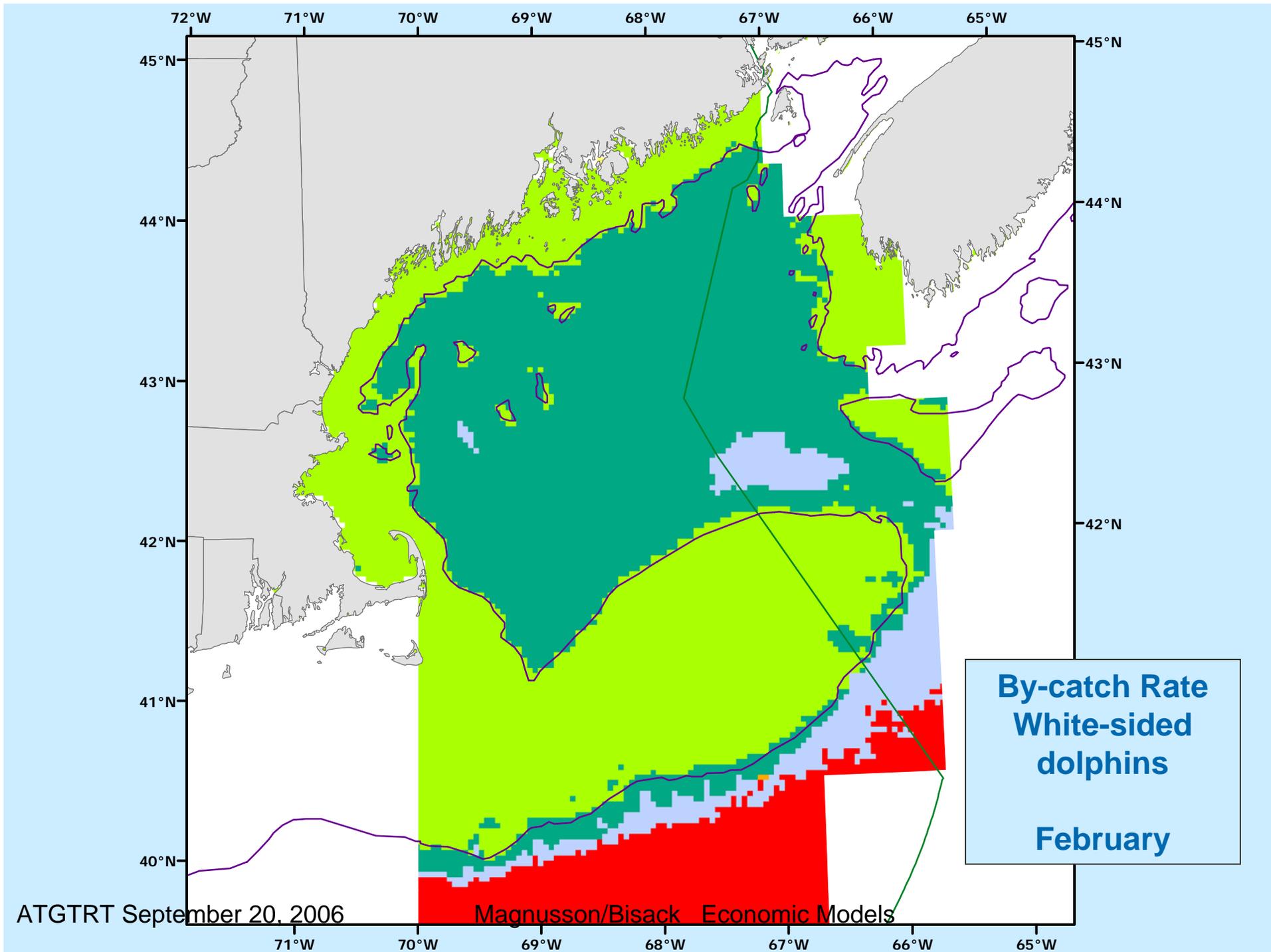
- For equity need to consider impacts by:
 - Fishery (FMP/species)
 - Size of vessels
 - Ports of landings and home port

