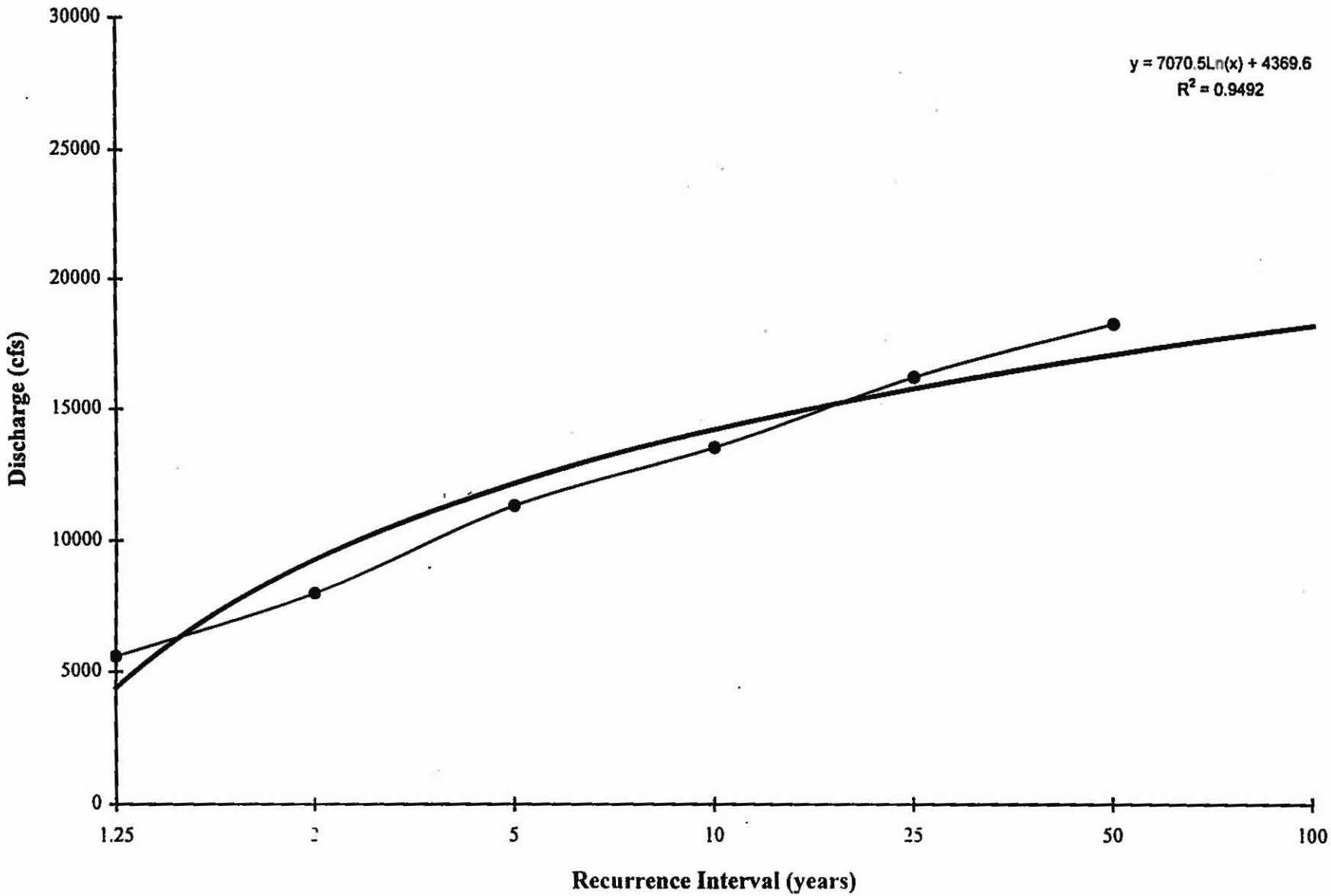
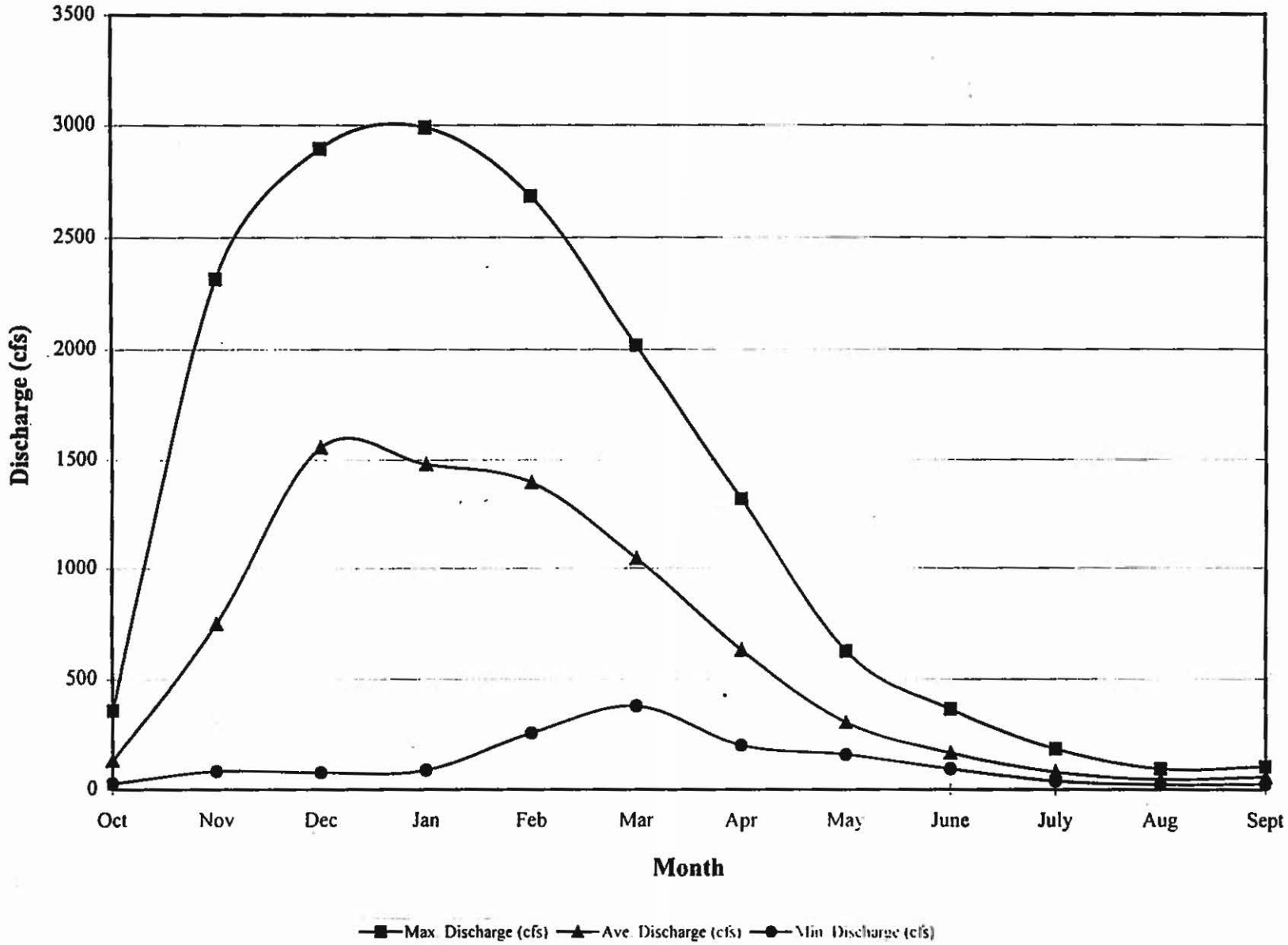
Appendix A

Hydrology

Due to lack of data presented by the USGS, best line fit methodology was used to predict the expected 100-year recurrence interval for discharge for the lower Siuslaw watershed. Extrapolated data from the USGS data for the Siuslaw River Basin (gauging station #14307620) were used to predict the 1.25-, 2-, 5-, 10-, 25-, and 50-year recurrence intervals for discharges (these data are included in this appendix). The data was extrapolated by altering the USGS data to reflect the area of the lower Siuslaw watershed, rather than the entire 558-square-mile Siuslaw River Basin. The 100-year discharge was provided by the USGS using extrapolated data from the 1994 rating curve.

