

Forest Practices Technical Guidance

Water Classification

Objective

The purpose of a water classification system is to match the physical characteristics and beneficial uses of a water body to some set of protection measures. The following water classification system was developed to meet this purpose and provide a relatively simple method for delineating the various types of waters found on forest lands.

For purposes of the Forest Practices Rules the waters of the state are classified as either streams, wetlands, or lakes. The various types of streams, wetlands, and lakes are described in detail below. Forest Practices Technical Guidance is advisory guidance, developed by the State Forester through a stakeholder process to assist landowners and resource professionals. The objective of this guidance is to describe how a water body is classified for the purposes of applying protection measures described in the forest practice rules.

Background

In 2022, Senate Bill 1501 directed the Board of Forestry to adopt rules to apply the 2022 Private Forest Accord Report. The Report memorializes the agreements between authors of a conservation coalition and authors of a working forest coalition. They negotiated to modify Oregon's forest practice regulations in support of developing an acceptable habitat conservation plan (HCP). The HCP would provide the means to seek an Incidental Take Permit under Section 10 of the U.S. Endangered Species Act for the covered species identified in the Report.

Terminology and Definitions

"Bog" means a wetland that is characterized by the formation of peat soils and that supports specialized plant communities. A bog is a hydrologically closed system without flowing water. It is usually saturated, relatively acidic, and dominated by ground mosses, especially sphagnum. A bog may be forested or non-forested and is distinguished from a swamp and a marsh by the dominance of mosses and the presence of extensive peat deposits.

"Channel migration zone" (CMZ) means the area where the active channel of a stream is prone to move and this results in a potential near-term loss of riparian function and associated habitat adjacent to the stream, except as modified by a permanent levee, dike, railroad lines, or any public transportation infrastructure. For this purpose, near term means the time scale required to grow a mature forest.

"Estuary" means a body of water semi-enclosed by land and connected with the open ocean within which saltwater is usually diluted by freshwater derived from the land. "Estuary" includes all estuarine waters, tidelands, tidal marshes, and submerged lands extending upstream to the head of tidewater. However, the Columbia River Estuary extends to the western edge of Puget Island.

"Fish Use" means any stream used by anadromous fish, game fish, or fish listed as threatened or endangered under the federal or state endangered species acts.

"Lateral Type Np stream" means any Type Np stream that is not a Terminal Type Np stream. (Specific to the Eastern Oregon Geographic Region).

“Important Spring” are springs in arid parts of Eastern Oregon that have established wetland vegetation, flow year-round in most years, are used by a concentration of diverse animal species, and, by reason of sparse occurrence, have a major influence on the distribution and abundance of upland species.

“Seeps” means features similar to springs, except without a well-defined point or points of groundwater surface discharge and usually very low flow.

“Stream” means a channel, such as a river or creek, which carries flowing surface water during some portion of the year.

(a) For the purposes of the forest practice rules, streams include:

- (A) The water itself, including any vegetation, aquatic life, or habitats therein
- (B) Beds and banks below the high-water level which may contain water, whether or not water is actually present
- (C) The area between the high-water level of connected side channels
- (D) Beaver ponds, oxbows, and side channels if they are connected by surface flow to the stream during a portion of the year; and
- (E) Stream-associated wetlands

(b) “Streams” do not include:

- (A) Ephemeral overland flow (such flow does not have a channel); or
- (B) Road drainage systems or water developments as defined in OAR 629-600-100(157).

“Springs” means features where groundwater discharges to land surface or a surface water body at a well-defined point or points. Spring volumes range from small, intermittent trickles to millions of gallons per day, depending on the groundwater source and hydraulic head.

“Terminal Type Np stream” means the largest Type Np stream by basin size that is immediately upstream of the end of a Type F or Type SSBT stream. (Specific to the Eastern Oregon Geographic Region).

“SSBT Use” means a stream with salmon, steelhead, or bull trout present or otherwise used by salmon, steelhead, or bull trout at any time of the year as determined by the State Forester.

“Type SSBT Stream” means a stream that is classified as a Type F stream and has SSBT use.

“Type D Stream” means a stream that has domestic water use, but no fish use.

“Type N stream” means a stream that meets the criteria of a Type Np or Ns stream.

“Type Np stream” means all perennial streams that are not Type SSBT or Type F.

“Type Ns stream” means all seasonal stream reaches that are not Type SSBT, Type F or Type Np streams.

“Water Development” means water bodies developed for human purposes that are not part of a stream such as waste treatment lagoons, reservoirs for industrial use, drainage ditches, irrigation ditches, farm ponds, stock ponds, settling ponds, gravel ponds, cooling ponds, log ponds, pump chances, or heli-ponds that are maintained for the intended use by human activity.

Overview

Streams, Wetlands, and Lakes

Waters of the state include an array of water types—estuaries, lakes, ponds, springs, rivers, marshes, water developments (excluding hydrologically disconnected water developments, e.g., ditch lines that don’t connect to streams), etc. However, FPA classification is based upon determining the best fit into three major classifications—lakes, streams, or wetlands. Of these three, determine the one single classification for a water body that best fits. This should be done based upon the dominant feature.

Streams

Streams are classified according to their size and according to one of the following beneficial use categories:

1. Streams that are used by fish, including fish-bearing streams that have domestic use, are classified as **Type F**.
2. Streams that have salmon, steelhead, or bull trout present or past use are classified as **Type SSBT**.
3. Streams that are not used by fish and are perennial are classified as **Type Np**.
4. Streams that are not used by fish and are seasonal are classified as **Type Ns**.
5. Streams that have domestic water use and are non-fish use are classified as **Type D**. A Type D may also be classified as Type Np or Type Ns concurrently. Only streams may be designated as Domestic Use.

Note: A 'water development' is not considered a stream for consideration of Forest Practices requirements, although it may be connected to fish use and that is connected to other Waters of the State (as defined in OAR 629-600-0100(159)).

Fish Use Streams

The purpose of the Forest Practices water classification system (OAR 629-635-0200 (1)) is to match the physical characteristics and beneficial uses, including fish use, of a water body to a set of appropriate protection measures required during forest management activities on non-federal forest lands regulated by the FPA. The FPA rules recognize two broad categories of fish streams based on the occurrence of certain fish species and suitable habitat:

- “Type F stream” means a stream with fish use, or both fish use and domestic water use (OAR 629-600-0100 (148)). “Fish use” means inhabited at any time of the year by anadromous or game fish species or fish that are listed as threatened or endangered species under the federal or state Endangered Species Acts (OAR 629-600-0100 (45)) (Appendix A).
- “Type SSBT stream means a stream that is classified as a Type F stream and has SSBT use (OAR 629-600-0100 (152)). “SSBT use” means a stream with salmon, steelhead or Bull Trout present or otherwise used by salmon, steelhead, or Bull Trout (SSBT) at any time of the year as determined by the State Forester (OAR 629-100-0100 (130)).

Revisions to the stream classification and water protection rules were key components of the Private Forest Accord (PFA) agreement. The revised rules reflect the changes to riparian management objectives and the stream classification process that were outlined in the PFA Report (2022). Major changes to the stream classification system and hydrography network included using an approved fish distribution model and information from existing field surveys to ensure all streams on forestland were classified regarding fish use. The need for increased efforts to coordinate field surveys with ODFW was also identified. SSBT rules were not amended during the Private Forest Accord agreement.

For the purposes of administering the stream classification rules, the historical data and the fish model are contained within in the authoritative [Statewide Flow Line Hydrography](#) data which provides a comprehensive framework to establish the distribution of fish presence (fish use streams) and habitat features that impact fish migration.

