

NPAFC

Doc. 1192

Rev. _____

Rev. Date: _____

Offshore distributions of anadromous lamprey and threespine stickleback

by

Kentaro Morita, Shoko H. Morita & Masa-aki Fukuwaka

*Hokkaido National Fisheries Research Institute, Fisheries Research Agency,
116 Katsurakoi, Kushiro 085-0802, Japan, (E-mail: moritak@affrc.go.jp)*

Submitted to the

NORTH PACIFIC ANADROMOUS FISH COMMISSION

by

Japan

October 2009

THIS PAPER MAY BE CITED IN THE FOLLOWING MANNER:

Morita, K., S. H. Morita, H., and M. Fukuwaka. 2009. Offshore distributions of anadromous lamprey and threespine stickleback. NPAFC Doc. 1192. 4 pp. (Available at <http://www.npafc.org>)

Offshore distributions of anadromous lamprey and threespine stickleback

Abstract: Pacific lamprey (*Entosphenus tridentatus*), Arctic lamprey (*Lampetra japonica*) and threespine stickleback (*Gasterosteus aculeatus*) are anadromous fishes inhabiting the North Pacific Ocean. The analysis of by-catch data of Japanese offshore salmon monitoring suggested that both lamprey and threespine stickleback were distributed across a wide range in the offshore waters of Pacific Ocean.

Japanese research vessels have monitored the stock condition of Pacific salmon with extensive fishing efforts (Ishida and Ogura, 1992). Although the research program was designed to capture Pacific salmon, the by-catch data allowed us to examine the ecology of other fishes in offshore waters (Machidori, 1986). For example, an analysis of the by-catch data showed that anadromous Dolly Varden (*Salvelinus malma*) were distributed across a wide range in the offshore waters of the Pacific Ocean (Morita *et al.*, In press).

Pacific lamprey (*Entosphenus tridentatus*), Arctic lamprey (*Lampetra japonica*) and threespine stickleback (*Gasterosteus aculeatus*) are anadromous fishes inhabiting the North Pacific Ocean and adjacent rivers (Fig. 1). Although many studies have investigated the migration of stickleback and lamprey (Lucas and Baras 2001), little is known about them in the offshore waters. Here, we document the offshore distribution of anadromous stickleback and lamprey using the by-catch data of Japanese offshore salmon monitoring.

The by-catch data from the Japanese offshore salmon monitoring were compiled for the periods 1960-1962 and 1972-2009. The data were collected using research gillnets, commercial gillnets, longlines and trawls. The total number of fishing operations was 17,077. Fishing stations were scattered throughout the North Pacific Ocean and are basically at least 22 km away from shore (Fig. 2). Unfortunately, the by-catch data did not allow us to distinguish between Pacific lamprey and Arctic lamprey.

Anadromous lamprey and threespine stickleback were collected across a wide range in the offshore waters of Pacific Ocean, including the Bering Sea and Okhotsk Sea (Fig. 3). In addition, a threespine stickleback was caught in the offshore waters of Chukuchi Sea in the Arctic Ocean (Fig. 1). The total numbers of lamprey and threespine stickleback caught were 56 and 4,008, respectively. Offshore areas may be therefore considered an important habitat for anadromous lamprey and threespine stickleback.

Ishida, Y., and M. Ogura. 1992. Review of high-seas salmon research by National Research Institute of Far Seas Fisheries. In: Ishida, Y., K. Nagasawa, D. W. Welch, and K. W. Myers (eds) *Proceedings of the International Workshop on Future Salmon Research in the North Pacific Ocean*. National Research Institute of Far Seas Fisheries, Shimizu, Japan, pp 23–30.

Lucas, M. C., and E. Baras. 2001. *Migration of freshwater fishes*. Blackwell Science Ltd, Oxford, UK. 420 pp.

Machidori, S. 1986. Distribution of fishes caught incidentally in the salmon gillnet in the Subarctic Region of the North Pacific Ocean I–V. *Salmon Report Series* 31: 1–65. (in Japanese)

Morita, K., S. H. Morita, M. Fukuwaka, and T. Nagasawa. Offshore Dolly Varden charr (*Salvelinus malma*) in the North Pacific. *Environmental Biology of Fishes*. In press.



