North Umpqua River Summer Steelhead Sport Fishery Management Framework

2026

Oregon Department of Fish and Wildlife

Umpqua Fish District

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Background

The Oregon Department of Fish and Wildlife (ODFW) has developed this fishery management framework to establish the criteria and process that will be used to evaluate the need for a conservation closure of the summer steelhead sport fishery on the North Umpqua River. This framework provides in-season conservation protection for summer steelhead by limiting sport angling pressure when abundance is expected to fall below the Critical Abundance Threshold (CAT) of 1,200 wild spawners established in the Coastal Multi-Species Conservation and Management Plan (CMP; ODFW 2014). ODFW begins monitoring annual run strength of North Umpqua River summer steelhead beginning May 1 at Winchester Dam. A complete census count of wild adult summer steelhead passing through the fishway at Winchester Dam is conducted to determine if abundance is likely to be critically low based on historical run timing. When developing the framework, ODFW included ten percent buffers in the daily count thresholds to provide additional confidence to avoid impacts on the population (Appendix A, Figure 4).

Permanent angling rules for the North Umpqua River will typically apply (see Oregon Sport Fishing Regulations, Southwest Zone) unless the following rules of the North Umpqua River Summer Steelhead Sport Fishery Management Framework trigger adoption of an Oregon Temporary Rule(s) to restrict angling in Umpqua River Sport Fisheries. Previous restrictions have closed all angling in the North Umpqua River and tributaries from the mouth to the marker below Soda Springs Dam near the power plant enclosure and ended December 1. Future rules would likely be similar.

Decision Framework

Based on analyses described within this document, the following rules will be used to implement adaptive in-season management of the North Umpqua River summer steelhead fishery. To implement this adaptive framework, ODFW will complete: a) full census counts of adult wild summer steelhead passing Winchester Dam from May 1 - July 19 and b) stratified sub-sample counts of adult wild summer steelhead passing Winchester Dam from July 20 - November 30. Management decisions will also consider recent year run strengths, environmental conditions, lag time in assessing counts, and other factors including other fisheries management impacting this fishery. This framework may change if alternate future management is needed.

Rule 1: Permanent regulations in the *Oregon Sport Fishing Regulations* (Southwest Zone) and/or any temporary rules apply before June 15 (typically the fishery is open).

Rule 2: If wild summer steelhead counts at Winchester Dam are less than 373 adult fish through June 15, ODFW will close the fishery. If the count is above 373, the fishery will remain open.

Rule 3: From June 15 to July 19, if counts "cross" the specified daily thresholds for seven consecutive days, ODFW will adaptively manage the fishery up to one time during this period (i.e., *open* if counts move from below to above the threshold and close if counts move from above to below).

<u>Rule 4:</u> After July 19, if estimated counts cross the specified threshold for a seven consecutive day period, ODFW will *consider* adaptively managing the fishery up to one time during this period (i.e., open if counts move from below to above the threshold and close if counts move from above to below).

Impacts on Other Umpqua River Fisheries

<u>Spring Chinook</u>

It is unlikely that a closure to all fishing in the North Umpqua River and tributaries below the marker below Soda Springs Dam will be implemented before July 1 due to the lag in counts. The spring Chinook season ends on June 30, so no impacts are anticipated.

<u>Trout (cutthroat and rainbow)</u>

A closure to all fishing in the North Umpqua River and tributaries below the marker below Soda Springs Dam may be implemented when ODFW thresholds are not met to provide protection for summer steelhead. Trout and steelhead angling gear is very similar and it is difficult to enforce a steelhead closure while also allowing trout angling. There are nearby lakes and reservoirs as well as waterbodies above Slide Creek Dam where anglers may still fish for trout if a North Umpqua River fishing closure occurs.

<u>Coho Salmon</u>

Typically, the North Umpqua River is open to hatchery coho salmon fishing year-round. There are very few hatchery coho in the North Umpqua River, which means a lower impact on this fishery. A full closure to all fishing in the North Umpqua River and tributaries below the marker below Soda Springs Dam, including coho, may be necessary when summer steelhead thresholds are not met as similar gear is used for coho salmon and steelhead. It is anticipated that in most years, hatchery coho salmon angling will remain open in the mainstem Umpqua River to provide other opportunities. Other circumstances may require a closure of coho fishing in the Umpqua River Basin that may not part of this framework.

<u>Winter Steelhead</u>

Few winter steelhead enter the North Umpqua River before December 1, so minimal impact to winter steelhead anglers is anticipated.

