# Oregon DEQ Division 33 Review Summary Sheet



**Application Information** 

Applicant Name:	Town of Bonanza	Application Number:	R-89212
Basin & Sub-basin:	Klamath / Lost River	Requested Water Amount:	27.87 AF in three ponds (9.82 AF in Pond 1, 9.82 AF in Pond 2, 8.23 AF in Pond 3)
Nearest Surface Water:	Storage Pond 1, 2, 3	Nearest Receiving Waterbody:	Storage Pond 1, 2, 3
Proposed Use:	Wastewater Treatment and Storage + Irrigation	Requested Period of Use:	January 1 through December 31 (storage) – March 1 through September 30 (irrigation)

Division 33 Geograph	iic /	Area
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$\square$ Lower Columbia $\ \square$ Upper Columbia $\ \boxtimes$ Statewide							
<b>Upper and Lower Columbia Basins only</b> : Based upon the review completed below, does the proposed use comply with existing state and federal water quality standards or may conditions be applied to bring the use into compliance?	□No	□ Yes	☐ Insufficient data				
<b>Statewide:</b> Will the proposed use result in water quality impacts that will cause either "loss" or "net loss" of essential habitat of sensitive threatened or endangered (ST&E) fish species? (Note: the presence of ST&E fish species is determined by Oregon Department of Fish and Wildlife.)	⊠ No	□ Yes	☐ Insufficient data				

# **Recommended Pre-Proposed Final Order Actions**

1.
Mitigation Obligation  ☐ No ☐ Yes
Prior to issuance of a Proposed Final Order, the applicant shall submit a mitigation proposal that is of no less
volume and rate than the permitted use. The proposal shall include water that is sourced upstream of the point
of diversion or appropriation, or the uppermost point on the stream at which the potential for surface water
interference occurs. If a surface water right is used for mitigation, it shall be transferred instream for the
[month-month] time period and of similar water quality. The applicant should contact their OWRD caseworker
to discuss flow mitigation options. Flow mitigation is site-specific, therefore DEQ recommends written approval
of the mitigation proposal by DEQ prior to issuance of a proposed final order.

# **Recommended Permit Conditions**

- 1. Water Quality: All water use under this permit shall comply with state and federal water quality laws. The permittee shall not violate any state and federal water quality standards, shall not cause pollution of any waters of the state, and shall not place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means. The use may be restricted if the quality of source stream or downstream waters decrease to the point that those waters no longer meet existing state or federal water quality standards. Permittee is responsible for obtaining any necessary state and federal permits.
- 2. WPCF Permit Conditions: Follow the Permit Conditions on current WPCF permit for the facility.

3.

#### **Seasonal Limitations**

Reason for limitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TMDL: Critical period						$\boxtimes$	$\boxtimes$	$\boxtimes$	$\boxtimes$			
WAB: 20% flow threshold exceeded												
Other:												

# Additional Reviewer comments ☐ No ☒ Yes

[Use this space to describe any of the following: reasoning to substantiate permit conditions; examples of additional information that may allow or disallow the use; and why any variations to the standard Division 33 review process were necessary. Designate conditions related to Division 310 with an asterisk.]

Water can be stored January 1<sup>st</sup> through December 31<sup>st</sup> of each year. The irrigation season for the Lost River is March 1<sup>st</sup> through September 30<sup>th</sup>.

Per the conditions of the WPCF permit:

No discharge to start waters is permitted. All recycled water shall be distributed on land, for dissipation by evapotranspiration and controlled seepage by following sound irrigation practices so as to prevent:

- 1) Prolonged ponding of treated recycled water on the ground surface;
- 2) Surface runoff or subsurface drainage through drainage tile;
- 3) The creation of odors, fly and mosquito breeding or other nuisance conditions;
- 4) The overloading of land with nutrients, organics, or other pollutant parameters; and,
- 5) Impairment of existing or potential beneficial uses of groundwater.

Irrigation shall conform to the Recycled Water Use Plan approved by the Department.

Unless otherwise approved in writing by the Department, the monthly average dry weather influent flow shall not exceed 0.070 MGD.

No recycled water shall be applied to food crops destined for human consumption or shall otherwise be made available for a use that is inconsistent with the uses provided for in OAR 340-55. Recycled water shall be applied to a fodder or timber crop only.

Unless otherwise approved by the Department, wastewater shall not be applied to land that is frozen, snow covered or saturated.

