

# Appendix A

## Data Sources



Useful Tools		
Topic	Link to Tool	Purpose
Climate	<a href="#">PRISM Climate Group</a>	Find and download information on precipitation and temperature in the Northwest.
Climate, Surface Water, and more	<a href="#">Northwest River Forecast Center</a>	Search for information and forecasts on precipitation, temperatures, streamflow and more.
Groundwater	<a href="#">Well Log Query.</a>	Search well logs by location, tax lot number, owner name, well log number, and several other conditions.
Surface Water	<a href="#">Miscellaneous Streamflow Measurements Query.</a>	Find miscellaneous streamflow measurements taken by OWRD staff.
Surface Water	<a href="#">Near Real Time Hydrographics Database,</a>	Find and download current mean daily streamflow measurements from both USGS and OWRD stream gages.
Surface Water	<a href="#">Historical Streamflow and Lake Level Database.</a>	Find and download historic mean daily streamflow measurements from both USGS and OWRD stream gages.
Surface Water	<a href="#">Peak Discharge Estimation Mapping Tool for Active Gages</a> <a href="#">Peak Discharge Estimation Mapping Tool for Defined Watersheds</a>	Provides information regarding the estimated peak flows in Oregon. These flows can be used to create flood map estimates.
Surface Water	<a href="#">USGS WaterWatch</a>	Select a stream gage on the interactive map and find normal 7-day average streamflow compared to historical streamflow for the day of the year
Surface Water Availability	<a href="#">Water Availability Reporting System</a>	Find information on water availability estimates for rivers and streams throughout the state, watershed characteristics, and information about instream and-out-of-stream flow requirements.
Surface Water and Groundwater	<a href="#">USGS Water Science School</a>	Information on basics of hydrology.
Head of Tide and Estuary	<a href="#">Estuary Data Viewer</a>	Provides spatial information on head of tide, wetlands, estuary habitats, and regulations.



# Appendix B

## Terminology



- **Aquifer:** A water-bearing body of naturally occurring earth materials that is sufficiently porous and permeable to yield usable quantities of water to wells and/or springs (OWRD & OHA, 2015).
- **Confined aquifers:** Aquifers that are covered and underlain by layers of sediments or rocks that only allow water to permeate very slowly. Water in these aquifers is under pressure, and can discharge without added pumping in what are called artesian wells (USGS, 2017).
- **Discharge:** The volume of water that passes a given location within a given period of time (USGS, 2017). Discharge is often measured in cubic feet per second (cfs).
- **Drought:** The word drought has many different definitions. In hydrology, a drought is an extended period of decreased precipitation and streamflow (USGS, 2017).
- **Exceedance:** This is the percentage of time that flows exceed a certain amount. Exceedance levels are used to understand how often a rate of flow is present in a stream. The Department uses 80 percent and 50 percent exceedance flows for determining water availability (Cooper, 2002). Low flows have high exceedance amounts because they are frequently exceeded. High flows, on the other hand, have low exceedance amounts because they are not frequently exceeded. The 80 percent exceedance flow is the amount of flow that is in a river or stream 80 percent of the time and the 50 percent exceedance is the amount of flow that is in a river or stream 50 percent of the time.
- **Flood:** A flood occurs when prolonged rainfall over several days or intense rainfall over a short period of time causes a river to overflow and flood the surrounding area (USGS, 2017).
- **Flood Return Interval:** A return interval, also known as a recurrence interval is an estimate of the likelihood of a flood or a river discharge flow to occur. The flood return interval for a stream is the probability that a flood of a given magnitude will be equaled or exceeded in a given year. A flood having a recurrence interval of 10 years has a 10 percent chance of recurring in any year; a 100-year flood has a 1percent chance of recurring each year (USGS, 2017).
- **Groundwater:** Water that is stored underground. Groundwater flows or seeps downward from the land surface and saturates soil or rock and supplies springs and wells (USGS, 2017).
- **Groundwater flow measurements:** Groundwater discharge in wells is typically measured in gallons per minute (gpm), which is also a measurement of a volume (x gallons) over a period of time (x minutes). Groundwater flow through aquifers is also referred to as discharge. Discharge areas are areas where water is leaving an aquifer and either entering a stream or coming up through the ground in a spring or wetland (USGS, 2017).

