Determining Surface Water Availability in Oregon

Open File Report SW 02-002

State of Oregon
Water Resources Department

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By Richard M. Cooper, PE

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Cover photo: Watermaster Awbrey Perry measuring Tumalo Creek 200 feet above the station house for gaging station 14073000 on February 9, 1948. Note the ice floating in the creek.

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Acknowledgements

Developing this methodology and compiling the various databases has been a long and difficult task. It has required the cooperative efforts of many people. In particular, the following people are gratefully acknowledged for their substantial contributions.

Ken Stahr works full time on water availability and makes numerous contributions. He is responsible for keeping the Water Availability Database current and error free: he is responsible for calculating consumptive uses for water rights processed prior to 1993; he manages the watershed coverages in the Geographic Information System and the watershed characteristics database, and produces a variety of maps for our internal use and for people outside the agency.

Bob Harmon is lead worker for Geographic Information System work in the Department. He acquired all the watershed characteristic coverages now used for this analysis and wrote the computer programs that calculate watershed characteristics. He also wrote the computer programs that create a variety of maps showing watershed delineations and water availability across Oregon.

Ben Scales is in charge of Hydrographics for the Department and is responsible for estimating stream flow for the many gages operated by the Department. On numerous occasions, he has rearranged his schedule to accommodate data needs for water availability. Ben also reviews all our estimates of natural stream flow.

Others no longer work on water availability, but were responsible for much of the early work on the methodology. Kathy Boles coded the computer program that isolates existing water rights for a given watershed. Adam Sussman was responsible for much of the early work on the consumptive use part of our methodology, and he delineated the watersheds in the North Coast Basin. Ken Rauscher did the first work on the methods used to calculate watershed characteristics and originated the way watershed nesting is handled. Michael Ciscell acquired the first coverages of watershed characteristics and for several years maintained the computer code used to generate those characteristics. Virginia Gabert, Tracy Eichenlaub, and Kris Byrd did much of the delineation, digitizing, and nesting of watersheds across Oregon. Virginia also identified the water rights associated with most of the watersheds west of the Cascades.

Many thanks also to Ben Scales, Bob Harmon, Jonathan La Marche, Fred Lissner, Rich Marvin, Barry Norris, and Ken Stahr for their critical reviews of this report. Finally, thank you to Day Marshall for proofreading the report.

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Abstract

The Oregon Water Resources Department (Department or OWRD) limits appropriation from Oregon streams to assure new applicants use of surface water a reasonable amount of time and to minimize regulatory conflict. The standards for new appropriation of water are: (1) consumptive use from allocations for out-of-stream uses can total no more than the 80-percent exceedance natural stream flow, and (2) allocations for in-stream flows can be no more than the 50-percent exceedance natural stream flow.

OWRD has created and maintains a database of the amount of surface water available for appropriation for most waters in the state. This database is used to evaluate applications for new uses of water.

Water availability (**WA**) is obtained from natural stream flow ($\mathbf{Q_{NSF}}$) by subtracting existing storage (**ST**), out-of-stream consumptive uses (**CU**) and in-stream demands (**IS**).

$$\mathbf{WA = Q_{NSF} - ST - CU - IS}$$

Ideally, water availability would be calculated for every watershed above a point of diversion or in-stream demand. *Practically*, the number of watersheds must be limited. The watersheds selected for analysis are called *Water Availability Basins* (WABs).

Stream flow can be highly variable, and it is useful to characterize it in some way, usually by a statistic, e.g., a monthly or annual mean. For water availability, it is important to know how often water is available. The appropriate statistic in this case is exceedance stream flow. This statistic tells us how often to expect a given rate of stream flow to occur.

Exceedance stream flows are determined directly from gage records, or for ungaged streams, by estimation through modeling. When determined from gage records, the exceedance flows must be corrected to a common base period, and then, to natural stream flow. When determined through modeling, the exceedance flows are estimated from statistical models that relate watershed characteristics to natural stream flow. The models are derived by multiple linear regression.

Storage is water retained in a reservoir. It is debited from water availability when the water is stored. It diminishes availability both upstream and downstream of the point of diversion.

Consumptive use is divided into three major categories: irrigation, municipal, and all others e.g., domestic, livestock. These uses are *less than* 100 percent consumptive. It is assumed the non-consumed part of a diversion is returned to the stream from which it was diverted.

Consumptive use from irrigation is from estimates made by the US Geological Survey (Portland). Consumption from other uses is based on the associated water rights. In these cases, consumptive use is obtained by multiplying the maximum diversion rate allowed for the water right by a consumptive use coefficient. Consumptive use diminishes availability both upstream and downstream of the point of diversion.

There are two types of in-stream demands: in-stream water rights and scenic waterway flows. In-stream demands diminish availability upstream only. Because they are non-consumptive, they do not diminish stream flow downstream as do consumptive uses.

Water availability has been calculated for over 2500 WABs. In general, the calculation of water availability at one WAB cannot be considered in isolation from other WABs in the same stream system. *For water to be available at any given upstream point, it must be available at all points of calculation downstream.*

Introduction

Water is a finite resource, and in the case of surface water, its quantity is not distributed uniformly throughout the year. Stream flow is typically highest in winter when demand is low and lowest in summer when demand is high. In most basins in the state, summer stream flows often are not sufficient to meet all demands. Where and when shortfalls occur, a water right does not guarantee access to water. Oregon follows the Prior Appropriations Doctrine, and when water is limited, it goes to those with the oldest water rights; the shortfall is not shared equally.

In 1989, the Oregon Legislature directed the Oregon Water Resources Department (Department or OWRD) to establish a Water Availability Program. The directive had three parts:

1. To set standards for evaluating whether water is available for in-stream and out-of-stream uses.
2. To establish and maintain a Water Availability Database based on these standards.
3. To use the database to evaluate applications for new uses of surface water.

The standards for determining availability of surface water were adopted into rule by the Water Resources Commission in July 1992. The purposes of these standards were to limit new appropriations of water to situations where the applicant can expect use of water a reasonable amount of time and to limit situations where the Department will have to regulate water use.

Standards have been set for both out-of-stream and in-stream appropriations from *live flow*[1]. These standards are applied by month and refer to stream flow over a period of many years, not to any one month or other short period of time.

For *out-of-stream appropriations* from live flow, the sum of the consumptive part of the diversions and any in-stream demands cannot be more than the natural stream flow occurring at least 80 percent of the time. At full appropriation, the most junior user can expect use of water 80 percent of the time.

For *in-stream appropriations* from live flow, the amount of water to be left in the stream cannot be more than the *natural stream flow* that occurs at least 50 percent of the time. When reviewing an application for an in-stream water right, requests for in-stream flows in excess of the 50-percent exceedance flow are reduced to that amount. This restriction means that under natural conditions the in-stream flow will be met at least 50 percent of the time.

Out-of-stream and in-stream appropriations may also be allocated from stored water. These appropriations are not subject to the availability of live flow, but to the availability of stored water as determined by the storing agency. A contract with the storing agency for use of water is a prerequisite for a right for stored water.

The Water Availability Calculation

The water availability calculation is based on the definition of over-appropriation for surface water found in the Department's Water Allocation Policy (OAR 690-400-010 (11)(a)(A)).

"Over appropriated means a condition of water allocation in which the quantity of surface water available during a specified period is not sufficient to meet the expected demands from all water rights at least 80% of the time."

The water availability methodology defines three types of *expected demands*:

1. Storage,
2. Consumptive uses, and
3. In-stream demands (i.e., in-stream water rights and scenic waterway flows).

Other uses of water that are in-stream and non-consumptive are not included as expected demands. Examples of these uses are mining, aquaculture, and hydroelectric.

[1] Live stream flow arises from natural hydrologic processes. It is not augmented from stored water, but may be impacted by diversions.

We can then define water availability in terms of this equation:

$WA = Q_{NSF} – ST – CU – IS$ ..... (1)

where

WA = The water available.

Q_{NSF} = The 80-percent exceedance natural streamflow at a specified point on the stream.

ST = Storage in or from the stream and its tributaries upstream from the specified point.

CU = Consumptive uses from the stream and its tributaries upstream from the specified point.

IS = In-stream flow demands for a stream reach that includes the specified point.

Natural Stream Flow

Natural stream flow is unaffected by consumptive use or reservoir storage. With a few exceptions, it is meant to represent prehistoric streamflow. In some cases, human-caused changes to hydrologic features in a watershed preclude a return to prehistoric natural conditions. For these watersheds, even if all consumptive uses stopped and regulatory structures were removed, stream flow would not return to its prehistoric state. An example of this kind of human-caused change is the isolation and draining of Lower Klamath Lake. In this case, "natural stream flow" is calculated as though the lake never existed even though this calculation does not represent the prehistoric condition of the watershed.

Stream flow is naturally variable, and to be useful in this calculation, it must be characterized by a meaningful statistic. Typical statistics are mean daily flow, mean monthly flow, mean annual flow, ten-year flood event, and median monthly flow. The statistic chosen must have meaning in the context in which it will be used. For water availability, we are interested in *how often* a rate of flow is present in a stream. The appropriate statistic is *exceedance stream flow*.

An exceedance stream flow is the stream flow exceeded a given percent of the time. For example, the 60-percent exceedance stream flow for the Rogue River above Prospect for May is 1,170 cubic feet per second (cfs). In May, then, the stream flow in the Rogue River above Prospect is greater than or equal to 1,170 cfs 60 percent of the time and less than 1,170 cfs 40 percent of the time. For comparison, the 50-percent exceedance stream flow is 1310 cfs and the 80-percent exceedance flow is 866 cfs.

Storage

Storage is water retained in a reservoir. The reservoir may be *in-channel* of the stream that is the source of the water or *off-channel*. In the latter case, water is diverted from the stream and conveyed to the reservoir. An example of in-channel storage is Detroit Reservoir on the North Santiam River. An example of an off-channel reservoir is Cold Springs Reservoir, which is in Cold Springs Canyon, but is filled from the Umatilla River by way of the Umatilla Project Feed Canal.

Water is debited from water availability when it is stored. Storage diminishes availability both upstream and downstream of the point of diversion. Available upstream water is diminished because water must be left in-stream to be available for storage. Available downstream water is diminished because storing water reduces stream flow.

Releases from storage are not added to water availability. The Department does not control these releases and cannot give applicants reasonable assurance of the use of the released stored water.

Consumptive Use

Consumptive uses represent water withdrawn from a stream and lost to evaporation or transpiration (i.e., plant use) or transferred out of the watershed. Generally, unconsumed water is assumed to return to the stream; only the consumptive part is subtracted from the natural stream flow. For out-of-watershed transfers, all of the withdrawn water is assumed to be consumed.

A consumptive use diminishes availability both upstream and downstream of the point of diversion. Available upstream water is diminished

because water must be left in-stream to be available for the specified use. Available downstream water is diminished because a consumptive use reduces stream flow.

In-Stream Flow Demands

There are two types of in-stream demands: (1) in-stream water rights and (2) scenic waterway flows. In-stream demands generally refer to a specified length of a stream, or *reach*, but occasionally refer to a single point on the stream.

For the water availability calculation, the expected demand is the *full amount* of each water right or scenic waterway flow. In-stream demands diminish availability upstream only. Since they are non-consumptive, they do not diminish stream flow downstream as do consumptive uses.

An in-stream water right is held in trust by the Water Resources Department for the benefit of the people of Oregon to maintain water in stream for public use. Public uses include habitat for fish and wildlife, recreation, and pollution abatement. An in-stream water right has the same legal status as any water right and is subject to the Prior Appropriations Doctrine.

A scenic waterway is a rule established by the Water Resources Commission that sets minimum stream flow levels, for any of several stream reaches in the state, sufficient to maintain the free-flowing character of those stream reaches. A scenic waterway flow is not a water rights and is not subject to the prior appropriations doctrine.

Where Water Availability is Calculated

Ideally a water availability calculation would be done for every watershed[2] associated with a point of diversion or an in-stream water right.

[2] A watershed, in this case, includes all lands draining to the stream upstream of the point of diversion or the downstream end of an in-stream water right reach.

Because there are so many water rights, the ideal approach is impractical.

The practical alternative is to limit the number of watersheds for which water availability is calculated. The delineation of these watersheds depends on the location of in-stream demands and on the physiography of affected streams. Generally watersheds are defined above the mouths of significant tributaries, on main channels above significant tributaries and for all in-stream demands.

These delineated watersheds are referred to as Water Availability Basins (WABs)[3]. Water availability is estimated at the downstream end, or *pour point*, of each WAB.

Large drainage areas, e.g. the Rogue and Umpqua basins, are broken into a number of WABs. The WABs are *nested*, each upstream WAB being included in a WAB downstream. For water to be available in a given WAB, it must be available in all the other watersheds in which it is nested. Figure 1 gives an example of a set of nested WABs for the North Fork of the Siuslaw River. In the figure, for water to be available in watershed **5**, it must also be available in watersheds **1**, **2** and **3**, but not **4**.

At the time of this report, over 2500 water availability basins have been defined (Figure 2 and Appendix F). Water availability analyses have been completed for most of these watersheds. Also in Figure 2 are outlined the 18 administrative basins defined by the Department. Except for the Rogue and Umpqua basins, these 18 basins represent more than one stream system. The OWRD basins are listed in Table 1.

[3] A better term for these watersheds would have been Water Availability Watershed, the term *basin* being reserved for larger hydrologic areas such as the Willamette or John Day River drainages in their entireties. However, the term Water Availability Basin, and especially, its acronym WAB, have become deeply imbedded in the OWRD lexicon and will be used herein.

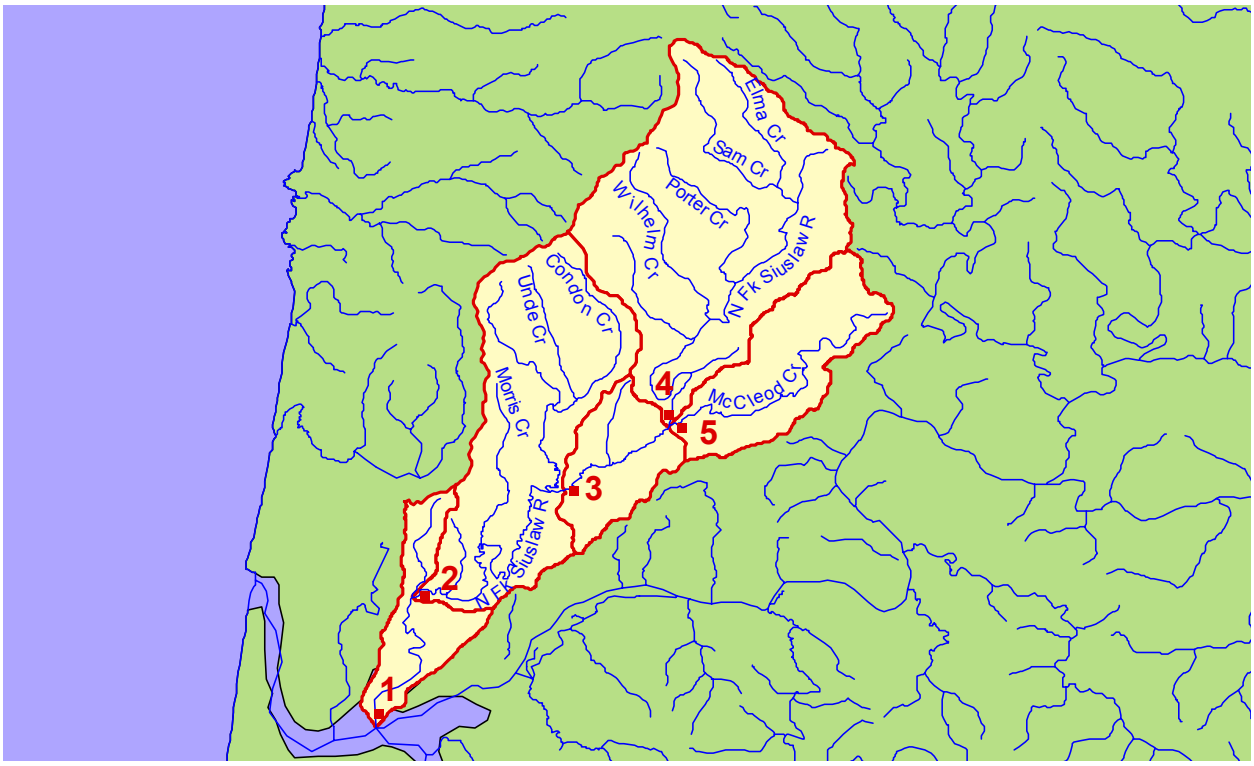


Figure 1. Nested Water Availability Basins – An Example: North Fork Siuslaw River.

Water availability is calculated at the pour point of each WAB. Typically there are 150 to 250 WABs delineated within a basin. In general, the calculation of water availability at one WAB cannot be considered in isolation from the other WABs in the same stream system. Any upstream use subtracts from water availability at all points downstream as well as upstream. *For water to be available at any given upstream point, it must be available at all points of calculation downstream.*

Predicting Future Stream Flow

The result of the water availability analysis is the stream flow expected to be available for *future* use. This future stream flow is predicted by inference from *past* stream flow. The prediction is based on the assumption that future stream flow will be like past stream flow.

Table 1. OWRD Administrative Basins

Basin Number	Basin Name
1	North Coast
2	Willamette
3	Sandy
4	Hood
5	Deschutes
6	John Day
7	Umatilla
8	Grande Ronde
9	Powder
10	Malheur
11	Owyhee
12	Malheur Lakes
13	Goose and Summer Lakes
14	Klamath
15	Rogue
16	Umpqua
17	Mid Coast
18	South Coast

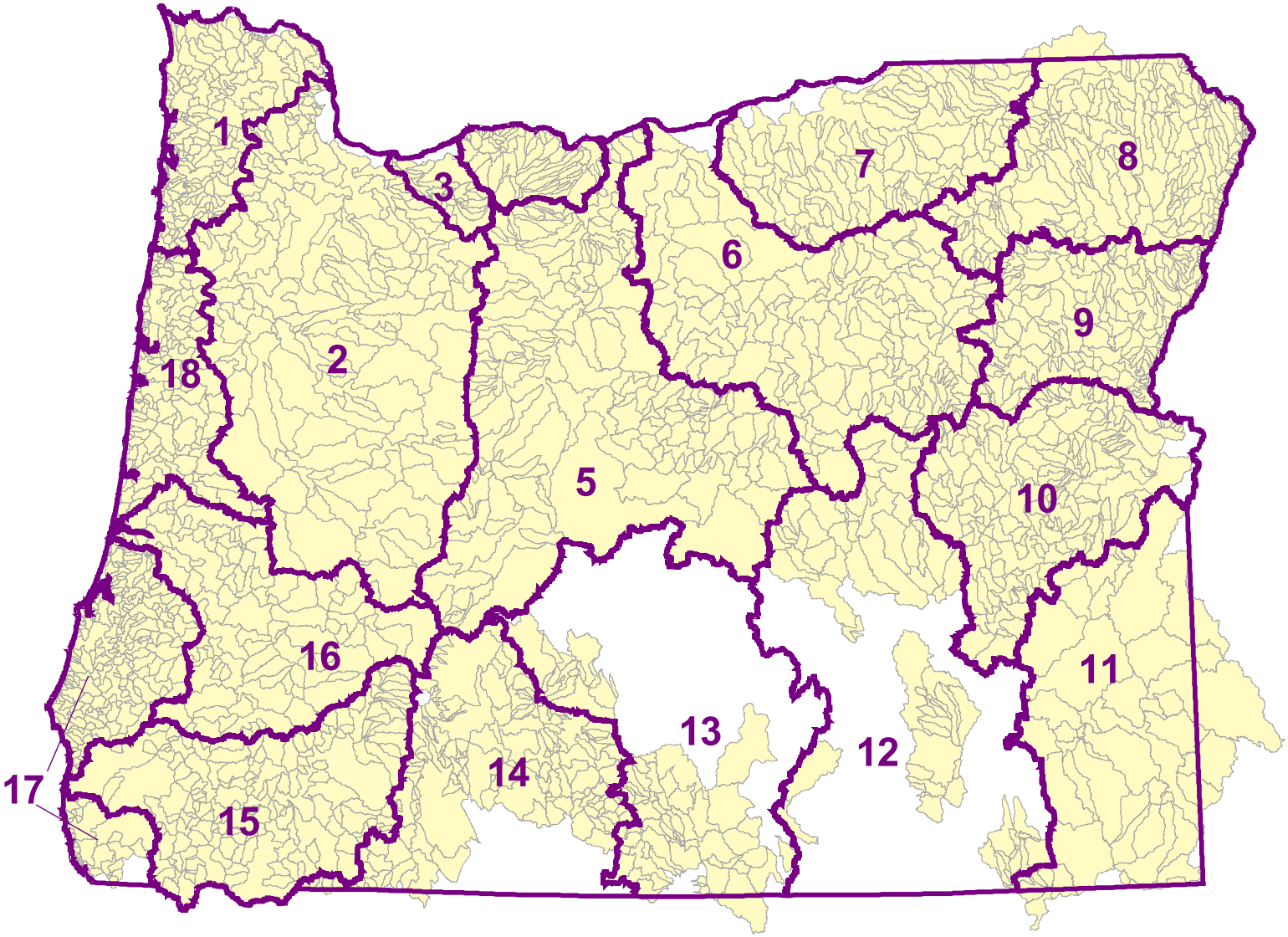


Figure 2. Water Availability Basins (Light Outline) and OWRD Administrative Basins (Heavy Outline).

Table 2. A Two-Sided t-test for Linear Trends in Mean Annual Stream Flows for Four Long-term Gages in Oregon.

The four gages are: a) 14048000, John Day River at McDonald Ferry, OR; b) 14174000, Willamette River at Albany, OR ; c) 14310000, Umpqua River at Elkton, OR); and d) 14359000, Rogue River at Raygold near Central Point, OR.

The null hypothesis (H_o) is that the trend is not significant; that is, the slope of the linear trend is not significantly different from zero. The null hypothesis is rejected if the t-statistic is greater than t-critical for + t > 0.0 and less than - t-critical for t < 0.0.

Gage	Degrees of Freedom	t	t-critical for a two-sided test at α = 0.05	Accept H_o?
14048000	91	1.22	+/- 1.99	Yes
14174000	92	1.28	+/- 1.99	Yes
14321000	92	0.34	+/- 1.99	Yes
14359000	92	1.09	+/- 1.99	Yes

The assumption that past stream flow can be used as a predictor of future stream flow cannot be tested directly. The best that can be done is to verify that past stream flow has been homogeneous and consistent. Generally, this means there are not trends or jumps in the data; that is, whatever statistics are used to describe stream flow are not changing with time.

Inconsistencies or jumps tend to be local and are often human caused. Drainage of large lakes, construction of reservoirs or diversions, urbanization, or deforestation all may compromise a time series' utility for predicting future stream flow. Where possible, inconsistencies can be corrected; for example, by adding diversions back to stream flow. This type of correction was used extensively in this analysis and is described in detail later in the report. In other cases, the data cannot be corrected. For example, there is usually not enough information to correct mean daily stream flows for the effects of storage – as is the case in this analysis.

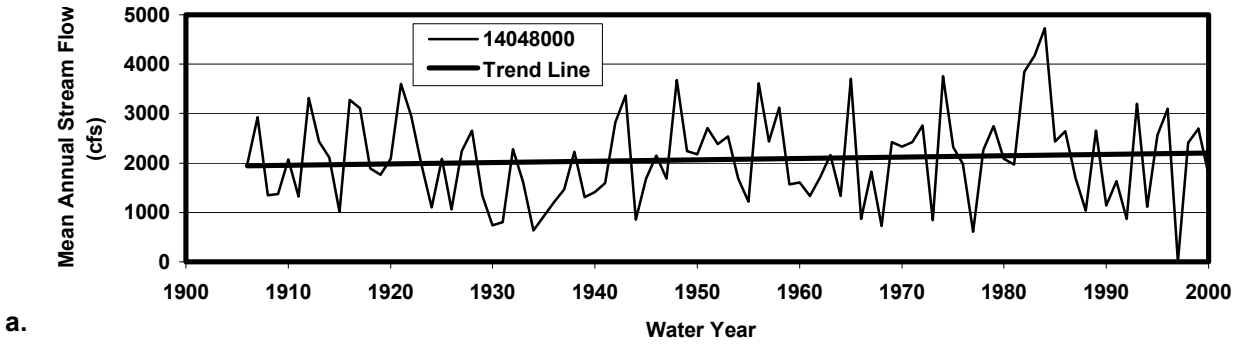
Trends due to changes in general processes like climate can be inferred from inspection of a few representative stream flow time series. A usual test of homogeneity is to determine a trend line for a long-term series of mean annual stream flows, then use a 2-sided t-test to determine if the trend is significant. (Salas, 1985). If a significant trend exists then the statistics describing the time series are not constant in time.

There are four long-term gages in Oregon suitable for the test of homogeneity 1) John Day River at McDonald Ferry (14048000); 2) Willamette River at Albany, OR, (14174000); 3) Umpqua River near Elkton, OR, (14321000); and 4) Rogue River at Raygold near Central Point, OR (14359000). All have continuous stream flow record between 1906 and 2000.

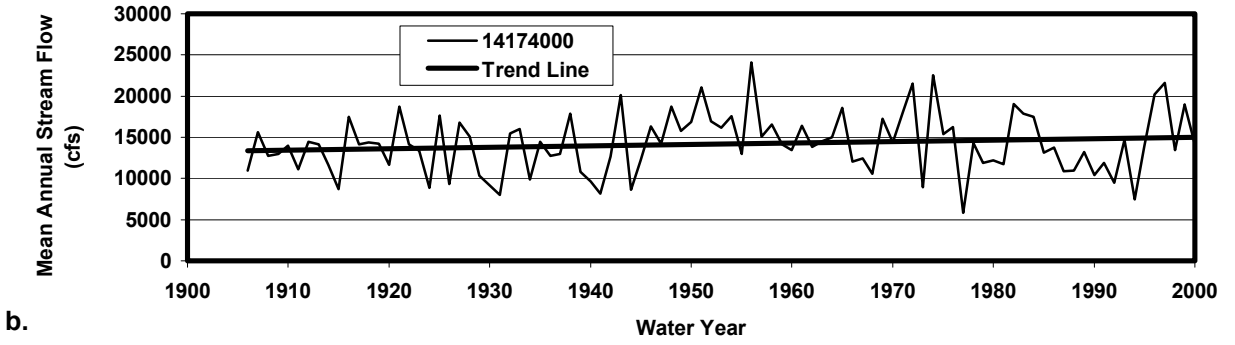
Although large reservoirs have been in place on the Willamette River since 1941 and on the Rogue River since 1976, we assume that the mean *annual* stream flows of these rivers are unaffected by storage. The reservoirs on these rivers are used primarily for flood control and their operation is determined by rule curve[4]. For flood control, a rule curve requires the reservoir to be emptied prior to the wet season to provide capacity to attenuate flood flows. In this case, there is not significant carryover of storage from one year to the next and annual flows are unaffected. The John Day and Umpqua Rivers are unregulated by storage.

A trend line was determined for the time series of mean annual flows for each gage (Figure 3). For the t-test, for each gage, the null hypothesis is that the trend is not significant; that is, the slope of the trend line is not significantly different from zero. The results of the t-tests are shown in Table 2. None of the trends is significant, and we conclude the time series are homogeneous.

[4] A rule curve specifies the water surface elevation of a reservoir throughout the year.



a.



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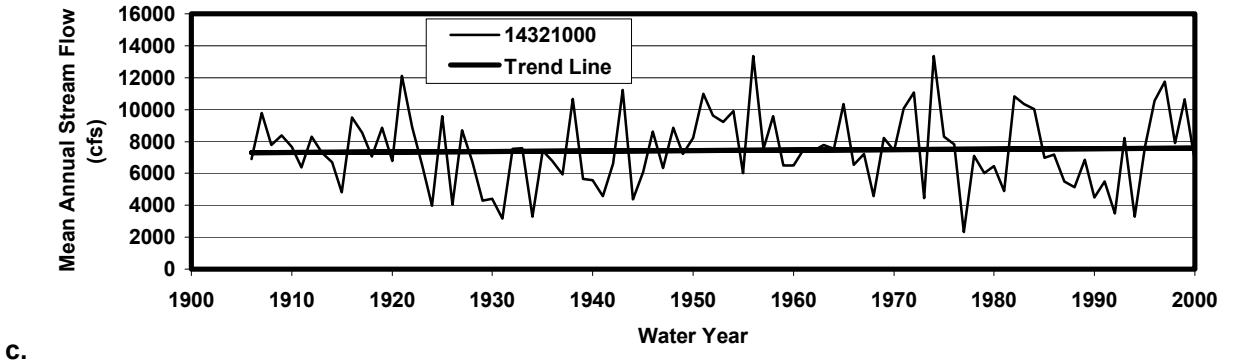

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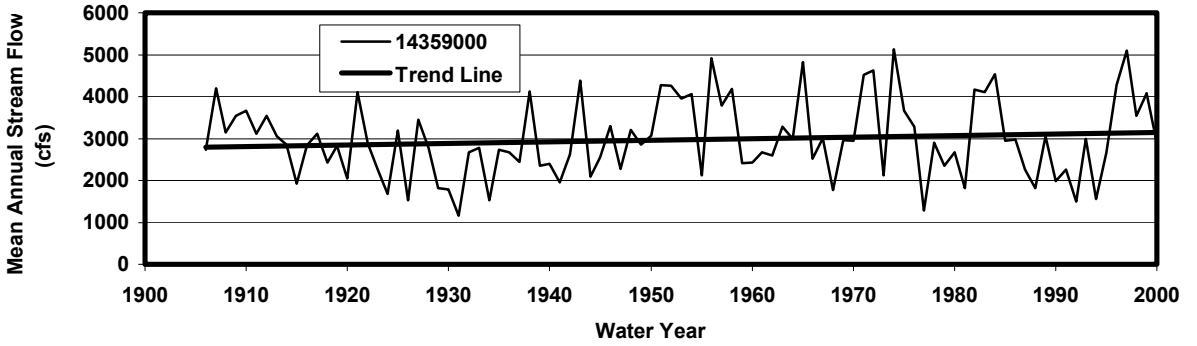

d.

Figure 3. Mean Annual Stream Flow for Four Long-Term Gages in Oregon: a) 14048000, John Day River at McDonald Ferry, OR; b) 14174000, Willamette River at Albany, OR ; c) 14321000, Umpqua River at Elkton, OR; and d) 14359000, Rogue River at Raygold near Central Point, OR. The trend lines were computed from a linear regression of the stream flows.

Calculating Water Availability

The water availability calculation at any point on a stream requires this information:

1. the **80-percent exceedance natural stream flow** at the point;
2. the quantity of **storage** in the watershed above the point;
3. the **consumptive use** of water in the watershed above the point; and
4. the **in-stream demands** for the stream reach that includes the point.

An overview flow chart of how these components of the water availability equation are derived is shown in Figure 4. Arrows show the direction of data movement. Subsequent flow charts will show the methodology in more detail.

Although the Department requires only the 50- and 80-percent exceedance stream flows to evaluate applications for new water use, a whole suite of exceedance stream flows, i.e., a *flow duration curve*, is calculated for watersheds with measured stream flows. In the Department's database of flow duration curves for measured streams, a flow duration curve is represented by these exceedance values: 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 75, 80, 85, 90, and 95 percent.

All exceedance flows in this analysis are based on measured stream flows, either directly from continuous records and miscellaneous measurements or indirectly by use of a regional regression analysis. Regional regression is a standard hydrologic technique to generalize stream flows from measured to unmeasured watersheds.

Stream flows are measured by any of several government agencies, but either the U.S. Geological Survey (USGS) or the Department makes almost all measurements in Oregon. The Department stores these measurements in the **Hydrographics Database**. The hydrographics database and other databases referred to in this report can be accessed on the Department's website:

https://www.oregon.gov/owrd/

When exceedance stream flows are calculated directly from measured flows, they are affected by use upstream and by the period over which the measurements were taken. In the former case, the consumptive use must be added back to the measured flows to get natural flow. In the latter case, the exceedance flows must be corrected to a common period, i.e., a *base period*; otherwise, some exceedance flows may represent wet periods, and others, dry periods.

It is critical that all exceedance flows represent not only the same period, but also a *long* period of time. As will be discussed later, the base period used in the water availability analysis is represented by water years[5] 1958 to 1987.

The section **Measured Watershed Stream Flow Analysis** describes how measured stream flows are used to calculate flow duration curves corrected to natural flow and to a common base period. Only measured stream flows *unaffected* by significant storage are used in this analysis. Exceedance stream flows cannot be corrected for the effects of storage.

Most sites (WABs) where a water availability calculation is required do not have measured stream flows. The section **Unmeasured Watershed Stream Flow Analysis** describes how 50- and 80-percent exceedance stream flows for unmeasured sites are estimated by a regional regression analysis. The 50- and 80-percent exceedance natural stream flows for both measured and unmeasured WABs are stored in the **WAB Stream Flow Database.** Other exceedance values are not available.

The section **Storage and Consumptive Use Demands** describes how consumptive uses are calculated for correcting measured flow to natural flow, *and* it describes how consumptive uses and storage are calculated for use in the

[5] A water year is from October 1 to September 30. For example, water year 1987 was from October 1, 1986 to September 30, 1987.

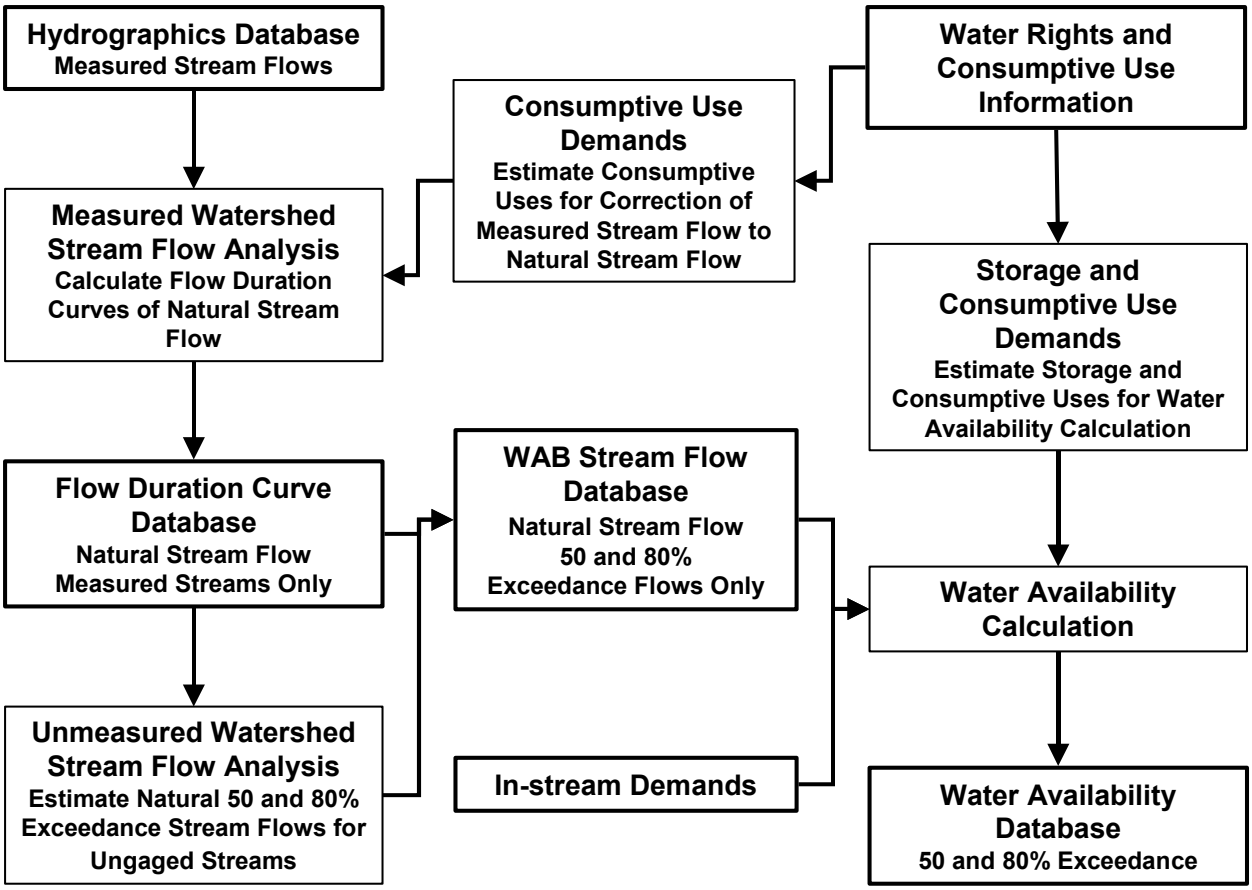

Figure 4. The Water Availability Methodology - an Overview.

water availability calculation. In the first case, the calculated consumptive use represents the *actual* average consumption during the period the measurements were made. To get flow duration curves representing natural stream flow, the estimated consumptive uses are added to the flow duration curves representing the gage measurements. The resulting flow duration curves are stored in the **Flow Duration Curve Database**.

In the second case, the calculation is similar to the calculation done to correct measured flow to natural flow, but it differs in some important aspects. First, the calculation represents the consumption from all water rights as of the *present* time. Second, in some cases, the calculation represents *potential* use rather than *actual* use.

In both cases, out-of-stream demand for irrigation is based on work done by the USGS. All other demands are based on existing water rights on file with the Department. Generally the amount subtracted in the water availability calculation is the part of the diversion that is consumed; it is assumed that unconsumed water returns to the stream.

In-stream Demands are either water rights or scenic waterway flows. In either case, the full value of the demand is used in the water availability calculation. In-stream demands differ from out-of-stream demands in that they are not additive. If there are two or more in-stream demands for the same reach, the largest value for each month is used in the water availability calculation.

Measured Watershed Stream Flow Analysis

The flow chart in Figure 5 shows the steps in going from stream flow measurements to flow duration curves of natural stream flow. As noted earlier, only those measurements unaffected by storage are used in this analysis[6]. For our analysis, a continuous record is represented by mean daily stream flows. A miscellaneous measurement represents an instantaneous stream flow.

The analysis for continuous records is discussed in the next section. Miscellaneous measurements are treated similarly to continuous records, but the differences are sufficient that they are discussed in a separate section.

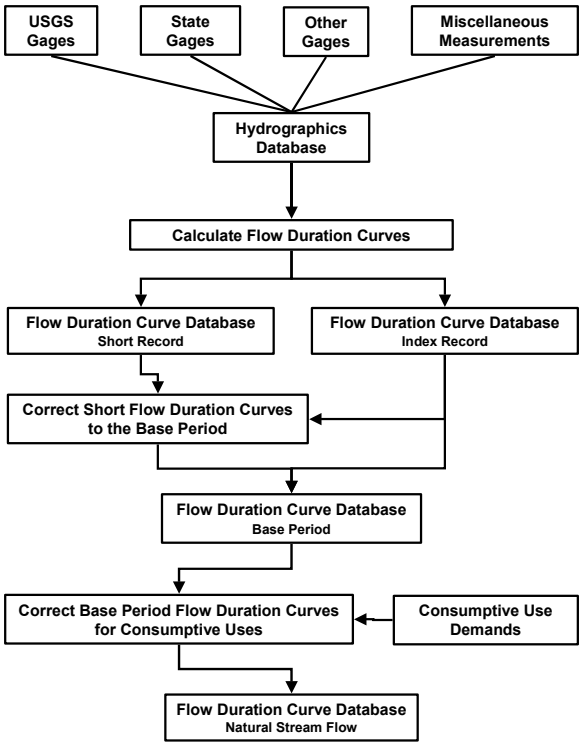

Figure 5. The Water Availability Methodology - Measured Watershed Stream Flow Analysis.

Calculation of Flow Duration Curves from a Continuous Record

A continuous record is a series of mean daily stream flows calculated from measurements made continuously or at short intervals for a specific location on a stream. This location is usually referred to as a gage or station.

To begin, gaged measurement sites are divided into those that have record that coincides with the base period, i.e., *Index Records,* representing water years 1958-1987, and those that do not, i.e., *Short Records*, representing all other periods of record. Flow duration curves are calculated for both short and index records. The flow duration curves for the index records are used to correct the flow duration curves for the short records to the base period. Flow duration curves that correspond to the base period are then corrected to natural flow by adding back consumptive use upstream. The **Flow Duration Curve Database** contains the flow duration curves calculated at all steps in the process: short, index, base period, and natural stream flow.

Calculating an exceedance stream flow from mean daily flows is best demonstrated by an example. See Table 3. The mean daily stream flows in column 2 represent the flows as they occurred in time. In column 4, these same flows have been sorted from smallest to largest. The middle value in column 4 is the 50-percent exceedance flow. Half the time the flow was greater than this value and half the time less. The 80-percent exceedance stream flow is 143 cfs. Stream flow was greater than 143 cfs 80 percent of the time, and less, 20 percent of the time.

In actual practice, the calculations are made by techniques outlined by Searcy (1959) and

[6] While it is possible in concept to correct the mean daily flows on which the exceedance stream flows are based for the effects of storage, this is rarely done in practice. Daily changes in storage for reservoirs are seldom recorded. The measurements are subject to considerable bias because of the operation of the reservoir and wind piling water to one side or the other of the reservoir.

Table 3. Example Calculation of Flow Duration Curves From Continuous Records.

Mean Daily Stream Flows				Percent Exceedance
		Sorted Order		
				100
				90
3	123			80
				70
				60
6	199			50
				40
				30
				20
				10
				0

Yevjevich (1982). Further, the flow duration curves are calculated for each month. For example, for thirty years of continuous record, for January, 930 mean daily flows (31 days x 30 years) are used to calculate the exceedance flow.

Selecting a Base Period

As noted earlier, the Department selected 1958 to 1987 as the base period. This decision was made in 1992 when the Water Availability Program was initiated. At the time, stream flow records at the Department were available only through 1987. The analysis used to determine the base period in 1992 is essentially the same as the analysis reported here, except that now, data through 2000 are included. Even with the addition of these 13 years of data, the selected base period, 1958 to 1987, is reasonable and appropriate.

A base period is required because stream flow is variable. The variability occurs at several time scales, with shorter-term variations superimposed on longer-term variations making complex patterns. For example, annual stream flows are serially correlated, i.e., dry years tend to follow dry years and wet years tend to follow wet years. A time series of stream flows for many years appears cyclic because of this correlation.

Superimposed on these long-term cycles are seasonal variations. Most streams have a pronounced high flow period related to high rainfall or snowmelt and a pronounced low flow period related to low rainfall, no snow, or freezing temperatures. The difference between high and low flows may be several orders of magnitude. Finally, rain events or diurnal changes in snowmelt cause stream flow variability on the scale of a few hours. This variability is superimposed on the seasonal and long-term cycles in stream flow.

A flow duration curve describes the variability in stream flow *for the time period for which the curve was calculated.* Exceedance flows calculated for the same watershed, but for different time periods, can be significantly different from one another. The decade centered on 1930, for example, was much drier than the decade of the 1950's (Tables 4 and Table 5).

Table 4. Comparison of 50-Percent Exceedance Stream Flows for Two 10-Year Periods for Gage 14048000 – John Day River at McDonald Ferry, OR.

Month	1926-1935	1951-1960	% Difference*
1	486	1090	124
2	1020	2320	127
3	2300	2570	11.7
4	3860	5660	46.6
5	3270	5720	74.9
6	1170	2460	110
7	235	510	117
8	65	183	182
9	64	168	163
10	188	367	98.2
11	300	537	79.0
12	436	843	93.3

* Percent Difference is relative to the earlier period.

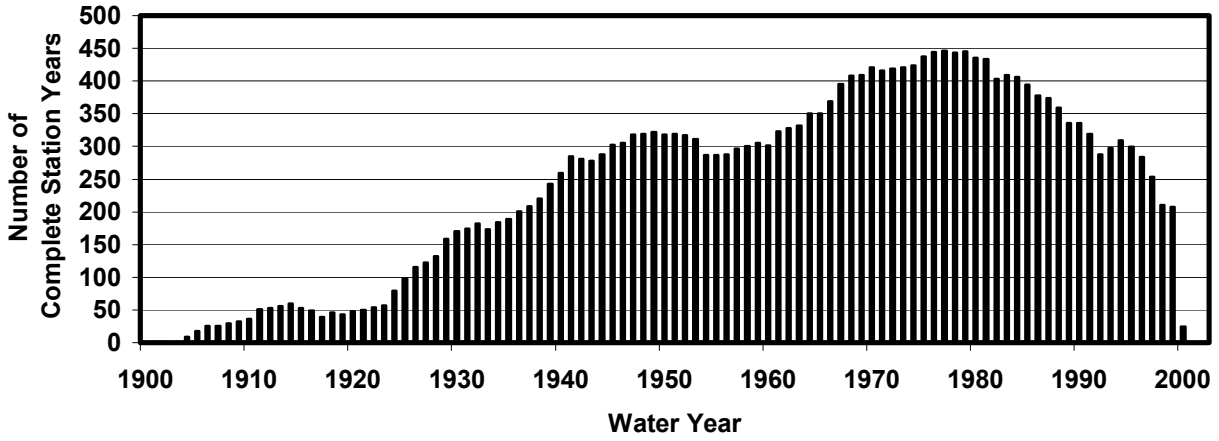

Figure 6. Number of Complete Water Years of Record for All Gages in Oregon.

In order to apply the water availability standards fairly to all streams, the exceedance stream flows used in the analysis must represent a time period that is sufficiently long, or judiciously chosen, or both, to account for the expected variation in stream flow over the long-term. This time period is called the *base period*.

The choice of a base period is significantly constrained by the availability of stream flow records. Continuous stream flow measurements are available only from about 1900 to the present and within that period; most measurements were made in the last half of the 20th century (Figure 6). To maximize the number of index gages and the number of short record gages that have record coincident with the index gages, the base period should be chosen where the most gage records occur. The selection of the base period is a compromise between choosing a base period most like the long-term and maximizing the amount of data for use in the analysis.

To begin, the length of the base period must be selected. A common length is 30 years. The Oregon Climate Service, for example, bases its estimates of climate variables, such as mean annual precipitation and temperature, on a 30-year period. Searcy (1959) suggests a 30-year base period for correcting short record flow duration curves.

We also have adopted a 30-year base period. Longer base periods were considered, because the longer the base period, the better the flow duration curves are defined. But again, the available data restrict the options. The number of possible index stations falls off rapidly as the length of the base period increases.

Table 6 shows the average number of station years available for each of the possible 30-year base periods ending between 1980 and 2000. The number of station years increases to 1990, then decreases. The base periods ending 1985 to 1996 have the most available record, in roughly equivalent amounts.

Table 5. Comparison of 50-Percent Exceedance Stream Flows for Two 10-Year Periods for Gage 14321000 – Umpqua River at Elkton, OR.

Month	1926-1935	1951-1960	% Difference*
1	8770	13000	48.2
2	9230	13700	48.4
3	8340	10700	28.3
4	7610	9070	19.1
5	4600	6250	35.9
6	2400	3650	52.1
7	1210	1790	47.9
8	942	1310	39.1
9	897	1210	34.9
10	1050	1600	52.4
11	1810	3240	79.0
12	5520	8310	50.5

* Percent Difference is relative to the earlier period.

Table 6. Average Number of Station Years for Each of the Possible 30-Year Base Periods Ending from 1980 to 2000.

Ending Year	Average Number of Station Years
1980	367.5
1981	371.3
1982	374.2
1983	377.5
1984	381.4
	385.0
	388.0
	390.6
	392.6
	393.6
	394.8
	394.6
	393.3
	392.1
	390.8
	389.1
	386.2
1997	381.5
1998	374.9
1999	368.2
2000	354.9

Tables 7 and 8 compare the 50-percent exceedance stream flows for each of the 12 possible base periods ending between 1985 and 1996 to the 50-percent exceedance stream flows for the period 1906 to 2000 for two long-term gages. The long–term gages are the John Day River at McDonald Ferry, OR, 14048000, and the Umpqua River at Elkton, OR, 14321000, respectively. These two gages are the only long-term gages in Oregon unaffected by significant storage.

For the Umpqua River gage (Table 8), all base periods compare well with the long-term. The comparison is less favorable for the John Day River gage (Table 7), but still much better than the comparison made in Table 4. The other important comparison is among the base periods. For the same gage, all compare favorably with one another. Any of the possible base periods would give similar results in the stream flow analysis.

If the Department were to select a base period today, we would probably choose the period 1961 to 1990 because it is the base-period used by the Oregon Climate Service in calculating mean climate statistics such as annual precipitation and temperature. However, the difference in using a 1958 to 1987 base period or a 1961 to 1990 base period is slight. The work to convert from one base period to the other would be enormous.

Correcting to a Base Period

When the period of record for a gage does not coincide with the base period of 1958 to 1987, the *short* or out-of-phase record must be corrected to the base period. This correction is based on a graphical association of the exceedance flows of the short record gage with the exceedance flows of an *index* gage on a similar watershed that does coincide with the base period (Searcy, 1959). A later section discusses how index gages are selected.

The index gage and the short record gage must have concurrent record for this method to work. Searcy does not provide guidance as to how many years of concurrent record are required to get a good association between gages. Our experience at OWRD correcting hundreds of short record gages suggests that generally more than five years of concurrent record are required (though gages with as few as three years of concurrent record with an index gage have been used). The association is best when there are ten or more years of concurrent record.

All OWRD exceedance flows used in the water availability analysis represent the base period. A list of index gages used to correct short record gages to the base period is shown in Appendix A. A list of short record gages is shown in Appendix B.

As an example of a correction to the base period, consider these stream flow gages in the North Coast Basin: (1) the Nehalem River near Foss, OR (14301000) and (2) the Wilson River near Tillamook, OR (14301500). For the Nehalem River gage the period of record is 1939 to 1987, and for the Wilson River gage the period

Table 7. A Comparison of 50-Percent Exceedance Stream Flows for the Long-Term Period 1906 to 2000 to the 12 Possible 30-Year Base Periods Between 1956 and 1996 – for Gage 14048000, John Day River at McDonald Ferry, OR.

50-Percent Exceedance Stream Flow in cfs.													
Month	1906 - 2000	1956 - 1985	1957 - 1986	1958 - 1987	1959 - 1988	1960 - 1989	1961 - 1990	1962 - 1991	1963 - 1992	1964 - 1993	1965 - 1994	1966 - 1995	1967 - 1996
1	922	1260	1210	1220	1170	1120	1130	1140	1120	1130	1120	1080	1160
2	1740	2320	2360	2410	2260	2200	2190	2130	2110	1990	1990	1980	2100
3	3050	3110	3200	3160	3030	3170	3150	3050	3040	3200	3210	3250	3430
4	5090	4970	4830	4740	4590	4770	4670	4670	4430	4580	4520	4490	4630
5	4570	5260	5030	4800	4520	4720	4630	4760	4650	4660	4680	4670	4830
6	2210	2570	2520	2460	2360	2410	2380	2420	2360	2430	2320	2320	2380
7	452	500	479	477	452	465	467	496	489	502	486	487	503
8	153	167	164	164	154	161	162	170	168	173	168	167	174
9	146	159	157	154	146	152	149	154	152	156	151	144	152
10	300	323	331	336	327	316	316	319	320	314	321	325	329
11	464	524	541	543	523	503	498	493	506	489	478	477	479
12	669	927	927	945	889	857	856	850	902	832	831	810	873
Percent Difference with 1906 to 2000 Period													
Month		1956 - 1985	1957 - 1986	1958 - 1987	1959 - 1988	1960 - 1989	1961 - 1990	1962 - 1991	1963 - 1992	1964 - 1993	1965 - 1994	1966 - 1995	1967 - 1996
1		36.66	31.24	32.32	26.90	21.48	22.56	23.64	21.48	22.56	21.48	17.14	25.81
2		33.33	35.63	38.51	29.89	26.44	25.86	22.41	21.26	14.37	14.37	13.79	20.69
3		1.97	4.92	3.61	-0.66	3.93	3.28	0.00	-0.33	4.92	5.25	6.56	12.46
4		-2.36	-5.11	-6.88	-9.82	-6.29	-8.25	-8.25	-12.97	-10.02	-11.20	-11.79	-9.04
5		15.10	10.07	5.03	-1.09	3.28	1.31	4.16	1.75	1.97	2.41	2.19	5.69
6		16.29	14.03	11.31	6.79	9.05	7.69	9.50	6.79	9.95	4.98	4.98	7.69
7		10.62	5.97	5.53	0.00	2.88	3.32	9.73	8.19	11.06	7.52	7.74	11.28
8		9.15	7.19	7.19	0.65	5.23	5.88	11.11	9.80	13.07	9.80	9.15	13.73
9		8.90	7.53	5.48	0.00	4.11	2.05	5.48	4.11	6.85	3.42	-1.37	4.11
10		7.67	10.33	12.00	9.00	5.33	5.33	6.33	6.67	4.67	7.00	8.33	9.67
11		12.93	16.59	17.03	12.72	8.41	7.33	6.25	9.05	5.39	3.02	2.80	3.23
12		38.57	38.57	41.26	32.88	28.10	27.95	27.06	34.83	24.36	24.22	21.08	30.49
Average		15.74	14.75	14.37	8.94	9.33	8.69	9.79	9.22	9.10	7.69	6.72	11.32

Table 8. A Comparison of 50-Percent Exceedance Stream Flows for the Long-Term Period 1906 to 2000 to the 12 Possible 30-Year Base Periods Between 1956 and 1996 – for Gage 14321000, Umpqua River at Elkton, OR.

50-Percent Exceedance Stream Flow in cfs.													
Month	1906 - 2000	1956 - 1985	1957 - 1986	1958 - 1987	1959 - 1988	1960 - 1989	1961 - 1990	1962 - 1991	1963 - 1992	1964 - 1993	1965 - 1994	1966 - 1995	1967 - 1996
1	10700	9960	9710	9890	9680	9770	9860	10000	10000	10400	9950	9740	9880
2	11200	10600	10700	10800	10300	10100	10200	9690	9520	9460	9430	9480	10000
3	9900	10100	9860	9460	9360	9690	9490	9230	8660	9080	8760	9010	8870
4	8310	8240	8000	7880	7730	7860	7670	7720	7670	7660	7590	7760	7890
5	5700	5670	5590	5510	5610	5650	5470	5500	5370	5470	5280	5410	5620
6	3150	3000	2900	2880	2840	2860	2850	2830	2780	2840	2700	2800	2890
7	1510	1480	1460	1460	1430	1440	1430	1440	1430	1450	1410	1430	1450
8	1140	1150	1140	1120	1100	1110	1100	1100	1080	1090	1070	1060	1070
9	1110	1150	1140	1140	1120	1130	1120	1120	1120	1130	1110	1110	1110
10	1290	1400	1390	1390	1360	1350	1340	1340	1320	1300	1310	1310	1310
11	3010	3540	3440	3440	3340	3290	3320	3380	3360	3300	3100	3200	3240
12	8140	10600	10100	9990	9860	9800	9830	9670	9150	9370	9420	8990	9560
Percent Difference with 1906 to 2000 Period													
Month		1956 - 1985	1957 - 1986	1958 - 1987	1959 - 1988	1960 - 1989	1961 - 1990	1962 - 1991	1963 - 1992	1964 - 1993	1965 - 1994	1966 - 1995	1967 - 1996
1		-6.92	-9.25	-7.57	-9.53	-8.69	-7.85	-6.54	-6.54	-2.80	-7.01	-8.97	-7.66
2		-5.36	-4.46	-3.57	-8.04	-9.82	-8.93	-13.48	-15.00	-15.54	-15.80	-15.36	-10.71
3		2.02	-0.40	-4.44	-5.45	-2.12	-4.14	-6.77	-12.53	-8.28	-11.52	-8.99	-10.40
4		-0.84	-3.73	-5.17	-6.98	-5.42	-7.70	-7.10	-7.70	-7.82	-8.66	-6.62	-5.05
5		-0.53	-1.93	-3.33	-1.58	-0.88	-4.04	-3.51	-5.79	-4.04	-7.37	-5.09	-1.40
6		-4.76	-7.94	-8.57	-9.84	-9.21	-9.52	-10.16	-11.75	-9.84	-14.29	-11.11	-8.25
7		-1.99	-3.31	-3.31	-5.30	-4.64	-5.30	-4.64	-5.30	-3.97	-6.62	-5.30	-3.97
8		0.88	0.00	-1.75	-3.51	-2.63	-3.51	-3.51	-5.26	-4.39	-6.14	-7.02	-6.14
9		3.60	2.70	2.70	0.90	1.80	0.90	0.90	0.90	1.80	0.00	0.00	0.00
10		8.53	7.75	7.75	5.43	4.65	3.88	3.88	2.33	0.78	1.55	1.55	1.55
11		17.61	14.29	14.29	10.96	9.30	10.30	12.29	11.63	9.63	2.99	6.31	7.64
12		30.22	24.08	22.73	21.13	20.39	20.76	18.80	12.41	15.11	15.72	10.44	17.44
Average		3.54	1.48	0.81	-0.98	-0.60	-1.26	-1.65	-3.55	-2.45	-4.76	-4.18	-2.25

of record is 1931 to 1987. For this illustration, however, assume that the Wilson River gage has only a short record, from 1973 to 1982.