Best line fit graphic depicting 100-yr recurrence interval for the lower Siuslaw Watershed




3500
3000
2500
2000
1500
1000
500
0
Discharge (cfs)
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
June
July
Aug
Sept
Month
Max. Discharge (cfs)
Ave. Discharge (cfs)
Min. Discharge (cfs)

STATISTICAL SUMMARIES OF STREAMFLOW DATA IN OREGON: VOLUME 2 -- ANNUAL LOW AND HIGH FLOW AND INSTANTANEOUS PEAK FLOW

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By Roy E. Wellman, Janice M. Gordon, and Robert L. Moffatt

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ABSTRACT

Statistical summaries of streamflow data at 358 stream-gaging sites are presented to aid in appraising the hydrology of river basins in Oregon. Records for 36 stream-gaging stations were compiled into separate periods because of changes in streamflow regulation during the period of data collection. Statistical summaries for the periods before and after regulation are presented for comparison.

A brief description is given on the physical and operational features for each stream-gaging station. Tables of annual low-flow and high-flow frequency data, and tables of instantaneous peak discharges for selected recurrence intervals also are shown.

INTRODUCTION

This is the second of two volumes of statistical summaries of streamflow data collected at stream-gaging stations in Oregon. Volume 1 contains statistical summaries of monthly and annual flow, and monthly and annual flow-duration information (Moffatt and others, 1990). This report contains annual low-flow and high-flow frequency analyses, and flood-frequency summaries.

The purpose of this report is to provide streamflow characteristics, based on historical data, to water-resource managers. This report was prepared in cooperation with the Oregon Water Resources Department (OWRD). The locations of stream-gaging stations are shown on plate 1.

STREAMFLOW RECORDS

A brief description of each gaging station outlining the physical and operational features of the site precedes the statistical summaries. Except for paragraphs describing revised records and extremes for a specific year, the station descriptions are identical to the 1987 published version in the annual release "Water Resources Data - Oregon" (U.S. Geological Survey, 1987 volumes 1 and 2). A detailed explanation of the station description and a definition of terms is given in that report. Data from active and discontinued gaging stations having a minimum of 10 years of daily mean-discharge values are shown in this report. For active stations, data through the 1987 water year are included in this report.

In addition to requiring 10 years of daily record to be included in these analyses, gaging-station records had to satisfy one of two criteria. The data had to be hydrologically transferable (for use in estimating streamflow in ungaged basins), or the data had to be a significant indicator of flow availability. For example, data from a gaging station at the outlet of a natural lake may have little hydrologic transferability

(owing to storage of water in the lake). The data, however, would be a good indication of low-flow availability as well as flood events, and would be included without the peak-low analyses.

The natural flow of a stream may be altered by the construction of a dam, an irrigation diversion, or by the augmentation of flow by transbasin diversions; If drainage basin conditions changed during the operation of a gaging station, statistical summaries that reflect both natural and altered states of flow are provided when there are at least 10 years of data for each basin condition.

STATISTICAL SUMMARY TABLES

The tables of statistical analyses include magnitude and probabilities of non-exceedance of low flows in nine duration classes, magnitude and probabilities of exceedances of high flows in seven duration classes, and magnitude and probabilities of exceedances of instantaneous peak flows. The period of record shown in the heading is the first and last water year for which daily mean discharge values are available, and does not necessarily indicate continuous record (see the PERIOD OF RECORD paragraph in the station description for fragmentary records). The value "n" shown in the tables represents the number of years of systematic record used in the respective computations of flow frequency. The statistical output in the low-flow and high-flow tables were generated by using computer programs available from the U.S. Geological Survey's (USGS) WATSTORE (National Water Data Storage and Retrieval System) and USGS's computer software ANNIE (Lumb and others, 1989). The statistical outputin the instantaneous peak-flow tables were generated from annual instantaneous peak discharges using the USGS's computer software ANNIE.

Frequency Curves

A frequency curve is a graphical representation of the cumulative distribution of a random population of data. If a time series is used, magnitude is related to some recurrence interval. These populations, for this report, are the n-day (n equals number of days) high flow and n-day low flow mean values generated from daily mean flow values and the annual instantaneous peak flow. If individuals in the population are random and homogeneous, the frequency curve can be used as a probability curve, estimating a probability of exceedance or non-exceedance. Frequency curves are applied to a wide variety of water resource problems. High flow frequency curves are used for flood-plain zoning and the design of industrial and municipal water-supply systems, irrigations supplies, and as guidelines for minimal flow requirements. Many other applications have been made. Guidelines outlined by Hardison (1969) were used to determine the extension of frequency curves. The recurrence interval was extended to 25 years if the minimum years of station record equaled 15 years; 50 years if the minimum years of station record equaled 20 years; and 100 years if the minimum years of station record equaled 25 years.

Magnitude and Probability of Low Flows

The computation period for low-flow analysis is based on a climatic year which ends on March 31, thus assuring the low-flow season will be complete within a twelve-month period. The annual events of various duration were evaluated for randomness with Kendall Tau statistics, available in the ANNIE (Lumb and others, 1989), as a pre-processing step to frequency analysis 1989). Stations with Kendall Tau statistics indicating a 5 percent or less chance of annual flow events being independent were further studied to determine if the time periods were suitable for frequency analysis. Some stations exhibited apparent trends in the data as a result of climatic variability. Time periods were adjusted only if land use changes in the watershed could be verified.

The tabulations show annual-minimum mean flows for averaging periods of 1, 3, 7, 14, 30, 60, 90, 120, and 183 consecutive days (n-day mean flows) for recurrence intervals of 2, 5, 10, 20, 50, and 100 years. The associated annual non-exceedance probabilities are 50, 20, 10, 5, 2, and 1 percent. The annual minima are based on a climatic year. Recurrence intervals for low flows represent the average time between occurrences of annual minimum flows less than the stated flow magnitudes. Non-exceedance probability is the probability, or chance, expressed as a percentage, that the annual minimum flow will be less than the stated magnitude in any given year. For example, the low flow during a 30-day period might not be exceeded on the average of once every 50 years, and would have a 2 percent chance of not being exceeded in any given year.

Magnitude and Probability of High Flows

The computation period is based on a 12-month water year which ends September 30, after the occurrence of seasonal high-water events. Annual events of various durations were evaluated for randomness with Kendall Tau statistics, available in the ANNIE (Lumb and others, 1989) software package, as a pre-processing step to frequency analysis.

The tabulations show annual maximum mean flows for averaging periods of 1, 3, 7, 15, 30, 60, and 90 consecutive days (n-day mean flows) for recurrence intervals of 2, 5, 10, 25, 50, and 100 years. The associated annual exceedance probabilities are 50, 20, 10, 4, 2, and 1 percent. The annual minima are based on a climatic year. Recurrence intervals for high flows represent the average length of time between occurrences of annual high flows greater than the stated flow magnitudes. Exceedance probability is the probability, or chance, expressed as a percentage, that the annual high flow will be greater than the stated magnitude in any given year. Computed frequency points were checked to assure the 1-day high flows do not exceed peak-flow frequency points.

