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Ms. Watson & Ms. Cleaver & Mr. Tweit:

We submit the following comments to the North Pacific Fishery Management Council's Ecosystem Committee regarding the development of a purpose and need and range of alternatives for a programmatic Environmental Impact Statement (EIS) for the groundfish fisheries on behalf of The Boat Company. The Boat Company is a charitable foundation with a 40 year history of operating in Alaska where it conducts multi-day conservation, education, sport fishing and adventure tours in Southeast Alaska aboard two small cruise vessels. Charitable work focuses on Alaska conservation issues, including efforts to protect and maintain fishery resources and fish habitat which support diverse local fishing economies throughout Alaska. The Boat Company requests that you develop alternatives that respond to the cumulative impacts of climate change and fisheries on marine resources and coastal communities that adopt an ecosystem based fishery management approach accompanied by bycatch reductions and area protections.

The need statement recognizes that climate change impacts warrant revisiting the programmatic analysis. Alaska's marine ecosystems have experienced multiple record-setting marine heat waves over the past decade.[1] Significant changes to ecosystems and marine biodiversity occurred, including species range shifts, abundance declines, and lower survival and growth of both commercial and forage

[1] Walsh, J.E., Thoman, R.L., Bhatt, U.S., Bieniek, P.A., Brettschneider, B., Brubaker, M., Danielson, S., Lader, R., Fetterer, F., Holderied, K. and Iken, K., 2018. The high latitude marine heat wave of 2016 and its impacts on Alaska. *Bull. Am. Meteorol. Soc*, *99*(1), pp.S39-S43; Siddon, E. 2021. Ecosystem Status Report 2021: Eastern Bering Sea, Stock Assessment and Fishery Evaluation Report. North Pacific Fishery Management Council, Anchorage, AK.

fish species.[2] Warming caused reductions in the extent and duration of Bering Sea sea ice coverage also changed food webs and fish abundance and distribution.[3] Some species, such as Pacific cod and snow crab, experienced precipitous declines.[4]

Marine heat waves are now the most common cause of declared fishery disasters in the U.S. and will likely become more frequent and intense.[5] Socioeconomic consequences include loss of fisheries income and employment, food availability and other ecosystem services.[6] Impacts to marine ecosystems and coastal communities warrant analysis of new alternative management approaches.[7]

The purpose and need statement focuses the analysis on four fishery management issues most affected by climate impacts: (1) ecosystem effects and ecosystem based fishery management; (2) current allocations and limited access fisheries; (3) tribal and indigenous engagement; and (4) the intersection of science and management. Ecosystem-based fishery management recognizes a need to regulate more than target species and account for a wide range of ecological relationships when fisheries affect an entire ecosystem.[8] Moving further toward ecosystem-based fishery management should include additional

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[2] *Id.;* Cheung, Suryan et al. 2021. Ecosystem response persists after a prolonged marine heatwave. Scientific Reports (2021) 11:6235; Barbeaux, S.J., Holsman, K. and Zador, S., 2020. Marine heatwave stress test of ecosystem-based fisheries management in the Gulf of Alaska Pacific cod fishery. *Frontiers in Marine Science*, *7*, p.703.; Cheung, W.W., Frölicher, T.L., Lam, V.W., Oyinlola, M.A., Reygondeau, G., Sumaila, U.R., Tai, T.C., Teh, L.C. and Wabnitz, C.C., 2021. Marine high temperature extremes amplify the impacts of climate change on fish and fisheries. *Science Advances*, *7*(40), p.eabh0895; Ferriss, B.E. and Zador, S. 2021. Ecosystem Status Report 2021: Gulf of Alaska, Stock Assessment and Fishery Evaluation Report, North Pacific Fishery Management Council. Anchorage, Alaska 99501.

