Walleye pollock bycatch in salmon gillnet survey in the central Bering Sea, 1981~2009

(Revised edition of 2004 STC submitted document)

A. Nishimura[1], M. Fukuwaka[1] , K. Morita[1]& S. Sato[2]

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

[2]Nat. Salmon Res. Center, Sapporo

During the past 29 years, the National Research Institute of Far Seas Fisheries and HNF has been conducting salmon gillnet surveys in the central Bering Sea. The major objective of the surveys is to monitor the stock condition of salmon in the central Pacific and Bering Sea. Recently, the surveys were conducted during June-August, with including 10-20 stations in the Bering Sea by chartered R/V *Wakatake Maru* (Fukuwaka et al., NPAFC Doc. 1115. 19 pp.). 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).

During these surveys, walleye pollock has appeared as bycatch species from gillnet sampling in the central Bering Sea. Historical catch data was analyzed to invest the appearance frequency of walleye pollock in the salmon gillnet surveys. Catch number of all non-salmonid bycatch species were recorded by each mesh size. In this analysis, CPUE (ind.no./tan·12h) was calculated for research-mesh and commercial-mesh gillnet, respectively.

In the 1980s, more than 800 individuals of pollock were incidentally collected on an average, with showing maximum bycatch of 1,717 individuals in 1983 (Table 1). About 50% of pollock was collected by 82-93 mm mesh gillnet. Following the next peak in 1987, pollock bycatch rapidly decreased in the early 1990s, and the average bycatch in the 1990s reduced to 13 individuals. Three adult pollock of 590 mm, 681 mm, and 688 mm (FL) were collected in 2008, but no pollock was collected in 2009. Pollock bycatch has been at a lowest level in the latest years include 2009 (Fig. 1).

In the central Bering Sea area, mid-water trawl fisheries had developed in the early 1980s which targeting pelagic walleye pollock, and maximum of 1.4 mmt of pollock were taken from *Donut Hole* in 1989. In the early 1990s, however, pollock catches decreased rapidly, and *Donut Hole* catch in 1991 was 80 % less than in 1989. With considering the low abundance level of the pelagic walleye pollock resources in the central Bering Sea, pollock fishery in this area has been closed since 1993. Observed gillnet CPUE trend from the end of 1980s to early 1990s was similar to the catch in rapid decrease.

The Bogoslof area is used as a reference area to estimate the spawning biomass in the entire Aleutian Basin, and acoustic surveys were conducted to estimate the resources abundance in the Convention area since 1988. The *Miller Freeman* estimates in the Bogoslof area indicated that the biomass has decreased from 2.4 mmt in 1988 to 0.63 mmt in 1993, and biomass is lower level (<0.5 mmt) after 1993.

When we look back the historical bycatch data in salmon survey, a strong relation between pollock bycatch and pelagic pollock abundance was suggested. This analysis pointed out that pollock bycatch in salmon gillnet survey is a useful index of pollock abundance in the central Bering Sea area. In spite of more than 10 years of a moratorium, there has been no evidence for neither recovery of stock abundance nor newly recruitment of young fish (< 50cm) in this area.

Since 2007, sub-surface trawl salmon survey in the Bering Sea has been conducted by R/V *Hokko Maru* of HNF, besides the *Wakatake Maru* gillnet survey (Morita et al., NPAFC Doc. 1116. 11 pp.). In 2008, one pollock of 567 mm (FL) was collected, but no pollock was collected in 2009. Bycatch information from the newly started R/V *Hokko Maru* survey will also useful for our future information.

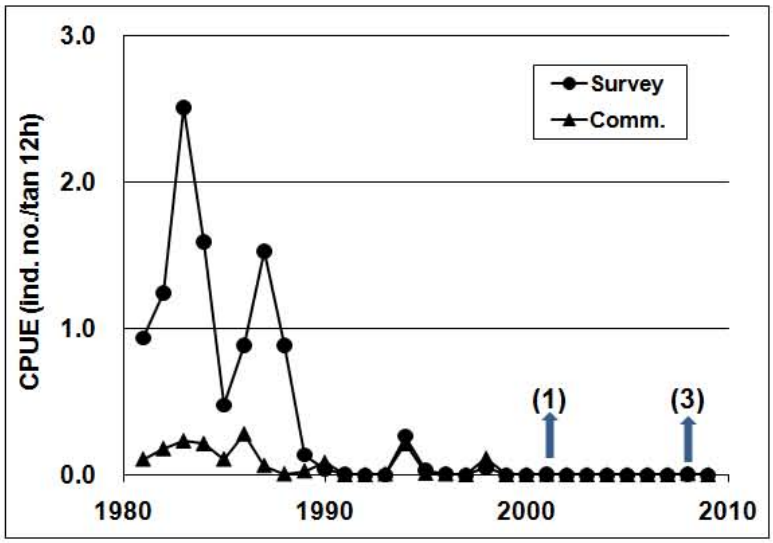

Fig. 1. CPUE (individual no./tan.·12h) of walleye pollock bycatch in Japanese salmon gillnet survey. Survey; survey mesh (48-158 mm). Comm; commercial mesh (115 mm).

