# Walleye pollock bycatch in salmon gillnet survey in the central Bering Sea, 1981~2010

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M. Fukuwaka[1] , T. Ishihara[2], & Y. Hiyama[1]

[1]Hokkaido Nat. Fish. Res. Inst., Kushiro,

[2]Nat. Salmon Res. Center, Sapporo

During the past 30 years, the National Research Institute of Far Seas Fisheries and Hokkaido National Fish Research Institute (HNF) have conducted salmon gillnet survey in the central Bering Sea. The major objective of the survey is to monitor stock condition of salmon in the central Pacific and Bering Sea. This year, the survey was conducted during June-July, at nine stations in the Bering Sea by using chartered R/V *Wakatake Maru.*

Survey gill net is consisted of research gillnet with variable 10 mesh (48-158 mm mesh; 3-6 tans for each mesh size) and of commercial-mesh gillnet (115 mm mesh; 19-120 tans). To catch fishes, the gill net is set at 16:00 in the afternoon (Local Mean Time) and retrieved at 04:00 in the following day. During the survey, walleye pollock is caught as bycatch species. Catch number of all non-salmonid bycatch species, including walleye pollock, is recorded by each mesh size. CPUE (ind.no./tan) is calculated for research-mesh and commercial-mesh gillnet, respectively. Historical catch data is used to see the appearance frequency of walleye pollock in the survey.

In the 1980s, more than 800 individuals of pollock had been collected on average, showing maximum bycatch of 1,717 individuals in 1983, and about 50% of pollock was collected by 82-93 mm mesh gillnet (Table 1). Following the next peak in 1987, pollock bycatch had been decreased rapidly toward the early 1990s, and the average bycatch in the 1990s was reduced to 13 individuals. Although three adults of pollock with the fork length (FL) of 590 mm, 681 mm, and 688 mm were collected in 2008, no pollock was collected in 2009 and 2010. Pollock bycatch has been at a lowest level in the latest years including 2010 (Fig. 1).

In the central Bering Sea area, mid-water trawl fisheries which targeted pelagic walleye pollock was developed in the early 1980s and maximum of 1.4 mmt of pollock were caught from *Donut Hole* in 1989. In the early 1990s, however, pollock catches had been decreased rapidly. *Donut Hole* catch in 1991 was 80 % less than that in 1989. Considering the low abundance level of pelagic walleye pollock resources in the central Bering Sea, pollock fishery in this area has been closed since 1993.

Observed CPUE trend of bycatch survey from the end of 1980s to the early 1990s was similar to the trend of actual catch amount in the area.

To estimate the spawning biomass in the entire Aleutian Basin the Bogoslof area is used as a reference, and acoustic survey has been conducted to estimate the resource's abundance in the Convention area since 1988. From this survey it is observed that in relation to the decrease of actual catch amount in the area, the distribution of pelagic walleye pollock has been decreased as well. The *Miller Freeman*'s estimates in the Bogoslof area indicated that the biomass has been decreased from 2.4 mmt in 1988 to 0.63 mmt in 1993, and it has been lower level (<0.5 mmt) after 1993.

When we look back the historical bycatch data in salmon survey, a strong relationship between the result of pollock bycatch survey and the result of pelagic pollock abundance estimation is observed, which shows that pollock bycatch survey with salmon gillnet is a useful index of pollock abundance in the central Bering Sea area. Historical bycatch data also shows that in spite of more than 10 years of moratorium, there has been no evidence of recovery of stock abundance or new recruitment of young fish (< 50 cm ) in this area.

