

Regional Information Report No. 3A07-02

**Norton Sound Spawn-on-Kelp Management Plan,
2007**

by

Jim Menard

and

Scott Kent

April 2007

Alaska Department of Fish and Game

Division of Commercial Fisheries



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the *Système International d'Unités* (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, Special Publications and the Division of Commercial Fisheries Regional Reports. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H _A
		north	N	base of natural logarithm	<i>e</i>
Weights and measures (English)		south	S	catch per unit effort	CPUE
cubic feet per second	ft ³ /s	west	W	coefficient of variation	CV
foot	ft	copyright	©	common test statistics	(F, t, χ^2 , etc.)
gallon	gal	corporate suffixes:		confidence interval	CI
inch	in	Company	Co.	correlation coefficient	
mile	mi	Corporation	Corp.	(multiple)	R
nautical mile	nmi	Incorporated	Inc.	correlation coefficient	
ounce	oz	Limited	Ltd.	(simple)	r
pound	lb	District of Columbia	D.C.	covariance	cov
quart	qt	et alii (and others)	et al.	degree (angular)	°
yard	yd	et cetera (and so forth)	etc.	degrees of freedom	df
		exempli gratia		expected value	<i>E</i>
Time and temperature		(for example)	e.g.	greater than	>
day	d	Federal Information		greater than or equal to	≥
degrees Celsius	°C	Code	FIC	harvest per unit effort	HPUE
degrees Fahrenheit	°F	id est (that is)	i.e.	less than	<
degrees kelvin	K	latitude or longitude	lat. or long.	less than or equal to	≤
hour	h	monetary symbols		logarithm (natural)	ln
minute	min	(U.S.)	\$, ¢	logarithm (base 10)	log
second	s	months (tables and		logarithm (specify base)	log ₂ , etc.
		figures): first three		minute (angular)	'
		letters	Jan, ..., Dec	not significant	NS
Physics and chemistry		registered trademark	®	null hypothesis	H ₀
all atomic symbols		trademark	™	percent	%
alternating current	AC	United States		probability	P
ampere	A	(adjective)	U.S.	probability of a type I error	
calorie	cal	United States of		(rejection of the null	
direct current	DC	America (noun)	USA	hypothesis when true)	α
hertz	Hz	U.S.C.	United States	probability of a type II error	
horsepower	hp		Code	(acceptance of the null	
hydrogen ion activity	pH	U.S. state	use two-letter	hypothesis when false)	β
(negative log of)			abbreviations	second (angular)	"
parts per million	ppm		(e.g., AK, WA)	standard deviation	SD
parts per thousand	ppt, ‰			standard error	SE
volts	V			variance	
watts	W			population	Var
				sample	var

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The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: <http://www.sf.adfg.ak.us/statewide/divreprots/html/intersearch.cfm>.

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TABLE OF CONTENTS

	Page
LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
ABSTRACT	1
INTRODUCTION.....	1
Calendar of events	1
Regulations.....	2
Herring stock status and guideline harvest level.....	3
Permit application procedures	4
Permit requirements.....	4
Harvest of kelp	5
Allocation of kelp	5
Harvest and production.....	6
Fishery conduct and management	6
Requirements for buyers.....	6
License requirements	7
Other agency requirements	7
LIST OF ADF&G MANAGEMENT CONTACTS	10

LIST OF TABLES

Table	Page
1. Historical commercial herring fishery summary information, Norton Sound District, 1979–2006.	8

LIST OF FIGURES

Figure	Page
1. Norton Sound herring districts and subdistricts.	9

ABSTRACT

This plan provides an overview of the management approach, permit requirements, and regulations for the 2007 Norton Sound herring spawn-on-kelp pound fishery. Pound fishery participants are encouraged to carefully review the section of this plan containing requirements of other agencies. During 2006, the Norton Sound herring inseason biomass was estimated to be 24,610 tons, but poor survey conditions prevented a peak aerial survey from being conducted. Consequently, the 2005 aerial survey biomass estimate was used for the 2007 projection. The 2007 biomass is estimated to be 38,415 tons, allowing a harvest of 7,683 tons at a 20% exploitation rate. A maximum of 320 tons of herring are to be reserved to allow for the harvest of not more than 90 tons of spawn on kelp. Most successful kelp harvests have occurred in Subdistrict 1 where ripe herring are found in high abundance. Herring spawn typically occurs in Norton Sound between the last week in May and the first week in June.

