1984年第37大吉丸によるアラスカ湾における日米共同底魚トロール調査中間報告

Preliminary Report on the Japan-U.S. Cooperative Demersal Trawl Survey in the Gulf of Alaska by Daikichi maru No.37 in 1984

若　林　　清

Kiyoshi Wakabayashi

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若林　清
（遠洋水産研究所）

1984年の水産庁による北洋底魚トロール調査は、ベーリング海とアラスカ湾の2水域に分けて、それぞれ別の調査船によって実施された。アラスカ湾の調査は、北転型スターン・トロール船第37大吉丸を用船し、7－10月の期間、日米共同底魚トロール調査として実施されている。本報告は、調査の概要と、7－8月に実施された第1次調査の結果を速報的にまとめたものである。

調査の概要

底魚類のバイオマス推定を主目的として、1979年に開始された日米共同トロール調査は、これまで東部ベーリング海で3回、アリューシャン列島水域で2回実施されてきた。1984年にはアラスカ湾における初めての調査が、日本船1隻、米国船3隻の参加のもとに実施された。

調査水域は、西経144－170度における水深約10－800 mの水域である。水深約100 m以浅の水域

本報告の引用は下記に従うこと：
若林　清　1984．1984年第37大吉丸によるアラスカ湾における日米共同底魚トロール調査中間報告（北太平洋漁業国際委員会提出文書）．10頁．水産庁、東京．

This paper may be cited in the following manner:
Wakabayashi, Kiyoshi. 1984. Preliminary report on the Japan-U.S. cooperative demersal trawl survey in the Gulf of Alaska by Daikichi maru No. 37 in 1984. (Document submitted to the International North Pacific Fisheries Commission) 10 p. Fisheries Agency of Japan, Tokyo, 100 Japan.

（大陸棚に湾入する 100 m以深の海谷部を含む）については、海底地形等に応じて 22 の階層に区分し、過去の米国調査で得られた魚群密度資料に基づき、約 10 － 15 マイル間隔にひき網定点を設けてひき網を実施した。水深約 100 m以深の水域では、ほぼ等間隔に設置された 29 本の日米共同はえなわ定線を、100 － 200 m、200 － 300 m、300 － 500 m、500 － 700 m、700 － 800 m の 5 水深帯に区分し、1 定線当り 100 － 200 m水深帯で 1.5 回、700 － 800 m水深帯で 0.5 回、その他の水深帯では 1 回の割合でひき網定点を定めた。

第 1 次調査では、ほぼ西経 162 度以西における 100 m以浅の水域及び西経 144 － 170 度における 100 m以深の水域を調査した。調査の期間中、米国用船トロール船Ｍｏｒｎｉｎｇ　Ｓｔａｒ号が第 37 大吉丸と行動を共にして、100 m以浅の水域では、バイオマス推定及び両国調査船間の漁獲効率比較のための同時平行操業を行なった。100 m以深の水域では、両船が同一日に同一はえなわ定線の周辺水域で、任意にひき網水域を選定して操業した。得られた資料はバイオマス推定、日米トロール船間の漁獲効率比較ならびに日米トロール船と日米共同はえなわ調査船第五龍昇丸の漁獲資料の比較に用いられる。トロール船が第五龍昇丸に先行してひき網する場合には、予定定線位置から 3 マイル以上離して実施し、トロールひき網がはえなわ調査結果に影響しないよう配慮した。

第 2 次調査では、第 37 大吉丸が単独で、西経 147 － 162 度における約 100 m以浅の水域を東端から調査ひき網を実施中である。

各定点では 30 分を目標にひき網を実施し、ＸＢＴにより水温を測定した。漁獲物は魚種（又は魚種群）ごとにバネ秤で重量を測定して、漁獲物重量組成を求めた。漁獲量が多い場合には、魚種別の 1 カゴ平均重量とカゴ数により漁獲重量を推定した。主要魚種については、約 150 尾の雌雄別体長組成を求め、また、漁獲重量と体長組成標本重量及び標本尾数から漁獲尾数を推定した。体長測定を実施しなかった魚種については、漁獲尾数を全て数えるか、標本の重量及び尾数をもとに漁獲尾数を推定した。更に、いくつかの定点では、主要魚種の年齢形質を採取し、また、生物測定や魚種判別のための冷凍標本を作成した。

