US Army Corps of Engineers®
Portland District

WILLAMETTE VALLEY SYSTEM OPERATIONS AND MAINTENANCE

APPENDIX K: RECREATION ANALYSIS

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EXECUTIVE SUMMARY

As shown in Recreation Environmental Consequences Chapter 3, no substantial effects to recreation are expected under the Preferred Alternative scenario for the Willamette River Basin (WRB) when compared to the No-action Alternative. However, there are expected to be some moderate to major effects in particular locations under some alternative scenarios.

National Economic Development (NED) account recreation effects were analyzed using the U.S. Army Corps of Engineers' (USACE) Visitation Estimation Reporting System (VERS), U.S. Forest Service (USFS) visitation data, Unit-Day-Value (UDV) data, as well as USACE Hydrologic Engineering Center (HEC) Reservoir System Simulation (ResSim) software modeled reservoir elevation data.

The results of the NED analysis, particularly reservoir annual visitations, were used as inputs into the Regional Economic Development (RED) account model to analyze changes in economic activity. For riverine recreation activities downstream of reservoirs, a qualitative analysis was done using HEC-ResSim modeled flows at several river gage locations across the hydrologic period of record. On an annual basis, there are no substantial effects expected for any of the river gage location/alternative combinations. On a seasonal basis, there are several location/season/alternative combinations that show both positive and negative moderate (+/- 5%-20%) and major effects (+/- >20%) compared to the No-action Alternative.

CHAPTER 1 – RECREATION ANALYSIS INPUTS

1.1 VISITATION

Visitation to Willamette Valley System Reservoirs is estimated using the USACE VERS (USACE, 2022) data for 2019. A visitation is defined as the entry of one person into a recreation area or site to carry on one or more recreational activities. Average visitation estimates were indexed to 2021 using U.S. Census population data for the county in which the project is located (USCB 2016, USCB 2021e). It is recognized that using U.S. Census county population estimates to index 2016 visitation data to 2021 assumes that most visits are by local people. However, it is unknown whether or not this is actually the case. If most visits are actually by non-local people, the visitation estimates in this appendix may be somewhat overstated.

Visitations are tracked by VERS using various tools such as vehicle meters and the National Recreation Reservation System. For instances where a particular recreation activity at a project is not estimated by the VERS, existing visitation and other data were used to estimate visitation for the activity. For example, where number of camping visits data was not available, but campsites are known to exist and are published typically by the U.S. Forest Service, a ratio of campers per campsite was calculated using data where both number of campsites and estimated camping visits were available. This resulted in an estimate of 118.053 campers per campsite per year.

VERS data provides estimated visitation figures for campgrounds located on USACE/Federal, fee-owned land, state and county-managed campgrounds as well as other known campgrounds, including those operated by the U.S. Forest Service. Other campgrounds within 10 miles of USACE reservoirs were identified using Open Street Map geospatial data (MGC No Date) and are included in the number of estimated camper visitations. Two known dispersed campgrounds, one each near Cougar Reservoir and Blue River Reservoir were included in the data. For these dispersed camping areas, aerial imagery was used to estimate the number of campsites. After examination of several past years of imagery via Google Earth, no images of actual campers could be seen, even though the published dispersed camping areas did look to exist, judging from road access and scattered open and forested areas. It was therefore estimated by best professional judgement that 15 sites exist at each of these locations. It is assumed that many visitors to these nearby campgrounds plan to make the <10- mile journey to the larger reservoir but may under some circumstances choose to forego plans to camp at all if the reservoir is at an undesirably low water elevation. Non-fee-owned land campgrounds added to this analysis by reservoir are shown in the table below.

Table 1-1-1: List of Included Campgrounds

Reservoir	Camping Areas	Campsites [1]
BLUE RIVER LAKE OR	1. Dispersed	15
	2. Mona	23
	3. Lookout	55
COUGAR LAKE OR	1. Slide Creek	16
	2. Sunnyside	13
	3. Cougar Crossing	12
	4. Dispersed	15
DETROIT LAKE	1. Cove Creek	57
	2. Hoover	28
	3. Santiam Flats	26
	4. South Shore	25
	5. Elk Lake	17
	6. Detroit Lake State CG	300
FALL CREEK LAKE OR	1. Big Pool	5
	2. Broken Bowl	16
	3. Clark Creek	1
	4. Dolly Varden	5
GREEN PETER LAKE	1. Boat in Camping	15
	2. Cascadia	22
	3. Cascadia Group	2

HILLS CREEK LAKE	1. Black Canyon 2. Casey's Riverside RV Park 3. Sand Prairie 4. Packard Creek	75 55 21 33
LOOKOUT POINT LAKE OR	1. Ivan Oakes	24
Total	25	876

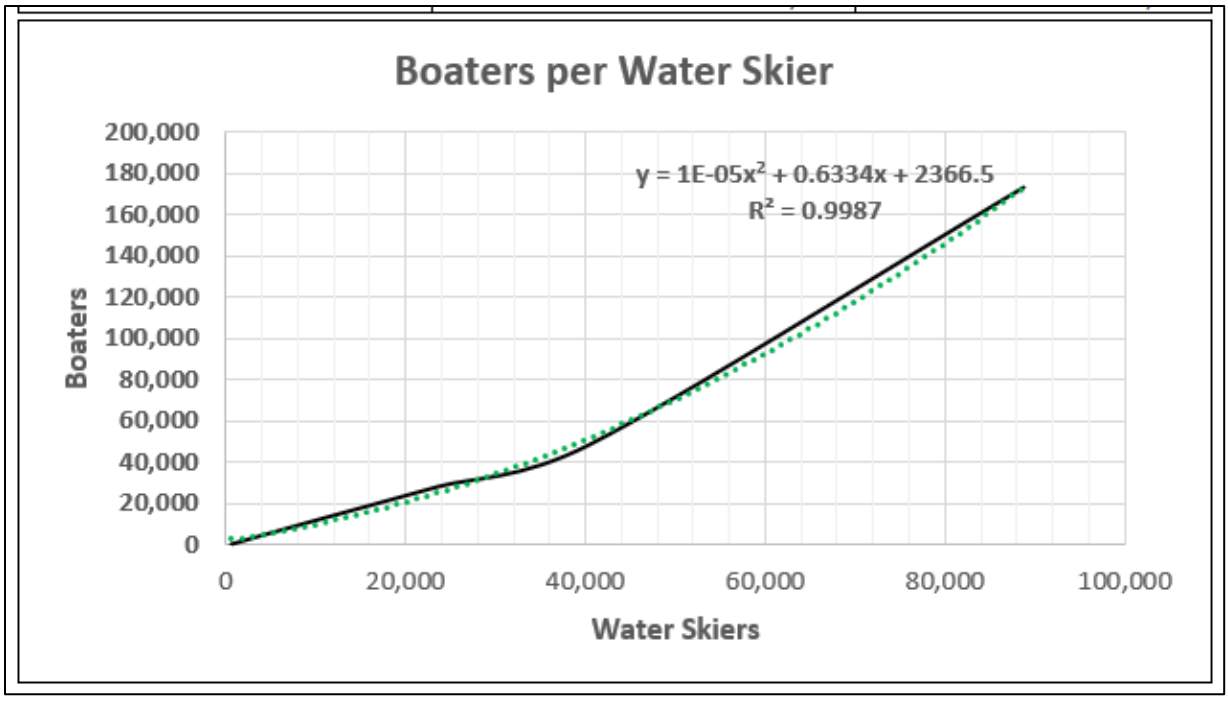
Other visitation categories where data was unavailable included boater and water skiers for some areas. For the water skiers, the same ratio methodology described in the preceding paragraph was used to calculate a .62 water skier per boater ratio. To estimate boaters where no data was available, the following table of known values and Figure 1-1 were created that shows the polynomial equation used to estimate the unknown number of boaters where only water skier data is available.

Table 1-2: Water Skiers and Boater User Estimates

Reservoir	Water Skier VERS Estimate	Boater VERS Estimate
BLUE RIVER LAKE	28	46
LOOKOUT POINT LAKE	9,122	14,768
DORENA LAKE	15,961	25,840
DEXTER LAKE	30,148	48,808
FERN RIDGE LAKE	43,477	70,387
TOTAL	98,736	159,849

(USACE 2022e, USACE 2022p, USACE 2022j, USACE 2022i, USACE 2022l)

Figure 1-1. Boater Visitation Regression.



Estimating visitations in general and particularly by activity is a difficult task for any agency given the limitations of human resources that typically serve the public better in other ways such as keeping facilities clean and safe. Methodologies are continually being improved upon using non-human tools to gather data. This means that visitation data is not always consistent or complete. The important concept for this analysis is that the data is consistent across the alternatives and therefore provides a relative comparison between them.

For this analysis, 2016 visitation numbers were indexed to approximate 2022 values using Lane, Linn, and Marion County population change data from the U.S. Census Bureau. The table below shows data that was used for indexing visitation values to approximate 2022 levels.

Table 1-3. County Population Change Rate from 2016 to 2021.

	2016 Population Estimate	2022 Population Estimate	2016 to 2022 Index
Lane County	369,519	381,181	1.032
Linn County	122,814	130,467	1.062
Marion County	336,316	346,741	1.031

(USCB 2016, USCB 2022e)

The following tables show visitation estimates for WVS reservoirs included in the recreation effects analysis. Visitation figures are shown at the published 2016 values, as well as the indexed 2022 values.

Table 1-4. Annual Visitation Estimates – Green Peter Lake.

GREEN PETER LAKE	2016 Estimated Visits [1]	2022 Estimated Visits [2]
Picnickers	11,493	9,059
Campers	9,092	11,711
Swimmers	15,390	13,074
Water Skiers	19,185	10,488
Boaters	15,673	16,979
Sightseers	57,073	12,591
Anglers	41,809	10,077
Other	1,265	533

[1] Source: (USACE 2022n)

[2] Estimated adjusted visits are indexed from 2016 to 2021 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

Table 1-5. Annual Visitation Estimates – Cottage Grove Lake.

COTTAGE GROVE LAKE	2016 Estimated Visits [1]	2022 Estimated Visits [2]
Picnickers	57,125	25,790
Campers	3,323	30,585
Swimmers	49,990	29,841
Water Skiers	55,532	43,569
Boaters [3]	0	70,537
Sightseers	27,012	25,272
Anglers	43,010	20,691
Other	9,115	6,111

[1] Source: (USACE 2022f)

[2] Estimated adjusted visits are indexed from 2016 to 2021 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

[3] Number of boaters are estimated for 2021 using regression analysis as described in Section 1.1 of Technical this appendix.

Table 1-6. Annual Visitation Estimates – Dorena Lake.

DORENA LAKE OR	2016 Estimated Visits [1]	2022 Estimated Visits [2]
Picnickers	34,778	20,539
Campers	11,751	34,144
Swimmers	24,108	35,022
Water Skiers	23,652	16,465
Boaters	28,595	26,656
Sightseers	17,403	31,946
Anglers	47,336	11,350
Others	6,759	39,636

[1] Source: (USACE 202016j)

[2] Estimated adjusted visits are indexed from 2016 to 2022 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

Table 1-7. Annual Visitation Estimates – Blue River Lake.

BLUE RIVER LAKE	2016 Estimated Visits [1]	2022 Estimated Visits [2]
Picnickers	1,501	2,472
Campers [3]	0	22,715
Swimmers	627	789
Water Skiers	652	29
Boaters	687	47
Sightseers	8,033	4,342
Anglers	3,179	1,843
Others	428	1,178

[1] Source: (USACE 2016e)

[2] Estimated adjusted visits are indexed from 2016 to 2021 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

[3] Number of campers are estimated for 2022 using GIS tools and data as well as local, county, and state data as described in Section 1.1 of this appendix.

Table 1-8. Annual Visitation Estimates – Cougar Lake.

COUGAR LAKE	2016 Estimated Visits [1]	2022 Estimated Visits [2]
Picnickers	5,963	5,489
Campers [3]	1,378	5,389
Swimmers	3,908	1,768
Water Skiers	3,098	2,819
Boaters [4]	0	4,564
Sightseers	18,428	11,006
Anglers	8,100	4,137
Others	1,106	2,653

[1] Source: (USACE 2016g)

[2] Estimated adjusted visits are indexed from 2016 to 2022 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

[3] Number of campers are estimated for 2022 using GIS tools and data as well as local, county, and state data as described in Section 1.1 of this appendix.

[4] Number of boaters are estimated for 2022 using regression analysis as described in Section 1.1 of this appendix -Recreation.

Table 1-9. Annual Visitation Estimates – Fern Ridge Lake.

FERN RIDGE LAKE	2016 Estimated Visits [1]	2022 Estimated Visits [2]
Picnickers	177,556	121,231
Campers	14,598	0
Swimmers	105,121	179,081
Water Skiers	88,722	44,849
Boaters	173,594	72,608
Sightseers	81,682	122,347
Anglers	118,870	38,007
Others	25,183	27,257

[1] Source: (USACE 2016l)

[2] Estimated adjusted visits are indexed from 2016 to 2022 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

Table 1-10. Annual Visitation Estimates – Fall Creek Lake.

FALL CREEK LAKE	2016 Estimated Visits [1]	2021 Estimated Visits [2]
Picnickers	43,083	20,116
Campers [3]	515	4,114
Swimmers	60,089	31,567
Water Skiers	47,595	11,595
Boaters	33,278	18,771
Sightseers	3,799	16,528
Anglers	26,883	12,130
Others	19	3,315

[1] Source: (USACE 2016k)

[2] Estimated adjusted visits are indexed from 2016 to 2022 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

[3] Number of campers are estimated for 2022 using GIS tools and data as well as local, county, and state data as described in Section 1.1 of this appendix.

Table 1-11. Annual Visitation Estimates – Lookout Point Lake.

LOOKOUT POINT LAKE	2016 Estimated Visits [1]	2022 Estimated Visits [2]
Picnickers	13,873	6,176
Campers [3]	0	5,537
Swimmers	18,981	11,796
Water Skiers	8,369	9,410
Boaters	10,223	15,234
Sightseers	12,662	25,219
Anglers	30,011	6,241
Others	514	351

[1] Source: (USACE 2016p)

[2] Estimated adjusted visits are indexed from 2016 to 2021 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

[3] Number of campers are estimated for 2022 using GIS tools and data as well as local, county, and state data as described in Section 1.1 of this appendix.

Table 1-12. Annual Visitation Estimates – Dexter Lake.

DEXTER LAKE	2016 Estimated Visits [1]	2022 Estimated Visits [2]
Picnickers	32,872	35,939
Campers	0	0
Swimmers	29,608	53,376
Water Skiers	40,514	31,099
Boaters	49,026	50,348
Sightseers	28,375	124,132
Anglers	67,479	24,128
Others	1,861	8,011

[1] Source: (USACE 2016i)

[2] Estimated adjusted visits are indexed from 2016 to 2021 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

Table 1-13. Annual Visitation Estimates – Hills Creek Lake.

HILLS CREEK LAKE	2016 Estimated Visits [1]	2022 Estimated Visits [2]
Picnickers	53	6,636
Campers [3]	0	44,942
Swimmers	8	2,138
Water Skiers [4]	0	6,795
Boaters [4]	0	11,001
Sightseers	1,032	13,910
Anglers	335	5,001
Others	1	3,208

[1] Source: (USACE 2016o)

[2] Estimated adjusted visits are indexed from 2016 to 2022 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

[3] Number of campers are estimated for 2022 using GIS tools and data as well as local, county, and state data as described in Section 1.1 of this appendix.

[4] Number of boaters and water skiers are estimated for 2021 using regression analysis as described in Section 1.1 of this appendix.

Table 1-14. Annual Visitation Estimates – Foster Lake.

FOSTER LAKE	2016 Estimated Visits [1]	2022 Estimated Visits [2]
Picnickers	49,661	74,485
Campers	10,127	55,948
Swimmers	33,944	97,459
Water Skiers	27,806	36,308
Boaters	87,287	58,781
Sightseers	180,244	74,352
Anglers	63,465	37,676
Hunters	0	17,071

[1] Source: (USACE 2016m)

[2] Estimated adjusted visits are indexed from 2016 to 2021 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

Table 1-15. Annual Visitation Estimates – Detroit Lake

DETROIT LAKE	2016 Estimated Visits [1]	2022 Estimated Visits [2]
Picnickers	16,979	4,514
Campers	20,992	106,433
Swimmers	15,218	1,455
Water Skiers	14,961	8,967
Boaters	0	14,518
Sightseers	38,991	15,098
Anglers	22,913	3,401
Hunters	5,596	2,182

[1] Source: (USACE 2016h)

[2] Estimated adjusted visits are indexed from 2016 to 2021 using data from U.S. Census Bureau 1-Year American Community Survey County level data. Source: (USCB 2016), (USCB 2022e)

[3] Number of campers are estimated for 2021 using GIS tools and data as well as local, county, and state data as described in Section 1.1 of this appendix.

[4] Number of boaters are estimated for 2022 using regression analysis as described in Section 1.1 of this appendix.

1.2 UNIT DAY VALUES

Unit Day Values (UDV) are determined each year by the USACE and represent a general dollar value that can be placed on a visit to a recreation facility. UDV's for this analysis are taken from USACE Economic Guidance Memorandum 22-03, "Unit Day Values for Recreation for Fiscal Year 2022" (USACE 2022-A), and are weighted per project by recreational experience, opportunity, carrying capacity, accessibility, and environmental. Weights per reservoir across these elements were provided by the USACE Recreation Budget Evaluation System (Rec-BEST). The table below shows an example of the UDV weightings for Detroit Reservoir.

Table 1-16. Unit Day Value General Recreation Scoring Example – Detroit Lake.

UDV Weight Description	Rating	Scoring Criteria & Range	Scoring Criteria & Range	Scoring Criteria & Range	Scoring Criteria & Range	Scoring Criteria & Range
UDV1 Recreation Experience	4	Two general activities (0-4)	Several general activities (5-10)	Several general activities: one high quality value activity (11-16)	Several general activities: more than one high quality high activity (17-23)	Numerous high quality value activities; some general activities (24-30)
UDV2 Availability of Opportunity	2	Several within 1 hour travel time; a few within 30 minutes travel time (0-3)	Several within 1 hour travel time; none within 30 minutes travel time (4-6)	One or two within 1 hour travel time; none within 45 minutes travel time (7-10)	None within 1 hours travel time (11-14)	Non within 2 hours travel time (15-18)
UDV3 Carrying Capacity	4	Minimum facility for development for public health and safety (0-2)	Basic facility to conduct activities (3-5)	Adequate facilities to conduct without deterioration of the resource or activity experience (6-8)	Optimum facilities to conduction activity at site potential (9-11)	Ultimate facilities to achieve intent of selected alternative 12-14)
UDV4 Accessibility	12	Limited access by any means to site or within the site (0-3)	Fair access, poor quality roads to site; limited access within the site (4-6)	Fair access, fair road to site; fair access, good roads within the site (7-10)	Good access, good roads to site; fair access, good roads within the site (11-14)	Good access, high standard road to site; good access within the site (15-18)
UDV5 Environmental	6	Low esthetic factors that substantially lower quality (0-2)	Average esthetic quality: factors exist that lower quality to minor degree (3-6)	Above average esthetic quality: any limiting factors can be reasonably rectified (7-10)	High esthetic quality: no factors exist that lower quality (11-15)	Outstanding esthetic quality: no factors exist that lower quality (16-20)

Note: Values separated by dashed parenthesis signify the point ranges in the UDV recreational experience scoring. For example, if the Environmental weight in the bottom row is judged to be "Average", it can be given a score of between 3 and 6 (shown as (3-6) in table).

UDV's were also separate into two classes, General Hunting and Fishing, as well as General Recreation that includes picnickers, campers, swimmers, boaters, water skiers, and sightseers. The UDV dollar value between these two classes is somewhat different and is shown in Table 1-14 that is taken from EGM 20-03. The point values in the first column represent the scoring value total across the recreation experience, opportunity, carrying capacity, accessibility, and environmental categories. Point values are interpolated in one-point increments but for brevity are not shown below. For example, the Detroit Lake scoring in the table above totals to 28 points. This interpolates to a dollar value per visit of $7.66 for General Recreation and $9.92 for General Hunting and Fishing per the table below.

Table 1-17. Unit Day Value Dollar Values from EGM 20-03 in FY 2025 Dollars.

Point Values	General Recreation Values ($)	General Fishing and Hunting Values
0	5.17	7.44
10	6.14	8.41
20	6.79	9.05
30	7.76	10.02
40	9.70	11.00
50	11.00	11.97
60	11.97	13.26
70	12.61	13.91
80	13.91	14.88
90	14.88	15.20
100	15.52	15.52

Applying separate UDV dollar values to the number of days boat ramps are usable versus unusable, as described in the Hydrologic Inputs and Recreation Effects on an Annual Basis sections of this appendix, requires an assumed percentage loss of visitation when boat ramps are unusable. These assumptions per recreational activity are based on professional judgement through discussions between PDT economists and were passed to USACE field recreation personnel for concurrence. The general rationale is that when boat ramps become unusable, a reservoir is less attractive to visitors both physically and esthetically because of low water levels that often expose steep bank terrain with little or no vegetation. The assumed loss per activity is shown in the table below.

Table 1-18. Assumed Percent Recreational Activity Lost when Boat Ramps are Unusable.

Visitation Category	Percent Visitation Loss When Boat Ramps Unusable
Picnickers	25%
Campers	25%
Swimmers	25%
Water Skiers	100%
Boaters	90%
Sightseers	25%
Fishermen	90%
Hunters	0%

The final step toward applying a UDV to each day that a boat ramp is usable versus unusable during the peak recreation season of May 15 to September 15 was to calculate a total annual visitation value for each reservoir respectively, and then divide this number by the 124 days of the peak recreation season to derive a daily average UDV value. For example, Detroit Reservoir visitations for all activities tally up to 185,999, 156,574 of which are in the General Recreation category and 29,425 of which are in the General Hunting and Fishing category. Divided by 124, this equals a daily average of 1,263 and 237 for general recreation and general hunting and fishing visits, respectively. These daily visitation values were then multiplied by the $6.58 and $8.55 values per visit as discussed previously in this subsection, the products summed, and the sum divided by 124. This resulted in a daily UDV total for each reservoir. The results of the calculations described in this paragraph are shown in the tables below for each reservoir with and without boat ramp usability.

Table 1-19. UDV Values by Reservoir with Boat Ramp Usability.

Reservoir	Total Annual Visits	Annual Visits Gen Rec	Annual Visits Gen Hunt/Fish	UDV Gen Rec	UDV Gen Hunt/Fish	Total General Rec Value	Total Annual Gen Hunt/Fish Rec Value	Total Annual Rec Value	Daily Avg Rec Value
Green Peter	184,429	137,967	46,462	$7.66	$9.92	$1,057,237	$461,043	$1,518,280	$12,244
Cottage Grove	324,410	270,468	53,941	$10.61	$11.68	$2,869,670	$629,982	$3,499,652	$28,223
Dorena	201,156	145,176	55,980	$10.48	$11.58	$1,521,442	$648,362	$2,169,803	$17,498
Blue River	38,357	34,624	3,733	$7.08	$9.34	$245,172	$34,867	$280,039	$2,258
Cougar	53,398	43,871	9,527	$7.57	$9.83	$331,929	$93,610	$425,539	$3,432
Fern Ridge	812,693	663,620	149,073	$8.73	$10.51	$5,793,403	$1,566,757	$7,360,160	$59,356
Fall Creek	226,060	198,221	27,839	$7.95	$10.12	$1,576,650	$281,680	$1,858,330	$14,987
Lookout Point	103,794	72,205	31,589	$8.54	$10.41	$616,346	$328,902	$945,248	$7,623
Dexter	258,438	186,681	71,756	$7.18	$9.44	$1,339,999	$677,237	$2,017,236	$16,268
Hills Creek	69,003	68,655	348	$7.57	$8.00	$519,446	$2,782	$522,228	$4,212
Foster	488,128	419,671	68,457	$10.22	$11.39	$4,289,042	$779,587	$5,068,629	$40,876
Detroit	243,083	213,171	29,912	$7.57	$9.83	$1,612,850	$293,915	$1,906,765	$15,377
Total	3,002,948	2,454,331	548,617			21,773,185	5,798,724	27,571,909	222,354

Table 1-20. UDV Values by Reservoir Without Boat Ramp Usability.

