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7.5 RECREATION CAPACITY AND SUITABILITY ANALYSIS (REC 5)

7.5.1 Study Objectives

The objective of this study is to investigate the capacity of recreation resources to accommodate existing and additional visitation. It will also assess whether new recreation facilities and activities are suitable in the study area while maintaining the integrity of various resources and meeting the long-term needs of visitors and their desired experience. This type of analysis is sometimes called a recreation carrying capacity analysis. Recreation carrying capacity has been defined in a number of ways, but a useful definition is “the level of use beyond which impacts exceed standards” (Shelby and Heberlein 1986). At some point, recreation demand cannot be met without negatively affecting sensitive resources in the study area and/or the recreation experience that people seek when they come to a site, reservoir, river, or watershed.

The full results of this study are presented in REC 5 Appendix 1 of this report. In addition, a related but separate study, Trail Feasibility Study (see REC 5 Appendix 2), addresses trail-related recreation resources in the study area. It identifies potential trails to accommodate future demand for trail-related activities.

7.5.2 Study Area

The study area for this analysis includes the recreation sites, use areas, and water bodies at Lake Merwin, Yale Lake, Swift Reservoir, Swift bypass reach, and the Swift No.2 canal. The study area also considers a 0.5-mile (0.8 km) buffer zone surrounding each reservoir for the GIS-based analysis.

7.5.3 Methods

7.5.3.1 Study Design

This analysis consists of 6 interrelated tasks:

- An analysis of existing recreation facility capacity and expansion capability using facility and use area occupancy levels and capacity utilization (expansion of the analysis conducted for Yale Lake) (PacifiCorp 1999).
- An analysis of the suitability for potential recreation development using GIS technology that assesses opportunities and constraints to potential recreation development in the study area (expansion of the analysis conducted for Yale Lake) (PacifiCorp 1999).
- A trail routing study using mapped GIS land and resource data, field reconnaissance, resource work group consultation, and GPS recordings to identify compatible non-motorized trail route(s) in the study area. This study would analyze alternative trail routes and required construction techniques, potential constraints and impacts of various routes, and estimated costs. The trail is intended to accommodate non-

motorized uses only. This task builds off of other GIS-based analyses in this overall study plan and is contingent upon initiation of the overall package.

- An analysis and mapping of desired recreation opportunities or experiences in the study area using a modified USFS-based Recreation Opportunity Spectrum (ROS) or other similar type of recreation management methodology. ROS classes will be defined and mapped for non-USFS-managed project lands. This mapping and analysis will help define the vision of the RRG. It would also define future recreation management units to be used in the RRMP. Furthermore, the analysis will help define what types of recreation opportunities (e.g., primitive, semi-primitive, developed or urban) will be provided on non-USFS-managed project lands and where those boundaries are located. This analysis will then be used in the RRMP's proposed Monitoring Program.
- Identification of appropriate Limits of Acceptable Change (LAC) indicators and standards based on a modified USFS-based methodology applied to the project area. LAC indicators and standards will be developed and applied to each management unit. This analysis will then be used in the RRMP's proposed Monitoring Program.
- Compilation of the above tasks into a summary report.

The capacity and suitability information will be used in the follow-on Recreation Needs Analysis by providing compatibility information on the limitations of potential new recreation development such as trails, campgrounds, and day use sites. Facility, resource or social capacity information will also be integrated into the RRMP's proposed Monitoring Program.

7.5.3.2 Study Area

The study area for this analysis is the area surrounding the project reservoirs (0.5-mile buffer zone around the 3 reservoirs and the Swift No. 2 Project area).

7.5.3.3 Analytical Methods and Reporting

Methodology for the 6 interrelated component tasks of this analysis is described below.

Existing Recreation Facility Occupancy and Utilization Analysis

The first part of this analysis assesses recreation capacity based on analysis of existing recreation facility occupancy and capacity utilization in the study area. This analysis will focus on the capacity of developed recreation facilities because they receive the greatest amount of visitation and are subject to increased crowding problems. These resources include developed campgrounds and day-use areas including boat launches. The capacity analysis will utilize recreation use and facility data obtained in the Recreation Demand Analysis Study, Supply Analysis Study, survey of private RV park/resort owners and operators, and the visitor attitudes and preferences survey. These analyses will provide an understanding of area facilities, existing use patterns, responses to questions regarding crowding, and facility capacities.