第 1 次調査では、規定のひき網以外に 5 回のひき網を実施し、音響機器を用いて、ひき網速度及びトロールワープ長の相違や舵切りによる網口高さ及び網口幅の変化を観察した。これらのひき網では、漁獲物の計測は行なわなかった。

乗船調査員

調査船には、常時以下に示す 3 名の調査員が乗船して調査を実施したが、この他に約 15 名の乗組員が調査員とともに調査作業に従事した。

若　林　　清（遠洋水産研究所）

石　田　　実（北海道大学水産学部）

Craig Rose (Northwest and Alaska Fisheries Center, Seattle)

7月14日－7月30日の期間

Lael Ronholt（　同　　上　）

8月1日－8月22日の期間

調査船及び漁具

第37大吉丸は総トン数349.96トンの北転型トロール船で、1979年以降の日米共同トロール調査に用船されたものとほぼ同型の船である。調査船の要目を表1に示した。また、本調査に使用したトロール漁具及び附属漁具の仕様を表2に示した。トロール網の規模は、1983年のアリューシャン列島水域調査で使用された網とほぼ同一であった。アラスカ湾における大規模調査は初めてであり、また、この水域は漁撈長にとって未知の部分も多かったため、破網を防ぐ目的でグランドロープの中央部約 13.5 *m* に、直径約 57 *cm*の自動車用タイヤを3本のチェーンで密に連結して用いた。グランドロープの両端には 51 *cm*の鉄製ボビンを、それから中央に向けて42 *cm*のゴム製及び鉄製ボビンを交互に配置し、各ボビン間には31 *cm*× 20 *cm*の打抜タイヤ板を密に配置した。グランドロープにタイヤを用いたトロール漁具は、ボビンのものに比較して漁獲効率が低下することが報告されている（山口，1981）。

音響機器を用いた測定によれば、ひき網中の網口高さは平均約3.5 *m*であり、また、網口幅は21－29 *m*で水深に従って広がる傾向を示した。

調　査　日　程

第37大吉丸は、1984年7月5日塩釜を出港し、7月15日にUnalaska島南東水域から第1次調査を開始した。7月21日までの期間には、西経162度以西の約100 *m*以浅の水域を調査し、7月22日から8月20日までの期間には西経145－170度における100 *m*以深の水域を調査した。7月17日には、Dutch Harborにおける燃油補給のため、調査を中断し、また、7月31日及び8月1日には、Morning Star号がShumagin諸島のSand Point入港したため、規定の調査を中断して、音響機器を用いた網口幅測定試験を実施した。8月20日に第1次調査を終了し、8月22日にKodiakに入港した。

その後、第37大吉丸は8月28日にKodiakを出港し、9月現在第2次調査を実施中である。10月3日に調査を全て終了し、Dutch Harbor入港後、10月17日塩釜に帰港の予定である。

調査結果の概要

第1次調査では、調査水域滞在36日間に177回のひき網を実施し、網口幅測定試験ひき網5回と根掛り等の不成功ひき網10回を除く、162回のひき網資料が得られた。各ひき網定点及びはえなわ定線の位置を図1に示した。

各定点における魚種別漁獲量及びオヒョウの漁獲尾数を30分当りに調整し、そのＩＮＰＦＣ海区別水深帯別平均漁獲量（ＣＰＵＥ）を表3に示した。このうち、Yakutat海区の値は西経145－147度

の狭い水域から得られたものである。

オヒョウの定点別 30 分当り漁獲尾数を図 2 に、その体長組成を海区別水深帯別にまとめて表 4 に示した。

文　　献

山　口　閑　常　　1981：1980 年度アリューシャン水域における底魚資源の日米共同調査。昭和 55 年度漁業資源研究会議北日本底魚部会会議報告，水産庁・他：14 － 27。

Table 1. Specifications of the research vessel Daikichi maru No. 37 conducting the Japan-U.S. cooperative demersal trawl survey in the Gulf of Alaska in 1984.

Overall length (m)	50.41
Gross tonnage (ton)	349.96
Shaft horsepower (PS)	2,500
Propeller	Controllable pitched propeller
Type of trawl	Stern trawl
Numbers of crew	22
Numbers of scientists	3

Table 2. Specifications of trawl gears used for the 1984 Gulf trawl survey.