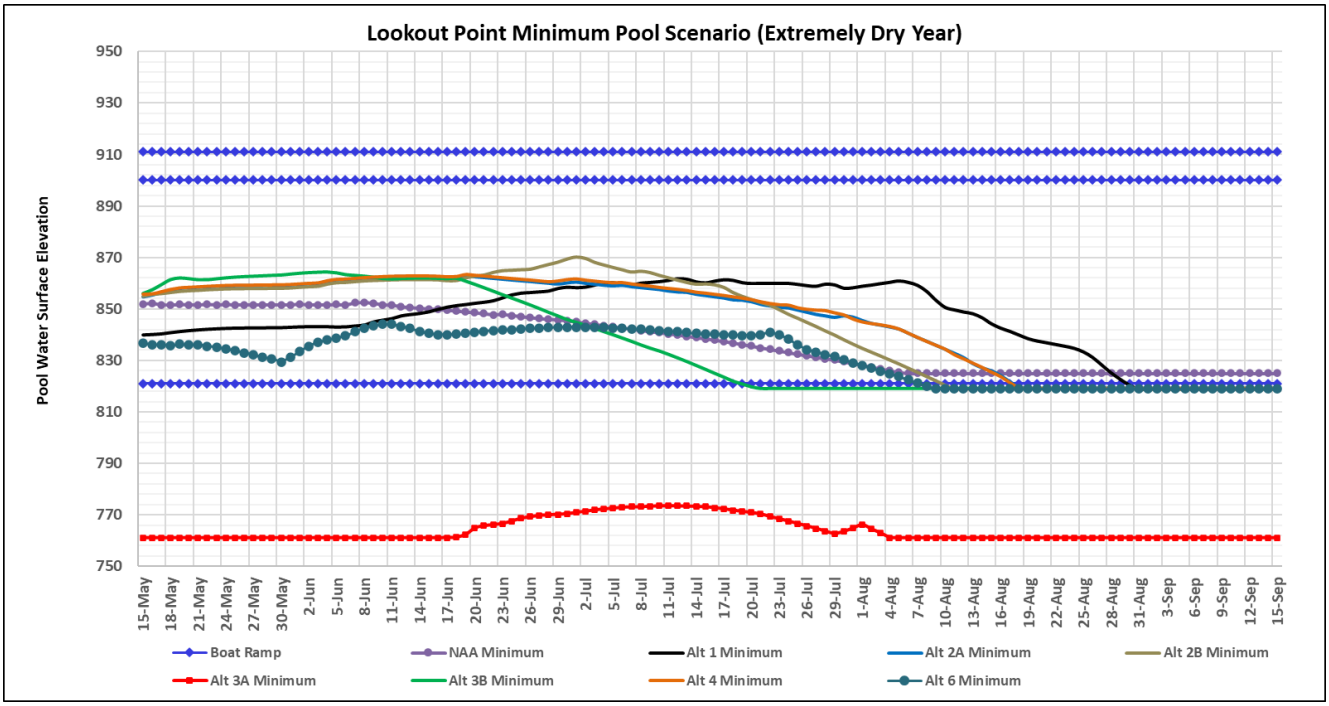
Reservoir	Total Annual Visits	Annual Visits Gen Rec	Annual Visits Gen Hunt/Fish	UDV Gen Rec	UDV Gen Hunt/Fish	Total General Rec Value	Total Annual Gen Hunt/Fish Rec Value	Total Annual Rec Value	Daily Avg Rec Value
Green Peter	82,840	76,966	5,874	$7.66	$9.92	$589,788	$58,290	$648,078	$5,226
Cottage Grove	127,640	113,756	13,884	$10.61	$11.68	$1,206,951	$162,146	$1,369,097	$11,041
Dorena	83,183	71,290	11,893	$10.48	$11.58	$747,121	$137,746	$884,867	$7,136
Blue River	82,840	76,966	5,874	$7.66	$9.92	$589,788	$58,290	$648,078	$5,226
Cougar	127,640	113,756	13,884	$10.61	$11.68	$1,206,951	$162,146	$1,369,097	$11,041
Fern Ridge	83,183	71,290	11,893	$10.48	$11.58	$747,121	$137,746	$884,867	$7,136
Fall Creek	82,840	76,966	5,874	$7.66	$9.92	$589,788	$58,290	$648,078	$5,226
Lookout Point	83,183	71,290	11,893	$10.48	$11.58	$747,121	$137,746	$884,867	$7,136
Dexter	82,840	76,966	5,874	$7.66	$9.92	$589,788	$58,290	$648,078	$5,226
Hills Creek	127,640	113,756	13,884	$10.61	$11.68	$1,206,951	$162,146	$1,369,097	$11,041
Foster	83,183	71,290	11,893	$10.48	$11.58	$747,121	$137,746	$884,867	$7,136
Detroit	82,840	76,966	5,874	$7.66	$9.92	$589,788	$58,290	$648,078	$5,226
Total	127,640	113,756	13,884			$1,206,951	$162,146	$1,369,097	$11,041

The Daily Total UDV values shown in the tables above were multiplied by the number of boat ramp usable and non-usable days during the peak recreation season for each year of the period of record. More details on this methodology are provided in the Recreation Effects on an Annual Basis section of this appendix.

1.3 HYDROLOGIC INPUTS

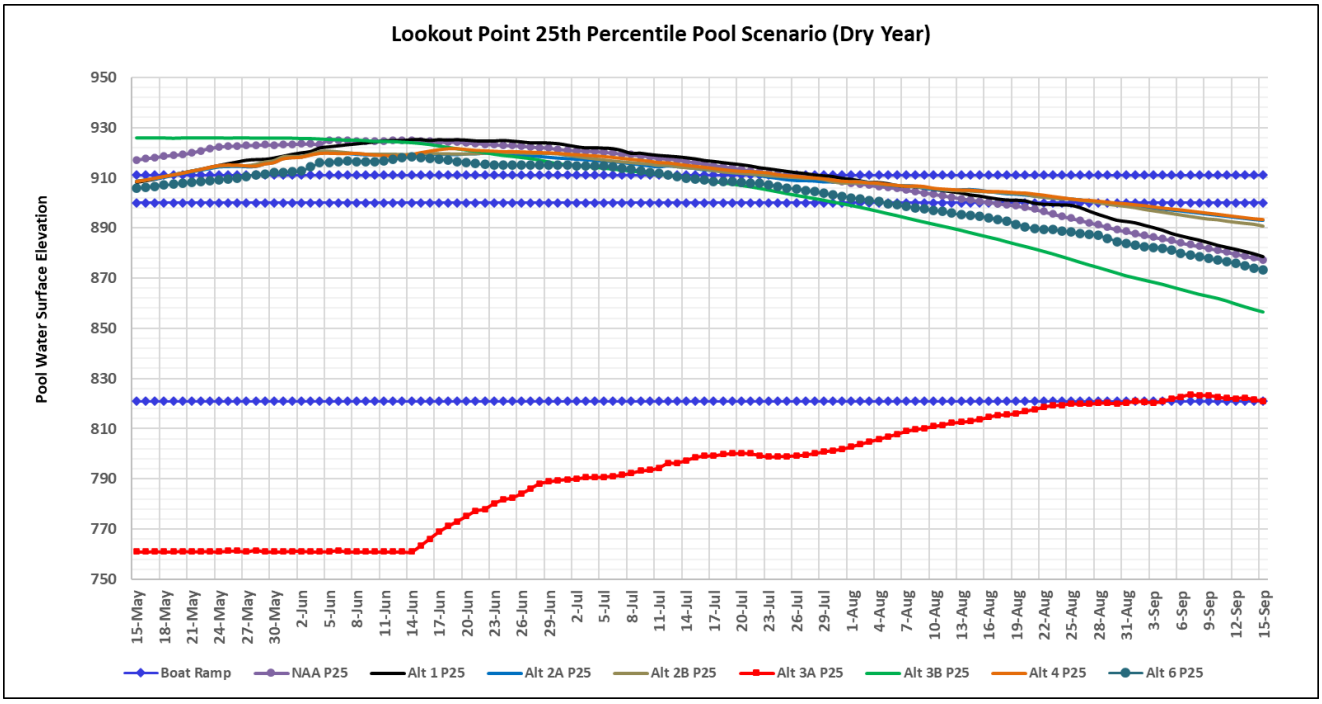
Daily reservoir pool elevation data for each of 83 water years from the HEC-ResSim model was used to determine the percentage of time that boat ramps were available during the peak recreation season of May 15 through September 15. A boat ramp was considered to be usable when the ramp elevation fell below the reservoir pool elevation and unusable when the boat ramp elevation was above the pool elevation. Even though this may not always be exactly the case, as there may be locations where towing vehicles can travel below the boat ramp to launch vessels into the water, it provides an equal comparison across all alternatives. The charts below show examples for Lookout Point Reservoir of how each alternative pool elevation scenario compares to boat ramp elevations during the peak recreation season using 5-number summary statistics compiled from the 83-year water year period of record. The charts are based on non-exceedance probability data. For example, the P25 (Dry Year) chart is saying that "25 percent of the time the pool elevation will not exceed these values and 75 percent of the time it will exceed these values."

Figure 1-2. Boat Ramp Estimated Availability Chart – Extremely Dry Year – Lookout Point Reservoir.



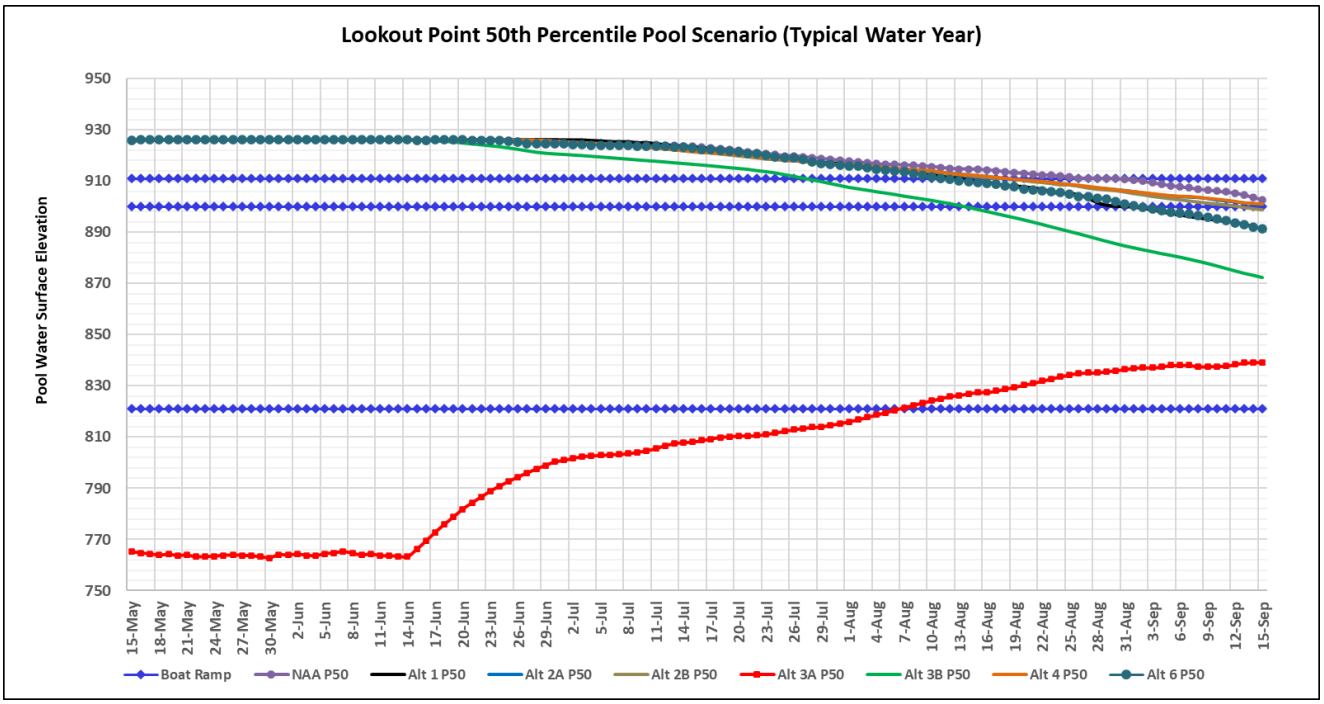
Note: Preferred Alternative 5 is the same as Alternative 2B

Figure 1-3. Boat Ramp Estimated Availability Chart – Dry Year – Lookout Point Reservoir.



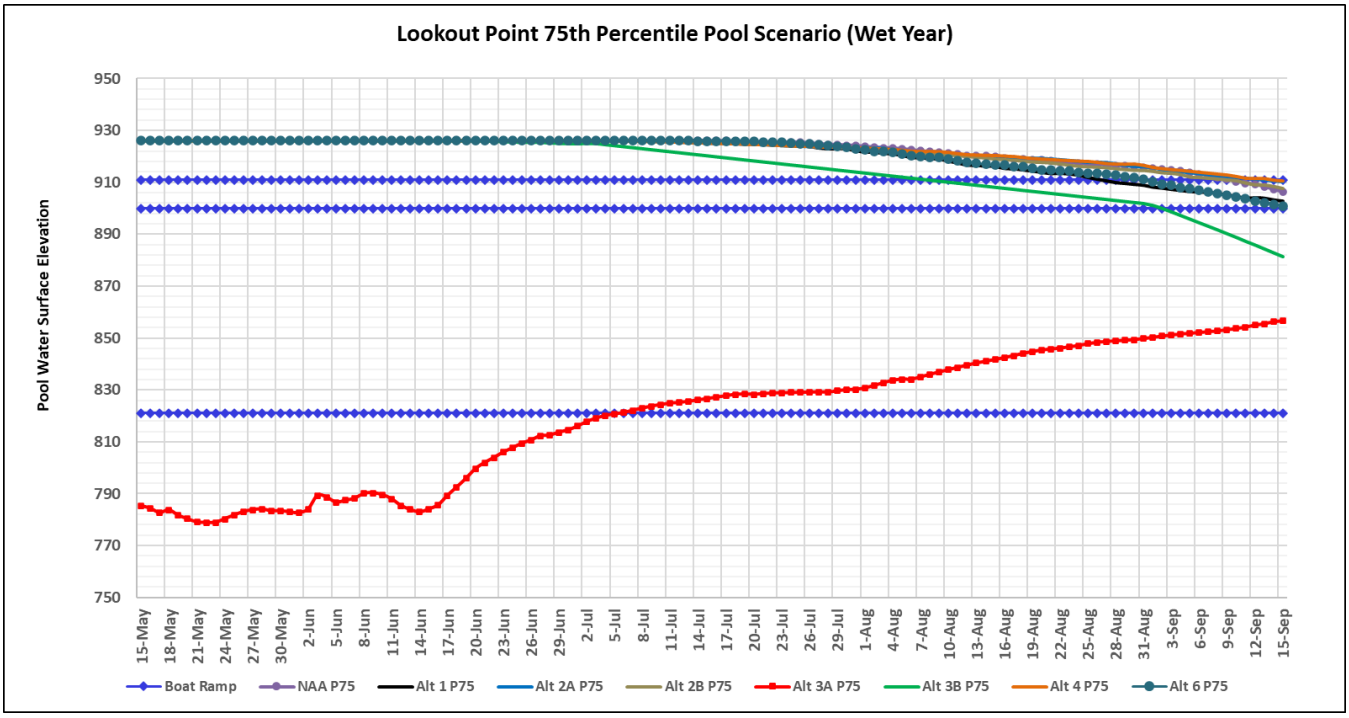
Note: Preferred Alternative 5 is the same as Alternative 2B

Figure 1-4. Boat Ramp Estimated Availability Chart – Median Year – Lookout Point Reservoir.



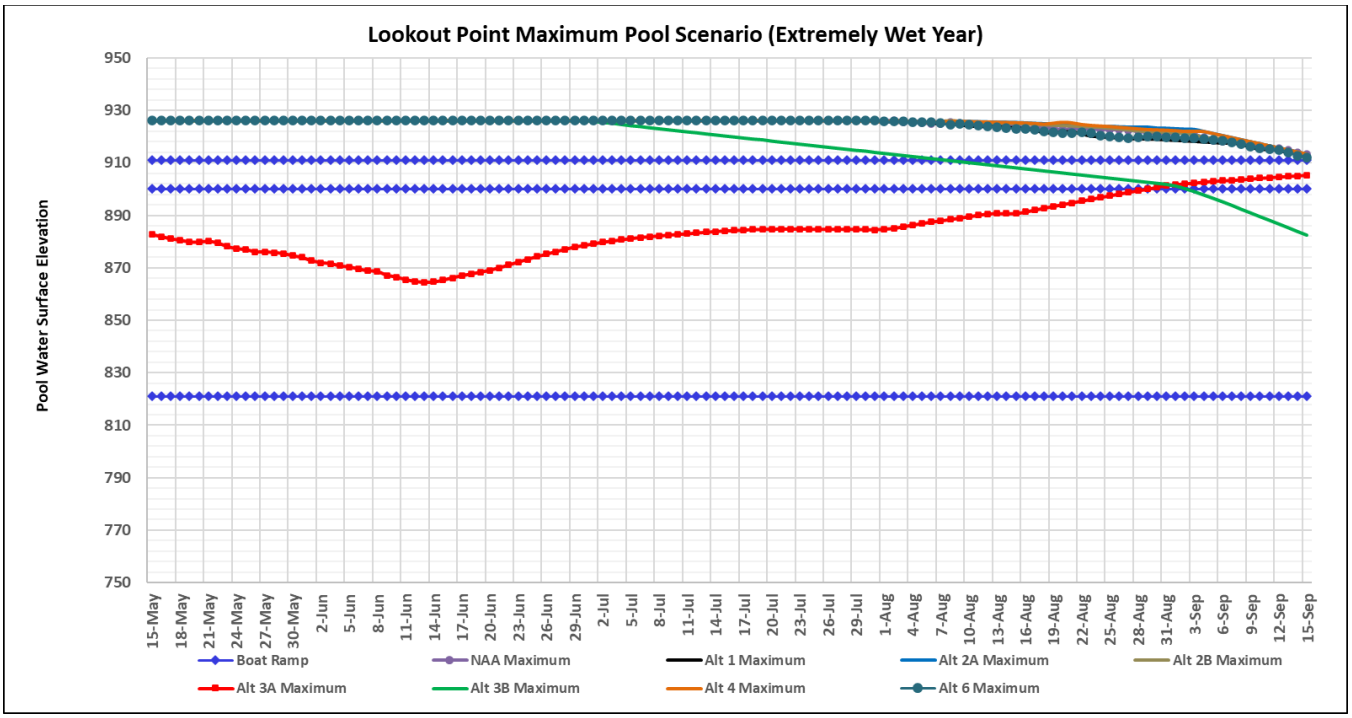
Note: Preferred Alternative 5 is the same as Alternative 2B

Figure 1-5. Boat Ramp Estimated Availability Chart – Wet Year – Lookout Point Reservoir.



Note: Preferred Alternative 5 is the same as Alternative 2B

Figure 1-6. Boat Ramp Estimated Availability Chart – Extremely Wet Year – Lookout Point Reservoir.



Note: Preferred Alternative 5 is the same as Alternative 2B

Alternative 3A is shown on the red line in the charts above and stands out as falling below the lowest boat ramp elevation much of the time. This is indicative of Measure 720 where low elevation outlets could be used to pass fish in spring by delaying refill of reservoirs each year until June 15.

CHAPTER 2 - RECREATION EFFECTS – NATIONAL ECONOMIC DEVELOPMENT

2.1 ASSUMPTIONS

The following assumptions were used for this analysis:

1. The peak recreation season at reservoirs is May 15 to September 15 each year.
2. Due to majority of recreation visits to reservoirs occur during the peak recreation season, and the seasonality, and the interpolative nature of the data projections, no attempt was made to separate annual visitation data into separate time periods. All visits are binned into the peak recreation season.
3. A boat ramp is considered usable if its elevation falls below the water surface elevation of the reservoir and was considered unusable if its elevation is above the water surface elevation of the reservoir.
4. The general assumption for this analysis is that when reservoir water levels are low enough to prevent boat launching safely via constructed boat ramps, it would discourage the public from going to the reservoir for both the physical and esthetic reasons. However, people who do choose to visit a reservoir for recreational purposes when water levels are low value the experience and create the same economic activity as they would any other time.
5. For riverine recreation areas, water flows that are consistent with past flows are directly related to the amount of utility most river recreationists enjoy.

2.2 METHODOLOGY

To estimate the annual effects of each of the alternatives on recreation, each of the 83 simulated water year outputs from HEC-ResSim were compared to each boat ramp to calculate an annual availability of the ramps based on whether the boat ramp elevation was above or below the daily pool elevation. The availability of individual ramps at each reservoir were then averaged with each other to determine the average annual availability for each reservoir. The annual average number of available (aka “usable”) and unavailable (aka “unusable”) days were multiplied appropriately by the UDV Daily Average Recreation Values figures shown in far-right column in Table 1-16 of this appendix. Summing the products of annual usable/unusable day visitations and annual usable/unusable average daily UDV values provides recreation benefit estimates in dollar terms, that are then averaged across all reservoir boat ramps to determine the average annual recreation benefit for the reservoir. It should be noted that even though visitation overall decreases in some alternatives, the UDV values for the reservoirs with positive visitation impacts are higher than the UDV values at the reservoirs negatively impacted.

2.3 AVERAGE ANNUAL EFFECTS

Results examples from the annual effects to recreation analysis are shown in Table 2-1 and Table 2-2.

Table 2-1. Average Annual Recreation Value Example – Hills Creek Reservoir – Alternative 1.

Sub-basin	Reservoir	Boat Ramp	Elevation (NAVD 88)	Avg. Annual Usable Days [1]	Avg. Annual Unusable Days [1]	Avg. Daily Rec Value: Usable Days	Avg. Daily Rec Value: Unusable Days	Average Annual Rec Benefit
Middle Fork Willamette	Hills Creek	Bingham Landing	1520	85.23	38.77	124.00	5522.86	3255.65
Middle Fork Willamette	Hills Creek	CT Beach Park	1507	100.70	23.30	124.00	5522.86	3255.65
Middle Fork Willamette	Hills Creek	Packard Creek	1441	120.46	3.54	124.00	5522.86	3255.65
Average				102.13	21.87		5522.86	3255.65

Note: Because table values are rounded to two digits, Avg Annual Rec Benefits may not calculate exactly equal to what is shown.

[1] Averaged across 83 water years using HEC-ResSim model pool elevation data and NWP District boat ramp elevation data.

Average Annual Effects

Results examples from the annual effects to recreation analysis are shown in Table 2-1 and Table 2-2.

Table 2-1 for Hills Creek Alternative 1 were calculated for each alternative/reservoir combination. The action alternatives were then compared to the no action alternative to estimate the change in value (aka “benefits”) that is anticipated to occur under each alternative scenario. Table 2-2 shows an example of all economic values across all alternatives for Hills Creek Reservoir.

Table 2-2. Average Annual Recreation Benefits Example – Hills Creek Reservoir – All Alternatives.

Figures in Thousands	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	59	63	63	62	59	47	63	60	67	64
Change in Visits from No Action	0	4	5	4	0	-12	5	1	8	5
Total Annual Benefits	$36,980	$39,655	$39,845	$39,214	$37,037	$29,398	$39,851	$37,797	$30,318	$40,212
Average Annual Benefits	$446	$478	$480	$473	$446	$354	$480	$455	$438	$485
Change in Benefits from No Action	$0	$32	$35	$27	$1	-$91	$35	$10	-$8	$39
Percent Change from No Action Benefits	0.00%	7.25%	7.77%	6.06%	0.16%	-20.49%	7.77%	2.22%	-1.62%	8.75%
Effects Scale[1]	None	Moderate	Moderate	Moderate	None	Major	Moderate	Minor	Minor	Moderate

Note: All Figures shown in 1,000s. Dollar values are at 2025 Price Level

[1] Effects Scale descriptions shown in Table 2-3

The effects scale used in this analysis is shown in Table 2-3.

Table 2-3. Recreation Degree of Effect.

Degree of Adverse or Beneficial Effect	Criteria
None/ Negligible	Effects are not measurable or change <1% from the No Action Alternative
Minor	Effects change from 1% to 5% (+/-) from the No Action Alternative
Moderate	Effects change from 5% to 20% (+/-) from the No Action Alternative
Major	Effects change more than 20% (+/-) from the No Action Alternative

CHAPTER 3 - UNCERTAINTY IN RESERVOIR RECREATION ANALYSIS RESULTS

Uncertainty in the average annual visitors and total recreation value results were measured utilizing the variability in the HEC-ResSim model outputs. HEC-ResSim outputs several stage and flow statistical values based on individual Monte Carlo simulation results. These statistics range from simulated minimum to maximum values. The 25th percentile leans toward the minimum value and represents a drier year, while the 75th percentile leans toward the maximum value and represents a wetter year. These statistics were used to construct the charts in Figure 1-2 Through Figure 1-6 as well as Table 3-1 and Table 3-2 below.

Table 3-1. Annual Visitation Uncertainty Statistics – All Reservoirs - All Alternatives.

Reservoir	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Green	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	180,263	183,392	173,946	173,946	173,951	84,281	174,188	174,025	176,763	
–	Average	180443.3	183575.4	174119.9	174119.9	174125	84365.28	174362.2	174199	176939.8	
–	Median	180623.7	183759	174294.1	174294.1	174299.1	84449.65	174536.6	174373.2	177116.7	
–	75th	180804.3	183942.7	174468.4	174468.4	174473.4	84534.1	174711.1	174547.6	177293.8	
Cottage	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	304,750	311,687	311,657	311,114	306,478	309,164	311,203	311,137	305,273	309,290
–	Average	305,683	312,604	312,489	312,002	307,624	310,185	312,059	312,059	306,209	309,956
–	Median	306,081	313,025	312,826	312,378	308,179	310,619	312,418	312,460	306,611	310,192
–	75th	306,770	313,688	313,464	313,035	308,952	311,378	313,061	313,130	307,274	310,741
Dorena	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	176,207	188,933	185,181	184,636	182,079	184,481	184,798	184,721	184,721	184,944
–	Average	176,947	189,647	185,849	185,353	182,984	185,276	185,483	185,483	185,483	185,483
–	Median	177,137	189,981	185,998	185,534	183,296	185,502	185,651	185,662	185,691	185,623
–	75th	177,740	190,505	186,663	186,213	184,063	186,230	186,320	186,366	186,290	186,043
Blue	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	35,328	36,463	36,552	36,380	34,974	25,456	25,631	25,599	25,596	25,691
–	Average	35,553	36,708	36,752	36,605	35,344	25,772	25,772	25,772	25,772	25,772
–	Median	35,669	36,849	36,871	36,738	35,510	25,823	25,854	25,868	25,875	25,838
–	75th	35,802	36,991	36,987	36,865	35,787	26,003	25,936	25,965	25,965	25,871
Cougar	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	47,654	50,366	50,317	28,724	29,340	28,780	50,394	49,381	50,285	50,285
–	Average	47,968	50,805	50,645	29,505	29,505	29,505	50,724	50,724	50,724	50,724
–	Median	48,151	51,032	50,777	29,822	29,541	29,798	50,857	51,268	50,950	50,950
–	75th	48,302	51,273	51,019	30,124	29,602	30,090	51,097	51,787	51,191	51,191
Fern	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	797,232	797,070	797,070	797,070	797,070	797,070	797,070	797,070	797,284	797,302
–	Average	798,658	798,501	798,501	798,501	798,501	798,501	798,501	798,501	798,501	798,501
–	Median	799,062	798,901	798,901	798,901	798,901	798,901	798,901	798,901	798,845	798,862
–	75th	800,175	800,023	800,023	800,023	800,023	800,023	800,023	800,023	799,800	799,785
Fall	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM

Reservoir	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	109,799	111,021	111,409	111,272	110,790	110,961	111,534	110,915	84,545	
–	Average	110,169	111,407	111,728	111,612	111,178	111,340	111,854	111,262	84,830	
–	Median	110,408	111,655	111,958	111,847	111,420	111,584	112,086	111,505	85,014	
–	75th	110,669	111,922	112,179	112,081	111,698	111,848	112,307	111,739	85,215	
Lookout	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	90,870	88,920	90,485	89,574	49,716	82,965	90,614	90,610	86,996	66,629
–	Average	91,529	89,497	91,024	90,168	51,329	84,216	91,160	91,272	87,728	68,703
–	Median	91,857	89,934	91,281	90,475	51,547	84,701	91,415	91,544	88,173	68,912
–	75th	92,278	90,285	91,686	90,878	52,647	85,728	91,824	92,016	88,603	70,858
Dexter	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438
–	Average	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438
–	Median	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438
–	75th	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438	258,438
Hills	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	58,646	62,584	63,097	62,016	58,140	46,604	63,110	59,791	57,559	63,980
–	Average	58,872	63,130	63,433	62,428	58,963	46,805	63,442	60,173	57,912	64,016
–	Median	58,993	63,395	63,513	62,565	59,251	46,868	63,520	60,316	58,065	64,073
–	75th	59,102	63,697	63,817	62,903	59,888	46,931	63,826	60,619	58,210	64,114
Foster	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	486,334	488,128	488,128	488,128	488,129	430,253	488,128	488,128	487,941	485,184
–	Average	486,444	488,128	488,128	488,128	488,128	433,549	488,128	488,128	487,918	484,685
–	Median	486,496	488,128	488,128	488,128	488,129	435,284	488,128	488,128	487,941	485,204
–	75th	486,555	488,128	488,128	488,128	488,129	436,832	488,128	488,128	487,941	485,204
Detroit	Statistic	No	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25	222,276	231,999	220,228	220,227	146,125	212,139	220,220	220,227	222,361	222,408
–	Average	222,822	232,453	221,232	221,231	146,942	213,434	221,223	221,231	222,935	222,982
–	Median	223,082	232,772	221,651	221,651	147,037	213,965	221,643	221,651	223,222	223,258
–	75th	223,565	233,037	222,394	222,391	147,448	215,013	222,383	222,391	223,722	223,758

Table 3-2. Annual Visitation Uncertainty Statistics – Total for All Reservoirs - All Alternatives.

Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt6	NTOM
25 Percentile	2,477,735	2,514,590	2,501,154	2,476,309	2,350,489	2,375,350	2,489,605	2,458,041	2,393,143	1,367,513
Average	2,482,914	2,519,911	2,506,491	2,482,358	2,357,757	2,385,682	2,494,928	2,459,820	2,397,614	1,370,435
Median	2,484,967	2,522,456	2,508,385	2,484,629	2,359,830	2,389,899	2,496,826	2,462,116	2,399,395	1,371,465
75th Percentile	2,488,729	2,526,064	2,512,619	2,489,000	2,364,976	2,396,666	2,501,037	2,466,066	2,402,599	1,373,631

Table 3-3 shows uncertainty statistics for all reservoirs combined for each of the proposed alternatives. There is ~.5% difference between the 25th and 75th percentile interquartile values for each alternative. This indicates that there is minimal uncertainty in the pool elevation at the reservoirs when operating according to the rule curve, assuming that there is adequate natural water to supply sufficient reservoir inflows.

Table 3-3. Annual Recreation Value Uncertainty Statistics – All Reservoirs - All Alternatives.

Reservoir	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Green Peter	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25th Percentile	$1,472,822	$1,501,787	$1,408,462	$1,408,462	$1,408,503	$645,784	$1,410,120	$1,409,328	$1,441,929	$1,424,576
–	Average	$1,482,599	$1,509,402	$1,428,486	$1,428,486	$1,428,529	$660,422	$1,430,558	$1,429,163	$1,452,627	$1,436,772
–	Median	$1,487,129	$1,513,480	$1,435,091	$1,435,091	$1,435,134	$659,668	$1,436,940	$1,435,415	$1,457,971	$1,441,436
–	75th Percentile	$1,494,983	$1,518,072	$1,451,801	$1,451,800	$1,451,843	$677,668	$1,453,711	$1,452,351	$1,467,915	$1,451,449
Cottage Grove	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25th Percentile	$3,286,822	$3,361,935	$3,361,607	$3,355,731	$3,305,540	$3,334,616	$3,356,687	$3,324,606	$1,448,183	$1,433,687
–	Average	$3,296,885	$3,371,823	$3,370,581	$3,365,302	$3,317,896	$3,345,636	$3,365,923	$3,365,923	$1,452,627	$1,436,772
–	Median	$3,301,181	$3,376,368	$3,374,217	$3,369,363	$3,323,888	$3,350,312	$3,369,795	$3,370,243	$1,454,533	$1,437,866
–	75th Percentile	$3,308,608	$3,383,511	$3,381,089	$3,376,448	$3,332,224	$3,358,499	$3,376,731	$3,377,475	$1,457,680	$1,440,412
Dorena	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM

Reservoir	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25th Percentile	$1,898,150	$2,036,758	$1,995,888	$1,989,954	$1,962,122	$1,988,277	$1,991,710	$1,952,668	$1,906,705	$1,955,028
–	Average	$1,906,124	$2,044,456	$2,003,089	$1,997,679	$1,971,877	$1,996,847	$1,999,094	$1,960,724	$1,914,570	$1,960,724
–	Median	$1,908,176	$2,048,050	$2,004,695	$1,999,629	$1,975,240	$1,999,282	$2,000,909	$1,962,624	$1,916,722	$1,962,208
–	75th Percentile	$1,914,671	$2,053,699	$2,011,860	$2,006,948	$1,983,509	$2,007,128	$2,008,123	$1,970,061	$1,922,904	$1,966,652
Blue River	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25th Percentile	$257,060	$265,707	$266,366	$265,068	$254,410	$181,976	$266,476	$262,121	$257,510	$267,103
–	Average	$258,699	$267,491	$267,826	$266,705	$257,103	$184,234	$267,938	$263,884	$259,280	$267,938
–	Median	$259,538	$268,520	$268,688	$267,674	$258,315	$184,601	$268,798	$264,872	$260,322	$268,629
–	75th Percentile	$260,508	$269,547	$269,538	$268,601	$260,324	$185,885	$269,650	$265,868	$261,225	$268,967
Cougar	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25th Percentile	$378,094	$400,577	$400,137	$222,135	$226,441	$222,120	$400,773	$221,691	$400,577	$399,910
–	Average	$380,582	$404,069	$402,743	$227,718	$227,718	$227,718	$403,397	$227,718	$404,069	$403,397
–	Median	$382,034	$405,874	$403,793	$229,969	$227,993	$229,976	$404,456	$230,161	$405,874	$405,198
–	75th Percentile	$383,235	$407,796	$405,719	$232,225	$228,461	$232,233	$406,367	$232,495	$407,796	$407,117
Fern Ridge	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25th Percentile	$7,218,740	$7,217,260	$7,217,260	$7,217,260	$7,217,260	$7,217,260	$7,217,260	$7,217,260	$7,224,493	$7,219,357
–	Average	$7,231,648	$7,230,209	$7,230,209	$7,230,209	$7,230,209	$7,230,209	$7,230,209	$7,230,209	$7,235,515	$7,230,209
–	Median	$7,235,312	$7,233,840	$7,233,839	$7,233,839	$7,233,839	$7,233,839	$7,233,839	$7,233,839	$7,238,638	$7,233,483
–	75th Percentile	$7,245,390	$7,243,994	$7,243,995	$7,243,995	$7,243,995	$7,243,995	$7,243,995	$7,243,995	$7,247,287	$7,241,835
Fall Creek	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25th Percentile	$1,697,476	$1,721,319	$1,728,608	$1,726,028	$1,716,831	$1,720,120	$1,731,044	$1,719,099	$1,699,971	$1,733,405
–	Average	$1,703,201	$1,727,309	$1,733,545	$1,731,297	$1,722,850	$1,726,004	$1,736,010	$1,724,482	$1,705,666	$1,736,010
–	Median	$1,706,889	$1,731,150	$1,737,125	$1,734,942	$1,726,594	$1,729,777	$1,739,602	$1,728,242	$1,709,307	$1,736,796
–	75th Percentile	$1,710,922	$1,735,291	$1,740,545	$1,738,565	$1,730,904	$1,733,879	$1,743,043	$1,731,865	$1,713,236	$1,738,802
Lookout Point	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25th Percentile	$823,746	$808,439	$825,597	$817,752	$421,359	$751,059	$826,740	$826,636	$790,066	$806,609
–	Average	$829,723	$813,680	$830,511	$823,189	$435,032	$762,384	$831,720	$832,671	$796,712	$831,720

Reservoir	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	Median	$832,698	$817,655	$832,860	$825,961	$436,881	$766,769	$834,049	$835,158	$800,759	$834,250
–	75th Percentile	$836,510	$820,842	$836,551	$829,694	$446,202	$776,066	$837,777	$839,465	$804,665	$857,806
Dexter	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25 Percentile	25th Percentile	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236
–	Average	Average	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236
–	Median	Median	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236
–	75th Percentile	75th Percentile	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236	$2,017,236
Hills Creek	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25th Percentile	$443,823	$473,639	$477,519	$469,336	$439,997	$352,669	$477,616	$452,493	$435,597	$479,853
–	Average	$445,539	$477,769	$480,063	$472,455	$446,225	$354,188	$480,128	$455,384	$438,265	$480,128
–	Median	$446,451	$479,772	$480,667	$473,490	$448,402	$354,664	$480,721	$456,467	$439,426	$480,549
–	75th Percentile	$447,280	$482,059	$482,972	$476,053	$453,225	$355,144	$483,035	$458,763	$440,524	$480,862
Foster	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25th Percentile	$5,049,873	$5,068,629	$5,068,629	$5,068,629	$5,068,637	$4,463,374	$5,068,629	$5,068,629	$5,066,656	$5,073,851
–	Average	$5,051,011	$5,068,629	$5,068,629	$5,068,629	$5,068,629	$4,497,572	$5,068,629	$5,068,629	$5,066,415	$5,068,629
–	Median	$5,051,551	$5,068,629	$5,068,629	$5,068,629	$5,068,637	$4,515,563	$5,068,629	$5,068,629	$5,066,656	$5,074,062
–	75th Percentile	$5,052,170	$5,068,629	$5,068,629	$5,068,629	$5,068,637	$4,531,621	$5,068,629	$5,068,629	$5,066,656	$5,074,062
Detroit	Statistic	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
–	25th Percentile	$1,739,011	$1,817,390	$1,722,496	$1,722,490	$1,124,267	$1,657,272	$1,722,428	$1,722,490	$1,714,209	$1,725,821
–	Average	$1,743,282	$1,820,942	$1,730,349	$1,730,338	$1,130,548	$1,667,390	$1,730,273	$1,730,338	$1,718,637	$1,730,273
–	Median	$1,745,318	$1,823,442	$1,733,628	$1,733,623	$1,131,281	$1,671,541	$1,733,560	$1,733,623	$1,720,846	$1,732,416
–	75th Percentile	$1,749,095	$1,825,517	$1,739,439	$1,739,416	$1,134,443	$1,679,726	$1,739,349	$1,739,416	$1,724,699	$1,736,298

Table 3-4. Annual Recreation Value Uncertainty Statistics – Total for All Reservoirs - All Alternatives.

Alternative	25th Percentile	Average	Median	75th Percentile
NA	$26,282,854	$26,346,529	$26,373,513	$26,420,608
Alt 1	$26,690,676	$26,753,015	$26,784,014	$26,826,193
Alt 2A	$26,489,802	$26,563,267	$26,590,467	$26,649,374
Alt 2B	$26,279,394	$26,358,984	$26,389,407	$26,449,599
Alt 3A	$25,162,602	$25,253,851	$25,283,440	$25,351,003
Alt 3B	$24,551,763	$24,669,840	$24,713,227	$24,799,079
Alt 4	$26,486,719	$26,561,115	$26,588,533	$26,647,646
Alt 5	$26,404,384	$26,521,350	$26,553,478	$26,616,547
Alt 6	$22,961,204	$23,008,991	$23,030,319	$23,063,906
NTOM	$23,111,859	$23,163,037	$23,182,694	$23,230,049

Table 3-5 through Table 3-23 below display the results in which the Chapter 3 environment consequences discussions are based on.

Table 3-5. Recreation Results by Reservoir – Detroit Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	223	233	221	221	147	213	221	221	223	223
Change from No Action - Visits	0	10	-2	-2	-76	-9	-2	-2	0	0
Total Annual Benefits	$144,692	$151,138	$143,619	$143,618	$93,835	$138,393	$143,613	$143,618	$144,760	$144,792
Average Annual Benefits	$1,743	$1,821	$1,730	$1,730	$1,131	$1,667	$1,730	$1,730	$1,719	$1,720
Change from No Action - Benefits	$0	$78	-$13	-$13	-$613	-$76	-$13	-$13	-$102	-$101
Percent Change From No Action - Benefits	0.00%	4.45%	-0.75%	-0.75%	-35.15%	-4.35%	-0.75%	-0.75%	-1.42%	-1.35%
Effects Scale[1]	None	Minor	None	None	Major	Minor	None	None	Minor	Minor

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-6. Recreation Results by Reservoir – Foster Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	486	488	488	488	488	434	488	488	488	485
Change from No Action - Visits	0	2	2	2	2	-53	2	2	2	-2
Total Annual Benefits	$419,234	$420,696	$420,696	$420,696	$420,696	$373,298	$420,696	$420,696	$420,512	$417,693
Average Annual Benefits	$5,051	$5,069	$5,069	$5,069	$5,069	$4,498	$5,069	$5,069	$5,066	$5,033
Change from No Action - Benefits	$0	$18	$18	$18	$18	-$553	$18	$18	$15	-$19
Percent Change From No Action - Benefits	0.00%	0.35%	0.35%	0.35%	0.35%	-10.96%	0.35%	0.35%	0.30%	-0.37%
Effects Scale[1]	None	None	None	None	None	Moderate	None	None	None	None

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-7. Recreation Results by Reservoir – Green Peter Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	180	183	174	174	174	84	174	174	177	175
Change from No Action - Visits	0	3	-6	-6	-6	-96	-6	-6	-4	-5
Total Annual Benefits	$123,056	$125,280	$118,564	$118,564	$118,568	$54,815	$118,736	$118,621	$120,568	$119,252
Average Annual Benefits	$1,483	$1,509	$1,429	$1,429	$1,429	$660	$1,431	$1,429	$1,453	$1,437
Change from No Action - Benefits	$0	$27	-$54	-$54	-$54	-$822	-$52	-$53	-$30	-$46
Percent Change From No Action - Benefits	0.00%	1.81%	-3.65%	-3.65%	-3.65%	-55.46%	-3.51%	-3.60%	-2.02%	-3.09%
Effects Scale[1]	None	Minor	Minor	Minor	Minor	Major	Minor	Minor	Minor	Minor

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-8. Recreation Results by Reservoir – Cougar Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	48	51	51	30	30	30	51	30	51	51
Change from No Action - Visits	0	3	3	-19	-19	-19	3	-19	3	3
Total Annual Benefits	$31,588	$33,538	$33,428	$18,901	$18,901	$18,901	$33,482	$18,901	$33,538	$33,538
Average Annual Benefits	$381	$404	$403	$228	$228	$228	$403	$228	$404	$404
Change from No Action - Benefits	$0	$24	$22	-$153	-$153	-$153	$23	-$153	$24	$24
Percent Change From No Action - Benefits	0.00%	6.17%	5.81%	-40.17%	-40.17%	-40.17%	5.99%	-40.17%	6.17%	6.17%
Effects Scale[1]	None	Moderate	Moderate	Major	Major	Major	Moderate	Major	Moderate	Moderate

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-9. Recreation Results by Reservoir – Blue River Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	36	37	37	37	35	26	26	26	36	37
Change from No Action - Visits	0	1	1	1	0	-10	-10	-10	0	1
Total Annual Benefits	$21,472	$22,202	$22,230	$22,136	$21,340	$15,291	$22,239	$21,902	$21,520	$22,095
Average Annual Benefits	$259	$268	$268	$267	$257	$184	$268	$264	$259	$266
Change from No Action - Benefits	$0	$9	$9	$8	-$2	-$75	$9	$5	$1	$8
Percent Change From No Action - Benefits	0.00%	3.40%	3.52%	3.09%	-0.62%	-28.80%	3.56%	2.01%	0.23%	2.90%
Effects Scale[1]	None	Minor	Minor	Minor	None	Major	Minor	Minor	None	Minor

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-10. Recreation Results by Reservoir – Lookout Point Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	92	90	91	90	51	84	91	91	88	69
Change from No Action - Visits	0	-2	-1	-1	-40	-7	0	2	-3	-22
Total Annual Benefits	$68,867	$67,535	$68,932	$68,325	$36,108	$63,278	$69,033	$69,112	$66,127	$49,105
Average Annual Benefits	$830	$814	$831	$823	$435	$762	$832	$833	$797	$592
Change from No Action - Benefits	$0	-$16	$1	-$7	-$395	-$67	$2	$3	-$33	-$238
Percent Change From No Action - Benefits	0.00%	-1.93%	0.10%	-0.78%	-47.57%	-8.11%	0.24%	0.36%	-3.98%	-28.70%
Effects Scale[1]	None	Minor	None	None	Major	Moderate	None	None	Minor	Major

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-11. Recreation Results by Reservoir – Hills Creek Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	59	63	63	62	59	47	63	60	58	64
Change from No Action - Visits	0	4	5	4	0	-12	5	1	-1	5
Total Annual Benefits	$36,980	$39,655	$39,845	$39,218	$37,037	$29,398	$39,851	$37,797	$36,376	$40,212
Average Annual Benefits	$446	$478	$480	$473	$446	$354	$480	$455	$438	$485
Change from No Action - Benefits	$0	$32	$35	$27	$1	-$91	$35	$10	-$7	$39
Percent Change From No Action - Benefits	0.00%	7.25%	7.77%	6.06%	0.16%	-20.49%	7.77%	2.22%	-1.62%	8.75%
Effects Scale[1]	None	Moderate	Moderate	Moderate	None	Major	Moderate	Minor	Minor	Moderate

Note that the figures are in 1,000s, and the dollar values are at 2022 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-12. Recreation Results by Reservoir – Dexter Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	258	258	258	258	258	258	258	258	258	258
Change from No Action - Visits	0	0	0	0	0	0	0	0	0	0
Total Annual Benefits	$167,431	$167,431	$167,431	$167,431	$167,431	$167,431	$167,431	$167,431	$167,431	$167,431
Average Annual Benefits	$2,017	$2,017	$2,017	$2,017	$2,017	$2,017	$2,017	$2,017	$2,017	$2,017
Change from No Action - Benefits	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Percent Change From No Action - Benefits	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Effects Scale[1]	None	None	None	None	None	None	None	None	None	None

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-13. Recreation Results by Reservoir – Fall Creek Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	208	210	211	211	210	210	211	210	208	92
Change from No Action - Visits	0	3	4	3	2	3	4	3	0	-115
Total Annual Benefits	$141,366	$143,367	$143,884	$143,698	$142,997	$143,258	$144,089	$143,132	$143,132	$143,132
Average Annual Benefits	$1,703	$1,727	$1,734	$1,731	$1,723	$1,726	$1,736	$1,725	$1,706	$739
Change from No Action - Benefits	$0	$24	$30	$28	$20	$23	$33	$21	$3	-$964
Percent Change From No Action - Benefits	0.00%	1.41%	1.78%	1.65%	1.16%	1.34%	1.93%	1.25%	0.15%	-56.61%
Effects Scale[1]	None	Minor	Minor	Minor	Minor	Minor	Minor	Minor	None	Major

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-14. Recreation Results by Reservoir – Dorena Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	177	190	186	185	183	185	186	182	178	181
Change from No Action - Visits	0	13	9	9	6	8	9	5	1	4
Total Annual Benefits	$158,208	$169,690	$166,256	$165,807	$163,666	$165,738	$165,925	$162,740	$158,909	$162,105
Average Annual Benefits	$1,906	$2,045	$2,003	$1,998	$1,972	$1,997	$1,999	$1,961	$1,915	$1,953
Change from No Action - Benefits	$0	$138	$97	$92	$66	$91	$93	$55	$9	$47
Percent Change From No Action - Benefits	0.00%	7.26%	5.09%	4.81%	3.45%	4.76%	4.88%	2.86%	0.45%	2.47%
Effects Scale[1]	None	Moderate	Moderate	Minor	Minor	Minor	Minor	Minor	None	Minor

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-15. Recreation Results by Reservoir – Cottage Grove Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	306	313	313	312	308	310	312	309	306	310
Change from No Action - Visits	0	7	7	6	2	5	6	4	1	4
Total Annual Benefits	$273,641	$279,861	$279,758	$279,320	$275,385	$277,688	$279,372	$276,760	$274,115	$277,482
Average Annual Benefits	$3,297	$3,372	$3,371	$3,365	$3,318	$3,346	$3,366	$3,335	$3,303	$3,343
Change from No Action - Benefits	$0	$75	$74	$68	$21	$49	$69	$38	$6	$46
Percent Change From No Action - Benefits	0.00%	2.27%	2.24%	2.07%	0.64%	1.48%	2.09%	1.14%	0.17%	1.40%
Effects Scale[1]	None	Minor	Minor	Minor	None	Minor	Minor	Minor	None	Minor

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-16. Recreation Results by Reservoir – Fern Ridge Reservoir.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	799	799	799	799	799	799	799	799	800	801
Change from No Action - Visits	0	0	0	0	0	0	0	0	1	2
Total Annual Benefits	$599,464	$599,332	$599,332	$599,332	$599,332	$599,332	$599,332	$599,332	$599,898	$600,396
Average Annual Benefits	$7,232	$7,230	$7,230	$7,230	$7,230	$7,230	$7,230	$7,230	$7,236	$7,242
Change from No Action - Benefits	$0	-$1	-$1	-$1	-$1	-$1	-$1	-$1	$4	$10
Percent Change From No Action - Benefits	0.00%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	0.05%	0.14%
Effects Scale[1]	None	None	None	None	None	None	None	None	None	None

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-17. Recreation Results – All Reservoirs.

Metric	No Action	Alt 1	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4	Alt 5	Alt 6	NTOM
Average Annual Visits	2,871	2,914	2,892	2,867	2,742	2,680	2,881	2,848	2,870	2,745
Change from No Action - Visits	0	43	21	-4	-129	-191	10	-23	-1	-126
Total Annual Benefits	$2,185,999	$2,219,725	$2,203,976	$2,187,020	$2,095,294	$2,046,821	$2,203,797	$2,180,041	$2,185,325	$2,095,434
Average Annual Benefits	$26,347	$26,753	$26,563	$26,359	$25,254	$24,670	$26,561	$26,275	$26,312	$25,229
Change from No Action - Benefits	$0	$407	$217	$13	-$1,093	-$1,677	$215	-$72	-$35	-$1,117
Percent Change From No Action - Benefits	0.00%	1.54%	0.82%	0.05%	-4.15%	-6.36%	0.81%	-0.27%	-0.13%	-4.24%
Effects Scale[1]	None	Minor	None	None	Minor	Moderate	None	None	None	Minor

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-18. Recreation Results by Alternative – No Action Alternative.

Reservoir	Average Annual Visits	Change in Visits from No Action	Total Annual Benefits	Average Annual Benefits	Change in Benefits from No Action	Percent Change in Benefits from No Action	Effects Scale
Detroit	223	0	$144,692	$1,743	0	0.00%	None
Foster	486	0	$419,234	$5,051	0	0.00%	None
Green Peter	180	0	$123,056	$1,483	0	0.00%	None
Cougar	48	0	$31,588	$381	0	0.00%	None
Blue River	36	0	$21,472	$259	0	0.00%	None
Lookout Point	92	0	$68,867	$830	0	0.00%	None
Hills Creek	59	0	$36,980	$446	0	0.00%	None
Dexter	258	0	$167,431	$2,017	0	0.00%	None
Fall Creek	208	0	$141,366	$1,703	0	0.00%	None
Dorena	177	0	$158,208	$1,906	0	0.00%	None
Cottage Grove	306	0	$273,641	$3,297	0	0.00%	None
Fern Ridge	799	0	$599,464	$7,232	0	0.00%	None
Total	**2,871**	**0**	**2,185,999**	**26,346**	**0**	**0.00%**	**None**

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-19. Recreation Results by Alternative – Alternative 1.

Reservoir	Average Annual Visits	Change in Visits from No Action	Total Annual Benefits	Average Annual Benefits	Change in Benefits from No Action	Percent Change in Benefits from No Action	Effects Scale
Detroit	233	10	$151,138	$1,821	78	4.45%	Minor
Foster	488	2	$420,696	$5,069	18	0.35%	None
Green Peter	183	3	$125,280	$1,509	27	1.81%	Minor
Cougar	51	3	$33,538	$404	24	6.17%	Moderate
Blue River	37	1	$22,202	$268	9	3.40%	Minor
Lookout Point	90	-2	$67,535	$814	-16	-1.93%	Minor
Hills Creek	63	4	$39,655	$478	32	7.25%	Moderate
Dexter	258	0	$167,431	$2,017	0	0.00%	None
Fall Creek	210	3	$143,367	$1,727	24	1.41%	Minor
Dorena	190	13	$169,690	$2,045	138	7.26%	Moderate
Cottage Grove	313	7	$279,861	$3,372	75	2.27%	Minor
Fern Ridge	799	0	$599,332	$7,230	-1	-0.02%	None
Total	**2,914**	**43**	**2,219,725**	**26,753**	**407**	**1.54%**	**Minor**

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-20. Recreation Results by Alternative – Alternative 2A.

Reservoir	Average Annual Visits	Change in Visits from No Action	Total Annual Benefits	Average Annual Benefits	Change in Benefits from No Action	Percent Change in Benefits from No Action	Effects Scale
Detroit	221	-2	$143,619	$1,730	-13	-0.75%	None
Foster	488	2	$420,696	$5,069	18	0.35%	None
Green Peter	174	-6	$118,564	$1,429	-54	-3.65%	Minor
Cougar	51	3	$33,428	$403	22	5.81%	Moderate
Blue River	37	1	$22,230	$268	9	3.52%	Minor
Lookout Point	91	-1	$68,932	$831	1	0.10%	None
Hills Creek	63	5	$39,845	$480	35	7.77%	Moderate
Dexter	258	0	$167,431	$2,017	0	0.00%	None
Fall Creek	211	4	$143,884	$1,734	30	1.78%	Minor
Dorena	186	9	$166,256	$2,003	97	5.09%	Moderate
Cottage Grove	313	7	$279,758	$3,371	74	2.24%	Minor
Fern Ridge	799	0	$599,332	$7,230	-1	-0.02%	None
Total	**2,891**	**21**	**2,203,975**	**26,563**	**217**	**0.82%**	**None**

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-21. Recreation Results by Alternative – Alternative 2B.

