Re: Instream Water Rights in WRD Basin 1 (North Coast)

Hello (To Interested Water Users, Managers, and Providers – See addressee list on page 2),

The Oregon Department of Fish and Wildlife (ODFW) is reinitiating their instream water rights (ISWR) filing process throughout Oregon. By way of background, it is the policy of the state, through the Oregon Department of Fish and Wildlife, the Oregon Department of Environmental Quality, and the Oregon Parks and Recreation Department and enabling statutes to apply for ISWRs on waterways of the state to conserve, maintain, and enhance aquatic and fish life, wildlife, fish and wildlife habitat, water quality, and recreational values for the benefit of present and future generations of the citizens of this state.

This need to apply for ISWRs is highlighted in the Integrated Water Resource Strategy where it recommends ODFW determine instream flow needs and establish additional instream water rights. ODFW focuses on ISWRs in support of maintaining instream flows to conserve and maintain fish and wildlife populations and their associated habitats. It is ODFW's policy to apply for ISWRs on waterways of the state to conserve, maintain, and enhance aquatic and fish life, wildlife, and fish and wildlife habitat for the benefit of present and future generations of the citizens of this state. The long-term goal of this policy shall be to obtain an instream water right on every waterway exhibiting fish and wildlife values (OAR 635-400-0005). However, it has been almost 20 years since ODFW last applied for a new ISWR. Beginning in 2016, we began the process to file on reaches where we had existing biological data throughout the state.

A backgrounder on ISWRs can be found here-
http://www.dfw.state.or.us/fish/water/docs/BKGWaterRights.pdf

Some important points include:

- Three state agencies may apply for instream water rights- Department of Environmental Quality, Parks and Recreation Department, and Department of Fish and Wildlife for the following uses: recreation, pollution abatement, navigation, maintenance and enhancement of fish and wildlife populations and their habitats.
- ISWRs provide the targets for what flows are needed as the state strives to restore flow for fish, wildlife, their habitats, water quality, or recreation.
- Instream rights are enforced like all other water rights. By law, instream (like out-of-stream) applications cannot take away or impair any legally established water use having an earlier priority date.

As this is a restart of the instream water right filing process, we recognize that there might be questions. As we move forward with preparing these instream water right applications, we wanted to reach out to your group to facilitate a dialog and answer questions that you might have. As applications are developed in your area, we can send follow-up information. If you have any questions regarding the process, or are interested in receiving additional information, please do not hesitate to contact me.

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Addressee's for North Coast Outreach Memo – sent via Email 9/18/17

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October 19, 2017

[Enter Addressee Here]
Generic Notification Letter: See addressee list at end of document

To Interested Water Users, Managers, and Providers in the North Coast Basin

REFERENCE: Proposed Instream Water Right Application in North Coast Basin (Oregon Water Resources Department Basin 1)

It is the Oregon Department of Fish and Wildlife's (ODFW) policy to apply for instream water rights (ISWRs) on waterways of the state to conserve, maintain, and enhance aquatic and fish life, wildlife, and fish and wildlife habitat for the benefit of present and future generations of the citizens of this state. In an effort to better inform the public about this process we are notifying interested local parties about upcoming filings. Additionally, the Oregon Water Resources Department requires applicants intending to file an application for an ISWR to notify affected local governments (OAR 690-077-0020 (j)). As such, we are notifying you that we intend to submit applications to the Oregon Water Resources Department for instream rights in your area.

For ongoing updates about the current instream filing process we encourage you to sign up for updates on the ODFW Water Quality and Quantity Program website (http://www.dfw.state.or.us/fish/water/). In addition, public notifications for state water right applications can be found through the Oregon Water Resources Department Water Rights Public Notice page (http://apps.wrd.state.or.us/apps/misc/wrd_notice_view/?notice_id=21).

If you have any questions regarding the current instream filing process, proposed applications, or would like to arrange a meeting with your group, please do not hesitate to contact Anna Pakenham Stevenson at 503-947-6084 or Anna.p.stevenson@state.or.us

Sincerely,

Anna Pakenham Stevenson
Water Quality and Quantity Program Manager

Attachment:
Proposed places of instream use and amounts of water requested for North Coast Basin

The proposed place of instream use and amount of water requested by month (in cubic feet per second) would be in the following streams and reaches:

Columbia Tributaries

Beaver Creek, tributary to Columbia River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
88	88	88	88	52	35	35	35	35	35	52/88	88	CFS

Carcus Creek, tributary to Clatskanie River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
17	17	17	17									CFS

Lewis & Clark River, tributary to Columbia River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
115	115	115	115	74	50	50	50	74/115	115	115	115	CFS

Necanicum River and Nehalem River Watersheds

Necanicum River, tributary to Pacific Ocean:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
45	45	45	45	30	20	20	20	20/30	45	45	45	CFS

North Fork Nehalem River, tributary to Nehalem River:

Reach #1: Above Buchanan Creek

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
250	250	250	250	128	86	86				250	250	CFS

Reach #2: Above Little North Fork Nehalem River

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
110	110	110	110	68	46	46	46	46	68	110	110	CFS

Fishhawk Creek, tributary to Beneke Creek:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
147	147	147	147	75	50	50	50	50	90/147	147	147	CFS

Klootchie Creek, tributary to Necanicum River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
45	45	45	45	28	19	19	19	19/28	45	45	45	CFS

South Fork Necanicum River, tributary to Necanicum River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
125	125	125	125	61	40	40	40	40/61	125	125	125	CFS

North Fork Necanicum River, tributary to Necanicum River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
47	47	47	47	31	21	21	21	21/31	47	47	47	CFS

Bergsvik Creek, tributary to Necanicum River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
26	26	26	26	22	18	14	10	10	17/26	26	26	CFS

North Fork Ecola Creek, tributary to Ecola Creek:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
60	60	60	60	36	24	24	24	24		60	60	CFS

West Fork Ecola Creek, tributary to Ecola Creek:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
56	56	56	56	33	22	22	22	22		56	56	CFS

Arch Cape Creek, tributary to Pacific Ocean:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
43	43	43			30	23	17				43	CFS

Short Sand Creek, tributary to Pacific Ocean:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
34	34	34		28	23	18	13	13/28		34	34	CFS

Nehalem River, tributary to Nehalem Bay:

Reach #1: Beginning at the mouth

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
400	400	400	400	265	178	178	178	178/265	400	400	400	CFS

Reach #2: Above Deep Creek

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
180	180	180	180	113	76	76	76	76/113	180/	180	180	CFS

Reach #3: Above Robinson Creek

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
47	47	47	47	29	19	19					40	CFS

Soapstone Creek, tributary to Buchanan Creek:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
120	120	120									120	CFS

Gods Valley Creek, tributary to North Fork Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
32	32	32	32							32	32	CFS

Cook Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
100	100	100	100	52	35	35	35	35	52/100	100	160	CFS

Salmonberry River, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
119	119	119	119	70	47	47	47	47	70/119	119	119	CFS

Cronin Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
65	65	65	65	36	24	24				65	65	CFS

Spruce Run Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
34	34	34	34	20	13	13	13	13	20/34	34	34	CFS

Humbug Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
130	130	130	130	78	52	52	52	52	95/130	130	130	CFS

East Humbug Creek, tributary to Humbug Creek:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
43	43	43	43	25	17	17	17	17	25/43	43	43	CFS

West Humbug Creek, tributary to Humbug Creek:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
68	68	68	68	40	27	27	27	27	40/68	68	68	CFS

Quartz Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
51	51	51								51	51	CFS

Cow Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
26	26	26			10	10		10		26	26	CFS

Buster Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
64	64	64	64	43	29	29	29	29	51/64	64	64	CFS

Beneke Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
82	82	82	82	47	31	31	31	31	54/82	82	82	CFS

Northrup Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
34	34	34	34	25	13	13	13	13	25/34	34	34	CFS

Fishhawk Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
43	43	43	43	35	17	17	17	17	35/43	43	43	CFS

Beaver Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
17	17	17	17	10	7	7	7	7	10	17	17	CFS

Rock Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
100	100	100	100	77	52	52	52	52	77/100	100	100	CFS

Wolf Creek, tributary to Nehalem River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
60	60	60	60	36	24	24	24	24	46/60	60	60	CFS

Miami River and Kilchis River Watersheds

Kilchis River, tributary to Tillamook Bay:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
300	300	300	300	180	120	120	120	120	225/300	300	300	CFS

Wilson River Watershed

Wilson River, tributary to Pacific Ocean:

Reach #1: Above confluence of the Little North Fork Wilson River
Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
450	450	450	450	450/240	160	160				520	520	CFS

Reach #2: Above confluence of North Fork Wilson River
Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
320	320	320	320	320/145	97	97	97	320	320	320	320	CFS

Trask River Watershed

Trask River, tributary to Pacific Ocean:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
							157	500	500			CFS

Tillamook River Watershed

Bewley Creek, tributary to Tillamook River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
26	26	26	26	15	10	10	10	10	10/15	26	26	**CFS**

Nestucca River Watershed

Nestucca River, tributary to Nestucca Bay:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
136	136	136	136	136/111	74	74	74	136	136	136	136	**CFS**

Beaver Creek, tributary to Nestucca River:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
						50	50	150	150	150		**CFS**

West Beaver Creek, tributary to Beaver Creek:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
31	31	31	31	31/22	12	12	12	12	22/31	31	31	**CFS**

Little Nestucca River, tributary to Nestucca Bay:

Reach #1: Beginning at the mouth

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Unit
						89	89	89	155/230			**CFS**

Reach #2: Above South Fork Little Nestucca River

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	**Unit**
					50	50	50	125	125			**CFS**

Neskowin Creek, tributary to Pacific Ocean:

Amount of water (in cubic feet per second) requested by month:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	**Unit**
113	113	113	113	62	41	41	41	41/88	126	126	126	**CFS**

Addressee's for North Coast Basin Notification Letter – sent 10/19/2017

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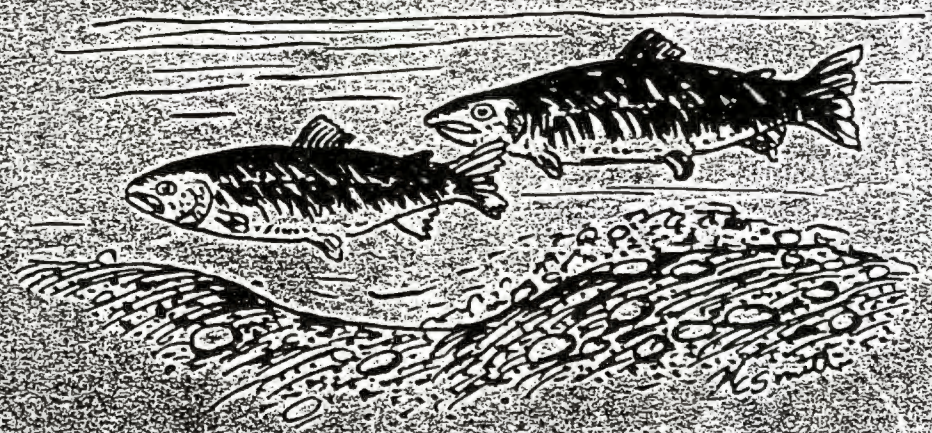
Basin Investigations

NORTH COAST BASIN



OREGON STATE GAME COMMISSION
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THE FISH AND WILDLIFE RESOURCES OF THE NORTH COAST BASIN, OREGON, AND THEIR WATER REQUIREMENTS

A Report with Recommendations to the
OREGON STATE WATER RESOURCES BOARD

By

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and
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Oregon State Game Commission
Basin Investigations Section

FEDERAL AID TO FISH RESTORATION
Progress Report
Fisheries Stream Flow Requirements
Project F-69-R-5, Job Number 3

Portland, Oregon

April, 1968

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INTRODUCTION

This report describes the water requirements of fish and wildlife in the North Coast Basin, outlines the procedures used for defining these requirements, and submits minimum perennial flow regimen necessary for maintaining reasonable levels of fish and wildlife production in the basin. Similar reports have been submitted to the State Water Resources Board since 1961 for nine other Oregon drainage basins.

Field studies relevant to this report were initiated in the spring of 1965 and terminated in the fall of 1966. Most of the investigations were conducted during the months of June through September of 1965 and 1966.

Personnel contributing to the study were aquatic biologist, James M. Hutchison, Gregory J. Hattan, and the authors. Consulting and documentary assistance were provided by Oregon State Game Commission district biologists, Wernald H. Christianson, Warren M. Knispel, and William E. Hosford, and personnel of the Fish Commission of Oregon, United States Geological Survey, and Oregon State Water Resources Board.

FISH RESOURCES OF THE NORTH COAST BASIN

Fish Populations

Salmon and steelhead are the most important game fish in the North Coast Basin. More than three times as much angler effort was expended on salmon and steelhead trout angling in 1965 than on any other group of fish. Four of nine species of anadromous fish found in the North Coast have basin-wide distribution. The four most common species are the winter steelhead trout, coho salmon, fall chinook salmon, and sea-run cutthroat trout. Summer steelhead trout, spring chinook salmon, chum salmon, pink salmon, and sturgeon are less widespread, but are well established in certain stream systems in the basin (Plate 1). Various index counts are regularly made on salmon and steelhead to evaluate their population levels (Tables 1, 2, 3, and 4). Shad and eulechon (smelt) migrate through the Columbia River but do not inhabit tributary streams.

Resident trout are indigenous to nearly all streams in the North Coast Basin. The majority of trout stocked in the lakes and streams of the basin are cutthroat, but plantings of rainbow are common in lakes (Appendix VI). Most cutthroat are anadromous, spending part of their life cycle in saltwater and returning to "cradle" streams as adults, 11 to 19 inches in length.

Table 1. Spring chinook salmon counts in the Wilson, Trask and Nestucca Rivers, 1962 and 1964 through 1967 1/

River	Year	Number of pools examined	Number of chinook counted
Wilson	1962 2/	17	152
	1964	4	110
	1965	10	11
	1966	8	21
	1967	10	8
Trask	1962 2/	20	526 3/
	1964	10	224
	1965	16	131 4/
	1966	12	40
	1967	19	86
Nestucca	1964	10	59
	1965	12	62
	1966	8	39
	1967	20	15

1/ Data obtained by skin and SCUBA diving.
2/ Source: Fish Commission of Oregon.
3/ Includes chinook salmon in pool below the F.C.O. Trask River Hatchery.
4/ Does not include the chinook salmon (300+) in the pool below the F.C.O. Trask River Hatchery.

Table 2. Three Rivers trap counts, 1961-64

Year	Months	Coho	Chinook	Steelhead
1960-61	Nov-Feb.	143	2	117
1961-62	Oct-Mar.	262	24	116
1962-63	Oct-Apr.	368	21	90
1963-64	Oct-Apr.	368	34	22 1/

1/ An unknown number of steelhead passed upstream uncounted when a segment of the trap washed out during high water.

Table 3. Chinook salmon spawning surveys, Nehalem River, 1960-67

Species	Year	Miles surveyed	Fish per mile	Total fish 1/
Fall chinook	1961	4	61.8	247 (19)
	1962	4	43.8	175 (27)
	1963	5	51.4	257 (50)
	1964	5	50.0	250 (26)
	1965	5	44.8	224 (56)
	1966	5	38.8	194 (19)
	1967	5	34.8	174 (16)
Summer chinook	1961	12	5.6	67 (6)
	1963	12	3.4	41 (10)
	1964	12	9.3	111 (7)
	1965	12	8.8	106 (7)
	1966	12	3.3	36 (6)
	1967	No survey made		

1/ Figures in parenthesis indicate jack salmon which are also included in the total.

Table 4. Coho salmon spawning surveys, 1961-67

Stream	Year	Miles surveyed	Fish per mile	Total fish 1/
Nehalem R.	1961	12.5	32.2	403 (23)
	1962	11.5	22.2	265 (34)
	1963	15.0	16.4	246 (10)
	1964	15.0	32.8	493 (34)
	1965	13.8	24.3	336 (19)
	1966	13.8	17.8	245 (26)
	1967	13.8	26.3	364 (37)
Necanicum	1961	4.75	20.4	97 (6)
	1962	4.25	18.1	77 (8)
	1963	4.25	12.0	51 (3)
	1964	4.25	31.3	133 (14)
	1965	4.25	13.4	57 (9)
	1966	4.25	25.6	109 (9)
	1967	4.25	4.0	17

1/ Figures in parenthesis indicate jack salmon which are also included in totals.

Perch, sunfish, crappie, bass, and bullhead are the warm-water game fish species of the North Coast Basin. All are common in backwater areas along the lower Columbia River, lowland lakes, and ponds along the coast (Table 5). Brown bullhead have been reported in the lower Necanicum River.

Table 5. Distribution of warm-water game fish in North Coast Basin lakes and ponds with public access

Lake	Surface acres	Location	Species present
Burkes Lake	6.3	West of Warrenton T.8 N., R.10 W., Sec. 21	Largemouth bass
Burnham Pond	3	Goble, N.W. of St. Helens, T.5 N. R.1 W., Sec. 8	Largemouth bass, bluegill
Cemetery Lake	10.3	South of Warrenton T.8N., R.10 W., Sec. 28	Yellow perch, white crappie, largemouth bass, bluegill
Coffenbury Lake	50	West of Warrenton T.8 N., R.10 W., Sec. 17, 18, 20	Yellow perch, brown bullhead
Crabapple Lake	22	West of Warrenton T.8 N., R.10 W., Sec. 20	Largemouth bass, yellow perch
Crescent Lake	7	Manhattan T.2 N., R.10 W., Sec. 29	Largemouth bass
Cullaby Lake	200	North of Gearhart T.7 N., R.10 W., Sec. 15, 22, 23	White crappie, black crappie, yellow perch, brown bullhead, largemouth bass
Lytle Lake	59	North of Rockaway T.2 N., R.10 W., Sec. 29, 32	Largemouth bass
Marie Lake	0.6	Twin Rocks T.1 N., R.10 W., Sec. 5	Largemouth bass, pumpkinseed sunfish
Smith Lake	40	North of Garibaldi T.1 N., R.10 W., Sec.18	Largemouth bass, brown bullhead
Smith Lake	41	South of Warrenton T.8 N., R.10 W., Sec. 28, 33	Largemouth bass, yellow perch, bluegill, white crappie, black crappie, warmouth
Spring Lake	11	North of Garibaldi T.1 N., R.10 W., Sec. 5, 8	Largemouth bass, black crappie

Table 5 (continued)

Lake	Surface acres	Location	Species present
Stanley Lake	7	Gearhart T.6 N., R.10 W., Sec.15	Brown bullhead
Sunset Lake	107	North of Gearhart T.7 N., R.10 W., Sec. 9, 16, 21	Yellow perch, largemouth bass, brown bullhead
West Lake	32	North of Gearhart T.7 N., R.10 W., Sec.22	Brown bullhead, yellow perch, largemouth bass

Lingcod, greenling, surfperch, rockfish, and flounder are nongame marine fish that support a popular sport fishery in the bays and coastal areas. Dungeness crabs and several species of clams and oysters are also economically important fauna of the North Coast Basin.

Fifteen species of undesirable or "rough" fish are found in the waters of the basin, the majority occurring in the lower Columbia River and its tributaries (Table 6). Ocean tributaries in the basin south to, and including the Nehalem drainage, contain suckers, lamprey, sculpin, and stickleback. Dace, sculpin, and stickleback are the only species of rough fish present in the Tillamook Subbasin. Where rough fish have become well established, they compete with game fish for food and space.

Table 6. Distribution of nongame fish in the North Coast Basin

Species	General distribution
Carp	Columbia River and lower reaches of its tributaries
Chiselmouth	Columbia River and tributaries
Chub	Columbia River and tributaries
Sculpin	Common throughout the basin
Dace	Columbia River and tributaries. Limited distribution in the Nestucca River system
Goldfish	Columbia River. Suspected in lower reaches of Columbia River tributaries
Lamprey	Columbia and Nehalem Subbasin streams
Peamouth	Columbia River and tributaries
Shiners	Columbia River and tributaries
Squawfish	Columbia River and tributaries
Stickleback	Nestucca River. Suspected in tidal areas of other coastal streams. Columbia River and tributaries
Suckers	In most Columbia and Nehalem Subbasin streams. Absent in Tillamook Subbasin
Tench	Columbia River. Suspected in lower reaches of Columbia River tributaries
Troutperch	Columbia River. Suspected in lower reaches of Columbia River tributaries

Economic and Aesthetic Values

Sport fisheries

The sport fisheries of the North Coast Basin are as varied as any other basin in the state (Table 7). The magnitude of the combined effort on these fisheries is indicated in Figure 1. Although not as popular as in some other parts of Oregon, the lake and stream trout fisheries are intensively managed and could withstand considerably more angling pressure than they now receive. Approximately 200,000 trout are stocked annually into 30 streams and 12 lakes by the Oregon State Game Commission (Appendix VI). The basin supports much of the most popular and productive salmon and steelhead angling in the state. More than 40,000 days were spent angling for marine fish such as lingcod, surfperch, rockfish, flounder, and greenling in 1965. Columbia River sloughs and several inland lakes provide a significant fishery on warm-water game fish.

Table 7. Angler trips and catch by species in the North Coast Basin in 1965 1/

Species	Angler trips	Catch
Salmon unidentified	276,051	128,345
Coho	34,374	89,404
Chinook	4,922	13,709
Jack salmon	20,275	17,785
Steelhead	144,804	93,100
Trout	152,143	267,075
Warm-water game fish	40,800	108,269
Nongame marine fish	44,592	173,879
Totals	717,961	891,566

1/ Source: Calvin, Lyle D. and Thomas D. Burnett, "Survey of Angling Effort in Oregon in 1965".

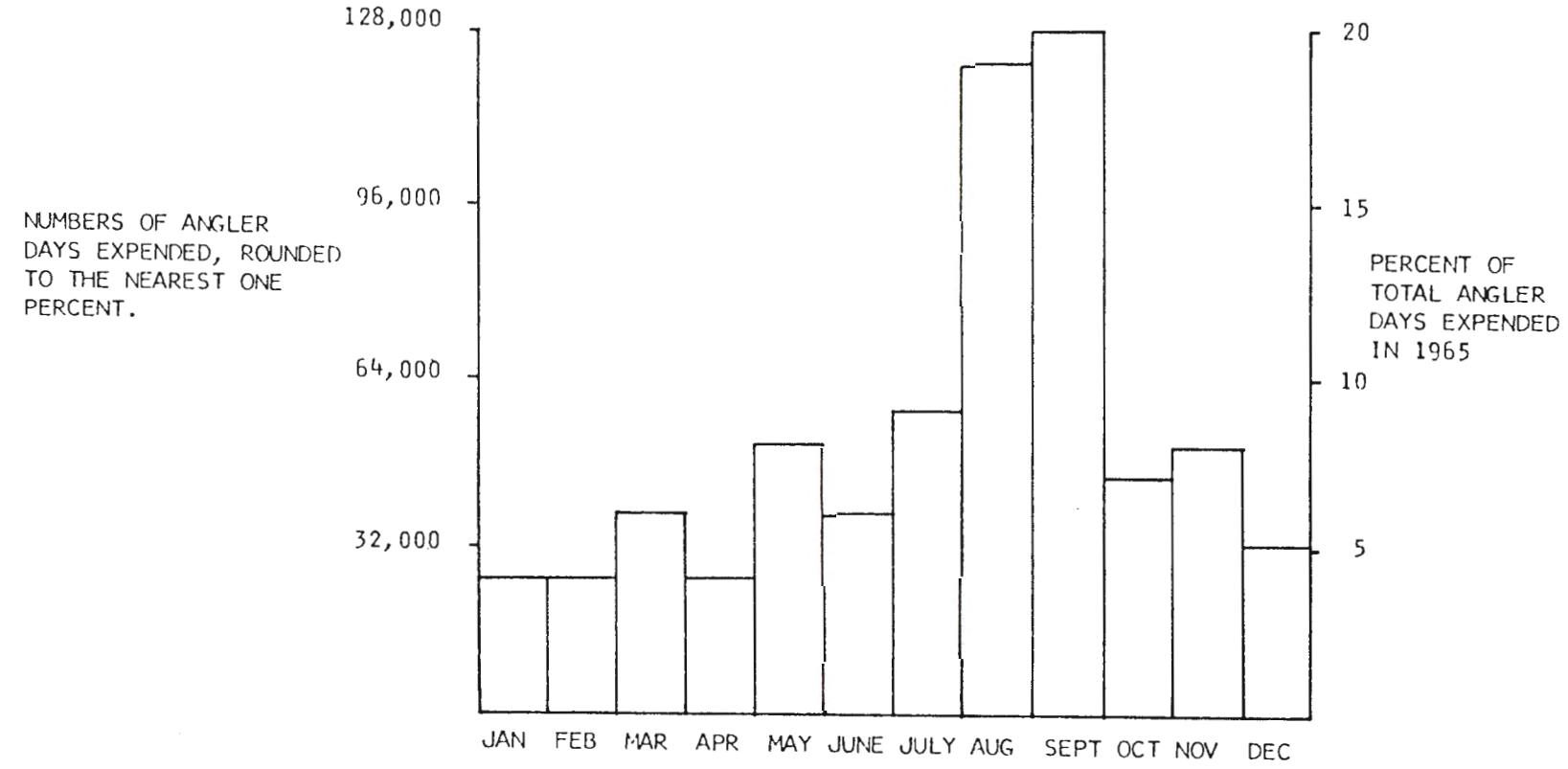


FIGURE 1. ANGLER TRIPS EXPENDED ON ALL SPORT FISH IN THE NORTH COAST BASIN IN 1965.

Source: Calvin, Lyle D. and Thomas D. Burnett, "Survey of Angling Efforts in Oregon in 1965."

The catch and angler effort expended on salmon and steelhead in the North Coast Basin is impressive (Tables 7, 8, and 9). Nearly one-half million fisherman days were spent in the basin on salmon and steelhead in 1965 (Figure 2).

Table 8. Salmon and steelhead sport catch in certain North Coast Basin streams in 1965 and 1966 1/

Stream	Catch			
	1965		1966	
	salmon	steelhead	salmon	steelhead
Columbia River 2/	42,728	14,400	40,057	22,199
Big Creek	445	1,993	983	5,082
Clatskanie	81	257	200	375
Gnat Creek	3/	219	4	502
Lewis & Clark R.	42	242	30	285
Youngs River	15	16	51	21
Klaskanine	591	273	886	912
Kilchis River	169	300	592	703
Miami River	73	180	85	226
Necanicum River	257	703	196	821
Nehalem River	6,597	3,279	4,818	4,724
Salmonberry R.	34	85	12	174
Neskowin Creek	19	73	77	230
Nestucca River	3,825	7,058	4,218	12,507
Tillamook River	142	38	68	166
Trask River	2,769	2,665	3,232	4,230
Wilson River	1,306	11,128	1,781	17,887
Totals	59,093	42,909	57,290	71,044
Combined totals	102,002		128,334	

1/ From Oregon State Game Commission salmon and steelhead punchcard records.
2/ Includes all river below Bonneville Dam.
3/ No catch reported.

Table 9. Columbia River and ocean sport fishery, 1946-66 1/ 2/

Year	Boat trips	Number of anglers	Number of chinook	Number of coho	Total salmon	Catch per angler trip	Period for which catch was estimated
1946	14,900	40,400	23,400	2,600	26,000	0.64	8/24 - 9/7
1947	13,600	39,000	12,800	3,200	16,000	0.41	8/24 - 9/1
1948	15,600	47,500	12,000	3,000	15,000	0.32	8/24 - 9/5
1949	13,900	40,500	11,200	2,800	14,000	0.35	8/24 - 9/4
1950	15,000	40,000	16,600	2,300	18,900	0.47	8/24 - 9/2
1951	17,200	48,500	7,200	1,900	9,100	0.19	8/24 - 9/3
1952	11,800	34,000	11,000	4,000	15,000	0.44	8/24 - 9/1
1953	18,500	50,700	14,700	8,000	22,700	0.45	8/10 - 9/15
1954	15,700	55,000	12,500	16,000	28,500	0.52	8/1 - 9/15
1955	20,000	64,300	12,500	15,200	27,700	0.43	8/1 - 9/15
1956	20,000	78,000	34,000	50,000	84,000	1.08	8/1 - 9/15
1957	14,600	54,000	18,500	38,700	57,200	1.06	7/3 - 9/15
1958	19,000	66,000	25,000	39,600	64,600	0.98	6/1 - 9/15
1959	19,200	75,000	23,400	50,000	73,400	0.98	6/1 - 9/30
1960	21,000	78,000	37,700	34,600	72,300	0.93	6/30 - 9/30
1961	29,600	89,800	20,500	85,500	106,000	1.18	6/11 - 9/30
1962	30,500	116,400	29,900	118,900	148,800	1.28	6/7 - 9/15
1963	30,600	117,800	32,600	116,200	148,800	1.26	6/10 - 9/22
1964	27,800	113,100	28,100	134,100	162,200	1.43	6/15 - 9/20
1965	36,500	152,600	53,200	251,800	305,000	2.00	6/21 - 9/26
1966	41,400	163,900	71,400	187,800	259,200	1.58	6/1 - 9/30

1/ Fishery includes Columbia River downstream from Bonneville Dam and ocean fishery off the mouth of the Columbia River.

2/ Not included are an estimated 420 pink salmon in 1963, and 660 in 1965.

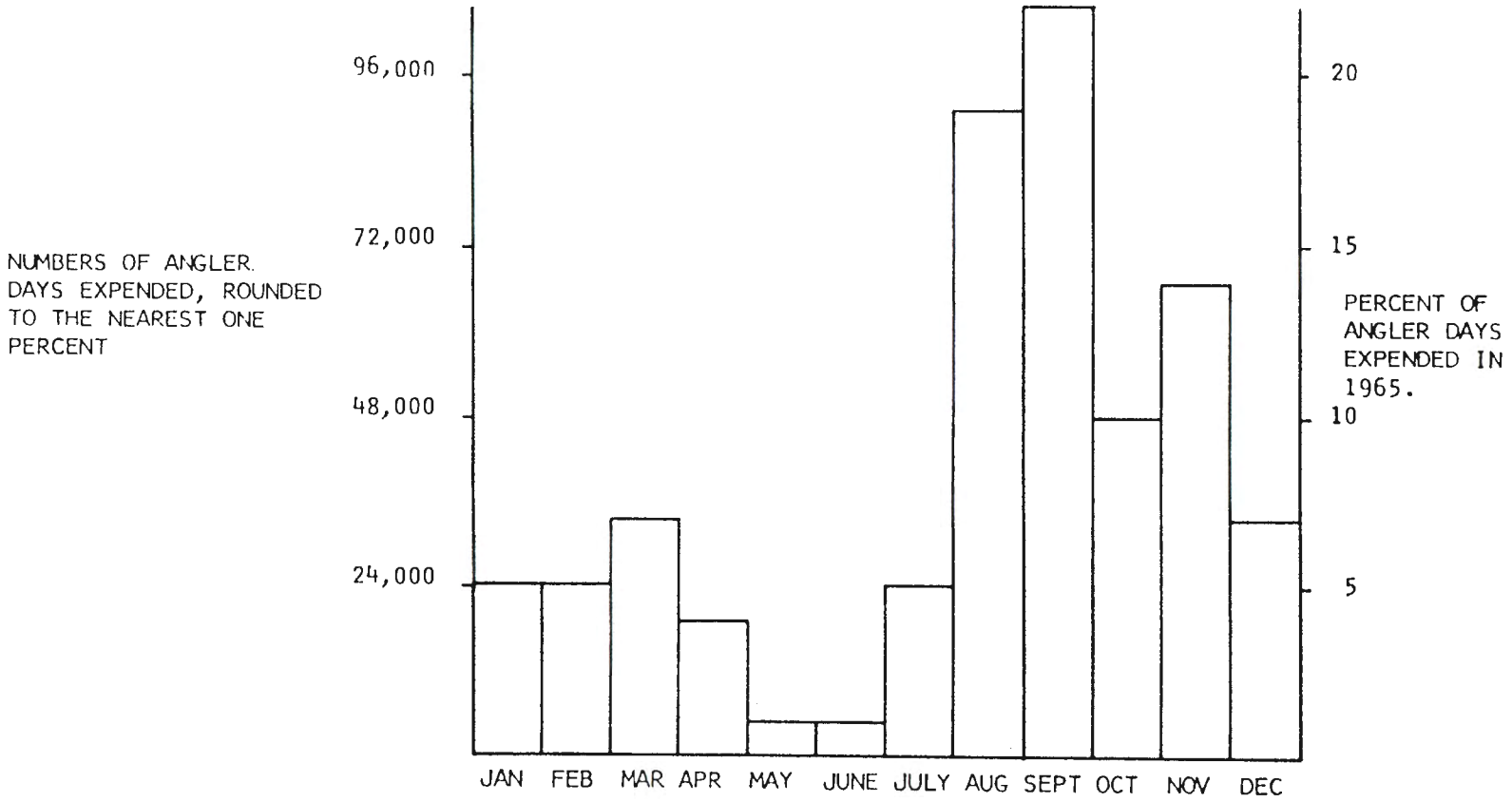


FIGURE 2. ANGLER TRIPS EXPENDED ON SALMON AND STEELHEAD IN THE NORTH COAST BASIN IN 1965. EXCLUDES NONRESIDENT ANGLING ON THE COLUMBIA RIVER.