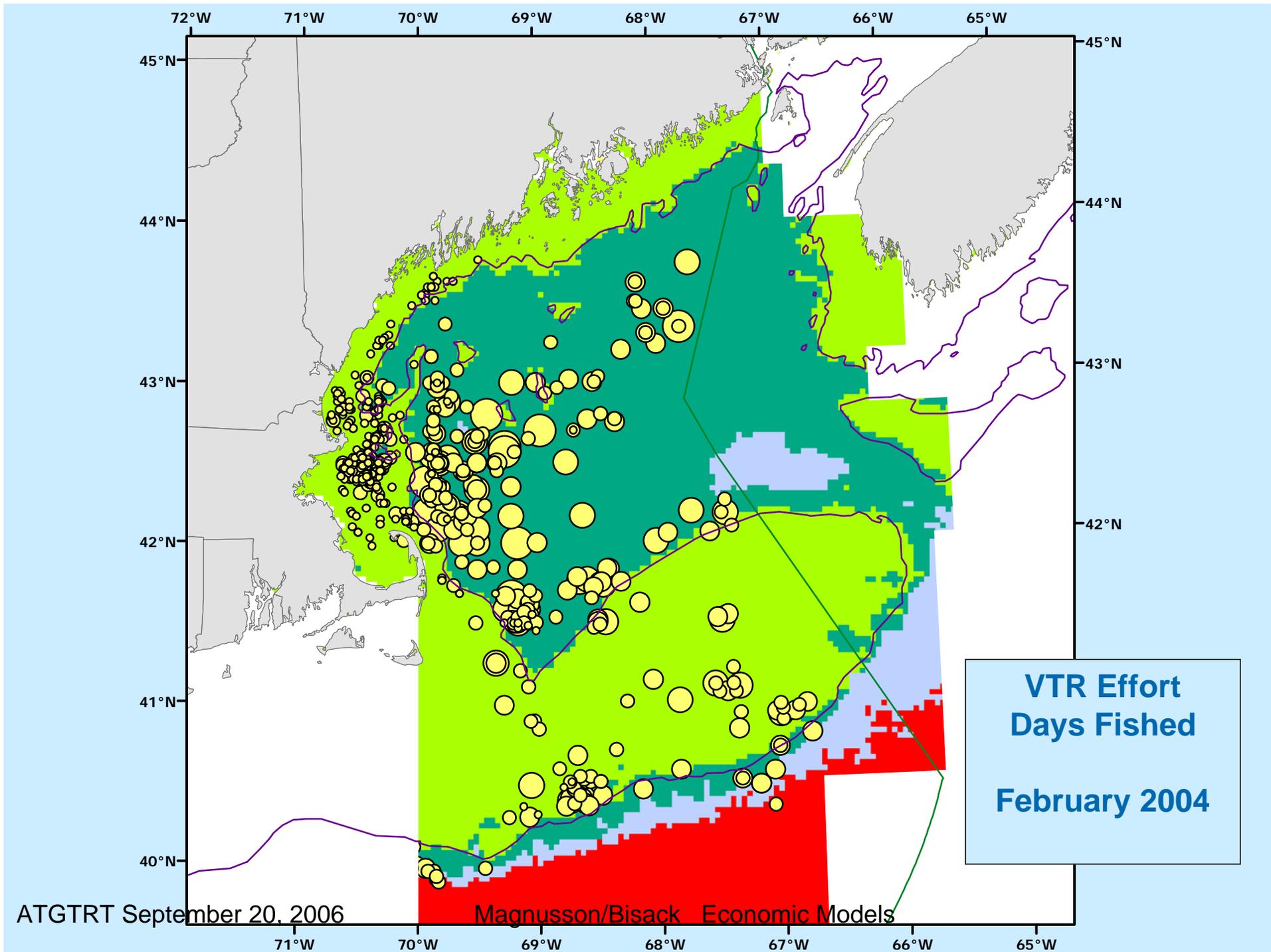
Example

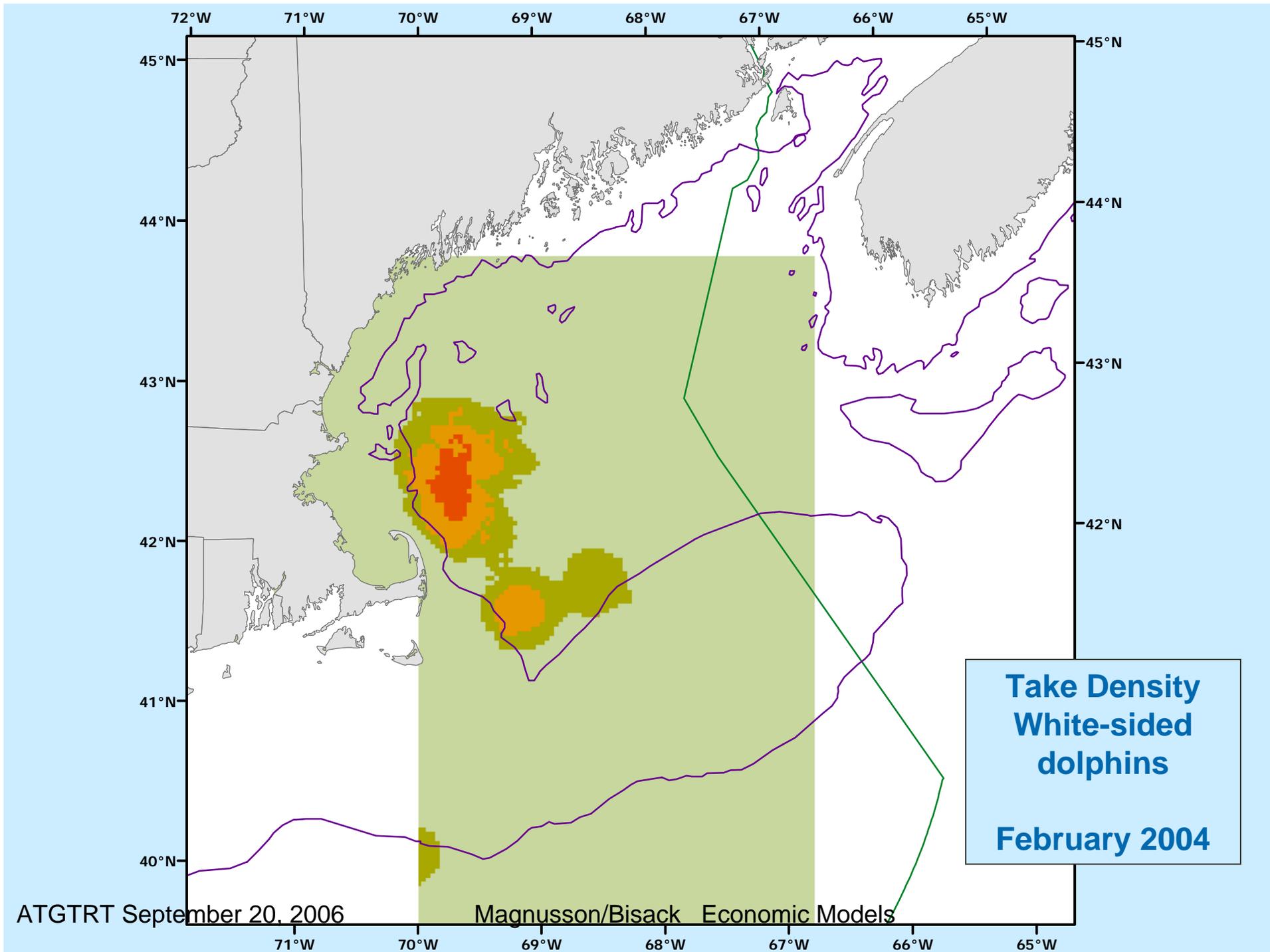
- Single species – white-sided dolphins
- Single fishery – Northeast bottom trawl
- Single month – February 2004

