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To: Marisa Keefe
Fisheries and Oceans Canada
401 Burrard Street, Vancouver, BC
V6C 3S4

Re: Pacific Wild Alliance (PWA) Recommendations for 2022/2023 Pacific herring IFMP

Dear Marisa Keefe,

Pacific Wild Alliance (PWA) is submitting the following as per the request for input pertaining to the 2021/2022 Integrated Fishery Management Plan for Pacific herring. PWA is driven by the goal of protecting the marine and terrestrial wildlife on the B.C. coast. We appreciate the opportunity to comment on the draft Pacific herring IFMP for 2022/2023 and would like to remain engaged in consultation moving forward.

Pacific herring is a cornerstone of marine biodiversity on the British Columbia (B.C.) coast, has been an important part of First Nations' economy and culture since time immemorial, helping to support local coastal communities. It was only during the last century, when the commercial herring fishery began, that this critically important forage fish drastically declined, and even collapsed, in many places along Canada's Pacific coast. The commercial gill net and seine herring sac roe fisheries have directly caused the current low biomass and low productivity of herring populations across B.C.. Additionally, the Food and Bait and Special Use Fisheries have led to the extirpation of many local stocks of herring. B.C.'s herring stocks need time to rebuild or we risk losing them forever.

Across B.C., Pacific herring continues to be in a low-spawning, low-biomass state. DFO Science has acknowledged that overharvest is the driving factor causing the perilous state of several stocks of Pacific herring today:

> *"These states were preceded by a transition to low production that began as early as the late 1990's from levels of comparatively high spawning biomass. The low spawning stock depletion levels reached during these periods was comparable to the levels estimated during the collapse of all five major stocks in the late 1960's, which was*

attributed to overharvest rather than loss of production" (Kronlund, et al. 2018, pg viii, para 2). [1]

There is not enough science to support a commercial gillnet and seine sac roe fishery in the Strait of Georgia (SoG), or anywhere else in B.C.. DFO science does not have enough research to guarantee their Biological Harvest Rules are sustainable. For example, the 20% harvest rate that was long considered sustainable for the SoG stocks has been found to be unsustainable and has been reduced to 10% for the second year in a row.

The Draft 2022/2023 Pacific Herring Integrated Fisheries Management Plan states:

> *"[The] estimated median spawning biomass in 2022 in the Strait of Georgia was 78,444 tons, down slightly from the projected pre-fishery biomass last year. The forecasted median spawning biomass in 2023 is 68,114 tons (range: 36,412-135,049 tons)" page 195, paragraph 1.*

Spawning biomass declined by 26% between 2020 and 2022. Looking ahead to 2023, spawning biomass is projected to decline an additional 13% from 2022. The estimated median spawning biomass for 2023 is 10,330 tons less than the estimated median spawning biomass in 2022. This represents a marked decline in the estimated herring biomass several years in a row within the SoG. The large range and high degree of uncertainty at which Pacific herring is estimated to return (36,412 to 135,049 tons) in the SoG is concerning. As per the Draft 2022/2023 Pacific Herring IFMP, the quota for the SoG has been set at a maximum of 6,625 tons. If only 36,412 tons (the low end of DFO's prediction) return to spawn, 6,625 tons would represent an 18% harvest rate which has already been identified by DFO Science as over-harvest.

Pacific Wild Alliance commends DFO Haida Gwaii, the Council of Haida Nation, Parks Canada and the University of British Columbia for all recognizing that resident sub-stocks of Pacific herring exist and must be managed separately, something that DFO and the 2022/2023 Draft Pacific Herring IFMP fails to adequately address. Numerous recent studies have indicated the

[1] Kronlund, A.R., Forrest, R.E., Cleary, J.S., and Grinnell, M.H. (2017). The Selection and Role of Limit Reference Points for Pacific Herring (*Clupea pallasii*) in British Columbia, Canada. DFO Can. Sci. Advis. Sec. Res. Doc. 2018/009. ix +125 p.

potential conservation risks of ignoring sub-stock level dynamics in Pacific herring [2,3,4,5,6]. When small local stocks are fished as part of a larger-scale quota, they may collapse. In B.C., many of these small local stocks have already been extirpated after the massive stock collapse in the 1960s [7].