Source: Calvin, Lyle D. and Thomas D. Burnett, "Survey of Angling Efforts in Oregon in 1965."

The trout fishery of the North Coast Basin supported more than 150,000 angler days (Tables 7 and 10). Although not comparable to the basin's large salmon and steelhead fishery, there is potential for a sizable increase in the trout fishery if stream discharges are not excessively depleted and stream-side habitat is left undisturbed.

Angling for warm-water game fish in the basin is relatively localized, but accounted for more than 40,000 angler days and 108,000 fish in the creel in 1965 (Tables 7 and 11). Most of the angler effort and catch takes place in the lower Columbia River sloughs.

Because of the variety and availability of nongame marine fish, they make an important contribution to the North Coast sport fisheries. These marine fish are caught by anglers in the bays and along the jetties and beaches. A survey of 1965 angler use tabulated nearly 45,000 angler trips expended to catch approximately 174,000 marine fish (Tables 7 and 12). In addition, many hours are spent in pursuit of Dungeness crabs and several species of clams. The Fish Commission of Oregon manages and regulates the harvest of these popular animals.

Table 10. Angler trips by month for trout in the North Coast Basin in 1965 1/ 2/

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
Number	0	0	3,431	3,594	34,399	25,419	27,487	31,702	16,379	2,195	7,092	445	152,143
Percent	0	0	2	2	23	17	18	21	11	1	5	0	100

1/ Trout classification includes anadromous or sea-run cutthroat trout.

2/ Source: Calvin, Lyle D. and Thomas D. Burnett, "Survey of Angling Effort in Oregon in 1965."

Table 11. Angler trips by month for warm-water game fish in the North Coast Basin in 1965 1/

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
Number	0	0	1,345	886	5,807	9,909	7,256	546	15,051	0	0	0	40,800
Percent	0	0	3	2	14	25	18	1	37	0	0	0	100

1/ Source: Calvin, Lyle D. and Thomas D. Burnett, "Survey of Angling Effort in Oregon in 1965."

Table 12. Angler trips by month for marine nongame fish in the North Coast Basin in 1965 1/ 2/

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
Number	879	0	6,864	1,352	14,298	4,052	6,784	7,140	3,193	30	0	0	44,592
Percent	2	0	16	3	32	9	15	16	7	0	0	0	100

1/ Lingcod, greenling, surfperch, rockfish, flounder and some other fish are considered as marine nongame fish.

2/ Source: Calvin, Lyle D. and Thomas D. Burnett, "Survey of Angling Effort in Oregon in 1965".

From a philosophical viewpoint, sportsmen and other conservationists place special emphasis on the aesthetic values relative to the fish resources of a region. Although little is probably known of the psychological benefits imparted to people by the presence of unspoiled streams and thriving fish populations, they do exist. Fishermen comprise a minority of the people who enjoy these psychological benefits; therefore, the pollution of a stream or the destruction of a fish population concerns not only anglers but a large segment of the public. In short, the annual three million dollar price estimated for the North Coast Basin steelhead and salmon fisheries might be conservative if they had to be replaced by resources of equal recreational and therapeutic value. If these fisheries were permitted to depreciate through the influence of pollution, stream flow depletions and careless watershed destruction, the cost of restoring the resource would exceed the cost of preventing the loss of stream habitat through proper management of water and watershed.

Commercial Fisheries

Commercial fish landings at Astoria, Nehalem, Tillamook, Netarts and Pacific City annually exceed 20,000,000 pounds (Table 13). Chinook and coho salmon landings in the North Coast between 1960 and 1964 annually averaged 651,000 pounds. Lesser catches of chum, pink and sockeye salmon and steelhead are also taken. The most significant fishery, that on bottom fish, harvests principally rockfish, flatfish and sablefish.

Salmon, steelhead, shad, smelt and sturgeon are caught with gill nets in the Columbia River. Salmon are also taken on troll in the ocean. Bottom fish are harvested the entire year, principally by otter trawl along the continental shelf and other coastal areas. Several techniques are employed to harvest the various species of shellfish.

Other than the lower Columbia River, Tillamook Bay is the only Oregon bay not closed to commercial fishing by legislative action. It is presently closed to commercial fishing by regulation, but may be opened at any time at the discretion of the Fish Commission.

Mainly because of the expanded fishery on bottom fish, made possible by new markets for these fish and modernized processing methods, commercial fisheries of the North Coast Basin have increased by about 17 percent during a recent 10-year period.

Table 13. Commercial fish landings of the North Coast Basin, 1960-64 1/

Average	Bottom fish	Tuna	Crab	Shrimp	Coho	Chinook	Total
landings, pounds	17,985,000	4,639,000	1,657,000	649,000	523,000	128,000	25,581,000
Percent of average landings	70	18	6.5	3	2	0.5	100
Percent of average annual Oregon catch landed in North Coast Basin	62	72	29	24	22	12	--

1/ Substantial commercial landings of shad, smelt and sturgeon are also made. The 1964 Oregon landings of these species totaled 1,317,000 pounds.

Characteristics of North Coast Basin Streams

Water availability

Water supplies in the North Coast Basin are generally adequate for current fish and wildlife populations. Water shortages are typically limited to three months of the year (July, August, September). For more than six months each year flows in most streams exceed the level required for optimum utilization of spawning and rearing areas for fish production. Peak flows occur in December, January, and February.

Of the four principal river systems in the North Coast Basin, (Nehalem, Wilson, Trask, and Nestucca) the Nehalem drainage experiences the most critical water shortages during the summer (Figure 3). A comparison of mean summer (July-September) discharges per unit of drainage area reveals this point. For the summer period of 1965 the values were 0.16 cfs per square mile drainage area for the Nehalem River system, 0.58 for the Trask, 0.52 for the Wilson and 0.43 cfs per square mile for the Nestucca (Table 14). It was also the Nehalem River system where the adverse effects of low stream flows on fish life (See Appendix IV-Biological Requirements) were most evident. Conversely, the fish life in streams which discharge into Tillamook Bay are least troubled by inadequate summer minimum flows which may also partly explain why the spring chinook salmon are more successfully established in the Trask and Wilson River systems.

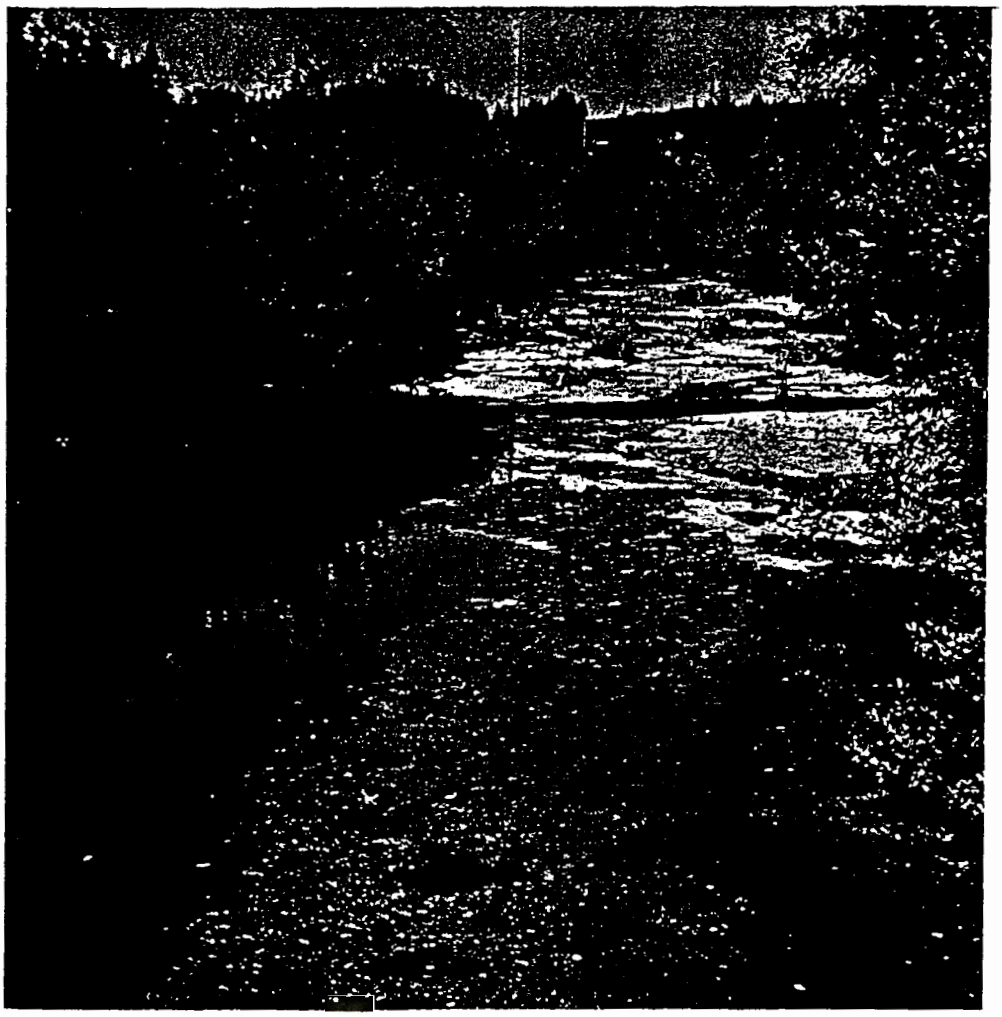


Figure 3. Nehalem River at river mile 91.0, discharge 1.7 cfs, August 9, 1966.

Table 14. Comparison of summer mean discharges of the Nehalem, Nestucca, Trask, and Wilson Rivers in 1965 with those of a prior duration 1/

River	Gage location (river mile)	Drainage area (square miles)	Mean discharge (July-Sept) 1965	Mean discharge (July-Sept)
Nehalem	13.5	667	108 cfs	197 cfs (1946-65)
Nestucca	13.5	180	76	2/
Trask	10.4	145	84	122 (1951-55) (1961-65)
Wilson	9.4	161	84	141 (1946-65)

1/ Source: U.S. Geological Survey.
2/ Gage installed in 1964.

Anadromous fish in the Lower Columbia tributaries spawn about a month earlier than fish elsewhere in the basin and therefore encounter more difficulty in their early fall migrations. The 1949 legislative withdrawal of the Clatskanie River and its tributaries, Klaskanine River and its tributaries, Lewis and Clark River, and Big Creek from any future legal appropriations other than for fish life, was a significant step toward perpetuating runs in these streams. The protection of all existing unappropriated water during the late summer and early fall in the remaining Columbia Subbasin streams is likewise needed to maintain the present resource.

Withdrawals which create significant flow deficiencies during the natural low flow period include: A municipal diversion on the Upper South Fork Necanicum River, an industrial diversion on Coal Creek (Kilchis River tributary), municipal withdrawals on Youngs River and Lewis and Clark River, miscellaneous withdrawals on Beaver Creek (Columbia River tributary), and irrigation and municipal withdrawals in the Tillamook River system.

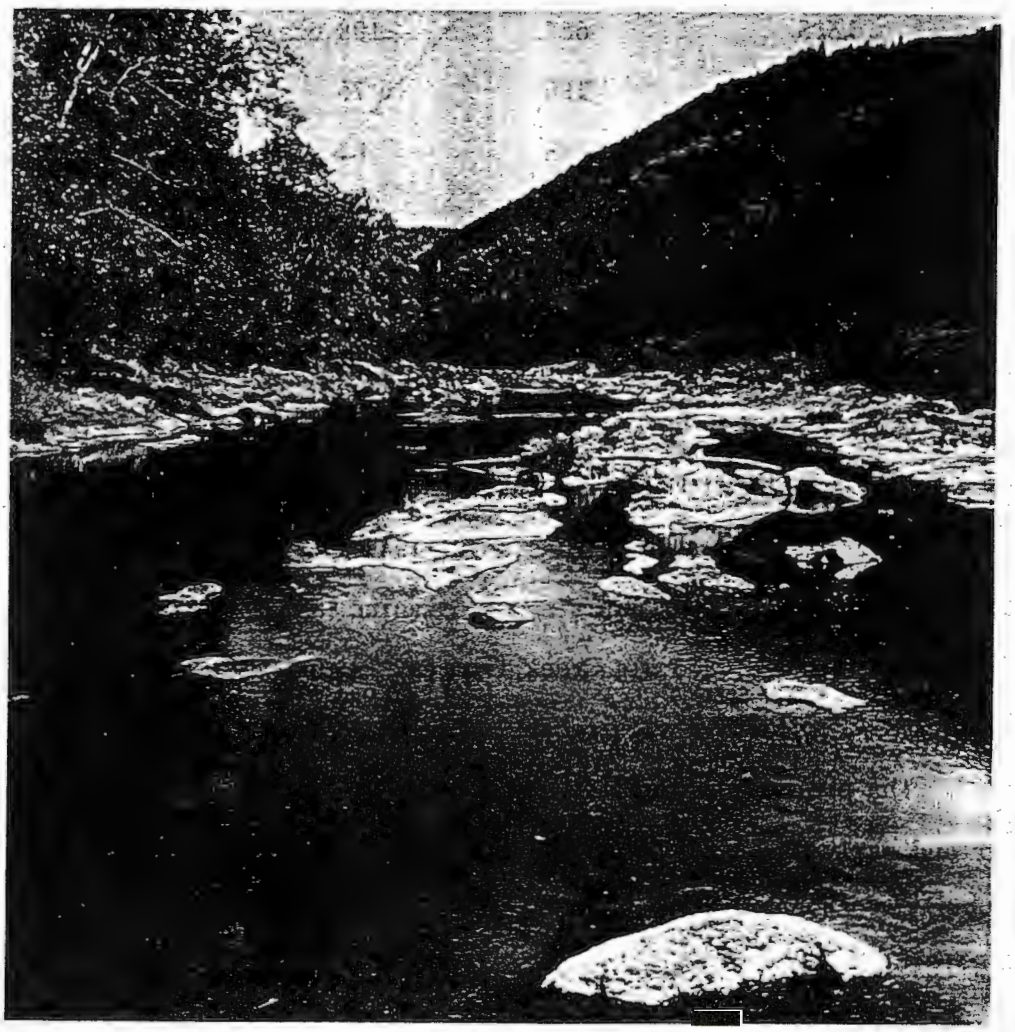


Figure 4. Nehalem River at river mile 20.0, typical low gradient, bedrock pool area where water temperatures frequently become excessive for fish life during the summer, August 1966.

Water quality

In general, the quality of water in North Coast Basin streams is excellent for fish production. Most water quality problems associated with fish life relate to domestic and industrial pollution, siltation, or temperature. Few incidences have been reported of fish kills resulting from either domestic or industrial effluents.

Silt in the streams results from either natural erosion or man-caused disturbances such as road construction and gravel removal. The addition of silt is most critical during periods of low flow because much of it may be deposited on gravel bars important for spawning and rearing of fish. The blanket of silt and sand has a smothering effect on fish eggs which incubate in the gravel. It is also harmful to aquatic insects which provide food for fish.

High water temperatures add another burden to fish life. Temperatures exceeding 65 F begin to have certain critical effects on fish. Foremost of these is an increase in the metabolic rate resulting in an increased need for dissolved oxygen. This condition is compounded by the decreased ability of water to hold dissolved oxygen as the temperature increases. Another significant effect is the more frequent occurrence of disease at higher temperatures. Under natural low flow conditions during the summer, many of the streams in the North Coast Basin exceed 65 F. In most streams, these high temperatures are only temporary and many fish can seek relief in the cooler tributaries; but in some, excessive water temperatures persist throughout much of the summer. Because of the proportionately lower summer flows in the Nehalem River system, water temperatures attain levels more critical to fish than in most other North Coast drainage systems (Figure 4). Water temperatures approaching 80 F have

been recorded in the Nehalem River (Appendix 3). Here and in most streams in the basin, any further flow depletions during the months of July, August, and September may result in increasingly higher stream temperatures with greater impacts on fish life.

Barriers

Barriers to fish passage, in the form of log jams, water falls, cascades and dams, preclude the use of large sections of many streams for fish production. The most common type of barrier is the log jam. The Oregon State Game Commission and Fish Commission of Oregon, with the financial assistance of certain other land management agencies, expend considerable time and revenue annually for removing jams. Most impassable log jams occur in the headwaters of a stream system where logging is most extensive. The combination of careless stream-side logging and high winter flows are responsible for the formation of most jams.

There are several falls in the basin which block anadromous fish from potentially productive stream areas (Table 15 and Figure 5). A few falls have been laddered or made passable where economically feasible.

Table 15. Status of falls and dams affecting anadromous fish

Stream	Type of barrier	Location	Passage status
Beaver Creek	Falls	River mile 4.8	Impassable
Lewis & Clark River	"	" " 21.5	"
" " "	Dam	" " 16.5	Marginal
Carcus Cr. (Clatskanie R)	Falls	1-2 mi. above mouth	Impassable
Youngs River	"	River mile 9.2	"
S. Fk. Necanicum R.	Dam	" " 1.2	Marginal
N. Fk. Necanicum R.	"	0.2 mi. above mouth	"
W.Fk. Elk Cr. (Pacific)	Falls	Approx. 1.0 mi above mouth	Impassable
W.Fk. Elk Cr. (Pacific)	"	Approx. 0.5 mi. above mouth	"
Miami River	"	River mile 12.2	Marginal
Little N.Fk. Wilson R.	Steep gradient	" " 6.5	"
Jordan Cr. (Wilson R.)	Falls	" " 6.0 (Approx)	Impassable
S.Fk. Wilson River	"	" " 2.0	Marginal
Drift Cr. (Wilson R.)	"	" " 0.3	Impassable
Trask R., Middle Fk.	"	" " 2.0	"
" "	"	" " 3.0	"
" "	"	" " 3.8	"
Bark Shanty Cr. (Trask R.)	"	" " 1.2	"
" "	"	" " 2.7	Unknown
Munson Cr. (Tillamook R.)	"	" " 2.3	Impassable
Three Rivers (Nestucca R)	"	" " 9.0	"

Table 15 (continued)

Stream	Type of barrier	Location	Passage status
Cedar Cr. (Nestucca R.)	Dam	River mile 0.3	Impassable 1/
Clarence Cr. " "	Falls	" " 1.0	"
Slick Rock Cr. (Nestucca R.)	"	" " 1.1	"
Bible Cr. (Nestucca R.)	"	" " 1.0	"
Testament Cr. " "	"	Unknown	"
Elk Cr. (Nestucca R.)	"	River mile 2.8	Marginal
Nestucca R.	"	" " 40.7	"
" "	Steep gradient	" " 46.7	Impassable
Little Nestucca R.	Falls	" " 13.7	"
Louie Cr. (L. Nestucca R.)	"	Unknown	Marginal
Sand Cr.	"	2.0 mi. above Andy Cr.	Impassable
Jackson Cr.	Steep gradient	River mile 1.3	"

1/ The dam was made impassable to reduce the incidence of disease in water used at the fish hatchery downstream.

Fig. 5 Beaver Creek Falls at river mile 4.8 on Beaver Creek, tributary to Clatskanie Slough near Clatskanie, Oregon, August, 1966.

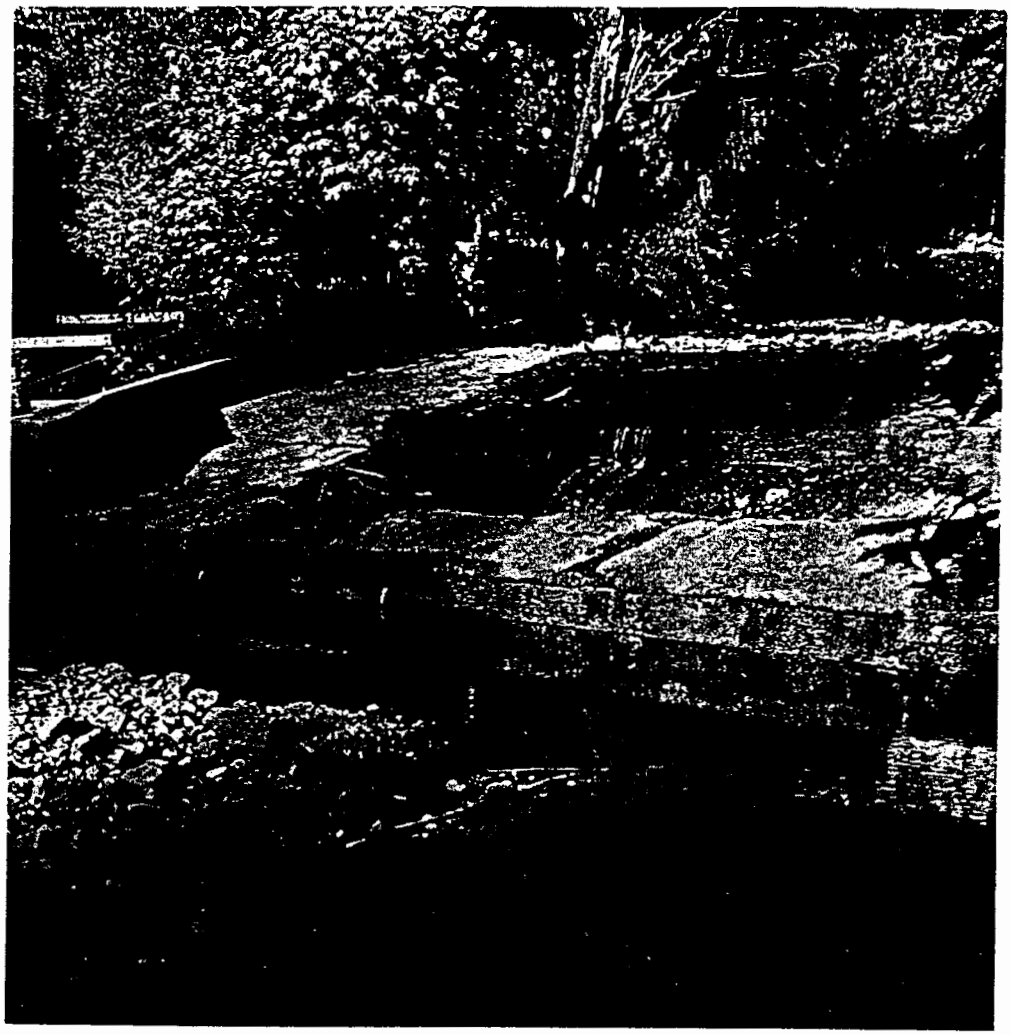


Fig. 6 Diversion dam and poorly constructed fish ladder near mouth of North Fork Necanicum River, August 1966. Approximately three quarters of flow was being diverted from stream.

Existing man-made dams in the basin are relatively minor (Figure 6); although some proposed structures would have a serious effect on fish and wildlife, if constructed. Some beaver dams create barriers to fish movement during medium and low flow periods, but most are removed by high water or are otherwise made passable.

Improperly installed road culverts or culverts altered by high water often create impassable or marginal passage conditions (Figures 7 and 8). After prolonged effort on the part of the fish and game departments, road construction agencies have become more cognizant of the importance of properly designed culverts suitable for fish passage, this problem is becoming less common.

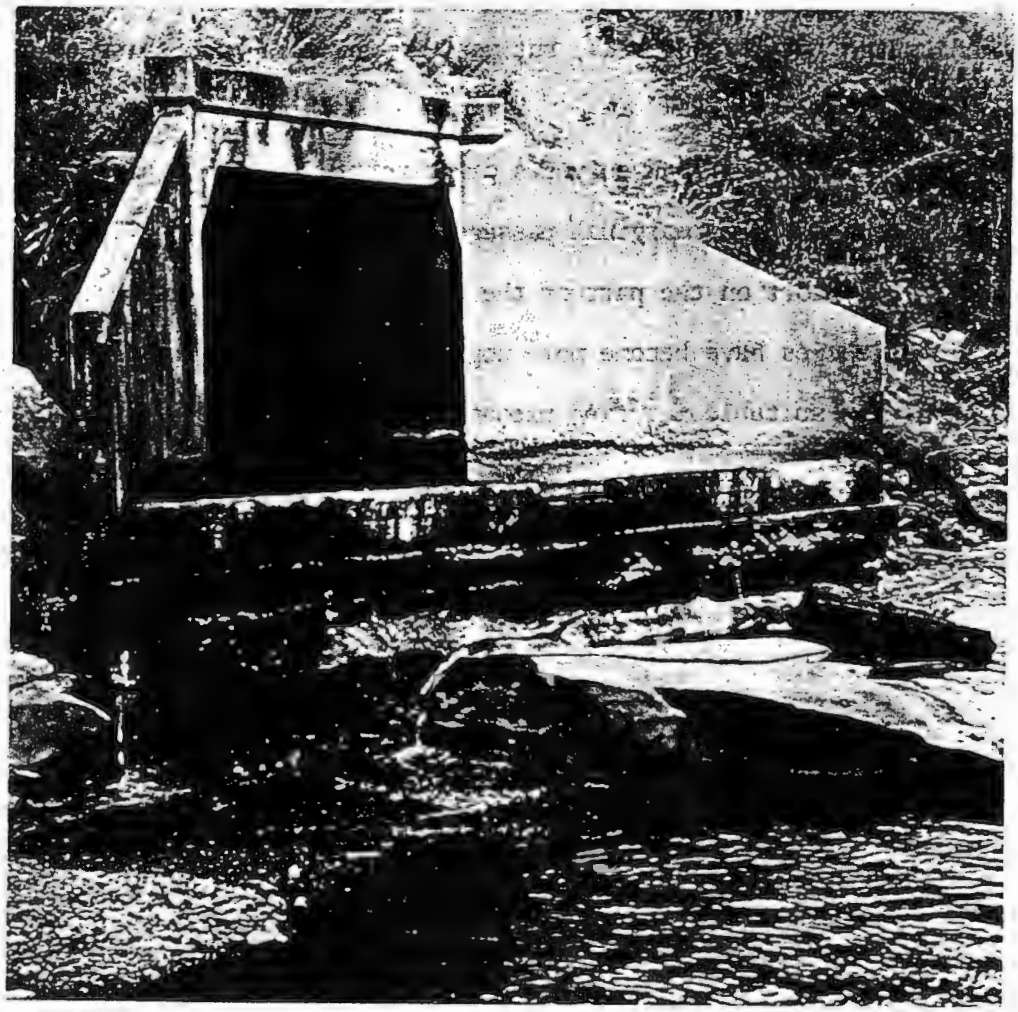


Fig. 7 Culvert at the mouth of Killam Creek on the Tillamook River is poorly designed and impassable to fish at low flows, August 1966.

Fig. 8 Culvert at the mouth of Fawcet Creek on the Tillamook River, August 1966. High flows have eroded under bottom step making it impassable to fish at low flows.

Management and Research

To help maintain and perpetuate fishery resource of the North Coast Basin, conservation agencies have employed several professional fishery management and research biologists who devote all or part of their time to this effort. The Oregon State Game Commission maintains three full-time biologists, stationed at Tillamook, Seaside and Deer Island, whose responsibilities are to gather factual information concerning the area's game fish resources and their recreational uses.

The Fish Commission of Oregon conducts similar investigations on the basin's salmon, shellfish, and nongame marine fish.

The Research Division of the Oregon State Game Commission has been using the Wilson River as one of the key streams in its investigations of winter steelhead. An intensified program was performed to determine the size, age, and condition of fish and time of stocking that produce the best returns of hatchery reared stocks. These efforts have resulted in larger runs of steelhead and led to liberalized bag limits and extension of open waters available to the angler.

The Fish and Game Commissions operate six fish hatcheries in the basin. The Fish Commission manages four, which are located on Big Creek, North Fork Nehalem River, and Klaskanine River, each rearing salmon and steelhead, and one on Trask River, which rears salmon exclusively. The two Game Commission hatcheries on Gnat Creek and Cedar Creek raise salmon, steelhead, and trout. Fish reared at these facilities are stocked principally in the North Coast Basin.

STREAM FLOW STUDY

Studies designed to ascertain minimum stream flow requirements of fish in North Coast Basin streams were conducted during the summers of 1965 and 1966. The product of these studies are submitted in the form of minimum discharge recommendations by semi-monthly periods in Appendix I. The primary intent of the recommendations is to serve as a guide for protecting stream flows from excessive appropriation. These are designed to maintain and perpetuate native fish populations presently in the basin. Enhancement is not a consideration in these recommendations. If flows greater than the recommended minimums can be provided in any stream, such provision should be encouraged since it will benefit fish life.

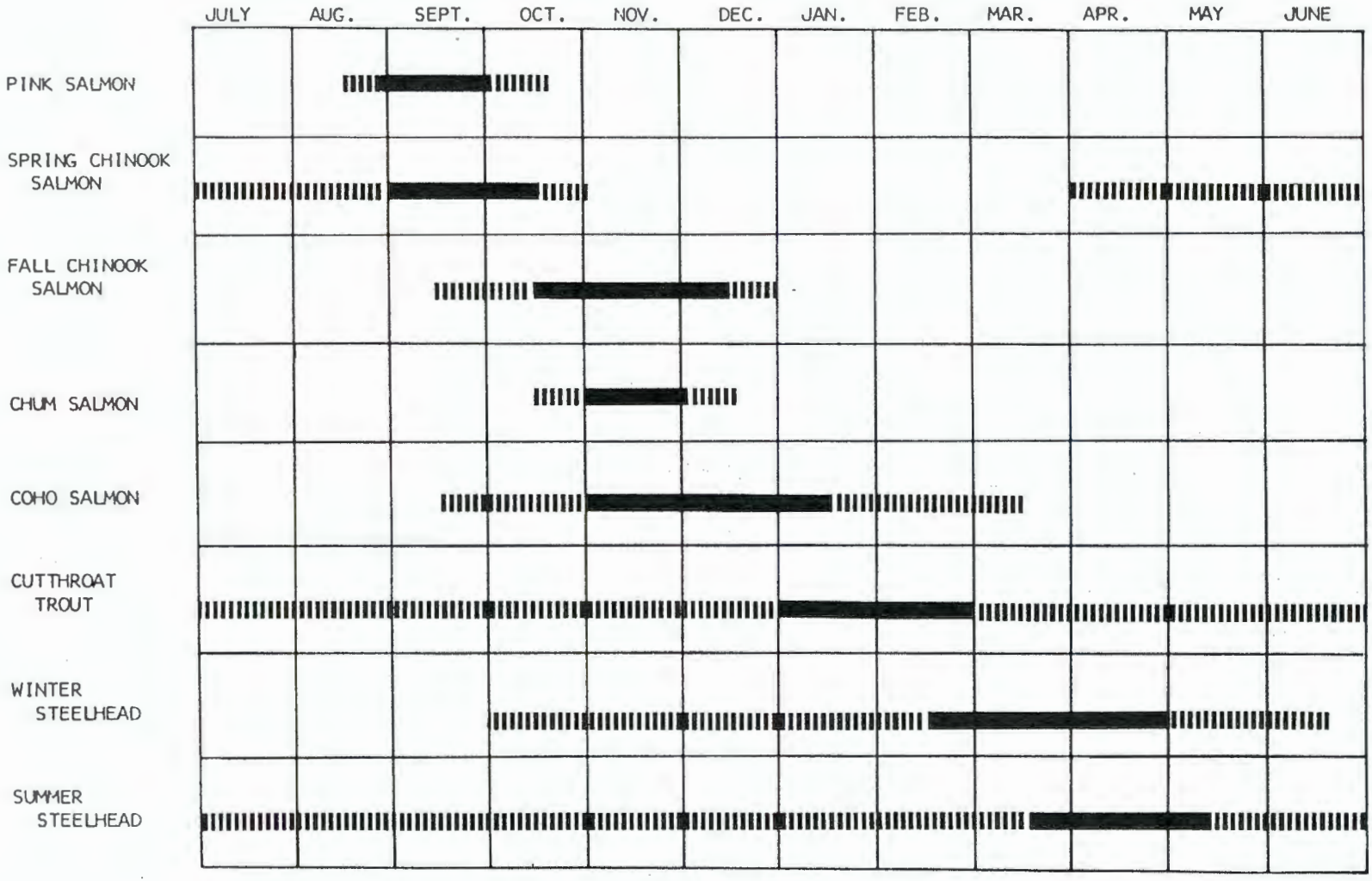
Discharge measurements were used as one of the guides for determining flow regimens submitted in Appendix I. Discharge information was compiled during the study by Oregon State Game Commission's Basin Investigations personnel (Appendix II) and by U. S. Geological Survey stream gaging stations. A tabulation of the mean summer flows during the past 10 to 20 years indicates that 1965 summer stream flows were 60 to 70 percent of average (Table 14). U. S. Geological Survey gaging records for the summer of 1966 and the periodical measurements of the Oregon State Game Commission Survey Crew (Appendix II) indicate that the 1966 runoff was slightly higher than in 1965, though less than average.

Methods for determining the rates recommended in Appendix I were the same as those used in the nine basins studied previously. The recommended flows are based on the biological requirements of fish (Appendix V) and water availability or existing flows. Each recommended flow provides an average condition

over gravel bars that meets the minimum depth and velocity requirements of fish.