[3] Thoman, R.L., Bhatt, U.S., Bieniek, P.A., Brettschneider, B.R., Brubaker, M., Danielson, S.L., Labe, Z., Lader, R., Meier, W.N., Sheffield, G. and Walsh, J.E., 2020. The record low Bering Sea ice extent in 2018. *Bulletin of the American Meteorological Society*, *101*(1), pp.S53-S58; Hunt, G.L., L. Eisner & N.M. Call. 2021. How will diminishing sea ice impact commercial fishing in the Bering Sea? Arctic, Antarctic and Alpine Research 53:1; Siddon, E. 2021; Fedewa, E.J., T.M. Jackson, J.K. Richar, J.L. Gardner & M.A. Litzow. 2020. Recent shifts in northern Bering Sea snow crab (Chionoecetes opilio) size structure and the potential role of climate-mediated range contraction. Deep–Sea Research II 181-182 (2020) 104878; Szuwalski, C. 2021. An assessment for eastern Bering Sea snow crab. Report, North Pacific Fishery Management Council, 1007 W. 3rd Ave, Suite 400, Anchorage, AK 99501

[4] Barbeaux, S.J., K. Holsman & S. Zador. 2020; Suryan et al. 2021; NPFMC. 2023. Rebuilding Plan for Eastern Bering Sea Snow Crab Final Action Analysis. (C1 Snow Crab Rebuilding Analysis February 2023).

[5] Bellquist, L., Saccomanno, V., Semmens, B.X., Gleason, M. & J. Wilson. 2021. The rise in climate change-induced federal fishery disasters in the United States. PeerJ 9:e311186. Cheung, W.W., et al. 2021; Walsh, J.E. et al. 2018; Markon, C., S. Gray, M. Berman, L. Eerkes-Medrano, T. Hennessy, H. Huntington, J. Littell, M. McCammon, R. Thoman and S. Trainor, 2018: Alaska. In: Impacts, risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington DC, USA, pp. 1185-1241.

[6] Smith, K.E., Burrows, M.T., Hobday, A.J., Sen Gupta, A., Moore, P.J., Thomsen, M., Wernberg, T., & Smale, D.A. 2021. Socioeconomic impacts of marine heatwaves: Global issues and opportunities. Science, 374(6566).

[7] *Id.* (identifying "a pressing need to develop a toolbox of adaptation and mitigation measures, including improved climatological forecasting, proactive resource management, and enhanced resilience…").

[8] Pace, N.L., 2009. Ecosystem-based management under the Magnuson-Stevens Act: Managing the competing interests of the Gulf of Mexico red snapper and shrimp fisheries. *Sea Grant L. & Pol'y J.*, *2*, p.1.

regulation of ecosystem issues – like habitat protection, bycatch reduction and protection of forage fish.[9]

Ecosystem-based fishery management alternatives could be structured so that one is more protective of marine resources than the other, or they could include different management tools.[10] Simpler measures include area closures and bycatch reduction and advanced measures consider forage fish and food web interactions, additional identification of essential fish habitats, and address cumulative impacts of fisheries on ecosystems.[11] These alternatives could address other management issues such as allocation and access by encouraging gear shifts to lower impact gear types where feasible.[12] Promoting more selective fishing is a principal approach and has worked in many fisheries.[13] Alternatives could also address tribal community engagement in fisheries with a particular emphasis on salmon.[14] Given the conservation status of some stocks, it would be prudent to evaluate additional measures as needed to avoid potential ESA designations.[15]

Alternatives should revisit how to measure optimum yield from the fisheries - ecosystem-based fisheries management may be essential to achieving long-term optimum yield in a changing climate.[16] Optimum yield has economic components aimed to maximum profits, biological components that maximize catch constrained by overfishing limits and the need to reduce impacts to ecosystems, and sociological components in terms of catches that are best for traditional fishing communities, potentially at the expense of large corporations.[17] National Standard 1 accounts for the importance of local community-based fisheries – optimum yield is not just a single target number but rather "the amount of fish that will provide the greatest overall benefit to the nation … *as reduced by any relevant, economic, social, or ecological factor*."[18] Social factors include "preservation of a way of life for fishermen

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[9] *Id.*; Kuriyama, P.T., Siple, M.C., Hodgson, E.E., Phillips, E.M., Burden, M., Fluharty, D., Punt, A.E., Essington, T.E., Henderschedt, J. and Armstrong, D.A., 2015. Issues at the fore in the land of Magnuson and Stevens: A summary of the 14th Bevan Series on Sustainable Fisheries. *Marine Policy*, *54*, pp.118-121 (explaining that reducing forage fish harvests during low productivity years can prevent severe stock collapses and maintain a crucial energy source for higher trophic level species).

