
APPENDIX H

Oregon Plan Water Quality Summary Tables

Appendix H: Water Quality Summary Tables

INTRODUCTION

The tables referenced in this section provide summaries of water quality data and land use/land cover information for each of the ESUs. Tables H-1 through H-8 are discussed here. Tables H-1, H-3, H-5, and H-7 show by water quality parameter the number of stream miles in each of four categories:

- Waterbodies identified on the 1994/96 *303(d) List* as water quality limited for the given parameter.
- Waterbodies evaluated as needing more data to determine their water quality status or that are of potential concern for the given parameter.
- Waterbodies evaluated as meeting water quality standards for the given parameter.
- Total stream miles assessed for the given parameter.

The data is organized by U.S. Geologic Survey (USGS) fourth field hydrologic units (HUCs) and also includes the total number of stream miles in each hydrologic unit. Some of the parameters in the tables are actually groupings of several individual parameters. Those groupings follow:

- **Aquatic Weeds** — includes algae, chlorophyll *a*, aquatic weeds, aquatic growth, Macrophytes, and Periphyton.
- **Bacteria** — includes bacteria, fecal coliform, e-Coli, and water contact recreation.
- **Nutrients** — includes nitrogen and phosphorus.
- **Sediment** — includes sediment and turbidity.
- **Toxics** — includes pesticides and other toxics.

Data presented in Tables H-1, H-3, H-5, and H-7 reflect evaluations made in developing Oregon's 1994/96 *303(d) List*. They represent an evaluation of data that were readily available to DEQ and information contained in the 1988 Nonpoint Source Assessment. The results are not necessarily representative of conditions or the magnitude of problems found in each hydrologic unit, but serve as a basis for planning. Where "NE" appears in the tables, it indicates that a parameter was not evaluated to determine if it met water quality standards. For example, if no data for toxics was available, no evaluation was made.

In the column headed "Stream Miles", DEQ has provided summary information for each HUC as follows:

- **Total Stream Miles** — This is a calculation of the total stream miles in the HUC. Note that bays and estuaries are represented as lines and are included in the mileage estimates rather than represented as surface areas; lakes and reservoirs are not included.
- **303(d) List** — This is a calculation of the total stream miles in the HUC that are water quality limited (do not meet standards). Note that it is not possible to calculate this number by merely summing the 303(d) Listed miles for each parameter in the table because many stream segments are listed for more than one parameter. Thus, summing across the columns would result in double counting many segments, and an incorrect total.

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- **Need Data or Potential Concern** — This is a calculation of the total stream miles in the HUC that DEQ has identified as needing more data to determine their status or of potential concern. See the note above less than 303(d) Listed about the inability to sum across the columns to get this total.
 - **Meets Standards** — This is a calculation of the total number of stream miles in the HUC that meet all water quality standards for which they were evaluated by DEQ. Thus, if waterbodies were evaluated for temperature, pH, bacteria, and sediment, but not evaluated for the other parameters, the total for the HUC indicates the number of miles that meets the water quality standards for temperature, pH, bacteria, and sediment. It is unknown whether those stream miles meet other water quality standards or not. Therefore, use these numbers with caution. Also, see the note above less than 303(d) Listed about the inability to sum across the columns to get this total.
 - **Total Assessed** — This is a calculation of the total stream miles in the HUC that have been assessed by DEQ as:
 1. Water quality limited,
 2. Needing data or of potential concern, or
 3. Meeting standards.

Please note that because many stream segments are on the 303(d) List for one or more parameters and also identified as being of potential concern for other parameters, it is not possible to sum the numbers above to get the total assessed without double counting many stream segments. Likewise, it is not possible to sum the numbers in the columns to get the correct total. See the note above less than 303(d) Listed.

Tables H-2, H-4, H-6, and H-8 provide estimates of linear stream miles by adjacent land use and/or land cover by ownership in each of the steelhead ESUs. Fourth field hydrologic unit organizes the information. Each table shows four types of land use/land cover (urban, agriculture, rangeland, and forest) for the following categories of land ownership:

- Total stream miles adjacent to publicly owned lands.
- Total stream miles adjacent to privately owned lands.
- Totals for publicly and privately owned lands.
- Total stream miles on 303(d) List that are adjacent to publicly owned lands.
- Total stream miles on 303(d) List that are adjacent to privately owned lands.
- Total stream miles on 303(d) List that are adjacent to all publicly and privately owned lands.

Stream mile estimates in Tables H-2, H-4, H-6, and H-8 are based on the 1:100,000 scale Pacific Northwest River Reach data set from the U.S. Geological Survey in the form of a geographic information system (GIS) data layer. There are some data limitations associated with each of the input layers. For the 303(d) stream segments, bays, estuaries, sloughs, and “double line” rivers are treated as single lines in the GIS layer and are included in the initial processing. The estimate of total 303(d) miles for a basin includes these features. Lakes and reservoirs are not included in the calculations, and the Columbia River and the Snake River are excluded from the estimates.

The U.S. Geological Survey land use/land cover layer identifies broad natural and cultural features and has a minimum mapping area of 10 acres for cultural (e.g., urban; agricultural land uses)

features and 40 acres for non-cultural (e.g., rangeland; forest). The identified land classifications include the following land features:

- Urban includes residential, commercial, industrial, transportation, mixed urban or built-up land, and other urban or built-up land.
- Agriculture includes cropland and pasture, orchards, groves, vineyards and nurseries, confined feeding operations, and an “other” category.
- Rangeland includes herbaceous rangeland, shrub and brush rangeland, and mixed rangeland.
- Forest includes deciduous, evergreen, and mixed groups.

These classifications of land use/land cover date to the 1970s, so they may be out of date in many cases.

This layer also identifies larger water features. The GIS overlay routine assigns the land use/land cover “water” to some features of the 303(d) segment layer and the layer of all waterbodies in the State, notably to all or parts of the Columbia, Willamette, Umpqua, and Snake Rivers. The Columbia and Snake were excluded from the estimate calculations. For the Willamette and Umpqua in the 303(d) layer, DEQ manually assigned a land use/land cover for the land use/land cover areas identified as “water” features.

The sources of information for the ownership layer also vary widely, dating to the 1970s and 1980s. Map sources for the GIS layers are the BLM 1:100,000 surface management maps.

The sum of all land use/land cover and ownership combinations may not equal the total 303(d) segments in a basin. If the GIS layers do not overlay exactly, the resulting “sliver” segments may be assigned a land use/land cover category or an ownership category, but not both. Some 303(d) segments representing bays, estuaries, and sloughs may be assigned the water land cover category during processing and are excluded. Only segments with urban/built-up, agriculture lands, rangeland, and forested lands are included in the bay ownership estimates; other uses/covers are excluded.

**Appendix H: Table H-1
Klamath Mountains Province And Oregon Coast ESUs 303(d) Data Summary**

Klamath Mountains Province and Oregon Coast ESUs By Hydrologic Unit	Stream Miles	Aquatic Weeds	Biological Criteria	Dissolved Oxygen	Bacteria	Flow Mod.	Habitat Mod.	Nutrie	pH	Sediment	Temp.	Toxics	TDG
17100201—Necanicum													
Total Stream Miles	127												
303(d) Listed	21	0	0	0	21	0	0	0	0	0	0	0	0
Need Data or Potential Concern	27	0	NE	4	4	21	0	6	4	0	21	0	0
Meets Standards	0	21	NE	21	0	NE	NE	NE	21	NE	0	NE	NE
Total Assessed	27	21	0	25	25	21	0	6	25	0	21	0	0
17100202—Nehalem													
Total Stream Miles	930												
303(d) Listed	109	0	0	0	17	0	0	0	0	0	92	0	0
Need Data or Potential Concern	297	0	NE	0	7	135	13	18	0	196	13	0	0
Meets Standards	0	17	NE	94	92	NE	NE	NE	94	NE	0	NE	NE
Total Assessed	318	17	0	94	116	135	13	18	94	196	105	0	0
17100203—Wilson / Trask / Nestucca													
Total Stream Miles	1058												
303(d) Listed	160	0	0	0	74	29	11	0	0	36	59	0	0
Need Data or Potential Concern	273	0	NE	0	21	101	162	185	0	210	42	2	0
Meets Standards	71	62	NE	105	152	NE	NE	NE	86	NE	105	NE	NE
Total Assessed	414	62	0	105	247	130	172	185	86	246	206	2	0
17100204—Siletz / Yaquina													
Total Stream Miles	1074												
303(d) Listed	89	0	0	0	19	0	30	0	0	30	70	0	0
Need Data or Potential Concern	176	0	NE	0	7	48	23	9	0	158	60	0	0
Meets Standards	21	78	NE	83	131	NE	NE	NE	101	NE	3	NE	NE
Total Assessed	284	78	0	83	157	48	53	9	101	188	133	0	0
17100205—Alsea													
Total Stream Miles	783												