Unless otherwise approved in writing by the Department, a vegetative cover shall be maintained on the land irrigation area at all times. Vegetation shall be periodically cut and removed to ensure maximum evapotranspiration and nutrient capture.

The lagoons must be lowered sufficiently by the end of the irrigation season to ensure maximum practicable storage capacity during the non-irrigation months.

All wastewater and process related residuals shall be managed and disposed of in a manner that will, prevent: a violation of the Department's Groundwater Quality protection Rules (OAR 340-040); and a violation of any permit-specific groundwater concentration limits," established pursuant to OAR 340-040-0030, which have been subsequently incorporated into this permit.

		ultation: [Describe	any substantial interagency	consultation. W	ho was contacted and what						
wa	s discussed?]										
Jus	Justin Sterger (Water Quality Permit Writer) + Patty Isaak (Permit Coordinator for Eastern Region)										
		ared by: Cole Hendr		mplete: 9/15/20							
			·								
Λ	tidogradation I	Policy									
An	tidegradation I		lation Policy (OAR 340-041-00	004(1)) is to guid	e decisions that affect water						
		•	urther degradation from new								
		•	_	•	to ensure the full protection of						
	_	•	n's Antidegradation Policy al	lows exemptions	and conditions for new or						
	increased wat	er use.									
1.	Temporary Us	se or Net Benefit									
			nporary use in response to ar	emergency, a re	estoration activity that the DEQ						
				-	than six months) use to protect						
		•	• •		y will minimize adverse effects						
	to threatened	and endangered sp	pecies?	☑ No □	] Yes						
	If yes, recomn	nend approval of th	e application and identify co	nditions necessa	ry to protect water quality for						
		• •	You may skip to Question 7.		, , ,						
_											
2.	_	Resource Water	drawing directly from an Out	standing Posour	ce Water with critical habitat						
	for ST&E fish		•	_	Yes						
	. 5. 5. 32 11011		ے		<del>- · · ·</del>						
		ior to permit issuan	ce, the applicant must provid	le suitable flow r	mitigation. You may skip to						
	question 7.										
3.	Water Quality	/ Limited									
			ted or a tributary to a water of	quality limited w	ater body? Note: limit						
	downstream review to 6 <sup>th</sup> field HUC for parameters that diminished flow can affect (temperature, dissolved										
	oxygen, pH, etc.). $\square$ No $\boxtimes$ Yes										
	Integrated Re	port 303(d) List Sur	mmary Table								
	Assessment	Assessment Unit	_	Status*	Ponoficial Uses						
	Unit Name	Description	Parameter	Status*	Beneficial Uses						

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Assessment Unit Name	Assessment Unit Description	Parameter	Status*	Beneficial Uses
Lost River	Yonna Ditch to	Total Dissolved Gas	Category 5	Fish and Aquatic Life
		Dissolved Oxygen – Year Round	Category 4A	Fish and Aquatic Life
	Olene Hot Springs	pH	Category 4A	Fish and Aquatic Life
		Temperature – Year Round	Category 4A	Fish and Aquatic Life

\*Integrated Report Category

Category 4 - Data indicate that at least one designated use is not supported, but a TMDL is not needed to address the pollutant

Category 4A - Clean-up plans (also called TMDLs) that will result in the waterbody meeting water quality standards and supporting its beneficial uses have been approved

Category 4B - Other pollution control requirements are expected to address pollutant of concern and will result in attainment of water quality standards

**Category 4C** - The impairment is caused by pollution, not a pollutant. For example, flow, or lack of flow, are not considered pollutants, but may be affecting the waterbody's beneficial uses

**Category 5** - Data indicate a designated use is not supported or a water quality standard is not attained and a TMDL is needed. This category constitutes the Section 303(d) list that EPA will approve or disapprove under the Clean Water Act

Analysis: [If the answer to question 3 is yes, then describe how the use does or does not comply with existing state and federal water quality standards, and how the use may affect ST&E fish species habitat.]

### Temperature

The Lost River does not meet Oregon's stream temperature standards. Oregon's stream temperature standards are based on the life cycle needs of salmonids and other resident fish and aquatic life. Water temperatures are influenced by solar radiation, stream shade, ambient air temperatures, channel morphology, groundwater inflows, and stream velocity, volume, and flow. Surface water temperatures may also be warmed by anthropogenic activities such as discharging heated water, changing stream width or depth, reducing stream shading, and water withdrawals. Stream temperatures that exceed the standards can disrupt the life cycle of a sensitive, threatened, or endangered fish species and may even cause death. In waterbodies where temperatures exceed standards, additional summertime water withdrawals will reduce the stream's heat capacity and cause greater fluctuation in daytime and nighttime stream temperatures. This will result in the diminution of habitat of sensitive, threatened, or endangered fish species.