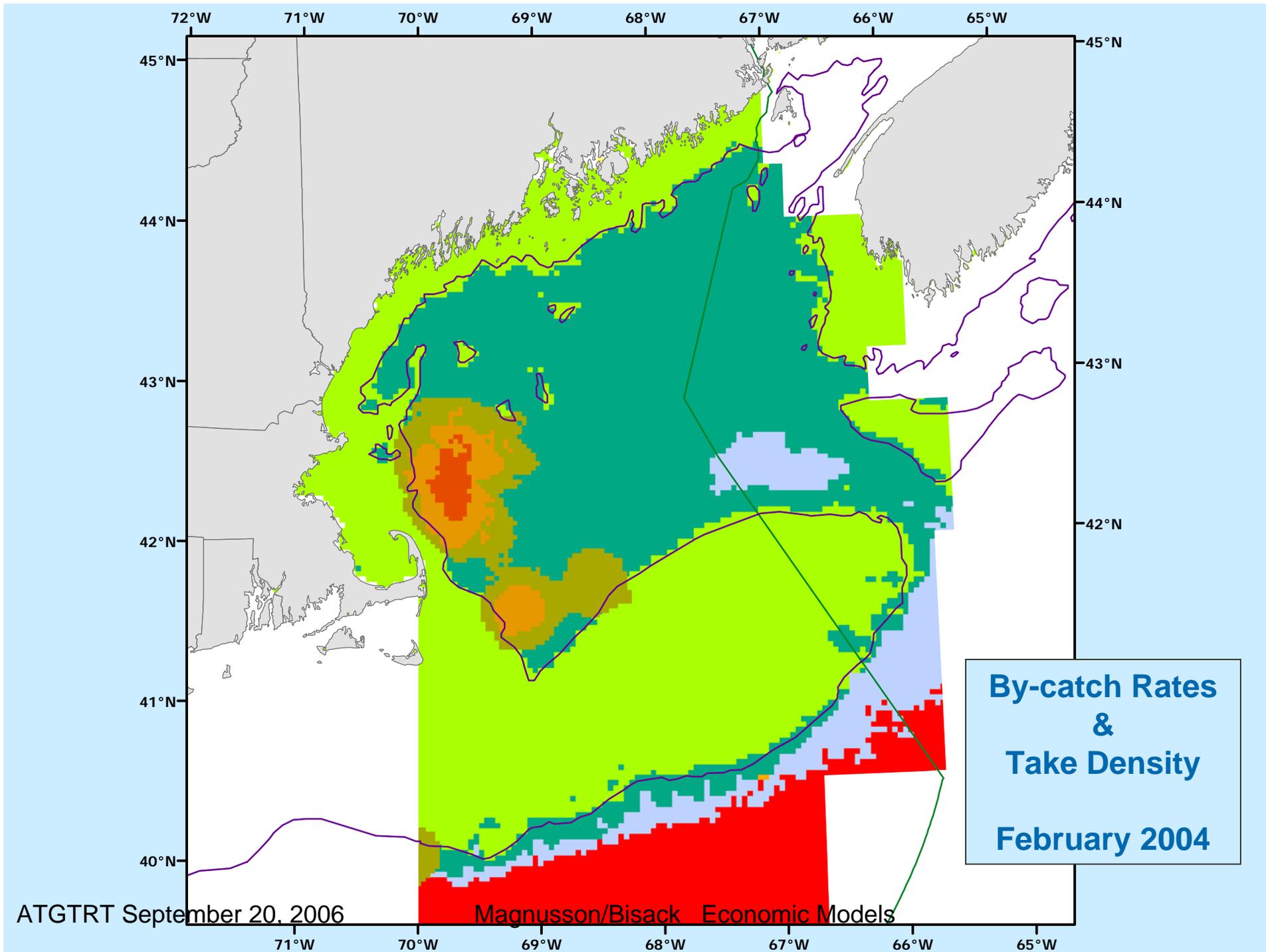
Example – NE BT WSD

1. White-sided dolphin takes
 - Where are high by-catch rates?
 - Where are high estimated take areas?