Magnitude and Probability of Instantaneous Peak Flows

The magnitude of instantaneous peak flows are listed in the statistical-summary tables for selected recurrence intervals as computed from a log-Pearson Type III probability distribution of peak flows using guidelines from Bulletin 17B of the U.S. Water Resources Council (1981). The years of systematic record were the determinants for choosing the

coefficient of skew computational method. For stations having less than 20 years of data, the frequency curve was based on a generalized skew coefficient. For stations having more than 20 years of data, the skew coefficient was determined by weighing the generalized skew against the skew of the systematic record of annual peaks as recommended by Bulletin 17B of the U.S. Water Resources Council (1981). The skew used for a particular station is shown at the bottom of the table. Procedures for including historic flood information were used where applicable. Historical peaks are data outside the period or periods of systematic data.

Major floods in western Oregon occur between October and March, when the majority of annual precipitation falls as winter rainstorms. In eastern Oregon, major floods can result from winter rainstorms, from spring melting of the winter snowpack, or from summer convective storms (U.S. Geological Survey, 1991). Western Oregon flood events were considered to result from a singular cause, winter rainstorms, and were treated as one population. Eastern Oregon flood events, resulting from different causes, could not be identified and separated objectively, and were not analyzed using a mixed-population analyses.

Flood-frequency statistics at gaging stations immediately downstream from dams and reservoirs are computed only for the non-regulated period, assuming there were 10 years of record available for the analysis.

14307620 SIUSLAW RIVER NEAR MAPLETON, OR
(National stream quality accounting network station)

LOCATION.--Lat 44°03'45", long 123°52'55", in SW 1/4 NW 1/4 sec.27, T.17 S., R.10 W., Lane County, Hydrologic Unit 17100206, on right bank 250 ft above Shoemaker Creek, 2.5 mi northwest of Mapleton, and at mile 23.7.

DRAINAGE AREA.--588 mi^2.

PERIOD OF RECORD.--October 1967 to 1987.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 41 ft, from topographic map.

REMARKS.--No regulation or diversions upstream from station.

AVERAGE DISCHARGE.--20 years, 2,141 ft^3/s, 49.45 in/yr, 1,551,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 49,400 ft^3/s Jan. 21, 1972, gage height, 28.45 ft; minimum discharge, 45 ft^3/s Aug. 18, 19, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of December 1964 reached a stage of about 28 ft, from information by local residents (discharge not determined).

STATISTICAL SUMMARIES

[n = number of values used to compute statistics]

MAGNITUDE AND PROBABILITY OF ANNUAL LOW FLOW
BASED ON PERIOD OF RECORD 1969-1987

PERIOD (CONSECUTIVE DAYS)	n	DISCHARGE, IN FT^3/S, FOR INDICATED RECURRENCE INTERVAL, IN YEARS, AND ANNUAL NONEXCEEDANCE PROBABILITY, IN PERCENT					
		2 50%	5 20%	10 10%	20 5%	50 2%	100 1%
1	19	89	66	57	51	--	--
3	19	91	68	59	53	--	--
7	19	95	71	62	55	--	--
14	19	101	76	66	59	--	--
30	19	112	86	76	68	--	--
60	19	137	105	92	82	--	--
90	19	164	126	111	100	--	--
120	19	204	159	141	129	--	--
183	19	367	281	246	221	--	--

MAGNITUDE AND PROBABILITY OF ANNUAL HIGH FLOW
BASED ON PERIOD OF RECORD 1968-1987

PERIOD (CONSECUTIVE DAYS)	n	DISCHARGE, IN FT^3/S, FOR INDICATED RECURRENCE INTERVAL, IN YEARS, AND ANNUAL EXCEEDANCE PROBABILITY, IN PERCENT					
		2 50%	5 20%	10 10%	25 4%	50 2%	100 1%
1	19	23300	32900	38800	45800	50600	--
3	19	19200	26500	30900	36000	39500	--
7	19	14100	18600	21300	24500	26600	--
15	19	10000	13000	14700	16800	18300	--
30	19	7890	9650	10500	11300	11800	--
60	19	6230	7960	8810	9610	10100	--
90	19	5450	7040	7760	8420	8770	--

MAGNITUDE AND PROBABILITY OF INSTANTANEOUS PEAK FLOW
BASED ON PERIOD OF RECORD 1968-1987

DISCHARGE, IN FT^3/S, FOR INDICATED RECURRENCE INTERVAL, IN YEARS, AND ANNUAL EXCEEDANCE PROBABILITY, IN PERCENT						
1.25 80%	2 50%	5 20%	10 10%	25 4%	50 2%	100 1%
18900	27000	38200	45500	54700	61500	--

Systematic n = 20 historical n = 0
Generalized 17b skew = -0.128

14307620 SIUSLAW RIVER NEAR MAPLETON, OR
(National stream quality accounting network station)

LOCATION.--Lat 44°03'45", long 123°52'55", in SW 1/4 NW 1/4 sec.27, T.17 S., R.10 W., Lane County, Hydrologic Unit 17100206, on right bank 250 ft above Shoemaker Creek, 2.5 mi northwest of Mapleton, and at mile 23.7.

DRAINAGE AREA.--588 mi^2.

PERIOD OF RECORD.--October 1967 to 1987.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 41 ft, from topographic map.

REMARKS.--No regulation or diversions upstream from station.

AVERAGE DISCHARGE.--20 years, 2,141 ft^3/s, 49.45 in/yr, 1,551,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 49,400 ft^3/s Jan. 21, 1972, gage height, 28.45 ft; minimum discharge, 45 ft^3/s Aug. 18, 19, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of December 1964 reached a stage of about 28 ft, from information by local residents (discharge not determined).

STATISTICAL SUMMARIES FOR THE PERIOD 1968-1987

[n = number of values used to compute statistics; months are abbreviated; Ann = annual]

Monthly and annual statistics based on mean daily discharge, in cubic feet per second

Month	n	Minimum	(year)	Maximum	(year)	Mean	Standard deviation	Percent of annual runoff
Oct	20	94	1975	1220	1969	449	323	1.8
Nov	20	281	1977	7820	1974	2520	2020	9.7
Dec	20	261	1977	9790	1982	5260	2800	20.9
Jan	20	300	1977	10100	1970	5000	2760	19.8
Feb	20	876	1977	9080	1986	4710	2080	17.0
Mar	20	1290	1978	6820	1974	3530	1700	14.0
Apr	20	686	1977	4450	1982	2120	1020	8.1
May	20	541	1985	2100	1984	1040	431	4.1
Jun	20	320	1973	1240	1984	567	255	2.2
Jul	20	127	1977	628	1983	269	106	1.1
Aug	20	77	1973	321	1968	157	61	0.6
Sep	20	86	1987	356	1971	194	83	0.7
Ann		576	1977	3720	1974	2140	724	100.0

Flow duration statistics based on mean daily discharge

Discharge, in cubic feet per second, which was equaled or exceeded for indicated percent of time