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303(d) Listed	119	0	0	0	0	0	0	0	0	0	119	0	0
Need Data or Potential Concern	205	0	NE	18	6	26	73	0	0	166	7	0	0
Meets Standards	0	26	NE	26	26	NE	NE	NE	26	NE	7	NE	NE
Total Assessed	255	26	0	45	32	26	73	0	26	166	133	0	0
17100206—Siuslaw													
Total Stream Miles	908												
303(d) Listed	178	0	0	0	0	0	63	0	0	44	133	0	0
Need Data or Potential Concern	265	0	NE	115	0	69	259	100	0	215	92	0	0
Meets Standards	2	100	NE	100	100	NE	NE	NE	100	NE	15	NE	NE
Total Assessed	344	100	0	215	100	69	322	100	100	259	239	0	0
17100207—Siltcoos													
Total Stream Miles	115												
303(d) Listed	0	0	0	0	0	0	0	0	0	0	0	0	0
Need Data or Potential Concern	27	0	NE	0	0	3	24	0	0	24	24	0	0
Meets Standards	0	0	NE	0	0	NE	NE	NE	0	NE	0	NE	NE
Total Assessed	27	0	0	0	0	3	24	0	0	24	24	0	0
17100301—North Umpqua													
Total Stream Miles	1334												
303(d) Listed	220	0	0	0	0	53	67	0	43	51	211	0	0
Need Data or Potential Concern	199	0	NE	6	0	21	55	0	0	113	17	0	19
Meets Standards	55	53	NE	53	53	NE	NE	NE	53	NE	96	NE	NE
Total Assessed	374	53	0	59	53	74	122	0	96	164	324	0	19
17100302—South Umpqua													
Total Stream Miles	1915												
303(d) Listed	315	57	85	67	67	29	60	16	158	71	300	0	0
Need Data or Potential Concern	466	0	NE	0	0	303	172	10	0	252	125	0	0
Meets Standards	13	93	NE	71	26	NE	NE	42	10	NE	13	NE	NE
Total Assessed	586	151	85	138	93	332	232	67	168	323	437	0	0

Appendix H: Table H-1
Klamath Mountains Province And Oregon Coast ESUs 303(d) Data Summary

Klamath Mountains Province and Oregon Coast ESUs By Hydrologic Unit	Stream Miles	Aquatic Weeds	Biological Criteria	Dissolved Oxygen	Bacteria	Flow Mod.	Habitat Mod.	Nutrie	pH	Sediment	Temp.	Toxics	TDG
1710030 —Umpqua													
Total Stream Miles	1674												
303(d) Listed	283	0	0	45	157	128	0	0	19	0	269	0	0
Need Data or Potential Concern	547	0	NE	0	0	142	344	110	0	317	154	0	0
Meets Standards	29	128	NE	84	0	NE	NE	NE	110	NE	19	NE	NE
Total Assessed	596	128	0	128	157	271	344	110	128	317	442	0	0
17100304—Coos													
Total Stream Miles	837												
303(d) Listed	48	0	0	10	38	0	0	0	0	0	4	8	0
Need Data or Potential Concern	256	0	NE	6	4	0	161	0	0	161	70	13	0
Meets Standards	33	0	NE	0	135	NE	NE	NE	0	NE	4	NE	NE
Total Assessed	313	0	0	15	178	0	161	0	0	161	78	21	0
17100305—Coquille													
Total Stream Miles	1212												
303(d) Listed	303	31	0	88	112	0	5	0	0	0	278	0	0
Need Data or Potential Concern	363	0	NE	4	0	99	266	87	0	300	58	0	0
Meets Standards	46	55	NE	43	5	NE	NE	NE	130	NE	45	NE	NE
Total Assessed	468	86	0	134	116	99	271	87	130	300	381	0	0
17100306—Sixes													
Total Stream Miles	474												
303(d) Listed	116	0	0	0	0	0	20	0	0	0	113	0	0
Need Data or Potential Concern	79	0	NE	0	0	32	1	0	0	62	35	0	0
Meets Standards	28	30	NE	60	60	NE	NE	NE	60	NE	28	NE	NE
Total Assessed	185	30	0	60	60	32	21	0	60	62	176	0	0
17100307—Upper Rogue													
Total Stream Miles	1613												
303(d) Listed	206	0	0	0	17	16	37	0	0	58	181	0	0
Need Data or Potential	170	0	NE	0	0	92	17	17	0	103	68	0	0

Appendix H: Table H-1
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Klamath Mountains Province and Oregon Coast ESUs By Hydrologic Unit	Stream Miles	Aquatic Weeds	Biological Criteria	Dissolved Oxygen	Bacteria	Flow Mod.	Habitat Mod.	Nutrie	pH	Sediment	Temp.	Toxics	TDG
Concern													
Meets Standards	174	42	NE	42	26	NE	NE	NE	42	NE	207	NE	NE
Total Assessed	469	42	0	42	42	109	54	17	42	161	457	0	0
17100308—Middle Rogue													
Total Stream Miles	846												
303(d) Listed	242	0	0	0	125	26	26	0	0	0	225	0	0
Need Data or Potential Concern	259	0	NE	0	23	141	54	62	0	234	49	30	0
Meets Standards	11	30	NE	84	45	NE	NE	NE	84	NE	17	NE	NE
Total Assessed	333	30	0	84	194	167	80	62	84	234	291	30	0
17100309—Applegate													
Total Stream Miles	741												
303(d) Listed	107	0	9	0	0	64	14	0	0	9	93	0	0
Need Data or Potential Concern	131	0	NE	26	9	74	60	9	0	111	24	50	0
Meets Standards	78	50	NE	50	50	NE	NE	NE	50	NE	101	NE	NE
Total Assessed	235	50	9	75	59	138	75	9	50	120	218	50	0
17100310—Lower Rogue													
Total Stream Miles	908												
303(d) Listed	214	0	0	0	28	0	0	0	55	0	214	28	0
Need Data or Potential Concern	192	33	NE	0	0	117	85	28	0	185	45	0	0
Meets Standards	44	55	NE	96	69	NE	NE	NE	14	NE	50	NE	NE
Total Assessed	319	88	0	96	96	117	85	28	69	185	309	28	0
17100311—Illinois													
Total Stream Miles	970												
303(d) Listed	207	0	0	0	0	73	25	0	0	0	199	0	0
Need Data or Potential Concern	220	0	NE	18	0	56	23	0	0	146	56	0	0
Meets Standards	92	24	NE	24	24	NE	NE	NE	24	NE	99	NE	NE
Total Assessed	364	24	0	42	24	129	48	0	24	146	355	0	0
17100312—Chetco													
Total Stream Miles	618												
303(d) Listed	97	0	0	0	0	0	0	0	0	0	97	0	0

Appendix H: Table H-1
Klamath Mountains Province And Oregon Coast ESUs 303(d) Data Summary

Klamath Mountains Province and Oregon Coast ESUs By Hydrologic Unit	Stream Miles	Aquatic Weeds	Biological Criteria	Dissolved Oxygen	Bacteria	Flow Mod.	Habitat Mod.	Nutrie	pH	Sediment	Temp.	Toxics	TDG
Need Data or Potential Concern	159	0	NE	0	0	90	0	0	0	151	37	0	0
Meets Standards	18	70	NE	70	70	NE	NE	NE	70	NE	18	NE	NE
Total Assessed	175	70	0	70	70	90	0	0	70	151	152	0	0
All Coastal HUCs													
Total Stream Miles	18138												
303(d) Listed	3033	88	94	209	675	419	358	16	274	298	2657	36	0
Potential Concern	4311	33	NE	197	81	1569	1792	640	4	3105	997	95	19
Meets Standards	714	935	NE	1106	1065	NE	NE	NE	1076	NE	826	NE	19
Total Assessed	6089	1056	94	1512	1820	1989	2150	656	1354	3403	4481	131	38
Legend: NE = Not Evaluated.													