Reservoir	Average Annual Visits	Change in Visits from No Action	Total Annual Benefits	Average Annual Benefits	Change in Benefits from No Action	Percent Change in Benefits from No Action	Effects Scale
Detroit	221	-2	$143,618	$1,730	-13	-0.75%	None
Foster	488	2	$420,696	$5,069	18	0.35%	None
Green Peter	174	-6	$118,564	$1,429	-54	-3.65%	Minor
Cougar	30	-19	$18,901	$228	-153	-40.17%	Major
Blue River	37	1	$22,136	$267	8	3.09%	Minor
Lookout Point	90	-1	$68,325	$823	-7	-0.78%	None
Hills Creek	62	4	$39,214	$473	27	6.06%	Moderate
Dexter	258	0	$167,431	$2,017	0	0.00%	None
Fall Creek	211	3	$143,698	$1,731	28	1.65%	Minor
Dorena	185	9	$165,807	$1,998	92	4.81%	Minor
Cottage Grove	312	6	$279,320	$3,365	68	2.07%	Minor
Fern Ridge	799	0	$599,332	$7,230	-1	-0.02%	None
Total	**2,867**	**-4**	**2,187,042**	**26,359**	**13**	**0.05%**	**None**

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-22. Recreation Results by Alternative – Alternative 3A.

Reservoir	Average Annual Visits	Change in Visits from No Action	Total Annual Benefits	Average Annual Benefits	Change in Benefits from No Action	Percent Change in Benefits from No Action	Effects Scale
Detroit	147	-76	$93,835	$1,131	-613	-35.15%	Major
Foster	488	2	$420,696	$5,069	18	0.35%	None
Green Peter	174	-6	$118,568	$1,429	-54	-3.65%	Minor
Cougar	30	-19	$18,901	$228	-153	-40.17%	Major
Blue River	35	0	$21,340	$257	-2	-0.62%	None
Lookout Point	51	-40	$36,108	$435	-395	-47.57%	Major
Hills Creek	59	0	$37,037	$446	1	0.16%	None
Dexter	258	0	$167,431	$2,017	0	0.00%	None
Fall Creek	210	2	$142,997	$1,723	20	1.16%	Minor
Dorena	183	6	$163,666	$1,972	66	3.45%	Minor
Cottage Grove	308	2	$275,385	$3,318	21	0.64%	None
Fern Ridge	799	0	$599,332	$7,230	-1	-0.02%	None
Total	**2,742**	**-129**	**2,095,296**	**25,254**	**-1,093**	**-4.15%**	**Minor**

Note that the figures are in 1,000s, and the dollar values are at 2022 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-23. Recreation Results by Alternative – Alternative 3B.

Reservoir	Average Annual Visits	Change in Visits from No Action	Total Annual Benefits	Average Annual Benefits	Change in Benefits from No Action	Percent Change in Benefits from No Action	Effects Scale
Detroit	213	-9	$138,393	$1,667	-76	-4.35%	Minor
Foster	434	-53	$373,298	$4,498	-553	-10.96%	Moderate
Green Peter	84	-96	$54,815	$660	-822	-55.46%	Major
Cougar	30	-19	$18,901	$228	-153	-40.17%	Major
Blue River	26	-10	$15,291	$184	-75	-28.80%	Major
Lookout Point	84	-7	$63,278	$762	-67	-8.11%	Moderate
Hills Creek	47	-12	$29,398	$354	-91	-20.49%	Major
Dexter	258	0	$167,431	$2,017	0	0.00%	None
Fall Creek	210	3	$143,258	$1,726	23	1.34%	Minor
Dorena	185	8	$165,738	$1,997	91	4.76%	Minor
Cottage Grove	310	5	$277,688	$3,346	49	1.48%	Minor
Fern Ridge	799	0	$599,332	$7,230	-1	-0.02%	None
Total	**2,680**	**-191**	**2,046,821**	**24,670**	**-1,677**	**-6.36%**	**Moderate**

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-24. Recreation Results by Alternative – Alternative 4.

Reservoir	Average Annual Visits	Change in Visits from No Action	Total Annual Benefits	Average Annual Benefits	Change in Benefits from No Action	Percent Change in Benefits from No Action	Effects Scale
Detroit	221	-2	$143,613	$1,730	-13	-0.75%	None
Foster	488	2	$420,696	$5,069	18	0.35%	None
Green Peter	174	-6	$118,736	$1,431	-52	-3.51%	Minor
Cougar	51	3	$33,482	$403	23	5.99%	Moderate
Blue River	26	-10	$22,239	$268	9	3.56%	Minor
Lookout Point	91	0	$69,033	$832	2	0.24%	None
Hills Creek	63	5	$39,851	$480	35	7.77%	Moderate
Dexter	258	0	$167,431	$2,017	0	0.00%	None
Fall Creek	211	4	$144,089	$1,736	33	1.93%	Minor
Dorena	186	9	$165,925	$1,999	93	4.88%	Minor
Cottage Grove	312	6	$279,372	$3,366	69	2.09%	Minor
Fern Ridge	799	0	$599,332	$7,230	-1	-0.02%	None
Total	**2,881**	**10**	**2,203,799**	**26,561**	**215**	**0.81%**	**None**

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-25. Recreation Results by Alternative – Alternative 5.

Reservoir	Average Annual Visits	Change in Visits from No Action	Total Annual Benefits	Average Annual Benefits	Change in Benefits from No Action	Percent Change in Benefits from No Action	Effects Scale
Detroit	221	-2	$143,618	$1,730	-13	-0.75%	None
Foster	488	2	$420,696	$5,069	18	0.35%	None
Green Peter	174	-6	$118,621	$1,429	-53	-3.60%	Minor
Cougar	30	-19	$18,901	$228	-153	-40.17%	Major
Blue River	26	-10	$21,902	$264	5	2.01%	Minor
Lookout Point	91	2	$69,112	$833	3	0.36%	None
Hills Creek	60	1	$37,797	$455	10	2.22%	Minor
Dexter	258	0	$167,431	$2,017	0	0.00%	None
Fall Creek	210	3	$143,132	$1,725	21	1.25%	Minor
Dorena	182	5	$162,740	$1,961	55	2.86%	Minor
Cottage Grove	309	4	$276,760	$3,335	38	1.14%	Minor
Fern Ridge	799	0	$599,332	$7,230	-1	-0.02%	None
Total	**2,848**	**-21**	**2,180,042**	**26,275**	**-72**	**-0.27%**	**None**

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-26. Recreation Results by Alternative – Alternative 6.

Reservoir	Average Annual Visits	Change in visits from No Action	Total Annual Benefits	Average Annual Benefits	Change in Benefits from No Action	Percent Change in Benefits from No Action	Effects Scale[1]
Detroit	223	0	144,760	$1,719	-102	-1.42%	Minor
Foster	488	2	$420,512	$632	15	0.30%	None
Green Peter	177	-4	$120,568	$463	-30	-2.02%	Minor
Cougar	51	3	33,538	$404	24	6.17%	Moderate
Blue River	36	0	$21,520	$259	1	0.23%	None
Lookout Point	88	-3	$66,127	$797	-33	-3.98%	Minor
Hills Creek	58	-1	$36,376	$438	-7	-1.62%	Minor
Dexter	258	0	$167,431	$2,017	0	0.00%	None
Fall Creek	208	0	143,132	$1,706	3	0.15%	None
Dorena	178	1	$158,909	$1,915	9	0.45%	None
Cottage Grove	306	1	$274,115	$3,303	6	0.17%	None
Fern Ridge	800	1	$599,898	$7,236	4	0.05%	None
Total	**2,870**	**0**	**$2,186,886**	**$20,887.60**	**-112**	**-20.72%**	**Major**

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

Table 3-27. Recreation Results by Alternative – Revised Interim Operations.

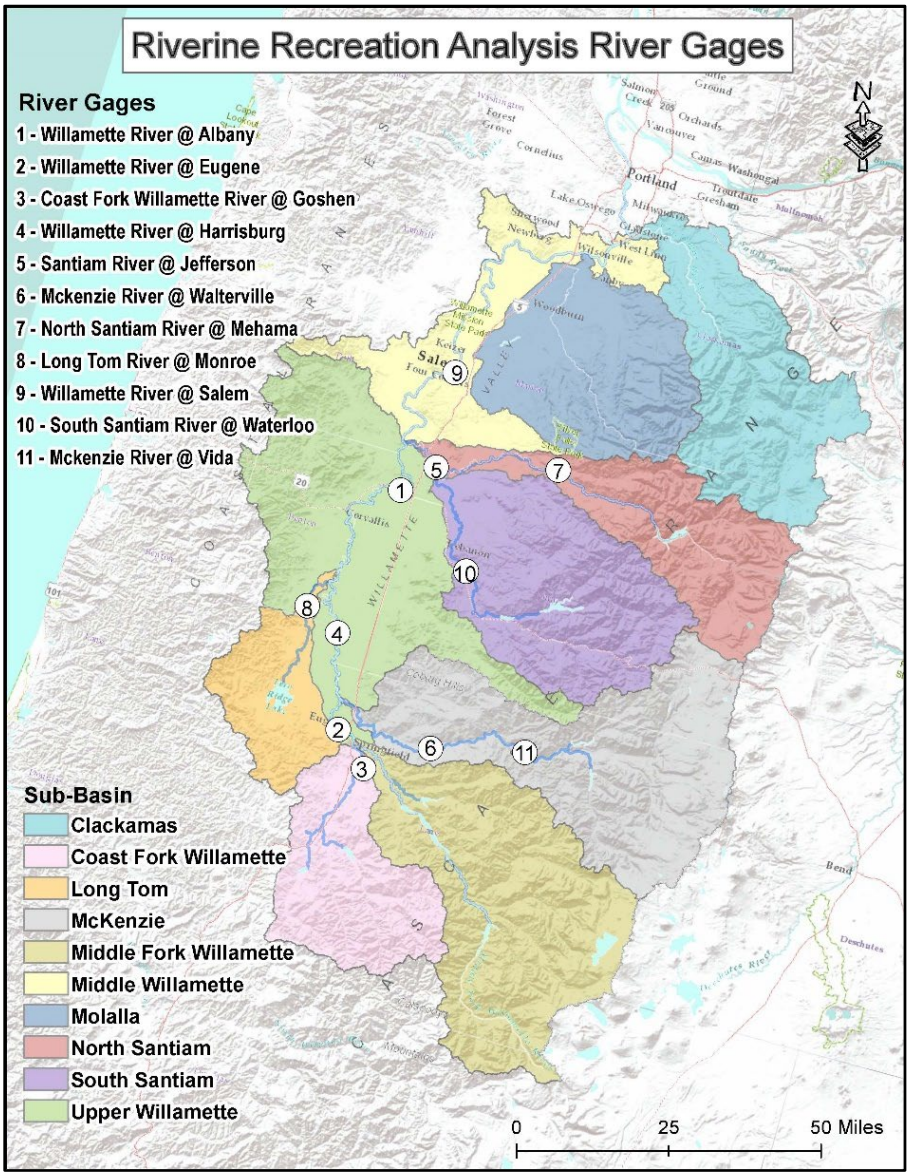
Reservoir	Average Annual Visits	Change in visits from No Action	Total Annual Benefits	Average Annual Benefits	Change in Benefits from No Action	Percent Change in Benefits from No Action	Effects Scale[1]
Detroit	223	0	$144,792	$1,720	-$24	-1.35%	Minor
Foster	485	-2	$417,693	$5,033	-$19	-0.37%	Minor
Green Peter	175	-5	$119,252	$463	-46	-3.09%	Minor
Cougar	50.8	2.8	33538	$404	$24	6.17%	Moderate
Blue River	37	1	$22,095	$266	8	2.90%	Minor
Lookout Point	69	-22	$49,105	$592	-238	-28.70%	Major
Hills Creek	64	5	$40,212	$485	39	8.75%	Moderate
Dexter	258	0	$167,431	$2,017	0	0.00%	None
Fall Creek	92	-115	143,132	$739	-964	-56.61%	Major
Dorena	181	4	$162,105	$1,953	47	2.47%	Minor
Cottage Grove	310	4	$277,482	$3,343	46	1.40%	Minor
Fern Ridge	801	2	$600,396	$7,242	10	0.14%	None
Total	**2,745**	**-125**	**2,177,233**	**24,256**	**-1,117**	**-7.94%**	**Moderate**

Note that the figures are in 1,000s, and the dollar values are at 2025 price level. Effects Scales are described in Table 2-3 of this appendix.

CHAPTER 4 - RECREATION EFFECTS – RIVERINE RECREATION

Because riverine recreation in the Willamette Valley System is widespread and abundant, with no visitor tracking data available, a qualitative analysis was done to estimate general effects on recreation to riverine areas across the alternatives. Using HEC-ResSim model simulated flow data for various river gage locations across the 83-year period of record, daily flows at each gage location were compared for the action and no action alternatives. The same reservoir effects scale shown in Table 2-3 of this appendix was used for riverine area effect estimations. Figure 4-1 shows the location of river gages that were used.

Figure 4-1. River Gages Used for Riverine Recreation Analysis.



4.1 CHANGES IN FLOW AT RIVER GAGE LOCATIONS

Table 4-1 through Table 4-6 show river gage/season/alternative statistics. Combinations showing estimated average flows that are plus or minus 5 percent of the No-action Alternative flows are highlighted in green (+) and red (-), respectively.

Table 4-1. Riverine Flow Uncertainty Statistics - Alternative 1.

Control Point (gage) and Season	25% non-exceedance (Dry Year)	Average	Median	75% non-exceedance (Wet Year)
Albany	–	–	–	–
Annual	-2.71%	-0.03%	0.20%	0.75%
Winter (12/21-03/20)	0.33%	0.28%	0.74%	0.08%
Spring (03/21-06/20)	-14.86%	-4.31%	-2.40%	0.78%
Summer (06/21-09/20)	6.41%	7.70%	5.32%	6.15%
Fall (09/21-12/20)	1.19%	0.52%	-0.42%	0.11%
Eugene	–	–	–	–
Annual	-4.78%	-0.04%	-0.53%	1.56%
Winter (12/21-03/20)	-0.77%	0.75%	1.55%	1.80%
Spring (03/21-06/20)	-27.24%	-8.33%	-9.60%	0.40%
Summer (06/21-09/20)	11.17%	13.19%	10.27%	11.61%
Fall (09/21-12/20)	1.99%	0.15%	-1.11%	-1.48%
Goshen	–	–	–	–
Annual	-3.64%	-0.02%	-0.49%	0.68%
Winter (12/21-03/20)	-0.02%	-0.05%	-0.05%	-0.04%
Spring (03/21-06/20)	-21.78%	-3.54%	-4.54%	2.47%
Summer (06/21-09/20)	10.55%	5.80%	6.49%	4.14%
Fall (09/21-12/20)	6.25%	1.93%	0.35%	0.17%
Harrisburg	–	–	–	–
Annual	-3.24%	-0.03%	0.21%	0.95%
Winter (12/21-03/20)	-0.09%	0.36%	1.01%	0.42%
Spring (03/21-06/20)	-17.06%	-5.10%	-3.53%	0.95%
Summer (06/21-09/20)	7.87%	8.24%	5.98%	6.67%
Fall (09/21-12/20)	1.07%	0.62%	-0.25%	-0.41%
Jasper	–	–	–	–
Annual	-4.93%	-0.03%	-1.54%	1.40%
Winter (12/21-03/20)	-0.96%	1.18%	1.35%	2.80%
Spring (03/21-06/20)	-28.09%	-10.00%	-16.17%	-1.26%
Summer (06/21-09/20)	11.34%	14.01%	10.78%	12.93%
Fall (09/21-12/20)	0.85%	-0.42%	-0.06%	-3.17%
Jefferson	–	–	–	–

Annual	-3.94%	-0.06%	-0.26%	1.23%
Winter (12/21-03/20)	-0.87%	-0.22%	0.00%	0.49%
Spring (03/21-06/20)	-10.19%	-1.93	-0.17%	1.83%
Summer (06/21-09/20)	-21.35%	-13.60%	-16.71%	-9.95%
Fall (09/21-12/20)	5.90%	5.12%	4.02%	4.06%
Mehama	–	–	–	–
Annual	-2.95%	-0.06%	-0.71%	1.09%
Winter (12/21-03/20)	-1.08%	-0.39%	-0.74%	0.10%
Spring (03/21-06/20)	-9.36%	-1.99%	-2.14%	1.77%
Summer (06/21-09/20)	-11.59%	-4.78%	-6.61%	-1.01%
Fall (09/21-12/20)	6.28%	3.63%	2.77%	2.29%
Monroe	–	–	–	–
Annual	-0.03%	0.00%	0.01%	0.00%
Winter (12/21-03/20)	0.00%	0.00%	0.00%	0.00%
Spring (03/21-06/20)	0.19%	0.06%	0.11%	0.02%
Summer (06/21-09/20)	0.40%	0.21%	0.24%	0.07%
Fall (09/21-12/20)	-0.16%	-0.03%	-0.01%	0.00%
Salem	–	–	–	–
Annual	-2.84%	-0.04%	0.25%	0.72%
Winter (12/21-03/20)	0.06%	0.12%	0.58%	-0.07%
Spring (03/21-06/20)	-13.10%	-3.31%	-1.10%	1.09%
Summer (06/21-09/20)	-0.51%	1.52%	-0.30%	1.18%
Fall (09/21-12/20)	3.19%	2.14%	1.17%	1.54%
Vida	–	–	–	–
Annual	-1.67%	-0.02%	0.19%	0.83%
Winter (12/21-03/20)	-0.01%	-0.02%	-0.05%	0.08%
Spring (03/21-06/20)	-9.64%	-3.12%	-2.04%	1.41%
Summer (06/21-09/20)	3.92%	3.01%	2.19%	0.82%
Fall (09/21-12/20)	2.25%	1.56%	1.64%	1.12%
Waterloo	–	–	–	–
Annual	-7.55%	-0.07%	0.13%	1.26%
Winter (12/21-03/20)	-2.11%	-0.22%	-0.40%	-0.21%
Spring (03/21-06/20)	-19.33%	-2.53%	4.28%	3.64%
Summer (06/21-09/20)	-29.19%	-21.64%	-25.52%	-21.06%
Fall (09/21-12/20)	7.34%	8.45%	6.74%	6.44%

Table 4-2. Riverine Flow Uncertainty Statistics - Alternative 2A.

Control Point (gage) and Season	25% Non-exceedance (Dry Year)	Average	Median	75% Non-exceedance (Wet Year)
Albany	–	–	–	–
Annual	-2.20%	-0.1%	0.14%	0.73%
Winter (12/21-03/20)	-0.07%	0.13%	0.61%	0.34%
Spring (03/21-06/20)	-11.69%	-3.30%	-1.58%	0.70%
Summer (06/21-09/20)	-2.53%	-0.70%	-3.00%	-2.14%
Fall (09/21-12/20)	5.85%	3.07%	2.39%	2.28%
Eugene	–	–	–	–
Annual	-3.78%	-0.03%	0.08%	1.46%
Winter (12/21-03/20)	-2.07%	0.33%	1.54%	1.72%
Spring (03/21-06/20)	-21.06%	-6.32%	-6.82%	0.67%
Summer (06/21-09/20)	-1.69%	-1.72%	-4.06%	-3.68%
Fall (09/21-12/20)	8.88%	5.17%	5.35%	3.51%
Goshen	–	–	–	–
Annual	-3.18%	-0.02%	0.03%	0.50%
Winter (12/21-03/20)	-0.03%	-0.02%	0.06%	-0.08%
Spring (03/21-06/20)	-17.04%	-2.24%	-1.23%	2.53%
Summer (06/21-09/20)	-0.24%	0.11%	-2.82%	0.29%
Fall (09/21-12/20)	6.64%	1.83%	1.53%	0.14%
Harrisburg	–	–	–	–
Annual	-2.68%	-0.02%	0.24%	0.80%
Winter (12/21-03/20)	-0.72%	0.17%	0.61%	0.44%
Spring (03/21-06/20)	-13.46%	-3.84%	-1.88%	1.02%
Summer (06/21-09/20)	-1.55%	-0.89%	-3.02%	-2.22%
Fall (09/21-12/20)	6.38%	3.67%	3.30%	2.18%
Jasper	–	–	–	–
Annual	-3.26%	-0.03%	-0.34%	0.91%
Winter (12/21-03/20)	-3.59%	0.51%	1.27%	1.77%
Spring (03/21-06/20)	-20.83%	-7.71%	-12.61%	-0.98%
Summer (06/21-09/20)	-0.72%	-1.98%	-4.30%	-5.39%
Fall (09/21-12/20)	10.54%	6.22%	9.22%	4.08%
Jefferson	–	–	–	–
Annual	0.04%	0.03%	-0.36%	-1.28%
Winter (12/21-03/20)	-9.90%	-6.20%	-9.65%	-8.13%
Spring (03/21-06/20)	-2.64%	-0.75%	0.26%	0.90%
Summer (06/21-09/20)	22.83%	22.00%	25.87%	24.19%
Fall (09/21-12/20)	4.81%	3.42%	3.13%	0.88%

Mehama	–	–	–	–
Annual	-1.54%	0.01%	-0.45%	0.70%
Winter (12/21-03/20)	-1.42%	-0.50%	-1.00%	0.04%
Spring (03/21-06/20)	-4.95%	-1.12%	-1.92%	0.98%
Summer (06/21-09/20)	8.56%	5.63%	8.90%	4.17%
Fall (09/21-12/20)	-3.85%	-0.45%	-2.24%	0.18%
Monroe	–	–	–	–
Annual	-0.03%	0.00%	0.01%	0.00%
Winter (12/21-03/20)	0.00%	0.00%	0.00%	0.00%
Spring (03/21-06/20)	0.19%	0.06%	0.11%	0.02%
Summer (06/21-09/20)	0.42%	0.22%	0.25%	0.08%
Fall (09/21-12/20)	-0.16%	-0.03%	-0.01%	0.00%
Salem	–	–	–	–
Annual	-1.63%	-0.01%	-0.13%	-0.04%
Winter (12/21-03/20)	-2.58%	-1.86%	-2.66%	-2.77%
Spring (03/21-06/20)	-9.31%	-2.34%	-0.75%	0.59%
Summer (06/21-09/20)	4.08%	5.74%	5.51%	5.84%
Fall (09/21-12/20)	5.33%	3.15%	2.17%	2.17%
Vida	–	–	–	–
Annual	-1.19%	-0.01%	0.01%	0.43%
Winter (12/21-03/20)	-0.05%	0.00%	0.14%	-0.01%
Spring (03/21-06/20)	-7.43%	-2.20%	-1.32%	1.13%
Summer (06/21-09/20)	0.09%	-0.13%	-1.19%	-1.70%
Fall (09/21-12/20)	4.71%	2.48%	2.25%	1.41%
Waterloo	–	–	–	–
Annual	4.65%	0.06%	-0.58%	-3.67%
Winter (12/21-03/20)	-25.41%	-15.98%	-28.20%	-21.42%
Spring (03/21-06/20)	2.01%	-0.45%	4.99%	1.32%
Summer (06/21-09/20)	34.49%	37.75%	42.79%	49.55%
Fall (09/21-12/20)	18.89%	8.59%	9.44%	1.94%

Table 4-3. Riverine Flow Uncertainty Statistics - Alternative 2B.

Control Point (gage) and Season	25% Non-exceedance (Dry Year)	Average	Median	75% Non-exceedance (Wet Year)
Albany	–	–	–	–
Annual	-1.71%	0.00%	0.37%	0.73%
Winter (12/21-03/20)	1.38%	1.27%	1.98%	0.34%
Spring (03/21-06/20)	-6.72%	0.28%	3.33%	0.70%
Summer (06/21-09/20)	-3.57%	-3.01%	-4.41%	-2.14%
Fall (09/21-12/20)	0.62%	-1.15%	-2.70%	2.28%
Eugene	–	–	–	–
Annual	-3.20%	-0.01%	0.13%	1.46%
Winter (12/21-03/20)	-1.32%	0.41%	0.70%	1.72%
Spring (03/21-06/20)	-20.50%	-6.14%	6.22%	0.67%
Summer (06/21-09/20)	4.10%	4.31%	4.78%	-3.68%
Fall (09/21-12/20)	6.24%	2.53%	2.04%	3.51%
Goshen	–	–	–	–
Annual	-3.19%	-0.01%	-0.03%	0.50%
Winter (12/21-03/20)	-0.05%	-0.07%	-0.08%	-0.08%
Spring (03/21-06/20)	-17.14%	-2.27%	-1.31%	2.53%
Summer (06/21-09/20)	2.78%	1.88%	0.39%	0.29%
Fall (09/21-12/20)	5.63%	1.67%	0.95%	0.14%
Harrisburg	–	–	–	–
Annual	-2.41%	0.0%	0.54%	0.80%
Winter (12/21-03/20)	1.34%	1.83%	2.51%	0.44%
Spring (03/21-06/20)	-8.38%	0.29%	3.71%	1.02%
Summer (06/21-09/20)	-2.80%	-3.29%	-4.44%	-2.22%
Fall (09/21-12/20)	-0.17%	-1.43%	-2.52%	2.18%
Jasper	–	–	–	–
Annual	-3.10%	-0.02%	-0.05%	0.91%
Winter (12/21-03/20)	-2.64%	0.67%	1.09%	1.77%
Spring (03/21-06/20)	-20.00%	-7.46%	-12.20%	-0.98%
Summer (06/21-09/20)	5.31%	4.51%	5.35%	-5.39%
Fall (09/21-12/20)	5.59%	2.78%	4.92%	4.08%
Jefferson	–	–	–	–
Annual	0.02%	0.03%	-0.38%	-1.28%
Winter (12/21-03/20)	-9.92%	-6.18%	-9.68%	-8.13%
Spring (03/21-06/20)	-2.70%	-0.79%	0.26%	0.90%
Summer (06/21-09/20)	22.83%	22.00%	25.86%	24.19%
Fall (09/21-12/20)	4.83%	3.44%	3.11%	0.88%

Mehama	–	–	–	–
Annual	-1.59%	0.02%	-0.43%	0.70%
Winter (12/21-03/20)	-1.42%	-0.46%	-.93%	0.04%
Spring (03/21-06/20)	-5.14%	-1.22%	-1.99%	0.98%
Summer (06/21-09/20)	8.56%	5.63%	8.90%	4.17%
Fall (09/21-12/20)	-3.83%	-0.41%	-2.21%	0.18%
Monroe	–	–	–	–
Annual	-0.03%	0.00%	0.01%	0.00%
Winter (12/21-03/20)	0.00%	0.00%	0.00%	0.00%
Spring (03/21-06/20)	0.19%	0.06%	0.11%	0.02%
Summer (06/21-09/20)	0.42%	0.22%	0.25%	0.08%
Fall (09/21-12/20)	-0.16%	-0.03%	-0.01%	0.00%
Salem	–	–	–	–
Annual	-1.35%	-0.01%	-0.05%	-0.04%
Winter (12/21-03/20)	-1.60%	-1.21%	-2.22%	-2.77%
Spring (03/21-06/20)	-6.20%	-0.12%	-2.52%	0.59%
Summer (06/21-09/20)	3.07%	4.12%	4.54%	5.84%
Fall (09/21-12/20)	2.10%	0.66%	-0.79%	2.17%
Vida	–	–	–	–
Annual	-1.69%	-0.01%	0.06%	0.43%
Winter (12/21-03/20)	6.11%	0.00%	4.44%	-0.01%
Spring (03/21-06/20)	-4.37%	-2.20%	11.68%	1.13%
Summer (06/21-09/20)	-12.02%	-0.13%	-11.72%	-1.70%
Fall (09/21-12/20)	-9.96%	2.48%	-10.61%	1.41%
Waterloo	–	–	–	–
Annual	4.65%	0.06%	-0.58%	-3.67%
Winter (12/21-03/20)	-25.41%	-15.99%	-28.21%	-21.42%
Spring (03/21-06/20)	2.01%	-0.45%	4.99%	1.32%
Summer (06/21-09/20)	34.49%	37.75%	42.79%	49.55%
Fall (09/21-12/20)	18.89%	8.59%	9.44%	1.94%

Table 4-4. Riverine Flow Uncertainty Statistics - Alternative 3A.