Month	95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	(n)
Oct	84	93	103	127	147	158	178	204	243	362	468	629	798	1170	1850	20
Nov	215	310	422	504	580	669	881	1200	1670	2450	2910	3680	4930	6750	9550	20
Dec	396	780	1170	1510	1870	2180	2930	3760	4920	6350	7220	8210	9340	1400	4700	20
Jan	531	1070	1380	1660	1870	2100	2540	3160	4000	5320	6180	7200	8240	900	5600	20
Feb	905	1230	1490	1780	2030	2270	2780	3380	4170	5370	6030	7080	8220	100	3300	20
Mar	1140	1320	1480	1630	1740	1860	2170	2570	3110	3870	4430	5090	5900	7090	9040	20
Apr	786	919	1010	1090	1170	1250	1400	1580	1830	2210	2450	2790	3190	3950	5450	20
May	449	508	562	614	654	694	771	863	975	1100	1190	1280	1400	1640	2070	20
Jun	269	291	320	349	371	391	428	476	517	571	605	645	714	844	1220	20
Jul	135	152	166	176	185	195	217	240	268	294	313	338	366	404	473	20
Aug	73	83	93	106	115	121	133	143	154	168	180	190	201	228	278	20
Sep	76	82	87	93	99	104	116	142	172	208	228	258	289	363	497	20
Ann	100	136	167	199	242	311	519	880	1360	2060	2540	3190	4130	5800	8700	

Appendix B

Road Condition Inventories

Key to the Chronic Road Maintenance Locations map

Source: Eli Adkisson, Roads Manager on the Mapleton Ranger District

All Forest Service local roads (spurs) have been waterbarred unless noted otherwise.

1. Hadsall Creek Road (County Rd 5035, FS #4880): From entry (MP 0.0) at County Rd 5036 south to Forest Service Boundary.
- High traffic and use
- Extensive tread damage annually from log haul
- Requires annual ditch cleanout, primarily from tread erosion and cutbank ravel

2. Sweet Ck. Road (County Rd 5036, FS #48): From Cedar Ck south to Goodwin Pk.
- Deteriorating culverts, metal pipes are rusted and not functioning well
- Requires annual ditch cleanout, extensive cutbank ravel

3. Beaver Ck Road (FS #4800-831): From Forest Boundary (MP 0.7 aprox.) to a half mile upstream (northeast) from Cabbage Ck confluence.
- Road flooding and drainage problems from Beaver dams

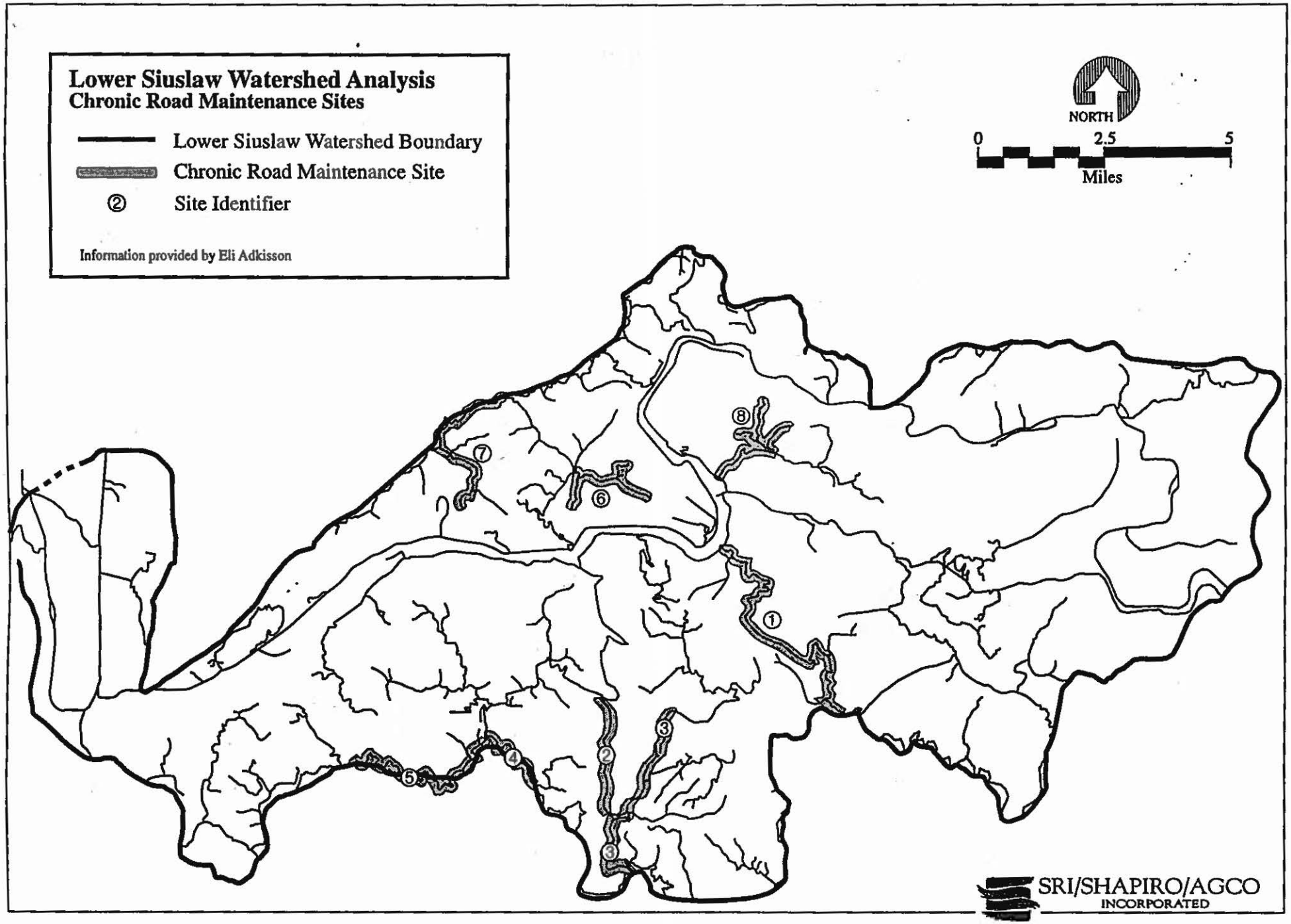
4. Sunset Road (FS #2480): From road #24 intersection southeast to Elk Wallow Ck.
- Extensive cutbank ravel and backslope failures/slumps

5. Cedar Ck Road (FS #24): From road #2480 intersection west to spur road #888.
- Multiple road prism slumps and sidecast failures (deteriorating logs in fill)
- Repaired 7 locations with deep-seat patches (compacted layers of pit run and gravel fill)

6. FS Roads #2610-812, 818, 819, & 820:
- None have been waterbarred
- Some road prism sections are sinking (slumps)

7. FS Road #2610 & 2610-719: From the end of spur #719 north to intersection with road # 2610, and then east to intersection with road #2619.
- Lots of slumps and cutbank ravel along entire length

8. All of the FS #2680 spur roads in section 36 have not been waterbarred.


Lower Siuslaw Watershed Analysis
Chronic Road Maintenance Sites
Lower Siuslaw Watershed Boundary
Chronic Road Maintenance Site
② Site Identifier
Information provided by Eli Adkisson
NORTH
0
2.5
5
Miles
SRI/SHAPIRO/AGCO
INCORPORATED

RCA Key:

For Column Headings for the Culvert Assessment:

DIA = pipe diameter (in)
SID = route or road number
MP = milepost
Type = culvert type
galv = galvanized bit = bituminous conc = concrete
GRAD = gradient of pipe
FILL HT = depth of fill above pipe at road centerline (ft)
CHAN WDT = channel width (ft)
INCOND = inlet condition
pl = plugged culvert inlet pp = partially plugged culvert inlet cl = clear inlet
OUTCOND = outlet condition
OUTHT = outlet height (ft) above water
DIVER_POT = diversion potential
DIVER_DIS = distance (ft) of diverted flow to next channel entry site
PROBLEMS = specific field notes, available from S.O., Courtney Cloyd

