APPENDIX B

TABLES

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TABLE 2-1. PRELIMINARY PROJECTIONS OF 1994 ALASKA COMMERCIAL SALMON HARVESTS BY FISHING AREA AND SPECIES

Management Region/Area	Species (in thousands of fish)					
	Chinook	Sockeye	Coho	Pink	Chum	Total
SOUTHEAST REGION						
Southeast Region Total	278	1,960	2,600	47,000	3,700	55,500
CENTRAL REGION						
Prince William Sound	44	1,180	590	24,100	1,090	27,004
Upper Cook Inlet	15	2,000	400	600	250	3,265
Lower Cook Inlet	1	272	13	595	111	992
Bristol Bay	76	39,600	157	1,140	1,040	42,013
Central Region Total	136	43,000	1,160	26,400	2,490	73,200
WESTWARD REGION						
Kodiak	25	2,430	325	13,700	610	17,090
Chignik	7	1,900	200	1,300	200	3,607
South Peninsula	10	4,000	300	7,000	1,600	12,910
North Peninsula	16	2,500	200	100	250	3,066
Aleutian Islands	0	5	0	300	0	305
Westard Region Total	58	10,830	1,020	22,400	2,660	36,900
ARCTIC-YUKON-KUSKOKWIM REGION						
Arctic-Yukon-Kuskokwim Region Total	156	134	625	553	600	2,060
ALASKAN TOTAL	628	55,900	5,410	96,300	9,450	167,000

Note: Projections as of 6 January 1994. Columns do not total exactly do to rounding.

Source: Savikko and Simpson (1994, Table 1)

TABLE 2-2. SELECTED PERCENT RECOVERY RATES FOR PROCESSING OF PACIFIC FINFISH

Species	From	To: Product type	Percent Recovery Rate Average	Range
Pacific cod				
	Whole fish	D/H-On	81	72-90
		D/H-Off	63	56-75
		Skin-on fillets (V-cut)	45	38-48
		Skinless fillets (V-cut	39	22-45
		S/B fillets (V-cut)	33	18-39
		Skin-on fillets	38	
		Skinless fillets (J-cut)	32	
		S/B fillets (J-cut)	26	
		Steaks	62	
		Salted D/H-Off	45	
		Smoked D/H-Off	58	
		Belly flaps	10	
		Liver	5	
		Roe	4	
Fish meal				
	Lean fish	Meal	18	16-20
	Fatty fish	Meal	22	20-25
Pacific herring				
	Whole fish	D/H-On	82	78-87
		D/H-Off	70	60-76
		Skin-on fillets	53	45-60
		Skinless fillets	49	41-58
		Salted round	82	79-88
		Salted gibbed	65	
		Salted fillets	42	35-47
		Smoked D/H-Off	60	
		Roe	10	3-18
		Pickled D/H-On	74	
Pacific hake				
	Whole fish	D/H-On	80	70-85
		D/H-Off	60	56-71
		Skin-on fillet	43	
		Skinless fillet	32	
		S/B fillet	27	
		Roe		2-8
Arrowtooth flounder				
	Whole fish	D/H-On	90	84-94
		D/H-Off	74	70-80
		Skinless fillet	34	25-39
		Surimi	11	
		Kirimi	48	
		S/B fillet	25	18-30
Walleye pollock				
	Whole fish	D/H-On	79	72-86
		D/H-Off	62	52-72
		Skin-on fillets	40	35-55
		Skinless fillets	34	29-43
		S/B fillets	28	24-36
		Mince	50	30-60
		Surimi (shore plant)	20	15-22
		Surimi (factory trawle	15	11-17
		Roe	6.5	3-20
Pink salmon				
	Whole fish	D/H-On	91	84-94
		D/H-Off	73	68-80
		Canned	65	58-67
		Skin-on fillet	52	47-58
		Skinless fillet	42	41-46
		S/B fillet	33	30-36
		S/B trim	14	12-16
		Steaks	58	53-65
		Dry-salted sides	36	
		Mild cure sides	30	
		Smoked sides	30	
		Roe	6	3-10
Greenland turbot				
	Whole fish	D/H-On	90	
		D/H-Off	74	70-80
		Skinless fillet	30	25-35
Sablefish				
	Whole fish	D/H-On	89	
		D/H-Off	68	
		D/H-Off	62	
		Skin-on fillet	40	
		Skinless fillet	35	
		Steaks	62	
		Salted D/H-Off	45	
		Smoked sides	31	
Rock sole				
	Whole fish	D/H-On	87	82-92
		D/H-Off	67	62-78
		Skinless fillet	28	22-30
Sharks, general		D/H-On	80	62-90
		D/H-Off	58	22-75
		Skinless fillet	32	17-56
		Fins	5	1-12
Sockeye salmon				
	Whole fish	D/H-On	92	85-94
		D/H-Off	74	66-82
		Canned	67	60-70
		Skin-on fillet	53	50-59
		Skinless fillet	46	41-49
		S/B fillet	35	30-38
		S/B trim	15	16-Dec
		Steaks	57	55-65
		Dry-salt sides	40	
		Mild cure sides	33	
		Smoked sides	33	
		Roe	4	3-6
Coho salmon				
	Whole fish	D/H-On	92	87-94
		D/H-Off	75	70-83
		Canned	67	60-70
		Skin-on fillet	57	52-60
		Skinless fillet	51	46-56
		S/B fillet	38	30-40
		S/B trim	14	17-Dec
		Steaks	62	58-65
		Dry-salt sides	43	
		Mild cure sides	36	
		Smoked sides	36	
		Roe	7	5-10
Dover sole				
	Whole fish	D/H-On	86	75-90
		D/H-Off	65	55-65
		Skinless fillet	29	26-32
Pacific ocean perch				
	Whole fish	D/H-On	88	82-94
		D/H-Off	62	46-72
		Skinless fillet	30	27-32
Pacific halibut				
	Whole fish	D/H-On	88	85-92
		D/H-Off	72	68-80
		Steaks	62	60-75
		Skin-on fillet	49	45-56
		Skinless fillet (Fletch	41	34-44
Flathead sole				
	Whole fish	D/H-On	86	80-94
		D/H-Off	67	60-79
		Skinless fillet	27	25-32

D/H = Dressed/Headed S/B = Skinless/Boneless SOURCE: CRAPO et al. (1993)