- **Groundwater level:** Ground water level, also known as static water level, is the depth to water below the land surface in a well when the well's pump is not operating (OWRD & OHA, 2015). Measurements of the ground water level represent the amount of water stored in the aquifer from which the measured well is drawing water. Water level declines can indicate seasonal fluctuations, variations in groundwater recharge or discharge, or overuse of the aquifer (USGS, 2017).
- **Hydrograph:** Describes the timing and amount of flow in a river or stream. It is a graph that shows discharge (cubic feet per second) over time (daily, monthly, yearly, etc.). Hydrographs are useful for showing high flow periods, often called peak flows, when a river or stream has high discharge, and low flow periods, when a river or stream has low discharge (Hornberger et al., 2014).
- **Instream flow requirement:** A requirement that a certain amount of streamflow be left instream. There are three main types of demands for water to be left instream: instream water rights, Indian treaty rights, and scenic waterway flows. The instream flow requirement used in OWRD's Water Availability Reporting System is the sum of these demands (OWRD, 2013).
- **Instream water right:** A water right that allows a certain amount of water to be protected instream. The water right protects water instream at a single point or along a reach of stream. Instream water rights specify how much water is protected instream and that amount may vary from month to month. Every instream water right has a priority date. During times of shortage, senior water rights get their water first and water rights that are junior to the instream water right can be shut off. Instream water rights are held by the Oregon Water Resources Department (OWRD, 2013).
- **Recharge:** Water enters the ground through recharge areas where water can *infiltrate* (soak into the ground). Aquifers have recharge rates, which are typically measured in inches or feet per year. Recharge rates depend on both the type of aquifer, the amount of precipitation, and the available recharge areas. Pavement and hard surfaces can cover recharge areas and allow water that would have infiltrated into the ground and recharged aquifers to instead flow into streams and rivers (Passero, n.d.).
- **River Mouth:** OWRD identifies the "mouth" as the lowest point in a watershed where all streams eventually drain. This definition does not account for tidal influence on discharge. (OWRD has discontinued gages that were in the zone of tidal influence).
- **Slope and Elevation:** Slope and elevation are important indicators of precipitation and stream characteristics. The slope of a watershed (how steep the hillsides are), combined with other factors, influences the amount and timing of runoff after precipitation events, the shape of the stream channel, and the movement of large wood and sediment from the hillslope to the stream channel (USGS, 2016; Lienkaemper & Swanson, 1987).



- **Stream flow measurements:** Water quantity in rivers and streams is typically measured in cubic feet per second (cfs). This is a measurement of a volume (x cubic feet) over a time (x seconds) and is referred to as a river's discharge (USGS, 2017).
- **Spring:** Groundwater that discharges to the surface, but does not form a natural channel. Springs are sometimes associated with wetlands or seeps (OWRD, 2013).
- **Unconfined aquifers:** Aquifers that are replenished by water infiltrating from the surface. These aquifers may interact with surface water, either receiving recharge from rivers or streams or discharging water into rivers and streams (USGS, 2017).
- **Volume measurements:** Water volumes (a fixed amount of water) in lakes, reservoirs, and sometimes groundwater are typically measured in acre feet (AF), which is equal to a one-foot depth of water covering one acre of area.
- **Water Year:** A water year is a 12-month period from October 1st to September 30th the following year. It is common to characterize water resources in the U.S. by the water year because the water year follows precipitation patterns, which tend to be wet during the winter and dry during the summer (USGS, 2017).
- **Well:** An artificial excavation for the purpose of withdrawing groundwater. Artesian wells are wells that drill into a confined aquifer, where water is under pressure. Artesian wells are also referred to as flowing wells because water flows out of the well without pumping (USGS, 2017).

Useful Conversion Factors	
Volume	1 ac-ft=325,850 gallons
	1 m gall=3.07 acre-feet
Power	1 psi= 2.31 ft head
	1 hp=746 watts= 1 cfs falling 8.81 ft
Length	1/4 mile = 1320 ft
	1 mile = 5,280 ft
Rate	1 cfs = 448.8 gpm
	1 cfs = 1.983471 ac-ft/day
	1 mgd = 1.547 cfs = 695 gpm



# Appendix C

Other Important Streams in the Mid Coast



## **Other Streams Identified as Important by the Mid-Coast Place-Based Planning Partnership**

The Partnership has prioritized the understanding water resource characteristics of streams that flow directly into the ocean and that serve as current or potential public water systems. Information about these streams is provided in the main body of the report.

