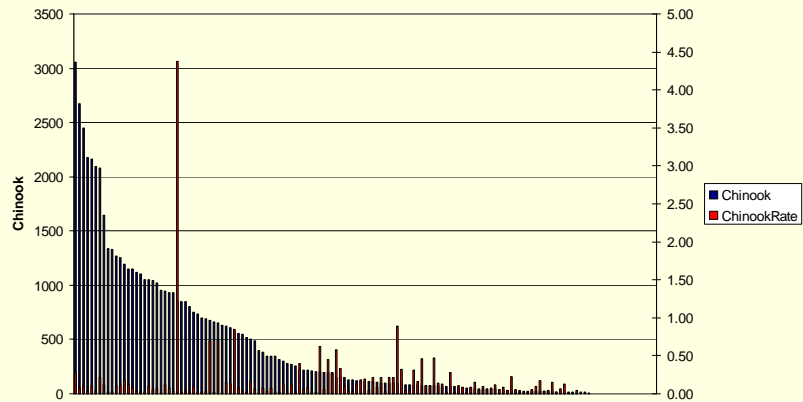

Incentives for bycatch avoidance: hotspot closures and individual bycatch quotas

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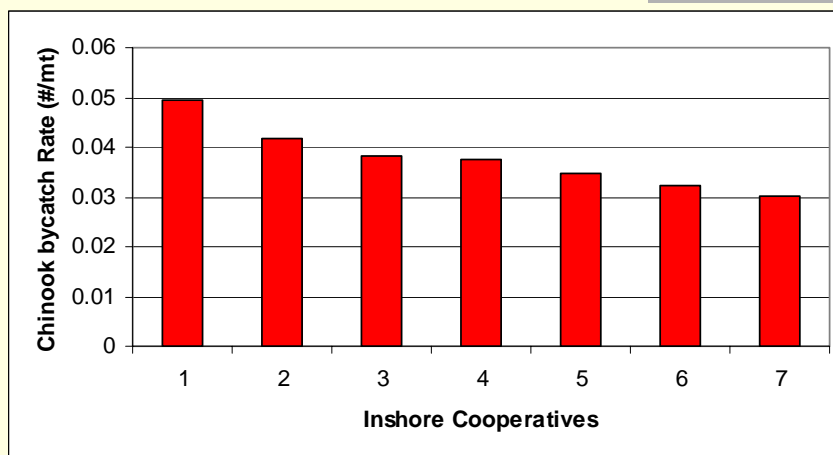
Overview

- Individual and coop bycatch behavior
- Response to select 2006 closures
- How to evaluate fisher behavior with hotspot closures
- Incentives in the VRHS system
- Tradable bycatch systems (i.e. vessel bycatch accountability systems)

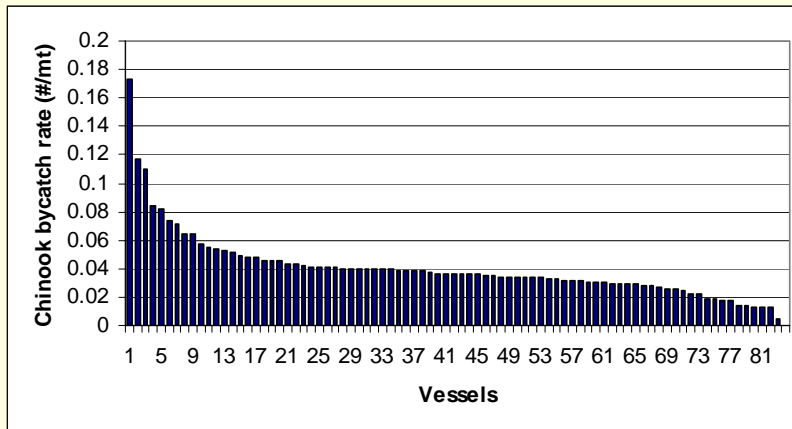
Vessel Bycatch Rates, 2005



Inshore Cooperative Bycatch Rates 2000-2005 (A Season)



Inshore Vessel Bycatch Rates 2000-2005 (A Season)