Appendix H: Table H-2
Land Use / Land Cover For Klamath Mountains Province And Oregon Coast ESUS

Klamath Mountains Province & Oregon Coast ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
1710020 —Necanicum						
Urban Stream Miles	0	8	8	0	3	3
Agricultural Stream Miles	0	4	4	0	2	2
Rangeland Stream Miles	0	2	2	0	0	0
Forest Stream Miles	8	102	110	0	13	13
Total Stream Miles	8	116	124	0	18	18
17100202—Nehalem						
Urban Stream Miles	0	9	9	0	2	2
Agricultural Stream Miles	0	48	48	0	24	24
Rangeland Stream Miles	0	1	1	0	0	0
Forest Stream Miles	308	560	868	16	60	76
Total Stream Miles	308	618	926	16	86	102
17100203—Wilson / Trask / Nestucca						
Urban Stream Miles	1	15	16	0	5	5
Agricultural Stream Miles	0	88	88	0	56	56
Rangeland Stream Miles	0	1	1	0	1	1
Forest Stream Miles	582	347	929	31	55	86
Total Stream Miles	583	451	1034	31	117	148
17100204—Siletz/Yaquina						
Urban Stream Miles	0	29	29	0	7	7
Agricultural Stream Miles	0	44	44	0	8	8
Rangeland Stream Miles	0	1	1	0	0	0
Forest Stream Miles	191	773	964	8	53	61
Total Stream Miles	191	847	1038	8	68	76
17100205—Alsea						
Urban Stream Miles	0	5	5	0	1	1
Agricultural Stream Miles	0	34	34	0	19	19
Rangeland Stream Miles	0	0	0	0	0	0

Appendix H: Table H-2
Land Use / Land Cover For Klamath Mountains Province And Oregon Coast ESUS

Klamath Mountains Province & Oregon Coast ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
Forest Stream Miles	419	307	726	33	65	98
Total Stream Miles	419	346	765	33	85	118
17100206—Siuslaw						
Urban Stream Miles	0	12	12	0	2	2
Agricultural Stream Miles	0	36	36	0	9	9
Rangeland Stream Miles	0	0	0	0	0	0
Forest Stream Miles	359	482	841	59	106	165
Total Stream Miles	359	530	889	59	117	176
17100207—Siltcoos						
Urban Stream Miles	0	1	1	0	0	0
Agricultural Stream Miles	0	1	1	0	0	0
Rangeland Stream Miles	3	0	3	0	0	0
Forest Stream Miles	32	68	100	0	0	0
Total Stream Miles	35	70	105	0	0	0
17100301—North Umpqua						
Urban Stream Miles	4	10	14	1	12	13
Agricultural Stream Miles	0	27	27	0	9	9
Rangeland Stream Miles	0	13	13	0	3	3
Forest Stream Miles	1025	236	1261	141	53	194
Total Stream Miles	1029	286	1315	142	77	219
17100302—South Umpqua						
Urban Stream Miles	3	83	86	1	24	25
Agricultural Stream Miles	0	152	152	0	55	55
Rangeland Stream Miles	0	25	25	0	4	4
Forest Stream Miles	902	747	1649	136	94	230
Total Stream Miles	905	1007	1912	137	177	314
17100303—Umpqua						
Urban Stream Miles	0	38	38	0	7	7
Agricultural Stream Miles	0	98	98	0	90	90

Appendix H: Table H-2
Land Use / Land Cover For Klamath Mountains Province And Oregon Coast ESUS

Klamath Mountains Province & Oregon Coast ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
Rangeland Stream Miles	0	21	21	0	3	3
Forest Stream Miles	561	847	1408	50	126	176
Total Stream Miles	561	1004	1565	50	226	276
17100304—Coos						
Urban Stream Miles	1	14	15	0	10	10
Agricultural Stream Miles	0	11	11	0	3	3
Rangeland Stream Miles	1	1	2	0	0	0
Forest Stream Miles	172	586	758	0	23	23
Total Stream Miles	174	612	786	0	36	36
17100305—Coquille						
Urban Stream Miles	0	22	22	0	10	10
Agricultural Stream Miles	1	119	120	0	73	73
Rangeland Stream Miles	0	8	8	0	3	3
Forest Stream Miles	333	700	1033	65	140	205
Total Stream Miles	334	849	1183	65	226	291
17100306—Sixes						
Urban Stream Miles	0	9	9	0	2	2
Agricultural Stream Miles	0	31	31	0	25	25
Rangeland Stream Miles	1	16	17	1	8	9
Forest Stream Miles	143	262	405	30	43	73
Total Stream Miles	144	318	462	31	78	109
17100307—Upper Rogue						
Urban Stream Miles	0	9	9	0	2	2
Agricultural Stream Miles	1	76	77	0	30	30
Rangeland Stream Miles	4	6	10	0	2	2
Forest Stream Miles	991	502	1493	81	86	167
Total Stream Miles	996	593	1589	81	120	201
17100308—Middle Rogue						
Urban Stream Miles	1	118	119	1	57	58

Appendix H: Table H-2
Land Use / Land Cover For Klamath Mountains Province And Oregon Coast ESUS

Klamath Mountains Province & Oregon Coast ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
Agricultural Stream Miles	1	152	153	1	59	60
Rangeland Stream Miles	0	22	22	0	6	6
Forest Stream Miles	155	380	535	34	82	116
Total Stream Miles	157	672	829	36	204	240
17100309—Applegate						
Urban Stream Miles	1	29	30	1	7	8
Agricultural Stream Miles	1	63	64	0	32	32
Rangeland Stream Miles	1	0	1	0	0	0
Forest Stream Miles	384	255	639	26	38	64
Total Stream Miles	387	347	734	27	77	104
17100310—Lower Rogue						
Urban Stream Miles	2	27	29	1	7	8
Agricultural Stream Miles	2	12	14	2	6	8
Rangeland Stream Miles	0	0	0	0	0	0
Forest Stream Miles	578	276	854	115	76	191
Total Stream Miles	582	315	897	118	89	207
17100311—Illinois						
Urban Stream Miles	0	16	16	0	5	5
Agricultural Stream Miles	1	23	24	0	7	7
Rangeland Stream Miles	0	0	0	0	0	0
Forest Stream Miles	744	183	927	137	55	192
Total Stream Miles	745	222	967	137	67	204
17100312—Chetco						
Urban Stream Miles	0	11	11	0	6	6
Agricultural Stream Miles	0	2	2	0	1	1
Rangeland Stream Miles	0	1	1	0	1	1
Forest Stream Miles	398	187	585	43	46	89
Total Stream Miles	398	201	599	43	54	97
All Klamath Mountains and Oregon Coast HUCs						
Urban Stream Miles	13	465	478	5	169	174

Appendix H: Table H-2
Land Use / Land Cover For Klamath Mountains Province And Oregon Coast ESUS

Klamath Mountains Province & Oregon Coast ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
Agricultural Stream Miles	7	1021	1028	3	508	511
Rangeland Stream Miles	10	118	128	1	31	32
Forest Stream Miles	8285	7800	16085	1005	1214	2219
Total Stream Miles	8315	9404	17719	1014	1922	2936

**Appendix H: Table H-3
Southwest Washington And Lower Columbia River Esus 303(D) Data Summary**

Southwest Washington & Lower Columbia River ESUs By Hydrologic Unit	Stream Miles	Aquatic Weeds	Biological Criteria	Dissolved Oxygen	Bacteria	Flow Mod.	Habitat Mod.	Nutrients	pH	Sediment	Temp.	Toxics	TDG
17070105—Middle Columbia – Hood													
Total Stream Miles	1657												
303(d) Listed	203	0	0	0	0	72	106	0	0	120	163	0	71
Need Data or Potential Concern	368	0	NE	0	108	200	140	60	0	219	131	81	0
Meets Standards	30	15	NE	15	15	NE	NE	NE	15	NE	140	NE	NE
Total Assessed	510	15	0	15	122	272	246	60	15	339	435	81	71
17080001—Lower Columbia – Sandy													
Total Stream Miles	820												
303(d) Listed	92	0	0	0	0	0	0	0	59	0	92	59	59
Need Data or Potential Concern	293	0	NE	0	12	87	170	12	0	170	17	75	0
Meets Standards	48	34	NE	95	139	NE	NE	NE	77	NE	119	NE	NE
Total Assessed	323	34	0	95	151	87	170	12	136	170	229	134	59
17080003—Lower Columbia – Clatskanie													
Total Stream Miles	444												
303(d) Listed	58	0	0	58	58	0	0	0	56	0	56	56	56
Need Data or Potential Concern	180	0	NE	0	4	7	0	4	0	98	3	76	0
Meets Standards	0	0	NE	0	0	NE	NE	NE	3	NE	0	NE	NE
Total Assessed	160	0	0	58	62	7	0	4	58	98	58	132	56
17080006—Lower Columbia – Youngs													
Total Stream Miles	456												
303(d) Listed	37	0	0	37	28	0	0	0	0	0	28	28	28
Need Data or Potential Concern	107	0	NE	0	0	23	0	7	0	72	18	54	0
Meets Standards	0	52	NE	17	52	NE	NE	NE	52	NE	0	NE	NE
Total Assessed	107	52	0	54	80	23	0	7	52	72	46	82	28
17090011—Clackamas													
Total Stream Miles	1104												
303(d) Listed	56	0	0	0	0	0	13	0	0	0	56	0	0
Need Data or Potential Concern	220	0	NE	30	4	19	97	8	0	109	25	0	0