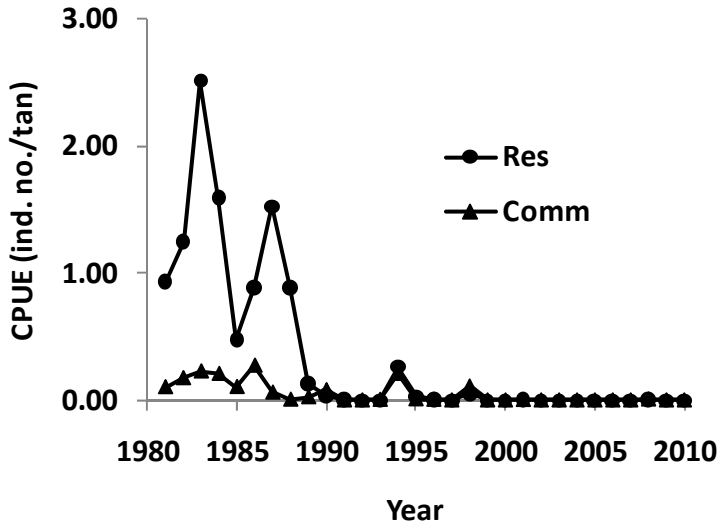


**Fig. 1.** CPUE (individual no./tan) of walleye pollock bycatch in Japanese salmon gillnet survey. Res; research mesh (48-158 mm). Comm; commercial mesh (115 mm).