TABLE 2-3. SELECTED PERCENT RECOVERY RATES FOR PROCESSING OF PACIFIC SHELLFISH

Species	From	To: Product type	Percent Recovery Rate Average	Range
Dungeness crab				
	Raw whole	Raw sections	60	
		Cooked whole	90	
		Cooked sections	52	
		Cooked meat	24	22-25
		(during molt)		13-14
	Raw sections	Cooked sections	87	
	Cooked whole	Cooked meat	27	
	Cooked sections	Cooked meat	46	
King crab (red, brown, or golden)				
	Raw whole	Raw sections	69	67-74
		Cooked whole	92	90-95
		Cooked sections	60	52-67
		Cooked meat	25	23-28
		(during molt)		16-19
	Raw sections	Cooked sections	87	
	Cooked whole	Cooked meat	27	
	Cooked sections	Cooked meat	42	
King crab (blue)				
	Raw whole	Raw sections	65	
		Cooked whole	90	
		Cooked sections	55	50-61
		Cooked meat	20	16-23
		(during molt)		13-14
	Raw sections	Cooked sections	84	
	Cooked whole	Cooked meat	22	
	Cooked sections	Cooked meat	37	
Tanner crab (bairdi and opilio)				
	Raw whole	Raw sections	68	65-72
		Cooked whole	92	90-95
		Cooked sections	60	58-66
		Cooked meat	17	15-21
		(during molt)		10-14
	Raw sections	Cooked sections	88	
	Cooked whole	Cooked meat	19	
	Cooked sections	Cooked meat	28	
Pink shrimp				
	Raw whole	Raw headless	53	
		Cooked whole	90	
		Raw peeled	36	
		Cooked peeled	25	
	Raw headless	Cooked peeled	69	
	Cooked whole	Cooked peeled	28	
Spot shrimp				
	Raw whole	Raw headless	47	45-49
		Cooked whole	90	
		Raw peeled	34	30-38
		Cooked peeled	26	
	Raw headless	Cooked peeled	72	
	Cooked whole	Cooked peeled	29	
Ocotpus				
	Whole	Gutted/Skin-On	80	80-85
		Gutted/Skinned	65	
		Viscera	20	
Squid				
	Whole	Edible meats	71	64-73
		Mantle w/ fins	52	45-55
		Mantle w/o fins	39	36-42
		Tentacles	17	13-20
		Fins	12	10-13
Sea cucumber				
	Whole	Eviscerated meat	36	
		Edible meat	25	
		Cooked meat	13	
		Dried meat	5	
Sea urchin (green)				
	Whole	Roe		5-30
Sea urchin (red)				
	Whole	Roe		8-30
Scallops				
	Raw whole	Adductor muscle	10	8-12
		Viscera	22	20-26
	Raw meats	Cooked meats	50	
Abalone, pinto				
	Whole	Edible muscle	42	40-45
		Meat	25	
		Trimming	16	
		Dried muscle	10	
Oysters				
	Raw whole	Raw meats		5-14
	Raw meats	Cooked meats	61	
Clams				
Softshell				
	Whole	Edible meats	57	53-62
Macoma				
	Whole	Edible meats	53	45-59
Cockles				
	Whole	Edible meats	42	38-48
Littlenecks				
	Whole	Edible meats	37	31-46
Geoducks				
	Whole	Edible meats	33	32-35
		Steaks	22	20-25
		Necks	12	9-14
Razors				
	Whole	Edible meats	44	42-50
	Raw meat	Cooked meat	60	
Butter				
	Whole	Edible meats	45	36-46
Mussels				
	Whole	Edible meat (wild)	26	19-32
		Edible meat (culture	20	11-27
		Steamed	14	10-18

SOURCE: CRAPO et al. (1993)

TABLE 2-4. EFFLUENT QUALITY DATA FOR ALASKAN SHORE-BASED SEAFOOD PROCESSORS-1992 AND 1993[1]

PRODUCT[2]		TSS-mg/L		Oil/grease-mg/L		BOD-mg/L	
		Monthly ave.	Daily max.	Monthly ave.	Daily max.	Monthly ave.	Daily max.
BOTTOMFISH	median	105	150	73	91	n/a	n/a
	n	120	124	101	106	n/a	n/a
	min	10	6.0	2.8	4.5	n/a	n/a
	max	4,553	3,324	1,621	1,486	n/a	n/a
CRAB	median	36	43	13	18	n/a	n/a
	n	16	18	15	17	n/a	n/a
	min	5.5	8.0	1.0	2.0	n/a	n/a
	max	1,513	3,376	351	369	n/a	n/a
SALMON	median	176	215	90	116	n/a	n/a
	n	26	28	34	35	n/a	n/a
	min	15	16	6.3	9.0	n/a	n/a
	max	1,214	1,668	1,130	2,250	n/a	n/a
HALIBUT	median	67	104	49	81	n/a	n/a
	n	17	17	16	17	n/a	n/a
	min	12	12	6.3	12	n/a	n/a
	max	325	325	273	359	n/a	n/a
HERRING	median	78	82	28	85	n/a	n/a
	n	7	8	5	6	n/a	n/a
	min	39	39	1.2	1.2	n/a	n/a
	max	418	1,284	184	277	n/a	n/a
TOTAL	median	150	202	141	166	155	164
	n	233	236	221	223	19	20
	min	2.0	1.0	0.4	0.5	3.7	2.8
	max	3,576	4,500	1,480	5,456	6,852	22,400
MEAL	median	88	142	28	44	80	120
	n	18	18	18	18	15	15
	min	16	24	1.4	1.4	36	36
	max	1,330	1,949	153	284	13,356	39,750
STICKWATER	median	4,900	9,540	2.1	5.6	7,600	7,600
	n	53	53	25	25	47	47
	min	9.0	23	0.2	0.2	1.5	2.0
	max	84,000	110,000	91,139	203,800	148,950	432,000
SURIMI	median	1,079	1,366	208	257	2,323	1,845
	n	25	25	25	25	6	6
	min	24	33	8.0	17	286	286
	max	6,209	7,808	282,400	295,200	7,328	7,750

n/a = not available

[1] Obtained from Discharge Monitoring Reports (DMRs) submitted to U.S. EPA's Permit Compliance System (PCS) database

[2] Product classifications are as follows:

BOTTOMFISH = Bottomfish (e.g, pollock)
CRAB = Crab, including crabmeat and crab sections
SALMON = Includes both hand-butchered and mechanized salmon operations
HALIBUT = Halibut and other headed/gutted bottomfish
HERRING = Herring, including fillets and roe
TOTAL = Includes multiple, single, or unspecified species; typically reserved for final effluent
MEAL = Fishmeal
STICKWATER = Stickwater from fish meal operations
SURIMI = Surimi production from pollock

TABLE 2-5. FLOW AND PRODUCTION DATA FOR ALASKAN SHORE-BASED SEAFOOD PROCESSORS-1992 AND 1993[1] (Page 1 of 2)