Fig. 1. Upper panel: anadromous Pacific lamprey (*Entosphenus tridentatus*) captured in the Bering Sea (59°00'N, 175°00'W) by R/V *Hokko-maru* on 15 July 2009 (TL 56 cm). Lower panel: anadromous threespine stickleback (*Gasterosteus aculeatus*) captured in the Chukuchi Sea (68°00'N, 168°00'E) by R/V *Hokko-maru* on 21 July 2009 (TL 89 mm).

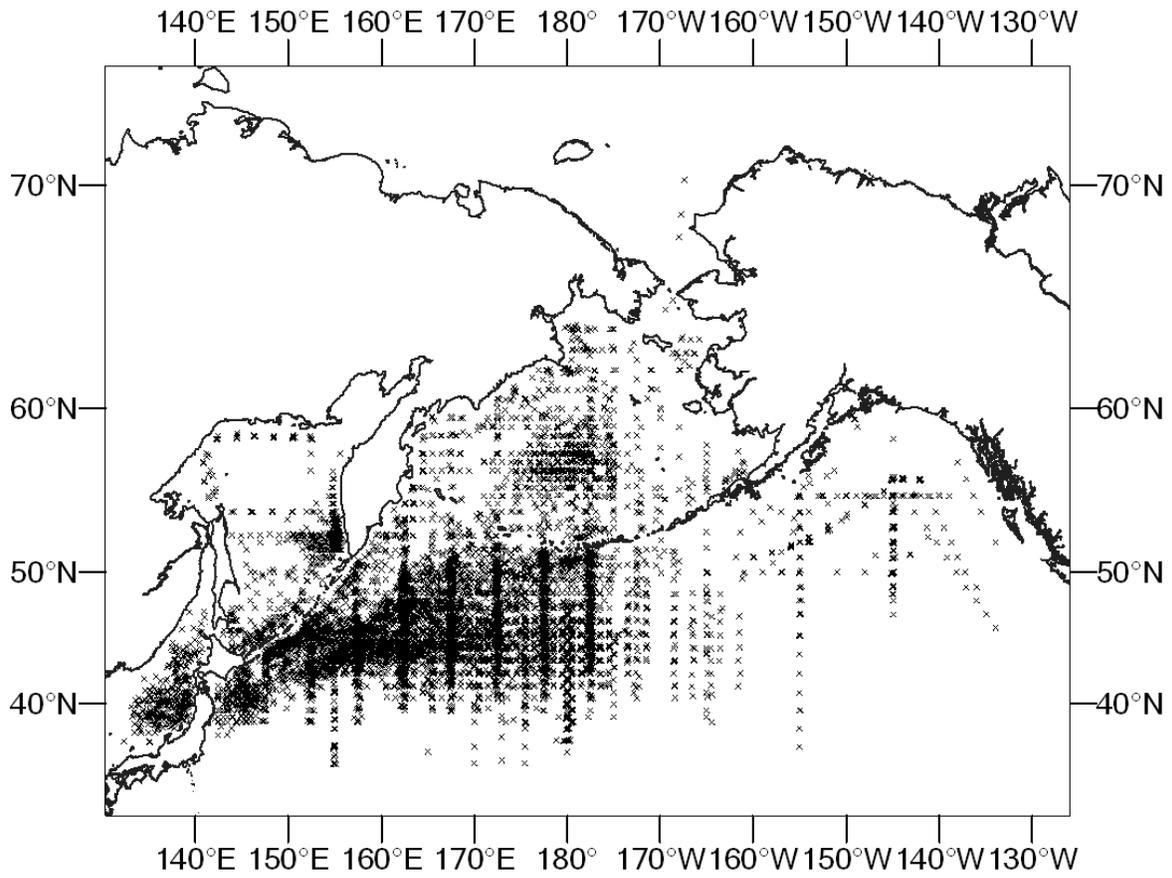


Fig. 2. Distribution of fishing stations by the Japanese offshore salmon monitoring (gillnets, longlines, trawls) compiled in this study.