# **Dissolved Oxygen**

The Lost River does not meet Oregon's dissolved oxygen standards. Fish and other aquatic organisms require different concentrations of dissolved oxygen based on their species and life history stage. Oregon's dissolved oxygen standards are based on the most sensitive species and life history stage at the location and season of concern. Dissolved oxygen levels are affected by temperature, flow, nutrient loading, algae growth, and other factors. If dissolved oxygen drops too low enough levels, it can result in fish kills. In waterbodies where dissolved oxygen concentrations are known to be insufficient for the habitat of sensitive, threatened, and endangered fish, any additional reduction in dissolved oxygen concentrations would result in the diminution of habitat.

# рΗ

pH is a measure of how acidic or basic (alkaline) the water is. Water with a pH greater than 7 is alkaline, water with a pH of less than 7 is acidic. Every species of fish has adapted to a specific range of pH. Fish exposed to changes in pH outside their normal range can be stressed or even die. Stress leaves fish vulnerable to disease, degrading their health. Additionally, alkaline conditions can transform nitrogen in the water column into a more toxic form of ammonia that can poison fish. Withdrawals from the stream will reduce the stream's heat capacity and cause greater fluctuation in daytime and nighttime stream temperatures. When nutrients and sunlight are sufficiently present, higher stream temperatures lead to more algal growth. During the day, algae absorb carbon dioxide from the water for cell growth, raising pH. At night, photosynthesis stops and algae continue to respire, releasing carbon dioxide and lowering pH. This cycle creates diel fluctuations in pH. Additional withdrawals from a stream that is already impaired for pH will lead to larger diel fluctuations in pH. Fish and aquatic insects are sensitive to imbalances in pH. Low pH levels (below 5) may lead to death and high pH levels (9-14) can harm fish by denaturing cellular membranes. These pH imbalances result in the diminution of the habitat of sensitive, threatened, or endangered fish species.

Recommended Conditions: [Consider if water quality can be protected by limiting the rate and quantity of
water used, period of use, or by including other permit conditions.]

#### **Water Quality**

#### 4. Total Maximum Daily Load Summary

Are there TMDLs established for parameters identified as being affected by flow modification?  $\square$  No  $\boxtimes$  Yes

Analysis: [List TMDL, identify the load allocation, and if flow modification is a contributing factor. Describe how the use does or does not comply with existing state and federal water quality standards and how the use may affect ST&E fish species habitat.]

# **Upper Klamath and Lost River Subbasins**

Two TMDLs were established in 2019 for ammonia toxicity, chlorophyll-a, dissolved oxygen, pH, and temperature in the Upper Klamath and Lost River subbasins. These were established to address salmonid and federally endangered sucker fisheries concerns. Water quality impairments in tributaries and mainstem reaches throughout the Upper Klamath and Lost River subbasins have reduced the extent of spawning and rearing habitat for shortnose suckers, Lost River suckers, and redband trout. External nutrient loading in the Upper Klamath River and Lost River subbasins coupled with organic matter export from Upper Klamath Lake creates summertime ammonia, dissolved oxygen, and pH conditions that are stressful to salmonids and suckers. Elevated summertime stream temperatures (critical period June – September) attributed to sources in the Upper Klamath and Lost River subbasins result primarily from riparian vegetation disturbance. Reduction in stream surface shading (via decreased riparian vegetation height, width and/or density and increased channel width) increases the amount of solar radiation reaching the stream surface. Increases in temperature are also directly related to extensive hydrologic modification and reduced stream flows. Additionally, inadequate streamflow and increased water temperature negatively impact dissolved oxygen and pH standards.

Recommended Conditions: [Consider if water quality can be protected by limiting the rate and quantity of
water used, period of use, or by including other permit conditions.]

5. Cumulative Withdrawals Effects

**Water Quality** 

Is it likely that the proposed activity, together with existing	withdrawals in t	he OWRD's Water Availability Basir
(WAB), will lower water quality and impair aquatic life?	⊠ No	☐ Yes

#### **Water Availability and Cumulative Impacts Summary Table**

Percent of natural flow = (consumptive use/natural stream flow)\*100. See Appendix for additional instructions.