The Statewide Flow Line Hydrography data was developed as mandated in the Oregon Private Forest Accord (PFA, 2022) and Senate Bill 1501 in which one of the main objectives was to protect fish and wildlife habitat through increased protections requirements from adoption of revised Forest Practice rules. The revised rules increased tree retention in riparian areas along fish bearing streams and added limitations to disturbances near Type N streams. The Flow Line data includes a synthetic stream model for the entire state, with relevant attributes indicating fish presence, information on flow permanence, and other attributes identified as required for use in implementing the FPA rules regulations. This Statewide Flow Line is updated regularly using surveys conducted for both fish presence and flow permanence. The Oregon [Private Forest Accord](#) and Forest Practices Act specify the methodology to develop and maintain the Statewide Flow Line data. After streams were modeled using the highest resolution elevation data available and the synthetic stream network was created, the Fransen fish model (Fransen et. al, 2006) was applied to predict the upper extent of fish presence for all streams in the modeled watersheds in Oregon. The historic ODF fish presence data, (previously maintained in the ODF Statewide Streams Fish Presence dataset) was then conflated to the synthetic streams and was used to correct any fish model outputs with survey data that had been previously obtained with valid fish survey (field surveys for fish use). The final data were reviewed by ODF and ODFW GIS staff to ensure that data met minimum conflation success rates.

The modeled fish distribution results that have been incorporated into the Statewide Flow Line network are considered as the initial classification for fish use and are allowed to apply the streamside vegetation requirements outline in Division 643 of the FPA rules. Notwithstanding the published fish distribution model, the Forest Practices rules allow for field surveys to correct modeled fish distribution (OAR 629-635-0200 (11)(c)) or verify the designation of fish use in stream segments that were initially classified as fish use based on the model (OAR 629-635-0200 (11)(d)).

A field survey for fish use as described in OAR 629-635-0200(11)(c) and completed using the methodology in the Surveying Forest Streams for Fish Use (published jointly by ODF/ODFW) may be completed to revise the extent of fish use (Type F) for streams segments in the Statewide Flow Line hydrography data. Any completed survey for fish presence must be submitted to ODF and reviewed/approved by ODFW before it is considered accepted and ultimately incorporated in the regulatory Statewide Flow Line data. ODFW has 21 days to disqualify a survey, otherwise it is incorporated in the regulatory data.

The department may use other reliable fish survey information (not collected/completed under the Surveying for Fish Use protocols) when determining whether if a stream has fish use, if approved by ODFW. This information could include surveys done by landowners, federal or state agencies, universities, or other persons or entities which may include fish observations not associated with a survey for fish use under the provisions of the Surveying Forest Streams for Fish Use. The department will determine whether such information is reliable and sufficient to the fish use standard for stream classification as required in OAR 629-635 and the application of the forest practice rules. If applicable, all other provisions in OAR 629-635-0200 that specify a process or standard (e.g., notice to landowners, use of physical habitat criteria, barrier identification), those requirements are to be adhered to prior to the general allowance of “other reliable and sufficient information.”

For Type SSBT streams (those having identified salmon, steelhead, and bull trout use) in the Statewide Flow Line data, this information has been included as an individual attribute based on the distribution data maintained and provided by ODFW as required in OAR 629-635-0200(12). Once the updated Surveying

Forest Streams for Fish Use is published and implemented, it will include a protocol and methodology to determine the maximum upstream extent of SSBT use when the landowner chooses to update this information. A survey for SSBT use may be completed upon evaluation and certain conditions are met prior to conducting field surveys for fish use. The maximum upstream distribution of SSBT and resident trout fish species will be determined when the physical survey criteria for either falls/chutes, channel gradient, or lack of livable space has been encountered for SSBT or resident trout species, respectively.

For complete information on surveying streams that may include SSBT use, please refer to the Surveying Forest Streams for Fish Use (Pending revisions, 2026).

Updates to Type SSBT distribution attributes: Statewide Flow Line data now includes all size classifications for SSBT use. This SSBT information existed in the ODFW data provided to ODF prior to 2023 but was only shown in the regulatory layer for small and medium streams as prescribed in the rules. Due to stream sizing being recalculated on all segments on the new hydrography line work, the SSBT distribution may appear differently based on stream size changes. What may now be a medium stream, may have been previously a large stream and therefore no SSBT information was published by rule. SSBT distribution information is now included on all stream sizes in the Statewide Flow Line data.

Type N Streams

A Type N stream is defined as not having any fish use. Due to the revisions in Forest Practice rules in 2022, a Type N stream now may have concurrent domestic use. The domestic use classification and associated streamside protection will only apply on portions of a small stream upstream of the required tree retention area based on requirement for small Type N streams described in OAR 629-643-0130 and 629-643-0143. See DOMESTIC USE Streams in the next section for the requirements for identifying and classifying these streams.

Small Type N streams are classified as either perennial (Type Np) or seasonal (Type Ns) for application of appropriate protection measures. During Phase 1 of the flow permanence protocol, classifying small Type N streams is completed by conducting an Operational Field Survey (OAR 629-635-200(18)(a)) in order to determine the uppermost flow feature. The location of this feature (upper most flow feature) establishes a distinct break between.

- a) Type Np (downstream) and
- b) Type Ns (upstream)

Once the Phase 2 of the flow permanence protocol is in effect, the department will utilize a statewide flow-duration model to identify the uppermost extent of perennial flow for small Type N streams. Under this protocol, the modeled end of perennial flow (uppermost flow feature) is identified, mapped, and published by the department. Landowners and operators should refer to the modeled end in the published Statewide Flow Line hydrography data when planning forest operations. If a landowner does not agree with the modeled end, a verified end survey may be completed following the approved methodology and then submitted to the department. All operational field surveys (flow surveys) are subject to review and approval by ODFW. If the operational field survey is not disapproved within 21 days, the survey may define the relevant attributes (uppermost flow feature) for layout and will be added to the Statewide Flow Line data.

The classification of the stream as Np or Ns determines the streamside protection requirements including vegetation retention and the appropriate equipment limitation zone for individual stream

reaches. The small Type N vegetation retention and equipment limitation zone requirements for all operators are provided in OAR 629-643-0130 and more detail for Small Forestland Owners (SFOs) is provided in OAR 629-643-0143.

Large and Medium size Type N streams do not require further classification as either perennial or seasonal.

For complete information regarding the requirements for Small Type N streams, refer to the published Forest Practices Technical Guidance and Survey Protocol for Small Type N streams located here: <https://www.oregon.gov/odf/documents/workingforests/fp-technical-guidance-small-type-n-stream-guidance-and-flow-permanence-field-survey-protocol.pdf>.

Domestic Use Streams

Type D streams do not contain fish and are located upstream of any domestic water intake for which a water use permit has been issued by the Oregon Water Resources Department. The procedure for determining how far upstream from an intake that Type D classification applies depends on whether the intake is for a community water supply or not. This difference is explained below:

1. If the domestic use is a community water system (has 15 or more service connections used by year-round residents, or which regularly serves 25 or more year-round residents; (OAR 333-061-0020) the Type D classification shall initially apply to the length of stream that was designated Class I under the classification system that was in effect on April 22, 1994 (as shown on district water classification maps). This initial classification based on the presence of community water systems does not extend to any tributaries that were not previously shown as Class I.
2. If the domestic use is not a community water system, Type D classification shall initially be applied for the shortest of the following distances:
 - a) The distance upstream from the intake to the farthest upstream point of summer surface flow,
 - b) Half the distance from the intake to the drainage boundary; or
 - c) 3,000 feet upstream from the intake.