PRODUCT[2]		Raw prod.-lb/month		Raw prod.-lb/day		Finish. prod.-lb/month		Finish. prod.-lb/day		Flow-MGD	
		Monthly ave.	Daily max.	Monthly ave.	Daily max.	Monthly ave.	Daily max.	Monthly ave.	Daily max.	Monthly ave.	Daily max.
BOTTOMFISH	median	295,215	370,524	21,144	n/a	n/a	351,500	n/a	1,930,000	n/a	n/a
	n	76	150	13	n/a	n/a	64	n/a	5	n/a	n/a
	min	14	14	3,819	n/a	n/a	1,400	n/a	652,000	n/a	n/a
	max	7,600,000	11,082,500	50,733	n/a	n/a	4,140,000	n/a	2,430,000	n/a	n/a
CRAB	median	45,284	130,453	n/a	n/a	63,500	15,400	n/a	n/a	0.71	2.3
	n	10	58	n/a	n/a	4	44	n/a	n/a	55	10
	min	1,125	846	n/a	n/a	15,900	12	n/a	n/a	0.02	
	max	211,620	5,983,680	n/a	n/a	76,300	4,000,000	n/a	n/a	4.2	4.2
SALMON	median	274,609	453,185	7,400	113,963	n/a	471,000	56,700	532,000	0.14	n/a
	n	20	50	17	3	n/a	26	5	10	5	n/a
	min	1,321	6,228	69	113,136	n/a	1,560	18,750	84,852	0.07	n/a
	max	325,700	7,770,150	867,000	470,235	n/a	6,640,000	712,000	2,220,000	2.9	n/a
HALIBUT	median	416,642	345,638	n/a	n/a	n/a	66,245	n/a	298,000	n/a	n/a
	n	11	20	n/a	n/a	n/a	6	n/a	3	n/a	n/a
	min	30,266	30,266	n/a	n/a	n/a	2,550	n/a	132,000	n/a	n/a
	max	1,833,780	1,957,630	n/a	n/a	n/a	1,760,000	n/a	509,000	n/a	n/a
HERRING	median	302,776	862,000	n/a	456,904	n/a	605,000	n/a	n/a	n/a	n/a
	n	7	19	n/a	2	n/a	11	n/a	n/a	n/a	n/a
	min	6,210	16,357	n/a	71,300	n/a	5,000	n/a	n/a	n/a	n/a
	max	21,412,400	56,239,700	n/a	842,507	n/a	1,420,000	n/a	n/a	n/a	n/a
SHRIMP	median	n/a	920,863	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	min	n/a	39,576	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
	max	n/a	1,802,150	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TOTAL	median	38,584	181,961	58,986	236,087	4,685	71,708	55,348	161,494	0.20	0.69
	n	44	71	60	13	9	41	33	4	416	52
	min	9	70	20	28,770	65	65	31	137,166	0.002	0.04
	max	7,816,940	85,351,600	865,000	285,000	35,422	19,300,000	255,442	166,428	19	5.6
WASTE	median	n/a	n/a	92,925	79,500	n/a	n/a	n/a	n/a	n/a	n/a
	n	n/a	n/a	21	20	n/a	n/a	n/a	n/a	n/a	n/a
	min	n/a	n/a	2,514	7.1	n/a	n/a	n/a	n/a	n/a	n/a
	max	n/a	n/a	2,326,800	662,745	n/a	n/a	n/a	n/a	n/a	n/a

TABLE 2-5. FLOW AND PRODUCTION DATA FOR ALASKAN SHORE-BASED SEAFOOD PROCESSORS-1992 AND 1993[1] (Page 2 of 2)

PRODUCT[2]		Raw prod.-lb/month		Raw prod.-lb/day		Finish. prod.-lb/month		Finish. prod.-lb/day		Flow-MGD	
		Monthly ave.	Daily max.	Monthly ave.	Daily max.	Monthly ave.	Daily max.	Monthly ave.	Daily max.	Monthly ave.	Daily max.
MEAL	median	114,698	407,251	278,290	n/a	n/a	129,500	n/a	n/a	1.4	115
	n	34	66	32	n/a	n/a	14	n/a	n/a	53	23
	min	320	37	149	n/a	n/a	490	n/a	n/a	0.005	0.06
	max	11,300,000	40,318,600	461,760	n/a	n/a	4,370,000	n/a	n/a	138	223
STICKWATER	median	n/a	5,453,550	n/a	n/a	n/a	169,500	n/a	n/a	1.0	n/a
	n	n/a	10	n/a	n/a	n/a	20	n/a	n/a	22	n/a
	min	n/a	119,495	n/a	n/a	n/a	6,080	n/a	n/a	0.04	
	max	n/a	28,665,300	n/a	n/a	n/a	2,900,000	n/a	n/a	2.4	n/a
SURIMI	median	n/a	11,276,580	n/a	n/a	n/a	5,130,000	n/a	n/a	1.7	n/a
	n	n/a	10	n/a	n/a	n/a	8.0	n/a	n/a	26	n/a
	min	n/a	8.0	n/a	n/a	n/a	1.7	n/a	n/a	0.53	n/a
	max	n/a	52,817,000	n/a	n/a	n/a	12,500,000	n/a	n/a	1,728.0	n/a

n/a = not available

[1] Obtained from Discharge Monitoring Reports (DMRs) submitted to U.S. EPA's Permit Compliance System (PCS) database

[2] Product classifications are as follows:

BOTTOMFISH = Bottomfish (e.g, pollock)
CRAB = Crab, including crabmeat and crab sections
SALMON = Includes both hand-butchered and mechanized salmon operations
HALIBUT = Halibut and other headed/gutted bottomfish
HERRING = Herring, including fillets and roe
SHRIMP = Shrimp
TOTAL = Includes multiple, single, or unspecified species; typically reserved for final effluent
WASTE = Bycatch disposed of in the dumping zone
MEAL = Fishmeal
STICKWATER = Stickwater from fish meal operations
SURIMI = Surimi production from pollock

TABLE 2-6 TOTAL SUSPENDED SOLIDS LOADING DATA FOR ALASKAN SEAFOOD PROCESSORS-1992 AND 1993

PRODUCT[2]		TSS-lb/1000 lb prod.		TSS-lb/month		TSS-lb/day	
		Monthly ave.	Daily max.	Monthly ave.	Daily max.	Monthly ave.	Daily max.
BOTTOMFISH	median	2.4	4.5	n/a	n/a	n/a	n/a
	n	136	142	n/a	n/a	n/a	n/a
	min	0.06	0.2	n/a	n/a	n/a	n/a
	max	32	46	n/a	n/a	n/a	n/a
CRAB	median	2.6	3.2	n/a	n/a	n/a	n/a
	n	17	21	n/a	n/a	n/a	n/a
	min	0.1	0.6	n/a	n/a	n/a	n/a
	max	30	69	n/a	n/a	n/a	n/a
SALMON	median	3.3	4.8	n/a	n/a	n/a	n/a
	n	27	29	n/a	n/a	n/a	n/a
	min	0.2	0.2	n/a	n/a	n/a	n/a
	max	23	28	n/a	n/a	n/a	n/a
HALIBUT	median	1.4	1.8	n/a	n/a	n/a	n/a
	n	15	16	n/a	n/a	n/a	n/a
	min	0.2	0.2	n/a	n/a	n/a	n/a
	max	3.1	3.1	n/a	n/a	n/a	n/a
HERRING	median	1.4	5.1	n/a	n/a	n/a	n/a
	n	7	8	n/a	n/a	n/a	n/a
	min	0.1	0.1	n/a	n/a	n/a	n/a
	max	7.5	21	n/a	n/a	n/a	n/a
SHRIMP	median	4.5	5.6	n/a	n/a	n/a	n/a
	n	6	7	n/a	n/a	n/a	n/a
	min	1.7	1.8	n/a	n/a	n/a	n/a
	max	6.4	13	n/a	n/a	n/a	n/a
TOTAL	median	5.2	5.6	n/a	493,542	164	228
	n	71	74	n/a	9	181	184
	min	0.2	0.2	n/a	3,647	1.0	2.0
	max	771	567	n/a	1,697,280	110,758	200,110
MEAL	median	1.3	2.6	n/a	n/a	48	76
	n	43	43	n/a	n/a	25	25
	min	0.02	0.03	n/a	n/a	7.0	9.0
	max	81	162	n/a	n/a	108	302
STICKWATER	median	1.1	1.9	n/a	n/a	14,715	20,644
	n	19	19	n/a	n/a	11	11
	min	0.2	0.2	n/a	n/a	1.0	2.0
	max	9.0	33	n/a	n/a	280,280	461,497
SURIMI	median	n/a	n/a	n/a	n/a	11,831	21,109
	n	n/a	n/a	n/a	n/a	10	10
	min	n/a	n/a	n/a	n/a	7.0	10
	max	n/a	n/a	n/a	n/a	46,846	108,845

n/a = not available

[1] Obtained from Discharge Monitoring Reports (DMRs) submitted to U.S. EPA's Permit Compliance System (PCS) database