No WAB Available	
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Watershed ID	Exceedance Level	Month	Natural Stream Flow	Consumptive Use	Expected Stream Flow	Reserved Stream Flows	Instream Requirement	Net Water Available	Percent of Flow

	Monthly flow in Cubic Feet per Second (CFS). Annual flow in Acre Feet (AF)). Highlight months that exceed 20% of percent of flow.
6.	Flow Modification Compliance with State and Federal Water Quality Standards
	Based on responses to questions 3, 4, and 5, is the use in compliance with state and federal water quality
	standards or can compliance with state and federal water quality standards be assured, and ST&E habitat loss
	prevented through flow mitigation and/or by imposing permit condition(s)?
	□ No □ Yes
	Recommended Conditions: [If water quality can be protected by modifying or limiting the amount diverted,
	period of use, or other permit conditions, then select appropriate condition from the conditions list.]
7.	Compliance with other State and Federal Water Quality Standards
	ORS 468B.025 prohibits pollution of waters of the state. Are there additional water quality impairments that
	would result from this proposed used by degrading surface water or groundwater quality?
	□ No □ Yes
	If water quality can be protected by applying permit conditions, then select all appropriate conditions from
	the standardized menu of conditions.
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	Recommended conditions: [List conditions]
	WPCF Permit Conditions
Į	Wi Ci i Cinii Conditions

#### PRE-PROPOSED FINAL ORDER ACTIONS

DEQ recommends that the applicant provide suitable replacement water as mitigation for anticipated impacts to water quality and more specifically the habitat of sensitive, threatened, and endangered fish species. Additional mitigation may be required from other Interagency Review Team members (for example: OWRD may require mitigation for periods when water is not available). Surface water flow mitigation is unlikely to provide the same benefit that groundwater can provide to gaining stream reaches. However, if groundwater mitigation is unavailable within the same aquifer, surface water mitigation may provide suitable mitigation.

### Flow Mitigation Obligation:

Prior to issuance of a Proposed Final Order, the applicant shall submit a mitigation proposal that is of no less volume and rate than the permitted use. The proposal shall include water that is sourced upstream of the point of diversion or appropriation, or the uppermost point on the stream at which the potential for surface water interference occurs. If a surface water right is used for mitigation, it shall be instream for the *month - month time* period and of similar water quality. The applicant should contact their OWRD caseworker to discuss flow mitigation options.

**Riparian:** If the riparian area is disturbed in the process of developing, modifying or repairing a point of diversion under this water use permit, the permittee shall be responsible for restoration and enhancement of such riparian area in accordance with the Oregon Department of Fish and Wildlife's Habitat Mitigation Policy described in Oregon Administrative Rule OAR Chapter 635-415. Prior to development, modification or repairs at the point of diversion, the permittee shall submit, to the Oregon Water Resources Department, either a Riparian Mitigation Plan approved in writing by Oregon Department of Fish and Wildlife (ODFW) or a written declaration from ODFW that riparian mitigation is not necessary. The permittee shall maintain the riparian area for the life of the permit and subsequent certificate per the approved Riparian Mitigation Plan. The permittee is hereby directed to contact the local Oregon Department of Fish and Wildlife Fish Biologist prior to development of the point of diversion.

Water Storage Construction: The applicant shall locate the reservoir outside of the stream's natural channel.

identify waterbody and set back to prevent stream capture and justification for distance selected.

(Note to reviewer: The 1200C permit requires a 50-foot setback, which is cited from the National General Construction Permit OAR-660-023-0090(5). Requiring the storage reservoir to be outside of the mapped 100 year floodway may also be a protective buffer.)

**Construction Activities:** 1200-C NPDES Stormwater Construction permit coverage is required from DEQ or Agent for construction activities (clearing, grading, excavation, grubbing, stumping, demolition, staging, stockpiling and other land disturbing activities) that will disturb one or more acres, or that will disturb less than one acre of land but is part of a common plan of development or sale that will ultimately disturb one or more acres of land and have the potential to discharge to surface waters or to a conveyance system that leads to surface waters of the state.

**In-Water or Riparian Construction**: For in-water or riparian construction, permittee may be required to obtain additional permits from the Oregon Department of State Lands, the U.S. Army Corps of Engineers, and the DEQ Section 401 certification program prior to construction. The applicant must contact these agencies to confirm requirements.