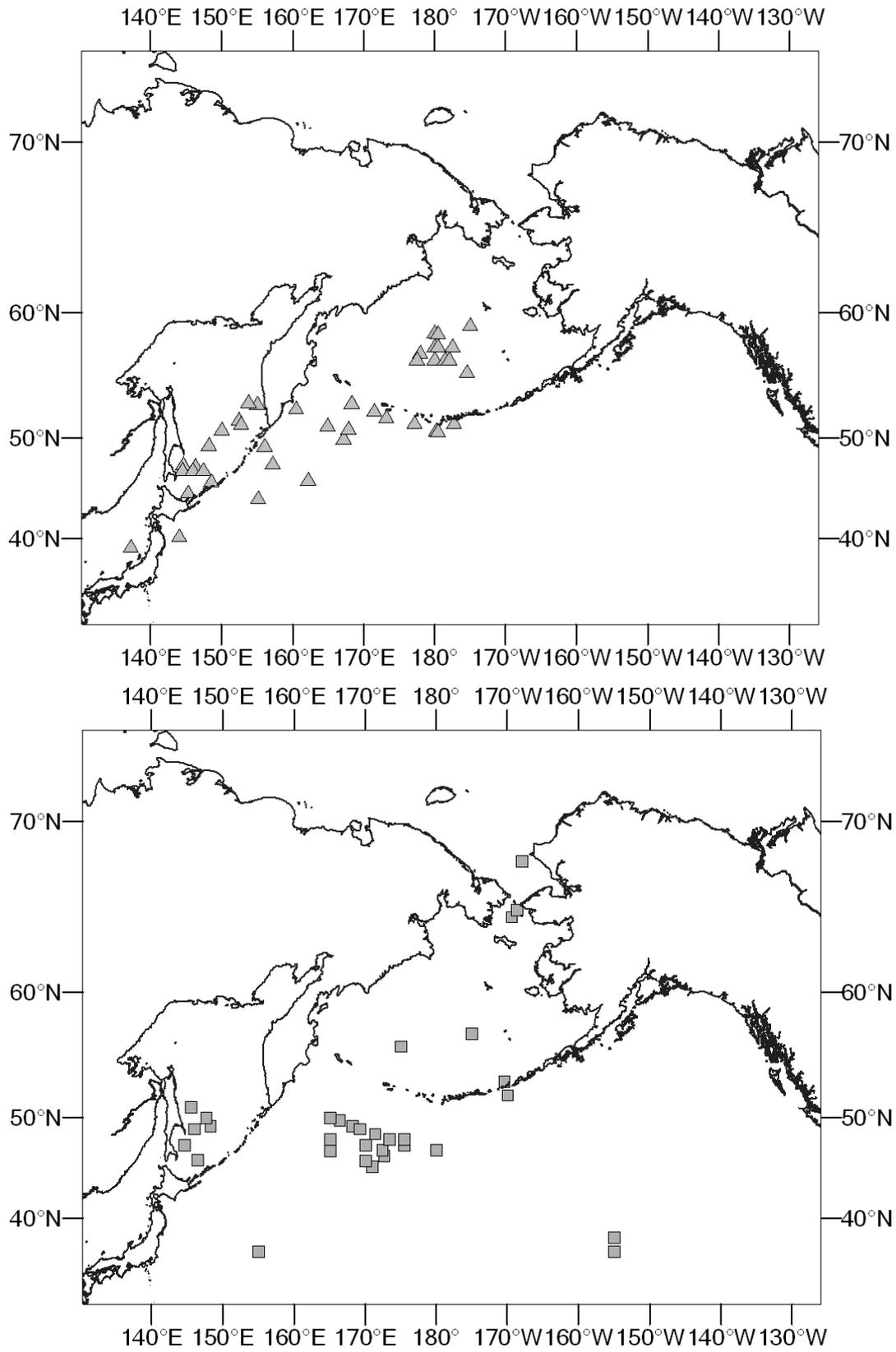


Fig. 3. Upper panel: distribution of fishing stations where lamprey were caught (triangles). Lower panel: distribution of fishing stations where threespine stickleback were caught (squares).