[2] Product classifications are as follows:

BOTTOMFISH = Bottomfish (e.g, pollock)
CRAB = Crab, including crabmeat and crab sections
SALMON = Includes both hand-butchered and mechanized salmon operations
HALIBUT = Halibut and other headed/gutted bottomfish
HERRING = Herring, including fillets and roe
SHRIMP = Shrimp
TOTAL = Includes multiple, single, or unspecified species; typically reserved for final effluent
MEAL = Fishmeal
STICKWATER = Stickwater from fish meal operations
SURIMI = Surimi production from pollock

TABLE 2-7. OIL AND GREASE LOADING DATA FOR ALASKA SHORE-BASED SEAFOOD PROCESSORS-1992 AND 1993[1]

PRODUCT[2]		OG-lb/1000 lb prod.		OG-lb/month		OG-lb/day	
		Monthly ave.	Daily max.	Monthly ave.	Daily max.	Monthly ave.	Daily max.
BOTTOMFISH	median	1.5	2.8	n/a	n/a	n/a	n/a
	n	114	120	n/a	n/a	n/a	n/a
	min	0.06	0.06	n/a	n/a	n/a	n/a
	max	7.8	15	n/a	n/a	n/a	n/a
CRAB	median	1.6	1.3	n/a	n/a	n/a	n/a
	n	14	20	n/a	n/a	n/a	n/a
	min	0.4	0.006	n/a	n/a	n/a	n/a
	max	78	16	n/a	n/a	n/a	n/a
SALMON	median	2.2	3.0	n/a	n/a	n/a	n/a
	n	34	36	n/a	n/a	n/a	n/a
	min	0.07	0.07	n/a	n/a	n/a	n/a
	max	3366	7,307	n/a	n/a	n/a	n/a
HALIBUT	median	0.8	1.3	n/a	n/a	n/a	n/a
	n	15	16	n/a	n/a	n/a	n/a
	min	0.2	0.4	n/a	n/a	n/a	n/a
	max	5.1	5.7	n/a	n/a	n/a	n/a
HERRING	median	0.5	1.8	n/a	n/a	n/a	n/a
	n	6	7	n/a	n/a	n/a	n/a
	min	0.04	0.04	n/a	n/a	n/a	n/a
	max	4.2	6.2	n/a	n/a	n/a	n/a
SHRIMP	median	1.0	2.0	n/a	n/a	n/a	n/a
	n	6	7	n/a	n/a	n/a	n/a
	min	0.5	0.6	n/a	n/a	n/a	n/a
	max	2.9	7.2	n/a	n/a	n/a	n/a
TOTAL	median	1.6	2.7	n/a	29,163	94	154
	n	71	72	n/a	6	181	184
	min	0.01	0.01	n/a	3,252	0.2	0.2
	max	249	309	n/a	136,434	37,981	81,991
MEAL	median	1.2	2.0	n/a	n/a	16	28
	n	42	43	n/a	n/a	25	25
	min	0.001	0.001	n/a	n/a	2.6	3.8
	max	31	54	n/a	n/a	32	69
STICKWATER	median	0.04	0.07	n/a	n/a	2.0	2.3
	n	19	19	n/a	n/a	4	4
	min	0.01	0.01	n/a	n/a	0.04	0.06
	max	0.3	0.5	n/a	n/a	519,908	40,773
SURIMI	median	n/a	n/a	n/a	n/a	1,337	3,406
	n	n/a	n/a	n/a	n/a	9	10
	min	n/a	n/a	n/a	n/a	2.8	5.3
	max	n/a	n/a	n/a	n/a	3,565	21,012

n/a = not available

[1] Obtained from Discharge Monitoring Reports (DMRs) submitted to U.S. EPA's Permit Compliance System (PCS) database

[2] Product classifications are as follows:

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CRAB = Crab, including crabmeat and crab sections
SALMON = Includes both hand-butchered and mechanized salmon operations
HALIBUT = Halibut and other headed/gutted bottomfish
HERRING = Herring, including fillets and roe
SHRIMP = Shrimp
TOTAL = Includes multiple, single, or unspecified species; typically reserved for final effluent
MEAL = Fishmeal
STICKWATER = Stickwater from fish meal operations
SURIMI = Surimi production from pollock

TABLE 2-8. F[illegible]CHEMICAL OXYGEN DEMAND (5-DAY) LOA[illegible]NG DATA FOR S[illegible]RE-BASED SEAFOOD PROCESSORS-1992 AN[illegible]93[1]

PRODUCT[2]		BOD-lb/1000 lb prod.		BOD-lb/month		BOD-lb/day	
		Monthly ave.	Daily max.	Monthly ave.	Daily max.	Monthly ave.	Daily max.
BOTTOMFISH	median	n/a	n/a	n/a	n/a	n/a	n/a
	n	n/a	n/a	n/a	n/a	n/a	n/a
	min	n/a	n/a	n/a	n/a	n/a	n/a
	max	n/a	n/a	n/a	n/a	n/a	n/a
CRAB	median	n/a	n/a	n/a	n/a	n/a	n/a
	n	n/a	n/a	n/a	n/a	n/a	n/a
	min	n/a	n/a	n/a	n/a	n/a	n/a
	max	n/a	n/a	n/a	n/a	n/a	n/a
SALMON	median	n/a	n/a	n/a	n/a	n/a	n/a
	n	n/a	n/a	n/a	n/a	n/a	n/a
	min	n/a	n/a	n/a	n/a	n/a	n/a
	max	n/a	n/a	n/a	n/a	n/a	n/a
HALIBUT	median	n/a	n/a	n/a	n/a	n/a	n/a
	n	n/a	n/a	n/a	n/a	n/a	n/a
	min	n/a	n/a	n/a	n/a	n/a	n/a
	max	n/a	n/a	n/a	n/a	n/a	n/a
HERRING	median	n/a	n/a	n/a	n/a	n/a	n/a
	n	n/a	n/a	n/a	n/a	n/a	n/a
	min	n/a	n/a	n/a	n/a	n/a	n/a
	max	n/a	n/a	n/a	n/a	n/a	n/a
SHRIMP	median	n/a	n/a	n/a	n/a	n/a	n/a
	n	n/a	n/a	n/a	n/a	n/a	n/a
	min	n/a	n/a	n/a	n/a	n/a	n/a
	max	n/a	n/a	n/a	n/a	n/a	n/a
TOTAL	median	1.4	2.0	n/a	910,350	108,988	149,857
	n	14	14	n/a	9	6	6
	min	0.06	0.07	n/a	1,074	162.0	502.0
	max	66	351	n/a	2,614,380	161,518	2,537,781
MEAL	median	1.1	1.6	57	110	112	216
	n	41	41	14	14	12	12
	min	0.001	0.002	6.6	6.6	16	17
	max	476	1,125	476	752	723	1,817
STICKWATER	median	0.30	0.35	n/a	n/a	39,100	54,585
	n	18	18	n/a	n/a	11	11
	min	0.06	0.07	n/a	n/a	0.10	0.10
	max	18	3.9	n/a	n/a	1,155,810	1,155,810
SURIMI	median	n/a	n/a	n/a	n/a	11,190	30,583
	n	n/a	n/a	n/a	n/a	5	5
	min	n/a	n/a	n/a	n/a	5.5	8.0
	max	n/a	n/a	n/a	n/a	17,335	321,882

n/a = not available

[1] Obtained from Discharge Monitoring Reports (DMRs) submitted to U.S. EPA's Permit Compliance System (PCS) database