Fishing in January 31 Closure Area

Period		Chinook	Rate	% of Trips	% of Pollock	% of Chinook
Before closure	in	465	0.128	5.4	5.2	15.0
	out	2626	0.040	94.6	94.8	85.0
During closure	in	7	0.078	0.3	0.3	0.8
	out	865	0.029	99.7	99.7	99.2
After closure	in	374	0.181	3.0	3.0	2.8
	out	13072	0.196	97.0	97.0	97.2

Fishing in February 10 Closure Area

Period		Chinook	Rate	% of Trips	% of Pollock	% of Chinook
Before closure	in	7873	0.741	11.2	15.4	58.6
	out	5573	0.096	88.8	84.6	41.4
During closure	in	0	NA	0	0	0
	out	5259	0.086	100	100	100
After closure	in	0	NA	0	0	0
	out	10464	0.151	100	100	100

Evaluation of VRHS System

- Vessels in different tiers provide some information about fishing conditions inside of the hotspot closures
 - All vessels are avoiding hotspot closures, so some additional incentive may be needed to encourage “clean” vessels to fish in hotspot areas
- What’s the effect of “Dirty 20” lists?
- Observing repeated location choices by individuals and coops provides lots of information
- Modeling travel distances, catch rates, and bycatch rates can provide additional insight into how vessels respond to closures and high bycatch rates

Some current incentives deserve further consideration

- Tier 1 and 2 coops are avoiding hotspots even when they are not required to do so.
- Several incentives in the current inter-cooperative agreement are non-uniform and should be evaluated further
 - If a coop is having a very clean beginning of the week, there is little personal cost of higher bycatch later in the week
 - Similarly, if a coop has a very dirty beginning of the week, the only impact of continued high bycatch is being on the "Dirty 20" list
 - If either of the above conditions apply, there is some incentive for vessels or coops to have higher bycatch because it will lead to a higher base rate adjustment
- If pollock are highly mobile, then there is little cost of closures of last week's fishing grounds

Tradable Quotas/Permits for Bycatch

- Used in pollution management in SO₂
- This is essentially an ITQ for bycatch (or dedicated access privilege, or vessel bycatch accountability)
- Operational in other countries (e.g. New Zealand, Canada)
- Various instruments, such as a deemed value system, can be employed to minimize economic concentration or protect different community interests

Two types of tradable quotas are possible with salmon and pollock

1. A system of trades that allows pollock fishers to trade salmon bycatch rights among vessels or coops
2. A system that allows commercial or community salmon fisheries to sell salmon rights to the pollock fishery

When are the gains from trade the largest?

- When there is considerable heterogeneity of costs, economic values, or opportunities
- Here, when the value of bycatch is very different for different vessels or cooperatives

What is an efficient system?

- In an efficient system of salmon catch/bycatch management, the value of the last salmon caught by each fisher, be they in the pollock or salmon fishery, should be the same.
- Within the pollock fishery, the value of the last salmon caught should be the same for all vessels.

Tradable Quota System is Highly Compatible with SeaState Management

- Precise spatially explicit bycatch data will be at least as valuable in a system that includes bycatch quota
- In other countries, bycatch quota is managed by firms, organizations, or government agencies

Quota versus Fee

- It should be noted that a fee/tax can also provide a consistent incentive, though typically no one likes them
- Setting a fee is challenging – it could be too expensive and there could be “too much” avoidance of salmon, or the fee could be too low and there could be too much bycatch

Questions for Additional Research

- Are the benefits of a tradable quota system greater than the transaction costs of the system, including potentially increased monitoring?
- Do the differential incentives in the current system substantially affect behavior and bycatch rates? Should the current system be modified to make the incentives more consistent?

How Do We Decide if a Vessel Bycatch Accountability System Would be an Improvement?

- All of this depends on making decisions about the biological cap/ trigger limit
- For a hard cap, some type of tradable bycatch system is likely to be the least expensive way for the pollock fishery to minimize salmon bycatch
- For trigger limits, the relative cost *to the pollock fishery* of a quota system to the VRHS system depends on the costs of the rolling versus any potential fixed closures

Conclusions

- Pollock vessels are responding to bycatch information and closures
- Different vessels consistently have very different bycatch rates
- There are substantial opportunities for bycatch trades within the pollock fishery
- If politically palatable, “salmon quota trades” between the pollock and salmon fisheries could provide large economic gains for all parties