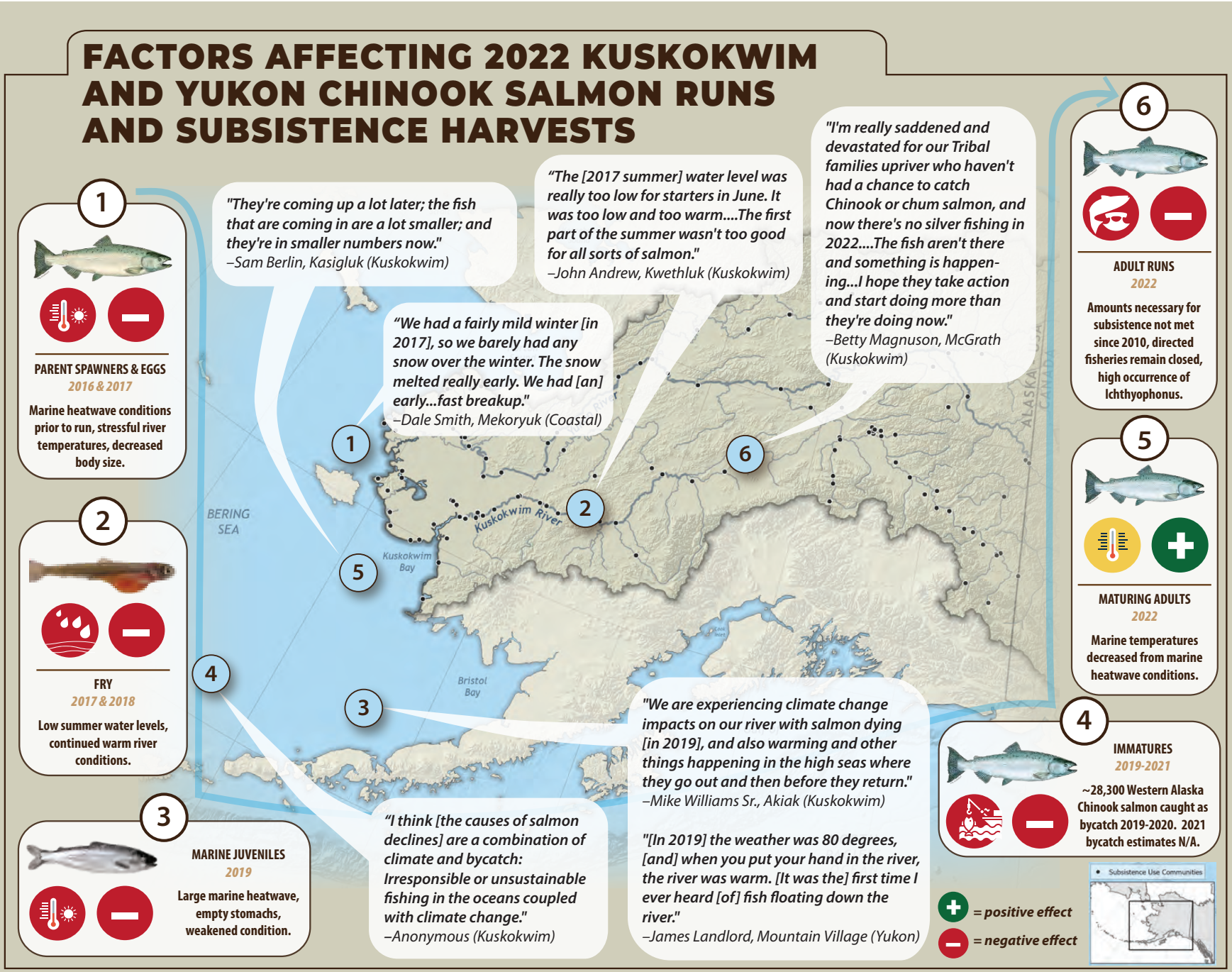
FACTORS AFFECTING 2022 KUSKOKWIM AND YUKON CHINOOK SALMON RUNS AND SUBSISTENCE HARVESTS