Appendix A

Data Description

The fish passage structure at Winchester Dam has 24hr video surveillance situated in a historic fish counting room. Prior to 2015, all videos were viewed to produce a census count of all fish crossing the dam. Starting in 2015, a stratified sample of video was viewed to generate an estimate of fish passage. In this analysis, only census data between 2000 and 2014 is used.

Statistical Methods

Three sets of alternative models were fit to the cumulative proportion of fish that crossed Winchester Dam within each year between 2000 and 2014. In the first set of models, each year was considered an independent replicate of the cumulative proportion of the run without including year as a potential explanatory variable. In the second set of models, year was incorporated into the model as an additive factor influencing the estimated proportion, while in the third set of models it was modeled as a multiplicative factor that interacted with day. Each model set included orthogonal polynomial sequences that were added iteratively up to a 4^{th} degree polynomial. The regressions were modeled using the binomial distribution with a logit link function. A binomial distribution was appropriate because each fish represents a single Bernoulli trial in which it either crosses (success) or fails to cross (failure) the dam on or before a particular date. A full set of models is provided in Table 1.

The model terms in each model were tested for significance against a Z distribution. The fitted values for the cumulative proportion were then mapped onto a 1,200 fish run by multiplying the expected proportion by a total run size of 1,200. As with any linear relationship, the expected counts provide a point estimate in which there is an equal probability of the exact count being slightly higher or lower on a particular day. Therefore, to provide alternative options taking account of the potential variance in the relationship, management control rule curves were also mapped to the Winchester dam counts by increasing the expected proportion by 1, 5, 10, and 15 percentage points, respectively. Each of these curves provides an increasingly conservative management threshold more likely to capture all possible counts for a 1,200 fish run.

Table 1. Model sets used to describe the relationship between the day and cumulative proportion of steelhead crossing Winchester Dam. *d* is the day since May 1, *y* is the year, *P* is the proportion of the total run that has crossed Winchester Dam on or before day *d*, and β reflects estimated parameters indexed by subscripts.

Eq. #	Model Set
	Model Set 1 – Day only models
1.1	$P = \beta_0 + \beta_1 d + e$
1.2	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + e$
1.3	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + \beta_3 d^3 + e$
1.4	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + \beta_3 d^3 + \beta_4 d^4 + e$
	Model set 2 – Fixed year effect (i.e., differing intercepts)
2.1	$P = \beta_0 + \beta_y + \beta_1 d + +e$
2.2	$P = \beta_0 + \beta_y + \beta_1 d + \beta_2 d^2 + e$
2.3	$P = \beta_0 + \beta_y + \beta_1 d + \beta_2 d^2 + \beta_3 d^3 + e$
2.4	$P = \beta_0 + \beta_y + \beta_1 d + \beta_2 d^2 + \beta_3 d^3 + \beta_4 d^4 + e$
	Model set 3 – Interaction between day and year (i.e., differing slopes)
3.1	$P = \beta_0 + \beta_1 d + \beta_2 dy + e$
3.2	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + \beta_3 d^3 + \beta_4 dy + e$
3.3	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + \beta_3 d^3 + \beta_4 dy + e$
3.4	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + \beta_3 d^3 + \beta_4 d^4 + \beta_5 dy + e$

<u>Results</u>

Model comparisons suggest that a third-degree polynomial using day as the only explanatory variable is the most appropriate way to estimate the proportion of fish that have crossed Winchester Dam (Figure 1). Adding a year term did not improve model fits among models of the same degree (Table 1). Moreover, within each of the models in model sets 2 and 3 all the year terms were insignificant (p_z>0.05). Coefficients for all models that did not include year (i.e., Model Set 1) are available in Table 3.

Despite being the most supported model, mapping the observed cumulative proportions for each year onto a 1,200 fish run illustrates the historical variation in run-timing. Run timing is especially variable across years after July 1, with many years suggesting the counts required to reach 1,200 fish was higher than the average relationship predicted by the model. Figure 2 provides alternative curves produced by adding on varied percentage points to the estimated proportions to create a safeguard.

Table 2: AIC scores for all model sequences up to a 3rd degree polynomial. Model rank by degree provides the relative support across each model set for models with the same exponents where 1 is the most supported and 3 is the least supported. Overall rank compares all models across all sets holistically. ΔAIC is the difference between in AIC score between each model and the most-supported model across all degrees and candidate sets (i.e., M 1.3).