We correct the "short record" for the Wilson River to the base period using the Nehalem River as our *index* gage. In this example, the flow duration curve for the Wilson River gage for the base period is already known (since the *actual* period of record includes the entire base period), and we can check how well our correction of the "short record" worked.

The January flow duration curves for the two gages for the short period (and in this case, also the concurrent period), are shown in Figures 7 and 8[7]. Figure 8 also shows the flow duration curve for the Nehalem River gage for the base period. The difference in the flow duration curves shown in Figure 8 illustrates the need to correct short records to a longer base period.

A graphical relationship between the two gages is established based on the flow duration curves for the two stations for their concurrent periods of record (Figure 9). The 5-percent exceedance stream flow for the Nehalem River gage is plotted against the 5-percent exceedance stream flow for the Wilson River gage, then for the 7.5-percent exceedance stream flow, and so on, for all available exceedance flows.

To correct the short flow duration curve to the base period, it is assumed that the stream flow relationship for the two gages shown in Figure 9 is independent of the period of record used to create the flow duration curves and depends only on stream flow. If this is the case, the same relationship between gages applies for the concurrent record as well as the base period.

In Figure 9, for the *concurrent period*, the 50-percent exceedance flow at the Nehalem River gage, 3,900 cfs, corresponds to a 50-percent exceedance flow of 1,400 cfs at the Wilson River gage (dotted arrows). If, for the *base period*, the 50-percent exceedance stream flow at the Nehalem River gage is 4,720, then the 50-percent exceedance stream flow at the Wilson River gage for the base period is 1,630 cfs (solid arrows).

The actual base period, short record and corrected-to-base-period flow duration curves are shown in Figure 10. The flow duration curve corrected to the base period compares much more favorably with the actual base period flow duration curve than does the short record flow duration curve.

The individual exceedance stream flows for all flow duration curves used in the analysis are shown in Table 9. For the Wilson River gage, the percent differences between the short record flow duration curve (column 5) and the actual flow duration curve for the base period (column 4) are shown in column 6. The percent differences between the corrected to base period flow duration curve (column 7) and the actual flow duration curve for the base period are shown in column 8. Finally, the differences between the percent differences are shown in the last column.

The differences in the last column represent the improvement the correction made in bringing the short record flow duration curves closer to the actual flow duration curves for base period. A *negative* number means the correction made the short record flow duration curve *less* like the actual flow duration curve. Overall the correction considerably improved the short record flow duration curve as an estimate of the actual base period flow duration curve.

Calculation of Exceedance Flows from Miscellaneous Measurements

Miscellaneous measurements are individual stream flow measurements made at intervals of days or months or years. Each represents the stream flow at the time it was made. Typically, the available measurements are fewer than 50. Because there are so few measurements, the variability of the stream flow is usually significantly underrepresented. Estimating flow duration curves from these measurements works best when the stream exhibits small variability, for example, when dominated by spring flow.

[7] When correcting a flow duration curve to the base period, the curve is represented by 37 exceedance stream flows - every 2.5 percent from 5- to 95-percent exceedance.

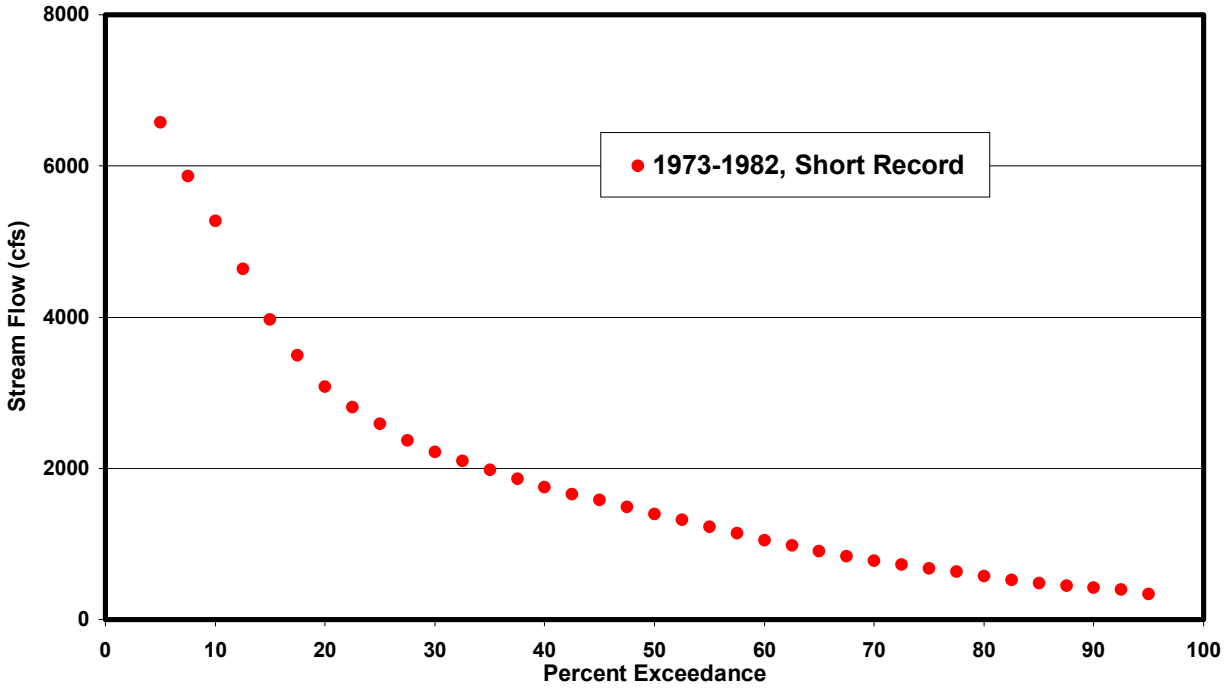

Figure 7. January Short Record Flow Duration Curve for the Wilson River near Tillamook, OR - Gage 14301500.

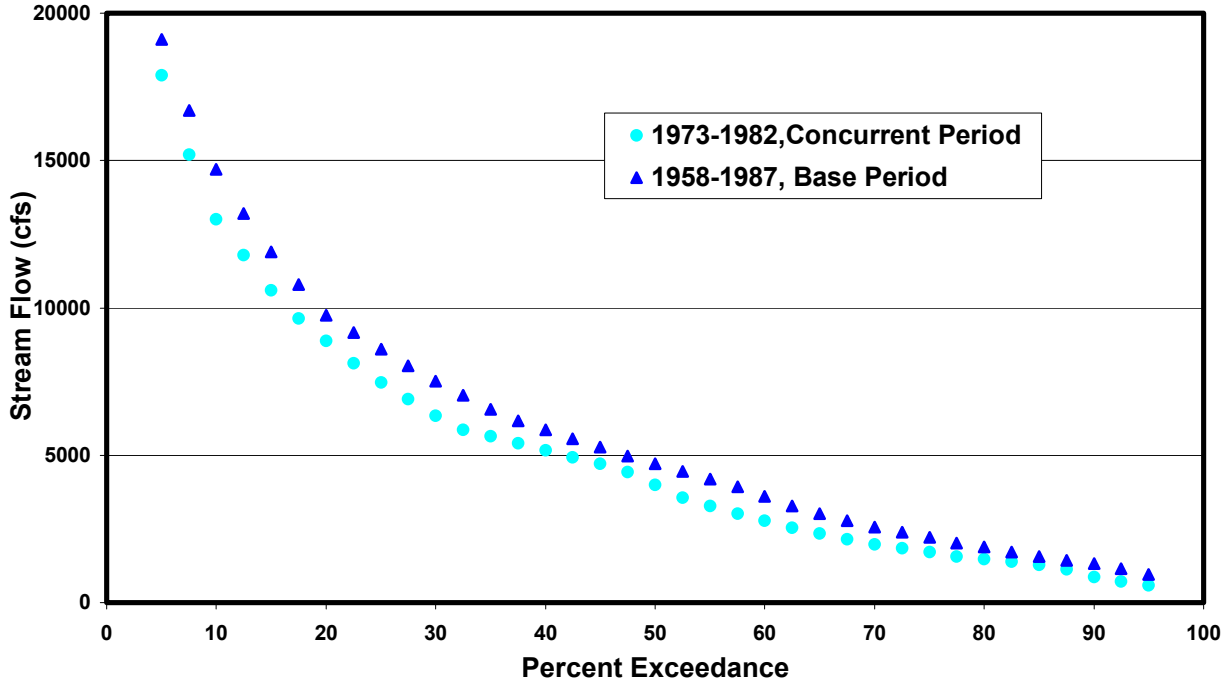

Figure 8. January Concurrent and Base Period Flow Duration Curves for the Nehalem River near Foss, OR - Gage14301000.

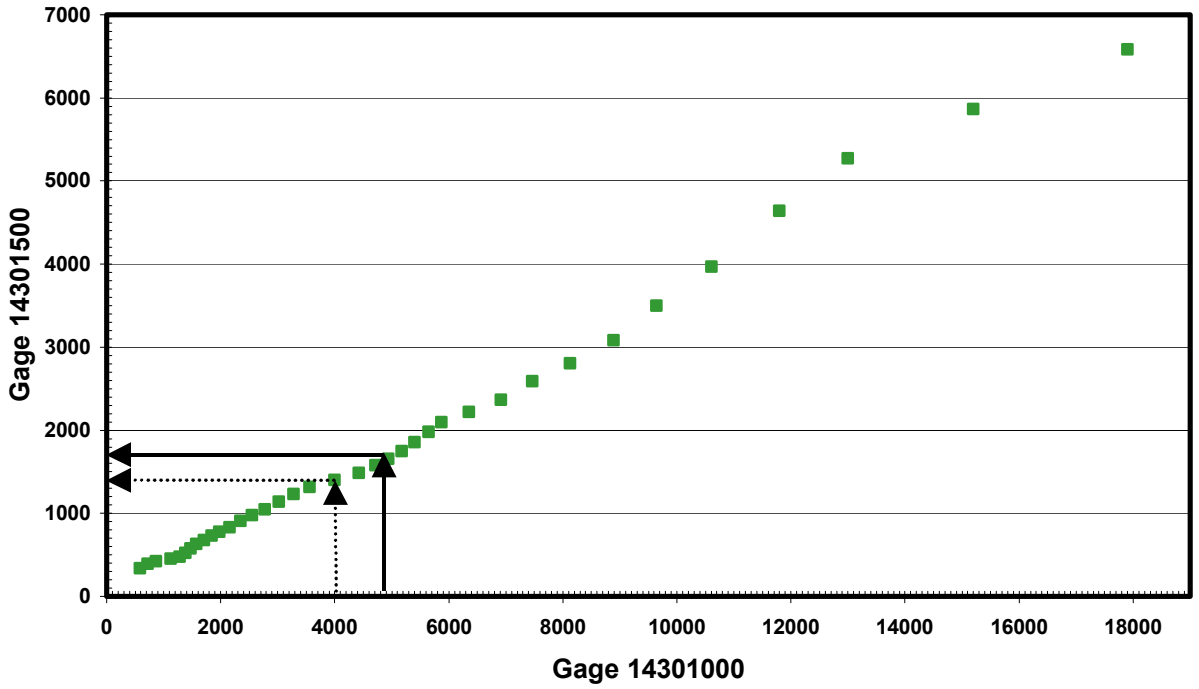

Figure 9. Relationship Between January Exceedance Stream Flows for the Nehalem River near Foss (Gage 14301000) and the Wilson River near Tillamook, OR (Gage 143015000) for the Concurrent Period 1973-1982.

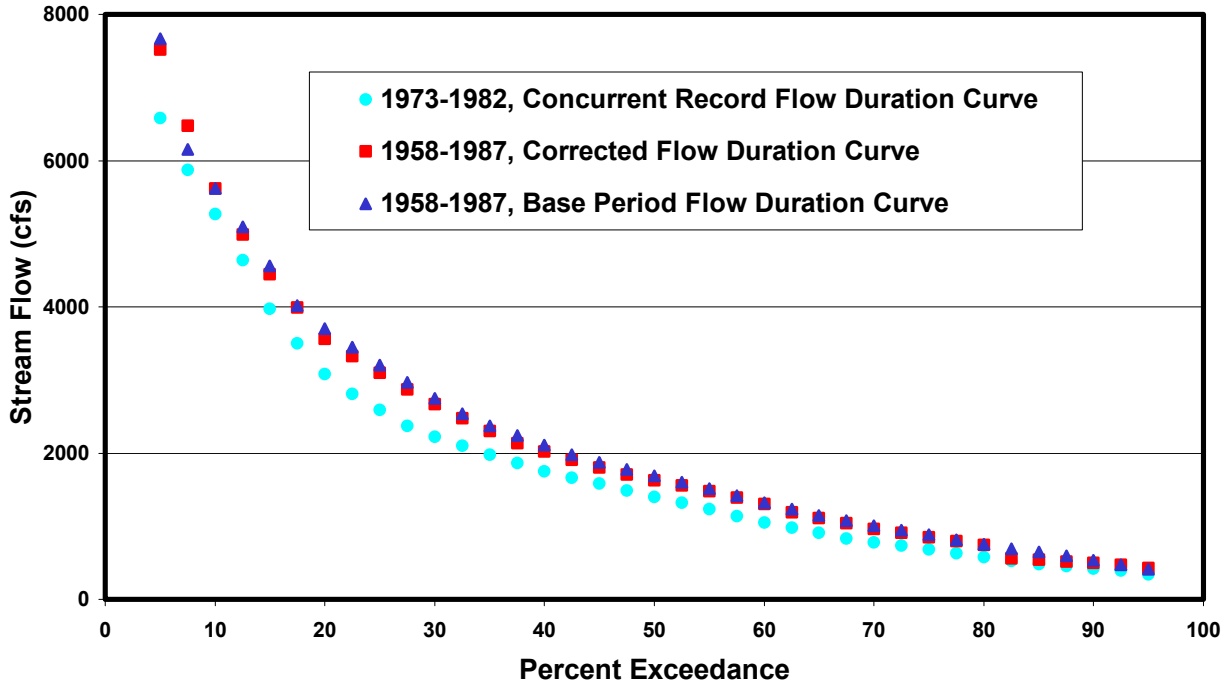

Figure 10. Comparison of January Flow Duration Curves for the Wilson River near Tillamook, OR – Gage 14301500.

Table 9. Correcting a Short Record Flow Duration Curve To the Base Period. An Example: January Stream Flows for the Wilson River near Tillamook, OR – Gage 14301500.

Exceed-ance Level	Nehalem River 14301000		Wilson River 14301500					
	Flow Duration Curve 1973-1982 (cfs)	Flow Duration Curve 1958-1987 (cfs)	Actual Flow Duration Curve 1958-1987 (cfs)	Short Record Flow Duration Curve 1973-1982		Corrected Flow Duration Curve 1958-1987		Improve-ment from Short Record (%)
				Stream Flow (cfs)	Difference from Actual (%)	Stream Flow (cfs)	Difference from Actual (%)	
95.0	587	948	414	341	17.6	432	-4.3	13.3
92.5	717	1150	475	394	17.1	470	1.1	16.0
90.0	869	1320	535	423	20.9	499	6.7	14.2
87.5	1120	1440	593	451	23.9	519	12.5	11.5
85.0	1280	1570	644	480	25.5	539	16.3	9.2
82.5	1380	1720	695	525	24.5	561	19.3	5.2
80.0	1470	1880	749	578	22.8	742	0.9	21.9
77.5	1570	2030	814	631	22.5	793	2.6	19.9
75.0	1710	2210	880	681	22.6	852	3.2	19.4
72.5	1840	2380	946	731	22.7	908	4.0	18.7
70.0	1980	2560	1010	780	22.8	967	4.3	18.5
67.5	2150	2790	1080	835	22.7	1040	3.7	19.0
65.0	2350	3020	1150	907	21.1	1110	3.5	17.7
62.5	2550	3270	1230	978	20.5	1190	3.3	17.2
60.0	2770	3600	1320	1050	20.5	1300	1.5	18.9
57.5	3020	3920	1420	1140	19.7	1390	2.1	17.6
55.0	3280	4200	1510	1230	18.5	1480	2.0	16.6
52.5	3560	4460	1600	1320	17.5	1560	2.5	15.0
50.0	3990	4720	1690	1400	17.2	1630	3.6	13.6
47.5	4420	4980	1780	1490	16.3	1710	3.9	12.4
45.0	4710	5270	1870	1580	15.5	1800	3.7	11.8
42.5	4940	5570	1980	1660	16.2	1910	3.5	12.6
40.0	5170	5860	2110	1750	17.1	2020	4.3	12.8
37.5	5400	6160	2240	1860	17.0	2140	4.5	12.5
35.0	5640	6560	2370	1980	16.5	2300	3.0	13.5
32.5	5870	7040	2540	2100	17.3	2480	2.4	15.0
30.0	6350	7520	2750	2220	19.3	2670	2.9	16.4
27.5	6910	8030	2970	2370	20.2	2870	3.4	16.8
25.0	7460	8600	3200	2590	19.1	3100	3.1	15.9
22.5	8130	9170	3450	2810	18.6	3330	3.5	15.1
20.0	8890	9740	3700	3080	16.8	3560	3.8	13.0
17.5	9640	10800	4020	3500	12.9	3990	0.7	12.2
15.0	10600	11900	4560	3970	12.9	4450	2.4	10.5
12.5	11800	13200	5090	4640	8.8	4990	2.0	6.9
10.0	13000	14700	5620	5270	6.2	5620	0.0	6.2
7.5	15200	16700	6150	5870	4.6	6480	-5.4	-0.8
5.0	17900	19100	7670	6580	14.2	7520	2.0	12.3

Using miscellaneous measurements to estimate flow duration curves for highly variable, runoff driven streams should be undertaken with great care.

In a method similar to the one used to correct continuous measurements to the base period, miscellaneous measurements are used in association with a continuous stream flow record, i.e., the index gage, to estimate the flow duration curves for the measurement site (Searcy, 1959). The relationship between the two streams is established by a linear regression of their concurrent measurements. The method scales the flow duration curves of the index gage either up or down as a function of the regression line. The resultant flow duration curves are identical in shape to the flow duration curves for the continuous record station.

Since the shapes of the resultant monthly flow duration curves depend entirely on the index gage, it is important to choose an index gage with a watershed as similar to the watershed of the miscellaneous measurements as possible (See next section). While it is most convenient to use a long-term station to create flow duration curves for the miscellaneous site, sometimes the best relationship is with a short record gage. In this case, the resulting flow duration curves must be corrected to the base period using a gage with a long-term record.

As an example, consider the miscellaneous record site on Sun Creek (21420310) tributary to Annie Creek in the Klamath Basin. Measurements were made by the National Park Service from 1989 to 1997 at the point the creek leaves Crater Lake National Park. A suitable relationship could not be established with a long-term index station. However, a U.S. Forest Service short record gage on an adjacent watershed, Annie Creek (61420301), correlated well with the measurements at the miscellaneous site[8]. The Annie Creek gage has a period of record from water years 1992 to 1997.

[8] The "measurement" used for the Annie Creek gage is actually the mean daily flow for the day the miscellaneous measurement on Sun Creek was made.

The concurrent stream flows for 21420310 and 61420301 are shown in Table 10 and the linear regression of these measurements is shown Figure 11. The equation of the regression line is

Y = exp(-2.02106 + 1.13926(ln X)) .....(2)

Where **X** represents exceedance stream flows for Annie Creek and **Y** represents exceedance stream flows for 21420310. This equation is used to estimate exceedance stream flows for Sun Creek. For example, the 50-percent exceedance stream flow for September for Annie Creek is 58.8 cfs. Replacing **X** in the regression equation with this value, and solving for Y gives 13.9 cfs, the 50-percent exceedance flow for September for Sun Creek. Table 11 shows selected exceedance stream flows estimated for Sun Creek based on the Annie Creek gage.

The flow duration curves estimated for the miscellaneous measurement site on Sun Creek represent the same period of record as the index station – in this case, from 1992 to 1997. Although not discussed here, the flow duration curves for Sun Creek were corrected to the base period using the gage Deschutes River below Snow Creek near La Pine OR (14050000) as the index.

Flow duration curves estimated from miscellaneous measurements can be found in the **Flow Duration Curve Database**. A list of miscellaneous measurement sites used in the water availability analysis is given in Appendix C.

Selecting an Index Station

Correcting a short record to the base period or estimating flow duration curves for a set of miscellaneous measurements requires an index station. For best results, the watershed of the index station should be hydrologically similar to the *target* watershed of the short record station or miscellaneous measurement site. We have developed two methods for comparing watersheds in order to select the most similar.

In the first case, we compare watersheds based on their physical characteristics. We make the

Table 10. Concurrent Stream Flow Measurements for Sun Creek (Gage 21420310 – Miscellaneous Measurements) and Annie Creek (Gage 61420301 – Mean Daily Flows).

Date	Sun Creek (cfs)	Annie Creek (cfs)	Date	Sun Creek (cfs)	Annie Creek (cfs)
11/18/92	6.1	31.3	5/22/96	33.3	144
5/20/93	38.1	136	5/30/96	29.4	129
6/3/93	36.0	126	6/6/96	40.6	171
6/10/93	37.4	132	6/17/96	43.7	148
6/24/93	39.7	139	6/20/96	35.9	134
6/27/93	39.3	147	6/27/96	33.0	123
6/28/93	45.2	147	7/3/96	32.6	121
7/20/93	28.8	95.6	7/11/96	24.7	102
9/22/93	12.5	58.6	7/18/96	22.9	94.0
6/14/94	14.2	53.0	7/25/96	19.7	88.0
6/28/94	11.2	45.4	8/1/96	20.8	85.0
7/11/94	11.6	42.0	8/15/96	16.4	79.0
7/25/94	8.9	39.1	8/29/96	14.2	72.0
8/8/94	8.7	35.7	9/11/96	14.3	69.0
8/22/94	8.8	37.8	9/25/96	13.3	66.0
9/6/94	8.7	36.2	10/11/96	9.8	65.1
9/22/94	7.6	35.3	5/14/97	37.5	181
6/13/95	30.2	109	5/20/97	47.0	183
6/15/95	30.2	109	5/28/97	41.0	159
6/20/95	27.1	99.0	6/9/97	47.7	167
7/5/95	39.3	128	6/19/97	42.3	150
7/10/95	40.1	128	6/19/97	37.7	159
7/20/95	29.2	97.0	7/1/97	36.6	125
7/27/95	22.9	83.0	7/10/97	30.6	114
8/10/95	16.5	69.0	7/17/97	23.3	101
8/17/95	14.7	65.0	7/31/97	20.7	89.9
8/24/95	13.6	61.0	8/26/97	19.1	76.6
9/6/95	12.5	58.0	9/2/97	15.6	72.4
9/12/95	12.8	55.0			

assumption that watersheds with similar physical characteristics have similar stream flows. This assumption is good for runoff driven streams where stream flow is directly affected by surface characteristics. These characteristics are readily estimated and include those listed in Table 13. The comparison is poor for watersheds dominated by spring flow. Here subsurface characteristics determine stream flow. These characteristics are largely unknown.

In the second case, we compare watersheds based on their flow duration curves. A flow duration curve represents the probability distribution of stream flow for a watershed. Hydrologically similar watersheds will have flow duration curves similar in shape, but not necessarily in magnitude. This comparison works for either runoff or spring dominated watersheds, but only when gaged.

Table 11. Selected Exceedance Stream Flows for Sun Creek – Gage 21420310.

Flow Duration Curves Based on a Correlation with US Forest Service Gage 61420301.

Ex.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
20%	19.3	18.0	16.4	18.2	37.5	42.4	30.3	19.8	16.6	15.3	15.3	18.2
50%	9.1	8.0	12.6	12.7	24.1	34.8	24.3	17.3	13.9	10.8	10.4	10.4
80%	6.6	6.3	9.6	10.5	15.5	24.6	17.3	13.2	11.5	8.0	7.4	6.4

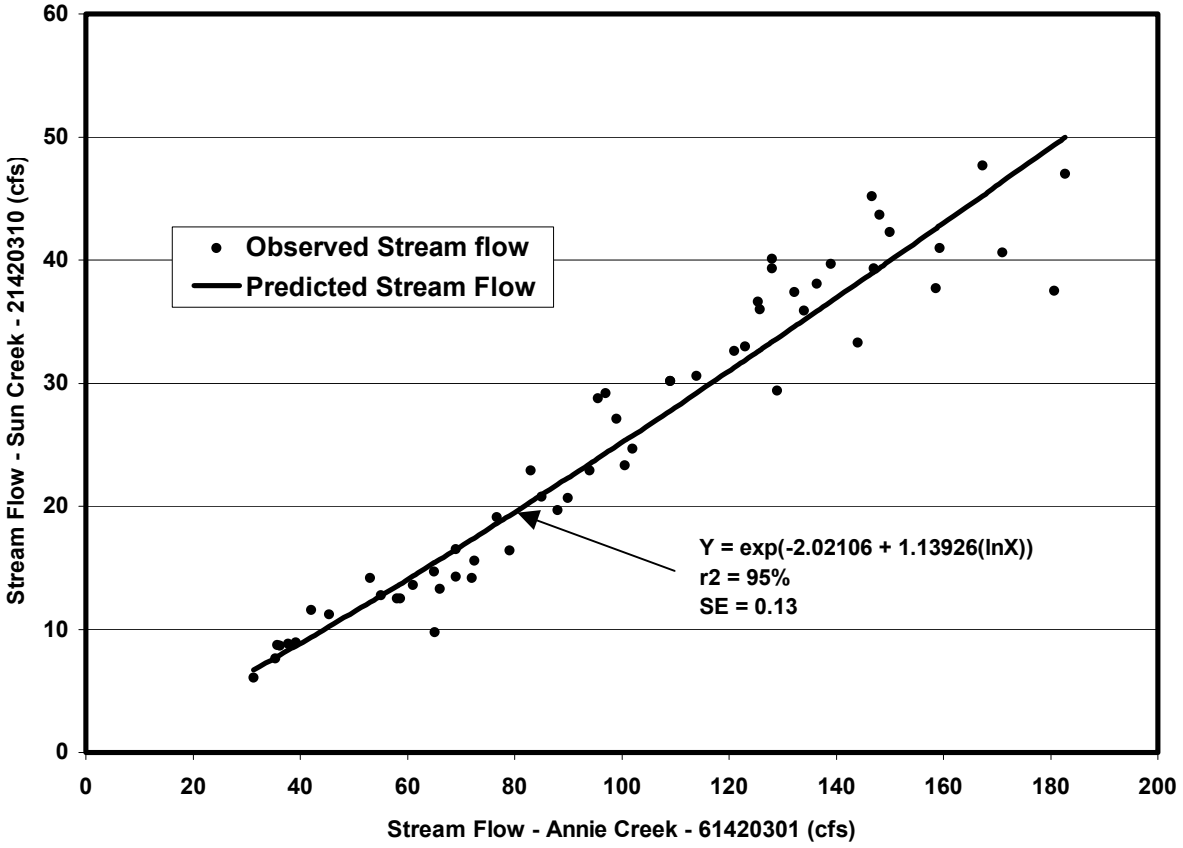

Figure 11. Relationship Between Stream Flow at Sun Creek (Gage 21420310 - Miscellaneous Measurements) and Annie Creek (Gage 61420301– Mean Daily Flows).

By Comparison of Watershed Characteristics
In this case, the physical characteristics of the target watershed are compared to the physical characteristics of a set of possible index stations. The differences between physical characteristics such as mean elevation and January precipitation are scored and summed over all the characteristics considered. The index stations are ranked based on their total score. The smallest score represents the index station most like the target.

Watershed characteristics are measured at a variety of scales. For large-scale characteristics, such as watershed area, the difference between the target and a possible index station can be much larger than for, say, maximum January temperature. Using the actual difference between characteristics gives more weight to some characteristics than to others. To avoid this problem, the characteristics are *standardized*. All standardized characteristics, Y, have a mean of 0.0 and a standard deviation of 1.0.

For all index stations, i,

$$Y_i = \frac{X_i - \overline{X}}{\sigma} \quad \text{..... (3)}$$

where

Y_i = the standardized value of characteristic X for index station i,
X_i = characteristic X for index station i,
$\overline{X}$ = mean of characteristic X for all index stations, and
σ = standard deviation of characteristic X for all index stations.

Table 12 shows example standardizations for 35 index gages in the eastern Oregon for three watershed characteristics: area, elevation, and mean annual precipitation. In practice, the standardizations are done for all characteristics for all index gages in Oregon and surrounding states.

Table 13 shows the results of a comparison between a short record gage on the Miami River to a possible index station on the Wilson River. Table 14 is a list of the 10 possible index watersheds most similar to the watershed on the Miami River.

By Comparison of Flow Duration Curves
In this case, the flow duration curves of the target station are compared to the flow duration curves for a set of possible index stations. Flow duration curves for the concurrent record for both stations are calculated and compared. The differences between selected values on each monthly flow duration curve are summed over all the flow duration curves. The index stations are ranked based on their total score. The smallest score represents the index station most like the target.

In order to make valid comparisons between index stations, the flow duration curves are standardized by dividing through by the highest stream flow value for each flow duration curve. The maximum value on each curve is 1.0. Table 15 gives a list of the ten index watersheds with stream flow characteristics most like the watershed above the gage on Pine Creek near Oxbow, OR.

Correction to Natural Stream Flow

Gaged stream flows and miscellaneous measurements, and therefore, the flow duration curves derived from them, are commonly affected by upstream consumptive uses. To obtain natural stream flow, the average consumptive use during the period of record for the gage is estimated and added to the exceedance stream flow derived from the gaged stream flow.

$$\mathbf{Q_{NSF} = Q_{GAGE} + CU} \quad \text{.....(4)}$$

Where

$\mathbf{Q_{NSF}}$ = natural exceedance stream flow,
$\mathbf{Q_{GAGE}}$ = gaged exceedance stream flow, and
CU = average consumptive use during the period of record for the gage.

Calculation of consumptive uses is discussed in **Storage and Consumptive Use Demands**. Recall that measured stream flows significantly affected by storage are not used in this analysis. A correction for storage is not required.

Table 12. Standardizing Watershed Characteristics: An Example for 35 Selected Index Gages in Eastern Oregon for Area, Elevation and Annual Precipitation.

Gage	Gage Location	Area		Elevation		Annual Precipitation	
		Actual (mi^2)	Standardized	Actual (ft)	Standardized	Actual (in)	Standardized
1036600	Twentymile Cr nr Adel, OR	189.3	-0.52	5816	0.82	15.4	-1.04
1037150	Deep Cr ab Adel, OR	185.0	-0.52	6014	1.03	19.2	-0.80
1037850	Honey Cr nr Plush, OR	168.2	-0.53	5918	0.93	18.4	-0.85
1038400	Chewaucan R nr Paisley, OR	267.1	-0.47	6057	1.07	26.5	-0.34
1039350	Silvies R nr Burns, OR	912.9	-0.08	5176	0.15	18.2	-0.87
1039600	Donner Und Blitzen R nr Frenchglen, OR	205.9	-0.51	6209	1.23	30.1	-0.11
1040650	Trout Cr nr Denio, NV	85.5	-0.58	5936	0.95	17.8	-0.89
1149350	Williamson R nr Klamath Agency, OR	1322.1	0.17	5119	0.09	27.5	-0.28
1149750	Sprague R nr Beatty, OR	528.0	-0.31	5420	0.41	22.9	-0.57
1150100	Sprague R nr Chiloquin, OR	1593	0.34	5278	0.26	23.0	-0.57
1150250	Williamson R bl Sprague R nr Chiloquin, OR	2997	1.20	5191	0.17	25.0	-0.44
1321400	Malheur R nr Drewsey, OR	943.5	-0.06	4808	-0.23	17.0	-0.94
1321650	N Fk Malheur R nr Beulah, OR	341.8	-0.42	5356	0.34	23.0	-0.56
1328820	Eagle Cr ab Sc nr New Bridge, OR	156.1	-0.54	5764	0.77	46.6	0.94
1329200	Imnaha R at Imnaha, OR	621.7	-0.25	5077	0.05	33.9	0.13
1331900	Grande Ronde R at La Grande, OR	685.8	-0.21	4606	-0.44	27.6	-0.27
1332000	Catherine Cr nr Union, OR	103.0	-0.57	5302	0.28	39.4	0.48
1333000	Lostine R nr Lostine, OR	71.4	-0.59	6860	1.91	57.0	1.60
1333050	Bear Cr nr Wallowa, OR	67.0	-0.59	5936	0.95	48.6	1.06
1333250	Grande Ronde R At Rondowa, OR	2592	0.95	4511	-0.54	31.4	-0.03
1333300	Grande Ronde R At Troy, OR	3307	1.39	4415	-0.64	31.4	-0.03
1401000	S Fk Walla Walla R nr Milton, OR	61.8	-0.60	4250	-0.81	47.7	1.01
1402000	Umatilla R ab Meacham Cr nr Gibbon, OR	131.3	-0.55	3950	-1.13	40.5	0.55
1402250	McKay Cr nr Pilot Rock, OR	179.3	-0.52	3253	-1.85	26.6	-0.34
1403750	Strawberry Cr nr Prairie City, OR	7.0	-0.63	6825	1.87	40.3	0.54
1404050	John Day R nr Dayville, OR	1685	0.40	4637	-0.41	19.9	-0.76
1404250	Camas Cr nr Ukiah, OR	120.9	-0.56	4712	-0.33	27.7	-0.26
1404400	M Fk John Day R at Ritter, OR	522.6	-0.31	4768	-0.27	23.1	-0.56
1404600	N Fk John Day R at Monument, OR	2530	0.91	4531	-0.52	22.3	-0.60
1404650	John Day R at Service Cr, OR	5139	2.51	4433	-0.62	20.6	-0.71
1404800	John Day R at McDonald Ferry, OR	7629	4.03	3914	-1.16	18.6	-0.84
1405000	Deschutes R bl Snow Cr nr La Pine, OR	107.8	-0.57	5761	0.76	71.3	2.51
1409150	Metolius R nr Grandview, OR	319.1	-0.44	4159	-0.91	41.2	0.59
1410150	White R bl Tygh Valley, OR	397.7	-0.39	2958	-2.16	28.7	-0.20
1411850	W Fk Hood R nr Dee, OR	95.8	-0.57	3120	-1.99	86.1	3.45
1036600	Twentymile Cr nr Adel, OR	189.3	-0.52	5816	0.82	15.4	-1.04
Mean		1036	0.00	5030	0.00	31.8	0.00
Standard Deviation		1636	1.00	958.6	1.00	15.7	1.00

Table 13. Comparison of Selected Watershed Characteristics for the Watershed above Gage 14301300 on the Miami River near Garibaldi, OR and the Watershed above Gage 14301500 on the Wilson River near Tillamook, OR.

Characteristic	14301300	14301500	Difference	Weight	Score
Drainage Area (mi^2)	28.5	161.6	0.087	1.00	0.087
Maximum Relief (ft)	2398	3398	0.473	1.00	0.473
Mean Slope (%)	29.7	28.0	0.206	1.00	0.206
Average Aspect (^{o})	190.3	185.2	0.275	1.00	0.275
Mean Elevation (ft)	950.1	1667	0.463	1.00	0.463
Area above 3000 ft (%)	0.00	2.84	0.077	1.00	0.077
Area above 4000 ft (%)	0.00	0.00	0.000	1.00	0.000
Area above 5000 ft (%)	0.00	0.00	0.000	1.00	0.000
Area above 6000 ft (%)	0.00	0.00	0.000	1.00	0.000
Mean Jan Precipitation (in)	19.7	20.0	0.0586	1.00	0.058
Mean July Precipitation (in)	2.00	1.66	0.780	1.00	0.780
Mean July Min Temp (^{o}F)	49.0	48.3	0.195	1.00	0.195
Mean Jan Max Temp (^{o}F)	47.7	40.3	1.689	1.00	1.689
Mean Soil Permeability (in/hr)	1.49	1.49	0.003	1.00	0.003
Total					4.305

Table 14. Index Watersheds Most Like the Watershed Above Gage 14301300 on the Miami River near Garibaldi, OR, Based on a Comparison of Watershed Characteristics.

Rank	Gage	OWRD Basin	Location	Distance from 14301300 (miles)	Score
1	14301500	1	Wilson River near Tillamook, OR	15.0	4.30
2	14303600	1	Nestucca River near Beaver, OR	24.5	4.77
3	14305500	18	Siletz River at Siletz, OR	55.5	5.06
4	14306400	18	Five Rivers near Fisher, OR	92.4	6.34
5	14306500	18	Alsea River near Tidewater, OR	87.7	6.46
6	14306100	18	North Fork Alsea River at Alsea, OR	82.0	6.51
7	14139700	3	Cedar Creek nr Brightwood, OR	89.9	7.07
8	14163000	2	Gate Creek at Vida, OR	118.1	7.72
9	14301000	1	Nehalem River near Foss, OR	27.0	7.75
10	14192500	2	South Yamhill River near Willamina, OR	38.8	7.83

Table 15. Watersheds Most Like the Watershed Above Gage 13291090 on Pine Creek near Oxbow, OR – Based on a Comparison of Flow Duration Curves.

Rank	Gage	OWRD Basin	Location	Concurrent Period of Record	Number of Concurrent Records	Total Difference
1	13333000	8	Grande Ronde River at Troy, OR	11/66- 6/96	848	26.19
2	14044000	6	Middle Fork John Day River at Ritter, OR	11/66- 6/96	848	28.07
3	14046000	6	North Fork John Day River at Monument, OR	11/66- 6/96	848	29.60
4	13332500	8	Grand Ronde River at Rondowa, OR	11/66- 6/91	706	29.64
5	14046500	6	John Day River at Service Creek, OR	11/66- 6/96	848	32.45
6	14048000	6	John Day River at McDonald Ferry, OR	11/66- 6/96	848	35.87
7	10371500	13	Deep Creek above Adel, OR	11/66- 6/96	848	42.89
8	10384000	13	Chewaucan River near Paisley, OR	11/66- 6/96	848	43.69
9	10396000	12	Donner und Blitzen River near Frenchglen, OR	11/66- 6/96	848	45.23
10	13320000	8	Catherine Creek near Union, OR	11/66- 6/96	848	48.55

Table 16. Watershed Characteristics Used in the Regression Analysis.

Characteristic	Units	Data Type	Scale or Resolution	Source
Watershed area	square miles	vector	1:24000	OWRD
Maximum watershed relief	feet	grid	1:250000	US Geological Survey
Mean watershed slope	percent	grid	1:250000	US Geological Survey
Mean slope aspect	degrees	grid	1:250000	US Geological Survey
Mean elevation	feet	grid	1:250000	US Geological Survey
Mean Jan precipitation	inches	grid	10000 m	Oregon Climate Service
Mean Jul precipitation	inches	grid	10000 m	Oregon Climate Service
Mean Jul min temperature	degrees	grid	10000 m	Oregon Climate Service
Mean Jan max temperature	degrees	grid	10000 m	Oregon Climate Service
Soil permeability	inches/hour	vector	1:250000	Natural Resources Conservation Service

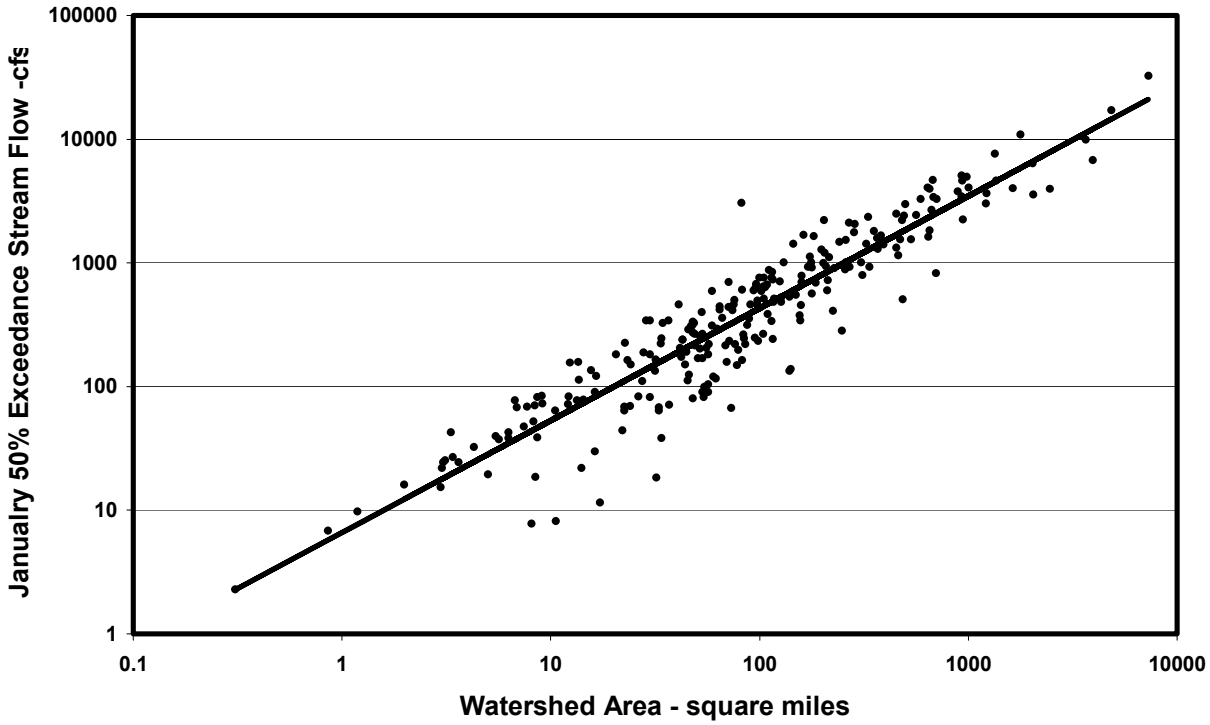

Figure 12. January 50-Percent Exceedance Stream Flow vs. Watershed Area for Gaged Streams West of the Cascade Crest Using Log-Transformed Data.

Unmeasured Watershed Stream Flow Analysis

Most water availability sites do not have measured stream flows. For these cases, stream flows are generalized from measured sites using a regional regression analysis[9]. Regression analysis is based on the assumption that stream flow is related to various watershed characteristics. For example, stream flow increases with watershed size, other factors like precipitation being equal. A 100-square mile watershed produces more runoff than a 25-square mile watershed.

As an example, the relationship between 50-percent exceedance natural stream flow for January and watershed area for gaged streams west of the Cascade crest is shown in Figure 12. The line shown on the plot is drawn to minimize the sum of the squared differences between the line and the points. The line "models" the relationship between stream flow and watershed area. It can be used to predict the stream flow for a watershed given its area.

Similar relationships exist between stream flow and other watershed characteristics (Table 16), each characteristic accounting for part of the variability in stream flow. These relationships can be quantified in a mathematical form. For example, the following equation is the mathematical relationship between the 50-percent exceedance natural stream flow for January and watershed characteristics for watersheds east of the Cascade crest:

[9] Using statistical regression models to estimate stream flow is a standard hydrologic technique and is well documented in the literature. (Harris et al, 1979, 1983; Lystrom, 1970; Riggs, 1973; Thomas and Benson, 1969)

Table 17. Watershed Characteristics for Ish Tish Creek at the Mouth.

Characteristic	Characteristic Value
Area (A)	19.9 mi^2
Slope (S)	7.85%
Aspect (As)	210 ^{o}
Mean Elevation (E)	5350 ft
Mean January Precipitation (JnP)	2.37 in
Mean July Precipitation (JlP)	0.60 in
Mean January Maximum Temperature (JXT)	40.3 ^{o}F
Mean Soils Permeability (SP)	1.24 in/hr

$$Q_{NSF} = \exp(-12.2) A^{1.02} S^{0.568} As^{0.962} E^{-1.03} JnP^{1.38} JlP^{0.617} JXT^{3.21} SP^{0.385} \quad \text{..... (5)}$$

where

A	=	Area
S	=	Mean Slope
As	=	Mean Aspect
E	=	Mean Elevation
JnP	=	Mean Jan Precipitation
JlP	=	Mean Jul Precipitation
JXT	=	Mean Jan Max Temperature
SP	=	Mean Soil Permeability

For a watershed where the 50-percent exceedance stream flow is unknown and no measurements exist, an estimate of the 50-percent exceedance stream flow can be made by substituting the *known* characteristics for the watershed into the regression equation (e.g., Equation 5).

Generally it is required that the known stream flow statistics (in our case, the 50- and 80-percent exceedance stream flows) used in formulating the regression equations represent *natural* stream flow (Thomas and Benson, 1969). Flow regulation by reservoirs or withdrawals from the stream cannot be accounted for in the regression model. Including them results in a poor regression model that gives biased stream flow estimates.

It is often useful to divide a large region like the State of Oregon into several homogeneous subregions before developing regression equations (Harris et al, 1979, Harris and Hubbard, 1983). In developing this methodology, various sets of sub-regions were defined and tried. In most cases, significant discontinuities occurred at region boundaries; that is, for similar adjacent watersheds, but in different regions, the estimated stream flow were often significantly different. Better, more consistent results were obtained for larger, more encompassing sub-regions. For this methodology, the state is divided into only two regions. Region 10 is west of the Cascade crest and Region 30 is east of the Cascade crest.

Estimating Exceedance Stream Flow from a Regional Regression Analysis – an Example Calculation

This example calculation is for the 50-percent exceedance stream flow during January for Ish Tish Creek at its mouth. Ish Tish Creek is a tributary to the South Fork Sprague River in the Klamath Basin. The physical characteristics for the watershed are given in Table 17. Substituting into Equation 5 for watersheds east of the Cascades (Region 30):

$$Q_{NSF} = \exp(-12.2)(19.9)^{1.02}(7.85)^{0.568}(210)^{0.962}(5350)^{-1.03}(2.37)^{1.38}(0.60)^{0.617}(40.3)^{3.21}(1.24)^{0.385}$$

$$Q_{NSF} = 3.17 \text{ cfs}$$

Defining the Mathematical Relationship Between Stream Flow and Watershed Characteristics

For this analysis, we assume a linear relationship between stream flow and watershed characteristics. The linear mathematical model takes the form

$y = b_0 + b_1x_1 + b_2x_2 + \ldots + b_mx_m$. ..... (6)

where y represents stream flow and x_1, x_2, . . ., x_m represent the *m* watershed characteristics. b_1, b_2, . . ., b_m represent the regression coefficients which define the relationship among variables and are determined from the data.

The data consist of *n* observations of y and x_m, from which *n* equations of the type of Equation 6 can be written. The regression coefficients are determined by minimizing the sum of the squared differences between the actual values of y and the values of y estimated by the *n* equations. The equations resulting from this minimization are called the normal equations.

In matrix notation, the normal equations are written as

(X'X)B = X'Y..... (7)

where

$$X = \begin{bmatrix} x_{01} & x_{11} & \cdots & x_{m1} \\ x_{02} & x_{12} & \cdots & x_{m2} \\ \vdots & \vdots & & \vdots \\ x_{0n} & x_{1n} & \cdots & x_{mn} \end{bmatrix}, \quad Y = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{bmatrix}, \text{ and } \quad B = \begin{bmatrix} b_0 \\ b_1 \\ \vdots \\ b_m \end{bmatrix}.$$

X is the matrix containing the watershed characteristics, i.e., the independent variables. x_{mn}, for example, is characteristic m for watershed n.

X' is the transpose of **X**.

Y is the vector containing the stream flows for the various watersheds, i.e., the dependent variable. y_n, for example, is the stream flow for watershed n.

B is the vector containing the coefficients relating **X** to **Y**. b_m, for example, is the coefficient associated with characteristic m.

Equation 7 can be solved for **B** if **(X'X)** has an inverse.

$B = (X'X)^{-1}X'Y$ .....(8)

The vector of the predicted values of **Y**, **Y***, is given by

Y* = XB .....(9)

This method is known as ordinary least squares (OLS). See Chatterjee and Price (1991), chapter 3, for a straightforward discussion on how this method is implemented. Finally, note that the set of simultaneous equations resulting from the regression of the data are solved by the computer algorithm for singular value decomposition given by Press et al. (1986).

Transforming the Data

While ordinary least squares assumes a linear relationship between the dependent and independent variables, the true relationship in this analysis is non-linear. Fortunately, a log transformation[10] of the stream flow and watershed characteristics allows us to model the non-linear relationship with the linear relationship described in the previous section (Riggs, 1968, 1973).

Figure 13 shows the same area versus stream flow plotted for gaged streams west of the Cascade crest, as does Figure 12, except that the data have not been transformed to log values. Clearly, transforming the variables makes the relationship between stream flow and watershed characteristics more linear.

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[10] For the water availability analysis, we use the base *e,* or natural, logarithm for the transformation. The base 10 logarithms would work just as well.

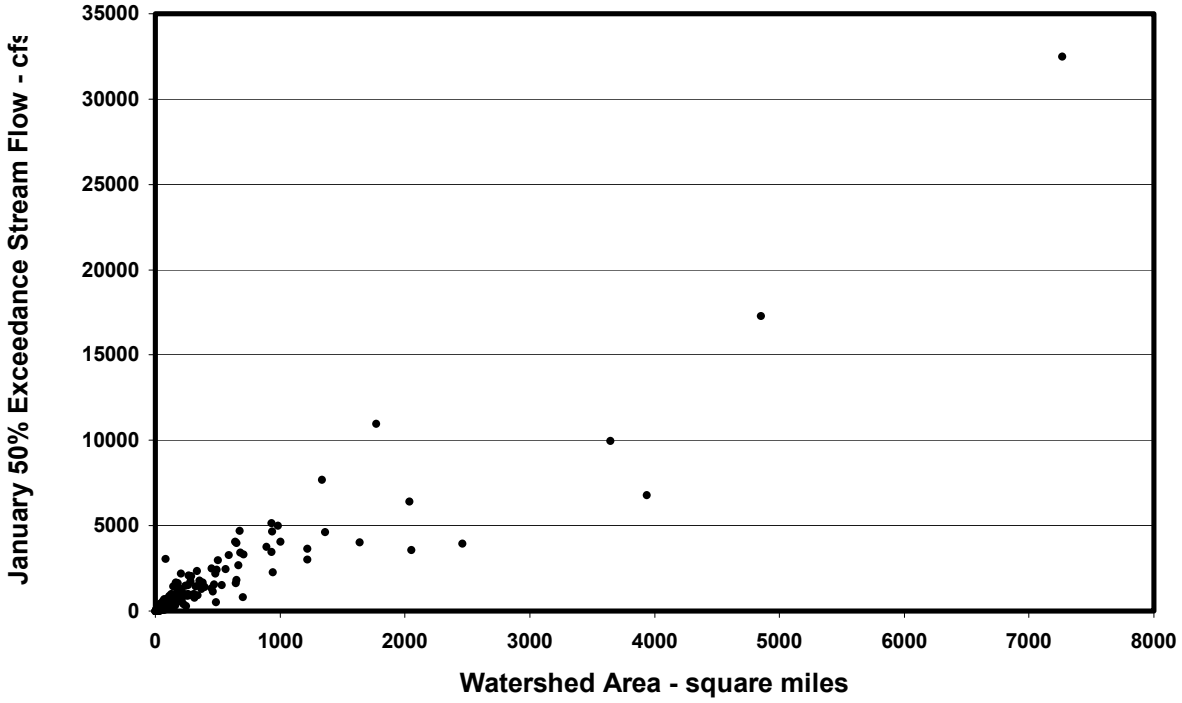

Figure 13. January 50-Percent Exceedance Stream Flow vs. Watershed Area for Gaged Streams West of the Cascade Crest Using Non-Log-Transformed Variables.

The non-linear model of the relationship between stream flow and watershed characteristics looks like this

$$y = \exp(b_0)x_1^{b1}x_2^{b2} \ldots x_m^{bm} \quad \text{..... (10)}$$

A log transformation of Equation 10 yields this linear relationship

$$\log(y) = b_0 + b_1\log(x_1) + b_2\log(x_2) + \ldots + b_m\log(x_m) \quad \text{..... (11)}$$

Equation 11 is used to form the *n* simultaneous equations, or normal equations, described in the previous section.

Table 18. Metadata Links.

Data Provider	Metadata Link
US Geological Survey	
Hydrography	http://rockyweb.cr.usgs.gov/nmpstds/dlgstds.html
Digital Elevation Model	http://rockyweb.cr.usgs.gov/nmpstds/demstds.html
Natural Resources Conservation Service	
State Soil Geographic Database	http://www.ftw.nrcs.usda.gov/stat2.html
Oregon Climate Service	
PRISM Precipitation	http://www.climatesource.com/cd1/ppt_met_us.htm
PRISM Temperature, Mean	http://www.climatesource.com/cd2/tmean_met_us.html
PRISM Temperature, Max	http://www.climatesource.com/cd2/tmax_met_us.htm
PRISM Temperature, Min	http://www.climatesource.com/cd2/tmin_met_us.htm
PRISM Snowfall	http://www.climatesource.com/cd11/snow_us.html

Estimating Watershed Characteristics

The Department currently has the means to estimate 93 watershed characteristics (See Appendix D). Each of these 93 characteristics is generated from overlay analysis using a Geographic Information System (GIS)[11]. Each is associated with either a coverage (vector data) or a grid (raster data). These data come from the U.S. Geological Survey (Hydrography and Elevation), the Oregon Climate Service (Precipitation and Temperature), and the Natural Resources Conservation Service (Soils). Links to the metadata (and the source data) of each coverage or grid are given in Table 18.

To begin, each watershed is delineated from USGS 1:24000 scale topographic maps and digitized into a coverage of all watersheds. The locations of the outlet and the centroid, the area, and the perimeter of each watershed are calculated directly from this coverage. For other characteristics, the watershed coverage is overlaid on the respective coverage or grid. Stream length and percent area of lakes and ponds are determined from an overlay of the hydrography coverage. Relief is simply the difference of the highest and lowest elevations in the watershed determined from the elevation grid. For all others, the value of the characteristic is its average over the area of the watershed. The data are analyzed using an Arc Macro Language (AML) script. The AML is available from OWRD on request.

Most of the 93 characteristics were not used in the regression analysis. Some of the characteristics, such as the location of the centroid of a watershed, are poorly (or not at all) related to stream flow. Others, such as percent of a watershed above 3000 feet, tend to cluster at one or two values. For example, most coastal watersheds have zero percent of their area above 3000 feet and most east side watersheds have no area below 3000 feet (Figure 14). Still other characteristics, such as the monthly precipitations or temperatures, are highly correlated with each other and using all or most of these values in a regression analysis would not add information to the analysis. Finally, precipitation intensity and snow pack are recent additions to the list of characteristics. They have not yet been incorporated into the analysis. The characteristics used successfully in the regression analysis are given in Table 16 along with the data type, scale or resolution, and the data source.

[11] OWRD uses Arc Info 7.2.1, Environmental Systems Research Institute, Inc. (Redlands, CA).

