1988 NORTON SOUND HERRING PRELIMINARY REPORT

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[1]The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate needs for up-to-date information, reports in this series may contain preliminary data.

FORWARD

This report was prepared just after the commercial herring fishing season and termination of field studies. Information contained in this report is preliminary and subject to change upon more intensive analysis of data. Biomass estimates and test fishing data are still being analyzed at the time of this report. This report is intended to be used as a preliminary summary of the 1988 Norton Sound commercial herring fishery.

FISHERY SUMMARY

The 1988 Norton Sound herring fishery opened by emergency order on May 27. A total of five gill net openings for 44 hours of fishing and six beach seine openings for 25 hours of fishing occurred this season. The entire district closed by emergency order on May 31. The total harvest based on fish tickets was 4,672.1 short tons (st) of herring (Table 1). Since 1980, catches have averaged 3,978 st (Table 2).

There were approximately 348 fishermen who made at least one delivery during the season. This is the second highest effort on record since a large scale domestic fishery began in 1980. Fishing effort during the 1980 to 1986 period averaged 276 fishermen. Effort levels in 1987 escalated to a record high of 564 fishermen. The total number of fishing vessels which participated in 1988 was impossible to estimate because of changing effort distribution as the season progressed. A survey flown during the May 28 gill net opening spotted approximately 200 fishing vessels. The fishing effort during 1988 was lower than in 1987 due to: 1) a moratorium on new effort was in effect for this season, which allowed only fishermen who had participated prior to January 1, 1987 to participate in 1988; 2) the bulk of the tendering and non-local fleet was not present on the grounds when the fishery opened.

During the 1988 season, 343 fishermen used gill nets, landing a total of 4473.7 st; 6 fishermen participated in the beach seine fishery landing 198.4 st of herring (Table 3). The beach seine openings were conducted during separate times from the gill net openings to prevent gear conflicts.

There were 11 companies present on the grounds during the season to purchase herring. These 11 companies registered 12 processors and 53 tenders to operate in Norton Sound; a total of 12 processors and 49 tenders were reported by company representatives to have arrived on the grounds prior to the fishery closure on May 31 (Table 4).

The average sac roe recovery was 9.0%. Based on final operations reports, the average grounds price paid for a short ton of 10% roe herring was $1,000.00. The average price paid to the fishermen for a short ton of 9.0% fish was approximately $900.00. Of the 4672.1 st harvested, 416.2 st were purchased as bait herring (roe % less than 6.0%) for which fishermen received an average of $ 93.00 per ton. The total value of the herring harvest to the fishermen was approximately $3,864,000.00. This

is the highest dollar value in the history of this fishery (Table 2). The average fisherman earned $11,072.00.

The estimated inseason district biomass was 33,924 st. This peak biomass was observed on a single survey day (May 25), and was the highest peak and single survey biomass estimate documented in the history of the Norton Sound herring fishery. An exploitation rate of 20% could have allowed a commercial harvest of 6,785 st (6,311 st. by gill net, 474 st by beach seine). However, due to the timing of the arrival of the peak biomass and the lack of processing and tendering capacity present on the grounds, it was not possible to fully harvest the available surplus. The commercial harvest of 4,672.1 st represented an exploitation of 13.8%.

FISHERY MANAGEMENT/EMERGENCY ORDERS

The 1988 Norton Sound herring management plan stated that the Department would attempt to manage the fishery for an above average roe recovery (8.5% or higher). State of Alaska statutes direct that the resource should be managed so as to maximize the return to the state and the industry. A new regulation in effect for the 1988 season allowed for an emergency order opening of the fishery rather than a regulatory opening date.

The 1988 Norton Sound herring management plan also stated a projected biomass of 23,700 st expected to return this season. This projected return was based upon the 1987 postseason escapement estimates using mean rates of natural mortality and growth and expected age class composition of the return. If aerial survey observations and age class composition data indicated a return of 23,700 st, then 20% or 4,740 st (4,266 st by gill nets, 474 st by beach seines) could be harvested.