The Type D classification shall apply also to tributaries off the main stream channel as long as either 1 or 2 apply above. The extension of the Type D classification on tributaries will need to follow the distance rules and Type Np/Ns determinations determined by field surveys or modeled end (once available).

Domestic Use may be applied to streams and only applies to surface water. A domestic use point of diversion or intake accessing only ground water such as a spring or well (no surface water in a channel is collected) would not qualify an upstream reach of a channel as having domestic use. Wetlands and lakes do not receive the domestic use designation. Streams that are tributary to lakes receive domestic use status only if the domestic use point of diversion or intake is actually in the stream channel, at or upstream of the point where the stream enters the lake. A domestic use permit for diverting water from the lake itself does not confer

domestic use status on any streams that are tributary to the lake.

Measuring Points for Type D Classification

In practice, ODF will assume that the domestic use stream designation begins at the physical, on-the-ground point of diversion or water intake. This is consistent with the fact that the permit holder may move the mapped point of diversion and, with the language in OAR 629-635-0200(6), declare domestic use to occur upstream of an “intake.” If the physical intake for a domestic water use permit has not yet been constructed, use the point of diversion shown on the water use permit map. If there is an existing intake (even if it is currently inactive), or evidence of where an intake used to be, start the domestic use designation from that point. If there is no remaining evidence of an intake, use the point of diversion shown on Oregon Water Resources Department (WRD) website and water use permit map. Figure 1 shows the distance for Type D classification for domestic water uses that are not community water systems.

A representative of a community water system or other domestic use water permit holder may request that the department designate additional lengths of channels upstream from a domestic water intake or reservoir as Type D. The representative or permit holder must present evidence that additional stream protection is needed.

The department will decide whether to extend Type D classification to these other channels based on evidence presented by the requesting party showing that protection measures associated with Type N classification would be insufficient to prevent adverse temperature increases, turbidity increases, or other water quality changes at the domestic water use intake or reservoir. These criteria also will be used to evaluate the extent of Type D classification for new community water systems. The department will decide whether to extend the length of Type D classification within 30 days of the presentation of evidence.

The domestic water use classification may be waived by the department at the request of the landowner who is the sole domestic water use permit holder for an intake and who owns all the land along upstream channels that would be affected by the classification related to that intake. The waiver is not intended to affect the classification related to downstream domestic water use intakes.

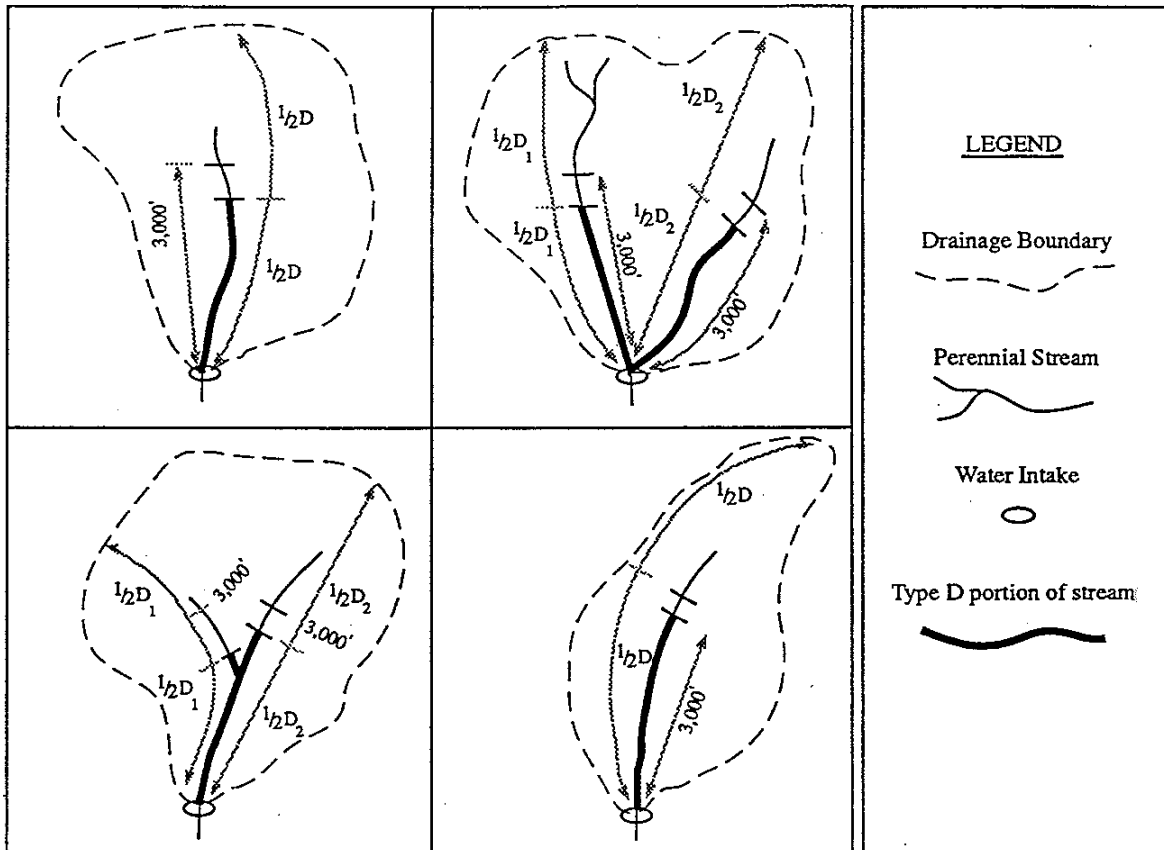


Figure 1 – Applying distance methodology from water intake for Type D Protections

Top Row: Half the distance from the intake to the drainage boundary (left); half distance from intake extending to tributaries (right)

Bottom Row: Half the distance upstream from the intake (left) and the maximum 3000 ft upstream (right)

STREAM SIZE

For each of the beneficial use categories, streams are categorized further according to three size categories: **large, medium, and small**.

The stream size categories are based on the average annual flow of a stream. Average annual flow is measured in cubic feet per second (cfs) and is simply the total volume of water (in cubic feet) transported by a stream during a normal year divided by the total seconds in a year.

Stream size categories were included in the classification system because they allow the tailoring of protection measures to fit site conditions. For example, fewer trees need to be retained along small streams than along large streams because the depletion of woody debris in a small stream is less during high flows and less debris volume is required to create the needed habitat in a channel.

Small streams have an average annual flow of 2 cfs or less. Medium streams have an average annual flow greater than 2 cfs but less than 10 cfs. Large streams have an average annual flow of 10 cfs or greater.

The average annual flow at any point along a stream is calculated using a relationship that is based on the upstream drainage area and annual precipitation. In cases where the watershed area and annual precipitation relationship clearly do not estimate a stream's size, the alternative process of using direct measure of stream flow may be used. Additional guidance for providing actual flow measurements to inform the stream size is described in the **Stream Flow Measurements** section. This may be necessary when it is obvious that the flow is unusually influenced by a spring or lava tube. An example of where the measured flow should be used is the Metolius River, which exits the ground as a large stream. Here, recent lava flows have obscured the actual drainage area and so the relationship between flow and drainage area would not apply.

Any stream with a drainage area less than 200 acres shall be assigned to the small stream category regardless of the calculated value (OAR 629-635-0200(16)(c)).

The assignment of size categories to streams on forestland based on the calculated average flows will be done by the department.

The equation that relates average annual flow to drainage area and average annual precipitation was developed using data from gauging stations on forested streams in eastern and western Oregon. Streams where gauge data were greatly influenced by water storage or withdrawals were not included in the analysis.