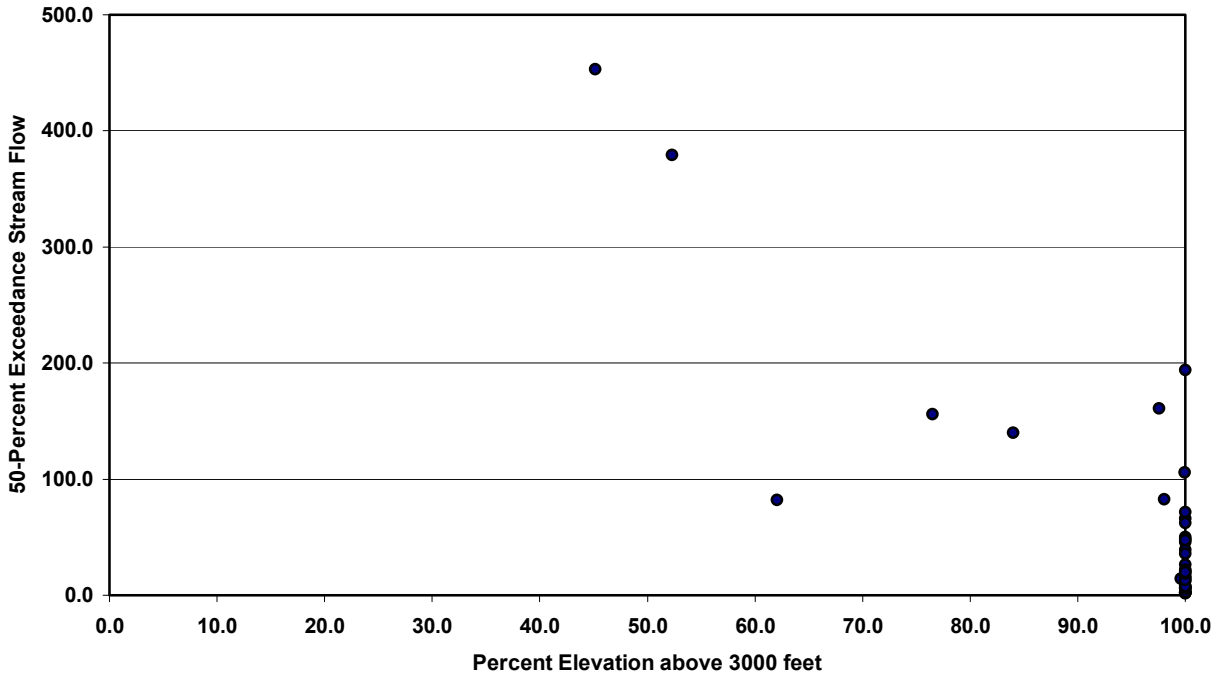

Figure 14. Percent Elevation above 3000 feet vs. 50-Percent Exceedance Stream Flow – for Gages East of Cascade Crest.

Goodness of Fit

A mathematical relationship, or "model", between stream flow and watershed characteristics will not account for all the variability in the stream flow data. However, the model developed from the regional regression analysis is the *best fit* to the given data, minimizing the variability not accounted for by the model.

Many combinations of watershed characteristics can be regressed against the set of gaged stream flows; all of which are the best fit for that particular combination of characteristics. Some combinations better fit the stream flow data than others. In order to determine the best combination, i.e., the one that best minimizes the unaccounted for variability, we measure the *goodness of fit* of each model.

As an illustration, consider the simple model shown in Figure 12. Each point on the chart represents a gaged watershed. The 50-percent exceedance stream flow for each watershed has been plotted against the area of the watershed. The line in the figure represents the mathematical model "regressed" from the points. Note that the model does not pass through every point. The difference in stream flow between each point and the model (along a line of constant area) is the residual, **e**, for that point:

$$\mathbf{e_i = nsf(model)_i - nsf(actual)_i} \quad \text{.....(12)}$$

One measure of the goodness of fit of the model is the standard error (**SE**), which is simply the standard deviation of the residuals. Since magnitude of the standard error, in part, depends on the magnitude of the stream flows, the standard error usually is divided by the mean of all the stream flows and multiplied by 100 to get another measure, the percent standard error (**%SE**).

$$\mathbf{\%SE = 100(SE/nsf(mean))} \quad \text{.....(13)}$$

Percent standard error is independent of the magnitude of the stream flows. Generally the

Table 19. Watershed Characteristics Used for Region 10 (West of the Cascade Crest) – 50-Percent Exceedance.

Characteristic	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Area	√	√	√	√	√	√	√	√	√	√	√	√
Relief					√	√	√	√	√	√		
Slope							√	√	√	√		
Aspect												
Elevation	√	√	√	√	√	√					√	√
Jan Precipitation	√	√	√	√	√	√	√	√	√	√	√	√
Jul Precipitation	√	√	√	√	√	√	√	√	√	√	√	√
Jan Max Temp												
Jul Min Temp					√	√	√	√	√	√	√	
Soil Permeability				√	√	√	√	√	√	√	√	√

Table 20. Watershed Characteristics Used for Region 30 (East of Cascade Crest) – 50-Percent Exceedance.

Characteristic	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Area	√	√	√	√	√	√	√	√	√	√	√	√
Relief		√	√	√	√	√	√	√	√	√	√	√
Slope	√	√	√					√	√	√	√	√
Aspect	√	√	√	√	√						√	√
Elevation	√	√	√	√	√	√	√	√	√	√	√	√
Jan Precipitation	√	√	√	√	√	√	√	√	√	√	√	√
Jul Precipitation	√	√	√	√	√	√	√	√	√	√	√	√
Jan Max Temp	√	√	√	√							√	√
Jul Min Temp			√	√	√	√	√					
Soil Permeability	√	√	√	√	√	√	√	√	√	√	√	√

smaller the percent standard error, the better the fit.

Another measure of the goodness of fit is the regression coefficient, r^2, which is 100 times the square of the correlation coefficient, r. The regression coefficient represents the percent of the variability of the stream flow data accounted for by the model. In this case, the larger the value of r^2, the better the model. The regression coefficient cannot be larger than 100.

The characteristics used for models developed west (Region 10) and east (Region 30) of the Cascades are shown in Tables 19 and 20. Note that the sets of characteristics differ from month to month. Although not all shown here, there is, in fact, a different regression model for each month for each exceedance level for each region.

The goodness of fit for each of these models is shown in Table 21. The regression models with the best fit are in winter and spring, and with the poorest fit in late summer. In winter and spring, stream flow is a function of runoff processes that

Table 21. Goodness of Fit for Regression Models – 50-Percent Exceedance.

Month	Region 10 West of Cascade Crest			Region 30 East of Cascade Crest		
	# Gages	% SE	r^2	# Gages	% SE	r^2
Jan	249	24	98	137	38	95
Feb	249	23	98	139	34	96
Mar	249	22	98	139	36	95
Apr	249	26	98	139	43	93
May	247	35	96	139	56	90
Jun	245	40	96	139	55	93
Jul	245	51	94	134	55	94
Aug	245	60	92	135	68	91
Sep	245	58	93	135	71	90
Oct	247	48	94	135	67	90
Nov	249	35	96	135	49	93
Dec	249	25	98	137	46	94

are largely accounted for by the physical characteristics used in the regressions. Late summer flows are more a function of sub-surface processes. Characteristics accounting for these processes are poorly represented in the regressions.

Stream Flow Correction

Gaged stream flows can be used to improve stream flows estimated by the regression equations. Simply put, the sum of stream flows for contributing areas above a gage should equal the gaged stream flow. This is best illustrated by an example.

Figure 15 shows the watersheds at the upper end of the South Fork Sprague River. Watershed 31420226 is Whitworth Creek. Watershed 70799 is the South Fork Sprague River above Whitworth Creek. Watershed 61420208 is the South Fork Sprague River above Brownsworth Creek and includes both of the other watersheds.

The U.S. Forest Service operates a gage at the mouth of watershed 61420208. The area identified as 41420202 is not a watershed. It represents the area of watershed 61420208 not accounted for by watersheds 31420226 and 70799.

In Table 22, column 2 lists the monthly 50-percent exceedance stream flow for the gage at the mouth of watershed 61420208 (corrected to the base period and natural stream flow). The next 3 columns show the monthly stream flows estimated by the regression equations for area 41420202 and watersheds 31420226 and 70799. Column 6 shows the sum of the monthly stream flows for the three areas.

If the estimated monthly stream flows for 41420202, 31420226, and 70799 were exact, they would sum to the actual stream flows for watershed 61420208. Clearly, they do not. In order to improve the estimates, a correction factor is calculated by dividing the actual monthly stream flows by the corresponding sum of monthly estimated stream flow. The correction factors are shown in column 7. If each estimated monthly stream flow is multiplied by its respective correction factor, a set of estimated stream flows is generated that sum to the actual flows at 61420208. These corrected flows are shown in columns 8 to 10.

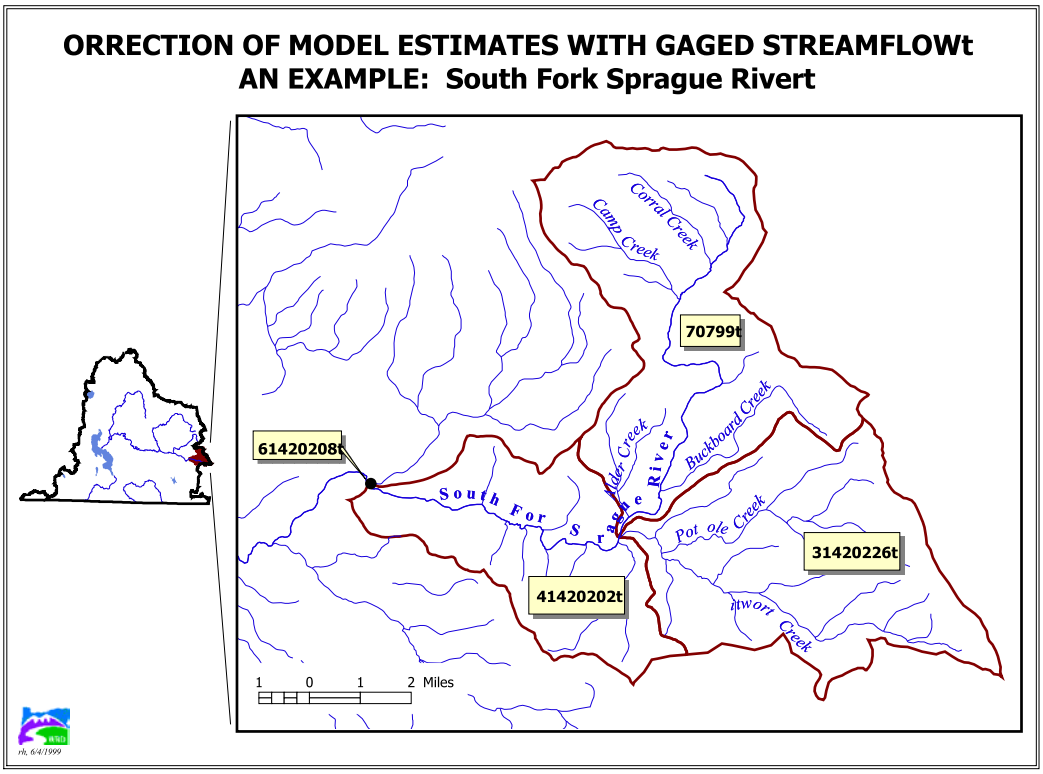

Figure 15. Correction of Model Estimates with Gaged Stream Flow - An Example for the South Fork Sprague River.

In using this method, we assume that exceedance stream flows represent volume of stream flow as do average stream flows. Strictly speaking, this is not the case. However, when attenuation of peak flows and travel times are short, it is a good approximation. It is a poor approximation when gradients are low, when significant lakes or marshes occur in the waterway, and when travel times are long.

A variation on this method can be used to correct stream flows for a single ungaged watershed. In this case, the correction factors are determined by comparing modeled stream flows to actual stream flows for a gaged watershed that is hydrologically similar to the ungaged watershed.

In the example shown in Table 23, the estimated 50-percent exceedance stream flows for Drews Creek above Quartz Creek (Watershed ID 70846) are "corrected" based on stream flows for nearby gage 113409000, Thomas Creek below Cox Flat near Lakeview. Table 24 compares the physical characteristics of these two watersheds.

In Table 23, the actual and modeled 50-percent exceedance stream flows for gage 11340900 are shown in columns 2 and 3. The ratios, by month, of actual to modeled stream flows are the correction factors shown in column 4. The modeled monthly stream flows for watershed 70846 (column 5) are multiplied by their respective correction factor to get the corrected stream flow shown in column 6.

Table 22. Correction of Model Estimates with Gaged Stream Flow – An Example: South Fork Sprague River.

Month	Measured Stream Flows (cfs)	Modeled Stream Flow (cfs)				Corrected Stream Flow (cfs)			
	61420208	41420202	31420226	70799	Sum	Correction	41420202	31420226	70799
Jan	21.1	2.3	7.0	5.4	14.7	1.4354	3.3	10.0	7.8
Feb	23.0	4.4	9.0	7.7	21.1	1.0900	4.8	9.8	8.4
Mar	45.2	8.0	15.9	15.0	38.9	1.1620	9.3	18.5	17.4
Apr	108.0	8.9	22.4	23.9	55.2	1.9565	17.4	43.8	46.8
May	137.0	5.8	26.8	27.6	60.2	2.2757	13.2	61.0	62.8
Jun	52.4	2.3	14.1	14.5	30.9	1.6958	3.9	23.9	24.6
Jul	16.5	0.6	4.0	4.0	8.6	1.9186	1.1	7.7	7.7
Aug	11.3	0.3	1.6	1.6	3.5	3.2286	0.9	5.2	5.2
Sep	11.7	0.3	1.4	1.3	3.0	3.9000	1.2	5.5	5.1
Oct	13.9	0.3	1.5	1.5	3.3	4.2121	1.3	6.3	6.3
Nov	17.5	0.8	2.9	2.4	6.1	2.8689	2.3	8.3	6.9
Dec	17.7	1.6	5.0	3.8	10.4	1.7019	2.7	8.5	6.5

Table 23. Correction of Model Estimates With Gaged Stream Flow – An Example: Drews Creek above Quartz Creek.

Month	Gage 11340900 Thomas Creek below Cox Flat near Lakeview, OR			Watershed 70846 Drews Creek above Quartz Creek	
	Actual (cfs)	Modeled (cfs)	Correction Factor	Modeled Stream Flow (cfs)	Corrected Stream Flow (cfs)
Jan	2.41	4.50	.54	3.51	1.9
Feb	6.51	6.55	.99	4.93	4.9
Mar	17.1	11.5	1.49	8.12	12.1
Apr	37.2	20.9	1.78	14.1	25.1
May	33.0	22.1	1.50	18.2	27.2
Jun	8.77	9.39	.93	8.50	7.9
Jul	2.28	2.87	.79	2.22	1.8
Aug	1.01	1.41	.71	.97	.7
Sep	.93	1.26	.74	.81	.6
Oct	.76	1.43	.53	.90	.5
Nov	1.12	2.62	.43	1.79	.8
Dec	1.72	3.80	.45	2.78	1.3

Table 24. Comparison Of Selected Characteristics For Watersheds 70846 and 11340900.

70486 – Drews Cr tributary to Goose Lake, above Quartz Cr
11340900 – Thomas Cr below Cox Flat near Lakeview, Or
Distance Between Watershed Centroids: 5.43 miles

Characteristic	Watershed	
	70486	11340900
Drainage Area (mi^2)	12.8	17.9
Maximum Relief (ft)	2390	2030
Mean Slope (%)	12.7	13.9
Average Aspect (deg)	200	169
Mean Elevation (ft)	6190	6210
Area above 3000 ft (%)	100	100
Area above 4000 ft (%)	100	100
Area above 5000 ft (%)	99.7	100
Area above 6000 ft (%)	63.4	63.0
Mean January Precipitation (in)	2.82	3.09
Mean July Precipitation (in)	0.80	0.82
Mean July Min Temp (deg)	45.3	45.2
Mean January Max Temp (deg)	39.4	37.8
Soils Mean Permeability (in/hr)	1.83	1.86

Storage and Consumptive Use Demands

Storage and consumptive use diminish stream flow. In the water availability methodology, we estimate this diminishment for two cases. In one case, we correct gaged stream flow to natural stream flow by adding to the gaged stream flow an estimate of consumptive use (but not storage) during the period the gage was in operation (Figure 16). In the other case, the water availability calculation, we estimate the diminishment we expect to occur from all water rights including storage (Figure 17). In either case, the calculations of consumptive use are the same. The cases differ only in the number and type of water rights included in the analysis.

In the latter case, the expected use may exceed the actual use. Municipalities often have rights to more water than they currently use. As the municipality grows, it "grows" into its right. Also certain government agencies can "reserve" water for future use. In either case, for the water availability calculation, the water is not available for appropriation, even though it is not currently being used.

Broad and Collins (1996) discuss in detail water use in the state for water years 1985 and 1990. The interested reader is referred to their report.

Storage

Storage refers to water retained in a reservoir. Water is stored for any of several reasons:

1. To attenuate flood peaks;
2. To provide water for out-of-stream uses during low flow periods;
3. To augment stream flow during periods of low natural stream flow;
4. To provide recreational opportunities; and
5. To provide head for power generation.

A reservoir may serve any or all of these uses.

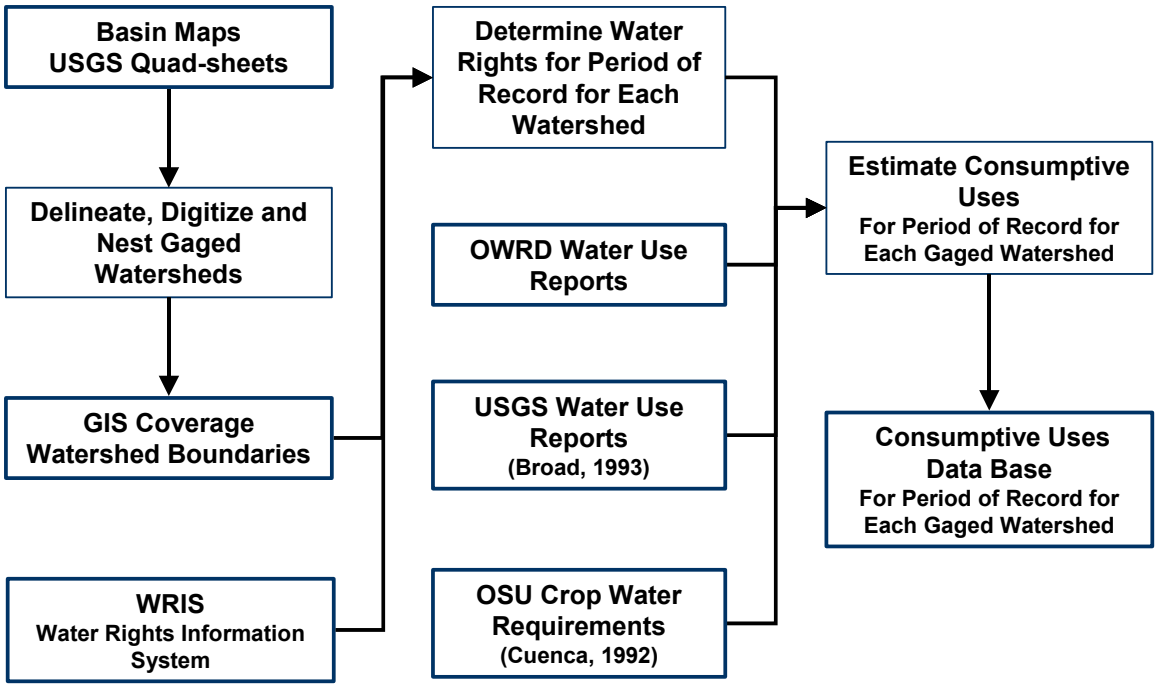

Figure 16. Storage and Consumptive Use Calculations – Correcting to Natural Stream Flow.

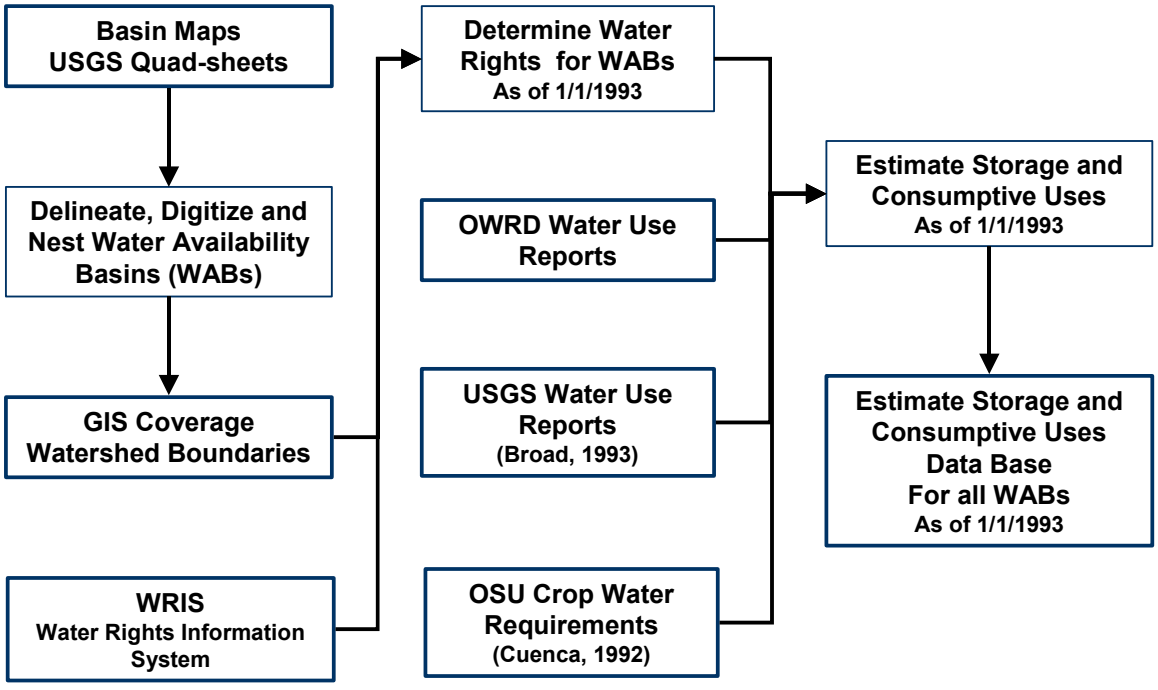

Figure 17. Storage and Consumptive Use Calculations – For the Water Availability Calculation.

Stored water is debited from natural stream flow when it is stored, not when it is used. The water is under the authority of the agency storing it, and that agency determines the use of the water. Usually, prospective users must contract with the storing agency for use of the water.

Where records are available, the expected storage demand is based on *historical storage*; otherwise, it is based on the *full amount* of the water right. For many large reservoirs, the *contents,* i.e., volume of stored water, of the reservoir is reported for the end of each month. From the *change* in contents from one month to the next, the mean stream flow required to cause this change in contents is calculated. This mean stream flow is debited from natural stream flow in the water availability calculation. Table 25 shows this calculation for Detroit Reservoir for the month of November.

Where historic storage for a reservoir is unknown, it is assumed the reservoir is filled once each year and that storage is proportional to stream flow for the allowed storage season. Table 26 shows an example calculation for a small 15.5 ac-ft reservoir on Muddy Creek tributary to Marys River. Note that storage is allowed for only part of the year. The stream flows represent the water available as of the date of the water right application.

Table 25. Debiting Natural Stream Flow for Effects of Storage Based on Historic Storage – An Example: Detroit Reservoir.

Year	Month End Contents (ac-ft)		Change in Contents (ac-ft)	Mean Stream Flow (cfs)
	October	November		
1958	246100	179200	-66900	1120
1959	261400	173900	-87500	1470
1960	250100	162700	-87400	1470
1961	264500	309400	44900	755
1962	261600	196500	-65100	1090
1963	253500	249300	-4200	70.6
1964	258200	182300	-75900	1280
1965	256100	215900	-40200	676
1966	259700	154600	-105100	1770
1967	271300	155200	-116100	1950
1968	310600	154300	-156300	2630
1969	264400	171000	-93400	1570
1970	250400	169000	-81400	1370
1971	225700	220700	-5000	84.0
1972	243700	240600	-3100	52.1
1973	225900	181600	-44300	745
1974	249100	206200	-42900	721
1975	220600	162600	-58000	975
1976	252300	168600	-83700	1410
1977	239400	157400	-82000	1380
1978	225000	281500	56500	950
1979	242600	175600	-67000	1130
1980	225400	169000	-56400	950
1981	207100	160100	-47000	790
1982	217800	156500	-61300	1030
1983	268500	174100	-94400	1590
1984	223100	194700	-28400	477
1985	239100	181000	-58100	976
1986	244100	154300	-89800	1510
1987	244400	242800	-1600	26.9
Mean	246723	190020	-56703	953

Note: 1 cfs flowing all day yields 1.9835 acre-feet of water. For a 30-day month, the yield is 59.5 acre-feet.

Consumptive Use

A consumptive use causes a net reduction in stream flow and is usually associated with an evaporative or transpirative loss (Figure 18). Typically a user's diversion is more than is lost to consumption. For example, for a domestic use, very little water from showers, toilet flushing or dish washing is actually lost. Eventually, most of this water is returned to the stream.

In the water availability calculation, only the part of the diversion lost to evaporation and transpiration is debited from natural stream flow. The exception to this "rule" occurs when diversions are from one watershed to another. In this case,

Table 26. Debiting Natural Stream Flow For Effects of Storage – Based on Storage Capacity of a Reservoir. An Example: 15.5 ac-ft Reservoir on Muddy Creek tributary to Marys River.

Month	Storage Allowed?	Stream Flow (cfs)	Storage Debited (cfs)	Storage Debited (ac-ft)
1	Yes	386	0.059	3.63
2	Yes	338	0.052	2.91
3	Yes	285	0.044	2.71
4	Yes	169	0.026	1.55
5	Yes	65.3	0.010	0.61
6	Yes	25.7	0.004	0.24
7	No	5.35	0.000	0.0
8	No	N/A	0.000	0.0
9	No	N/A	0.000	0.0
10	No	N/A	0.000	0.0
11	Yes	58.6	0.009	0.54
12	Yes	350	0.054	3.31

the use is 100 percent consumptive for the watershed where diversion occurs. The consumptive use *is* the diversion.

It can be argued that all of the allowed diversion be debited in all cases, because the *potential* exists for the unused portion of a diversion to be used. For example, the user could switch to another more consumptive use, could sell the unused portion of the diversion to another user, or could "waste" the unused diversion in some way.

Under Oregon water law, however, a user cannot *change* the intended use or place of use of a water right, *expand* the intended use, or *waste* water. An irrigation water right, for example, is appurtenant to the land on which it will be used. The grower cannot sell or give any unused diversion to another grower to irrigate other lands nor can the grower expand his own use to new lands under the existing water right. Because of these restrictions, consumptive use for an *existing* water right cannot increase.

Table 27. Irrigation in Oregon – 1990 (Broad and Collins, 1996).

	State	West of Cascade Crest	East of Cascade Crest
Number of Cultivated Acres	5,200,000	1,500,000	3,700,000
Number of Irrigated Acres	2,000,000	400,000	1,600,000
Irrigation as a Percent of Water Use in Oregon	82	7	75
Percent of Irrigation in Oregon	100	8	92
Percent of Diversion from Surface Water	91	74	94
Percent of Diversion from Ground Water	9	26	6
Percent of Spray Irrigation	55	90	44
Percent of Flood Irrigation	45	10	56
Percent of Conveyance Losses	19	8	19
Percent of Diversion Used Consumptively	43	67	41
Application Rates (ft/yr)	3.8	1.6	4.4

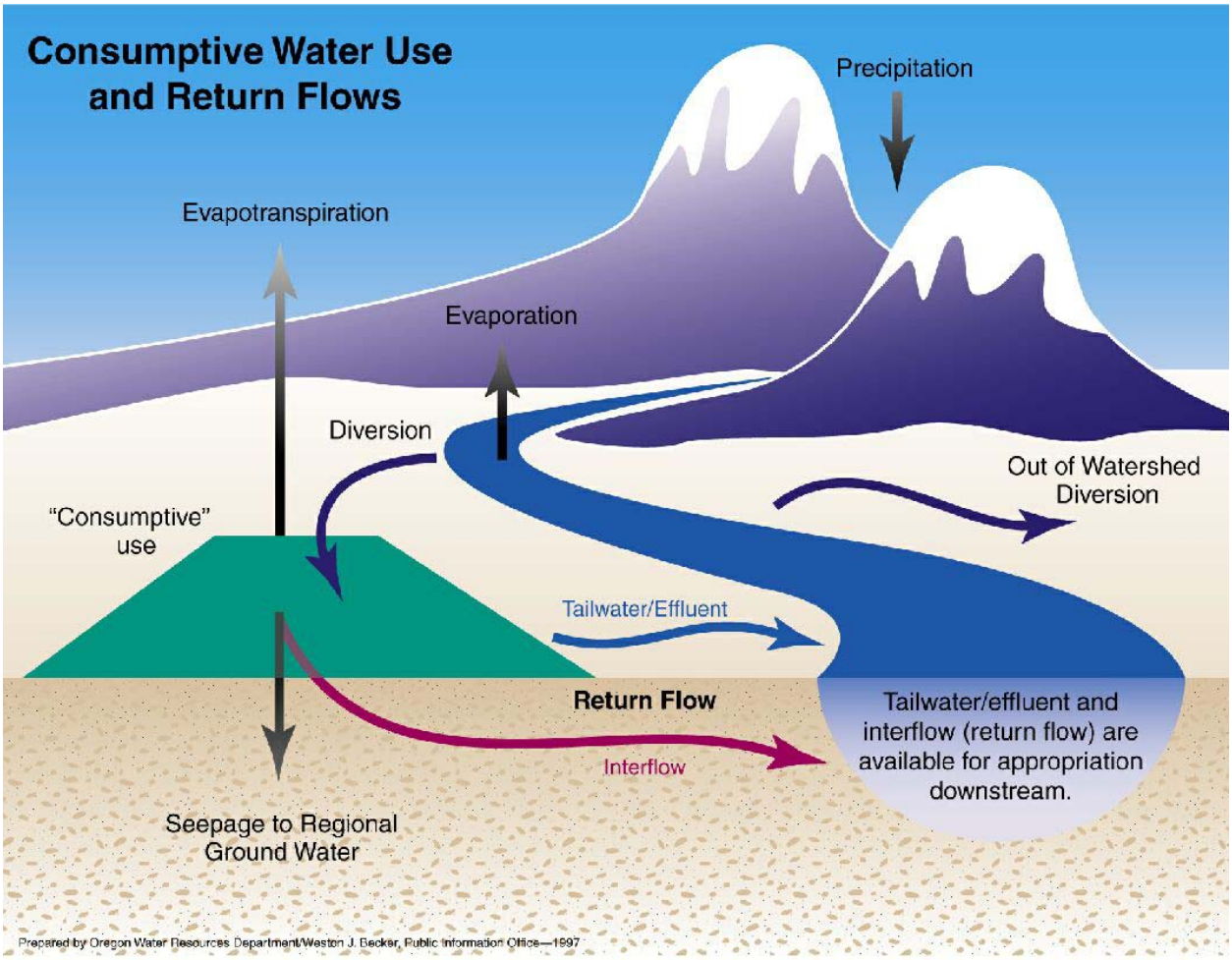

Figure 18. Consumptive Water Use and Return Flows.

We place consumptive uses into three major categories: irrigation, municipal and all other uses. These other uses (e.g., domestic, commercial, industrial) are generally minor in comparison to irrigation and municipal use and are usually small in comparison to stream flow. As will be explained later, for irrigation or municipal use, actual diversion is often less than the maximum allowable diversion. For other uses, diversion is assumed at the maximum rate.

Our categories of use are based on water right classification and not actual use. A use is considered domestic, commercial or industrial only if that is its water right classification. Domestic, commercial, and industrial uses supplied under a municipal right are considered municipal uses. For example, about 4 percent of the water use in Oregon in 1990 was for domestic use (Broad and Collins, 1996). However, 76 percent of this water was from public supply. For our purposes, then, only about 1 percent of total diversions were for domestic uses.

Estimating Irrigation Consumptive Use

Irrigation accounts for over 80 percent of the water use in Oregon (Broad and Collins, 1996). Table 27 details how and where this water was used in 1990. Please note, that in 1990, 82 percent of the water use in Oregon was due to irrigation. Of these diversions for irrigation, 91 percent were from surface water. Over all, only

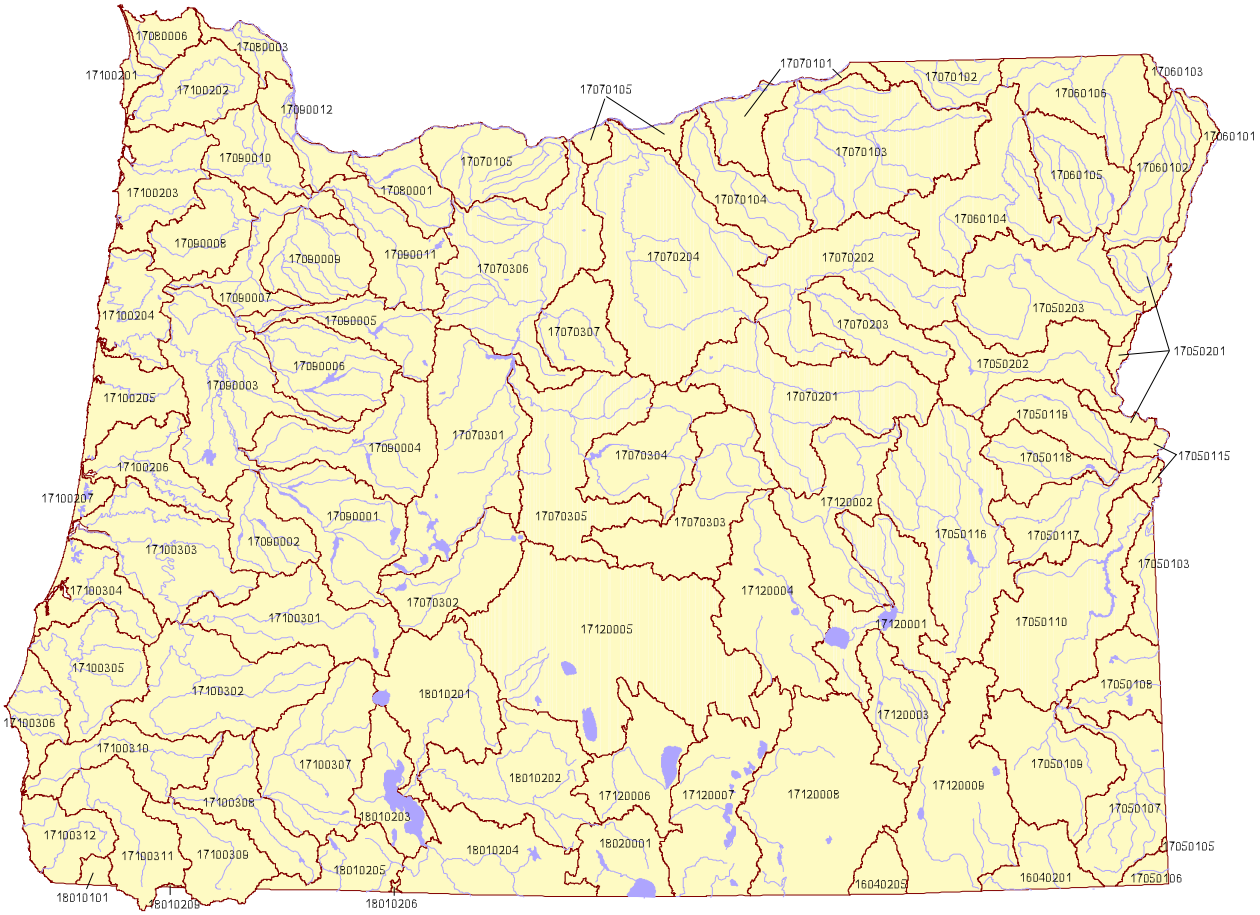

Figure 19. USGS 4th Field Hydrologic Units in Oregon.

43 percent of water diverted was actually used consumptively by the crops irrigated.

In developing this part of the water availability methodology, the following methods were considered for estimating irrigation consumptive use for a watershed:

1. Multiplying the number of acres permitted to be irrigated by all water rights by the permitted duty;
2. Summing the permitted rates of diversion for all water rights;
3. Summing the actual diversions; or
4. Taking a census of the actual number of acres irrigated and the type of crops grown, then finding the consumptive use based on crop water requirements.

Since we wished to make an estimate of the *actual* water consumption from irrigation, we chose the last method. The first three methods overestimate the actual consumptive use. The last method is discussed in this section. The reasons why the other three methods overestimate consumptive use are discussed in the following section.

The Department bases its estimate of irrigation consumptive use on the crop water requirements of the kinds and the acreage of the crops grown in Oregon in 1990. This work was done by the Portland office of the U.S. Geological

Table 28. Acres Irrigated and Annual Consumptive Use in Oregon.

Hydrologic Unit	Annual CU	Actual Irrigation	Permitted Irrigation	Hydrologic Unit	Annual CU	Actual Irrigation	Permitted Irrigation
	1000s ac-ft	1000s acres	1000s acres		1000s ac-ft	1000s acres	1000s acres
16040201	2.244	0.992	1.256	17070102	33.448	15.045	20.184
16040205	0.395	0.256	0.509	17070103	161.444	72.303	97.18
17050103	81.785	36.149	45.783	17070104	30.484	13.131	19.028
17050107	7.138	3.155	3.996	17070105	77.488	29.211	45.402
17050108	56.436	24.944	31.593	17070201	38.549	23.801	48.594
17050109	5.055	2.234	2.83	17070202	10.558	6.203	12.034
17050110	48.174	21.293	26.968	17070203	3.256	2.031	4.17
17050115	106.117	46.903	59.404	17070204	20.178	10.615	19.132
17050116	33.931	18.502	31.483	17070301	52.391	31.014	46.042
17050117	89.431	39.54	50.086	17070302	4.179	2.634	3.002
17050118	40.74	18.007	22.806	17070303	24.057	12.825	16.352
17050119	68.586	30.316	38.399	17070304	40.657	21.536	26.792
17050201	36.435	18.054	25.639	17070305	120.863	66.337	83.417
17050202	47.762	24.838	27.5	17070306	89.794	46.444	52.39
17050203	190.979	101.481	151.999	17070307	25.535	14.624	15.531
17060101	0.115	0.071	0.082	17080001	0.698	0.457	1.221
17060102	4.323	2.671	3.076	17080003	1.788	1.065	3.452
17060103	0.09	0.056	0.064	17080006	0.363	0.422	0.433
17060104	70.166	42.091	66.877	17090001	1.46	2.069	2.579
17060105	76.448	47.244	54.401	17090002	3.888	4.99	6.867
17060106	1.596	0.986	1.135	17090003	37.368	32.389	64.687
17070101	167.71	71.657	98.341	17090004	8.511	8.876	15.035

Survey, which reports water use in the state every five years (Broad and Collins, 1996). The number of irrigated acres and total annual consumptive use are tabulated for areas, called hydrologic units, delineated by the USGS (See Figure 19). The number of irrigated acres is based on a combination of the 1987 Census of Agriculture, 1990 crop statistics provided by the Cooperative Extension Office at Oregon State University, and the 1989 - 90 Oregon Agriculture and Fisheries statistics.

Table 28 - Continued. Acres Irrigated and Annual Consumptive Use in Oregon.

Hydrologic Unit	Annual CU	Actual Irrigation	Permitted Irrigation	Hydrologic Unit	Annual CU	Actual Irrigation	Permitted Irrigation
	1000s ac-ft	1000s acres	1000s acres		1000s ac-ft	1000s acres	1000s acres
17090005	20.377	17.858	31.291	17100306	5.752	4.194	5.882
17090006	13.111	10.043	20.265	17100307	66.406	15.027	92.419
17090007	23.072	24.085	40.438	17100308	23.261	35.026	33.595
17090008	18.156	16.047	38.549	17100309	13.79	3.967	19.336
17090009	22.268	16.802	32.768	17100310	4.04	1.062	5.364
17090010	29.492	24.188	47.555	17100311	7.881	1.695	10.976
17090011	3.965	3.35	5.465	17100312	2.222	1.34	1.853
17090012	6.846	5.181	12.81	17120001	26.822	17.372	34.565
17100201	0.314	0.551	0.373	17120002	67.904	43.639	87.392
17100202	1.185	1.322	2.065	17120003	36.566	23.683	47.121
17100203	2.473	3.594	6.822	17120004	23.633	15.307	30.452
17100204	0.525	0.517	2.742	17120005	23.025	17.561	18.073
17100205	1.569	1.656	3.074	17120006	75.391	40.9	39.782
17100206	1.797	0.866	3.175	17120007	90.183	47.857	47.366
17100207	0.254	0.119	0.449	17120008	20.284	13.067	25.198
17100301	3.502	2.064	5.792	17120009	15.423	9.809	19.236
17100302	12.77	8.113	21.115	18010201	76.029	48.519	71.806
17100303	8.345	5.707	13.797	18010202	65.6	40.867	55.442
17100304	2.332	1.756	3.655	18010203	62.018	39.578	58.573
17100305	11.038	10.407	17.283	18010204	142.894	91.072	134.189
17090005	20.377	17.858	31.291	18010206	3.637	2.18	4.258

Consumptive use is based on the number of irrigated acres by crop type, irrigation method, and an Oregon State University study on crop water requirements (Cuenca, 1992). Table 28 shows the consumptive use for each of the hydrologic units in Oregon as reported by the USGS (Broad, 1992 and 1993). Also shown are the actual number of acres irrigated from the census conducted by the USGS and the number of potential acres irrigated from the water rights of record.

Only rarely will a watershed of interest also be a hydrologic unit, e.g., the Sprague River at the mouth. Generally the watershed will be either

larger than a single hydrologic unit, e.g., the Willamette River at the mouth, or more often, smaller than and contained within a hydrologic unit, e.g., South Fork John Day River at the mouth.

Where the watershed is larger than a hydrologic unit, the annual consumptive uses from the hydrologic units within the watershed must be combined to get the consumptive use for the watershed. Where the watershed is smaller than a hydrologic unit, the consumptive use for the watershed is a fraction of the consumptive use for the hydrologic unit.

To calculate this fraction, the number of acres *permitted* to be irrigated is determined for both the watershed and the hydrologic unit. The fraction is found by dividing the number of acres for the watershed by the number of acres for the hydrologic unit. Multiplying this fraction by the annual water consumption in the hydrologic unit gives an estimate of the annual water consumption for the watershed.

Occasionally, water for irrigation is diverted from one watershed to another. Where this is the case, the diversion, not the evaporative or transpirative loss, is the consumptive use for the watershed where the diversion occurs. Many times the diversion is measured, and if this is the case, the average measured diversion is the consumptive use. Where the diversion is not measured, the annual diversion, and in this case, the consumptive use, is estimated by multiplying the allowed *duty* of the diversion by the number of acres to be irrigated. The allowed duty and irrigation season for various streams in the state are given in Appendix E.

Because the water consumption is calculated on a monthly basis, the annual value obtained from the USGS must be distributed over the course of the growing season. Tables 29 and 30 show the distributions used in the Water Availability analysis. Distributions for Regions 1 to 27 (Figure 20) are based on crop water requirements calculated by researchers at Oregon State University (Cuenca et al, 1992). These regions are used for watersheds where there is sufficient water to meet demands year around.

In many places in eastern Oregon, stream flow is insufficient late in the year to meet crop requirements. In these cases, irrigators can only divert when water is available and usually divert water in excess of crop requirements early in the year to build soil moisture. These distributions tend to have peaks in May and June rather than July and August. A number of irrigation distributions have been defined based on actual canal diversions. Table 31 describes the regions assigned to the irrigation distribution defined by diversions. Figure 21 shows where the various irrigation distribution regions are used.

Methods that Over-Estimate Irrigation Consumptive Use

In the previous section, three methods were described for estimating irrigation consumptive use that all over-estimate the actual consumptive use. To reiterate, these methods are:

1. Multiplying the number of acres permitted to be irrigated by all water rights by the permitted duty;
2. Summing the permitted rate of diversion for all water rights; and
3. Summing the actual diversions.

In this section, the reasons why these methods are inappropriate for estimating actual irrigation consumptive use are discussed.

In the first method, actual irrigated acres may vary significantly from those permitted by the water rights and may be as little as 40 percent of that permitted (Table 32). Clearly, using permitted acres in the proposed calculation rather than actual acres will overestimate the actual consumptive use due to irrigation.

Several factors contribute to the difference between permitted and actual acres irrigated. Many growers do not exercise their rights to the fullest extent nor do they irrigate as many acres as they are permitted. Non-use due to agricultural practices such as crop rotation and leaving

Table 29. Distribution of Irrigation Consumptive Use by Month – Distribution Based on Theoretical Crop Water Requirement.

Region	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Fraction of Annual											
1	0	0	0	0.011	0.045	0.152	0.418	0.322	0.040	0.011	0	0
2	0	0	0	0.011	0.071	0.204	0.329	0.266	0.107	0.011	0	0
3	0	0	0.003	0.011	0.111	0.172	0.337	0.268	0.088	0.011	0	0
4	0	0	0.002	0.045	0.150	0.184	0.271	0.230	0.111	0.007	0	0
5	0	0	0.002	0.012	0.092	0.180	0.325	0.258	0.122	0.009	0	0
6	0	0	0.005	0.042	0.116	0.184	0.279	0.222	0.135	0.014	0.002	0
7	0	0	0.008	0.077	0.128	0.175	0.243	0.200	0.126	0.041	0.001	0
8	0	0	0.005	0.050	0.119	0.185	0.274	0.222	0.133	0.012	0	0
9	0	0	0.001	0.060	0.145	0.193	0.261	0.212	0.119	0.007	0	0
10	0	0	0.017	0.098	0.153	0.170	0.211	0.179	0.117	0.056	0	0
11	0	0	0.014	0.090	0.144	0.167	0.231	0.185	0.121	0.049	0	0
12	0	0	0.014	0.087	0.139	0.165	0.229	0.190	0.122	0.054	0	0
13	0	0	0.013	0.083	0.135	0.168	0.240	0.195	0.115	0.051	0	0
14	0	0	0.019	0.096	0.149	0.174	0.211	0.180	0.116	0.056	0	0
15	0	0	0.002	0.053	0.117	0.159	0.291	0.233	0.117	0.028	0	0
16	0	0	0	0.066	0.141	0.172	0.242	0.192	0.130	0.056	0	0
17	0	0	0	0.046	0.138	0.181	0.267	0.204	0.131	0.032	0	0
18	0	0	0	0.067	0.127	0.173	0.261	0.207	0.141	0.024	0	0
19	0	0	0	0.094	0.131	0.163	0.249	0.196	0.131	0.037	0	0
20	0	0	0	0.089	0.136	0.175	0.241	0.195	0.128	0.036	0	0
21	0	0	0	0.056	0.132	0.171	0.261	0.202	0.128	0.050	0	0
22	0	0	0.005	0.080	0.121	0.153	0.267	0.217	0.121	0.036	0	0
23	0	0	0.003	0.075	0.113	0.148	0.268	0.223	0.130	0.041	0	0
24	0	0	0.010	0.084	0.127	0.151	0.240	0.189	0.133	0.066	0	0
25	0	0	0.014	0.098	0.139	0.171	0.233	0.169	0.113	0.063	0	0
26	0	0	0.009	0.093	0.131	0.165	0.230	0.178	0.122	0.072	0	0
27	0	0	0.008	0.086	0.126	0.165	0.233	0.187	0.123	0.073	0	0

Table 30. Distribution of Irrigation Consumptive Use by Month – Distribution Based on Diversions.

Region	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Fraction of Annual											
28	0	0	0	0.050	0.325	0.375	0.175	0.05	0.025	0	0	0
29	0	0	0	0.010	0.194	0.301	0.192	0.162	0.120	0.022	0	0
30	0	0	0.005	0.175	0.535	0.160	0.070	0.03	0.015	0.010	0	0
31	0	0	0.001	0.013	0.235	0.203	0.178	0.198	0.164	0.008	0	0
33	0	0	0	0	0.127	0.319	0.303	0.197	0.054	0	0	0
34	0	0	0.028	0.127	0.361	0.289	0.086	0.042	0.042	0.025	0	0
35	0	0	0.037	0.084	0.202	0.257	0.168	0.100	0.087	0.065	0	0
39	0	0	0.022	0.056	0.202	0.225	0.162	0.125	0.115	0.093	0	0
40	0	0	0.030	0.140	0.370	0.290	0.100	0.040	0.020	0.010	0	0
42	0	0	0.105	0.174	0.206	0.156	0.127	0.093	0.074	0.066	0	0
43	0	0	0	0.054	0.159	0.201	0.223	0.189	0.137	0.038	0	0
46	0.010	0.003	0.057	0.116	0.157	0.142	0.114	0.083	0.084	0.093	0.083	0.058
48	0	0	0.030	0.140	0.330	0.250	0.110	0.080	0.050	0.010	0	0
49	0.040	0.100	0.390	0.250	0.090	0.050	0.030	0.020	0.010	0.005	0.005	0.010
54	0.041	0.040	0.028	0.058	0.113	0.152	0.156	0.149	0.144	0.057	0.035	0.025
55	0.040	0.063	0.103	0.234	0.292	0.107	0.034	0.022	0.021	0.024	0.028	0.032
56	0.068	0.074	0.086	0.125	0.146	0.117	0.068	0.058	0.060	0.064	0.064	0.069
57	0	0.001	0.039	0.109	0.153	0.175	0.187	0.164	0.129	0.042	0	0
80	0	0	0.030	0.200	0.180	0.130	0.050	0.020	0.010	0.005	0	0
81	0	0	0.075	0.100	0.120	0.130	0.110	0.080	0.050	0.010	0	0
82	0	0	0	0.165	0.330	0.255	0.125	0.070	0.030	0.020	0.005	0
83	0.010	0.005	0.025	0.060	0.170	0.190	0.190	0.180	0.085	0.055	0.025	0.015

Table 31. Descriptions for Regions Defined by Diversions.

Region	Region Description
28	Powder River tributaries, and main stem before 1967, above Thief Valley
29	Powder River main stem above Thief Valley after 1967
30	Powder River tributaries below Thief Valley
31	Powder River main stem below Thief Valley
33	Wallowa River
34	Goose and Summer Lakes + Malheur Lakes + Eastern Hood Basin
35	Upper Deschutes River
39	Some lower Deschutes River tributaries
40	Malheur River – live flow
42	Umatilla River – live Flow
43	Klamath 'A' Canal
46	Owyhee River – live flow
48	Grande Ronde River above Wallowa River
49	Willow Creek, Butter Creek
54	Little Walla Walla River, Hudson Bay Canal, Pleasant View Canal
55	Sycan River below Sycan Marsh (11502500+11501000+11499100 + 61420210)
56	Williamson River below the Marsh (11502500+11493500)
57	Cranberry (ET) Use – South Coast
80	Bully Creek (13226500) – Correction to natural flow only
81	Grande Ronde River (13323500,13332500,13333000) – Correction to natural flow only
83	Link River (51507505) 1906-1919

fields fallow also accounts, in part, for the differences. Finally, some rights may be abandoned but not canceled.

Using duty in Method 1 also overestimates consumptive use. Duty represents the volume of water allowed to be diverted over the irrigation season. It is a good estimate of diversion, but not of consumptive use. As will be discussed under Method 3, diversions are generally more than crop requirements. Some of the water diverted in excess of the requirements returns to the stream.

The economic and agricultural reasons for the difference between the actual and permitted number of acres and the difference between

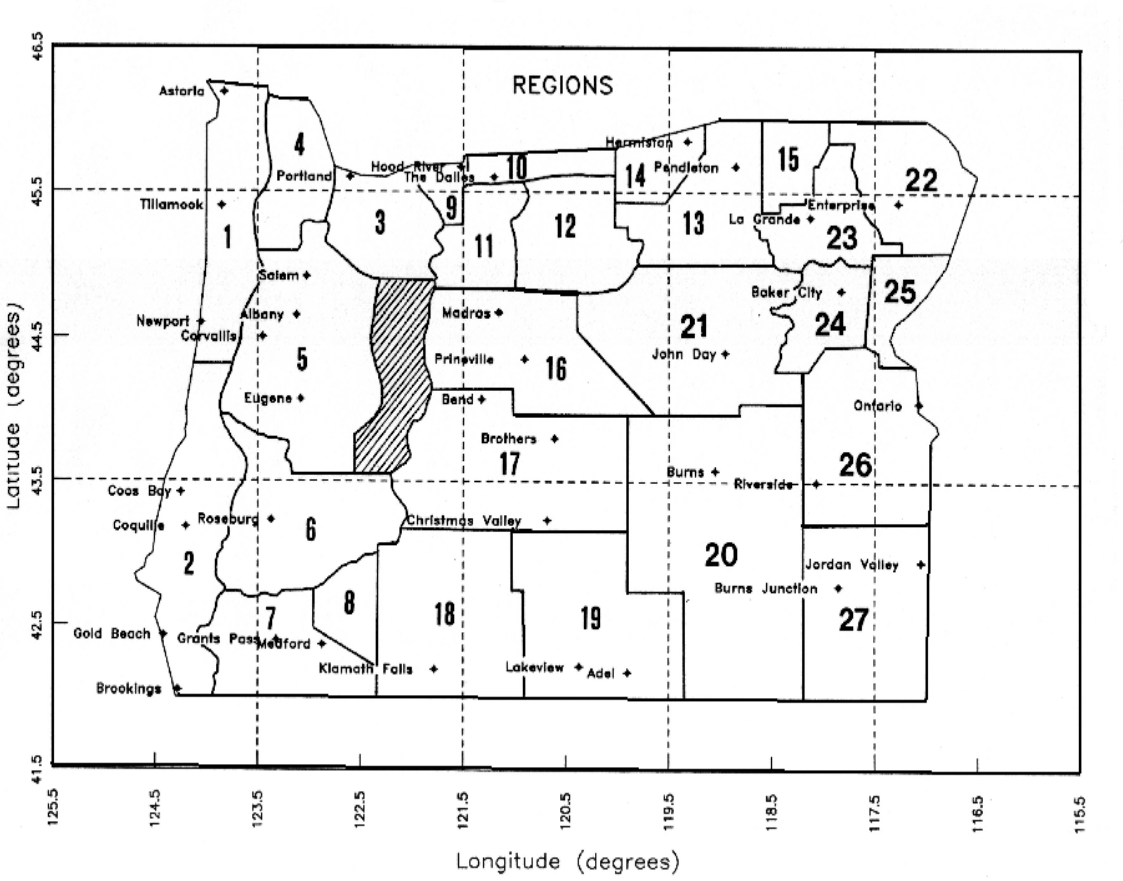

Figure 20. Irrigation Consumptive Use Regions (Cuenca, et al, 1992, p.6).

diversion and consumptive use have been consistent in the past and we assume they will continue into the future. If economic incentives (e.g., demand for winter wheat rather than alfalfa) or agricultural practice (e.g., increased use of drip irrigation) changes in the future, our assumption will need to be revisited.

In Method 2, basing irrigation consumption on the maximum allowed diversion rate would be a gross overestimation of the consumptive use from irrigation and of the total diversion. Irrigation is limited by rate *and* duty. Duty is more restrictive than rate and growers divert at their maximum rate only intermittently[12]. A grower diverting at the maximum rate continuously would either drown the crop, which is not a beneficial use, or be illegally watering lands other than those intended. In either case, the grower would run out of duty before the irrigation season ended.

[12] Occasionally, there are exceptions to this argument. Sometimes an irrigator cannot divert at what would ordinarily be the allowed rate because of infrastructure limitations. During final proof, the rate specified in the permit is reduced to that of the *possible* diversion. In some of these cases, the rate may be more limiting than the duty.

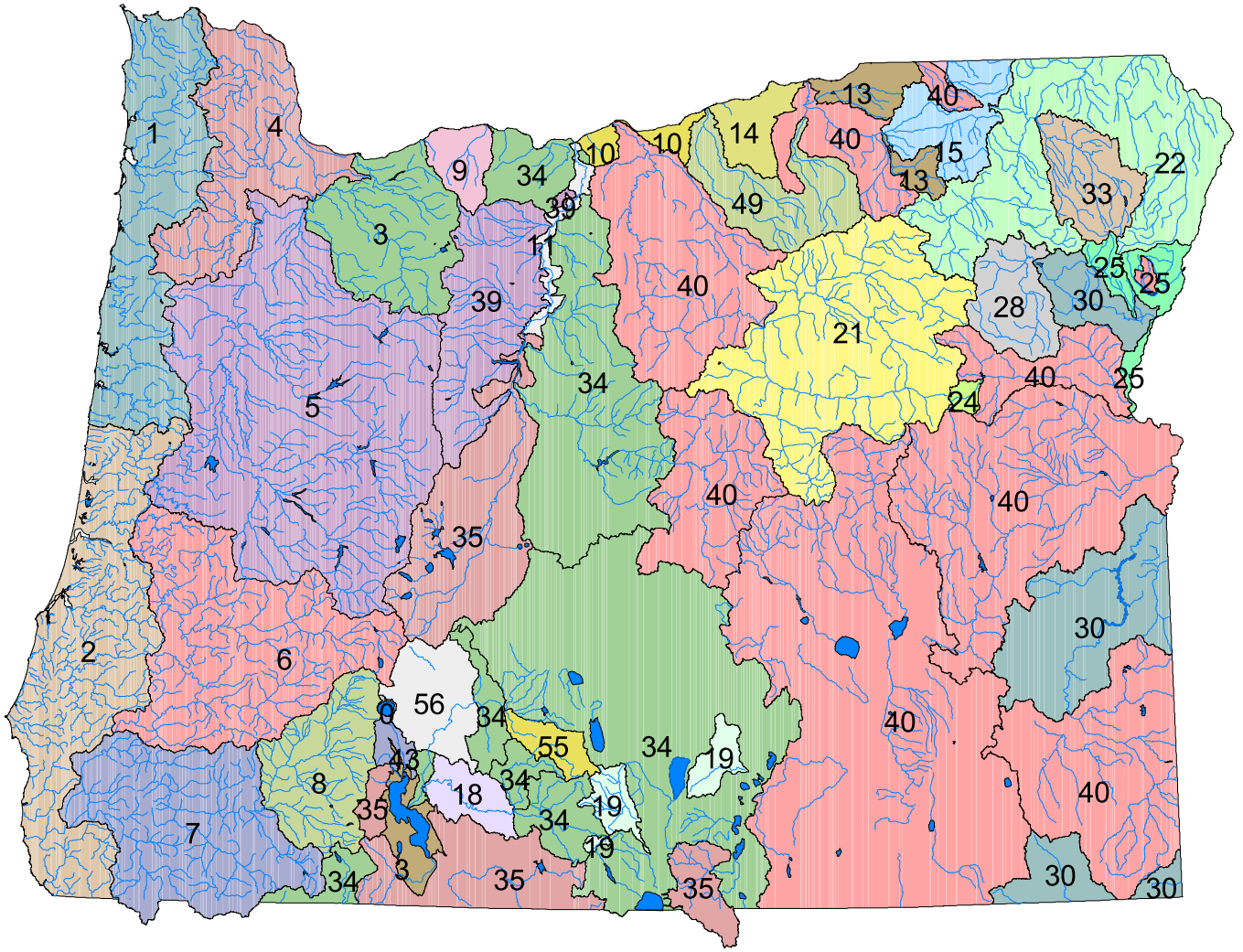

Figure 21. Irrigation Distribution Regions as Defined and Used by OWRD.

