

NATAL HOMING OF HERRING RELEASED IN MIYAKO BAY

Hiroyuki Okouchi* and Masahiro Nakagawa

National Center for Stock Enhancement

Sakiyama 4-9-1 Miyako, Iwate, 027-0097, Japan

okouchi@affrc.go.jp

Since 1984, the FRA Miyako station has conducted local herring stock enhancement experiments at Miyako Bay (Figure 1) targeting the stock spawning in the coastal area of Honshu, the main island of Japan. Results show that the catch of spawning herring in Miyako Bay has increased since 1989, and landing weights reached 1–2 tons in recent years. Because stocked fish comprised about 20% of the catch, we confirmed natal homing of released herring.

Juveniles are released at 5 cm (TL), and stay in and around Miyako Bay for 10 months. They grow to 12–17 cm TL. However, the behavior of 1+ fish that leave Miyako Bay remains unclear. Three research projects addressed this issue. First, we attached dart tags to 5,000 captive 1+ fish and released them in 1988 and 1989 for a preliminary study of the migration area. Second, we verified the above through recoveries of ALC marked fish released in Miyako Bay since 1993. These two studies showed that the released 1+ fish migrate (feeding

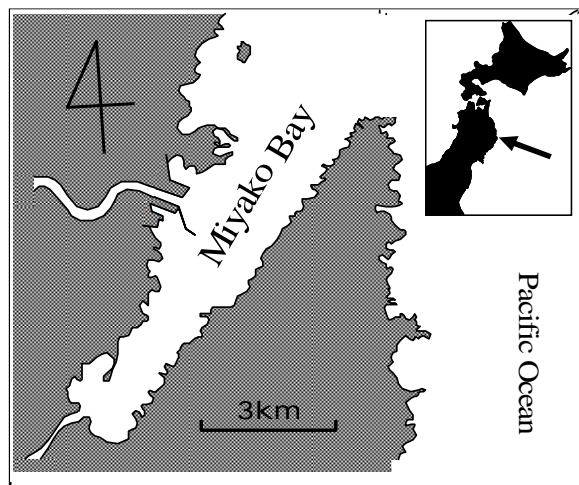
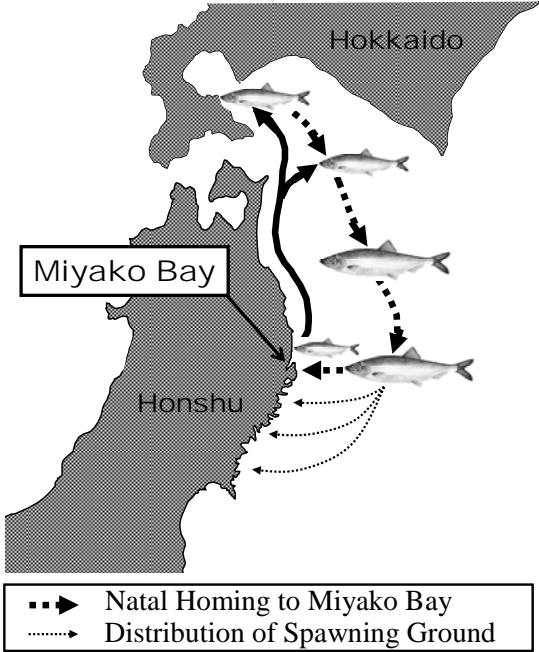


Figure 1: Location of Miyako Bay.

migration) to Funka Bay of Hokkaido in summer. Then they mature to 2+ years during the winter (January to April) of the subsequent year and home to Miyako Bay (Figure 2). The third research project occurred in 2003 and 2004: 500 adult fish that had spawned at Miyako Bay were captured and released again with a dart-tag attached. They also migrate (feeding migration) to Funka Bay in summer. Then they came to spawn in Miyako Bay again the following year.

During the 13 years from 1992 to 2003, 5.63 million juveniles (5–6 cm TL) were released and 7,390 adults (2+ and 3+ year-old) were caught in Miyako Bay. The return rates of released fish for each annual release group were estimated as 0.01–0.71%; 0.11% on the average. Two

causes explain the low return rate: low survival because the herring juveniles are predated; and distribution of spawning grounds. Actually, in other spawning grounds of Honshu, we discovered ALC marked fish that had been released in Miyako Bay.



These results imply that efforts only in the releasing area are insufficient for successful herring stock enhancement. A cooperative system over a large area is needed. However, results showed that stock enhancement technology, including juvenile production and marking technology, and the method of surveying for estimating stocking effectiveness were effective for ecological investigations.

Figure 2: Feeding-migration and homing route of herring released in Miyako Bay.