Appendix H: Table H-3
Southwest Washington And Lower Columbia River Esus 303(D) Data Summary

Southwest Washington & Lower Columbia River ESUs By Hydrologic Unit	Stream Miles	Aquatic Weeds	Biological Criteria	Dissolved Oxygen	Bacteria	Flow Mod.	Habitat Mod.	Nutrients	pH	Sediment	Temp.	Toxics	TDG
Meets Standards	113	27	NE	27	27	NE	NE	NE	27	NE	175	NE	NE
Total Assessed	362	27	0	57	31	19	110	8	27	109	256	0	0
17090012—Lower Willamette													
Total Stream Miles	421												
303(d) Listed	80	20	24	20	75	0	0	25	20	0	73	20	0
Need Data or Potential Concern	152	0	NE	0	0	42	3	76	0	125	8	66	0
Meets Standards	0	48	NE	48	0	NE	NE	NE	50	NE	0	NE	NE
Total Assessed	166	68	24	68	75	42	3	101	70	125	82	87	0
All Lower Columbia River HUCs													
Total Stream Miles	4902												
303(d) Listed	527	20	24	116	162	72	120	25	135	120	468	163	213
Need Data or Potential Concern	1320	0	NE	30	128	379	411	167	0	794	203	353	0
Meets Standards	192	176	NE	202	233	NE	NE	NE	224	NE	435	NE	NE
Total Assessed	1628	196	24	348	522	451	530	192	359	914	1105	516	213
Legend: NE = Not Evaluated.													

Appendix H: Table H-4
Land Use / Land Cover For Southwest Washington And Lower Columbia River ESUs

Southwest Washington & Lower Columbia River ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
17070105—Middle Columbia – Hood						
Urban Stream Miles	2	26	28	0	1	1
Agricultural Stream Miles	0	405	405	0	37	37
Rangeland Stream Miles	2	151	153	0	20	20
Forest Stream Miles	467	489	956	33	40	73
Total Stream Miles	471	1071	1542	33	98	131
17080001—Lower Columbia – Sandy						
Urban Stream Miles	3	23	26	0	2	2
Agricultural Stream Miles	0	16	16	0	0	0
Rangeland Stream Miles	0	0	0	0	0	0
Forest Stream Miles	494	188	682	3	28	31
Total Stream Miles	497	227	724	3	30	33
17080003—Lower Columbia – Clatskanie						
Urban Stream Miles	0	12	12	0	0	0
Agricultural Stream Miles	0	73	73	0	2	2
Rangeland Stream Miles	0	1	1	0	0	0
Forest Stream Miles	22	242	264	0	0	0
Total Stream Miles	22	328	350	0	2	2
17080006—Lower Columbia – Youngs						
Urban Stream Miles	0	5	5	0	0	0
Agricultural Stream Miles	1	44	45	0	3	3
Rangeland Stream Miles	0	3	3	0	1	1
Forest Stream Miles	43	263	306	0	4	4
Total Stream Miles	44	315	359	0	8	8
17090011—Clackamas						
Urban Stream Miles	0	22	22	0	3	3
Agricultural Stream Miles	0	67	67	0	8	8
Rangeland Stream Miles	1	1	2	0	0	0

Appendix H: Table H-4
Land Use / Land Cover For Southwest Washington And Lower Columbia River ESUs

Southwest Washington & Lower Columbia River ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
Forest Stream Miles	783	217	1000	16	29	45
Total Stream Miles	784	307	1091	16	40	56
<i>17090012—Lower Willamette</i>						
Urban Stream Miles	0	94	94	0	56	56
Agricultural Stream Miles	2	77	79	0	13	13
Rangeland Stream Miles	1	3	4	0	3	3
Forest Stream Miles	16	154	170	0	5	5
Total Stream Miles	19	328	347	0	77	77
<i>All Lower Columbia River HUCs</i>						
Urban Stream Miles	5	182	187	0	62	62
Agricultural Stream Miles	3	682	685	0	63	63
Rangeland Stream Miles	4	159	163	0	24	24
Forest Stream Miles	1825	1553	3378	52	106	158
Total Stream Miles	1837	2576	4413	52	255	307

**Appendix H: Table H-5
Upper Willamette River ESUs 303(d) Data Summary**

Upper Willamette River ESUs By Hydrologic Unit	Stream Miles	Aquatic Weeds	Biological Criteria	Dissolved Oxygen	Bacteria	Flow Mod.	Habitat Mod.	Nutrients	pH	Sediment	Temp.	Toxics	TDG
17090001—Mid-Fork Willamette													
Total Stream Miles	1343												
303(d) Listed	49	0	0	0	0	0	0	0	0	0	49	0	0
Need Data or Potential Concern	280	0	NE	0	0	61	26	0	0	254	141	0	0
Meets Standards	5	20	NE	20	20	NE	NE	NE	20	NE	21	NE	NE
Total Assessed	291	20	0	20	20	61	26	0	20	254	211	0	0
17090002—Coast Fork Willamette													
Total Stream Miles	687												
303(d) Listed	55	0	0	0	29	0	0	0	0	0	55	0	0
Need Data or Potential Concern	134	0	NE	0	0	36	44	0	0	134	61	0	0
Meets Standards	0	7	NE	7	7	NE	NE	NE	36	NE	0	NE	NE
Total Assessed	134	7	0	7	36	36	44	0	36	134	116	0	0
17090003—Upper Willamette													
Total Stream Miles	2171												
303(d) Listed	241	0	12	32	195	14	0	0	0	0	176	0	0
Need Data or Potential Concern	462	0	NE	29	43	189	54	180	0	425	93	0	0
Meets Standards	0	180	NE	217	50	NE	NE	NE	249	NE	0	129	NE
Total Assessed	499	180	12	278	288	203	54	180	249	425	269	129	0
17090004—McKenzie													
Total Stream Miles	1239												
303(d) Listed	154	0	0	0	0	0	0	0	0	0	154	0	0
Need Data or Potential Concern	289	0	NE	0	0	53	36	37	0	289	54	96	0
Meets Standards	21	37	NE	37	37	NE	NE	NE	37	NE	21	NE	NE
Total Assessed	300	37	0	37	37	53	36	37	37	289	228	96	0
17090005—North Santiam													
Total Stream Miles	868												
303(d) Listed	59	0	0	0	0	0	0	0	0	0	59	0	0
Need Data or Potential Concern	149	0	NE	0	33	104	33	33	0	105	32	0	0
Meets Standards	31	44	NE	57	57	NE	NE	NE	57	NE	98	NE	NE
Total Assessed	195	44	0	57	89	104	33	33	57	105	189	0	0