Eq.	Model Description	Model	Degree	AIC	ΔAIC	Model Rank	
						Same Degree	Overall
1.1	Day only model	$P = \beta_0 + \beta_1 d + e$	1	1507	165	1	7
2.1	Fixed year effect	$P = \beta_0 + \beta_y + \beta_1 d + +e$	1	1514	172	2	8
3.1	Interaction between day and year	$P = \beta_0 + \beta_1 d + \beta_2 dy + e$	1	1521	179	3	9
1.2	Day only model	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + e$	2	1344	2	1	2
2.2	Fixed year effect	$P = \beta_0 + \beta_y + \beta_1 d + \beta_1 d^2 + e$	2	1350	8	2	4
3.2	Interaction between day and year	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + \beta_3 d^3 + \beta_4 dy + e$	2	1361	19	3	6
1.3	Day only model	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + \beta_3 d^3 + e$	3	1342	0	1	1
2.3	Fixed year effect	$P = \beta_0 + \beta_y + \beta_1 d + \beta_1 d^2 + \beta_1 d^3 + e$	3	1348	6	2	3
3.3	Interaction between day and year	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + \beta_2 d^3 + \beta_4 dy + e$	3	1359	17	3	5

Table 3: Estimated coefficients up to a 4th degree polynomial for Model Set 1. The 4th degree term was not significant, suggesting one step down (i.e., 3rd degree) is sufficient for modeling the data.

	Model	Coefficient	Estimate	SE	Z	P_Z
1.1	$P = \beta_0 + \beta_1 d + e$	β_0	0.86	0.05	15.78	<.01
		β_1	119.86	4.024	29.78	<.01
1.2	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + e$	β_0	0.603	0.060	10.09	<.01
		β_1	113.53	3.81	29.82	<.01
		β_2	-28.26	3.77	-7.49	<.01

1.3	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + \beta_3 d^3 + e$	β_0	0.52	0.07	7.40	<.01
		β_1	129.92	5.78	22.46	<.01
		β_2	-30.02	4.66	-6.44	<.01
		β_3	24.22	4.78	5.07	<.01
1.4	$P = \beta_0 + \beta_1 d + \beta_2 d^2 + \beta_3 d^3 + \beta_4 d^4 + e$	β_0	0.57	0.079	7.267	<.01
		β_1	128.62	5.83	22.06	<.01
		β_2	-23.64	6.41	-3.69	<.01
		β_3	23.98	4.77	5.03	<.01
		β_4	6.89	4.73	1.46	0.15

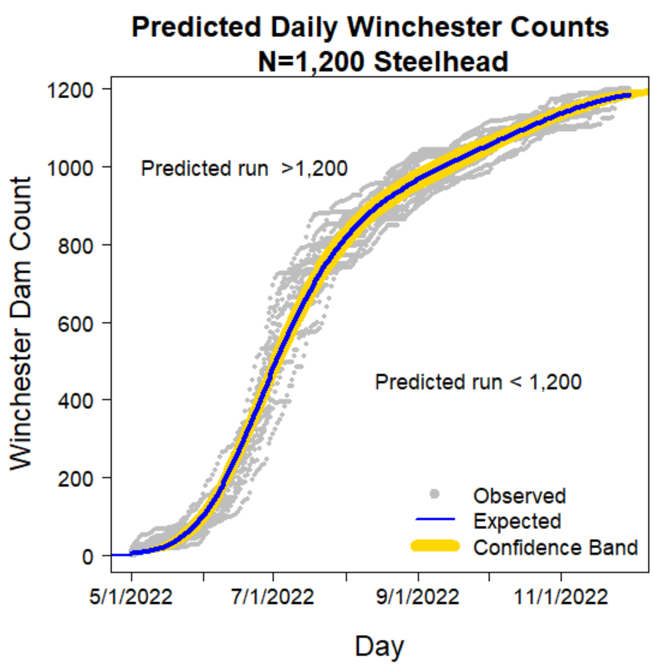

Figure 2. Visual representation of transformed estimated proportions to dam counts for a 1,200 fish steelhead run. Counts in the top left quadrant above the curve suggest the steelhead run will contain over 1,200 fish. Counts in the lower right quadrant below the curve suggest the run will contain less than 1,200 fish. Grey dots reflet observed cumulative proportions mapped to a 1,200 fish run.