CULVERTS – LOWER SIUSLAW

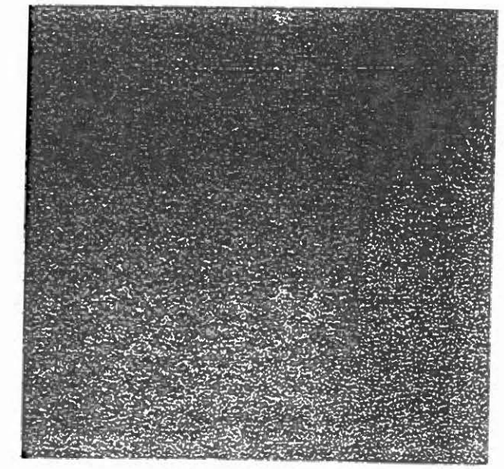
AREA	PERIMETER	CULVERTS_	CULVERTS_I	DIA	SID	NSID	MP	LINK	TYPE	GRAD	FILL_HT	CHAN_WDT	INCOND	OUTCOND	OUTHT	DOWNPIPE	DIVER_POT	DIVER_DIS	PROBLEMS
0.000000	0.000000	1	896	18	2170000	Is6	6.45	0.000000	galv	4	3	30	pp 1	ok	1		y	500	see notes
0.000000	0.000000	2	1552	0	217000000.00	Is126		0.000000											
0.000000	0.000000	3	895	18	2170000	Is5	2.0	0.000000	bit	3	3	50	cl 2	ok	3		y	200	see notes
0.000000	0.000000	4	827	24	2170000	Is4	1.7	0.000000	bit	8	2	36	pp 3	ok	6		y	200	see notes
0.000000	0.000000	5	826	36	2170000	Is3	1.6	0.000000	galv		4	50	pp 4	sl	30		y	100	see notes
0.000000	0.000000	6	894	24	2170000	Is2	1.3	0.000000	bit	6	3	15	cl 5	ok	2		y	200	see notes
0.000000	0.000000	7	893	48	2170000	Is1	.5	0.000000	bit	8	6	40	cl 6	ok	0		y	500	see notes
0.000000	0.000000	8	897	18	2610000	Is7	6.7	0.000000	galv	4	3	30	pp 7				y	50	see notes
0.000000	0.000000	9	904	24	2680000	Is13	.8	0.000000	galv	1	5	180	cl 8	ok	0		n		
0.000000	0.000000	10	905	36	2680000	Is13.1	.8	0.000000	galv	2	7	180	pp 9	ok	0		n		
0.000000	0.000000	11	898	18	2610811	Is8	.4	0.000000	galv	3		40	pl 10				y	150	see notes
0.000000	0.000000	12	1545	0	261000000.00	Is103		0.000000											
0.000000	0.000000	13	1546	0	261000000.00	Is102		0.000000											
0.000000	0.000000	14	900	24	2610827	Is9	.15	0.000000		10	18	95	pp 11	ok	0		y		
0.000000	0.000000	15	1547	0	261000000.00	Is101		0.000000											
0.000000	0.000000	16	901	24	2610000	Is10	1.0	0.000000		6	15	75	cl 12	ok	2		y	50	see notes
0.000000	0.000000	17	1548	0	261083400.00	Is125		0.000000											
0.000000	0.000000	18	902	18	2610000	Is11	.55	0.000000		8	12	75	cl 13	ok	0				see notes
0.000000	0.000000	19	903	18	2610000	Is12	.1	0.000000	galv	3	20	125	cl 14	ok	3		y	300	see notes
0.000000	0.000000	20	1549	0	480083100.00	Is108		0.000000											
0.000000	0.000000	21	908	18	4800831	Is14	.8	0.000000	galv	3	3	90	pp 15	ok	1		y	50	see notes
0.000000	0.000000	22	907	24	4800831	Is15	1.0	0.000000	galv	3	4	60	pp 16	ok	0		y	200	see notes
0.000000	0.000000	23	1550	0	480083100.00	Is109		0.000000											
0.000000	0.000000	24	914	24	4880000	Is21	.1	0.000000	galv	1	2	100	cl 17	ok	0		n		see notes
0.000000	0.000000	25	915	24	4880000	Is22	.15	0.000000	galv	1	2		cl 18	ok	2		n		see notes
0.000000	0.000000	26	916	18	4880000	Is23	.18	0.000000	galv	1	3	50	pp 19	ok	3		n		see notes
0.000000	0.000000	27	917	36	4880000	Is24	1.4	0.000000	bit	2	3		cl 20	ok	5		n		
0.000000	0.000000	28	918	30	4880000	Is25	1.5	0.000000	galv	1	1	60	cl 21	ok	1		n		
0.000000	0.000000	29	1551	0	480083600.00	Is110		0.000000											
0.000000	0.000000	30	1553	0	488000000.00	Is104		0.000000											
0.000000	0.000000	31	919	24	4880000	Is26	2.25	0.000000	bit	2	2	100	cl 22	ok	1		n		see notes
0.000000	0.000000	32	976	24	4880000	Is26.1	2.25	0.000000	bit	2	3	100	cl 23	ok	4		n		see notes
0.000000	0.000000	33	920	18	4880000	Is27	2.35	0.000000	bit	1	3	300	cl 24	ok			n		see notes
0.000000	0.000000	34	974	24	4880000	Is27.1	2.4	0.000000	bit	2	3	300	cl 25	ok			n		see notes
0.000000	0.000000	35	1536	0	488000000.00	Is105		0.000000											
0.000000	0.000000	36	921	24	4880000	Is28	2.7	0.000000	galv	2	4	60	cl 26	ok	2		n		see notes
0.000000	0.000000	37	975	24	4880000	Is28.1	2.7	0.000000	galv	2	5	60	cl 27	pl	4		n		see notes
0.000000	0.000000	38	928	18	4880000	Is35	4.0	0.000000	galv	1	3	100	cl 28	ok			y		see notes
0.000000	0.000000	39	922	18	4880000	Is29	2.85	0.000000	galv	1	3	40	cl 29	ok	6		y	100	see notes
0.000000	0.000000	40	923	18	4880000	Is30	3.0	0.000000	galv	2	3	60	pp 30	sl			n		see notes
0.000000	0.000000	41	1538	0	488000000.00	Is107		0.000000											
0.000000	0.000000	42	924	30	4880000	Is31	3.2	0.000000	galv	1	1		cl 31	ok	5		y	250	see notes
0.000000	0.000000	43	925	24	4880000	Is32	3.4	0.000000	galv	2	3	75	pp 32	ok	1		y	300	see notes
0.000000	0.000000	44	1537	0	488000000.00	Is106		0.000000											
0.000000	0.000000	45	977	24	4880000	Is32.1	3.4	0.000000	galv	2	4	5	pp 33	ok	1		y	300	see notes
0.000000	0.000000	46	927	30	4880000	Is34	3.6	0.000000	galv	3	20	120	cl 34	ok	3		y	300	see notes
0.000000	0.000000	47	926	36	4880000	Is33	3.45	0.000000	bit	2	12		cl 35	ok	1		y	300	
0.000000	0.000000	48	1500	0	240000000.00	Is119		0.000000											
0.000000	0.000000	49	937	18	2400000	Is43	1.4	0.000000	galv	3	10	45	pp	ok	1		y	50	see notes
0.000000	0.000000	50	936	24	2400000	Is42	1.12	0.000000	conc	3	10	50	cl	ok	0		y	100	see notes
0.000000	0.000000	51	935	30	2400000	Is41	1.1	0.000000	conc		12	80	cl 38	ok	0		y	100	
0.000000	0.000000	52	1539	0	480083100.00	Is111		0.000000											
0.000000	0.000000	53	1501	0	240000000.00	Is118		0.000000											
0.000000	0.000000	54	934	18	2400000	Is40	1.05	0.000000	galv	3	8	60	cl 39	ok	1		y	100	
0.000000	0.000000	55	933	18	2400000	Is39	.75	0.000000	galv	3	3	50	cl	ok	1		y	100	
0.000000	0.000000	56	932	40	2400000	Is38	.7	0.000000	conc	1	3	60	cl	ok	0		y	200	
0.000000	0.000000	57	931	18	2400000	Is37	.5	0.000000	galv		3	25	cl	ok	1		n		
0.000000	0.000000	58	930	18	2400000	Is36	.45	0.000000	conc	2	4	30	pp 43	ok	3		n		
0.000000	0.000000	59	1540	0	480083100.00	Is97		0.000000											
0.000000	0.000000	60	1541	0	480083100.00	Is98		0.000000											
0.000000	0.000000	61	1542	0	480083100.00	Is99		0.000000											
0.000000	0.000000	62	909	18	4800831	Is16	6.4	0.000000	galv	3	10	120	pl 44	ok	0		n		see notes
0.000000	0.000000	63	1543	0	480083100.00	Is100		0.000000											
0.000000	0.000000	64	910	18	4800831	Is17	6.5	0.000000		6	13	60	pp 45	ok	0		n		
0.000000	0.000000	65	911	18	4800831	Is18	6.7	0.000000	galv	2	12	100	cl	ok	6		n		
0.000000	0.000000	66	912	18	4800831	Is19	6.75	0.000000	galv	3	6	75	pp	ok	4		n		
0.000000	0.000000	67	913	18	4800831	Is20	6.8	0.000000	galv	2	4	60	pp 48	ok	4		n		
0.000000	0.000000	68	1523	0	240000000.00	Is76		0.000000											

