“Implementation of an ecosystem approach to fisheries management”

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The North Pacific Ocean is home to multiple species of salmonid fishes, including anadromous Pacific salmon that regularly migrate from freshwater to the sea and back. Salmon provide economic benefits in the form of subsistence, commercial, and recreational fisheries, and contribute to the cultural enrichment of the regions where they occur. Their ecological role is complex as they facilitate energy transfer directly and indirectly at multiple trophic levels in many ecosystems.

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Since 2011, the NPAFC Science Plan was expanded to cover the fisheries management issues including, as one of the most important, an accurate forecast of returning salmon abundance. The Long-term Research and Monitoring Plan (LRMP) for Pacific Salmon in the North Pacific Ocean was adopted by the Commission in 2010. The LRMP highlighted several approaches to apply collaborative efforts in order to improve understanding of common mechanisms that regulate Pacific salmon production: precision monitoring of abundance and biomass in the ocean as the most reliable method for predicting changes in production of anadromous populations; accurate stock identification methods such as genetic and otolith mark analyses; and modelling to explain how Pacific salmon production will change in the ocean ecosystems affected by changing climate. The concept of the International Year of the Salmon (IYS) was first proposed in the LRMP.

After the 2015 Symposium, a new NPAFC Science Plan (2016–2020) was developed and integrated with a proposal for the IYS. The IYS was conceived as an intensive burst of internationally coordinated, interdisciplinary, scientific research and outreach focused on salmon, and their importance to people. Both the Science Plan and the IYS contain five overarching research themes including Human Dimension. Expected IYS outcomes include improved forecasting, understanding of temporal and spatial risks for Pacific salmon stocks in a changing climate and environment, and better planning given environmental uncertainties to improve wild stock sustainability and probability of success of hatchery propagation and salmon farming.

Throughout the course of the IYS five-year initiative, three High Seas Expeditions have been planned to study the winter ecology of salmon and try to identify the mechanisms regulating

types. Novel technologies such as gliders, environmental DNA and genetic stock identification are used to enhance research efforts. The 2022 Expedition brought together scientists from Canada, Japan, the Republic of Korea, the Russian Federation, and the United States to conduct five NPAFC member countries to build on research from the 2019 and 2020 International Gulf of Alaska Expeditions. More scientific results are to come from collected samples processing in laboratories and from the North Pacific Ocean-wide expedition in 2022. New genomic technology will facilitate the assessment of the impact of changing ocean conditions on the health of Pacific salmon. Using of autonomous glider will enhance understanding on small-scale oceanographic structure of the ocean upper layer in winter and provide with additional information on marine life distribution there.

It is increasing recognized that the single biggest impediment to science and management of salmon and their associated ecosystems are timely access to data. Our collaborative high seas work has reaffirmed the need toN 0 Tw T* [((i)-1(c O)3(2t)4(1(i)]TJ 5fess)5(tw 148.165 T(m)4(p)1(act)-11(