Factors Affecting 2022 Western Alaska Chinook Salmon Runs & Subsistence Harvest

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Western Alaska Chinook salmon runs have concurrently declined to low abundance levels for over a decade (ADF&G, 2013; Schindler et al., 2013; KRITFC, 2022; Liller, 2021)[1]. Salmon are integral to the Western Alaska ecosystem, bridging marine and freshwater habitats, filling both prey and predator niches, and supporting vital subsistence harvests (Courtney et al., 2019; KRITFC, 2022). The figure on page 1 highlights the factors that contributed to the 2022 run sizes of Chinook salmon across Western Alaska as evidenced by Western science, Indigenous Knowledge, and community observations from the Kuskokwim and Yukon rivers.

Cumulative ecosystem factors since 2016 impacted the spawning adults, to the marine-stage juveniles, and ultimately the returning adults in 2022. For the parent spawners in 2016 and 2017, marine heatwave conditions (Hennon et al., 2022), smaller and younger size at maturity (Lewis et al., 2015; Oke et al., 2020), and warm river temperatures during the adult spawning migration likely contributed to reduced reproductive success (von Biela et al., 2020; Howard & von Biela, in review). Low summer water levels and warm river conditions had the potential to impact eggs (2016–2017), and freshwater conditions could continue to influence fry and smolt growth and survival (2017–2018), but those relationships vary in different places depending on the absolute values of temperature, flow, and water level and are not fully understood across different tributaries.

Marine juveniles experienced heatwave conditions again in the eastern Bering Sea in 2019 when low zooplankton productivity (Kimmel et al., 2022) contributed to empty stomachs and decreased fish condition (Murphy et al., 2021). In 2019 and 2020 combined, approximately 28,300 immature Chinook salmon from Western Alaska (Yukon and Coastal Western Alaska regions) were caught as bycatch[2]). The estimated impact rate of bycatch to combined Western Alaska Chinook salmon stocks averaged 1.9% for the 2011–2021 runs (see Table 9 here[3]) or annual estimates of 6,331–10,614 fewer spawners to Western Alaska (see Table 7 here[3]). The impact rate for the 2022 run is not yet available, but is expected to be higher based on low run sizes in 2022 (i.e., impact rate is inversely related to run size).

Marine temperatures largely relaxed to average conditions over the past year (Siddon, 2022), which may have a positive effect on 2022 spawning success. However, amounts necessary for subsistence use of Chinook salmon in Kuskokwim and Yukon communities have not been met since 2010 and were not met again in 2022. Food security impacts associated with Chinook salmon declines in Western Alaska have been compounded by declines regionally in other salmon species, such as coho and chum salmon (KRITFC, 2022).

Please see the complete 2022 Eastern Bering Sea Ecosystem Status Report for referenced material:
Siddon, E. 2022. Ecosystem Status Report 2022: Eastern Bering Sea, Stock Assessment and Fishery Evaluation Report, North Pacific Fishery Management Council, 1007 West 3rd Ave., Suite 400, Anchorage, Alaska 99501.

[1]https://static1.squarespace.com/static/5afdc3d5e74940913f78773d/t/6359792089ec3e15693c80dd/1666808118921/Salmon+Sit+Report+2022_10-03-22_FINAL.pdf

[2]https://meetings.npfmc.org/CommentReview/DownloadFile?p=38f9b0d4-52be-4718-8dc7-d837d1be531c.pdf&fileName=D1b%20Bering%20Sea%20Chinook%20Genetics%202020.pdf

[3]https://meetings.npfmc.org/CommentReview/DownloadFile?p=c16a58bc-e94e-4fd3-a23f-08909946bf20.pdf&fileName=D1c%20Chinook%20Salmon%20AEQ.pdf