

Hello, my name is Mike Litzow, PO Box 1332, Kodiak. I am a fisheries oceanographer and currently the director of the local NOAA Fisheries lab. However, I would like to stress that I am not speaking in my capacity as a NOAA employee today, and the work I am testifying about was completed prior to my employment with NOAA.

I am testifying today concerning on-time Public Comments 258, 293, and 355. These comments are in response to proposals 58, 64, 65, 66.

- A critical assumption in favor of proposals 58-66 is that the Shedd et al. ADF&G genetics study provides a reasonable estimate of the average incidence of Cook Inlet sockeye in Kodiak fisheries.
- Unfortunately, the Shedd et al. genetics study occurred during 2014-2016, which were the years of the North Pacific Warm Blob.
- In the Gulf of Alaska, ocean temperatures in these years were the highest that had ever been observed, going back to at least 1900. Atmospheric pressure was also unusually high, with reduced wind mixing of the ocean, weaker wind-driven currents, and reduced coastal precipitation.
- Unusual biological patterns occurred throughout the Gulf of Alaska ecosystem during these years, including massive die-offs of seabirds and whales, the largest paralytic shellfish poisoning event ever observed, the 2016 pink salmon failure, and the collapse of the Gulf of Alaska cod fishery.
- Sockeye migration patterns are known to be highly sensitive to ocean conditions.
- In addition, conditions in sockeye rivers were highly unusual during these years.
  - River temperatures were extremely high.
  - River levels were generally low.
  - These are also conditions that are expected to create unusual migration patterns and run timing for sockeye.
- Unfortunately, we have no data on the migration patterns of returning Gulf of Alaska sockeye salmon. However, very good long-term data are available on run timing, which

can give us a picture of how returning sockeye responded to unusual conditions during 2014-2016. These data show that:

- Commercial sockeye catches were unusually late in the Southwest Kodiak district.
- Some Cook Inlet runs were unusually late.
- Other Cook Inlet runs were unusually early.
- These contrasting patterns of unusual run timing suggest complex, unusual patterns of return migration during 2014-2016, and suggest caution when interpreting the Shedd et al. results.
- In conclusion, proposals 58-66 would change long-standing management practices, largely based on data that were collected during years that were unlike any that had ever been observed in the Gulf of Alaska. This range of unusual conditions is an important source of doubt concerning how representative the 2014-2016 Shedd et al. data may be for typical patterns of stock mixing, and suggests caution when extrapolating those findings to other years.