Aerial survey conditions prior to the season were predominantly good. Waters were clear in ice free areas. Shore ice was not as extensive as in recent years and began dispersing very rapidly due to warm water and air temperatures as the season approached. No herring were spotted on the season's first survey on May 16. A survey flown on the evening of May 18 in the Unalakleet and Cape Denbigh subdistricts spotted a total of 51.6 st, mostly near the Beeson Slough area, where early fish have historically been spotted. A district wide survey flown on May 20 under poor conditions saw no herring (Table 5). This survey, however, documented rapid movement of ice away from shore, with Norton Bay nearly ice free.

On May 23, three surveys were flown. The first survey flown from Unalakleet to Stuart Island documented a small spawn near St. Michael village, and spotted a total of 357.5 st; the second surveyed from Unalakleet to Nome, and spotted approximately 2789.6 st. This survey also documented several small spawns in the Nome, Golovin, and Elim subdistricts. The third survey on May 23 again covered the southern shores of the St. Michael subdistrict, where a dozen small spawns and 1627.1 st, were documented. Conditions throughout this survey day were predominantly poor due to wind and turbid water conditions, with the exception of excellent viewing conditions near Nome. Broken, loose ice and ice fog was also present from just north of Tolstoi Point to Stuart Island. However, the third survey of the day, which concentrated on the southern shores, documented a rapid building of the biomass in this area; fish were seen near or in among ice floes, with spawning already beginning to occur. Because of the large amount of loose ice present, it was likely that the total biomass near the southern shores were not being observed. At this time, no processing nor tendering fleet was present in Norton Sound.

On May 24, a survey was flown from Unalakleet to Cape Darby. Conditions were fair to good, with the exception of the Unalakleet subdistrict which was unacceptable due to muddy water and ice conditions. The St. Michael subdistrict was unsurveyable due to ice and fog conditions. Approximately 5,884.5 st were documented, with 3,Ø24 st in the Elim and 2,445 st in the Cape Denbigh subdistricts, respectively. Small spawns were observed at Cape Denbigh and near Baldhead; extensive spawning (3.8 linear miles) was documented along the coastline between Elim and Cape Darby.

On May 25, a survey of the entire district flown under good to fair conditions documented the peak inseason biomass of 33,923 st. Spawning was observed in the St. Michael, Cape Denbigh, and Elim subdistricts. A total of 1Ø.6 linear miles was documented. As yet, no commercial fleet had arrived on the grounds.

Department crews began test fishing at Cape Denbigh and Unalakleet on May 21. The first test fish captures occurred at Cape Denbigh on May 22. Also on May 22, local fishermen from Elim reported spawning activity near the village. On May 23, a subsistence catch sample obtained from Elim showed a high percent of male herring, with all female herring ripe or near ripe. Increasing test fish catches at Cape Denbigh on May 23 also indicated a high male content, but predominantly ripe female herring. All samples had a predominance of large, old age class herring.

As early as the peak survey day, May 25, the age class began to shift with more younger herring beginning to appear in variable mesh catches. Samples obtained in St. Michael Bay with commercial gear on May 25 were found to be large, old ripe herring. With no commercial fleet present to buy herring, and with spawning activity progressing rapidly it became apparent that the commercial fleet was going to miss the peak spawning biomass. Also on May 25, the Unalakleet test fish crew was deployed to the Elim area to obtain samples of the spawning biomass present.

On May 25, company representatives began to trickle into Unalakleet. One company stated the earliest they would have any buying fleet on the grounds would be late May 25 or early May 26.

On May 26, with many more industry representatives now present and a few vessels also present, a beach party was organized in Unalakleet. Samples were obtained from eight separate locations, from St. Michael Bay to west Cape Denbigh. Roe percents ranged from 4.85% to 9.15%; low roe recoveries were due to partially spawned egg sacs, spawn outs, and high male content in the samples. Very few (5 fish) immature herring were found. Industry roe technicians from 2 companies provided sample analysis. A large crowd of fishermen and locals turned out to view the beach party samples. Local fishermen from Unalakleet and St. Michael provided valuable assistance by obtaining samples from Black Point, Tolstoi Point, and St. Michael Bay. Samples from west Cape Denbigh to Shaktoolik were obtained by a Department test fish crew.