Head rope length (m)	49.1
Footrope length (m)	57.0
Overall net length (m)	73.4[a]
Mesh size of codend (mm)	100[b]
Diameter of bobbins (mm)	420[c]
Diameter of tires (mm)	570
Dandyline length (m)	134[d]
Size of otterdoor (m x m)	2.2 x 3.4[e]
Weight of otterdoor in water (Kg)	2,142

a including codend (20 m in length)
b triple-layered
c a 520 mm-bobbin at each end of footrope
d otter pendant (12 m) + joinning wire (2 m) + single dandyline (60 m) + double dandyline (60 m)
e width x height

Table 3. Average catch per unit effort (kg/30-min.-trawled) of major species, by INPFC area and depth zone, sampled by Daikichi maru No. 37 during the Japan-U.S. cooperative demersal trawl survey in the Gulf of Alaska in 1984

INPFC Area	SHUMAGIN						CHIRIKOF				
Depth zone	-100	100-200	200-300	300-500	500-700	700-800	100-200	200-300	300-500	500-700	700-800
Number of hauls	24	23	13	9	8	3	10	8	6	5	3
Yellowfin sole	5.4										
Rock sole	120.5	25.2	15.9	1.3			2.1				
Flathead sole	15.9	13.9	1.3	0.1			0.3	2.9			
Deepsea sole											
Roughscale sole											
Greenland turbot				6.3					7.4	2.3	1.9
Arrowtooth flounder	36.1	314.2	153.4	49.3	7.5	0.6	1,090.3	636.4	136.3	5.4	3.8
Halibut	40.8	29.0	10.8	3.4			144.8	45.1	2.7		
Rex sole	0.5	19.6	67.8	43.3	1.8		28.9	71.9	114.4	38.8	6.7
Dover sole	0.1	6.1	10.8	26.8	68.3	47.3	8.0	40.2	65.0	77.2	102.2
Other flounders	0.4										
Sub-total of flounders	219.7	408.0	260.0	130.5	77.6	47.9	1,274.4	796.5	325.8	123.7	114.6
Pacific cod	274.0	128.9	45.8	0.3			921.1	158.9	9.4		
Pollock	177.2	299.8	916.5	0.4			0.1	2.2	0.4		
Other cods											
sub-total of cods	451.2	428.7	962.3	0.7			921.2	161.1	9.8		
Sablefish	0.3	154.8	395.6	678.8	538.3	78.7	92.8	372.0	546.9	447.2	361.8
Pacific ocean perch	0.6	111.2	2,075.9	12.0			5.4	21.8	6.9		
Northern rockfish	135.4	74.3	17.2	133.8			12.9	0.4			
Shortraker rockfish				94.0				0.2	26.6	6.4	
Rougheye rockfish		0.2	3.2	310.1			0.5	51.4	436.5	2.5	
Other rockfishes	2.1	4.7	1.1	0.4			2.4	0.8	0.3		
Thornyheads		1.2	193.5	182.3	176.5	126.7	18.4	427.5	211.1	110.1	82.1
Pacific herring											
Smelts											
Atka mackerel	88.4	0.9	0.2	0.1							
Other greenlings	1.0	0.7	0.1				1.5				
Sculpins	18.3	12.2	81.0	5.6	0.0		20.2	49.8	32.8	0.3	0.2
Poachers	0.0	0.0		0.0	0.0		0.0	0.0	0.1	0.0	0.0
Eelpouts			0.0	0.1	0.5	0.2		0.1	0.2	0.0	0.1
Snailfishes				0.3	2.8	3.0	0.1	0.1	3.4	2.9	1.2
Grenadiers				799.8	1,655.3	1,643.3		0.2	905.8	1,121.5	1,209.2
Seacher	0.1	0.2	0.1				0.5				
Prowfish	0.2	5.1	6.7	2.3			3.7	4.1	0.7	0.0	
Skates	3.2	2.1	9.3	1.1	2.7		6.8	1.8	6.5	1.5	1.0
Other fishes	2.2	14.5	0.2	0.0	0.2	0.1	2.1	0.3	0.1	0.3	0.2
Sub-total of otherfishes	251.8	382.1	2,784.1	2,220.7	2,376.3	1,852.0	167.3	930.5	2,177.9	1,692.7	1,655.8
Total of fishes	922.7	1,218.8	4,006.4	2,351.9	2,453.9	1,899.9	2,362.9	1,888.1	2,513.5	1,816.4	1,770.4
Octopuses		0.2	0.8	5.6	1.2	1.5	1.2	0.9	9.3	2.6	2.4
Squids	0.0	0.1	1.4	25.8	5.6	0.3	0.1	2.3	5.7	2.7	0.6
Pink shrimp											
Sidestripe shrimp			0.0					0.1			
Other shrimps											
Sub-total of others	0.0	0.3	2.2	31.4	6.8	1.8	1.3	3.3	15.0	5.3	3.0
Total of catches	922.7	1,219.1	4,008.6	2,383.3	2,460.7	1,901.7	2,364.2	1,891.4	2,528.5	1,821.7	1,773.4
Numbers of halibut caught	11.8	3.8	2.9	0.4			8.6	3.5	0.2		