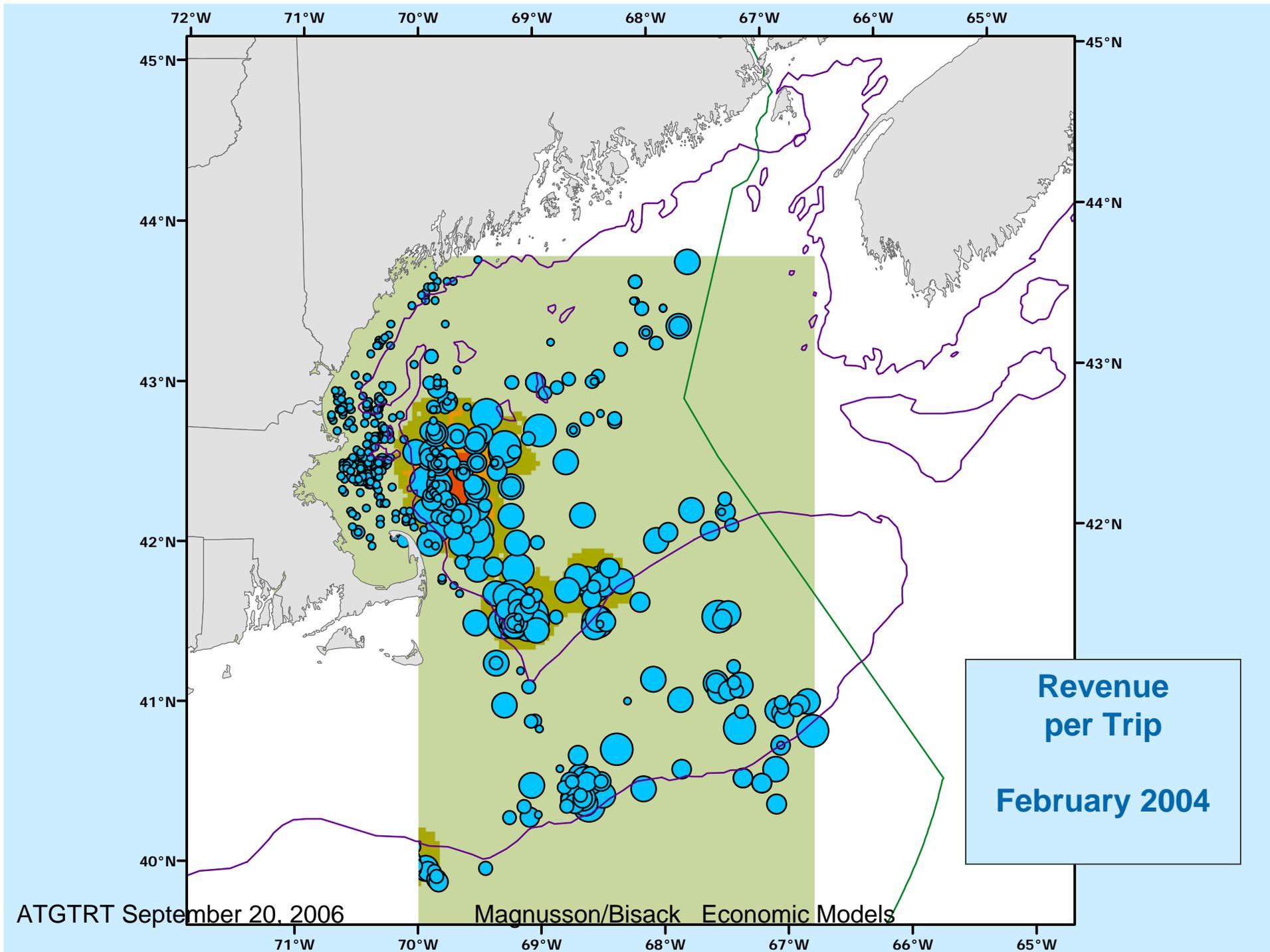


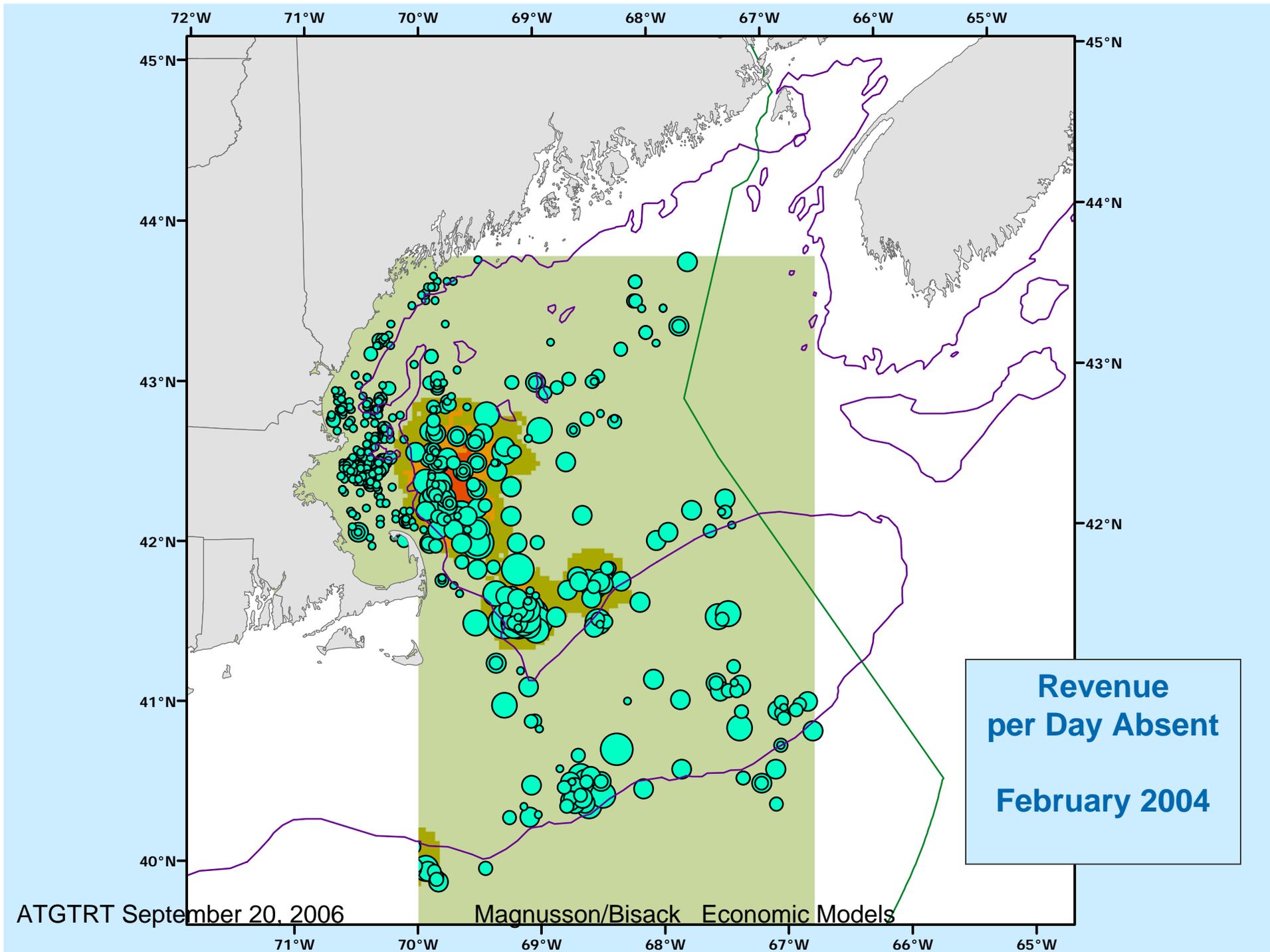


Example – NE BT WSD

2. Revenues

- What are current revenues?
- How important are high take areas?