Immediately following the beach party, the Department management staff met with representatives from five companies present in Unalakleet. At this time just four companies had any tendering or processing capacity on the grounds; a capacity of just 1,930 st was determined to be present at the time of this meeting. One company with 1,000+ st capacity wanted to the Department to open immediately; the rest wanted the Department to hold off. With more holding/processing capacity expected to arrive during the evening of May 26, and with continuing spawning and loss of marketable herring biomass, an opening was decided for May 27 at 8:00 a.m. to 10:00 a.m. for the gill net fleet. With an allowable harvest of 6,785 st (6,311 st by gill net, 474 st by beach seine), it was imperative the fleet be carefully monitored in terms of hold/processing capacity so as not to create a wastage problem.

Throughout the next few days (May 27-May 31), fishing periods were scheduled in rapid succession, alternating gear types, with

period lengths based on current hold capacity. The buying fleet continued to trickle on to the Norton Sound herring grounds. Department staff closely monitored fleet arrival and movement throughout the season. Commercial gill net fishing periods were scheduled with the incoming tides when possible to minimize catches of spawned out herring. Beach seine periods were scheduled between gill net periods as soon as clean-up catch reports and tendering capability were available. A total of 5 gill net openings occurred between May 27 and May 30 for a total of 44 hours of gill net fishing; a total of 6 beach seine openings occurred from May 27 to May 31 for a total of 25 hours of fishing.

The total harvest by gill nets based on inseason processor verbals was 4,465 st with 8.6% overall roe recovery. The total harvest by beach seiners based on inseason processor verbals was 259 st with 10.2% overall roe recovery. Thus, the total reported harvest inseason was 4,724 st at 8.7% roe recovery. With the exception of a few "hot spots" of fishing, this years' commercial fishery was scratch fishing, at best, due to the late arrival of the large vessel fleet. This is the first time in the history of the Norton Sound fishery this situation has occurred. Although the reported harvest inseason filled the preseason guideline harvest of approximately 4,740 st, over 2,000 st were left on the table. The fishery was closed following the last beach seine opening on May 31 to prevent the harvest of unmarketable or low value herring. The inseason reported harvest represented an exploitation of just 13.9% of the peak inseason biomass.

Weather conditions slowed the pace of the fishery at times, most notably during the openings from May 29-May 31. Also, as the season progressed, fishing effort declined due to decreasing catch rates and rough sea conditions.

Although ice was present prior to and during the fishery, winds and current kept the ice off the beach during the bulk of the fishery. Loose ice was blown back in to the beach in subdistrict 1, from Shorty Cove to St. Michael Island on May 30, but did not interfere with commercial fishing efforts at this late date. Warm waters contributed to rapid melting of the ice.

The Department test fish crew near Elim experienced rough sea conditions during much of their operations there. Even with strong winds and swell action, the coastline waters between Elim and Cape Darby remained relatively clear. Herring were difficult to capture in these deep, clear waters.

One tender and a few fishing skiffs arrived near Elim during the May 30 gill net opening. However, slow catch rates caused them to leave after a few hours of fishing, departing in the early morning hours. The Department crew provided valuable monitoring and sampling coverage of this area far removed from the central operations at Unalakleet.

CATCH REPORTING AND ENFORCEMENT

Buyers registered for the 1988 season were required to report herring purchases twice daily (8:30 a.m. and 8:30 p.m.) and immediately following beach seine openings at times announced inseason during fleet broadcasts. This season, due to the rapid scheduling of successive openings which alternated gear types, clean-up catch reports were requested as soon as catch figures became available. In general, compliance with requested catch reports was very good. The single side band and VHF radios worked very well for receiving verbal harvest data, and for communicating fishery information and opening announcements to the buying fleet.

Protection efforts in Norton Sound consisted of two single engine aircraft (supercub and C180), a helicopter, and two Boston Whalers. Personnel consisted of five permanent, full-time Fish and Wildlife Protection officers and one seasonal Fish and Wildlife Protection Aide.

Fish and Wildlife Protection officers patrolled the fishing grounds during each opening and closure. A total of 36 citations were issued for fishing closed period; 2 citations were issued for incorrect or lack of ADF&G number; 1 citation for fishing without a license; and 1 citation for no ADF&G number plate. In addition, one fishing vessel was seized for fishing excess gear. Three cases were made for violation of the superexclusive use area designation, with more likely to follow pending investigation of postseason fish ticket information. A total of 11.1 st of herring were confiscated by the State of Alaska during the 1988 season. Additional forfeitures are likely to follow pending upcoming court case decisions.