[10] For example, the two alternatives could propose different ranges of bycatch limits adjustments and area protections, or the alternatives could provide different triggers for framework actions, different buffers between overfishing limits and acceptable biological catch and reduced harvest mortality rates for rockfish and stocks with more uncertainty.

[11] Kuriyama, P.T., et al., 2015..

[12] Chuenpagdee, R, L.E. Morgan, S.M. Maxwell, E.A. Norse & D. Pauly. 2003. Shifting gears: assessing collateral impacts of fishing methods in US waters. Front Ecol Environ 2003: 1(10):517-524.

[13] Perez Roda, M.A. (ed.), Gilman, E., Huntington, T., Kennelly, S.J., Suuronen, P., Chaloupka, M. and Medley, P. 2019. A third assessment of global marine fisheries discards. FAO Fisheries and Aquaculture Technical Paper No. 633. Rome, FAO. 78 pp.

[14] Salmon are by far the most important fish species for state of Alaska and tribal fisheries. Because of the cumulative impacts of climate change and bycatch on salmon, an alternative or alternative sub-option solely designed to address salmon bycatch in the pollock fisheries in the Gulf of Alaska and Bering Sea would be appropriate.

[15] Kuriyama, P.T., et al., 2015.

[16] *Id.*

[17] *Id.*

[18] 50 C.F.R. § 600.310(e)(3).

and their families, and dependence of local communities on a fishery (e.g., involvement in fisheries and ability to adapt to change).[19]

Ecosystem-based fishery management alternatives should add ecological and coastal community socio-economic objectives to inform optimum yield determinations. Both Fishery Management Plans specify an optimum yield range and use caps and assume that that there is no significant detrimental impact on the industry.[20] The plans also recognize that the potential need to revisit optimum yield if major changes occur in the relevant ecological, social, or economic factors.[21] All of those factors have changed, as recognized in the draft purpose and need statement.

Moreover, the fishing "industry" is so diverse that the optimum yield caps and ranges have different effects on different fishermen. Alaska fishing fleets range from community-based fishermen working in skiffs and small boats to large catcher processors from Seattle.[22] Most of the commercial fleet – nearly 6,000 vessels – consists of smaller boats less than 58' long.[23] Nearly a half million residents and visitors sport fish in Alaska each year and many rely on hundreds of sport fish guide businesses concentrated in coastal communities where Chinook and halibut are accessible.[24] One of the reasons for undertaking this effort is because Chinook, halibut and other species are at lower abundance levels, triggering reduced harvest quotas and fishery closures. Lower abundances magnify the impacts of bycatch when taken in the pursuit of groundfish optimum yield targets.

The external cost of bycatch thus needs to be considered in alternatives that revisit optimum yield for the fisheries in an ecosystem-based fisheries management system. Average annual trawl bycatch of species targeted in other fisheries between 2017 and 2021 was 46,365 Chinook salmon, 392,345 chum salmon,4,272,000 round pounds of sablefish, 4,293,000 net pounds of halibut, over 1.1 million individual tanner and snow crab and 27,187 red king crab.[25] The losses all accrue to other commercial, sport and subsistence fisheries and the broader ecosystem.

The Boat Company requests that the Committee's alternatives consider and include improved spatial management measures. Alternatives or alternative sub-options could consider designating different percentages of federally managed waters for various resource conservation purposes – whether Marine Protected Areas for broader habitat conservation purposes or species-specific protections, such as halibut and crab nursery areas or seasonal closures of salmon migratory routes to fisheries that take salmon as bycatch.[26] Larger networks of protected areas could

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[19] 50 C.F.R. § 600.310(e)(3)(iii)(B)(1), (2). The availability of alternative employment opportunities and economic contributions to fishing communities in Alaska are also economic factors

[20] NPFMC. 2020. Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands at §3.2.2.2. Anchorage, AK. November 2020; NPFMC. 2020b. Fishery Management Plan for groundfish of the Gulf of Alaska at §3.2.2.2. Anchorage, AK. November 2020.

[21] *Id.*

[22] McKinley Research Group, LLC. 2022 The economic value of Alaska's seafood industry at 24. January 2022. Prepared for Alaska Seafood Marketing Institute. *Available at:* https://www.alaskaseafood.org/wp-content/uploads/MRG_ASMI-Economic-Impacts-Report_final.pdf

[23] *Id.*

[24] Himes-Cornell, A., K. Hoelting, C. Maguire, L. Munger-Little, J. Lee, J. Fish, R. Felthover & C. Geller. 2013. Community profiles for North Pacific fisheries- Alaska. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-259, Vol. 1, 70 p. Tables 19-21.