Example – NE BT WSD

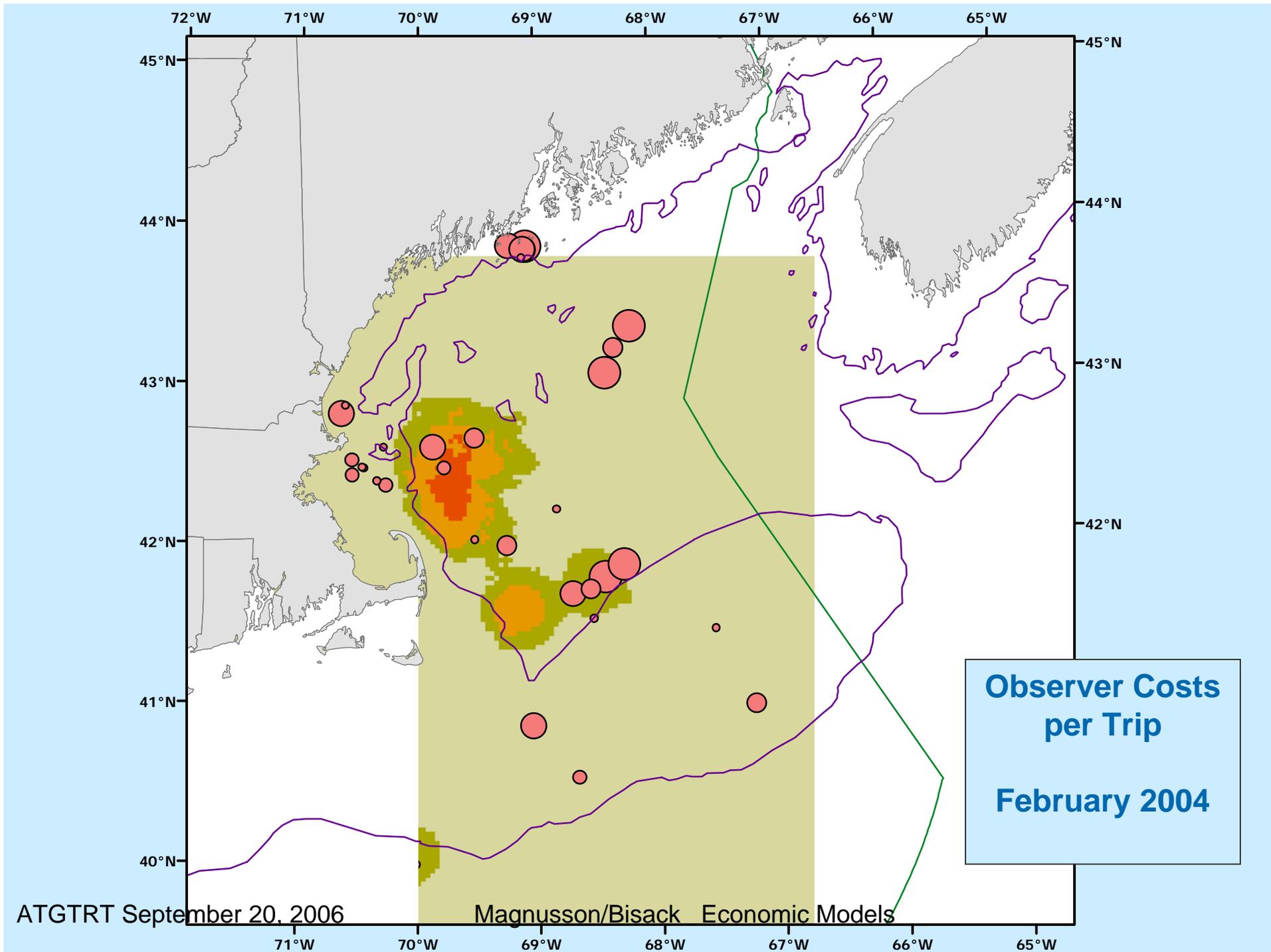
2. Revenues

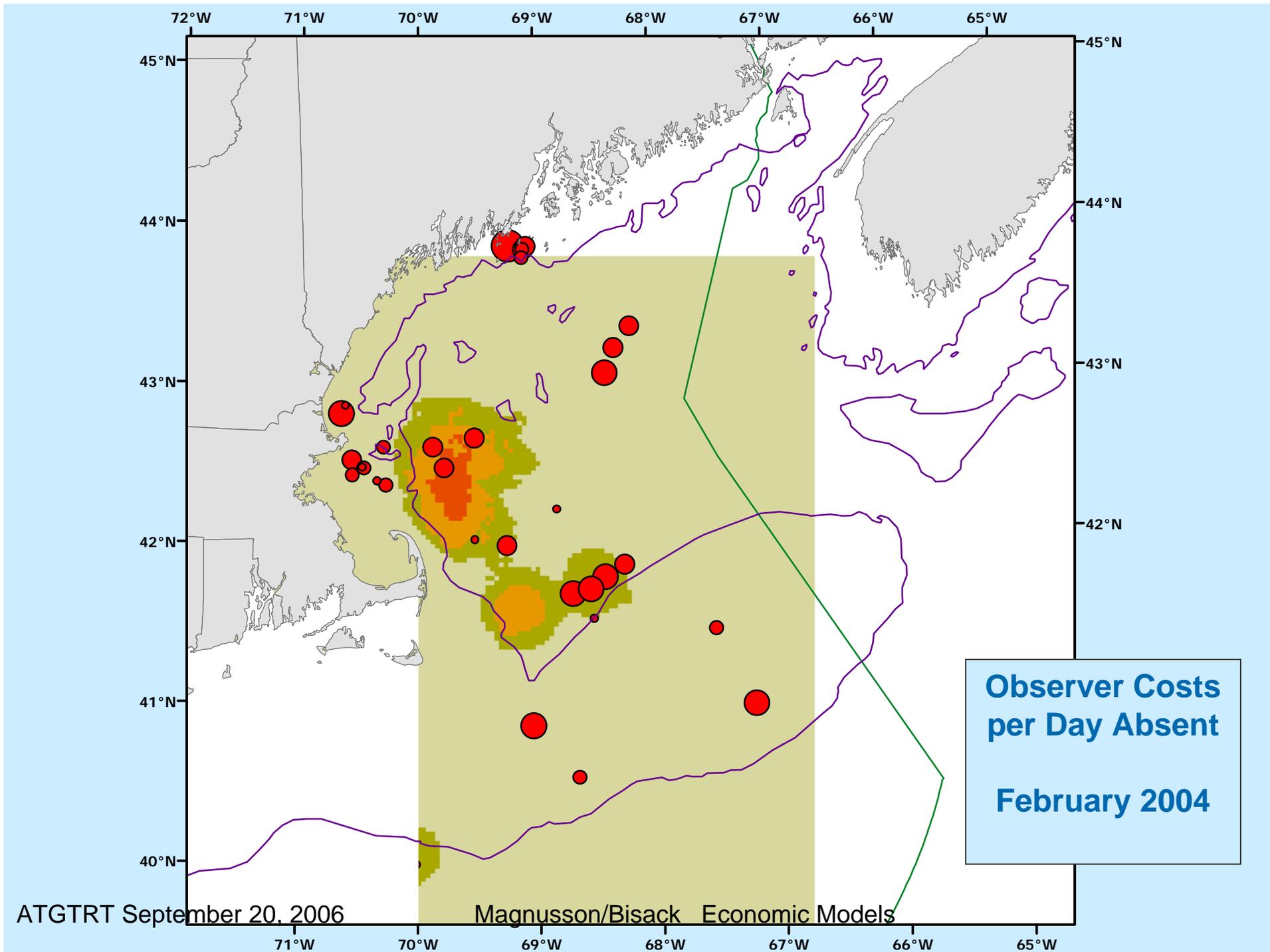
- What might cause them to change?
 - Reduced catch from:
 - Gear modification
 - reduced catch-ability?
 - Time/area closures
 - reduced access?

Example – NE BT WSD

3. Costs

- What are the costs of fishing?
 - Observer program data for trip costs
 - Fuel and oil cost
 - Ice cost
 - Food cost
 - Supplies cost
 - Number of crew





