ASSESSMENT OF TANNER CRAB STOCKS FROM

THE 1980 NMFS TRAWL SURVEY IN THE

EASTERN BERING SEA

J. E. Reeves, Member

Tanner Crab Plan Development Team

Northwest and Alaska Fisheries Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
2725 Montlake Boulevard East
Seattle, Washington 98112

September 1980

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The 1980 NMFS trawl survey for Tanner crabs was conducted from May 12 to July 17, with about 360 tows being completed by two vessels, the NOAA vessel OREGON and the NOAA vessel OCEAN HARVESTER. Coverage of commercial and immediate pre-recruit sized Tanner crabs was similar to that of the 1979 survey.

C. opilio

Estimates of abundance for commercial and pre-recruit sized C. opilio males are down substantially from the 1979 survey especially in the region south of 58° North (Table 1). Large males are down almost 50%, and pre-recruits are lower by about 15%. Comparable estimates for crabs north of 58° North have remained unchanged or have increased over 1979 estimates. However, the reliability of the survey estimates north of 58° is questionable, since estimates of available crabs has been exceeded by the foreign catch in both of the last two seasons.

For ABC calculations, a biological size limit of 105 mm was chosen. This is the size of 100% maturity for male C. opilio (Somerton and Low, 1977) and corresponds to the 140-mm size of 100% maturity for C. bairdi, which is also the legal minimum size limit for this species, according to the Tanner Crab Fishery Management Plan. Estimates of ABC for C. opilio were calculated in the same manner as last year (Reeves, 1979) taking into account the timing of the survey (Table 2) in relation to the July molting period. The total ABC for the 1981 C. opilio fishery is estimated at 91 million pounds, down 28% from the estimate for the 1979 fishery. Of this total, 78 million pounds is estimated south of 58° North and 13 million pounds is estimated north of 58°.

For the stock south of 58°, OY is estimated at 59 million pounds.
This was obtained by adjusting the ABC estimate south of 58° using the
1980 U.S. catch size composition which reflects market restrictions
on the size of crabs caught. As in the past, the 10 percent point or
carapace width above which 90 percent of the catch occurs was used to
determine the lower size limit of the population of male C. opilio for
calculation of the OY south of 58°. As seen in Table 5, the ten percent
point is 110 mm for the U.S. catch. Since the size composition of the
foreign catch was considerably smaller than the U.S. (Table 5), no
adjustment of the ABC was made for C. opilio north of 58° North.

It should be noted that about 25 percent of the foreign catch was
below the biological limit established above. While the validity of
this size limit needs further study, the average size of crab in the
foreign catch has been declining (Figure 1). In addition, catch rates
for the 1980 foreign fishery dropped from the previous season (Table 7).
These factors and the apparent inability of the research survey to
consistently monitor the population north of 58° indicate that some
caution is warranted and that a decline in the resource north of 58° North
may be ahead.

C. bairdi

The 1980 estimated abundance of legal male C. bairdi is on a par with
the 1979 estimate (Table 1). The estimate of pre-recruit males is up
somewhat from 1979. The 1980 survey was earlier than in 1979. As a result,
all surviving pre-recruit crabs are expected to molt to legal size between
the time of the survey and the 1981 fishery. Thus, the combined estimate
of legal and pre-recruit males results in an increased ABC of 41 million
pounds for the 1981 fishery. No adjustment from ABC to OY is made, since

a legal minimum size limit, based in part on biological considerations,

is in effect for <u>C</u>. <u>bairdi</u>.

References

Reeves, J.E., 1979. Assessment of Tanner crab stocks from the 1979 NMFS

trawl survey in the eastern Bering Sea, NPFMC Doc., 7 p.