Key words: Norton Sound, management plan, herring, *Macrocystis*, *Fucus*, spawn-on-kelp, pound fishery.

INTRODUCTION

This plan provides an overview of the management approach, permit requirements, and regulations for the 2007 Norton Sound herring spawn-on-kelp pound fishery. This is an open pound fishery, enclosures are not allowed; however, two leads of 300 feet in length are permissible. **An open pound fishery** involves suspending kelp from a floating structure in an area where herring are spawning. Herring are not handled or captured, and the kelp with eggs is removed from the water and then sold. If leads are used then the leads and pound structure must remain in the fishing location for no less than 4 weeks and no more than 6 weeks after harvesting the spawn on kelp. If no leads are used then structures must be removed from the water after the fishery closes.

Herring spawn-on-kelp fisheries were conducted in Norton Sound from 1978 to 1984. Most harvests were of *Fucus sp.* (the wild kelp of Norton Sound) in Subdistrict 1. However, during the 1984 season a single permittee operated an open pound using imported *Macrocystis sp.* kelp (a large bladed kelp found in Southeast Alaska) in Subdistrict 5. He successfully harvested herring spawn on *Macrocystis sp.* product and proved the feasibility of such a fishery. Alaska Department of Fish and Game (ADF&G) biologists listed at the end of this document are available to answer questions concerning this management plan. Pound fishery participants are also encouraged to carefully review the section of this plan containing requirements of other agencies.

CALENDAR OF EVENTS

The following is a calendar of events to be considered by pound operators for the 2007 fishing season.

April 14 Management Plan is available and mailed to applicants. ADF&G pound permit applications will be made available.

April 16 Deadline for submitting an application to ADF&G for a pound permit.

April 25 ADF&G will issue a permit to each qualified applicant that has met the April 16 deadline. Kelp allocations will be made for each pound operator who has informed ADF&G of their intent to operate an open pound. **Once a permit holder has received a spawn-on-kelp permit they will be considered a participant in the kelp fishery and have to operate that gear type for the**

remainder of the season. They may not participate in gillnet, beach seine, or wild kelp fisheries.

May 18 to June 5 Permit holders may deploy kelp once they have notified ADF&G of the placement of their pounds.

June 1 to June 19 ADF&G will announce when pounds must be completely removed from the water.

If it appears spawning will occur earlier or later than usual, the fishery's opening and closing dates will be adjusted accordingly.

REGULATIONS

The Alaska Board of Fisheries has approved the following regulations creating the Norton Sound pound fishery:

5 AAC 27.965. MANAGEMENT PLAN FOR HERRING POUND SPAWN-ON-KELP FISHERY IN THE NORTON SOUND DISTRICT.

(a) The purpose of this management plan is to establish criteria for the herring pound spawn-on-kelp fishery in the Norton Sound District.

(b) The commissioner, or the commissioner's designee, shall issue a permit for participation in the herring pound spawn-on-kelp fishery if:

(1) an applicant holds a valid Norton Sound herring gillnet or beach seine CFEC interim-use permit or limited entry permit; and

(2) an applicant applies for the herring pound spawn-on-kelp permit before April 16 of each calendar year.

(c) A permit holder that participates in the herring pound spawn-on-kelp fishery may not also participate in the gillnet or beach seine sac roe herring fishery in the Norton Sound District during the same year.

(d) The herring allocation for the herring pound spawn-on-kelp fishery may not be more than 320 tons of herring. The department shall deduct this allocation from the total annual herring harvest projection before determining the seine harvest allocation under 5 AAC 27.960.

(e) The herring spawn-on-kelp guideline harvest level may not be more than 90 tons. The herring spawn-on-kelp guideline harvest level includes the combined weight of herring eggs and kelp.