ABUNDANCE AND RESEARCH

The peak inseason biomass of 33,924 st was documented on May 25 under fair to excellent conditions. This is the largest biomass

ever observed in the Norton Sound district. Following the peak survey day on May 25, conditions for aerial spotting of biomass became poor to unacceptable due to wind and swell action creating water turbidity, as well as the presence of turbidity from several consecutive days of spawn activity. In addition, loose ice from Pastol Bay, south of Stuart Island, drifted into the inner sound and was blown against the southern shores, from Shorty Cove to St. Michael Island. This loose ice traveled north and gradually reached Blueberry Point, north of Unalakleet.

Peak spawning activity occurred from May 25-27. Spawning activity began first in the Elim subdistrict (May 23) and eventually reached the south side of Stuart Island (May 29 and June 1). Areas of continuous spawn on May 26 contributed to poor survey conditions overall following the May 25 peak survey.

Based on aerial survey and age class composition data from 1987, it was projected that approximately 23,700 st would be present on the grounds during the 1988 season; the projected age class composition of the return was 3%, 25%, 26%, 9%, 20%, and 16% of herring age 5, 6, 7, 8, 9, and 10+, respectively. Inseason analysis of test fish samples showed an age structure similar to the expected composition of the return. The higher than anticipated peak biomass seemed to be the result of strong returns of older age herring (8+) as well as a strong showing of age 5 and 6 year old herring. Complete analysis of age composition of the test and commercial samples will be available under separate cover in project reports.

Two Department field crews were operational during the 1988 season. One crew operated from Cape Denbigh. A second crew operated initially from Unalakleet, and later from the Portage area, west of Elim. A test fish camp was not established at the traditional Klikitarik site because of the presence of loose ice. The second test fish crew provided valuable test fish data as well as monitoring coverage of the northern shores of Norton Sound which are far removed from the central herring grounds operations at Unalakleet. The test fish crews presence and sampling efforts on the herring grounds were critical to the management of the 1988 commercial herring fishery.

Unalakleet field office personnel during the season consisted of the area management biologist, the assistant management biologist, a data entry clerk/monitor/public receptionist, and a fisheries biologist/scale reader/public information receptionist.

Field personnel consisted of two fisheries biologists and two fisheries technicians.

Additional support staff from the regional office in Anchorage consisted of the regional management biologist and the regional research biologist. These personnel provided valuable assistance with inseason age cohort analysis, on-site fishery observations, beach party coordination, drafting of emergency orders, input in management decisions, and biological sampling. Their willingness to participate in all phases of the program was very appreciated, and vital to proper monitoring and management of the fishery. Additional support was provided by the statewide herring biometrician.

At the time of this report preparation, field data and herring scales collected during the season are being analyzed. These data will be analyzed and presented in separate project and management reports later this season.

Table 1. Herring harvest and effort by date and subdistrict, Norton Sound District, all gear types combined, 1988.

	Subdistrict 1 Canal Point-Spruce Creek			Subdistrict 2 Spruce Creek-Junction Creek			Subdistrict 3 Junction Creek-Island Point			Subdistrict 5 Kwiniuk River - Cape Darby			District Totals		
Date	Number Fishermen	Daily Catch(st)	Daily Roe % 1/	Number Fishermen	Daily Catch(st)	Daily Roe % 1/	Number Fishermen	Daily Catch(st)	Daily Roe % 1/	Number Fishermen	Daily Catch(st)	Daily Roe % 1/	Number Fishermen	Daily Catch(st)	Daily Roe % 1/
5/27	167	548.5	8.7	3	57.6	9.2	82	571.2	8.3	0	-	-	250	1,177.2	8.6
5/28	199	1,071.0	9.3	0	-	-	80	557.9	9.4	0	-	-	279	1,628.9	9.3
5/29	121	404.5	8.6	6	20.7	11.0	33	100.7	8.7	0	-	-	157	525.9	8.8
5/30	177	737.1	9.5	18	21.0	10.0	37	77.0	8.0	5	6.4	7.7	229	841.5	9.4
5/31	111	498.5	8.7	0	-	-	0	-	-	0	-	-	111	498.5	8.7
Totals	270	3,259.5 2/	9.1	25	99.3 3/	9.7	116	1,306.9 4/	8.8	5	6.4 5/	7.7	348 6/	4,672.1 7/8/	9.0