Example – NE BT WSD

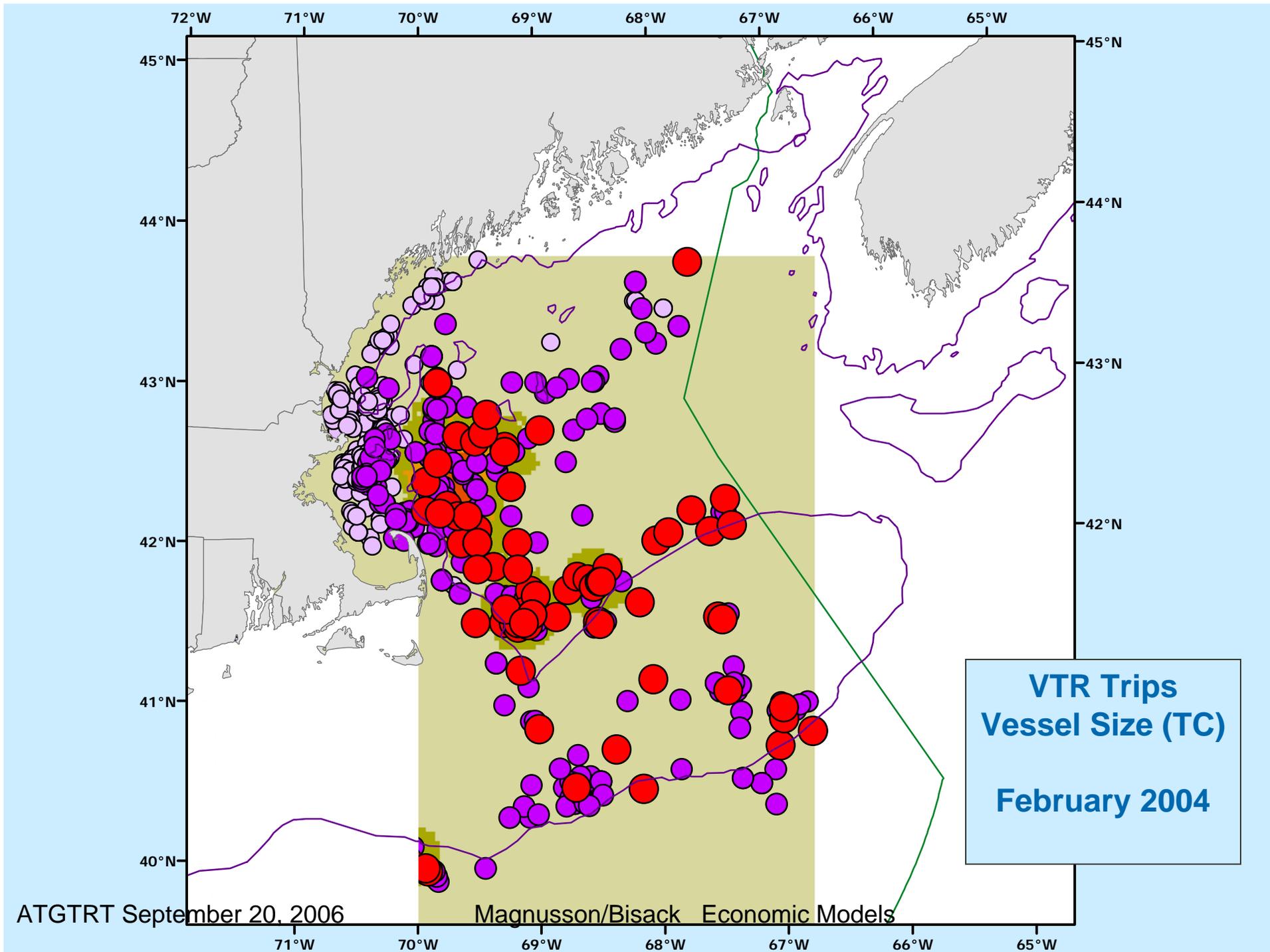
3. Costs

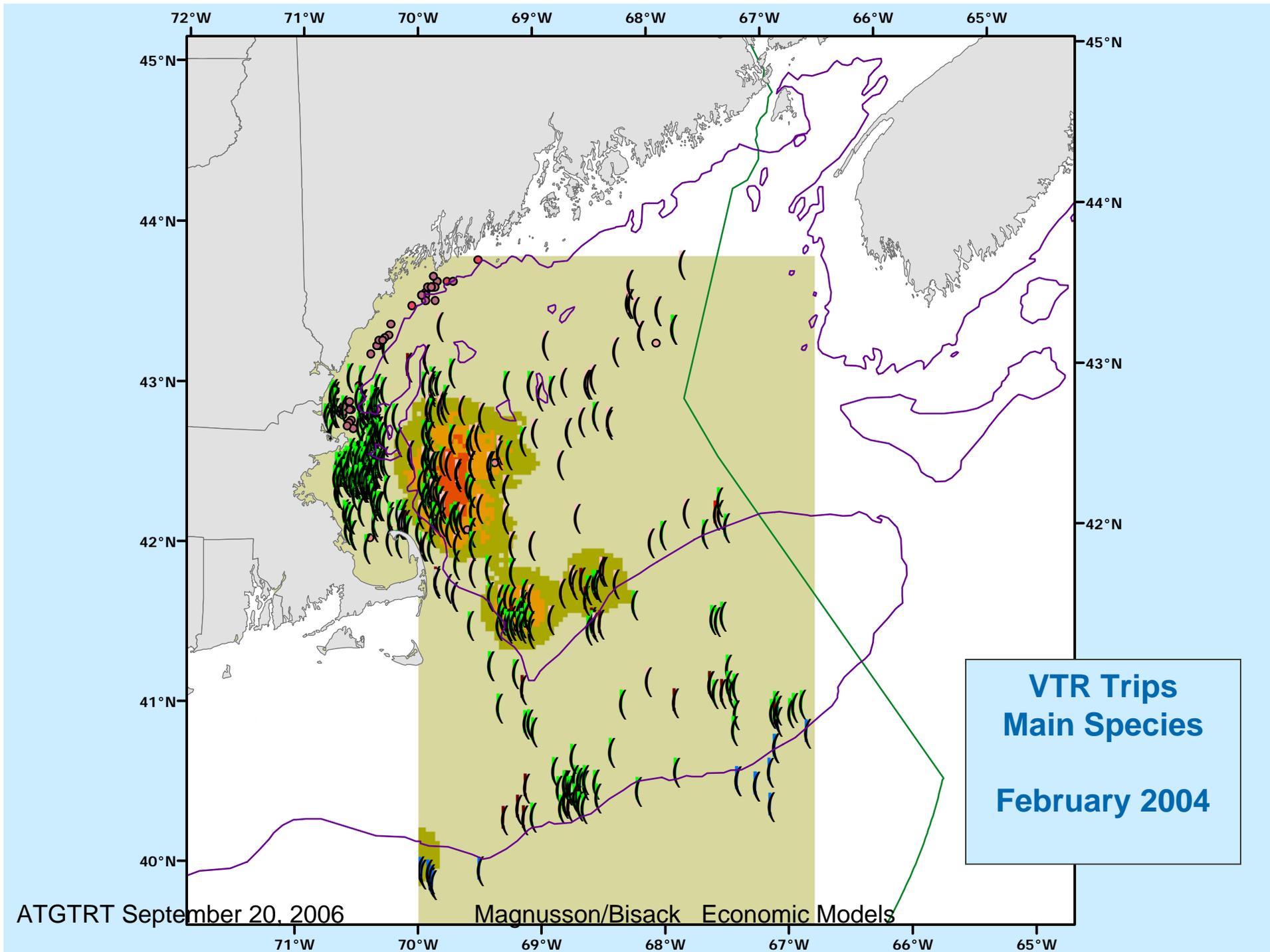
- What might cause them to change?
 - Gear modifications
 - New gear?
 - Fuel ?
 - Time/area closures
 - Travel further or stay closure?