The relationship between flow, drainage area, and precipitation were determined by multiple linear regression analysis. The independent variables in the data set (drainage area and precipitation) were transformed logarithmically (base e) to increase the linearity of the various relationships with the dependent variable. The dependent variable (flow) was assumed to be log-normally distributed. Analysis of the transformed data resulted in the following equation:

Western Oregon

$$\log(\text{FLOW}) = -11.972 + 0.990 * \log(\text{AREA}) + 1.593 * \log(\text{PRECIP})$$

n = 48; adjusted squared multiple R² = 0.96
standard error of estimate = 0.31

Eastern Oregon

$$\log(\text{FLOW}) = -15.712 + 1.176 * \log(\text{AREA}) + 2.061 * \log(\text{PRECIP})$$

n = 23; adjusted squared multiple R² = 0.83
standard error of estimate = 0.55

where: FLOW = average annual flow (cfs, cubic feet per second)
AREA = upstream drainage area (acres)
PRECIP = average annual precipitation (inches)

By rearranging the terms in the above equations, the relationships can be expressed as:

Western Oregon

$$\text{AREA} = 178600 * \text{FLOW}^{1.010} * \text{PRECIP}^{-1.609}$$

Eastern Oregon

$$\text{AREA} = 634300 * \text{FLOW}^{0.850} * \text{PRECIP}^{-1.753}$$

Using these last two equations, the drainage area corresponding to the division points between small and medium (2 cfs) and medium and large (10 cfs) streams can be calculated for various precipitation values, as shown in Table 1 and Table 2.

Stream Size Calculations in Statewide Flow Line Hydrography data (July 2023)

The mean annual flow was calculated by the contractor (Terrainworks) during the watershed modeling process for all modeled stream segments in the Flow Line dataset. The contractor (Terrainworks) used the regression equations shown above for both eastern and western Oregon to calculate the average annual flow for each modeled stream segment. The equations were reformatted into metric units in which the outputs were then converted back to imperial. As per the equation, the inputs used for the calculation include the upstream drainage area and normal annual precipitation. The upstream drainage area for each segment was calculated using the elevation data and DEM's and the annual precipitation was sourced with the OSU PRISM climate data for the 30-year normal mean annual precipitation raster data. ([Index of /projects/request/normals/1981-2010/800m \(oregonstate.edu\)](https://indexof/projects/request/normals/1981-2010/800m)) For each location in the stream network, the upstream mean annual precipitation values were developed. This value plus the upstream drainage area for this location was used to calculate mean annual

flow. The stream sizes were then classified into their appropriate size category, as defined by the in rule by the, based on the calculated mean annual flow value.

Updates to stream size attributes: Average stream flows were calculated and assigned the appropriate size classification for all stream segments in the new hydrography data published in the Statewide Flow Lines. As a result, the stream size classification may be different than was previously published. For example, a stream that was previously classified as a large stream may now be classified as a medium stream or a small stream may now be classified as a medium stream.

Direct Stream Flow Measurements

Rule Reference: 629-635-0200(16)(b) – Actual measurements of average annual flow may substitute for the calculated flows described in the Forest Practice Technical Guidance.

The determination of stream size using watershed area and annual precipitation may underestimate the size of some spring-fed streams in eastern Oregon. In cases where the watershed area and annual precipitation relationship clearly does not estimate a stream's size, the alternative process of using direct measure of stream flow will be used. **Spring-fed** streams have relatively uniform flow throughout the year. Therefore, direct measurement of flow at any time of the year except during late summer and early fall or during spring runoff would provide a reasonable approximation of average annual flow.

Direct measurement of flow involves determining both the velocity and wetted cross-sectional area of the stream. Velocity is best measured using a flow meter, but a rough estimate of velocity can be obtained with a float method by measuring the time it takes for a wood chip to float a distance downstream and applying a correction factor. The wetted cross-sectional area is commonly measured using a level, level rod, and measuring tape. *Figure 2* can be used to determine stream sizes for various combinations of velocity and the wetted cross-sectional area.

The goal in acquiring field measurements of flow is to adjust the designated stream size classification using an approximate average annual flow used to determine size classification as outlined in rule (OAR 629-635-0200 (15)). This guidance does not prescribe the exact methodology to collect direct flow measures but does describe a general process to collect and submit observations. If any landowner desires to collect direct flow measurements, the proposed methodology should be discussed with ODF staff prior to collection to ensure the submissions are adequate to revise the average annual flow/size classifications that are reflected in the ODF Statewide Flow Line Data.

The methodology to collect direct flow measures are not prescribed in this guidance but does describe a general process to collect and submit observations. If a direct measurement of flow is needed to evaluate the size classification of a specific stream segment, please consult the ODF to discuss a specific sampling methodology and process prior to collecting field observations. The specific process and requirements for obtaining direct stream flow measurements should be established and agreed upon before field observations are collected. Please contact the closest ODF office or Stewardship Forester to request a consultation for the direct stream flow collection process. The decision to change the size classification on any stream reach is the at the discretion of the State Forester.

Collect sufficient field evidence/observations of stream size that provide sufficient evidence to justify the changing from the current size classification to a different one. This evidence may include, but is not limited to the following measurements of the physical characteristics of the stream segments in question:

- Stream width at bank full height at a minimum of 3 distinct locations
- Wetted width at time of collection
- Stream depth at active channel height (or bank full height) in the apparent thalweg
- Stream velocity

ODF will consider additional information and when available should be provided with any stream size revision request:

- Precipitation measurements that provide an average annual total for the area in question collected either with field observations or historical information available through
 - a. Field collection or observation of rainfall amounts that follow an approved methodology to obtain an estimate of the mean annual precipitation.
 - b. Historical data must meet acceptable data standards, including:
 - The information needs to be widely available and referenced for consideration.
 - Provided historical precipitation information shall correlate (and be extrapolated) to the stream location in question. Any calculations values may be requested by ODF.

ODF will consider additional information and when available should be provided with any stream-size revision requests.