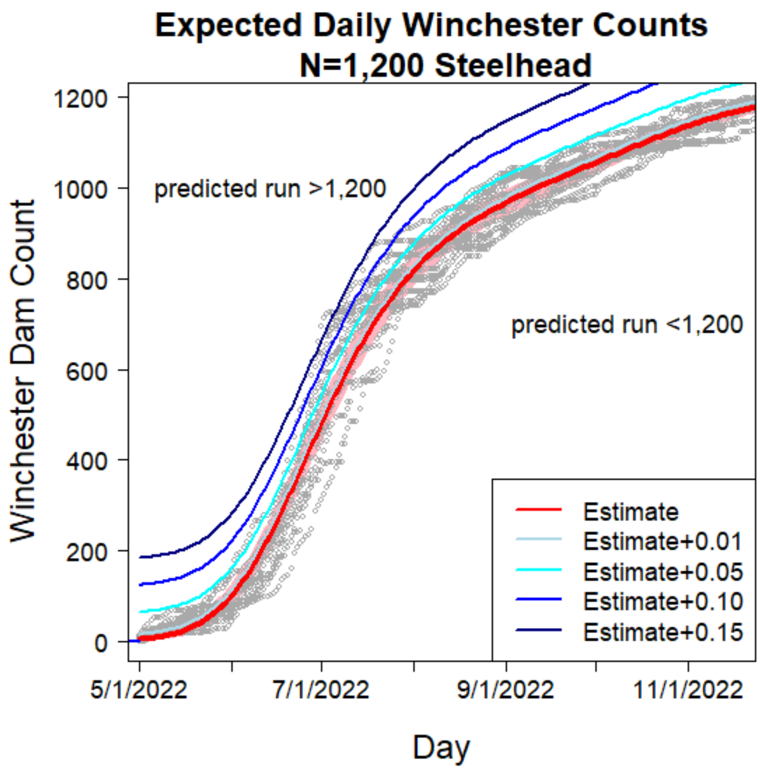

Figure 3: Alternative decision rule curves based on adding fixed percentage points to the estimated curve. Grey dots provide observed proportions mapped to a 1,200 fish run.

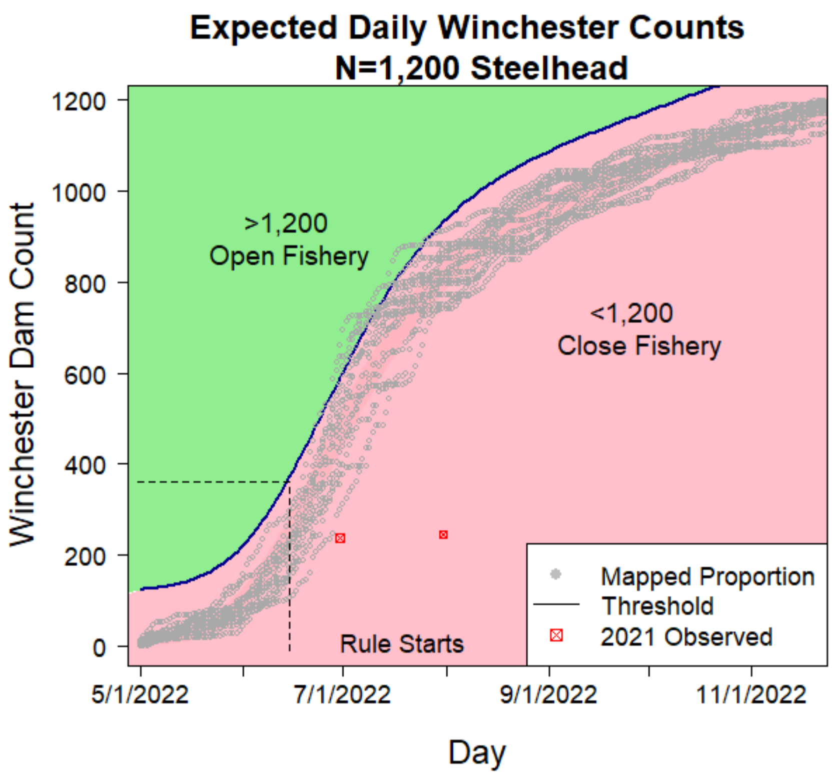

Figure 4: Final decision rule curve based on adding 10 fixed percentage points to the estimated relationships. Areas shaded red represent counts that indicate the run size is likely to be smaller than 1,200 fish. Green shaded areas represent counts in which a 1,200 fish run size minimum is likely and the fishery will be open.