[2] Product classifications are as follows:

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HERRING = Herring, including fillets and roe
SHRIMP = Shrimp
TOTAL = Includes multiple, single, or unspecified species; typically reserved for final effluent
MEAL = Fishmeal
STICKWATER = Stickwater from fish meal operations
SURIMI = Surimi production from pollock

TABLE 2-9. PROXIMATE COMPOSITION (PERCENT) OF ALASKAN FISHERY WASTES

Type	Sample	n	Moisture	Protein	Fat	Ash	Source
Cod	hand fillet	6	79.5	14.3	1.7	3.9	Crapo 1988
Cod	hand fillet	n/a	78.9	15.6	2.1	4.3	Crawford et al. 1972
Cod	machine filet (winter)	6	79.4	14.1	2.0	3.8	Crapo 1988
Cod	machine filet (spawning)	4	80.6	13.5	0.9	4.1	Crapo 1988
Cod	skinner wastes	6	78.8	20.3	0.6	2.6	Crapo 1988
Cod	trimming table	6	85.1	14.9	0.6	0.8	Crapo 1988
Cod	cod roe	2	71.5	23.5	2.5	1.4	Crapo 1988
Pollock	machine filet (winter)	4	81.3	11.3	3.0	3.6	Crapo 1988
Pollock	machine filet (spawning)	4	82.0	12.5	1.9	3.7	Crapo 1988
Pollock	hand fillet	n/a	74.8	13.8	8.9	2.7	Babbitt 1982
Pollock	head	n/a	81.1	13.6	1.4	4.9	Babbitt 1982
Pollock	viscera	n/a	45.0	8.2	40.1	0.8	Babbitt 1982
Pollock	frame	n/a	80.4	15.9	0.7	3.3	Babbitt 1982
Pollock	skin	n/a	81.8	18.0	0.3	0.9	Babbitt 1982
Pollock	bloodwater	2	98.5	0.9	0.2	0.3	Crapo 1988
Surimi	filet waste	3	81.3	11.3	3.0	3.6	Crapo 1988
Surimi	bloodwater	3	97.9	1.3	0.4	0.3	Crapo 1988
Surimi	deboner waste	3	86.1	10.7	0.8	0.7	Crapo 1988
Surimi	refiner waste	3	86.4	12.1	0.7	0.4	Crapo 1988
Surimi	rotary screen wastewater	3	98.8	0.8	0.2	0.2	Crapo 1988
Halibut	heads	3	65.5	11.6	16.2	4.1	Crapo 1988
Salmon	heads	3	67.3	13.3	15.8	4.2	Crapo 1988
Salmon	heads	n/a	65.1	15.0	17.5	3.6	Kizevetter 1971
Salmon	viscera	3	80.5	16.2	2.5	1.6	Crapo 1988
Salmon	viscera	n/a	76.0	18.0	4.0	2.0	Kizevetter 1971
Crab	Tanner	3	76.7	8.9	1.1	9.2	Crapo 1988
Crab	king	3	71.7	13.8	1.6	10.3	Crapo 1988
Flatfish	flatfish	3	79.4	13.8	3.8	3.2	Crapo 1988

n/a = not available

TABLE 2-10. THEORETICAL COMPOSITION OF SEAFOOD WASTE

Constituent	Percent Wet Weight	Approximate Density[a] (g/cm^3)	Percent Dry Weight
Water	75	1.0	-
Protein	7	1.5	60
Fat/Carbohydrates	15	0.9	28
Bone/Chitin	3	3.0	12
Total Estimated Wet Weight Density		1.13	
Carbon	16.7[b]	-	50[b]
Nitrogen	2.9[c]	-	8.8[c]
Phosphorus	0.27[c]	-	0.8[c]
Sulfur	0.27[c]	-	0.8[c]

[a] Typical values in the *Handbook of Chemistry and Physics* (Weast 1982).

[b] Typical dry weight carbon (C) content of organic matter used.

[c] Estimated concentrations of nitrogen (N) and phosphorus (P) based on the Redfield ratio of C:N:P (106:16:1 by atoms) in organic matter (Redfield 1958; Redfield et al. 1963). Ratio of sulfur to phosphorus assumed to be 1:1.

TABLE 2-11. MEASURED AND DERIVED CONCENTRATIONS OF NITROGEN, PHOSPHORUS, AND SULFUR IN WHOLE FISH AND SEAFOOD WASTE			
Nitrogen	Phosphorus	Sulfur	Source
8.8	0.8	0.8	Derived in this study
-	1.38 - 2.47	-	Donaldson 1967: whole adult sockeye salmon
4.4 - 7.3	0.6 - 1.8	0.5	United Nations 1986: crab wastes
5.4 - 7.9	2.1 - 2.9	0.3	United Nations 1986: shrimp wastes
6.5	-	0.09	Tetra Tech 1987: crab wastes - measured concentrations
7.6	-	0.43	Tetra Tech 1987: crab wastes - derived concentrations