Somerton, D. and L.L. Low, 1977. Determination of minimum size and yield

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JAPANESE TANNER CRAB
CATCH COMPOSITION
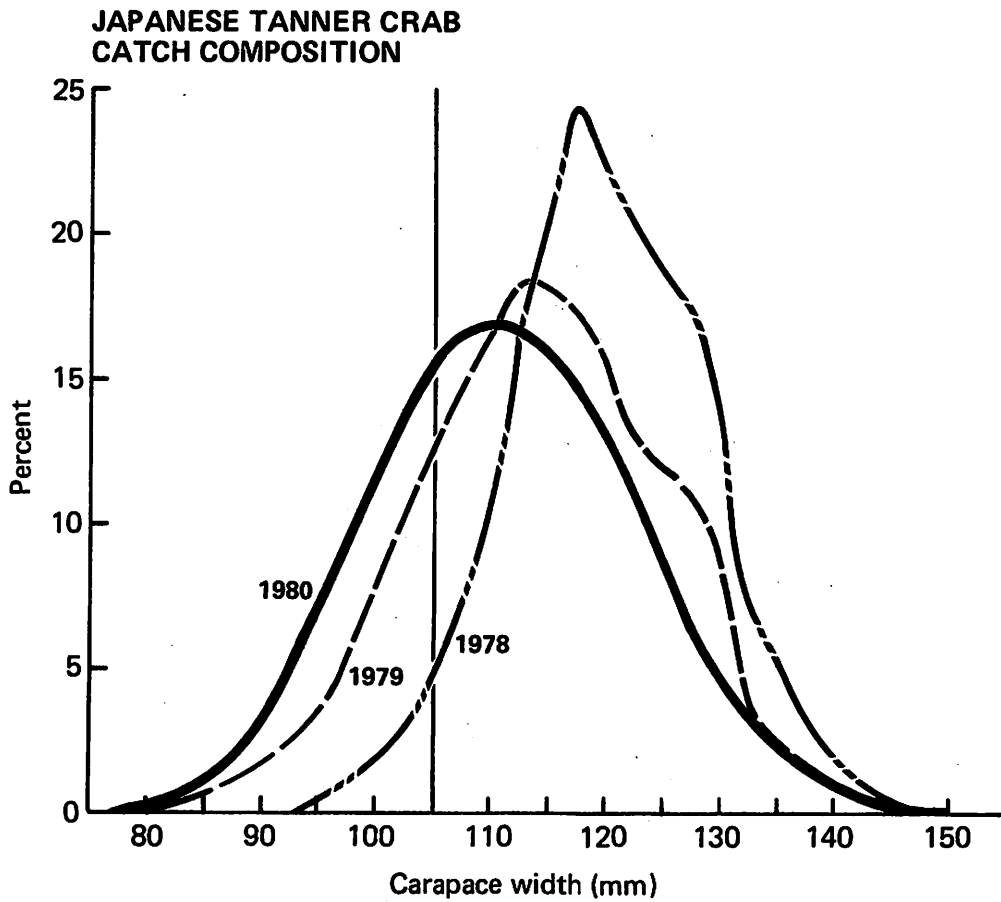
Figure 1. Size distribution of the Japanese Tanner crab catch in the eastern Bering Sea, 1978-80.

Table 1. Survey abundance estimates for Tanner crabs, eastern Bering
Sea (millions of crabs).

Year	C. bairdi		C. opilio	
	Pre-recruits (125-134 mm)	Legals (>134 mm)	Pre-recruits (100-104 mm)	"Legals" (>104 mm)
1975	78	176	415	431
1976	49	135	-	-
1977	40	92	-	-
1978	26	46	76	126
1979	16	32	54 (6, N) (48, S)	159 (9, N) (150, S)
1980	19	31	45 (11, N) (34, S)	88 (10, N) (78, S)

Table 2. Distribution of 1980 NMFS survey effort by week in the U.S. and Japanese fishery areas.

