Special Publication No. BOF 2015-03

Options for Amounts Reasonably Necessary for Subsistence Uses of Herring Spawn on Kelp: Togiak District

Prepared for the December 2015 Bristol Bay Finfish Alaska Board of Fisheries Meeting

By

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October 2015

Alaska Department of Fish and Game

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the reports by the Department of Fish and Game. 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)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

all commonly-accepted abbreviations e.g., Mr., Mrs., AM, PM, etc.	
all commonly-accepted professional titles e.g., Dr., Ph.D., R.N., etc.	
Alaska Administrative Code	AAC
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures):	first three letters (Jan,...,Dec)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

SPECIAL PUBLICATION NO. BOF 2015-03

OPTIONS FOR AMOUNTS REASONABLY NECESSARY FOR SUBSISTENCE USES OF HERRING SPAWN ON KELP: TOGIAK DISTRICT

PREPARED FOR THE DECEMBER 2015 BRISTOL BAY FINFISH ALASKA BOARD OF FISHERIES MEETING

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November 2015

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This document should be cited as:
Krieg, Theodore M., James A. Fall, Lisa Olson, and Terri Lemons. 2015. Options for amounts reasonably necessary for subsistence uses of herring spawn on kelp: Togiak District; prepared for the December 2015 Bristol Bay Finfish Alaska Board of Fisheries meeting. Alaska Department of Fish and Game Division of Subsistence Special Publication No. BOF 2015-03, Anchorage.

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ABSTRACT

This report provides options for amounts reasonably necessary for subsistence (ANS) for consideration by the Alaska Board of Fisheries (board) as it discusses Proposal 82 addressing the subsistence fishery for Pacific herring *Clupea pallasi* spawn on kelp in the Togiak District, Bristol Bay, Alaska, during its December 2015 meeting. The subsistence herring spawn on kelp fishery in the Togiak District continues to be important to residents of Togiak, as well as to others in the Bristol Bay area. Harvesting is a specialized activity in which a relatively small number of community members harvest and distribute herring spawn to many others. The board has made a positive customary and traditional use finding for herring spawn on kelp in the district, but has not yet made an ANS finding.

Key words: Pacific herring, *Clupea pallasi*, herring spawn, subsistence fishing, harvest estimate, subsistence, Togiak, Togiak Traditional Council.

INTRODUCTION

This report has been prepared for the board for reference when considering Proposal 82, which asks the board to consider adopting a finding of ANS for herring spawn on kelp in the Togiak District, Bristol Bay, Alaska. The Togiak District is described as all waters of Alaska between the longitude of the tip of Cape Constantine at 158° 53.50′ W. long. and the longitude of the tip of Cape Newenham at 162° 10.51′ W. long. (5 AAC 27.805).

Under AS 16.05.258(a), the board is charged with identifying fish stocks, or portions of stocks, that "are customarily taken or used for subsistence" (a "C&T" finding). If a portion of these stocks can be harvested consistent with sustained yield principles, the board "shall determine the amount of the harvestable portion that is reasonably necessary for subsistence uses" [AS 16.05.258(b)].

At its 1987 meeting, the board made a positive C&T use finding for the harvest of herring spawn on kelp in the Togiak District (5 AAC 01.336(a)(2); Appendix A). The board has found that 250,000 pounds usable weight of finfish other than salmon is reasonably necessary for subsistence uses in the Bristol Bay Area (5 AAC 01.336(b)(2)), and herring spawn on kelp is included in that amount. However, due to local concerns expressed prior to, and at, the 2012 board meeting, and in response to requests for information from resource managers (Holen et al. 2012:2), the board may wish to consider making a separate finding for herring spawn on kelp in order to later assess if a normally diligent participant in the Togiak District subsistence fishery has had a reasonable expectation of success of taking herring spawn on kelp (AS 16.05.258(f)).

At its 2012 Bristol Bay meeting in Naknek, the board was presented with historical subsistence local and traditional knowledge, as well as harvest information for the 2011–2012 data years (Holen et al. 2012), Since that time, harvest data were collected for the 2013 data year for Togiak. This report updates the subsistence harvest information and provides options for the board to consider for making an ANS finding.