Control Point (gage) and Season	25% Non-exceedance (Dry Year)	Average	Median	75% Non-exceedance (Wet Year)
Albany	–	–	–	–
Annual	-4.17%	0.00%	1.53%	1.95%
Winter (12/21-03/20)	4.27%	3.75%	5.88%	3.62%
Spring (03/21-06/20)	1.05%	7.25%	13.29%	13.48%
Summer (06/21-09/20)	-15.24%	-12.88%	-13.24%	-11.81%
Fall (09/21-12/20)	-15.98%	-7.87%	-9.52%	-5.92%
Eugene	–	–	–	–
Annual	-4.76%	0.00%	2.85%	3.97%
Winter (12/21-03/20)	8.07%	7.06%	13.55%	8.88%
Spring (03/21-06/20)	3.17%	13.84%	21.41%	26.44%
Summer (06/21-09/20)	-13.72%	-21.19%	-20.68%	-26.33%
Fall (09/21-12/20)	-20.47%	-11.06%	-12.12%	-6.56%
Goshen	–	–	–	–
Annual	-2.25%	0.00%	0.21%	0.30%
Winter (12/21-03/20)	0.15%	0.03%	0.14%	-0.13%
Spring (03/21-06/20)	-17.70%	-2.34%	-1.56%	2.78%
Summer (06/21-09/20)	27.33%	13.03%	20.32%	5.07%
Fall (09/21-12/20)	0.89%	-0.44%	-2.50%	-1.41%
Harrisburg	–	–	–	–
Annual	-4.61%	0.00%	1.71%	2.57%
Winter (12/21-03/20)	6.14%	5.42%	8.49%	6.26%
Spring (03/21-06/20)	0.44%	8.36%	14.90%	15.94%
Summer (06/21-09/20)	-13.87%	-13.77%	-13.88%	-14.20%
Fall (09/21-12/20)	-18.14%	-9.53%	-11.65%	-7.45%
Jasper	–	–	–	–
Annual	-4.19%	0.00%	1.85%	5.04%
Winter (12/21-03/20)	11.00%	11.06%	17.80%	16.58%
Spring (03/21-06/20)	9.84%	19.33%	24.11%	34.24%
Summer (06/21-09/20)	-16.06%	-25.07%	-24.36%	-30.55%
Fall (09/21-12/20)	-22.21%	-14.43%	-15.43%	-10.42%
Jefferson	–	–	–	–
Annual	-1.60%	0.05%	-1.28%	0.13%
Winter (12/21-03/20)	0.08%	-0.60%	-4.36%	-3.27%
Spring (03/21-06/20)	11.18%	10.44%	15.41%	14.20%
Summer (06/21-09/20)	-7.31%	-0.31%	3.01%	9.65%
Fall (09/21-12/20)	-13.75%	-7.64%	-12.38%	-7.87%

Mehama	–	–	–	–
Annual	-5.35%	0.08%	-1.71%	4.41%
Winter (12/21-03/20)	21.85%	14.56%	13.28%	13.95%
Spring (03/21-06/20)	22.57%	22.39%	29.11%	29.74%
Summer (06/21-09/20)	-38.78%	-28.63%	-28.84%	-14.81%
Fall (09/21-12/20)	-40.38%	-24.68%	-31.89%	-20.23%
Monroe	–	–	–	–
Annual	-0.03%	0.00%	0.01%	0.00%
Winter (12/21-03/20)	0.00%	0.00%	0.00%	0.00%
Spring (03/21-06/20)	0.19%	0.06%	0.11%	0.02%
Summer (06/21-09/20)	0.42%	0.22%	0.25%	0.08%
Fall (09/21-12/20)	-0.16%	-0.03%	-0.01%	0.00%
Salem	–	–	–	–
Annual	-3.24%	-0.01%	-0.85%	1.11%
Winter (12/21-03/20)	2.79%	1.83%	1.83%	0.95%
Spring (03/21-06/20)	3.71%	8.12%	14.45%	12.73%
Summer (06/21-09/20)	-13.55%	-8.98%	-8.22%	-5.07%
Fall (09/21-12/20)	-14.44%	-7.35%	-9.39%	-6.38%
Vida	–	–	–	–
Annual	-3.38%	0.00%	-0.71%	0.95%
Winter (12/21-03/20)	6.67%	7.14%	7.04%	8.49%
Spring (03/21-06/20)	-0.14%	4.60%	7.74%	8.95%
Summer (06/21-09/20)	-8.29%	-5.88%	-6.12%	-4.80%
Fall (09/21-12/20)	-15.14%	-10.30%	-15.61%	-12.93%
Waterloo	–	–	–	–
Annual	4.68%	0.06%	-0.58%	-3.56%
Winter (12/21-03/20)	-25.25%	-15.99%	-28.24%	-21.25%
Spring (03/21-06/20)	1.99%	-0.45%	5.02%	1.32%
Summer (06/21-09/20)	34.48%	37.75%	42.79%	49.56%
Fall (09/21-12/20)	18.84%	8.59%	9.44%	2.07%

Table 4-5. Riverine Flow Uncertainty Statistics - Alternative 3B.

Control Point (gage) and Season	25% Non-exceedance (Dry Year)	Average	Median	75% Non-exceedance (Wet Year)
Albany	–	–	–	–
Annual	-4.77%	0.02%	0.63%	2.18%
Winter (12/21-03/20)	-1.55%	1.86%	2.56%	2.57%
Spring (03/21-06/20)	-1.64%	5.37%	9.87%	10.57%
Summer (06/21-09/20)	-6.07%	-4.80%	-7.04%	-2.52%
Fall (09/21-12/20)	-12.40%	-6.07%	-7.51%	-3.91%
Eugene	–	–	–	–
Annual	-8.91%	0.04%	-0.44%	4.75%
Winter (12/21-03/20)	-13.82%	-0.33	-2.48%	4.51%
Spring (03/21-06/20)	-12.06%	3.30%	4.84%	11.92%
Summer (06/21-09/20)	7.88%	6.75%	7.18%	9.01%
Fall (09/21-12/20)	-10.63%	-4.78%	-5.44%	-1.35%
Goshen	–	–	–	–
Annual	-2.59%	-0.01%	-0.33%	0.48%
Winter (12/21-03/20)	-1.52$	-0.36%	-0.94%	0.06%
Spring (03/21-06/20)	-18.29%	-2.41%	-1.39%	2.68%
Summer (06/21-09/20)	7.98%	5.22%	8.35%	3.43%
Fall (09/21-12/20)	10.35%	1.70%	-0.23%	-0.77%
Harrisburg	–	–	–	–
Annual	-5.63%	0.02%	0.35%	2.95%
Winter (12/21-03/20)	-2.11%	2.78%	2.72%	5.01%
Spring (03/21-06/20)	-2.26%	6.24%	11.09%	12.46%
Summer (06/21-09/20)	-5.49%	-5.14%	-6.28%	-3.12%
Fall (09/21-12/20)	-14.16%	-7.45%	-9.32%	-5.53%
Jasper	–	–	–	–
Annual	-8.76%	0.06%	-2.06%	5.72%
Winter (12/21-03/20)	-18.29%	-0.21%	-7.72%	7.76%
Spring (03/21-06/20)	-9.57%	5.29%	3.59%	15.59%
Summer (06/21-09/20)	8.80%	6.84%	8.05%	9.12%
Fall (09/21-12/20)	-10.98%	-6.93%	-6.28%	-4.37%
Jefferson	–	–	–	–
Annual	0.90%	0.01%	0.02%	0.23%
Winter (12/21-03/20)	6.66%	1.26%	-0.73%	-1.11%
Spring (03/21-06/20)	11.30%	6.49%	13.45%	8.47%
Summer (06/21-09/20)	-9.00%	0.43%	4.36%	10.38%
Fall (09/21-12/20)	-11.97%	-7.17%	-11.30%	-6.25%

Mehama	–	–	–	–
Annual	2.32%	0.00%	-3.12%	-1.15%
Winter (12/21-03/20)	-9.87%	-9.02%	-16.98%	-12.64%
Spring (03/21-06/20)	-6.13%	-2.43%	-3.29%	-1.39%
Summer (06/21-09/20)	23.10%	23.25%	26.21%	29.23%
Fall (09/21-12/20)	10.88%	3.77%	-0.28%	3.06%
Monroe	–	–	–	–
Annual	-0.03%	0.00%	0.01%	0.00%
Winter (12/21-03/20)	0.00%	0.00%	0.00%	0.00%
Spring (03/21-06/20)	0.19%	0.06%	0.11%	0.02%
Summer (06/21-09/20)	0.42%	0.22%	0.25%	0.08%
Fall (09/21-12/20)	-0.16%	-0.03%	-0.01%	0.00%
Salem	–	–	–	–
Annual	-2.81%	0.00%	0.39%	1.16%
Winter (12/21-03/20)	1.04%	1.31%	0.90%	1.05%
Spring (03/21-06/20)	2.13%	5.61%	11.06%	8.97%
Summer (06/21-09/20)	-7.34%	-3.13%	-3.20%	1.41%
Fall (09/21-12/20)	-11.64%	-6.12%	-8.54%	-5.03%
Vida	–	–	–	–
Annual	-2.46%	0.04%	0.25%	2.27%
Winter (12/21-03/20)	11.53%	10.22%	10.69%	12.26%
Spring (03/21-06/20)	9.24%	11.34%	16.84%	17.03%
Summer (06/21-09/20)	-19.83%	-17.46%	-17.78%	-16.64%
Fall (09/21-12/20)	-19.34%	-14.27%	-18.28%	-14.09%
Waterloo	–	–	–	–
Annual	-0.29%	0.05%	6.41%	2.95%
Winter (12/21-03/20)	33.43%	13.09%	20.20%	12.41%
Spring (03/21-06/20)	38.92%	19.65%	46.97%	23.52%
Summer (06/21-09/20)	-45.37%	-30.20%	-23.74%	-10.97%
Fall (09/21-12/20)	-40.67%	-21.90%	-25.46%	-19.40%

Table 4-6. Riverine Flow Uncertainty Statistics - Alternative 4.

Control Point (gage) and Season	25% Non-exceedance (Dry Year)	Average	Median	75% Non-exceedance (Wet Year)
Albany	–	–	–	–
Annual	-2.09%	-0.01%	0.15%	0.66%
Winter (12/21-03/20)	-0.03%	0.11%	0.66%	0.23%
Spring (03/21-06/20)	-11.70%	-3.32%	-1.94%	0.86%
Summer (06/21-09/20)	-2.50%	-0.71%	-2.95%	-2.27%
Fall (09/21-12/20)	6.26%	3.12%	2.67%	2.09%
Eugene	–	–	–	–
Annual	-3.56%	-0.03%	0.38%	1.24%
Winter (12/21-03/20)	-167%	0.30%	1.82%	1.17%
Spring (03/21-06/20)	-21.09%	-6.35%	-7.16%	1.20%
Summer (06/21-09/20)	-1.59%	-1.77%	-4.04%	-4.28%
Fall (09/21-12/20)	9.22%	5.25%	6.26%	3.32%
Goshen	–	–	–	–
Annual	-2.14%	-0.02%	0.35%	0.18%
Winter (12/21-03/20)	-0.51%	-0.17%	-0.24%	0.11%
Spring (03/21-06/20)	-16.89%	-2.26%	-1.25%	2.44%
Summer (06/21-09/20)	1.62%	1.36%	-0.88%	1.99%
Fall (09/21-12/20)	11.23%	1.90%	2.89%	-1.57%
Harrisburg	–	–	–	–
Annual	-2.55%`	-0.02%	0.28%	0.58%
Winter (12/21-03/20)	-0.62%	0.15%	0.65%	0.08%
Spring (03/21-06/20)	-13.41%	-3.86%	-2.27%	1.12%
Summer (06/21-09/20)	-1.48%	-0.92%	-2.96%	-2.39%
Fall (09/21-12/20)	6.68%	3.73%	3.72%	1.87%
Jasper	–	–	–	–
Annual	-2.86%	-0.04%	-0.46%	1.01%
Winter (12/21-03/20)	-2.84%	0.55%	1.61%	1.89%
Spring (03/21-06/20)	-20.85%	-7.75%	-12.94%	-0.50%
Summer (06/21-09/20)	-0.88%	-2.18%	-4.52%	-5.95%
Fall (09/21-12/20)	11.34%	6.30%	8.89%	4.17%
Jefferson	–	–	–	–
Annual	-70%	0.00%	0.31%	0.64%
Winter (12/21-03/20)	-0.51%	-0.27%	-0.13%	0.25%
Spring (03/21-06/20)	-2.65%	-0.50%	0.80%	0.99%
Summer (06/21-09/20)	19.23%	15.28%	18.88%	14.75%
Fall (09/21-12/20)	-7.39%	-3.06%	-4.80%	-2.01%

Mehama	–	–	–	–
Annual	-1.51%	0.01%	-0.23%	0.68%
Winter (12/21-03/20)	-1.12%	-0.43%	-0.86%	0.08%
Spring (03/21-06/20)	-5.15%	-1.15%	-1.97%	0.93%
Summer (06/21-09/20)	8.56%	5.63%	8.87%	4.17%
Fall (09/21-12/20)	-3.84%	-0.51%	-1.63%	0.11%
Monroe	–	–	–	–
Annual	-0.03%	0.00%	0.01%	0.00%
Winter (12/21-03/20)	0.00%	0.00%	0.00%	0.00%
Spring (03/21-06/20)	0.19%	0.06%	0.11%	0.02%
Summer (06/21-09/20)	0.42%	0.22%	0.25%	0.08%
Fall (09/21-12/20)	-0.16%	-0.03%	-0.01%	0.00%
Salem	–	–	–	–
Annual	-1.74%	-0.01%	0.37%	0.50%
Winter (12/21-03/20)	0.00%	0.00%	0.60%	-0.05%
Spring (03/21-06/20)	-9.26%	-2.27%	-0.65%	0.76%
Summer (06/21-09/20)	3.55%	4.01%	3.78%	3.18%
Fall (09/21-12/20)	1.29%	0.71%	-0.31%	0.43%
Vida	–	–	–	–
Annual	-1.16%	-0.01%	0.02%	0.46%
Winter (12/21-03/20)	0.02%	0.00%	0.10%	-0.02%
Spring (03/21-06/20)	-7.42%	-2.22%	-1.32%	1.16%
Summer (06/21-09/20)	0.11%	-0.17%	-1.30%	-1.81%
Fall (09/21-12/20)	4.76%	2.53%	2.39%	1.58%
Waterloo	–	–	–	–
Annual	1.22%	-0.01%	2.01%	0.29%
Winter (12/21-03/20)	-0.36%	-0.32%	-0.21%	-0.40%
Spring (03/21-06/20)	2.50%	0.22%	6.35%	1.57%
Summer (06/21-09/20)	28.79%	23.52%	29.14%	27.27%
Fall (09/21-12/20)	-13.20%	-6.82%	-8.10%	-5.90%

Table 4-7. Riverine Flow Uncertainty Statistics - Alternative 5.

Control Point (gage) and Season	25% Non-exceedance (Dry Year)	Average	Median	75% Non-exceedance (Wet Year)
Albany	–	–	–	–
Annual	-1.29%	-0.01%	0.45%	0.49%
Winter (12/21-03/20)	2.37%	1.71%	2.83%	1.32%
Spring (03/21-06/20)	-5.01%	0.02%	1.88%	3.57%
Summer (06/21-09/20)	-3.55%	-3.04%	-4.00%	-3.91%
Fall (09/21-12/20)	-1.05%	-1.64%	-2.55%	-2.00%
Eugene				
Annual	-1.62%	-0.01%	0.26%	1.02%
Winter (12/21-03/20)	-1.89%	0.36%	0.46%	1.87%
Spring (03/21-06/20)	-12.81%	-4.57%	-4.88%	-0.01%
Summer (06/21-09/20)	5.75%	4.23%	4.53%	2.77%
Fall (09/21-12/20)	4.52%	1.41%	1.85%	0.09%
Goshen				
Annual	-1.59%	-0.01%	0.05%	0.41%
Winter (12/21-03/20)	0.49%	-0.08%	-0.07%	-0.07%
Spring (03/21-06/20)	-9.55%	-1.30%	-0.91%	1.68%
Summer (06/21-09/20)	2.06%	1.81%	2.08%	2.24%
Fall (09/21-12/20)	2.83%	0.89%	0.59%	0.11%
Harrisburg				
Annual	-1.67%	0.00%	0.42%	0.83%
Winter (12/21-03/20)	2.73%	2.43%	3.52%	2.63%
Spring (03/21-06/20)	-6.39%	0.02%	1.87%	4.44%
Summer (06/21-09/20)	-2.40%	-3.33%	-4.03%	-4.47%
Fall (09/21-12/20)	-1.48%	-2.01%	-2.80%	-2.69%
Jasper				
Annual	-1.74%	-0.01%	0.38%	0.79%
Winter (12/21-03/20)	-3.42%	0.59%	0.76%	1.72%
Spring (03/21-06/20)	-12.54%	-5.68%	-8.73%	-0.85%
Summer (06/21-09/20)	7.14%	4.42%	4.84%	2.22%
Fall (09/21-12/20)	3.27%	1.56%	4.32%	0.37%
Jefferson				
Annual	0.27%	0.03%	-0.39%	-1.48%
Winter (12/21-03/20)	-9.14%	-6.17%	-9.62%	-8.43%
Spring (03/21-06/20)	-2.61%	-0.83%	0.20%	0.73%
Summer (06/21-09/20)	21.55%	21.79%	24.93%	23.20%

Control Point (gage) and Season	25% Non-exceedance (Dry Year)	Average	Median	75% Non-exceedance (Wet Year)
Fall (09/21-12/20)	5.26%	3.52%	3.30%	0.95%
Mehama				
Annual				
Winter (12/21-03/20)	-1.60%	0.02%	-0.37%	0.66%
Spring (03/21-06/20)	-1.45%	-0.46%	-0.87%	0.02%
Summer (06/21-09/20)	-5.14%	-1.23%	-2.02%	0.78%
Fall (09/21-12/20)	8.56%	5.63%	8.90%	4.17%
Monroe	-3.84%	-0.40%	-2.04%	0.23%
Annual				
Winter (12/21-03/20)	-0.03%	0.00%	0.01%	0.00%
Spring (03/21-06/20)	0.00%	0.00%	0.00%	0.00%
Summer (06/21-09/20)	0.19%	0.06%	0.11%	0.02%
Fall (09/21-12/20)	0.42%	0.22%	0.25%	0.08%
Salem	-0.16%	-0.03%	-0.01%	0.00%
Annual				
Winter (12/21-03/20)	-0.88%	-0.01%	-0.08%	-0.03%
Spring (03/21-06/20)	-1.28%	-0.93%	-1.61%	-1.87%
Summer (06/21-09/20)	-5.20%	-0.30%	1.57%	2.47%
Fall (09/21-12/20)	3.24%	4.05%	4.42%	3.96%
Vida	2.35%	0.40%	-0.92%	-0.23%
Annual				
Winter (12/21-03/20)	-1.94%	0.02%	-0.13%	2.30%
Spring (03/21-06/20)	10.66%	7.74%	8.34%	8.59%
Summer (06/21-09/20)	0.81%	5.08%	7.98%	11.37%
Fall (09/21-12/20)	-11.83%	-11.22%	-11.57%	-11.96%
Waterloo	-11.69%	-8.19%	-11.23%	-6.45%
Annual				
Winter (12/21-03/20)	5.41%	0.06%	-0.79%	-4.01%
Spring (03/21-06/20)	-22.91%	-15.97%	-28.05%	-21.72%
Summer (06/21-09/20)	2.78%	-0.52%	4.95%	1.24%
Fall (09/21-12/20)	30.81%	37.31%	39.89%	46.08%

Table 4-7. Riverine Flow Uncertainty Statistics - Alternative 6.

Control Point (gage) and Season	25% Non-exceedance (Dry Year)	Average	Median	75% Non-exceedance (Wet Year)
Albany	–	–	–	–
Annual	-2.71%	-0.03%	0.20%	0.75%
Winter (12/21-03/20)	0.33%	0.28%	0.74%	0.08%
Spring (03/21-06/20)	-14.86%	-4.31%	-2.40%	0.78%
Summer (06/21-09/20)	6.41%	7.70%	5.32%	6.15%
Fall (09/21-12/20)	1.19%	0.52%	-0.42%	0.11%
Eugene				
Annual	-4.78%	-0.04%	-0.53%	1.56%
Winter (12/21-03/20)	-0.77%	0.75%	1.55%	1.80%
Spring (03/21-06/20)	-27.24%	-8.33%	-9.60%	0.40%
Summer (06/21-09/20)	11.17%	13.19%	10.27%	11.61%
Fall (09/21-12/20)	1.99%	0.15%	-1.11%	-1.48%
Goshen				
Annual	-3.64%	-0.02%	-0.49%	0.68%
Winter (12/21-03/20)	-0.02%	-0.05%	-0.05%	-0.04%
Spring (03/21-06/20)	-21.78%	-3.54%	-4.54%	2.47%
Summer (06/21-09/20)	10.55%	5.80%	6.49%	4.14%
Fall (09/21-12/20)	6.25%	1.93%	0.35%	0.17%
Harrisburg				
Annual	-3.24%	-0.03%	0.21%	0.95%
Winter (12/21-03/20)	-0.09%	0.36%	1.01%	0.42%
Spring (03/21-06/20)	-17.06%	-5.10%	-3.53%	0.95%
Summer (06/21-09/20)	7.87%	8.24%	5.98%	6.67%
Fall (09/21-12/20)	1.07%	0.62%	-0.25%	-0.41%
Jasper				
Annual	-4.93%	-0.03%	-1.54%	1.40%
Winter (12/21-03/20)	-0.96%	1.18%	1.35%	2.80%
Spring (03/21-06/20)	-28.09%	-10.00%	-16.17%	-1.26%
Summer (06/21-09/20)	11.34%	14.01%	10.78%	12.93%
Fall (09/21-12/20)	0.85%	-0.42%	-0.06%	-3.17%
Jefferson				
Annual	-3.94%	-0.06%	-0.26%	1.23%
Winter (12/21-03/20)	-0.87%	-0.22%	0.00%	0.49%
Spring (03/21-06/20)	-10.19%	-1.93%	-0.17%	1.83%
Summer (06/21-09/20)	-21.35%	-13.60%	-16.71%	-9.95%

Control Point (gage) and Season	25% Non-exceedance (Dry Year)	Average	Median	75% Non-exceedance (Wet Year)
Fall (09/21-12/20)	5.90%	5.12%	4.02%	4.06%
Mehama				
Annual				
Winter (12/21-03/20)	-2.95%	-0.06%	-0.71%	1.09%
Spring (03/21-06/20)	-1.08%	-0.39%	-0.74%	0.10%
Summer (06/21-09/20)	-9.36%	-1.99%	-2.14%	1.77%
Fall (09/21-12/20)	-11.59%	-4.78%	-6.61%	-1.01%
Monroe	6.28%	3.63%	2.77%	2.29%
Annual				
Winter (12/21-03/20)	-0.03%	0.00%	0.01%	0.00%
Spring (03/21-06/20)	0.00%	0.00%	0.00%	0.00%
Summer (06/21-09/20)	0.19%	0.06%	0.11%	0.02%
Fall (09/21-12/20)	0.40%	0.21%	0.24%	0.07%
Salem	-0.16%	-0.03%	-0.01%	0.00%
Annual				
Winter (12/21-03/20)	-2.84%	-0.04%	0.25%	0.72%
Spring (03/21-06/20)	0.06%	0.12%	0.58%	-0.07%
Summer (06/21-09/20)	-13.10%	-3.31%	-1.10%	1.09%
Fall (09/21-12/20)	-0.51%	1.52%	-0.30%	1.18%
Vida	3.19%	2.14%	1.17%	1.54%
Annual				
Winter (12/21-03/20)	-1.67%	-0.02%	0.19%	0.83%
Spring (03/21-06/20)	-0.01%	-0.02%	-0.05%	0.08%
Summer (06/21-09/20)	-9.64%	-3.12%	-2.04%	1.41%
Fall (09/21-12/20)	3.92%	3.01%	2.19%	0.82%
Waterloo	2.25%	1.56%	1.64%	1.12%
Annual				
Winter (12/21-03/20)	-7.55%	-0.07%	0.13%	1.26%
Spring (03/21-06/20)	-2.11%	-0.22%	-0.40%	-0.21%
Summer (06/21-09/20)	-19.33%	-2.53%	4.28%	3.64%
Fall (09/21-12/20)	-26.19%	-21.64%	-25.52%	-21.06%