Spring and fall chinook salmon are the largest salmonids in the basin, and thus have the greatest transportation and spawning flow requirements. Because summer steelhead and spring chinook salmon reside in streams during the summer prior to spawning, their dependency on minimum summer flows exceeds that of any of the other game fish in the basin. Stream flow requirements for spawning and passage of coho, chum, and pink salmon, and steelhead and sea-run cutthroat trout are similar (Appendix V). Seasonal stream flow requirements for all anadromous fish in the basin were developed from Figure 9 on spawning periodicity. Because natural selection has adjusted the life histories of fish to natural stream discharge patterns, recommendations developed in Appendix I are necessarily keyed to these patterns. Although nothing conclusive can be said of the relationship of the recommended flows with angling, the minimums submitted here are believed to be considerably below optimum for this purpose.

FIGURE 9. PERIODICITY CHART SHOWING WHEN ADULT ANADROMOUS FISH ARE PRESENT OR SPAWNING IN NORTH COAST BASIN STREAMS. DOTTED LINES INDICATE PRESENCE OF ADULTS IN THE STREAMS AND SOLID LINES INDICATE PERIODS OF HEAVIEST SPAWNING. SPAWNING BEGINS APPROXIMATELY ONE MONTH EARLIER IN COLUMBIA RIVER TRIBUTARIES.



GAME RESOURCES OF THE NORTH COAST BASIN

General

Because of the availability, distribution, and quality of Oregon's coastal fresh water supplies, wildlife numbers and distribution are not limited by water shortages as in some other parts of the state. Diversions, impoundments, and excessive consumptive use could cause local water shortages, particularly during late summer. Flooding of habitat by reservoirs and water pollution by domestic and industrial effluents are potential hazards to wildlife.

Among many management techniques regular index counts are made on most of the basin's game animals to evaluate population status and determine surpluses for hunting (Tables 17, 19, 20 and 21).

Big Game

More hunter-days are expended on black-tailed deer than any other game animal in the North Coast Basin (Table 16). The Tillamook Burn and extensive logging have made vast areas of the basin more productive for deer by removing the overstory and allowing the growth of forage plants. This has made the North Coast Basin one of the best areas in the state for black-tailed deer.

Table 16. Deer harvest, North Coast Basin

	1964	1965	1966	1967
Estimated no. of hunters	19,116	19,325	17,021	16,700
Estimated total deer kill	9,198	6,946	6,626	6,210
Estimated total hunter-days	110,130	104,139	97,203	87,730

Table 17. Black-tailed deer population trends

Big game mgmt. unit	Sample route miles traveled	Deer observed per mile traveled				
		1962	1963	1964	1965	1966
Clatsop	106	2.4	2.7	2.6	2.4	2.2
Nestucca	92	1.5	2.0	2.5	2.2	1.7
Trask	111	3.4	3.2	4.3	2.2	3.5
Wilson	39	2.3	3.2	3.2	3.1	2.7
Weighted means		2.5	2.7	3.2	2.4	2.5

Roosevelt elk are relatively plentiful in the basin. The 1964 harvest exceeded 2,700 animals (Table 18), when 12,000 sportsmen, expending several times that many hunter-days, hunted elk in the basin. The habitat preference of elk is similar to deer, thus they too have benefited from the removal of dense forest canopy. Like the other important game species, their population dynamics are under constant surveillance by the biologists. Among other measures, population trend counts (Table 19) are made annually on elk. These indices of animal numbers are used to adjust the regulations governing their harvest.

Table 18. Elk harvest, North Coast Basin

	1964	1965	1966	1967
Estimated number of hunters	12,287	11,397	9,954	9,870
Estimated total elk kill	2,728	1,806	1,456	1,493

Table 19. Roosevelt elk population trends

Big game mgmt. unit	Sample route miles traveled	Elk observed per mile traveled 1962	1963	1964	1965	1966
Clatsop	47	10.6	12.0	14.9	16.0	17.0
Nestucca	20	0.5	5.4	6.5	7.8	4.7
Trask	27	2.3	3.5	3.2	1.3	1.5
Wilson	29	8.2	6.2	9.5	13.0	12.5
Weighted mean		6.6	7.7	9.7	10.7	10.5

Upland Game

Five species of upland game birds occupy the North Coast Basin. Two species, the band-tailed pigeon and mourning dove, are migratory. Resident game birds include the blue grouse, ruffed grouse, and mountain quail; all utilize forest habitat primarily. Production and population trend counts are taken each year on grouse and quail to help ascertain proper harvest regulations (Table 20). More hunting pressure is exerted on doves and pigeons than on grouse and quail.

Table 20. Grouse and mountain quail population trends, North Coast Basin

Species	Miles traveled	Birds per mile 1962	1963	1964	1965	1966
Blue grouse	124	0.22	0.17	0.12	0.13	0.15
Ruffed grouse	124	0.06	0.05	0.11	0.10	0.14
Mountain quail	124	0.35	0.49	0.25	0.17	0.06

Waterfowl

Of the basin's wildlife, the 19 species of waterfowl which spend all or part of each year in this area are most dependent on water supplies. Water

shortages and pollution are the most important water related limitations affecting waterfowl. These are especially important to the birds, particularly ducks, during their fall and winter concentration (Table 21). Most water developments, unless for consumptive uses, do not create problems for waterfowl. Contrary to the interests of most wildlife, shallow impoundments, where they complement or enhance existing habitat, are beneficial to ducks, geese and certain other water birds. A few species, such as the wood duck, commonly nest in the basin. Major winter waterfowl concentration and hunting areas are on the lower Columbia River, Sand Lake, and Youngs, Nehalem, Tillamook and Netarts Bays.

Table 21. Annual winter waterfowl inventory, North Coast Basin

Species	1963	1964	1965	1966	1967	Mean
Mallard	350	593	2,781	528	1,131	1,077
American widgeon	3,102	4,004	8,433	1,003	2,773	3,863
Green wing teal	84	80	31	73	1,323	318
Shoveler	0	1,186	3	11	38	246
Pintail	1,353	2,927	2,828	638	1,179	1,785
Redhead	9	19	5	14	19	13
Canvasback	495	600	475	713	681	593
Scaup	492	594	511	456	875	586
Ring-necked	85	47	13	27	35	41
Goldeneye	49	47	32	96	46	54
Bufflehead	454	477	384	429	391	427
Ruddy duck	615	476	255	973	626	589
Merganser	165	307	152	251	254	226

Table 21 (continued)

Species	1963	1964	1965	1966	1967	Mean
Scoter	147	139	24	319	268	121
Harlequin	0	17	11	0	0	6
Snow goose	0	0	160	0	0	32
White-fronted goose	0	0	0	3	0	1
Canada goose	40	360	300	6	0	141
Lesser Canada goose	0	0	0	0	200	40
Cackling goose	0	10	0	0	0	2
Black brant	410	1,416	1,108	667	1,296	979
Whistling swan	671	994	861	820	539	777
Coot	437	408	738	917	767	655

Furbearers

Beaver, muskrat, mink and otter are the four most valuable furbearers in the basin. Eight other species are commonly trapped (Table 22). Total annual revenue from the harvest of the basin's furbearers, based on green pelt value, ranges from nearly $16,000 to more than $23,000. Furbearers rely extensively on water for their existence. Proper water quantities, as well as quality, are important. Probably the most destructive water problems are floods and pollution, each condition capable of causing losses or driving the animals from a stream.

Table 22. Fur trapping, Clatsop, Columbia and Tillamook Counties 1/

Species	1963-64		1964-65		1965-66	
	Harvest	Value	Harvest	Value	Harvest	Value
Beaver	1,049	$11,067	1,269	$10,076	1,145	$13,626
Muskrat	2,263	2,512	1,727	1,692	2,654	3,291
Mink	320	2,659	269	2,055	316	2,316
Otter	57	1,191	59	1,281	70	1,714
Raccoon	291	471	166	241	344	795
Nutria	277	349	7	9	321	642
Bobcat	26	137	53	306	38	535
Coyote	62	191	40	175	40	257
Oppossum	124	48	70	21	124	58
Fox	2	7	0	0	9	36
Weasel	10	3	11	5	22	9
Skunk	0	0	1	1	21	23
Totals	4,481	$18,635	3,672	$15,862	5,104	$23,302

1/ These figures represent more than 90 percent of all licensed trapping in Clatsop, Columbia and Tillamook Counties. Some additional trapping took place by children under 14 years of age who were not required to obtain a license or file a report of their catch.

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APPENDIX

Appendix I. Recommended minimum flows for fish life, North Coast Basin

Stream	Location	Dec-Apr.	May	June	July	August	Sept.	Oct.	Nov.
Miscellaneous Columbia River Tributaries									
Bear Creek	0.7 mi. above mouth	15	10	7	5	3 2	10 15	15	15
Beaver Creek	1.8 mi. above Stewart Cr.	30	15	7	5	4	4	4 8	15 30
Big Creek	1.1 mi. above mouth	50	40	30	25	20	30 50	50	50
Clatskanie River	1.1 mi. below Perkin Cr.	60	40	20	15	8	30 60	60	60
Carcus Creek *	Mouth	10	7	4	2	1	1	5 10	10
(Klaskanine River)									
N.Fk. Klaskanine R.	Mouth	40	25	15	10	5	30 40	40	40
S.Fk. Klaskanine R.	Mouth	40	25	15	10	5	30 40	40	40
Lewis & Clark River	River mile 10.8	45	30	20	15	6	30 45	45	45
Plympton Creek	0.3 mi. above mouth	20	15	10	7	4	15 20	20	20
Young's River	0.1 mi. below Young's Falls	40	30	20	15	7	20 40	40	40
Kilchis River	0.2 mi. below Mapes Creek	75	50	50	50 35	25	50	75	75
Clear Creek	Mouth	30	15	5	3	2	2 15	30	30
Coal Creek	Mouth	8	8	2	1	1	1	6 8	8
Little S.Fk. Kilchis R.	Mouth	50	30 20	15	10	5	5	20 50	50
North Fk. Kilchis R.	Mouth	50	30 20	15	12	6	6	20 50	50
South Fk. Kilchis R.	Mouth	40	30 20	12	8	5	5	15 40	40
Miami River	0.2 mi. above Moss Creek	80	50	30	20	15	15 50	80	80
Miami River *	River mile 7.0	50	30	20	14	8	8 30	50	50
Moss Creek	Mouth	25	15 6	2	2	1	1	15 25	25
Peterson Creek	Mouth	12	3	2	2	1	1	8 12	12
Prouty Creek	Mouth	12	2	1	1	0.5	0.5	8 12	12
Miscellaneous Ocean Tributaries									
Arch Cape Creek	Head of tidewater	25	15	8	6	4	4 18	25	25

Appendix I (continued)

Stream	Location	Dec-Apr.	May	June	July	August	Sept.	Oct.	Nov.
(Elk Creek)									
N.Fk. Elk Creek	Mouth	25	9	5	4	3	3	15 25	25
West Fk. Elk Creek	Mouth	25	11	7	5	5	4	15 25	25
Neskowin Creek	1.1 mi. above mouth	40	20	12	8	6	5 30	40	40
Sand Creek	0.3 mi. above Jewell Cr.	30	15 8	4	3	2	2 20	30	30
Short Sand Creek	0.6 mi. above mouth	20	3	2	2	2	2 15	20	20
Necanicum River	0.7 mi. above Circle Cr.	75	50	35	20	20	20 50	75	75
" "	Just above Bergsvik Cr.	20	15 10	5	3	3	3	12 20	20
Bergsvik Creek	Mouth	15	10 6	4	2	2	2	10 15	15
Klootchie Creek	Mouth	15	10 6	4	3	2	2	12 15	15
N.Fk. Necanicum R.	Mouth to mile 0.4	15	12 8	5	3	2	2	8 15	15
S.Fk. Necanicum R.	Mouth	15	12 8	5	3	2	2	8 15	15
Nehalem River	USGS gage 14-3010	400	300	200	200	200	240	400	400
" "	0.4 mi. above Humbug Cr.	200	150	150	100	50	100	200	200
" "	Just above Rock Creek	50	30	20	12	4	4	30 50	50
" "	Just above Wolf Creek	30	15	10	6	3	3	15 30	30
Anderson Creek	Mouth	20	10 5	3	3	2 1	1	8 15	20
Beaver Creek (R.M.66.0)	Mouth	10	6 4	2	2	0.5	0.5	2 5	5
Buster Creek *	Mouth	30	20 15	10	4	2	2	20 30	30
Cook Creek	Mouth	60	40	30	20	12	12	40 60	60
Cow Creek	0.6 mi. above mouth	15	7	3	2	1	1	8 15	15
Cronin Creek	Mouth	40	25 12	8	5	3	3	25 40	40
Deep Creek *	Mouth	15	10 5	3	2	1	1	10 15	15
East Fk. Nehalem R.	Mouth	15	10	5	3	1	1	3 10	10
Fishhawk Creek (R.M.65.7)	Mouth	25	15	8	6	4	4	15 25	25
Foley Creek	1.0 mi. above mouth	50	35 25	18	12	9	7	30 50	50

Appendix I (continued)

Stream	Location	Dec-Apr.	May	June	July	August	Sept.	Oct.	Nov.
Humbug Creek	1.2 mi. above mouth	60	40 25	15	10	3	3	40 60	60
S.Fk. Humbug Creek	Mouth	25	15	8 4	2	2	2	15 25	25
W.Fk. Humbug Creek	Mouth	40	25	15 6	3	3	3	30 40	40
Lost Creek	Mouth	20	15 8	6	3	2	2	10 20	20
N.Fk. Nehalem River	0.6 mi. below Grassy Creek	150	100 70	50	30	20	20 80	150	150
" " " "	Just above Gods Valley Cr.	70	50	30	20	15	15 40	70	70
Gods Valley Creek	Mouth	40	20 10	5	3	2	2	20 40	40
Soapstone Creek	Mouth	60	40 20	10	6	4	4	40 60	60
Northrup Creek	Mouth	20	15 8	5	3	2	2	10 20	20
Oak Ranch Creek	Mouth	15	10 5	3	2	1	1	10 15	15
Peterson Creek	Mouth	15	7 3	1.5	1	1	1	10 15	15
Quartz Creek *	Mouth	30	20 10	6	4	2	2	20 30	30
Rock Creek	Mouth	80	50	30	20	20	20 50	80	80
Roy Creek	Mouth	15	6 2	0.5	0.5	0.5	1	10 15	15
Salmonberry River	Mouth	70	50	40	30	25	25 50	70	70
Spruce Run Creek	Mouth	20	10 5	3	1	1	2	10 20	20
Walker Creek	Just above Fishhawk Creek	30	20 15	10	5	2	2	20 30	30
Fishhawk Creek	Just above Walker Creek	30	20 15	10	4	1	2	20 30	30
Wolf Creek	Mouth	20	15 10	6	3	1	1	10 20	20
Nestucca River	USGS gage 14-3036	320	320	240	70	70	150	320	320
" "	0.5 mi. below Bear Creek	150	150	60	60	60	60 100	150	150
" "	USGS gage 14-3029	8	8 6	4	3	2	2	3	8
Bays Creek	Mouth	20	20 10	5	4	3	3	12 20	20
Bear Creek (Beaver Creek)	Mouth	20	20 15	7	6	3	3	15 20	20
Bear Creek	Mouth	8	8 8	2	2	1	1	6 8	8

Appendix I (continued)

Stream	Location	Dec-Apr.	May	June	July	August	Sept.	Oct.	Nov.
East Beaver Creek	Mouth	50	50	30	16	12	8	8	40	50	50
West Beaver Creek	Mouth	18	18	10	6	2	2	2	15	18	18
Bible Creek	Mouth	15	15	6	2	2	2	2	10	15	15
Clarence Creek	Mouth	15	15	6	2	1	1	1	10	15	15
Clear Creek	Mouth	20	20	8	4	3	2	2	12	20	20
Elk Creek	Mouth	20	20	12	8	4	4	4	15	20	20
Farmer Creek	Mouth	25	25	12	6	4	4	4	15	25	25
Little Nestucca River	0.1 mi. below Fall Creek	75	75	50	30	20	20	50	75		75
" " "	Just above Louie Creek	30	30	20	10	4	4	4	20	30		30
Bear Creek *	Mouth	15	15	6	3	2	1	1	10	15		15
Fall Creek	Mouth	10	10	6	3	2	1	1	8	10		10
Louie Creek	Mouth	15	15	6	3	2	1	1	10	15		15
S.Fk. Little Nestucca R.	"	18	18	10	7	5	3	3	12	18		18
Moon Creek	Just above East Creek	30	30	20	20	5	3	20	30			30
East Creek	Just above Moon Creek	35	35	20	10	7	4	3	25	35		35
Niagara Creek	Mouth	30	30	25	25	5	3	20	30			30
Powder Creek	Mouth	20	20	10	5	3	2	2	10	20		20
Slick Rock Creek	Mouth	15	15	6	3	2	1	1	10	15		15
Testament Creek	Mouth	15	15	8	4	3	3	3	12	15		15
Three Rivers	Mouth	70	70	50	40	25	15	15	40	70		70
" "	Just above Alder Creek	40	40	20	12	8	6	6	25	40		40
Alder Creek	Mouth	25	25	10	5	4	3	3	15	25		25
Wolfe Creek	Mouth	10	10	6	3	3	2	2	8	10		10
Tillamook River	Just above Bewley Creek	80	50		50	25	8	50	80			80
Bewley Creek	Mouth	15	10	6	3	2	2	2	15	15		15
Fawcet Creek	Mouth	25	15	10	6	3	2	2	15	25		25

Appendix I (continued)

Stream	Location	Dec-Apr.	May	June	July	August	Sept.	Oct.	Nov.
Killam Creek	Mouth	15	10	5	2	1	1 10	15	15
Munson Creek	Mouth	20	12 6	3	2	1	1	10 20	20
Simmons Creek	Mouth	20	13 8	4	3	1	1	15 20	20
Trask River	USGS gage 14-3025	300	300	220	70	70	150	300	300
Green Creek *	Mouth	8	5 2	0.5	0.5	0.5	0.5	1 5	8
N.Fk. Trask River	Mouth	90	70	70	50	35	50	90	90
Bark Shanty Creek	Mouth	18	12	8	6	4	4	14 18	18
Clear Creek	Mouth	25	15	15	6	4	15	25	25
Mid. Fk. of North Fk. Trask River	Just above N.Fk. of N.Fk. Trask River	50	30	30	25	16	30	50	50
N.Fk. of North Fork Trask River	Mouth	35	20	12	8	5	5	25 35	35
S.Fk. Trask River	Mouth	60	40	40	40	30	40	60	60
E.Fk. of South Fork Trask River	Mouth	40	30	30	20	15	25	40	40
Edwards Creek	Mouth	30	20	20	8	4	15	30	30
Wilson River	USGS gage 14-3015	320	320	240	70	70	200	320	320
Cedar Creek	Mouth	30	20	12	10	8	5	18 30	30
Devils Lake Fork	Mouth	40	30	30	10	6	20	40	40
Elk Creek	Mouth	30	15	5	4	4	3	20 30	30
Fall Creek	Mouth	10	7	5	3	2	2	6 10	10
Jordan Creek	Mouth	35	20	20	15	10	20	35	35
Little N.Fk. Wilson R.	Mouth	70	45	30	20	10	20 40	70	70
N.Fk. Wilson River	Mouth	45	30	30	20	12	25	45	45
S.Fk. Wilson River	Mouth	40	30	30	10	5	20	40	40

* Part of recommended discharge regimen were extrapolated by correlating known discharge volumes with flow requirements of neighboring streams of similar size.

Appendix II. Miscellaneous flow and temperature measurements, North Coast Basin streams, 1965-1966

Stream	Date	Time	Temp. °F. Water	Temp. °F. Air	Flow cfs	Location	Remarks
Columbia R. Tribs.							
Bear Cr.	6-10-65	11:30 AM	54	61	11.1*	0.7 mi. above mouth	
" "	7-16-65	12:00 Noon	59	62	26*	"	
" "	9-16-65	12:35 PM	53	63	2.5*	"	
" "	4-28-66	7:15 PM	53	52	13*	"	
" "	6-7-66	4:25 PM	57	61	9.3*	"	
" "	7-6-66	12:10 PM	57	59	6.8*	"	
" "	8-8-66	2:45 PM	64	70	3.2*	"	
" "	9-14-66	2:10 PM	57	60	1.9*	"	Recent rain
" "	11-7-66	12:45 PM	45	-	7.3*	"	
Beaver Cr.	7-16-65	2:30 PM	65	68	2.2	1.4 mi. upstream from Inglis, Oregon	
" "	9-16-65	10:50 AM	52	59	1.9	"	
" "	4-28-66	4:35 PM	56	63	2.1*	"	
" "	6-7-66	1:10 PM	57	58	7.0*	"	
" "	7-6-66	10:45 AM	57	58	5.0*	"	
" "	8-8-66	1:05 PM	62	73	2.1*	"	
" "	9-14-66	11:10 AM	55	56	3.6*	"	Recent rain
" "	11-7-66	11:00 AM	43	-	4.0*	"	
Big Cr.	6-10-65	12:00 Noon	53	61	59*	1.1 mi. upstream from mouth	
" "	7-16-65	12:25 PM	59	62	25.9*	"	
" "	9-16-65	12:20 PM	53	62	22.5*	"	
" "	4-28-66	7:00 PM	50	53	84*	"	
" "	6-7-66	4:10 PM	55	60	52*	"	
" "	7-6-66	11:55 AM	53	58	31.4*	"	
" "	8-8-66	2:30 PM	62	71	24.3*	"	
" "	9-14-66	1:45 PM	54	60	22.6*	"	Recent rain
" "	11-7-66	12:00 PM	44	-	32.0*	"	

* Measured flow, others are estimated.

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Clatskanie R.	6-10-65	1:15 PM	59	65	27	1.2 mi. downstream from Keystone Creek	
"	7-16-65	2:00 PM	65	66	17*	"	
"	9-16-65	11:20 AM	54	60	15.2*	"	
"	4-28-66	5:10 PM	53	63	59*	"	
"	6-7-66	1:45 PM	56	58	26*	0.2 mi. below Keystone Cr.	
"	7-6-66	11:00 AM	57	60	18.0*	"	
"	8-8-66	1:30 PM	63	74	9.1*	"	
"	9-14-66	11:40 AM	57	56	10.8*	"	Recent rain
Carcus Cr.	9-14-66	12:20 PM	55	56	1.0*	0.3 mi. above mouth	Recent rain
(Klaskanine R.)							
N.Fk. Klaskanine	6-10-65	8:45 AM	56	58	25*	Mouth	
" "	7-16-65	11:05 AM	61	61	6.4*	"	
" "	8-26-65	6:15 PM	65	68	6.2*	"	
" "	9-16-65	2:50 PM	56	64	12.1*	"	
" "	4-29-66	8:55 AM	48	54	43*	"	
" "	6-7-66	5:35 PM	58	59	20*	"	
" "	7-6-66	1:05 PM	57	61	11.4*	"	
" "	8-8-66	3:45 PM	67	73	3.2*	"	
" "	9-14-66	3:20 PM	58	64	3.7*	"	Recent rain
S.Fk. Klaskanine	6-10-65	9:00 AM	56	58	27*	Mouth	
" "	7-16-65	11:15 AM	61	61	8.9*	"	
" "	8-26-65	6:25 PM	64	68	5.7*	"	
" "	9-16-65	2:35 PM	57	64	10.9*	"	
" "	4-29-66	9:00 AM	47	54	35*	"	
" "	6-7-66	5:20 PM	58	59	22*	"	
" "	7-6-66	1:00 PM	56	61	12.7*	"	
" "	8-8-66	3:35 PM	66	73	5.2*	"	
" "	9-14-66	3:10 PM	58	64	4.1*	"	Recent rain

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Lewis & Clark R.	6-10-65	10:10 AM	57	60	64*	River mile 10.8	
" "	7-16-65	9:30 AM	59	58	7.0	"	
" "	7-16-65	10:15 AM	63	58	13.5*	"	
" "	8-26-65	5:30 PM	69	69	10.6*	"	
" "	9-16-65	1:50 PM	58	64	25	"	
" "	4-29-66	10:15 AM	49	55	76	"	
" "	6-7-66	6:15 PM	60	56	29*	"	
" "	7-6-66	1:50 PM	59	60	25.3*	"	
" "	8-8-66	4:30 PM	70	72	7.5*	"	
" "	9-14-66	4:15 PM	61	64	6.5*	"	Recent rain
Plympton Cr.	6-10-65	12:30 PM	53	64	17.4*	0.3 mi. above mouth	
"	7-16-65	1:00 PM	61	64	6.4*	"	
"	9-16-65	11:45 AM	51	61	6.3*	"	
"	4-28-66	5:30 PM	49	54	17.6*	"	
"	6-7-66	2:40 PM	54	58	14.6*	"	
"	7-6-66	11:25 AM	53	60	10.6*	"	
"	8-8-66	2:00 PM	59	70	4.6*	"	
"	9-14-66	1:15 PM	54	60	4.7*	"	Recent rain
"	11-7-66	11:30 AM	44	-	8.5*	"	
Young's R.	6-10-65	9:30 AM	57	60	35	Mile 8.9, 0.1 mi. below Young's Falls	
"	7-16-65	10:45 AM	62	59	9.0*	"	
"	8-26-65	6:00 AM	65	68	6.5*	"	
"	9-16-65	2:20 PM	56	64	14.5*	"	
"	4-29-66	9:30 AM	48	54	40*	"	
"	6-7-66	5:55 PM	59	58	20.4*	"	
"	7-6-66	1:20 PM	58	60	19.7*	"	
"	8-8-66	4:00 PM	67	74	6.8*	"	
"	9-14-66	3:50 PM	59	65	4.3*	"	Recent rain

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Kilchis R.	8-26-64	10:45 AM	58	58	103*	1/4 mi. downstream from Mapes Creek	
"	6-17-65	7:30 PM	56	54	75*	"	
"	7-13-65	10:40 AM	60	65	42.5*	"	
"	8-26-65	8:35 AM	60	59	28.8*	"	
"	9-17-65	9:35 AM	51	46	35*	"	
"	6-10-66	9:00 AM	58	56	90*	"	
"	7-12-66	9:35 AM	57	52	57*	"	
"	8-10-66	9:45 AM	61	64	26.7*	"	
"	9-16-66	10:40 AM	58	62	27.2*	"	Recent rain
Clear Cr.	6-17-65	6:10 PM	54	55	5.2*	Mouth	
"	7-13-65	10:50 AM	56	65	3.1*	"	
"	8-26-65	8:45 AM	57	59	1.2*	"	
"	9-17-65	9:50 AM	50	47	1.7*	"	
"	3-25-66	11:30 AM	48	62	42*	"	
"	6-10-66	7:45 AM	54	55	10.3*	"	
"	7-12-66	9:50 AM	54	53	4.7*	"	
"	8-10-66	10:00 AM	57	63	2.1*	"	
"	9-16-66	11:00 AM	56	64	1.7*	"	Recent rain
Coal Cr.	6-17-65	5:40 PM	60	55	0.4	Mouth	Numerous coho juveniles observed
"	7-13-65	10:20 AM	62	63	0.1	"	"
"	8-26-65	11:00 AM	-	-	-	"	Dry to 300 yds. above mouth, flow 0.1 cfs.
"	9-17-65	9:20 AM	48	46	0.2	"	
"	3-25-66	11:00 AM	48	60	9.0*	"	Several juvenile coho & steelhead observed
"	6-10-66	9:15 AM	55	56	1.0	"	
"	8-10-66	9:35 AM	-	63	Dry	"	
Little South Fk.	6-17-65	7:00 PM	56	55	21*	Mouth	
"	7-13-65	12:15 PM	59	73	10.7*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Little South Fk.	8-26-65	9:00 AM	59	59	7.0*	Mouth	
" "	9-17-65	10:00 AM	50	48	7.5*	"	
" "	3-25-65	11:50 AM	49	63	126*	"	
" "	6-10-66	7:55 AM	55	55	17.0*	"	
" "	7-12-66	10:05 AM	55	54	11.8*	"	
" "	8-10-66	10:15 AM	60	65	4.8*	"	
" "	9-16-66	11:15 AM	56	64	6.1*	"	Recent rain
N.Fk. Kilchis R.	6-17-65	6:25 PM	57	56	18.2*	Mouth	
" "	7-13-65	11:30 AM	61	72	9.2*	"	
" "	8-26-65	9:30 AM	62	60	5.7*	"	
" "	9-17-65	11:35 AM	52	54	6.6*	"	
" "	3-25-66	12:55 AM	49	65	170	"	
" "	6-10-66	8:25 AM	58	55	16.5*	"	
" "	7-12-66	10:30 AM	60	56	17.9*	"	
" "	8-10-66	10:35 AM	62	64	6.8*	"	
" "	9-16-66	11:35 AM	58	65	6.8*	"	Recent rain
S.Fk. Kilchis R.	6-17-65	6:35 PM	54	56	15.2*	Mouth	
" "	7-13-65	11:40 AM	57	72	7.4*	"	
" "	8-26-65	9:40 AM	58	60	5.0*	"	
" "	9-17-65	11:45 AM	50	54	5.7*	"	
" "	3-25-66	12:50 PM	49	65	130	"	Several juvenile salmonids observed at mouth
" "	6-10-66	8:30 AM	55	55	13.1*	"	
" "	7-12-66	10:35 AM	56	56	8.5*	"	
" "	8-10-66	10:45 AM	57	64	4.1*	"	
" "	9-16-66	11:45 AM	56	65	4.2*	"	Recent rain
Miami R.	8-26-64	9:30 AM	55	59	46*	200 yards upstream from Prouty Creek	
"	6-17-65	4:45 PM	55	56	42*	1/4 mi. upstream from Moss Creek	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Miami R.	7-13-65	9:50 AM	56	61	23*	1/4 mi. upstream from Moss Creek	
"	8-17-65	5:50 PM	63	75	18*	"	
"	9-17-65	12:30 PM	55	55	16.5*	"	
"	3-25-66	9:00 AM	45	48	315*	"	
"	6-9-66	12:40 PM	60	70	33*	"	
"	7-7-66	6:20 PM	59	67	30.7*	"	
"	8-10-66	9:15 AM	56	61	16.7*	"	
"	9-16-66	10:20 AM	56	60	13.7*	"	Recent rain
"	7-7-66	5:35 PM	57	70	18*	River Mile 7.0	
"	8-10-66	8:35 AM	57	60	8.0*	"	
"	9-16-66	9:45 AM	55	59	5.0*	"	Recent rain
Moss Cr.	6-17-65	3:35 PM	50	57	0.5*	Mouth	Intermittent flow in sections of lower 1.0 - 2.0 miles.
"	7-13-65	9:35 AM	53	60	2.0*	Mile 1.1	Dry in lower 1.1 mi.
"	8-17-65	5:10 PM	60	78	0.6	"	
"	9-17-65	1:00 PM	54	56	1.0	"	
"	3-25-66	9:30 AM	46	48	35*	Mouth	
"	6-9-66	12:30 PM	60	70	1.3	Mile 1.0	Dry in lower 0.8 mi. Coho juveniles seen at mile 1.0.
"	7-7-66	6:10 PM	56	68	5.7*	"	0.5 cfs between mouth & mile 0.4.
"	8-10-66	9:00 AM	55	60	1.0	"	Dry in lower 1.0 mi. many coho zeros seen.
"	9-16-66	10:20 AM	54	60	2.0	Mile 1.4	Lowermost flow at mi. 1.0, estimated at 0.5 cfs.
Peterson Cr.	6-17-65	4:30 PM	53	56	1.8*	0.2 mi. above mouth	
"	7-13-65	9:00 AM	52	58	0.8*	"	Numerous coho salmon juveniles observed at mile 0.2.

