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Advisory Announcement

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2023 TOGIAK HERRING FORECAST

The 2023 Togiak herring biomass forecast is 316,203 short tons, which yields a total allowable harvest of 63,241 short tons per the 20% exploitation rate in regulation. This harvest is further split among fisheries in series, per the *Bristol Bay Herring Management Plan* 5 AAC 27.865(b): 1,500 tons to the Togiak spawn-on kelp fishery, then 7% of the remaining harvest to the Dutch Harbor food and bait fishery, and then the remainder to the Togiak sac roe fishery. The sac roe fishery is then allocated 80% to purse seines and 20% to gillnets (Table 1).

Table 1.–The 2023 Togiak District herring biomass, with resulting harvest forecasts and allocations per 5 AAC 27.865.

	Biomass (Short Tons)	Harvest (Short Tons)
Biomass Estimate	316,203	
Total Allowable Harvest (20% exploitation rate)		63,241
Togiak Spawn on Kelp Fishery (Fixed Allocation)		1,500
Remaining Allowable Harvest		61,741
Dutch Harbor Food/Bait Allocation (7% of remaining allocation)		4,322
Togiak District Sac Roe Fishery		57,419
Purse Seine Allocation (80%)		45,935
Gillnet Allocation (20%)		11,484

The 2023 mature herring biomass forecast is 316,203 tons and is the second highest forecast (after the 2022 forecast) since 1993 (Figure 1). This continues an increasing trajectory of Togiak mature herring biomass and is due primarily to the large recruitment of age-4 fish in 2020 and 2021 as well as the bodily growth of those strong year classes. Recruitment since 2017 has also been above the long-term median of 128 million fish since (1980-2022), with the 2020 and 2021 recruitments being 3.1 and 4.7 times larger, respectively, than the median recruitment. The 2020 and 2021 cohorts are projected to make up an even larger portion of the population in 2023 due to increasing maturity and growth (Figure 2). The majority of the mature population in 2023 is expected to be age-6 and age-7 fish, both by number (39% and 22% respectively) and by biomass (36% and 24% respectively; Figure 2). The forecast average weight of a fish in the 2023 mature population is 321 g (Figure 2), whereas the forecast average weight of a fish that is vulnerable to the commercial purse seine fishery is 332 g.

The assessment model used to forecast the Togiak herring population utilizes time series of harvest, age composition of the purse seine and gillnet harvest, age composition of the mature population, and aerial survey biomass estimates from 1980 forward. The age composition of the seine harvest is estimated from samples taken from the entire commercial purse seine harvest. The age composition of mature population biomass is estimated from samples taken from the seine fishery near in time to the peak survey and the post-peak surveys. Mature biomass is estimated by combining aerial survey biomass estimates (peak- and post-peak) with presurvey harvest (purse seine and gillnet). The assessment model uses between-dataset weighting and variable weighting within the aerial survey dataset to reflect the confidence staff has in the respective datasets and the confidence staff has in the individual aerial survey estimates. Confidence in the individual aerial survey estimates is based on the number of surveys, timing of surveys, weather, and water conditions. The forecasted average weight-at-age of herring for 2023 was calculated using the average weight from recent commercial purse seine fishery samples (2021 and 2022).

Uncertainty is not yet quantified for Togiak herring forecasts but is considered to be relatively high for the 2023 forecast due to the widely varying estimates of biomass from aerial surveys in 2021 and 2022 (Figure 1). Aerial survey conditions were good in 2022, but mechanical issues prevented surveys at the peak of the run. As a result, the 2022 aerial survey peak biomass estimate had a relatively low overall confidence ranking of 0.25 out of 1.0. In addition, the model estimates a single survival rate across all ages and years and if the survival of exceptionally large year classes differs from others, this will not be captured in the forecast. All these factors reduce certainty in the 2023 forecast.

Herring are detected in our sampling when they recruit into the fishery; this process begins around age-4 and may not be fully complete until approximately age-9. Large recruitments into this population generally occur every eight to ten years, typically last one or two years, and biological sampling suggests the most recent recruitments occurred in 2020 and 2021. It is difficult to measure contributions of young age classes because these fish are not fully recruited (available) in the harvest and often arrive on the spawning grounds near the end of, or after, the fishery. Improved estimation of herring year class size is expected as cohorts are observed in the fishery in subsequent years.

