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My name is Michael Link. I am an independent research biologist with LGL Alaska Research Associates. I represent my clients' interests by bringing objective science to under-studied issues that are important to them, including many federal, local and state governments. I am not a lobbyist.

Among other roles, I have been under contract to the Bristol Bay Science and Research Institute (BBSRI), a subsidiary of the BBEDC since 2001 (Bristol Bay Economic Development Corporation).

In collaboration with ADF&G, I have managed the Port Moller test fishery since 2004. In 2002, I led an interdisciplinary study to look at options to restructure the Bristol Bay salmon fishery¹. I have worked collaboratively with ADF&G in this region since 1999 and in other regions around Alaska since 1986.

Today I would like to speak about sockeye escapement goal policies.

I have had little time to review the latest escapement goal document but I do not doubt that from a technical perspective, they have made the best use of the data to estimate the MSY-based escapement levels.

In general, I concur that increasing several of the sockeye escapements in the Bay will likely increase the average annual catch over the long run.

However, increasing escapement levels *all the way* to the inferred MSY levels will not necessarily maximize the economic performance of the fishery.

In theory, we have known this for decades. In general, society values money in hand today more than an identical amount of money in 5 years. By definition, at the MSY escapement level for a salmon stock, the last fish in the escapement is expected *on average* to yield a catch of exactly 1 fish in 4 or 5 years.

Whether MSY escapement is a "close enough" management target or diverges greatly from those needed for the greatest economic return is a function of a whole bunch of factors specific to a fishery. In the Bristol Bay fishery, the divergence between economic and biological performance measures is influenced by the fact that the industry has a large investment in fixed costs. Building and maintaining capacity for the harvest from periodic very large runs doesn't make a lot of sense.

MSY escapements will yield greater long-term average catch but they do that at the expense inter-annual variability in catch. Greater inter-annual variability in catch has a cost for harvesters and processors. To simplify, the fishery values the each fish from very large returns less than fish from smaller, more stable annual catches.

There is NOTHING unethical *or* unscientific about recognizing that economic yield from a fishery may be maximized at escapement levels different than MSY. Unlike some very long-lived species, a focus on economic yield from the Bay fishery will always involve maintaining large and healthy stocks.

I hope the escapement goal discussion can move beyond framing this issue as "an industry trying to overharvest the fish and the Department is trying to save the fish". The Department is following their

¹ I also represented Bristol Bay on the Advisory Panel of WASSIP.

mandate and the industry and region's communities are trying to maximize the economic benefit from the fishery.

In 2004, I initiated a study to look at how escapement goal policy may be affected by incorporating economic objectives. BBSRI contracted Mr. Brian Bue and Dr. Ray Hilborn to model the Egegik fishery, including the cost structure of the harvesting and processing sectors, the impact harvest levels can have on fish price, and the fish population's responses to different escapement goal policies². We used the model to see what effects the cost structure of the industry in the Bay may have on the choice of optimum escapement goal policies.

We concluded that an economic objective of total income from the fishery would involve a policy that includes some harvesting at stock sizes below that required to produce maximum average catch (MSY). We published this work in a peer-reviewed journal in 2008 (Canadian Journal of Fisheries and Aquatic Sciences).

ADF&G has a mandate to strive for MSY yield; unfortunately there few or no resources allocated to address the economic performance of the fishery.

My goal with this presentation has NOT been to increase decisiveness on this topic. On the contrary, my hope is that we can simply acknowledge that there is nothing wrong with being explicit about the direction economic factors may influence escapement goal policies.

Thank you.

Michael Link, December 5, 2012.

² Mr. Bue is a recently retired research biologist from ADF&G; Dr. Hilborn is a fishery scientist with the University of Washington who has a long history of research on the Bristol Bay salmon fishery.