**Herbicide Applications**: When herbicide application is within three feet of water, the permittee is responsible for ensuring that herbicide application laws are met, and that they obtain from DEQ any necessary pesticide application permits, including the 2300-A Pesticide General Permit or the 2000-J NPDES General Permit. Polluted return flows are not allowed to enter waters of the state per ORS 468B.025(1).

#### STANDARIZED MENU OF CONDITIONS

Water Quality: All water use under this permit shall comply with state and federal water quality laws. The permittee shall not violate any state and federal water quality standards, shall not cause pollution of any waters of the state, and shall not place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means. The use may be restricted if the quality of source stream or downstream waters decrease to the point that those waters no longer meet existing state or federal water quality standards. Permittee is responsible for obtaining any necessary state and federal permits.

**Agricultural Water Quality Management Area Rules**: The permittee shall comply with basin-specific Agricultural Water Quality Management Area Rules described in Oregon Administrative Rule Chapter 603-095. The permittee shall protect riparian areas, including through irrigation practices and the management of any livestock, allowing site capable vegetation to establish and grow along streams, while providing the following functions: shade (on perennial and some intermittent streams), bank stability, and infiltration or filtration of overland runoff.

**Flow Restrictor:** The permittee shall install a flow control valve on the diversion system to limit use to the permitted rate. The valve shall be in place, functional, and verified by the Certified Water Rights Examiner before a certificate is issued. The valve or a suitable replacement shall remain in place for the life of the water right.

**Limit Rate**: Water withdrawal shall be limited to *Enter CFS or AF for the defined period, or a month by month rate or volume*.

**Limit Period of Use**: Water use shall be limited to the period: start date through end date.

(Note to reviewer: Do not split the irrigation season. Require mitigation if water is not available during the requested time period.)

**Limit Diversion**: The permittee shall not divert water under this water use permit unless streamflow in the waterbody name is at or above CFS cubic foot per second, as determined at Gaging Station ID

**Off-Channel Stored Water Releases**: The permittee shall not release polluted water from this off-channel reservoir into waters of the state except when the release is directed by the State Engineer to prevent dam failure.

**On-Channel Reservoir**: The permittee shall design and operate the water storage facility such that all waters within and below the reservoir meet water quality criteria. The permittee shall develop a reservoir operations plan that details how water quality criteria and standards will be met. A Certified Water Rights Examiner shall verify that the reservoir operations are consistent with the plan before a certificate is issued. The reservoir operator shall maintain a copy of the plan and make it available for review upon request.

**Restrict Reservoir Release:** To prevent pollution downstream, the permittee shall not release water from the reservoir when the flow at Gaging Station ID (gage name) is below the Mean Daily Discharge of *CFS* (discharge which was equaled or exceeded for 90% percent of the time) except when the release is directed by the State Engineer to prevent dam failure.

**Live Flow**: Once the allocated volume has been stored, permittee shall pass all live flow downstream at a rate equal to inflow, using methods that protect instream water quality.

**Lining**: The permittee shall line the reservoir with *include material or allowable infiltration rate* to minimize seepage and protect groundwater quality per Oregon Administrative Rule 340-040. The liner is to be in place,

inspected, and approved by the Certified Water Rights examiner prior to storage of water.\* If the liner fails, the water user shall replace it within one calendar year. **Site-Specific Condition**: The permittee shall

<sup>\*</sup> OAR 690-410-0010(2)(a), OAR 690-310-0120, OAR 690-310-0140

# Appendix: General Overview, Instructions for Water Availability Analysis, and Process Flow Chart

# **General Overview**

The purpose of OAR Chapter 690, Division 33 is to aid the Oregon Water Resources Department (OWRD) in determining whether a proposed use will impair or be detrimental to the public interest with regard to listed sensitive, threatened, or endangered (ST&E) fish species. Oregon's stream temperature, dissolved oxygen (DO), pH and several other water quality standards are based on the life cycle needs of salmonids and other resident fish and aquatic life. Exceeding the standards can disrupt the life cycle of a ST&E fish species and may cause death. In addition, OWRD must consider water quality impacts as part of a public interest review, OAR 690-310-0120. Water quality impacts and conditions unrelated to ST&E species should be noted as "Division 310" in the recommendations to OWRD. The DEQ's Water Right Application Review Procedures document contains a full description of the review process.