Table 32. Comparison of Acres Irrigated By Water Right and by Census.

HUC	Stream	Acres by Water Right (OWRD)	Acres by Census (USGS)	Percent of Allowed Acres Irrigated
17050203	Powder R	152,000	101,000	66.5
17070103	Umatilla R	97,180	72,300	74.4
17100203	Nehalem R	6,870	3,610	52.5
17100302	S Umpqua R	21,000	8,050	38.3
17100305	Coquille R	17,300	10,100	58.4
17100309	Applegate R	20,000	8,060	40.3
17120002	Silvies R	87,400	43,600	49.9

Table 33 shows the effect of a grower diverting at the maximum rate continuously from the beginning of the irrigation season for selected streams.

Finally for Method 3, in standard agricultural practice, more water is diverted than can be used consumptively by the crop. There are two reasons for this. First, most conveyances leak. In eastern Oregon, losses due to leakage from conveyance systems (e.g., canals and pipes) average 19 percent. West of the Cascades, the losses average only 8 percent (Broad and Collins, 1996).

The larger losses in eastern Oregon are due to more numerous and longer conveyances and to geology, not to poor practice on the part of irrigators. For example, in the Bend area, many miles of canal are cut through blocky and highly fractured basaltic lava. Losses from these ditches average 46 percent of water diverted (Gannet, 2000).

Second, irrigation methods are not 100 percent efficient. Not all of the water applied is used consumptively by the crop. Flood irrigation is about 45 percent efficient and spray irrigation is about 65 – 85 percent efficient (Broad and Collins, 1996).

Note that to the extent our assumption that all non-consumed water is returned to the stream, flood irrigation does not impact the resource more than does sprinkler irrigation. In fact, sprinkler irrigation may have more impact on the resource because of higher evaporation rates. Some of the sprinkler-applied water is lost to evaporation from the water surface even before it reaches the soil. This water is considered part of the consumptive use because it is lost to the stream even though it is not used by the plants.

Other applied water passes through the root zone without being absorbed by the plants. Most of this water returns to the stream, but some is lost to deep ground water. The part lost to deep groundwater is considered part of the consumptive use. Generally, the loss to deep groundwater is negligible.

In some areas, such as the upper Deschutes basin, all the water passing through the root zone without being absorbed goes to the regional groundwater system. For the upper Deschutes, this water is considered entirely consumed[13].

[13] In fact, this water is not lost to the Deschutes River. It eventually returns to the river many miles downstream near and in Lake Billy Chinook (Gannet et al, 2000).

Table 33. Effects of Continuous Use of an Irrigation Right on the Duration of Irrigation.

River System	Rate cfs/acre	Duty ac-ft/acre	Number of Days to Depletion of Duty	Last Day of Irrigation
Nestucca	1/80	2.5	100	Jul 9
Willamette	1/80	2.5	100	Jul 9
Rogue	1/40 - 1/80	3.5 - 4.5	88 - 182	Jun 27 - Sep 29
Coquille	1/80	2.5	100	Jul 9
John Day	1/40	5	100	Jul 9
Malheur	1/20 - 1/40	3	30 – 60	N/A

In some cases, over-irrigation is required by good practice. In low rainfall areas, where irrigation water has a relatively high concentration of salts, excess water may be needed to carry the salts through the root zone and away from the crop.

Few growers deliberately waste water. However, differences in soils, topography, weather, root density, and plant vigor, make knowing the right amount of water to apply everywhere difficult. Even within the same field the right amount of water one place may not be the right amount in another.

Even if it were possible to know the exact amount of water to apply everywhere in a field, doing so would be extremely difficult if not impossible. Still, improvement can be made. Sprinkler irrigation, for example, is better at putting water where it is needed than flood irrigation. Drip irrigation is better still. As water becomes more scarce and valuable, it is expected that irrigation will become more efficient with respect to the resource.

Estimating Municipal Consumptive Use

Municipalities are unique among water users. Demand tends to increase over time because of population growth. In order to be certain of an uninterrupted water supply, there is a need to have an alternate source of water available in case the primary source fails or becomes contaminated. Since a certified water right is only for the amount of water being used at certification[14], a certificate cannot be expanded as the population grows, and a certificate cannot be issued for an alternate source that is not developed.

Municipalities address this problem by filing for *extensions* for their permits. An extension allows them to delay the certification of their water right. As a permit, the water right may be for more than is actually being used, and may, in fact, be for a source not used at all (Table 34).

The OWRD allows incremental perfection of water rights for municipalities. In this case, part of a permit is certified; the balance is left as a permit. In order to delay certification of the uncertified portion of the permit, the municipality must continue to extend the permit. This option is available only to municipalities.

[14] An applicant for new use of water proposes to the OWRD the amount and timing of the diversion needed to satisfy that use. If the OWRD determines that the proposed use is in the public interest and that the amount and timing of the diversion is reasonable for the given use, a conditional water right or *permit* is issued. After a period of time, the user is asked to demonstrate how much and when water is *actually* being diverted. The water right is *certified* for this actual use, up to the use specified in the permit. In going to certificate, a water right may be cut back from the use specified in the permit, but cannot be for more than described in the permit. The certificate specifies the final terms under which the user can divert water.

Table 34. Comparison of Water Rights of Record, Active Water Rights, and Actual Use.

Municipality	Water Rights of Record (cfs)	Water Rights in Use (cfs)	Current Actual Diversion (cfs)
Medford	203	203	30 - 40
Ashland	16.46	16.46	3.50 - 7.55
Canyon Creek	2.08	1.07	0.4 - 0.7
Eugene	300	273	35 - 75
Salem	449	194	15 - 45
Toledo	19.14	14.14	0.0 - 0.9

Table 35. Municipal Consumptive Use Coefficients.

	Coastal Basins	Willamette and Sandy	Rogue and Umpqua	East Side (Summer Discharge)	East Side (No Summer Discharge)
Summer	0.15	0.45	0.64	0.60	1.00
Winter	0.10	0.15	0.15	0.30	0.30

Table 36. Consumptive Use Coefficients For Minor Out-of-Stream Uses.

Use	Coefficient
Industrial	0.10
Domestic	0.20
Commercial	0.15
Livestock	0.50
Agricultural	0.50

The *expected* demands for municipal use are based on water rights currently in use. Water rights held as alternate sources are not considered in calculating expected demands. The expected demand is the consumptive part of the *active* water rights.

The *actual* consumptive use is obtained by multiplying a consumptive use coefficient by the actual diversion of the municipality. Municipalities are required to report to the OWRD the amount of their diversion annually, so these data are readily available.

Table 35 gives the consumptive use coefficients used around the state. These coefficients are based on actual municipal diversions and sewage outfalls.

Estimating Other Consumptive Uses

These uses are minor in comparison to municipal use and irrigation and generally are minor in comparison to stream flow. The calculation of the consumptive part of these uses is based on the associated water rights. Consumptive use is obtained by multiplying a consumptive use coefficient by the maximum diversion rate allowed for the water right (Table 36). Coefficients are applied to all months of the year. These coefficients are based on work done by the USGS (Solley and Merk, 1985).

The Water Availability Reporting System (WARS)

The Water Availability Database is available on-line. It may be accessed from the Department's Web site at:

https://www.oregon.gov/owrd/access_data/

Follow the link to WARS (Water Availability Reporting System). When the telnet window appears, login at the prompt with the username "wars" (in lower case). A password is not required.

Each screen presents a list of user options or a table of information. Options are numbered and are selected by typing the number of the option followed by the ENTER key. Entering "?" displays a help screen for the current menu.

When an option is entered, a new screen or prompt appears. Tables sometimes give the user numbered options to choose from, otherwise typing ENTER will exit the table. When prompted, type in the required information followed by the ENTER key.

Generally, tables may be written to a file and downloaded or printed. File are written to a pub-lic directory. As the user names the file, care should be taken to select a name he or she will readily recognize and one unlikely to be used by another user. Users writing to the same file will overwrite one another's work.

File names may be up to 60 characters in length. There is no required format though some characters are illegal. The file name will be rejected if these characters are used.

The file may be down-loaded most conveniently from the Department's internet site

https://www.oregon.gov/owrd

by clicking on **file pick up** and then on the folder **WARS**.

Alternately, from the internet browser, the file pickup directory may be accessed by entering this URL:

ftp://www.wrd.state.or.us/pub/wars/

Finally the file's directory can be accessed from the UNIX or Windows Command Line (run option):

ftp://powder.wrd.state.or.us

Login as anonymous and change directories to pub/wars.

A note of caution: the files generated by WARS are in a UNIX format. They have a new line character at the end of each line but not an end of line character. DOS and Windows require both characters. Most word processors and spreadsheets will read UNIX files without difficulty. If, however, an application will not load the file because it reports a line is too long, the file will have to be converted to the DOS format to be used by that application.

Things To Keep In Mind About Water Availability

The water availability numbers in the water availability database were calculated considering all relevant storages, out-of-stream consumptive uses, in-stream water rights, and scenic waterway flows. Water is available when the result of the water availability calculation is *positive,* that is, the sum of storage, consumptive uses, and any in-stream requirement is *less* than the natural streamflow.

Water availability is dynamic. Its status changes as new uses for water are permitted. The water availability numbers presented in the tables represent water availability today. These numbers are subject to change at any time.

In some cases, water is shown to be not available, in part, because of an in-stream water right or scenic waterway flow. If the in-stream water right or scenic waterway flow is so conditioned,

water may be available for some uses such as domestic and livestock though the tables show no water to be available.

The Water Availability Reporting System came on line in 1993. Baseline water availability was calculated at that time based on all permits, certificates, and decrees in existence on January 1, 1993. These water rights were lumped together to calculate the consumptive use associated with them. Since January 1, 1993, all water right applications reviewed by the Department are tracked individually in the database. Detailed information may be obtained about these water rights. Whether a water right is tracked individually in the database depends on when it was processed, NOT its priority date. Some tracked water rights have priority dates before 1993.

NOTE: ALL in-stream water rights and converted minimum stream flows, scenic waterway flows, reservations, and Indian treaty rights are tracked individually in the database.

Uncertainty of Water Availability Estimates

The water availability calculation provides an *estimate* of water availability. The *true* water availability and therefore the error of the estimate are unknown. The reliability of an estimate is described by the *uncertainty* of the estimate. Considering measured streamflow as an example, the true streamflow might be described as being within plus or minus 5 percent of the measured streamflow[15]. In this example, streamflow estimates (i.e., the streamflow measurements) are believed to be quite close to their true values; the uncertainty of the estimates is small.

In calculating water availability, there is uncertainty associated with both measured and calculated data. For the measured streamflows and for streamflow estimates made from the regression models, the uncertainty can be calculated. For correction of the 80-percent exceedance flows to the base period and for calculation of consumptive uses, the uncertainty is unknown. The overall uncertainty depends on how the water availability calculation is made. In general, the more directly the calculation is made from measured streamflow data, the smaller the uncertainty.

The water availability methodology is designed so that the errors, though unknown, are random. To the extent this is true, the *average* error of all the estimates is zero. The errors associated with the water availability estimates are scattered randomly about zero, half being positive errors (overestimates) and half being negative errors (underestimates).

The object of the analysis is to determine water availability based on an 80-percent exceedance standard. On *average* for all Water Availability Basins, this is true. For a basin where water availability is underestimated, the estimate reflects a stricter standard, e.g., a 90- or 95- percent exceedance standard. Where water availability is overestimated, the estimate reflects a less strict standard, e.g., a 60- or 70-percent exceedance standard.

[15] A measurement within 5 percent of the true value is considered an excellent measurement. Within 10 percent is a good measurement, within 15 percent , fair, and within 20 percent, poor.

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Appendix A

Index Gages

INDEX GAGES

GAGE NUMBER	GAGE NAME	PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
10317500	N FK HUMBOLDT R AT DEVILS GATE NR HALLECK, NV	10/1913 - 9/1982	47	Y
10327500	HUMBOLDT R AT COMUS, NV	10/1894 - 4/2001	86	Y
10329000	L HUMBOLDT R NR PARADISE VALLEY, NV	10/1921 - 3/2001	62	Y
10329500	MARTIN CR NR PARADISE VALLEY, NV	10/1921 - 4/2001	79	N
10352500	MCDERMITT CR NR MCDERMITT, NV	10/1948 - 3/2001	51	Y
10366000	TWENTYMILE CR NR ADEL, OR	3/1910 - 9/1998	63	Y
10371500	DEEP CR AB ADEL, OR	10/1922 - 9/2000	71	Y
10378500	HONEY CR NR PLUSH, OR	10/1910 - 9/1998	71	Y
10384000	CHEWAUCAN R NR PAISLEY, OR	4/1912 - 9/2000	80	Y
10393500	SILVIES R NR BURNS, OR	6/1903 - 9/1997	82	Y
10396000	DONNER UND BLITZEN R NR FRENCHGLEN, OR	4/1911 - 9/2000	70	Y
10406500	TROUT CR NR DENIO, NV	3/1911 - 9/1997	65	Y
11350500	ASH CR AT ADIN, CA	4/1904 - 5/1996	43	Y
11355500	HAT CR NR HAT CR, CA	7/1926 - 9/1994	67	Y
11367500	MCCLOUD R NR MCCLOUD, CA	4/1931 - 9/2000	69	N
11481200	LITTLE R NR TRINIDAD, CA	10/1955 - 4/2001	45	Y
11482500	REDWOOD CR AT ORICK, CA	9/1911 - 4/2001	49	Y
11493500	WILLIAMSON R NR KLAMATH AGENCY, OR	10/1954 - 9/2000	43	Y
11497500	SPRAGUE R NR BEATTY, OR	4/1912 - 9/2000	47	Y
11501000	SPRAGUE R NR CHILOQUIN, OR	3/1921 - 9/2000	79	N
11502500	WILLIAMSON R BL SPRAGUE R NR CHILOQUIN, OR	10/1917 - 9/2000	82	Y
11519500	SCOTT R NR FORT JONES, CA	10/1941 - 4/2001	59	Y
11521500	INDIAN CR NR HAPPY CAMP, CA	1/1957 - 4/2001	43	N
11522500	SALMON R AT SOMES BAR, CA	10/1911 - 4/2001	77	Y
11523200	TRINITY R AB COFFEE CR NR TRINITY CTR, CA	10/1957 - 4/2001	43	Y

INDEX GAGES				
GAGE NUMBER	GAGE NAME	PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
11532500	SMITH R NR CRESCENT CITY, CA	10/1931 - 4/2001	69	N
12010000	NASELLE R NR NASELLE, WA	6/1929 - 4/2001	71	N
12020000	CHEHALIS R NR DOTY, WA	10/1939 - 3/2001	61	N
12025000	NEWAUKUM R NR CHEHALIS, WA	3/1929 - 4/2001	59	Y
12054000	DUCKABUSH R NR BRINNON, WA	7/1938 - 2/2001	62	N
12104500	GREEN R NR LESTER, WA	10/1945 - 9/1993	46	Y
12108500	NEWAUKUM CR NR BLACK DIAMOND, WA	7/1944 - 3/2001	54	Y
12414500	ST JOE R AT CALDER, ID	5/1911 - 4/2001	81	Y
12424000	HANGMAN CR AT SPOKANE, WA	4/1948 - 9/2000	51	Y
12452800	ENTIAT R NR ARDENVOIR, WA	9/1957 - 9/2000	43	N
12467000	CRAB CR NR MOSES LAKE, WA	10/1942 - 9/2000	58	N
12470500	ROCKY FORD CR NR EPHRATA, WA	8/1942 - 10/1991	49	N
12488500	AMERICAN R NR NILE, WA	4/1909 - 4/2001	61	Y
13169500	BIG JACKS CR NR BRUNEAU, ID	12/1938 - 3/2001	44	Y
13168500	BRUNEAU R NR HOT SPRING, ID	7/1909 - 1/2001	62	Y
13185000	BOISE R NR TWIN SPRINGS, ID	4/1911 - 4/2001	89	Y
13186000	S FK BOISE R NR FEATHERVILLE, ID	5/1945 - 4/2001	55	Y
13200000	MORES CR AB ROBIE CR NR ARROWROCK DAM, ID	10/1950 - 4/2001	50	Y
13214000	MALHEUR R NR DREWSEY, OR	10/1926 - 9/1998	72	N
13216500	N FK MALHEUR R AB BEULAH RES NR BEULAH, OR	1/1914 - 9/1998	62	Y
13288200	EAGLE CR AB SC NR NEW BRIDGE, OR	10/1957 - 12/1997	40	N
13292000	IMNAHA R AT IMNAHA, OR	10/1928 - 9/2000	72	N
13319000	GRANDE RONDE R AT LA GRANDE, OR	10/1903 - 9/1989	80	Y
13320000	CATHERINE CR NR UNION, OR	8/1911 - 9/1996	73	Y
13325001	E FK WALLOWA R + PP TAILRACE NR JPSEPH, OR	10/1924 - 9/1983	59	N

INDEX GAGES				
GAGE NUMBER	GAGE NAME	PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
13330000	LOSTINE R NR LOSTINE, OR	9/1912 - 9/2000	72	Y
13330500	BEAR CR NR WALLOWA, OR	4/1915 - 9/2000	66	Y
13332500	GRANDE RONDE R AT RONDOWA, OR	10/1926 - 9/1991	65	N
13333000	GRANDE RONDE R AT TROY, OR	10/1944 - 9/2000	56	N
13235000	S FK PAYETTE R AT LOWMAN, ID	6/1941 - 4/2001	59	Y
13336500	SELWAY R NR LOWELL, ID	4/1911 - 4/2001	71	Y
13337000	LOCHSA R NR LOWELL, ID	10/1910 - 4/2001	73	Y
13344500	TUCANNON R NR STARBUCK, WA	10/1914 - 4/2001	41	Y
13351000	PALOUSE R AT HOOPER, WA	10/1897 - 9/2000	62	Y
14010000	S FK WALLA WALLA R NR MILTON, OR	2/1903 - 10/1991	69	Y
14013000	MILL CR NR WALLA WALLA, WA	10/1913 - 4/2001	62	Y
14020000	UMATILLA R AB MEACHAM CR NR GIBBON, OR	4/1933 - 9/2000	67	N
14021000	UMATILLA R AT PENDLETON, OR	11/1903 - 9/1991	56	Y
14022500	MCKAY CR NR PILOT ROCK, OR	5/1921 - 9/1989	61	Y
14032000	BUTTER CR NR PINE CITY, OR	1/1926 - 9/1991	59	Y
14034500	WILLOW CR AT HEPPNER, OR	10/1951 - 9/2000	49	N
14034800	RHEA CR NR HEPPNER, OR	10/1960 - 9/1991	31	N
14037500	STRAWBERRY CR AB SLIDE CR NR PRAIRIE CITY, OR	4/1925 - 9/1997	68	Y
14040500	JOHN DAY R AT PICTURE GORGE, NR DAYVILLE, OR	10/1926 - 9/1998	72	N
14042500	CAMAS CR NR UKIAH, OR	5/1914 - 9/1998	62	Y
14044000	M FK JOHN DAY R AT RITTER, OR	10/1929 - 9/2000	71	N
14046000	N FK JOHN DAY R AT MONUMENT, OR	3/1925 - 9/2000	73	Y
14046500	JOHN DAY R AT SERVICE CR, OR	3/1925 - 9/2000	72	Y
14048000	JOHN DAY R AT MCDONALD FERRY, OR	12/1904 - 9/2000	94	Y
13330000	LOSTINE R NR LOSTINE, OR	9/1912 - 9/2000	72	Y

INDEX GAGES

GAGE NUMBER	GAGE NAME	PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14050000	DESCHUTES R BL SNOW CR NR LA PINE, OR	10/1937 - 9/1997	60	N
14050500	CULTUS R AB CULTUS CR NR LA PINE, OR	10/1922 - 9/1997	63	Y
14051000	CULTUS CR AB CRANE PRAIRIE RES NR LA PINE, OR	3/1924 - 9/1997	60	Y
14052000	DEER CR AB CRANE PRAIRIE RES NR LA PINE, OR	4/1924 - 9/1997	60	Y
14054500	BROWN CR NR LA PINE, OR	7/1922 - 9/1997	62	Y
14057500	FALL R NR LA PINE, OR	7/1938 - 9/1997	59	N
14073001	TUMALO CR + COLUMBIA SOUTHERN CN NR TUMALO, OR	10/1923 - 9/1987	64	N
14075000	SQUAW CR NR SISTERS, OR	7/1906 - 9/1997	85	Y
14078000	BEAVER CR NR PAULINA, OR	10/1942 - 9/1985	43	N
14088000	LAKE CR NR SISTERS, OR	7/1917 - 9/1997	79	Y
14091500	METOLIUS R NR GRANDVIEW, OR	3/1912 - 9/2000	80	Y
14101500	WHITE R BL TYGH VALLEY, OR	10/1917 - 9/1990	73	N
14113000	KLICKITAT R NR PITT, WA	7/1909 - 4/2001	66	Y
14118500	W FK HOOD R NR DEE, OR	10/1932 - 9/1999	67	N
14123500	WHITE SALMON R NR UNDERWOOD, WA	11/1912 - 9/1999	79	Y
14134000	SALMON R NR GOVERNMENT CAMP, OR	6/1910 - 9/1995	70	Y
14137000	SANDY R NR MARMOT, OR	9/1911 - 9/2000	87	Y
14141500	LITTLE SANDY R NR BULL RUN, OR	5/1911 - 9/2000	81	Y
14144800	M FK WILLAMETTE R NR OAKRIDGE, OR	10/1958 - 9/1997	39	N
14146500	SALMON CR NR OAKRIDGE, OR	2/1913 - 6/1994	65	Y
14147500	N FK OF M FK WILLAMETTE R NR OAKRIDGE, OR	10/1909 - 9/1994	64	Y
14152500	COAST FK WILLAMETTE R AT LONDON, OR	10/1935 -10/1987	52	N
14154500	ROW R AB PITCHER CR NR DORENA, OR	10/1935 - 9/2000	65	N
14158500	MCKENZIE R AT OUTLET OF CLEAR LAKE, OR	10/1912 - 9/2000	56	Y
14158790	SMITH R AB SMITH R RES NR BELKNAP SPRINGS, OR	10/1960 - 9/2000	40	N

INDEX GAGES				
GAGE NUMBER	GAGE NAME	PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14166500	LONG TOM R NR NOTI, OR	10/1935 - 9/2000	65	N
14167000	COYOTE CR NR CROW, OR	7/1940 - 9/1987	47	N
14171000	MARYS R NR PHILOMATH, OR	10/1940 - 9/2000	45	Y
14172000	CALAPOOIA R AT HOLLEY, OR	10/1935 - 11/1990	55	N
14178000	N SANTIAM R BL BOULDER CR NR DETROIT, OR	1/1907 - 9/2000	74	Y
14179000	BREITENBUSH R AB FRENCH CR NR DETROIT, OR	6/1932 - 9/2000	57	Y
14182500	LITTLE N SANTIAM R NR MEHAMA, OR	10/1931 - 9/2000	69	N
14185000	S SANTIAM R BL CASCADIA, OR	9/1935 - 9/2000	65	N
14190500	LUCKIAMUTE R NR SUVER, OR	8/1905 - 9/2000	66	Y
14192500	S YAMHILL R NR WILLAMINA, OR	5/1934 - 9/1995	61	N
14193000	WILLAMINA CR NR WILLAMINA, OR	6/1934 - 9/1995	61	N
14194000	S YAMHILL R NR WHITESON, OR	7/1940 - 9/1994	54	N
14194300	N YAMHILL R NR FAIRDALE, OR	10/1958 - 9/1995	35	Y
14198500	MOLALLA R AB PC NR WILHOIT, OR	10/1935 - 9/1993	58	N
14209500	CLACKAMAS R AB THREE LYNX CR, OR	4/1909 - 9/2000	83	Y
14211500	JOHNSON CR AT SYCAMORE, OR	10/1940 - 9/2000	60	N
14222500	E FK LEWIS R NR HEISSON, WA	10/1929 - 4/2001	60	Y
14301000	NEHALEM R NR FOSS, OR	10/1939 - 9/2000	61	N
14301500	WILSON R NR TILLAMOOK, OR	10/1914 - 9/2000	70	Y
14305500	SILETZ R AT SILETZ, OR	10/1905 - 9/2000	79	Y
14306100	N FK ALSEA R AT ALSEA, OR	10/1931 - 9/1989	32	Y
14306500	ALSEA R NR TIDEWATER, OR	10/1939 - 9/2000	61	N
14307700	JACKSON CR NR TILLER, OR	10/1955 - 9/1986	31	N
14308000	S UMPQUA R AT TILLER, OR	10/1910 - 9/2000	62	Y
14309000	COW CR NR AZALEA, OR	4/1926 - 9/2000	70	Y

INDEX GAGES				
GAGE NUMBER	GAGE NAME	PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14309500	W FK COW CR NR GLENDALE, OR	10/1955 - 9/2000	45	N
14310000	COW CR NR RIDDLE, OR	3/1926 - 9/2000	48	Y
14311000	N MYRTLE CR NR MYRTLE CR, OR	10/1955 - 11/1986	31	N
14311200	OLALLA CR NR TENMILE, OR	10/1956 - 9/1992	33	Y
14316500	N UMPQUA R AB COPELAND CR NR TOKETEE FALLS, OR	9/1949 - 9/2000	51	N
14316700	STEAMBOAT CR NR GLIDE, OR	10/1956 - 9/2000	44	N
14318000	LITTLE R AT PEEL, OR	10/1954 - 9/2000	36	Y
14319500	N UMPQUA R AT WINCHESTER, OR	10/1908 - 9/2000	57	Y
14321000	UMPQUA R NR ELKTON, OR	10/1905 - 9/2000	95	N
14325000	S FK COQUILLE R AT POWERS, OR	10/1916 - 9/2000	81	Y
14328000	ROGUE R AB PROSPECT, OR	1/1908 - 9/1998	77	Y
14335200	S FK BIG BUTTE CR AB WILLOW CR NR B FLS, OR	5/1935 - 9/2000	61	Y
14335500	S FK BIG BUTTE CR NR BUTTE FALLS, OR	10/1910 - 9/1996	74	Y
14338000	ELK CR NR TRAIL, OR	11/1945 - 9/2000	54	N
14371500	GRAVE CR AT PEASE BRIDGE NR PLACER, OR	4/1940 - 10/1989	47	Y
14372500	E FK ILLINOIS R NR TAKILMA, OR	3/1926 - 9/1996	59	Y
14375500	W FK ILLINOIS R BL ROCK CR NR OBRIEN, OR	10/1954 -10/1985	31	N
14377100	ILLINOIS R NR KERBY, OR	10/1961 - 9/2000	39	N

Appendix B

Short Record Gages

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
10370000	CAMAS CR NR LAKEVIEW, OR	10/1912 - 9/1973	25	Y
10371000	DRAKE CR NR ADEL, OR	3/1915 - 9/1973	22	Y
10374500	DEEP CR AT ADEL, OR	5/1909 - 12/1922	4	Y
10382550	CHEWAUCAN R NR BUCK MTN, NR PAISLEY, OR	10/1982 - 11/1986	4	N
10382600	CHEWAUCAN R BL COFFEEPOT CR NR PAISLEY, OR	10/1982 - 11/1986	4	N
10386000	CHEWAUCAN R AT NARROWS, NR PAISLEY, OR	1/1914 - 9/1921	5	Y
10386500	CHEWAUCAN R AT HOTCHKISS FORK, NR PAISLEY, OR	2/1914 - 9/1920	5	Y
10390550	BRIDGE CR AT SPAHR RANCH, NR SILVER LAKE, OR	11/1970 - 10/1978	7	N
10395600	ROCK CR NR BURNS	10/1963 - 9/1976	7	Y
10396500	MUD CR NR DIAMOND, OR	10/1910 - 7/1930	0	Y
10397000	BRIDGE CR NR FRENCHGLEN, OR	4/1911 - 9/1970	36	Y
10400000	MCCOY CR NR DIAMOND, OR	5/1910 - 7/1941	3	Y
10401500	DONNER UND BLITZEN R NR VOLTAGE, OR	11/1937 - 11/1977	10	Y
10402800	CLAW CR NR RILEY, OR	1/1967 - 11/1978	11	Y
10403000	SILVER CR NR RILEY, OR	10/1951 - 10/1980	29	Y
10406310	WILDHORSE CR NR ANDREWS, OR	10/1950 - 9/1953	3	N
11337900	DRY CR NR LAKEVIEW, OR	11/1945 - 9/1951	5	N
11339500	DREWS CR NR LAKEVIEW, OR	1/1909 - 11/1912	2	Y
11339995	COTTONWOOD CR AB COTTONWOOD RES NR LAKEVIEW, OR	10/1980 - 9/2000	18	Y
11340500	COTTONWOOD CR NR LAKEVIEW, OR	11/1908 - 9/1998	74	Y
11340900	THOMAS CR BL COX FLAT NR LAKEVIEW, OR	9/1976 - 9/1988	12	N
11340950	THOMAS CR AB BARNES SPRING NR LAKEVIEW, OR	10/1945 - 9/1958	12	N
11341000	THOMAS CR NR LAKEVIEW, OR	3/1927 - 9/1931	4	N
11341050	COX CR BL SALT CR NR LAKEVIEW, OR	10/1976 - 9/1988	12	N
11341111	COX CR NR LAKEVIEW, OR	10/1945 - 9/1951	5	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
11341112	BAUERS CR NR LAKEVIEW, OR	10/1945 - 9/1951	5	N
11341120	CAMP CR NR LAKEVIEW, OR	11/1945 - 9/1949	3	N
11341125	AUGER CR NR LAKEVIEW, OR	11/1945 - 9/1949	3	N
11483500	MILLER CR AT GERBER RESERVOIR, NR LORELLA, OR	8/1904 - 12/1908	4	N
11484000	MILLER CR NR LORELLA, OR	1/1909 - 9/1918	3	Y
11491400	WILLIAMSON R BL SHEEP CR, NR LENZ, OR	10/1973 - 9/2000	27	N
11492100	WILLAIMSON R AT MILITARY CROSSING, NR LENZ, OR	10/1993 - 9/1995	0	Y
11492400	BIG SPRINGS CR BL LENZ CR, NR LENZ, OR	5/1992 - 10/1995	3	N
11494000	WILLAIMSON R AB SPRING CR, NR KLAMATH AGENCY, OR	5/1912 - 9/1925	4	Y
11494500	WILLAIMSON R AT CHILOQUIN, OR	8/1911 - 9/1917	4	Y
11498500	LONG CR NR SILVER LAKE, OR	5/1918 - 9/1957	0	Y
11499000	SYCAN R NR BEATTY, OR	4/1917 - 9/1925	8	N
11499100	SYCAN R BL SNAKE CR, NR BEATTY, OR	10/1973 - 9/2000	27	N
11503000	ANNIE SPRINGS NR CRATER LAKE, OR	6/1977 - 9/2000	23	N
11504000	WOOD R AT FORT KLAMATH, OR	10/1913 - 9/1936	18	Y
11504100	WOOD R NR FORT KLAMATH, OR	10/1964 - 9/1967	3	N
11504200	CROOKED CR NR FORT KLAMATH, OR	10/1964 - 9/1967	3	N
11505700	VARNEY CR NR ROCKY POINT, OR	10/1964 - 9/1967	3	N
11507500	LINK R AT KLAMATH FALLS, OR	5/1904 - 3/1919	14	N
11509500	KLAMATH R AT KENO, OR	6/1904 - 12/1913	9	Y
11510000	SPENCER CR NR KENO, OR	7/1929 - 9/1932	0	Y
11510500	KLAMATH R AT SPENCER BRIDGE, NR KENO, OR	10/1913 - 3/1919	O	Y
11512000	FALL CR AT COPCO, CA	4/1933 - 9/1959	26	N
11513000	GRIZZLEY CR NR LILYGLEN, OR	10/1941 - 9/1953	6	Y
11513500	BEAVER CR AT PINEHURST, OR	10/1943 - 9/1948	5	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
11514500	KEENE CR NR ASHLAND, OR	4/1917 - 9/1922	0	Y
11516500	JENNY CR NR COPCO, CA	10/1922 - 9/1928	4	Y
11516600	COTTONWOOD CR AT HORNBROOK, CA	10/1964 - 11/1971	7	N
13172900	SUCCOR CR NR JORDAN VALLEY, OR	10/1965 - 9/1971	13	Y
13178000	JORDAN CR AB LONE TREE CR, NR JORDAN VALLEY, OR	10/1945 - 10/1971	23	Y
13184000	OWYHEE R AT OWYHEE, OR	3/1890 - 9/1986	25	Y
13213700	STINKINGWATER CR NR DREWSEY, OR	10/1968 - 9/1978	9	Y
13213800	COTTONWOOD CR NR DREWSEY, OR	11/1967 - 9/1991	18	Y
13215000	MALHEUR R BL WARMSPRINGS RES NR RIVERSIDE, OR	1/1909 - 7/1917	1	Y
13217500	N FK MALHEUR AT BEULAH, OR	6/1926 - 9/2000	74	Y
13219000	MALHEUR R NR NAMORF, OR	6/1913 - 10/1919	6	N
13226500	BULLY CR AT WARMSPRINGS NR VALE, OR	10/1963 - 6/1986	22	N
13227000	BULLY CR NR VALE, OR	10/1933 - 4/1965	26	Y
13228000	MALHEUR R AT VALE, OR	3/1890 - 9/1919	10	Y
13269300	N FK BURNT R NR WHITNEY, OR	6/1964 - 6/1980	13	Y
13270800	S FK BURNT R AB BARNEY CR, NR UNITY, OR	3/1963 - 9/1999	18	Y
13271600	S FK BURNT R AB WHITED RES, NR UNITY, OR	5/1951 - 9/1955	2	Y
13273000	BURNT R NR HEREFORD, OR	3/1915 - 1/1938	9	Y
13274000	BURNT R AT BRIDGEPORT, OR	3/1915 - 11/1935	2	Y
13275000	BURNT R AT HUNTINGTON, OR	10/1928 - 9/1932	4	N
13275100	POWDER R AB PHILLIPS LAKE NR SUMPTER, OR	10/1967 - 9/1980	12	Y
13275105	POWDER R AT HUDSPETH LANE NR SUMPTER, OR	7/1980 - 9/1999	19	N
13275200	DEER CR AB PHILLIPS LAKE NR SUMPTER, OR	10/1967 - 9/1991	23	Y
13275500	POWDER R NR BAKER, OR	1/1904 - 9/1967	48	Y
13281200	ROCK CR NR HAINES, OR	6/1976 - 8/1999	20	Y

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
13281500	POWDER R NR HAINES, OR	10/1946 - 9/1953	7	N
13282400	ANTHONY CR BL N FK NR N POWDER, OR	12/1962 - 9/1978	15	N
13283600	WOLF CR AB WOLF CR RES NR N POWDER, OR	3/1973 - 9/1990	17	N
13285900	BIG CR BL BURN CR NR MEDICAL SPRINGS, OR	12/1962 - 9/1979	16	N
13287200	W EAGLE CR BL JIM CR NR BAKER, OR	10/1967 - 9/1986	17	Y
13289500	POWDER R NR ROBINETTE, OR	10/1928 - 9/1932	4	N
13290190	PINE CR NR OXBOW, OR	11/1966 - 7/1996	28	N
13291000	IMNAHA R AB GUMBOOT CR, OR	10/1944 - 9/1953	9	N
13318500	GRANDE RONDE R NR HILGARD, OR	3/1937 - 9/1956	19	N
13318800	GRANDE RONDE R AT HILGARD, OR	10/1966 - 11/1981	15	Y
13323500	GRANDE RONDE R NR ELGIN, OR	10/1955 - 10/1981	26	Y
13323600	INDIAN CR NR IMBLER, OR	3/1938 - 9/1950	12	N
13323700	N FK CLARKS CR NR ELGIN, OR	12/1965 - 9/1983	13	Y
13324300	LOOKINGGLASS CR NR LOOKING GLASS, OR	10/1982 - 9/2000	18	N
13325500	WALLOWA R AB WALLOWA LAKE NR JOSEPH, OR	2/1924 - 9/1941	11	Y
13329500	HURRICANE CR NR JOSEPH, OR	5/1915 - 9/1978	54	Y
13331400	LITTLE MINAM R NR COVE, OR	6/1938 - 9/1943	3	Y
13331500	MINAM R AT MINAM, OR	6/1912 - 9/2000	36	Y
14010500	S FK WALLA WALLA R BELOW PP&L PLANT, NR MILTON,OR	10/1903 - 9/1945	17	Y
14010800	N FK WALLA WALLA R NR MILTON FREEWATER, OR	10/1969 - 10/1991	22	N
14011000	N FK WALLA WALLA R NR MILTON, OR	1/1930 - 10/1969	39	N
14011800	COUSE CR NR MILTON -FREEWATER, OR	11/1964 - 12/1978	12	Y
14016200	PINE CR NR WESTON, OR	10/1964 - 9/1985	17	Y
14016300	DRY CR AB LITTLE DRY CR NR WESTON, OR	10/1965 - 9/1974	8	Y
14016350	SWARTZ CR NR UMPINE, OR	4/1975 - 1/1984	8	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14020300	MEACHAM CR AT GIBBON, OR	8/1975 - 9/2000	25	N
14020700	UMATILLA R NR CAYUSE, OR	10/1968 - 9/1975	7	N
14020900	WILDHORSE CR NR ATHENA, OR	10/1966 - 9/1978	12	N
14022000	UMATILLA R AB MCKAY CR, NR PENDLETON, OR	10/1923 - 9/1934	11	N
14022200	N FK MCKAY CR NR PILOT ROCK, OR	5/1973 - 9/2000	27	N
14023500	MCKAY CR NR PENDLETON. OR	11/1918 - 9/1927	7	Y
14024200	E BIRCH CR NR PILOT ROCK, OR	10/1967 - 6/1973	5	N
14025000	BIRCH CR AT RIETH, OR	5/1921 - 9/1976	47	Y
14020600	UMATILLA R AT YOAKUM, OR	10/1903 - 11/1927	24	N
14032050	BUTTER CR AT FOLEYS BRIDGE, NR ECHO, OR	3/1937 - 9/1948	8	Y
14033500	UMATILLA R NE UMATILLA, OR	11/1903 - 11/1927	24	N
14034470	WILLOW CR AB WILLOW CR LAKE, NR HEPPNER, OR	10/1982 - 9/2000	18	N
14034480	BALM FK NR HEPPNER, OR	5/1982 - 9/2000	18	N
14034900	RHEA CR NR IONE, OR	10/1971 - 12/1978	7	Y
14036000	WILLOW CR NR ARLINGTON, OR	10/1960 - 9/1979	19	N
14038501	JOHN DAY R + PC POWER CN AT PRARIE CITY, OR	10/1925 - 9/1953	28	N
14038530	JOHN DAY R NR JOHN DAY, OR	10/1968 - 9/2000	30	Y
14038602	CANYON CR NR CANYON CITY, OR	10/1980 - 9/1991	11	N
14039500	S FK JOHN DAY R NR DAYVILLE, OR	10/1986 - 9/1991	5	N
14040600	MOUNTAIN CR NR MITCHELL, OR	5/1966 - 10/1991	25	N
14041000	DESOLATION CR NR DALE, OR	10/1949 - 9/1958	9	N
14041500	N FK JOHN DAY R NR DALE, OR	10/1929 - 9/1958	29	N
14042000	CAMAS CR NR LEHMAN, OR	10/1950 - 10/1970	20	Y
14043560	SNIPE CR NR UKIAH, OR	10/1967 - 9/1973	6	N
14044500	FOX CR AT GORGE NR FOX, OR	10/1930 - 9/1958	28	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14046778	BRIDGE CR AB COYOTE CANYON, NR MITCHELL, OR	11/1989 -9/1993	3	N
14047100	BUTTE CR NR FOSSIL, OR	7/1972 - 9/1991	19	N
14047380	LONE ROCK CR NR LONEROCK, OR	1/1966 - 9/1991	24	Y
14047390	ROCK CR AB WHYTE PARK NR CONDON, OR	9/1975 - 9/1989	14	Y
14047400	ROCK CR AB CAYUSE CAN NR CONDON, OR	4/1965 - 9/1981	16	N
14051000	CULTUS CR AB CRANE PRAIRIE RES NR LA PINE, OR	3/1924 - 9/1997	60	Y
14055500	ODELL CR NR CRESCENT, OR	6/1913 - 9/1976	43	Y
14055600	ODELL CR NR LA PINE, OR	10/1969 - 9/1997	27	Y
14057000	DESCHUTES R AT PRINGLE FALLS, NR LA PINE, OR	10/1915 - 9/1917	2	N
14059000	LITTLE DESCHUTES R AT CRESCENT, OR	1/1905 - 9/1914	3	Y
14060000	CRESCENT CR AT CRESCENT LAKE NR CRESCENT, OR	1/1912 - 9/1991	63	Y
14061000	BIG MARSH CR HOEY RANCH NR CRESCENT, OR	4/1912 - 9/1958	30	Y
14063300	PAULINA CR NR LAPINE, OR	10/1982 - 10/1995	11	Y
14063850	SPRING R NR LA PINE, OR	7/1938 - 9/1942	4	Y
14070700	BRIDGE CR NR BEND, OR	8/1980 - 1/1986	5	Y
14074600	THREE CR BL SNOW CR CN NR SISTERS, OR	7/1930 - 12/1978	7	Y
14074900	SNOW CR NR SISTERS, OR	10/1970 - 9/1997	26	N
14077500	N FK BEAVER CR NR PAULINA, OR	10/1942 - 9/1954	12	N
14078420	N FK CROOKED R BL LOOKOUT CR NR PAULINA, OR	11/1968 - 12/1978	9	Y
14078450	HOWARD CR NR PAULINA, OR	10/1969 - 11/1974	5	N
14078500	N FK CROOKED R AB DEEP CR, OR	10/1943 - 9/1973	15	Y
14079000	N FK CROOKED R BL DEEP CR, NR POST, OR	10/1946 - 9/1953	7	N
14079500	N FK CROOKED R NR POST, OR	10/1940 - 8/1993	25	Y
14079800	CROOKED R AB PRINEVILLE RES, NR POST, OR	10/1960 - 9/1998	12	Y
14080500	CROOKED R NR PRINEVILLE, OR	10/1941 - 10/1991	50	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14083000	OCHOCO CR AB MILL CR NR PRINEVILLE, OR	10/1917 - 7/1933	12	Y
14083500	MILL CR NR PRINEVILLE, OR	3/1916 - 7/1933	5	Y
14086000	MCKAY CR NR PRINEVILLE, OR	10/1924 - 9/1932	7	Y
14087500	CROOKED R NR CULVER, OR	10/1917 - 11/1960	43	N
14090350	JEFFERSON CR NR CAMP SHERMAN, OR	9/1983 - 9/2000	17	Y
14090400	WHITEWATER R NR CAMP SHERMAN, OR	7/1982 - 9/2000	18	N
14092150	SEEKSEEQUA CR NE WARM SPRINGS, OR	5/1987 - 9/1993	6	N
14092200	WILLOW CR NR MADRAS, OR	10/1967 - 12/1978	9	Y
14092750	SHITIKE CR AT PETERS PASTURE NR WARM SPRINGS, OR	7/1982 - 9/2000	18	N
14092885	SHITIKE CR BL WOLFORD CAN NR WARM SPRINGS, OR	10/1974 - 9/1996	22	N
14093000	SHITIKE CR NR WARM SPRINGS, OR	10/1911 - 9/2000	16	Y
14093500	DESCHUTES R AT MECCA, OR	6/1911 - 9/1922	11	N
14093600	TROUT CR BL AMITY CR NR ASHWOOD, OR	11/1965 - 9/1991	21	Y
14095500	WARM SPRINGS R NR SIMNASHO, OR	10/1949 - 9/2000	22	Y
14096300	MILL CR NR BADGER BUTTE NR WARM SPRINGS, OR	9/1983 - 9/2000	17	Y
14096850	BEAVER CR BL QUARTZ CR, NR SIMNASHO, OR	10/1983 - 9/30/2000	17	N
14097100	WARM SPRINGS R NR KAHNEETA HOT SPRINGS, OR	10/1972 - 9/2000	28	N
14097200	WHITE R NR GOVERNMENT CAMP, OR	7/1969 - 1/1982	11	Y
14103000	DESCHUTES R AT MOODY NR BIGGS, OR	10/1897 - 9/1922	18	Y
14103995	FIFTEENMILE CR AB RAMSEY CR NR DUFUR, OR	11/1926 - 12/1931	4	N
14104500	FIFTEENMILE CR NR RICE, OR	10/1946 - 9/1984	17	Y
14049000	EIGHTMILE CR NE DUFUR, OR	2/1926 - 12/1931	2	Y
14105300	EIGHTMILE CR NR THE DALLES, OR	4/1968 - 12/1973	3	Y
14105600	THREEMILE CR NR THE DALLES, OR	10/1969 - 1/1974	2	Y
14105850	S FL MILL CR NR THE DALLES, OR	10/1960 - 9/1968	8	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14113200	MOSIER CR NR MOSIER, OR	5/1963 - 10/1981	18	Y
14113400	DOG R NR PARKDALE, OR	10/1960 - 10/1971	11	Y
14118000	GREEN POINT CR BL N FK NR DEE, OR	8/1949 - 9/1954	5	Y
14120000	HOOD R AT TUCKER BRIDGE NR HOOD R, OR	10/1897 - 9/2000	40	Y
14121001	HOOD R + PP&L CONDUIT NR HOOD R, OR	4/1913 - 9/1964	51	N
14131000	LITTLE ZIGZAG R TWIN BRIDGES RHODODENDRON, OR	4/1926 - 9/1936	10	N
14131400	ZIGZAG R NR RHODODENDRON, OR	7/1981 - 9/1993	12	N
14131500	ZIGZAG R AT RHODODENDRON, OR	1/1920 - 9/1930	5	Y
14133500	SANDY R AB SALMON R AT BRIGHTWOOD, OR	5/1910 - 3/1931	8	Y
14134500	SALMON R BL LINNEY CR, OR	10/1927 - 9/1950	23	N
14135000	SALMON R AT WELCHES, OR	8/1913 - 9/1936	13	Y
14135500	SALMON R AB BOULDER CR NR BRIGHTWOOD, OR	9/1936 - 9/1952	16	N
14138400	CEDAR CR NR SANDY, OR	6/1970 - 9/1985	14	Y
14138800	BLAZED ALDER CR NR RHODODENDRON, OR	10/1963 - 9/2000	37	N
14138870	FIR CR NR BRIGHTWOOD, OR	10/1975 - 9/2000	25	N
14139700	CEDAR CR NR BRIGHTWOOD, OR	7/1964 - 9/2000	35	Y
14139800	S FK BULL RUN R NR BULL RUN, OR	10/1974 - 9/2000	26	N
14144900	HILLS CR AB HILLS CR RES, NR OAKRIDGE, OR	10/1958 - 10/1981	23	Y
14145000	HILLS CR NR OAKRIDGE, OR	9/1935 - 9/1943	8	N
14145500	M FK WILLAMETTE R AB SALT CR, NR OAKRIDGE, OR	10/1913 - 7/1961	27	Y
14145600	SALT CR BL GOLD LAKE, NR CASCADE SUMMIT, OR	6/1939 - 9/1943	4	N
14146000	SALT CR NR OAKRIDGE, OR	7/1913 - 9/1951	19	Y
14146700	GRAY CR NR OAKRIDGE, OR	7/1978 - 11/1986	8	N
14147000	WALDO LAKE OUTLET NR OAKRIDGE, OR	10/1936 - 9/1984	30	Y
14148000	M FK WILLAMETTE R BL N FK NR OAKRIDGE, OR	3/1911 - 7/1961	38	Y

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14150000	M FK WILLAMETTE R NR DEXTER, OR	10/1946 - 10/1953	7	N
14150300	FALL CR NR LOWELL, OR	9/1963 - 10/1999	36	N
14150500	FALL CR AB WINBERRY CR, NR LOWELL, OR	10/1935 - 9/1943	8	N
14150800	WINBERRY CR NR LOWELL, OR	9/1963 - 10/1981	18	Y
14151000	FALL CR BL WINBERRY CR NR FALL CR, OR	10/1935 - 12/1965	30	N
14151500	LITTLE FALL CR NR FALL CR, OR	10/1935 - 9/1948	13	N
14152000	M FK WILLAMETTE R AT JASPER, OR	10/1906 - 3/1917	8	Y
14153800	LAYNG CR AB PRATHER CR NR DISSTON, OR	10/1976 - 9/1995	16	Y
14155500	ROW R NR COTTAGE GROVE, OR	1/1939 - 9/1949	10	N
14156000	MOSBY CR NR COTTAGE GROVE, OR	2/1936 - 9/1946	10	N
14156500	MOSBY CR AT MOUTH, NR COTTAGE GROVE, OR	9/1946 - 10/1981	34	Y
14157000	COAST FK WILLAMETTE R AT SAGINAW, OR	10/1923 - 10/1942	18	Y
14158000	WILLAMETTE R AT SPRINGFIELD, OR	10/1911 - 9/1942	25	Y
14158700	MCKENZIE R NR BELKNAP SPRINGS, OR	10/1957 - 9/1962	5	N
14158930	BUDWORM CR NR BELKNAP SPRINGS, OR	7/1978 - 10/1986	7	Y
14159000	MCKENZIE R AT MCKENZIE BRIDGE, OR	8/1910 - 10/1995	84	Y
14159100	HORSE CR NR MCKENZIE BRIDGE, OR	10/1962 - 11/1982	7	Y
14159500	S FK MCKENZIE R NR RAINBOW, OR	10/1947 - 9/2000	53	N
14161000	BLUE R AB QUENTIN CR, OR	10/1947 - 9/1955	8	N
14161100	BLUE R BL TIDBITS CR NR BLUE R, OR	9/1963 - 9/2000	36	Y
14161500	LOOKOUT CR NR BLUE R, OR	10/1949 - 9/2000	43	Y
14162000	BLUE R NR BLUE R, OR	9/1935 - 12/1964	29	N
14162200	BLUE R AT BLUE R, OR	5/1966 - 9/1968	2	N
14162500	MCKENZIE R NR VIDA, OR	7/1910 - 9/2000	76	Y
14163000	GATE CR AT VIDA, OR	10/1951 - 4/1991	30	Y

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14164000	MCKENZIE R NR SPRINGFIELD, OR	11/1905 - 3/1915	8	N
14165000	MOHAWK R NR SPRINGFIELD, OR	9/1935 - 9/2000	53	Y
14165500	MCKENZIE R NR COBURG, OR	10/1944 - 9/1972	28	N
14169300	AMAZON CR AT EUGENE, OR	10/1962 - 9/1975	13	Y
14170000	LONG TOM R AT MONROE, OR	10/1921 - 11/1941	19	Y
14171500	MUDDY CR NR CORVALLIS, OR	10/1963 - 9/1968	5	N
14173500	CALAPOOIA R AT ALBANY, OR	10/1940 - 12/1981	41	Y
14174000	WILLAMETTE R AT ALBANY, OR	11/1892 - 9/2000	105	Y
14178700	E HUMBUG CR NR DETROIT, OR	8/1978 - 7/1994	15	N
14181500	N SANTIAM R AT NIAGARA, OR	10/1911 - 9/2000	70	Y
14183000	N SANTIAM R AT MEHAMA, OR	7/1905 - 9/2000	84	Y
14185700	M SANTIAM R NR UPPER SODA, OR	10/1980 - 5/1994	13	N
14185800	M SANTIAM R NR CASCADIA, OR	8/1963 - 12/1988	19	Y
14185900	QUARTZVILLE CR NR CASCADIA, OR	8/1963 - 9/2000	36	Y
14186000	M SANTIAM R NR FOSTER, OR	10/1931 - 9/1947	16	N
14186500	M SANTIAM R AT MOUTH NR FOSTER, OR	10/1950 - 9/1966	16	N
14187000	WILEY CR NR FOSTER, OR	10/1947 - 9/2000	37	Y
14187100	WILEY CR AT FOSTER, OR	9/1973 - 9/1988	15	N
14187500	S SANTIAM R AT WATERLOO, OR	7/1905 - 9/2000	78	Y
14188610	SCHAFER CR NR LACOMB, OR	10/1993 - 9/2000	7	N
14188700	CRABTREE CR NR CRABTREE, OR	10/1963 - 7/1970	6	Y
14188800	THOMAS CR NR SCIO, OR	10/1962 - 9/1987	25	N
14189000	SANTIAM R AT JEFFERSON, OR	10/1907 - 9/2000	70	Y
14189500	LUCKIAMUTE R NR HOSKINS, OR	5/1934 - 10/1978	44	Y
14190000	LUCKIAMUTE R AT PEDEE, OR	10/1940 - 9/1971	30	Y

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14190100	LITTLE LUCKIAMUTE R AT FALLS CITY, OR	8/1965 - 9/2000	35	N
14190350	GRANT CR NR FALLS CITY, OR	6/1968 - 9/1978	10	N
14191000	WILLAMETTE R AT SALEM, OR	10/1909 - 9/2000	84	Y
14193300	MILL CR NR WILLIMINA, OR	10/1958 - 10/1971	15	Y
14194150	SOUTH YAMHILL RIVER AT MCMINNVILLE, OR	10/1994 - 9/2000	6	N
14195000	HASKINS CR NR MCMINNVILLE, OR	10/1928 - 9/1951	23	N
14196500	YAMHILL R NR PIKE, OR	10/1940 - 9/1951	11	N
14198400	BULL CREEK NEAR WILHOIT, OR	10/1993 - 9/2000	7	N
14199000	MOLALLA R NR MOLALLA, OR	10/1905 - 9/1951	9	Y
14200000	MOLALLA R NR CANBY, OR	8/1928 - 3/1979	46	Y
14200200	N FK SILVER CR NR SILVERTON, OR	9/1941 - 9/1976	11	Y
14200230	S FK SILVER CR NR SILVERTON, OR	6/1965 - 9/1976	11	N
14200300	SILVER CR AT SILVERTON, OR	10/1963 - 10/1979	14	Y
14200400	LITTLE ABIQUA CR NR SCOTTS MILLS, OR	7/1993 - 9/2000	7	N
14201000	PUDDING R NR MT ANGEL, OR	10/1939 - 3/1966	26	N
14201300	ZOLLNER CR NR MT ANGEL, OR	7/1993 - 9/2000	7	N
14201340	PUDDING R NR WOODBURN, OR	10/1997 - 9/2000	3	N
14201500	BUTTE CR AT MONITOR, OR	1/1936 - 10/1985	31	Y
14202000	PUDDING R AT AURORA, OR	10/1928 - 9/1997	40	Y
14202500	TUALATIN R NR GASTON, OR	10/1940 - 2/1985	27	Y
14202850	SCOGGINS CR AB HENRY HAGG LAKE NR GASTON, OR	10/1972 - 9/1995	23	N
14202920	SAIN CR NR GASTON, OR	10/1972 - 9/1995	23	N
14203000	SCOGGIN CR NR GASTON, OR	10/1940 - 12/1974	34	Y
14203500	TUALATIN R NR DILLEY, OR	11/1939 - 9/2000	60	N
14204000	GALES CR NR GALES CR, OR	10/1935 - 9/1970	17	Y