(f) The department shall manage the herring pound spawn-on-kelp fishery to achieve the spawn-on-kelp guideline harvest level by restricting the number of blades of kelp that may be suspended from a herring pound as follows:

(1) no more than a total of 75,000 blades of kelp are allowed in the herring pound spawn-on-kelp fishery; and

(2) the maximum number of blades of kelp any permit holder may attach to a herring pound is 3000; if more than 25 permits are issued for the herring pound spawn-on-kelp fishery, the department shall determine the number of blades of kelp a permit holder may attach to a herring pound by dividing 75,000 by the number of permits issued.

(g) Before a permit holder attaches kelp to a herring pound, the permit holder must plainly and legibly mark the permit holder's name and five digit CFEC permit number in a conspicuous place on the herring pound. After fishing commences until the season is closed, the CFEC permit number marked on a herring pound may not be changed. For purposes of this subsection, fishing commences when a permit holder first attaches kelp to the herring pound in the water.

(h) Only one permit holder may operate a herring pound at a time.

(i) The permit holder must be physically present at any time when kelp is being attached to the herring pound and when herring spawn on kelp is harvested from the herring pound. The permit holder shall weigh the spawn on kelp when it is removed from the herring pound and provide that information to a local representative of the department who is designated as a catch monitor for the fishery.

(j) Before the herring pound spawn-on-kelp permits are issued, the commissioner may specify on the permits any other criteria that the commissioner determines is necessary for the conservation and management of herring and kelp and the herring pound spawn-on-kelp fishery.

(k) After a person removes the spawn-on-kelp from the herring pound, the person shall maintain the pound structure at its present fishing location for not less than four weeks in its original configuration, with adequate water circulation on all sides to optimize egg hatching. Not later than six weeks after a person removes the spawn on kelp from a structure, the person shall remove the structure and leads from the water.

(1) A herring pound structure may have two leads of which each lead may not be more than 300 feet in length deployed from shore to a structure of the pound. (This is not an enclosed pound.) The lead shall consist of a seine weight net of not more than two inches stretched mesh measure, cork line, lead line and anchors at either end.

(m) For the purposes of this section, a "herring pound" is a structure or a means of suspending kelp in the water to provide spawning substrate for herring to be harvested as spawn on kelp. The structure may not have an enclosure, but may have two leads. A lead may not be more than 300 feet in length measured from shore to a point on the structure.

HERRING STOCK STATUS AND GUIDELINE HARVEST LEVEL

Historically, Norton Sound herring stock size has been approximately 20,000-50,000 tons of spawning biomass (Table 1). During 2006, the inseason biomass was estimated to be 24,610 tons. However, poor weather conditions precluded department personnel from conducting a peak biomass aerial survey. Therefore, the 2005 aerial survey biomass estimate was used to formulate the 2007 projection. By adjusting for growth and survival, it is estimated that the 2007 biomass will be 38,415 tons, allowing a harvest of 7,683 tons at a 20% exploitation rate. A maximum of 320 tons of herring are to be reserved to allow for the harvest of not more than 90 tons of spawn on kelp. Most successful kelp harvests have occurred in Subdistrict 1 where ripe herring were found in high abundance.

Herring spawn typically occurs in Norton Sound between the last week in May and the first week in June. The earliest recorded spawn occurred on May 15, 1983, and the latest recorded spawn was on June 29, 1992. During the 2006 season, spawning was observed from June 10 through June 12. The majority of spawn occurs on the *Fucus sp.* beds of southern Norton Sound, although herring

do spawn on eel grass and even bare rock along the northern shore of Norton Sound. Typically, spawning occurs first in Subdistrict 1, then 5-7 days later in Subdistrict 5. Occasionally, when water temperatures are warm along the northern coast, spawn will occur first in Norton Bay. Herring are thought to be opportunistic spawners, targeting suitable plant substrate not occupied by spawn that is more than 24 hours old.

