**Why Hard Caps or Fixed Targets for Managing Bycatch of Alaskan Chinook Salmon in the Bearing Sea Pollock Fishery Can Be Destructive to Chinook and the Alaskan Economy.**

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**History:**

While most fisheries harvests have an accidental non-target species catch rate (bycatch) of around 25%, the Bearing Sea pollock fleet does remarkably well with a typical bycatch rate of less than half a percent. The problem is that much of this low bycatch rate is composed of chinook salmon, an emblematic species for Inuit culture and for the artisanal fisheries of Western Alaska.

In 2000, chinook salmon bycatch was only several thousand fish, but in 2007, with efforts at spatial avoidance (rolling hotspot closures) this number spiked uncontrollably to nearly 128,000 individual chinook. This created an understandable outcry from concerned salmon interests and a call for a limit or “hard cap” to be placed on the number of chinook the pollock industry should be allowed to take (pollock fishing is shut down if the annual limit is exceeded). This is a reasonable response. It lowers the total right? But unfortunately, it can actually put chinook populations in greater danger of collapse.

Here we briefly discuss how hardcaps work, showing the conditions where they are appropriate, and where they will produce unintended destructive results.

**Hardcaps: when do they work and when are they harmful?**

-Hard caps set a fixed limit on allowable bycatch. A hard cap is effective if it protects the bycaught population and saves it from excess mortality that is thought to inhibit production (both this year and future harvests). Is this true for Alaskan chinook?

-***Fixed hard caps work when the underlying population level of the bycatch species is the same from year to year*.**  If salmon populations were steady, with bycatch numbers of say 100,000 every year, then a hard cap of 45,000 would reduce the effect of pollock fishing every year by about 55%. A fixed hard cap would be effective.

**-*However, what if chinook salmon are not constant from year to year****?* It is well known that chinook salmon populations vary widely from year to year. They can exhibit low abundance and low bycatch levels (eg, 4k bycatch in 2000) to high abundance and high bycatch (eg 128k bycatch in 2007). This means that a hard cap of say 45,000 that would limit bycatch in 2007 would not have limited bycatch in 2000.

**-*Hard caps only protect chinook populations when they are abundant (when chinook needs the least protection).*** A hard cap of 45,000 would have a large impact in a year where the normal bycatch might have been 128,000 (it would reduce bycatch by 65%). But this is when Chinook are relatively abundant, and need less protection. The large reduction could have little consequence to current or future productivity of chinook .

-So what about the millennial year 2000, when total Chinook bycatch was about 4,000?

-***A hard cap will not protect chinook when they are rare (during population bottlenecks as in 2000-2003)*.** When chinook populations are rare and closest to extinction, they are most vulnerable biologically (eg. lowest genetic diversity); the population is forced to put all of its eggs in just a few baskets. ***Low abundance population bottlenecks are perhaps the greatest hazard to maintaining the viability of a wild capture fishery like Chinook salmon.***

***-If Chinook are not protected when they are rare and can be driven closer to extinction, future hard caps become less relevant.*** A hard cap of 45,000 means there is no significant penalty for catching salmon up to that hard cap. Therefore, there is incentive to drive bycatch up to the 45,000 limit when Chinook are rare (eg. when the normal bycatch would have been 4k as in 2000).

***- A fixed hard cap will harm the Chinook fishery because it offers no protection and can encourage potential abuse when Chinook are rare and vulnerable.***

-To make matters worse, from the standpoint of the pollock industry, hard caps will produce economic hardship as a result of potentially leaving 100’s of millions of dollars of uncaught Pollock TAC in the sea. This will certainly have significant direct repercussions on the people employed by the Industry and indirectly to those people downstream within the State of Alaska, as well as to shrinking State Tax revenues.

-Managing bycatch with simple hard caps and fixed performance targets is harmful to everyone in the Alaskan Pollock/Chinook debate. They are punitive at the wrong times, and represent a counter-productive approach to this difficult problem.

- ***Setting aggressively low hardcaps can backfire*** because they increase incentives to harm chinook at their most vulnerable times. They create financial stress within and around the Pollock Industry that can lead to harmful actions that undermine sustainability or other environmental concerns. People behave badly when they are desperate, and excessively punitive hardcaps can create desperation.

*In summary, the basic problem is that hard caps are fixed, but that Chinook populations vary. Hardcaps offer no protection when salmon are rare and need it most. Aggressive hardcaps can encourage over-exploitation when rare.*

**What will work for chinook?**

-Therefore, limits for Chinook salmon bycatch must either be adaptive to varying chinook abundance or be accompanied by significant incentives to avoid bycatch more strongly when salmon are rare.

-There must be a strong incentive program in addition to a hard cap.

-Incentive schemes such as the Legacy Market-Incentive Plan, that directly address the variability of Chinook populations, and invoke higher allocation incentives to avoid bycatch when Chinook are rare are a step in the right direction (Legacy allocations of ITEC (individual tradable encounter credits) and Dynamic Salmon Savings).

-ITEC transactions provide natural open-market price signals that tie the cost of bycatch (at the individual vessel level) to the costs of foregone pollock if a hard cap is hit. The price of bycatch credits is not artificially dictated, but set by the market.

-Such transparent markets are robust and would be difficult to manipulate on an external (not in-house or near-house) third party exchange (manipulation is illegal on a CFTC certified exchange, so bad behavior is less likely).

-Beyond a platform for ITEC trading, a certified electronic market-place would create an important precedent (infrastructure) for transacting fishery business that would make industry more efficient and more accountable.

-Win-win schemes such as this protect the chinook salmon fishery, as well as help to preserve jobs and revenues related to the pollock fishery.