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Peterson Cr.	8-17-65	5:25 PM	62	77	0.5	0.2 mi. above mouth	
"	9-17-65	1:10 PM	55	57	0.5	"	
"	3-25-66	9:45 AM	47	50	10.4*	Mouth	
"	6-9-66	12:05 PM	56	68	2.5*	"	
"	7-7-66	5:50 PM	56	68	3.1*	"	
"	8-10-66	8:45 AM	56	60	1.4*	"	
"	9-16-66	10:00 AM	55	60	2.0*	"	Recent rain
Prouty Cr.	6-17-65	4:15 PM	52	57	1.0	0.2 mi. above mouth	
"	7-13-65	9:15 AM	52	59	0.5*	"	
"	8-17-65	5:30 PM	60	77	0.3	"	
"	9-17-65	1:20 PM	54	57	0.5	"	
"	3-25-66	10:10 AM	47	53	8.0*	Mouth	
"	6-9-66	12:20 PM	-	68	0.5	0.3 mi. above mouth	Dry at mouth, 0.6 cfs 0.8 mi. above mouth.
"	9-16-66	10:10 AM	55	60	1.0	0.5 mi. above mouth	Dry in lower 0.5 mi. Recent rain
Miscellaneous Ocean Tribs.							
Arch Cape Cr.	6-9-65	6:20 PM	59	63	5.4*	0.2 mi. above mouth	
"	7-14-65	5:30 PM	64	68	2.5	"	
"	8-26-65	4:10 PM	62	70	5.0*	"	
"	9-16-65	5:50 PM	54	65	10.1*	"	
"	4-29-66	1:45 PM	51	65	14.6*	"	
"	6-8-66	9:00 AM	53	59	4.1*	"	
"	7-6-66	5:55 PM	55	56	13.3*	"	
"	9-15-66	6:45 PM	57	59	2.5*	"	Recent rain
"	11-7-66	4:45 PM	47	-	19.6*	"	
(Elk Cr.)							
N.Fk. Elk Cr.	6-9-65	7:00 AM	60	63	10.9*	Mouth	
"	7-14-65	6:00 PM	66	66	4.4*	"	
"	8-26-65	4:40 PM	66	70	4.3*	"	
"	9-16-65	5:25 PM	57	66	9.2*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
N.Fk. Elk Cr.	4-29-66	1:15 PM	51	64	22*	Mouth	
"	6-8-66	8:30 AM	55	57	6.6*	"	
"	7-6-66	6:15 PM	58	55	11.7*	"	
"	8-10-66	7:30 AM	62	57	3.2*	"	
"	9-15-66	7:15 PM	57	59	3.0*	"	Recent rain
W.Fk. Elk Cr.	6-9-65	6:45 PM	59	63	11.0*	Mouth	
"	7-14-65	6:15 PM	62	65	5.5*	"	
"	8-26-65	4:50 PM	63	70	6.3*	"	
"	9-16-65	5:15 PM	57	66	11.1*	"	
"	4-29-66	1:05 PM	51	64	24*	"	
"	6-8-66	8:40 AM	54	57	9.0*	"	
"	7-6-66	6:25 PM	58	55	18.9*	"	
"	8-10-66	7:25 AM	62	57	5.2*	"	
"	9-15-66	7:10 PM	56	59	3.7*	"	Recent rain
Neskowin Cr.	7-20-65	11:45 AM	58	62	10.0*	1.1 mi. above mouth	
"	8-16-65	11:50 AM	59	69	6.5*	"	
"	9-13-65	11:30 AM	58	65	4.5*	"	
"	6-14-66	9:40 AM	57	67	13.7*	"	
"	7-11-66	10:50 AM	60	63	12.7*	"	
"	8-15-66	11:35 AM	62	70	5.6*	"	
"	9-19-66	10:50 AM	53	63	8.0*	"	Recent rain
"	11-4-66	10:25 AM	48	46	42.2*	"	
Sand Cr.	6-18-65	10:00 AM	53	56	6.6*	1.0 mi. N.E. of Sand Lake	
"	7-12-65	12:50 PM	59	74	2.6*	"	
"	8-17-65	11:05 AM	58	66	1.1*	"	
"	9-14-65	10:10 AM	55	54	2.3*	"	
"	3-25-66	3:15 PM	50	64	52*	"	
"	6-14-66	12:00 Noon	60	74	4.9*	"	
"	7-11-66	11:30 AM	58	65	3.7*	"	
"	8-12-66	2:50 PM	59	82	0.9*	"	
"	9-19-66	1:05 PM	57	73	2.1*	"	Recent rain
"	11-4-66	11:25 AM	49	55	11.9*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Short Sand Cr.	6-9-65	6:00 PM	57	64	3.2*	0.6 mi. above mouth	
" "	7-14-65	5:15 PM	60	70	1.5	"	
" "	8-26-65	3:55 PM	61	70	1.7	"	
" "	9-16-65	6:00 PM	53	63	5.8*	"	
" "	4-29-66	2:00 PM	49	65	8.0*	"	
" "	6-8-66	9:15 AM	52	59	2.4*	"	
" "	7-6-66	5:40 PM	54	56	6.5*	"	
" "	8-10-66	7:55 AM	57	57	1.9*	"	
" "	9-15-66	6:35 PM	54	61	1.4*	"	Recent rain
" "	11-7-66	4:30 PM	46	-	15*	"	
Necanicum R.	6-9-65	8:45 AM	55	64	55*	River mile 6.0, 0.7 mi. above Circle Cr.	0.3 mi. above Hwy. #101 crossing
"	7-15-65	8:40 AM	65	60	21.4*	"	"
"	8-19-65	4:10 PM	63	64	20.4*	"	"
"	9-16-65	3:50 PM	59	65	32*	"	"
"	4-29-66	11:00 AM	49	57	86*	"	"
"	6-9-66	8:40 AM	58	60	43*	"	"
"	7-6-66	2:40 PM	59	63	35.5*	"	"
"	8-9-66	7:10 AM	64	57	13.4*	"	"
"	9-15-66	8:00 AM	57	56	8.7*	"	" (recent rain)
"	11-7-66	1:50 PM	47	-	107*	"	"
Necanicum R.	6-9-65	10:40 AM	52	67	6.1*	Just upstream from Bergsvik Cr.	
"	7-15-65	9:45 AM	57	60	3.0*	"	
"	8-19-65	3:05 PM	59	64	3.8*	"	
"	9-16-65	4:50 PM	54	66	3.8*	"	
"	4-29-66	12:15 PM	49	63	7.5*	"	
"	6-9-66	9:55 AM	52	57	4.9*	"	
"	7-6-66	3:40 PM	56	60	3.1*	"	
"	8-9-66	8:10 AM	58	61	1.6*	"	
"	9-15-66	9:10 AM	51	59	1.5*	"	Recent rain
Bergsvik Cr.	6-9-65	10:30 AM	52	67	5.7*	Mouth	
"	7-15-65	9:35 AM	59	60	1.8*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Bergsvik Cr.	8-19-65	3:00 PM	59	64	3.9*	Mouth	
"	9-16-65	4:45 PM	54	66	1.6*	"	
"	4-29-66	12:25 PM	49	63	14.5*	"	
"	6-9-66	9:50 AM	54	57	3.9*	"	
"	7-6-66	3:42 PM	56	60	3.0*	"	
"	8-9-66	8:15 AM	60	61	1.1*	"	
"	9-15-66	9:15 AM	52	59	0.7*	"	Recent rain
Kloochie Cr.	6-9-65	9:15 AM	53	64	4.8*	Mouth	
"	7-15-65	9:00 AM	62	60	1.7	"	
"	8-19-65	3:50 PM	60	64	3.9*	"	
"	9-16-65	4:05 PM	57	65	3.0*	"	
"	4-29-66	11:20 AM	49	59	10.8*	"	
"	6-9-66	9:00 AM	56	60	2.9*	"	
"	7-6-66	3:00 PM	56	61	3.6*	"	
"	8-9-66	7:25 AM	61	57	1.7*	"	
"	9-15-66	8:25 AM	52	56	1.3*	"	Recent rain
"	11-7-66	2:15 PM	47	-	13.9*	"	
N.Fk. Necanicum	6-9-65	10:00 AM	55	66	5.3*	0.3 mi. above mouth, above hatchery diversion	
"	7-15-65	9:25 AM	60	60	2.4*	"	
"	8-19-65	3:20 PM	60	64	4.9*	"	
"	9-16-65	4:35 PM	60	66	2.0	"	
"	4-29-66	12:00 Noon	52	62	10.6*	"	
"	6-9-66	9:35 AM	56	61	3.8*	"	Hatchery diversion flowing 1.3 cfs.
"	7-6-66	3:20 PM	59	60	4.2*	"	Hatchery diversion flowing 1.8 cfs.
"	8-9-66	7:55 AM	60	60	2.2*	"	Hatchery diversion flowing 1.7 cfs.
"	9-15-66	8:50 AM	53	58	1.6*	"	Hatchery diversion flowing 1.4 cfs. Recent rain.

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
S.Fk. Necanicum	6-9-65	9:30 AM	52	64	5.8*	Mouth	
"	7-15-65	9:10 AM	60	60	2.8*	"	
"	8-19-65	3:35 AM	60	64	1.3*	"	
"	9-16-65	4:25 PM	56	66	0.6	"	
"	4-29-66	11:40 AM	50	61	10.5*	"	
"	6-9-66	9:10 AM	54	61	4.2*	"	
"	7-6-66	3:10 PM	57	60	2.1*	"	
"	8-9-66	7:40 AM	60	58	0.7*	"	
"	9-15-66	8:35 AM	51	58	0.7*	"	Recent rain
Nehalem R.	6-9-65	12:00 Noon	-	67		USGS gage 14-3010	
"	7-14-65	5:05 PM	70	69		"	
"	8-26-65	2:15 PM	68	70		"	
"	9-15-65	9:50 AM	-	55		"	
"	6-8-66	9:45 AM	61	60		"	
"	7-7-66	3:35 PM	63	70		"	
"	8-9-66	2:50 PM	73	80		"	
"	9-15-66	5:20 PM	61	64		"	Recent rain
Nehalem R.	6-9-65	2:15 PM	65	74	176*	0.4 mi. upstream from Humbug Cr.	
"	7-14-65	1:55 PM	72	75	92*	"	
"	8-27-65	12:05 PM	66	72	56.5*	"	
"	9-15-65	1:15 PM	61	59	55*	"	
"	6-8-66	12:45 PM	63	72	190*	"	
"	7-7-66	2:10 PM	63	71	132*	"	
"	8-9-66	1:05 PM	73	78	33.4*	"	
"	9-15-66	4:00 PM	62	68	49.5*	"	Recent rain
"	11-8-66	12:10 PM	45	-	138	"	
Nehalem R.	6-9-65	2:25 PM	64	77	-	Just above confluence of Oak Ranch Creek	
"	7-15-65	12:20 PM	69	65	-	"	
"	8-19-65	11:05 AM	68	64	-	"	
"	9-15-65	3:30 PM	60	59	-	"	
"	6-8-66	3:45 PM	65	72	-	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Nehalem R.	7-7-66	11:30 AM	62	65	-	Just above confluence of Oak Ranch Cr.	
"	8-9-66	10:40 AM	67	71	-	"	
"	9-15-66	1:10 PM	59	67	-	"	Recent rain
Nehalem R.	6-9-65	4:00 PM	65	77	28.5*	200 yds. upstream from Rock Cr.	
"	7-15-65	2:00 PM	70	67	12.8*	"	
"	8-19-65	10:25 AM	66	64	4.8*	"	
"	9-15-65	4:10 PM	60	59	2.5*	"	
"	3-23-66	10:30 AM	40	48	250	"	
"	6-8-66	4:45 PM	65	72	24*	"	
"	7-7-66	12:35 PM	61	69	32.6*	"	
"	8-9-66	11:25 AM	67	72	1.7*	"	
"	9-15-66	2:25 PM	58	67	4.2*	"	Recent rain
"	11-8-66	3:20 PM	43	-	9.6*	"	
Nehalem R.	7-15-65	2:45 PM	65	68	4.5*	0.1 mi. upstream from Wolf Cr.	
"	9-15-65	5:15 PM	58	59	2.4*	"	
"	3-23-66	10:30 AM	40	48	198*	"	
"	8-19-65	2:15 PM	60	64	4.9*	"	
"	7-7-66	1:00 PM	57	70	7.4*	"	
"	8-9-66	12:00 Noon	60	75	2.2*	"	
"	9-15-66	2:50 PM	54	67	4.0*	"	Recent rain
"	11-8-66	4:00 PM	42	-	4.9*	"	
Anderson Cr.	6-9-65	10:45 AM	52	62	5.6*	Mouth	
"	6-8-66	10:00 AM	52	60	3.3*	"	
"	7-7-66	3:55 PM	55	70	2.8*	"	
"	8-9-66	3:20 PM	60	76	0.9*	"	
"	11-8-66	9:40 AM	45	-	7.2*	"	
Beaver Cr.(lower)	7-7-66	11:00 AM	56	65	1.8*	Mouth	
"	8-9-66	10:20 AM	-	70	0.1	"	
"	9-15-66	12:15 PM	-	62	0.5	"	Recent rain
"	11-8-66	2:20 PM	-	-	2	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Buster Cr.	9-15-66	10:50 AM	54	60	1.0*	Mouth	Recent rain
Cook Cr.	6-9-65	11:00 AM	53	65	53*	Mouth	
"	7-14-65	4:15 PM	63	73	20.2*	"	
"	8-26-65	1:50 PM	60	68	14.5*	"	
"	9-15-65	10:00 AM	56	55	18.9*	"	
"	3-24-66	3:25 PM	-	-	300	"	
"	6-8-66	10:15 AM	54	62	29.3*	"	
"	7-7-66	4:10 PM	59	70	32.7	"	
"	8-9-66	3:40 PM	64	76	11.4*	"	
"	9-15-66	5:55 PM	55	62	14.7*	"	Recent rain
"	11-8-66	10:20 AM	45	-	53*	"	
Cow Cr.	6-9-65	11:30 AM	58	70	2.8*	0.6 mi. above mouth	
"	7-15-65	10:25 AM	61	62	0.9*	"	
"	8-19-65	1:20 PM	60	64	0.8*	"	
"	9-15-65	1:30 PM	-	-	1	"	
"	3-23-66	1:15 PM	48	55	30*	"	
"	6-8-66	1:45 PM	62	72	3.5*	"	
"	7-7-66	9:00 AM	56	59	1.7*	"	
"	8-9-66	9:05 AM	61	64	0.7*	"	
"	9-15-66	10:35 AM	54	60	0.6*	"	Recent rain
"	11-8-66	1:05 PM	-	-	2	"	
Cronin Cr.	6-9-65	1:00 PM	55	71	13*	Mouth	
"	7-14-65	2:35 PM	60	75	5.2*	"	
"	3-24-66	2:10 PM	47	63	118*	"	
"	6-8-66	12:15 PM	56	71	7.2*	"	
"	7-7-66	2:55 PM	56	70	7.6*	"	
"	8-9-66	1:45 PM	59	78	2.4*	"	
"	9-15-66	4:40 PM	55	67	2.7*	"	Recent rain
"	11-8-66	11:30 AM	45	-	13.2*	"	
Deep Cr.	7-7-66	10:35 AM	57	64	2.0*	0.1 mi. above mouth	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Deer Cr.	9-15-66	12:50 PM	53	67	0.3	Mouth	Extensive logjam at mouth. Recent rain.
E.Fk. Nehalem R.	6-9-65	2:45 PM	62	77	6.5*	Mouth	
"	7-15-65	12:40 PM	65	65	1.8*	"	
"	8-19-65	10:50 AM	64	64	1.3*	"	
"	9-15-65	3:45 PM	57	59	0.9*	"	
"	3-23-66	-	-	-	200	"	
"	6-8-66	4:00 PM	63	71	5.4*	"	
"	7-7-66	11:40 AM	59	66	4.3*	"	
"	8-9-66	10:55 AM	63	72	0.7*	"	
"	9-15-66	1:20 PM	56	67	1.6*	"	Recent rain
"	11-8-66	2:55 PM	44	-	2.9*	"	
Fishhawk Cr.	6-9-65	1:40 PM	60	77	14.1*	0.2 mi. above mouth	Trib. at r.m. 65.8
"	7-15-65	11:45 AM	64	64	6.9*	"	
"	8-19-65	11:40 AM	64	64	2.6*	"	
"	9-15-65	3:05 PM	58	59	4.5*	"	
"	3-23-66	2:45 PM	-	-	125	"	
"	6-8-66	3:00 PM	61	74	11.2*	"	
"	7-7-66	10:55 AM	57	64	11.7*	"	
"	8-9-66	10:15 AM	62	69	3.7*	"	
"	9-15-66	12:10 PM	55	62	4.5*	"	Recent rain
"	11-8-66	2:15 PM	43	-	13.7*	"	
Foley Cr.	6-9-65	10:00 AM	54	60	26*	1.0 mi. above mouth	
"	7-14-65	5:00 PM	66	70	14.7*	"	
"	8-26-65	1:15 PM	60	65	14.2*	"	
"	9-15-65	8:30 AM	55	55	30.4*	"	
"	6-8-66	11:50 AM	61	68	17*	"	
"	7-7-66	5:05 PM	63	70	17.5*	"	
"	8-9-66	4:00 PM	70	78	8.6*	"	
"	9-15-66	6:10 PM	58	62	6.9*	"	Recent rain
"	11-8-66	8:45 AM	45	-	46*	"	
Humbug Cr.	6-9-65	2:50 PM	58	75	24*	1.2 mi. above mouth	
"	7-14-65	1:35 PM	65	74	5.9*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Humbug Cr.	8-27-65	11:40 AM	61	67	3.9	1.2 mi. above mouth	
"	9-15-65	12:45 PM	58	58	11*	"	
"	3-23-66	12:30 PM	43	52	277*	"	
"	6-8-66	1:10 PM	60	72	16.5*	"	
"	7-7-66	1:50 PM	59	70	10.7*	"	
"	8-9-66	12:45 PM	66	77	2.6*	"	
"	9-15-66	3:35 PM	57	68	2.7*	"	Recent rain
"	11-8-66	12:40 PM	45	-	41*	"	
E.Fk. Humbug	7-14-65	1:10 PM	62	74	1.7	Mouth	
"	9-15-65	12:30 PM	56	58	3.0	"	
"	7-7-66	8:15 AM	56	57	2.6*	"	
"	8-9-66	8:35 AM	62	64	0.8*	"	
"	9-15-66	9:35 AM	54	58	0.7*	"	Recent rain
W.Fk. Humbug	7-14-65	1:10 PM	60	74	3	Mouth	
"	9-15-65	12:35 PM	55	58	4	"	
"	7-7-66	8:30 AM	54	57	7.5*	"	
"	8-9-66	8:45 AM	60	64	2.2*	"	
"	9-15-66	9:45 AM	53	58	2.0*	"	Recent rain
Lost Cr.	6-9-65	11:35 AM	54	66	9*	Mouth	
"	7-14-65	3:50 PM	66	74	3*	"	
"	8-26-65	2:05 PM	62	69	2.6*	"	
"	9-15-65	10:10 AM	56	55	2.0*	"	
"	3-24-66	3:00 PM	51	63	88*	"	
"	6-8-66	10:35 AM	53	62	6.4*	"	
"	7-7-66	4:20 PM	61	73	5.4*	"	
"	8-9-66	3:00 PM	66	79	1.8*	"	
"	9-15-66	5:40 PM	57	63	2.8*	"	Recent rain
"	11-8-66	9:20 AM	44	-	9.5*	"	
N.Fk. Nehalem R.	6-9-65	5:15 PM	61	67	73*	0.6 mi. downstream from Grassy Cr.	
"	7-14-65	11:30 AM	62	66	29*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
N.Fk. Nehalem R.	8-26-65	12:45 PM	63	65	17.1*	0.6 mi. downstream from Grassy Cr.	
"	9-15-65	11:05 AM	57	57	36*	"	
"	6-8-66	11:25 AM	61	65	52*	"	
"	7-6-66	4:50 PM	59	58	49*	"	
"	8-9-66	4:25 PM	70	76	20.8*	"	
"	9-16-66	9:15 AM	56	58	19.8*	"	Recent rain
"	11-7-66	4:00 PM	46	-	141*	"	
N.Fk. Nehalem R.	6-9-65	4:30 PM	59	74	46*	Just upstream from Gods Valley Cr.	
"	7-14-65	12:00 Noon	60	72	18.8*	"	
"	8-27-65	10:30 AM	60	64	17.3*	"	
"	9-15-65	11:35 AM	56	57	26*	"	
"	6-8-66	10:45 AM	57	62	33*	"	
"	7-6-66	4:30 PM	57	59	21*	"	
"	8-9-66	4:50 PM	68	74	15.8*	"	
"	9-16-66	8:50 AM	56	54	13.6*	"	Recent rain
"	11-7-66	3:25 PM	46	-	63*	"	
Coal Cr.	6-9-65	5:30 PM	59	66	14.5*	0.3 mi. above mouth	
"	7-14-65	11:10 AM	59	63	6.3*	"	
Gods Valley Cr.	6-9-65	4:15 PM	62	74	8*	Mouth	
"	7-14-65	11:50 AM	65	71	1.3*	"	
"	8-27-65	10:20 AM	61	64	1.5*	"	
"	9-15-65	11:25 AM	59	57	3.0*	"	
"	3-24-66	5:05 PM	47	60	83*	"	
"	6-8-66	10:40 AM	62	62	4.1*	"	
"	7-6-66	4:20 PM	59	59	4.3*	"	
"	8-9-66	4:45 PM	74	74	0.8*	"	
"	9-16-66	8:40 AM	57	54	1.2*	"	
"	11-7-66	3:15 PM	46	-	18.7*	"	Recent rain

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Soapstone Cr.	6-9-65	4:00 PM	57	76	11.9*	Mouth	
"	7-14-65	12:30 PM	61	73	4.7*	"	
"	8-27-65	10:45 AM	58	65	4.4*	"	
"	9-15-65	12:00 Noon	56	58	7.5*	"	
"	3-24-66	5:30 PM	46	60	114*	"	
"	6-8-66	10:20 AM	57	59	7.1*	"	
"	7-6-66	4:05 PM	57	60	7.5*	"	
"	8-9-66	5:05 PM	66	72	2.6*	"	
"	9-16-66	8:25 AM	56	54	2.3*	"	Recent rain
"	11-7-66	2:45 PM	46	-	33*	"	
Northrup Cr.	6-9-65	12:45 PM	59	77	7.1*	0.2 mi. above mouth	
"	7-15-65	11:20 AM	63	63	2.4*	"	
"	8-19-65	12:20 PM	62	64	1.7*	"	
"	9-15-65	2:40 PM	57	59	2.3*	"	
"	3-23-66	2:20 PM	-	-	100	"	
"	6-8-66	2:35 PM	60	74	5.5*	"	
"	7-7-66	10:05 AM	57	62	4.1*	"	
"	8-9-66	9:50 AM	61	66	1.0*	"	
"	9-15-66	11:45 AM	54	61	1.2*	"	Recent rain
"	11-8-66	1:50 PM	43	-	5.2*	"	
Oak Ranch Cr.	6-9-65	2:15 PM	57	77	2.8*	Mouth	
"	7-15-65	12:15 PM	59	65	1.4*	"	
"	8-19-65	11:00 AM	60	64	1.0*	"	
"	9-15-65	3:25 PM	56	59	1.0*	"	
"	3-23-66	3:20 PM	46	58	58*	"	
"	6-8-66	3:45 PM	58	72	3.0*	"	
"	7-7-66	11:25 AM	55	65	2.5*	"	
"	8-9-66	10:35 AM	58	71	1.1*	"	
"	9-15-66	1:05 PM	53	67	1.3*	"	Recent rain
"	11-8-66	2:40 PM	44	-	1.8*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Peterson Cr.	6-9-65	10:30 AM	51	60	1.5	0.3 mi. above mouth	
"	7-14-65	4:40 PM	57	73	0.3	"	
"	8-26-65	1:25 PM	57	66	0.3	"	
"	7-7-66	4:30 PM	-	72	0.5	"	
"	9-15-66	6:00 PM	-	62	0.1	"	Recent rain
"	11-8-66	9:00 AM	-	-	1.8	"	
Quartz Cr.	9-15-66	10:15 AM	51	59	3.0*	0.3 mi. upstream from mouth	Recent rain
Rock Cr.	6-9-65	3:30 PM	62	77	26.5*	Mouth	
"	7-15-65	1:25 PM	68	66	19.4*	"	
"	8-19-65	10:10 AM	67	64	8.7*	"	
"	9-15-65	4:00 PM	60	59	9.8*	"	
"	3-23-66	-	-	-	250	"	
"	6-8-66	4:15 PM	65	71	47*	"	
"	7-7-66	12:05 PM	60	66	17.4*	"	
"	8-9-66	11:15 AM	67	72	11.6*	"	
"	9-15-66	2:00 PM	58	66	12.2*	"	Recent rain
"	11-8-66	3:10 PM	43	-	27*	"	
Roy Cr.	8-26-65	1:20 PM	-	-	Dry	0.1 mi. above mouth	
"	6-8-66	9:30 AM	54	59	0.2	"	
"	7-7-66	4:35 PM	-	72		"	No flow
"	8-9-66	3:50 PM	-	78		"	No flow
"	9-15-66	6:05 PM	-	62		"	No flow
"	11-8-66	8:55 AM	-	-	1.0	"	
Salmonberry R.	6-9-65	12:15 PM	58	68	97*	0.1 mi. above mouth	
"	7-14-65	3:15 PM	69	75	38*	"	
"	8-26-65	12:45 PM	62	70	25.8*	"	
"	9-15-65	9:30 AM	57	55	33*	"	
"	6-8-66	11:45 AM	59	68	63*	"	
"	7-7-66	3:15 PM	60	68	52.5*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Salmonberry R.	8-9-66	2:00 PM	70	78	25*	0.1 mi. above mouth	
"	9-15-66	5:00 PM	57	65	27.2*	"	Recent rain
"	11-8-66	11:00 AM	45	46	59*	"	
Spruce Run Cr.	6-9-65	1:40 PM	55	73	4.2*	Mouth	
"	7-14-65	2:20 PM	58	75	0.8	"	
"	3-24-66	11:50 AM	45	59	43*	"	
"	7-7-66	2:30 PM	54	71	2.7*	"	
"	8-9-66	1:25 PM	60	76	0.4*	"	
"	9-15-66	4:15 PM	54	67	1.4*	"	Recent rain
"	11-8-66	11:45 AM	44	-	5.0*	"	
Walker Cr.	6-9-65	12:00 Noon	56	74	18*	Just above confluence of Fishhawk Cr.	
"	7-15-65	10:45 AM	63	63	4.2*	"	
"	8-19-65	12:40 PM	62	64	1.7*	"	
"	9-15-65	2:10 PM	57	59	1.7*	"	
"	3-23-66	1:40 PM	44	56	232*	"	
"	6-8-66	2:10 PM	58	72	15.6*	"	
"	7-7-66	9:40 AM	57	60	7.5*	"	
"	8-9-66	9:20 AM	63	66	1.8*	"	
"	9-15-66	11:15 AM	56	60	1.8*	"	Recent rain
"	11-8-66	1:25 PM	42	-	9.0*	"	
Fishhawk Cr.	6-9-65	12:15 PM	55	74	14.7*	Just above confluence of Walker Cr.	
"	7-15-65	10:50 AM	62	63	3.4*	"	
"	8-19-65	12:50 PM	62	64	1.1*	"	
"	9-15-65	2:20 PM	57	59	2.3*	"	
"	3-23-66	2:45 PM	-	-	125	"	
"	6-8-66	2:15 PM	58	72	13.1*	"	
"	7-7-66	9:50 AM	56	60	5.7*	"	
"	8-9-66	9:30 AM	61	66	1.3*	"	
"	9-15-66	11:20 AM	53	60	1.0*	"	Recent rain
"	11-8-66	1:30 PM	42	-	18.3*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Wolf Cr.	6-9-65	4:30 PM	58	76	8.8*	0.3 mi. above mouth	
"	7-15-65	3:00 PM	63	68	3.6*	"	
"	8-19-65	2:00 PM	60	64	1.4*	"	
"	9-15-65	4:55 PM	56	59	1.2*	"	
"	3-23-66	10:30 AM	40	50	136*	"	
"	6-8-66	5:25 PM	59	70	7.4*	"	
"	7-7-66	1:15 PM	56	70	3.3*	"	
"	8-9-66	12:10 PM	60	75	1.0*	"	
"	9-15-66	3:00 PM	54	67	1.7*	"	Recent rain
"	11-8-66	3:50 PM	40	-	2.0*	"	
Nestucca R.	8-26-64	5:55 PM	61	-	116*	80 yds. upstream from Farmer Cr.	
Nestucca R.	6-14-66	10:35 AM	61	70		USGS gage 14-3036	
"	7-11-66	2:00 PM	63	72		"	
"	8-12-66	1:55 PM	67	83		"	
"	9-20-66	1:10 PM	60	80		"	Recent rain
Nestucca R.	6-18-65	3:25 PM	54	52	54*	0.5 mi. downstream from Bear Cr.	
"	4-20-65	-	49	56	165*	"	
"	7-20-65	3:45 PM	59	64	38.6*	"	
"	8-16-65	3:30 PM	68	81	21.3	"	
"	9-13-65	2:55 PM	59	68	18.4*	"	
"	6-14-66	5:30 PM	67	70	68*	"	
"	7-11-66	5:10 PM	61	71	35.3*	"	
"	8-12-66	11:50 AM	58	74	20.5*	"	
"	9-20-66	10:25 AM	51	60	21.3*	"	Recent rain
Nestucca R.	6-18-65	4:20 PM	53	53		USGS gage 14-3029	
"	7-20-65	4:30 PM	57	64		"	
"	8-16-65	4:25 PM	62	82		"	
"	6-14-66	6:45 PM	62	65		"	
"	7-11-66	5:45 PM	60	68		"	
"	8-12-66	10:55 AM	55	70		"	
"	9-20-66	9:30 AM	50	56		"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Bays Cr.	6-18-65	1:10 PM	52	56	4.9*	0.2 mi. above mouth	
"	7-20-65	1:20 PM	55	62	4.5*	"	
"	8-16-65	1:25 PM	59	72	4.3*	"	
"	9-13-65	1:25 PM	56	68	2.8*	"	
"	4-8-66	11:45 AM	50	51	21*	"	
"	6-14-66	3:00 PM	60	78	6.6*	"	
"	7-11-66	3:00 PM	58	72	4.6*	"	
"	8-12-66	1:30 PM	57	82	2.8*	"	
"	9-20-66	12:35 PM	54	74	2.2*	"	Recent rain
Bear Cr.	6-18-65	3:40 PM	51	53	7.3*	Mouth	
"	7-20-65	4:00 PM	56	64	5.9*	"	
"	8-16-65	3:45 PM	63	82	3.7*	"	
"	9-13-65	3:05 PM	56	68	2.9*		
"	4-8-66	1:45 PM	48	53	23*	"	
"	6-14-66	5:50 PM	60	70	8.6*	"	
"	7-11-66	5:20 PM	57	72	6.0*	"	
"	8-12-66	11:40 AM	55	74	3.1*	"	
"	9-20-66	10:20 AM	51	60	3.1*	"	Recent rain
(Beaver Cr.)							
Bear Cr.	6-18-65	10:25 AM	52	57	3*	Mouth	
"	7-12-65	12:15 PM	59	74	1.0*	"	
"	8-16-65	1:00 PM	61	71	0.8	"	
"	9-13-65	1:00 PM	58	67	0.9	"	
"	4-8-66	11:00 AM	50	51	7.2*	"	
"	6-14-66	11:35 AM	60	73	2.3	"	
"	7-11-66	1:20 AM	62	70	1.7*	"	
"	9-19-66	2:55 AM	57	75	0.7*	"	Recent rain
E.Beaver Cr.	6-18-65	10:40 AM	52	57	23.5*	Mouth	
"	7-12-65	12:05 PM	58	74	14.4*	"	
"	8-16-65	12:45 PM	61	70	11.2*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
E.Beaver Cr.	9-13-65	12:45 PM	57	67	6.7*	Mouth	
"	4-8-66	10:45 AM	49	50	57*	"	
"	6-14-66	11:20 AM	58	73	18.7*	"	
"	7-11-66	1:40 PM	61	70	14.5*	"	
"	8-12-66	2:30 PM	63	82	8.2*	"	
"	9-19-66	12:45 PM	57	71	13*	"	Recent rain
"	11-4-66	2:30 PM	50	65	36*	"	
W.Beaver Cr.	6-18-65	10:45 AM	52	55	6*	Mouth	
"	7-12-65	12:10 PM	62	74	1.3	"	
"	8-16-65	12:50 PM	63	70	0.8	"	
"	9-13-65	12:55 PM	59	67	0.8	"	
"	4-8-66	10:35 AM	51	50	17.2*	"	
"	6-14-66	11:10 AM	61	73	7.0*	"	
"	7-11-66	1:30 PM	61	70	2.7*	"	
"	8-12-66	2:30 PM	62	82	0.6*	"	
"	9-19-66	12:40 PM	57	71	3.4*	"	Recent rain
Bible Cr.	6-14-66	4:50 PM	-	76	2.5	Mouth	
"	7-11-66	4:45 PM	-	74	2.0	"	
"	8-12-66	12:10 PM	-	76	1.2	"	
"	9-20-66	10:55 AM	51	60	1.9*	"	Recent rain
Clarence Cr.	6-18-65	2:20 PM	51	52	2.0*	Mouth	
"	7-20-65	3:25 PM	57	65	0.7*	"	
"	8-16-65	2:50 PM	59	79	0.5	"	
"	9-13-65	11:50 AM	56	65	0.8	"	
"	4-18-66	1:05 PM	48	53	11*	"	
"	6-14-66	4:25 PM	58	77	2.9*	"	
"	7-11-66	4:25 PM	57	73	1.8*	"	
"	8-12-66	12:35 PM	55	78	1.0*	"	
"	9-20-66	11:20 AM	52	64	0.7*	"	Recent rain