PERMIT APPLICATION PROCEDURES

Permit applications are available beginning April 1, 2007 at the Nome ADF&G Area Office, and can be obtained by writing the Alaska Department of Fish and Game, Commercial Fisheries Division, Pouch 1148, Nome, Alaska 99762. To establish eligibility for the 2007 pound fishery, an operator must submit a permit application to the Nome Fish and Game office by **April 16, 2007**. Applications sent by mail must be postmarked no later than April 16. Applications received after this date will not be permitted. Original applications are required.

On approximately April 25, ADF&G will issue a permit to each eligible applicant. The permit will specify conditions that will be required of each pound operator. Permits will be issued for open pounds only. Once a permit holder has received a spawn-on-kelp permit they will have to operate that gear type for the remainder of the season, and they may not participate in gillnet, beach seine, or wild spawn-on-kelp fisheries.

PERMIT REQUIREMENTS

Existing regulations require ADF&G to establish permit stipulations for management of the Norton Sound pound fishery. The following stipulations will be specified on each permit:

- 1.) Herring spawn-on-kelp **open and closed pounds are now defined in regulation (see under REGULATIONS)**. Since these pounds must be adequate to support spawn-on-kelp, the pound will be declared ineligible if 150 pounds of weight placed on any side of the pound submerges a side of the structure.
- 2.) Each pound must be identified by an upright sign in a conspicuous place with the permittee's full name and number which was assigned by ADF&G on the first page of the permit. Letters and numbers must be at least six inches high and consist of lines at least one-half inch wide that contrast with the background. Pound permit numbers must be the same size and also be permanently affixed to the top surface of the pound structure where they will be visible from the air.
- 3.) Pound operators will not be required to have a structure in the water until the introduction of kelp. Operators must inform ADF&G by April 16 of their intent to use an open pound. Once an operator has declared his intention to participate in the open pound kelp fishery, they may not switch to the sac roe fishery or wild kelp. Open pounds must be clearly identified as stated above. Kelp storage areas must also be declared by the operators either before the kelp is deployed in a pound or to hold excess kelp after the pounds are deployed. Once spawning is determined to be imminent, excess kelp will be removed from the spawning area.

- 4.) Permit holders may locate their pound in Subdistrict 1, east of Wood Point, through Subdistrict 6. Subdistrict 7 is excluded (Figure 1).
- 5.) Each permit holder must be physically present at the fishing site during times when kelp is being placed in the pound, during times when the pound structure with kelp suspended is being moved to another location, and during collection and sale of herring spawn-on-kelp product.
- 6.) All lines of kelp must be plainly and legibly marked above the water surface with the number of kelp blades on that line. This permit stipulation was requested by the Alaska Bureau of Wildlife Enforcement to help ensure that kelp blade allocations are not exceeded. (Duct tape numbered with waterproof ink will satisfy this requirement).
- 7.) After harvesting their product or when discontinuing operation, all fishers must first contact ADF&G before leaving the fishing grounds and hail the approximate amount of herring spawn-on-kelp harvested from their pound.
- 8.) Each permit holder's spawn-on-kelp product must remain separate from other permit holder's product until after processing.
- 9.) The permit must be in the possession of the pound operator at all times.
- 10.) The pound structure must be completely removed from the water by a date set by ADF&G management staff.

HARVEST OF KELP

During the 2007 Norton Sound herring sac roe season, a herring sac roe CFEC permit (either gillnet or beach seine) is required to harvest spawn-on-kelp. Kelp harvest permits will also be required and may be obtained from the Nome ADF&G office. Based on results from fisheries in Southeastern Alaska and Prince William Sound, roughly 200 pounds of kelp is needed to produce one ton of spawn-on-kelp. This assumes that weight gains of ten times are occurring from the weight of kelp to the weight of spawn-on-kelp product harvested.

ALLOCATION OF KELP

Pound operators are advised that kelp allocations of up to 3000 blades are possible during the 2007 season based on a harvest objective of 90 tons of spawn-on-kelp product and the Board of Fisheries requirement that the amount of roe harvested by each operator be kept to roughly the same amounts harvested by the average sac roe fisher. Actual kelp allocations will depend on the number of operators who have registered by April 16, and will not be announced until April 24. Notification of the kelp allocations will be announced by news release. Kelp blades will be allocated equally among the participating fishers.