Table 3. (continued)

INPFC Area	KODIAK					YAKUTAT	
Depth zone	100-200	200-300	300-500	500-700	700-800	100-200	200-300
Number of hauls	14	12	9	7	3	3	2
Yellowfin sole							
Rock sole	5.0	0.1					
Flathead sole	3.0	2.4				22.4	1.5
Seepsea sole							
Roughscale sole							
Greenland turbot					0.5		
Arrowtooth flounder	1,195.1	164.4	199.4	15.0		66.3	68.3
Halibut	317.4	110.5	23.8	5.7		144.1	24.1
Rex sole	47.1	59.5	50.0	23.0	1.4	0.9	8.9
Dover sole	19.7	33.8	73.2	168.0	163.0	11.4	87.1
Other flounders	0.5	0.0		0.5	0.3		0.5
Sub-total of flounders	1,587.8	370.7	346.4	212.2	165.2	245.1	190.4
Pacific cod	219.6	65.2	0.9			321.3	11.4
Pollock	4.6	468.8	1.8			0.4	7.4
Other cods							
Sub-total of cods	224.2	534.0	2.7			321.7	18.8
Sablefish	536.9	354.8	101.2	368.2	570.7	45.6	197.5
Pacific ocean perch	44.3	95.5	48.8	0.2		1,096.7	167.4
Northern rockfish	4.4	1.2	0.2				
Shortraker rockfish		1.1	127.6	40.9			
Rougheye rockfish	0.1	6.6	478.6	2.2		1.9	30.9
Other rockfishes	48.4	5.5	1.1			16.8	6.5
Thornyheads	0.2	120.1	133.0	132.6	110.1	4.9	139.0
Pacific herring							
Smelts	0.3	0.4				3.0	0.5
Atka mackerel	0.1	0.2					
Other greenlings							
Sculpins	2.0	62.4	38.8	4.9		1.2	96.9
Poachers	0.0	0.0	0.1	0.0	0.0		
Eelpouts	0.0	0.3	0.5	0.3	0.9	0.6	0.1
Snailfishes		0.0	0.9	1.5	0.7		
Grenadiers	0.0		229.9	803.1	647.5		
Seacher	0.1	0.0	0.0				
Prowfish	9.9	6.4	1.4			7.0	6.8
Skates	2.8	2.8	0.8	1.2	1.5	12.0	
Other fishes	0.9	0.2	0.4	0.3	1.4	29.9	10.7
Sub-total of otherfishes	650.6	657.5	1,163.3	1,355.4	1,332.8	1,219.6	656.3
Total of fishes	2,462.6	1,562.2	1,512.4	1,567.6	1,498.0	1,786.4	865.5
Octopuses	0.1	0.1	3.3	1.3	6.4	0.2	1.1
Squids	0.1	0.9	28.3	5.5	4.2		
Pink shrimp						0.1	
Sidestripe shrimp		0.1	0.0			0.2	0.1
Other shrimps	0.0	0.0				0.0	
Sub-total of others	0.2	1.1	31.6	6.8	10.6	0.5	1.2
Total of catches	2,462.8	1,563.3	1,544.0	1,574.4	1,508.6	1,786.9	866.7
Numbers of halibut caught	11.8	5.6	0.8	0.1		4.0	0.5

Table 4. Fength frequency distributions of Pacific halibut, sexes combined, by INPFC area and depth zone, sampled by Daikichi maru No. 37 during the Japan-U.S. cooperative demersal trawl survey in the Gulf of Alaska in 1984