Relationship Between Velocity and Cross Sectional Area for Three Stream Sizes

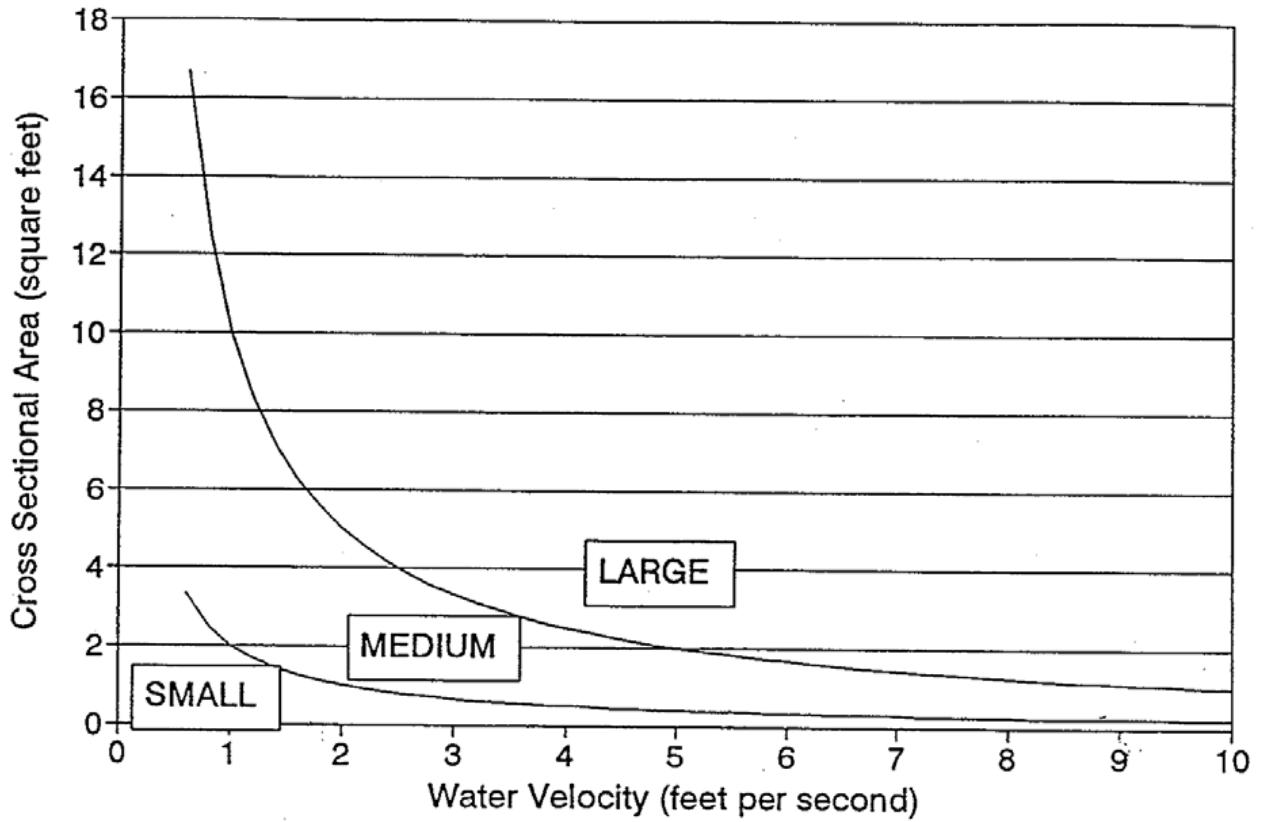


Figure 2 Graph of relationship between cross section and stream velocity

Table 1 and 2 are intended for reference purposes as combinations of average annual precipitation and drainage areas in acres that would be for each stream size classification.

Table 1. Drainage areas that represent the break points between small and medium and between medium and large streams for western Oregon.

WESTERN OREGON

Average Annual Precipitation (inches)	DRAINAGE AREA (acres)	
	Small / Medium 2 cfs	Medium / Large 10 cfs
30 or less	1510	7680
35	1180	5990
40	950	4830
45	790	4000
50	660	3370
55	570	2890
60	500	2520
65	440	2210
70	390	1960
75	350	1760
80	310	1580
85	280	1440
90	260	1310
95	240	1200
100	220	1110
105	200	1020
110	200	950
115	200	880
120	200	830
125	200	770
130	200	730
135	200	680
140 or more	200	640

Table 2. Drainage areas that represent the break points between small and medium and between medium and large streams for eastern Oregon.

EASTERN OREGON

Average Annual Precipitation (inches)	DRAINAGE AREA (acres)	
	Small / Medium 2 cfs	Medium / Large 10 cfs
15 or less	9930	39000
20	6000	23600
25	4060	15900
30	2950	11600
35	2250	8840
40	1780	7000
45	1450	5690
50	1200	4730
55 or more	880	4000

Wetlands and Other Features

Wetlands shall be classified further as indicated below as either significant wetlands, stream associated wetlands, or all other wetlands:

The following types of wetlands are classified as "**significant wetlands**":

- Wetlands greater than 8 acres
- Estuaries
- Bogs
- Important springs in Eastern Oregon

Stream-associated wetlands which are less than 8 acres and are considered to be part of the stream and are therefore classified according to the stream with which they are connected.

All other wetlands, (including seeps and springs) are classified according to their size:

- "Other wetlands greater than one-quarter acre" or;
- "Other wetlands less than one- quarter acre."

Significant Wetlands

Significant Wetlands are classified depending on the following characteristics and geographic locations:

Wetlands greater than 8 acres

Any wetland that contains the plant communities, soil type, and physical characteristics of a wetland that is larger than 8 acres is considered a significant wetland.

Estuaries

Estuaries are considered significant wetlands regardless of size. Upstream boundaries of estuaries are defined by the limits of tidal influence, known as the "heads of tide." Heads of tide for Oregon estuaries are identified in the publication Heads of Tide for Coastal Streams in Oregon prepared by the Division of State Lands. Districts should use this publication to identify upstream estuary boundaries. In many cases head of tide extends up water bodies that look like streams rather than bay-like estuaries. In these cases, the streams are to be protected as estuaries up to the head of tide.

Bogs

Bogs are considered significant wetlands regardless of size. Bogs are identified using the following characteristics:

- **Hydrology** - Bogs are usually hydrologically closed systems (no surface flow).
- **Soils** - Soils are wet, acidic, and often characterized by extensive peat deposits. Peat develops when dead plant parts accumulate, but do not fully decompose because of bog soil conditions.
- **Vegetation** - Mosses, especially sphagnum moss, dominate the ground vegetation, although other ground vegetation is often present. Bogs may be forested or non-forested.

In coastal areas bogs may occur in association with inter-dune depressions. In eastern Oregon, primarily in the Cascades, bogs develop in flat, poorly drained areas within zones of abundant rainfall. There is no comprehensive inventory of bogs in Oregon. Some coastal sites are listed in Christy (1979). Eastside bog descriptions are found in Kovalchik (1987).

Important Springs in Eastern Oregon

"Important springs in eastern Oregon" are recognized as such only if they have all the following characteristics listed in subsection 1(e) of the rule:

- Have established wetland vegetation;
- Flow year round in most years, and
- Are used by a concentration of diverse animal species.

*The definition of "important springs in eastern Oregon" is intended to paint the picture of an oasis of water, wetland vegetation, and wildlife use in an otherwise arid setting. ODF Forester and landowners should consult with ODFW biologists for information on wildlife use at possible "important springs" sites. Springs are differentiated from streams by the lack of a defined channel; however, some springs may have outlets **(where a channelized flow of water can be seen)**.*

List protection measures for all features that are classified as Significant Wetlands are found in Division 629-645 of the Forest Practice Rules. Figures 3 and 4 depict the various RMA widths for each of the classified Significant Wetland features.

Stream Associated Wetlands

"Stream-associated wetlands" are included in the definition of a "stream," and excluded from the definition of "other wetlands." The protection requirements for stream-associated wetlands are the same as for a "stream," regardless of the physical features on the ground. In cases where the RMA is expanded to incorporate the stream-associated wetland plus 25 feet, the RMA protection measures (e.g., tree retention requirements) are the same as indicated for the classification of the stream and do not change due to the wider buffer.

The stream RMA width is measured from the edge of the high-water level of the outermost main channel. A main channel is any channel that has flowing water when average flows occur. There may be several main channels that are all part of the connected stream system. To determine the edge of the high-water level or the edge of the channel migration zone (CMZ) if present (See CMZ Forest Practice Technical Guidance). Stream-associated wetlands are classified according to the stream with which they are connected to.

The outer RMA boundary for the stream must encompass any stream-associated wetlands and any side channels. If the RMA widths *Western and Eastern Oregon stream matrices*, measured from the high-water level of the main channel (shown in the *Western and Eastern Oregon stream matrices*) encompass any stream-associated wetlands and side channel(s), no expansion of the RMA boundary is needed. When a stream-associated wetland extends beyond the stream RMA, provide an additional 25 feet measured from the outer edge of the wetland. The same 25-foot expansion applies to side channels, if not already encompassed by the RMA widths in the stream matrices.

Figure 5 depicts how the additional 25-foot additional RMA width would be applied with the associated stream.



Significant Wetlands and Lakes



OAR 629-645-0000 to 629-650-0040

Riparian Management Area (RMA)

Leave understory plants, all snags and downed wood, and 50% of the trees by species and size.