To assess developed facility capacity, several indicators will be reviewed that may demonstrate that a capacity problem exists. More than one indicator will be used whenever possible. Three primary types of capacity indicators to be reviewed in this analysis include:

- Campground Occupancy Rates - These include weekday, weekend, weekly, and peak day rates for campgrounds and are used to measure facility capacity during different time frames. Actual rates will be calculated based on PacifiCorp camp host counts and vehicle counts.
- Survey Crowding Responses - These include responses to specific survey questions dealing with visitor crowding, facility needs, and user attitudes. These responses will indicate how visitors feel about existing facility use and whether capacity levels may be exceeded. This indicator will focus on the percentage of respondents who felt crowded to some degree. Perceived crowding assessment judgments are based on previous research (Shelby and Heberlein 1986) conducted independently of the watershed studies. This research has utilized responses from more than 17,000 individuals in 35 studies. The research resulted in a 5-category ranking of capacity judgment:

Suppressed Crowding	0-35 percent feel crowded
Low Normal	35-50 percent feel crowded
High Normal	50-65 percent feel crowded
More than Capacity	65-80 percent feel crowded
Much More than Capacity	80-100 percent feel crowded

Crowding responses from the recreation survey will be compared against these judgment rankings to identify potential capacity problems.

- Facility Capacity Utilization - These include percentage measurements of facility utilization developed in this analysis. This methodology was adapted from indicators used by federal agencies (USFS, BLM, and others) including persons-at-one-time (PAOTs), recreation visitor days (RVDs), and facility capacity utilization percentages. Indicators will be applied to the season defined as when facilities are open to the public and when use primarily occurs.

Seasonal facility capacity threshold level definitions adapted from similar levels used by federal land management agencies and used in this analysis include:

- 40 percent - "Optimal Use" - Allows a facility or use area to rest and revegetate during slow periods or periods of closure. Peak capacity is typically reached during summer holiday weekends and during a few summer weekends. This level of use is optimal for many older facilities and those in sensitive resource areas. Newer

facilities may accommodate higher percentages of use due to the incorporation of sensitive design features and siting.

- 60 percent - “Well Utilized” - Indicates a well utilized facility or use area which reaches capacity during summer holidays, most summer weekends, and a few summer weekdays. A newer well-designed facility should function satisfactorily at this level of use, if allowed to rest during the off-season. An older facility will likely not be able to accommodate this level of use without significant impact or degradation of the user experience. Many visitors will perceive some crowding; however, off-peak periods are still available for those visitors who desire more solitude. Some impacts may be expected and will likely need to be addressed.
- 80 percent - “Heavily Utilized” - Indicates a very high level of use with capacity reached or exceeded during all summer weekends, many summer weekdays, and all summer holidays. The visitor experience is more urban with fewer opportunities for solitude. Many more visitors will perceive some crowding and many will likely go elsewhere. Sustained use at this level requires hardened or paved facilities, increased levels of management and crowd control, a full reservation system, and a more aggressive monitoring program. Impacts and maintenance levels increase substantially at this higher level.
- 100 percent - “Extreme Use” - Indicates an extreme use level with facilities always at or above capacity, even during weekdays. The visitor experience becomes much more urban in nature with little or no opportunities for solitude. Most visitors will perceive crowding and many will likely go elsewhere. Sustained use at this level requires more hardened or paved facilities, increased levels of management, full reservations, and increased levels of monitoring and crowd control. Impacts and maintenance levels likely increase substantially at this higher level.

Facility use indicators, such as maximum number of campsites and parking spaces, will also be used to determine the maximum amount of people a site could accommodate at any one time. This is called a PAOT measurement. This measure is a common theoretical capacity measurement used for developed facilities. When the number of days the facility is open for public use is taken into account, another capacity measure (the PAOT day) may be identified for each facility. Multiplying the total PAOT days by 2 for overnight facilities or by 1 for day-use areas provides an estimate of maximum theoretical capacity utilization (or capacity utilization) in a second unit measure called RVDs. The RVD measure is utilized by the federal land management agencies when measuring visitor use over time, such as total RVDs per season or year. It recognizes a smaller unit of time (12 hours).