CL = 42
PP = 32
PL = 4 ALL FS

AREA	PERIMETER	CULVERTS	CULVERTS_I	DIA	SID	NSID	MP	LINK	TYPE	GRAD	FILL_HT	CHAN_WDT	INCOND	OUTCOND	OUTHT	DOWNPIPE	DIVER_POT	DIVER_DIS	PROBLEMS
0.000000	0.000000	69	1524	0	240000000.00	ls75		0.000000											
0.000000	0.000000	70	1521	0	240000000.00	ls81		0.000000											
0.000000	0.000000	71	1522	0	240000000.00	ls80		0.000000											
0.000000	0.000000	72	1503	0	248093300.00	ls124		0.000000											
0.000000	0.000000	73	1502	0	248000000.00	ls120		0.000000											
0.000000	0.000000	74	1544	0	240095000.00	ls83		0.000000											
0.000000	0.000000	75	1520	0	240000000.00	ls82		0.000000											
0.000000	0.000000	76	966	18	4800831	ls69	1.65	0.000000	bit	2	2	60	pl 49	pp			n		
0.000000	0.000000	77	1504	0	248093300.00	ls123		0.000000											
0.000000	0.000000	78	1525	0	240000000.00	ls74		0.000000											
0.000000	0.000000	79	965	18	4800831	ls68	1.6	0.000000	bit	2	2	40	cl 56	ok	1		n		
0.000000	0.000000	80	1505	0	248093300.00	ls122		0.000000											
0.000000	0.000000	81	1526	0	240000000.00	ls79		0.000000											
0.000000	0.000000	82	1506	0	248093300.00	ls121		0.000000											
0.000000	0.000000	83	1528	0	240000000.00	ls77		0.000000											
0.000000	0.000000	84	1527	0	240000000.00	ls78		0.000000											
0.000000	0.000000	85	951	24	4800000	ls53	.35	0.000000	bit	2	6	40	pp 51	ok	4		y	250	see notes
0.000000	0.000000	86	964	18	4800831	ls67	1.3	0.000000	bit	2	2	75	cl	ok	3				
0.000000	0.000000	87	1507	0	480000000.00	ls84		0.000000											
0.000000	0.000000	88	949	24	4800000	ls54	.55	0.000000	bit	2	3	60	pp 53	ok	0		y	100	
0.000000	0.000000	89	963	24	4800831	ls66	1.1	0.000000	galv	2	3	75	pp	ok	4		y	250	see notes
0.000000	0.000000	90	950	18	4800000	ls55	.6	0.000000	bit	2	2	50	pp	ok	0		y	100	see notes
0.000000	0.000000	91	962	18	4800831	ls65	.85	0.000000	galv	2	2		pp 56	ok	4		y	150	see notes
0.000000	0.000000	92	1508	0	480000000.00	ls85		0.000000											
0.000000	0.000000	93	961	18	4800831	ls64	.7	0.000000	galv		1	40	pp 57	ok	1		n		see notes
0.000000	0.000000	94	1509	0	480000000.00	ls86		0.000000											
0.000000	0.000000	95	970	36	4800939	ls72	.3	0.000000	bit	1	10	90	pp 58	ok			n		see notes
0.000000	0.000000	96	972	30	4800939	ls70	.15	0.000000	bit	6	15		cl	ok	4		y	100	
0.000000	0.000000	97	971	0	4800939	ls71	.3	0.000000	bit	6	8	40	cl	ok	0				
0.000000	0.000000	98	953	90	4800000	ls56	1.25	0.000000	galv	1	12	150	pp	ok	0		n	150	see notes
0.000000	0.000000	99	969	36	4800940	ls73	.05	0.000000	bit	3	10		pp 62		0		n		
0.000000	0.000000	100	1511	0	480000000.00	ls112		0.000000											
0.000000	0.000000	101	954	36	4800000	ls57	1.45	0.000000	bit	3	8	75	cl 63	ok			y	75	see notes
0.000000	0.000000	102	1512	0	480000000.00	ls113		0.000000											
0.000000	0.000000	103	955	36	4800000	ls58	1.75	0.000000	bit	2	5	60	cl 64	ok	0		y	60	
0.000000	0.000000	104	1513	0	480000000.00	ls114		0.000000											
0.000000	0.000000	105	956	18	4800000	ls59	1.85	0.000000	bit	2	3	20	pp 65	ok	2		n		
0.000000	0.000000	106	957	18	4800000	ls60	1.95	0.000000	bit	2	3	20	pp	ok	0		n		see notes
0.000000	0.000000	107	958	36	4800000	ls61	2.45	0.000000	bit	1	3	20	pp	ok	1				see notes
0.000000	0.000000	108	959	18	4800000	ls62	2.75	0.000000		2	4	25	pl	ok			n		see notes
0.000000	0.000000	109	960	30	480000000.00	ls63	2.8	0.000000					pp 69				y		see notes
0.000000	0.000000	110	1514	0	480000000.00	ls115		0.000000											
0.000000	0.000000	111	1515	0	480000000.00	ls116		0.000000											
0.000000	0.000000	112	1516	0	480000000.00	ls87		0.000000											
0.000000	0.000000	113	1517	0	489000000.00	ls93		0.000000											
0.000000	0.000000	114	938	24	4890000	ls44	2.25	0.000000	galv		4	60	cl 70	ok	3		y	50	
0.000000	0.000000	115	939	18	4890000	ls45	2.4	0.000000	galv	2	3	50	cl	ok	1		y	50	
0.000000	0.000000	116	1518	0	489000000.00	ls117		0.000000											
0.000000	0.000000	117	945	36	4890912	ls51	.5	0.000000	bit		10		cl 72	ok					see notes
0.000000	0.000000	118	942	24	4890000	ls48	3.3	0.000000	bit	2	8	60	cl	ok	2				
0.000000	0.000000	119	940	18	4890000	ls46	2.9	0.000000		1	3		cl	ok			y	100	
0.000000	0.000000	120	941	18	4890000	ls47	3.1	0.000000	bit	1	3	60	pp 75	ok	0		n		
0.000000	0.000000	121	1519	0	480000000.00	ls88		0.000000											
0.000000	0.000000	122	944	18	4890912	ls50	.5	0.000000	bit		10		cl	ok					see notes
0.000000	0.000000	123	943	18	4890912	ls49	.5	0.000000	bit		10		cl	ok					see notes
0.000000	0.000000	124	947	18	4890000	ls52	3.9	0.000000	bit	2	6	75	pp 78	ok	0		y	200	
0.000000	0.000000	125	1529	0	480000000.00	ls89		0.000000											
0.000000	0.000000	126	1530	0	480000000.00	ls90		0.000000											
0.000000	0.000000	127	1531	0	480000000.00	ls91		0.000000											
0.000000	0.000000	128	1532	0	480000000.00	ls92		0.000000											
0.000000	0.000000	129	1533	0	480091000.00	ls94		0.000000											
0.000000	0.000000	130	1534	0	480091000.00	ls95		0.000000											
0.000000	0.000000	131	1535	0	480091000.00	ls96		0.000000											