1/ Daily roe % does not include bait roe %.
2/ Includes a harvest of 247.5 st of bait herring (roe % = 4.5).
3/ Includes a harvest of 12.2 st of bait herring (roe % = 3.3).
4/ Includes a harvest of 153.9 st of bait herring (roe % = 4.5).
5/ Includes a harvest of 2.6 st of bait herring (roe % = 5.2).
6/ Actual number of participating fishermen; one fisherman made gill net and beach seine deliveries.
7/ Includes a harvest of 416.2 st of bait herring (roe% = 4.5).
8/ A total of 11.1 st of herring was confiscated by Alaska Department of Public Safety.

Table 2. Herring biomass estimates and commercial fisheries data for the Norton Sound District, 1979-1988.

Year	Biomass (st) [1/]	Harvest (st) [2/]	Percent Exploitation [3/]	Percent Roe	Dollar Value (millions)	Number Fishermen
1979	7,700	1292	16.8	7.0	.6	67
1980 [4/]	8,400	2452	29.2	8.1	.5	294
1981	25,100	4371	17.3	8.8	1.5	332
1982 [4/]	17,400	3933	22.6	8.8	1.0	237
1983	28,100	4582	16.3	8.6	1.4	272
1984	23,100	3662 [5/]	15.8	10.3	.9	194
1985	20,000	3548	17.7	9.9	1.4	277
1986	28,062	5194	18.5	9.6	2.9	323
1987	32,370	4082	12.6 [6/]	8.6	2.6	564
1988	33,924	4672	13.8	9.0	3.9	348

1/ Methods of calculating biomass have varied over the years. Biomass estimates listed follow methods used during that year.

2/ Includes both bait and sac roe harvests.

3/ Represents total District exploitation. During many years southern subdistricts are closed because exploitation of the local biomass reaches 20%, while northern subdistricts have remained open because little or no harvest has occurred.

4/ Minimal biomass estimates due to poor survey conditions.

5/ Includes an estimated 90 st of wastage.

6/ Peak estimate made after the commercial fishery; the fishery was not re-opened due to the high probability of spawnouts present after two consecutive days of heavy spawning.

Table 3. Norton Sound herring harvest by subdistrict by gear type, 1988.

		Gill Net				Beach Seine				Totals			
Stat Area	Location	Sac Roe (s.t.)	Avg. Roe %	Bait (s.t.)	# fm	Sac Roe (s.t.)	Avg. Roe %	Bait (s.t.)	# fm	Sac Roe (s.t.)	Avg. Roe %	Bait (s.t.)	# fm
333-70	Canal Point-Spruce Creek	2974.2	9.1	240.5	268	37.8	8.6	7.0	1	3012.0	9.1	247.5	270
333-72	Spruce Creek-Junction Creek	29.6	10.7	12.2	22	57.6	9.2	0	3	87.1	9.7	12.2	25
333-74	Junction Creek-Island Point	1057.0	8.8	153.9	111	96.0	9.6	0	5	1153.0	8.8	153.9	116
333-77	Kwiniuk River-Cape Darby	3.8	7.7	2.6	5	-	-	-	0	3.8	7.7	2.6	5
Totals		4064.5 1/	9.0	409.2 2/	343	191.4	9.3	7.0	6	4255.9 1/	9.0	416.2 2/	348 3/

1/ Includes 9.8 st of sac roe herring confiscated by the Alaska Department of Public Safety.
2/ Includes 1.3 st of bait herring confiscated by the Alaska Department of Public Safety.
3/ Number of individual participants (one fisherman delivered gill net and beach seine herring.

Table 4. Norton Sound herring buyers and associated data, 1988.