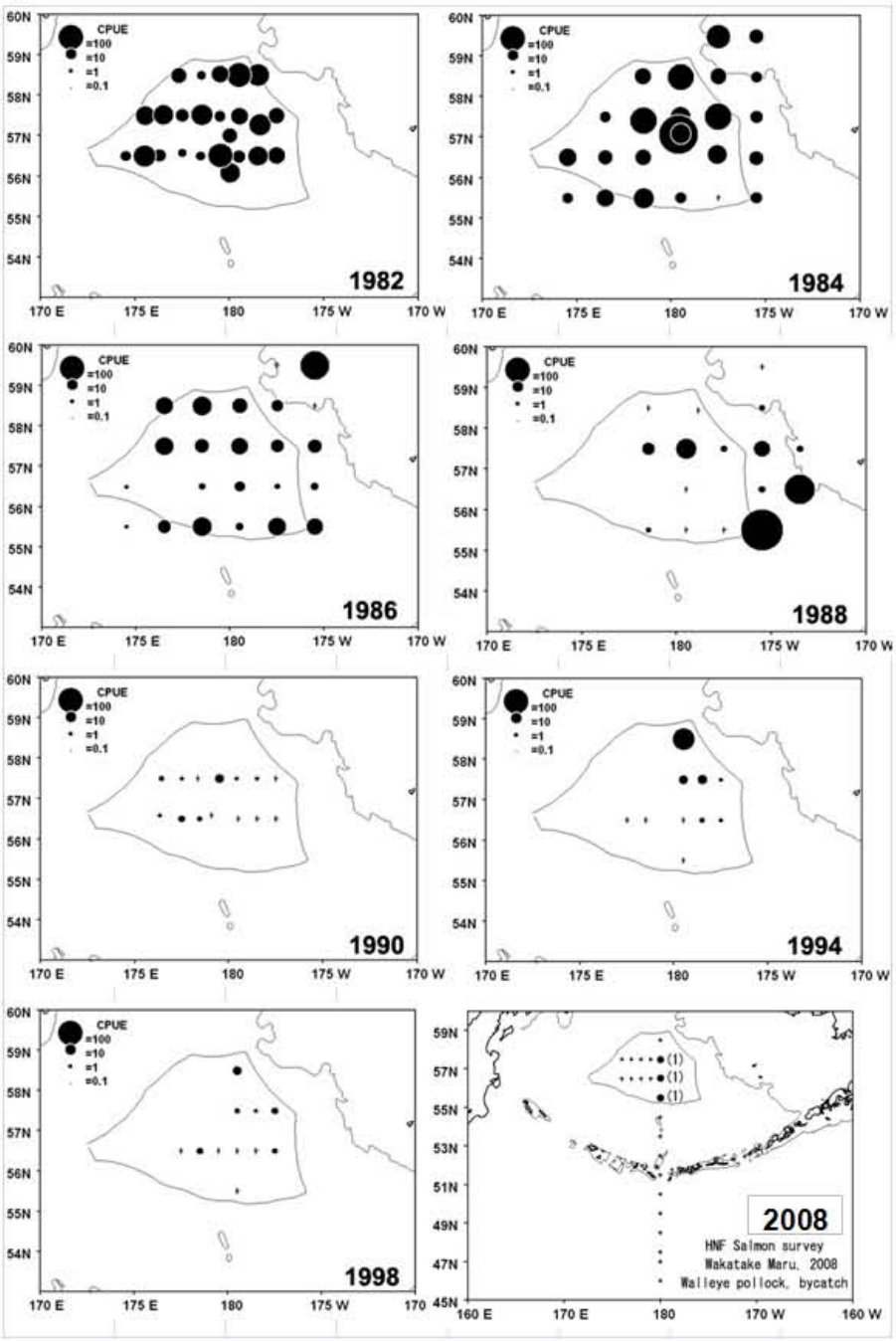

Fig. 2. Horizontal CPUE (ind.no./tan·12h) distribution of bycatch walleye pollock in salmon gillnet survey. No pollock was collected in 2009.

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·12 hour).

	Catch no/12h		Effort		CPUE	
	Survey	Comm.	Survey	Comm.	Survey	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	0.89	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