INPFC Area	SHUMAGIN					CHIRIKOF				KODIAK					YAKUTAT			Grand Total	
Depth zone / FL class	-100	100-200	200-300	300-500	Total	100-200	200-300	300-500	Total	100-200	200-300	300-500	500-700	Total	100-200	200-300	Total	Number	%
(cm) -25																			
30	2				2													2	0.3
35	5				5													5	0.7
40	17				17					3				3				20	2.6
45	38	3	5		46					6				6				52	6.8
-50	51	2	4		57					2				2				59	7.7
55	44	8	7		59	1			1	5	2			7				67	8.8
60	44	17	8		69	8			8	4				4	1		1	82	10.8
65	18	8	4		30	2			2	1	1			2	1		1	35	4.6
70	11	12	6		29	6			6	7				7				42	5.5
-75	6	4	1		11	3			3	7				7				21	2.8
80	5	3	1		9	7	2		9	2	1			3				21	2.8
85	4	1		1	6	4	2		6	3	3	1		7	1		1	20	2.6
90	3	7	1		11	7	7		14	12	5			17				42	5.5
95	2	9		1	12	7	4		11	7	5			12	1		1	36	4.7
-100	4	3		1	8	9	6		15	9	7			16	1		1	40	5.2
105	3	3			6	5	2		7	7	8			15	1		1	29	3.8
110	3				3	6		1	7	12	4	1	1	18				28	3.7
115	1	1			2	6	3		9	8	5	1		14				25	3.3
120	2	1	1		4	4	1		5	13	6			19				28	3.7
-125	1	1			2	2			2	6	4			10				14	1.8
130		1			1	2			2	7	2			9	2		2	14	1.8
135	1				1					4	3			7	2		2	10	1.3
140						1			1	2	5	2		9				10	1.3
145	1	1			2					3	2		1	6				8	1.0
-150										3	1	2		6				6	0.8
155	1				1					3				3	1	1	2	6	0.8
160						1			1	4				4				5	0.7
165		1			1	1			1	4	1			5				7	0.9
170							1		1	4				4				5	0.7
-175										5	1			6				6	0.8
180						2			2	3				3				5	0.7
185																		0	
190						1			1	4				4				5	0.7
195										2				2				2	0.3
-200															1		1	1	0.1
205										1				1				1	0.1
210										2				2				2	0.3
215																			
220																			
-225																			
230						1			1									1	0.1
Total	267	86	38	3	394	86	28	1	115	165	66	7	2	240	12	1	13	762	100.1

