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**Japanese Salmon Research Under
the NPAFC Science Plan 2016–2020**

by

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The 2016-2020 NPAFC Science Plan has defined its primary goal “Understand Variations in Pacific Salmon Productivity in a Changing Climate” with five research themes aligned with the International Year of the Salmon (IYS) initiatives (IYSWG 2016, SSC 2016). These research themes are: status of Pacific salmon and steelhead trout, Pacific salmon and steelhead trout in a changing North Pacific Ocean, new technologies, management systems, and integrated information systems. It is a high priority for Japanese salmon research to explain and forecast the annual variation of salmon production, corresponding to the new Science Plan themes. Japanese research consists of three components: (1) monitoring of major salmon populations, (2) salmon studies in the ocean, and (3) development and application of techniques for studying stock-specific distribution and abundance.

Japanese Research Plan in 2016-2020

J-1 Monitoring of Major Salmon Populations

This long-term monitoring program aims to assess the status of major populations of chum and pink salmon for their proper stock management including forecast of salmon survivals. The program includes the following items:

- Annual changes in the timing and number of adult returns
- Annual changes in body size and age at maturity, and fecundity
- Otolith mark surveys to assess status of wild and hatchery stocks
- Genetic monitoring for stock diversity conservation
- Epidemiological survey of pathogenic organisms
- Development of synthetic model for accurate forecast

J-2 Salmon Studies in the Ocean

The early life history studies are important to understand the survival mechanisms of salmon. The Bering Sea is a primary feeding habitat for various salmon populations including Japanese chum salmon. Following up the BASIS programs (NPAFC 2001, 2009), Japan will continue a long-term monitoring survey in the Bering Sea. To clarify mechanisms controlling population dynamics of salmon, we focus on the following research items:

- Stock-specific migration and survival of juvenile salmon
- Stock-specific distribution and abundance of salmon in the Bering Sea and adjacent

waters

- Climate change and productions of lower trophic levels
- Feeding competition, trophic status and growth change of salmon

J-3 Development and Application of Techniques for Studying Stock-Specific Distribution and Abundance

The development of North Pacific rim genetic baseline for Pacific salmon is necessary to monitor stock-specific ocean distribution and abundance for accurate estimates of intra-specific interactions and adult returns. Mass otolith mark releases will be continued to assess biological status of hatchery and wild stocks. Recently, environmental DNA (eDNA) technique has been developed for detecting animal species in aquatic environments (Rees et al. 2014). We will conduct a pilot study using the eDNA technique to estimate salmon distribution and abundance in offshore waters.

- Improvement of genetic baseline for chum salmon
- Development of genetic baselines for pink salmon
- Mass otolith mark releases for assessment of wild and hatchery stocks
- eDNA study in offshore waters

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