TABLE 3-1. SUMMARY OF TIDE RANGES AND MAXIMUM TIDAL CURRENTS AT SELECTED LOCATIONS IN ALASKA

Location	Tide Ranges				Maximum Tidal Currents					
	Mean		Diurnal		Flood			Ebb		
	m	ft	m	ft	m/sec	kn	Degrees	m/sec	kn	Degrees
SOUTHEAST										
Ketchikan	4.0	13.0	4.7	15.4	0.41	0.8	310	0.10	0.2	120
Ward Cove	4.1	13.3	4.8	15.7	-	-	-	-	-	-
Wrangell	4.1	13.3	4.8	15.7	0.41	0.8	050	0.41	0.8	235
Petersburg	4.1	13.4	4.8	15.7	1.9	3.7	225	1.7	3.4	045
Sitka	2.3	7.7	3.0	9.9	0.15	0.3	333	0.21	0.4	156
Juneau	4.2	13.7	5.0	16.3	0.15	0.3	302	0.05	0.1	085
Haines	4.3	14.2	5.1	16.8	-	-	-	-	-	-
Yakutat	2.4	7.8	3.1	10.1	-	-	-	-	-	-
PRINCE WILLIAM SOUND										
Cordova	3.1	10.1	3.8	12.5	0.92	1.8	212	0.51	1.0	0.26
Valdez	3.0	9.7	3.7	12.1	-	-	-	-	-	-
Whittier	3.0	9.8	3.7	12.3	-	-	-	-	-	-
Seward	2.5	8.3	3.2	10.6	-	-	-	-	-	-
COOK INLET										
Seldovia	4.7	15.5	5.5	18.0	-	-	-	-	-	-
Homer	4.8	15.7	5.5	18.1	-	-	-	-	-	-
Kenai	5.3	17.5	6.0	19.8	-	-	-	-	-	-
Anchorage	7.9	25.9	8.8	28.8	1.8	3.5	081	1.6	3.1	234
KODIAK										
Kodiak	2.0	6.6	2.6	8.5	0.46	0.9	056	0.26	0.5	228
Alitak Bay	2.8	9.3	3.6	11.7	-	-	-	-	-	-
Moser Bay	2.8	9.3	3.5	11.6	-	-	-	-	-	-
ALASKA PENINSULA/ALEUTIAN ISLANDS										
Port Moller	2.3	7.6	3.3	10.8	0.46	0.9	158	0.97	1.9	335
Sand Point	1.6	5.2	2.2	7.3	-	-	-	-	-	-
King Cove	1.5	4.8	2.1	6.8	-	-	-	-	-	-
Akutan	0.7	2.4	1.2	3.9	-	-	-	-	-	-
Dutch Harbor	0.7	2.2	1.1	3.7	-	-	-	-	-	-
Atka - Martin H.	-	-	1.0	3.2	-	-	-	-	-	-
Adak - Clam L.	-	-	0.9	2.9	-	-	-	-	-	-
BRISTOL BAY										
Egegik	3.3	10.8	4.1	13.3	-	-	-	-	-	-
Naknek River >Entrance	5.6	18.5	6.9	22.6	-	-	-	-	-	-
>Naknek Air Base	0.6	2.1	1.0	3.2	-	-	-	-	-	-
Dillingham	-	-	-	-	1.7	3.4	030	0.6	2.1	205
PRIBILOFS										
St. Paul	0.6	2.0	1.0	3.2	-	-	-	-	-	-
St. George	-	-	1.0	3.3	-	-	-	-	-	-
St. Matthew Island	0.4	1.3	0.6	2.1	-	-	-	-	-	-
Between St. Paul/St. George	-	-	-	-	0.31	0.6	260	-	-	-
SW Coast - St. Matthew	-	-	-	-	0.62	1.2	292	0.51	1.0	119
ARCTIC-YUKON-KUSKOKWIM										
Nome	0.3	1.0	0.5	1.6	-	-	-	-	-	-
Kotzebue	0.6	2.1	0.8	2.7	-	-	-	-	-	-

Source: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, 1992 Tidal Current and Tide Tables.

TABLE 3-2. ESTIMATED SETTLING VELOCITIES AND CURRENT SPEEDS NECESSARY TO RESUSPEND DIFFERENT SIZES OF SEAFOOD SOLID WASTE PARTICLES

Seafood Waste Particle Diameter (cm)	Settling Velocity[a] (m/sec)		Resuspension Current Speed[b] (m/sec)		
	ρ = 1.13	ρ = 1.05	ρ = 1.05	ρ = 1.13	ρ = 1.4
	For a Given Particle Density in g/cm^3				
0.1	0.017	0.0057	0.07	0.11	0.20
0.2	0.036	0.014	0.08	0.15	0.28
0.3	0.055	0.021	0.09	0.18	0.37
0.318 (1/8 in.)	0.058	0.022	0.09	0.19	0.38
0.4	0.072	0.029	0.10	0.22	0.44
0.5	0.089	0.036	0.12	0.25	0.51
0.6	0.105	0.042	0.13	0.28	0.58
0.635 (1/4 in)	0.111	0.045	0.14	0.29	0.60
0.7	0.122	0.049	0.14	0.31	0.64
0.8	0.138	0.055	0.16	0.34	0.70
0.9	0.154	0.062	0.17	0.37	0.76
1.0	0.165	0.068	0.18	0.40	0.82
1.1	0.174	0.075	0.19	0.42	0.86
1.2	0.181	0.081	0.20	0.45	0.90
1.27 (1/2 in)	0.186	0.085	0.21	0.47	0.93
1.3	0.189	0.087	0.22	0.47	0.95

[a] Stokes fall velocity (Sleath 1984). Assumes a seawater density of 1.025 g/cm^3 and a kinematic viscosity of seawater at 5° C equal to 1.52×10^{-6} m^2/sec.

[b] The calculation of the resuspension current speed [i.e., the current speed 1 m (3.3 ft) above the seafloor (U_{100}) that is sufficient to cause resuspension of particles] is based on use of Shield's diagram (Vanoni 1977) to compute the critical shear velocity u_* and the relation $u_* = (0.003)^{.5}\ U_{100}$ (Sternberg 1972).

Conversion Factors:

To convert cm to in multiply cm*0.3937

To convert m/sec to knots multiply m/sec*1.9438

To convert m/sec to ft/sec multiply m/sec*3.2808

TABLE 3-3. IDEALIZED CHEMICAL REACTIONS OF MICROBIALLY MEDIATED ORGANIC MATTER DECOMPOSITION
Microbially Mediated Process:
1. Aerobic respiration $(CH_2O)_x(NH_3)_y(H_3PO_4)_z^{a} + (x+2y)O_2 \rightarrow xCO_2 + (x+y)H_2O + yHNO_3 + zH_3PO_4$
2. Nitrate reduction $5(CH_2O)_x(NH_3)_y(H_3PO_4)_z + 4xNO_3^- \rightarrow xCO_2 + 3xH_2O + xHCO_3^- + 2xN_2 + 5yNH_3 + 5zH_3PO_4$
3. Manganese reduction $(CH_2O)_x(NH_3)_y(H_3PO_4)_z + 2xMnO_2 + 3xCO_2 + xH_2O \rightarrow 4xHCO_3^- 2xMn^{2+} + yNH_3 + zH_3PO_4$
4. Iron reduction $(CH_2O)_x(NH_3)_y(H_3PO_4)_z + 4xFe(OH)_3 + 7xCO_2 \rightarrow 8xHCO_3^- + 3xH_2O + 4xFe^{2+} + yNH_3 + zH_3PO_4$
5. Sulfate reduction $2(CH_2O)_x(NH_3)_y(H_3PO_4)_z + xSO_4^{2-} \rightarrow 2xHCO_3^- + xH_2S + yNH_3 + 2zH_3PO_4$
6. Methane production $2(CH_2O)_x(NH_3)_y(H_3PO_4)_z \rightarrow xCO_2 + xCH_4 + 2yNH_3 + 2zH_3PO_4$
7. Fermentation (generalized) $12(CH_2O)_x(NH_3)_y(H_3PO_4)_z \rightarrow xCH_3CH_2COOH + xCH_3COOH + 2xCH_3CH_2OH + 3xCO_2 + xH_2 + 12yNH_3 + 12zH_3PO_4$
[a] Theoretical chemical formula for organic matter. Source: Aller (1982, Table I)

TABLE 3-4. RANGE OF SEDIMENT DECAY RATE CONSTANTS (K) FOR ORGANIC MATERIAL

(day^{-1})	Degraded Substrate	Measurement Method	Location	Reference
$1.6x10^{-6}$ [a]	Refractory organic material	Benthic chamber, core incubation, pore water	Santa Monica Basin, CA	Jahnke 1990
$<8.2x10^{-5}$ [a]	Organic material	^{14}C	Resurrection Bay, AK	Henrichs and Doyle 1986
$>4.1x10^{-4}$ [a]	Labile organic material	Benthic chamber, core incubation, pore water	Santa Monica Basin, CA	Jahnke 1990
$1.2x10^{-3}$ [a]	Organic material	^{14}C	Long Island Sound, NY	Turekian et al. 1980
$1.7x10^{-3}$ - $6.0x10^{-3}$ [a]	Organic material	Pore water nitrogen	North Sea	Billen 1982
$2.3x10^{-3}$ [b]	Refractory algal material	^{35}S	Long Island Sound, NY	Westrich and Berner 1984
$2.7x10^{-3}$ [b]	Refractory organic material	^{35}S	Long Island Sound, NY	Westrich and Berner 1984
$2.7x10^{-3}$ - $8.2x10^{-3}$ [a]	Refractory algal material	^{14}C	Resurrection Bay, AK	Henrichs and Doyle 1986
$1.0x10^{-2}$ [c]	--	--	--	EPA 1982
$2.0x10^{-2}$ [b]	Labile organic material	^{35}S	Long Island Sound, NY	Westrich and Berner 1984
$2.4x10^{-2}$ [b]	Labile algal material	^{35}S	Long Island Sound, NY	Westrich and Berner 1984
$1.4x10^{-1}$ [a]	Labile algal material	^{14}C	Resurrection Bay, AK	Henrichs and Doyle 1986
Range: $1.6x10^{-6}$ - $1.4x10^{-1}$ day^{-1}				

[a] Total degradation was measured.