The two main categories of Division 33 reviews are based on the geographic distribution of ST&E fish species:

- o **For Proposed Uses in the Columbia River Basin,** reviews must determine whether a proposed use complies with existing state and federal water quality standards. Upper Columbia applications specifically require applicants to provide evidence that the proposed use complies with existing state and federal water quality standards. <u>Geographic scope</u>: Columbia River Basin (includes all waters that ultimately drain into the Columbia River).
- o **For Proposed Uses Statewide**, review is conducted under the "Statewide review" procedure. Statewide reviews must determine whether a proposed use may affect ST&E fish species habitat. The statewide review procedure is intended to identify permit conditions that can prevent the "loss" or "net loss" of essential habitat of ST&E fish species. When permit conditions cannot be identified that meet this standard, then the DEQ recommends denial of the permit. <u>Geographic scope</u>: all areas outside the Columbia River Basin where OWRD determines ST&E fish species are present.

# Instructions for Populating the Water Availability Summary Table using data from OWRD's WAB (Section 5)

- Open OWRD's Water Availability Reporting System.
- Search for the water availability basin of interest. Select 50% exceedance. The 50% exceedance stream flow is the stream flow that occurs at least half of the time.
- The water availability analysis will display a nested list of watersheds that contain the POD. Select the highest nesting order WAB that contains the POD.
- Download to an Excel spreadsheet. Percent of flow is calculated using this equation:

$$\textit{Percent of Flow} = \frac{\textit{Consumptive Use}}{\textit{Natural Stream Flow}} * 100$$

You may choose to add the proposed rate (or storage amount) to the consumptive use.

### **Instructions for Water Availability Analysis**

To complete Section 6, review and consider the cumulative impact of consumptive withdrawals using the OWRD WAB. All water withdrawals and the following factors should be considered when conducting a water availability analysis.

- Instream Flow: Consider the percent of natural flow removed from the stream in each month (see right-most column in Water Availability and Cumulative Impacts Summary Table). Based on best professional judgment, evaluate if the cumulative withdrawal is likely to cause impairment to aquatic life or water quality. Water quality standards are established to protect aquatic life. In scientific literature, researchers have identified ecological harm occurring when flows are reduced by >6-35% of daily flow¹. Consider the seasonality of any listings and season of withdrawal to determine impact for each month of the year.
- Antidegradation: Rule 340-041-0004 applies: withdrawals cannot cumulatively increase a waterbody's temperature by more than 0.5 degrees Fahrenheit or cause a 0.1 mg/l decrease in dissolved oxygen from the upstream end of a stream reach to the downstream end of the reach so long as it has no adverse effects on threatened and endangered species. See OAR 340-041-0004(3)-(5) for a description in rule of activities that do not result in lowering of water quality.
- **Flow modification**: Consider if cumulative withdrawals are contributing to flow modification and a likely limiting factor in the waterbody at certain times of the year. Temperature and dissolved oxygen are flow-related parameters. When streamflow is reduced, assimilative capacity is reduced. As a waterbody heats up, dissolved oxygen concentrations decline. Reduced stream flows (including groundwater inputs to streamflow), exacerbate temperature and/or dissolved oxygen impairments.
- **Temperature**: Increases in temperature or a reduction in dissolved oxygen adversely impacts ST&E fish. Fish require different temperature and concentrations of dissolved oxygen based on species and life history stage. Oregon's temperature and dissolved oxygen limits are based on the most sensitive species and the life history stage of those species at the location and season of concern. Additional heat or reduction in dissolved oxygen concentrations will further impact these species habitat. Reduced flows can also increase the concentrations of phosphorous, bacteria, pesticides and metals.

# **Instructions for Calculating "Limit Diversion" Rate**

This condition is selected to limit withdrawals once the cumulative withdrawals in the watershed have exceeded the protective threshold of 20 percent and/or the ISWR is not fully protective of aquatic life. A different value can be selected, but the reviewer should state why a particular percent was selected.

"Natural stream flow" is obtained from OWRD's Water Availability Reporting System. The condition is applied on a monthly timeframe based on OWRD's data.

"Natural stream flow" - (percent of flow \* "natural stream flow") = Expected Stream Flow

The applicant would have to stop using when instream flows drop below the Expected Stream Flow.

Example:

Natural stream flow for a particular month = 1200 CFS

1200 CFS - (.2 \* 1200 CFS) = 960 CFS

<sup>&</sup>lt;sup>1</sup> Richter BD, Davis MM, Apse C, Konrad C. 2011. Short Communication, A Presumptive Standard For Environmental Flow Protection. River Research and Applications. Published online in Wiley Online Library (wileyonlinelibrary.com), DOI: 10.002/rra.1551

#### **DEQ Water Right Review Flow Chart**