This appendix includes information about other streams with gage data and a list of other streams identified as important by the Partnership. This appendix does not include additional information about all other streams identified as important, with the exception of Rocky Creek, which is an identified potential future storage site.

The Partnership has not yet defined priority streams for future water supply, studies, or restoration. Therefore, this list does not represent defined Partnership priorities.

### **Salmon River Watershed**

- Bear Creek
- Little Salmon River
- Salmon Creek
- Slick Rock Creek
- Treat River
- Trout Creek

### **Siletz Bay-Ocean Tributaries**

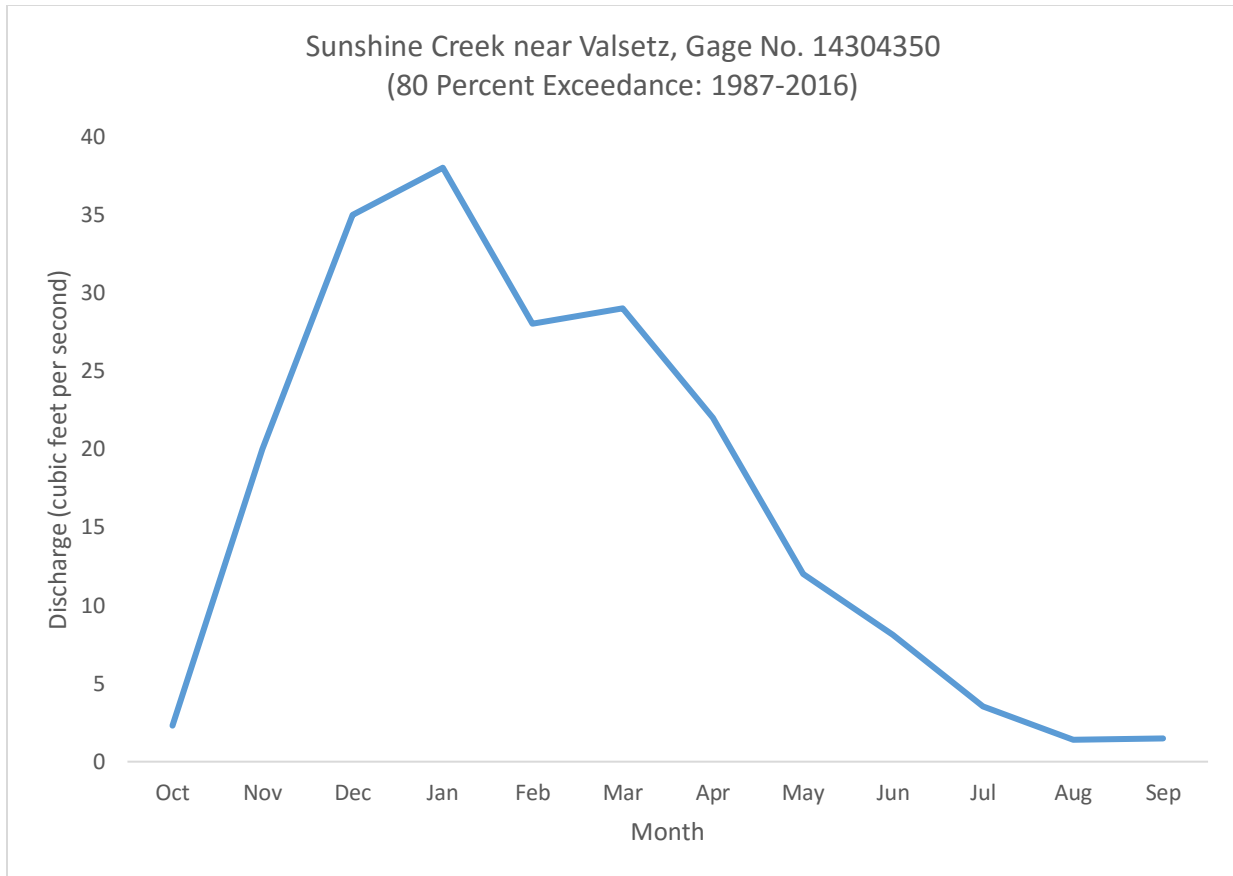
- Devil's Lake
- Side Creek

### **Siletz River Watershed**

- Cedar Creek
- Euchre Creek
- Gravel Creek
- North and South Fork Siletz
- Rock Creek
- Sunshine Creek
- Mill Creek
- Tangerman Creek

#### **Sunshine Creek**

High streamflow in Sunshine Creek occurs in November and March and low streamflow occurs during August and early September. Streamflow is high throughout the winter, declining throughout April, May, June, and July, then increasing in October.