The Draft 2022/2023 Pacific Herring IFMP states:

> *"The precautionary approach in fisheries management requires caution when scientific knowledge is uncertain. The absence of adequate scientific information should not result in postponed action or failure to take action to avoid the risk of serious harm to fish stocks or their ecosystem." page 26, paragraph 5*

We believe that the summation of the concerns outlined above concerning the Draft 2022/2023 Pacific Herring IFMP is in conflict with a precautionary approach given the amount of scientific uncertainty regarding the management of Pacific herring in B.C. that still exists.

Below are Pacific Wild Alliance's recommendations for amendments to the 2022/2023 Pacific herring IFMP and in consideration for future management plans:

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[2] Benson, A. J., Cox, S. P., & Cleary, J. S. (2015). Evaluating the conservation risks of aggregate harvest management in a spatially-structured herring fishery. *Fisheries Research*, *167*, 101–113. https://doi.org/10.1016/j.fishres.2015.02.003

[3] Okamoto, D. K., Hessing‐Lewis, M., Samhouri, J. F., Shelton, A. O., Stier, A., Levin, P. S., & Salomon, A. K. (2020). Spatial variation in exploited metapopulations obscures risk of collapse. *Ecological Applications*, *30*(3). https://doi.org/10.1002/eap.2051

[4] MacCall, A. D., Francis, T. B., Punt, A. E., Siple, M. C., Armitage, D. R., Cleary, J. S., Dressel, S. C., Jones, R. R., Kitka, H., Lee, L. C., Levin, P. S., McIsaac, J., Okamoto, D. K., Poe, M., Reifenstuhl, S., Schmidt, J. O., Shelton, A. O., Silver, J. J., Thornton, T. F., . . . Woodruff, J. (2018). A heuristic model of socially learned migration behaviour exhibits distinctive spatial and reproductive dynamics. *ICES Journal of Marine Science*, *76*(2), 598–608. https://doi.org/10.1093/icesjms/fsy091

[5] Stier, A. C., Olaf Shelton, A., Samhouri, J. F., Feist, B. E., & Levin, P. S. (2020). Fishing, environment, and the erosion of a population portfolio. *Ecosphere*, *11*(11). https://doi.org/10.1002/ecs2.3283

[6] Rogers, L. A., Salomon, A. K., Connors, B., & Krkošek, M. (2018). Collapse, Tipping Points, and Spatial Demographic Structure Arising from the Adopted Migrant Life History. *The American Naturalist*, *192*(1), 49–61. https://doi.org/10.1086/697488

[7] Pitcher, T.J., Lam, M.E., Kaiser, M, White, A. (S.J.) and Pakhomov, E. (2017) Hard of Herring. In Tortell, P. (ed) Reflections of Canada: Illuminating our Opportunities and Challenges at 150 years. UBC Press, PWIAS

1. Coast-wide moratorium on the Roe Herring (seine and gillnet), Food and Bait, and Special Use Fisheries.

Historically, herring were abundant on the B.C. coast, supporting many coastal First Nations for thousands of years prior to the introduction of industrial fishing. In the last 100 years, stocks have declined to unprecedented and alarming levels. After decades of extremely high commercial catches, herring populations have crashed coast wide. Today, herring no longer spawn in many of their former spawning grounds along the coast and major herring populations in B.C. are failing to thrive.

Pacific herring need time to recover. Natural mortality rates have increased in recent years and are currently higher than at any time since the late 1960s. B.C. 's herring populations simply can not withstand the pressures of the commercial Roe Herring (seine and gillnet), the Food and Bait, and Special Use Fisheries. Herring are the foundation of B.C.'s marine food web. Our marine ecosystems, First Nations, and coastal communities can not withstand the loss of Pacific herring. It is time to put ecosystems over industry and protect Pacific herring while there is still time.