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14204500	GALES CR NR FOREST GROVE, OR	10/1940 - 9/1981	27	Y
14205500	E FK DAIRY CR AT MOUNTAINDALE, OR	10/1940 - 9/1951	11	N
14206000	MCKAY CR NR NORTH PLAINS, OR	10/1940 - 9/1956	11	Y
14206500	TUALATIN R AT FARMINGTON, OR	10/1939 - 9/1977	19	Y
14206900	FANNO CR AT 56TH AVE, AT PORTLAND, OR	10/1990 - 9/2000	10	N
14206950	FANNO CR AT DURHAM, OR	10/1993 - 2/1996	2	N
14207500	TUALATIN R AT WEST LINN, OR	8/1928 - 9/2000	72	N
14208000	CLACKAMAS R AT BIG BOTTOM, OR	4/1920 - 10/1970	50	Y
14208500	OAK GROVE FK AT TIMOTHY MEADOWS, OR	3/1913 - 9/1928	14	Y
14209000	OAK GROVE FK AB POWERPLANT INTAKE, OR	10/1909 - 9/2000	91	N
14210000	CLACKAMAS R AT ESTACADA, OR	4/1908 - 9/2000	92	N
14211000	CLACKAMAS R NR CLACKAMAS, OR	10/1962 - 1/1991	21	Y
14248700	BEAR CR NR SVENSEN, OR	8/1965 - 12/1975	10	Y
14251500	YOUNGS R NR ASTORIA, OR	10/1927 - 9/1958	31	N
14299000	S FK NECANICUM R NR SEASIDE, OR	9/1977 - 9/1995	16	Y
14299140	W FK ELK CR NR CANNON BEACH, OR	10/1974 - 9/1986	6	Y
14299150	N FK ELK CR NR CANNON BEACH, OR	10/1974 - 9/1986	12	N
14301250	JETTY CR NR BRIGHTON, OR	11/1975 - 9/1995	19	N
14301300	MIAMI R NR GARIBALDI, OR	10/1973 - 9/1995	21	Y
14302480	TRASK RIVER ABOVE CEDAR CREEK NEAR TILLAMOOK, OR	4/1996 - 9/2000	4	N
14302500	TRASK R NR TILLAMOOK, OR	7/1931 - 6/1972	34	Y
14302600	KILLAM CR NR TILLAMOOK, OR	6/1975 - 9/1995	12	Y
14302700	TILLAMOOK R NR TILLAMOOK, OR	10/1973 - 11/1977	3	Y
14302900	NESTUCCA R NR FAIRDALE, OR	10/1960 - 9/2000	40	N
14303000	NESTUCCA R NR MCMINNVILLE, OR	10/1928 - 9/1944	16	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14303200	TUCCA CR NR BLAINE, OR	7/1983 - 9/2000	17	N
14303600	NESTUCCA R NR BEAVER, OR	10/1964 - 3/1969	4	N
14303750	SALMON R NR OTIS, OR	10/1974 - 9/1995	21	N
14303800	ROCK CR NR LINCOLN CITY, OR	10/1972 - 9/1992	19	Y
14303950	SCHOONER CR NR LINCOLN CITY, OR	10/1972 - 4/1986	13	N
14304350	SUNSHINE CR NR VALSETZ, OR	10/1972 - 9/1995	23	N
14304850	BIG ROCK CR NR VALSETZ, OR	10/1972 - 9/1989	16	N
14306030	YAQUINA R NR CHITWOOD, OR	10/1972 - 9/2000	28	N
14306036	MILL CR NR TOLEDO, OR	10/1959 - 10/1973	14	Y
14306040	N FK BEAVER CR NR SEAL ROCK, OR	7/1965 - 9/1967	2	N
14306200	S FK ALSEA R NR ALSEA, OR	10/1957 - 9/1963	6	N
14306300	FALL CR NR ALSEA, OR	8/1958 - 9/1963	5	N
14306340	E FK LOBSTER CR NR ALSEA, OR	7/1983 - 9/2000	17	N
14306400	FIVE RIVERS NR FISHER, OR	8/1958 - 10/1990	28	Y
14306600	DRIFT CR NR SALADO, OR	9/1958 - 11/1970	10	Y
14306700	NEEDLE BR NR SALADO, OR	9/1958 - 9/1973	15	N
14306800	FLYNN CR NR SALADO, OR	9/1958 - 10/1973	15	Y
14306810	DEER CR NR SALADO, OR	9/1958 - 10/1973	15	Y
14308620	DRIFT CR NR WALDPORT, OR	10/1983 - 9/1995	10	Y
14306900	BIG CR NR ROOSEVELT BEACH, OR	10/1972 - 9/1995	23	N
14307000	SIUSLAW R AB WILDCAT CR AT AUSTA, OR	10/1931 - 12/1940	9	N
14307500	LAKE CR AT TRIANGLE LAKE, OR	10/1931 - 9/1955	24	N
14307580	LAKE CR NR DEADWOOD, OR	10/1967 - 9/1989	22	N
14307620	SIUSLAW R NR MAPLETON, OR	10/1967 - 2/1996	27	Y
14307645	N FK SIUSLAW R NR MINERVA, OR	10/1967 - 9/1985	18	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14308500	ELK CR NR DREW, OR	10/1954 - 9/2000	42	Y
14308600	S UMPQUA R AT DAYS CR, OR	3/1975 - 10/1992	15	Y
14308700	DAYS CR AT DAYS CR, OR	10/1955 - 7/1972	16	N
14310700	S MYRTLE CR NR MYRTLE CR, OR	10/1955 - 7/1972	16	N
14310800	S MYRTLE CR BL CARSON CR NR MYRTLE CR, OR	6/1972 - 5/1983	6	Y
14308700	DAYS CR AT DAYS CREEK, OR	10/1955 - 7/1972	16	N
14308900	CANYON CREEK AT CANYONVILLE, OR	6/1969 - 8/1971	1	N
14308990	COW CREEK AB GALESVILLE RES, NEAR AZALEA, OR	10/1985 - 9/2000	15	N
14310700	S MYRTLE CREEK NR MYRTLE CREEK, OR	10/1955 - 7/1972	16	N
14310800	S MYRTLE CR BL CARSON CREEK, NR MYRTLE CREEK, OR	6/1972 - 5/1983	6	Y
14311200	OLALLA CR NR TENMILE, OR	10/1956 - 9/1992	33	Y
14311300	TENMILE CR AT TENMILE, OR	10/1967 - 9/1978	11	N
14311500	LOOKINGGLASS CR AT BROCKWAY, OR	10/1955 - 1/1980	24	N
14312000	S UMPQUA R NR BROCKWAY, OR	12/1905 - 1/1980	47	Y
14312170	S FK DEER CR NR DIXONVILLE, OR	10/1989 - 9/2000	11	N
14312200	DEER CR NR ROSEBURG, OR	10/1955 - 9/1978	21	Y
14312400	SILENT CREEK NEAR DIAMOND LAKE, OR	10/1971 - 11/1977	6	Y
14312500	LAKE CR NR DIAMOND LAKE, OR	10/1922 - 9/2000	34	Y
14313501	N UMPQUA R BL LEMOLO LAKE, NR TOKETEE FALLS, OR	10/1927 - 9/1954	27	N
14314501	CLEARWATER R + NO 1 POWER CN NR TOKETEE, FALLS, OR	10/1928 - 9/1983	55	N
14315500	N UMPQUA R AT TOKETEE FALLS, OR	10/1925 - 9/1948	22	Y
14316001	FISH CR + FISH CR POWER CN NR TOKETEE FALLS, OR	10/1947 - 9/1983	36	N
14316800	N UMPQUA R BL STEAMBOAT CR, NR GLIDE, OR	10/1972 - 9/1992	12	Y
14317500	N UMPQUA R AB ROCK CR NR GLIDE, OR	7/1924 - 9/1945	20	Y
14317600	ROCK CR NR GLIDE, OR	10/1957 - 6/1973	15	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14318500	N UMPQUA R NR GLIDE, OR	10/1915 - 9/1938	14	Y
14319200	SUTHERLIN CR AT SUTHERLIN, OR	10/1955 - 9/1967	12	N
14319850	GASSY CR NR NONPAREIL, OR	10/1988 - 9/2000	12	N
14319900	CALAPOOYA CR AT NONPAREIL, OR	7/1976 - 10/1988	12	N
14320700	CALAPOOYA CR NR OAKLAND, OR	10/1955 - 9/2000	44	Y
14321400	ELK CR NR ELKHEAD, OR	9/1968 - 9/1999	16	Y
14322000	ELK CR NR DRAIN, OR	10/1955 - 10/1979	23	Y
14323100	SMITH R NR GARDINER, OR	10/1965 - 6/1973	7	N
14323200	TENMILE CR NR LAKESIDE, OR	10/1957 - 10/1976	19	Y
14323500	TIOGA CR NR TIOGA, OR	10/1982 - 9/1996	14	N
14323997	PRIORLI CR NR DELLWOOD, OR	10/1983 - 9/1996	13	N
14324500	W FK MILLICOMA R NR ALLEGANY, OR	10/1954 - 11/1981	27	Y
14324600	S FK COQUILLE R AB PANTHER CR NR ILLAHE, OR	10/1956 - 9/1970	14	N
14324700	S FK COQUILLE R NR ILLAHE, OR	10/1956 - 9/1974	18	N
14324900	S FK COQUILLE R NR POWERS, OR	10/1956 - 9/1970	14	N
14326500	M FK COQUILLE R NR MYRTLE POINT, OR	10/1930 - 9/1946	16	N
14326800	N FK COQUILLE R NR FAIRVIEW, OR	10/1963 - 10/1981	18	Y
14326815	MIDDLE CR NR MCKINLEY, OR	10/1983 - 9/1996	13	N
14326850	CHERRY CR NR MCKINLEY, OR	10/1983 - 9/1996	13	N
14326950	W FK BRUMMIT CR NR SITKUM, OR	10/1983 - 9/1996	13	N
14327000	N FK COQUILLE R NR MYRTLE POINT, OR	12/1928 - 9/1968	22	Y
14327110	GEIGER CR AB GEIGER CREEK RES NR BANDON. OR	10/1991 - 9/1996	5	N
14327120	FERRY CR NR BANDON, OR	10/1977 - 9/1996	6	Y
14327145	DRY CR NR SIXES, OR	11/1974 - 9/1975	0	N
14327150	SIXES R AT SIXES, OR	10/1967 - 6/1970	2	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14327250	ELK R AB ANVIL CR, NR PORT ORFORD, OR	7/1974 - 9/2000	23	Y
14327500	ROGUE R AB BYBEE CR, NR UNION CR, OR	1/1930 - 9/1952	22	N
14330000	ROGUE R BL PROSPECT, OR	10/1913 - 9/2000	48	Y
14330500	S FK ROGUE R AB IMNAHA CR NR PROSPECT, OR	10/1931 - 9/1949	18	N
14331000	IMNAHA CR NR PROSPECT, OR	10/1933 - 9/1949	16	N
14332001	S FK ROGUE R + S FK POWER CN NR PROSPECT, OR	10/1924 - 9/1983	41	Y
14333000	M FK ROGUE R NR PROSPECT, OR	10/1925 - 9/1955	30	N
14333500	RED BLANKET CR NR PROSPECT, OR	6/1925 - 12/1981	48	Y
14335000	ROGUE R BL S FK ROGUE R NR PROSPECT, OR	10/1928 - 9/1965	37	N
14335100	FOURBIT CR NR BUTTE FALLS, OR	6/1949 - 9/1978	29	Y
14336700	N FK BIG BUTTE CR NR BUTTE FALLS, OR	10/1928 - 9/1957	24	Y
14337500	BIG BUTTE CR NR MCLEOD, OR	10/1945 - 9/2000	45	Y
14337600	ROGUE R NR MCLEOD, OR	10/1965 - 1/1977	11	N
14337800	ELK CR NR CASCADE GORGE, OR	8/1973 - 9/2000	27	N
14337870	W BR ELK CR NR TRAIL, OR	9/1973 - 9/2000	26	Y
14339000	ROGUE R AT DODGE BR NR EAGLE POINT, OR	10/1938 - 1/1977	38	N
14339500	S FK L BUTTE CR BIG ELK RNGR STA, OR	10/1926 - 9/1962	33	Y
14341500	S FK L BUTTE CR NR LAKECREEK, OR	10/1921 - 10/1982	59	Y
14353000	W FK ASHLAND CR NR ASHLAND, OR	10/1924 - 10/1982	15	Y
14353500	E FK ASHLAND CR NR ASHLAND, OR	10/1924 - 10/1982	15	Y
14359000	ROGUE R AT RAYGOLD NR CENTRAL PT, OR	9/1905 - 1/1977	71	N
14359400	EVANS CR AB W FK NR WIMER, OR	10/1941 - 9/1953	11	Y
14359500	EVANS CR NR BYBEE SPRINGS NR ROGUE R, OR	10/1925 - 9/1953	11	Y
14361500	ROGUE R AT GRANTS PASS, OR	1/1939 - 1/1977	37	N
14361590	M FK APPLEGATE R NR COPPER, OR	8/1979 - 10/1987	8	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
14361600	ELLIOTT CR NR COPPER, OR	10/1977 - 10/1987	10	Y
14361700	CARBERRY CR NR COPPER, OR	1/1978 - 10/1987	9	N
14362000	APPLEGATE R NR COPPER, OR	10/1938 - 12/1980	42	N
14362250	STAR G NR RUCH, OR	6/1983 - 9/2000	17	Y
14363000	APPLEGATE R NR RUCH, OR	10/1911 - 9/1953	31	Y
14366000	APPLEGATE R NR APPLEGATE, OR	10/1938 - 12/1980	42	N
14368500	POWELL CR NR WILLIAMS, OR	10/1946 - 9/1958	12	N
14369500	APPLEGATE R NR WILDERVILLE, OR	10/1938 - 9/2000	39	Y
14370000	SLATE CR AT WONDER, OR	10/1943 - 9/1957	14	N
14370500	JUMPOFF JOE CR NR MERLIN, OR	2/1929 - 9/1957	24	Y
14370600	JUMPOFF JOE CR NR PLEASANT VALLEY, OR	12/1969 - 4/1992	20	Y
14372000	GRAVE CR NR PLACER, OR	7/1913 - 9/1955	10	Y
14372300	ROGUE R NR AGNESS, OR	10/1960 - 1/1977	16	N
14373500	ALTHOUSE CR NR HOLLAND, OR	10/1943 - 9/1953	7	Y
14375000	SUCKER CR NR HOLLAND, OR	4/1940 - 9/1965	24	Y
14375100	SUCKER CR BL L GRAYBACK CR NR HOLLAND, OR	10/1965 - 9/1996	30	Y
14375400	ELK CREEK NEAR O'BRIEN, OR	11/1969 - 9/1994	23	Y
14376500	W FK ILLINOIS R NR OBRIEN, OR	10/1946 - 9/1954	8	N
14377000	ILLINOIS R AT KERBY, OR	3/1926 - 9/1961	35	N
14377500	DEER CR NR DRYDEN, OR	12/1941 - 9/1956	14	N
14378000	ILLINOIS R NR SELMA, OR	10/1956 - 1/1968	11	N
14378200	ILLINOIS R NR AGNESS, OR	10/1960 - 11/1981	21	Y
14400000	CHETCO R NR BROOKINGS, OR	10/1969 - 9/2000	31	N
14400200	WINCHUCK R NR BROOKINGS, OR	1/1977 - 9/1978	1	N
61420101	COTTONWOOD CR NR BEAVER MARSH, OR (USFS)	10/1992 - 9/1997	5	N

SHORT RECORD GAGES

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	COMPLETE WATER YEARS	GAPS?
61420102	MILLER CR NR BEAVER MARSH, OR (USFS)	10/1993 - 9/1997	4	N
61420103	SAND CR NR LENZ, OR (USFS)	10/1992 - 9/1997	5	N
61420104	SINK CR NR SAND CR JUNCTION, OR (USFS)	10/1995 - 9/1997	2	N
61420201	COYOTE CR NR SYCAN MARSH, OR (USFS)	10/1992 - 9/1996	4	N
61420202	DEMING CR NR BLY, OR (USFS)	10/1992 - 9/1997	4	Y
61420203	FISHHOLE CR NR BLY, OR (USFS)	10/1992 - 9/1997	5	N
61420204	FIVEMILE CR NR BLY, OR (USFS)	10/1992 - 9/1997	5	N
61420205	LONG CR NR BLY, OR (USFS)	10/1992 - 9/1997	5	N
61420206	N FK SPRAGUE R AT SANDHILL XING NR BLY, OR (USFS)	10/1992 - 9/1997	5	N
61420207	PARADISE CR NR BLY, OR (USFS)	10/1992 - 9/1997	5	N
61420208	S FK SPRAGUE R AB BROWNSWORTH CR NR BLY, OR (USFS)	10/1992 - 9/1997	5	N
61420209	SYCAN R AB SYCAN MARSH, OR (USFS)	10/1992 - 9/1997	5	N
61420210	SYCAN R AT RD BRDG BL SYCAN MARSH, OR (USFS)	10/1992 - 9/1997	5	N
61420301	ANNIE CR NR CRATER LAKE, OR (USFS)	10/1992 - 9/1997	5	N
61420302	CHERRY CR NR KLAMATH AGENCY, OR (USFS)	10/1992 - 9/1997	5	N
61420303	SEVENMILE CR NR FORT KLAMATH, OR (USFS)	10/1992 - 9/1997	5	N
61420601	SPENCER CR NR KENO, OR (USFS)	10/1992 - 9/1997	5	N

Appendix C

Miscellaneous Measurements

MISCELLANEOUS MEASUREMENTS

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	NUMBER OF MEASUREMENTS
21420101	SPRING CREEK (34S 7E 9 SENE)	12/1983 - 12/1988	12
21420103	SCOTT CREEK (31S 7E 18 NWSE)	10/1929 - 5/1993	52
21420104	SAND CREEK (31S 7E 29 SENE)	10/1954 - 5/1993	43
21420105	LARKIN CREEK (34S 7E 11 SW)	10/1960 - 9/1973	13
21420106	BIG SPRINGS CREEK (30S 8E 22 NWSE)	4/1984 - 12/1988	7
21420107	SCOTT CREEK (31S 7E 18 NWSE)	8/1991 - 5/1997	50
21420108	Deep Creek (31S 11E 29 SWSE)	4/1992 - 6/1996	41
21420109	Irving Creek (30S 11E 19 SESW)	11/1991 - 5/1996	29
21420110	Jackson Creek (30S 11E 7 SENE)	11/1991 - 4/1997	68
21420111	Williamson River ab Larkin Creek (34S 7E 2 SWNW)	5/1992 - 5/1997	49
21420112	Williamson River nr Rocky Ford (31S 10E 7 NWSW)	12/1991 - 5/1996	43
21420194	Shellock Draw (31S 9E 15 NWNE)	4/1980 - 6/1989	31
21420195	Yoss Creek (32S 9E 10 SESW)	6/1980 - 10/1988	27
21420196	Hog Creek (32S 8E 27 SWNW)	6/1980 - 10/1988	29
21420197	Jackson Creek (30S 11E 7 SWSE)	4/1980 - 12/1988	31
21420201	S FK Sprague River (37S 15E 8 SWSE)	1/1992 - 3/1996	34
21420202	N FK Sprague River (35S 14E 36 NENW)	1/1992 - 5/1997	46
21420203	N FK Sprague River (35S 15E 30 SESW)	4/1992 - 8/1995	19
21420204	Sycan River (34S 12E 31 SWSE)	12/1991 - 7/1997	30
21420206	Brownsworth Creek (37S 15E 2 SENW)	12/1991 - 4/1997	46
21420207	Trout Creek (35S 9E 35 NWSE)	2/1992 - 3/1996	38
21420208	Sprague River (35S 9E 9 NENE)	5/1992 - 9/1995	18
21420297	McCready Spring (34S 8E 25 NENE)	4/1920 - 9/1973	18
21420298	Coyote Creek (31S 13E 27 NWSE)	3/1980 - 10/1988	27
21420299	Chocktoot Creek (32S 14E 10 SWSE)	3/1915 - 6/1989	30

MISCELLANEOUS MEASUREMENTS

GAGE NUMBER	GAGE NAME	UNREGULATED PERIOD OF RECORD	NUMBER OF MEASUREMENTS
21420301	SUN CREEK (32S 7.5E 32 NENE)	4/1992 - 5/1993	11
21420302	ROCK CREEK (35S 6E 3 NENE)	12/1964 - 5/1993	42
21420303	VARNEY CREEK (36S 6E 3 NWNE)	4/1992 - 7/1996	51
21420304	ROCK CREEK (35S 6E 3 NWSE)	12/1991 - 5/1997	51
21420305	THREEMILE CREEK (34S 6E 2 LOT 22)	12/1991 - 5/1997	51
21420306	BILLIE CREEK (36S 5E 28 SESW)	4/1992 - 5/1997	28
21420307	FOURMILE CREEK (36S 5E 13 NWNW)	4/1992 - 5/1997	52
21420308	WOOD RIVER (33S 7.5E 15 NWSW)	4/1992 - 2/1996	27
21420389	MOSS CREEK (36S 7.5E 31)	4/1964 - 10/1967	38
21420390	THREEMILE CREEK (34S 6E 3)	9/1964 - 10/1967	43
21420393	SEVENMILE CREEK (33S 6E 36)	7/1916 - 10/1954	31
21420395	WOOD RIVER SPRINGS (33S 7.5E 3)	10/1955 - 9/1971	15
21420396	NANNIE CREEK (34S 6E 14)	10/1954 - 10/1967	24
21420397	CHERRY CREEK (34S 6E 22)	9/1954 - 10/1967	38
21420398	FORT CREEK (33S 7.5E 26)	11/1914 - 3/1989	50
21420399	CROOKED CREEK (34S 7.5E 13)	8/1915 - 9/1965	35
21420601	CLOVER CREEK (38S 15E 15 SESW)	5/1993 - 11/1994	18
21420602	COW CREEK (41S 1E 14 NENW)	2/1992 - 4/1997	34

Appendix D

Physical Characteristics for Watersheds in Oregon and Neighboring States as Compiled by OWRD

Watershed Characteristics				
Characteristic	**Units**	**Data Type**	**Scale or Resolution**	**Source**
Latitude of Outlet	°	Vector	1:24000	Water Resources
Longitude of Outlet	°	Vector	1:24000	Water Resources
Latitude of Centroid	°	Vector	1:24000	Water Resources
Longitude of Centroid	°	Vector	1:24000	Water Resources
Drainage Area	mi^2	Vector	1:24000	Water Resources
Stream Length	mi	Vector	1:24000	US Geological Survey
Perimeter	mi	Vector	1:24000	Water Resources
Lakes and Ponds	%	Vector	1:24000	US Geological Survey
Area/Perimeter	N/A	Vector	1:24000	Water Resources
Minimum Watershed Elevation	ft	Grid	1:250000	US Geological Survey
Maximum Polygon Elevation	ft	Grid	1:250000	US Geological Survey
Maximum Watershed Elevation	ft	Grid	1:250000	US Geological Survey
Maximum Relief	ft	Grid	1:250000	US Geological Survey
Mean Slope	%	Grid	1:250000	US Geological Survey
Average Aspect	°	Grid	1:250000	US Geological Survey
Mean Elevation	ft	Grid	1:250000	US Geological Survey
Area above 3000 ft	%	Grid	1:250000	US Geological Survey
Area above 4000 ft	%	Grid	1:250000	US Geological Survey
Area above 5000 ft	%	Grid	1:250000	US Geological Survey
Area above 6000 ft	%	Grid	1:250000	US Geological Survey
Soils Storage Capacity	in	Vector	1:250000	Natural Resource Conservation Service
Soils Mean Permeability	in/hr	Vector	1:250000	Natural Resource Conservation Service
Soils Depth to Bedrock	in	Vector	1:250000	Natural Resource Conservation Service

Watershed Characteristics				
Characteristic	Units	Data Type	Scale or Resolution	Source
Mean Annual Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean January Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean February Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean March Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean April Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean May Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean June Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean July Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean August Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean September Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean October Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean November Precipitation	in	Grid	10000 m	Oregon Climate Service
Mean December Precipitation	in	Grid	10000 m	Oregon Climate Service
Precipitation Intensity 2-yr 1-	in	Grid	10000 m	Oregon Climate Service
Precipitation Intensity 2-yr 2-day	in	Grid	10000 m	Oregon Climate Service
Precipitation Intensity 2-yr 3-day	in	Grid	10000 m	Oregon Climate Service
Precipitation Intensity 2-yr 4-day	in	Grid	10000 m	Oregon Climate Service
Precipitation Intensity 2-yr 5-day	in	Grid	10000 m	Oregon Climate Service
Mean Annual Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean January Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean February Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean March Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean April Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean May Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean June Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean July Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean August Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean September Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean October Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean November Snow Pack	in	Grid	10000 m	Oregon Climate Service
Mean December Snow Pack	in	Grid	10000 m	Oregon Climate Service

Watershed Characteristics				
Characteristic	Units	Data Type	Scale or Resolution	Source
Mean Annual Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean January Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean February Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean March Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean April Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean May Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean June Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean July Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean August Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean September Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean October Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean November Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean December Min Temperature	°	Grid	10000 m	Oregon Climate Service
Mean Annual Temperature	°	Grid	10000 m	Oregon Climate Service
Mean January Temperature	°	Grid	10000 m	Oregon Climate Service
Mean February Temperature	°	Grid	10000 m	Oregon Climate Service
Mean March Temperature	°	Grid	10000 m	Oregon Climate Service
Mean April Temperature	°	Grid	10000 m	Oregon Climate Service
Mean May Temperature	°	Grid	10000 m	Oregon Climate Service
Mean June Temperature	°	Grid	10000 m	Oregon Climate Service
Mean July Temperature	°	Grid	10000 m	Oregon Climate Service
Mean August Temperature	°	Grid	10000 m	Oregon Climate Service
Mean September Temperature	°	Grid	10000 m	Oregon Climate Service
Mean October Temperature	°	Grid	10000 m	Oregon Climate Service
Mean November Temperature	°	Grid	10000 m	Oregon Climate Service
Mean December Temperature	°	Grid	10000 m	Oregon Climate Service
Mean Annual Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean January Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean February Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean March Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean April Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean May Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean June Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean July Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean August Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean September Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean October Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean November Max Temperature	°	Grid	10000 m	Oregon Climate Service
Mean December Max Temperature	°	Grid	10000 m	Oregon Climate Service

Appendix E

Season, Rate and Duty for Irrigation Rights

Season, Rate and Duty for Irrigation Rights			
		Rate cfs/ac	Duty ac-ft
1 - North Coast Basin			
All Water	3/1-10/31	1/80	2.5
2 - Willamette Basin			
Ash Creek	4/1-9/30	1/80	2.5
Calapooia River	5/1-9/30	1/80	2.5
Luckiamute River	4/1-9/30	1/80	2.5
Marys River	4/1-9/30	1/80	2.5
Mill Creek		1/80	2.5
North Santiam River	5/1-9/30	1/80	2.5
Rickreal Creek	4/1-9/30	1/80	2.5
Santiam River	4/1-9/30	1/80	2.5
South Santiam River	4/1-9/30	1/80	2.5
Tualatin River	5/1-9/30	1/80	2.5
Yamhill River	4/1-9/30	1/80	2.5
All other streams		1/80	2.5
3 - Sandy Basin			
All Water	3/1-10/31	1/80	2.5
4 - Hood Basin			
Chenowith		1/60	3.0
Holman Creek	3/1-10/31	1/60	3.0
	When necessary		3.0
Hood River	4/1-10/1	1/80	3.0
Mill Creek	4/1-10/1	1/60	3.0
Mosier Creek	3/1-10/1	1/60	3.0
Neal Creek	3/1-10/31	1/60	3.0
Threemile Creek		1/60	3.0

Season, Rate and Duty for Irrigation Rights			
		Rate cfs/ac	Duty ac-ft
5 - Deschutes Basin			
Antelope Creek	3/1-10/31	1/80	3.0
Crooked River		1/40	4.0
Deschutes River	4/1-11/1	1/40	4.0
Hay Creek		1/40	3.0
Metolius River		1/60	3.0
Mill Creek > Warm Springs R	4/1-10/1	1/60	
	Variable 4/1-12/1		4.0
	Variable 3/1-11/15		
Mud Creek, Middle Branch		1/80	
	Variable 2/1-12/1		
	When necessary		2.5
Squaw Creek	Not fixed	1/50	none
	When necessary		2.5
Trout Creek	All year	1/40	6.0
Tumalo Creek		1/70	variable
	When necessary		3.0
Willow Creek	3/1-10/31	1/60	2.0

Season, Rate and Duty for Irrigation Rights			
		Rate cfs/ac	Duty ac-ft
6 - John Day Basin			
Bridge Creek	3/1-10/1	1/40	4.0
	When		3.0
Cochran (Cupper) Creek	3/1-10/31	1/50	4.0
Gable Creek	3/1-10/31	1/80	4.0
John Day River	4/1-9/30	1/40	5.0
John Day River Tributaries	3/1-10/31	1/40	4.0
Middle Fork John Day River	3/1-10/31	1/40	5.0
North Fork John Day River		1/40	5.0
South Fork John Day River		1/40	4.0
7 - Umatilla Basin			
Butter Creek	1/1-9/1	1/50	4.0
Dugger Creek	5/1-9/1	1/80	3.0
	Variable 6/1-9/30		
Johnson Creek		1/80	4.0
Mud Creek and branches	3/1-10/31	1/80	3.0
Pine Creek	4/1-10/1	1/60	3.0
Umatilla River above Pendleton	3/1-11/1	1/80	3.0
Umatilla River Below Pendleton	3/1-11/1	1/40	4.5
Walla Walla River	Not fixed	3/80	N/A
Walla Walla River Tributaries for upland early irrigation			2.5
	Variable		3.0
	When necessary		3.0

Season, Rate and Duty for Irrigation Rights			
		Rate cfs/ac	Duty ac-ft
8 - Grande Ronde Basin			
	When necessary		3.0
Hurricane Creek		1/40	3.5
Imnaha River	4/15-10/15	1/40	4.0
	Variable 3/1-10/1		3.0
South Fork	3/1-10/31	1/40	3.5
Snake River	3/1-10/31	1/40	4.0
Wallowa River	5/1-10/1	1/40	3.5
9 - Powder Basin			
Burnt River	4/1-10/1	1/40	3.0
North Powder River	3/1-10/1	1/40	4.0
Pine Creek	4/1-10/1	1/40	4.5
	When necessary		3.5
Snake River	3/1-10/31	1/40	4.0
10 - Malheur Basin			
Cottonwood Creek	3/1-10/31	1/80	3.0
	When necessary		3.0
Snake River		1/40	4.0
Willow Creek	2/15-10/15	1/40	3.0
11 - Owyhee Basin			
Jordan Creek	3/1-10/31	1/60	4.0
Owyhee River	4/1-10/15	1/60	4.0
Snake River	3/1-10/31	1/40	4.0
Wildhorse Creek	Not fixed	1/60	2.5

Season, Rate and Duty for Irrigation Rights			
		Rate cfs/ac	Duty ac-ft
12 - Malheur Lakes Basin			
Black Canyon	3/1-10/31	1/80	3.0
Coffee Pot Creek		1/40	2.5
Donner und Blitzen River	3/15-10/1	1/40	3.0
Harney Lake	3/1-10/31	1/80	3.0
Home Creek	3/1-10/31	1/80	3.0
Rattlesnake Creek	Not fixed	1/40	3.0
Roaring Springs Creek	3/1-10/31	1/80	3.0
Rock Creek		1/80	3.0
Skull Creek	3/1-10/31	1/80	3.0
Silver Creek	3/1-8/1	1/60	3.0
Silvies River	3/20-9/1	1/80	2.5
Threemile Creek	3/1-10/31	1/80	3.0
Trout Creek	3/15-10/1	1/40	3.0
Wildhorse Creek	Not fixed	1/60	2.5
13 - Goose and Summer Lakes Basin			
Anna Creek	4/1-11/1	1/60-1/80	3.0-4.0
Bridge Creek	4/1-9/30	1/80	3.0
Buck Creek	3/1-10/1	1/40	3.0
	Variable 1/1-9/30		4.0
Crane Creek		1/40	2.5
Goose Lake	3/1-10/31	1/40	2.5
Goose Lake Tributaries	4/1-9/30	1/40	2.5
Hart Lake	3/1-10/31	1/40	3.0
Kelly Creek	3/1-9/15	1/40	2.5
Silver Creek	4/1-	1/40	3.0
Summer Lake	3/1-10/31	1/40	3.0
Warner Lake		1/40	3.0

Season, Rate and Duty for Irrigation Rights			
		Rate cfs/ac	Duty ac-ft
14 - Klamath Basin			
Annie Creek	3/1-10/31	1/80	3.0
Cherry Creek		1/80	3.0
Fourmile Creek	3/1-10/31	1/50	5.0
Lost River	3/1-9/30	1/80	2.5
Lost River Tributaries	3/1-10/31	1/40	3.0
Klamath Lake	3/1-10/31	1/40	3.0
Klamath River	3/1-10/31	1/40	3.0
Sevenmile Creek		1/50	5.0
Sprague River	3/1-10/1	1/40	3.0
Swan Lake	3/15-9/30	1/40	3.0
Wildhorse Creek	3/1-10/31	1/40	3.0
Williamson River	3/1-10/31	1/40	3.0
Wood River	3/1-10/31	1/50	5.0
15 - Rogue Basin			
Rogue River Tributaries	3/1-10/31	1/40	4.5
Althouse Creek	4/1-10/31	1/50	3.5
Illinois River	4/1-11/1	1/50	3.5
Little Butte Creek	4/1-10/1	1/80	4.5
Rogue River	4/1-11/1	1/80	4.5
Sucker Creek		1/50	
16 - Umpqua Basin			
Cow Creek	4/1-10/1	1/70	3.5
All other streams	3/1-10/31	1/80	2.5
17 - South Coast Basin			
McVay Creek		1/80	2.5
All other waters	3/1-10/31	1/80	2.5
18 - Mid Coast Basin			
All waters	3/1-10/31	1/80	2.5

Appendix F

Water Availability Basins

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
1	1	BEAR CR > COLUMBIA R - AT MOUTH
7	1	CLATSKANIE R > CLATSKANIE SL - AB PERKINS CR
11	1	ECOLA CR > PACIFIC OCEAN - AT MOUTH
16	1	KILCHIS R > TILLAMOOK BAY - AT MOUTH
18	1	LEWIS AND CLARK R > YOUNGS BAY - AT MOUTH
21	1	LITTLE NESTUCCA R > NESTUCCA BAY - AB FALL CR
24	1	MIAMI R > TILLAMOOK BAY - AT MOUTH
31	1	N FK TRASK R > TRASK R - AB BARK SHANTY CR
34	1	NECANICUM R > PACIFIC OCEAN - AB KLOOTCHIE CR
36	1	NEHALEM R > NEHALEM BAY - AT MOUTH
38	1	NEHALEM R > NEHALEM BAY - AB SALMONBERRY R
39	1	NEHALEM R > NEHALEM BAY - AB HUMBUG CR
40	1	NEHALEM R > NEHALEM BAY - AB BENEKE CR
41	1	NEHALEM R > NEHALEM BAY - AB DEEP CR
42	1	NEHALEM R > NEHALEM BAY - AB ROCK CR
45	1	NESTUCCA R > NESTUCCA BAY - AB THREE R
47	1	NESTUCCA R > NESTUCCA BAY - AB EAST CR
48	1	NESTUCCA R > NESTUCCA BAY - AB BIBLE CR
50	1	ROCK CR > NEHALEM R - AT MOUTH
57	1	THREE R > NESTUCCA R - AB CEDAR CR
59	1	TILLAMOOK R > TILLAMOOK BAY - AB BEAVER CR
67	1	WILSON R > TILLAMOOK BAY - AB JORDAN CR
68	1	WILSON R > TILLAMOOK BAY - AB N FK WILSON R
69	1	YOUNGS R > YOUNGS BAY - AB MOOSMOOS CR AT GAGE 1425150
70249	1	SALMONBERRY R > NEHALEM R - AT MOUTH
70268	1	KLOOTCHIE CR > NECANICUM R - AT MOUTH
70269	1	BERGSVIK CR > NECANICUM R - AT MOUTH
70288	1	FOLEY CR > NEHALEM R - AT MOUTH
70942	1	ANDERSON CR > NEHALEM R - AT MOUTH
70943	1	CARCUS CR > CLATSKANIE R - AT MOUTH
70944	1	CLATSKANIE R > CLATSKANIE SL - AB N FK CLATSKANIE
70945	1	CLATSKANIE R > CLATSKANIE SL - AT MOUTH
70946	1	COOK CR > NEHALEM R - AT MOUTH
70947	1	LEWIS AND CLARK R > YOUNGS BAY - AB HECKARD CR
70948	1	LOST CR > NEHALEM R - AT MOUTH
70949	1	N FK NECANICUM R > NECANICUM R - AT MOUTH
70950	1	PLYMPTON CR > WESTPORT SL - AT MOUTH
70951	1	ROY CR > NEHALEM R - AT MOUTH
70953	1	BEAVER CR > DOBBINS SL - AT MOUTH
70954	1	BIG CR > COLUMBIA R - AT MOUTH
70955	1	NECANICUM R > PACIFIC OCEAN - AT MOUTH
70956	1	N FK KLASKANINE R > KLASKANINE R - AT MOUTH
70957	1	N FK NEHALEM R > NEHALEM R - AT MOUTH
70958	1	PETERSON CR > NEHALEM R - AT MOUTH
70959	1	S FK KLASKANINE R > KLASKANINE R - AT MOUTH
70960	1	YOUNGS R > YOUNGS BAY - AB KLASKANINE R
71221	1	POWDER CR > NESTUCCA R - AT MOUTH
71222	1	PROUTY CR > MIAMI R - AT MOUTH
71223	1	SAND CR > SAND L - AT MOUTH
71224	1	S FK KILCHIS R > KILCHIS R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
71225	1	S FK LITTLE NESTUCCA R > LITLLE NESTUCCA R - AT MOUTH
71226	1	S FK TRASK R > TRASK R - AT MOUTH
71227	1	S FK TRASK R > TRASK R - AB E FK OF S FK TRASK
71228	1	S FK WILSON > WILSON R - AT MOUTH
71229	1	SIMMIONS CR > TILLAMOOK R - AT MOUTH
71230	1	SLICK ROCK CR > NESTUCCA R - AT MOUTH
71231	1	TESTAMENT CR > NSTUCCA R - AT MOUTH
71232	1	TILLAMOOK R > TILLAMOOK BAY - AT MOUTH
71233	1	W BEAVER CR > BEAVER CR - AT MOUTH
71234	1	WOLFE CR > NESTUCCA R - AT MOUTH
71235	1	TRASK R > TILLAMOOK BAY - AT MOUTH
71236	1	WILSON R > TILLAMOOK BAY - AT MOUTH
71237	1	WILSON R > TILLAMOOK BAY - AB LITTLE N FK WILSON
71238	1	MOON CR > EAST CR - AT MOUTH
71239	1	MOSS CR > MIAMI R - AT MOUTH
71240	1	MUNSON CR > TILLAMOOK R - AT MOUTH
71241	1	NESKOWIN CR > PACIFIC OCEAN - AT MOUTH
71242	1	NESTUCCA R > NESTUCCA BAY - AT MOUTH
71243	1	NESTUCCA R > NESTUCCA BAY - AB BEAVER CR
71244	1	NESTUCCA R > NESTUCCA BAY - AB NIAGARA CR
71245	1	N FK KILCHIS R > KILCHIS R - AT MOUTH
71246	1	N FK OF N FK TRASK > N FK TRASK - AT MOUTH
71247	1	N FK TRASK R > TRASK R - AT MOUTH
71248	1	N FK WILSON R > WILSON R - AT MOUTH
71249	1	NIAGARA CR > NESTUCCA R - AT MOUTH
71250	1	PETERSON CR > MIAMI R - AT MOUTH
71251	1	KILLIAM CR > TILLAMOOK R - AT MOUTH
71252	1	LITTLE NESTUCCA R > NESTUCCA BAY - AT MOUTH
71253	1	LITTLE NESTUCCA R > NESTUCCA BAY - AB S FK L NESTUCCA R
71254	1	LITTLE N FK WILSON R > WILSON R - AT MOUTH
71255	1	LOUIE CR > LITLLE NESTUCCA R - AT MOUTH
71256	1	LITTLE S FK KILCHIS R > KILCHIS R - AT MOUTH
71257	1	M FK OF N FK TRASK > N FK TRASK - AT MOUTH
71259	1	FARMER CR > NESTUCCA R - AT MOUTH
71260	1	FAWCETT CR > TILLAMOOK R - AT MOUTH
71261	1	GREEN CR > TRASK R - AT MOUTH
71262	1	JORDAN CR > WILSON R - AT MOUTH
71263	1	KILCHIS R > TILLAMOOK BAY - AB MYRTLE CR
71264	1	KILCHIS R > TILLAMOOK BAY - AB LITTLE S FK KILCHIS R
71265	1	E BEAVER CR > BEAVER CR - AT MOUTH
71266	1	EDWARDS CR > S FK TRASK - AT MOUTH
71267	1	E FK OF S FK TRASK > S FK TRASK - AT MOUTH
71268	1	ELK CR > NESTUCCA R - AT MOUTH
71269	1	ELK CR > WILSON R - AT MOUTH
71270	1	FALL CR > WILSON R - AT MOUTH
71271	1	FALL CR > NESTUCCA R - AT MOUTH
71272	1	BIBLE CR > NESTUCCA R - AT MOUTH
71273	1	CEDAR CR > WILSON R - AT MOUTH
71274	1	CLARENCE CR > NESTUCCA R - AT MOUTH
71275	1	CLEAR CR > KILCHIS R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
71276	1	CLEAR CR > N FK TRASK R - AT MOUTH
71277	1	CLEAR CR > NESTUCCA R - AT MOUTH
71278	1	COAL CR > KILCHIS R - AT MOUTH
71279	1	DEVIL L FK > WILSON R - AT MOUTH
71280	1	EAST CR > NESTUCCA R - AT MOUTH
71281	1	THREE RIVERS > NESTUCCA R - AT MOUTH
71282	1	THREE R > NESTUCCA R - AB ALDER CR
71283	1	ALDER CR > THREE R - AT MOUTH
71284	1	BARK SHANTY CR > N FK TRASK R - AT MOUTH
71285	1	BAYS CR > NESTUCCA R - AT MOUTH
71286	1	BEAR CR > E BEAVER CR - AT MOUTH
71287	1	BEAR CR > NESTUCCA R - AT MOUTH
71288	1	BEAR CR > LITTLE NESTUCCA R - AT MOUTH
71289	1	BEAVER CR > NESTUCCA R - AT MOUTH
71290	1	BEWLEY CR > TILLAMOOK R - AT MOUTH
71921	1	ARCHIBALD CR > NEHALEM R - AT MOUTH
71922	1	BEAVER CR > NEHALEM R - AT MOUTH
71923	1	FISHHAWK CR > NEHALEM R - AT MOUTH
71924	1	DEEP CR > NEHALEM R - AT MOUTH
71925	1	NORTHRUP CR > NEHALEM R - AT MOUTH
71926	1	FISHHAWK CR > BENEKE CR - AT MOUTH
71927	1	BUSTER CR > NEHALEM R - AT MOUTH
71928	1	COW CR > NEHALEM R - AT MOUTH
71929	1	QUARTZ CR > NEHALEM R - AT MOUTH
71930	1	W HUMBUG CR > HUMBUG CR - AT MOUTH
71931	1	E HUMBUG CR > HUMBUG CR - AT MOUTH
71932	1	HUMBUG CR > NEHALEM R - AT MOUTH
71933	1	SPRUCE RUN CR > NEHALEM R - AT MOUTH
71934	1	CRONIN CR > NEHALEM R - AT MOUTH
71935	1	W FK ECOLA CR > ECOLA CR - AT MOUTH
71936	1	BENEKE CR > NEHALEM R - AT MOUTH
71937	1	GOD VALLEY CR > N FK NEHALEM R - AT MOUTH
71938	1	NEHALEM R > NEHALEM BAY - AB ROBINSON CR
71939	1	N FK NEHALEM R > NEHALEM R - AB SOAPSTONE CR
71940	1	SOAPSTONE CR > N FK NEHALEM R - AT MOUTH
71941	1	ARCH CAPE CR > PACIFIC OCEAN - AT MOUTH
71942	1	N FK ECOLA CR > ECOLA CR - AT MOUTH
71943	1	S FK NECANICUM R > NECANICUM R - AT MOUTH
71944	1	SHORT SAND CR > PACIFIC OCEAN - AT MOUTH
71945	1	WOLF CR > NEHALEM R - AT MOUTH
71946	1	E FK NEHALEM R > NEHALEM R - AT MOUTH
30100301	1	GOBLE CR > COLUMBIA R - AT MOUTH
30100302	1	HUNT CR > COLUMBIA R - AT MOUTH
30100303	1	WEST CR > WESTPORT SL - AT MOUTH
30100304	1	ROSS CR > WESTPORT SL - AT MOUTH
30100305	1	OLSEN CR > WESTPORT SL - AT MOUTH
30100306	1	OK CR > WESTPORT SL - AT MOUTH
30100307	1	TANDY CR > WESTPORT SL - AT MOUTH
30100308	1	GRAHAM R > WESTPORT SL - AT MOUTH
30100309	1	FLUME CR > COLUMBIA R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30100310	1	GREEN CR > COLUMBIA R - AT MOUTH
30100311	1	NICE CR > COLUMBIA R - AT MOUTH
30100312	1	FOX CR > COLUMBIA R - AT MOUTH
30100313	1	TIDE CR > COLUMBIA R - AT MOUTH
30100314	1	ADAMS CR > MERRILL CR - AT MOUTH
30100315	1	MERRILL CR > TIDE CR - AT MOUTH
30100316	1	MCBRIDE CR > COLUMBIA R - AT MOUTH
30100317	1	LITTLE JACK FALLS > NEER - AT MOUTH
30100318	1	JACK FALLS > NEER CR - AT MOUTH
30100319	1	KELLY CR > COLUMBIA R - AT MOUTH
30100320	1	EILERTSON CR > WESTPORT SL - AT MOUTH
30100601	1	YOUNGS R > YOUNGS BAY - AT MOUTH
30100602	1	SKIPANON R > COLUMBIA R - AT MOUTH
30100603	1	MILL CR > COLUMBIA R - AT MOUTH
30100604	1	JOHN DAY R > COLUMBIA R - AT MOUTH
30100605	1	MARYS CR > COLUMBIA R - AT MOUTH
30100606	1	FERRIS CR > COLUMBIA R - AT MOUTH
30100607	1	FERTILE VALLEY CR > COLUMBIA R - AT MOUTH
30100608	1	GNAT CR > BLIND SL - AT MOUTH
30100609	1	TWILIGHT CR > COLUMBIA R - AT MOUTH
30100610	1	BEAR CR > COLUMBIA R - AB WATERWORKS CR AT GAGE 14248
30100611	1	KLASKANINE R > YOUNGS R - AT MOUTH
30120101	1	INDIAN CR > PACIFIC OCEAN - AT MOUTH
30120102	1	FALL CR > PACIFIC OCEAN - AT MOUTH
30120103	1	ASBURY CR > PACIFIC OCEAN - AT MOUTH
30120201	1	WALKER CR > BENEKE CR - AT MOUTH
30120203	1	NEHALEM R > NEHALEM BAY - AB COOK CR AT GAGE 14301000
30120302	1	SPRING L > PACIFIC OCEAN - AT MOUTH
30120303	1	ELECTRIC CR > TILLAMOOK BAY - AT MOUTH
30120304	1	LARSON CR > TILLAMOOK BAY - AT MOUTH
30120305	1	PATTERSON CR > TILLAMOOK BAY - AT MOUTH
30120306	1	DOUGHTY CR > TILLAMOOK BAY - AT MOUTH
30120307	1	DICK CR > TILLAMOOK BAY - AT MOUTH
30120308	1	FLOWER POT CR > TILLAMOOK BAY - AT MOUTH
30120309	1	COLEMAN CR > CAPE MEARES L - AT MOUTH
30120310	1	SHORT CR > PACIFIC OCEAN - AT MOUTH
30120311	1	FALL CR > PACIFIC OCEAN - AT MOUTH
30120312	1	UNN STR > PACIFIC OCEAN - AT MOUTH
30120313	1	O'HARA CR > NETARTS BAY - AT MOUTH
30120314	1	YAGER CR > NETARTS ABY - AT MOUTH
30120315	1	WHISKEY CR > NETARTS BAY - AT MOUTH
30120316	1	JACKSON CR > NETARTS BAY - AT MOUTH
30120317	1	ROVER CR > PACIFIC OCEAN - AT MOUTH
30120318	1	RENEKE CR > SAND L - AT MOUTH
30120319	1	SMITH CR > TILLAMOOK BAY - AT MOUTH
30120320	1	VAUGHN CR > TILLAMOOK BAY - AT MOUTH
30120321	1	LARSON CR > PACIFIC OCEAN - AT MOUTH
30120322	1	UNN STR (01-0320) > PACIFIC OCEAN - AT MOUTH
30120323	1	RICE CR > NETARTS BAY - AT MOUTH
30120324	1	AUSTIN CR > NETARTS BAY - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30120325	1	CAPE CR > PACIFIC OCEAN - AT MOUTH
30120326	1	CRESCENT CR > PACIFIC COEAN - AT MOUTH
30120330	1	TRASK R > TILLAMOOK BAY - AB GOLD CR AT GAGE 14302500
30120331	1	TILLAMOOK R > TILLAMOOK BAY -AB BEWLEY CR AT GAGE 14302700
30120332	1	NESTUCCA R > NESTUCCA BAY - AB SAILING CR AT GAGE 14303600
30120333	1	JETTY CR > NEHALEM BAY - AB MOUTH AT GAGE 14301250
30120334	1	MIAMI R > TILLAMOOK BAY - AB MOSS CR AT GAGE 14301300
30120335	1	KILCHIS R > TILLAMOOK BAY - AB MURPHY CR AT GAGE 14301450
30120336	1	WILSON R > TILLAMOOK BAY - AB NEGRO JACK CR AT GAGE 14301
71	2	ABIQUA CR > PUDDING R - AT MOUTH
72	2	AGENCY CR > S YAMHILL R - AT MOUTH
73	2	ALDER CR > N SCAPPOOSE CR - AT MOUTH
74	2	BEAVER CR > GALES CR - AT MOUTH
76	2	CALAPOOIA R > WILLAMETTE R - AB MOUTH
77	2	CALAPOOIA R > WILLAMETTE R -AB JOHNSON CR AT GAGE 14172000
78	2	CEDAR CR > N SCAPPOOSE CR - AT MOUTH
80	2	CLACKAMAS R > WILLAMETTE R - AT MOUTH
82	2	CLEAR CR > CLACKAMAS R - AT MOUTH
83	2	CLEAR CR > CLACKAMAS R - AB LITTLE CLEAR CR
86	2	COLLAWASH R > CLACKAMAS R - AT MOUTH
87	2	COX CR > MILTON CR - AT MOUTH
88	2	CRABTREE CR > S SANTIAM R - AT MOUTH
89	2	DEEP CR > CLACKAMAS R - AT MOUTH
90	2	SIERKES CR (DEEP CR) > N SCAPPOOSE CR - AT MOUTH
91	2	DEER CR > S YAMHILL R - AT MOUTH
92	2	DENNY CR > E FK DAIRY CR - AT MOUTH
93	2	E FK COLLAWASH R > COLLAWASH R - AT MOUTH
94	2	E FK DAIRY CR > DAIRY CR - AB UNN STR
95	2	E FK MCKAY CR > MCKAY CR - AT MOUTH
96	2	EAGLE CR > CLACKAMAS R - AT MOUTH
97	2	ELK L CR > COLLAWASH R - AT MOUTH
99	2	FISH CR > CLACKAMAS R - AT MOUTH
100	2	FISH CR > CLACKAMAS R - AB WASH CR
101	2	GALES CR > TUALATIN R - AT MOUTH
102	2	GALES CR > TUALATIN R - AB ILER CR
103	2	GATE CR > MCKENZIE R - AB MOUTH
104	2	GOURLAY CR > S SCAPPOOSE CR - AT MOUTH
105	2	GREASY CR > MARYS R - AT MOUTH
106	2	HAMILTON CR > S SANTIAM R - AT MOUTH
108	2	HOT SPRINGS FK COLLAWASH R > COLLAWASH R - AT MOUTH
109	2	LITTLE BEAVER CR > GALES CR - AT MOUTH
110	2	LITTLE FALL CR > FALL CR - AB MOUTH
111	2	LITTLE LUCKIAMUTE R > LUCKIAMUTE R - AB FERN CR
112	2	LITTLE N SANTIAM R > N SANTIAM R - AB MOUTH
113	2	LIZZIE CR > N SCAPPOOSE CR - AT MOUTH
114	2	LONG TOM R > WILLAMETTE R - AB MOUTH
115	2	LOST CR > M FK WILLAMETTE R - AT MOUTH
116	2	LOWE CR > CLACKAMAS R - AT MOUTH
117	2	LUCKIAMUTE R > WILLAMETTE R - AT MOUTH
118	2	LUCKIAMUTE R > WILLAMETTE R - AB SOAP CR