Analysis of Recreation Development Suitability Using GIS Technology

The second part of this analysis will assess recreation site development suitability from a resource database overlay perspective. The ability of the study area to accommodate any new potential recreation site development will be assessed using GIS-based technology. This analysis will look at a number of opportunities and constraints to recreation site development in the study area.

Opportunities and constraints to recreation site development will be assessed using a series of available resource data layers contained in PacifiCorp's GIS database.

Opportunity and constraint GIS data layers will be used in this analysis (see the Yale Recreation FTR for an example of GIS-based products) (PacifiCorp 1999). Opportunities and constraints for potential recreation development will be considered including natural and man-made factors. GIS data layers and buffer area, where applicable, will be ranked from 1 to 5 (low to high priority weights) to develop opportunity and constraint maps that depict a range of low to high values. Composite recreation development opportunity and constraints maps will then be prepared. Acreage totals for each category ranking will be generated by GIS.

7.5.4 Key Questions

The Recreation Capacity and Suitability Analysis (see REC 5 Appendices 1 and 2) will address the following "key" questions as they relate to relicensing:

- Is extending the season of use for campgrounds compatible with terrestrial resource values?

This topic is currently being discussed in the RRG and TRG. Extending the season of use for campgrounds would appear to have varying effects, depending upon which site is selected and the exact timeframe being considered. At Cresap Bay Campground, extending the season of use would conflict with guidelines established in the Merwin Wildlife Habitat Management Program. Extending the season of use at Cougar Camp and/or Beaver Bay Campground may have varying effects on elk corridor use or winter range use. Some timeframe expansion may be acceptable, as long as it does not extend into the period of time that elk are present. At Swift Campground, the timeframe is already extended to accommodate hunters and anglers in the shoulder season.

- Are existing and potential future shoreline recreation developments such as campgrounds, picnic areas, and access points compatible with sensitive resources?

A range of sensitive ecological resources was considered in the GIS-based recreation site development suitability analysis conducted as part of this study. Based on this analysis, only a small percentage of the study area is suitable for potential new recreation development. In addition, priority is given to infill or expansion of existing recreation facilities, not new facilities in undeveloped areas. The Cougar Park/Camp area appears to be the most suitable for new recreation facility development, assuming that an adequate buffer along Cougar Creek is provided.

- Are existing and future recreation needs compatible with basin resources?

Both existing and future recreation needs were examined in the Recreation Capacity and Suitability Analysis and the Recreation Needs Analysis. It is believed that project-related recreation needs may be met through the programs to be developed in the RRMP. Recreation development is believed to be sustainable and appropriate for the project area and compatible with basin resources.

- Is an extension of the Lewis River Trail feasible and compatible along Swift and Yale reservoirs, potentially creating a component of a regional trail system?

Phase 2 of the Trail Feasibility Study (completed in 2002; see REC 5 Appendix 3) includes a schematic plan for a non-motorized trail network, specifying trailhead locations and feasible connections to trails outside the study area, such as the Lewis River Trail. Phase 1 of the Trail Feasibility Study (completed, see REC 5 Appendix 2 of this report) summarized potential non-motorized trail alignments along Swift Reservoir and Yale Lake. The most feasible segment along Swift Reservoir follows existing roads on the south side under the control of the Washington DNR and Pope Resources. To determine the feasibility and compatibility of an extension of the Lewis River Trail, discussions with Pope Resources and the DNR on the use of these roads for recreation purposes needs to occur. In addition, the compatibility of the proposed trail route with the existing residential development at Swift Reservoir (Northwoods) also needs to be further explored. Other resource issues still need to be investigated, including an eagle nest and old growth habitat near Drift Creek, and several washout areas along existing timber roads that would be used as trail routes. A trail along Yale Lake would appear to be relatively straightforward to implement since the most feasible route follows the existing Yale IP Road alignment. There are, however, several resource, land ownership and easement, and maintenance issues that need further investigation to finalize a trail route along Yale Lake.

- Are there conflicts between types of reservoir recreation and tribal uses, and how can potential conflicts be reduced?