[25] Fisheries Catch and Landings Reports in Alaska | NOAA Fisheries

[26] For example, Alternatives 3 and 4 in the 2004 PEIS considered expanding protected areas in ranges of up to twenty percent, and fifty percent, respectively.

assist species tracking their thermal habitats.[27] Area protection measures should focus on bottom trawling which is the largest human cause of damage to global sea bed habitats.[28] Mobile bottom trawl gear constantly contacts the sea floor, degrading or destroying seabed habitats and damaging a variety of sea floor species.[29] Trawls "mow" cold water coral reefs and disturb soft-sediment habitats, often leaving barren habitats.[30] These disturbances degrade habitats used by fish for spawning, breeding, feeding or growth to maturity.[31]

The Boat Company also requests that alternatives revisit bycatch limits. There should be bycatch limits for species that currently have no limits: Bering Sea chum salmon, Gulf of Alaska tanner crab and herring, sablefish. There should be options to lower limits for currently limited species, by, for example, ten to thirty percent in one alternative and thirty to fifty percent in a second alternative. Trawl gear is responsible for the largest proportion of the bycatch mortality of valuable commercial, sport and subsistence species in the Bering Sea and Gulf of Alaska.[32] Impacts include the majority of halibut bycatch, significant numbers of Chinook and chum salmon each year that originate in Alaska rivers that are experiencing record low productivity for some stocks and at times large numbers of sablefish. The bycatch includes a high proportion of juvenile fish which reduces future yields for sport, subsistence and commercial fishermen who would otherwise harvest the bycaught species once mature.[33] Alternatives should identify thresholds at which bycatch cannot exceed harvests in directed fisheries: (1) when directed fisheries are closed for conservation purposes, and (2) levels at which trawl bycatch consumes a disproportionate share of the harvestable quota.

In sum, the Boat Company appreciates the work of the Committee to move the PEIS process forward, and requests the development of ecosystem-based fishery management alternatives that include a range of area-based protections, bycatch limits reductions, and other measures that enhance coastal and interior Alaska fishing community resilience to climate change.

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[27] Smith, K.E., et al. 2021.

[28] Steadman, D., J.B. Thomas, V.R. Villanueva, F. Lewis, D. Pauly, M.L. Deng Palomares, N. Bailly, M. Levine, J. Virdin, S. Rocliffe & T. Collinson. 2021. New perspectives on an old fishing practice: Scale, context and impacts of bottom trawling.

[29] *Id.*; Cook, K.V., A.J. Reid, D.A. Patterson, K.A. Robinson, J.M. Chapman, S.G. Hinch, S.J. Cooke. 2018. A synthesis to understand responses to capture stressors among fish discarded from commercial fisheries and options for mitigating their severity. Fish and Fisheries 2018:1-19; Olsgard, F., M.T. Schaanning, S. Widdicombe, M.A. Kendall, M.C. Austen. 2008. Effects of bottom trawling on ecosystem functioning. Journal of Experimental Marine Biology and Ecology 366 (2008) 123-133.

[30] Armstrong, C.W., G.K. Vondolia & M. Aansen. 2016. Use and Non-use values in an applied bioeconomic model of fisheries and habitat connections. Marine Resource Economics 32, No. 4; Olsgard, F. et al 2008.

[31] Chuenpagdee, R, L.E. Morgan, S.M. Maxwell, E.A. Norse & D. Pauly. 2003.

[32] Fissel, B. et al. 2021. Stock assessment and fishery evaluation report for the groundfish fisheries of the Gulf of Alaska and Bering Sea Aleutian Islands Area: economic status of the groundfish fisheries off Alaska, 2019, Table 12: Prohibited species catch (PSC) by species, area and gear 2015-2019.

[33] Cook, K.V., A.J. Reid, D.A. Patterson, K.A. Robinson, J.M. Chapman, S.G. Hinch, S.J. Cooke. 2018. A synthesis to understand responses to capture stressors among fish discarded from commercial fisheries and options for mitigating their severity. Fish and Fisheries 2018:1-19