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Clear Cr.	6-22-65	11:45 AM	54	66	3.2*	0.2 mi. above mouth	
"	7-20-65	12:15 PM	56	62	2.9*	"	
"	8-16-65	12:15 PM	59	69	2.0*	"	
"	9-13-65	2:25 PM	54	69	0.6	"	
"	5-4-66	1:00 PM	52	57	6.6*	"	
"	6-15-66	11:05 AM	57	80	4.1*	"	
"	7-11-66	10:30 AM	56	63	3.0*	"	
"	8-15-66	11:10 AM	57	74	1.9*	"	
"	9-19-66	11:15 AM	55	67	2.2*	"	Recent rain
Elk Cr.	6-18-65	3:55 PM	51	53	9.4*	Mouth	
"	8-16-65	3:55 PM	63	82	4.9*	"	
"	9-13-65	3:15 PM	57	68	4.1*	"	
"	4-8-66	2:00 PM	47	53	24*	"	
"	6-14-66	6:05 PM	62	68	12.3*	"	
"	7-11-66	5:30 PM	58	70	4.9*	"	
"	8-12-66	11:30 AM	58	72	4.6*	"	
"	9-20-66	10:05 AM	51	59	4.5*	"	Recent rain
Farmer Cr.	6-18-65	11:20 AM	53	56	6*	Mouth	
"	7-12-65	11:40 AM	59	73	5.3*	"	
"	8-17-65	10:45 AM	58	65	3.9*	"	
"	9-13-65	12:35 PM	57	66	3.9*	"	
"	3-25-66	3:45 PM	50	64	45*	"	
"	6-14-66	10:20 AM	57	68	9*	"	
"	7-11-66	1:55 PM	58	71	5*	"	
"	8-12-66	2:10 PM	61	82	3.6*	"	
"	9-20-66	1:15 PM	59	80	3.2*	"	Recent rain
"	11-4-66	2:55 PM	51	62	14.8*	"	
Little Nestucca R.	6-22-65	12:15 PM	55	62	38*	200 yds. below Fall Cr.	
"	7-20-65	11:15 AM	57	62	18.8*	"	
"	8-16-65	11:30 AM	61	68	22*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Little Nestucca	9-13-65	11:10 AM	57	64	15.9*	200 yds. below Fall Cr.	
"	5-4-66	12:10 PM	53	55	83*	"	
"	6-15-66	10:45 AM	61	75	46*	"	
"	7-12-66	4:30 PM	59	60	35*	"	
"	8-15-66	12:05 PM	59	72	17*	"	
"	9-19-66	10:15 AM	53	60	21*	"	Recent rain
Little Nestucca	7-20-65	9:45 AM	56	60	2.5	150 yds. above Louie Cr.	
"	8-16-65	10:30 AM	60	66	3.2*	"	
"	9-13-65	10:20 AM	56	60	2.6*	"	
"	5-4-66	11:00 AM	51	54	21*	"	
"	6-15-66	9:30 AM	56	63	10.5*	"	
"	7-12-66	5:25 PM	60	58	4.1*	"	
"	8-15-66	10:05 AM	58	60	3.5*	"	
"	9-19-66	9:20 AM	52	56	4.5*	"	
"	11-4-66	9:15 AM	45	42	16.8*	"	Recent rain
Bear Cr.	6-15-66	10:15 AM	57	68	3.1*	Mouth	
"	11-4-66	9:45 AM	43	43	8.4*	150 yds. above mouth	
Fall Cr.	6-22-65	11:15 AM	55	62	4.6	Mouth	
"	7-20-65	10:55 AM	55	61	1.7*	"	
"	8-16-65	11:15 AM	57	68	1.5*	"	
"	9-13-65	11:00 AM	54	63	1.2	"	
"	5-4-66	12:20 PM	52	55	8.9*	"	
"	6-15-66	10:30 AM	57	73	3.7*	"	
"	7-12-66	4:40 PM	56	60	3.0*	"	
"	8-15-66	12:10 PM	56	72	1.4*	"	
"	9-19-66	10:25 AM	51	60	2.1*	"	Recent rain
Louie Cr.	6-22-65	1:40 PM	54	66	2.8*	Mouth	
"	7-20-65	10:05 AM	56	60	1.9*	"	
"	8-16-65	10:45 AM	59	66	0.9*	"	
"	9-13-65	10:30 AM	56	60	0.8*	"	

Appendix II (Continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Louie Cr.	5-4-66	10:45 AM	49	53	6.5*	Mouth	
"	6-15-66	9:15 AM	55	62	3.3*	"	
"	7-12-66	5:15 PM	60	58	1.8*	"	
"	8-15-66	10:00 AM	56	60	0.7*	"	
"	9-19-66	9:30 AM	51	56	1.0*	"	Recent rain
S.Fk. Little Nestucca R.	6-22-65	2:30 PM	56	66	7*	Mouth	
"	7-20-65	10:30 AM	55	60	4.7*	"	
"	8-16-65	11:00 AM	58	68	3.5*	"	
"	9-13-65	10:45 AM	54	62	2.6*	"	
"	5-4-66	11:45 AM	50	52	13*	"	
"	6-15-66	9:55 AM	55	67	12.8*	"	
"	7-12-66	5:00 PM	56	60	9.3*	"	
"	8-15-66	12:30 PM	57	72	4.2*	"	
"	9-19-66	9:50 AM	51	57	4.9*	"	Recent rain
Moon Cr.	6-18-65	1:25 PM	53	55	9.4*	Just above confluence with East Cr.	
"	7-20-65	1:35 PM	58	62	3.9*	"	
"	8-16-65	1:40 PM	64	74	4.0*	"	
"	9-13-65	1:40 PM	58	68	2.4*	"	
"	4-8-66	12:05 PM	49	52	28*	"	
"	6-14-66	3:30 PM	62	77	11.7*	"	
"	7-11-66	3:30 PM	60	73	7.2*	"	
"	8-12-66	1:15 PM	60	80	3.5*	"	
"	9-20-66	12:00 Noon	55	70	2.9*	"	Recent rain
East Cr.	6-18-65	1:30 PM	53	55	12.6*	Just upstream from Moon Cr.	
"	7-20-65	1:45 PM	57	62	8.0*	"	
"	8-16-65	1:50 PM	61	74	4.1*	"	
"	9-13-65	1:45 PM	57	68	3.2*	"	
"	4-8-66	12:20 PM	49	52	45*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
East Cr.	6-14-66	3:20 PM	63	78	14*	Just upstream from Moon Cr.	
"	7-11-66	3:20 PM	60	73	8.8*	"	
"	8-12-66	1:10 PM	58	80	5.7*	"	
"	9-20-66	11:50 AM	53	69	3.0*	"	Recent rain
Niagara Cr.	6-18-65	2:10 PM	53	55	9.3*	Mouth	
"	7-20-65	3:00 PM	59	65	4.6*	"	
"	8-16-65	2:30 PM	68	78	2.2	"	
"	9-13-65	2:15 PM	56	69	1.6	"	
"	4-8-66	12:55 PM	48	53	37*	"	
"	6-14-66	4:10 PM	65	77	6.6*	"	
"	7-11-66	4:10 PM	63	73	4.0*	"	
"	8-12-66	12:40 PM	65	78	2.2*	"	
"	9-20-66	11:25 AM	57	66	2.0*	"	Recent rain
Powder Cr.	6-18-65	1:45 PM	52	55	5.8*	Mouth	
"	7-20-65	2:45 PM	57	64	2.5*	"	
"	8-16-65	2:20 PM	62	77	0.9	"	
"	9-13-65	2:05 PM	56	69	1.0	"	
"	4-8-66	12:40 PM	48	52	23*	"	
"	6-14-66	3:50 PM	61	77	6.4*	"	
"	7-11-66	3:50 PM	60	74	3.1*	"	
"	8-12-66	12:50 PM	58	79	2.1*	"	
"	9-20-66	11:35 AM	53	68	1.7*	"	Recent rain
Slick Rock Cr.	6-18-65	2:45 PM	51	56	2.7*	Mouth	
"	7-20-65	3:35 PM	56	65	2.2*	"	
"	8-16-65	3:05 PM	60	80	0.7*	"	
"	9-13-65	2:30 PM	56	69	0.6	"	
"	4-8-66	1:15 PM	48	53	12*	"	
"	6-14-66	4:40 PM	62	77	3.0*	"	
"	7-11-66	4:35 PM	57	74	2.1*	"	
"	8-12-66	12:25 PM	55	78	1.3*	"	
"	9-20-66	11:05 AM	52	62	1.0*	"	Recent rain

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Testament Cr.	6-18-65	3:00 PM	51	52	4	Mouth	
"	7-20-65	3:40 PM	56	65	3.4	"	
"	8-16-65	3:15 PM	60	80	2.8	"	
"	9-13-65	2:40 PM	54	69	2.2	"	
"	4-8-66	1:30 PM	47	53	19*	"	
"	6-14-66	5:05 PM	60	74	6.5*	"	
"	7-11-65	4:55 PM	57	73	4.3*	"	
"	8-12-66	12:02 PM	56	78	2.0*	"	
"	9-20-66	10:40 AM	52	60	2.4*	"	Recent rain
Three Rivers	6-22-65	11:30 AM	54	65	52*	Mouth	
"	7-12-65	11:25 AM	58	71	34.1*	"	
"	8-17-65	10:30 AM	59	65	18.3*	"	
"	9-13-65	12:05 PM	58	66	17.6*	"	
"	4-8-66	10:00 AM	48	50	168*	"	
"	6-15-66	12:15 PM	63	85	49.3*	"	
"	7-11-66	10:15 AM	56	62	37*	"	
"	8-15-66	11:00 AM	59	74	22.1*	"	
"	9-19-66	11:30 AM	55	68	21	"	Recent rain
"	11-4-66	3:10 PM	49	60	67	"	
Three Rivers	6-22-65	10:15 AM	50	60	11.8	Just upstream from Alder Cr.	
"	7-12-65	11:00 AM	54	70	7.5	"	
"	8-17-65	10:05 AM	56	65	5.8	"	
"	9-14-65	9:40 AM	55	54	7.0	"	
"	4-8-66	9:30 AM	47	49	50	"	
"	6-15-66	1:00 PM	60	86	23*	"	
"	7-11-66	9:55 AM	53	62	13.9*	"	
"	8-15-66	10:35 AM	56	70	6.1*	"	
"	9-19-66	3:35 PM	56	76	10.0*	"	
"	11-4-66	3:50 PM	49	59	23.3*	"	Recent rain
Alder Cr.	6-22-65	10:10 AM	51	60	6.9*	Mouth	
"	7-12-65	10:55 AM	55	70	5.7*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Alder Cr.	8-17-65	10:00 AM	57	65	3.7*	Mouth	
"	9-14-65	9:35 AM	55	54	3.9*	"	
"	4-8-66	9:20 AM	48	49	28*	"	
"	6-15-66	12:50 PM	61	86	4.7*	"	
"	7-11-66	9:45 AM	53	62	3.5*	"	
"	8-15-66	10:30 AM	55	70	3.1*	"	
"	9-19-66	3:20 PM	60	76	3.0*	"	Recent rain
"	11-4-66	3:45 PM	51	59	14.3*	"	
Wolfe Cr.	6-18-65	1:00 PM	54	56	3.8*	Mouth	
"	7-20-65	12:30 PM	57	62	3.0*	"	
"	8-16-65	1:15 PM	61	71	1.8*	"	
"	9-13-65	1:15 PM	58	67	1.7	"	
"	4-8-66	11:30 AM	50	51	8.2*	"	
"	6-14-66	2:40 PM	65	78	2.7*	"	
"	7-11-66	2:20 PM	63	72	2.3*	"	
"	8-12-66	1:40 PM	61	82	1.4*	"	
"	9-20-66	12:45 PM	57	75	1.2*	"	Recent rain
Tillamook R.	8-26-64	3:55 PM	61	-	44.5*	200 yds. upstream from Bewley Cr.	
"	6-18-65	8:40 AM	54	53	35*	"	
"	7-12-65	1:45 PM	68	74	19.1*	"	
"	8-17-65	12:00 Noon	63	67	4.4*	"	
"	9-14-65	11:05 AM	60	55	3.5*	"	
"	3-25-66	1:45 PM	50	63	300*	"	
"	6-14-66	1:30 PM	65	75	39*	"	
"	7-11-66	12:50 PM	62	68	29*	"	
"	8-11-66	3:20 PM	71	78	4.3*	"	
"	9-19-66	2:18 PM	62	75	24.4*	"	Recent rain
"	11-4-66	1:40 PM	50	70	75	"	
Bewley Cr.	6-18-65	8:50 AM	55	53	6.6*	Mouth	
"	7-12-65	1:55 PM	59	74	1.9*	"	
"	8-17-65	12:30 PM	61	68	1.2*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Bewley Cr.	9-14-65	11:15 AM	58	55	0.6	Mouth	
"	3-25-66	2:05 PM	-	-	20	"	
"	6-14-66	1:40 PM	62	75	3.1*	"	
"	7-11-66	1:00 PM	58	68	2.6*	"	
"	8-11-66	3:30 PM	60	78	1.1*	"	
"	9-19-66	2:30 PM	57	75	2.1*	"	Recent rain
"	11-4-66	2:00 PM	51	70	11.4*	"	
Fawcet Cr.	6-18-65	9:15 AM	52	54	5.8*	Mouth	
"	7-12-65	1:35 PM	63	74	2.3*	"	
"	8-17-65	11:40 AM	59	67	1.1*	"	
"	9-14-65	10:35 AM	58	54	0.8	"	
"	3-25-66	2:30 PM	51	64	47*	"	
"	6-14-66	1:10 PM	64	75	9.0*	"	
"	7-11-66	12:25 PM	61	68	8.2*	"	
"	8-11-66	4:00 PM	66	78	0.5*	"	
"	9-19-66	1:50 PM	58	75	10.0*	"	Recent rain
"	11-4-66	1:10 PM	51	70	16.5*	"	
Killam Cr.	6-18-65	9:00 AM	53	53	5.6*	Mouth	
"	7-12-65	2:10 PM	60	74	1.1*	"	
"	8-17-65	11:50 AM	58	67	0.5	"	
"	3-25-66	2:20 PM	-	-	24	"	
"	6-14-66	2:05 PM	61	77	7.3*	"	
"	7-11-66	12:40 PM	57	68	2.4*	"	
"	8-11-66	3:40 PM	62	76	0.1	"	
"	9-19-66	2:05 PM	56	75	2.6	"	Recent rain
"	11-4-66	1:25 PM	51	70	11.0*	"	
Munson Cr.	6-18-65	9:30 AM	53	54	2.8*	0.2 mi. above mouth	
"	7-12-65	1:15 PM	62	74	1.6*	"	
"	8-17-65	11:30 AM	58	66	0.8	"	
"	3-25-66	2:50 PM	50	64	19*	"	
"	6-14-66	12:45 PM	63	75	1.9*	"	
"	7-11-66	12:00 Noon	60	67	2.7*	"	

Appendix II (continued)

Stream	Date	Time	Temp °F. Water	Air	Flow cfs	Location	Remarks
Munson Cr.	8-11-66	4:15 PM	65	78	1.2*	0.2 mi. above mouth	
"	9-19-66	1:30 PM	61	75	1.5*	"	Recent rain
"	11-4-66	12:40 PM	51	70	5.3*	"	
Simmons Cr.	6-18-65	9:25 AM	52	54	3.7*	0.2 mi. above mouth	
"	7-12-65	1:30 PM	60	74	2.0*	"	
"	8-17-65	11:35 AM	57	67	0.7*	"	
"	3-25-66	2:40 PM	51	64	23*	"	
"	6-14-66	12:55 PM	61	74	6.8*	"	
"	7-11-66	12:10 PM	57	67	3.9*	"	
"	8-11-66	4:10 PM	62	78	1.0*	"	
"	9-19-66	1:40 PM	57	75	1.9*	"	Recent rain
"	11-4-66	1:00 PM	50	70	11.0*	"	
Trask R.	6-8-65	10:50 AM	58	54		USGS gage 14-3025	
"	7-12-65	2:35 PM	-	75		"	
"	9-20-66	1:50 PM	-	80		"	Recent rain
Green Cr.	6-8-65	10:45 AM	51	54	0.8	0.4 mi. above mouth	
"	7-12-65	6:45 PM	58	70	0.2	"	
"	8-17-65	4:45 PM	58	82	less than 0.1	"	
"	9-14-65	11:55 AM	57	56	0.3	"	
"	5-4-66	6:55 PM	-	57	1.2	"	
"	6-9-66	5:30 PM	56	66	0.5	"	
"	7-8-66	7:00 AM	52	53	0.6	"	
"	8-11-66	3:05 PM	56	85	0.3	"	
"	9-20-66	1:45 PM	54	80	0.6	"	Recent rain
N.Fk. Trask R.	6-8-65	1:15 PM	57	57	95*	0.5 mi. above mouth	
"	7-22-65	-	-	-	52	"	
"	8-17-65	2:45 PM	70	82	30*	"	
"	9-14-65	1:20 PM	60	58	49*	"	
"	5-4-66	5:15 PM	61	68	170	Mouth	
"	6-9-66	2:45 PM	58	74	67*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
N.Fk. Trask R.	7-8-66	10:15 AM	59	64	63*	Mouth	Rough measurement
"	8-11-66	12:40 PM	64	78	34*	"	
"	9-20-66	2:50 PM	62	80	30*	"	Recent rain
Bark Shanty Cr.	6-8-65	1:15 PM	53	58	16.3*	Mouth	
"	5-4-66	2:30 PM	57	64	17.5*	"	
"	6-9-66	3:20 PM	61	73	7.3*	"	
"	7-8-66	7:45 PM	52	54	7.6*	"	
"	8-11-66	1:05 PM	58	77	4.0*	"	
"	9-20-66	3:10 PM	57	80	3.5*	"	Recent rain
Clear Cr.	6-8-65	2:15 PM	56	58	9.3*	Mouth	
"	7-12-65	5:00 PM	64	75	4.5*	"	
"	8-17-65	3:45 PM	69	84	2.6*	"	
"	9-14-65	1:50 PM	60	59	1.9*	"	
"	5-4-66	4:35 PM	59	69	10*	"	
"	6-9-66	4:35 PM	62	71	6.1*	"	
"	7-8-66	8:50 AM	53	57	6.4*	"	
"	8-11-66	1:35 PM	65	79	2.4*	"	
"	9-20-66	3:35 PM	63	80	2.3*	"	Recent rain
M.Fk. of N.Fk. Trask R.	6-8-65	3:00 PM	59	62	48*	0.2 mi. upstream from mouth of N.Fk. of N.Fk.	
"	7-12-65	5:30 PM	68	75	26*	"	
"	8-17-65	4:00 PM	70	85	18.7*	"	
"	9-14-65	2:20 PM	59	59	15.4*	"	
"	5-4-66	3:30 PM	62	71	62*	"	
"	6-9-66	4:15 PM	62	72	35*	"	
"	7-8-66	8:30 AM	53	55	31.4*	"	
"	8-11-66	2:00 PM	63	81	17.5*	"	
"	9-20-66	4:00 PM	60	80	18.1*	"	Recent rain
N.Fk. of N.Fk. Trask R.	6-8-65	2:45 PM	58	60	17*	Mouth	
"	7-12-65	5:20 PM	66	75	8.1*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
N.Fk. of N.Fk. Trask R.	8-17-65	3:55 PM	70	85	6.2*	Mouth	
"	9-14-65	2:10 PM	60	59	5.1*	"	
"	5-4-66	4:10 PM	59	70	44*	"	
"	6-9-66	4:05 PM	63	73	12.9*	"	
"	7-8-66	8:40 AM	53	55	9.9*	"	
"	8-11-66	1:45 PM	64	81	4.8*	"	
"	9-20-66	3:50 PM	64	80	4.5*	"	Recent rain
S.Fk. Trask R.	6-8-65	12:45 PM	54	56	102*	0.2 mi. above mouth	
"	7-12-65	4:00 PM	65	75	44.8*	"	
"	8-17-65	2:10 PM	63	78	33.8*	"	
"	9-14-65	1:05 PM	57	58	34.7*	"	
"	5-4-66	5:50 PM	59	65	58*	150 yds. above E.Fk. of South Fk.	
"	6-9-66	2:30 PM	62	74	29*	"	
"	7-8-66	9:40 AM	53	63	35*	"	
"	8-11-66	12:10 PM	56	68	15*	"	
"	9-20-66	2:20 PM	58	80	13.5*	"	Recent rain
E.Fk. of S.Fk. Trask R.	6-8-65	11:45 AM	56	55	49*	0.2 mi. above mouth	
"	7-12-65	3:10 PM	65	75	29.6*	"	
"	8-17-65	1:45 PM	63	77	18.4*	"	
"	9-14-65	12:25 PM	58	57	15	"	
"	5-4-66	5:35 PM	61	67	52*	"	
"	6-9-66	2:20 PM	64	74	29*	"	
"	7-8-66	9:50 AM	55	63	23.7*	"	
"	8-11-66	12:20 PM	60	70	15*	"	
"	9-20-66	2:35 PM	60	80	11.2*	"	Recent rain
Edwards Cr.	6-8-65	11:30 AM	53	55	11.5*	Mouth	
"	7-12-65	3:25 PM	65	75	5.8*	"	
"	8-17-65	2:25 PM	66	80	2.9*	"	
"	9-14-65	12:35 PM	58	58	2.1*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Edwards Cr.	5-4-66	6:00 PM	57	63	18*	Mouth	
"	6-9-66	2:10 PM	63	74	8.3*	"	
"	7-8-66	9:30 AM	53	62	8.9*	"	
"	8-11-66	12:00 Noon	60	68	4.0*	"	
"	9-20-66	2:10 PM	59	80	7.4*	"	Recent rain
Wilson R.	8-26-64	11:50 AM	64	60		USGS gage 14-3015	
"	6-8-65	5:50 PM	59	57		"	
"	5-5-66	11:20 AM	57	60		"	
"	9-16-66	1:00 PM	-	65		"	Recent rain
Cedar Cr.	6-17-65	2:05 PM	54	61	17.1*	0.1 mi. above mouth	
"	7-13-65	3:34 PM	66	77	10.6*	"	
"	8-18-65	3:50 PM	63	71	8.1*	"	
"	9-14-65	5:10 PM	57	56	5.2*	"	
"	5-5-66	12:50 PM	54	75	23*	"	
"	6-10-66	10:55 AM	54	57	15.3*	"	Recent moderate rainfall
"	7-8-66	11:50 AM	58	71	9.0*	"	
"	8-10-66	1:00 PM	61	70	7.0*	"	
"	9-16-66	2:10 PM	57	70	4.8*	"	Recent rain
Devil's Lake Fk.	6-17-65	11:45 AM	55	58	19.5*	0.3 mi. above mouth	
"	7-13-65	4:25 PM	66	77	9.9*	"	
"	8-18-65	4:45 PM	70	75	5.6*	"	
"	9-14-65	4:25 PM	57	57	6.2*	"	
"	5-5-66	3:15 PM	58	76	56*	"	
"	6-10-66	12:15 PM	56	62	21.4*	"	Recent moderate rainfall
"	7-8-66	1:00 PM	62	76	10.8*	"	
"	8-10-66	2:20 PM	66	79	5.2*	"	
"	9-16-66	3:15 PM	60	75	8.0*	"	Recent rain
Elk Cr.	6-8-65	12:15 PM	55	58	7.4*	0.2 mi. above mouth	
"	7-13-65	4:10 PM	68	77	4.5*	"	
"	8-18-65	4:25 PM	69	75	2.2*	"	
"	9-14-65	4:35 PM	58	57	1.0*	"	

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
Elk Cr.	5-5-66	2:35 PM	54	76	27*	0.2 mi. above mouth	
"	6-10-66	12:05 PM	55	62	6.4*	"	Recent moderate rainfall
"	7-8-66	12:50 PM	58	75	4.0*	"	
"	8-10-66	2:10 PM	69	78	4.0	"	
"	9-16-66	3:00 PM	61	74	2.9*	"	Recent rain
Fall Cr.	6-8-65	5:30 PM	53	58	6	Mouth	
"	7-13-65	2:10 PM	57	73	2	"	
"	8-18-65	3:05 PM	58	67	1.5	"	
"	5-5-66	11:40 AM	-	61	7*	"	
"	6-10-66	10:15 AM	52	58	5.3*	"	Recent moderate rainfall
"	7-8-66	11:20 AM	57	68	2.9*	"	
"	9-16-66	1:10 PM	54	65	1.5*	"	Recent rain
Jordan Cr.	6-8-65	4:50 PM	56	58	40*	Mouth	
"	7-13-65	2:30 PM	65	74	18.4*	"	
"	8-18-65	3:30 PM	67	69	10.1*	"	
"	9-14-65	3:25 PM	58	59	10.2*	"	
"	5-5-66	12:15 PM	56	69	48*	"	
"	6-10-66	10:30 AM	57	58	26.6*	"	Recent moderate rainfall
"	7-8-66	11:30 AM	58	69	22.6*	"	
"	8-10-66	12:40 PM	62	70	10.9*	"	
"	9-16-66	1:25 PM	57	68	10.0*	"	Recent rain
Little North Fk.	6-8-65	6:00 PM	54	57	54*	0.3 mi. above mouth	
"	7-13-65	1:45 PM	66	73	17.3*	"	
"	8-18-65	2:45 PM	61	67	13.7*	"	
"	5-5-66	11:00 AM	-	-	47*	"	
"	6-10-66	9:55 AM	56	57	46*	"	Recent moderate rainfall
"	7-8-66	11:00 AM	59	65	25.7*	"	
"	8-10-66	12:15 PM	63	65	10.8*	"	
"	9-16-66	12:50 PM	58	65	10.0*	"	Recent rain

Appendix II (continued)

Stream	Date	Time	Temp. °F. Water	Air	Flow cfs	Location	Remarks
N.Fk. Wilson R.	6-17-65	2:30 PM	57	65	35*	0.5 mi. above mouth	
"	7-13-65	3:10 PM	66	75	19.2*	"	
"	8-18-65	4:15 PM	68	75	13.9*	"	
"	9-14-65	4:00 PM	59	59	11.8*	"	
"	5-5-66	2:15 PM	57	75	61*	"	
"	6-10-66	11:10 AM	56	58	22.2*	"	Recent moderate rainfall
"	7-8-66	12:10 PM	59	73	24.7*	"	
"	8-10-66	1:25 PM	66	75	13.5*	"	
"	9-16-66	2:25 PM	59	73	11.1*	"	Recent rain
S.Fk. Wilson R.	6-17-65	12:35 PM	55	61	17*	0.3 mi. above mouth	
"	7-13-65	4:00 PM	69	77	7.9*	"	
"	8-18-65	4:35 PM	70	75	3.5*	"	
"	9-14-65	4:45 PM	58	57	4.7*	"	
"	5-5-66	2:50 PM	58	76	43*	"	
"	6-10-66	11:55 AM	55	61	21*	"	Recent moderate rainfall
"	7-8-66	12:40 PM	63	75	11.8*	"	
"	8-10-66	2:00 PM	68	78	6.1*	"	
"	9-16-66	2:40 PM	60	74	5.2*	"	Recent rain

Appendix III. Miscellaneous water and air temperature records for streams of the North Coast Basin

Type of instrument Recording thermometers Stream or impoundment Necanicum River Location One-half mile above tidewater at Necanicum Park on right bank. Dates covered 5-18-65 through 10-26-65 Source OSGC

	May				June				July				August			
	Water		Air		Water		Air		Water		Air		Water		Air	
Day	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1					64	52			61	57	61	52	64	60	62	55
2					59	55			59	56	58	52	60	58	59	57
3					58	55			60	57	58	51	62	57	60	56
4					61	54			61	57	60	52	66	60	64	54
5					63	57			60	56	54	51	68	62	68	54
6					65	58			61	56	62	50	69	61	68	50
7					63	57			60	58	58	54	68	62	62	52
8					61	56			59	57	58	52	64	62	60	55
9					60	54			58	56	57	51	69	61	67	55
10					60	54			58	56	56	52	70	63	67	55
11									62	56	62	52	68	63	64	55
12									64	59	65	54	62	60	58	54
13									65	58	66	50	-	-	-	-
14									67	61	64	54	64	-	67	-
15									67	63	63	53	62	60	63	55
16									63	61	60	53	64	59	64	57
17									65	60	61	50	66	60	65	55
18	57	-							65	59	62	48	61	59	59	55
19	54	51							64	59	61	47	59	57	59	57
20	53	50							61	60	57	54	60	56	63	56
21	52	50							62	58	59	51	62	58	64	56
22	51	50							63	59	60	53	62	60	62	57
23	52	49							66	59	69	53	62	59	66	56
24	55	49							67	60	66	50	63	58	67	55
25	58	50			-	-	-	-	65	61	62	55	61	57	63	53
26	58	52			56	53	54	48	61	58	58	53	63	59	64	55
27	60	54			59	51	65	43	62	57	65	48	62	57	63	51
28	60	54			62	55	69	48	64	56	66	46	60	55	61	49
29	57	54			59	58	60	53	66	58	67	52	61	54	61	46
30	59	53			62	55	66	48	65	60	64	54	63	54	72	44
31	57	53							65	58	63	51	64	55	73	48
Ave.	55.9	51.5			60.8	54.9	62.8	48.0	62.8	58.2	61.5	51.5	63.6	58.8	63.8	53.7

Appendix III (continued)

Type of instrument Recording thermometers Stream or impoundment Necanicum River Location One-half mile above tidewater at Necanicum Park on right bank. Dates covered 5-18-65 through 10-26-65 Source OSGC

	September				October			
	Water		Air		Water		Air	
Day	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	65	57	63	54				
2	61	59	59	54				
3	63	57	62	51				
4	63	59	60	51				
5	62	58	60	50				
6	65	56	71	47				
7	64	55	65	46				
8	62	59	57	51	59	56	63	51
9	61	59	57	54	59	56	59	47
10	61	58	58	52	57	54	58	45
11	60	58	55	53	57	55	56	53
12	62	58	60	52	56	55	54	52
13	61	58	57	52	58	56	58	51
14	60	59	56	54	57	54	53	49
15	60	58	55	51	52	50	53	44
16	60	56	61	45	51	49	50	41
17	57	53	58	41	55	51	57	56
18	59	52	63	41	52	51	53	47
19	60	53	61	42	53	50	57	50
20	60	54	62	45	56	52	60	48
21	57	56	55	53	55	51	67	46
22	63	56	66	51	54	51	65	48
23	65	57	75	49	55	50	67	46
24	65	56	75	48	56	52	65	49
25	60	57	59	49	55	52	64	50
26					54	52	61	47
27								
28								
29								
30								
31								
Ave.	61.4	56.7	61.2	49.4	55.3	52.5	58.9	48.4

Appendix III (continued)

Type of instrument Recording thermometer Stream or impoundment Nehalem River Location Two hundred yards above Cook Creek on right bank near USGS gage 14-3010. Dates covered 5-18-65 through 10-26-65 Source OSGC

Day	May Max.	May Min.	June Max.	June Min.	July Max.	July Min.	August Max.	August Min.	September Max.	September Min.	October Max.	October Min.
1			62	53	-	-	71	69	67	62	66	54
2			65	54	65	62	70	68	66	64	63	55
3			62	54	67	59	68	67	66	62	62	59
4			60	52	64	60	70	65	67	58	59	57
5			62	56	67	58	74	62	67	62	60	58
6			60	56	68	59	74	64	67	58	62	60
7			60	54	75	64	69	64	67	56	60	54
8			60	58	70	68	70	65	62	56	54	51
9			64	59	68	65	71	66	62	61	52	48
10			65	58	62	59	72	66	67	61	58	51
11			62	58	64	61	74	69	64	61	58	57
12			60	55	63	59	71	67	65	62	59	57
13			58	54	66	58	71	67	62	59	60	58
14			58	56	64	58	74	67	63	61	65	57
15			-	56	70	64	75	67	62	60	63	60
16			-	-	72	68	75	65	59	53	61	57
17			-	-	74	64	72	65	59	51	55	51
18	58	-	-	-	70	66	70	67	61	51	52	49
19	55	54	-	-	68	62	70	69	61	53	-	-
20	55	53	-	-	68	62	70	68	65	54	59	-
21	56	52	-	-	67	66	71	68	62	59	58	51
22	55	53	63	-	68	65	72	67	69	61	58	51
23	54	52	64	60	72	65	70	67	71	61	58	51
24	55	52	62	56	78	65	71	67	72	60	58	52
25	57	52	61	56	74	68	70	67	67	59	59	52
26	62	50	61	59	70	68	69	66	63	62	57	52
27	58	54	63	54	68	66	66	63	62	57		
28	60	54	67	57	69	62	66	61	61	55		
29	58	56	68	60	77	60	66	58	63	59		
30	57	55	70	60	72	67	69	57	64	55		
31	56	54			74	67	69	59				
Ave.	56.9	53.2	62.4	54.0	69.3	63.3	70.6	65.3	64.4	58.4	59.0	54.2

Remarks: Readings of the instrument were somewhat inconsistent with hand thermometer readings. Compensations were made but extreme accuracy is questionable (probably always within two degrees.)