Table 4-9. Riverine Flow Uncertainty Statistics – NTOM

Control Point (gage) and Season	25% Non-exceedance (Dry Year)	Average	Median	75% Non-exceedance (Wet Year)
Albany	–	–	–	–
Annual	-3.66%	0.07%	-0.09%	1.46%
Winter (12/21-03/20)	-5.45%	-0.63%	-1.62%	0.22%
Spring (03/21-06/20)	-0.70%	1.49%	3.80%	3.76%
Summer (06/21-09/20)	-4.43%	3.95%	4.16%	10.89%
Fall (09/21-12/20)	-3.94%	-1.59%	-3.25%	-1.43%
Eugene				
Annual	-	-	-	-
Winter (12/21-03/20)	-	-	-	-
Spring (03/21-06/20)	-	-	-	-
Summer (06/21-09/20)	-	-	-	-
Fall (09/21-12/20)	-	-	-	-
Goshen				
Annual	-0.11%	0.00%	-0.49%	-0.18%
Winter (12/21-03/20)	-1.22%	-0.21%	-0.82%	-0.33%
Spring (03/21-06/20)	-1.57%	-0.34%	-0.48%	0.01%
Summer (06/21-09/20)	0.18%	-0.32%	-0.23%	-1.61%
Fall (09/21-12/20)	3.56%	0.73%	0.07%	0.20%
Harrisburg				
Annual	-1.39%	0.00%	0.18%	0.91%
Winter (12/21-03/20)	3.31%	2.49%	3.69%	2.91%
Spring (03/21-06/20)	-6.39%	-0.02%	1.80%	4.48%
Summer (06/21-09/20)	-2.36%	-3.32%	-4.02%	-4.48%
Fall (09/21-12/20)	-1.09%	-2.06%	-3.86%	-2.82%
Jasper				
Annual	-1.84%	0.10%	-1.61%	2.55%
Winter (12/21-03/20)	-20.48%	-8.45%	-16.48%	-4.68%
Spring (03/21-06/20)	-1.80%	4.90%	6.61%	13.73%
Summer (06/21-09/20)	23.84%	19.64%	23.77%	21.40%
Fall (09/21-12/20)	-1.89%	-3.95%	-7.20%	-6.08%
Jefferson				
Annual	4.91%	0.10%	-1.97%	-4.46%
Winter (12/21-03/20)	-7.99%	-7.46%	-14.71%	-13.51%
Spring (03/21-06/20)	1.81%	-0.52%	1.11%	-1.53%

Control Point (gage) and Season	25% Non-exceedance (Dry Year)	Average	Median	75% Non-exceedance (Wet Year)
Summer (06/21-09/20)	4.21%	8.10%	8.41%	11.64%
Fall (09/21-12/20)	23.46%	8.64%	8.22%	1.96%
Mehama				
Annual				
Winter (12/21-03/20)	5.89%	0.15%	-0.47%	-2.31%
Spring (03/21-06/20)	-3.31%	-6.31%	-9.87%	-8.67%
Summer (06/21-09/20)	-0.01%	-0.76%	-0.65%	-0.40%
Fall (09/21-12/20)	0.25%	0.71%	0.20%	0.30%
Monroe	23.54%	7.89%	8.84%	2.49%
Annual				
Winter (12/21-03/20)	2.13%	0.48%	0.77%	0.33%
Spring (03/21-06/20)	0.32%	-0.02%	-0.04%	-0.03%
Summer (06/21-09/20)	0.24%	0.31%	0.42%	0.41%
Fall (09/21-12/20)	0.44%	0.53%	0.28%	0.09%
Salem	4.47%	1.39%	1.99%	1.01%
Annual				
Winter (12/21-03/20)	-1.12%	0.03%	-0.88%	-0.59%
Spring (03/21-06/20)	-5.45%	-2.70%	-5.59%	-4.19%
Summer (06/21-09/20)	-0.23%	0.67%	2.80%	1.47%
Fall (09/21-12/20)	-3.08%	4.53%	5.32%	10.46%
Vida	5.36%	2.33%	0.65%	0.48%
Annual				
Winter (12/21-03/20)	-1.93%	0.01%	0.79%	3.06%
Spring (03/21-06/20)	6.41%	6.42%	9.80%	9.48%
Summer (06/21-09/20)	-0.60%	0.62%	3.25%	5.57%
Fall (09/21-12/20)	-11.92%	-9.02%	-11.23%	-8.27%
Waterloo	-4.75%	-3.00%	-4.00%	-0.74%
Annual				
Winter (12/21-03/20)	5.51%	0.07%	-3.03%	-5.07%
Spring (03/21-06/20)	-21.58%	-15.20%	-29.38%	-22.86%
Summer (06/21-09/20)	-0.17%	-0.69%	-1.06%	-0.95%
Fall (09/21-12/20)	21.47%	26.88%	26.73%	35.41%

Each of the values in Table 4-1 through Table 4-9 was calculated using an average flow from the No Action Alternative and a flow from the corresponding gage/season/alternative. For example, the average annual No Action Alternative flow for the Waterloo gage at the 25th percentile is 1,605.9 cubic feet per second (cfs) and 1,681.0 cfs for Alternative 3A. This equates to a change of +4.68% for Alternative 1 compared to the No Action Alternative as is shown in Table 4-1 in

the Waterloo-Annual-25% N.E. cell. The abbreviation “N.E.” is short for “non-exceedance”. The 25% non-exceedance probability means that there is a 25% chance that the value will not be exceeded in a given year and a 75% chance that it will be exceeded.

4.2 WHITEWATER RECREATION

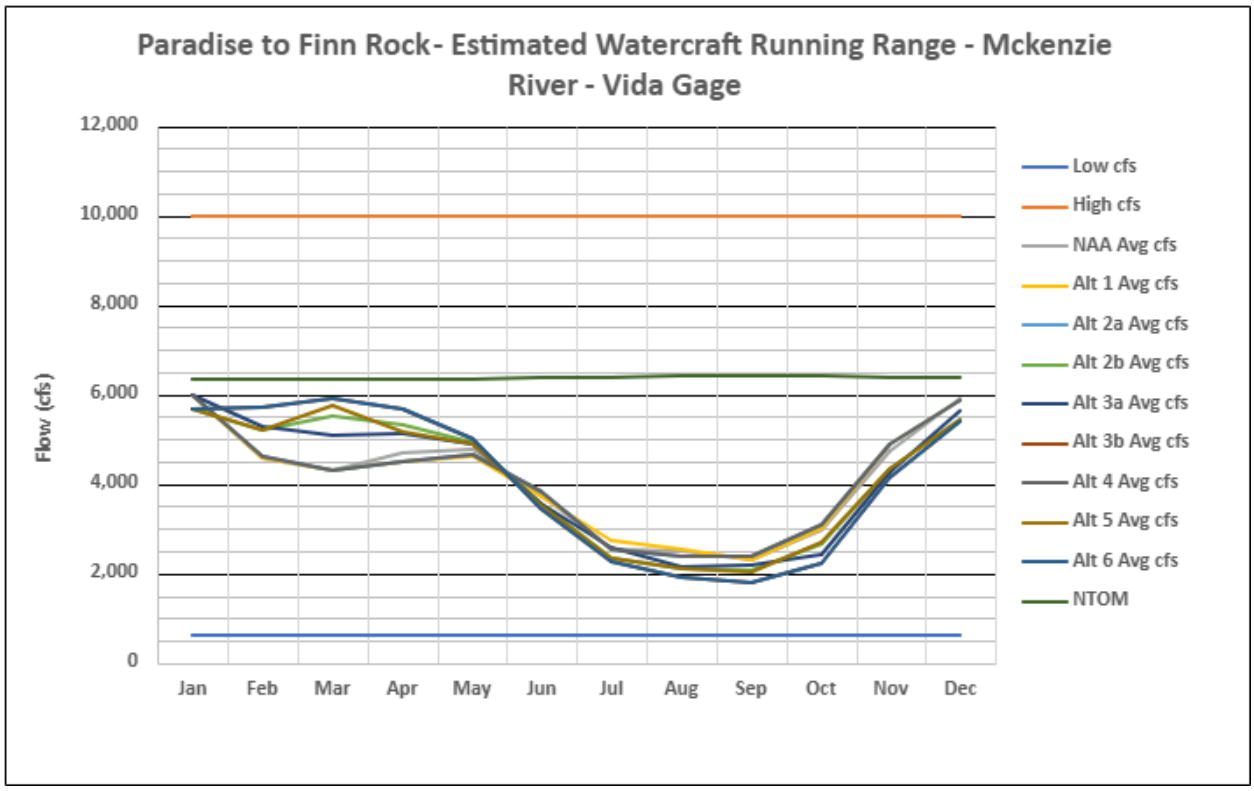
The charts and data in this section show high and low water flow data concerning riverine watercraft operation compared to the EIS alternative estimated water flows at various river gage locations. This is not an exhaustive listing of riverine watercraft recreation reaches but does show some of the most popular areas along the McKenzie and North Santiam rivers where high/low range water flow data is available.

4.2.1 Paradise to Finn Rock – McKenzie River – River Mile Range 71.7 to 54.0

The graph below shows the high and low water flow ranges for operating recreational watercraft suitable for riverine activities such as kayaking and rafting from Paradise Campground to Finn Rock on the McKenzie River, as well as the estimated average monthly flows that are expected to occur under each alternative. The tabular data is shown below the graph.

Figure 4-2. Paradise to Finn Rock Estimated Watercraft Running Range, McKenzie River Vida, Oregon Gage.

A



1.High/low water data source: https://www.americanwhitewater.org/content/River/state-summary/?state=OR. Accessed 6/14/2023

2. High and low water flow range does not in any way represent a "safe" range

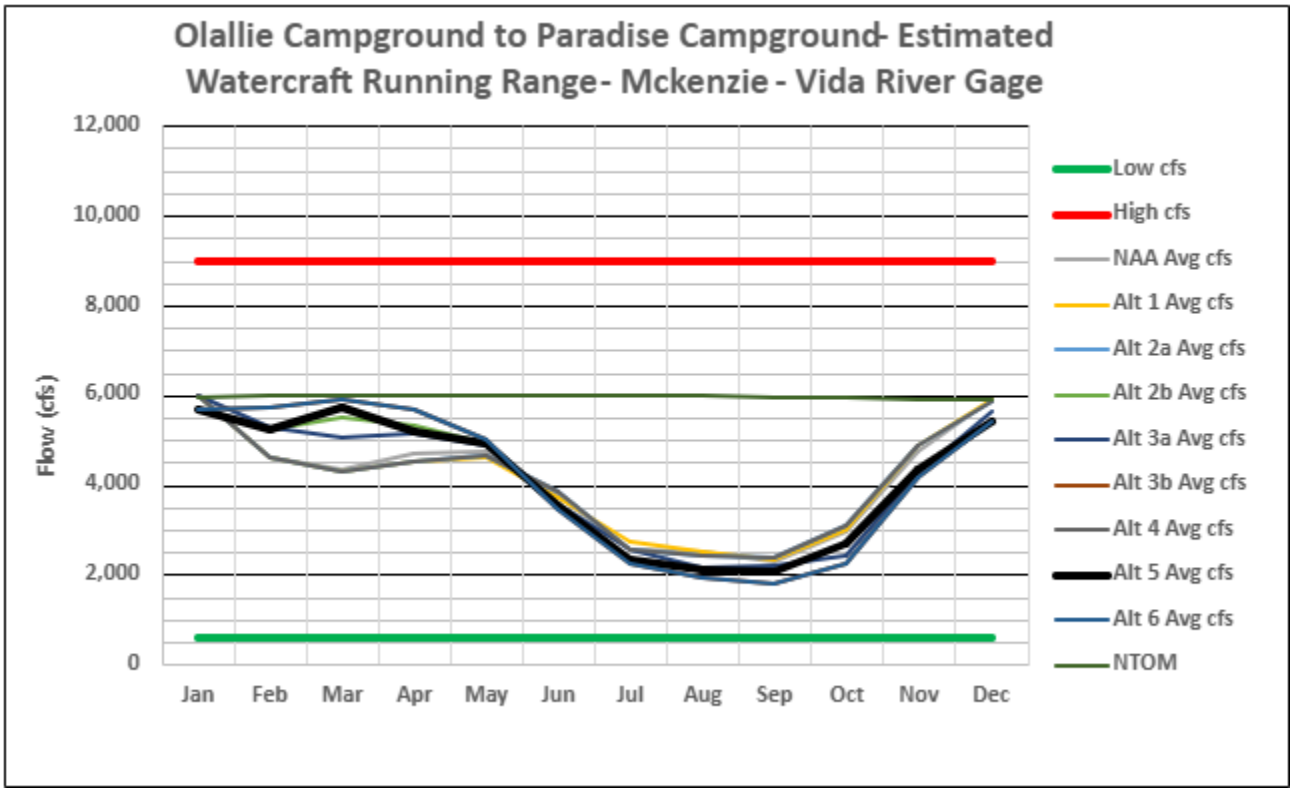
Table 4-8. Paradise to Finn Rock, Estimated Watercraft Running Range, McKenzie River, Vida Gage, Oregon.

Month	Low cfs	High cfs	NAA Avg cfs	Alt 1 Avg cfs	Alt2aAvg cfs	Alt 2b Avg cfs	Alt 3a Avg cfs	Alt 3b Avg cfs	Alt 4 Avg cfs	Alt 5 Avg cfs	Alt 6 Avg cfs	NTOM
Jan	600	10,000	5,989	5,989	5,985	5,681	5,973	5,685	5,986	5,656	5,685	6,345
Feb	600	10,000	4,596	4,596	4,610	5,223	5,294	5,702	4,610	5,213	5,702	6,348
Mar	600	10,000	4,322	4,304	4,303	5,511	5,070	5,911	4,302	5,738	5,911	6,348
Apr	600	10,000	4,715	4,499	4,508	5,334	5,133	5,667	4,508	5,165	5,667	6,344
May	600	10,000	4,758	4,606	4,669	4,918	4,875	5,022	4,668	4,897	5,022	6,357
Jun	600	10,000	3,754	3,722	3,827	3,545	3,571	3,437	3,826	3,538	3,437	6,383
Jul	600	10,000	2,549	2,729	2,535	2,345	2,561	2,252	2,536	2,343	2,252	6,396
Aug	600	10,000	2,513	2,525	2,401	2,098	2,146	1,925	2,397	2,109	1,925	6,403
Sep	600	10,000	2,287	2,322	2,381	2,050	2,203	1,801	2,385	2,040	1,801	6,403
Oct	600	10,000	2,959	3,011	3,107	2,670	2,420	2,242	3,107	2,688	2,242	6,403
Nov	600	10,000	4,751	4,887	4,883	4,346	4,266	4,151	4,884	4,325	4,151	6,396
Dec	600	10,000	5,895	5,889	5,876	5,430	5,632	5,406	5,877	5,430	5,406	6,395

4.2.2 Olallie Campground to Paradise Campground – McKenzie River – River Mile Range 80.0 to 71.7

The graph below shows the high and low water flow ranges for operating recreational watercraft suitable for riverine activities such as kayaking and rafting from Olallie Campground to Paradise Campground on the McKenzie River, as well as the estimated average monthly flows that are expected to occur under each alternative. The tabular data is shown below the graph.

Figure 4-3. Olallie Campground to Paradise Campground, Estimated Watercraft Running Range, McKenzie, Vida River Gage, Oregon.



1.High/low water data source: https://www.americanwhitewater.org/content/River/state-summary/?state=OR. Accessed 6/14/2023

2. High and low water flow range does not in any way represent a "safe" range

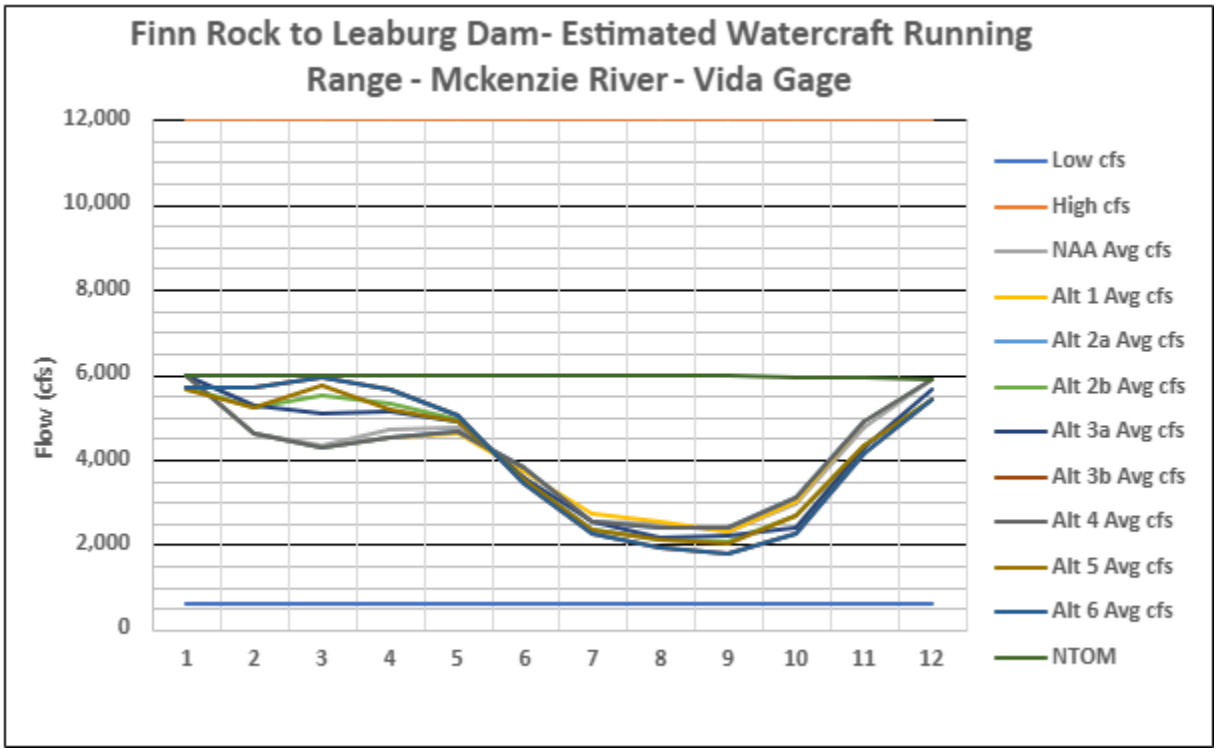
Table 4-9. Olallie Campground to Paradise Campground, Estimated Watercraft Running Range, McKenzie, Vida River Gage, Oregon.

Month	Low cfs	High cfs	NAA Avg cfs	Alt 1 Avg cfs	Alt2a Avg cfs	Alt 2b Avg cfs	Alt 3a Avg cfs	Alt 3b Avg cfs	Alt 4 Avg cfs	Alt 5 Avg cfs	Alt 6 Avg cfs	NTOM
Jan	600	9,000	5,989	5,989	5,985	5,681	5,973	5,685	5,986	5,656	5,685	5,966
Feb	600	9,000	4,596	4,596	4,610	5,223	5,294	5,702	4,610	5,213	5,702	5,985
Mar	600	9,000	4,322	4,304	4,303	5,511	5,070	5,911	4,302	5,738	5,911	5,992
Apr	600	9,000	4,715	4,499	4,508	5,334	5,133	5,667	4,508	5,165	5,667	5,993
May	600	9,000	4,758	4,606	4,669	4,918	4,875	5,022	4,668	4,897	5,022	5,987
Jun	600	9,000	3,754	3,722	3,827	3,545	3,571	3,437	3,826	3,538	3,437	5,981
Jul	600	9,000	2,549	2,729	2,535	2,345	2,561	2,252	2,536	2,343	2,252	5,972
Aug	600	9,000	2,513	2,525	2,401	2,098	2,146	1,925	2,397	2,109	1,925	5,967
Sep	600	9,000	2,287	2,322	2,381	2,050	2,203	1,801	2,385	2,040	1,801	5,954
Oct	600	9,000	2,959	3,011	3,107	2,670	2,420	2,242	3,107	2,688	2,242	5,936
Nov	600	9,000	4,751	4,887	4,883	4,346	4,266	4,151	4,884	4,325	4,151	5,911
Dec	600	9,000	5,895	5,889	5,876	5,430	5,632	5,406	5,877	5,430	5,406	5,877

4.2.3 Finn Rock to Leaburg Dam – McKenzie River – River Mile Range 54.0 to 38.8

The graph below shows the high and low water flow ranges for operating recreational watercraft suitable for riverine activities such as kayaking and rafting from Finn Rock to Leaburg Dam on the McKenzie River, as well as the estimated average monthly flows that are expected to occur under each alternative. The tabular data is shown below the graph.

Figure 4-4. Finn Rock to Leaburg Dam, Estimated Watercraft Running Range, McKenzie River, Vida Gage, Oregon.



1.High/low water data source: https://www.americanwhitewater.org/content/River/state-summary/?state=OR. Accessed 6/14/2023

2. High and low water flow range does not in any way represent a "safe" range

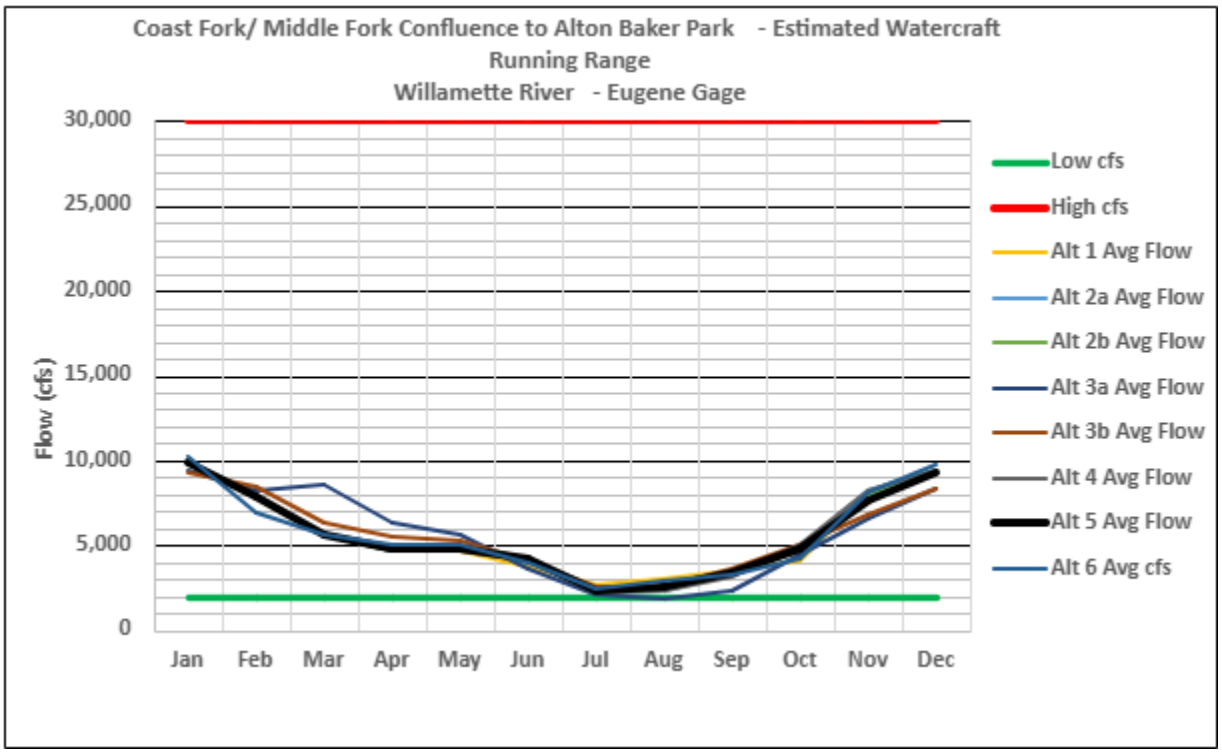
Table 4-10. Finn Rock to Leaburg Dam, Estimated Watercraft Running Range, McKenzie River, Vida Gage, Oregon.

Month	Low cfs	High cfs	NAA Avg cfs	Alt 1 Avg cfs	Alt2a Avg cfs	Alt 2b Avg cfs	Alt 3a Avg cfs	Alt 3b Avg cfs	Alt 4 Avg cfs	Alt 5 Avg cfs	Alt 6 Avg cfs	NTOM
Jan	600	12,000	5,989	5,989	5,985	5,681	5,973	5,685	5,986	5,656	5,685	5,966
Feb	600	12,000	4,596	4,596	4,610	5,223	5,294	5,702	4,610	5,213	5,702	5,985
Mar	600	12,000	4,322	4,304	4,303	5,511	5,070	5,911	4,302	5,738	5,911	5,992
Apr	600	12,000	4,715	4,499	4,508	5,334	5,133	5,667	4,508	5,165	5,667	5,993
May	600	12,000	4,758	4,606	4,669	4,918	4,875	5,022	4,668	4,897	5,022	5,987
Jun	600	12,000	3,754	3,722	3,827	3,545	3,571	3,437	3,826	3,538	3,437	5,981
Jul	600	12,000	2,549	2,729	2,535	2,345	2,561	2,252	2,536	2,343	2,252	5,972
Aug	600	12,000	2,513	2,525	2,401	2,098	2,146	1,925	2,397	2,109	1,925	5,967
Sep	600	12,000	2,287	2,322	2,381	2,050	2,203	1,801	2,385	2,040	1,801	5,954
Oct	600	12,000	2,959	3,011	3,107	2,670	2,420	2,242	3,107	2,688	2,242	5,936
Nov	600	12,000	4,751	4,887	4,883	4,346	4,266	4,151	4,884	4,325	4,151	5,911
Dec	600	12,000	5,895	5,889	5,876	5,430	5,632	5,406	5,877	5,430	5,406	5,877

4.2.4 Coast Fork/ Middle Fork Confluence to Alton Baker Park – Willamette River – River Mile Range 187.0 to 182.7

The graph below shows the high and low water flow ranges for operating recreational watercraft suitable for riverine activities such as kayaking and rafting from the Coast Fork/Middle Fork confluence to Alton Baker Park on the Willamette River in Eugene OR, as well as the estimated average monthly flows that are expected to occur under each alternative. The tabular data is shown below the graph.

Figure 4-5. Coast Fork/Middle Fork Confluence to Alton Baker Park, Estimated Watercraft Running Range, Willamette River, Eugene Gage, Oregon.