Week	South of 58°		North of 58°	
	Number of Tows	Percent	Number of Tows	Percent
5/7 - 5/13	6	4		
5/14 - 5/20	24	14	3	2
5/21 - 5/27	20	12	2	2
5/28 - 6/3	22	13	1	1
6/4 - 6/10	19	11	15	13
6/11 - 6/17	27	16	16	14
6/18 - 6/24	20	12	9	7
6/25 - 7/1	7	4	21	18
7/2 - 7/8	6	4	23	20
7/9 - 7/15	1	1	27	23
7/16 - 7/22	9	5		
7/23 - 6/29	6	4		

Table 3. Estimates of ABC for C. bairdi in the eastern Bering Sea (range in parenthesis).

Survey Year	Size Group	Millions of Crabs	Average Weight (lb)	Millions of Pounds	Exploitation Rate	ABC (Millions of Pounds)	Fishing Season
1977	>134	92	2.41	222	.40	89	1978
1978	>134	45	2.36	106	.40	43	1979
1979	>134	28	2.40	67	.40	27	1980
1980	>134	41 (34,48)	2.48	102 (84,119)	.40	41 (34,48)	1981

Table 4. Estimates of ABC for C. opilio in the eastern Bering Sea (range in parenthesis).

Survey year	Size group	Millions of crabs	Average weight (lb)	Millions of pounds	Exploita-tion rate	ABC (millions of pounds)	Fishing Season
1975	>115	431	1.79	772	.58	448	1978
1978	> 99	187	1.26	235	.58	136	1979
1979	>104	156		218	.58	126	
North of 58° N		5	1.40	7	.58	4	1980
South of 58° N		151	1.40	211	.58	122	
1980	>104	111 (92,130)	1.40	156 (129,182)	.58	91 (75,106)	
North of 58° N		16 (4,28)	1.38	22 (6,39)	.58	13 (3,23)	1981
South of 58° N		95 (80,110)	1.40	134 (112,154)	.58	78 (65,89)	

Table 5. Size frequency distribution for the 1980 U.S. and Japanese catches of C. opilio, eastern Bering Sea.

Carapace Width Group (mm)	U.S.		Japan	
	Percent Frequency	Cumulative Percent	Percent Frequency	Cumulative Percent
<91	.002	.002	.017	.017
91-95	.004	.006	.048	.065
96	.001	.007	.012	.077
97	.002	.009	.014	.091
98	.003	.012	.019	.110
99	.002	.014	.017	.127
100	.003	.017	.027	.154
101-105	.026	.043	.138	.292
106	.008	.051	.029	.321
107	.012	.063	.034	.355
108	.020	.083	.037	.392
109	.017	.100	.030	.422
110	.029	.129	.038	.460
111-115	.196	.325	.165	.625
116-120	.299	.624	.145	.777
121-125	.248	.872	.106	.876
126-130	.107	.979	.062	.938
>130	.021	1.000	.062	1.000

Table 6. OY for eastern Bering Sea Tanner crab obtained by adjusting the
ABC to account for commercial size limits (ranges in parenthesis).

Stock	Biological Size Limit	ABC (Millions of pounds, Metric Tons)	Commercial Size Limit	OY (Millions of pounds, Metric Tons)
C. opilio	4.1 inches	78 (65, 89)	4.3 inches	59 (49, 69)
South of 58° N	(105 mm)	35400 (29500, 40400)	(110 mm)	26800 (22200, 31300)
C. opilio	4.1 inches	13 (3,23)	4.1 inches	13 (3, 23)
North of 58° N	(105 mm)	5900 (1400, 10400)	(105 mm)	5900 (1400, 10400)
C. opilio		91 (75, 106)		72 (57, 87)
Total		41300 (34000-48100)		32700 (25900-39500)
C. bairdi	5.5 inches	41 (34, 48)	5.5 inches	41 (34, 48)
	(140 mm)	18600 (15400-21800)	(140 mm)	18600 (15400-21800)

Table 7. Catch rates for the Japanese Tanner crab fishery in the eastern
Bering Sea, 1979 and 1980.

	1979	1980	Percent Change
Mothership (lbs/pot-lift)	20.8	17.9	-14%
Landbased (mt/vessel-day)	3.41	2.68*	-21%

* Through 8/16/80.