Further discussions with the Cultural Resource Group are needed as trail programs are integrated into the RRMP. However, since recreation-related impacts to terrestrial and aquatic resources are being minimized in current recreation plans, it is anticipated that tribal use areas and values can be protected. Additionally, new recreation development being considered will be focused at or adjacent to existing recreation sites, thereby protecting existing undisturbed areas.

7.5.5 Results and Discussion

The major findings of the Recreation Capacity and Suitability Analysis are summarized below. Results of the analysis are documented in detail in REC 5 Appendix 1 in this 2001 Technical Report. Phases 1 and 2 of the Trail Feasibility Study are included as REC 5 Appendices 2 and 3.

7.5.5.1 Summary of Recreation Facility Capacity

Recreation facility capacity was assessed by analyzing 2 indicators: (1) recreation site utilization, and (2) recreation capacity types and limiting factors. These 2 indicators are summarized below.

Recreation Site Utilization

Campground, day use site (including river access sites below Merwin Dam), and dispersed site capacity utilization data are presented in Table 7.5-1. Below are highlights of these table data.

- Recreation site and facility utilization varies greatly during the recreation season due to weather conditions. Peak use occurs during the drier summer months (July and August), especially during warmer weekends.
- In general, campgrounds are much more heavily used than day use areas on a consistent basis. Not all sites are used equally.
- Half (2) of all campgrounds are currently at capacity on a seasonal basis.
- On average, campgrounds operate at approximately 50 percent of capacity during the recreation season. This rises to 94 percent during peak months.
- About half (9) of all developed day use sites are below or approaching capacity on a seasonal basis.
- Day use sites operate at about one-third (35 percent) of capacity during the recreation season. During peak months, utilization of day use sites rises to over half (52 percent).
- On average, seasonal dispersed site camping (39 percent) and day use (40 percent) are below capacity on all 3 reservoirs. During the 2 peak months, utilization of both dispersed camping (58 percent) and day use sites (53 percent) is much higher.
- The maximum theoretical capacity (for planning purposes) for all recreation sites in the project area is approximately 1,641,000 visitors. This total is based on 100 percent utilization of all developed campsites, parking spaces, and dispersed sites during the season when these facilities are available for public use.
- An estimate of the actual number of visitors to the study area is about 594,000 visitors. This equates to a 36 percent seasonal utilization of all sites in the project area.
- During the 2 peak months, the estimated number of visitors to the study area is about 254,000 visitors. Utilization rises to 58 percent during this period.

Table 7.5-1. Capacity of study area recreation sites.

	Number of Sites/Spaces	Season Days Open to the Public	Maximum Visitor Capacity – Season ¹	Estimated Average # of Sites/ Spaces Occupied per Day – Season	Current Visitor Use – Season	Current Seasonal Occupancy	Maximum Visitor Capacity – Peak Months ²	Estimated Average # of Sites/Spaces Occupied per Day – Peak	Current Visitor Use – Peak Months	Current Peak Month Occupancy
Developed Campground Sites	Campsites									
Beaver Bay	63	150	32,130	31	15,810	49 percent	13,280	60	12,648	95 percent
Cougar Camp	45	102	15,606	30	10,404	67 percent	9,486	44	9,275	98 percent
Cresap Bay	58	102	20,114	44	15,259	76 percent	12,226	54	11,383	93 percent
Swift Camp	93	210 ³	47,552	33	15,484	33 percent	19,604	86	18,129	92 percent
SUBTOTAL	259	102-210	115,403	138	56,957	49 percent	54,597	244	51,435	94 percent
Developed Day Use Sites	Parking									
Beaver Bay	40	150	20,400	11	5,610	28 percent	8,432	13	2,740	33 percent
Cougar Camp Boat Launch	100	102	34,680	25	8,670	25 percent	21,080	29	6,113	29 percent
Cougar Camp	80	180	48,960	12	7,344	15 percent	16,864	14	2,951	18 percent
Yale Park ⁴	280	365	347,480	78	96,798	28 percent	59,024	100	21,080	36 percent
Saddle Dam ⁵	145	115	56,695	75	29,325	52 percent	30,566	129	27,193	89 percent
Merwin Park	250	365	310,250	34	42,194	14 percent	52,700	103	21,712	41 percent
Speelyai Bay	90	365	111,690	66	81,906	73 percent	18,972	76	16,021	84 percent
Cresap Bay	50	115	19,550	40	15,640	80 percent	10,540	46	9,697	92 percent
Swift Day Use	200 (est.)	210	142,800	46	32,844	23 percent	42,160	53	11,172	27 percent
Eagle Cliff	40	210	28,560	4	2,856	10 percent	8,432	5	1,054	13 percent
Merwin River Access ⁶	30	365	37,230	5	6,205	17 percent	9,282	6	1,856	20 percent
Lewis River Hatchery Access	35	365	43,435	26	32,266	74 percent	14,518	39	16,177	111 ⁷ percent
Cedar Creek Access	70	365	86,870	53	65,773	76 percent	29,036	75	31,110	107 ⁷ percent
Haapa Access	65	365	80,665	32	39,712	49 percent	20,111	32	9,901	49 percent
Island River Access	50	365	62,050	30	37,230	60 percent	20,740	30	12,444	60 percent
Johnson Creek Access ⁸	10	365	12,410	N/A	N/A	N/A	4,148	N/A	N/A	N/A
SUBTOTAL	1,522	102-365	1,443,725	537	504,373	35 percent	366,605	750	191,223	52 percent