The community of Togiak (population 817; U.S. Census 2010) is located in Togiak Bay, approximately 68 miles west of Dillingham (Figure 1). The Togiak Traditional Council is the Alaska Native tribal governing body. As estimated in 2008 (Fall et al. 2012), 95% of the community is Alaska Native. In 2008, residents of Togiak harvested an estimated total of 237,814 edible pounds of wild fish, land mammals, marine mammals, shellfish, birds and their eggs, and wild plants, or 1,265 pounds per household. As estimated in usable pounds, salmon made up the largest portion of Togiak's 2008 wild resource harvest at 38%. Herring spawn on kelp, or *melucuaq* in Central Yupik, made up about 7% of the total resources harvested in Togiak, was harvested by 29% of households and used by 79% of Togiak households indicating a strong sharing network. An estimated 10,604 lb of herring spawn on kelp was harvested in 2008, or 13 pounds per person (±26.9%; Fall et al. 2012). Harvest is generally by hand picking from the rocks at low tide (97%); some residents (35%) use rakes from skiffs during times of high water (Holen et al. 2012:10).

In addition to Togiak, the communities of Twin Hills, Manokotak, Clark's Point, Dillingham and Aleknagik have recorded subsistence harvests of herring spawn on kelp in the Togiak Bay area in past subsistence harvest surveys conducted by the Division of Subsistence. Twin Hills is located about 4 miles east–northeast of Togiak, adjacent to Togiak Bay. Manokotak, Clark's Point, Dillingham, and Aleknagik are located in the Nushagak Bay watershed to the east of Togiak Bay. To reach Togiak Bay from those communities, travel by boat or skiff is required out of Nushagak Bay and around Cape Constantine; it is about 100 miles by water from Dillingham to reach the eastern edge of Togiak Bay. The waters off of Cape Constantine are known for being especially treacherous in bad weather.

Subsistence harvests of spawn on kelp by the Nushagak Bay communities have declined since the 1990s as participation by those communities in the Togiak herring commercial fishery has declined. Until the mid to late 1990s the Togiak sac roe fishery, which is not limited entry, was quite lucrative and many commercial fishers from the communities listed above participated. Limited entry permits are required for the commercial spawn on kelp fishery. Boats rigged for purse seines or gillnets were used to catch the herring from which the roe was removed. The herring spawn on kelp commercial fishery was conducted with skiffs and harvested by hand similar to the spawn on kelp subsistence harvest. Since 1996 the spawn on kelp fishery has been conducted in 1999, 2002, and 2003, which was the last year that the fishery was conducted (Elison et al. 2015:107). Most of the fishers from the local communities participating in the sac roe fishery used their 32-foot Bristol Bay commercial salmon boats and fished with gillnets, although some rigged their 32-foot gillnet vessels for seining. After participating in either the sac roe or spawn on kelp fisheries, local participants would regularly return to their communities with spawn on kelp for their own use and to share with other households. Those participants in the commercial spawn on kelp fishery who wanted to take some for subsistence harvested it in conjunction with the commercial fishery. From 1993–2002, the average amount of time that the spawn on kelp fishery lasted was 8.5 hours (Fair et al. 2004:129).

Gillnet effort in the sac roe fishery peaked in 1996 with 461 boats participating. The 1978–1997 average was 244 boats and the 1993–1997 average was 254 boats (ADF&G 1999:147). In 2000, the number of gillnet boats participating was 227, and in 2001 it was 96 boats. The number of gillnet boats has remained below 100 since 2001, with a low of 18 in 2012 (Elison et al. 2015:106). In recent years, due to the low number of boats participating in the fishery, only a portion of which are local boats, there has been less spawn on kelp brought back to the local communities through that avenue.

Although the amount of subsistence spawn on kelp harvested by communities other than Togiak has been less in recent years because of the reason stated above, Manokotak and Aleknagik in 2008 and Dillingham in 2010 recorded harvests of spawn on kelp in Division of Subsistence harvest survey projects. Independent of the commercial fishery, Nushagak Bay watershed residents will travel to Togiak Bay by skiff to harvest spawn on kelp. Distance, weather conditions and timing to arrive in Togiak Bay to harvest during optimum tides and sufficient spawn production would be limiting factors. Additionally people can fly into Togiak and go out with Togiak residents to harvest spawn on kelp, but the expense of buying a plane ticket may be a barrier. Sharing networks through family and friends from Togiak for spawn on kelp are long standing. During the relatively brief herring season people are excited about giving and receiving spawn on kelp because it is a specialty food when fresh that people thoroughly enjoy eating. Both Manokotak and Aleknagik have family ties to Togiak, and, in the case of Manokotak, also to the historic village of Kulukak in Kulukak Bay which is where a substantial part of the commercial sac roe fishery takes place. Much of Aleknagik was populated by people moving there in the past from Togiak and in the 2008 survey, 9% of Aleknagik residents identified that they were born in Togiak (Holen et al. 2012:25). In 2008 in Manokotak, 7% of the population said they were born in Togiak and although it has been since about the 1940s that anyone has lived in Kulukak, 6% of Manokotak residents said that they were born there (Holen et al. 2012:97). In Dillingham in 2010, an estimated 1% of the households identified Togiak as where their family was living when they were born (Evans et al. 2013:22).