Example – NE BT WSD

4. Impacts:

- Who will be affected by change?
 - By vessel size/fishery

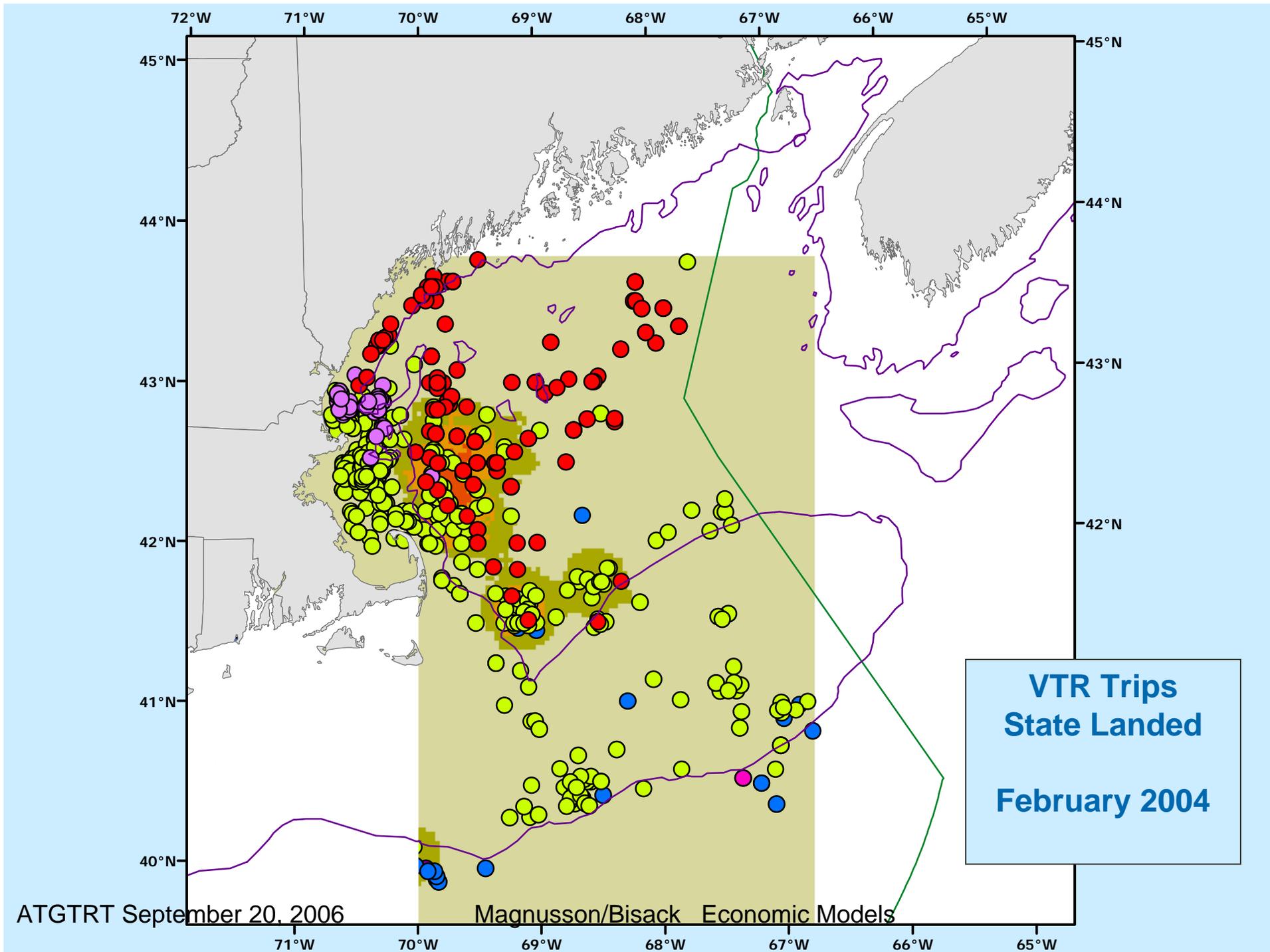




Example – NE BT WSD

4. Impacts:

- Who will be affected by change?
 - By vessel size/fishery
- Where will impact be felt?
 - By State/port



Example – NE BT WSD

4. Impacts:

- Who will be affected by change?
 - By vessel size/fishery
- Where will impact be felt?
 - By State/port
- How big is the impact?
 - On vessel profits
 - On industry/sector profits

Bringing It Together

- Our role is to help identify alternatives with “most bang for the buck” or least cost for same bang
- “Least cost” alternative may not be “best”
- Economics is only one aspect to consider