2. Outline a more consistent plan to integrate TEK into management

The 2022/2023 Pacific herring IFMP mentions the need to integrate Traditional Ecological Knowledge (TEK) and Indigenous Knowledge (IK) into DFO management plans. Consulting with First Nations is a necessary step in Fisheries Reconciliation and ensuring access to fishing rights. Having this mentioned in the IFMP is promising, however, direct action and steps in accomplishing this integration should be outlined and incorporated into the IFMP. Pacific Wild Alliance supports the indigenous-led commercial SOK fisheries that have been proven to be sustainable and have been occurring since time immemorial. We support DFO for their intention of re-opening this sector in 2022/2023.

3. Adoption of the Draft Haida Gwaii 'íináang | iinang Pacific Herring: An Ecosystem Overview and Ecosystem-based Rebuilding Plan's recognition and management of sub-stocks of herring within the SoG

The spatial distribution of herring stocks is still not recognized in the Pacific herring management plan. The IFMP assigns stocks to the area in which they are fished – however, there is sufficient evidence to suggest that many regions are home to sub-stocks of non-migratory herring. As such, they cannot be managed as the same unit. The commercial fishery has been known to open prior to the arrival of migratory stocks, depleting the local and extremely vulnerable populations sub-stocks. This crucial information has remained under-researched by DFO and unmentioned in management plans with the notable exception of the Draft Haida Gwaii 'íináang | iinang Pacific Herring: An Ecosystem Overview and Ecosystem-based Rebuilding Plan. We encourage DFO to recognize sub-stocks in the 2022/2023 IFMP for Pacific herring in the SoG as they have been in Haida Gwaii.

4. Create recovery plans based on the historical recognition of sub-stocks of Pacific herring in B.C.

In order to meaningfully protect B.C. 's depleting and extremely vulnerable sub-stock populations of Pacific herring, recovery plans need to be created by DFO. It is expected that TEK will be instrumental in identifying sub-stock populations and informing appropriate recovery and management strategies. Ignoring sub-stock level dynamics in Pacific herring is likely to exacerbate the collapse of herring stocks, decrease the genetic diversity of herring in B.C. and have a negative impact on First Nations and coastal communities who rely on regional sub-stocks for food, social and ceremonial uses.

5. Move towards Ecosystem-Based Management (EBM)

The new Sustainable Fisheries Framework is outlined in the IFMP and includes policies for adopting EBM approaches. This is a step in the right direction. As a community with a shared objective (to ensure biodiversity and healthy oceans for future generations) we must not dig a deeper hole by allowing commercial fishing to proceed as usual while surrounding stocks remain depleted. While we speculate, we still do not fully understand Pacific herring's value as a foundational species in the marine ecosystem and its correlation to the endangered status of Chinook salmon and Southern Resident Killer Whales. EBM allows for a holistic analysis of the herring fishery in relation to the ecosystem, rather than simply at a species level.

6. Conduct catch-per-unit-effort analysis that is publicly available and re-evaluate the max quota for the SoG

In fisheries biology, the catch-per-unit-effort (CPUE) is an indirect measure of the abundance of a target species. Changes in the CPUE are used to signify changes to the target species' true abundance. If effort in the Pacific herring fishery remains stagnant while the catch is decreasing, this would demonstrate a collapse in the stock and should be publicly shared.

There has been very little change in the number of licenses distributed, number of vessels, and fishing effort in the commercial herring fishery while the stocks move closer to collapse. Additionally, the number of licenses issued has not decreased while the quota has continued to decrease. Last year, the commercial landings of Pacific herring totaled nearly 3,407 tons, not fulfilling the total allowable catch of 7,850 tons for non-Indigenous fisheries in the SoG. This suggests that despite the fishing effort, there were insufficient amounts of fish to fulfill the quota. In the absence of a coast-wide moratorium, and given the state of the 2021/2022 catch, it is apparent that even a 10% allowable harvest rate is too high and not representative of a precautionary approach.

We must take responsibility for the state of Pacific herring. We must uphold our promises to First Nations, advocate for our ecosystems, and support the continued sustainable livelihoods of coastal communities. We look forward to your response to our recommendations.

Sincerely,

Sydney Dixon
Marine Specialist
Pacific Wild Alliance