**Appendix H: Table H-5
Upper Willamette River ESUs 303(d) Data Summary**

Upper Willamette River ESUs By Hydrologic Unit	Stream Miles	Aquatic Weeds	Biological Criteria	Dissolved Oxygen	Bacteria	Flow Mod.	Habitat Mod.	Nutrients	pH	Sediment	Temp.	Toxics	TDG
17090006—South Santiam													
Total Stream Miles	1134												
303(d) Listed	30	0	0	0	30	0	0	0	0	0	30	0	0
Need Data or Potential Concern	204	0	NE	0	0	77	101	16	0	191	161	0	0
Meets Standards	11	31	NE	31	12	NE	NE	NE	31	NE	11	NE	NE
17090006—South Santiam (Cont'd)													
Total Assessed	245	31	0	31	42	77	101	16	31	191	201	0	0
17090007—Middle Willamette													
Total Stream Miles	915												
303(d) Listed	156	0	93	0	125	25	0	0	0	0	118	6	0
Need Data or Potential Concern	238	0	NE	21	41	126	93	161	0	166	43	115	0
Meets Standards	0	93	NE	98	0	NE	NE	NE	125	NE	0	NE	NE
Total Assessed	238	93	93	119	166	151	93	161	125	166	161	121	0
17090008—Yamhill													
Total Stream Miles	966												
303(d) Listed	191	44	0	33	191	46	0	0	0	0	151	0	0
Need Data or Potential Concern	268	0	NE	38	57	140	22	51	0	235	61	96	0
Meets Standards	0	147	NE	157	0	NE	NE	NE	191	NE	0	NE	NE
Total Assessed	289	191	0	229	248	186	22	51	191	235	212	96	0
17090009—Molalla – Pudding													
Total Stream Miles	1050												
303(d) Listed	83	0	0	8	83	33	0	0	0	0	83	35	0
Need Data or Potential Concern	208	0	NE	19	46	57	38	103	0	158	74	0	0
Meets Standards	5	104	NE	34	0	NE	NE	NE	110	NE	5	NE	NE
Total Assessed	222	104	0	61	129	90	38	103	110	158	163	35	0
17090010—Tualatin													
Total Stream Miles	874												
303(d) Listed	283	53	64	138	236	0	0	0	30	0	164	0	0
Need Data or Potential Concern	316	0	56	31	8	97	115	16	0	254	92	144	0
Meets Standards	12	101	NE	124	56	NE	NE	NE	255	NE	65	NE	NE
Total Assessed	356	154	120	293	300	97	115	16	286	254	321	144	0
All Upper Willamette River HUCs													

Appendix H: Table H-5
Upper Willamette River ESUs 303(d) Data Summary

Upper Willamette River ESUs By Hydrologic Unit	Stream Miles	Aquatic Weeds	Biological Criteria	Dissolved Oxygen	Bacteria	Flow Mod.	Habitat Mod.	Nutrients	pH	Sediment	Temp.	Toxics	TDG
Total Stream Miles	11248												
303(d) Listed	1300	97	169	212	888	118	0	0	30	0	1038	42	0
Need Data or Potential Concern	2548	0	56	138	227	940	563	597	0	2211	813	450	0
Meets Standards	85	765	NE	782	239	NE	NE	NE	1111	NE	220	129	NE
Total Assessed	2768	861	225	1131	1354	1057	563	597	1141	2211	2071	621	0
Legend: NE = Not Evaluated.													

Appendix H: Table H-6
Land Use / Land Cover For Upper Willamette River ESUs

Upper Willamette River ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
17090001—Middle Fork Willamette						
Urban Stream Miles	0	27	27	0	4	4
Agricultural Stream Miles	0	11	11	0	3	3
Rangeland Stream Miles	1	0	1	0	0	0
Forest Stream Miles	1103	158	1261	19	11	30
Total Stream Miles	1104	196	1300	19	18	37
17090002—Coast Fork Willamette						
Urban Stream Miles	1	54	55	0	10	10
Agricultural Stream Miles	0	71	71	0	16	16
Rangeland Stream Miles	0	4	4	0	0	0
Forest Stream Miles	235	311	546	15	10	25
Total Stream Miles	236	440	676	15	36	51
17090003—Upper Willamette						
Urban Stream Miles	0	97	97	0	17	17
Agricultural Stream Miles	12	1079	1091	0	154	154
Rangeland Stream Miles	0	14	14	0	0	0
Forest Stream Miles	107	787	894	1	58	59
Total Stream Miles	119	1977	2096	1	229	230
17090004—McKenzie						
Urban Stream Miles	3	29	32	2	17	19
Agricultural Stream Miles	0	43	43	0	20	20
Rangeland Stream Miles	3	0	3	0	0	0
Forest Stream Miles	775	364	1139	52	57	109
Total Stream Miles	781	436	1217	54	94	148
17090005—North Santiam						
Urban Stream Miles	0	11	11	0	2	2
Agricultural Stream Miles	0	81	81	0	19	19
Rangeland Stream Miles	0	0	0	0	0	0
Forest Stream Miles	542	203	745	1	22	23

Appendix H: Table H-6
Land Use / Land Cover For Upper Willamette River ESUs

Upper Willamette River ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
Total Stream Miles	542	295	837	1	43	44
17090006—South Santiam						
Urban Stream Miles	0	18	18	0	1	1
Agricultural Stream Miles	0	208	208	0	11	11
Rangeland Stream Miles	0	0	0	0	0	0
17090006—South Santiam (Cont'd)						
Forest Stream Miles	321	548	869	0	3	3
Total Stream Miles	321	774	1095	0	15	15
17090007—Middle Willamette						
Urban Stream Miles	1	74	75	0	27	27
Agricultural Stream Miles	10	519	529	2	93	95
Rangeland Stream Miles	0	3	3	0	0	0
Forest Stream Miles	15	220	235	1	30	31
Total Stream Miles	26	816	842	3	150	153
17090008—Yamhill						
Urban Stream Miles	0	17	17	0	6	6
Agricultural Stream Miles	1	407	408	1	111	112
Rangeland Stream Miles	1	1	2	3	0	3
Forest Stream Miles	106	393	499	10	37	47
Total Stream Miles	108	818	926	14	154	168
17090009—Molalla – Pudding						
Urban Stream Miles	0	35	35	0	4	4
Agricultural Stream Miles	0	451	451	0	51	51
Rangeland Stream Miles	0	0	0	0	0	0
Forest Stream Miles	89	472	561	0	28	28
Total Stream Miles	89	958	1047	0	83	83
17090010—Tualatin						
Urban Stream Miles	0	102	102	0	53	53
Agricultural Stream Miles	0	346	346	0	152	152
Rangeland Stream Miles	0	1	1	0	0	0

Appendix H: Table H-6
Land Use / Land Cover For Upper Willamette River ESUs

Upper Willamette River ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
Forest Stream Miles	58	360	418	7	69	76
Total Stream Miles	58	809	867	7	274	281
<i>All Upper Willamette River HUCs</i>						
Urban Stream Miles	5	464	469	2	141	143
Agricultural Stream Miles	23	3216	3239	3	630	633
Rangeland Stream Miles	5	23	28	3	0	3
Forest Stream Miles	3351	3816	7167	106	325	431
Total Stream Miles	3384	7519	10903	114	1096	1210

**Appendix H: Table H-7
Snake River Basin ESUs 303(d) Data Summary**

Snake River Basin ESUs By Hydrologic Unit	Stream Miles	Aquatic Weeds	Biological Criteria	Dissolved Oxygen	Bacteria	Flow Mod.	Habitat Mod.	Nutrients	pH	Sediment	Temp.	Toxics	TDG
17060101—Hells Canyon													
Total Stream Miles	302												
303(d) Listed	59	0	0	0	0	0	0	0	0	0	59	0	0
Need Data or Potential Concern	0	0	NE	0	0	0	0	0	0	0	0	0	0
Meets Standards	0	0	NE	0	0	NE	NE	NE	0	NE	0	NE	NE
Total Assessed	59	0	0	0	0	0	0	0	0	0	59	0	0
17060102—Imnaha													
Total Stream Miles	951												
303(d) Listed	148	0	0	0	0	0	29	0	0	0	148	0	0
Need Data or Potential Concern	110	0	NE	0	50	68	0	68	0	90	38	0	0
Meets Standards	0	0	NE	0	0	NE	NE	NE	0	NE	0	NE	NE
Total Assessed	186	0	0	0	50	68	29	68	0	90	186	0	0
17060103—Lower Snake – Asotin													
Total Stream Miles	105												
303(d) Listed	14	0	0	0	0	0	0	0	0	0	14	0	0
Need Data or Potential Concern	0	0	NE	0	0	0	0	0	0	0	0	0	0
Meets Standards	0	0	NE	0	0	NE	NE	NE	0	NE	0	NE	NE
Total Assessed	14	0	0	0	0	0	0	0	0	0	14	0	0
17060104—Upper Grande Ronde													
Total Stream Miles	2011												
303(d) Listed	438	104	0	99	82	104	294	104	139	294	390	0	0
Need Data or Potential Concern	493	0	NE	68	0	288	78	38	0	226	138	104	0
Meets Standards	40	142	NE	38	42	NE	NE	NE	76	NE	70	NE	NE
Total Assessed	643	246	0	206	124	392	372	142	215	520	597	104	0
17060105—Wallowa													
Total Stream Miles	969												
303(d) Listed	129	0	0	15	74	84	95	0	59	106	88	0	0
Need Data or Potential Concern	193	0	NE	0	8	40	58	103	0	88	91	0	0
Meets Standards	4	70	NE	59	0	NE	NE	NE	26	NE	4	NE	NE
Total Assessed	202	70	0	75	82	125	153	103	85	193	183	0	0