Table 4 – count thresholds for each day starting June 15th.

Date	Count Threshold
6/15/2022	373
6/16/2022	386
6/17/2022	400
6/18/2022	414
6/19/2022	428
6/20/2022	442
6/21/2022	457
6/22/2022	471
6/23/2022	486
6/24/2022	501
6/25/2022	515
6/26/2022	530
6/27/2022	545
6/28/2022	559
6/29/2022	574
6/30/2022	589
7/1/2022	603
7/2/2022	617
7/3/2022	631
7/4/2022	645
7/5/2022	659
7/6/2022	673
7/7/2022	686
7/8/2022	699
7/9/2022	712
7/10/2022	725
7/11/2022	737
7/12/2022	749
7/13/2022	761
7/14/2022	773
7/15/2022	784
7/16/2022	795
7/17/2022	806
7/18/2022	817
7/19/2022	827
7/20/2022	837
7/21/2022	847
7/22/2022	857
7/23/2022	866
7/24/2022	875
7/25/2022	884

7/26/2022	892
7/27/2022	900
7/28/2022	908
7/29/2022	916
7/30/2022	924
7/31/2022	931
8/1/2022	938
8/2/2022	945
8/3/2022	952
8/4/2022	959
8/5/2022	965
8/6/2022	972
8/7/2022	978
8/8/2022	983
8/9/2022	989
8/10/2022	995
8/11/2022	1000
8/12/2022	1005
8/13/2022	1011
8/14/2022	1016
8/15/2022	1020
8/16/2022	1025
8/17/2022	1030
8/18/2022	1034
8/19/2022	1039
8/20/2022	1043
8/21/2022	1047
8/22/2022	1051
8/23/2022	1055
8/24/2022	1059
8/25/2022	1063
8/26/2022	1067
8/27/2022	1071
8/28/2022	1074
8/29/2022	1078
8/30/2022	1082
8/31/2022	1085
9/1/2022	1088
9/2/2022	1092
9/3/2022	1095
9/4/2022	1098
9/5/2022	1101
9/6/2022	1105
9/7/2022	1108
9/8/2022	1111

9/9/2022	1114
9/10/2022	1117
9/11/2022	1120
9/12/2022	1123
9/13/2022	1126
9/14/2022	1129
9/15/2022	1132
9/16/2022	1135
9/17/2022	1137
9/18/2022	1140
9/19/2022	1143
9/20/2022	1146
9/21/2022	1149
9/22/2022	1152
9/23/2022	1154
9/24/2022	1157
9/25/2022	1160
9/26/2022	1163
9/27/2022	1166
9/28/2022	1168
9/29/2022	1171
9/30/2022	1174
10/1/2022	1177
10/2/2022	1179
10/3/2022	1182
10/4/2022	1185
10/5/2022	1188
10/6/2022	1190
10/7/2022	1193
10/8/2022	1196
10/9/2022	1198
10/10/2022	1201
10/11/2022	1204
10/12/2022	1207
10/13/2022	1209
10/14/2022	1212
10/15/2022	1215
10/16/2022	1217
10/17/2022	1220
10/18/2022	1223
10/19/2022	1225
10/20/2022	1228
10/21/2022	1230
10/22/2022	1233
10/23/2022	1236

10/24/2022	1238
10/25/2022	1241
10/26/2022	1243
10/27/2022	1246
10/28/2022	1248
10/29/2022	1250
10/30/2022	1253
10/31/2022	1255
11/1/2022	1258
11/2/2022	1260
11/3/2022	1262
11/4/2022	1264
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11/6/2022	1269
11/7/2022	1271
11/8/2022	1273
11/9/2022	1275
11/10/2022	1277
11/11/2022	1279
11/12/2022	1280
11/13/2022	1282
11/14/2022	1284
11/15/2022	1286
11/16/2022	1287
11/17/2022	1289
11/18/2022	1291
11/19/2022	1292
11/20/2022	1294
11/21/2022	1295
11/22/2022	1296
11/23/2022	1298
11/24/2022	1299
11/25/2022	1300
11/26/2022	1301
11/27/2022	1302
11/28/2022	1303
11/29/2022	1305
11/30/2022	1305

Reference

Oregon Department of Fish and Wildlife. 2014. Coastal Multi-Species Conservation and Management Plan. June 2014. Oregon Department of Fish and Wildlife, Salem, Oregon.