Appendix III (continued)

Type of instrument Minimum-maximum thermometer Stream or impoundment Nestucca River Location Two hundred yards above Niagara Creek on left bank, river mile 29.7 Dates covered 5-19-65 through 9-13-65 Source OSGC

Day	May Max.	May Min.	June Max.	June Min.	July Max.	July Min.	August Max.	August Min.	September Max.	September Min.
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13			57	45						
14									61	53
15										
16										
17							73	55		
18			64	48						
19	Installed									
20										
21					61	47				
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
Ave.			60.5	46.5	61.0	47.0	73.0	55.0	61.0	53.0

Appendix III (continued)

Type of instrument Recording thermometer Stream or impoundment N. Fk. Trask R. Location Two hundred yards above Bark Shanty Cr. on left bank. Dates covered 5-19-65 to 10-15-65 Source OSGC

Day	May Max.	May Min.	June Max.	June Min.	July Max.	July Min.	August Max.	August Min.	September Max.	September Min.	October Max.	October Min.
1			63	50	72	61	69	65	66	58	57	52
2			65	53	75	62	65	62	62	58	56	53
3			65	54	73	63	68	61	65	57	55	53
4			65	55	74	61	72	61	63	56	54	53
5			66	55	74	62	74	62	64	57	57	54
6			66	55	75	63	75	64	64	58	58	55
7			66	55	72	62	74	64	63	56	58	55
8			57	56	65	61	69	63	60	56	59	56
9			66	54	61	58	73	64	58	57	59	57
10			64	56	63	58	70	63	63	56	57	53
11			60	56	66	58	67	63	60	57	57	54
12			63	53	70	58	64	61	61	56	57	55
13			57	54	73	60	71	60	60	57	58	55
14			56	53	72	62	71	61	60	58	56	53
15			57	53	75	62	72	61	59	57	53	52
16			65	52	75	63	72	61	57	54		
17			60	55	73	62	72	63	57	52		
18			55	54	72	60	71	63	56	51		
19	53	-	66	53	68	58	65	62	56	51		
20	53	49	68	56	63	60	65	60	58	52		
21	54	50	68	57	66	59	68	61	57	55		
22	51	50	68	57	71	58	70	61	60	55		
23	52	48	68	58	73	60	67	61	59	55		
24	55	49	68	57	74	62	68	61	60	55		
25	59	50	61	57	69	63	64	60	58	55		
26	61	51	59	56	67	64	65	59	56	55		
27	62	52	65	53	73	61	63	59	-	-		
28	62	53	66	57	75	62	63	56	57	-		
29	57	53	72	60	75	65	63	55	58	54		
30	55	52	72	61	77	65	63	55	57	53		
31	55	51			74	67	65	56				
Ave.	56.1	50.7	63.7	55.2	71.1	61.3	68.3	60.9	59.8	55.4	56.7	54.0

Appendix III (continued)

Temperature (°F) of water, Nestucca River near Beaver, Oregon, October 1964 to September 1965 1/

	October		November		December		January		February		March		April		May		June		July		August		September	
Day	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
1			52	52	48	48	43	43	46	45	43	43	47	47	52	50	58	52	67	64	70	65	63	60
2			52	52	48	48	43	43	45	45	43	43	47	45	50	49	62	55	69	63	65	63	63	62
3			52	51	48	47	43	43	45	45	43	43	48	46	49	49	61	58	68	63	65	62	62	60
4			52	52	47	47	43	43	46	45	43	43	48	48	49	49	62	57	70	63	68	62	62	58
5			52	50	47	47	43	43	46	45	43	43	48	48	49	48	62	58	70	64	70	63	62	60
6			50	48	47	46	43	43	45	44	43	43	48	46	48	46	62	58	70	64	70	64	63	59
7			48	48	46	46	44	43	45	45	43	43	46	46	50	48	62	58	69	65	69	65	62	58
8			48	48	46	46	44	44	45	45	43	43	47	46	52	49	60	56	65	62	68	65	62	60
9			48	48	47	46	44	44	45	45	44	43	48	47	56	52	62	55	63	59	70	65	60	59
10			48	48	47	46	44	44	45	44	44	44	48	48	56	52	62	58	61	59	70	66	62	58
11			48	48	46	45	44	44	44	44	44	44	49	47	57	53	61	58	64	59	68	66	62	61
12			48	46	45	44	44	44	45	44	44	44	50	49	57	54	59	54	68	61	66	64	61	58
13	57	55	46	44	44	44	44	44	45	45	44	44	50	50	56	53	58	55	69	63	67	62	60	59
14	56	56	45	44	44	44	44	44	45	44	44	44	50	49	55	52	56	54	71	65	69	63	59	59
15	56	55	45	44	44	44	44	44	44	44	44	44	50	50	55	53	56	55	70	66	70	64	59	59
16	55	53	44	44	44	40	44	44	44	43	44	43	50	50	53	52	59	54	71	65	69	65	59	58
17	53	51	44	44	40	37	44	44	44	43	43	43	50	50	53	51	59	58	71	66	69	65	58	54
18	51	50	44	44	37	37	44	44	44	44	43	42	50	50	55	52	58	55	69	63	68	65	56	54
19	52	51	44	43	38	37	44	44	44	44	42	42	50	50	54	53	61	54	68	63	65	63	56	54
20	52	51	43	42	39	38	44	44	44	43	42	42	50	50	53	52	65	59	66	63	63	62	56	54
21	52	51	42	42	43	39	44	44	43	43	43	42	50	50	52	51	65	60	67	61	65	62	56	56
22	52	51	43	42	44	43	44	44	43	43	44	43	50	49	52	51	65	59	68	61	67	64	61	56
23	51	51	46	43	44	44	44	44	43	43	45	44	50	50	51	50	63	60	72	63	67	64	62	58
24	51	51	48	46	45	44	44	44	43	42	45	44	50	50	50	50	64	58	71	66	67	64	62	59
25	51	51	48	48	45	45	45	44	42	42	44	43	53	50	55	50	61	59	71	66	66	64	62	59
26	51	48	48	46	45	45	46	45	43	42	43	43	56	52	57	52	60	56	67	64	64	63	60	59
27	48	48	46	46	45	44	46	46	43	43	44	43	56	54	58	54	62	55	66	60	65	62	59	58
28	50	48	46	46	44	43	46	46	43	43	44	44	55	54	59	55	65	58	69	61	64	60	58	58
29	51	50	46	46	45	45	46	46	-	-	44	44	54	52	58	55	69	62	69	64	63	58	58	58
30	52	51	48	46	43	42	46	46	-	-	46	44	54	52	55	54	69	64	70	66	64	58	58	55
31	52	52	-	-	43	42	46	46	-	-	47	46	-	-	54	53	-	-	71	66	63	57	-	-
Ave.																								
Range			47	46	44	44	44	44	44	44	44	43	50	49	54	51	62	57	68	63	67	63	60	58

1/ Water temperature records furnished by U. S. Department of the Interior, Geological Survey, Water Resources Division.

Appendix III (continued)

Temperature (°F) of water, Trask River near Tillamook, October 1964 to September 1965 1/

Day	October		November		December		January		February		March		April		May		June		July		August		September	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
1	56	54	52	52	48	48	41	40	46	44	46	44	51	49	52	50	58	52	66	62	66	63	64	49
2	55	54	52	51	48	48	41	40	45	44	45	44	49	46	51	49	61	55	67	62	64	62	64	49
3	54	52	51	50	48	47	41	40	46	45	45	42	50	46	50	49	61	57	66	62	63	60	64	49
4	54	52	51	50	47	46	41	41	46	46	47	44	50	47	50	49	60	56	67	62	66	60	64	49
5	55	53	51	48	47	46	42	41	46	45	47	44	50	48	49	47	62	56	67	62	66	60	64	49
6	55	53	48	46	47	45	42	42	45	44	47	44	48	45	52	46	62	58	67	62	67	61	64	49
7	54	54	47	46	46	46	42	41	46	44	48	44	48	46	53	47	62	57	66	63	66	62	64	49
8	56	54	47	46	48	46	42	42	46	45	47	44	49	48	54	48	60	55	64	60	65	61	64	49
9	56	55	48	46	48	47	42	41	45	44	48	45	50	49	56	51	62	54	60	57	68	62	64	49
10	56	54	48	48	47	46	42	42	46	44	48	45	49	48	57	53	60	57	58	56	66	64	64	49
11	56	53	48	47	46	44	42	41	46	44	48	45	51	47	58	52	60	57	64	57	66	62	64	49
12	57	54	47	45	44	44	41	41	46	45	48	46	52	49	57	54	58	53	66	60	64	61	64	49
13	56	56	45	44	44	44	42	41	46	46	47	44	52	50	57	53	57	54	67	61	66	60	64	49
14	56	56	45	44	44	44	43	42	46	44	47	43	53	49	56	51	54	53			67	61	64	49
15	56	54	44	42	44	43	44	43	45	44	48	45	53	51	54	52	55	54			66	61	64	49
16	54	52	42	42	43	37	44	43	46	45	48	46	52	50	53	51	60	53			66	62	64	49
17	52	50	43	42	37	36	43	42	48	46	46	45	51	49	54	50	59	55			66	62	64	49
18	50	49	43	42	38	36	43	42	48	46	46	43	51	49	55	50	55	54			66	62	64	49
19	50	49	42	41	39	38	44	43	47	47	45	42	51	50	55	52	60	53			62	62	64	49
20	50	49	41	41	41	39	45	44	47	46	48	44	51	50	52	50	63	57			62	60	64	49
21	50	49	41	41	43	41	45	44	46	44	49	47	51	49	54	50	62	58					64	49
22	50	49	45	41	46	43	44	43	45	44	49	48	52	49	53	50	61	56					64	49
23	49	48	47	45	46	45	44	43	45	44	49	47	51	49	50	49	59	57					64	49
24	50	49	48	47	45	45	44	42	46	44	48	44	54	51	52	50							64	49
25	50	48	47	47	45	45	43	42	47	44	46	44	56	52	56	50							64	49
26	48	46	47	45	45	44	45	43	47	46	47	45	58	54	57	52							64	49
27	47	46	45	45	44	43	45	45	47	45	47	45	58	54	58	54							64	49
28	50	47	46	45	43	42	46	45	45	44	47	46	56	54	58	54							64	49
29	51	50	47	46	42	41	47	46	-	-	49	47	56	52	58	54			68	62			64	49
30	52	51	48	47	41	40	48	47	-	-	51	48	54	52	55	54			69	63			64	49
31	52	52	-	-	40	40	47	46	-	-	51	50	-	-	54	51	-	-	68	64				
Ave. Range	53	51	47	45	44	43	43	43	46	45	47	45	52	49	54	51								

Note: Temp. inlet out of water or nearly out of water June 24-30, July 14-28, August 21 to September 30.
1/ Water temperature records furnished by U. S. Department of the Interior, Geological Survey, Water Resources Division.

Appendix IV. Monthly maximum, mean, and minimum water temperatures for years of record on some streams in the North Coast Basin 1/

Stream			Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Location
Clatskanie R.	1950-54	Mean	51	45	43	42	42	43	47	54	57	62	62	58	2 miles below
		Max.-Min.	59 41	52 33	49 35	48 35	48 37	50 38	56 39	65 46	71 49	75 52	73 53	66 49	Carcus Cr.
Gnat Cr.	1960-62	Mean	48	45	43	42	44	43	46	48	53	55	56	53	2 miles above
		Max.-Min.	54 43	50 38	46 36	46 34	48 35	48 37	50 42	56 45	58 48	61 50	59 52	59 50	Big Noise Cr.
Big Cr.	1950-55	Mean	51	47	45	43	43	43	46	50	52	56	56	54	0.3 mile below
		Max.-Min.	56 46	53 39	48 38	48 37	47 38	47 37	51 41	55 43	61 47	61 50	62 51	60 47	Mill City Cr.
Young's R.	1947-58	Mean	51	46	44	43	45	45	48	52	55	61	61	56	
		Max.-Min.	60 42	52 37	50 38	49 34	51 32	50 35	57 43	64 44	67 44	70 47	69 49	65 47	River Mile 9.4
North Fork Klaskanine R.	1950-55	Mean	51	46	45	43	43	43	47	50	54	57	58	56	2 miles above N.
		Max.-Min.	59 43	52 34	48 34	48 37	48 36	49 35	53 41	60 42	65 46	65 51	65 51	66 47	Fk. of N. Fk.
Nehalem R.	1947-62	Mean	53	45	44	44	44	44	48	55	61	66	67	62	0.2 mile above
		Max.-Min.	66 44	52 36	54 37	50 35	50 34	49 34	57 43	69 47	76 48	78 48	77 58	73 51	Cook Cr.
Wilson R.	1947-62	Mean	53	46	44	44	44	45	49	54	58	64	65	61	1 mile above
		Max.-Min.	63 43	53 38	52 39	50 36	50 35	50 36	57 42	68 46	74 45	76 47	75 56	72 50	Little North Fork
Trask R.	1947-62	Mean	54	47	45	43	45	45	48	53	59	64	64	61	0.6 mile above
		Max.-Min.	62 45	54 39	51 39	50 34	51 35	50 35	57 42	63 44	69 47	76 50	73 58	69 52	Gold Cr.
Cedar Cr.	1943-62	Mean	50	46	45	43	44	45	48	50	51	54	54	53	
		Max.-Min.	57 41	53 35	50 36	49 34	49 38	53 38	56 42	57 43	60 41	62 47	60 47	60 44	Mouth

1/ Temperature records furnished by spot observations and temperature correlation adjustments by U. S. Geological Survey and miscellaneous records of the Oregon State Game Commission. Data was compiled by the U. S. Department of the Interior, Geological Survey and recorded in their publication entitled "Compilation of Water-Temperature Data for Oregon Streams", 1964.

Appendix V. Biological requirements of fish

A stream must present certain physical characteristics and provide water of adequate quantity and quality in order to support a population of fish. The requirements for salmon and steelhead are reviewed in this appendix. Conditions suitable for these anadromous fish will also accommodate resident trout.

Habitat preferences

Species of fish differ in their requirements or preferences for habitat. Some are best adapted to riffles, while others use pools extensively. Since production of food organisms is highest in riffles, best production of fish is achieved with a balanced combination of riffles and pools. The gradient of a stream in combination with the flow governs the ratio between riffles and pools. In a reach of a given gradient, a discharge that creates a strong flowing riffle situation would not be suitable for a quiet-water fish. On the other hand, a small flow that reduces the stream to a series of pools, virtually eliminates habitat for the riffle dwellers. Therefore, consideration must be taken in each particular reach of stream so that stream flows will be maintained that provide habitat best suited for the species in question.

Spawning

Salmon and trout must have gravel for spawning. For salmon and steelhead, gravel should range between 1/4 inch and 6 inches in diameter with extremes in sizes being least desirable. Chinook salmon normally select slightly larger gravel than do coho and steelhead, while anadromous cutthroat and resident trout choose the smaller gravels. Gravel must be relatively free of sand and silt, and must not be seriously compacted. Excessive sand and silt create adverse conditions for eggs and fry in the gravel by causing low intragravel

flows which in turn result in decreased supplies of dissolved oxygen for respiration. Large amounts of fine material can also reduce survival of fry because it fills the gravel interstices thus blocking their emergence route out of the spawning bed. Adequate depth of gravel is necessary for construction of a redd or nest by the female fish. Chinook salmon dig slightly deeper redds than do the coho salmon and steelhead. Redd depths may vary from approximately 6 to 15 inches.

Salmon and steelhead require about two months to hatch and another month to emerge from the gravel after hatching. This is primarily controlled by the prevailing water temperatures. Suitable water temperatures for spawning range from about 42 to 55 F.

The dissolved oxygen requirement for egg survival in the gravel is higher (8 ppm) than for fish after hatching (5 ppm). To meet the greater demand of eggs, clean permeable gravel is required to insure adequate flow of intra-gravel water.

Biologists have made measurements at numerous redds of the three species concerned. From the results of these studies, water depth and velocity criteria have been determined for proper spawning conditions. Minimum water depth for chinook salmon spawning is 0.8 foot, while coho salmon and steelhead require at least 0.6 foot. Proper velocities for spawning by all three species range between 1.0 and 2.5 feet per second as measured 0.4 foot from the bottom.

Rearing

The most critical time in the fresh water life of young salmonids is the period of low flow during the summer. Depending on the species, up to 3 years is spent in fresh water before migrating to the ocean. To support the young

fish during this period, the stream must contain sufficient flow to provide food, shelter, and a suitable medium in which to live.

Food: Juvenile salmon and steelhead feed primarily on immature aquatic insects. Production of these organisms is confined almost entirely to riffle areas. The best producing riffles are those composed of large gravel or rubble. Clean, well-aerated water flowing over these areas is necessary for proper maintenance of these food forms.

Shelter: Shelter has been described as any place a fish will seek when frightened or disturbed. Such places may be found within riffles, but are usually associated with deeper pool areas. Shelter is necessary not only for fish to escape their enemies, but to avoid psychological stress.

Suitable medium: A suitable medium in which to live refers primarily to water quality requirements. Good rearing water is high in dissolved oxygen (above 5 ppm), with temperatures not exceeding 65 F for extended periods, low in turbidity, and not greatly acid or alkaline.

High water temperatures contribute to mortalities by simply exceeding the tolerances of salmonids. Water loses its capacity to hold dissolved oxygen as its temperature increases, yet the metabolic rate and resultant oxygen requirement of cold-blooded animals is greater at higher temperatures. In addition, water temperatures above the optimum for salmonids are often ideal for competing species of undesirable fish. The incidence of disease frequently increases with rising temperatures. Turbid waters generally cause greater damage to fish habitat than to fish themselves, primarily from the siltation of food-producing and spawning areas. Heavy silt loads, however, can injure the gills and other tender structures and

result in mortality. Water that is far from neutral, either acid or alkaline, interferes with the physiology of fish.

Adequate summer stream flows play a vital part in meeting each of the three basic rearing requirements. Without an adequate flow, any or all of the conditions may be seriously limited and result in a substantially decreased fish production.

Passage

By definition, anadromous fish migrate between the ocean and fresh water. To complete this cycle, the fish must have adequate stream flow for passage. As upstream migrants, adult salmon and steelhead require a portion of the stream cross-section to have sufficient depth so passage will not be impeded. Minimum depths of 0.8 foot for chinook, and 0.6 foot for coho and steelhead are recommended as desirable passage conditions. Abrupt reduction in stream flow exceeding 1 cfs may cause some retardation of upstream passage.

The juvenile fish in fresh water must have enough water for intra-stream movement during their rearing period; a minimum stream depth of 0.1 - 0.2 foot is required throughout the year. Flows adequate to insure good survival of juveniles on their seaward migration are greater than those required for intra-stream movement, but this is usually no problem because the downstream migration normally takes place during seasons of higher flows.

Appendix VI. Oregon State Game Commission fish stocking in the North Coast Basin, 1961-65 1/ 2/

Stream system or lake	Species 3/	Size 4/	1961	1962	1963	1964	1965
Bear Cr.	St	F	64,188	23,998			15,000
" "	Co	F	50,003				
Bear Cr., W. Fk.	St	F				5,196	
Beaver Cr. (Nestucca)	Ct	L	500	400			
Beaver Cr., E. Fk.	Ct	L	202	602	1,400	502	496
Beaver Cr. (Columbia)	Ct	L	1,000	1,500	996	996	998
Big Cr.	St	F	33,451	21,891	15,000	14,993	
" "	Ct	L	4,000	399	4,999	2,896	2,497
Cedar Cr.	St	F	11,035	10,037			
" "	St	L			13,295		
Clatskanie R.	Ct	L	1,496	1,798	1,499	1,198	998
" "	St	F			25,004	30,926	89,845
Cook Cr.	Ct	L		1,323	1,500	501	502
Crooked Cr. (Nehalem)	St	F	2,503				
" " "	Ct	F		3,035			
Elk Cr.	Ct	L	1,002	1,200	1,199	500	502
Gnat Cr.	Co	F			19,992		
" "	St	F		23,429	24,996	41,802	38,517
Kilchis R.	Ct	L	2,205	3,024	3,450	1,900	2,297
" "	Ct	F		2,423			
Lewis & Clark R.	Co	F	44,695		60,719	57,045	88,293
" " "	Ct	L	5,026	4,013	3,799	2,999	1,998
" " "	St	F			32,111	24,953	59,744

Appendix VI (continued)

Stream system or lake	Species 3/	Size 4/	1961	1962	1963	1964	1965
Little Nestucca R.	Ct	L	2,003	2,000	3,102	2,898	1,700
" " "	Ct	F		4,463			
" " "	St	F				12,960	
Miami R.	Ct	L	1,706	1,898	2,298	1,502	1,700
Necanicum R.	Ct	L	21,317	20,258	26,496	18,878	20,697
" "	St	F		1,382		20,103	19,989
Nehalem R.	Ct	L	10,198	9,097	14,472	9,502	9,501
" "	St	F				50,883	56,917
Nehalem R., E. Fk.	St	F					14,990
" " " "	Ct	F		2,040			
Nehalem R., N. Fk.	Ct	L	4,015	3,016	4,001	3,849	4,001
" " " "	St	F				14,000	9,996
Neskowin Cr.	Ct	L	802	998	1,301	899	1,002
Nestucca R.	St	F	34,696	117,014	43,248	58,394	53,790
"	St	L					33,072
"	Ct	L	18,253	14,005	19,487	9,997	12,012
"	Ct	F		12,113			
"	Ch	F		18,581			
Pebble Cr. (Nehalem)	St	F	2,503				
" " "	Ct	F		3,034			
Plympton Cr.	Ct	F				1,347	
Rock Cr.	Ct	L	5,011	4,144	1,999	4,694	1,000

Appendix VI (continued)

Stream system or lake	Species 3/	Size 4/	1961	1962	1963	1964	1965
Rock Cr., N. Fk.	Ct	L					1,999
Salmon R.	Ct	L	10,002	9,000	6,498	3,002	1,999
" "	St	F				9,900	15,014
" "	St	L					4,739
Salmonberry R.	St	F		5,997			
Salmonberry R., N. Fk.	Ct	F			927		
" " " "	St	F		5,997			
Sand Cr.	Ct	L	701	800	1,197	701	499
Three Rivers	St	F	4,006		27,315	28,151	28,977
" "	Ct	L	2,199	1,900	3,679	1,801	1,198
" "	Ct	F		10,976	783		
Tillamook R.	Ct	L	1,701	2,002	3,298	1,201	2,000
" "	Ct	F		4,463			
Trask R.	Ct	L	5,264	5,000	8,638	4,511	7,394
" "	Ct	F		2,984			
" "	St	F					20,028
Trask R., N. Fk.	St	F					19,516
Trask R., S. Fk.	St	F					36,818
Watseco Cr.	St	L					9,100
Wilson R.	St	F	81,954	72,462	65,343	71,241	60,222
" "	Ct	F		4,462			
Wilson R., Devils Lk. Fk.	St	F		5,211			9,555

Appendix VI (continued)

Stream system or lake	Species 3/	Size 4/	1961	1962	1963	1964	1965
Wilson R., Little N. Fk.	St	F	16,996		5,991		
Wilson R., S. Fk.	St	F	7,998	9,000	17,702	15,564	28,808
Wilson R., Upper N. Fk.	St	F		8,998	17,510	25,300	
Young's R.	Ct	L	1,001	3,000	3,200	2,500	2,500
Battle Lk.	Ct	F			790		480
Blue Lk.	Ct	L		800	801		
Cape Meares Lk.	Ct	L			5,957		2,990
" " "	Ct	F			7,680		
" " "	Rb	F					100,064
Clear Lk.	Ct	F		999			
Coates Lk.	Ct	F	498				
Coffenbury Lk.	Ct	F	10,078				
" "	Ct	L	7,440	3,998	4,007	1,998	1,998
" "	Rb	L				1,099	
C.Z. Beaver Ponds	Ct	F	2,000				
Floeter Lk.	Ct	F		460		724	
Hebo Lk.	Ct	L	1,700	1,900	2,968	2,000	2,292
" "	Ct	F		1,998	1,008		
Jim George Lk.	Ct	F		102			

Appendix VI (continued)

Stream system or lake	Species [3]	Size [4]	1961	1962	1963	1964	1965
Kauppi Lk.	Rb	F					992
" "	Ct	F		1,018	1,020		
Kidders Butte Lk.	Ct	L		496			
Lindsey Lk.	Ct	F				362	
Lost Lk.	Ct	L	3,400	998	1,292	1,002	1,002
" "	Ct	F			4,644		
" "	St	F					970
Lytle Lk.	Ct	L	2,214	1,908	2,470	1,503	1,490
" "	Ct	F		15,672		996	
" "	Rb	L					802
Oak Ranch Ponds	Ct	F		458			
Poly Lk.	Ct	F			398		455
Quartz Lk., No. 1	Ct	L			500		
Scout Camp Lk.	Ct	L			500		
" " "	Ct	F				1,539	
Smith Lk.	Ct	L	2,000	1,500	3,075	1,700	1,001
" "	Ct	F		2,997		996	
" "	Rb	L					801
Soapstone Lk.	Ct	F			1,050		
South Lk.	Ct	F			4,022		1,057

Appendix VI (continued)

Stream system or lake	Species 3/	Size 4/	1961	1962	1963	1964	1965
Spring Lk.	Ct	L	2,300	1,798	2,436	1,798	998
" "	Ct	F		2,997		996	
" "	Rb	L					898
Sunset Lk.	Rb	L	523	500		977	
" "	Ct	F	25,109			2,999	
" "	Ct	L	6,086	4,999	5,001		3,005
Titus Lk.	Ct	F				181	
Unnamed Lk. (Soapstone Cr.)	Ct	F	564				
Unnamed Lk. (Fishhawk Area)	Ct	F	561				
Unnamed Lk. (Fishhawk Area)	Ct	F	282				

1/ Similar stocking rates were applied prior to 1961.

2/ Warm-water game fish liberations and adult salmon and steelhead transplants are not included.

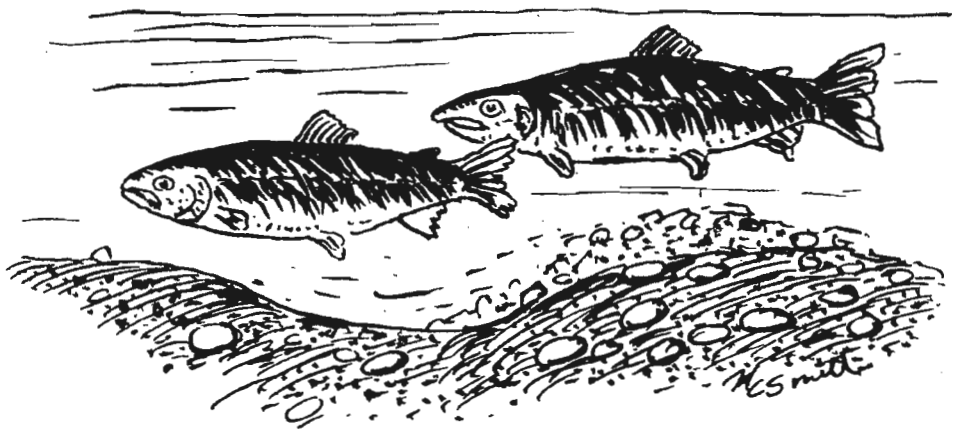
3/ Species abbreviations: Ch, chinook salmon; Co, coho salmon; Ct, cutthroat trout; Rb, rainbow trout; St, steelhead trout.

4/ "F" - fry and/or fingerlings; "L" - yearling or legal sized.

Environmental Investigations

NORTH COAST BASIN Supplement

FISH AND WILDLIFE RESOURCES AND THEIR WATER REQUIREMENTS



OREGON STATE GAME COMMISSION

P.O. BOX 3503, 1634 S.W. ALDER STREET
PORTLAND, OREGON 97208

SUPPLEMENT

to

THE FISH AND WILDLIFE RESOURCES OF THE NORTH COAST BASIN, OREGON, AND THEIR WATER REQUIREMENTS, APRIL 1968

By

Jim Lauman
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Environmental Management Section

A Report with Recommendations to the
OREGON STATE WATER RESOURCES BOARD

From the
Oregon State Game Commission
John W. McKean, Director

FEDERAL AID TO FISH RESTORATION
Completion Report
Fisheries Stream Flow Requirements
Project 69409, Job Number 14

Portland, Oregon

January 1972

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FOREWARD

The Oregon State Game Commission report entitled, "The Fish and Wildlife Resources of the North Coast Basin, Oregon, and Their Water Requirements" and this supplement to that report are designed to assist the State Water Resources Board with the task of programming Oregon's water resources. This supplement reviews some recreational use and economic considerations of the Basin's fish and wildlife resources. Shellfish and commercial harvest data are provided by the Fish Commission of Oregon.

Inasmuch as ORS 536.310 (7) directs the Board to consider "The maintenance of minimum perennial stream flows sufficient to support aquatic life...", minimum flows have been recommended which would support a reasonable level of fish production. These flows, however, are substantially less productive for game fish than the stream course is potentially capable of supporting. Although coastal stream systems have high annual water yields, low flows of summer critically restrict natural fish production.

The minimum flow regimen recommended in Appendix 1 of this supplement are the result of intensive field studies

utilizing the Game Commission's most refined techniques and replace the recommendations presented in the 1968 report for the North Coast Basin. Although based on all known biological requirements of salmonids, these recommended flows do not consider some significant effects of fluctuating, natural stream flows. High flows are generally believed necessary to stimulate upstream migration of adult salmon and steelhead, to remove silt which settles into spawning gravels during low discharge periods, and to help maintain a proper freshwater - salt-water balance in estuaries. But, because these occurrences are not thoroughly understood, natural peak flow regimen during during the fall and winter have not been recommended at this time.

The recommended minimum stream flows are principally designed to accommodate the environmental requirements of salmon and steelhead because these fish receive primary management emphasis in Oregon's coastal streams by fishery agencies. Summer flow requirements of anadromous fish and resident trout are essentially the same, but anadromous fish have higher flow requirements during the migration and spawning seasons.

Optimum flow recommendations, even though far lower than natural flows during the fall, winter, and spring seasons,

are considerably higher than natural stream flows during the summer. Optimum flows are designed to achieve optimum productivity for fish life according to those aspects of their water requirements currently understood.

To maximize sport and commercial fishing opportunities, juvenile salmon and steelhead are stocked throughout North Coast River systems. The best survival is achieved when juvenile fish are stocked as smolts, principally during the spring. Young fish migrate to the ocean almost immediately and return as adults to utilize the stream systems primarily during fall and winter freshets when adequate flows are naturally available. This stocking schedule not only avoids subjecting stocked fish to the critical elements of low summer flows, but reduces their competition with young native salmon and steelhead rearing in the stream. Streams, such as Big Creek and Klaskanine River, where hatcheries are located, often are heavily stocked to create large returning runs of adult fish that can be artificially spawned to supply the hatchery with eggs. The North Coast Basin has six fish hatcheries: Gnat Creek, Big Creek, North Fork Klaskanine, North Fork Nehalem, Trask River and Cedar Creek (Three Rivers).

Because the sale of angling licenses in Oregon is expected

to increase more than threefold within 30 years, not only will it be extremely important to maintain stream flows for natural production of game fish, but also to accommodate an expanding hatchery program. To meet future demands for outdoor recreation, hatcheries will play an increasingly important role. Fishery agencies are allocating large expenditures to modernize existing hatchery facilities and expand their production capabilities.

Many land and water uses have been at the expense of stream productivity. Without recognizing the importance of land and water planning and programming, the ability to meet future demands for fish resources will be increasingly difficult. The data in this supplement was selected to indicate some of the inherent values in the North Coast Basin's fish and wildlife resources.

FISH AND WILDLIFE VALUES

Freshwater Game Fish

Abundance and Distribution

North Coast Basin streams contain excellent habitat for Pacific salmon, steelhead, and sea-run cutthroat trout. All major river systems receive use from several forms of these anadromous salmonids. Table 1 gives estimated spawning escapement of anadromous salmonids for the Basin. Variation in population composition between river systems is the result of different biological requirements of species and races, plus hatchery release programs. Anadromous fish use over 550 North Coast Basin streams, many being small tributaries (Table 2).

Resident cutthroat and rainbow trout inhabit nearly all streams which maintain perennial flows as well as most lakes, reservoirs, and ponds. Their numbers have not been estimated, but of the two species cutthroat are most abundant and widespread. Hatchery releases of both species are made to supplement natural production for sport fishing.

Warm-water game fish populations are primarily limited to a series of coastal lakes and sloughs along the lower Columbia River. Species include largemouth bass, yellow

Table 1. Estimated number of adult anadromous salmonids spawning in North Coast Basin River systems /1 /2

Stream	Chinook Spring	Chinook Fall	Coho	Chum	Steelhead Winter	Steelhead Summer	Sea-run Cut-throat
Neskowin Cr.	---	180	180	500	350	---	400
Little Nestucca R.	90	1,215	1,080	1,000	1,290	100	800
Nestucca R.	1,800	19,350	17,500	1,000	36,000	5,500	5,000
Tillamook R.	540	2,970	1,890	500	300	50	2,500
Trask R.	3,150	17,325	23,275	1,000	11,000	200	5,000
Wilson R.	1,800	9,900	6,300	1,500	33,600	2,000	5,000
Kilchis R.	540	2,970	1,890	4,050	4,000	100	3,000
Miami R.	90	540	270	2,850	675	50	2,500
Nehalem R.	--	4,000	21,840	200	11,000	---	8,000
Necanicum R.	--	--	3,780	100	2,000	---	2,000
Lewis & Clark R.	--	50	3,000	50	750	---	500
Youngs R.	--	50	200	50	50	---	200
Klaskanine R.	--	400	14,500	100	2,000	---	300
Big Cr.	--	12,000	14,000	100	4,500	---	1,000
Clatskanie R.	--	100	1,600	50	2,000	---	500
Subtotal	8,010	71,050	111,305	13,050	109,515	8,000	36,700
Other Streams	--	1,800	7,400	1,700	3,000	---	7,600
Grand Total	8,010	72,850	118,705	14,750	112,515	8,000	44,300

/1 Estimates by Oregon State Game Commission and Fish Commission of Oregon.

