RC 46

Alaska Board of Fisheries
October 16, 2018
Alaska Salmon Hatchery Forum Discussion – Anchorage, Alaska

Dear Chairman Morisky and Board of Fisheries Members:

Given the board's and public's increasing interest in Ocean Carrying Capacity (OCC) as it relates to hatchery pink salmon production in Prince William Sound (PWS), we wish to use widely accepted data to put the scale of PWS hatchery pink salmon production into its proper context.

Ruggerone and Irvine (2018) provide an excellent summary of the best available data on numbers and biomass of hatchery- and natural-origin adult (mature) and juvenile (immature) pink, chum, and sockeye salmon in the North Pacific Ocean (NPO) for the years 1952–2015, which have been utilized for purposes of this analysis. Methodologies for estimating biomass of PWS hatchery pink salmon adult returns and juvenile salmon were also followed as described in Ruggerone and Irvine (2018). For the years 2013–2015, Knudsen et al (2016) provide the best data available specific to PWS hatchery pink salmon total (adult) return estimates, and associated biomass calculations; Haught et al. (2017) was utilized to estimate adult PWS hatchery pink salmon biomass for all other years.

PWS hatchery pink salmon production has remained relatively stable at current production levels since 1990, with total PWS adult and juvenile hatchery pink salmon biomass (approximately 70,000 metric tons) averaging 7.32% of the total NPO biomass of adult and juvenile pink salmon annually for the years 1990–2015 (Figure 1), with a peak of 16.09% in 2010.

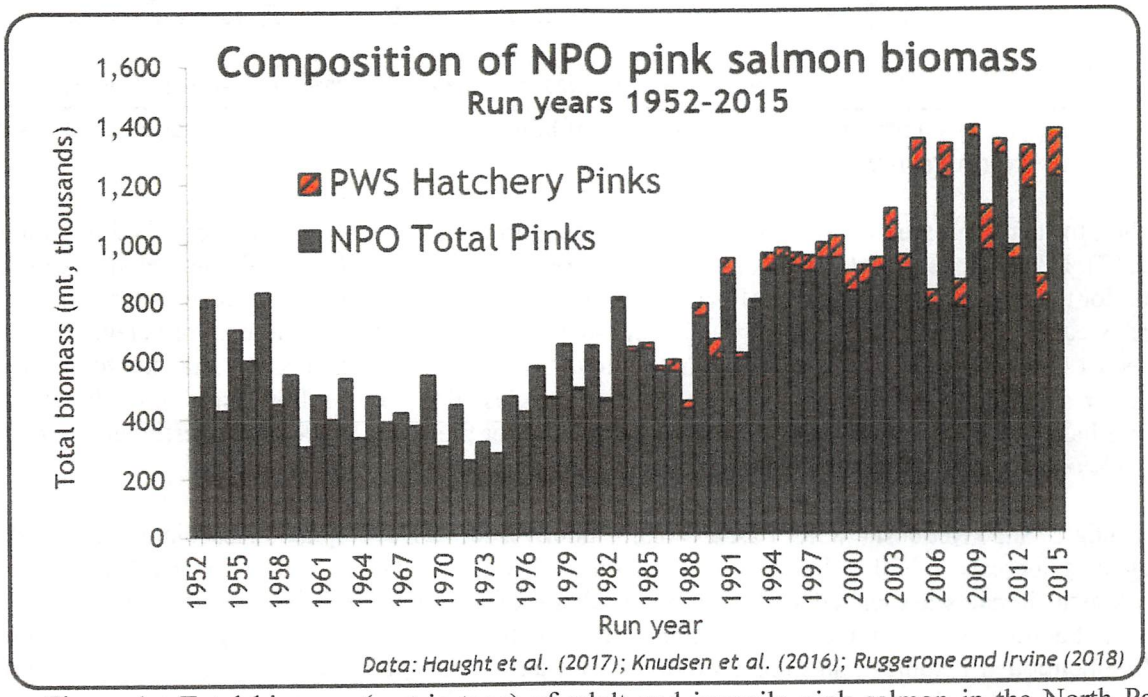

Figure 1—Total biomass (metric tons) of adult and juvenile pink salmon in the North Pacific Ocean, 1952–2015.

When including total NPO adult and juvenile chum and sockeye salmon biomass estimates for this timeframe, total PWS adult and juvenile hatchery pink salmon biomass is estimated to account for an average of 1.62% of the total biomass for these three salmon species annually in the NPO (Figure 2), with

a peak of 3.56% in 2010. Ruggerone and Irvine (2018) did not estimate abundances or biomass of steelhead, Chinook, coho, or cherry salmon, although they report that these salmonids represent approximately 1.25, 2.72, 0.15, and 0.02%, respectively, of the total reported catch by weight of Pacific Salmon during 1992–2015. Catch data as reported by NPAFC (2018) for the years 2013–2015 can be used to provide a reasonable estimate of total PWS adult and juvenile hatchery pink salmon biomass as a percentage of total NPO salmonid biomass, which we estimate to be 3.08, 2.02, and 3.22%, respectively, for these three years (2013–2015).