HARVEST AND PRODUCTION

Each permit holder's spawn-on-kelp blades must remain separate from other permit holder's spawn-on-kelp blades until after processing. Permit holders will be allowed to harvest the entire product produced in their pounds. A permit holder's fish ticket must report only the spawn-on-kelp harvested from his/her own pound. All fishers and any vessel carrying spawn-on-kelp product must first contact ADF&G and hail the estimated amount of spawn-on-kelp harvested before leaving the fishing grounds.

FISHERY CONDUCT AND MANAGEMENT

Suitable sites for pounds in Norton Sound are limited. To avoid herring mortality and damage to the pounds, operators should locate their pounds in an area with minimal exposure to wind and wave action, and with a relatively deep bottom.

ADF&G may station a manager and open boat in the subdistrict when herring are spawning. After that time, ADF&G personnel will closely monitor all phases of the fishery to assure compliance with permit conditions. All fishery announcements, including updates of herring activities and fishery openings/closures, will be broadcast by VHF radio, Channel 7. Fishers are strongly encouraged to have a VHF radio.

ADF&G will be closely monitoring herring activity in Norton Sound by vessel and aerial surveys. If it appears spawning will occur earlier or later than usual, the fishery's opening and closing dates will be adjusted accordingly.

ADF&G will regulate the fishery by setting and enforcing a strict limitation on the number of kelp blades that can be put in each permit holder's pound. If a permit holder wishes to store excess kelp early in the season prior to spawning they must make arrangements with ADF&G staff on how to separate and mark the excess kelp. Staff will designate a storage area well away from shore to hold kelp in excess of pound limits.

REQUIREMENTS FOR BUYERS

The buyer or their agent shall report to the Unalakleet ADF&G office upon arrival in Norton Sound to file district registration forms as specified in 5AAC 27.970.

Operators of floating processing vessels will be required to report in person, by VHF radio, or by telephone, to the ADF&G office in Unalakleet before the start of processing operations in Norton Sound. These reporting requirements are specified by regulation 5 AAC 39.130 (f).

Fish tickets must be submitted to ADF&G within three days after closure of the fishery. Fish tickets should be hand delivered to a representative of ADF&G, Commercial Fisheries in Unalakleet, Alaska before leaving the fishing district.

Floating processing vessels or tenders carrying spawn-on-kelp product from the fishery should first contact ADF&G before leaving the fishing grounds.

LICENSE REQUIREMENTS

In addition to ADF&G permits required to operate a pound, operators must also have a limited entry or interim use permit (G02Z or G34Z) from the Commercial Fisheries Entry Commission (CFEC). Individuals who do not have pound permits but are assisting in the operation of the fishery in any manner must have a crewmember license. All commercial vessels (including skiffs) used in the fishery are required to be licensed with CFEC. Fishers are required to display the permanent vessel license plate (ADF&G number) on both sides of the hull, cabin, or mast in permanent symbols at least 12 inches high and with lines at least 1 inch wide that contrast with the background.

Applications for vessel and fishing permits are available from all offices of ADF&G or online at <http://www.cfec.state.ak.us/mnuaf.htm>. They can also be obtained by writing the Commercial Fisheries Entry Commission, 8800-109 Glacier Highway, Juneau, Alaska 99801-8079. Crewmember licenses may be obtained from local vendors in most communities.

OTHER AGENCY REQUIREMENTS

Prospective pound operators are advised to consider other agency requirements for constructing and operating pounds in Norton Sound. All pound operators are urged to contact the Alaska Department of Natural Resources, the National Marine Fisheries Service, and the United States Coast Guard to determine other regulations and requirements.

Table 1.—Historical commercial herring fishery summary information, Norton Sound District, 1979–2006.