Dillingham is the hub community for the west side of Bristol Bay and Togiak residents regularly fly in and out of Dillingham, which provides the opportunity to bring spawn on kelp to Dillingham to share.

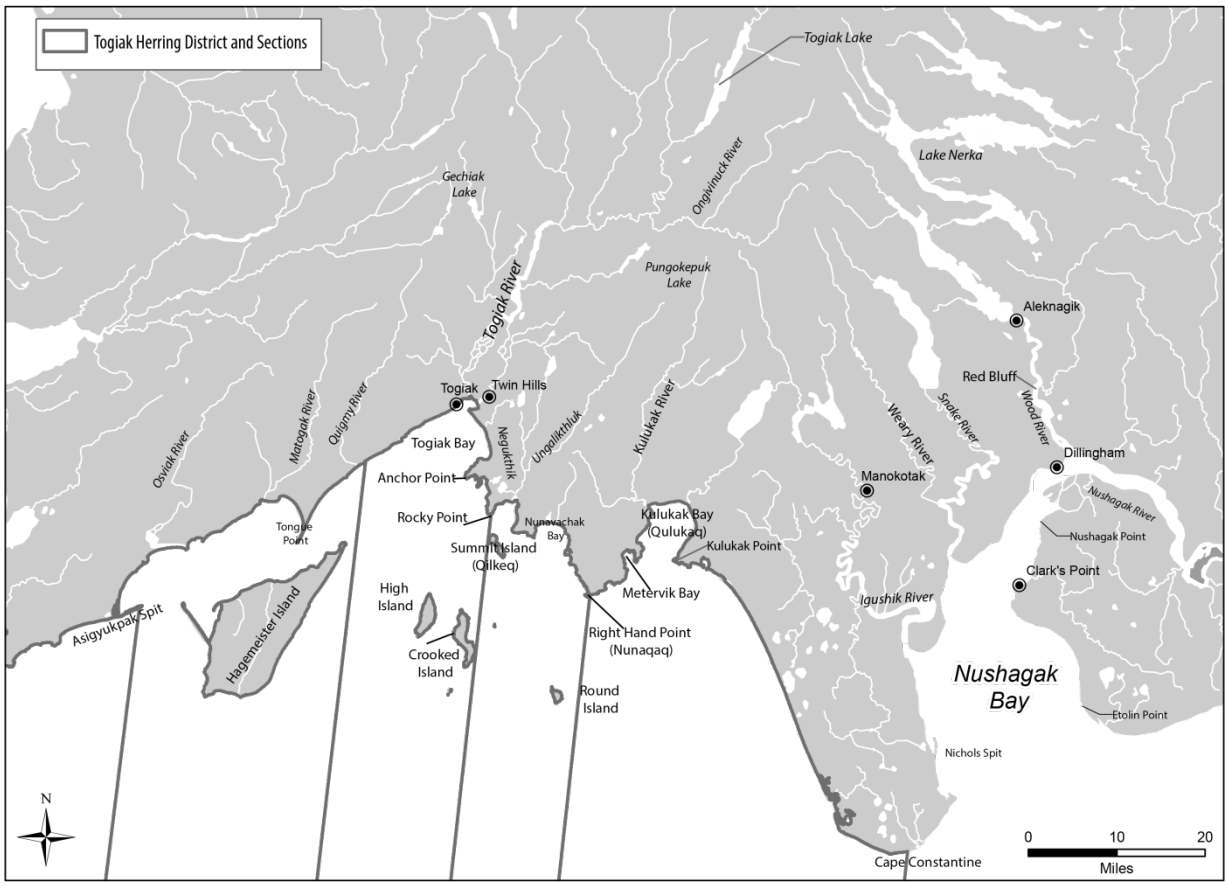

Figure 1.–Map of Togiak and Bristol Bay area.

METHODS AND DATA SOURCE

No permit is required to harvest subsistence herring spawn on kelp in the Togiak District, and there are no harvest limits. Harvest data presented in this report are from systematic household surveys conducted in 1984–2014 and analyzed by the Division of Subsistence Information Management staff (Holen et al. 2012; CSIS). However, to calculate the ANS options in this report, the spawn on kelp harvests for Dillingham (6,467 pounds usable weight; 1984), Manokotak (2,460 pounds usable weight; 1985), Aleknagik (482 pounds usable weight; 1989) and Clark's Point (199 pounds usable weight; 1989) were not included. A substantial portion of harvests in 1980s in those communities is attributed to local participation in the commercial fishery, which increased access to the spawn on kelp resource in Togiak Bay. For the purpose of suggested ANS options, the decision was made not to include those numbers.