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
119	2	LUCKIAMUTE R > WILLAMETTE R - AB MCTIMMONDS CR
120	2	LUCKIAMUTE R > WILLAMETTE R - AB KOPPLEIN CR
122	2	MARYS R > WILLAMETTE R - AB MUDDY CR
123	2	MCDOWELL CR > S SANTIAM R - AT MOUTH
124	2	MCFEE CR > TUALATIN R - AB GULF CAN
125	2	MCKAY CR > DAIRY CR - AB UNN STR
130	2	M SANTIAM R > S SANTIAM R - AB MOUTH
131	2	MILK CR > MOLALLA R - AT MOUTH
132	2	MILL CR > S YAMHILL R - AT MOUTH
133	2	MILTON CR > SCAPPOOSE BAY - AB SALMON CR
134	2	MOHAWK R > MCKENZIE R - AB MOUTH
135	2	MOLALLA R > WILLAMETTE R - AB GRIBBLE CR
136	2	MOLALLA R > WILLAMETTE R - AB SHOTGUN CR
137	2	N FK DEEP CR > DEEP CR - AT MOUTH
138	2	N FK EAGLE CR > EAGLE CR - AT MOUTH
139	2	N FK GALES CR > GALES CR - AT MOUTH
140	2	N FK M FK WILLAMETTE R > M FK WILLAMETTE R - AB MOUTH
141	2	N SANTIAM R > SANTIAM R - AT MOUTH
142	2	N SANTIAM R > SANTIAM R - AB TRASK CR
143	2	N SANTIAM R > SANTIAM R - AB LODORE CR
144	2	N SANTIAM R > SANTIAM R - AB LOG CR
145	2	N SCAPPOSSE CR > SCAPPOOSE CR - AT MOUTH
146	2	N YAMHILL R > YAMHILL R - AB TURNER CR
148	2	PEDEE CR > LUCKIAMUTE R - AT MOUTH
149	2	PINHEAD CR > CLACKAMAS R - AT MOUTH
150	2	PLENTYWATER CR > E FK DAIRY CR - AT MOUTH
151	2	PUDDING R > MOLALLA R - AB MILL CR
152	2	PUDDING R > MOLALLA R - AB HOWELL PRAIRIE
153	2	RAYMOND CR > S SCAPPOOSE CR - AT MOUTH
154	2	RICKREAL CR > WILLAMETTE R - AB UNN STR
155	2	ROARING R > CLACKAMAS R - AT MOUTH
157	2	S FK GALES CR > GALES CR - AT MOUTH
159	2	S SANTIAM R > SANTIAM R - AB HAMILTON CR
160	2	S SANTIAM R > SANTIAM R - AB DEER CR
161	2	S SCAPPOSSE CR > SCAPPOOSE CR - AB RAYMOND CR
162	2	S YAMHILL R > YAMHILL R - AB COZINE CR
163	2	S YAMHILL R > YAMHILL R - AT MOUTH
164	2	S YAMHILL R > YAMHILL R - AB WILLIMINA CR
165	2	SAIN CR > SCOGGINS CR - AT MOUTH
166	2	SALMON CR > MILTON CR - AT MOUTH
167	2	SANTIAM R > WILLAMETTE R - AT MOUTH
168	2	SANTIAM R > WILLAMETTE R - AB MORGAN CR
169	2	SILVER CR > PUDDING R - AT MOUTH
170	2	TANNER CR > SCOGGINS CR - AT MOUTH
171	2	THOMAS CR > S SANTIAM R - AT MOUTH
172	2	TICKLE CR > DEEP CR - AT MOUTH
175	2	TUALATIN R > WILLAMETTE R - AT MOUTH
176	2	TUALATIN R > WILLAMETTE R - AB MERCER CR
177	2	UNN STR > N SCAPPOOSE CR - AT MOUTH
178	2	W FK DAIRY CR > DAIRY CR - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
179	2	WASH CR > FISH CR - AT MOUTH
181	2	WILLAMETTE R > COLUMBIA R - AT MOUTH
182	2	WILLAMETTE R > COLUMBIA R - AB MOLALLA R
183	2	WILLAMETTE R > COLUMBIA R - AB MILL CR AT GAGE 14191000
185	2	WILLAMETTE R > COLUMBIA R - AB MCKENZIE R
186	2	WILLIMINA CR > S YAMHILL R - AB TINDLE CR
187	2	WILLIMINA CR > S YAMHILL R - AT MOUTH
188	2	YAMHILL R > WILLAMETTE R - AB PALMER CR
528	2	MCKENZIE R > WILLAMETTE R - AB MOUTH
529	2	MCKENZIE R > WILLAMETTE R - AB BEAR CR
530	2	BLUE R > MCKENZIE R - AT MOUTH
531	2	S FK MCKENZIE R > MCKENZIE R - AT MOUTH
532	2	COAST FK WILLAMETTE R > WILLAMETTE R - AT MOUTH
533	2	COAST FK WILLAMETTE R > WILLAMETTE R - AB ROW R
534	2	ROW R > COAST FK WILLAMETTE R - AT MOUTH
535	2	M FK WILLAMETTE R > WILLAMETTE R - AT MOUTH
536	2	M FK WILLAMETTE R >WILLAMETTE R -AB N FK M FK WILLAMETTE R
537	2	FALL CR > M FK WILLAMETTE R - AT MOUTH
69796	2	MOLALLA R > WILLAMETTE R - AT MOUTH
69799	2	BUTTE CR > PUDDING R - AT MOUTH
69998	2	PUDDING R > MOLALLA R - AT MOUTH
70491	2	OLALLIE CR > MCKENZIE R - AT MOUTH
70492	2	SCOTT CR > MCKENZIE R - AT MOUTH
70494	2	LOST CR > MCKENZIE R - AT MOUTH
70495	2	HORSE CR > MCKENZIE R - AT MOUTH
70742	2	QUARTZ CR > MCKENZIE R - AT MOUTH
70743	2	TURNER CR > N YAMHILL R - AT MOUTH
70744	2	TROUT CR > MOLALLA R - AT MOUTH
70745	2	PANTHER CR > N YAMHILL R - AT MOUTH
70746	2	N YAMHILL R > YAMHILL R - AT MOUTH
70747	2	MOLALLA R > WILLAMETTE R - AB MILK CR
70748	2	MARYS R > WILLAMETTE R - AT MOUTH
70749	2	MARYS R > WILLAMETTE R - AB BLAKESLY CR
70750	2	HASKINS CR > N YAMHILL R - AT MOUTH
70781	2	DRIFT CR > PUDDING R - AT MOUTH
70782	2	WILEY CR > S SANTIAM R - AT MOUTH
70783	2	NEAL CR > THOMAS CR - AT MOUTH
70784	2	LITTLE WILEY CR > WILEY CR - AT MOUTH
70785	2	STOUT CR > N SANTIAM R - AT MOUTH
70786	2	ROCK CR > N SANTIAM R - AT MOUTH
70787	2	MAD CR > N SANTIAM R - AT MOUTH
71551	2	CRYSTAL SPRINGS CR > JOHNSON CR - AT MOUTH
71554	2	JOHNSON CR > WILLAMETTE R - AT MOUTH
71556	2	OAK GROVE FK CLACKAMAS R > CLACKAMAS R - AT MOUTH
72024	2	COAL CR > M FK WILLAMETTE R - AT MOUTH
72025	2	GOLD CR > M FK WILLAMETTE R - AT MOUTH
72026	2	HILLS CR > M FK WILLAMETTE R - AT MOUTH
73293	2	MOLALLA R > WILLAMETTE R - AB N FK MOLALLA R
73294	2	MOLALLA R > WILLAMETTE R - AB TABLE ROCK FK MOLALLA R
73295	2	N FK MOLALLA R > MOLALLA R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
73296	2	TABLE ROCK FK MOLALLA R > MOLALLA R - AT MOUTH
73318	2	AMES CR > S SANTIAM R - AT MOUTH
73543	2	FANNO CR > TUALATIN R - AT MOUTH
73545	2	ROCK CR > TUALATIN R - AT MOUTH
73562	2	SALT CR > S YAMHILL R - AT MOUTH
30200110	2	ROCK CR > TUALATIN R - AB BEAVERTON CR
30200220	2	M FK WILLAMETTE R > WILLAMETTE R - AB WINDFALL CR
30200221	2	HILLS CR > M FK WILLAMETTE R - AB MOUTH
30200222	2	SALT CR > M FK WILLAMETTE R - AB MOUTH
30200223	2	GRAY CR > M FK WILLAMETTE R - AB MOUTH
30200301	2	LITTLE LUCKIAMUTE R > LUCKIAMUTE R - AT MOUTH
30200302	2	SOAP CR > LUCKIAMUTE R - AT MOUTH
30200303	2	MUDDY CR > E CHANNEL - AT MOUTH
30200320	2	MUDDY CR > MARYS R - AB EVERGREEN CR
30200321	2	WILLAMETTE R > COLUMBIA R - AB PERIWINKLE CR AT GAGE 14174
30200420	2	MCKENZIE R > WILLAMETTE R - AB POWERS CR
30200421	2	S FK MCKENZIE R >MCKENZIE R -AB TIPSOO CR AT GAGE 14159200
30200501	2	N SANTIAM R > SANTIAM R - AB LITTLE N SANTIAM R
30200601	2	S SANTIAM R > SANTIAM R - AT MOUTH
30200701	2	MILL CR > WILLAMETTE R - AT MOUTH
30200702	2	RICKREAL CR > WILLAMETTE R - AT MOUTH
30200801	2	YAMHILL R > WILLAMETTE R - AT MOUTH
30200901	2	MILL CR > PUDDING R - AT MOUTH
30201001	2	MCFEE CR > TUALATIN R - AT MOUTH
30201002	2	DAIRY CR > TUALATIN R - AT MOUTH
30201003	2	MCKAY CR > DAIRY CR - AT MOUTH
30201004	2	E FK DAIRY CR > DAIRY CR - AT MOUTH
30201005	2	SCOGGINS CR > TUALATIN R - AT MOUTH
30201006	2	TUALATIN R > WILLAMETTE R - AT GAGE 14207500
30201007	2	TUALATIN R > WILLAMETTE R - AB MCFEE CR
30201008	2	TUALATIN R > WILLAMETTE R - AB DAIRY CR
30201009	2	BEAVERTON CR > ROCK CR - AT MOUTH
30201011	2	TUALATIN R > WILLAMETTE R - AB SCOGGINS CR
30201012	2	W FK DAIRY CR > DAIRY CR - AB CEDAR CAN
30201013	2	TUALATIN R > WILLAMETTE R - AT GAGE 14206500
30201014	2	SCOGGINS CR > TUALATIN R - AB H HAGG L
30201101	2	S FK CLACKAMAS R > CLACKAMAS R - AT MOUTH
30201102	2	N FK CLACKAMAS R > CLACKAMAS R - AT MOUTH
30201103	2	CLACKAMAS R > WILLAMETTE R - AB CLEAR CR
30201104	2	DEEP CR > CLACKAMAS R - AB TICKLE CR
30201105	2	EAGLE CR > CLACKAMAS R - AB N FK EAGLE CR
30201106	2	CLACKAMAS R > WILLAMETTE R - AB EAGLE CR
30201107	2	CLACKAMAS R > WILLAMETTE R - AB N FK CLACKAMAS R
30201108	2	COLLAWASH R > CLACKAMAS R - AB HOT SPRINGS FK
30201109	2	CLACKAMAS R > WILLAMETTE R - AB COLLAWASH R
30201110	2	CLACKAMAS R > WILLAMETTE R - AT GAGE 14209500
30201111	2	CLACKAMAS R > WILLAMETTE R - AT GAGE 14208000
30201112	2	CLACKAMAS R > WILLAMETTE R - AT GAGE 14210000
30201201	2	MILTON CR > SCAPPOOSE BAY - AT MOUTH
30201202	2	SCAPPOOSE CR > SCAPPOOSE BAY - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30201203	2	S SCAPPOOSE CR > SCAPPOOSE CR - AT MOUTH
71480	3	SANDY R > COLUMBIA R - AT MOUTH
71544	3	ALDER CR > SANDY R - AT MOUTH
71545	3	BEAVER CR > SANDY R - AT MOUTH
71546	3	BOULDER CR > SALMON R - AT MOUTH
71547	3	CAMP CR > ZIGZAG R - AT MOUTH
71548	3	CEDAR CR > SANDY R - AT MOUTH
71549	3	CHENEY CR > SALMON R - AT MOUTH
71550	3	CLEAR FK SANDY R > SANDY R - AT MOUTH
71552	3	GORDON CR > SANDY R - AT MOUTH
71553	3	HENRY CR > ZIGZAG R - AT MOUTH
71555	3	LOST CR > SANDY R - AT MOUTH
71557	3	SALMON R > SANDY R - AT MOUTH
71558	3	SALMON R > SANDY R - AB CHENEY CR
71559	3	SANDY R > COLUMBIA R - AB SALMON R
71560	3	S FK SALMON R > SALMON R - AT MOUTH
71561	3	STILL CR > ZIGZAG R - AT MOUTH
71562	3	TROUT CR > SANDY R - AT MOUTH
71563	3	ZIGZAG R > SANDY R - AT MOUTH
72145	3	SANDY R > COLUMBIA R - AB UNN STR
30300101	3	BULL RUN R > SANDY R - AT MOUTH
30300102	3	LITTLE SANDY R > BULL RUN R - AT MOUTH
30300103	3	BULL RUN R > SANDY R - AB LITTLE SANDY R
30300104	3	SANDY R > COLUMBIA R - AB BULL RUN R
30300105	3	SANDY R > COLUMBIA R - AB ZIGZAG R
30300106	3	SANDY R > COLUMBIA R - AB BADGER CR AT G
189	4	E FK HOOD R > HOOD R - AB M FK HOOD R
192	4	HOOD R > COLUMBIA R - AT MOUTH
195	4	NEAL CR > HOOD R - AT MOUTH
70246	4	MILL CR > COLUMBIA R - AT MOUTH
70252	4	EIGHTMILE CR > FIFTEENMILE CR - AB UNN STR
70262	4	FIFTEENMILE CR > COLUMBIA R - AT MOUTH
71793	4	M FK HOOD R > E FK HOOD R - AT MOUTH
71798	4	EIGHTMILE CR > FIFTEENMILE CR - AT MOUTH
72076	4	W FK HOOD R > HOOD R - AT MOUTH
72077	4	LAKE BR > W FK HOOD R - AT MOUTH
72078	4	S FK MILL CR > MILL CR - AT MOUTH
72079	4	N FK MILL CR > MILL CR - AT MOUTH
72080	4	DOG R > E FK HOOD R - AT MOUTH
72081	4	LINDSEY CR > COLUMBIA R - AT MOUTH
30410501	4	INDIAN CR > HOOD R - AT MOUTH
30410502	4	ODELL CR > HOOD R - AT MOUTH
30410503	4	DITCH CR > HOOD R - AT MOUTH
30410504	4	PINE CR > HOOD R - AT MOUTH
30410505	4	DEAD POINT CR > W FK HOOD R - AT MOUTH
30410506	4	GREEN POINT CR > W FK HOOD R - AT MOUTH
30410507	4	W FK HOOD R > HOOD R - AB LAKE BR
30410508	4	EVANS CR > E FK HOOD R - AT MOUTH
30410509	4	E FK HOOD R > HOOD R - AB DOG R
30410510	4	EAGLE CR > COLUMBIA R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30410511	4	RUCKEL CR > COLUMBIA R - AT MOUTH
30410512	4	MOODY CR > COLUMBIA R - AT MOUTH
30410513	4	E FK HOOD R > HOOD R - AT MOUTH
30410514	4	DRY CR > COLUMBIA R - AT MOUTH
30410515	4	HERMAN CR > COLUMBIA R - AT MOUTH
30410516	4	GRAYS CR > COLUMBIA R - AT MOUTH
30410517	4	GORTON CR > COLUMBIA R - AT MOUTH
30410518	4	HARPHAN CR > GORTON CR - AT MOUTH
30410519	4	SUMMIT CR > COLUMBIA R - AT MOUTH
30410520	4	WARREN CR > COLUMBIA R - AT MOUTH
30410521	4	CABIN CR > COLUMBIA R - AT MOUTH
30410522	4	STARVATION CR > COLUMBIA R - AT MOUTH
30410523	4	VIENTO CR > COLUMBIA R - AT MOUTH
30410524	4	PERHAM CR > COLUMBIA R - AT MOUTH
30410525	4	PHELPS CR > COLUMBIA R - AT MOUTH
30410526	4	ROCK CR > COLUMBIA R - AT MOUTH
30410527	4	MOSIER CR > COLUMBIA R - AT MOUTH
30410528	4	DRY CR > MOSIER CR - AT MOUTH
30410529	4	W FK MOSIER CR > MOSIER CR - AT MOUTH
30410530	4	MOSIER CR > COLUMBIA R - AB W FK MOSIER CR
30410531	4	ROWENA CR > COLUMBIA R - AT MOUTH
30410532	4	GOOSEBERRY SPRING CR > COLUMBIA R - AT MOUTH
30410533	4	CHENOWETH CR > COLUMBIA R - AT MOUTH
30410534	4	THREEMILE CR > COLUMBIA R - AT MOUTH
30410535	4	FIVEMILE CR > EIGHTMILE CR - AT MOUTH
30410536	4	JAPANESE HOL > EIGHTMILE CR - AT MOUTH
30410537	4	DOUGLAS HOL > FIFTEENMILE CR - AT MOUTH
30410538	4	DAVIS CR > FIFTEENMILE CR - AT MOUTH
30410539	4	JAMESON CAN > FIFTEENMILE CR - AT MOUTH
30410540	4	DRY CR > FIFTEENMILE CR - AT MOUTH
30410541	4	STARVOUT CR > FIFTEENMILE CR - AT MOUTH
30410542	4	PINE CR > FIFTEENMILE CR - AT MOUTH
30410543	4	RAIL HOL > FIFTEENMILE CR - AT MOUTH
30410544	4	HENDERSON HOL > FIFTEENMILE CR - AT MOUTH
30410545	4	RAMSEY CR > FIFTEENMILE CR - AT MOUTH
30410546	4	FIFTEENMILE CR > COLUMBIA R - AB EIGHTMILE CR
30410547	4	FIFTEENMILE CR > COLUMBIA R - AB RAMSEY CR
30410548	4	FIFTEENMILE CR > COLUMBIA R - AB JAMESON CAN
30410549	4	EIGHTMILE CR > FIFTEENMILE CR - AB WOLF RUN
30410550	4	EIGHTMILE CR > FIFTEENMILE CR - AB FIVEMILE CR
30410575	4	HOOD R > COLUMBIA R - AT RM 0.75
197	5	DESCHUTES R > COLUMBIA R - AB TUMALO CR
198	5	DESCHUTES R > COLUMBIA R - AB SPRING R
199	5	DESCHUTES R > COLUMBIA R - AB LITTLE DESCHUTES R
70087	5	DESCHUTES R > COLUMBIA R - AT MOUTH
70088	5	WHITE R > DESCHUTES R - AT MOUTH
70247	5	TROUT CR > DESCHUTES R - AT MOUTH
70339	5	TROUT CR > DESCHUTES R - AB ANTELOPE CR
70353	5	CROOKED R > DESCHUTES R - AB SAND CR
70354	5	CROOKED R > DESCHUTES R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
70355	5	N FK CROOKED R > CROOKED R - AB JOHNSON CR
70356	5	N FK CROOKED R > CROOKED R - AB DEEP CR
70357	5	N FK CROOKED R > CROOKED R - AT MOUTH
70358	5	S FK CROOKED R > CROOKED R - AT MOUTH
70585	5	OCHOCO CR > CROOKED R - AB MARKS CR
70586	5	OCHOCO CR > CROOKED R - AB CANYON CR
70587	5	PETERSON CR > N FK CROOKED R - AT MOUTH
70588	5	S FK BEAVER CR > BEAVER CR - AT MOUTH
70589	5	SUGAR CR > BEAVER CR - AT MOUTH
70590	5	W FK MILL CR > MILL CR - AT MOUTH
70591	5	WILLOW CR > DESCHUTES R - AT MOUTH
70592	5	WOLF CR > BEAVER CR - AT MOUTH
70593	5	WOLF CR > OCHOCO CR - AT MOUTH
70594	5	MCKAY CR > CROOKED R - AB ALLEN CR
70595	5	MCKAY CR > CROOKED R - AT MOUTH
70596	5	ALLEN CR > MCKAY CR - AT MOUTH
70597	5	LITTLE MCKAY CR > MCKAY CR - AT MOUTH
70598	5	JOHNSON CR > N FK CROOKED R - AT MOUTH
70599	5	HOWARD CR > JOHNSON CR - AT MOUTH
70600	5	HORSE HEAVEN CR > CROOKED R - AT MOUTH
70601	5	GRAY CR > N FK CROOKED R - AT MOUTH
70602	5	E FK MILL CR > MILL CR - AT MOUTH
70603	5	CANYON CR > OCHOCO CR - AT MOUTH
70604	5	BRUSH CR > JOHNSON CR - AT MOUTH
70605	5	BEAVER CR > CROOKED R - AT MOUTH
70606	5	BEAR CR > CROOKED R - AT MOUTH
70607	5	ALLEN CR > JOHNSON CR - AT MOUTH
70608	5	MILL CR > OCHOCO CR - AT MOUTH
70609	5	MARKS CR > OCHOCO CR - AT MOUTH
70610	5	LOOKOUT CR > N FK CROOKED R - AT MOUTH
70611	5	OCHOCO CR > CROOKED R - AT MOUTH
70612	5	N FK BEAVER CR > BEAVER CR - AT MOUTH
70613	5	OCHOCO CR > CROOKED R - AB MILL CR
70693	5	CANYON CR > METOLIUS R - AT MOUTH
70694	5	CANDLE CR > METOLIUS R - AT MOUTH
70695	5	DESCHUTES R > COLUMBIA R - AB ROUND BUTTE RES
70696	5	JACK CR > METOLIUS R - AT MOUTH
70697	5	JEFFERSON CR > METOLIUS R - AT MOUTH
70698	5	METOLIUS R > DESCHUTES R - AB STREET CR
70699	5	METOLIUS R > DESCHUTES R - AB CANYON CR
70700	5	ODELL CR > DAVIS L - AT MOUTH
70751	5	S FK LAKE CR > METOLIUS R - AT MOUTH
70752	5	TUMALO CR > DESCHUTES R - AT MOUTH
70753	5	SQUAW CR > DESCHUTES R - AT MOUTH
70754	5	SQUAW CR > DESCHUTES R - AB INDIAN FORD CR
70755	5	SPRING CR > METOLIUS R - AT MOUTH
70756	5	SNOW CR > DESCHUTES R - AT MOUTH
70757	5	LITTLE DESCHUTES R > DESCHUTES R - AT MOUTH
70758	5	LITTLE DESCHUTES R > DESCHUTES R - AB CRESCENT CR
70759	5	LITTLE DESCHUTES R > DESCHUTES R - AB UNN STR

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
70760	5	INDIAN FORD CR > SQUAW CR - AT MOUTH
70761	5	FLY CR > METOLIUS R - AT MOUTH
70762	5	FALL R > DESCHUTES R - AT MOUTH
70763	5	DESCHUTES R > COLUMBIA R - AB CULTUS R
70764	5	DESCHUTES R > COLUMBIA R - AB BROWNS CR
70765	5	CRESCENT CR > LITTLE DESCHUTES R - AT MOUTH
70766	5	ABBOT CR > METOLIUS R - AT MOUTH
70767	5	BIG MARSH CR > CRESCENT CR - AT MOUTH
71794	5	LITTLE BADGER CR > BADGER CR - AT MOUTH
71795	5	BUCK HOL > DESCHUTES R - AT MOUTH
71796	5	BAKEOVEN CR > DESCHUTES R - AT MOUTH
71797	5	ANTELOPE CR > TROUT CR - AT MOUTH
71799	5	THREEMILE CR > WHITE R - AT MOUTH
71800	5	WHITE R > DESCHUTES R - AB UNN STR AT NF BOUNDARY
72061	5	FROG CR > CLEAR CR - AT MOUTH
72062	5	CEDAR CR > BOULDER CR - AT MOUTH
72063	5	BADGER CR > TYGH CR - AB LITTLE BADGER CR
72064	5	BOULDER CR > WHITE R - AT MOUTH
72065	5	CLEAR CR > WHITE R - AT MOUTH
72066	5	TYGH CR > WHITE R - AT MOUTH
72067	5	TYGH CR > WHITE R - AB BADGER CR
72068	5	TYGH CR > WHITE R - AB JORDAN CR
73197	5	DEEP CR > N FK CROOKED R - AT MOUTH
73198	5	PINE CR > CROOKED R - AT MOUTH
73199	5	CROOKED R > DESCHUTES R - AB N FK CROOKED R
73319	5	SODA CR > SPARKS L - AT MOUTH
73320	5	FALL CR > SODA CR - AT MOUTH
73321	5	GOOSE CR > SPARKS L - AT MOUTH
73322	5	QUINN CR > HOSMER L - AT MOUTH
73323	5	CULTUS R > DESCHUTES R - AT MOUTH
73324	5	CULTUS CR > DESCHUTES R - AT MOUTH
73325	5	BROWNS CR > DESCHUTES R - AT MOUTH
73326	5	BASIN CR > HEMLOCK CR - AT MOUTH
73327	5	HEMLOCK CR > LITTLE DESCHUTES R - AT MOUTH
73328	5	SPRUCE CR > HEMLOCK CR - AT MOUTH
73329	5	SPRING R > DESCHUTES R - AT MOUTH
73330	5	THREE CR > DEEP CAN - AT MOUTH
73331	5	LINK CR > BLUE L - AT MOUTH
79644	5	WHITE R > DESCHUTES R - AB UNN STR AT WHITE R FALLS
30510501	5	FULTON CAN > COLUMBIA R - AT MOUTH
30510502	5	SPANISH HOL > COLUMBIA R - AT MOUTH
30510503	5	SCOTT CAN > COLUMBIA R - AT MOUTH
30510504	5	HELM CAN > COLUMBIA R - AT MOUTH
30530101	5	METOLIUS R > DESCHUTES R - AT MOUTH
30530102	5	JUNIPER CR > METOLIUS R - AT MOUTH
30530103	5	BIG CAN > METOLIUS R - AT MOUTH
30530104	5	STREET CR > METOLIUS R - AT MOUTH
30530105	5	WHITEWATER R > METOLIUS R - AT MOUTH
30530106	5	FIRST CR > METOLIUS R - AT MOUTH
30530107	5	CACHE CR > S FK LAKE CR - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30530109	5	PAULINA CR > LITTLE DESCHUTES R - AT MOUTH
30530110	5	LONG PRAIRIE SL > LITTLE DESCHUTES R - AT MOUTH
30530112	5	DESCHUTES R > COLUMBIA R - AB BUCKHORN CAN
30530114	5	DESCHUTES R > COLUMBIA R - AB UNN STR
30530116	5	METOLIUS R > DESCHUTES R - AB CANDLE CR
30530301	5	ALKALI CR > BEAVER CR - AT MOUTH
30530302	5	PAULINA CR > BEAVER CR - AT MOUTH
30530303	5	GRINDSTONE CR > BEAVER CR - AT MOUTH
30530304	5	TWELVEMILE CR > S FK CROOKED R - AT MOUTH
30530305	5	S FK CROOKED R > CROOKED R - AB TWELVEMILE CR
30530401	5	WICKIUP CR > CROOKED R - AT MOUTH
30530402	5	CONANT CR > CROOKED R - AT MOUTH
30530403	5	NEWSOME CR > CROOKED R - AT MOUTH
30530404	5	DRAKE CR > CROOKED R - AT MOUTH
30530405	5	LOST CR > CROOKED R - AT MOUTH
30530406	5	PORTER CR > N FK CROOKED R - AT MOUTH
30530407	5	MAURY CR > CROOKED R - AT MOUTH
30530408	5	WATSON CR > CROOKED R - AT MOUTH
30530409	5	CAMP CR > CROOKED R - AT MOUTH
30530501	5	DRY R > CROOKED R - AT MOUTH
30530502	5	OLD DRY CR > MCKAY CR - AT MOUTH
30530503	5	LAWSON CR > OCHOCO CR - AT MOUTH
30530504	5	VEAZIE CR > OCHOCO CR - AT MOUTH
30530505	5	DUNCAN CR > OCHOCO CR - AT MOUTH
30530506	5	DRY CR > CROOKED R - AT MOUTH
30530507	5	CROOKED R > DESCHUTES R - AB DRY R
30530508	5	CROOKED R > DESCHUTES R - AB OSBORNE CAN
30530601	5	GORDON CAN > DESCHUTES R - AT MOUTH
30530602	5	MACKS CAN > DESCHUTES R - AT MOUTH
30530603	5	FERRY CAN > DESCHUTES R - AT MOUTH
30530604	5	OAK CAN > DESCHUTES R - AT MOUTH
30530605	5	JONES CAN > DESCHUTES R - AT MOUTH
30530606	5	FINNEGAN CR > BUCK HOL - AT MOUTH
30530607	5	BRONX CAN > BUCK HOL - AT MOUTH
30530608	5	HINTON CR > BUCK HOL - AT MOUTH
30530609	5	SPEARS CAN > BUCK HOL - AT MOUTH
30530610	5	MACKEN CAN > BUCK HOL - AT MOUTH
30530611	5	BUCK HOL > DESCHUTES R - AB MACKEN CAN
30530612	5	BUTLER CAN > TYGH CR - AT MOUTH
30530613	5	BADGER CR > TYGH CR - AT MOUTH
30530614	5	JORDAN CR > TYGH CR - AT MOUTH
30530615	5	ROCK CR > WHITE R - AT MOUTH
30530616	5	DESCHUTES R > COLUMBIA R - AB WHITE R
30530617	5	TRAIL HOL CR > BAKEOVEN CR - AT MOUTH
30530618	5	SALT CR > BAKEOVEN CR - AT MOUTH
30530619	5	BOOTEN CR > BAKEOVEN CR - AT MOUTH
30530620	5	ROBIN CR > BAKEOVEN CR - AT MOUTH
30530621	5	DEEP CR > BAKEOVEN CR - AT MOUTH
30530622	5	BAKEOVEN CR > DESCHUTES R - AB DEEP CR
30530623	5	STAG CAN > DESCHUTES R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30530624	5	WAPINITIA CR > DESCHUTES R - AT MOUTH
30530625	5	NENA CR > DESCHUTES R - AT MOUTH
30530626	5	EAGLE CR > DESCHUTES R - AT MOUTH
30530627	5	DESCHUTES R > COLUMBIA R - AB EAGLE CR
30530628	5	COVE CR > DESCHUTES R - AT MOUTH
30530629	5	OAK CR > DESCHUTES R - AT MOUTH
30530630	5	SKOOKUM CR > DESCHUTES R - AT MOUTH
30530631	5	SPRING BR > DESCHUTES R - AT MOUTH
30530632	5	WARM SPRINGS R > DESCHUTES R - AT MOUTH
30530633	5	BEAVER CR > WARM SPRINGS R - AT MOUTH
30530634	5	MILL CR > WARM SPRINGS R - AT MOUTH
30530635	5	BADGER CR > WARM SPRINGS R - AT MOUTH
30530636	5	WARM SPRINGS R > DESCHUTES R - AB BADGER CR
30530637	5	DESCHUTES R > COLUMBIA R - AB WARM SPRINGS R
30530638	5	DRY CR > DESCHUTES R - AT MOUTH
30530639	5	DRY HOL > DESCHUTES R - AT MOUTH
30530640	5	SEEKSEEQUA CR > DESCHUTES R - AT MOUTH
30530641	5	BOX CAN > DESCHUTES R - AT MOUTH
30530642	5	KERR CR > BUCK HOL - AT MOUTH
30530643	5	DESCHUTES R > COLUMBIA R - AB SHITIKE CR
30530644	5	SHITIKE CR > DESCHUTES R - AT MOUTH
30530701	5	BROCHER CR > TROUT CR - AT MOUTH
30530702	5	MUD SPRINGS CR > TROUT CR - AT MOUTH
30530703	5	HAY CR > TROUT CR - AT MOUTH
203	6	BEECH CR > JOHN DAY R - AT MOUTH
204	6	BRIDGE CR > JOHN DAY R - AT MOUTH
205	6	CANYON CR > JOHN DAY R - AT MOUTH
206	6	CLEAR CR > M FK JOHN DAY R - AT MOUTH
207	6	COTTONWOOD CR > JOHN DAY R - AT MOUTH
208	6	GRANITE CR > N FK JOHN DAY R - AT MOUTH
209	6	JOHN DAY R > COLUMBIA R - AT MOUTH
210	6	JOHN DAY R > COLUMBIA R - AB HEIDTMANN CAN
211	6	JOHN DAY R > COLUMBIA R - AB N FK JOHN DAY R
212	6	JOHN DAY R > COLUMBIA R - AB S FK JOHN DAY R
213	6	JOHN DAY R > COLUMBIA R - AB LITTLE PINE CR
214	6	M FK JOHN DAY R > N FK JOHN DAY R - AT MOUTH
217	6	N FK JOHN DAY R > JOHN DAY R - AB MEADOW BROOK
218	6	ROCK CR > JOHN DAY R - AT MOUTH
219	6	S FK JOHN DAY R > JOHN DAY R - AT MOUTH
69795	6	CAMAS CR > N FK JOHN DAY R - AT MOUTH
69797	6	CAMAS CR > N FK JOHN DAY R - AB CABLE CR
69798	6	CAMAS CR > N FK JOHN DAY R - AB OWENS CR
69946	6	COTTONWOOD CR > N FK JOHN DAY R - AT MOUTH
69947	6	VINEGAR CR > M FK JOHN DAY R - AT MOUTH
69948	6	E FK BEECH CR > BEECH CR - AB MCCLELLAN CR
69949	6	REYNOLDS CR > JOHN DAY R - AT MOUTH
69950	6	E FK BEECH CR > BEECH CR - AT MOUTH
69951	6	DEARDORFF CR > JOHN DAY R - AT MOUTH
69952	6	INDIAN CR > JOHN DAY R - AB LITTLE INDIAN CR
69953	6	LONG CR > M FK JOHN DAY R - AB S FK LONG CR

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
69954	6	LONG CR > M FK JOHN DAY R - AT MOUTH
69955	6	CAMP CR > M FK JOHN DAY R - AT MOUTH
69956	6	BIG WALL CR > N FK JOHN DAY R - AT MOUTH
69957	6	MURDERERS CR > S FK JOHN DAY R - AT MOUTH
69958	6	CLEAR CR > GRANITE CR - AT MOUTH
69959	6	BULL RUN CR > GRANITE CR - AT MOUTH
69960	6	N FK JOHN DAY R > JOHN DAY R - AT MOUTH
69961	6	GRANITE BOULDER CR > M FK JOHN DAY R - AT MOUTH
69962	6	BIG WALL CR > N FK JOHN DAY R - AB LITTLE WALL CR
69963	6	FIELDS CR > JOHN DAY R - AT MOUTH
70250	6	BRIDGE CR > JOHN DAY R - AB W BR BRIDGE CR
70251	6	ROCK CR > JOHN DAY R - AT MOUTH
70263	6	BEAR CR > BRIDGE CR - AT MOUTH
70640	6	JOHN DAY R > COLUMBIA R - AB CALL CR
70641	6	RAIL CR > JOHN DAY R - AT MOUTH
70642	6	ROBERTS CR > JOHN DAY R - AT MOUTH
70643	6	M FK CANYON CR > CANYON CR - AT MOUTH
70644	6	E FK CANYON CR > CANYON CR - AT MOUTH
70645	6	CANYON CR > JOHN DAY R - AB E FK CANYON CR
70646	6	PINE CR > JOHN DAY R - AT MOUTH
70647	6	N FK JOHN DAY R > JOHN DAY R - AB TRAIL CR
70648	6	N FK JOHN DAY R > JOHN DAY R - AB TEXAS BAR CR
70649	6	CRANE CR > N FK JOHN DAY R - AT MOUTH
70650	6	TRAIL CR > N FK JOHN DAY R - AT MOUTH
70651	6	INDIAN CR > M FK JOHN DAY R - AT MOUTH
70652	6	BIG BOULDER CR > M FK JOHN DAY R - AT MOUTH
70653	6	BIG CR > M FK JOHN DAY R - AT MOUTH
70654	6	S FK LONG CR > LONG CR - AT MOUTH
70655	6	MCCLELLAN CR > E FK BEECH CR - AT MOUTH
30620101	6	JOHNSON CR > JOHN DAY R - AT MOUTH
30620102	6	SQUAW CR > JOHN DAY R - AT MOUTH
30620103	6	MOUNTAIN CR > ROCK CR - AT MOUTH
30620104	6	ROCK CR > JOHN DAY R - AB MOUNTAIN CR
30620105	6	RATTLESNAKE CR > JOHN DAY R - AT MOUTH
30620106	6	FRANKS CR > JOHN DAY R - AT MOUTH
30620107	6	BLACK CAN > S FK JOHN DAY R - AT MOUTH
30620108	6	S FK JOHN DAY R > JOHN DAY R - AB MURDERERS CR
30620109	6	WIND CR > S FK JOHN DAY R - AT MOUTH
30620110	6	DEER CR > S FK JOHN DAY R - AT MOUTH
30620111	6	SUNFLOWER CR > S FK JOHN DAY R - AT MOUTH
30620112	6	PINE CR > S FK JOHN DAY R - AT MOUTH
30620113	6	S FK JOHN DAY R > JOHN DAY R - AB PINE CR
30620114	6	BELSHAW CR > JOHN DAY R - AT MOUTH
30620115	6	RILEY CR > JOHN DAY R - AT MOUTH
30620116	6	BEECH CR > JOHN DAY R - AB E FK BEECH CR
30620117	6	JOHN DAY R > COLUMBIA R - AB BEECH CR
30620118	6	LAYCOCK CR > JOHN DAY R - AT MOUTH
30620119	6	GRUB CR > JOHN DAY R - AT MOUTH
30620120	6	INDIAN CR > JOHN DAY R - AT MOUTH
30620121	6	BEAR CR > JOHN DAY R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30620122	6	DIXIE CR > JOHN DAY R - AT MOUTH
30620123	6	STRAWBERRY CR > JOHN DAY R - AT MOUTH
30620124	6	JOHN DAY R > COLUMBIA R - AB UNN STR
30620125	6	SLIDE CR > STRAWBERRY CR - AT MOUTH
30620126	6	DADS CR > JOHN DAY R - AT MOUTH
30620127	6	JEFF DAVIS CR > JOHN DAY R - AT MOUTH
30620128	6	DANS CR > JOHN DAY R - AT MOUTH
30620129	6	ISHAM CR > JOHN DAY R - AT MOUTH
30620130	6	JOHN DAY R > COLUMBIA R - AB ISHAM CR
30620131	6	GRAHAM CR > JOHN DAY R - AT MOUTH
30620132	6	JOHN DAY R > COLUMBIA R - AB RAIL CR
30620133	6	CALL CR > JOHN DAY R - AT MOUTH
30620134	6	S FK JOHN DAY R > JOHN DAY R - AB UNN STR
30620201	6	RUDIO CR > N FK JOHN DAY R - AT MOUTH
30620202	6	DEER CR > N FK JOHN DAY R - AT MOUTH
30620203	6	LITTLE WALL CR > BIG WALL CR - AT MOUTH
30620204	6	N FK JOHN DAY R > JOHN DAY R - AB M FK JOHN DAY R
30620205	6	DITCH CR > N FK JOHN DAY R - AT MOUTH
30620206	6	MALLORY CR > N FK JOHN DAY R - AT MOUTH
30620207	6	POTAMUS CR > N FK JOHN DAY R - AT MOUTH
30620208	6	STONY CR > N FK JOHN DAY R - AT MOUTH
30620209	6	FIVEMILE CR > CAMAS CR - AT MOUTH
30620210	6	OWENS CR > CAMAS CR - AT MOUTH
30620211	6	PINE CR > CAMAS CR - AT MOUTH
30620212	6	CABLE CR > CAMAS CR - AT MOUTH
30620213	6	MEADOW BROOK > N FK JOHN DAY R - AT MOUTH
30620214	6	TEXAS BAR CR > N FK JOHN DAY R - AT MOUTH
30620215	6	BIG CR > N FK JOHN DAY R - AT MOUTH
30620216	6	GRANITE CR > N FK JOHN DAY R - AB BULL RUN CR
30620217	6	N FK JOHN DAY R > JOHN DAY R - AB GRANITE CR
30620218	6	FOX CR > COTTONWOOD CR - AT MOUTH
30620219	6	DESOLATION CR > N FK JOHN DAY R - AT MOUTH
30620221	6	N FK JOHN DAY R > JOHN DAY R - AB UNN STR
30620301	6	PASS CR > LONG CR - AT MOUTH
30620302	6	BASIN CR > LONG CR - AT MOUTH
30620303	6	SIXMILE CR > M FK JOHN DAY R - AT MOUTH
30620304	6	EIGHTMILE CR > M FK JOHN DAY R - AT MOUTH
30620305	6	RUSH CR > M FK JOHN DAY R - AT MOUTH
30620306	6	GRANITE CR > M FK JOHN DAY R - AT MOUTH
30620307	6	SLIDE CR > M FK JOHN DAY R - AT MOUTH
30620308	6	M FK JOHN DAY R > N FK JOHN DAY R - AB INDIAN CR
30620309	6	M FK JOHN DAY R > N FK JOHN DAY R - AB GRANITE BOULDER CR
30620310	6	M FK JOHN DAY R > N FK JOHN DAY R - AB CLEAR CR
30620401	6	GRASS VALLEY CAN > JOHN DAY R - AT MOUTH
30620402	6	SCOTT CAN > JOHN DAY R - AT MOUTH
30620403	6	HAY CR > JOHN DAY R - AT MOUTH
30620404	6	ESAU CAN > JOHN DAY R - AT MOUTH
30620405	6	FERRY CAN > JOHN DAY R - AT MOUTH
30620406	6	JACKKNIFE CAN > JOHN DAY R - AT MOUTH
30620407	6	THIRTYMILE CR > JOHN DAY R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30620408	6	PINE HOL > JOHN DAY R - AT MOUTH
30620409	6	BUTTE CR > JOHN DAY R - AT MOUTH
30620410	6	SOREFOOT CR > JOHN DAY R - AT MOUTH
30620411	6	PINE CR > JOHN DAY R - AT MOUTH
30620412	6	MUDDY CR > JOHN DAY R - AT MOUTH
30620413	6	RHODES CAN > JOHN DAY R - AT MOUTH
30620414	6	CHERRY CR > JOHN DAY R - AT MOUTH
30620415	6	ROWE CR > JOHN DAY R - AT MOUTH
30620416	6	GIRDS CR > JOHN DAY R - AT MOUTH
30620417	6	SHOOFLY CR > JOHN DAY R - AT MOUTH
30620418	6	HEIDTMANN CAN > JOHN DAY R - AT MOUTH
30620419	6	SERVICE CR > JOHN DAY R - AT MOUTH
30620420	6	ALDER CR > JOHN DAY R - AT MOUTH
30620421	6	HORSESHOE CR > JOHN DAY R - AT MOUTH
30620422	6	KAHLER CR > JOHN DAY R - AT MOUTH
30620423	6	PARRISH CR > JOHN DAY R - AT MOUTH
30620424	6	HAYSTACK CR > JOHN DAY R - AT MOUTH
30620425	6	BOLOGNA CAN > JOHN DAY R - AT MOUTH
30620426	6	W BR BRIDGE CR > BRIDGE CR - AT MOUTH
30620427	6	ROCK CR > JOHN DAY R - AB WALLACE CAN
220	7	BIRCH CR > UMATILLA R - AT MOUTH
221	7	UMATILLA R > COLUMBIA R - AT MOUTH
222	7	UMATILLA R > COLUMBIA R - AB MCKAY CR
223	7	WALLA WALLA R > COLUMBIA R - AB LITTLE WALLA WALLA R
542	7	UMATILLA R > COLUMBIA R - AB MEACHAM CR
551	7	W BIRCH CR > BIRCH CR - AB JACK CAN
70488	7	N FK MEACHAM CR > MEACHAM CR - AT MOUTH
70489	7	MEACHAM CR > UMATILLA R - AB N FK MEACHAM CR
70490	7	MEACHAM CR > UMATILLA R - AT MOUTH
70563	7	RYAN CR > UMATILLA R - AT MOUTH
70564	7	S FK WALLA WALLA R > WALLA WALLA R - AT MOUTH
70565	7	N FK WALLA WALLA R > WALLA WALLA R - AT MOUTH
70566	7	S FK UMATILLA R > UMATILLA R - AT MOUTH
70567	7	N FK UMATILLA R > UMATILLA R - AT MOUTH
70568	7	BUCK CR > S FK UMATILLA R - AT MOUTH
70569	7	THOMAS CR > S FK UMATILLA R - AT MOUTH
70570	7	CAMP CR > MEACHAM CR - AT MOUTH
70571	7	COUSE CR > WALLA WALLA R - AT MOUTH
70572	7	MILL CR > WALLA WALLA R - AT MOUTH
70680	7	BRIDGE CR > W BIRCH CR - AT MOUTH
70681	7	E BIRCH CR > BIRCH CR - AT MOUTH
70682	7	MCKAY CR > UMATILLA R - AB SPRING HOL
70683	7	N FK MCKAY CR > MCKAY CR - AT MOUTH
70684	7	PEARSON CR > E BIRCH CR - AT MOUTH
70685	7	SQUAW CR > UMATILLA R - AT MOUTH
70686	7	STANLEY CR > W BIRCH CR - AT MOUTH
70687	7	W BIRCH CR > BIRCH CR - AT MOUTH
30710101	7	SIXMILE CAN > COLUMBIA R - AT MOUTH
30710102	7	WELL SPRING CAN > SIXMILE CAN - AT MOUTH
30710103	7	FOURMILE CAN > SIXMILE CAN - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30710104	7	SIXMILE CAN > COLUMBIA R - AB FOURMILE CAN
30710105	7	JUNIPER CAN > COLUMBIA R - AT MOUTH
30710106	7	LITTLE JUNIPER CAN > JUNIPER CAN - AT MOUTH
30710107	7	STRAWBERRY CAN > JUNIPER CAN - AT MOUTH
30710108	7	JUNIPER CAN > COLUMBIA R - AB STRAWBERRY CAN
30710109	7	JUNIPER CAN > COLUMBIA R - AT MOUTH
30710110	7	S FK JUNIPER CAN > JUNIPER CAN - AT MOUTH
30710111	7	N FK JUNIPER CAN > JUNIPER CAN - AT MOUTH
30710201	7	VANSYCLE CAN > WALLA WALLA R - AT MOUTH
30710202	7	RAYMOND G > PINE CR - AT MOUTH
30710203	7	PINE CR > WALLA WALLA R - AT MOUTH
30710204	7	DRY CR > PINE CR - AT MOUTH
30710205	7	PINE CR > WALLA WALLA R - AB DRY CR
30710206	7	BIRCH CR > WALLA WALLA R - AT MOUTH
30710207	7	COTTONWOOD CR > YELLOWHAWK CR - AT MOUTH
30710208	7	WALLA WALLA R > COLUMBIA R - AB BIRCH CR
30710209	7	LITTLE WALLA WALLA R > WALLA WALLA R - AT MOUTH
30710210	7	BIG SPRING > E LITTLE WALLA WALLA R - AT MOUTH
30710211	7	GRANDVIEW CR > E LITTLE WALLA WALLA R - AT MOUTH
30710301	7	SAND HOL > NONE - AT MOUTH
30710302	7	MILK CAN > SAND HOL - AT MOUTH
30710303	7	SAND HOL > NONE - AB MILK CAN
30710304	7	FOURMILE CAN > LOST L - AT MOUTH
30710305	7	BUTTER CR > UMATILLA R - AT MOUTH
30710306	7	LITTLE BUTTER CR > BUTTER CR - AT MOUTH
30710307	7	AYERS CAN > BUTTER CR - AT MOUTH
30710308	7	MATLOCK CAN > BUTTER CR - AT MOUTH
30710309	7	SLUSHER CAN > BUTTER CR - AT MOUTH
30710310	7	E FK BUTTER CR > BUTTER CR - AT MOUTH
30710311	7	BUTTER CR > UMATILLA R - AB E FK BUTTER CR
30710312	7	JOHNSON CR > BUTTER CR - AT MOUTH
30710313	7	BUTTER CR > UMATILLA R - AB JOHNSON CR
30710314	7	SERVICE CAN > UMATILLA R - AT MOUTH
30710315	7	SPIKES G > SERVICE CAN - AT MOUTH
30710316	7	STAGE G > UMATILLA R - AT MOUTH
30710317	7	ALKALI CAN > UMATILLA R - AT MOUTH
30710318	7	SPEARE CAN > UMATILLA R - AT MOUTH
30710319	7	COOMBS CAN > UMATILLA R - AT MOUTH
30710320	7	JACK CAN > W BIRCH CR - AT MOUTH
30710321	7	BEAR CR > W BIRCH CR - AT MOUTH
30710322	7	OWINGS CR > BEAR CR - AT MOUTH
30710323	7	BEAR CR > W BIRCH CR - AB OWINGS CR
30710324	7	W BIRCH CR > BIRCH CR - AB STANLEY CR
30710325	7	E BIRCH CR > BIRCH CR - AB PEARSON CR
30710326	7	MCKAY CR > UMATILLA R - AT MOUTH
30710327	7	MCKAY CR > UMATILLA R - AB N FK MCKAY CR
30710328	7	WOOD HOL > MCKAY CR - AT MOUTH
30710329	7	BASSEY CR > MCKAY CR - AT MOUTH
30710330	7	JOHNSON CR > MCKAY CR - AT MOUTH
30710331	7	MCKAY CR > UMATILLA R - AB JOHNSON CR

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30710332	7	TUTUILLA CR > UMATILLA R - AT MOUTH
30710333	7	WILDHORSE CR > UMATILLA R - AT MOUTH
30710334	7	GREASEWOOD CR > WILDHORSE CR - AT MOUTH
30710335	7	SAND HOL > WILDHORSE CR - AT MOUTH
30710336	7	SPRING HOL CR > WILDHORSE CR - AT MOUTH
30710337	7	GERKING CR > WILDHORSE CR - AT MOUTH
30710338	7	WILDHORSE CR > UMATILLA R - AB GERKING CR
30710340	7	COLD SPRINGS WASH > COLUMBIA R - AT MOUTH
30710341	7	DESPAIN G > COLD SPRINGS RES - AT MOUTH
30710342	7	COLD SPRINGS CAN > COLD SPRINGS RES - AT MOUTH
30710343	7	S FK COLD SPRINGS CAN > COLD SPRINGS CAN - AT MOUTH
30710344	7	N FK COLD SPRINGS CAN > COLD SPRINGS CAN - AT MOUTH
30710345	7	M FK COLD SPRINGS CAN > COLD SPRINGS CAN - AT MOUTH
30710346	7	BUTTER CR > UMATILLA R - AB AYERS CAN
30710347	7	UMATILLA R > COLUMBIA R - AB UNN STR
30710401	7	EIGHTMILE CAN > WILLOW CR - AT MOUTH
30710402	7	FOURMILE CAN > EIGHTMILE CAN - AT MOUTH
30710403	7	JORDAN CAN > EIGHTMILE CAN - AT MOUTH
30710404	7	EIGHTMILE CAN > WILLOW CR - AB YOUNGS CAN
30710405	7	BRENNER CAN > RHEA CR - AT MOUTH
30710406	7	MCKINNEY CR > RHEA CR - AT MOUTH
30710407	7	SPRING HOL CR > RHEA CR - AT MOUTH
30710408	7	BALM CAN > RHEA CR - AT MOUTH
30710409	7	THORN CR > RHEA CR - AT MOUTH
30710410	7	RHEA CR > WILLOW CR - AB THORN CR
30710411	7	CLARKS CAN > WILLOW CR - AT MOUTH
30710412	7	BLACKHORSE CAN > WILLOW CR - AT MOUTH
30710413	7	HINTON CR > WILLOW CR - AT MOUTH
30710414	7	SKINNERS FK > WILLOW CR - AT MOUTH
30710415	7	WILLOW CR > COLUMBIA R - AB SKINNERS FK
30710416	7	WILLOW CR > COLUMBIA R - AB RHEA CR
30710417	7	WILLOW CR > COLUMBIA R - AT MOUTH
30710418	7	RHEA CR > WILLOW CR - AT MOUTH
30710419	7	RHEA CR > WILLOW CR - AB SPRING HOL CR
30710420	7	BALM FK > WILLOW CR - AT MOUTH
30710421	7	WILLOW CR > COLUMBIA R - AB BALM FK
30710422	7	WILLOW CR > COLUMBIA R - AB SHOBE CAN
224	8	BEAR CR > WALLOWA R - AT MOUTH
225	8	BIG SHEEP CR > IMNAHA R - AT MOUTH
226	8	CATHERINE CR > GRANDE RONDE R - AB POND SL
227	8	GRANDE RONDE R > SNAKE R - AT MOUTH
228	8	GRANDE RONDE R > SNAKE R - AB SHEEP CR
230	8	GRANDE RONDE R > SNAKE R - AB HAYWIRE CAN
231	8	IMNAHA R > SNAKE R - AB ADAMS CAN
232	8	LITTLE SHEEP CR > BIG SHEEP CR - AT MOUTH
233	8	LOSTINE R > WALLOWA R - AT MOUTH
234	8	MINAM R > WALLOWA R - AT MOUTH
70583	8	JOSEPH CR > GRANDE RONDE R - AB COUGAR CR
70584	8	CHESNIMNUS CR > JOSEPH CR - AT MOUTH
70691	8	WENAHA R > GRANDE RONDE R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
70692	8	HURRICANE CR > WALLOWA R - AT MOUTH
70780	8	JOSEPH CR > GRANDE RONDE R - AT MOUTH
70861	8	SHEEP CR > GRANDE RONDE R - AT MOUTH
70862	8	S FK CATHERINE CR > CATHERINE CR - AT MOUTH
70865	8	N FK CATHERINE CR > CATHERINE CR - AT MOUTH
70866	8	LOOKINGGLASS CR > GRANDE RONDE R - AT MOUTH
70867	8	LIMBER JIM CR > GRANDE RONDE R - AT MOUTH
70868	8	FLY CR > GRANDE RONDE R - AT MOUTH
70872	8	BEAVER CR > GRANDE RONDE R - AT MOUTH
70873	8	FIVE POINTS CR > GRANDE RONDE R - AT MOUTH
71660	8	DARK CAN CR > MEADOW CR - AT MOUTH
71661	8	CLEAR CR > GRANDE RONDE R - AT MOUTH
71662	8	CLARK CR > GRANDE RONDE R - AT MOUTH
71663	8	PHILLIPS CR > GRANDE RONDE R - AT MOUTH
71664	8	CHICKEN CR > SHEEP CR - AT MOUTH
71665	8	INDIAN CR > GRANDE RONDE R - AT MOUTH
71666	8	CABIN CR > GRANDE RONDE R - AT MOUTH
71667	8	BEAR CR > MEADOW CR - AT MOUTH
71668	8	BURNT CORRAL CR > MEADOW CR - AT MOUTH
71669	8	WILLOW CR > GRANDE RONDE R - AT MOUTH
71670	8	W CHICKEN CR > CHICKEN CR - AT MOUTH
71671	8	SPRING CR > GRANDE RONDE R - AT MOUTH
71672	8	S FK CABIN CR > CABIN CR - AT MOUTH
71673	8	ROCK CR > GRANDE RONDE R - AT MOUTH
71674	8	PELICAN CR > FIVE POINTS CR - AT MOUTH
71675	8	N FK CABIN CR > CABIN CR - AT MOUTH
71676	8	MEADOW CR > GRANDE RONDE R - AT MOUTH
71677	8	MEADOW CR > GRANDE RONDE R - AB BEAR CR
71678	8	MCCOY CR > MEADOW CR - AT MOUTH
71679	8	MARLEY CR > MEADOW CR - AT MOUTH
71680	8	LITTLE CR > CATHERINE CR - AT MOUTH
71681	8	LITTLE CATHERINE CR > CATHERINE CR - AT MOUTH
71682	8	JARBOE CR > LOOKINGGLASS CR - AT MOUTH
71683	8	GORDON CR > GRANDE RONDE R - AT MOUTH
71733	8	MILL CR > WILLOW CR - AT MOUTH
71734	8	WILLOW CR > GRANDE RONDE R - AB MILL CR
72034	8	WALLOWA R > GRANDE RONDE R - AB LOSTINE R
72035	8	WALLOWA R > GRANDE RONDE R - AB PRAIRIE CR
72036	8	WALLOWA R > GRANDE RONDE R - AT MOUTH
30810101	8	CHALK CR > SNAKE R - AT MOUTH
30810102	8	MOUNTAIN SHEEP CR > SNAKE R - AT MOUTH
30810103	8	KNIGHT CR > SNAKE R - AT MOUTH
30810104	8	BIRCH CR > SNAKE R - AT MOUTH
30810105	8	DUG CR > SNAKE R - AT MOUTH
30810106	8	DEEP CR > SNAKE R - AT MOUTH
30810107	8	THORN SPRING CR > SNAKE R - AT MOUTH
30810108	8	CHRISTMAS CR > SNAKE R - AT MOUTH
30810109	8	ROLAND CR > SNAKE R - AT MOUTH
30810110	8	CAT CR > SNAKE R - AT MOUTH
30810111	8	BOB CR > SNAKE R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30810112	8	COPPER CR > SNAKE R - AT MOUTH
30810113	8	LONEPINE CR > SNAKE R - AT MOUTH
30810114	8	LOOKOUT CR > SNAKE R - AT MOUTH
30810115	8	TYRON CR > SNAKE R - AT MOUTH
30810116	8	CAMP CR > SNAKE R - AT MOUTH
30810117	8	SOMERS CR > SNAKE R - AT MOUTH
30810118	8	MCCARTY CR > SNAKE R - AT MOUTH
30810119	8	DAVIS CR > SNAKE R - AT MOUTH
30810120	8	PITTSBURG CR > SNAKE R - AT MOUTH
30810121	8	DURHAM CR > SNAKE R - AT MOUTH
30810122	8	MUIR CR > SNAKE R - AT MOUTH
30810123	8	TWO CORRAL CR > SNAKE R - AT MOUTH
30810124	8	SALT CR > SNAKE R - AT MOUTH
30810125	8	HOMINY CR > SNAKE R - AT MOUTH
30810126	8	TEMPERANCE CR > SNAKE R - AT MOUTH
30810127	8	QUARTZ CR > SNAKE R - AT MOUTH
30810128	8	SAND CR > SNAKE R - AT MOUTH
30810129	8	RUSH CR > SNAKE R - AT MOUTH
30810130	8	SLUICE CR > SNAKE R - AT MOUTH
30810131	8	WATERSPOUT CR > SNAKE R - AT MOUTH
30810132	8	HAT CR > SNAKE R - AT MOUTH
30810133	8	SADDLE CR > SNAKE R - AT MOUTH
30810134	8	CACHE CR > SNAKE R - AT MOUTH
30810135	8	BULL CR > SNAKE R - AT MOUTH
30810136	8	WILD SHEEP CR > SNAKE R - AT MOUTH
30810137	8	BATTLE CR > SNAKE R - AT MOUTH
30810138	8	STUD CR > SNAKE R - AT MOUTH
30810139	8	HELLS CAN > SNAKE R - AT MOUTH
30810140	8	COUGAR CR > SNAKE R - AT MOUTH
30810141	8	PLEASANT VALLEY CR > SNAKE R - AT MOUTH
30810142	8	EUREKA CR > SNAKE R - AT MOUTH
30810201	8	IMNAHA R > SNAKE R - AT MOUTH
30810202	8	COW CR > IMNAHA R - AT MOUTH
30810203	8	LIGHTNING CR > IMNAHA R - AT MOUTH
30810204	8	SLEEPY CR > LIGHTNING CR - AT MOUTH
30810205	8	LIGHTNING CR > IMNAHA R - AB SLEEPY CR
30810206	8	TULLEY CR > IMNAHA R - AT MOUTH
30810207	8	THORN CR > IMNAHA R - AT MOUTH
30810208	8	CORRAL CR > IMNAHA R - AT MOUTH
30810209	8	HORSE CR > IMNAHA R - AT MOUTH
30810210	8	PUMPKIN CR > HORSE CR - AT MOUTH
30810211	8	HORSE CR > IMNAHA R - AB PUMPKIN CR
30810212	8	IMNAHA R > SNAKE R - AB HORSE CR
30810213	8	FENCE CR > IMNAHA R - AT MOUTH
30810214	8	CAMP CR > BIG SHEEP CR - AT MOUTH
30810216	8	BEAR G > LITTLE SHEEP CR - AT MOUTH
30810217	8	DEVILS G > LITTLE SHEEP CR - AT MOUTH
30810218	8	LIGHTNING CR > LITTLE SHEEP CR - AT MOUTH
30810219	8	THREEBUCK CR > LITTLE SHEEP CR - AT MOUTH
30810220	8	LITTLE SHEEP CR > BIG SHEEP CR - AB THREEBUCK CR