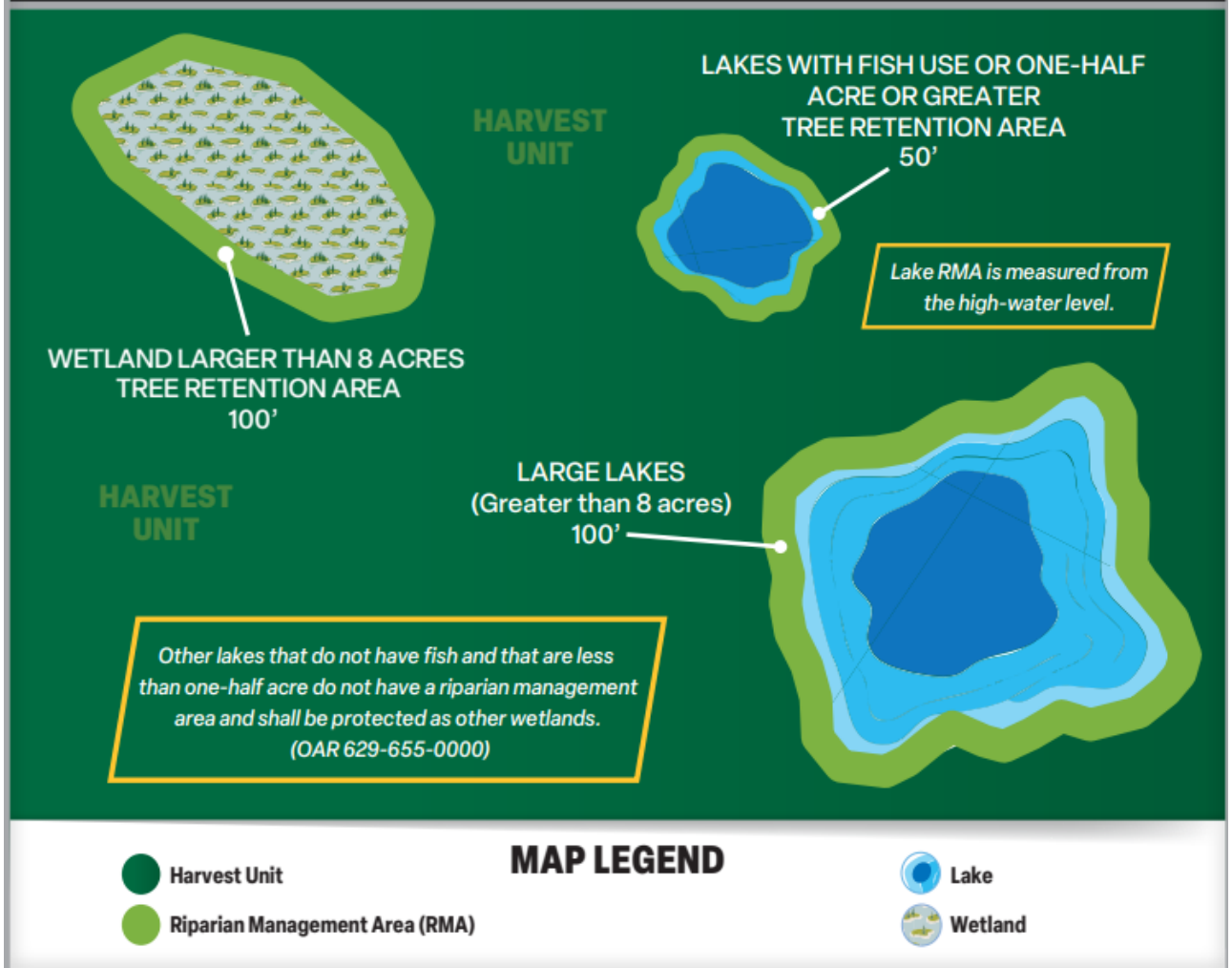


Figure 3 – Significant Wetlands and Lake RMA Widths



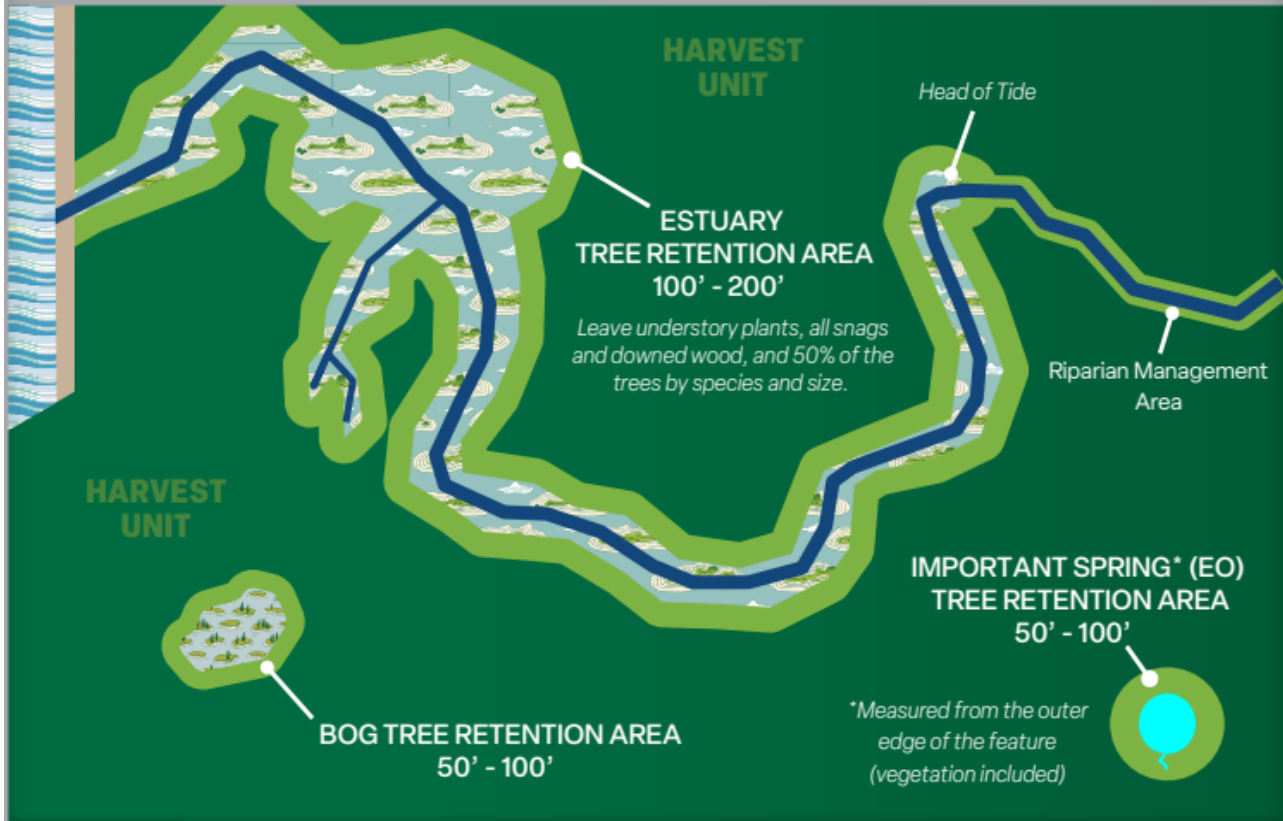
Significant Wetlands

Estuaries, Bogs, and Important Springs in Eastern Oregon.

OAR 629-645-0000 to 629-645-0050



RMA Distances of estuaries, bogs, or important springs in eastern Oregon are determined by the State Forester upon resource site inspection. Distance ranges are shown below.