**Appendix H: Table H-7
Snake River Basin ESUs 303(d) Data Summary**

Snake River Basin ESUs By Hydrologic Unit	Stream Miles	Aquatic Weeds	Biological Criteria	Dissolved Oxygen	Bacteria	Flow Mod.	Habitat Mod.	Nutrients	pH	Sediment	Temp.	Toxics	TDG
<i>17060106—Lower Grande Ronde</i>													
Total Stream Miles	1228												
303(d) Listed	190	0	0	0	0	0	91	0	0	85	190	0	0
Need Data or Potential Concern	270	0	NE	0	0	172	7	20	45	148	87	0	0
Meets Standards	16	0	NE	0	0	NE	NE	NE	0	NE	24	NE	NE
Total Assessed	301	0	0	0	0	172	98	20	45	233	301	0	0
<i>All Snake River Basin HUCs</i>													
Total Stream Miles	5565												
303(d) Listed	977	104	0	115	156	188	509	104	199	485	888	0	0
Need Data or Potential Concern	1066	0	NE	68	57	568	143	229	45	552	353	104	0
Meets Standards	60	212	NE	97	42	NE	NE	NE	102	NE	98	NE	NE
Total Assessed	1404	315	0	281	256	756	652	333	345	1037	1339	104	0
Legend:													
NE = Not Evaluated.													

**Appendix H: Table H-8
Land Use / Land Cover For Snake River Basin ESUs**

Snake River Basin ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
17060101—Hells Canyon						
Urban Stream Miles	0	0	0	0	0	0
Agricultural Stream Miles	0	0	0	0	0	0
Rangeland Stream Miles	121	5	126	0	0	0
Forest Stream Miles	113	0	113	0	0	0
Total Stream Miles	234	5	239	0	0	0
17060102—Imnaha						
Urban Stream Miles	0	1	1	0	0	0
Agricultural Stream Miles	0	12	12	0	6	6
Rangeland Stream Miles	87	238	325	11	48	59
Forest Stream Miles	517	94	611	65	16	81
Total Stream Miles	604	345	949	76	70	146
17060103—Lower Snake – Asotin						
Urban Stream Miles	0	0	0	0	0	0
Agricultural Stream Miles	0	0	0	0	0	0
Rangeland Stream Miles	34	15	49	0	0	0
Forest Stream Miles	43	0	43	0	0	0
Total Stream Miles	77	15	92	0	0	0
17060104—Upper Grande Ronde						
Urban Stream Miles	0	24	24	0	10	10
Agricultural Stream Miles	3	307	310	0	91	91
Rangeland Stream Miles	14	158	172	1	29	30
Forest Stream Miles	919	581	1500	188	117	305
Total Stream Miles	936	1070	2006	189	247	436
17060105—Wallowa						
Urban Stream Miles	0	10	10	0	8	8
Agricultural Stream Miles	1	185	186	0	56	56
Rangeland Stream Miles	2	83	85	0	5	5
Forest Stream Miles	417	250	667	10	43	53

Appendix H: Table H-8
Land Use / Land Cover For Snake River Basin ESUs

Snake River Basin ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
Total Stream Miles	420	528	948	10	112	122
<i>17060106—Lower Grande Ronde</i>						
Urban Stream Miles	0	0	0	0	0	0
Agricultural Stream Miles	1	54	55	0	5	5
Rangeland Stream Miles	62	264	326	14	66	80
Forest Stream Miles	570	276	846	71	32	103
Total Stream Miles	633	594	1227	85	103	188
<i>All Snake River Basin HUCs</i>						
Urban Stream Miles	0	35	35	0	18	18
Agricultural Stream Miles	5	558	563	0	158	158
Rangeland Stream Miles	320	763	1083	26	148	174
Forest Stream Miles	2579	1201	3780	334	208	542
Total Stream Miles	2904	2557	5461	360	532	892

Appendix H: Table H-8
Land Use / Land Cover For Snake River Basin ESUs

Snake River Basin ESUs By Hydrologic Unit	Public Land	Private Land	Total Public & Private	303(d) List (Public)	303(d) List (Private)	Total 303(d) List
17060101—Hells Canyon						
Urban Stream Miles	0	0	0	0	0	0
Agricultural Stream Miles	0	0	0	0	0	0
Rangeland Stream Miles	121	5	126	0	0	0
Forest Stream Miles	113	0	113	0	0	0
Total Stream Miles	234	5	239	0	0	0
17060102—Imnaha						
Urban Stream Miles	0	1	1	0	0	0
Agricultural Stream Miles	0	12	12	0	6	6
Rangeland Stream Miles	87	238	325	11	48	59
Forest Stream Miles	517	94	611	65	16	81
Total Stream Miles	604	345	949	76	70	146
17060103—Lower Snake – Asotin						
Urban Stream Miles	0	0	0	0	0	0
Agricultural Stream Miles	0	0	0	0	0	0
Rangeland Stream Miles	34	15	49	0	0	0
Forest Stream Miles	43	0	43	0	0	0
Total Stream Miles	77	15	92	0	0	0
17060104—Upper Grande Ronde						
Urban Stream Miles	0	24	24	0	10	10
Agricultural Stream Miles	3	307	310	0	91	91
Rangeland Stream Miles	14	158	172	1	29	30
Forest Stream Miles	919	581	1500	188	117	305
Total Stream Miles	936	1070	2006	189	247	436
17060105—Wallowa						
Urban Stream Miles	0	10	10	0	8	8
Agricultural Stream Miles	1	185	186	0	56	56
Rangeland Stream Miles	2	83	85	0	5	5
Forest Stream Miles	417	250	667	10	43	53

Appendix H: Table H-8
Land Use / Land Cover For Snake River Basin ESUs

SNAKE RIVER BASIN ESUs BY HYDROLOGIC UNIT	PUBLIC LAND	PRIVATE LAND	TOTAL PUBLIC & PRIVATE	303(d) LIST (PUBLIC)	303(d) LIST (PRIVATE)	TOTAL 303(d) LIST
Total Stream Miles	420	528	948	10	112	122
17060106—Lower Grande Ronde						
Urban Stream Miles	0	0	0	0	0	0
Agricultural Stream Miles	1	54	55	0	5	5
Rangeland Stream Miles	62	264	326	14	66	80
Forest Stream Miles	570	276	846	71	32	103
Total Stream Miles	633	594	1227	85	103	188
All Snake River Basin HUCs						
Urban Stream Miles	0	35	35	0	18	18
Agricultural Stream Miles	5	558	563	0	158	158
Rangeland Stream Miles	320	763	1083	26	148	174
Forest Stream Miles	2579	1201	3780	334	208	542
Total Stream Miles	2904	2557	5461	360	532	892

APPENDIX I

Oregon Drinking Water Program

Appendix I: Oregon Drinking Water Program

Drinking Water Protection in Oregon

A Partnership of the Oregon Department of Environmental Quality And the Oregon Health Division

Background

Approximately 75% of Oregon's citizens get their drinking water from public water systems. Public water systems in Oregon are regulated by the Oregon Health Division (OHD). In Oregon, public water systems with greater than 3 hookups, or serving more than 10 people, year-round are regulated. There were approximately 3550 listed total public water systems as of mid-1999. Of the total, 3175 of these are groundwater wells or springs, and 375 of these are surface water intakes on rivers and reservoirs. The 50 largest public water systems, serving >10,000 each, supply drinking water for 60% of the population of the state. In terms of sources of drinking water by population, 50% of Oregon's citizens rely solely on groundwater (mostly small systems). Approximately 30% rely solely on surface water. These are mostly large systems. Another 20% rely on surface water and groundwater, as an emergency backup supply or combination system.

Many citizens have contributed over the past ten years to build a program to protect drinking water in Oregon. The development of a wellhead (groundwater) protection program was originally mandated by the Safe Drinking Water Act Amendments of 1986. Then Governor Vic Atiyeh designated the Department of Environmental Quality (DEQ) as the agency responsible for developing a wellhead protection program for Oregon. DEQ first went to the 1993 Legislature with a proposal for a mandatory wellhead protection program and it was rejected. In 1994, DEQ re-designed the approach and used a citizens advisory committee to develop a *voluntary* wellhead protection program. The advisory committee met a total of 14 times over a period of two years to provide strategic input and help guide agency staff to write new rules and an extensive guidance manual. The Environmental Quality Commission adopted rules for the program in January 1996 and the guidance manual was completed in May 1996. The U.S. Environmental Protection Agency (EPA) granted formal approval of the program in September 1996, calling it a "national model for empowering communities to protect sources of drinking water".