1.High/low water data source: https://www.americanwhitewater.org/content/River/state-summary/?state=OR. Accessed 6/14/2023

2. High and low water flow range does not in any way represent a "safe" range

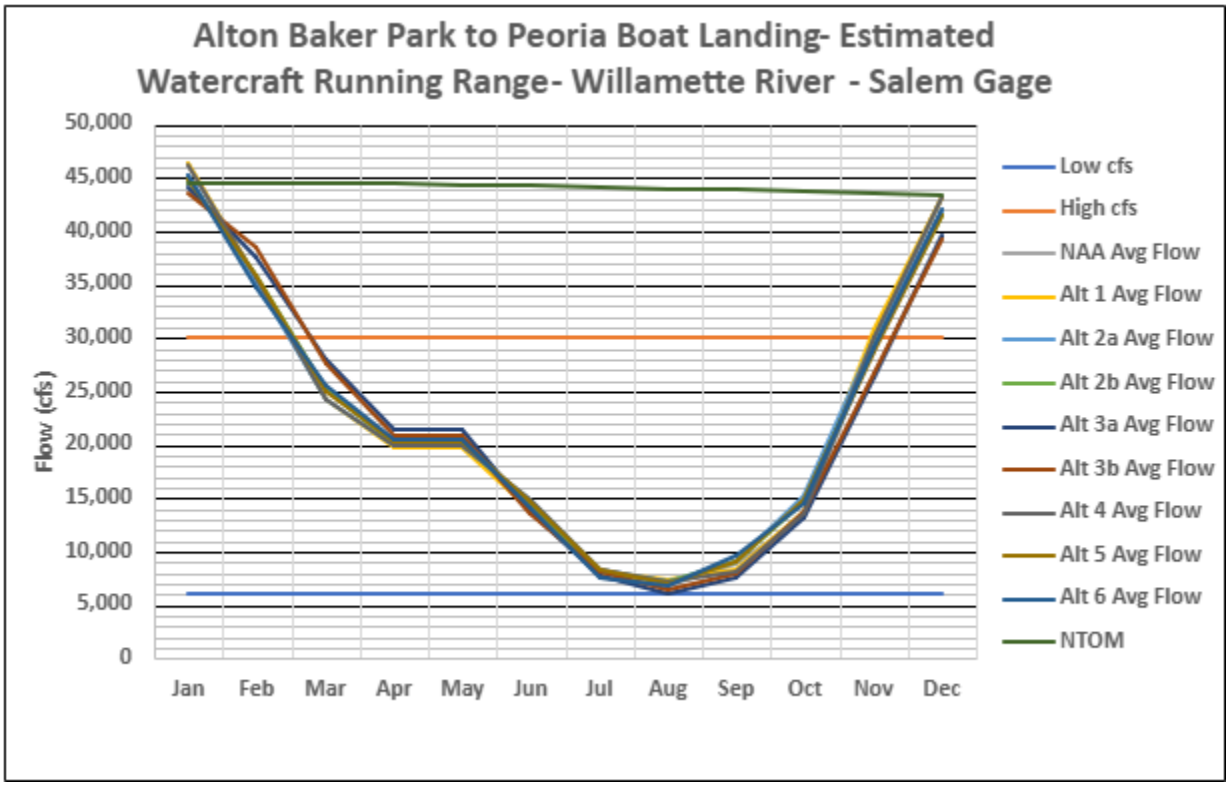
Table 4-11. Coast Fork/Middle Fork Confluence to Alton Baker Park, Estimated Watercraft Running Range, Willamette River, Eugene Gage, Oregon.

Month	NAA Avg Flow	Alt 1 Avg Flow	Alt 2a Avg Flow	Alt 2b Avg Flow	Alt 3a Avg Flow	Alt 3b Avg Flow	Alt 4 Avg Flow	Alt 5 Avg Flow	Alt 6 Avg cfs	NTOM
Jan	9,910	9,898	9,839	9,937	9,371	9,278	9,850	9,926	10,185	-
Feb	7,733	7,975	7,959	7,867	8,283	8,483	7,959	7,879	6,969	-
Mar	5,746	5,623	5,616	5,633	8,581	6,317	5,625	5,634	5,692	-
Apr	5,252	4,716	4,723	4,719	6,395	5,513	4,728	4,869	5,055	-
May	5,104	4,644	4,765	4,780	5,617	5,233	4,755	4,849	5,061	-
Jun	4,013	3,778	4,145	4,148	3,592	4,054	4,143	4,174	3,952	-
Jul	2,250	2,710	2,273	2,384	2,125	2,549	2,277	2,397	2,400	-
Aug	2,552	3,081	2,380	2,617	1,875	2,549	2,389	2,571	2,917	-
Sep	3,353	3,491	3,238	3,422	2,359	3,597	3,222	3,442	3,332	-
Oct	4,409	4,107	4,985	4,739	4,490	5,016	4,997	4,859	4,283	-
Nov	7,760	8,071	8,204	7,915	6,525	6,758	8,248	7,635	8,101	-
Dec	9,477	9,452	9,434	9,395	8,353	8,297	9,367	9,323	9,761	-

4.2.5 Alton Baker Park to Peoria Boat Landing – Willamette River – River Mile Range 182.7 to 141.1

The graph below shows the high and low water flow ranges for operating recreational watercraft suitable for riverine activities such as kayaking and rafting from Alton Baker Park to the Peoria Boat Landing on the Willamette River, as well as the estimated average monthly flows that are expected to occur under each alternative. The tabular data is shown below the graph.

Figure 4-6. Alton Baker Park to Peoria Boat Landing, Estimated Watercraft Running Range, Willamette River, Salem Gage, Oregon.



1.High/low water data source: https://www.americanwhitewater.org/content/River/state-summary/?state=OR. Accessed 6/14/2023

2. High and low water flow range does not in any way represent a "safe" range

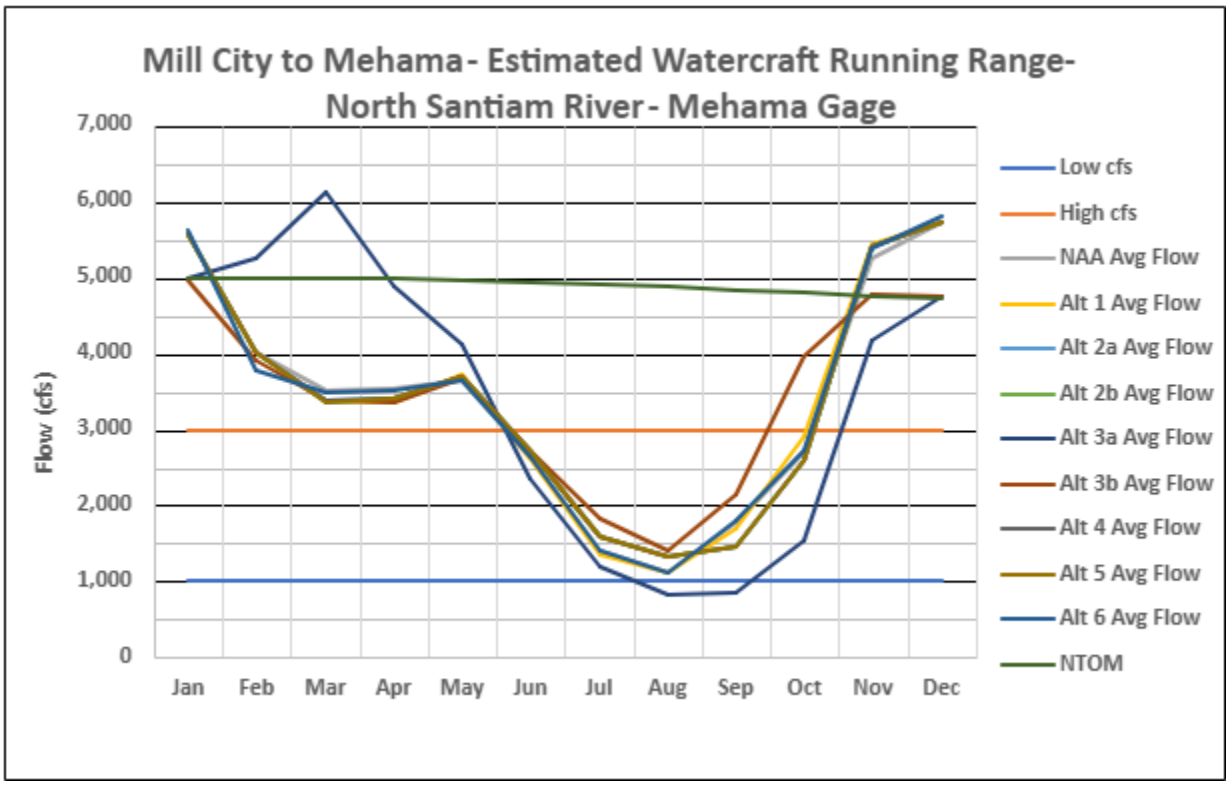
Table 4-12. Alton Baker Park to Peoria Boat Landing, Estimated Watercraft Running Range, Willamette River, Salem Gage, Oregon.

Month	Low cfs	High cfs	NAA Avg cfs	Alt 1 Avg cfs	Alt2 Avg cfs	Alt 2b Avg cfs	Alt 3a Avg cfs	Alt 3b Avg cfs	Alt 4 Avg cfs	Alt 5 Avg cfs	Alt 6 Avg cfs	NTOM
Jan	6,000	30,000	46,332	46,304	45,219	44,979	44,080	43,643	46,238	44,917	45,354	44,543
Feb	6,000	30,000	35,385	35,625	35,349	35,830	37,494	38,497	35,631	35,877	34,775	44,495
Mar	6,000	30,000	25,213	24,163	24,273	25,109	28,030	27,647	24,288	25,065	25,523	44,484
Apr	6,000	30,000	20,312	19,721	19,883	20,194	21,512	20,810	19,901	20,250	20,408	44,480
May	6,000	30,000	20,312	19,721	19,883	20,194	21,512	20,810	19,901	20,250	20,408	44,416
Jun	6,000	30,000	14,417	13,983	14,814	14,566	13,774	13,585	14,825	14,590	14,148	44,279
Jul	6,000	30,000	7,589	8,041	8,303	8,200	7,714	8,058	8,297	8,218	7,587	44,135
Aug	6,000	30,000	6,821	7,287	7,173	7,115	5,952	6,350	7,187	7,044	6,760	44,001
Sep	6,000	30,000	8,787	8,256	9,141	9,005	7,521	7,875	8,150	9,012	9,624	43,878
Oct	6,000	30,000	13,201	13,691	15,330	14,690	13,105	13,743	13,538	14,851	14,469	43,757
Nov	6,000	30,000	29,697	30,867	29,916	29,050	26,375	26,768	30,141	28,757	29,156	43,593
Dec	6,000	30,000	43,270	43,261	41,966	41,476	39,591	39,289	43,116	41,438	42,034	43,355

4.2.6 Mill City to Mehama – North Santiam River – River Mile Range 47.5 to 38.6

The graph below shows the high and low water flow ranges for operating recreational watercraft suitable for riverine activities such as kayaking and rafting from Mill City OR to Mehama OR on the North Santiam River, as well as the estimated average monthly flows that are expected to occur under each alternative. The tabular data is shown below the graph.

Figure 4-7. Mill City to Megama, Estimated Watercraft Running Range, North Santiam River, Mehama Gage, Oregon.



1.High/low water data source: https://www.americanwhitewater.org/content/River/state-summary/?state=OR. Accessed 6/14/2023

2. High and low water flow range does not in any way represent a "safe" range

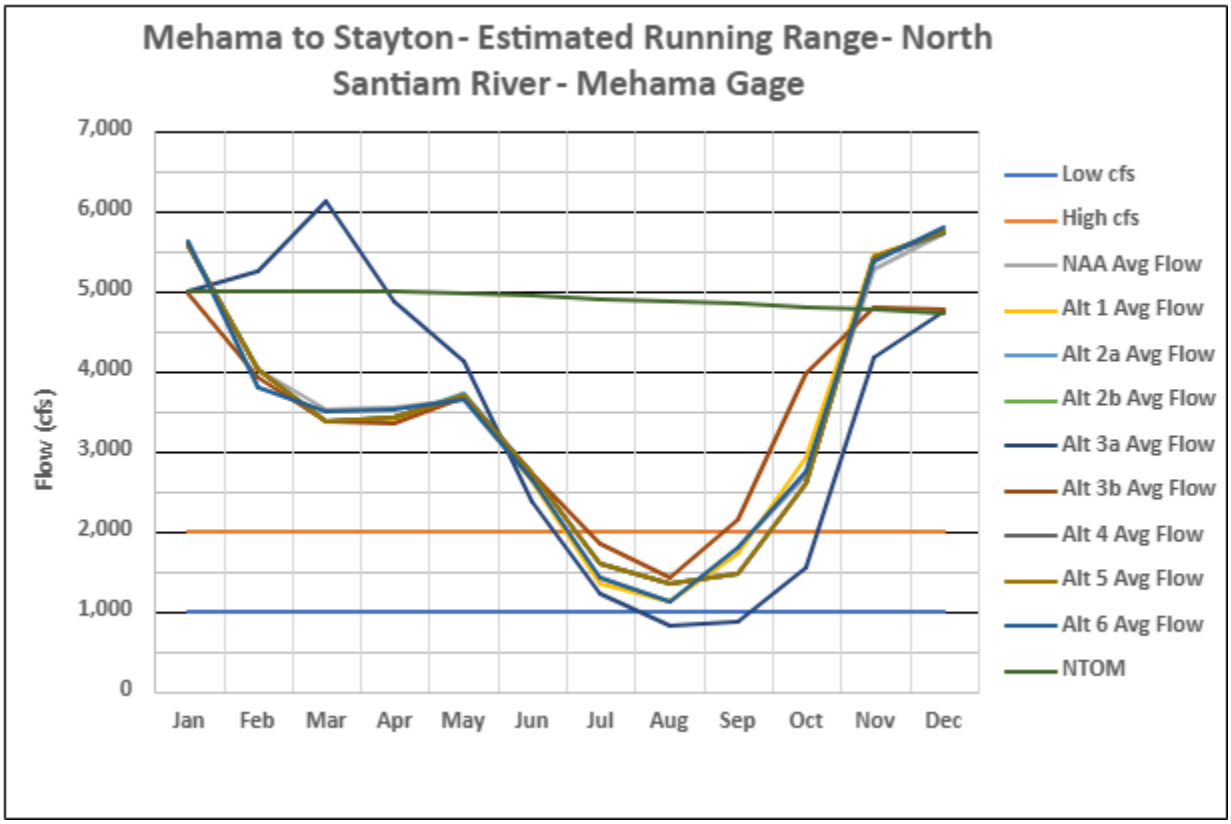
Table 4-13. Mill City to Mehama, Estimated Running Range, North Santiam River, Mehama Gage, Oregon.

Month	Low cfs	High cfs	NAA Avg Flow	Alt 1 Avg Flow	Alt 2a Avg Flow	Alt 2b Avg Flow	Alt 3a Avg Flow	Alt 3b Avg Flow	Alt 4 Avg Flow	Alt 5 Avg Flow	Alt 6 Avg Flow	NTOM
Jan	1,000	3,000	5,571	5,560	5,565	5,563	4,997	4,972	5,559	5,562	5,610	4,993
Feb	1,000	3,000	4,021	4,025	4,006	4,019	5,241	3,912	4,025	4,021	3,785	4,999
Mar	1,000	3,000	3,526	3,372	3,373	3,357	6,108	3,377	3,372	3,357	3,489	4,995
Apr	1,000	3,000	3,536	3,356	3,410	3,409	4,874	3,347	3,413	3,409	3,526	4,987
May	1,000	3,000	3,638	3,717	3,704	3,702	4,107	3,674	3,700	3,700	3,644	4,963
Jun	1,000	3,000	2,632	2,614	2,726	2,725	2,353	2,719	2,725	2,725	2,636	4,933
Jul	1,000	3,000	1,410	1,351	1,596	1,596	1,208	1,832	1,596	1,596	1,419	4,903
Aug	1,000	3,000	1,112	1,112	1,336	1,336	824	1,412	1,336	1,336	1,122	4,876
Sep	1,000	3,000	1,783	1,708	1,469	1,469	854	2,148	1,469	1,469	1,797	4,841
Oct	1,000	3,000	2,698	2,911	2,598	2,598	1,546	3,959	2,598	2,598	2,728	4,802
Nov	1,000	3,000	5,259	5,440	5,405	5,408	4,175	4,781	5,407	5,405	5,378	4,763
Dec	1,000	3,000	5,727	5,722	5,724	5,732	4,745	4,763	5,713	5,735	5,797	4,720

4.2.7 Mehama to Stayton– North Santiam River – River Mile Range 38.6 to 28.5

The graph below shows the high and low water flow ranges for operating recreational watercraft suitable for riverine activities such as kayaking and rafting from Mehama OR to Stayton OR on the North Santiam River, as well as the estimated average monthly flows that are expected to occur under each alternative. The tabular data is shown below the graph.

Figure 4-8. Mehama to Stayton, Estimated Running Range, North Santiam River, Mehama Gage, Oregon.



1.High/low water data source: https://www.americanwhitewater.org/content/River/state-summary/?state=OR. Accessed 6/14/2023

2. High and low water flow range does not in any way represent a "safe" range

Table 4-14. Mehama to Stayton, Estimated Running Range, North Santiam River, Mehama Gage, Oregon.

	Low cfs	High cfs	NAA Avg Flow	Alt 1 Avg Flow	Alt 2a Avg Flow	Alt 2b Avg Flow	Alt 3a Avg Flow	Alt 3b Avg Flow	Alt 4 Avg Flow	Alt 5 Avg Flow	Alt 6 Avg Flow	NTOM
Jan	1,000	2,000	5,571	5,560	5,565	5,563	4,997	4,972	5,559	5,562	5,610	4,993
Feb	1,000	2,000	4,021	4,025	4,006	4,019	5,241	3,912	4,025	4,021	3,785	4,999
Mar	1,000	2,000	3,526	3,372	3,373	3,357	6,108	3,377	3,372	3,357	3,489	4,995
Apr	1,000	2,000	3,536	3,356	3,410	3,409	4,874	3,347	3,413	3,409	3,526	4,987
May	1,000	2,000	3,638	3,717	3,704	3,702	4,107	3,674	3,700	3,700	3,644	4,963
Jun	1,000	2,000	2,632	2,614	2,726	2,725	2,353	2,719	2,725	2,725	2,636	4,933
Jul	1,000	2,000	1,410	1,351	1,596	1,596	1,208	1,832	1,596	1,596	1,419	4,903
Aug	1,000	2,000	1,112	1,112	1,336	1,336	824	1,412	1,336	1,336	1,122	4,876
Sep	1,000	2,000	1,783	1,708	1,469	1,469	854	2,148	1,469	1,469	1,797	4,841
Oct	1,000	2,000	2,698	2,911	2,598	2,598	1,546	3,959	2,598	2,598	2,728	4,802
Nov	1,000	2,000	5,259	5,440	5,405	5,408	4,175	4,781	5,407	5,405	5,378	4,763
Dec	1,000	2,000	5,727	5,722	5,724	5,732	4,745	4,763	5,713	5,735	5,797	4,720

CHAPTER 5 - RECREATION EFFECTS – REGIONAL ECONOMIC DEVELOPMENT

5.1 ASSUMPTIONS AND METHODOLOGY

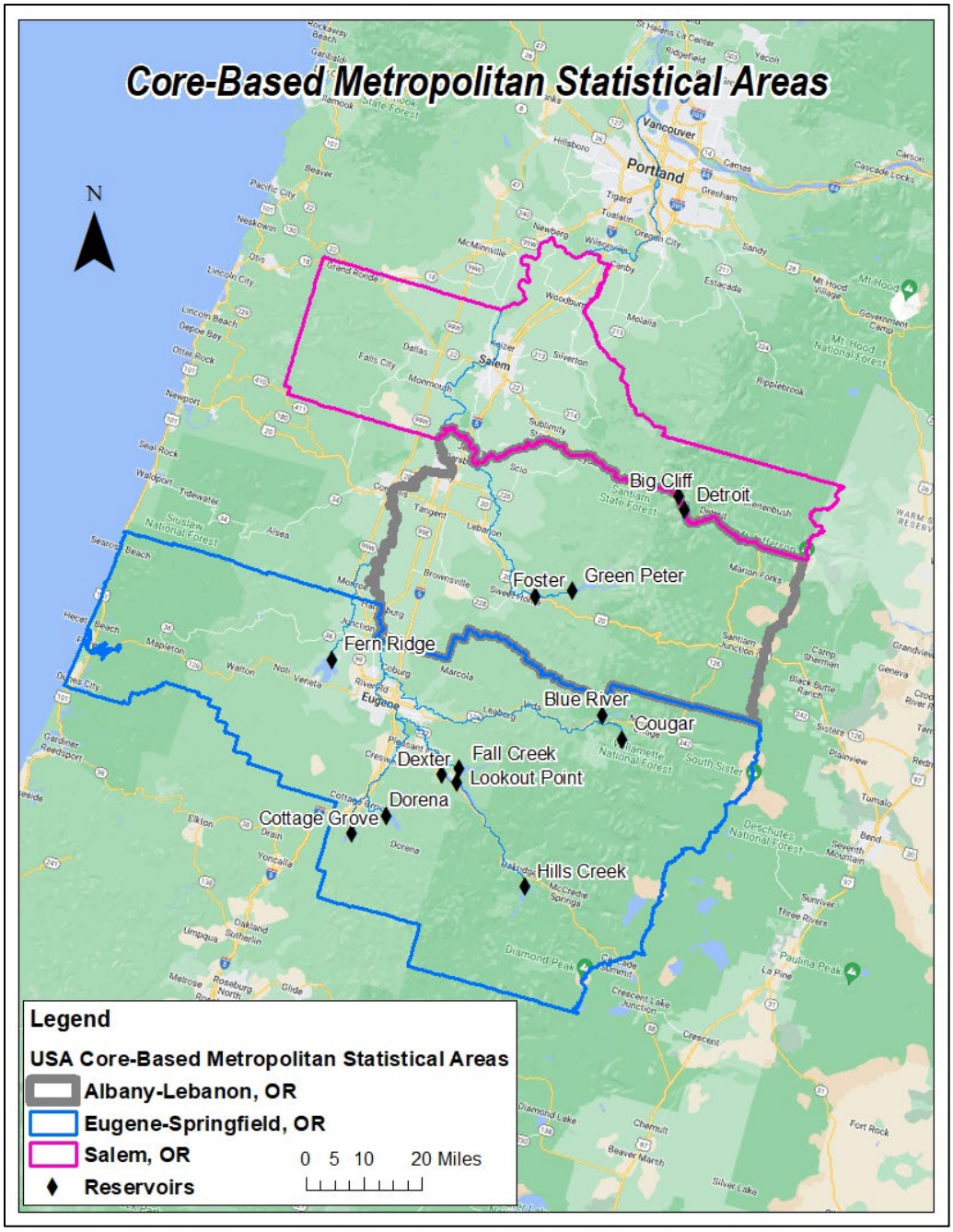
Using the NED methodology and spatial framework of evaluating impacts to lake-borne activities, the PDT is able to reasonably ascertain how the impacts from reservoir elevation will translate into a loss (or gain) in recreation-based visits to any given USACE operated reservoir. The loss or gain in visitation-induced economic activity will translate into a dollar total that will then produce a multiplier. A multiplier can be defined as "the proportional amount of increase or decrease in final income that results from an injection or withdrawal of spending." These activities and expenditures support economic output, jobs, earnings, and value added. Results are shown for three levels of geography: local, state, and national impact areas.

To accomplish the evaluation, visitation numbers, produced in the NED analysis were input in the USACE Regional Economic System (RECONS) Programs and Infrastructure Module, developed by the USACE Institute for Water Resources (IWR). This RECONS module application estimates the regional recreation=related economic impacts resulting from the existence of USACE projects.

For the purposes of this regional economic analysis, the value of the regional output is predicated on the average annual visitation. The multiplier effect associated with results of the uncertainty analysis do not produce substantial variance from the average value of site visitation. This RED analysis also assumes that 80% of people who visit the reservoirs are local (live within the CBSA), and 20% are non-local.

Local area RECONS results are aggregated to the three U.S. Census Bureau Core-based Metropolitan Statistical Areas (CBSA) in which the projects are located, and therefore visitations and subsequent direct economic activity will take place. CBSA's include Eugene-Springfield, Albany-Lebanon, and Salem as shown on the map below. Results are then aggregated at the state level, then the national level.

Figure 5-1. Core-based Metropolitan Statistical Areas Map.



5.2 RED TOTAL OUTPUT BY ALTERNATIVE

The tables below show the results of the RECONS regional economic development modeling across the various alternatives and CBSA-based geographic areas, these are combined effects across each CBSA. The "Local" area is the actual CBSA in which reservoir-induced visitation and direct economic activity (e.g. - person-to-business monetary transactions that occur because of

the existence of the reservoir) take place. The "State" and "U.S." areas are the State of Oregon and United States, respectively.

There are no significant changes to the recreation analysis above that would impact the regional economic development of the FEIS alternatives. The alternative regional economic development analyses in the FEIS are applicable, this section incorporates by reference information for all alternatives. The regional economic development modeling for Alternative 6 and the Revised Interim Operations, and the comparison of the effects to the No Action Alternative are below.