Source: OWRD<sup>1</sup>, 2017

## Depoe Bay-Ocean Tributaries

- Depoe Bay Creek

## Yaquina River Watershed

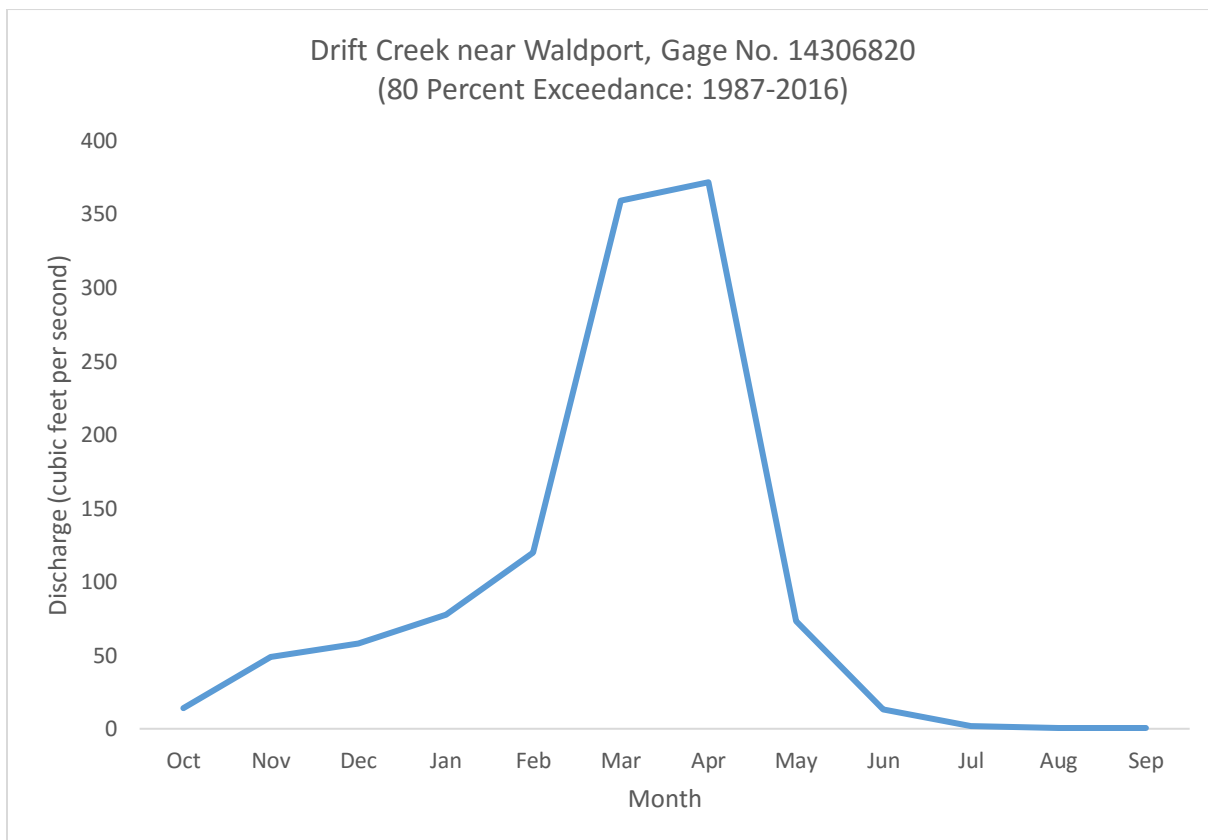
- Depot Creek
- Big Elk Creek
- Little Elk Creek
- Olalla Creek
- Thornton Creek
- Unnamed Creek (tributary to Yaquina Bay)

## Alesea River Watershed

- Drift Creek
- East Fork Lobster Creek
- Canal Creek
- Fall Creek
- Five Rivers
- Lobster Creek
- South Fork Alesea
- North Fork Weist Creek
- South Fork Weist Creek
- Eckman Creek