Company	Representative or Contact Name	Processing/ Tendering Vessels	Type of Processing
Anpac, Inc.	Jack Schultheis Tom Link	p/v Nushagak	Freezing
Icicle Seafoods, Inc.	Don Beeson Don Giles Randy Rogers	p/v Sno Pac p/v Bering Star m/v Pintail m/v Chichagof p/v Grace C m/v Deception m/v Tani Rae m/v Lady Anne m/v Viking Queen m/v Pacific Clipper	Freezing
Kemp Pacific Fisheries	Dee Jonrowe	m/v Debra D m/v Balena m/v Obsession m/v Ben B	Freezing
LaFayette	John Garner Tim Hamilton	p/v Pribilof p/v Layfayette m/v Bull Harbor m/v Northwind m/v Sea Trec III m/v Tracy D m/v Chevak m/v Dragnet I m/v Zingaro m/v Chatham	Freezing
New West Fisheries, Inc.	Jerry Thon Bob Seidel	p/v New West m/v Seldovia m/v Lois Anderson m/v Barge	Freezing
Pan Pacific Seafoods, Inc.	Leo Holthe Norm Dube	p/v Pacific Producer m/v Exito m/v Pavilof	Freezing
Seward Marine Services	Clinton Riis	m/v Kona	Freezing

(Continued)

Table 4. Norton Sound herring buyers and associated data, 1988.

Company	Representative or Contact Name	Processing/ Tendering Vessels	Type of Processing
Trident Seafood Corporation	Bart Eaton	p/v Alaska Packer p/v Neptune m/v Alaska Eagle m/v Echo m/v Cachalot m/v Prince William Sound m/v Alaska Shores m/v Express m/v Dristik m/v Pankof m/v Lowboy m/v Bristol Monarch m/v Tamar m/v Westling m/v Arctic Sun	Freezing
Western Fish Producers	Jorn Nordmann Tom Whinihan	p/v Nicolle N m/v Kona m/v Tiger m/v Hi Pac m/v Hak I	Freezing
Woodbine Alaska Fish Company	Virginia Ferrari	p/v Woodbine m/v Botany Bay m/v Tonto m/v Captain Banjo	Freezing
Y.A.K., Inc.	Al Chaffee	p/v Yardarmknot m/v Blue Fin m/v Yankee Clipper m/v Jamie D	Freezing

Table 5. Daily observed peak biomass estimates of Pacific herring, Norton Sound District, 1988. 1/

Date	Flight No.	Observer Initials	Survey Hours	Survey Rating 2/	Spawn No.	Spawn Length (mi)	Estimated Biomass (st) By Index Area 3/ KLK	UNK	CDB	NTB	ELM	GOL	NOM	TOTAL
5/16	1	CL/SM	3.9	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/18	2	SM	0.9	2	0	0.0		2.6	49.0					51.6
5/20	3	CL/SM	5.1	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/23	4	SM	2.0	4	1	0.2	357.5	0.0						357.5
5/23	5	CL	3.0	4	8	0.5		0.0	1505.0		135.8	76.3	1072.5	2789.6
5/23	6	CL/SM	1.6	4	12	0.5	1627.1	0.0						1627.1
5/24	7	CL/SM	2.6	3	7	4.0	0.0	0.0	2445.6	415.0	3024.0	0.0	0.0	5884.6
5/25	8	CL/SM	6.0	3	58	10.6	7508.5	3123.1	15555.2	1117.0	5154.1	878.2	587.9	33924.0 1/
5/26	9	CL	4.5	4	18	22.0	3681.3	901.3	4168.4	792.9	3110.0	205.8	571.2	13430.9
5/27	10 4/	RC	2.7	5	2	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/28	11	CL	3.4	4	0	0.0	0.0	0.0	0.0	0.0	2198.6	0.0	0.0	2198.6
5/29	12	CL	3.5	4	1	0.2		0.0	425.1	224.5	478.8	69.7	214.3	1412.4
5/29	13	SM	1.7	4	0	0.0	677.3	350.8	0.0	0.0	0.0	0.0	0.0	1028.1
5/30	14	SM	4.2	4	0	0.0	736.0	1686.7	1338.4	209.2	980.0	0.0	0.0	4950.3
6/01	15	SM	4.7	4	1	0.2	456.8	0.0	1075.4	663.4	772.5	1885.1	41.0	4894.2
			49.8		108	50.2								33924.0 1/

1/ Norton Sound district peak biomass.

2/ Rating 1=excellent 2=good 3=fair 4=poor 5=unacceptable

3/ KLK = s.d.1 NTB = s.d.4 NOM = s.d.7
UNK = s.d.2 ELM = s.d.5
CDB = s.d.3 GOL = s.d.6

4/ Spawn survey.