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30810221	8	BIG SHEEP CR > IMNAHA R - AB LITTLE SHEEP CR
30810222	8	SQUAW CR > BIG SHEEP CR - AT MOUTH
30810223	8	MARR CR > BIG SHEEP CR - AT MOUTH
30810224	8	TIMBER CR > BIG SHEEP CR - AT MOUTH
30810225	8	GRIFFITH CR > BIG SHEEP CR - AT MOUTH
30810226	8	BIG SHEEP CR > IMNAHA R - AB GRIFFITH CR
30810227	8	CARROL CR > BIG SHEEP CR - AT MOUTH
30810228	8	LICK CR > BIG SHEEP CR - AT MOUTH
30810229	8	BIG SHEEP CR > IMNAHA R - AB LICK CR
30810230	8	IMNAHA R > SNAKE R - AB BIG SHEEP CR
30810231	8	FREEZEOUT CR > IMNAHA R - AT MOUTH
30810232	8	GROUSE CR > IMNAHA R - AT MOUTH
30810233	8	IMNAHA R > SNAKE R - AB GROUSE CR
30810234	8	SUMMIT CR > IMNAHA R - AT MOUTH
30810235	8	CRAZYMAN CR > IMNAHA R - AT MOUTH
30810236	8	GUMBOOT CR > IMNAHA R - AT MOUTH
30810237	8	IMNAHA R > SNAKE R - AB GUMBOOT CR
30810301	8	CACHE CR > SNAKE R - AT MOUTH
30810302	8	GARDEN CR > SNAKE R - AT MOUTH
30810303	8	COON HOL > SNAKE R - AT MOUTH
30810304	8	JIM CR > SNAKE R - AT MOUTH
30810305	8	COOK CR > SNAKE R - AT MOUTH
30810306	8	CHERRY CR > SNAKE R - AT MOUTH
30810401	8	LITTLE LOOKINGGLASS CR > LOOKINGGLASS CR - AT MOUTH
30810402	8	LOOKINGGLASS CR >GRANDE RONDE R -AB LITTLE LOOKINGGLASS CR
30810403	8	DUNCAN CAN > GRANDE RONDE R - AT MOUTH
30810404	8	RYSDAM CAN > GRANDE RONDE R - AT MOUTH
30810405	8	UNN STR > GRANDE RONDE R - AT MOUTH
30810406	8	GRANDE RONDE R > SNAKE R - AB GORDON CR
30810407	8	GRANDE RONDE R > SNAKE R - AB WILLOW CR
30810408	8	CATHERINE CR > GRANDE RONDE R - AT MOUTH
30810409	8	MILL CR > CATHERINE CR - AT MOUTH
30810410	8	PYLES CR > CATHERINE CR - AT MOUTH
30810411	8	WHISKEY CR > GRANDE RONDE R - AT MOUTH
30810412	8	JORDON CR > GRANDE RONDE R - AT MOUTH
30810413	8	BEAR CR > GRANDE RONDE R - AT MOUTH
30810414	8	GRANDE RONDE R > SNAKE R - AB FLY CR
30810415	8	GRANDE RONDE R > SNAKE R - AB CLEAR CR
30810416	8	GRANDE RONDE R > SNAKE R - AB WALLOWA R
30810417	8	UNN STR > GRANDE RONDE R - AT MOUTH
30810418	8	GRANDE RONDE R > SNAKE R - AB SPRING CR
30810419	8	CATHERINE CR > GRANDE RONDE R - AB BRINKER CR
30810501	8	HOWARD CR > WALLOWA R - AT MOUTH
30810502	8	TROUT CR > MINAM R - AT MOUTH
30810503	8	MURPHY CR > MINAM R - AT MOUTH
30810504	8	LITTLE MINAM R > MINAM R - AT MOUTH
30810505	8	MINAM R > WALLOWA R - AB LITTLE MINAM R
30810506	8	DEER CR > WALLOWA R - AT MOUTH
30810507	8	ROCK CR > DRY CR - AT MOUTH
30810508	8	DRY CR > WALLOWA R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30810509	8	WALLOWA R > GRANDE RONDE R - AB BEAR CR
30810510	8	WHISKY CR > WALLOWA R - AT MOUTH
30810511	8	PARSNIP CR > WALLOWA R - AT MOUTH
30810512	8	TROUT CR > WALLOWA R - AT MOUTH
30810513	8	PRAIRIE CR > WALLOWA R - AT MOUTH
30810514	8	LOSTINE R > WALLOWA R - AB SPRING CR
30810515	8	WALLOWA R > GRANDE RONDE R - AB UNN STR
30810516	8	HURRICANE CR > WALLOWA R - AB NEWBY CR
30810601	8	COURTNEY CR > GRANDE RONDE R - AT MOUTH
30810602	8	MUD CR > GRANDE RONDE R - AT MOUTH
30810603	8	BUCK CR > MUD CR - AT MOUTH
30810604	8	TOPE CR > MUD CR - AT MOUTH
30810605	8	MCALISTER CR > MUD CR - AT MOUTH
30810606	8	MUD CR > GRANDE RONDE R - AB MCALISTER CR
30810607	8	WILDCAT CR > GRANDE RONDE R - AT MOUTH
30810608	8	WALLUPA CR > WILDCAT CR - AT MOUTH
30810609	8	WILDCAT CR > GRANDE RONDE R - AB WALLUPA CR
30810610	8	SICKFOOT CR > GRANDE RONDE R - AT MOUTH
30810611	8	GROSSMAN CR > GRANDE RONDE R - AT MOUTH
30810612	8	ELBOW CR > GRANDE RONDE R - AT MOUTH
30810613	8	BEAR CR > GRANDE RONDE R - AT MOUTH
30810614	8	SHEEP CR > GRANDE RONDE R - AT MOUTH
30810615	8	TAMARACK CR > JOSEPH CR - AT MOUTH
30810616	8	RUSH CR > JOSEPH CR - AT MOUTH
30810617	8	PEAVINE CR > JOSEPH CR - AT MOUTH
30810618	8	SWAMP CR > JOSEPH CR - AT MOUTH
30810619	8	COUGAR CR > JOSEPH CR - AT MOUTH
30810620	8	SUMAC CR > JOSEPH CR - AT MOUTH
30810621	8	CROW CR > JOSEPH CR - AT MOUTH
30810622	8	ELK CR > CROW CR - AT MOUTH
30810623	8	CROW CR > JOSEPH CR - AB ELK CR
30810624	8	PEAVINE CR > CHESNIMNUS CR - AT MOUTH
30810625	8	SALMON CR > CHESNIMNUS CR - AT MOUTH
30810626	8	ALDER CR > SALMON CR - AT MOUTH
30810627	8	PINE CR > SALMON CR - AT MOUTH
30810628	8	SALMON CR > CHESNIMNUS CR - AB PINE CR
30810629	8	CHESNIMNUS CR > JOSEPH CR - AB SALMON CR
30810630	8	DOE CR > CHESNIMNUS CR - AT MOUTH
30810631	8	BILLY CR > CHESNIMNUS CR - AT MOUTH
30810632	8	DEVILS RUN CR > CHESNIMNUS CR - AT MOUTH
30810633	8	CHESNIMNUS CR > JOSEPH CR - AB DEVILS RUN CR
30810634	8	COTTONWOOD CR > JOSEPH CR - AT MOUTH
30810635	8	HORSE CR > COTTONWOOD CR - AT MOUTH
30810636	8	BROADY CR > COTTONWOOD CR - AT MOUTH
30810637	8	COTTONWOOD CR > JOSEPH CR - AB BROADY CR
30810638	8	DEER CR > GRONDE RONDE R - AT MOUTH
30810639	8	BUFORD CR > GRANDE RONDE R - AT MOUTH
30810640	8	E BEAR CR > BEAR CR - AT MOUTH
30810641	8	W BEAR CR > BEAR CR - AT MOUTH
30820101	8	THIRTYTWO POINT CR > SNAKE R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30820102	8	BUCK CR > SNAKE R - AT MOUTH
30820103	8	SQUAW CR > SNAKE R - AT MOUTH
30820104	8	DOYLE CR > SNAKE R - AT MOUTH
30820105	8	LYNCH CR > SNAKE R - AT MOUTH
30820106	8	KIRBY CR > SNAKE R - AT MOUTH
30820107	8	LEEP CR > SNAKE R - AT MOUTH
30820108	8	SPRING CR > SNAKE R - AT MOUTH
30820109	8	MCGRAW CR > SNAKE R - AT MOUTH
30820110	8	NELSON CR > SNAKE R - AT MOUTH
30820111	8	STEAMBOAT CR > SNAKE R - AT MOUTH
235	9	CLEAR CR > PINE CR - AT MOUTH
236	9	E FK EAGLE CR > EAGLE CR - AT MOUTH
238	9	EAGLE CR > POWDER R - AB SKULL CR
239	9	EAGLE CR > POWDER R - AB E FK EAGLE CR
240	9	EAGLE CR > POWDER R - AB W EAGLE CR
241	9	N PINE CR > PINE CR - AT MOUTH
243	9	POWDER R > SNAKE R - AB BEAVER CR
245	9	W EAGLE CR > EAGLE CR - AB TROUT CR
70863	9	PINE CR > SNAKE R - AB LONG BR
70864	9	PINE CR > SNAKE R - AB FULLER CR
70869	9	E PINE CR > PINE CR - AB BEECHER CR
70870	9	E PINE CR > PINE CR - AT MOUTH
70871	9	ELK CR > LAKE FK CR - AT MOUTH
71684	9	W EAGLE CR > EAGLE CR - AT MOUTH
71685	9	N POWDER R > POWDER R - AB ANTONE CR
72159	9	ROCK CR > POWDER R - AB UNN STR
72160	9	S FK BURNT R > BURNT R - AB ELK CR
72161	9	S FK BURNT R > BURNT R - AB UNN STR
72162	9	W CAMP CR > CAMP CR - AT MOUTH
72163	9	WOLF CR > POWDER R - AT MOUTH
72164	9	ANTHONY FK > N POWDER R - AB INDIAN CR
72165	9	ANTHONY FK > N POWDER R - AT MOUTH
72166	9	ANTONE CR > N POWDER R - AT MOUTH
72167	9	BIG CR > POWDER R - AT MOUTH
72168	9	BURNT R > SNAKE R - AT MOUTH
72169	9	BURNT R > SNAKE R - AB UNN STR
72170	9	CLEAR CR > PINE CR - AB UNN STR
72171	9	CLEAR CR > WOLF CR - AT MOUTH
72172	9	CRACKER CR > POWDER R - AT MOUTH
72173	9	DALY CR > POWDER R - AT MOUTH
72174	9	DEER CR > POWDER R - AT MOUTH
72175	9	DUCK CR > N PINE CR - AT MOUTH
72176	9	DUTCH FLAT CR > N POWDER R - AT MOUTH
72177	9	E CAMP CR > CAMP CR - AT MOUTH
72178	9	ELK CR > S FK BURNT R - AT MOUTH
72179	9	LAKE FK CR > N PINE CR - AB ELK CR
72180	9	LAKE FK CR > N PINE CR - AT MOUTH
72181	9	LITTLE EAGLE CR > EAGLE CR - AT MOUTH
72182	9	LITTLE ELK CR > N PINE CR - AT MOUTH
72183	9	MCCULLY FK > POWDER R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
72184	9	N FK ANTHONY FK > ANTHONY FK - AT MOUTH
72185	9	N FK BURNT R > BURNT R - AB CAMP CR
72186	9	N FK BURNT R > BURNT R - AB W FK BURNT R
72187	9	N POWDER R > POWDER R - AB ANTHONY FK
72188	9	N POWDER R > POWDER R - AT MOUTH
72189	9	PINE CR > SNAKE R - AT MOUTH
72190	9	POWDER R > SNAKE R - AB CLEAR CR
72191	9	POWDER R > SNAKE R - AB UNN STR
72192	9	POWDER R > SNAKE R - AB GOOSE CR
72193	9	POWDER R > SNAKE R - AB EAGLE CR
72194	9	ROCK CR > POWDER R - AT MOUTH
30920101	9	MCLAIN G > PINE CR - AT MOUTH
30920102	9	FALL CR > N PINE CR - AT MOUTH
30920103	9	N PINE CR > PINE CR - AB DUCK CR
30920104	9	FISH CR > PINE CR - AT MOUTH
30920105	9	FOURMILE CR > PINE CR - AT MOUTH
30920106	9	DRY CR > E PINE CR - AT MOUTH
30920107	9	DEER CR > PINE CR - AT MOUTH
30920108	9	COPPER CR > SNAKE R - AT MOUTH
30920109	9	ASHBY CR > SNAKE R - AT MOUTH
30920110	9	BALLARD CR > SNAKE R - AT MOUTH
30920111	9	HERMAN CR > SNAKE R - AT MOUTH
30920112	9	HOMESTEAD CR > SNAKE R - AT MOUTH
30920113	9	IRONDYKE CR > SNAKE R - AT MOUTH
30920114	9	HOLBROOK CR > SNAKE R - AT MOUTH
30920115	9	BOB CR > SNAKE R - AT MOUTH
30920116	9	HUNTER CR > SNAKE R - AT MOUTH
30920117	9	HUNSACKER CR > SNAKE R - AT MOUTH
30920118	9	COTTONWOOD CR > SNAKE R - AT MOUTH
30920119	9	EAGLE ISLAND CR > SNAKE R - AT MOUTH
30920120	9	BLACK CAN > SNAKE R - AT MOUTH
30920121	9	ROAD CAN > SNAKE R - AT MOUTH
30920122	9	FERRY CAN > SNAKE R - AT MOUTH
30920123	9	TARTER CAN > SNAKE R - AT MOUTH
30920124	9	QUICKSAND CR > SNAKE R - AT MOUTH
30920125	9	CANYON CR > SNAKE R - AT MOUTH
30920126	9	SODA CR > SNAKE R - AT MOUTH
30920127	9	BIG DEACON CR > SNAKE R - AT MOUTH
30920128	9	LITTLE DEACON CR > SNAKE R - AT MOUTH
30920129	9	DOUGLAS CR > SNAKE R - AT MOUTH
30920130	9	CONNER CR > SNAKE R - AT MOUTH
30920131	9	FOX CR > SNAKE R - AT MOUTH
30920132	9	HIBBARD CR > SNAKE R - AT MOUTH
30920133	9	BEAR CR > SNAKE R - AT MOUTH
30920134	9	MORGAN CR > SNAKE R - AT MOUTH
30920135	9	BAY HORSE CR > SNAKE R - AT MOUTH
30920136	9	RYAN G > SNAKE R - AT MOUTH
30920137	9	BENSON CR > SNAKE R - AT MOUTH
30920201	9	DURBIN CR > BURNT R - AT MOUTH
30920202	9	CAVANAUGH CR > BURNT R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30920203	9	GOODMAN CR > BURNT R - AT MOUTH
30920204	9	MARBLE CR > BURNT R - AT MOUTH
30920205	9	POWELL CR > BURNT R - AT MOUTH
30920206	9	DIXIE CR > BURNT R - AT MOUTH
30920207	9	N FK DIXIE CR > DIXIE CR - AT MOUTH
30920208	9	S FK DIXIE CR > DIXIE CR - AT MOUTH
30920209	9	CHIMNEY CR > BURNT R - AT MOUTH
30920210	9	JORDAN CR > BURNT R - AT MOUTH
30920211	9	SISLEY CR > BURNT R - AT MOUTH
30920212	9	PEARCE G > BURNT R - AT MOUTH
30920213	9	SHIRTTAIL CR > BURNT R - AT MOUTH
30920214	9	SWAYZE CR > BURNT R - AT MOUTH
30920215	9	BURNT R > SNAKE R - AB SWAYZE CR
30920216	9	MANNING CR > BURNT R - AT MOUTH
30920217	9	PRITCHARD CR > BURNT R - AB DURKEE CR
30920218	9	DURKEE CR > PRITCHARD CR - AT MOUTH
30920219	9	ALDER CR > PRITCHARD CR - AT MOUTH
30920220	9	LAWRENCE CR > PRITCHARD CR - AT MOUTH
30920221	9	PRITCHARD CR > BURNT R - AB LAWRENCE CR
30920222	9	DEER CR > BURNT R - AT MOUTH
30920223	9	CAVE CR > BURNT R - AT MOUTH
30920224	9	DARK CAN > BURNT R - AT MOUTH
30920225	9	CLARKS CR > BURNT R - AT MOUTH
30920226	9	BIG CR > BURNT R - AT MOUTH
30920227	9	BURNT R > SNAKE R - AB BIG CR
30920228	9	CAMP CR > BURNT R - AT MOUTH
30920229	9	JOB CR > BURNT R - AT MOUTH
30920230	9	S FK BURNT R > BURNT R - AT MOUTH
30920231	9	M FK BURNT R > N FK BURNT R - AT MOUTH
30920232	9	W FK BURNT R > N FK BURNT R - AT MOUTH
30920233	9	JETT CR > BURNT R - AT MOUTH
30920234	9	PRITCHARD CR > BURNT R - AT MOUTH
30920238	9	STEVENS CR > S FK BURNT R - AT MOUTH
30920239	9	BARNEY CR > S FK BURNT R - AT MOUTH
30920246	9	CAMP CR > N FK BURNT R - AT MOUTH
30920247	9	TROUT CR > N FK BURNT R - AT MOUTH
30920248	9	CHINA CR > N FK BURNT R - AT MOUTH
30920249	9	AUBURN CR > BURNT R - AT MOUTH
30920250	9	MILL CR > BURNT R - AT MOUTH
30920252	9	CORNET CR > BURNT R - AT MOUTH
30920253	9	PINE CR > BURNT R - AT MOUTH
30920254	9	ROCK CR > BURNT R - AT MOUTH
30920301	9	POWDER R > SNAKE R - AT MOUTH
30920302	9	IMMIGRANT CR > POWDER R - AT MOUTH
30920303	9	LONG HOL > POWDER R - AT MOUTH
30920304	9	N FK DALY CR > DALY CR - AT MOUTH
30920305	9	S FK DALY CR > DALY CR - AT MOUTH
30920306	9	EAGLE CR > POWDER R - AT MOUTH
30920307	9	SUMMIT CR > EAGLE CR - AT MOUTH
30920308	9	PADDY CR > EAGLE CR - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
30920309	9	GLENDENNING CR > EAGLE CR - AT MOUTH
30920311	9	LOWER TIMBER CAN > POWDER R - AT MOUTH
30920312	9	UPPER TIMBER CAN > POWDER R - AT MOUTH
30920313	9	MAIDEN G > POWDER R - AT MOUTH
30920314	9	LOVE CR > POWDER R - AT MOUTH
30920315	9	GOOSE CR > POWDER R - AT MOUTH
30920316	9	RITTER CR > POWDER R - AT MOUTH
30920317	9	BALM CR > POWDER R - AT MOUTH
30920318	9	CLOVER CR > POWDER R - AT MOUTH
30920319	9	RUCKLES CR > POWDER R - AT MOUTH
30920320	9	TUCKER CR > POWDER R - AT MOUTH
30920321	9	CREWS CR > POWDER R - AT MOUTH
30920322	9	BEAGLE CR > BIG CR - AT MOUTH
30920323	9	WOLF CR > POWDER R - AB CLEAR CR
30920324	9	CUSICK CR > POWDER R - AT MOUTH
30920325	9	ANTELOPE CR > POWDER R - AT MOUTH
30920326	9	JIMMY CR > POWDER R - AT MOUTH
30920327	9	POWDER R > SNAKE R - AB ROCK CR
30920328	9	WILLOW CR > POWDER R - AT MOUTH
30920329	9	SALMON CR > POWDER R - AT MOUTH
30920330	9	BALDOCK SL > POWDER R - AT MOUTH
30920331	9	SUTTON CR > POWDER R - AT MOUTH
30920332	9	ELK CR > POWDER R - AT MOUTH
30920333	9	BEAVER CR > POWDER R - AT MOUTH
30920334	9	BLUE CAN > POWDER R - AT MOUTH
30920335	9	STICES G > POWDER R - AT MOUTH
30920336	9	DENNY CR > POWDER R - AT MOUTH
30920337	9	BIG CR > POWDER R - AB ALDER CR
30920339	9	TROUT CR > W EAGLE CR - AT MOUTH
70303	10	N FK MALHEUR R > MALHEUR R - AB CRANE CR
70304	10	N FK MALHEUR R > MALHEUR R - AB LITTLE MALHEUR R
70305	10	LITTLE MALHEUR R > N FK MALHEUR R - AB SQUAW CR
70306	10	CRANE CR > N FK MALHEUR R - AT MOUTH
70307	10	LITTLE CRANE CR > CRANE CR - AT MOUTH
70308	10	ELK CR > N FK MALHEUR R - AT MOUTH
70309	10	SWAMP CR > N FK MALHEUR R - AT MOUTH
70325	10	MALHEUR R > SNAKE R - AB UNN STR
70349	10	MALHEUR R > SNAKE R - AB UNN STR
70350	10	MALHEUR R > SNAKE R - AB UNN STR
70351	10	LAKE CR > MALHEUR R - AB MCCOY CR
70352	10	BIG CR > MALHEUR R - AB UNN STR
71450	10	BOSONBERG CR > MALHEUR R - AT MOUTH
71451	10	BULLY CR > MALHEUR R - AB UNN STR
71452	10	CALAMITY CR > WOLF CR - AT MOUTH
71453	10	CALF CR > MALHEUR R - AT MOUTH
71454	10	LITTLE MALHEUR R > N FK MALHEUR R - AT MOUTH
71455	10	MCCOY CR > LAKE CR - AT MOUTH
71456	10	N FK MALHEUR R > MALHEUR R - AB UNN STR
71457	10	PINE CR > MALHEUR R - AT MOUTH
71458	10	POLE CR > MALHEUR R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
71459	10	S FK MALHEUR R > MALHEUR R - AB SWAMP CR
71460	10	S FK MALHEUR R > MALHEUR R - AB GRANITE CR
71461	10	S FK MALHEUR R > MALHEUR R - AT MOUTH
71462	10	S WILLOW CR > WILLOW CR - AT MOUTH
71463	10	SUMMIT CR > MALHEUR R - AT MOUTH
71464	10	SUMMIT CR > MALHEUR R - AB UNN STR
71465	10	SWAMP CR > S FK MALHEUR R - AT MOUTH
71466	10	WOLF CR > MALHEUR R - AT MOUTH
31011501	10	JACOBSEN G > SNAKE R - AT MOUTH
31011601	10	N FK MALHEUR R > MALHEUR R - AT MOUTH
31011602	10	BUTTE CR > MALHEUR R - AT MOUTH
31011603	10	KINGSBURY G > N FK MALHEUR R - AT MOUTH
31011604	10	WARM SPRINGS CR > N FK MALHEUR R - AT MOUTH
31011605	10	JERRY CAN > WARM SPRINGS CR - AT MOUTH
31011606	10	WARM SPRINGS CR > N FK MALHEUR R - AB BENDIRE CR
31011607	10	BENDIRE CR > WARM SPRINGS CR - AT MOUTH
31011608	10	LOST CR > LITTLE MALHEUR R - AT MOUTH
31011609	10	BRIDGE CR > LITTLE MALHEUR R - AT MOUTH
31011610	10	BEAR CR > N FK MALHEUR R - AT MOUTH
31011611	10	MALHEUR R > SNAKE R - AB N FK MALHEUR R
31011612	10	CEDAR CR > MALHEUR R - AT MOUTH
31011613	10	BULL CAN > MALHEUR R - AT MOUTH
31011614	10	BASQUE CAN > MALHEUR R - AT MOUTH
31011615	10	JUNIPER BASIN CR > MALHEUR R - AT MOUTH
31011616	10	GRANITE CR > S FK MALHEUR R - AT MOUTH
31011617	10	HICKEY CR > GRANITE CR - AT MOUTH
31011618	10	STAR CR > GRANITE CR - AT MOUTH
31011619	10	GRANITE CR > S FK MALHEUR R - AB STAR CR
31011620	10	MCEWEN CR > S FK MALHEUR R - AT MOUTH
31011621	10	VISHER CR > S FK MALHEUR R - AT MOUTH
31011622	10	COBB CR > S FK MALHEUR R - AT MOUTH
31011623	10	COYOTE CR > S FK MALHEUR R - AT MOUTH
31011624	10	COLEMAN CR > S FK MALHEUR R - AT MOUTH
31011625	10	UNN STR > S FK MALHEUR R - AT MOUTH
31011626	10	CRANE CR > S FK MALHEUR R - AT MOUTH
31011627	10	LITTLE CRANE CR > CRANE CR - AT MOUTH
31011628	10	BEAVER CR > CRANE CR - AT MOUTH
31011629	10	CRANE CR > S FK MALHEUR R - AB BEAVER CR
31011630	10	DEADMAN CR > S FK MALHEUR R - AT MOUTH
31011631	10	UNN STR > S FK MALHEUR R - AT MOUTH
31011632	10	INDIAN CR > S FK MALHEUR R - AT MOUTH
31011633	10	S FK MALHEUR R > MALHEUR R - AB INDIAN CR
31011634	10	WARM SPRINGS CR > MALHEUR R - AT MOUTH
31011635	10	UNN STR > MALHEUR R - AT MOUTH
31011636	10	UNN STR > MALHEUR R - AT MOUTH
31011637	10	OTIS CR > MALHEUR R - AT MOUTH
31011638	10	WARM SPRINGS CR > OTIS CR - AT MOUTH
31011639	10	COTTONWOOD CR > OTIS CR - AT MOUTH
31011640	10	OTIS CR > MALHEUR R - AB COTTONWOOD CR
31011641	10	STINKINGWATER CR > MALHEUR R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
31011642	10	UNN STR > STINKINGWATER CR - AT MOUTH
31011643	10	WARM SPRINGS CR > STINKINGWATER CR - AT MOUTH
31011644	10	UNN STR > STINKINGWATER CR - AT MOUTH
31011645	10	MCMULLEN CR > STINKINGWATER CR - AT MOUTH
31011646	10	LITTLE STINKINGWATER CR > STINKINGWATER CR - AT MOUTH
31011647	10	STINKINGWATER CR > MALHEUR R - AB LITTLE STINKINGWATER CR
31011648	10	MULE CR > MALHEUR R - AT MOUTH
31011649	10	GRIFFIN CR > MALHEUR R - AT MOUTH
31011650	10	LITTLE MUDDY CR > MALHEUR R - AT MOUTH
31011651	10	MALHEUR R > SNAKE R - AB LITTLE MUDDY CR
31011652	10	MUDDY CR > MALHEUR R - AT MOUTH
31011653	10	DUCK CR > WOLF CR - AT MOUTH
31011654	10	WOLF CR > MALHEUR R - AB CALAMITY CR
31011655	10	BLUEBUCKET CR > MALHEUR R - AT MOUTH
31011656	10	COTTONWOOD CR > OTIS CR - AB UNN STR
31011658	10	LAKE CR > MALHEUR R - AT MOUTH
31011701	10	MALHEUR R > SNAKE R - AT MOUTH
31011702	10	SAND HOL > MALHEUR R - AT MOUTH
31011703	10	NEGRO ROCK CAN > SAND HOL - AT MOUTH
31011704	10	SAND HOL > MALHEUR R - AB NEGRO ROCK CAN
31011705	10	COTTONWOOD CR > MALHEUR R - AT MOUTH
31011706	10	LONG CR > COTTONWOOD CR - AT MOUTH
31011707	10	KEENEY CR > COTTONWOOD CR - AT MOUTH
31011708	10	SIXTEENMILE CR > COTTONWOOD CR - AT MOUTH
31011709	10	AVERY CR > COTTONWOOD CR - AT MOUTH
31011710	10	W FK COTTONWOOD CR > COTTONWOOD CR - AT MOUTH
31011711	10	CAMP CR > COTTONWOOD CR - AT MOUTH
31011712	10	COTTONWOOD CR > MALHEUR R - AB CAMP CR
31011713	10	WILLOW SPRING CR > MALHEUR R - AT MOUTH
31011714	10	CORBETT CR > MALHEUR R - AT MOUTH
31011715	10	SQUAW CR > MALHEUR R - AT MOUTH
31011716	10	HOG CR > MALHEUR R - AT MOUTH
31011718	10	GOLD CR > MALHEUR R - AT MOUTH
31011719	10	INDIAN CR > MALHEUR R - AT MOUTH
31011720	10	S TRAIL CR > MALHEUR R - AT MOUTH
31011721	10	SADDLEHORSE CR > MALHEUR R - AT MOUTH
31011722	10	HUNTER CR > MALHEUR R - AT MOUTH
31011723	10	MALHEUR R > SNAKE R - AB HOG CR
31011801	10	BULLY CR > MALHEUR R - AT MOUTH
31011802	10	COTTONWOOD CR > BULLY CR - AT MOUTH
31011803	10	DRY CR > BULLY CR - AT MOUTH
31011804	10	CLOVER CR > BULLY CR - AT MOUTH
31011805	10	BUCKBRUSH CR > CLOVER CR - AT MOUTH
31011806	10	REDS CR > CLOVER CR - AT MOUTH
31011807	10	LOG CR > CLOVER CR - AT MOUTH
31011808	10	DEEP CR > CLOVER CR - AT MOUTH
31011809	10	WHEATON CR > CLOVER CR - AT MOUTH
31011810	10	S CLOVER CR > CLOVER CR - AT MOUTH
31011811	10	N CLOVER CR > CLOVER CR - AT MOUTH
31011812	10	BULLY CR > MALHEUR R - AB CLOVER CR

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
31011813	10	COTTONWOOD CR > BULLY CR - AT MOUTH
31011814	10	S FK COTTONWOOD CR > COTTONWOOD CR - AT MOUTH
31011815	10	W FK COTTONWOOD CR > COTTONWOOD CR - AT MOUTH
31011816	10	COTTONWOOD CR > BULLY CR - AB W FK COTTONWOOD CR
31011817	10	INDIAN CR > BULLY CR - AT MOUTH
31011818	10	SWAMP CR > INDIAN CR - AT MOUTH
31011819	10	GREGORY CR > INDIAN CR - AT MOUTH
31011820	10	S FK INDIAN CR > INDIAN CR - AT MOUTH
31011821	10	N FK INDIAN CR > INDIAN CR - AT MOUTH
31011822	10	N FK BULLY CR > BULLY CR - AT MOUTH
31011823	10	BULLY CR > MALHEUR R - AB N FK BULLY CR
31011901	10	WILLOW CR > MALHEUR R - AT MOUTH
31011902	10	DRY G > WILLOW CR - AT MOUTH
31011903	10	KERN CR > WILLOW CR - AT MOUTH
31011904	10	MUD CR > WILLOW CR - AT MOUTH
31011905	10	LITTLE WILLOW CR > WILLOW CR - AT MOUTH
31011906	10	TURNER CR > WILLOW CR - AT MOUTH
31011907	10	POISON CR > WILLOW CR - AT MOUTH
31011908	10	STONE QUARRY G > WILLOW CR - AT MOUTH
31011909	10	GUM CR > WILLOW CR - AT MOUTH
31011910	10	WILLOW CR > MALHEUR R - AB GUM CR
31011911	10	PHIPPS CR > WILLOW CR - AT MOUTH
31011912	10	BLACK CR > WILLOW CR - AT MOUTH
31011913	10	POLE CR > WILLOW CR - AT MOUTH
31011914	10	BECKER CR > WILLOW CR - AT MOUTH
31011915	10	CANYON CR > WILLOW CR - AT MOUTH
31011916	10	CROW CR > WILLOW CR - AT MOUTH
31011917	10	BASIN CR > WILLOW CR - AT MOUTH
31011918	10	COW CR > WILLOW CR - AT MOUTH
31011919	10	WILLOW CR > MALHEUR R - AB COW CR
31011920	10	JEFF DAVIS CR > WILLOW CR - AT MOUTH
31011921	10	FIST CR > WILLOW CR - AT MOUTH
31011922	10	ALDER CR > WILLOW CR - AT MOUTH
31011923	10	LOST VALLEY CR > WILLOW CR - AT MOUTH
31011924	10	GROUSE CR > WILLOW CR - AT MOUTH
31011925	10	LONG CR > WILLOW CR - AT MOUTH
31011926	10	WILLOW CR > MALHEUR R - AB LONG CR
31011927	10	MILL BOULDER CR > WILLOW CR - AT MOUTH
31011928	10	JOHNSON BOULDER CR > WILLOW CR - AT MOUTH
31011929	10	WILLOW CR > MALHEUR R - AB S WILLOW CR
31020101	10	BIRCH CR > SNAKE R - AT MOUTH
31020102	10	ROAD G > SNAKE R - AT MOUTH
31020103	10	WHEEL G > SNAKE R - AT MOUTH
31020104	10	BRIDGE G > SNAKE R - AT MOUTH
31020105	10	WICKIUP G > SNAKE R - AT MOUTH
31020106	10	PATCH G > SNAKE R - AT MOUTH
31020107	10	MOORES HOL > SNAKE R - AT MOUTH
70021	11	N FK MCDERMITT CR > MCDERMITT CR - AB DRY CR
70324	11	N FK OWYHEE R > OWYHEE R - AT MOUTH
72021	11	JORDAN CR > OWYHEE R - AB COW CR

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
72022	11	JORDAN CR > OWYHEE R - AT MOUTH
31110301	11	SUCCOR CR > SNAKE R - AT MOUTH
31110601	11	TENT CR > E LITTLE OWYHEE R - AT STATE LINE
31110604	11	MAHOGANY CR > E FK QUINN R - AT STATE LINE
31110701	11	SOLDIER CR > OWYHEE R - AT MOUTH
31110702	11	M FK OWYHEE R > N FK OWYHEE R - AT MOUTH
31110703	11	ANTELOPE CR > OWYHEE R - AT MOUTH
31110704	11	UNN STR > ANTELOPE CR - AT MOUTH
31110705	11	FIELD CR > ANTELOPE CR - AT MOUTH
31110706	11	ANTELOPE CR > OWYHEE R - AB FIELD CR
31110707	11	W LITTLE OWYHEE R > OWYHEE R - AT MOUTH
31110708	11	TOPPIN CR > W LITTLE OWYHEE R - AT MOUTH
31110709	11	W LITTLE OWYHEE R > OWYHEE R - AB TOPPIN CR
31110710	11	OWYHEE R > SNAKE R - AB CROOKED CR
31110801	11	ROCK CR > JORDAN CR - AT MOUTH
31110802	11	JACK CR > JORDAN CR - AT MOUTH
31110803	11	COW CR > JORDAN CR - AT MOUTH
31110901	11	CROOKED CR > OWYHEE R - AT MOUTH
31110902	11	DRY CR > CROOKED CR - AT MOUTH
31110903	11	PALOMINO CR > CROOKED CR - AT MOUTH
31110904	11	RATTLESNAKE CR > CROOKED CR - AT MOUTH
31110905	11	DROUGHT CR > CROOKED CR - AT MOUTH
31110906	11	UNN STR > CROOKED CR - AT MOUTH
31110907	11	UNN STR > CROOKED CR - AT MOUTH
31110908	11	WILDCAT CR > CROOKED CR - AT MOUTH
31110909	11	CROOKED CR > OWYHEE R - AB PALOMINO CR
31110911	11	UNN STR > CROOKED CR - AT MOUTH
31110912	11	UNN STR > CROOKED CR - AT MOUTH
31111001	11	OWYHEE R > SNAKE R - AT MOUTH
31111002	11	DRY CR > OWYHEE R - AT MOUTH
31111003	11	TWIN SPRINGS CR > DRY CR - AT MOUTH
31111004	11	SAND HOL > DRY CR - AT MOUTH
31111005	11	FREEZEOUT CR > DRY CR - AT MOUTH
31111006	11	JUNIPER CR > DRY CR - AT MOUTH
31111007	11	BUTTE CR > DRY CR - AT MOUTH
31111008	11	DRY CR > OWYHEE R - AB BUTTE CR
31111009	11	BULL CR > OWYHEE R - AT MOUTH
31111010	11	BOGUS CR > OWYHEE R - AT MOUTH
31111011	11	RYEGRASS CR > OWYHEE R - AT MOUTH
31111012	11	BARREN VALLEY > NONE - AT MOUTH
31111013	11	OWYHEE R > SNAKE R - AB BIRCH CR
31120101	11	OREGON CAN CR > QUINN R - AT MOUTH
31120102	11	MCDERMITT CR > QUINN R - AT STATE LINE
31120103	11	MINE CR > MCDERMITT CR - AT MOUTH
31120104	11	PAYNE CR > MCDERMITT CR - AT MOUTH
31120105	11	MCDERMITT CR > QUINN R - AB PAYNE CR
31120106	11	MCDERMITT CR > QUINN R - AT GAGE #10352500
31120108	11	MEADOW CR > E FK QUINN R - AT STATE LINE
31120109	11	COTTONWOOD CR > E FK QUINN R - AT STATE LINE
70020	12	E FK TROUT CR > BIG TROUT CR - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
70022	12	LITTLE WHITEHORSE CR > WHITEHORSE CR - AB UNN STR
70023	12	WHITEHORSE CR > ALVORD DESERT - AB UNN STR
70024	12	WILLOW CR > ALVORD DESERT - AB UNN STR
70025	12	WILLOW CR > ALVORD DESERT - AB UNN STR
70026	12	BIG TROUT CR > TROUT CR - AT MOUTH
70027	12	LITTLE TROUT CR > TROUT CR - AT MOUTH
70028	12	BIG TROUT CR > TROUT CR - AB UNN STR
70029	12	TROUT CR > ALVORD DESERT - AT MOUTH
70073	12	UNN STR > KRUMBO CR - AT MOUTH
70074	12	KRUMBO CR > DONNER UND BLITZEN R - AB DRY KRUMBO CR
70293	12	EMIGRANT CR > SILVIES R - AB CRICKET CR
71467	12	BEAR CR > SILVIES R - AT MOUTH
71468	12	BEAR CR > SILVIES R - AB ANTELOPE CR
71469	12	RATTLESNAKE CR > NINEMILE SL - AB E FK RATTLESNAKE CR
71470	12	SILVER CR > HARNEY L - AB CLAW CR
71471	12	SILVER CR > HARNEY L - AB MILLER CAN
71472	12	SILVIES R > W FK SILVIES R - AB TROUT CR
71473	12	SAWMILL CR > SILVER CR - AT MOUTH
71474	12	TROUT CR > SILVIES R - AT MOUTH
71475	12	NICOLL CR > SILVER CR - AT MOUTH
72023	12	SAWTOOTH CR > EMIGRANT CR - AT MOUTH
84562	12	HOME CR > CATLOW VALLEY - AT HWY XING
84563	12	THREEMILE CR > CATLOW VALLEY - AT HWY XING
31200101	12	MALHEUR SL > MALHEUR L - AT MOUTH
31200102	12	HOT SPRINGS SL > MALHEUR SL - AT MOUTH
31200103	12	NINEMILE SL > MALHEUR SL - AT MOUTH
31200104	12	RATTLESNAKE CR > NINEMILE SL - AT MOUTH
31200105	12	SOLDIER CR > POISON CR SL - AT MOUTH
31200106	12	POISON CR SL > NINEMILE SL - AT MOUTH
31200107	12	MALHEUR SL > MALHEUR L - AB NINEMILE SL
31200201	12	W FK SILVIES R > MALHEUR L - AT MOUTH
31200202	12	SAGE HEN CR > SILVIES R - AT MOUTH
31200203	12	EMIGRANT CR > SILVIES R - AT MOUTH
31200204	12	SKULL CR > EMIGRANT CR - AT MOUTH
31200205	12	YELLOWJACKET CR > EMIGRANT CR - AT MOUTH
31200206	12	CRICKET CR > EMIGRANT CR - AT MOUTH
31200207	12	MYRTLE CR > SILVIES R - AT MOUTH
31200209	12	CAMP CR > SILVIES R - AT MOUTH
31200210	12	ANTELOPE CR > BEAR CR - AT MOUTH
31200211	12	SCOTTY CR > SILVIES R - AT MOUTH
31200212	12	SILVIES R > W FK SILVIES R - AB CAVE G
31200301	12	KIGER CR > DONNER UND BLITZEN R - AT MOUTH
31200302	12	MCCOY CR > KIGER CR - AT MOUTH
31200303	12	CUCAMONGA CR > KIGER CR - AT MOUTH
31200304	12	KIGER CR > DONNER UND BLITZEN R - AB CUCAMONGA CR
31200305	12	KRUMBO CR > DONNER UND BLITZEN R - AT MOUTH
31200306	12	DRY KRUMBO CR > KRUMBO CR - AT MOUTH
31200307	12	WEBB SPRING CR > DONNER UND BLITZEN R - AT MOUTH
31200308	12	MUD CR > DONNER UND BLITZEN R - AT MOUTH
31200309	12	DONNER UND BLITZEN R > MALHEUR L - AT USGS GAGE 10396000

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
31200310	12	BRIDGE CR > DONNER UND BLITZEN R - AT MOUTH
31200311	12	DONNER UND BLITZEN R > MALHEUR L - AT MOUTH
31200401	12	SILVER CR > HARNEY L - AT MOUTH
31200402	12	CHICKAHOMINY CR > SILVER CR - AT MOUTH
31200403	12	VIRGINIA CR > SILVER CR - AT MOUTH
31200404	12	MILLER CAN > SILVER CR - AT MOUTH
31200405	12	CLAW CR > SILVER CR - AT MOUTH
31200406	12	SILVER CR > HARNEY L - AT USGS GAGE 10403000
31200407	12	CLAW CR > SILVER CR - AB UNN STR
31200408	12	SILVER CR > HARNEY L - AB UNN STR
31200409	12	S WARM SPRINGS CR > HARNEY - AT MOUTH
31200801	12	DRY CR > CATLOW VALLEY - AT HWY XING
31200804	12	SIXMILE CR > CATLOW VALLEY - AT HWY XING
31200805	12	SKULL CR > CATLOW VALLEY - AT HWY XING
31200806	12	ROCK CR > CATLOW VALLEY - AB ROCK CR RES
31200807	12	GUANO CR > CATLOW VALLEY - AB SHIRK L
31200901	12	WHITEHORSE CR > ALVORD DESERT - AT MOUTH
31200902	12	WILDHORSE CR > ALVORD L - AT MOUTH
31200904	12	WILDHORSE CR > ALVORD L - AB UNN STR
31200905	12	WHITEHORSE CR > ALVORD DESERT - AB UNN STR
31200906	12	LITTLE WHITEHORSE CR > WHITEHORSE CR - AT MOUTH
31200907	12	WHITEHORSE CR > ALVORD DESERT - AB LITTLE WHITEHORSE CR
31200908	12	WILLOW CR > ALVORD DESERT - AT MOUTH
70486	13	DREWS CR > GOOSE L - AB QUARTZ CR
70487	13	DREWS CR > GOOSE L - AT MOUTH
70656	13	SILVER CR > SILVER L - AT USFS BOUNDARY
70657	13	W FK SILVER CR > SILVER CR - AB UNN STR
70658	13	BRIDGE CR > ISLAND BR SILVER CR - AB UNN STR
70659	13	BUCK CR > SILVER L - AB UNN STR
70660	13	CHEWAUCAN R > L ABERT - AB SMALL CR
70661	13	CHEWAUCAN R > L ABERT - AB COON HOL
70662	13	DAIRY CR > CHEWAUCAN R - AB DEAD HORSE CR
70663	13	DAIRY CR > CHEWAUCAN R - AT MOUTH
70664	13	ELDER CR > CHEWAUCAN R - AT MOUTH
70665	13	THOMAS CR > GOOSE L - AB UNN STR
31300102	13	THOMAS CR > GOOSE L - AT MOUTH
31300103	13	COTTONWOOD CR > THOMAS CR - AT MOUTH
31300104	13	WARNER CR > THOMAS CR - AT MOUTH
31300105	13	CAMP CR > THOMAS CR - AT MOUTH
31300106	13	COX CR > CAMP CR - AT MOUTH
31300107	13	COX CR > CAMP CR - AB BAUERS CR
31300108	13	BAUERS CR > COX CR - AT MOUTH
31300109	13	CAMP CR > THOMAS CR - AB COX CR
31300110	13	AUGUR CR > CAMP CR - AT MOUTH
31300111	13	CAMP CR > THOMAS CR - AB AUGUR CR
31300112	13	THOMAS CR > GOOSE L - AB CAMP CR
31300113	13	ANTELOPE CR > GOOSE L - AT MOUTH
31300114	13	DOG CR > DREWS CR - AT MOUTH
31300115	13	LA SERE CR > DREWS CR - AT MOUTH
31300116	13	HAY CR > DREWS CR - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
31300117	13	DREWS CR > GOOSE L - AB CHANDLER CR
31300118	13	DENT CR > DREWS CR - AT MOUTH
31300119	13	QUARTZ CR > DREWS CR - AT MOUTH
31300120	13	MILL CR > GOOSE L - AT MOUTH
31300121	13	DRY CR > GOOSE L - AT MOUTH
31300122	13	COGSWELL CR > GOOSE L - AT MOUTH
31300123	13	TANDY CR > GOOSE L - AT MOUTH
31300124	13	KELLEY CR > GOOSE L - AT MOUTH
31300501	13	PAULINA MARSH > SILVER L - AT MOUTH
31300502	13	TIMOTHY CR > BUCK CR - AT MOUTH
31300503	13	BEAR CR > BUCK CR - AT MOUTH
31300504	13	BUCK CR > SILVER L - AB BEAR CR
31300505	13	W FK SILVER CR > SILVER CR - AT MOUTH
31300506	13	SILVER CR > SILVER L - AB W FK SILVER CR
31300507	13	MURDOCK CR > SILVER L - AT MOUTH
31300508	13	DUNCAN CR > SILVER L - AT MOUTH
31300509	13	WILLOW CR > SILVER L - AT MOUTH
31300512	13	BUCK CR > SILVER L - AT MARSH
31300513	13	SILVER CR > SILVER L - AT MARSH
31300514	13	BRIDGE CR > ISLAND BR SILVER CR - AT MARSH
31300602	13	CHEWAUCAN R > L ABERT - AT MOUTH
31300603	13	CROOKED CR > CHEWAUCAN R - AT MOUTH
31300604	13	WILLOW CR > CHEWAUCAN R - AT MOUTH
31300605	13	MOSS CR > CHEWAUCAN R - AT MOUTH
31300606	13	BEAR CR > CHEWAUCAN R - AT MOUTH
31300607	13	COFFEEPOT CR > CHEWAUCAN R - AT MOUTH
31300608	13	BEN YOUNG CR > CHEWAUCAN R - AT MOUTH
31300609	13	SWAMP CR > CHEWAUCAN R - AT MOUTH
31300610	13	SOUTH CR > CHEWAUCAN R - AT MOUTH
31300611	13	CHEWAUCAN R > L ABERT - AB BEN YOUNG CR
31300612	13	AUGER CR > DAIRY CR - AT MOUTH
31300613	13	DEAD HORSE CR > DAIRY CR - AT MOUTH
31300702	13	FISH CR > CRUMP L - AT MOUTH
31300703	13	TWENTYMILE CR > CRUMP L - AT MOUTH
31300704	13	DEEP CR > CRUMP L - AT MOUTH
31300705	13	DEEP CR > CRUMP L - AB DRAKE CR
31300706	13	CAMAS CR > DEEP CR - AT MOUTH
31300707	13	HORSE CR > DEEP CR - AT MOUTH
31300708	13	DEEP CR > CRUMP L - AB HORSE CR
31300709	13	FISH CR > HART L - AT MOUTH
31300710	13	RABBIT CR > CAMPBELL L - AT MOUTH
31300713	13	HONEY CR > HART L - AT MOUTH
31300714	13	TWENTYMILE CR > CRUMP L - AB UNN STR
31300715	13	DRAKE CR > DEEP CR - AT MOUTH
70094	14	KLAMATH R > PACIFIC OCEAN - AT STATE LINE
70798	14	CHERRY CR > FOURMILE CR - AT MOUTH
70799	14	S FK SPRAGUE R > SPRAGUE R - AB WHITWORTH CR
70800	14	S FK SPRAGUE R > SPRAGUE R - AB CAMP CR
70801	14	S FK SPRAGUE R > SPRAGUE R - AB ISH TISH CR
70802	14	S FK SPRAGUE R > SPRAGUE R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
70803	14	SPENCER CR > KLAMATH R - AT MOUTH
70804	14	SPRAGUE R > WILLIAMSON R - AB SYCAN R
70805	14	SPRAGUE R > WILLIAMSON R - AT LONE PINE
70806	14	SPRAGUE R > WILLIAMSON R - AT MOUTH
70807	14	CROOKED CR > WOOD R - AT MOUTH
70808	14	DEMING CR > S FK SPRAGUE R -AT NF BOUNDARY (36S 15E 9 SESE
70809	14	FISHHOLE CR > S FK SPRAGUE R - AT MOUTH
70810	14	FORT CR > WOOD R - AT MOUTH
70811	14	JENNY CR > KLAMATH R - AB KEENE CR
70812	14	KLAMATH R > PACIFIC OCEAN - AB JOHN C BOYLE RES
70813	14	LINK R > KLAMATH R - AB L EWAUNA
70814	14	LONG CR > SYCAN R - AT MOUTH
70815	14	N FK SPRAGUE R > SPRAGUE R - AB SHEEPY CR
70816	14	N FK SPRAGUE R > SPRAGUE R - AT MOUTH
70817	14	PARADISE CR > SYCAN CR - AT MOUTH
70818	14	SPRING CR > WILLIAMSON R - AT MOUTH
70819	14	SUN CR > ANNIE CR - AT MOUTH
70820	14	SYCAN R > SPRAGUE R - AB PARADISE CR
70821	14	SYCAN R > SPRAGUE R - AT SYCAN MARSH OUTLET
70822	14	SYCAN R > SPRAGUE R - AB UNN STR AT RM 23
70823	14	SYCAN R > SPRAGUE R - AT MOUTH
70824	14	WILLIAMSON R > UPPER KLAMATH L - AT ROCKY FORD
70825	14	WILLIAMSON R > UPPER KLAMATH L - AB SPRING CR
70826	14	WILLIAMSON R > UPPER KLAMATH L - AT MOUTH
70827	14	WILLIAMSON R > UPPER KLAMATH L - AB SPRAGUE R
70828	14	WILLIAMSON R > UPPER KLAMATH L - AT KIRK
70829	14	WOOD R > UPPER KLAMATH L - AT MOUTH
70830	14	SEVENMILE CR > UPPER KLAMATH L - AT MOUTH
70831	14	ANNIE CR > WOOD R - AT MOUTH
70832	14	BROWNSWORTH CR > S FK SPRAGUE R - AT MOUTH
31420101	14	HOG CR > WILLIAMSON R - AT MOUTH
31420102	14	SAND CR > WILLIAMSON R - AT MOUTH
31420103	14	YOSS CR > WILLIAMSON R - AT MOUTH
31420104	14	SKELLOCK DRAW > WILLIAMSON R - AT MOUTH
31420105	14	SCOTT CR > WILLIAMSON R - AT MOUTH
31420106	14	BIG SPRINGS CR > WILLIAMSON R - AT MOUTH
31420107	14	WILLIAMSON R > UPPER KLAMATH L - AT MILITARY CROSSING
31420108	14	GOD CR > WILLIAMSON R - AT MOUTH
31420109	14	MOSQUITO CR > WILLIAMSON R - AT MOUTH
31420110	14	JACK CR > WILLIAMSON R - AT MOUTH
31420111	14	DOE CR > WILLIAMSON R - AT MOUTH
31420112	14	JACKSON CR > WILLIAMSON R - AT MOUTH
31420113	14	MILLER CR >ANTELOPE DESERT -AT NF BOUNDARY (27S 7E 32 SENE
31420114	14	WILLIAMSON R >UPPER KLAMATH L -AT NF BOUND(34S 7E 3 SESE)
31420115	14	WILLIAMSON R > UPPER KLAMATH L - AB DEEP CR
31420116	14	DESERT CR > ANTELOPE DESERT - AT CRATER L NP BOUNDARY
31420117	14	BEAR CR > ANTELOPE DESERT - AT CRATER L NP BOUNDARY
31420119	14	POTHOLE CR > ANTELOPE DESERT - AT CRATER L NP BOUNDARY
31420120	14	SCOTT CR > WILLIAMSON R - AT CRATER L NP BOUNDARY
31420122	14	SAND CR > WILLIAMSON R - AT NF BOUNDARY (31S 7E 31 SWSE)

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
31420123	14	UNN STR > ANTELOPE DESERT - AT CRATER L NP BOUNDARY
31420124	14	SILENT CR > ANTELOPE DESERT - AT CRATER L NP BOUNDARY
31420125	14	WILLIAMSON R > UPPER KLAMATH L - AT HWY 97 CROSSING
31420126	14	WILLIAMSON R > UPPER KLAMATH L - AT LOWER END KIRK CAN
31420127	14	WILLIAMSON R > UPPER KLAMATH L - AB KLAMATH MARSH
31420128	14	WILLIAMSON R > UPPER KLAMATH L - AT WICKIUP SPRING
31420129	14	LARKIN CR > WILLIAMSON R - AT MOUTH
31420130	14	IRVING CR > JACKSON CR - AT MOUTH
31420131	14	DEEP CR > WILLIAMSON R - AT MOUTH
31420132	14	DEEP CR > WILLIAMSON R - AT NF BOUNDARY (31S 11E 29 SES
31420136	14	JACKSON CR > WILLIAMSON R - AT NF BOUNDARY (30S 11E 7 SENE
31420139	14	SINK CR > ANTELOPE DESERT - AT NF BOUNDARY (28S 6E 13 NENE
31420140	14	COTTONWOOD CR >ANTELOPE DESERT -AT NF BOUND(28S 6E 36 SENE
31420142	14	WILLIAMSON R > UPPER KLAMATH L - AT (31S 10E 12 NWNE)
31420143	14	SCOTT CR > WILLIAMSON R - AT NF BOUNDARY (31S 7E 18 SWNE)
31420144	14	SAND CR > WILLIAMSON R - AT CRATER L NP BOUNDARY
31420145	14	SAND CR > WILLIAMSON R - AT NF BOUNDARY (31S 7E 29 NESW)
31420148	14	WILLIAMSON R >UPPER KLAMATH L -AT NF BOUND (33S 7E 35 NESE
31420203	14	TROUT CR > SPRAGUE R - AT MOUTH
31420206	14	WHISKY CR > SPRAGUE R - AT MOUTH
31420208	14	SNAKE CR > SYCAN R - AT MOUTH
31420209	14	BLUE CR > SYCAN R - AT MOUTH
31420210	14	UNN STR > SYCAN R - AT MOUTH
31420211	14	UNN STR > SYCAN R - AT MOUTH
31420212	14	MERRITT CR > SYCAN R - AT MOUTH
31420213	14	UNN STR > SYCAN R - AT MOUTH
31420214	14	DRY CR > SYCAN R - AT MOUTH
31420215	14	LONG CR > SYCAN R - AT MOUTH
31420216	14	COYOTE CR > SYCAN R - AT MOUTH
31420217	14	SHAKE CR > SYCAN R - AT MOUTH
31420218	14	CHOCKTOOT CR > SYCAN R - AT MOUTH
31420219	14	UNN STR > SYCAN R - AT MOUTH
31420221	14	BROWN CR > SPRAGUE R - AT MOUTH
31420222	14	FIVEMILE CR > N FK SPRAGUE R - AT MOUTH
31420223	14	MERYL CR > N FK SPRAGUE R - AT MOUTH
31420224	14	PARADISE CR > S FK SPRAGUE R - AT MOUTH
31420225	14	ISH TISH CR > S FK SPRAGUE R - AT MOUTH
31420226	14	WHITWORTH CR > S FK SPRAGUE R - AT MOUTH
31420227	14	LONG CR > SYCAN R - AT NF BOUNDARY (30S 12E 32 SES
31420228	14	SYCAN R > SPRAGUE R - AT NF BOUNDARY (33S 14E 24 SWS
31420229	14	N FK SPRAGUE R >SPRAGUE R - AT NF BOUNDARY (35S 15E 11 NES
31420230	14	FISHHOLE CR >S FK SPRAGUE R -AT NF BOUND (37S 15E 32 SEN
31420231	14	SPRAGUE R > WILLIAMSON R - AT BRAYMILL
31420233	14	SPRAGUE R > WILLIAMSON R - AB TROUT CR
31420234	14	N FK SPRAGUE R > SPRAGUE R - AT BALLEY FLATS
31420235	14	S FK SPRAGUE R > SPRAGUE R - AB FISHHOLE CR
31420237	14	SYCAN R > SPRAGUE R - AT TEDDY POWERS MEADOW
31420238	14	SYCAN R > SPRAGUE R - AT TORRENT SPRING
31420239	14	SYCAN R > SPRAGUE R - AB MERRIT CR
31420240	14	SYCAN R > SPRAGUE R - AB LONG CR