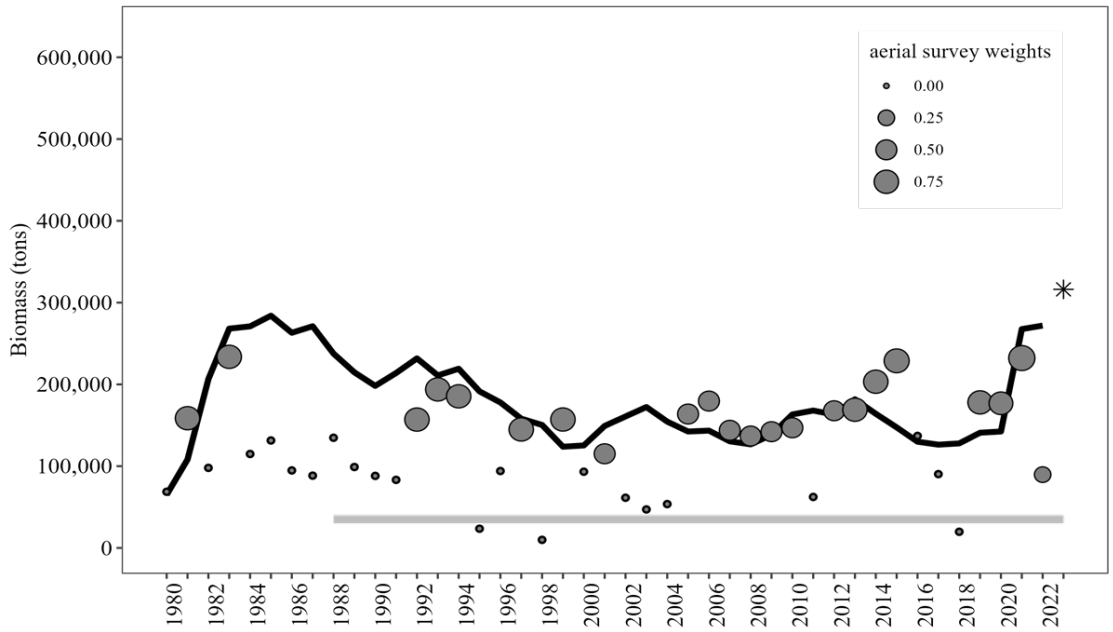

Figure 1. – Aerial survey-estimated biomass plus pre-peak catch that were included in the model (grey circles), model-estimated mature biomass (black solid line), and model-estimated mature biomass forecast (black asterisk). The size of the grey circles reflects the confidence weighting of each aerial survey estimate in the model based on weather, number of surveys, quality of surveys, and timing of surveys relative to the spawn (ranging from 0 = no confidence to 1 = perfect confidence). The confidence ranking in 2022 was 0.25. The grey line denotes the threshold biomass of 35,000 tons.

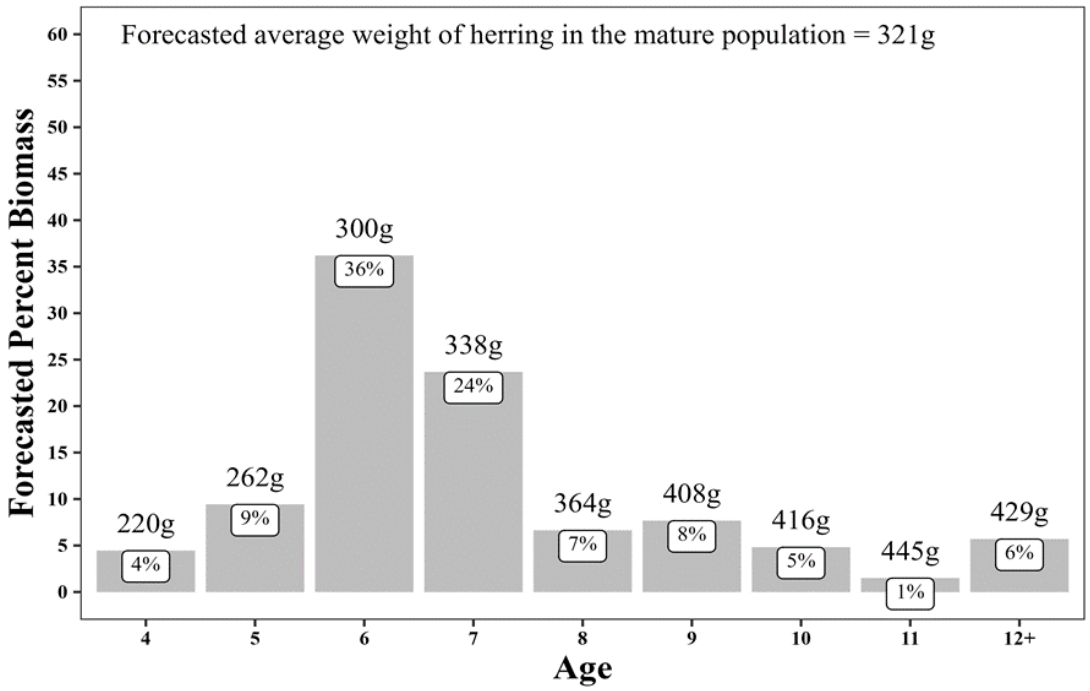

Figure 2. – Forecasted percent mature biomass of Togiak herring by age in 2023, showing average weight (grams) for each age class and for all age classes combined (321 g).