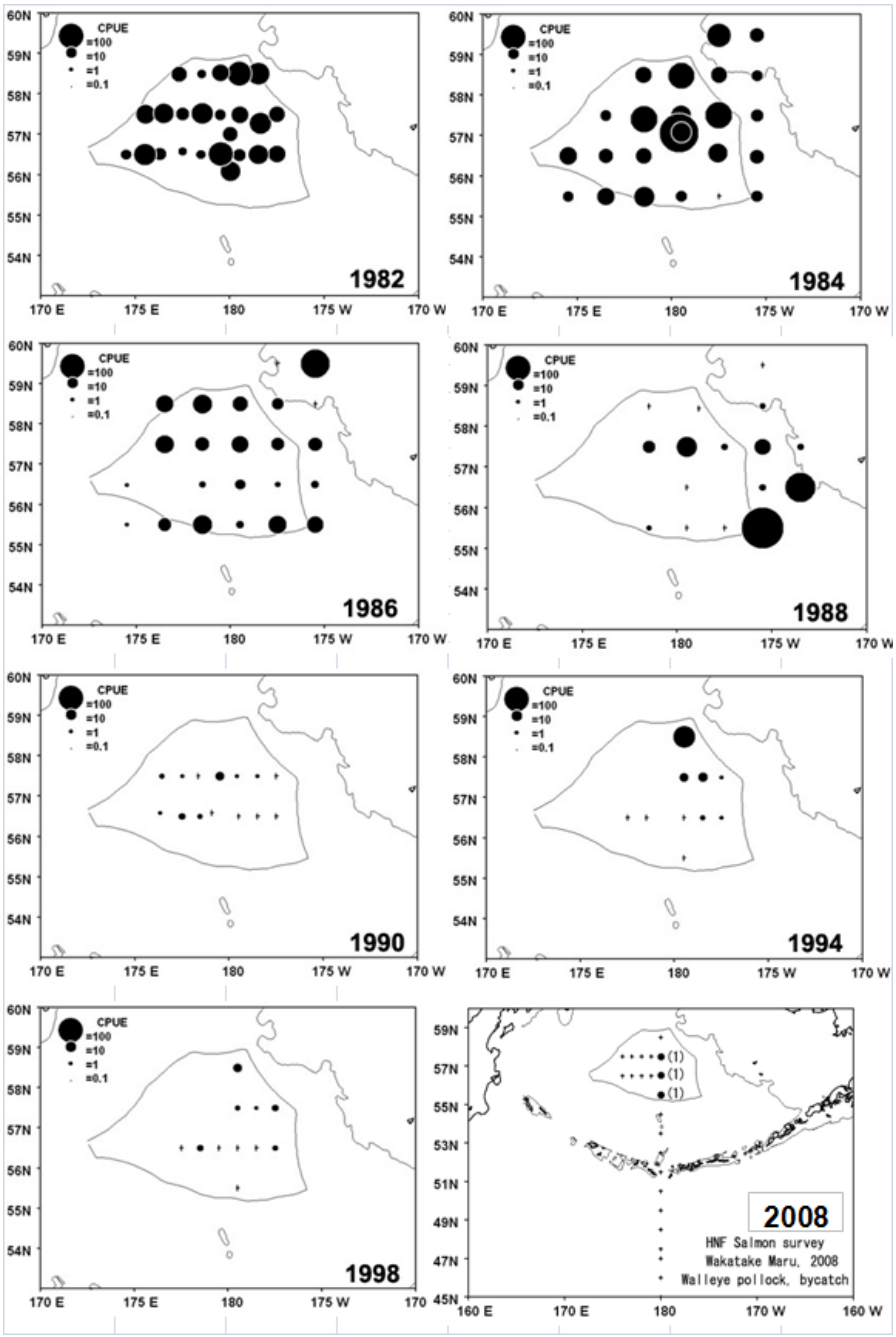


**Fig. 2.** Horizontal CPUE (ind.no./tan) distribution of bycatch walleye pollock in salmon gillnet survey. No pollock was collected in 2009 and 2010.

**Table 1.** Number of walleye pollock caught by salmon gillnet (Res: research mesh net, Comm: commercial mesh net), effort (tan), and CPUE (ind. no./tan).

| | Catch no | | Effort | | CPUE | |
|---|---|---|---|---|---|---|
| | Res | Comm | Res | Comm | Res | Comm |
| 1981 | 589 | 234 | 630 | 2232 | 0.93 | 0.10 |
| 1982 | 895 | 424 | 720 | 2400 | 1.24 | 0.18 |
| 1983 | 1717 | 366 | 684 | 1594 | 2.51 | 0.23 |
| 1984 | 1372 | 732 | 862 | 3479 | 1.59 | 0.21 |
| 1985 | 314 | 254 | 658 | 2376 | 0.48 | 0.11 |
| 1986 | 557 | 547 | 631 | 1986 | 0.88 | 0.28 |
| 1987 | 1691 | 90 | 1110 | 1450 | 1.52 | 0.06 |
| 1988 | 690 | 20 | 780 | 3340 | 0.88 | 0.01 |
| 1989 | 65 | 16 | 480 | 640 | 0.14 | 0.03 |
| 1990 | 17 | 55 | 420 | 675 | 0.04 | 0.08 |
| 1991 | 1 | 0 | 240 | 400 | 0.00 | 0.00 |
| 1992 | 0 | 0 | 330 | 209 | 0.00 | 0.00 |
| 1993 | 0 | 1 | 330 | 209 | 0.00 | 0.00 |
| 1994 | 87 | 44 | 330 | 209 | 0.26 | 0.21 |
| 1995 | 10 | 2 | 330 | 209 | 0.03 | 0.01 |
| 1996 | 2 | 1 | 270 | 171 | 0.01 | 0.01 |
| 1997 | 0 | 0 | 300 | 190 | 0.00 | 0.00 |
| 1998 | 17 | 23 | 330 | 209 | 0.05 | 0.11 |
| 1999 | 0 | 0 | 330 | 209 | 0.00 | 0.00 |
| 2000 | 0 | 0 | 330 | 209 | 0.00 | 0.00 |
| 2001 | 1 | 1 | 390 | 247 | 0.00 | 0.00 |
| 2002 | 0 | 0 | 390 | 247 | 0.00 | 0.00 |
| 2003 | 0 | 0 | 420 | 266 | 0.00 | 0.00 |
| 2004 | 0 | 0 | 420 | 266 | 0.00 | 0.00 |
| 2005 | 0 | 0 | 420 | 266 | 0.00 | 0.00 |
| 2006 | 0 | 0 | 420 | 266 | 0.00 | 0.00 |
| 2007 | 0 | 0 | 420 | 266 | 0.00 | 0.00 |
| 2008 | 1 | 2 | 420 | 266 | 0.00 | 0.01 |
| 2009 | 0 | 0 | 420 | 266 | 0.00 | 0.00 |
| 2010 | 0 | 0 | 270 | 171 | 0.00 | 0.00 |