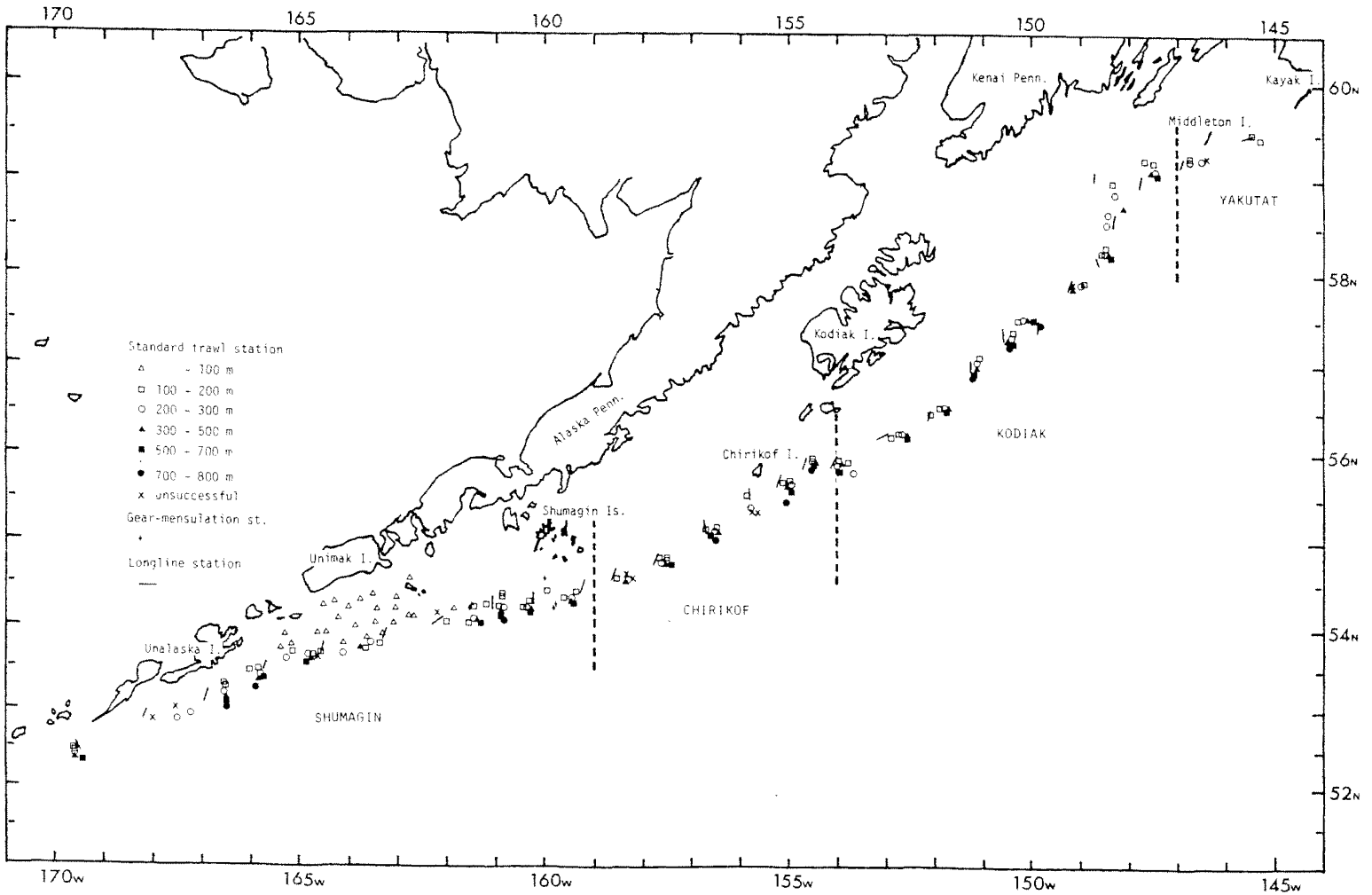

Figure 1. Trawl survey stations for the Daikichi maru No. 37 sampled during the Japan-U.S. cooperative demersal trawl survey in the Gulf of Alaska in 1984