Table 7.5-1. Capacity of study area recreation sites (cont.).

	Number of Sites/Spaces	Season Days Open to the Public	Maximum Visitor Capacity – Season ¹	Estimated Average # of Sites/ Spaces Occupied per Day – Season	Current Visitor Use – Season	Current Seasonal Occupancy	Maximum Visitor Capacity – Peak Months ²	Estimated Average # of Sites/Spaces Occupied per Day – Peak	Current Visitor Use – Peak Months	Current Peak Month Occupancy
Dispersed Undeveloped Camping Sites	Sites									
Merwin	10	115 ⁹	3,910	3	1,173	30 percent	2,108	5	1,054	50 percent
Yale	25	365	31,025	10	12,410	40 percent	5,270	16	3,373	64 percent
Swift	15	210	10,710	6	4,284	40 percent	3,162	8	1,686	53 percent
SUBTOTAL	50	115-365	45,645	19	17,867	39 percent	10,540	29	6,113	58 percent
Dispersed Undeveloped Day Use Sites	Sites									
Merwin	14	115	5,474	5	1,955	36 percent	2,951	6	1,265	43 percent
Yale	14	365	17,374	6	7,446	43 percent	2,951	9	1,897	64 percent
Swift	9	210	6,426	4	2,856	44 percent	1,897	5	1,054	56 percent
Swift 2 canal and Swift bypass reach ¹⁰	6	365	7,446	2	2,482	33 percent	1,265	3	6,32	50 percent
SUBTOTAL	43	115-365	36,720	17	14,739	40 percent	9,064	23	4,848	53 percent
TOTAL	--	--	1,641,493	--	593,936	36 percent	440,807	--	253,620	58 percent

¹ Assumes an average of 3.4 persons per campsite and vehicle per day.

² Peak months assumed to be July and August.

³ 36 of the 93 sites are open 210 days; 63 of the 93 sites are open 102 days.

⁴ Yale Park, Merwin Park, Speelyai Bay, Lewis River Hatchery Access, Cedar Creek Access, and Island River Access count data from 1999.

⁵ Saddle Dam, Merwin River Access, and Haapa Access count data from 2000. All other count data from 1998.

⁶ Peak season assumed to be May-June and September-October for the lower river access sites (Merwin River Access, Lewis River Hatchery Access, Cedar Creek Access, Haapa Access, Island River Access, and Johnson Creek Access).

⁷ Peak month occupancy is greater than 100 percent at the Lewis River Hatchery Access and the Cedar Creek Access because the parking areas are not well defined and vehicles often park along the road and in other marginal areas when the lots are full.

⁸ Johnson Creek Access opened in 2001. Count data were not available at the time of this analysis.

⁹ Assuming most dispersed site visitors boat to the site, number of days is based on the minimum days when at least 1 boat launch facility is usable.