### Drift Creek

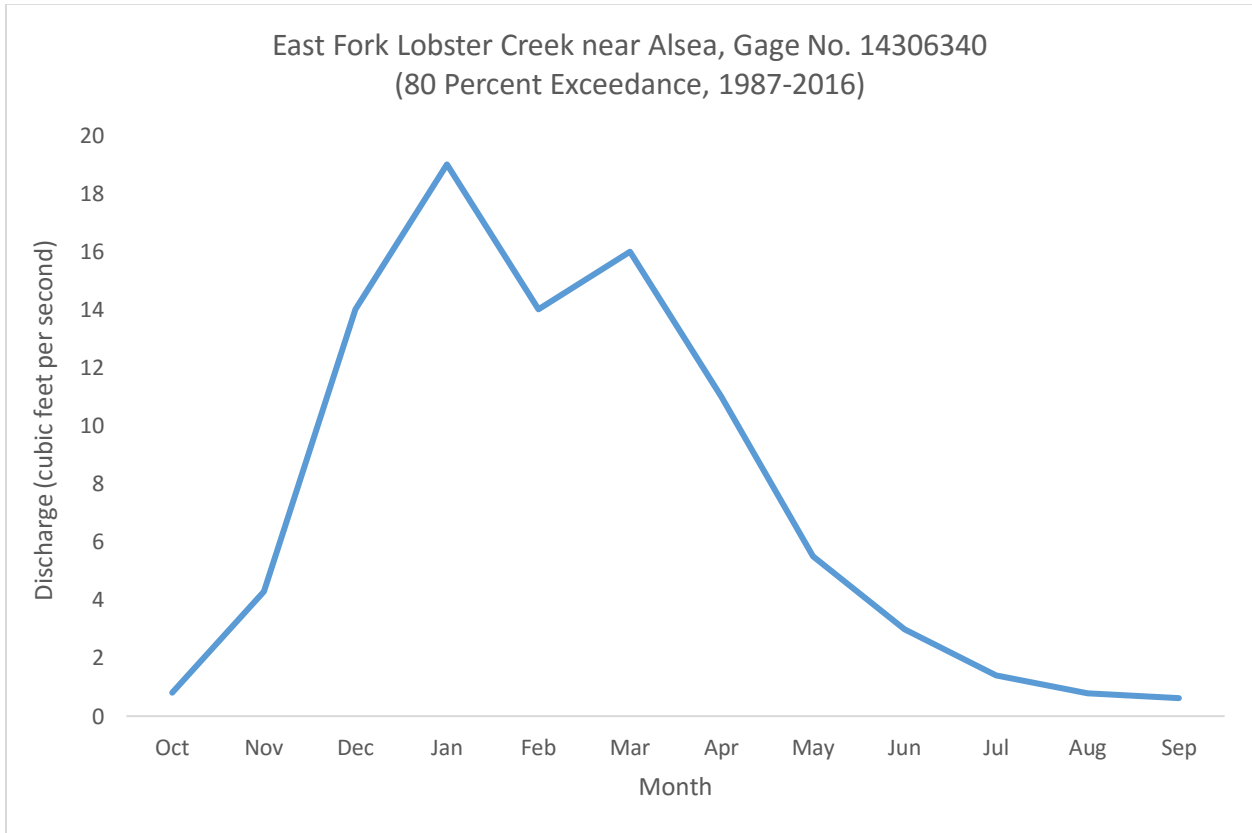
Drift Creek is a tributary to the Alesea River in the Drift Creek Wilderness Area of the Siuslaw National Forest (NRCS, 2005). The Drift Creek watershed receives as much as 120 inches of annual rainfall (OWRD<sup>2</sup>, 2017). The measured 80 percent exceedance streamflow in Drift Creek is highest in late March then declines sharply between late March and late June and is lowest from late July through late September. Streamflow increases between late October and late March (OWRD<sup>1</sup>, 2017).



Source: OWRD<sup>1</sup>, 2017

### East Fork Lobster Creek

East Fork Lobster Creek is a tributary to Lobster Creek (tributary to Five Rivers) and has its headwaters in Lane County. The measured 80 percent exceedance streamflow shows the creek experiences high flows December through March and low flows July through September (OWRD<sup>1</sup>, 2017).