Before the ink was dry on our wellhead protection program package, the 1996 Amendments to the Safe Drinking Water Act were signed by President Clinton. Instead of focusing on the implementation of wellhead protection, we shifted our focus to developing a whole new program to address new requirements and opportunities. *The Amendments provided opportunities to expand the program to incorporate protection of surface water sources in addition to groundwater sources of public water supplies.*

Why wellhead protection first ?

Wellhead protection is designed to protect from contamination the *groundwater resources* that supply public water systems. Approximately 90% of the public water systems in Oregon are groundwater-supplied. By population, this translates to roughly 70% of Oregon's citizens relying at least in part on groundwater for drinking water supplies. Approximately 12% (380) of the groundwater-supplied public water systems in Oregon have had significant levels of contaminants detected in routine monitoring, while surface water-supplied systems show far fewer water quality concerns. The initial focus on groundwater-supplied systems in Oregon was also due to the recognized difficulties in cleaning up groundwater contamination.

<p><i>Wellhead protection rules</i> (available through agency websites) DEQ rules: OAR 340-40-140 through 210 OHD rules: OAR 333-61-020, 050, 057, and 065 DLCD rules: OAR 660-23-140 (related to Goal 5)</p>

Source Water Assessments

The 1996 Amendments to the federal Safe Drinking Water Act (SDWA) provided new resources to DEQ and OHD to provide *drinking water protection* assistance to public water systems and communities. While developing a management plan to protect a public water system will remain voluntary in Oregon, the 1996 SDWA Amendments mandated that states agencies conduct “source water assessments” for every public water system. This means that DEQ and OHD must delineate the groundwater and surface water source areas which supply public water systems, inventory each of those areas to determine potential sources of contamination, and determine the most susceptible areas at risk for contamination.

To address these requirements, Oregon DEQ assembled a statewide citizen’s advisory committee (Drinking Water Protection Advisory Committee) to assist in the expansion of the former wellhead protection program. The members of the Drinking Water Protection Advisory Committee included **Dan Bradley**, General Manager, South Fork Water Board, *Committee Chair*; **Jeff Bauman**, Public Works Director, City of Wilsonville; **Bill Brookes**, Senior Hydrologist, Bureau of Land Management; **Merlin Brown**, City Recorder/Manager, City of Nehalem; **Steven Bruce**, Senior Project Manager, David Newton & Assoc.; **Paul Eckley**, Chief Utilities Engineer, City of Salem; **John Handler**, Public Works Superintendent, City of Manzanita; **Bob Jones**, Sr. Geologist, Medford Water Commission; **John Ledger**, Environmental/Natural Resources, Associated Oregon Industries; **Bruce McCammon**, Regional Hydrologist, US Forest Service; **Mike Meszaros**, Environmental Health Specialist, Curry County Env. Health; **Regna Merritt**, Program Leader, Oregon Natural Resources Council; **Jason Green**, Oregon Assoc of Water Utilities; **Tom Penpraze**, Util. Div. Manager, Corvallis Public Works; **Laurie Power**, Environmental Manager, Eugene Water and Electric; **Roger Prowell**, Water Supervisor, City of Bend; **Clinton Reeder**, Oregon Wheat Growers League; **Janet Senior**, Senior Planner, Portland Water Bureau; **Terry Witt**, Ex. Director, Oregonians for Food and Shelter. The Technical Advisory Team included **Donn Miller**, Water Resources Dept.; **Dennis Nelson**, Oregon Health Division; **Doug White**, Dept. Land Conservation & Dept.; **Peggy Vogue**, Dept. of Agriculture; **Terrence Conlon**, US Geological Survey; and **Sheree Stewart**, Dept. of Environmental Quality (Committee Coordinator).

The committee met six times over a period of one year. A document called the “Source Water Assessment Plan” was developed to describe the approach Oregon will take to meet the requirements over the next four years. The plan was approved by EPA in July 1999. The document describing the procedures for conducting the assessments, “Oregon’s Source Water Assessment Plan”, can be accessed through the DEQ Drinking Water Protection website.

There will be 2656 existing public water systems that will receive assessments. Of those, 1156 will receive full assessments and the 1500 transient noncommunity water systems (and small schools) will receive limited assessments---assistance through focused outreach from OHD. OHD will conduct the groundwater delineations . DEQ will be responsible for the surface water delineations and inventories for all 1156 systems receiving full assessments. DEQ and OHD have 9 new federally-funded staff positions to implement the requirements, including program coordination, computer database development, GIS development, technical assistance, contamination source inventories, surface water delineations, groundwater delineations, and susceptibility analyses. All assessments in Oregon are due to be completed by January 2003. The schedule for completing DEQ’s portion of the assessments is as follows:

Assessment and Inventory Completion Schedule for DEQ Positions

Full System Assessment-Surface Water Systems	158 Public Water Systems	50 in 2000 50 in 2001 50 in 2002 8 in 2003
Inventories of Groundwater Systems	998 Public Water Systems	23 in 1999 325 in 2000 325 in 2001 325 in 2002

DEQ and OHD will delegate the source water assessment tasks to the community or public water systems that request the opportunity to do their own, or those that serve a large number of citizens. Public water systems that serve over 20,000 citizens will be expected to do their own assessments, with assistance from the state staff. Public

water systems serving over 10,000 will be asked to provide staff assistance to conduct the inventory of potential sources. There are also a number of public water systems in Oregon that have already done “assessments” and protection plans. With dedicated resources and extensive local knowledge, in most cases, their work is equivalent or may be better than DEQ and OHD will accomplish with the federal funds. Communities interested in having the assessment work delegated to them can set up a consultation meeting with DEQ and OHD to discuss the minimum state requirements that need to be met. Communities receiving delegations for the assessment tasks will still receive technical assistance and support.

Information collected during the assessment will be made available to the public in a format that is usable by the community in developing their drinking water protection plans. DEQ and OHD will work closely with the local governing body to determine how to best disseminate this information to the general public. Of importance to the community citizens are maps that display the delineation, potential contaminant source inventory, and the susceptibility analysis. Delineations will be placed into a GIS (ARC/INFO) format as they are completed by both OHD (groundwater) and DEQ (surface water). The DEQ will take the lead in the development of GIS coverages. These coverages will be overlain onto standard coverages, e.g., political boundaries, roads, water features, etc. to prepare a final map for the community.

The public water system will receive a copy of a “source water assessment (SWA)” report that contains pertinent hydrogeological and/or hydrological information and details the assumptions and methods pertaining to their individual assessment. The agencies will also provide an “Informational Brochure” tailored to each community that will present a summary of the assessment results to the public. DEQ and OHD are also developing linked databases that will store and provide public access to the information collected during the assessments.

In Oregon, it is not required that communities use the source water assessments to develop a “drinking water protection plan. It is, however, highly recommended! Developing a protection plan facilitates local decision-making as the community determines how to protect their own drinking water sources. As resources allow, DEQ and OHD will continue to provide guidance, technical assistance, and review for any community interested in developing a drinking water protection plan beyond the minimum assessments to be done by the state.

How do you develop a Drinking Water Protection Plan?

To develop a drinking water protection plan, we first determine (or “delineate”) the land surface area where the drinking water originates, identify what kind and how many potential contamination sources are within that area, and then determine where the most sensitive or susceptible areas exist within the drinking water protection area. Again, these first three steps constitute the “source water assessments”, and *these will be performed by the state for the community in the next few years*. A schematic diagram is attached to this introductory text that provides information about the process and how the source water assessments relate to protection.

After the assessment is complete, the local community then voluntarily develops a management approach to reduce the risks of groundwater contamination from those sources. Since natural conditions and vulnerability to contaminants vary substantially from one part of Oregon to another, the protection of a public water supply can best be accomplished by the local community using an approach designed by that community. DEQ recommends that the management approach be developed so as to *minimize any burdens on individual property owners, but maximize the equity in responsibility for reducing the risks of future contamination*. The community may contract to have a plan prepared by a consultant, or choose to develop it with a community team. The process of developing a protection plan is described in detail in the *Oregon Wellhead Protection Guidance Manual* (available through DEQ’s Drinking Water Protection website) The document was developed to specifically assist groundwater-based systems. We will begin updating the guidance manual by 2001 to include guidance to surface water systems. Table 1 provides a list of examples of drinking water protection activities. These are the types of activities that can be funded by CWA 319 grants or SRF funding.