ROAD ASSESSMENT - LWR SINUSLAW

NODE	TNODE	LPOLY	RPOLY	LENGTH (M)	RDPROB	RDPROB_ID	SEQ_NO	ROUTE	MP BEGI	PROBLEM	ROUTE	END_MP	MP_FEET
0	0	0	0	22.268450	1	1	1.000000	2170000	0.800000	LS	2170000	0.814205	4224.000000
0	0	0	0	14.846030	2	2	2.000000	2170000	4.100000	LS	2170000	4.109470	21648.000000
0	0	0	0	23.752890	3	3	3.000000	2170000	4.400000	LS	2170000	4.415152	23232.000000
0	0	0	0	35.628970	4	4	4.000000	2170000	5.900000	FF	2170000	5.922727	31152.000000
0	0	0	0	15.677320	5	5	5.000000	2170000	6.000000	FF	2170000	6.010000	31680.000000
0	0	0	0	15.677200	6	6	6.000000	2170000	6.450000	LS	2170000	6.460000	34056.000000
0	0	0	0	12.126890	7	7	49.000000	2400000	0.500000	FF	2400000	0.507576	2640.000000
0	0	0	0	15.158450	8	8	50.000000	2400000	0.850000	FF	2400000	0.859470	4488.000000
0	0	0	0	16.007500	9	9	51.000000	2400000	1.000000	CF	2400000	1.010000	5280.000000
0	0	0	0	9.095223	10	10	52.000000	2400000	1.120000	FF	2400000	1.125682	5913.600000
0	0	0	0	12.126730	11	11	53.000000	2400000	1.350000	FF	2400000	1.357576	7128.000000
0	0	0	0	50.022960	12	12	54.000000	2400000	1.400000	FF	2400000	1.431250	7392.000000
0	0	0	0	18.190170	13	13	55.000000	2400000	1.550000	FF	2400000	1.561364	8184.000000
0	0	0	0	30.316920	14	14	56.000000	2400000	1.700000	FF	2400000	1.718939	8976.000000
0	0	0	0	30.316920	15	15	57.000000	2400000	1.750000	FF	2400000	1.768939	9240.000000
0	0	0	0	9.095174	16	16	58.000000	2400000	1.900000	FF	2400000	1.905682	10032.000000
0	0	0	0	15.158530	17	17	59.000000	2400000	2.000000	FF	2400000	2.009470	10560.000000
0	0	0	0	30.317120	18	18	63.000000	2400000	2.550000	FF	2400000	2.568939	13464.000000
0	0	0	0	22.737680	19	19	64.000000	2400000	3.300000	FF	2400000	3.314205	17424.000000
0	0	0	0	15.158550	20	20	66.000000	2400000	2.550000	FF	2400000	2.559470	13464.000000
0	0	0	0	45.475300	21	21	67.000000	2400000	3.700000	FF	2400000	3.728409	19536.000000
0	0	0	0	36.380310	22	22	68.000000	2400000	3.750000	FF	2400000	3.772727	19800.000000
0	0	0	0	75.792340	23	23	69.000000	2400000	4.300000	FF	2400000	4.347348	22704.000000
0	0	0	0	45.475340	24	24	70.000000	2400000	4.560000	FF	2400000	4.588409	24076.800000
0	0	0	0	45.476080	25	25	71.000000	2400000	4.660000	FF	2400000	4.688409	24604.800000
0	0	0	0	37.895780	26	26	72.000000	2400000	4.960000	FF	2400000	4.983674	26188.800000
0	0	0	0	60.634190	27	27	73.000000	2400000	5.310000	FF	2400000	5.347879	28036.800000
0	0	0	0	53.054770	28	28	74.000000	2400000	5.410000	FF	2400000	5.443144	28564.800000
0	0	0	0	30.317120	29	29	75.000000	2400000	5.860000	FF	2400000	5.878939	30940.800000
0	0	0	0	75.792430	30	30	76.000000	2400000	6.110000	FF	2400000	6.157348	32260.800000
0	0	0	0	27.285370	31	31	77.000000	2400000	6.210000	FF	2400000	6.227045	32788.800000
0	0	0	0	51.538950	32	32	78.000000	2400000	6.230000	FF	2400000	6.262197	32894.400000
0	0	0	0	22.738480	33	33	79.000000	2400000	6.240000	FF	2400000	6.254205	32947.200000
0	0	0	0	60.633470	34	34	80.000000	2400000	6.440000	FF	2400000	6.477879	34003.200000
0	0	0	0	90.951390	35	35	81.000000	2400000	6.640000	FF	2400000	6.696818	35059.200000
0	0	0	0	15.157410	36	36	82.000000	2400000	8.060000	CF	2400000	8.069470	42556.800000
0	0	0	0	29.350780	37	37	65.000000	2400848	1.400000	CF	2400848	1.418939	7392.000000
0	0	0	0	10.634380	38	38	60.000000	2400852	0.500000	FF	2400852	0.505682	2640.000000
0	0	0	0	17.723880	39	39	61.000000	2400852	0.800000	FF	2400852	0.809470	4224.000000
0	0	0	0	177.238800	40	40	62.000000	2400852	1.600000	FF	2400852	1.694697	8448.000000
0	0	0	0	27.877850	41	41	83.000000	2480000	0.100000	FF	2480000	0.117045	528.000000
0	0	0	0	92.926160	42	42	84.000000	2480000	0.350000	FF	2480000	0.406818	1848.000000
0	0	0	0	46.463020	43	43	85.000000	2480000	0.550000	FF	2480000	0.578409	2904.000000
0	0	0	0	92.926120	44	44	86.000000	2480000	0.600000	FF	2480000	0.656818	3168.000000
0	0	0	0	61.950880	45	45	87.000000	2480000	0.750000	FF	2480000	0.787879	3960.000000
0	0	0	0	46.463100	46	46	88.000000	2480000	0.800000	FF	2480000	0.828409	4224.000000
0	0	0	0	650.483200	47	47	89.000000	2480000	3.300000	FF	2480000	3.697727	17424.000000
0	0	0	0	92.926630	48	48	91.000000	2480000	4.100000	FF	2480000	4.156818	21648.000000
0	0	0	0	27.219310	49	49	7.000000	2500000	0.300000	FF	2500000	0.317045	1584.000000
0	0	0	0	27.219400	50	50	8.000000	2500000	0.350000	FF	2500000	0.367045	1848.000000
0	0	0	0	18.146310	51	51	9.000000	2500000	0.450000	FF	2500000	0.461364	2376.000000
0	0	0	0	23.168520	52	52	14.000000	2500712	0.150000	CF	2500712	0.164205	792.000000
0	0	0	0	22.401800	53	53	10.000000	2500796	0.200000	FF	2500796	0.214205	1056.000000
0	0	0	0	26.882080	54	54	11.000000	2500796	0.370000	FF	2500796	0.387045	1953.600000
0	0	0	0	14.934500	55	55	12.000000	2500796	0.400000	FF	2500796	0.409470	2112.000000
0	0	0	0	26.882250	56	56	13.000000	2500796	0.650000	FF	2500796	0.667045	3432.000000
0	0	0	0	14.787280	57	57	15.000000	2610000	0.400000	LS	2610000	0.409470	2112.000000
0	0	0	0	14.787200	58	58	16.000000	2610000	1.700000	LS	2610000	1.709470	8976.000000
0	0	0	0	26.617240	59	59	18.000000	2610000	3.000000	FF	2610000	3.017045	15840.000000
0	0	0	0	15.615400	60	60	19.000000	2610000	2.500000	LS	2610000	2.510000	13200.000000
0	0	0	0	15.615030	61	61	21.000000	2610000	5.820000	LS	2610000	5.830000	30729.600000
0	0	0	0	15.614980	62	62	22.000000	2610000	6.550000	LS	2610000	6.560000	34584.000000
0	0	0	0	15.615710	63	63	23.000000	2610000	6.500000	LS	2610000	6.510000	34320.000000
0	0	0	0	15.615790	64	64	24.000000	2610000	6.700000	LS	2610000	6.710000	35376.000000
0	0	0	0	15.615710	65	65	25.000000	2610000	7.200000	LS	2610000	7.210000	38016.000000
0	0	0	0	50.276870	66	66	26.000000	2610000	7.500000	FF	2610000	7.532197	39600.000000
0	0	0	0	22.180150	67	67	27.000000	2610000	8.600000	FF	2610000	8.614205	45408.000000
0	0	0	0	15.614300	68	68	28.000000	2610000	8.850000	FF	2610000	8.860000	46728.000000