Also, research for the 2011–2013 study years included weighing samples of Togiak herring spawn on kelp to determine the weight of one gallon. In almost all cases, when reporting their harvest of spawn on kelp, Togiak households report in gallons. This research indicated the weight to be 4.64 pounds per gallon, fewer than the 7-pound conversion factor previously used. The following total weights, including the ANS options, have been adjusted with the new conversion factor.

Table 1.–Harvest of herring spawn on kelp, in usable pounds, by Togiak and other Bristol Bay communities.

Year	Community	Estimated harvest spawn on kelp, pounds	Confidence interval (±)	Estimated harvest range, pounds	
				Low	High
1999	Togiak	3,921	0.423	2,263	5,580
2008	Togiak	10,604	0.269	7,752	13,457
2011	Togiak	5,742	0.1	5,168	6,316
2012	Togiak	1,035[a]	0.13	900	1,170
2013	Togiak	2,656	0.19	2,151	3,161
All years average		4,792		3,647	5,937
Average, excluding 2012		5,731		4,333	7,128
1999	Twin Hills	1,156	0.55	520	1,792
1999	Manokotak	650	0.187	529	772
2008	Manokotak	44	0.009	43	44
All years average		347		286	408
2008	Aleknagik	21	0[b]	21	21
2010	Dillingham	225	1.22	–50	500
2010	Dillingham	225	1.22	139[c]	500

a. Generally assessed by subsistence users as subsistence needs not met.
b. A value of zero for confidence interval may mean it was not calculated for the project, rather than a zero CI.
c. This value is a substitute for the negative value in the row above based on the reported harvest (210 lb)
Source ADF&G CSIS.

ANS OPTIONS IN 2015

Following are options for the board to consider should it choose to adopt ANS ranges for herring spawn on kelp in regulation during its December 2015 meeting. The department submitted and supports reviewing the ANS options due to the availability of harvest data and the resource and management concerns expressed at the 2012 meeting in Naknek.

TOGIAK DISTRICT, OPTION A: 5,300–9,800 USABLE POUNDS

This option is based on the sum of the **averages** of the low and high annual harvests, as determined by the confidence interval, as specified below.

Data source	Low estimate, usable pounds	High estimate, usable pounds
Togiak average (excluding 2012)	4,333	7,128
Twin Hills	520	1,792
Manokotak all years average	286	408
Aleknagik	21	21
Dillingham average, with substituted low range	139	500
Total	5,299	9,849
ANS Option A, rounded	5,300	9,800

TOGIAK DISTRICT, OPTION B: 4,100–12,700 USABLE POUNDS

This option is based on the sum of the lowest and highest harvest **point estimates**, as specified below

Data source	Low estimate, usable pounds	High estimate, usable pounds
Togiak (excluding 2012)	2,656	10,604
Twin Hills	1,156	1,156
Manokotak	44	650
Aleknagik	21	21
Dillingham	225	225
Total	4,102	12,656
ANS Option B, rounded	4,100	12,700

OPTION C: NO ACTION

Option C is to maintain status quo by not adopting ANS ranges at this time.

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APPENDIX A: 1987 CUSTOMARY AND TRADITIONAL SUMMARY TOGIAK HERRING SPAWN ON KELP

SUMMARY FORM: CUSTOMARY AND TRADITIONAL FINDINGS

RESOURCE: Herring, Herring Roe on Kelp

Person filling out form: James Fall

GEOGRAPHICAL AREA: Togiak District of Bristol Bay Area

Date: July 18, 1988

DATE OF ACTION: November / December 1987 Board of Fisheries

PROPOSAL INITIATING ACTION: 134-148

SUMMARY OF ACTION:

The board found that only the residents of Togiak, Twin Hills, Manokotak, Aleknagik, Dillingham, Clarks Point, and Ekuk have customary and traditional use of herring and herring roe-on-kelp in the Togiak District.

MAJOR POINTS OF DISCUSSION:

Discussion of whether villages on the Nushagak River (Ekwok, New Stuyahok, and Koliganek) should be included in finding. Local advisory committee representatives supported the inclusion of these communities, but there was no evidence of any long term use for subsistence, according to board members.

LIST ALL SUPPORTING MATERIALS USED DURING THE DISCUSSION (customary and traditional summary sheets, maps, overheads, tables; also findings of fact, motions, etc)

Data from TP 116 used to guide oral presentation. No handout.