Year	Estimated	Catch	Beach	Wild	<i>Macrocystis</i>	Number of	Dollar	Number of	Average	Peak	Fishery
	Biomass	Gillnet	Seine	Kelp	Kelp		Value		Roe %	Catch Day	Duration
	(tons)	(tons)	(tons)	(tons)	(lbs.)	Fishers	(millions)	Buyers			
1979	7,700	1,292	0	13		67	0.6	7	7.0	25-May	19-May/14-June
1980	8,400	2,452	0	24		294	0.5	8	8.1	30-May	21-May/05-June
1981	25,100	4,371	0	47		332	1.5	13	8.8	24-May	18-May/28-May
1982	19,403	3,933	0	38		237	1.0	7	8.8	08-June	03-June/11-June
1983	28,100	4,541	41	29		272	1.4	9	8.6	23-May	18-May/28-May
1984	23,100	3,245	327	16	6,000	194	0.9	8	10.3	10-June	06-June/28-May
1985	20,000	3,379	169			277	1.4	11	9.9	20-June	13-June/21-June
1986	28,100	4,979	215			323	2.9	10	9.6	09-June	03-June/10-June
1987	32,370	3,759	323			564	2.6	11	8.6	07-June	07-June/08-June
1988	33,924	4,474	198			348	3.9	11	9.0	28-May	27-May/31-May
1989	25,981	4,351	390			357	2.3	9	9.2	28-May	27-May/30-May
1990	39,384	6,032	347			365	3.6	8	8.8	29-May	28-May/30-May
1991	42,854	5,150	522			279	2.4	8	9.3	25-May	23-May/25-May
1992 ^a	57,974	0	0				0.0			20-June ^b	
1993	46,549	4,291	742			264	1.5	5	9.9	25-May	24-May/05-June
1994	31,088	921	40			215	0.3	6	10.3	08-June	05-June/09-June
1995	37,779	6,033	614			215	4.2	6	10.4	24-May	23-May/30-May
1996	26,596	5,581	589			287	4.5	10	10.6	25-May	24-May/25-May
1997	47,748	3,459	513			220	0.6	9	9.9	22-May	20-May/24-May
1998	52,033	2,632	0	1	16,083	47	0.2	2	9.2	25-May	22-May/09-June
1999	34,314	2,755	0		7,482	122	0.6	4	10.5	17-June	13-June/22-June
2000	32,680	4,390	81		4,500	97	0.8	4	9.5	11-June	07-June/15-June
2001	26,305	2,245	0		4,400	76	0.3	3	12.3	12-June	12-June/16-June
2002	27,068	1,123	0		0	46	0.1	2	10.6	24-May	22-May/03-June
2003	32,918	1,608	0		1,750	32	0.2	2	10.5	18-May	16-May/25-May
2004 ^a	34,180	11	0	0	0	4	0.0	0		24-May ^b	
2005	43,013	1,951	0	0	0	56	0.3	1	11.4	04-June	03-June/10-June
2006	24,635 ^c	671 ^d	0	0.57	^e	41	0.1	1	10.2	9-Jun	08-June/11-June

^a No fishery due to late sea ice breakup in 1992 and no sac roe fishery in 2004 due to lack of a buyer.

^b Date of peak aerial survey biomass estimate, typically one or two days prior to peak catch.

^c Biomass estimate does not include surveys of subdistricts 4-7 due to poor weather conditions in 2006.

^d 25 tons out of total sac roe herring catch was sold off as bait to NSEDC in 2006.

^e No interest was expressed in the *Macrocystis* kelp fishery.