[b] Only anoxic degradation was measured.

[c] No experiments were conducted.

TABLE 3-5. SUMMARY OF WASP5 MODELING CASE SCENARIOS OF SHORE-BASED AND OFFSHORE NEAR-SURFACE SEAFOOD SOLID WASTE DISCHARGES

Case #	Net Velocity (cm/sec)	Total Depth (m)	Surface Layer Thickness (m)	Bottom Layer Thickness (m)	Bottom Slope (%)
Shore-Based Discharges:					
1	5.0	15.24	11.24	4.00	0.0%
2	15.0	15.24	11.24	4.00	0.0%
3	5.0	15.24	11.24	4.00	12.5%
4	15.0	15.24	11.24	4.00	12.5%
5	5.0	15.24	11.24	4.00	25.0%
6	15.0	15.24	11.24	4.00	25.0%
Near-Surface Discharges in Open Ocean:					
7	5.0	15.24	2.00	13.24	0.0%
8	15.0	15.24	2.00	13.24	0.0%
9	5.0	30.48	2.00	28.48	0.0%
10	15.0	30.48	2.00	28.48	0.0%
11	5.0	45.72	2.00	43.72	0.0%
12	15.0	45.72	2.00	43.72	0.0%

TABLE 3-6. SEAFOOD WASTE ACCUMULATION MODEL INPUT VARIABLES	
Solids Distribution and Settling Velocities	
Solids Distribution	Settling Velocity (m/sec)
60 percent 20 percent 20 percent	0.085 0.045 0.022
Waste Solids Decay Rate Constant	0.02/day
Lateral and Longitudinal Dispersion Coefficients	$D_x = D_y = 0.1\ m^2/sec$

TABLE 3-7. SEAFOOD WASTE ACCUMULATION MODEL RESULTS

Case #[a]	Net-Drift Current Speed (cm/sec)	Water Depth (m)	Bottom Slope (%)	Waste Solids Discharge Rate (lb/yr wet weight)	Maximum Waste Accumulation Depth (cm)	Areal Coverage (acres)	
						S[b]	W[c]
Near-Bottom Shore-Based Discharges							
1	5.0	15.2	0.0	16,000,000	230	1.0	0.8
2	15.0	15.2	0.0	12,000,000	133	1.2	1.0
3	5.0	15.2	12.5	20,000,000	230	1.0	0.8
4	15.0	15.2	12.5	16,000,000	179	1.3	1.1
5	5.0	15.2	25.0	20,000,000	288	1.0	0.8
6	15.0	15.2	25.0	16,000,000	179	1.3	1.1
Near-Surface Floating Discharges in Open Ocean							
7	5.0	15.2	0.0	8,000,000	63.4	1.0	0.8
8	15.0	15.2	0.0	4,000,000	19.2	1.2	0.6
9	5.0	30.5	0.0	4,000,000	24.2	1.1	0.9
10	15.0	30.5	0.0	4,000,000	12.3	1.3	1.0
11	5.0	45.7	0.0	4,000,000	18.5	1.2	1.2
12	15.0	45.7	0.0	4,000,000	8.0	1.3	1.0

[a] Case numbers correspond to the case scenarios outlined in Table 3-5.

[b] Areal coverage of solid waste estimated by SURFER™.

[c] Areal coverage of solid waste estimated using WASP output.

TABLE 4- COMMON ZOOPLANKTON AND MICROPLANKTON FOR LOWER COOK INLET AND SHELIKOF STRAIT

	Shelikof Strait/Kodiak Island/ Lower Cook Inlet	Southeastern Bering Sea
Chaetognatha		
Sagitta elegans	X	X
Eukrahnia hamata	X	X
Cnidaria		
Coryne principes		X
Aglanthe digitale		X
Polychaeta		
Typhloscolex muelleri		X
Mollusca		
Gastropoda		
Limacina helicina		X
Blione limacina		X
Arthropoda		
Copepoda		
Acartia tumida	X	
Acartia longiremis		X
Calanus pacificus	X	
Calanus marshallae		X
Neocalanus cristatus	X	X
Neocalanus plumchrus	X	X
Eucalanus bungii	X	X
Metridia pacifica	X	
Metridia lucens		X
Oithona similus	X	X
Pseudocalanus spp.	X	X
Amphipoda		
Parathemisto pacifica	X	X
Parathemisto libellula		X
Euphausiacea		
Euphasia pacifica	X	
Thysanoessa inermis	X	X
Thysanoessa longipes		X
Thysanoessa raschi		X
Chordata		
Oikopleura spp.	X	X

Source: Cooney 1978; 1987.

ZOOPLANKTON SEASONAL STANDING STOCK IN LOWER COOK INLET AND SHELIKOF STRAIT

	Winter	Spring	Summer	Fall
Shelikof Strait/ (shelf)	42	112	525	77
Kodiak Island (oceanic)	63	70	434	70
lower Cook Inlet	-	5,010	1,440	-

Source: Cooney 1987

TABLE 7-1. LIFE HISTORY DATA FOR THE FIVE SPECIES OF SALMON FOUND IN ALASKA

	Species				
	Pink	Chum	Coho	Sockeye	Chinook
Number of eggs per female	2,000	3,000	3,500	3,700	4,800
Spawning season	mid-Jun to Oct	Jul-Nov	Jul-Dec	June-Nov	mid-May to mid-Dec
Time spent in freshwater	several days to several weeks	less than 1 month	1-2 years	1-4 years	3-12 months, 1-2 years
Out-migration of smolts	Feb-Apr	May-Sept	Feb to mid-Jul	May-Sept	Mar-Aug
Length of ocean phase (years)	1 and 1/3	1/2 to 5	1 to 2	1/2 to 4	1 to 5
Age at maturity (years)	2	2 to 6	2 to 4	3 to 7	2 to 8
Major spawning areas	intertidal and short streams	river-lake systems	short coastal streams and intertidal	river-lake systems	large rivers and tributaries

Source: U.S. DOI 1984, p. III-20.