MAP LEGEND			
	Harvest Unit		Stream (Type F, Np, or D)
	Riparian Management Area (RMA)		Ocean
	Estuary		Important Spring (EO)
			Wetland/Bog

Figure 4 - Estuary RMA Widths

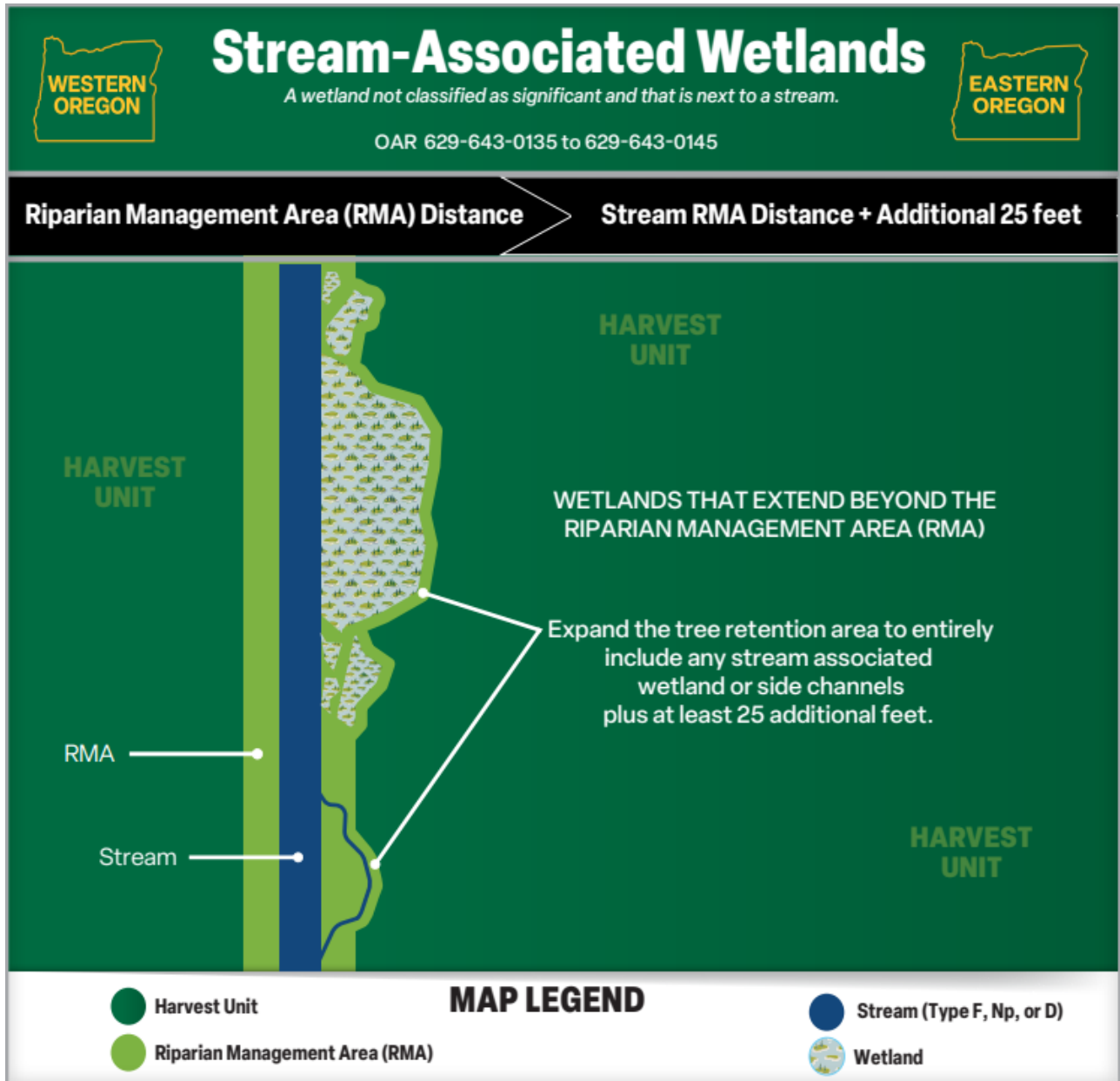


Figure 5 -Stream Associated Wetland RMA Widths

Seeps and Springs

Seeps and Springs are protected when they are located in or near the streamside RMAs. Seeps and springs are identified in the field and when they meet the conditions described below, require additional RMA protections to be applied and are dependent if they are located within the Western or Eastern Oregon geographic region.

Western Oregon

No harvest shall occur within 35 feet of seeps and springs within a no-harvest RMA along Type F, Type SSBT, Type N, and Type Np tributary to Type SSBT or Type F streams (OAR 629-643-0135(1) and 629-643-0145); Figure 3)). If the seep or spring and associated 35-foot retention area occur entirely within the existing no-harvest RMA, then no extension of the RMA is needed (Figure 3). However, if the seep or spring and associated tree retention area do not fit within the no-harvest RMA, then the no-harvest RMA shall be extended to a maximum of 35 feet of the seep or spring beyond the boundary so that all trees within this distance are retained (OAR 629-643-0135).