The Drinking Water Protection approach in Oregon is built on the concept of “community-based protection”, as are many other water quality programs. Community-based protection simply refers to the concept of allowing local control and decision-making to implement the water quality protection effort. Community-based protection is successful only with significant local citizen involvement. The primary advantage of community-based protection is that it links community needs to environmental needs. Any successful protection program will need to be flexible

enough to allow the community to adopt the “tools” or elements that are most appropriate for them. Allowing this local control in making the changes necessary for improving water quality will accomplish two key elements of restoration and protection. Community-based protection can draw on the knowledge and successful adaptive practices of the local area. Landowners generally know best how to achieve water resource restoration and protection as long as a thorough explanation of the problem is provided, the objectives are defined, and some free technical assistance is provided. Secondly, knowing they have more local control, citizens will also be more likely to participate in the program and more willing to assist with the educational and outreach effort which will make the plan successful.

The primary incentive for local communities to voluntarily implement drinking water protection is **the benefit of a more secure source of high quality water**. Other (perhaps more tangible) incentives include lower costs to the public by: a) a reduction in OHD public water supply monitoring requirements, and b) reduced likelihood of costs for replacement and/or treatment of contaminated drinking water. Long-term assurances of a safe and adequate drinking water supply also helps to protect property values and preserve the local and regional economic growth potential for the area. **Developing a plan to protect a public water system is always a cost effective use of resources, since it is extremely expensive to treat contaminated drinking water or to find an alternative source should a water supply be lost because of contamination.** DEQ estimates the cost of developing a drinking water protection plan for a small community of less than 500 to be approximately \$6000, compared to typical costs to investigate and install treatment for contamination of at least \$500,000. These numbers are based on actual costs of contamination response in 1992 at a small groundwater-supplied public water system in Marion County. A recent EPA study demonstrated the ratio of contaminant cleanup costs to basic prevention ranges from 5:1 to 200:1.

Linking Other Water Quality Efforts

Drinking water protection involves developing protection strategies for groundwater or surface water sources of public water supplies. There are many similarities between this program and other water quality protection programs, and it is essential that water quality efforts are coordinated and linked in each geographic area as much as possible. DEQ is committed to linking the drinking water protection efforts to other habitat and water quality improvement efforts for fish in Oregon, as well as the ongoing work to address Clean Water Act 303(d) water-quality-limited streams. One of the primary means of providing technical assistance is to give the community the information and coordination necessary to create these links.

Other agencies and water quality programs will also be involved in providing technical assistance as drinking water protection plans are developed. For example, on farmlands, the Oregon Department of Agriculture will provide assistance as provided for under Senate Bill 1010. In developing recommendations for protecting drinking water source areas, we have sought to maximize the use of existing programs in Oregon such as pollution prevention technical assistance (DEQ), sanitary survey results (OHD), household hazardous waste collection (DEQ), land use planning (DLCD), agricultural water quality management plans (ODA), best management practices for managed forests (ODF), water conservation education (WRD), rural water quality outreach (OSU Extension Service.), etc.

Protecting the drinking water supply in a community can also be a very effective way to encourage all citizens to participate in an issue which directly affects everyone in that community. This often leads to more public involvement in other significant local decisions concerning future livability issues (i.e., land use planning). In communities already developing and implementing Drinking Water Protection Plans, the process has served to bring many diverse interests together on a common goal and strengthened the local rural and urban relationships through communication and increased understanding. We must continue to do a better job in our outreach efforts to point out that we are all part of the existing water quality problems. The risks and sources of water quality problems are not only from industries, farmers, and managed forests, but every individual living, commuting and working in that area.

Table 1. Drinking Water Protection Activities

Public Education/Notification

- Public Education/Notification using:
 - Local Media (TV, Radio, Newspaper either paid or Public Service Announcements)
 - Letters to residents/land owners/operators
 - Bill stuffers/customer mailings
 - Educational meetings/workshops/fairs
 - Surveys of owners to assess current practices
- Residential areas: Distribute fact sheets or a newsletter on DWP, BMPs, and available resources including:
 - Household hazardous waste
 - Septic systems use, maintenance, and abandonment
 - Pollution prevention/waste reduction in the home (use of alternatives)
 - Lawn and garden maintenance
 - Home heating oil tank maintenance and abandonment
 - Proper well construction, maintenance, and abandonment
 - Drywells/sumps use, maintenance and abandonment
- Commercial/industrial areas: Distribute fact sheets or a newsletter on DWP, BMPs, and available resources including:
 - BMPs for specific businesses
 - Hazardous waste collection opportunities
 - Pollution prevention
 - Stormwater risks
 - Info on septic systems use and maintenance
 - Info on drywell/injection well/sump use, maintenance and abandonment
 - Construction/demolition Areas
- Provide information to businesses and residents at Planning or Permits Department on whether the activity they are proposing will impact groundwater upon permit application
- Educational programs in the schools
- Fund a public education/outreach coordinator
- Install signs – “Entering Drinking Water Protection Area” - include spill response contacts
- Stormdrain stenciling program (i.e. “drains to your drinking water”)

Public/Private Partnerships

- Encourage participation in Pollution Prevention and waste reduction through technical assistance
 - Organize/host open house workshops (partner with DEQ’s Toxic Use Reduction staff)
 - Provide one-on-one technical assistance
 - Survey owners to assess current practices and provide TA based on results
- Facilitate employee-training workshops (including training for municipal workers)
 - Chemical applicators license for pesticides
 - Pollution prevention/waste reduction (use of alternatives)
 - Petroleum/hazardous waste/maintenance chemicals use, storage, disposal
- Encourage public education by private sector – Education at point-of-sale
 - Pamphlet distribution at home and garden shop
 - Partner with Home Improvement shops to have them include DWP and P2 at their seminars
 - Provide lists of less hazardous alternatives next to products
- Facilitate business mentoring program and information sharing among commercial/industrial business owners; set up a publicly coordinated resource center or forum for small businesses
- Provide Recognition for Environmental Friendly Businesses (i.e. EcoLogical program of Auto Repair shops)
 - Green awards
 - Plaques & door signs

Hazardous Waste Collection

- Coordinate/facilitate hazardous waste collection (for small businesses)
- Coordinate/facilitate household hazardous waste collection events
- Develop an amnesty program/collection event for chemicals stored in DWPA

Table 1. Drinking Water Protection Activities

Spill Response Plans

- Establish detailed spill response procedures plan using citizen input
 - Example elements:
 - Set up regional spill number
 - Notify local Emergency Response Planners of drinking water source area location
 - Ensure public water system notification in spill event
 - Notify responsible parties (i.e. County, ODOT, railroads, businesses) of location within source area
 - Provide fire department and spill responders with good maps of storm and sanitary sewer systems
- Encourage and assist with spill response planning for specific groups of businesses
- Construct spill containment/diversion structures at wellheads

Zoning /Health Ordinance

- Develop technical basis for determining local needs for zoning using citizen input
 - Examples:
 - Maintain low density in residential areas (large lot zoning)
 - Overlay water resource protection districts
 - Special permitting requirements
 - Prohibition of various land uses
 - Require performance standards
 - Drainage requirements for stormwater
 - Transfer of development rights (transfer new development outside of DWPA)
 - Growth controls/timing
 - Regulate hazardous materials transport
- DCLD - Statewide Goal 5 Resource Area designation requirements

Urban Runoff/Stormwater Program

- Develop a local plan to address injection wells/sumps/drywells or stormwater control/pretreatment
- Verify permit status, encourage registration and proper maintenance or elimination
- Encourage use of pre-treatment and BMPs:
 - Detention ponds, retention ponds, vegetated swales, filter strips, urban forestry, sand filters
 - Street cleaning
 - Parking lot pretreatment requirements
 - Injection well/sump maintenance program

Property Purchase/Donation Program

- Conservation easement purchases
- Develop a local plan to encourage voluntary deed restrictions, land acquisition through donation/lease, or land set-asides in developments (more green space)

Septic System/Private Wells Upgrades/Maintenance Program

- Develop the technical basis for addressing community sewage collection and treatment system installation
- Cost-share or provide technical assistance for periodic inspection and maintenance
- Cost-share or provide grants for proper well abandonment
- Provide technical assistance for private well management practices, maintenance, and abandonment procedures

Water Conservation Program

- Develop a local plan for issues concerning water conservation (with public input), such as:
 - Maintenance of distribution infrastructure to decrease water loss
 - Develop rate structure that encourages conservation
 - Rebate program for water efficient appliances

Groundwater Monitoring Program

- Establish groundwater monitoring network of wells in areas of probable contamination that threaten drinking water supplies

Oregon's Drinking Water Protection Process for Public Water Systems (PWS)