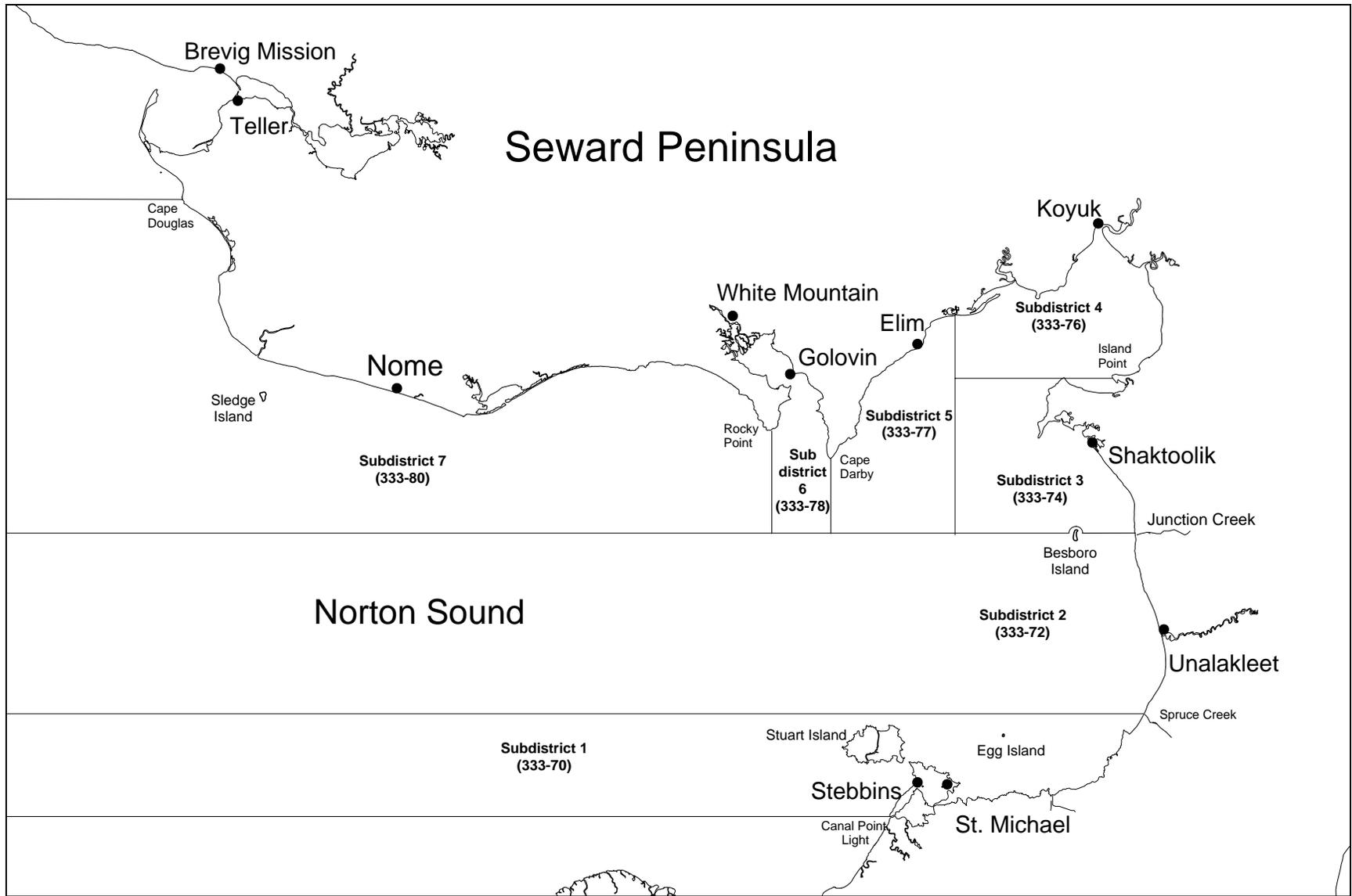


Figure 1.—Norton Sound herring districts and subdistricts.

LIST OF ADF&G MANAGEMENT CONTACTS

Following are Commercial Fisheries Division contacts regarding this management plan:

Gene Sandone Region III Supervisor	333 Raspberry Road Anchorage, Alaska 99518 (907) 267-2115
Dan Bergstrom Region III Management Biologist	333 Raspberry Road Anchorage, Alaska 99518 (907) 267-2171
Jim Menard Area Management Biologist	Pouch 1148 Nome, Alaska 99762 (907) 443-5167
Unalakleet Seasonal Office Area Management Staff open after approximately May 22	P.O. Box 243 Unalakleet, Alaska 99684 (907) 624-3921