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
31420241	14	CALAHAN CR > SYCAN R - AT MOUTH
31420242	14	S FK SPRAGUE R > SPRAGUE R - AB BROWNSWORTH CR
31420246	14	N FK SPRAGUE R >SPRAGUE R - AT NF BOUNDARY (35S 15E 30 SWS
31420248	14	FIVEMILE CR > N FK SPRAGUE R - AT NF BOUND (35S 13E 24 SWS
31420250	14	SPRAGUE R > WILLIAMSON R - AT KIRK SPRING AT 11497500
31420251	14	SYCAN R > SPRAGUE R - AB SYCAN MARSH
31420252	14	COYOTE CR > SYCAN R - AT NF BOUNDARY (31S 13E 27 SWN
31420253	14	LONG CR > SYCAN R - AT NF BOUNDARY (31S 12E 5 SWSE)
31420257	14	SYCAN R > SPRAGUE R - AT NF BOUNDARY (34S 12E 31 SWS
31420262	14	SPRAGUE R > WILLIAMSON R - AT UPPER S'OCHOLIS CAN
31420264	14	DEMING CR > S FK SPRAGUE R - AT NF BNDRY (36S 15E 9 SESE)
31420265	14	DEMING CR > S FK SPRAGUE R - AT MOUTH
31420266	14	SPRAGUE R > WILLIAMSON R - AT NF BOUNDARY (34S 7E 36 NENW)
31420267	14	N FK SPRAGUE R > SPRAGUE R -AT NF BOUNDARY (35S 15E 11 SEN
31420268	14	SPRAGUE R > WILLIAMSON R - AT CHILOQUIN DAM
31420269	14	SYCAN R > SPRAGUE R - AB BLUE CR
31420301	14	FOURMILE CR > UPPER KLAMATH L - AT MOUTH
31420302	14	ROCK CR > CRYSTAL CR - AT MOUTH
31420303	14	THREEMILE CR > FOURMILE CR - AT MOUTH
31420304	14	VARNEY CR > FOURMILE CR - AT MOUTH AT GS GAGE 11505700
31420306	14	FOURMILE CR >UPPER KLAMATH L -AT NF BOUND (36S 6E 17 NENW)
31420307	14	BILLIE CR > LAKE OF THE WOODS - AT MOUTH
31420308	14	VARNEY CR > FOURMILE CR - AT NF BOUNDARY (36S 6E 21 NENW)
31420309	14	UNN STR > ANNIE CR - AT CRATER L NP BOUNDARY
31420310	14	SEVENMILE CR >UPPER KLAMATH L -AT NF BOUND (33S 6E 14 SESE
31420311	14	CHERRY CR > FOURMILE CR - AT NF BOUNDARY (36S 6E 14 NWSW)
31420314	14	SUN CR > ANNIE CR - AT CRATER L NP BOUNDARY
31420321	14	THREEMILE CR > FOURMILE CR - AT NF BOUND (34S 6E 2 NWSE)
31420327	14	FOURMILE CR >UPPER KLAMATH L -AB VARNEY CR AT 11505600
31420328	14	ANNIE CR > WOOD R - AT NF BOUNDARY (32S 6E 36 NENE)
31420330	14	ROCK CR > CRYSTAL CR - AT NF BOUNDARY (35S 6E 3 SENE)
31420333	14	ANNIE CR > WOOD R - AT CRATER L NP BOUNDARY
31420601	14	HAYDEN CR > KLAMATH R - AT STATE LINE
31420602	14	JENNY CR > KLAMATH R - AT MOUTH
31420603	14	KEENE CR > JENNY CR - AT MOUTH
31420604	14	JOHNSON CR > JENNY CR - AT MOUTH
31420605	14	JENNY CR > KLAMATH R - AB JOHNSON CR
31420606	14	LONG PRAIRIE CR > KLAMATH R - AT STATE LINE
31420607	14	FALL CR > KLAMATH R - AT STATE LINE
31420608	14	SKOOKUM CR > JENNY CR - AT STATE LINE
31420609	14	SALT CR > CAMP CR - AT STATE LINE
31420610	14	CAMP CR > KLAMATH R - AT STATE LINE
31420611	14	SCOTCH CR > CAMP CR - AT STATE LINE
31420612	14	SLIDE CR > SCOTCH CR - AT STATE LINE
31420613	14	E FK COTTONWOOD CR > COTTONWOOD CR - AT STATE LINE
31420614	14	COTTONWOOD CR > KLAMATH R - AT STATE LINE
31420615	14	GROUSE CR > BEAVER CR - AT STATE LINE
31420616	14	COW CR > BEAVER CR - AT STATE LINE
31420619	14	KEENE CR > JENNY CR - AT KEENE CR DAM
31420241	14	CALAHAN CR > SYCAN R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
31420622	14	SPENCER CR > KLAMATH R - AT NF BOUNDARY
31420630	14	COW CR > BEAVER CR - AT NF BOUNDARY (41S 1W 11 SESW)
248	15	ANTELOPE CR > LITTLE BUTTE CR - AT MOUTH
249	15	APPLEGATE R > ROGUE R - AT MOUTH
250	15	APPLEGATE R > ROGUE R - AB JOE G
251	15	APPLEGATE R > ROGUE R - AB KANAKA G
255	15	FRUITDALE CR > ROGUE R - AT MOUTH
260	15	KANE CR > ROGUE R - AT MOUTH
261	15	LAKE CR > LITTLE BUTTE CR - AT MOUTH
263	15	LITTLE BUTTE CR > ROGUE R - AT MOUTH
264	15	REESE CR > ROGUE R - AT MOUTH
266	15	ROGUE R > PACIFIC OCEAN - AT MOUTH
268	15	ROGUE R > PACIFIC OCEAN - AB FALL CR
270	15	ROGUE R > PACIFIC OCEAN - AB CURRY G AT GAGE 14359000
272	15	ROGUE R > PACIFIC OCEAN - AB RED ROCK CAN
274	15	SAMS CR > ROGUE R - AT MOUTH
275	15	SARDINE CR > ROGUE R - AT MOUTH
276	15	THOMPSON CR > APPLEGATE R - AT MOUTH
279	15	WOLF CR > GRAVE CR - AT MOUTH
69808	15	SUCKER CR > E FK ILLINOIS R - AT MOUTH
69809	15	ALTHOUSE CR > E FK ILLINOIS R - AB TARTER G
69810	15	ALTHOUSE CR > E FK ILLINOIS R - AT MOUTH
70975	15	E FK WILLIAMS CR > WILLIAMS CR - AT MOUTH
70976	15	W FK WILLIAMS CR > WILLIAMS CR - AT MOUTH
70977	15	JOSEPHINE CR > ILLINOIS R - AT MOUTH
70978	15	ELDER CR > E FK ILLINOIS R - AT MOUTH
70979	15	E FK ILLINOIS R > ILLINOIS R - AB ELDER CR
70980	15	E FK ILLINOIS R > ILLINOIS R - AT MOUTH
70981	15	WILLIAMS CR > APPLEGATE R - AT MOUTH
70982	15	LITTLE APPLEGATE R > APPLEGATE R - AT MOUTH
70983	15	LITTLE APPLEGATE R > APPLEGATE R - AB YALE CR
70984	15	JUMPOFF JOE CR > ROGUE R - AT MOUTH
70985	15	GALICE CR > ROGUE R - AT MOUTH
70986	15	EVANS CR > ROGUE R - AB W FK EVANS CR
70987	15	EVANS CR > ROGUE R - AT MOUTH
70988	15	EMIGRANT CR > BEAR CR - AT MOUTH
70989	15	ELK CR > ROGUE R - AB DODES CR
70990	15	DITCH CR > PLEASANT CR - AT MOUTH
70991	15	DEER CR > ILLINOIS R - AB MCMULLIN CR
70992	15	DEER CR > ILLINOIS R - AT MOUTH
70993	15	BEAR CR > ROGUE R - AT MOUTH
70995	15	CLEAR CR > DEER CR - AT MOUTH
70996	15	W FK ILLINOIS R > ILLINOIS R - AB ROUGH AND READY CR
70997	15	W FK ILLINOIS R > ILLINOIS R - AT MOUTH
70998	15	W FK EVANS CR > EVANS CR - AT MOUTH
70999	15	WATERS CR > SLATE CR - AT MOUTH
71000	15	TRAIL CR > ROGUE R - AT MOUTH
71001	15	TRAIL CR > ROGUE R - AB W FK TRAIL CR
71002	15	THOMPSON CR > MCMULLIN CR - AT MOUTH
71003	15	TAYLOR CR > ROGUE R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
71005	15	SLATE CR > APPLEGATE R - AB BUTCHERKNIFE CR
71006	15	S FK LITTLE BUTTE CR > LITTLE BUTTE CR - AB BEAVER DAM CR
71007	15	S FK LITTLE BUTTE CR > LITTLE BUTTE CR - AB DEAD INDIAN CR
71008	15	S FK LITTLE BUTTE CR > LITTLE BUTTE CR - AT MOUTH
71009	15	PLEASANT CR > EVANS CR - AT MOUTH
71010	15	ROUGH AND READY CR > W FK ILLINOIS R - AT MOUTH
71011	15	LOUSE CR > JUMPOFF JOE CR - AB SOLDIER CR
71012	15	QUEENS BR > PLEASANT CR - AT MOUTH
71013	15	PLEASANT CR > EVANS CR - AB COLLINS CR
71014	15	S FK DEER CR > DEER CR - AT MOUTH
71015	15	LOUSE CR > JUMPOFF JOE CR - AT MOUTH
71016	15	CHENEY CR > APPLEGATE R - AT MOUTH
71017	15	BUTCHERKNIFE CR > SLATE CR - AT MOUTH
71018	15	BRIGGS CR > ILLINOIS R - AT MOUTH
71019	15	SIXMILE CR > ILLINOIS R - AT MOUTH
71020	15	FOOTS CR > ROGUE R - AT MOUTH
71021	15	FALL CR > ILLINOIS R - AT MOUTH
71022	15	ELK CR > W FK ILLINOIS R - AT MOUTH
71023	15	ELK CR > ROGUE R - AT MOUTH
71024	15	WOOD CR > W FK ILLINOIS R - AT MOUTH
71026	15	POWELL CR > WILLIAMS CR - AT MOUTH
71027	15	N FK DEER CR > DEER CR - AT MOUTH
71028	15	MURPHY CR > APPLEGATE R - AT MOUTH
71029	15	MULE CR > ROGUE R - AT MOUTH
71031	15	LAWSON CR > ILLINOIS R - AT MOUTH
71032	15	JUMPOFF JOE CR > ROGUE R - AB LOUSE CR
71033	15	INDIAN CR > ROGUE R - AT MOUTH
71034	15	GRAVE CR > ROGUE R - AB WOLF CR
71035	15	GRAVE CR > ROGUE R - AT MOUTH
71036	15	GRAVE CR > ROGUE R - AB BOULDER CR
71195	15	ANTELOPE CR > LITTLE BUTTE CR - AB RIO CAN
71196	15	BIRDSEYE CR > ROGUE R - AT MOUTH
71197	15	FIELDER CR > EVANS CR - AT MOUTH
71198	15	GALLS CR > ROGUE R - AT MOUTH
71199	15	GRAYBACK CR > SUCKER CR - AT MOUTH
71200	15	GRIFFIN CR > BEAR CR - AT MOUTH
71201	15	JACKSON CR > BEAR CR - AT MOUTH
71202	15	LITTLE ELDER CR > E FK ILLINOIS R - AT MOUTH
71203	15	LIMPY CR > ROGUE R - AB DUTCHER CR
71204	15	MENDENHALL CR > W FK ILLINOIS R - AT MOUTH
71205	15	RANCHERIE CR > ILLINOIS R - AT MOUTH
71206	15	WAGNER CR > BEAR CR - AT MOUTH
71207	15	WALKER CR > BEAR CR - AT MOUTH
71208	15	WARD CR > ROGUE R - AT MOUTH
71209	15	W FK TRAIL CR > TRAIL CR - AT MOUTH
71609	15	BEAR BR > EVANS CR - AT MOUTH
71610	15	BEAVER CR > APPLEGATE R - AT MOUTH
71611	15	BIG WINDY CR > ROGUE R - AT MOUTH
71612	15	DUTCHER CR > LIMPY CR - AT MOUTH
71613	15	FLAT CR > ELK CR - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
71614	15	FOREST CR > APPLEGATE R - AT MOUTH
71615	15	GLADE CR > LITTLE APPLEGATE R - AT MOUTH
71616	15	HOWARD CR > ROGUE R - AT MOUTH
71617	15	HUMBUG CR > APPLEGATE R - AT MOUTH
71618	15	JACKSON CR > APPLEGATE R - AT MOUTH
71619	15	JENNY CR > ROGUE R - AT MOUTH
71620	15	LONG BR > ROGUE R - AT MOUTH
71621	15	N FK LITTLE BUTTE CR > LITTLE BUTTE CR - AB UNN STR
71622	15	N FK LITTLE BUTTE CR > LITTLE BUTTE CR - AT MOUTH
71623	15	PICKETT CR > ROGUE R - AT MOUTH
71624	15	POORMAN CR > GRAVE CR - AT MOUTH
71625	15	SHAN CR > ROGUE R - AT MOUTH
71626	15	SNIDER CR > ROGUE R - AT MOUTH
71627	15	W BR ELK CR > ELK CR - AT MOUTH
71628	15	SUGARPINE CR > ELK CR - AT MOUTH
71629	15	YALE CR > LITTLE APPLEGATE R - AT MOUTH
72843	15	ILLINOIS R > ROGUE R - AB JOSEPHINE CR
72844	15	ILLINOIS R > ROGUE R - AB KLONDIKE CR
72845	15	ILLINOIS R > ROGUE R - AT MOUTH
72846	15	LITTLE WINDY CR > ROGUE R - AT MOUTH
72847	15	MEADOW CR > ROGUE R - AT MOUTH
72848	15	WHISKEY CR > ROGUE R - AT MOUTH
72849	15	KELSEY CR > ROGUE R - AT MOUTH
72850	15	STAIR CR > ROGUE R - AT MOUTH
72851	15	SQUAW CR > APPLEGATE R - AT MOUTH
72852	15	IMNAHA CR > S FK ROGUE R - AT MOUTH
72853	15	BUTTON CR > ELK CR - AT MOUTH
72854	15	DODES CR > ELK CR - AT MOUTH
72855	15	DALEY CR > BEAVER DAM CR - AT MOUTH
72856	15	BEAVER DAM CR > S FK LITTLE BUTTE CR - AT MOUTH
72857	15	DEAD INDIAN CR > S FK LITTLE BUTTE CR - AT MOUTH
72858	15	DEAD INDIAN CR > S FK LITTLE BUTTE CR - AB CONDE CR
73367	15	DRY CR > ROGUE R - AT MOUTH
73368	15	S FK ROGUE R > ROGUE R - AB M FK ROGUE R
73369	15	S FK ROGUE R > ROGUE R - AT MOUTH
73370	15	M FK ROGUE R > S FK ROGUE R - AT MOUTH
73371	15	RED BLANKET CR > M FK ROGUE R - AT MOUTH
73372	15	ABBOTT CR > ROGUE R - AT MOUTH
73373	15	UNION CR > ROGUE R - AT MOUTH
73374	15	CASTLE CR > ROGUE R - AT MOUTH
73375	15	CRATER CR > ROGUE R - AT MOUTH
73376	15	BYBEE CR > ROGUE R - AT MOUTH
73377	15	FOSTER CR > ROGUE R - AT MOUTH
73378	15	COPELAND CR > ROGUE R - AT MOUTH
73379	15	MILL CR > ROGUE R - AT MOUTH
73380	15	MILL CR > ROGUE R - AB GINKGO CR
73381	15	GINKGO CR > MILL CR - AT MOUTH
73382	15	NATIONAL CR > ROGUE R - AT MOUTH
73383	15	MUIR CR > ROGUE R - AT MOUTH
73384	15	STEVE FK CARBERRY CR > CARBERRY CR - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
73385	15	STURGIS FK CARBERRY CR > CARBERRY CR - AT MOUTH
73386	15	FOSTER CR > ROGUE R - AT MOUTH
31530708	15	ROGUE R > PACIFIC OCEAN - AB HOG CR
31530709	15	ROGUE R > PACIFIC OCEAN - AB ELK CR
31530710	15	BIG BUTTE CR > ROGUE R - AB MOUTH
31530711	15	ROGUE R > PACIFIC OCEAN - AB BYBEE CR
31530801	15	ROGUE R > PACIFIC OCEAN - AB APPLEGATE R
31530902	15	APPLEGATE R > ROGUE R - AB MILL G
31530904	15	CARBERRY CR > APPLEGATE R - AB MOUTH
31531001	15	ROGUE R > PACIFIC OCEAN - AB MEADOW CR
31531002	15	ROGUE R > PACIFIC OCEAN - AB GRAVE CR
31531008	15	ROGUE R > PACIFIC OCEAN - AB SHASTA COSTA CR
31531009	15	GRAVE CR > ROGUE R - AB BURGESS G
31531104	15	ILLINOIS R > ROGUE R - AB PANTHER CR
31531105	15	DEER CR > ILLINOIS R - AB UNN STR
31531106	15	W FK ILLINOIS R > ILLINOIS R - AB UNN STR
280	16	BIG CR > SMITH R - AT MOUTH
281	16	BIG TOM FOLLEY CR > ELK CR - AT MOUTH
282	16	BILLY CR > ELK CR - AT MOUTH
283	16	BOULDER CR > N UMPQUA R - AT MOUTH
284	16	BOULDER CR > S UMPQUA R - AT MOUTH
285	16	BRUSH CR > ELK CR - AT MOUTH
286	16	BUCKEYE CR > S UMPQUA R - AT MOUTH
287	16	CABIN CR > CALAPOOYA CR - AT MOUTH
289	16	CALAPOOYA CR > UMPQUA R - AT MOUTH
290	16	CALAPOOYA CR > UMPQUA R - AB WILLIAMS CR
291	16	CALF CR > N UMPQUA R - AT MOUTH
292	16	CAMP CR > MILL CR - AT MOUTH
293	16	CANTON CR > STEAMBOAT CR - AT MOUTH
294	16	CANYON CR > S UMPQUA R - AT MOUTH
295	16	CAVITT CR > LITTLE R - AT MOUTH
296	16	CLEARWATER R > N UMPQUA R - AT MOUTH
297	16	COFFEE CR > S UMPQUA R - AT MOUTH
298	16	COPELAND CR > N UMPQUA R - AT MOUTH
300	16	COW CR > S UMPQUA R - AT MOUTH
301	16	COW CR > S UMPQUA R - AB MIDDLE CR
303	16	DAYS CR > S UMPQUA R - AT MOUTH
304	16	DEADMAN CR > S UMPQUA R - AT MOUTH
305	16	DEAN CR > UMPQUA R - AT MOUTH
307	16	ELK CR > S UMPQUA R - AT MOUTH
309	16	ELK CR > UMPQUA R - AB BRUSH CR
310	16	ELK CR > UMPQUA R - AB PASS CR
311	16	FISH CR > N UMPQUA R - AT MOUTH
312	16	GASSY CR > CALAPOOYA CR - AT MOUTH
313	16	HALFWAY CR > SMITH R - AT MOUTH
314	16	HARDSCRABBLE CR > ELK CR - AT MOUTH
315	16	HUBBARD CR > UMPQUA R - AT MOUTH
316	16	JACK CR > ELK CR - AT MOUTH
317	16	JACKSON CR > S UMPQUA R - AT MOUTH
318	16	JOHNSON CR > SMITH R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
319	16	KENT CR > S UMPQUA R - AT MOUTH
320	16	LIMPY CR > N UMPQUA R - AT MOUTH
323	16	LOOKINGGLASS CR > S UMPQUA R - AT MOUTH
324	16	MORGAN CR > LOOKINGGLASS CR - AT MOUTH
325	16	MEHL CR > UMPQUA R - AT MOUTH
326	16	MIDDLE CR > COW CR - AT MOUTH
327	16	MILL CR > UMPQUA R - AT MOUTH
330	16	N FK SMITH R > SMITH R - AT MOUTH
332	16	N SISTER CR > SMITH R - AT MOUTH
337	16	N UMPQUA R > UMPQUA R - AB CLEARWATER R
338	16	O'SHEA CR > S UMPQUA R - AT MOUTH
341	16	OLDHAM CR > CALAPOOYA CR - AT MOUTH
342	16	PARADISE CR > UMPQUA R - AT MOUTH
343	16	PASS CR > ELK CR - AT MOUTH
344	16	QUINES CR > COW CR - AT MOUTH
345	16	RICE CR > S UMPQUA R - AT MOUTH
346	16	RIFFLE CR > COW CR - AT MOUTH
347	16	ROCK CR > N UMPQUA R - AT MOUTH
351	16	S UMPQUA R > UMPQUA R - AT MOUTH
355	16	SCHOLFIELD CR > UMPQUA R - AT MOUTH
356	16	SMITH R > UMPQUA R - AB UNN STR
357	16	SMITH R > UMPQUA R - AT MOUTH
359	16	SMITH R > UMPQUA R - AB N FK SMITH R
360	16	SMITH R > UMPQUA R - AB W FK SMITH R
361	16	SPENCER CR > SMITH R - AT MOUTH
362	16	STARVEOUT CR > COW CR - AT MOUTH
365	16	STEELHEAD CR > STEAMBOAT CR - AT MOUTH
368	16	UMPQUA R > PACIFIC OCEAN - AT MOUTH
369	16	VINCENT CR > SMITH R - AT MOUTH
371	16	W FK SMITH R > SMITH R - AT MOUTH
372	16	WEATHERLY CR > UMPQUA R - AT MOUTH
373	16	WHITEHORSE CR > COW CR - AT MOUTH
374	16	WILLIAMS CR > CALAPOOYA CR - AT MOUTH
375	16	WILLIS CR > S UMPQUA R - AT MOUTH
376	16	WINDY CR > COW CR - AT MOUTH
377	16	WOLF CR > UMPQUA R - AT MOUTH
378	16	YELLOW CR > UMPQUA R - AT MOUTH
379	16	YONCALLA CR > ELK CR - AT MOUTH
70573	16	COW CR > S UMPQUA R - AB WINDY CR
71172	16	N UMPQUA R > UMPQUA R - AB STEAMBOAT CR
71173	16	N UMPQUA R > UMPQUA R - AB LITTLE R
71174	16	N UMPQUA R > UMPQUA R - AT MOUTH
71175	16	N UMPQUA R > UMPQUA R - AB BOULDER CR
71176	16	STEAMBOAT CR > N UMPQUA R - AB MOUTH AT GAGE 14316700
71177	16	STEAMBOAT CR > N UMPQUA R - AB CANTON CR
71178	16	STEAMBOAT CR > N UMPQUA R - AB BIG BEND CR
71179	16	TENMILE CR > LOOKINGGLASS CR - AB SHIELDS CR
71180	16	TENMILE CR > LOOKINGGLASS CR - AT MOUTH
71181	16	CALAPOOYA CR > UMPQUA R - AB OLDHAM CR
71182	16	DEER CR > S UMPQUA R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
71183	16	ELK CR > UMPQUA R - AT MOUTH
71184	16	LITTLE R > N UMPQUA R - AT MOUTH
71185	16	LITTLE R > N UMPQUA R - AB CAVITT CR
71186	16	MYRTLE CR > S UMPQUA R - AT MOUTH
71187	16	N MYRTLE CR > MYRTLE CR - AT MOUTH
71188	16	LOOKINGGLASS CR > S UMPQUA R - AB MORGAN CR
71189	16	OLLALA CR > LOOKINGGLASS CR - AB TENMILE CR
71190	16	DEER CR > S UMPQUA R - AT MOUTH
71191	16	S MYRTLE CR > MYRTLE CR - AT MOUTH
71192	16	S UMPQUA R > UMPQUA R - AB COW CR
73350	16	UMPQUA R > PACIFIC OCEAN - AB LITTLE MILL CR
31630115	16	LITTLE R > N UMPQUA R - AB ENGLES CR AT GAGE 14318000
31630214	16	S UMPQUA R > UMPQUA R - AB ELK CR AT GAGE 14308000
31630216	16	W FK COW CR > COW CR - AB MOUTH AT GAGE 14309500
31630218	16	S UMPQUA R > UMPQUA R - AB MARSTERS CR AT GAGE 1431200
31630301	16	UMPQUA R > PACIFIC OCEAN - AB WOLF CR
31630317	16	CALAPPOYA CR > UMPQUA R - AB PELLAND CR AT GAGE 14319900
31630318	16	ELK CR > UMPQUA R - AB PASS CR AT GAGE 14322000
31630319	16	SMITH R > UMPQUA R - AB UNN STR AT GAGE 14323100
381	17	BIG CR > N TENMILE L - AB NOBLE CR
384	17	COQUILLE R > PACIFIC OCEAN - AT MOUTH
404	17	M FK COQUILLE R > S FK COQUILLE R - AB SANDY R
409	17	N FK COQUILLE R > COQUILLE R - AB WHITLEY CR
70228	17	JOHNSON CR > PACIFIC OCEAN - AT MOUTH
70229	17	CROOKED CR > PACIFIC OCEAN - AT MOUTH
70230	17	BEAR CR > COQUILLE R - AT MOUTH
70231	17	BIG CR > SUNSET BAY - AT MOUTH
70449	17	LARSON CR > LARSON SL - AT MOUTH
70450	17	PALOUSE CR > PALOUSE SL - AT MOUTH
70574	17	SEVENMILE CR > RANDOLPH SL - AT MOUTH
70688	17	S FK COOS R > COOS R - AT MOUTH
70689	17	W FK MILLICOMA R > MILLICOMA R - AB DEER CR
70690	17	W FK MILLICOMA R > MILLICOMA R - AT MOUTH
70874	17	WINCHUCK R > PACIFIC OCEAN - AB BEAR CR
70875	17	WILLOW CR > FLORAS CR - AT MOUTH
70876	17	WHEELER CR > E FK WINCHUCK R - AT MOUTH
70877	17	SIXES R > PACIFIC OCEAN - AT MOUTH
70878	17	SIXES R > PACIFIC OCEAN - AB EDSON CR
70879	17	SIXES R > PACIFIC OCEAN - AB S FK SIXES R
70880	17	SIXES R > PACIFIC OCEAN - AB M FK SIXES R
70881	17	S FK SIXES R > SIXES R - AT MOUTH
70882	17	S FK CHETCO R > CHETCO R - AT MOUTH
70883	17	RED CEDAR CR > ELK R - AT MOUTH
70884	17	QUAIL PRAIRIE CR > S FK CHETCO R - AT MOUTH
70885	17	PISTOL R > PACIFIC OCEAN - AT MOUTH
70886	17	PANTHER CR > ELK R - AT MOUTH
70887	17	N FK CHETCO R > CHETCO R - AT MOUTH
70888	17	M FK SIXES R > SIXES R - AT MOUTH
70889	17	JACK CR > CHETCO R - AT MOUTH
70890	17	HUNTER CR > PACIFIC OCEAN - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
70891	17	FLORAS CR > NEW R - AT MOUTH
70892	17	EUCHRE CR > PACIFIC OCEAN - AT MOUTH
70893	17	EUCHRE CR > PACIFIC OCEAN - AB CEDAR CR
70894	17	EUCHRE CR > PACIFIC OCEAN - AB CROOKED BRIDGE CR
70895	17	ELK R > PACIFIC OCEAN - AT MOUTH
70896	17	ELK R > PACIFIC OCEAN - AB ANVIL CR
70897	17	ELK R > PACIFIC OCEAN - AB BUTLER CR
70898	17	E FK WINCHUCK R > WINCHUCK R - AT MOUTH
70899	17	E FK WINCHUCK R > WINCHUCK R - AB FOURTH OF JULY CR
70900	17	EDSON CR > SIXES R - AT MOUTH
70901	17	DRY CR > SIXES R - AT MOUTH
70902	17	DEEP CR > PISTOL R - AT MOUTH
70903	17	CRYSTAL CR > SIXES R - AT MOUTH
70904	17	CROOK CR > PISTOL R - AT MOUTH
70905	17	CHETCO R > PACIFIC OCEAN - AB S FK CHETCO R
70906	17	CHETCO R > PACIFIC OCEAN - AB LITTLE CHETCO R
70907	17	CHETCO R > PACIFIC OCEAN - AB N FK CHETCO R
70908	17	CHETCO R > PACIFIC OCEAN - AT MOUTH
70909	17	CEDAR CR > EUCHRE CR - AT MOUTH
70910	17	BUTLER CR > ELK R - AT MOUTH
70911	17	BALD MTN CR > ELK R - AT MOUTH
70912	17	BLACKBERRY CR > ELK R - AT MOUTH
70913	17	BEAR CR > WINCHUCK R - AT MOUTH
70914	17	ANVIL CR > ELK R - AT MOUTH
70915	17	FOURMILE CR > NEW R - AT MOUTH
70916	17	FOURTH OF JULY CR > E FK WINCHUCK R - AT MOUTH
71696	17	WOODWARD CR > EVANS CR - AT MOUTH
71697	17	FERRY CR > COQUILLE R - AT MOUTH
72500	17	E FK MILLICOMA R > MILLICOMA R - AB MATSON CR
72501	17	E FK MILLICOMA R > MILLICOMA R - AT MOUTH
72502	17	JOHNSON CR > TENMILE L - AT MOUTH
72503	17	ROBERTS CR > JOHNSON CR - AT MOUTH
72504	17	BIG CR > M FK COQUILLE R - AT MOUTH
72505	17	WINCHESTER CR > SOUTH SL - AT MOUTH
72506	17	MINER CR > PACIFIC OCEAN - AT MOUTH
72507	17	CUNNINGHAM CR > COQUILLE R - AT MOUTH
72508	17	E FK COQUILLE R > N FK COQUILLE R - AB CHINA CR
72509	17	ELK CR > E FK COQUILLE R - AT MOUTH
72510	17	FAT ELK CR > FAT ELK DR - AT MOUTH
72511	17	JOHNS CR > N FK COQUILLE R - AT MOUTH
72512	17	M FK COQUILLE R > S FK COQUILLE R - AB TWELVEMILE CR
72513	17	MATSON CR > E FK MILLICOMA R - AB LITTLE MATSON CR
72514	17	MATSON CR > E FK MILLICOMA R - AT MOUTH
72515	17	MURPHY CR > N TENMILE L - AT MOUTH
72516	17	BENSON CR > TENMILE L - AT MOUTH
72517	17	BIG CR > N TENMILE L - AT MOUTH
72518	17	NOBLE CR > BIG CR - AT MOUTH
72519	17	BLACKS CR > N TENMILE L - AT MOUTH
72520	17	ADAMS CR > TENMILE L - AT MOUTH
72521	17	EEL CR > TENMILE CR - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
72522	17	WINTER CR > EEL L - AT MOUTH
72523	17	WILKINS CR > N TENMILE L - AT MOUTH
72524	17	SHUTTER CR > ADAMS CR - AT MOUTH
72525	17	M FK COQUILLE R > S FK COQUILLE R - AT MOUTH
72526	17	S FK COQUILLE > COQUILLE R - AT MOUTH
72527	17	M FK COQUILLE R > S FK COQUILLE R - AB BIG CR
72528	17	S FK COQUILLE R > COQUILLE R - AB ROCK CR
72782	17	HALL CR > COQUILLE R - AT MOUTH
72783	17	GRAY CR > COQUILLE R - AT MOUTH
72784	17	RINK CR > COQUILLE R - AT MOUTH
72785	17	YELLOW CR > S FK COQUILLE R - AT MOUTH
72786	17	DEMENT CR > S FK COQUILLE R - AT MOUTH
72787	17	LOST CR > E FK COQUILLE R - AT MOUTH
72788	17	BRUMMIT CR > E FK COQUILLE R - AT MOUTH
72789	17	TWELVEMILE CR > M FK COQUILLE R - AT MOUTH
72790	17	ROCK CR > M FK COQUILLE R - AT MOUTH
72791	17	SLATER CR > M FK COQUILLE R - AT MOUTH
72792	17	SANDY CR > M FK COQUILLE R - AT MOUTH
72793	17	SALMON CR > M FK COQUILLE R - AT MOUTH
72794	17	KING CR > M FK COQUILLE R - AT MOUTH
72795	17	CHERRY CR > MIDDLE CR - AT MOUTH
72796	17	E FK BRUMMIT CR > BRUMMIT CR - AT MOUTH
72797	17	W FK BRUMMIT CR > BRUMMIT CR - AT MOUTH
72798	17	RHODA CR > S FK COQUILLE R - AT MOUTH
72799	17	SALMON CR > S FK COQUILLE R - AT MOUTH
72800	17	WOODWARD CR > S FK COQUILLE R - AT MOUTH
72801	17	BAKER CR > S FK COQUILLE R - AT MOUTH
72802	17	BEAVER CR > S FK COQUILLE R - AT MOUTH
72803	17	TWOMILE CR > PACIFIC OCEAN - AT MOUTH
72804	17	TWOMILE CR > PACIFIC OCEAN - AT MOUTH
72805	17	N FK COQUILLE R > COQUILLE R - AB MIDDLE CR
72806	17	THREEMILE CR > PACIFIC OCEAN - AT MOUTH
72807	17	BOTTOM CR > WILLIAMS R - AT MOUTH
72808	17	E FK COQUILLE R > N FK COQUILLE R - AT MOUTH
72809	17	N FK COQUILLE R > COQUILLE R - AB E FK COQUILLE R
72810	17	N FK COQUILLE R > COQUILLE R - AT MOUTH
72811	17	N FK COQUILLE R > COQUILLE R - AB MOON CR
72812	17	FALL CR > S FK COOS R - AT MOUTH
72813	17	COLE CR > MYRTLE CR - AT MOUTH
72814	17	ROCK CR > MYRTLE CR - AT MOUTH
72815	17	JOHNSON CR > S FK COQUILLE R - AT MOUTH
72816	17	COAL CR > S FK COQUILLE R - AT MOUTH
72817	17	HAYES CR > S FK COQUILLE R - AT MOUTH
72818	17	SALMON CR > S FK COQUILLE R - AB WATERPIPE CR
72819	17	HUDSON CR > N FK COQUILLE R - AT MOUTH
72820	17	EVANS CR > N FK COQUILLE R - AT MOUTH
72821	17	BIG CR > S FK COOS R - AT MOUTH
72822	17	MIDDLE CR > N FK COQUILLE R - AB CHERRY CR
72823	17	MIDDLE CR > N FK COQUILLE R - AT MOUTH
72824	17	WOOD CR > N FK COQUILLE R - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
72825	17	LLEWELLEN CR > N FK COQUILLE R - AT MOUTH
72826	17	MOON CR > N FK COQUILLE R - AT MOUTH
72827	17	LOST CR > N FK COQUILLE R - AT MOUTH
72828	17	CHINA CR > E FK COQUILLE R - AT MOUTH
72829	17	STEEL CR > E FK COQUILLE R - AT MOUTH
72830	17	HANTZ CR > E FK COQUILLE R - AT MOUTH
72831	17	MYRTLE CR > M FK COQUILLE R - AB ROCK CR
72832	17	YANKEE RUN > E FK COQUILLE R - AT MOUTH
72833	17	ROCK CR > S FK COQUILLE R - AT MOUTH
72834	17	LAMPA CR > COQUILLE R - AT MOUTH
72835	17	CATCHING CR > S FK COQUILLE R - AT MOUTH
72836	17	S FK CATCHING CR > CATCHING CR - AT MOUTH
72837	17	M FK CATCHING CR > CATCHING CR - AT MOUTH
72838	17	WARD CR > CATCHING CR - AT MOUTH
72839	17	WEEKLY CR > E FK COQUILLE R - AT MOUTH
72840	17	MYRTLE CR > M FK COQUILLE R - AT MOUTH
72841	17	STEELE CR > N FK COQUILLE R - AT MOUTH
72842	17	FISHTRAP CR > COQUILLE R - AT MOUTH
72940	17	LITTLE MATSON CR > MATSON CR - AT MOUTH
72941	17	NORTH SL > NORTH INLET - AT MOUTH
72942	17	BESSE CR > S FK COOS R - AT MOUTH
72943	17	BURNT CR > TIOGA CR - AT MOUTH
72944	17	CATCHING CR > CATCHING SL - AT MOUTH
72945	17	CEDAR CR > WILLIAMS R - AT MOUTH
72946	17	COAL CR > S FK COOS R - AT MOUTH
72947	17	DANIELS CR > S FK COOS R - AT MOUTH
72948	17	DAVIS SL > ISTHMUS SL - AT MOUTH
72949	17	DEER CR > W FK MILLICOMA R - AT MOUTH
72950	17	DENTON CR > MILLICOMA R - AT MOUTH
72951	17	ELK CR > W FK MILLICOMA R - AT MOUTH
72952	17	FISH CR > W FK MILLICOMA R - AT MOUTH
72953	17	GLENN CR > E FK MILLICOMA R - AT MOUTH
72954	17	KENTUCKY CR > KENTUCKY SL - AT MOUTH
72955	17	KNIFE CR > W FK MILLICOMA R - AT MOUTH
72956	17	MARLOW CR > E FK MILLICOMA R - AT MOUTH
72957	17	MART DAVIS CR > MILLICOMA R - AT MOUTH
72958	17	MINK CR > S FK COOS R - AT MOUTH
72959	17	TIOGA CR > S FK COOS R - AT MOUTH
72960	17	METTMAN CR > KENTUCKY SL - AT MOUTH
72961	17	MORGAN CR > DANIELS CR - AT MOUTH
72962	17	SHOTGUN CR > TIOGA CR - AT MOUTH
72963	17	TIOGA CR > S FK COOS R - AB BUCK CR
72964	17	WHISKY RUN > PACIFIC OCEAN - AT MOUTH
72965	17	WILLIAMS R > S FK COOS R - AB CEDAR CR
72966	17	WILLIAMS R > S FK COOS R - AB PANTHER CR
72967	17	WILLIAMS R > S FK COOS R - AT MOUTH
72968	17	WILSON CR > CATCHING SL - AT MOUTH
72969	17	WREN SMITH CR > DANIELS CR - AT MOUTH
72970	17	SULLIVAN CR > LARSON SL - AT MOUTH
72971	17	WILLANCH INLET > COOS BAY - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
72972	17	SALMON CR > S FK COOS R - AT MOUTH
72973	17	ROGERS CR > S FK COOS R - AT MOUTH
72974	17	HUBBARD CR > PACIFIC OCEAN - AT MOUTH
72982	17	CUT CR > PACIFIC OCEAN - AT MOUTH
73012	17	ROBERTSON CR > JOHNSON CR - AT MOUTH
73200	17	FOURMILE CR > NEW R - AB S FK FOURMILE CR
73201	17	CROOKED BRIDGE CR > EUCHRE CR - AT MOUTH
73202	17	BIG S FK HUNTER CR > HUNTER CR - AT MOUTH
73203	17	MYERS CR > PACIFIC OCEAN - AT MOUTH
73204	17	LITTLE S FK HUNTER CR > HUNTER CR - AT MOUTH
73205	17	N FK HUNTER CR > HUNTER CR - AT MOUTH
73206	17	HUNTER CR > PACIFIC OCEAN - AB N FK HUNTER CR
73207	17	BOULDER CR > EUCHRE CR - AT MOUTH
73208	17	MYRTLE CR > MUSSEL CR - AT MOUTH
73209	17	MUSSEL CR > PACIFIC OCEAN - AT MOUTH
73210	17	BRUSH CR > PACIFIC OCEAN - AT MOUTH
73211	17	HAYS CR > SIXES R - AT MOUTH
73212	17	N FK SIXES R > SIXES R - AT MOUTH
73213	17	SUGAR CR > SIXES R - AT MOUTH
73214	17	OTTER CR > SIXES R - AT MOUTH
73215	17	ELEPHANT ROCK CR > SIXES R - AT MOUTH
80445	17	N FK FLORAS CR > FLORAS CR - AT MOUTH
80448	17	S FK FOURMILE CR > FOURMILE CR - AT MOUTH
80449	17	S FK FLORAS CR > FLORAS CR - AT MOUTH
31730401	17	TENMILE CR > PACIFIC OCEAN - AB EEL CR
31730402	17	KENTUCK SL > COOS BAY - AT MOUTH
31730403	17	COOS R > COOS BAY - AT MOUTH
31730404	17	MILLICOMA R > COOS R - AT MOUTH
31730405	17	S FK COOS R > COOS R - AB BIG CR
31730406	17	CATCHING SL > COOS BAY - AT MOUTH
31730407	17	ISTHMUS SL > COOS BAY - AT MOUTH
31730408	17	UNN STR 17-140059 > COOS BAY - AT MOUTH
31730409	17	PONY CR > PONY SL - AT MOUTH
31730410	17	CHICKSES CR > COOS BAY - AT MOUTH
31730411	17	FIRST CR > COOS BAY - AT MOUTH
31730412	17	FOURTH CR > COOS BAY - AT MOUTH
31730413	17	JOE NEY SL > SOUTH SL - AT MOUTH
31730414	17	DAY CR > DAY INLET - AT MOUTH
31730415	17	ELLIOT CR > BROWN SL - AT MOUTH
31730416	17	TALBOTT CR > TALBOTT SL - AT MOUTH
31730417	17	UNN STR 17-1400-01900120 > TALBOTT SL - AT MOUTH
31730418	17	HAYWOOD CR > HAYWOOD INLET - AT MOUTH
31730419	17	UNN STR > PACIFIC OCEAN - AT MOUTH
31730420	17	BIG DEVIL G > PACIFIC OCEAN - AT MOUTH
31730421	17	CAVE CR > PACIFIC OCEAN - AT MOUTH
31730422	17	MUSSEL CR 17-1450 > PACIFIC OCEAN - AT MOUTH
31730423	17	FIVEMILE CR > PACIFIC OCEAN - AT MOUTH
31730425	17	MACKLYN CR > PACIFIC OCEAN - AT MOUTH
31730433	17	W FK MILLICOMA R > MILLICOMA R - AB DAGGET CR AT 14324500
31730434	17	TENMILE CR > PACIFIC OCEAN - AB MOUTH AT GAGE 14323200

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
449	18	ELK CR > YAQUINA R - AB BEAR CR
460	18	GRAVEL CR > SILETZ R - AT MOUTH
470	18	LITTLE ELK CR > YAQUINA R - AT MOUTH
479	18	N FK SIUSLAW R > SIUSLAW R - AT MOUTH
488	18	S FK SILETZ R > SILETZ R - AT MOUTH
492	18	SALMON R > PACIFIC OCEAN - AT MOUTH
494	18	SAM CR > SILETZ R - AT MOUTH
495	18	SCHOONER CR > SILETZ BAY - AT MOUTH
498	18	SILETZ R > SILETZ BAY - AT MOUTH
500	18	SILETZ R > SILETZ BAY - AB SUNSHINE CR
501	18	SILETZ R > SILETZ BAY - AB GRAVEL CR
502	18	SIMPSON CR > YAQUINA R - AT MOUTH
505	18	SIUSLAW R > PACIFIC OCEAN - AT MOUTH
511	18	SLICK ROCK CR > SALMON R - AT MOUTH
517	18	WOAHINK CR > SILTCOOS R - AT MOUTH
523	18	YACHATS R > PACIFIC OCEAN - AB BEAMER CR
526	18	YAQUINA R > YAQUINA BAY - AT MOUTH
527	18	YAQUINA R > YAQUINA BAY - AB SIMPSON CR
71386	18	ALSEA R > ALSEA BAY - AB LINE CR
71387	18	ALSEA R > ALSEA BAY - AB FIVE RIVERS
71388	18	BEAR CR > SALMON R - AT MOUTH
71389	18	BEAR CR > SILETZ R - AT MOUTH
71390	18	CEDAR CR > SILETZ R - AT MOUTH
71391	18	DEER CR > SALMON R - AT MOUTH
71392	18	EUCHRE CR > SILETZ R - AT MOUTH
71393	18	MILL CR > YAQUINA R - AT MOUTH
71395	18	SALMON CR > SALMON R - AT MOUTH
71396	18	YAQUINA R > YAQUINA BAY - AB ELK CR
71397	18	YAQUINA R > YAQUINA BAY - AB BALES CR
71398	18	TENMILE CR > PACIFIC OCEAN - AT MOUTH
71399	18	FIVEMILE CR > TAHKENITCH L - AT MOUTH
71400	18	BIG CR > PACIFIC OCEAN - AT MOUTH
71401	18	CAPE CR > PACIFIC OCEAN - AT MOUTH
71402	18	DEADWOOD CR > LAKE CR - AT MOUTH
71403	18	ESMOND CR > SIUSLAW R - AT MOUTH
71404	18	FIDDLE CR > SILTCOOS L - AT MOUTH
71405	18	FISH CR > LAKE CR - AT MOUTH
71406	18	GREENLEAF CR > LAKE CR - AT MOUTH
71407	18	INDIAN CR > LAKE CR - AT MOUTH
71408	18	KNOWLES CR > SIUSLAW R - AT MOUTH
71409	18	LEITEL CR > TAHKENITCH L - AT MOUTH
71410	18	MAPLE CR > SILTCOOS L - AT MOUTH
71411	18	NELSON CR > LAKE CR - AT MOUTH
71412	18	LAKE CR > SIUSLAW R - AT MOUTH
71413	18	N FK SIUSLAW R > SIUSLAW R - AT MOUTH
71414	18	LAKE CR > SIUSLAW R - AB NELSON CR
71415	18	N FK SIUSLAW R > SIUSLAW R - AB MCLEOD CR
71416	18	N FK SIUSLAW R > SIUSLAW R - AB LINDSLEY CR
71417	18	S FK SIUSLAW R > SIUSLAW R - AT MOUTH
71418	18	SIUSLAW R > PACIFIC OCEAN - AB PLOWMAN CR

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
71419	18	SIUSLAW R > PACIFIC OCEAN - AB WOLF CR
71420	18	SIUSLAW R > PACIFIC OCEAN - AB HAIGHT CR
71421	18	SIUSLAW R > PACIFIC OCEAN - AB LAKE CR
71422	18	SWEET CR > SIUSLAW R - AT MOUTH
71423	18	WHITTAKER CR > SIUSLAW R - AT MOUTH
71424	18	WILDCAT CR > SIUSLAW R - AT MOUTH
71425	18	WOLF CR > SIUSLAW R - AT MOUTH
71426	18	YACHATS R > PACIFIC OCEAN - AB N FK YACHATS R
71427	18	YACHATS R > PACIFIC OCEAN - AT MOUTH
71428	18	SCHOOL FK > YACHATS R - AT MOUTH
71429	18	N FK YACHATS R > YACHATS R - AT MOUTH
71430	18	WILLIAMSON CR > N FK YACHATS R - AT MOUTH
72001	18	SALMON R > PACIFIC OCEAN - AB SLICK ROCK CR
72002	18	PANTHER CR > SALMON R - AT MOUTH
72003	18	SULPHUR CR > SALMON R - AT MOUTH
72004	18	ROCK CR > DEVILS L - AT MOUTH
72005	18	BIG ROCK CR > ROCK CR - AT MOUTH
72006	18	LITTLE ROCK CR > ROCK CR - AT MOUTH
72007	18	OLALLA CR > YAQUINA R - AT MOUTH
72008	18	ELK CR > YAQUINA R - AB GRANT CR
72009	18	GRANT CR > ELK CR - AT MOUTH
72010	18	FEAGLES CR > ELK CR - AT MOUTH
72011	18	S FK ALSEA R > ALSEA R - AT MOUTH
72012	18	FALL CR > ALSEA R - AT MOUTH
72013	18	GREEN R > FIVE RIVERS - AT MOUTH
72014	18	LOBSTER CR > FIVE RIVERS - AT MOUTH
72015	18	MILL CR > SILETZ R - AT MOUTH
72016	18	ROCK CR > SILETZ R - AT MOUTH
72017	18	FIVE RIVERS > ALSEA R - AT MOUTH
72018	18	FIVE RIVERS > ALSEA R - AB LOBSTER CR
72019	18	FIVE RIVERS > ALSEA R - AB GREEN R
72881	18	DEER CR > ELK CR - AT MOUTH
72882	18	N FK SILETZ R > SILETZ R - AT MOUTH
72884	18	BUMMER CR > S FK ALSEA R - AT MOUTH
72885	18	BEAR CR > ELK CR - AT MOUTH
31820401	18	CHITWOOD CR > PACIFIC OCEAN - AT MOUTH
31820402	18	CLIFF CR > PACIFIC OCEAN - AT MOUTH
31820403	18	LOGAN CR > PACIFIC OCEAN - AT MOUTH
31820404	18	SIJOTA CR > PACIFIC OCEAN - AT MOUTH
31820405	18	SCHOOLHOUSE CR > PACIFIC OCEAN - AT MOUTH
31820406	18	FOGARTY CR > PACIFIC OCEAN - AT MOUTH
31820407	18	DEPOE CR > DEPOE BAY - AT MOUTH
31820408	18	DEADHORSE CR > PACIFIC OCEAN - AT MOUTH
31820409	18	ROCKY CR > PACIFIC OCEAN - AT MOUTH
31820410	18	JOHNSON CR > PACIFIC OCEAN - AT MOUTH
31820411	18	SPENCER CR > PACIFIC OCEAN - AT MOUTH
31820412	18	WADE CR > PACIFIC OCEAN - AT MOUTH
31820413	18	COAL CR > PACIFIC OCEAN - AT MOUTH
31820414	18	MOOLACK CR > PACIFIC OCEAN - AT MOUTH
31820415	18	SCHOONER CR > PACIFIC OCEAN - AT MOUTH

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
31820416	18	LITTLE CR > PACIFIC OCEAN - AT MOUTH
31820417	18	BIG CR > PACIFIC OCEAN - AT MOUTH
31820418	18	KINGS SL > YAQUINA BAY - AT MOUTH
31820419	18	HENDERSON CR > PACIFIC OCEAN - AT MOUTH
31820420	18	GRANT CR > PACIFIC OCEAN - AT MOUTH
31820421	18	MOORE CR > PACIFIC OCEAN - AT MOUTH
31820422	18	THIEL CR > PACIFIC OCEAN - AT MOUTH
31820423	18	LOST CR > PACIFIC OCEAN - AT MOUTH
31820424	18	DEER CR > PACIFIC OCEAN - AT MOUTH
31820425	18	'D' R > PACIFIC OCEAN - AT MOUTH
31820426	18	UNN STR > DEVILS L - AT MOUTH
31820427	18	UNN STR > DEVILS L - AT MOUTH
31820436	18	SALMON R > PACIFIC OCEAN - AB DEER CR AT GAGE 14303750
31820437	18	ROCK CR > DEVILS L - AB UNN STR AT GAGE 14303800
31820438	18	SCHOONER CR > SILETZ BAY - AB ABRAMS CR AT GAGE 14303950
31820439	18	SILETZ R > SILETZ BAY - AB MILL CR AT GAGE 14305500
31820440	18	BIG ROCK CR > ROCK CR - AB LUCAS CR AT GAGE 14304850
31820441	18	MILL CR > YAQUINA R - AB UNN STR AT GAGE 14306036
31820442	18	YAQUINA R > YAQUINA BAY - AB TRAPP CR AT GAGE 14306030
31820501	18	BEAVER CR > PACIFIC OCEAN - AT MOUTH
31820502	18	HILL CR > PACIFIC OCEAN - AT MOUTH
31820503	18	SQUAW CR > PACIFIC OCEAN - AT MOUTH
31820504	18	COLLINS CR > PACIFIC OCEAN - AT MOUTH
31820505	18	BUCKLEY CR > PACIFIC OCEAN - AT MOUTH
31820506	18	BURNHAM CR > ALSEA BAY - AT MOUTH
31820507	18	PATTERSON CR > PACIFIC OCEAN - AT MOUTH
31820508	18	LITTLE CR > PACIFIC OCEAN - AT MOUTH
31820509	18	LINT SL > ALSEA BAY - AT MOUTH
31820510	18	BIG CR > PACIFIC OCEAN - AT MOUTH
31820511	18	STAR CR > PACIFIC OCEAN - AT MOUTH
31820512	18	AGENCY CR > PACIFIC OCEAN - AT MOUTH
31820513	18	N CAPE CR > PACIFIC OCEAN - AT MOUTH
31820514	18	CAPE CR > PACIFIC OCEAN - AT MOUTH
31820515	18	GWYNN CR > PACIFIC OCEAN - AT MOUTH
31820516	18	CUMMINS CR > PACIFIC OCEAN - AT MOUTH
31820517	18	BOB CR > PACIFIC OCEAN - AT MOUTH
31820518	18	SQUAW CR > PACIFIC OCEAN - AT MOUTH
31820519	18	ROCK CR > PACIFIC OCEAN - AT MOUTH
31820520	18	CHINA CR > PACIFIC OCEAN - AT MOUTH
31820521	18	BLOWOUT CR > PACIFIC OCEAN - AT MOUTH
31820522	18	HORSE CR > PACIFIC OCEAN - AT MOUTH
31820523	18	BERRY CR > PACIFIC OCEAN - AT MOUTH
31820524	18	SUTTON CR > PACIFIC OCEAN - AT MOUTH
31820525	18	VINGIE CR > PACIFIC OCEAN - AT MOUTH
31820542	18	N FK BEAVER CR > BEAVER CR - AB PETERSON CR AT 14306040
31820543	18	DRIFT > ALSEA R - AB MEADOW CR AT GAGE 14306600
31820544	18	ALSEA R > ALSEA BAY - AB HELLION CAN AT GAGE 1430650
31820545	18	FIVE RIVERS > ALSEA R - AB ELK CR AT GAGE 14306400
31820546	18	FALL CR > ALSEA R - AB SKUNK CR AT GAGE 14306300
31820547	18	S FK ALSEA R > ALSEA R - AB BUMMER CR AT GAGE 14306200

WATER AVAILABILITY BASINS		
ID NUMBER	OWRD BASIN	WATERSHED NAME
31820548	18	N FK ALSEA R > ALSEA R - AB MOUTH AT GAGE 14306100
31820549	18	BIG CR > PACIFIC OCEAN - AB UNN STR AT GAGE 14306900
31820636	18	N FK SIUSLAW R > SIUSLAW R - AB CONDON CR AT 14307645
31820637	18	SIUSLAW R > PACIFIC OCEAN - AB SHOEMAKER CR AT 14307600
31820638	18	LAKE CR > SIUSLAW R - AB INDIAN CR AT GAGE 14307580
31820639	18	LAKE CR > SIUSLAW R - AB CANYON CR AT GAGE 14307500
31820640	18	SIUSLAW R > PACIFIC OCEAN - AB WILDCAT CR AT 14307000
31820701	18	SILTCOOS R > PACIFIC OCEAN - AT MOUTH
31820702	18	TAHKENITCH CR > PACIFIC OCEAN - AT MOUTH
31820703	18	THREEMILE L > THREEMILE CR - AT MOUTH
31820704	18	THREEMILE CR > PACIFIC OCEAN - AT MOUTH