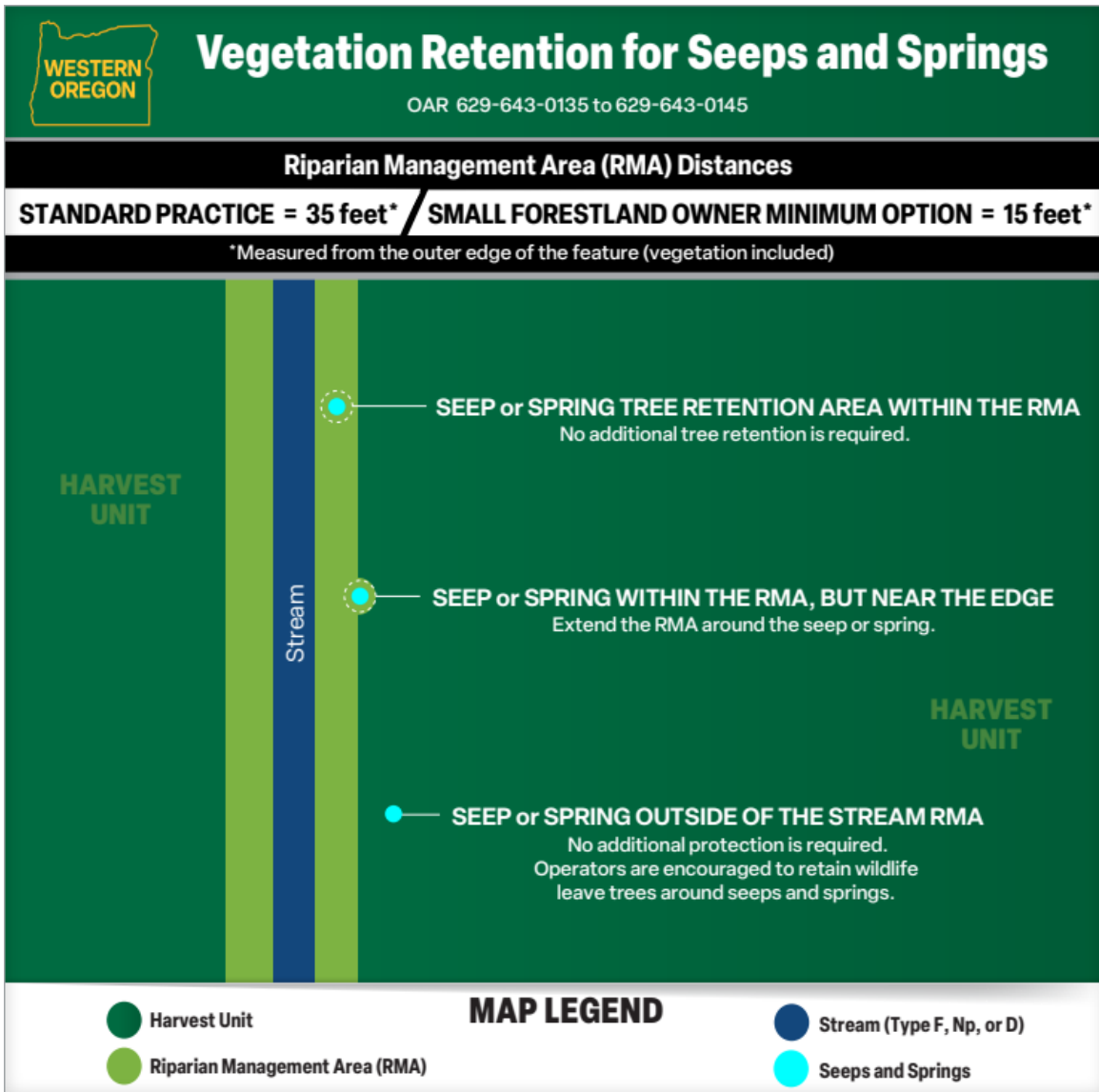


Figure 6 – Western Oregon Seep and Springs RMA Widths

Eastern Oregon

Seeps and springs in Eastern Oregon within the inner RMA zone along Type F, Type SSBT, Type D, and Type Np stream types must include a 35-foot no-harvest RMA from the edge of the feature for the length of the seep or spring (OAR 629-643-0135(2) and 629-643-0145 (Figure 4)). The inner zone stream RMA shall be extended to a maximum of 35 feet beyond the edge of the seep or spring so that all trees within this distance of the seep or spring are retained as needed.

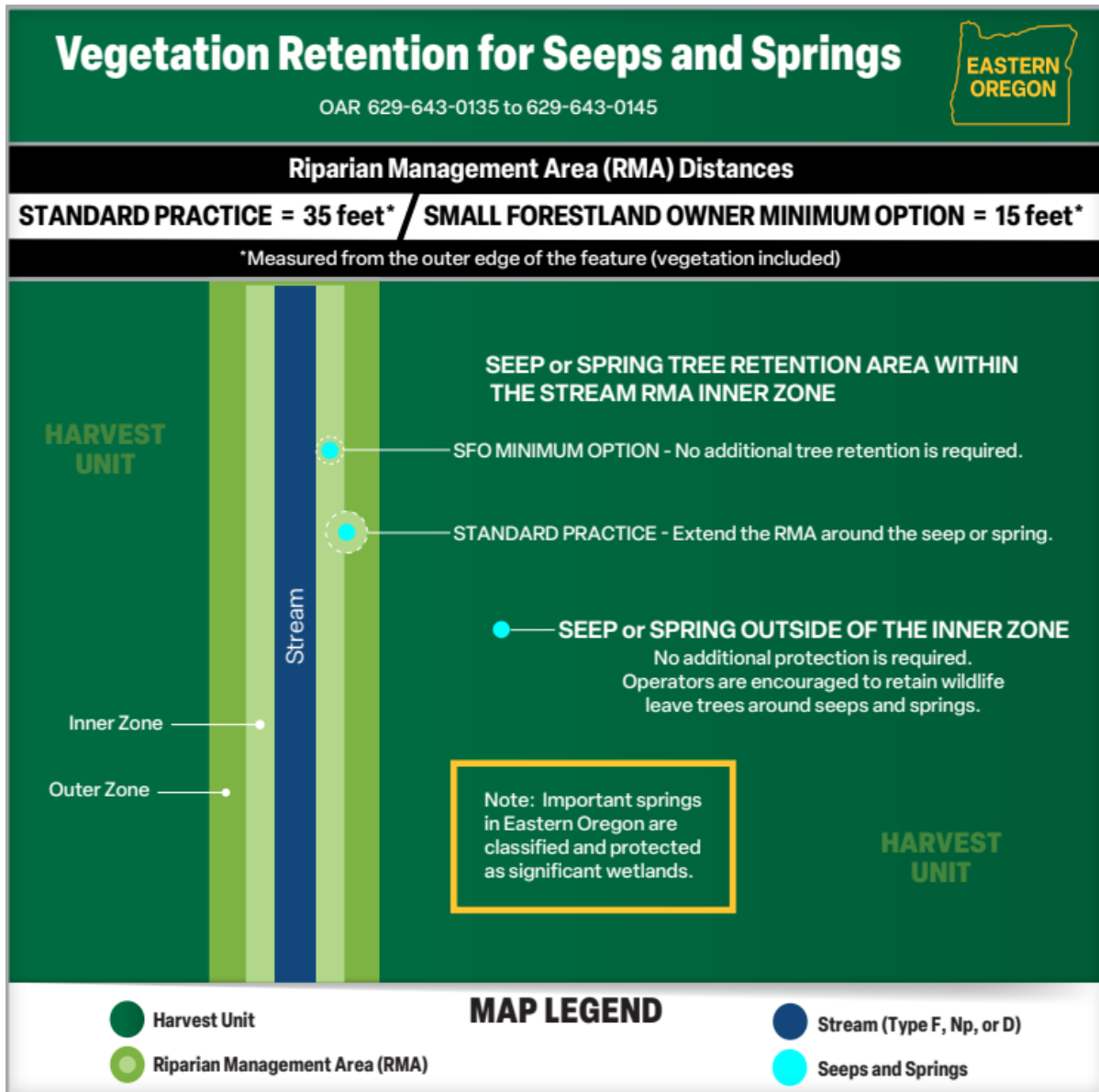


Figure 7 -Eastern Oregon Seep and Spring RMA Widths

Lakes

The difference between lakes and wetlands is not always clear. For the purposes of applying Forest Practice Rules, a “lake” is defined in OAR 629-600-0100 as a water body with year-round standing open water. The water, vegetation, aquatic life or habitats, and the beds, banks or wetlands below the normal high-water level are all considered to be a part of a lake. On many sites, lake and wetland areas may be interspersed. Classify such sites by the dominant feature; if it looks like a lake with some wetlands around it, call it a lake.

Lakes shall be classified further as indicated below:

- **“Large lakes”** are lakes greater than eight acres
- **“Other lakes”** are all other lakes

Lakes do not include "water developments," as defined in OAR 629-600-0100.

A lake is considered to have fish use if the lake is used by anadromous fish, game fish, or fish listed as threatened or endangered under the federal or state endangered species acts. Fish use can be either seasonal or year-round.

A lake is not considered to have fish use if fish were introduced through a fish stocking permit and there is documentation showing that the stream had no fish prior to stocking.

The water protection rules for water bodies identified as lakes are found in Division 650 of the Oregon Forest Practice Rules.

References

PRISM Climate Group, Northwest Alliance for Computational Science and Engineering, College of Engineering, Oregon State University, Corvallis, Oregon. www.prism.oregonstate.edu/methods
30-year normal precipitation data for 1981-2010 for Oregon.

Report on a preliminary survey of sphagnum containing wetlands of the Oregon Coast -
Report to the State Land Board; Christy, John A.; 1979

Riparian Zone Associations of Deschutes, Ochoco, Fremont, and Winema National Forests;
Kovalchik, Bernard L.; USDA Forest Service PNW Region R6 ECOL TP-279-87;1987

Private Forest Accord Report, February 2, 2022.

Oregon Forest Practices Act Water Protection Rules-Scientific and Policy Considerations
Lorenson et. al; Oregon Department of Forestry, December 1994