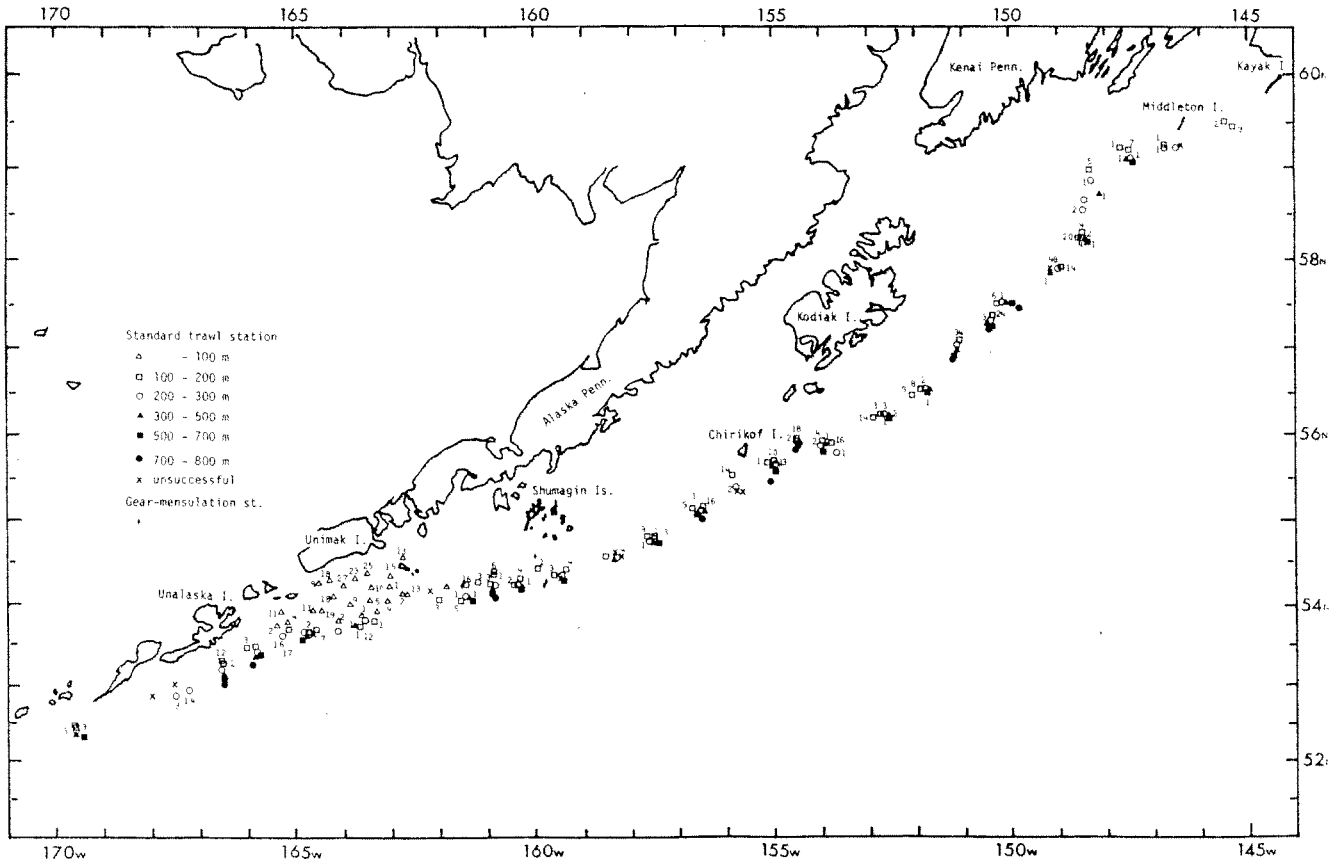

Figure 2. Numbers of Pacific halibut per 30 min.-trawled sampled by the Daikichi maru No. 37 during the Japan-U.S. demersal trawl survey in the Gulf of Alaska in 1984

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PRELIMINARY REPORT ON THE JAPAN-U.S. COOPERATIVE DEMERSAL TRAWL SURVEY IN THE GULF OF ALASKA BY DAIKICHI MARU NO. 37 IN 1984

Kiyoshi Wakabayashi

Fisheries Agency of Japan

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The North Pacific demersal trawl survey by the Fisheries Agency of Japan in 1984 was conducted by separate research vessels in the Bering Sea and Gulf of Alaska. The survey in the Gulf of Alaska was conducted as a Japan-U.S. cooperative survey by the Daikichi maru No. 37, a landbased dragnet trawler, during the period July to October. This preliminary report outlines the survey and provides a summary of results obtained in the first survey during July to August.

Outline of survey

The Japan-U.S. joint trawl surveys which commenced in 1979 with the main purpose of estimating biomass of demersal fish have been conducted three times in the eastern Bering Sea and twice in the Aleutian Islands region. In 1984, the first survey in the Gulf of Alaska was conducted by one Japanese research vessel and three U.S. research vessels.

The surveyed areas were in 10 to 800 m depths between 144° to 170°W. The areas shallower than about 100 m layer (including those parts of sea valleys deeper than 100 m layer which intruded into continental shelf) were classified into 22 classes according to bottom contours and trawling was conducted by establishing standard trawl stations at intervals of about 10 to 15 miles based on the density of fish data obtained by U.S. surveys in the past. In areas deeper than about 100 m the standard trawl stations were established in the following manner. Previously established 29 survey lines for the Japan-U.S. longline survey were divided into five depth zones: 100 to 200 m, 200 to 300 m, 300 to 500 m, 500 to 700 m, and 700 to 800 m. The trawl stations were established at proportions of 1.5 station per section of survey line in the 100 to 200 m depth zone, 0.5 stations per section in the 700 to 800 m zone, and one station per section in the other depth zones.

In the first survey, areas shallower than 100 m depth in waters west of 162°W and deeper than 100 m in waters of 144° to 170°W were surveyed. During the survey period the Morning Star, a chartered U.S. trawler, sailed with the Daikichi maru No. 37 and conducted the simultaneous parallel operations in waters shallower than 100 m in order to obtain simultaneous trawl data for estimating biomass and for the comparison of fishing efficiency between the research vessels of both countries. In areas deeper than 100 m, both research vessels operated randomly in areas near the same survey line on the same day. Data obtained are to be used for estimating biomass, comparison of fishing efficiency among the Japanese and U.S. trawlers, and comparison of catch data from Japanese and U.S. trawlers and the Ryusho maru No. 5, the Japan-U.S. joint longline research vessel. When the trawlers engaged in trawling prior to operations of the Ryusho maru No. 5, they conducted operations in waters more than 3 miles away from the scheduled location of stations in order to prevent effects by trawling having an impact on the longline survey results.