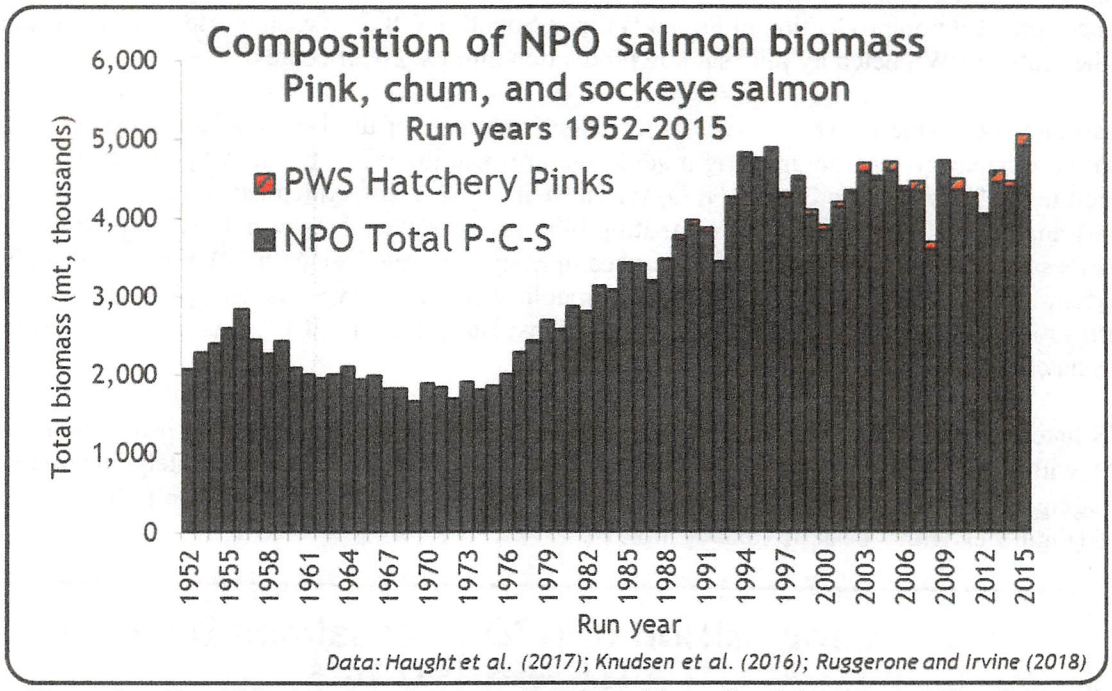

Figure 2— Total biomass (metric tons) of adult and juvenile pink, chum, and sockeye salmon in the North Pacific Ocean, 1952–2015.

When further compared to other components of the North Pacific ecosystem as described in Shuntov et al. (2017), PWS hatchery pink salmon biomass takes on even less significance. Shuntov et al. (2017) estimate that for the Russian Far East alone (Bering Sea, Sea of Okhotsk, Sea of Japan, ocean waters off Kamchatka, and ocean waters off the Kuril Islands), the long-term (1977– 2010) mean biomass of pelagic fish and squid species ("nekton") was 81.3 million tons. Shuntov et al. (2017) further assert that the total biomass for similar species throughout the subarctic Pacific is no less than 200 million tons. Thus, the average total PWS hatchery adult and juvenile pink salmon biomass for the years 1990–2015 is estimated to be less than 0.03% (~0.000248) of the total subarctic Pacific Ocean nekton.

Agenda Change Request (ACR) 1 asserts that Valdez Fisheries Development Association's (VFDA) recent egg take increase of 20 million green pink salmon eggs in 2018 is "cause for great concern over the biological impacts associated with continued release of very large numbers of hatchery salmon into the North Pacific Ocean, including the Bering Sea and the Gulf of Alaska." Again, using the previously aforementioned resources and methodologies, and an anticipated release of 18.8 million 0.6 gram pink salmon fry and projected 1.2 million adults resulting from this permitted increase in production, this would account for: less than 0.3% (~0.0027) of the total NPO biomass of adult and juvenile pink salmon annually for the years 1990–2015; less than 0.06% (~0.00059) of total adult and juvenile pink, chum and sockeye salmon biomass estimates for the NPO for this same timeframe; and less than 0.002% (~0.000012) of the total subarctic Pacific Ocean nekton for these years.

Ruggerone and Irvine (2018) and various authors have asserted that the high abundance of pink, sockeye, and hatchery chum salmon may have exceeded carrying capacity and be negatively constraining salmon production. However, we do not find their data to support any assertion that PWS hatchery pink salmon production alone could conceivably contribute to such a situation, and encourage board members to review Wertheimer and Heard's "High Ocean Biomass of Salmon and Trends in Alaska Salmon in a Changing Climate" document, which was submitted to the board with comments from Northern Southeast Regional Aquaculture Association (NSRAA), and can be found within PC069.

Respectfully submitted,

Casey Campbell, General Manager/CEO, Prince William Sound Aquaculture Corporation (PWSAC)
Mike Wells, Executive Director, Valdez Fisheries Development Association (VFDA)

Literature Cited

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