TABLE 7-2. ALASKA RECREATIONAL FISH AND SHELLFISH HARVESTS IN 1991 (NUMBERS)

Area Fished	Species							
	Salmon: Pink Sockeye Chinook	Salmon: Coho Chum	Trout[a]	Dolly Varden Arctic Char	Arctic Grayling	Pacific Halibut	Other[b]	Shellfish
W. Cook Inlet-W. Susitna River Drainings	27,272	29,743	5,343	2,809	3,393	1,576	12,103	27,658
Kenai Peninsula[c]	22,511	40,781	12,168	2,241	3,393	160,888	0,995	1,179,802
Kodiak	19,516	19,023	1,623	12,794	98	12,089	2,995	119
Naknek River Drainage-Alaska Peninsula	16,662	6,632	1,936	10,364	649	5,199	15,991	0
Southeast Alaska	128,066	129,539	19,656	45,954	81	74,038	6,262	--
Arctic-Yukon-Kuskokwim	4,459	13,820	75,831	19,771	52,354	0	7,809	--

[a] Includes steelhead, rainbow, cutthroat, and lake trout.

[b] Includes burbot, smelt, and whitefish.

[c] Includes waters contiguous to the Kenai Peninsula, including waters around Kalgin Island (excludes Kenai River drainages).

-- = Data not available.

Source: Mills (1992).

TABLE 7-3. MEAN HOUSEHOLD SUBSISTENCE HARVEST FOR SELECTED SPECIES (POUNDS)

Resource	Location			
	Western Region[a]	Nanwalek	Kodiak Island[b,c]	Tatitlek
SALMON				
Chinook	4,340	2.7	21.6	0.0
Sockeye	--	193	424.4	18.7
Pink	--	93.9	134.7	53.0
Coho	--	78.6	123	415.6
Chum	--	8.0	7.2	104.7
OTHER FISH				
Dolly Varden	--	144.9	73.6	0.44
Halibut	--	127.3	17.9	92.4
Rainbow Trout	--	10.0	20.4	0.29
Cod	573	55.1	--	19.9
Rockfish	--	121.2	--	63.2
Flounder	--	35.2	--	1.2
INVERTEBRATES				
Razor Clam	--	0.1	--	1.6
Butter Clam	--	15.6	15.5	5.4
Chiton	--	35.3	--	8.3
Tanner Crab	--	0.0	11.2	1.1
Dungeness Crab	--	0.0	20.7	0.0
King Crab	--	0.0	28.3	0.0
MARINE MAMMALS				
Harbor Seal	--	36.4	3.9	159.2
Sea Lion	13	42.4	1.9	25.8
Beluga Whale	1,666	--	--	--
BIG GAME				
Moose	1,356	15.2	--	0.0
Deer	--	6.6	--	143.2
Year:	1981	1987	1983	1991
Source:	Schroeder et al. 1987	KPB 1990	Schroeder et al. 1987	Seitz 1993

[a] Includes Alakanuk, Emmonak, Kotlike, Mountain Village, Sheldon Point, and Stebbins Communities only.

[b] Includes Karluk, Larsen Bay, and Port Lions communities only.

[c] Values listed are numbers harvested.

-- Data not available.

TABLE 8-1. RELEVANT ALASKAN DISTRICT COASTAL MANAGEMENT PROGRAMS (CMPS)	
District Coastal Management Program	Federal Approval Date
Aleutians East Borough	1992
Aleutians West Coastal Resource Service Area	1991
City of Angoon	1992
Annette Island Indian Reserve	1982
City of Bethel	1984
Bristol Bay Borough	1983
Bristol Bay Coastal Resource Service Area	1987
Cenaliulriit Coastal Resource Service Area	1985
City of Cordova	1986
City of Craig	1985
City of Hoonah	1984
City of Hydaburg	1983
City and Borough of Juneau	1986
City of Kake	1985
Kenai Peninsula Borough	1990
Ketchikan Gateway Borough	1984
City of Klawock	1985
Kodiak Island Borough	1984
Lake and Peninsula Borough	Pending*
City of Nome	1984
City of Pelican	1994
City and Borough of Sitka	1989
City of St. Paul	1989
City of Thorne Bay	1992
City of Valdez	1987
City of Whittier	1990
City of Yakutat	1981

*The Lake and Peninsula Borough CMP is expected to be completed by August 1994. The Lake and Peninsula Borough is currently utilizing the Bristol Bay Coastal Resource Service Area CMP. (Gardner, R., 3 May, 1994, personal communication).

TABLE 8-2. ALASKA REFUGE, SANCTUARIES, NATIONAL PARKS, AND MONUMENTS OF RELEVANCE TO SEAFOOD PROCESSING WASTE DISCHARGES
National Refuges and Sanctuaries Alaska Maritime National Wildlife Refuge Alaska Peninsula National Wildlife Refuge Becharof National Wildlife Refuge Izembek National Wildlife Refuge Kenai National Wildlife Refuge Kodiak National Wildlife Refuge Togiak National Wildlife Refuge Yukon Delta National Wildlife Refuge
State Refuges and Sanctuaries Anchorage Coastal Wildlife Refuge Cape Newenham State Game Refuge Goose Bay State Game Refuge Mendenhall Wetlands State Game Refuge McNeil River State Game Refuge and Sanctuary Palmer Hay Flats State Game Refuge Stan Price Wildlife Sanctuary Susitna Flats State Game Refuge Trading Bay State Game Refuge Walrus Island State Game Refuge Yakataga State Game Refuge
National Parks and Monuments Aniakchak National Monument and Preserve Bering Land Bridge National Preserve Cape Krusenstern National Monument Glacier Bay National Park Katmai National Park Kenai Fjords National Park Lake Clark National Park Wrangell-St. Elias National Park

TABLE 9-1. SUMMARY OF PREDICTED DISSOLVED OXYGEN DEPRESSION DUE TO SEAFOOD PROCESSING WASTE DISCHARGES TO COASTAL WATERS OF ALASKA

Receiving Water Dissolved Oxygen Concentration	Dissolved Oxygen Concentration Following Initial Dilution	Minimum Farfield Dissolved Oxygen Concentration	
(mg/L)	(mg/L)	(mg/L)	Travel Time (hr)
For an Initial Dilution of 10 and an Effluent $BOD_{5\text{-day}}$ Concentration of 155 mg/L			
10.0	8.50	8.50	0.02
9.0	7.60	7.60	0.02
8.0	6.70	6.70	0.02
7.0	5.80	5.80	0.02
For an Initial Dilution of 10 and an Effluent $BOD_{5\text{-day}}$ Concentration of 6,850 mg/L			
10.0	8.50	8.12	0.10
9.0	7.60	7.19	0.20
8.0	6.70	6.25	0.30
7.0	5.80	5.28	1.20
For an Initial Dilution of 25 and an Effluent $BOD_{5\text{-day}}$ Concentration of 155 mg/L			
10.0	9.40	9.40	0.02
9.0	8.44	8.44	0.02
8.0	7.48	7.48	0.02
7.0	6.52	6.52	0.02
For an Initial Dilution of 25 and an Effluent $BOD_{5\text{-day}}$ Concentration of 6,850 mg/L			
10.0	9.40	9.25	0.10
9.0	8.44	8.28	0.20
8.0	7.48	7.30	0.30
7.0	6.52	6.31	0.90-1.80

a The farfield dissolved oxygen concentration was calculated using the method of Brooks (Brooks 1960; U.S. EPA 1982). An initial dissolved oxygen demand of 5 mg/L, a wastefield width of 6 m following initial dilution, a Brooks' n equal to 1 (i.e.,linearly increasing diffusivity), $BOD_{5\text{-day}}$ first-order decay rate of 0.23/day at 25° C, and an ambient water temperature of 15° C was used in the calculation.