

Fluctuation of Japanese Chum Salmon Returning Rate Related to Sea Surface Temperatures Along the Spawning Migration Route

Toru Nagasawa¹ and Tomonori Azumaya²

¹*Hokkaido National Fisheries Research Institute, Fisheries Research Agency,
2-2 Nakanoshima, Toyohira-ku, Sapporo 062-0922, Japan*

²*Hokkaido National Fisheries Research Institute, Fisheries Research Agency,
116 Katsurakoi, Kushiro 085-0802, Japan*

Keywords: chum salmon, adult return rate, sea surface temperature, migration

Asian chum salmon catches, including Japanese stocks, increased following the 1977 regime shift and have maintained a high level of catch since then. A large portion of Japanese chum salmon stocks originate in hatcheries, and the number of chum salmon smolt releases has been almost constant (1,817-2,094 million) since 1980. Although there has been a constant enhancement effort, the number of returning chum salmon has fluctuated (44-89 million) after 1990. Before 1993, the average release size of chum salmon from hatcheries in Hokkaido was positively related to the return rate of Hokkaido chum salmon. After 1994, when the average release size was over 1.0 g, sea surface temperatures (SSTs) along the migration route from the Bering Sea to natal rivers in Hokkaido during September have been negatively related to the return rate of chum salmon. Archival tag data indicated that maturing chum salmon avoid warm waters (higher than 16°C) in both their horizontal and vertical movements. We have supposed the survival rate during the early sea life period was connected to year-class strength and return rate of Japanese chum salmon. We propose the additional working hypothesis that water temperatures along the spawning migration route in the northwestern Pacific affects the number of returning Japanese chum salmon.