Source: OWRD<sup>1</sup>, 2017

### Yachats River Watershed

- North Fork Yachats
- School Fork
- Stump Creek
- Big Creek
- Salmon Creek



# Appendix D

Water Availability Basins in the Mid Coast



## Water Availability Basins in the Mid Coast by Watershed<sup>1</sup>

<b>Water Availability Basins: Salmon River Watershed (OWRD<sub>2</sub>, 2017)</b>
SALMON R > PACIFIC OCEAN - AB SLICK ROCK CR
PANTHER CR > SALMON R - AT MOUTH
SLICK ROCK CR > SALMON R - AT MOUTH
BEAR CR > SALMON R - AT MOUTH
SULPHUR CR > SALMON R - AT MOUTH
SALMON CR > SALMON R - AT MOUTH
SALMON R > PACIFIC OCEAN - AB DEER CR AT GAGE 14303750
SALMON R > PACIFIC OCEAN - AT MOUTH
DEER CR > SALMON R - AT MOUTH

<b>Water Availability Basins: Siletz River Watershed (OWRD<sub>2</sub>, 2017)</b>
S FK SILETZ R > SILETZ R - AT MOUTH
N FK SILETZ R > SILETZ R - AT MOUTH
SILETZ R > SILETZ BAY - AB GRAVEL CR
GRAVEL CR > SILETZ R - AT MOUTH
SILETZ R > SILETZ BAY - AB SUNSHINE CR
ROCK CR > SILETZ R - AT MOUTH
MILL CR > SILETZ R - AT MOUTH
SAM CR > SILETZ R - AT MOUTH
SCHOONER CR > SILETZ BAY - AB ABRAMS CR AT GAGE 14303950
EUCHRE CR > SILETZ R - AT MOUTH
SILETZ R > SILETZ BAY - AT MOUTH
SIJOTA CR > SILETZ BAY - AT MOUTH
BEAR CR > SILETZ R - AT MOUTH
SILETZ R > SILETZ BAY - AB MILL CR AT GAGE 14305500
CEDAR CR > SILETZ R - AT MOUTH
DRIFT CR > SILETZ BAY - AT MOUTH
BIG ROCK CR > ROCK CR - AB LUCAS CR AT GAGE 14304850
BIG ROCK CR > ROCK CR - AT MOUTH
LITTLE ROCK CR > ROCK CR - AT MOUTH
SCHOONER CR > SILETZ BAY - AT MOUTH

<sup>1</sup> Streams highlighted in yellow were identified as important by the Partnership.

<b>Water Availability Basins: Yaquina River Watershed<sup>2</sup> (OWRD<sub>2</sub>, 2017)</b>
YAQUINA R > YAQUINA BAY - AB BALES CR
LITTLE ELK CR > YAQUINA R - AT MOUTH
FEAGLES CR > ELK CR - AT MOUTH
YAQUINA R > YAQUINA BAY - AB TRAPP CR AT GAGE 14306030
ELK CR > YAQUINA R - AB GRANT CR
YAQUINA R > YAQUINA BAY - AB SIMPSON CR
SIMPSON CR > YAQUINA R - AT MOUTH
ELK CR > YAQUINA R - AB BEAR CR
MILL CR > YAQUINA R - AB UNN STR AT GAGE 14306036
YAQUINA R > YAQUINA BAY - AB ELK CR
OLALLA CR > YAQUINA R - AT MOUTH
ELK CR > YAQUINA R - AT MOUTH
MILL CR > YAQUINA R - AT MOUTH
YAQUINA R > YAQUINA BAY - AT MOUTH
KING SL > YAQUINA BAY - AT MOUTH
BEAR CR > ELK CR - AT MOUTH
DEER CR > ELK CR - AT MOUTH
GRANT CR > ELK CR - AT MOUTH

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<sup>2</sup> Streams highlighted in yellow were identified as important to the Partnership.