FF = FILL FAILURE

LS = LAND SLIDE

FNODE_	TNODE_	LPOLY_	RPOLY_	LENGTH (M)	RDPROB_	RDPROB_ID	SEQ_NO	ROUTE	MP	PROBLEM	ROUTE_	END_MP	MP_FEET
0	0	0	0	90.716360	69	69	29.000000	2610719	0.900000	LS	2610719	0.956818	4752.000000
0	0	0	0	14.334710	70	70	17.000000	2610811	0.200000	FF	2610811	0.210000	1056.000000
0	0	0	0	16.700310	71	71	20.000000	2610813	0.100000	LS	2610813	0.110000	528.000000
0	0	0	0	46.552130	72	72	30.000000	2680000	0.250000	FF	2680000	0.268939	1320.000000
0	0	0	0	1722.426000	73	73	31.000000	2680000	0.900000	FF	2680000	1.600758	4752.000000
0	0	0	0	34.914080	74	74	32.000000	2680000	2.400000	FF	2680000	2.414205	12672.000000
0	0	0	0	421.298800	75	75	35.000000	2680721	0.100000	FF	2680721	0.289394	528.000000
0	0	0	0	163.651000	76	76	34.000000	2680742	0.100000	FF	2680742	0.289394	528.000000
0	0	0	0	89.201730	77	77	93.000000	4800000	0.050000	FF	4800000	0.078409	264.000000
0	0	0	0	148.669500	78	78	94.000000	4800000	0.150000	FF	4800000	0.197348	792.000000
0	0	0	0	178.403300	79	79	95.000000	4800000	0.300000	FF	4800000	0.356818	1584.000000
0	0	0	0	29.733960	80	80	96.000000	4800000	0.500000	FF	4800000	0.509470	2640.000000
0	0	0	0	35.681020	81	81	101.000000	4800000	2.600000	FF	4800000	2.611364	13728.000000
0	0	0	0	29.733300	82	82	102.000000	4800000	2.650000	FF	4800000	2.659470	13992.000000
0	0	0	0	59.467400	83	83	103.000000	4800000	2.700000	FF	4800000	2.718939	14256.000000
0	0	0	0	297.339200	84	84	104.000000	4800000	2.850000	FF	4800000	2.944697	15048.000000
0	0	0	0	178.403100	85	85	105.000000	4800000	3.150000	FF	4800000	3.206818	16632.000000
0	0	0	0	59.468240	86	86	106.000000	4800000	3.350000	FF	4800000	3.368939	17688.000000
0	0	0	0	59.467440	87	87	107.000000	4800000	3.450000	FF	4800000	3.468939	18216.000000
0	0	0	0	44.601490	88	88	108.000000	4800000	3.600000	FF	4800000	3.614205	19008.000000
0	0	0	0	118.935600	89	89	109.000000	4800000	3.960000	FF	4800000	3.997879	20908.800000
0	0	0	0	2961.572000	90	90	36.000000	4800831	0.000000	ER	4800831	1.799242	0.000000
0	0	0	0	40.526770	91	91	37.000000	4800831	2.100000	FF	4800831	2.124621	11088.000000
0	0	0	0	18.704610	92	92	97.000000	4800831	0.300000	FF	4800831	0.311364	1584.000000
0	0	0	0	23.380710	93	93	98.000000	4800831	0.850000	FF	4800831	0.864205	4488.000000
0	0	0	0	480.598100	94	94	38.000000	4800832	0.300000	ER	4800832	0.584091	1584.000000
0	0	0	0	27.163380	95	95	99.000000	4800847	0.100000	FF	4800847	0.118939	528.000000
0	0	0	0	152.754400	96	96	92.000000	4830000	1.250000	FF	4830000	1.344697	6600.000000
0	0	0	0	14.992330	97	97	39.000000	4880000	1.600000	ER	4880000	1.609470	8448.000000
0	0	0	0	15.832170	98	98	40.000000	4880000	1.800000	ER	4880000	1.810000	9504.000000
0	0	0	0	29.985000	99	99	41.000000	4880000	2.400000	ER	4880000	2.418939	12672.000000
0	0	0	0	15.832240	100	100	42.000000	4880000	3.100000	ER	4880000	3.110000	16368.000000
0	0	0	0	15.832240	101	101	43.000000	4880000	3.200000	ER	4880000	3.210000	16896.000000
0	0	0	0	29.985010	102	102	44.000000	4880000	3.700000	FF	4880000	3.718939	19536.000000
0	0	0	0	179.911100	103	103	45.000000	4880000	5.000000	FF	4880000	5.113636	26400.000000
0	0	0	0	14.993050	104	104	46.000000	4880000	6.450000	FF	4880000	6.459470	34056.000000
0	0	0	0	149.925900	105	105	47.000000	4880000	7.100000	FF	4880000	7.194697	37488.000000
0	0	0	0	149.925900	106	106	48.000000	4880000	7.200000	ER	4880000	7.294697	38016.000000
0	0	0	0	19.340800	107	107	110.000000	4890000	1.300000	LS	4890000	1.318939	6864.000000