Table 5-1: Total RED Output, No Action

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$74,610,408	704	$30,619,701	$44,234,215
Secondary Impact		$52,992,925	290	$17,432,982	$29,266,790
Total Impact	$74,610,408	$127,603,334	995	$48,052,682	$73,501,003
State					
Direct Impact		$84,176,654	741	$33,691,838	$48,792,250
Secondary Impact		$73,741,847	371	$24,882,620	$41,294,554
Total Impact	$84,176,654	$157,918,501	1,112	$58,574,455	$90,086,805
US					
Direct Impact		$132,811,000	810	$39,094,102	$63,392,295
Secondary Impact		$206,202,851	831	$62,501,406	$108,468,411
Total Impact	$132,811,000	$339,013,850	1,641	$101,595,508	$171,860,706

Table 5-2: RED Output Alternative 1

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$75,746,771	715	$31,080,630	$44,909,113
Secondary Impact		$53,805,517	295	$17,701,593	$29,717,274
Total Impact	$75,746,771	$129,552,289	1,010	$48,782,223	$74,626,387
State					
Direct Impact		$85,440,160	752	$34,196,326	$49,525,744
Secondary Impact		$74,847,050	377	$25,255,570	$41,913,460
Total Impact	$85,440,160	$160,287,209	1,129	$59,451,898	$91,439,206
US					
Direct Impact		$134,800,720	822	$39,679,448	$64,342,137
Secondary Impact		$209,292,102	843	$63,437,777	$110,093,442
Total Impact	$134,800,720	$344,092,821	1,665	$103,117,225	$174,435,579

Table 5-3 RED Output Alternative 2A

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$75,193,359	710	$30,849,245	$44,584,854
Secondary Impact		$53,457,970	293	$17,589,804	$29,529,508
Total Impact	$75,193,359	$128,651,330	1,002	$48,439,050	$74,114,362
State					
Direct Impact		$84,800,818	746	$33,935,114	$49,154,404
Secondary Impact		$74,281,776	374	$25,064,917	$41,596,943
Total Impact	$84,800,818	$159,082,594	1,120	$59,000,032	$90,751,347
US					
Direct Impact		$133,779,246	816	$39,376,168	$63,854,155
Secondary Impact		$207,706,180	837	$62,957,076	$109,259,202
Total Impact	$133,779,246	$341,485,424	1,653	$102,333,244	$173,113,357

Table 5-4 RED Output Alternative 2B

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$74,535,83	704	$30,585,195	$44,192,010
Secondary Impact		$52,960,46	290	$17,423,842	$29,251,224
Total Impact	$74,535,831	$127,496,2	994	$48,009,038	$73,443,233
State					
Direct Impact		$84,079,08	740	$33,650,139	$48,735,830
Secondary Impact		$73,653,61	371	$24,852,892	$41,245,160
Total Impact	$84,079,083	$157,732,6	1,111	$58,503,031	$89,980,990
US					
Direct Impact		$132,650,3	809	$39,045,630	$63,315,510
Secondary Impact		$205,953,5	830	$62,425,831	$108,337,250
Total Impact	$132,650,389	$338,603,9	1,639	$101,471,460	$171,652,760

Table 5-5 RED Output Alternative 3A

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$71,175,353	673	$29,237,18	$42,198,734
Secondary Impact		$50,623,971	277	$16,650,82	$27,956,679
Total Impact	$71,175,353	$121,799,324	950	$45,888,01	$70,155,412
State					
Direct Impact		$80,393,025	708	$32,173,29	$46,589,673
Secondary Impact		$70,426,402	355	$23,763,92	$39,437,975
Total Impact	$80,393,025	$150,819,428	1,062	$55,937,21	$86,027,649
US					
Direct Impact		$126,837,108	774	$37,331,89	$60,539,051
Secondary Impact		$196,927,776	793	$59,690,07	$103,589,465
Total Impact	$126,837,108	$323,764,884	1,567	$97,021,96	$164,128,515

Table 5-6 RED Output Alternative 3B

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$70,077,003	659	$28,651,503	$41,594,282
Secondary Impact		$50,223,450	275	$16,560,303	$27,794,728
Total Impact	$70,077,003	$120,300,453	933	$45,211,808	$69,389,009
State					
Direct Impact		$78,689,836	691	$31,435,437	$45,620,624
Secondary Impact		$68,869,812	347	$23,239,690	$38,566,592
Total Impact	$84,475,647	$147,559,649	1,038	$54,675,128	$84,187,216
US					
Direct Impact		$123,998,091	756	$36,473,913	$59,184,027
Secondary Impact		$192,519,903	776	$58,354,016	$101,270,801
Total Impact	$133,270,982	$316,517,994	1,531	$94,827,929	$160,454,829

Table 5-7 RED Output Alternative 4

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$74,896,484	707	$30,730,253	$44,407,412
Secondary Impact		$53,232,537	292	$17,514,536	$29,403,312
Total Impact	$74,896,484	$128,129,021	998	$48,244,789	$73,810,722
State					
Direct Impact		$84,475,647	744	$33,806,859	$48,965,811
Secondary Impact		$73,998,887	373	$24,969,430	$41,438,519
Total Impact	$84,475,647	$158,474,535	1,116	$58,776,289	$90,404,331
US					
Direct Impact		$133,270,982	813	$39,227,412	$63,611,642
Secondary Impact		$206,917,025	833	$62,717,877	$108,844,086
Total Impact	$133,270,982	$340,188,007	1,647	$101,945,28	$172,455,727

Table 5-8 RED Output Alternative 5

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$74,023,476	699	$30,379,50	$43,885,899
Secondary Impact		$52,572,664	288	$17,294,46	$29,034,288
Total Impact	$74,023,476	$126,596,141	987	$47,673,97	$72,920,188
State					
Direct Impact		$83,516,834	735	$33,428,18	$48,409,755
Secondary Impact		$73,164,286	368	$24,687,72	$40,971,124
Total Impact	$83,516,834	$156,681,119	1,104	$58,115,90	$89,380,880
US					
Direct Impact		$131,771,069	804	$38,788,18	$62,895,940
Secondary Impact		$204,588,259	824	$62,012,01	$107,619,090
Total Impact	$131,771,069	$336,359,328	1,628	$100,800,1	$170,515,031

Table 5-9 RED Output Alternative 6

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$74,596,770	704	$30,612,20	$44,226,953
Secondary Impact		$52,990,934	290	$17,432,99	$29,266,684
Total Impact	$74,596,770	$127,587,703	994	$48,045,20	$73,493,638
State					
Direct Impact		$84,154,723	741	$33,682,02	$48,779,700
Secondary Impact		$73,721,505	371	$24,875,77	$41,283,169
Total Impact	$84,154,723	$157,876,228	1112	$58,557,79	$90,062,870
US					
Direct Impact		$132,773,704	810	$39,082,67	$63,374,465
Secondary Impact		$206,144,950	830	$62,483,85	$108,437,953
Total Impact	$132,773,704	$338,918,652	1640	$101,566,5	$171,812,418

Table 5-10 RED Output NTOM

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$71,254,899	673	$29,265,13	$42,232,602
Secondary Impact		$50,483,900	277	$16,598,39	$27,866,925
Total Impact	$71,254,899	$121,738,800	950	$45,863,52	$70,099,527
State					
Direct Impact		$80,469,073	709	$32,223,78	$46,642,587
Secondary Impact		$70,510,507	355	$23,792,00	$39,484,956
Total Impact	$80,469,073	$150,979,580	1,064	$56,015,79	$86,127,543
US					
Direct Impact		$127,001,376	775	$37,391,19	$60,620,048
Secondary Impact		$197,182,806	794	$59,767,37	$103,723,619
Total Impact	$127,001,376	$324,184,182	1,569	$97,158,56	$164,343,666

5.3 RED OUTPUT: NO ACTION ALTERNATIVE VS. ACTION ALTERNATIVES

Where the previous section presented the RECONS RED benefit outputs by alternative, this section shows the difference between the RED output of the NAA and Action Alternatives.

Table 5-11 RED Output Difference, Alternative 1 vs. NAA

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$1,136,363	11	$460,929	$674,898
Secondary Impact		$812,592	5	$268,611	$450,484
Total Impact	$1,136,363	$1,948,955	15	$729,541	$1,125,384
State					
Direct Impact		$1,263,506	11	$504,488	$733,494
Secondary Impact		$1,105,203	6	$372,950	$618,906
Total Impact	$1,263,506	$2,368,708	17	$877,443	$1,352,401
US					
Direct Impact		$1,989,720	12	$585,346	$949,842
Secondary Impact		$3,089,251	12	$936,371	$1,625,031
Total Impact	$1,989,720	$5,078,971	25	$1,521,717	$2,574,873

Table 5-12 RED Output Difference, Alternative 2A vs. NAA

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$582,951	5	$229,544	$350,639
Secondary Impact		$465,045	3	$156,822	$262,718
Total Impact	$582,951	$1,047,996	8	$386,368	$613,359
State	$0	$0	0	$0	$0
Direct Impact	$0	$624,164	5	$243,276	$362,154
Secondary Impact	$0	$539,929	3	$182,297	$302,389
Total Impact	$624,164	$1,164,093	8	$425,577	$664,542
US	$0	$0	0	$0	$0
Direct Impact	$0	$968,246	6	$282,066	$461,860
Secondary Impact	$0	$1,503,329	6	$455,670	$790,791
Total Impact	$968,246	$2,471,574	12	$737,736	$1,252,651

Table 5-13 RED Output Difference, Alternative 2B vs. NAA

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		-$74,577	-1	-$34,506	-$42,205
Secondary Impact		-$32,462	0	-$9,140	-$15,566
Total Impact	-$74,577	-$107,040	-1	-$43,644	-$57,770
State					
Direct Impact		-$97,571	-1	-$41,699	-$56,420
Secondary Impact		-$88,231	0	-$29,728	-$49,394
Total Impact	-$97,571	-$185,802	-1	-$71,424	-$105,815
US					
Direct Impact		-$160,611	-1	-$48,472	-$76,785
Secondary Impact		-$249,338	-1	-$75,575	-$131,161
Total Impact	-$160,611	-$409,950	-2	-$124,048	-$207,946

Table 5-14 RED Output Difference, Alternative 3A vs. NAA

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		-$3,435,055	-32	-$1,382,515	-$2,035,481
Secondary Impact		-$2,368,954	-13	-$782,156	-$1,310,111
Total Impact	-$3,435,055	-$5,804,010	-45	-$2,164,669	-$3,345,591
State					
Direct Impact		-$3,783,629	-33	-$1,518,546	-$2,202,577
Secondary Impact		-$3,315,445	-17	-$1,118,692	-$1,856,579
Total Impact	-$3,783,629	-$7,099,073	-50	-$2,637,236	-$4,059,156
US					
Direct Impact		-$5,973,892	-36	-$1,762,209	-$2,853,244
Secondary Impact		-$9,275,075	-37	-$2,811,335	-$4,878,946
Total Impact	-$5,973,892	-$15,248,966	-74	-$4,573,544	-$7,732,191

Table 5-15 RED Output Difference, Alternative 3B vs. NAA

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		-$4,533,405	-46	-$1,968,198	-$2,639,933
Secondary Impact		-$2,769,475	-15	-$872,679	-$1,472,062
Total Impact	-$4,533,405	-$7,302,881	-61	-$2,840,874	-$4,111,994
State					
Direct Impact		-$5,486,818	-50	-$2,256,401	-$3,171,626
Secondary Impact		-$4,872,035	-24	-$1,642,930	-$2,727,962
Total Impact	$298,993	-$10,358,852	-74	-$3,899,327	-$5,899,589
US					
Direct Impact		-$8,812,909	-54	-$2,620,189	-$4,208,268
Secondary Impact		-$13,682,948	-55	-$4,147,390	-$7,197,610
Total Impact	$459,982	-$22,495,856	-109	-$6,767,579	-$11,405,877

Table 5-16 RED Output Difference, Alternative 4 vs. NAA

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		$286,076	3	$110,552	$173,197
Secondary Impact		$239,612	1	$81,554	$136,522
Total Impact	$286,076	$525,687	4	$192,107	$309,719
State					
Direct Impact		$298,993	3	$115,021	$173,561
Secondary Impact		$257,040	1	$86,810	$143,965
Total Impact	$298,993	$556,034	4	$201,834	$317,526
US					
Direct Impact		$459,982	3	$133,310	$219,347
Secondary Impact		$714,174	3	$216,471	$375,675
Total Impact	$459,982	$1,174,157	6	$349,781	$595,021

Table 5-17 RED Output Difference, Alternative 5 vs. NAA

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		-$586,932	-5	-$240,192	-$348,316
Secondary Impact		-$420,261	-2	-$138,516	-$232,502
Total Impact	-$586,932	-$1,007,193	-8	-$378,706	-$580,815
State					
Direct Impact		-$659,820	-6	-$263,657	-$382,495
Secondary Impact		-$577,561	-3	-$194,895	-$323,430
Total Impact	-$659,820	-$1,237,382	-9	-$458,549	-$705,925
US					
Direct Impact		-$1,039,931	-6	-$305,916	-$496,355
Secondary Impact		-$1,614,592	-7	-$489,393	-$849,321
Total Impact	-$1,039,931	-$2,654,522	-13	-$795,310	-$1,345,675

Table 5-18 RED Output Difference, Alternative 6 vs. NAA

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		-$13,638	0	-$7,492	-$7,262
Secondary Impact		-$1,991	0	$12	-$106
Total Impact	-$13,638	-$15,631	0	-$7,480	-$7,365
State					
Direct Impact		-$21,931	0	-$9,816	-$12,550
Secondary Impact		-$20,342	0	-$6,847	-$11,385
Total Impact	-$21,931	-$42,273	0	-$16,659	-$23,935
US					
Direct Impact		-$37,296	0	-$11,423	-$17,830
Secondary Impact		-$57,901	0	-$17,551	-$30,458
Total Impact	-$37,296	-$95,198	-1	-$28,972	-$48,288

Table 5-19 RED Output Difference, NTOM vs. NAA

Area	Local Capture [1]	Output [2]	Jobs [3]	Labor Income [4]	Value Added [5]
Local					
Direct Impact		-$3,355,509	-31	-$1,354,568	-$2,001,613
Secondary Impact		-$2,509,025	-14	-$834,587	-$1,399,865
Total Impact	-$3,355,509	-$5,864,534	-45	-$2,189,154	-$3,401,476
State					
Direct Impact		-$3,707,581	-32	-$1,468,049	-$2,149,663
Secondary Impact		-$3,231,340	-16	-$1,090,616	-$1,809,598
Total Impact	-$3,707,581	-$6,938,921	-49	-$2,558,661	-$3,959,262
US					
Direct Impact		-$5,809,624	-35	-$1,702,908	-$2,772,247
Secondary Impact		-$9,020,045	-36	-$2,734,034	-$4,744,792
Total Impact	-$5,809,624	-$14,829,668	-72	-$4,436,940	-$7,517,040

CHAPTER 6 - RECREATION EFFECTS – CAPACITY UTILIZATION

Campground occupancy rate data provided by U.S. Forest Service (USFS) recreation personnel is summarized in this section. The following tables show average occupancy rates at various USFS campgrounds at Detroit, Hills Creek, Blue River, and Cougar Reservoirs for the years 2020 to 2022. Occupancy rates are calculated by dividing the number of nights campsites are available by the number of nights they are occupied for a given time period. The figures below show occupancy rates by reservoir for the years 2020 to 2022.

Figure 6-1. U.S. Forest Service Campground Average Occupancy Rate, Detroit Reservoir, Oregon.

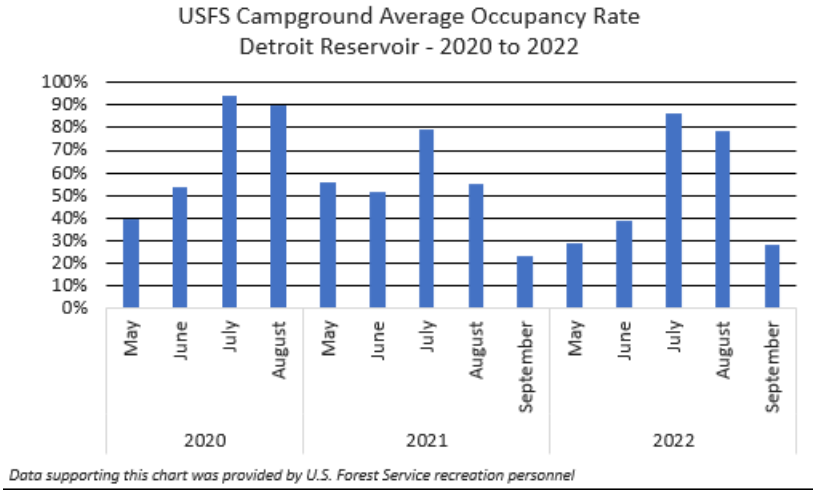


Figure 6-2. U.S. Forest Service Campground Average Occupancy Rate, Hills Creek Reservoir, Oregon.

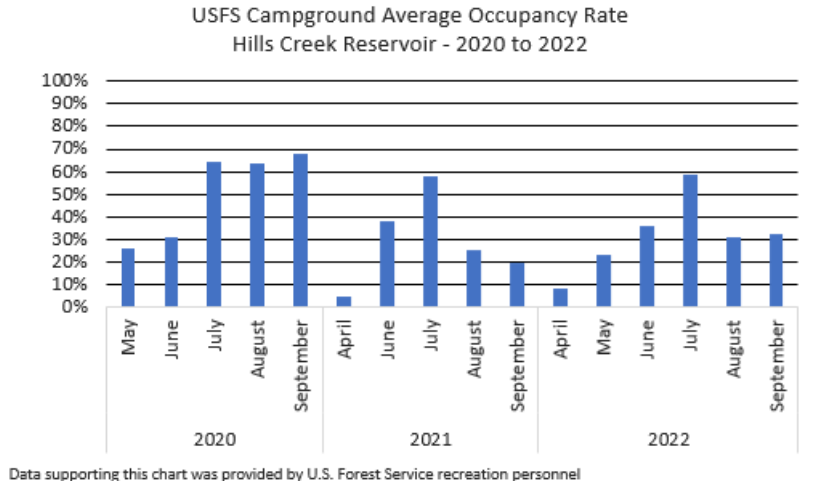


Figure 6-3. U.S. Forest Service Campground Average Occupancy Rate, Cougar Reservoir, Oregon.

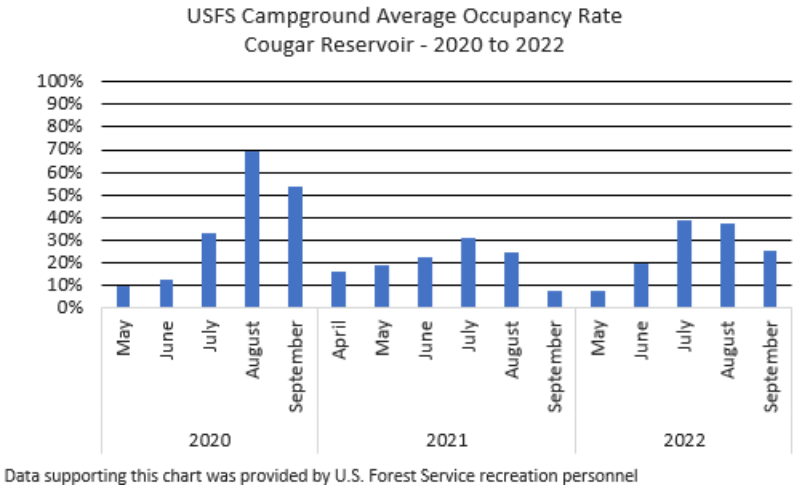


Figure 6-4. U.S. Forest Service Campground Average Occupancy Rate, Blue River Reservoir, Oregon.

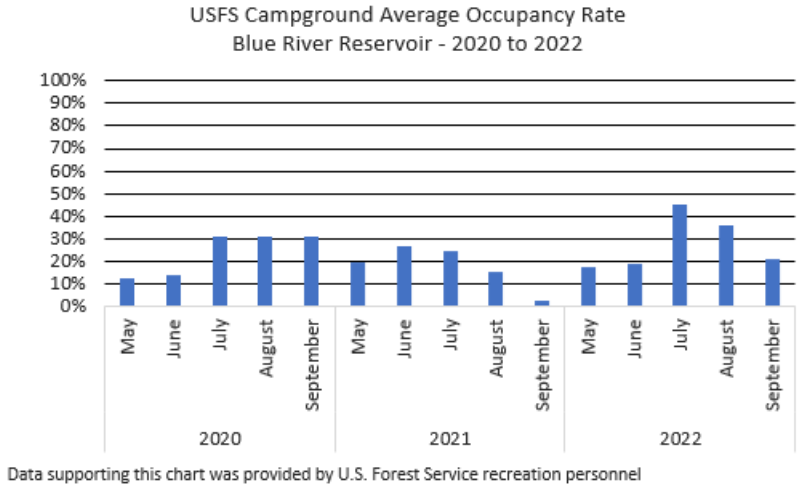
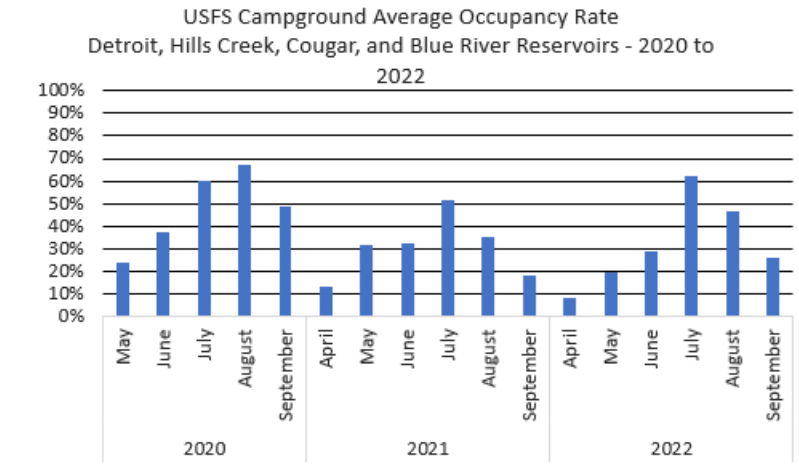


Figure 6-5. U.S. Forest Service Campground Average Occupancy Rate, Detroit, Hills Creek, Cougar, and Blue River Reservoirs, Oregon.



Data supporting this chart was provided by U.S. Forest Service recreation personnel

The figures below show occupancy rates by campground for the years 2020-2022

Figure 6-6. U.S. Forest Service Campground Average Occupancy Rate, Detroit Reservoir Campgrounds, Oregon.

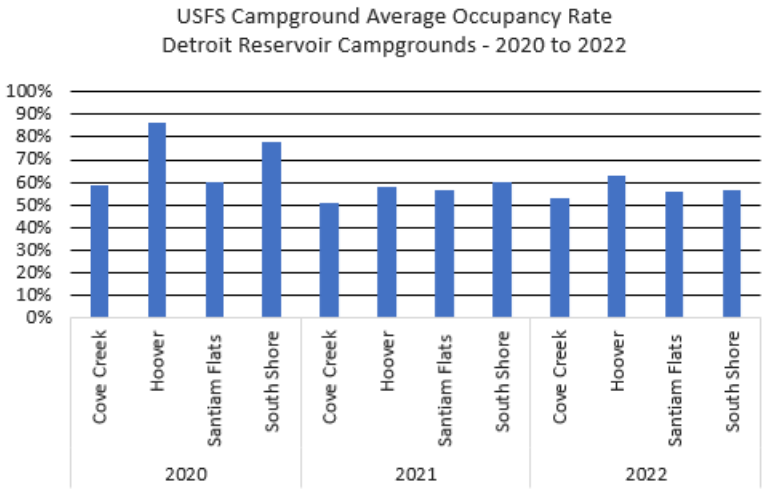


Figure 6-7. U.S. Forest Service Campground Average Occupancy Rate, Hills Creek Reservoir Campgrounds, Oregon.

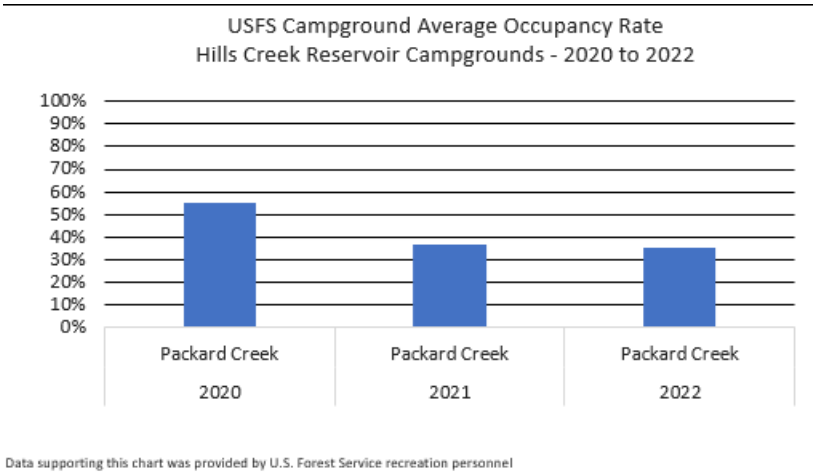


Figure 6-8. U.S. Forest Service Campground Average Occupancy Rate, Cougar Reservoir Campgrounds, Oregon.

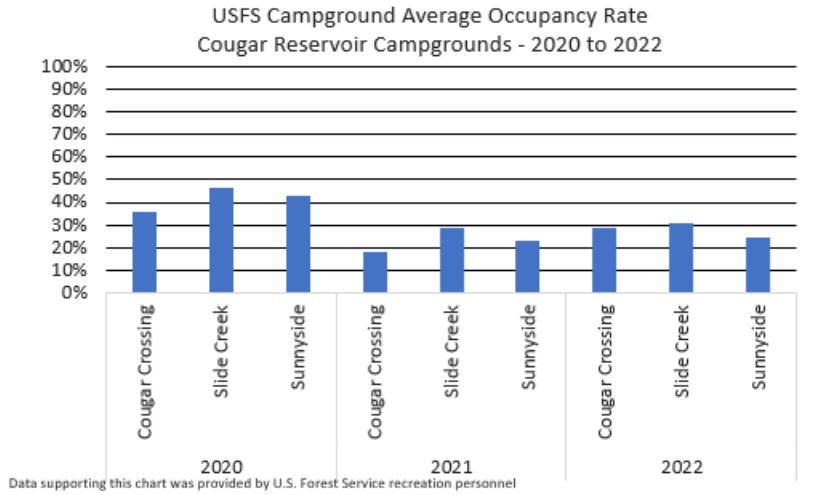
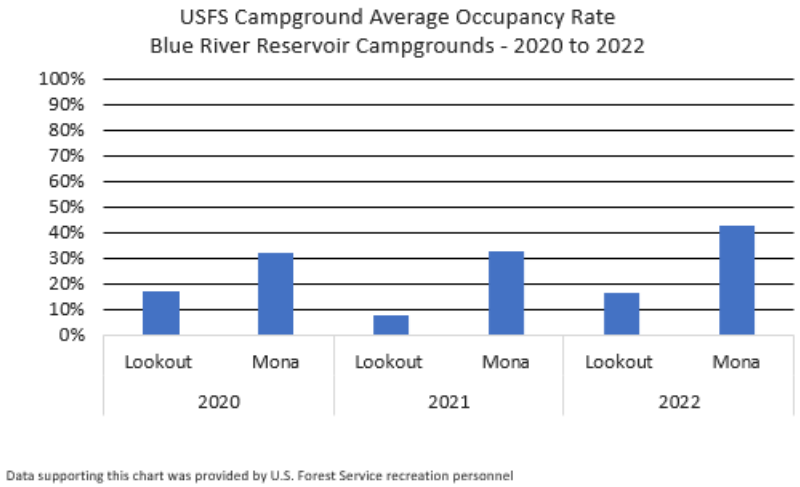


Figure 6-9. U.S. Forest Service Campground Average Occupancy Rate, Blue River Reservoir Campgrounds, Oregon.



Data supporting this chart was provided by U.S. Forest Service recreation personnel

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