<b>Water Availability Basins: Alsea River Watershed (OWRD2, 2017)</b>
FIVE RIVERS > ALSEA R - AB GREEN R
GREEN R > FIVE RIVERS - AT MOUTH
FIVE RIVERS > ALSEA R - AB LOBSTER CR
LOBSTER CR > FIVE RIVERS - AT MOUTH
S FK ALSEA R > ALSEA R - AB BUMMER CR AT GAGE 14306200
BUMMER CR > S FK ALSEA R - AT MOUTH
FALL CR > ALSEA R - AB SKUNK CR AT GAGE 14306300
FALL CR > ALSEA R - AT MOUTH
FIVE RIVERS > ALSEA R - AB ELK CR AT GAGE 14306400
N FK ALSEA R > ALSEA R - AT MOUTH
S FK ALSEA R > ALSEA R - AT MOUTH
ALSEA R > ALSEA BAY - AB FIVE RIVERS
FIVE RIVERS > ALSEA R - AT MOUTH
ALSEA R > ALSEA BAY - AB HELLION CAN AT GAGE 1430650
BURNHAM CR > ALSEA BAY - AT MOUTH
LINT SL > ALSEA BAY - AT MOUTH
ALSEA R > ALSEA BAY - AT MOUTH
DRIFT CR > ALSEA R - AT MOUTH
DRIFT CR > ALSEA R - AB WHEELLOCK CR
DRIFT CR > ALSEA R - AB MEADOW CR AT GAGE 14306600
ALSEA R > ALSEA BAY - AB LINE CR

<b>Water Availability Basins: Yachats River Watershed (OWRD2, 2017)</b>
SCHOOL FK > YACHATS R - AT MOUTH
WILLIAMSON CR > N FK YACHATS R - AT MOUTH
YACHATS R > PACIFIC OCEAN - AB N FK YACHATS R
N FK YACHATS R > YACHATS R - AT MOUTH
YACHATS R > PACIFIC OCEAN - AB BEAMER CR
YACHATS R > PACIFIC OCEAN - AT MOUTH

<b>Water Availability Basins: Pacific Ocean Tributaries<sup>3</sup> (OWRD<sub>2</sub>, 2017)</b>
ROCK CR > DEVILS L - AB UNN STR AT GAGE 14303800
ROCK CR > DEVILS L - AT MOUTH
UNN STR > DEVILS L - AT MOUTH
UNN STR > DEVILS L - AT MOUTH
D R > PACIFIC OCEAN - AT MOUTH
SCHOOLHOUSE CR > PACIFIC OCEAN - AT MOUTH
FOGARTY CR > PACIFIC OCEAN - AT MOUTH
DEPOE BAY CR > DEPOE BAY - AT MOUTH
DEADHORSE CR > PACIFIC OCEAN - AT MOUTH
ROCKY CR > PACIFIC OCEAN - AT MOUTH
JOHNSON CR > PACIFIC OCEAN - AT MOUTH
SPENCER CR > PACIFIC OCEAN - AT MOUTH
WADE CR > PACIFIC OCEAN - AT MOUTH
COAL CR > PACIFIC OCEAN - AT MOUTH
MOOLACK CR > PACIFIC OCEAN - AT MOUTH
SCHOONER CR > PACIFIC OCEAN - AT MOUTH
LITTLE CR > PACIFIC OCEAN - AT MOUTH (NEAR WALDPORT)
BIG CR > PACIFIC OCEAN - AT MOUTH (NEAR WALDPORT)
HENDERSON CR > PACIFIC OCEAN - AT MOUTH
GRANT CR > PACIFIC OCEAN - AT MOUTH
MOORE CR > PACIFIC OCEAN - AT MOUTH
BEAVER CR > PACIFIC OCEAN - AT MOUTH (NEAR SEAL ROCK)
N FK BEAVER CR > BEAVER CR - AB PETERSON CR AT GAGE 1430604 (NEAR SEAL ROCK)
STAR CR > PACIFIC OCEAN - AT MOUTH
AGENCY CR > PACIFIC OCEAN - AT MOUTH
THIEL CR > PACIFIC OCEAN - AT MOUTH
LOST CR > PACIFIC OCEAN - AT MOUTH
BUCKLEY CR > PACIFIC OCEAN - AT MOUTH
PATTERSON CR > PACIFIC OCEAN - AT MOUTH
LITTLE CR > PACIFIC OCEAN - AT MOUTH (NEAR NEWPORT)
BIG CR > PACIFIC OCEAN - AT MOUTH (NEAR YACHATS)
VINGIE CR > PACIFIC OCEAN - AT MOUTH
CLIFF CR > PACIFIC OCEAN - AT MOUTH
LOGAN CR > PACIFIC OCEAN - AT MOUTH
DEER CR > PACIFIC OCEAN - AT MOUTH (NEAR SEAL ROCK)

<sup>3</sup> Streams highlighted in yellow were identified as important by the Partnership.