/2 Estimates include hatchery contributions.

Table 2. Number of streams used by anadromous fish and streams with Game Commission flow recommendations, North Coast Basin /1

River system	Streams used by anadromous fish	Streams with OSGC Minimum Flow Recommendations
Columbia		
Lewis & Clark	9	1
Youngs Bay	8	3
Big Creek	7	1
Clatskanie	14	2
Others	27	3
	65	10
Necanicum	30	5
Nehalem	189	29
Tillamook Bay		
Miami	16	4
Kilchis	12	6
Wilson	41	9
Trask	37	10
Tillamook	22	6
Others	12	0
	140	35
Nestucca Bay		
Nestucca	64	21
Little Nestucca	26	5
	90	26
Neskowin Creek	11	1
Pacific Ocean tributaries	17	4
Sand Lake	7	1
Netarts Bay	8	0
GRAND TOTAL	557	111

/1 Includes only streams with known anadromous fish use.

perch, white and black crappie, bluegill, pumpkinseed, and warmouth bass.

Nearly all streams with year-around flows support at least one species of freshwater game fish. A comprehensive water-use program will help guarantee future generations of a continuing fishery resource. Minimum and optimum stream flow recommendations have been developed by the Oregon State Game Commission for 111 important fish production streams (Appendices I and II). Minimum flow recommendations are designed to maintain a minimum desirable level of natural production. Optimum flow recommendations are designed to completely satisfy currently understood aspects of fish production. But, because water requirements of fish are complex and not entirely understood, optimum flow recommendations may not allow maximum fish production.

Harvest

Sport Sport anglers annually expend over 440,000 angler-days in the North Coast Basin in pursuit of fresh-water game fish, with a gross expenditure of about $14,170,000. No satisfactory method exists to convert gross angler expenditures to total value to the economy. The majority of angler effort is expended on anadromous salmonids. Sport angling for salmon occurs on the Pacific Ocean, in seven estuaries, and on many streams (Table 3).

Table 3. Estimated annual harvest, angler-days, and gross expenditures for salmon, North Coast Basin /1

	Harvest	Angler -days	Gross expenditures
Ocean	112,801	94,796	$8,347,274
E Estuaries	12,560	57,240	929,440
Streams	14,821	59,284	1,096,754
Totals	140,182	211,320	$10,373,468

/1 Source: Oregon State Game Commission salmon-steelhead punch card data. (Appendix 6).

Table 3 shows that about 30% of the salmon angling and 10% of gross expenditures occur in the Basin's streams. The five top streams for instream salmon harvest are Nestucca, Trask, Wilson, and Klaskanine Rivers, and Big Creek.

Anglers find steelhead distributed throughout the Basin, with about 30 streams open for angling.

Table 4. Estimated annual steelhead harvest, angler-days, and gross expenditures, North Coast Basin /1

Harvest	Angler-days	Gross expenditures
41,508	165,232	$3,071,592

/1 Source: Oregon State Game Commission salmon-steelhead punch card data. (Appendix 6).

Angling for sea-run cutthroat is most productive within

estuaries. However, several stream systems yield good catches in freshwater areas. Harvest data indicate that about 25,950 angler-days are spent in harvesting 11,640 fish, with a gross expenditure by cutthroat fishermen of $480,075. Popular fishing waters include Tillamook, Nestucca, and Nehalem Bays and Nestucca, Trask, Wilson, Kilchis and Nehalem Rivers.

Resident trout and warm-water game fish angling is minor when compared to the fishing effort for anadromous species. Estimates of angler pressure and gross expenditures for the resident species are 40,150 angler-days and $240,900 respectively.

More people with more leisure time will demand an increase in angling opportunities. As one measure of this future pressure, the sale of angling licenses is predicted to increase 50% by 1980 and possibly as much as 350% by 2000. Stream flow levels are vital not only for maintaining desirable fish populations, but also to provide proper water conditions for recreational angling. Therefore, the Oregon Game Commission has developed recreational angling flow recommendations designed to insure stream flows which, if adopted, will accommodate the growing demand for more sport fishing opportunities on North Coast Basin streams (Appendix 4).

Commercial North Coast Basin streams annually provide about 685,000 salmon to the commercial fishery (includes hatchery contribution). These fish are taken in the ocean from San Francisco to Alaska and the catch is made up of about 62% coho and 38% chinook. The average annual value of these fish to fishermen is estimated at $3,860,000. No satisfactory method now exists to convert "value to fishermen" to "total value to the economy". However, discussions with industry suggest a two-fold increase in fishermen value would be a reasonable approximation.

There are four ports in the Basin which receive landings of commercially caught salmon. These ports received nearly 1,810,000 pounds of salmon in 1970, primarily coho and chinook, with a value to fishermen of about $1,000,000 (excludes Columbia River catch).

Other Resources

Estuaries

Seven estuaries, including Youngs Bay, Necanicum Bay, Nehalem Bay, Tillamook Bay, Netarts Bay, Sand Lake, and Nestucca Bay are located in the North Coast Basin. Estuaries are very complex ecological systems where freshwater and saltwater mix. This delicate balance between fresh and saltwater is just beginning to be understood. We have no present means to assess potential

disruptions in the intricate fresh-saline balance. Each estuary is unique with its own complement of salinities, temperatures, currents, shape and size, and distinct seasonal variations.

Estuaries are rich bodies of water, partly because of nutrients brought in by streams. They are the home for an amazing variety of animals and plants ranging from the lowest to the highest forms. Several important fish species, such as herring, need estuaries for successful spawning. Estuaries with their peculiar saline balance are important to the survival of young salmon and steelhead by providing them an opportunity to adjust to full sea-water conditions. Likewise, estuaries play an important part in the adjustment of adults to freshwater. Most of Oregon's important bottom fishes are dependent on estuaries during some part of their life.

Estuaries provide much commercial and recreational value to man. Ninety percent of Oregon's oysters are grown in Tillamook Bay. Under optimum conditions, oyster production is valued at up to $5,000 an acre per year (Table 5). Highly productive estuarine clam beds have substantial value to both sport and commercial interests.

Table 5. Commercial landings of oysters and clams at North Coast Basin ports in pounds round weight and estimated value to fishermen in 1970 /1

Port	Oysters		Clams	
	Landings	Value	Landings	Value
Tillamook	241,929	$236,000	7,819	$1,000
Netarts Bay	122	119	2,210	283
Nehalem Bay	---	---	258	33

/1 Source: Fish Commission of Oregon commercial landing records.

Certain estuaries are heavily utilized for sport fishing, clamming, and crabbing. Salmon and steelhead angling use and gross expenditures are given in Tables 3 and 4. Other fish species caught by anglers include flounder, sole, surfperch, rockfish, herring, anchovie, and sculpin. Catch and use figures for these species are given in Table 6.

Table 6. Estimated angler catch and effort on North Coast Basin estuaries for non-game bay fish in 1970 /1

Estuary	Catch (No. of fish)	Effort (Angler-days)
Necanicum Bay	9,000	1,800
Nehalem Bay	12,000	5,000
Tillamook Bay	24,500	6,000
Netarts Bay	5,000	1,000
Nestucca Bay	3,000	400

/1 Source: Estimates by Oregon State Game Commission.

In Tillamook Bay in 1963, 9,000 diggers took 171,000 clams from a 16 acre area. Use and harvest data for clamming are presented in Table 7.

Table 7. Estimated average annual number of clam digger-days and harvest in North Coast Basin estuaries /1

Bay	Digger days	Number of clams
Nehalem	900	27,000
Tillamook	18,000	540,000
Netarts	20,000	60,000
Nestucca	400	12,000

/1 Source: Estimates by Fish Commission of Oregon.

Oregon has significantly fewer estuarine areas than other coastal states. For example, all of Oregon's estuaries could fit into Willapa Bay, Washington. Oregon's 56,000 acres of estuaries make up less than one-tenth of one percent of the total land area of the state.

Wildlife

Composition, relative abundance, and distribution of the Basin's wildlife resources are discussed in the report to which this statement is appended.

Hunters annually expend considerable time and money in pursuit of game animals (Table 8).

Table 8. Estimated hunting data for the North Coast Basin, 1970 /1

	Harvest	Hunter-days	Gross expenditure
Big game	2,313 deer 1,625 elk	67,287 deer 49,778 elk	$1,352,469 1,324,095
	3,938	117,065	$2,676,564
Upland game	28,300	18,795	112,770
Waterfowl	42,700	27,680	221,440
TOTAL			$2,890,185

/1 Source: Oregon State Game Commission annual hunter questionnaire. (Appendix 6).

In addition to hunting, wildlife resources contribute about $30,000 annually to revenues from furbearer trapping.

Most game species do not have the precise and demanding stream flow requirements of fish. However, stream flows of adequate quantity and quality are essential to maintain game animal numbers and assure proper game distribution.

Recreation and Esthetics

The North Coast Basin annually provides millions of days of outdoor recreation. One indication of this use is provided by Oregon State Highway Department statistics which show that state parks and waysides in the Basin

received over 2 million day-visitors in fiscal year 1969-1970. Many of these visits are directly related to fish and wildlife and water-based recreation; therefore, adequate stream flows which contribute significantly to the esthetic appeal of the area must be protected to assure these values (Table 9).

Table 9. Sections of selected North Coast Basin streams that should have flow protection because of their esthetic values

Stream	Area
Wilson River	Entire
North Fork Trask River	Entire
Kilchis River	Above Mapes Creek
Nestucca River	Entire
North Fork Nehalem River	Above Soapstone Cr.
Salmonberry River	Entire
Trask River	Above Green Creek
Little North Fork Wilson River	Entire
Three Rivers	Entire
Miami River	Above Prouty Creek
Neskowin Creek	Entire
Clatskanie River	Above Keystone Creek

Summary

North Coast Basin presently supports over $14,000,000 in annual gross expenditures by sport anglers seeking anadromous

salmonids, resident trout, and warm-water game fish. Indirectly, the Basin's waterways contribute an annual gross expenditure of $2,975,385 for sport harvest of estuarine animals (excluding clams) and hunting of game animals. In addition, the commercial value of estuarine animals and revenues from furbearer trapping exceeded $265,000 in 1970. Anadromous fish produced in the Basin are also caught by sport and commercial fishermen in other coastal areas. Another consideration is the use of the Basin for other types of recreation for which adequate stream flows have esthetic importance.

Demand for use of fish and wildlife resources will continue to increase. A comprehensive minimum flow program will protect the Basin's fish and wildlife resources and water-connected recreation and insure that future water rights are appropriated only in the best interest of all natural resources.

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A P P E N D I C E S

Appendix 1. Recommended minimum stream flows for fish life, North Coast Basin 1/ 2/ 3/ 4/

Stream	Location	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Columbia River Tributaries													
Beaver Creek	1.8 mi. above Stewart Cr.	52	52	52	52	30	15	8	8	8	8	30/52	52
Clatskanie River	Below Perkin Cr.	81	81	81	81	50	30	15	15	15/50	93	93	93
Clatskanie River	Above Little Clatskanie River	34	34	34	34	20	8	4	4	4/20	34	34	34
Carcus Creek	Mouth	10	10	10	10	7	4	2	1	1	5/10	10	10
Plympton Creek	0.3 mi. above mouth	20	20	20	20	15	10	7	4	15/20	20	20	20
Big Creek	1.1 mi. above mouth	78	78	78	78	50	30	20	20	50/90	90	78	78
Bear Creek	0.7 mi. above mouth	15	15	15	15	10	7	5	3	10/15	15	15	15
(Klaskanine River)													
N.Fk. Klaskanine R.	Mouth	46	46	46	46	30	12	8	8	30/70	70	46	46
S.Fk. Klaskanine R.	Mouth	65	65	65	65	40	20	10	10	40/80	80	65	65
Youngs River	Below Wawa Creek	122	122	122	122	70	40	15	15	70/138	138	122	122
Lewis & Clark River	Below Klickitat Creek	74	74	74	74	50	30	15	15	50/80	80	74	74
Ocean Tributaries													
Necanicum River	Below Klootchie Creek	75	75	75	75	50	35	20	20	20/50	75	75	75
" "	Above Bergsvik Creek	30	30	30	30	20	10	4	4	4/20	30	30	30
Klootchie Creek	Mouth	28	28	28	28	15	10	4	4	4/15	28	28	28
S.Fk. Necanicum R.	Mouth	61	61	61	61	40	20	12	12	12/40	61	61	61
N.Fk. Necanicum R.	Mouth	31	31	31	31	20	8	4	4	4/20	31	31	31
Bergsvik Creek	Mouth	15	15	15	15	10	4	2	2	2	10/15	15	15
Elk Creek													
N.Fk. Elk Creek	Mouth	36	36	36	36	20	10	5	5	5	20/36	36	36
W.Fk. Elk Creek	Mouth	33	33	33	33	20	10	5	5	5	20/33	33	33
Arch Cape Creek	Head of tidewater	25	25	25	25	15	8	6	4	4/18	25	25	25
Short Sand Creek	Mouth	20	20	20	20	3	2	2	2	2/15	20	20	20

Appendix 1. (continued)

Stream	Location	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
4 59752 - Nehalem River	USGS Gage 14-3010	265	265	265	265	200	150	100	100	100/200	265	265	265
(1) " "	Below E.Fk. Nehalem R.	113	113	113	113	80	40	20	20	20/80	113	113	113
" "	Above Wolf Creek	29	29	29	29	20	10	6	6	6/20	40	40	29
N.Fk. Nehalem River	Below Soapstone Cr.	128	128	128	128	80	50	30	30	30/80	135	135	128
" " "	Below Little N. Fk.	68	68	68	68	40	20	15	15	15	40	68	68
Soapstone Creek	Mouth	65	65	65	65	40	20	12	12	12	40	65	65
Gods Valley Cr.	Mouth	22	22	22	22	15	8	4	4	4	15	22	22
Foley Creek	Mouth	46	46	46	46	30	20	10	10	10	30/55	55	55/46
Roy Creek	Mouth	15	15	15	15	6	2	1	1	1	10/15	15	15
Peterson Creek	Mouth	15	15	15	15	7	3	1	1	1	10/15	15	15
Anderson Creek	Mouth	20	20	20	20	10/5	3	1	1	1	8/15	20	20
Cook Creek	Mouth	52	52	52	52	30	20	12	12	12	30/52	52	52
Lost Creek	Mouth	20	20	20	20	15	6	3	2	2	10/20	20	20
Salmonberry River	Mouth	70	70	70	70	50	40	30	25	25	50/70	70	70
Cronin Creek	Mouth	36	36	36	36	25	12	6	6	6	25/47	47	47
Spruce Run Creek	Mouth	20	20	20	20	10	3	1	1	1	10	20	20
Humbug Creek	Below Big Creek	78	78	78	78	50	25	15	15	15	50/95	95	95
E.Fk. Humbug Creek	Mouth	25	25	25	25	15	8	2	2	2	15/25	25	25
W.Fk. Humbug Creek	Mouth	40	40	40	40	25	12	3	3	3	25/40	40	40
Quartz Creek	Mouth	30	30	30	30	20	10	4	2	2	20/30	30	30
Cow Creek	Mouth	15	15	15	15	7	3	1	1	1	8/15	15	15
Buster Creek	Mouth	43	43	43	43	30	15	5	5	5	30/51	51	51
Burke ~~Walker~~ Creek	Above Fishhawk Creek	47	47	47	47	30	15	8	8	8	30/54	54	54
Fishhawk Creek	Mouth	75	75	75	75	50	25	12	12	12	50/90	90	90
Northrup Creek	Mouth	20	20	20	20	15	5	2	2	2	15/20	20	20
Deep Creek	Mouth	15	15	15	15	10	3	1	1	1	10/15	15	15

(1) Established IWR (converted MPS) (1973) Generally @/> min rec. flows.

Appendix 1. (continued)

Stream	Location	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Fishhawk Creek (RM 65.7)	Mouth	25	25	25	25	15	8	4	4	4	15/25	25	25
Beaver Creek (RM 66)	Mouth	10	10	10	10	6	2	1	1	1	5	10	10
Oak Ranch Creek	Mouth	15	15	15	15	5	3	1	1	1	10/15	15	15
E.Fk. Nehalem River	Mouth	15	15	15	15	10	5	1	1	1	10	15	15
Rock Creek	Mouth	77	77	77	77	50	25	12	12	12	50/87	87	87
Wolf Creek	Mouth	36	36	36	36	25	12	6	6	6	25/46	46	46
Miami River	Above Moss Cr.	98	98	98	98	60	30	15	15	15	60/130	130	130
Moss Creek	Mouth	25	25	25	25	15/6	2	2	1	1	15/25	25	25
Peterson Creek	Mouth	12	12	12	12	6	2	2	1	1	8/12	12	12
Prouty Creek	Mouth	12	12	12	12	6	2	1	1	1	8/12	12	12
Kilchis River	Below Myrtle Creek	180	180	180	180	100	60	25	25	25	100/225	225	225
Kilchis River	Above Little S.Fk.	175	175	175	175	100	50	20	20	20	100/190	190	190
Coal Creek	Mouth	8	8	8	8	8	2	1	1	1	6/8	8	8
Clear Creek	Mouth	30	30	30	30	15	5	3	2	2/15	30	30	30
Little S.Fk. Kilchis R.	Mouth	50	50	50	50	30	15	10	5	5	20/50	50	50
N.Fk. Kilchis River	Mouth	50	50	50	50	30	15	12	6	6	30/50	50	50
S.Fk. Kilchis River	Mouth	40	40	40	40	30	12	8	5	5	30/40	40	40
Wilson River	Below Little N.Fk.	300	300	300	300	300/200	150	100	100	300	300	300	300
Wilson River	Below Cedar Creek	145	145	145	145	145/100	80	50	50	145	145	145	145
Little N.Fk. Wilson R.	Mouth	100	100	100	100	75	50	25	25	125	125	125	125
Fall Creek	Mouth	10	10	10	10	7	5	3	2	2	6/10	10	10
Jordan Creek	Mouth	35	35	35	35	20	20	15	10	35	35	35	35
Cedar Creek	Mouth	30	30	30	30	20	12	10	8	4	15	30	30
N.Fk. Wilson River	Mouth	63	63	63	63	50	30	15	15	95	95	95	95
Elk Creek	Mouth	30	30	30	30	15	5	4	4	30	30	30	30

Appendix 1. (continued)

Stream	Location	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
S.Fk. Wilson River	Mouth	68	68	68	68	40	25	12	12	79	79	79	79
Devils Lake Fork	Mouth	40	40	40	40	30	30	10	6	40	40	40	40
Trask River	Below N. & S. Forks	265	265	265	265	265/200	150	90	90	265	265	265	265
Green Creek	Mouth	8	8	8	8	5/2	1	1	1	5	8	8	8
S.Fk. Trask River	Mouth	142	142	142	142	142/100	60	30	30	155	155	155	155
S.Fk. Trask River	Below Edwards Creek	68	68	68	68	68/40	25	15	15	68	68	68	68
E.Fk. of S.Fk.	Mouth	40	40	40	40	40/30	20	15	15	40	40	40	40
Edwards Creek	Mouth	32	32	32	32	20	10	4	4	36	36	36	36
N.Fk. Trask River	Below Bark Shanty Cr.	167	167	167	167	167/100	70	40	40	190	190	190	190
Bark Shanty Creek	Mouth	18	18	18	18	12	8	6	4	18	18	18	18
Clear Creek	Mouth	25	25	25	25	15	6	4	4	25	25	25	25
N.Fk. of N.Fk.	Mouth	40	40	40	40	40/30	15	5	5	5	30/49	49	49
Mid.Fk. of N.Fk.	Below Elkhorn Creek	80	80	80	80	80/60	40	16	16	16	60/80	80	80
Tillamook River	Below Beaver Creek	80	80	80	80	60	40	25	25	95	95	95	95
Bewley Creek	Mouth	15	15	15	15	10	6	2	2	2	2/10	15	15
Killam Creek	Mouth	15	15	15	15	10	5	1	1	1	10/15	15	15
Fawcet Creek	Mouth	25	25	25	25	15	10	2	2	2	15/25	25	25
Simmons Creek	Mouth	20	20	20	20	13	4	1	1	1	13/20	20	20
Munson Creek	Mouth	20	20	20	20	12/6	3	1	1	1	12/20	20	20
Sand Creek	Above Jewell Creek	30	30	30	30	20/8	4	3	2	2	2/20	30	30
Nestucca River	Below Beaver Creek	258	258	258	258	258/200	150	90	90	258	258	258	258
Nestucca River	Above East Creek	183	183	183	183	183/140	100	60	60	183	183	183	183
Nestucca River	Below Elk Creek	111	111	111	111	111/80	60	20	20	111	111	111	111
Clear Creek	Mouth	20	20	20	20	20/8	4	3	2	2	12/20	20	20
Three Rivers	Below Cedar Creek	86	86	86	86	60	40	18	18	94	94	94	94
" "	Above Alder Creek	40	40	40	40	40/20	12	8	6	6	25/40	40	40
Alder Creek	Mouth	35	35	35	35	20	10	5	5	5	20/46	46	46

Appendix 1. (continued)

Stream	Location	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Farmer Creek	Mouth	25	25	25	25	25/15	6	4	4	4	15/25	25	25
Beaver Creek	Below E. Beaver Creek	75	75	75	75	60	40	18	18	83	83	83	83
E. Beaver Creek	Above Bear Creek	52	52	52	52	40	20	10	10	10	40/63	63	63
Bear Creek	Mouth	8	8	8	8	8	2	2	1	1	6/8	8	8
W. Beaver Creek	Mouth	18	18	18	18	18/10	6	2	2	2	15/18	18	18
Wolfe Creek	Mouth	10	10	10	10	10/6	3	3	2	2	8/10	10	10
Bays Creek	Mouth	20	20	20	20	20/10	5	4	3	3	12/20	20	20
East Creek	Above Moon Creek	35	35	35	35	35/20	10	7	4	3	25/35	35	35
Moon Creek	Mouth	43	43	43	43	30	20	5	5	49	49	49	49
Powder Creek	Mouth	20	20	20	20	20/10	5	3	2	2	10/20	20	20
Niagara Creek	Mouth	30	30	30	30	30/25	25	5	3	30	30	30	30
Clarence Creek	Mouth	15	15	15	15	15/6	2	1	1	1	6	15	15
Slick Rock Creek	Mouth	15	15	15	15	15/6	3	2	1	1	10/15	15	15
Bible Creek	Mouth	15	15	15	15	15/6	2	2	2	2	10	15	15
Testament Creek	Mouth	15	15	15	15	15/8	4	3	3	3	12	15	15
Bear Creek	Mouth	20	20	20	20	20/15	7	6	3	3	15/20	20	20
Elk Creek	Mouth	20	20	20	20	20/12	8	4	4	4	15	20	20
Little Nestucca River	Below Fall Creek	133	133	133	133	100	60	25	25	25	100/133	133	133
" " "	Below Louie Creek	75	75	75	75	60	30	9	9	85	85	85	85
Fall Creek	Mouth	10	10	10	10	10/6	3	2	1	1	6	10	10
Bear Creek	Mouth	15	15	15	15	15/6	3	2	1	1	10/15	15	15
S.Fk. Little Nestucca River	Mouth	18	18	18	18	18/12	7	5	3	3	12/18	18	18
Louie Creek	Mouth	15	15	15	15	15/10	3	2	1	1	10/15	15	15
Neskowin Creek	Below Prospect Creek	62	62	62	62	40	20	10	10	10/40	88	88	88

1/ Flows are expressed in cubic feet per second.

2/ Recommended flows should arrive at the point of recommendation and continue to the mouth, or to the next point for which a different flow is recommended.

3/ Recommended minimum flows are designed to provide instream conditions capable of maintaining a minimum desirable level of natural production. No consideration is given to the requirements of estuaries or to beneficial impacts of winter freshets.

4/ These recommendations are the result of intensive field studies utilizing refined techniques and replace those presented in the 1968 report.

① Certificate 64: ; (9/26/90) = min flow
② " 64746 (") = " "

Appendix 2. Recommended optimum stream flows for fish life, North Coast Basin 1/ 2/ 3/

Stream	Location	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Columbia River Tributaries													
Beaver Creek	1.8 mi. above Stewart Cr.	88	88	88	88	52	35	35	35	35	35	52/88	88
Clatskanie River	Below Perkin Cr.	147	147	147	147	81	54	54	54	54/81	160	160	160
" "	Above Little Clatskanine R.	57	57	57	57	34	23	23	23	23/34	57	57	57
Carcus Creek	Mouth	17	17	17	17	14	12	10	7	7	12/17	17	17
Plympton Creek	0.3 mi. above mouth	34	34	34	34	34	28	23	18	13	28/34	34	34
Big Creek	1.1 mi. above mouth	130	130	130	130	78	52	52	52	78/130	130	130	130
Bear Creek	0.7 mi. above mouth	26	26	26	26	22	18	14	10	18/26	26	26	26
Klaskanine River													
N.Fk. Klaskanine R.	Mouth	86	86	86	86	46	31	31	31	46/86	86	86	86
S.Fk. Klaskanine R.	Mouth	100	100	100	100	65	44	44	44	65/100	100	100	100
Youngs River	Below Wawa Cr.	190	190	190	190	122	82	82	82	122/190	190	190	190
Lewis & Clark River	Below Klickitat Cr.	115	115	115	115	74	50	50	50	74/115	115	115	115
Ocean Tributaries													
Necanicum River	Below Klootchie Cr.	140	140	140	140	75	50	50	50	50/75	140	140	140
" "	Above Bergsvik Cr.	45	45	45	45	30	20	20	20	20/30	45	45	45
① Klootchie Creek	Mouth	45	45	45	45	28	19	19	19	19/28	45	45	45
S.Fk. Necanicum R.	Mouth	125	125	125	125	61	40	40	40	40/61	125	125	125
N.Fk. Necanicum R.	Mouth	47	47	47	47	31	21	21	21	21/31	47	47	47
② Bergsvik Creek	Mouth	26	26	26	26	22	18	14	10	10	17/26	26	26
Elk Creek													
N.Fk. Elk Creek	Mouth	60	60	60	60	36	24	24	24	24	36/60	60	60
W.Fk. Elk Creek	Mouth	56	56	56	56	33	22	22	22	22	33/56	56	56
Arch Cape Creek	Head of tidewater	43	43	43	43	36	30	23	17	17/30	43	43	43
Short Sand Creek	Mouth	34	34	34	34	28	23	18	13	13/28	34	34	34

Appendix 2. (continued)

Stream	Location	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Nehalem River	USGS Gage 14-3010	400	400	400	400	265	178	178	178	178/265	400	400	400
" "	Below E.Fk. Nehalem R.	180	180	180	180	113	76	76	76	76/113	180	180	180
" "	Above Wolfe Cr.	47	47	47	47	29	19	19	19	19/29	40	40	40
N.Fk. Nehalem River	Below Soapstone Cr.	250	250	250	250	128	86	86	86	86/135	250	250	250
" " "	Below Little N.Fk.	110	110	110	110	68	46	46	46	46	68	110	110
Soapstone Creek	Mouth	120	120	120	120	65	44	44	44	44	65	120	120
Gods Valley Creek	Mouth	32	32	32	32	22	15	15	15	15	22	32	32
Foley Creek	Mouth	63	63	63	63	46	31	31	31	31	46/65	65	65
Roy Creek	Mouth	26	26	26	26	22	18	14	10	14	20/26	26	26
Peterson Creek	Mouth	26	26	26	26	22	18	14	10	10	17/26	26	26
Anderson Creek	Mouth	34	34	34	34	20	13	13	13	13	13/20	34	34
Cook Creek	Mouth	100	100	100	100	52	35	35	35	35	52/100	100	100
Lost Creek	Mouth	34	34	34	34	20	13	13	13	13	20/34	34	34
Salmonberry River	Mouth	119	119	119	119	70	47	47	47	47	70/119	119	119
Cronin Creek	Mouth	65	65	65	65	36	24	24	24	24	36/65	65	65
Spruce Run Creek	Mouth	34	34	34	34	20	13	13	13	13	20/34	34	34
Humbug Creek	Below Big Cr.	130	130	130	130	78	52	52	52	52	95/130	130	130
E.Fk. Humbug Creek	Mouth	43	43	43	43	25	17	17	17	17	25/43	43	43
W.Fk. Humbug Creek	Mouth	68	68	68	68	40	27	27	27	27	40/68	68	68
Quartz Creek	Mouth	51	51	51	51	35	20	20	20	20	35/51	51	51
Cow Creek	Mouth	26	26	26	26	18	10	10	10	10	18/26	26	26
Buster Creek	Mouth	64	64	64	64	43	29	29	29	29	51/64	64	64
Walker Creek	Above Fishhawk Creek	82	82	82	82	47	31	31	31	31	54/82	82	82
Fishhawk Creek	Above Walker Cr.	147	147	147	147	75	50	50	50	50	90/147	147	147
Northrup Creek	Mouth	34	34	34	34	25	13	13	13	13	25/34	34	34
Deep Creek	Mouth	26	26	26	26	18	10	10	10	10	18/26	26	26

Appendix 2. (continued)

Stream	Location	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Fishhawk Creek (RM 65.7)	Mouth	43	43	43	43	35	17	17	17	17	35/43	43	43
Beaver Creek (RM 66)	Mouth	17	17	17	17	10	7	7	7	7	10	17	17
Oak Ranch Creek	Mouth	26	26	26	26	18	10	10	10	10	18/26	26	26
E.Fk. Nehalem River	Mouth	26	26	26	26	18	10	10	10	10	18/26	26	26
Rock Creek	Mouth	100	100	100	100	77	52	52	52	52	77/100	100	100
Wolf Creek	Mouth	60	60	60	60	36	24	24	24	24	46/60	60	60
Miami River	Above Moss Cr.	175	175	175	175	98	66	66	66	66	130/183	183	183
Moss Creek	Mouth	43	43	43	43	35	17	17	17	17	35/43	43	43
Peterson Creek	Mouth	20	20	20	20	12	8	8	8	8	12/20	20	20
Prouty Creek	Mouth	20	20	20	20	12	8	8	8	8	12/20	20	20
Kilchis River	Below Myrtle Cr.	300	300	300	300	180	120	120	120	120	225/300	300	300
Kilchis River	Above Little S.Fk.	300	300	300	300	175	115	115	115	115	190/300	300	300
Coal Creek	Mouth	14	14	14	14	10	5	5	5	5	10/14	14	14
Clear Creek	Mouth	51	51	51	51	35	20	20	20	20/35	51	51	51
Little S.Fk. Kilchis River	Mouth	85	85	85	85	50	35	35	35	35	50/85	85	85
N.Fk. Kilchis River	Mouth	85	85	85	85	50	35	35	35	35	50/85	85	85
S.Fk. Kilchis River	Mouth	68	68	68	68	40	27	27	27	27	40/68	68	68
Wilson River	Below Little N.Fk.	450	450	450	450	450/240	160	160	160	520	520	520	520
" "	Below Cedar Cr.	320	320	320	320	320/145	97	97	97	320	320	320	320
Little N.Fk. Wilson R.	Mouth	160	160	160	160	100	67	67	67	160	160	160	160
Fall Creek	Mouth	17	17	17	17	12	7	7	7	7	12/17	17	17
Jordan Creek	Mouth	60	60	60	60	35	23	23	23	60	60	60	60
Cedar Creek	Mouth	51	51	51	51	30	20	20	20	20	30	51	51
N.Fk. Wilson River	Mouth	130	130	130	130	130/63	42	42	42	130	130	130	130
Elk Creek	Mouth	51	51	51	51	30	20	20	20	51	51	51	51

Appendix 2. (continued)

Stream	Location	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
S.Fk. Wilson River	Mouth	110	110	110	110	68	46	46	46	110	110	110	110
Devils Lake Fork	Mouth	68	68	68	68	40	27	27	27	68	68	68	68
Trask River	Below N. & S. Forks	500	500	500	500	500/235	157	157	157	500	500	500	500
Green Creek	Mouth	14	14	14	14	8	5	5	5	8	14	14	14
S.Fk. Trask River	Mouth	245	245	245	245	245/142	114	114	114	245	245	245	245
" " "	Below Edwards Cr.	105	105	105	105	105/68	46	46	46	105	105	105	105
E.Fk. of S.Fk.	Mouth	68	68	68	68	68/40	27	27	27	68	68	68	68
Edwards Creek	Mouth	53	53	53	53	32	21	21	21	53	53	53	53
N.Fk. Trask River	Below Bark Shanty Cr.	265	265	265	265	265/167	112	112	112	265	265	265	265
Bark Shanty Creek	Mouth	31	31	31	31	18	12	12	12	31	31	31	31
Clear Creek	Mouth	43	43	43	43	25	17	17	17	43	43	43	43
N.Fk. of N.Fk.	Mouth	63	63	63	63	63/40	27	27	27	27	40/63	63	63
Mid.Fk. of N.Fk.	Mouth	200	200	200	200	200/80	54	54	54	54	80/200	200	200
Tillamook River	Below Beaver Cr.	143	143	143	143	80	54	54	54	143	143	143	143
Bewley Creek	Mouth	26	26	26	26	15	10	10	10	10	10/15	26	26
Killam Creek	Mouth	26	26	26	26	15	10	10	10	10	15/26	26	26
Fawcet Creek	Mouth	43	43	43	43	25	17	17	17	17	25/43	43	43
Simmons Creek	Mouth	34	34	34	34	20	13	13	13	13	20/34	34	34
Munson Creek	Mouth	34	34	34	34	20	13	13	13	13	20/34	34	34
Sand Creek	Above Jewell Cr.	51	51	51	51	30	20	20	20	20	20/30	51	51
Nestucca River	Below Beaver Cr.	350	350	350	350	350/250	168	168	168	350	350	350	350
" "	Above East Cr.	250	250	250	250	250/183	123	123	123	250	250	250	250
" "	Below Elk Cr.	136	136	136	136	136/111	74	74	74	136	136	136	136
Clear Creek	Mouth	34	34	34	34	34/20	13	13	13	13	20/34	34	34
Three Rivers	Below Cedar Cr.	150	150	150	150	86	58	58	58	150	150	150	150
" "	Above Alder Cr.	68	68	68	68	68/40	27	27	27	27	40/68	68	68

Appendix 2. (continued)

Stream	Location	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Alder Creek	Mouth	60	60	60	60	35	24	24	24	24	35/60	60	60
Farmer Creek	Mouth	43	43	43	43	43/25	17	17	17	17	25/43	43	43
Beaver Creek	Below E. Beaver Cr.	150	150	150	150	75	50	50	50	150	150	150	150
E. Beaver Creek	Above Bear Cr.	85	85	85	85	52	35	35	35	35	52/85	85	85
Bear Creek	Mouth	34	34	34	34	23	13	13	13	13	23/34	34	34
W. Beaver Creek	Mouth	31	31	31	31	31/22	12	12	12	12	22/31	31	31
Wolfe Creek	Mouth	17	17	17	17	17/10	7	7	7	7	10/17	17	17
Bays Creek	Mouth	34	34	34	34	34/20	13	13	13	13	20/34	34	34
East Creek	Above Moon Cr.	60	60	60	60	60/35	24	24	24	24	35/60	60	60
Moon Creek	Mouth	78	78	78	78	43	29	29	29	80	80	80	80
Powder Creek	Mouth	34	34	34	34	34/20	13	13	13	13	20/34	34	34
Niagara Creek	Mouth	51	51	51	51	51/30	20	20	20	51	51	51	51
Clarence Creek	Mouth	26	26	26	26	26/15	10	10	10	10	15	26	26
Slick Rock Creek	Mouth	26	26	26	26	26/15	10	10	10	10	15/26	26	26
Bible Creek	Mouth	26	26	26	26	26/15	10	10	10	10	15	26	26
Testament Creek	Mouth	26	26	26	26	26/15	10	10	10	10	15	26	26
Bear Creek	Mouth	34	34	34	34	34/20	13	13	13	13	20/34	34	34
Elk Creek	Mouth	34	34	34	34	34/20	13	13	13	13	20	34	34
Little Nestucca River	Below Fall Cr.	230	230	230	230	230/133	89	89	89	89	155/230	230	230
" " "	Below Louie Cr.	115	115	115	115	115/75	50	50	50	125	125	125	125
Fall Creek	Mouth	17	17	17	17	17/10	7	7	7	7	10	17	17
Bear Creek	Mouth	26	26	26	26	26/15	10	10	10	10	15/26	26	26
S.Fk. Little Nestucca River	Mouth	31	31	31	31	31/18	12	12	12	12	18/31	31	31
Louie Creek	Mouth	26	26	26	26	26/15	10	10	10	10	15/26	26	26
Neskowin Creek	Below Prospect Cr.	113	113	113	113	62	41	41	41	41/88	126	126	126

1/ Flows are exprssed in cubic feet per second.