In the second survey the Daikichi maru No. 37 is now operating alone to survey from the east tip of the areas shallower than about 100 m in waters of 147° to 162°W.

At each station, 30-minute tows were planned to be made and water temperatures taken by XBT. The catches were weighed using a spring scale by species (or species group) and the catch composition by weight obtained. In the case of large catches, the weight of catch was estimated from the average weight per basket by species and the number of baskets. For main species, the body-length compositions by sex of about 150 fish was recorded and the number of fish caught estimated from the body-length composition, weight of sample, and numbers in the sample. For species which were not measured the numbers caught were obtained by counting all fish caught or by an estimate based on numbers and weight of fish sampled and the total

weight of fish. In addition, at several stations, materials for age determination of the main species were collected and frozen samples retained for later biological determinations.

In the first survey, five trawl operations other than the standard trawl operations were made. During these, changes in height and width of the net mouth in relation to changes in towing speed and direction, and warp length were observed with an acoustic device. During these operations, no measurements of the catch were made.

Research personnel on board the vessel

The following individuals participated in the survey and were assisted by about 15 crew members--

Kiyoshi Wakabayshi	Far Seas Fisheries Research Laboratory
Minoru Ishida	Department of Fisheries, Hokkaido University
Craig Rose	Northwest and Alaska Fisheries Center, Seattle (during the period July 14 to 30)
Lael Ronholt	Northwest and Alaska Fisheries Center, Seattle (during the period August 1 to 22)

Research vessels and gear

The Daikichi maru No. 37 is a landbased dragnet trawler (349.96 GRT) similar to those chartered for the Japan-U.S. joint trawl surveys since 1979. Details of the vessel are shown in Table 1. Specifications of trawl gear used are given in Table 2. The trawl net was almost the same as that of nets used for the survey in the Aleutian Islands region in 1983. Because this was the first time for a large scale research survey in the Gulf of Alaska and there were many unknown factors in conducting research in this area, the fishing gear was fitted with automobile tires of about 57 cm diameter which were tightly connected with three chains to the central 13.5 m of the

groundrope in order to prevent potential net damage. At both ends of the groundrope, 51 cm steel bobbins and 42 cm rubber and steel bobbins were alternately attached towards the center and 31 cmx20 cm hard rubber plates were attached at short intervals between each bobbin. It has been reported that the efficiency of the trawl gear rigged with the tires on the groundrope is decreased compared with trawl gear using only bobbins (Yamaguchi 1981).

According to measurements taken with the acoustic device, the height of net mouth during trawling averaged about 3.5 m and the width of the net mouth ranged from 21 to 29 m and there was an increasing trend as depth increased.

Itinerary

The Daikichi maru No. 37 left Shiogama on 1984 July 5 and commenced the first survey from southeastern Unalaska Island on July 15. This vessel operated in waters shallower than about 100 m in areas west of 162°W up to July 21 and in waters deeper than 100 m in the area of 145° to 170°W during the period July 22 to August 20. On July 17, she refueled at Dutch Harbor. On July 31 and August 1 the standard survey activities were suspended and net mouth measurements were conducted because the partner vessel, Morning Star, entered port at Sand Point on the Shumagin Islands. The Daikichi maru No. 37 completed the first survey on August 20 and entered Kodiak on August 22.

The Daikichi maru No. 37 left Kodiak on August 28 and engaged in the second survey as of September. She will complete all surveys on October 8 and after calling at Dutch Harbor is scheduled to return to Shiogama on October 17.

Outline of research vessels

In the first survey 177 trawl operations were conducted during the 36 days the Daikichi maru No. 37 stayed in the research area. Operations included 162 standard trawling operations, five net mouth measurement experiments, and ten unsuccessful tows (snagged on bottom, etc.) Locations of trawling stations and longlining stations are shown in Fig. 1.

The catch by species at each station, numbers of halibut caught per 30-minute haul, and the average catch (CPUE) by INPFC area and depth zone are shown in Table 3. Values for the Yakutat Area are for the narrow area of 145°W to 147°W.

The numbers of haliubt caught per 30-minute tow are shown in Fig. 2 for each station and size composition of the halibut by area and depth zone is shown in Table 4.

TABLES 1 TO 4 AND FIGS. 1 AND 2 ARE IN ENGLISH IN THE JAPANESE DOCUMENT