<b>Water Availability Basins: Pacific Ocean Tributaries (Cont.)<sup>4</sup> (OWRD2, 2017)</b>
HILL CR > PACIFIC OCEAN - AT MOUTH
COLLINS CR > PACIFIC OCEAN - AT MOUTH
LITTLE CR > PACIFIC OCEAN - AT MOUTH (NEAR SEAL ROCK)

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<sup>4</sup> Streams highlighted in yellow were identified as important by the Partnership.





# Appendix E

## Identified Potential Future Storage Projects



<b>Identified Potential Future Storage Projects (OWRD<sub>4</sub>, 2017)</b>			
<b>Project #</b>	<b>Name</b>	<b>T-R-S</b>	<b>Details</b>
1685	ELK CITY	11.00S-10.00W-14	<a href="#">Details</a>
1687	EUCHRE CREEK	9.00S-9.00W-16	<a href="#">Details</a>
1688	FALLS #1	8.00S-9.00W-24	<a href="#">Details</a>
1690	FALLS #2	8.00S-9.00W-23	<a href="#">Details</a>
1692	HOLMAN CREEK	8.00S-9.00W-26	<a href="#">Details</a>
1697	SAM CREEK	10.00S-9.00W-6	<a href="#">Details</a>
1698	SCOTT MOUNTAIN	14.00S-9.00W-18	<a href="#">Details</a>
1702	SILETZ TOWN	10.00S-10.00W-9	<a href="#">Details</a>
1703	SUNSHINE CREEK	9.00S-9.00W-15	<a href="#">Details</a>
1704	SUNSHINE CREEK	9.00S-9.00W-3	<a href="#">Details</a>
1707	TIDEWATER	13.00S-10.00W-32	<a href="#">Details</a>
2032	UNNAMED	10.00S-8.00W-8	<a href="#">Details</a>
2033	UNNAMED	10.00S-9.00W-6	<a href="#">Details</a>
1682	UNNAMED	10.00S-10.00W-30	<a href="#">Details</a>
1683	UNNAMED	11.00S-11.00W-11	<a href="#">Details</a>
1684	UNNAMED	12.00S-9.00W-1	<a href="#">Details</a>
1666	UNNAMED	6.00S-9.00W-29	<a href="#">Details</a>
1667	UNNAMED	6.00S-10.00W-25	<a href="#">Details</a>
1668	UNNAMED	6.00S-10.00W-34	<a href="#">Details</a>
1669	UNNAMED	6.00S-10.00W-36	<a href="#">Details</a>
1670	UNNAMED	7.00S-10.00W-30	<a href="#">Details</a>
1671	UNNAMED	8.00S-10.00W-4	<a href="#">Details</a>
1674	UNNAMED	9.00S-9.00W-12	<a href="#">Details</a>
1675	UNNAMED	9.00S-10.00W-8	<a href="#">Details</a>
1676	UNNAMED	9.00S-10.00W-14	<a href="#">Details</a>
1677	UNNAMED	9.00S-10.00W-18	<a href="#">Details</a>
1678	UNNAMED	9.00S-11.00W-8	<a href="#">Details</a>
1679	UNNAMED	9.00S-11.00W-21	<a href="#">Details</a>
1693	UNNAMED	12.00S-11.00W-33	<a href="#">Details</a>
1694	UNNAMED	13.00S-8.00W-2	<a href="#">Details</a>
2168	UNNAMED	12.00S-11.00W-14	<a href="#">Details</a>
2170	UNNAMED	12.00S-10.00W-24	<a href="#">Details</a>
2171	UNNAMED	13.00S-8.00W-3	<a href="#">Details</a>

<b>Identified Potential Future Storage Projects (Cont.) (OWRD<sub>2</sub>, 2017)</b>			
<b>Project #</b>	<b>Name</b>	<b>T-R-S</b>	<b>Details</b>
2177	UNNAMED	15.00S-11.00W-2	<a href="#">Details</a>
2178	UNNAMED	14.00S-10.00W-26	<a href="#">Details</a>

Source: OWRD4, 2017