

BOB SAM

PART C

SITKA TRIBE

RC 32

1. Sitka Sound has a more aggressive harvest rate equation than every other Southeast stock
  - e. The population structure of Sitka Sound herring is changing – rarely are fish older than 8 years
    - i. Market demands may encourage high-grading, targeting the largest, oldest fish
    - ii. Traditional knowledge and work by the Ocean Modeling Forum both indicate that older fish act as “scouts”, showing younger fish where to spawn
- II. What, if any, impacts does the sac roe fishery have on reproductive behavior of spawning herring?
- a. Test sets and capture of herring result in “false” spawns
    - i. Numerous seiners have testified that herring begin spawning when squeezed; this is not when those herring would have normally spawned and may trigger other herring to spawn in less-than-optimal times and places
  - b. Test sets and rushed sets result in delayed and/or unaccounted mortality
    - i. Stress from test sets may reduce reproductive fitness or change behavior
    - ii. Anecdotal evidence suggests seiners “dropping” the remaining fish of a nearly pumped set to make another set before an opener finishes
  - c. Subsistence harvesters have better years with a co-operative fishery
    - i. Even with a decreased biomass, subsistence users did relatively well in 2015, when a co-op limited fishing effort and pressure
  - d. Traditional knowledge indicates cultural practices to prevent people from disturbing spawning herring
- III. Is the current model appropriate given ecological conditions and management regime?
- a. TEK and archaeological evidence strongly suggest shifted baseline management from conditions prior to the start of reduction fisheries in the 1800s
    - i. Herring are being managed in a depleted state; this is not a “healthy” biomass
  - b. ADFG has no way to make in-season adjustments to the forecast
    - i. The estimate is vulnerable to any “Black Swan” perturbation that occurs in the 12 months prior to the fishery (changing ocean conditions, disease, increase in predators/competition); low frequency, high impact events cannot be accounted for until one year later
  - c. The model is based on a relatively brief data set and relies on historical data and may not be equipped to adequately forecast future conditions
    - i. “The Blob”, *Ichthyophonus*, ocean acidification, changing marine communities
  - d. The model does not adequately account for juvenile ocean survival
    - i. Any anomaly in juvenile ocean survival would not show up in the model after those fish mature – potentially a four year lag

- e. The model does not have any estimate of precision
  - i. Since uncertainty is unknown, it must be assumed to be high and more conservative management is warranted
- f. The aerial surveys and egg deposition surveys have no independent verification
  - i. The State is not transparent on surveys – there are no photos of aerial surveys to verify spawn and nautical miles of spawn observed in ADFG fishery updates do not add up to the total nautical miles of spawn listed in final reports
- g. All areas of spawn are assumed to have equal survival, regardless of location and ocean conditions
  - i. The north-south contraction and westward migration of spawn means that more larval herring are likely swept out to sea and not into protected bays; this may mean reduced survival and recruitment to the spawning population

IV. How has a changing marine ecosystem impacted Sitka Sound herring?

- a. How have changing ocean conditions (The Blob, ocean acidification) impacted Sitka Sound herring?
- b. How have changes in predator/prey abundance/distribution impacted Sitka Sound herring?
- c. How have declines in other forage fish impacted Sitka Sound herring?
- d. How have increasing hatchery releases from Deep Inlet impacted Sitka Sound herring?
  - i. Herring do not spawn on the south end of Sitka Sound near hatchery release sites any longer
  - ii. Anecdotal evidence suggests predation by salmon smolts on larval herring