2/ Recommended flows should arrive at the point of recommendation and continue to the mouth, or to the next point for which a different flow is recommended.

3/ Recommended optimum flows are designed to provide instream conditions capable of maintaining optimum levels of natural production. No consideration is given to the requirements of estuaries or to benefical impacts of winter freshets.

Appendix 3. Miscellaneous flow and temperature measurements, North Coast Basin 1970 and 1971.

Stream	Location	Date	Time	Water Temp.°F	Flow
Columbia River Tributaries					
Beaver Creek	Above Stewart Cr.	1-8-71	11:30 AM	42	95
		3-23-71	3:40 PM	49	122
		4-6-71	1:10 PM	48	91
		4-27-71	12:15 PM	53	42
		5-4-71	12:05 PM	55	24
		7-20-71	11:25 AM	64	5.4
Clatskanie River	Below Perkin Cr.	1-8-71	10:30 AM	44	240
		4-6-71	2:05 PM	47	225
		4-27-71	1:30 PM	52	97
		5-4-71	12:50 PM	54	65
		5-11-71	5:45 PM	63	56
		5-25-71	11:50 AM	56	57
		6-8-71	11:30 AM	54	35
		6-22-71	12:20 PM	60	28
		7-20-71	11:45 AM	64	24
Clatskanie River	Above Little Clatskanie R.	1-8-71	12:45 PM	41	46
		3-23-71	5:00 PM	46	98
		4-6-71	11:45 AM	46	34
		4-27-71	11:30 AM	50	23
		5-4-71	11:15 AM	54	12
		7-20-71	10:45 AM	64	2.3
Big Creek	River Mile 1.1	1-8-71	9:00 AM	44	302
		4-6-71	3:40 PM	46	220
		4-27-71	2:30 PM	50	145
		5-4-71	1:45 PM	51	100
		5-11-71	6:45 PM	58	79
		5-25-71	12:45 PM	51	128

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
Big Creek (cont.)	River Mile 1.1	6-8-71	12:20 PM	51	92
		6-22-71	1:30 PM	58	68
		7-20-71	12:30 PM	61	48
		8-6-71	1:20 PM	59	40
		8-20-71	12:15 PM	60	33
Klaskanine River					
North Fork Klaskanine R.	Mouth	1-7-71	4:45 PM	44	120
		3-23-71	11:45 AM	47	190
		4-6-71	5:45 PM	48	87
		4-27-71	4:00 PM	51	64
		5-4-71	3:10 PM	52	47
		6-8-71	1:30 PM	54	44
		6-22-71	2:30 PM	60	27
		7-20-71	1:30 PM	66	19
		8-6-71	11:45 AM	62	12
South Fork Klaskanine R.	Mouth	1-7-71	3:45 PM	44	110
		3-23-71	1:30 PM	47	356
		4-7-71	8:50 AM	45	105
		4-27-71	4:55 PM	50	68
		5-4-71	3:45 PM	53	50
		6-22-71	3:15 PM	60	23
		7-20-71	1:40 PM	67	16
		8-6-71	11:40 AM	62	11
Youngs River	Below Wawa Cr.	1-7-71	2:45 PM	44	155
		3-23-71	10:30 AM	46	277
		4-7-71	9:50 AM	46	173
		4-27-71	5:45 PM	52	95
		5-4-71	4:20 PM	55	64
		6-22-71	4:00 PM	63	54
		7-20-71	2:15 PM	71	33
		8-6-71	11:20 AM	64	16

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
Lewis & Clark River	Below Klickitat Cr.	1-7-71	1:30 PM	44	220
		3-23-71	9:00 AM	47	220
		4-7-71	11:00 AM	46	152
		4-28-71	8:10 AM	48	90
		5-4-71	5:15 PM	55	70
		5-12-71	8:15 AM	55	50
		6-8-71	2:15 PM	57	60
		6-22-71	4:30 PM	64	53
		7-20-71	2:50 PM	70	40
		8-6-71	10:50 AM	64	19
Ocean Tributaries					
Necanicum River	Below Klootchie Cr.	4-7-71	1:10 PM	47	231
		4-23-71	8:00 AM	45	240
		4-28-71	9:20 AM	48	162
		5-5-71	7:50 AM	50	108
		5-12-71	9:15 AM	54	82
		5-25-71	2:00 PM	53	180
		6-8-71	2:50 PM	55	91
		6-23-71	9:00 AM	56	100
		7-6-71	3:30 PM	56	101
		7-20-71	3:40 PM	67	68
		8-5-71	4:00 PM	67	40
		8-21-71	11:00 AM	63	21
Necanicum River	Above Bergsvik Cr.	1-7-71	9:10 AM	43	55
		4-7-71	3:20 PM	45	44
		4-23-71	9:30 AM	47	40
		4-28-71	1:15 PM	48	25
		5-5-71	9:30 AM	48	22
		5-12-71	9:45 AM	53	16
		7-20-71	5:00 PM	65	14
		8-5-71	2:35 PM	60	6.6

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp. °F	Flow
Klootchie Creek	Mouth	1-7-71	11:15 AM	43	20
		2-19-71	2:30 PM	44	46
		4-7-71	5:30 PM	47	21
		4-14-71	4:50 PM	50	37
		4-23-71	8:10 AM	46	24
		4-28-71	9:40 AM	49	19
		5-5-71	8:10 AM	50	12
		7-20-71	4:15 PM	66	4.5
		11-16-71	9:00 AM	50	80
South Fork Necanicum River	Mouth	1-7-71	10:30 AM	43	61
		3-24-71	10:10 AM	44	185
		4-7-71	2:50 PM	46	51
		4-14-71	4:20 PM	50	89
		4-15-71	7:45 AM	46	78
		4-23-71	8:30 AM	44	56
		4-28-71	10:15 AM	48	38
		5-5-71	8:45 AM	48	29
		7-20-71	4:30 PM	64	12
		11-16-71	10:00 AM	51	145
North Fork Necanicum River	Mouth	3-24-71	9:15 AM	45	64
		4-7-71	4:40 PM	47	36
		4-23-71	8:45 AM	45	34
		4-28-71	10:45 AM	48	24
		5-5-71	9:15 AM	48	14
		7-20-71	4:45 PM	72	4.7
Elk Creek					
North Fork Elk Creek	Mouth	4-14-71	6:05 PM	49	65
		4-22-71	7:00 PM	48	40
		4-28-71	6:00 PM	50	30
		5-5-71	6:30 PM	50	24
		6-8-71	6:00 PM	55	16
		8-5-71	4:30 PM	63	9.2

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
West Fork Elk Creek	Mouth	1-6-71	9:00 AM	42	48
		1-28-71	11:50 AM	46	180
		4-14-71	5:20 PM	49	63
		4-22-71	6:30 PM	50	51
		4-28-71	5:30 PM	51	38
		5-5-71	7:00 PM	50	26
		6-8-71	5:45 PM	56	18
		8-5-71	4:20 PM	62	8.1
Nehalem River	Above Cronin Cr.	6-9-71	10:15 AM	56	448
		6-23-71	2:00 PM	65	338
		7-21-71	11:30 AM	74	244
		8-5-71	11:30 AM	70	153
		8-20-71	9:45 AM	70	109
Nehalem River	Below East Fork Nehalem R.	5-25-71	4:15 PM	56	215
		6-2-71	1:20 PM	50	198
		6-9-71	12:30 PM	56	133
		6-23-71	11:10 AM	62	121
		7-21-71	2:30 PM	76	58
		8-5-71	1:30 PM	70	39
Nehalem River	Above Wolfe Cr.	3-22-71	1:30 PM	43	150
		4-29-71	3:35 PM	48	70
		5-5-71	12:05 PM	47	40
		5-12-71	4:00 PM	52	39
		6-2-71	11:30 AM	47	31
		6-9-71	2:30 PM	51	22
		7-21-71	4:00 PM	64	9.7
North Fork Nehalem River	Below Soapstone Cr.	2-19-71	9:55 AM	42	821
		4-23-71	2:00 PM	49	267
		4-28-71	4:10 PM	51	240

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
North Fork Nehalem River (cont.)	Below Soapstone Cr.	5-6-71	10:00 AM	49	148
		5-12-71	10:30 AM	56	129
		6-2-71	5:00 PM	52	150
		6-8-71	4:10 PM	56	143
		6-23-71	3:30 PM	61	165
		7-6-71	4:15 PM	57	151
		7-21-71	9:10 AM	60	122
		8-5-71	9:45 AM	57	71
		11-19-71	2:10 PM	50	460
North Fork Nehalem River	Below Little North Fork	1-6-71	4:15 PM	43	90
		1-28-71	1:15 PM	45	290
		2-19-71	11:20 AM	42	194
		3-19-71	3:45 PM	47	115
		4-7-71	4:00 PM	46	74
		4-23-71	10:00 AM	45	57
		4-28-71	1:45 PM	49	43
		5-5-71	10:00 AM	49	34
		7-20-71	5:50 PM	64	27
		8-5-71	3:00 PM	61	13
Soapstone Creek	Mouth	1-6-71	3:00 PM	43	75
		2-19-71	9:25 AM	42	196
		3-19-71	2:30 PM	47	104
		4-15-71	8:45 AM	45	110
		4-23-71	10:50 AM	46	54
		4-28-71	2:20 PM	51	33
		5-6-71	9:00 AM	48	29
		7-21-71	8:00 AM	56	25
Gods Valley Creek	Mouth	1-6-71	2:15 PM	43	50
		4-15-71	9:15 AM	46	76
		4-23-71	11:50 AM	47	34

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
Gods Valley Creek(cont.)	Mouth	4-28-71	3:00 PM	54	25
		5-6-71	9:30 AM	48	15
		6-8-71	3:30 PM	58	12
		7-21-71	8:00 AM	60	8.2
Foley Creek	Mouth	1-6-71	10:15 AM	41	153
		3-19-71	10:00 AM	47	134
		4-15-71	12:05 PM	50	155
		4-22-71	3:30 PM	52	96
		4-28-71	4:45 PM	51	65
		5-6-71	10:30 AM	52	48
		5-12-71	11:00 AM	54	43
		6-1-71	5:30 PM	51	45
		6-8-71	4:55 PM	59	34
		6-23-71	3:00 PM	58	57
		7-16-71	5:00 PM	60	50
		7-21-71	9:40 AM	57	35
		8-5-71	9:05 AM	56	21
		8-12-71	1:00 PM	64	17
Cook Creek	Mouth	1-6-71	11:55 AM	41	213
		4-22-71	5:30 PM	48	200
		5-5-71	5:20 PM	49	131
		5-12-71	11:40 AM	52	93
		6-9-71	9:00 AM	50	66
		6-23-71	2:30 PM	55	84
		7-21-71	10:10 AM	55	71
		8-5-71	10:20 AM	56	38
		8-20-71	8:40 AM	57	32
Cronin Creek	Mouth	1-6-71	11:30 AM	43	63
		3-19-71	11:50 AM	45	117
		4-15-71	11:30 AM	46	98
		4-22-71	4:50 PM	48	45

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
Cronin Creek (cont.)	Mouth	5-5-71	4:45 PM	48	27
		6-2-71	4:00 PM	50	22
		7-21-71	10:45 AM	55	10
		8-5-71	10:45 AM	56	8.7
Humbug Creek	Below Big Cr.	1-5-71	5:10 PM	40	175
		3-22-71	5:05 PM	47	170
		4-8-71	8:45 AM	45	125
		4-14-71	3:50 PM	48	205
		4-28-71	11:30 AM	48	75
		5-5-71	10:50 AM	50	41
		6-9-71	10:30 AM	54	34
		7-21-71	12:05 PM	64	18
Buster Creek	Mouth	1-5-71	4:10 PM	40	116
		4-8-71	9:50 AM	44	88
		4-29-71	12:30 PM	49	38
		5-5-71	3:40 PM	50	33
		6-2-71	2:45 PM	50	21
		7-21-71	1:00 PM	60	6.7
Walker Creek	Above Fishhawk Cr.	4-8-71	11:50 AM	46	137
		4-29-71	11:45 AM	49	65
		5-5-71	2:40 PM	50	33
		5-12-71	1:40 PM	56	29
		6-9-71	11:30 AM	52	34
		6-23-71	10:30 AM	57	22
		7-21-71	1:35 PM	64	5.7
Fishhawk Creek	Mouth	1-5-71	3:10 PM	39	173
		3-22-71	3:10 PM	45	198
		4-8-71	10:45 AM	45	130
		4-29-71	11:10 AM	48	63
		5-5-71	3:10 PM	50	38
		6-9-71	11:20 AM	51	25
		7-21-71	1:30 PM	65	8.9

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp. °F	Flow
Rock Creek	Mouth	4-29-71	9:55 AM	49	164
		5-5-71	1:20 PM	50	120
		5-12-71	2:50 PM	58	108
		6-2-71	12:30 PM	50	100
		6-9-71	1:30 PM	56	70
		6-23-71	11:45 AM	59	56
		7-21-71	3:00 PM	72	15
		8-5-71	1:10 PM	66	21
Wolf Creek	Mouth	1-5-71	12:00 NOON	40	99
		3-22-71	2:20 PM	43	137
		4-8-71	2:10 PM	46	109
		4-29-71	2:10 PM	48	43
		5-5-71	11:30 AM	48	30
		5-12-71	3:30 PM	54	24
		5-25-71	3:00 PM	51	28
		6-9-71	2:00 PM	52	15
		7-21-71	3:30 PM	64	5.9
Miami River	Above Moss Cr.	11-20-70	10:55 AM	50	270
		3-19-71	8:45 AM	44	300
		4-15-71	12:40 PM	50	178
		4-22-71	2:30 PM	52	158
		5-6-71	11:20 AM	52	74
		5-13-71	9:30 AM	51	64
		6-1-71	5:00 PM	52	80
		6-9-71	6:10 PM	56	52
		8-5-71	8:30 AM	56	37
		8-12-71	9:45 AM	58	23
Kilchis River	Below Myrtle Cr.	11-20-70	8:40 AM	49	860
		4-22-71	12:45 PM	48	314
		5-6-71	12:45 PM	54	189
		5-13-71	8:20 AM	52	150
		6-1-71	4:20 PM	51	138

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
Kilchis River (cont.)	Below Myrtle Cr.	6-10-71	9:15 AM	54	100
		6-23-71	4:30 PM	59	240
		7-23-71	9:10 AM	58	139
		8-4-71	4:00 PM	62	62
		11-19-71	11:00 AM	48	450
Kilchis River	Above Little South Fork	11-20-70	10:00 AM	49	587
		4-22-71	1:30 PM	48	230
		5-6-71	1:30 PM	54	132
		5-13-71	9:00 AM	52	106
		6-10-71	9:45 AM	54	89
		8-4-71	5:00 PM	62	56
		11-19-71	11:45 AM	48	353
Wilson River	Below Little North Fork	4-30-71	10:00 AM	48	824
		5-6-71	5:30 PM	55	635
		5-13-71	10:20 AM	53	575
		6-2-71	8:40 AM	50	476
		6-9-71	5:00 PM	58	344
		6-16-71	2:30 PM	58	433
		6-23-71	5:30 PM	62	433
		7-6-71	1:15 PM	56	430
		7-23-71	9:40 AM	61	285
		8-4-71	2:15 PM	66	187
		8-19-71	6:00 PM	68	153
Wilson River	Below Cedar Cr.	4-29-71	5:30 PM	50	530
		5-6-71	4:00 PM	56	493
		6-2-71	9:30 AM	49	275
		6-9-71	4:00 PM	56	230
		7-21-71	5:45 PM	69	207
		8-4-71	12:10 PM	62	129
		8-19-71	5:00 PM	68	88

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
Little North Fork Wilson River	Mouth	1-5-71	9:45 AM	39	160
		3-18-71	4:45 PM	48	231
		4-14-71	1:05 PM	48	193
		4-22-71	10:30 AM	47	101
		4-30-71	8:40 AM	48	84
		5-6-71	5:00 PM	57	61
		5-12-71	6:15 PM	54	46
		8-13-71	2:00 PM	62	28
North Fork Wilson River	Mouth	4-22-71	9:30 AM	44	225
		4-29-71	4:40 PM	49	168
		5-6-71	3:30 PM	55	170
		5-12-71	5:30 PM	54	122
		6-2-71	10:00 AM	48	90
		6-9-71	3:30 PM	56	65
		7-21-71	5:00 PM	62	61
		8-19-71	4:00 PM	64	25
South Fork Wilson River	Mouth	1-4-71	4:40 PM	41	129
		2-18-71	3:00 PM	43	179
		3-18-71	3:15 PM	45	133
		4-14-71	2:00 PM	48	152
		4-22-71	8:40 AM	42	103
		4-29-71	4:00 PM	48	78
		5-6-71	2:40 PM	54	70
		5-12-71	5:00 PM	52	56
		6-2-71	10:40 AM	48	35
		7-21-71	4:30 PM	70	14
		8-4-71	1:20 PM	62	12
Trask River	Below Hatchery Cr.	4-30-71	2:45 PM	50	668
		5-6-71	2:00 PM	58	465
		5-13-71	10:45 AM	54	397
		6-1-71	11:10 AM	50	356

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
Trask River (cont.)	Below Hatchery Cr.	6-10-71	10:30 AM	56	331
		6-16-71	2:00 PM	58	323
		6-24-71	8:20 AM	56	244
		7-6-71	12:30 PM	56	280
		7-23-71	10:15 AM	63	173
		8-4-71	10:30 AM	66	158
		8-19-71	12:10 PM	64	113
South Fork Trask River	Below East Fork of South Fork	4-30-71	11:30 AM	48	265
		5-7-71	9:45 AM	50	181
		6-1-71	3:10 PM	50	200
		6-10-71	12:05 PM	52	166
		7-23-71	11:30 AM	58	110
		8-19-71	2:00 PM	60	61
		11-19-71	2:10 PM	50	460
South Fork Trask River	Below Edwards Cr.	4-21-71	1:20 PM	50	115
		4-30-71	11:00 AM	48	96
		5-7-71	9:15 AM	49	70
		6-1-71	2:50 PM	50	80
		6-10-71	11:30 AM	52	59
		6-24-71	9:20 AM	50	56
		7-23-71	11:05 AM	56	43
		8-4-71	11:00 AM	58	40
		8-19-71	1:30 PM	60	23
Edwards Creek	Mouth	1-4-71	12:15 PM	41	64
		3-18-71	1:30 PM	48	98
		4-21-71	11:55 AM	50	52
		5-7-71	9:00 AM	49	24
		6-24-71	9:15 AM	50	22
		7-23-71	11:00 AM	56	10

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
North Fork Trask River	Below Bark Shanty Cr.	4-30-71	1:00 PM	50	336
		5-7-71	12:30 PM	54	263
		6-1-71	2:30 PM	50	193
		6-10-71	12:45 PM	54	160
		6-24-71	9:45 AM	53	138
		7-23-71	12:05 PM	64	88
		8-19-71	2:30 PM	66	64
North Fork of North Fork Trask River	Mouth	1-4-71	2:10 PM	40	98
		4-21-71	4:30 PM	46	102
		5-7-71	11:55 AM	52	78
		6-1-71	1:20 PM	49	36
		6-10-71	1:30 PM	54	28
		7-23-71	1:10 PM	64	13
Middle Fork of North Fork Trask River	Mouth	4-21-71	4:00 PM	46	185
		5-7-71	11:30 AM	52	116
		6-1-71	12:50 PM	49	81
		6-10-71	2:00 PM	54	62
		7-23-71	1:30 PM	67	39
		8-19-71	2:50 PM	66	27
Tillamook River	Below Beaver Cr.	11-20-70	1:00 PM	50	305
		4-21-71	10:50 AM	48	154
		4-28-71	3:55 PM	50	118
		5-6-71	6:30 PM	57	80
		5-13-71	11:30 AM	54	61
		6-2-71	12:30 PM	50	65
		6-10-71	8:45 AM	53	53
		7-22-71	9:00 AM	58	42
		8-6-71	7:30 AM	57	32

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
Nestucca River	Below Beaver Cr.	4-28-71	2:15 PM	48	648
		5-7-71	9:15 AM	52	475
		5-13-71	12:45 PM	54	497
		6-2-71	10:30 AM	50	352
		6-10-71	9:30 AM	54	335
		6-16-71	12:05 PM	56	307
		6-24-71	10:45 AM	56	271
		7-6-71	11:30 AM	56	287
		7-22-71	11:00 AM	62	193
		8-5-71	3:50 PM	66	155
		8-19-71	10:30 AM	64	115
Nestucca River	Above East Cr.	4-20-71	5:30 PM	46	425
		5-7-71	10:55 AM	51	287
		6-2-71	1:20 PM	50	221
		6-10-71	10:30 AM	53	163
		6-16-71	1:00 PM	56	166
		8-6-71	8:40 AM	62	71
		8-19-71	11:00 AM	63	71
Nestucca River	Below Elk Cr.	4-20-71	4:10 PM	46	168
		4-29-71	8:00 AM	43	138
		5-7-71	11:50 AM	51	93
		6-2-71	2:40 PM	48	51
		7-22-71	12:05 PM	63	18
		8-6-71	9:30 AM	57	19
Three Rivers	Below Cedar Cr.	11-19-70	1:05 PM	50	345
		4-20-71	1:20 PM	48	270
		4-28-71	12:45 PM	47	215
		5-6-71	5:30 PM	--	145
		5-13-71	1:00 PM	51	138
		6-2-71	9:50 AM	48	109
		6-9-71	4:20 PM	52	79

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp. °F	Flow
Three Rivers (cont.)	Below Cedar Cr.	6-16-71	11:15 AM	51	97
		6-24-71	11:00 AM	50	96
		7-6-71	11:15 AM	52	113
		7-22-71	10:30 AM	56	69
		8-5-71	3:10 PM	60	35
		8-19-71	9:50 AM	56	57
Alder Creek	Mouth	11-19-70	2:00 PM	50	59
		1-4-71	10:30 AM	41	72
		3-18-71	9:45 AM	43	70
		4-20-71	12:15 PM	48	38
		4-28-71	12:15 PM	47	32
		5-6-71	4:45 PM	55	21
		7-21-71	4:40 PM	63	6.6
		8-5-71	2:50 PM	60	7.2
Beaver Creek	Mouth	11-19-70	3:00 PM	50	270
		3-18-71	11:55 AM	46	295
		4-21-71	9:10 AM	46	148
		4-28-71	2:45 PM	49	96
		5-6-71	5:55 PM	57	60
		5-13-71	12:30 PM	53	58
		6-2-71	11:30 AM	50	52
		7-22-71	10:05 AM	57	51
		8-5-71	4:15 PM	63	26
East Fork Beaver Creek	Above Bear Cr.	11-19-70	4:00 PM	50	151
		2-18-71	1:30 PM	45	161
		4-21-71	9:45 AM	46	81
		4-28-71	3:15 PM	48	57
		5-7-71	8:45 AM	48	49
		7-22-71	9:40 AM	55	22
		8-5-71	4:45 PM	62	19

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
East Creek	Above Moon Cr.	4-20-71	2:45 PM	50	61
		4-29-71	9:45 AM	45	43
Moon Creek	Mouth	11-20-70	2:15 PM	49	78
		3-18-71	11:30 AM	45	110
		4-20-71	2:40 PM	50	52
		4-29-71	9:30 AM	46	32
		6-10-71	10:00 AM	50	18
		7-22-71	11:30 AM	55	9.2
		8-6-71	8:25 AM	55	7.5
		9-16-71	---	--	16
Little Nestucca River	Below Fall Cr.	11-19-70	10:40 AM	50	408
		4-14-71	11:50 AM	48	520
		4-28-71	11:10 AM	47	218
		5-6-71	3:30 PM	54	135
		6-2-71	8:45 AM	49	111
		6-9-71	4:00 PM	56	77
		6-16-71	10:45 AM	52	70
		7-6-71	10:45 AM	53	94
		7-21-71	3:55 PM	63	62
		8-5-71	1:50 PM	62	40
Little Nestucca River	Below Louie Cr.	11-19-70	9:40 AM	50	197
		3-18-71	9:30 AM	42	234
		4-20-71	11:15 AM	47	85
		4-28-71	12:05 PM	48	69
		5-6-71	4:20 PM	45	45
		6-2-71	9:15 AM	48	35
		7-6-71	10:15 AM	52	32
		8-5-71	2:30 PM	61	9.6

Appendix 3. (continued)

Stream	Location	Date	Time	Water Temp.°F	Flow
Neskowin Creek	Below Prospect Cr.	2-18-71	11:45 AM	47	200
		4-14-71	11:00 AM	48	98
		4-20-71	10:20 AM	46	88
		4-28-71	10:25 AM	47	46
		5-6-71	2:45 PM	53	25
		6-9-71	---	--	15
		7-21-71	3:00 PM	--	25
		11-15-71	2:45 PM	52	234
		11-16-71	12:30 PM	51	160

Stream flows and temperatures measured in 1965-1966 are published in the report to which this is a supplement.

Appendix 4. Recommended angling flows for selected North Coast Basin streams /1 /2

Stream	April-October	November-March
Neskowin Creek	30	125
Little Nestucca River	50	200
Nestucca River	300	1,600
Three Rivers	50	150
Tillamook River	50	200
Trask River	300	1,200
North Fork Trask River	80	300
South Fork Trask River	50	200
Wilson River	300	1,600
Little North Fork Wilson River	30	150
Devils Lake Fork (Wilson River)	50	200
Kilchis River	70	400
Miami River	50	200
Nehalem River	300	2,500
North Fork Nehalem River	80	500
Cook Creek	30	150
Salmonberry River	50	250
Rock Creek	50	200
Necanicum River	60	250
Lewis & Clark River	50	200
North Fork Klaskanine River	30	100
South Fork Klaskanine River	30	100

Appendix 4. (continued)

Stream	April-October	November-March
Big Creek	40	200
Clatskanie River	50	250

/1 Flows are expressed in cubic feet per second.

/2 All flows are to reach the mouth of the stream.

Appendix 5. Some reservoir sites presently thought compatible with fishery resources, North Coast Basin /1

Stream	Location
Columbia River Tributaries	
Beaver Creek	T7N-R4W-S12
Clatskanie River	T5N-R3W-S36
North Fork of North Fork of Klaskanine River	T7N-R8W-S17
Youngs River	T7N-R9W-S27
Necanicum River	
South Fork Necanicum River	T5N-R9W-S29
Nehalem River	
Nehalem River	T3N-R6W-S27
North Fork Nehalem River	T4N-R9W-S1
" " " "	T4N-R9W-S14
Salmonberry River	T3N-R6W-S17
Foley Creek	T2N-R10W-S23
Tillamook River	
Beaver Creek	T2S-R10W-S3
Sutton Creek	T2S-R10W-S14

/1 Detailed studies should be conducted to determine total impact on fish and wildlife before any of the above sites are considered for development.

Appendix 6. Values used in preparation of Tables 3, 4, and 8 and parts of the text

Daily gross expenditures by sportsmen /1

Species	Expenditure per day
Sea-run cutthroat	$18.50
Resident fish	6.00
Nongame marine fish	6.00
Deer (black-tailed)	20.10
Elk (Roosevelt)	26.60
Waterfowl	8.00
Small game	6.00

Gross expenditure per animal harvested /1

Species	Expenditure per animal harvested
Coho	$74.00
Chinook	74.00
Steelhead	74.00

Ratios of commercial harvest to spawning escapement /2

Species	Ratio
Ocean Tributaries	
Coho	3:1
Chinook	3:1
Columbia River Tributaries	
Coho	5:1
Chinook	4.5:1
Steelhead	1:4

Commercial fish values /2

Species	Average weight (lbs.)	Fishermen value per pound
Ocean		
Coho	8	$0.50
Chinook	12	.70
Columbia		
Coho	9	.40
Chinook	15	.60
Steelhead	10	.30

/1 Source: Oregon State Game Commission.

/2 Source: Fish Commission of Oregon.

Appendix 7. Streams which should be protected from gravel removal

Stream	Reach of stream
Clatskanie River	Above Swedetown
Lewis & Clark River	Above South Fork
Necanicum River	Above Meyer Creek
Nehalem River Tributaries	Above Vernonia
North Fork Nehalem River	Above Highway 53
Humbug Creek	Entire
Salmonberry River	Entire
Cook Creek	Entire
Miami River	Above Prouty Creek
Miami River Tributaries	All
Kilchis River	All River Mile 4.0
Kilchis River Tributaries	All
Wilson River	Above River Mile 8.5
Wilson River Tributaries	All
Trask River	Above Hanenkrat Creek
Trask River Tributaries	All
Tillamook River	Above River Mile 7.0
Tillamook River Tributaries	All
Nestucca River	Above River Mile 12.5
Nestucca River Tributaries	All
Little Nestucca River	Above River Mile 3.5
Little Nestucca River Tributaries	All
Neskowin Creek	Above River Mile 2.0
Neskowin Creek Tributaries	All