¹⁰ Swift 2 canal and Swift bypass reach are presented together because of their geographical proximity. Dispersed shoreline sites along the Swift 2 canal are occupied daily, for short periods of time, primarily by anglers. Sites along the Swift bypass reach primarily receive dispersed day use, as well as some overnight use.

Source: EDAW, Inc.

Recreation Facility Capacity Types and Limiting Factors

It is important to note that the 3 reservoirs provide an overall continuum of recreational experiences. Yale Lake provides the most developed type of experience, and use of sites is at or exceeds capacity frequently. Lake Merwin provides a less developed experience compared to Yale Lake, while Swift Reservoir provides a more primitive type of experience. Sites at Swift are the least used and also have among the lowest perceived crowding scores.

Table 7.5-2 summarizes the site- and reservoir-level conclusions from this analysis. Limiting factors were developed from carrying capacity constraints for 4 types of capacity (facility, physical/spatial, ecological, and social). Descriptions of each type of capacity are provided below.

Ecological Capacity – Ecological capacity is concerned with recreational use and its potential impacts to ecosystem components such as wetlands, riparian vegetation, and soils. Ecological impact indicators noted in the field include erosion, litter, sanitation problems, and wetland and riparian vegetation degradation.

Physical/Spatial Capacity – Physical/spatial capacity is concerned with the area or spatial needs of space-dependent recreation activities, such as the expansion potential of existing sites. Property ownership and topographic factors were primary assessment criteria.

Facility Capacity – Facility capacity is concerned with the use of sites, such as the number of vehicles at a boat ramp or parking lot, or the percent occupancy of various sites such as campsites. Facility capacity was assessed by collecting and analyzing on-site survey counts, evaluating site use and condition, obtaining occupancy information from site operators, and comparing data to past occupancy levels.

Social Capacity – Social capacity is concerned with visitors' perceptions of surrounding recreational use and related social capacity concerns such as user conflicts, lack of solitude, and perceptions of crowding. For each site, survey results were presented for how visitors felt about crowding at the site surveyed.

One of the most important overall conclusions from this analysis is that although sites are often utilized at or in excess of capacity, visitors still perceive relatively low levels of crowding. This lower level of perceived crowding could also reflect the fact that sites are planned or designed in such a way to minimize perceived crowding even when utilization is at capacity (e.g., no very large facilities provided, vegetative screening provided, and vehicular cruising discouraged).

Table 7.5-2. Summary of recreation capacity and limiting factors for project area recreation sites and reservoirs.

Area	Limiting Factor(s) ¹	Overall Capacity Summary ²	Year Capacity Reached ³
SITE-LEVEL			
Lake Merwin			
Merwin Park (Day Use)	Physical/Spatial	Below	NA
Speelyai Bay Park (Day Use)	Physical/Spatial and Facility	Exceeds	Present
Cresap Bay (Day Use)	Physical/Spatial, Facility, and Ecological	Exceeds	Present
Cresap Bay (Campground)	Physical/Spatial, Facility, and Ecological	Exceeds	Present
Yale Lake			
Saddle Dam Park (Day Use)	Ecological and Facility	Approaching	2030
Yale Park (Day Use)	Facility	Approaching	NA
Cougar Camp (Campground)	Facility	Exceeds	Present
Cougar Camp (Boat Launch)	Facility	Approaching	NA
Cougar Camp (Day Use)	Facility	Approaching	NA
Beaver Bay (Campground)	Physical/Spatial, Facility, and Ecological	Approaching	2016
Beaver Bay (Day Use)	Physical/Spatial, Ecological, Facility, and Social	Approaching	NA
Swift Reservoir			
Swift Camp (Day Use)	Facility	Approaching	NA
Swift Camp (Campground)	Facility	Approaching	2030
Eagle Cliff Park (Day Use)	Ecological and Facility	Below	NA
RESERVOIR-LEVEL			
Land Area			
Lake Merwin	Ecological, Physical/Spatial, and Facility	Approaching	-
Yale Lake	Ecological, Physical/Spatial, and Facility	Approaching	-
Swift Reservoir	Ecological and Facility	Approaching	-
Surface Water			
Lake Merwin	None	Below	-
Yale Lake	Physical/Spatial	Approaching	-
Swift Reservoir	Physical/Spatial	Below	-

¹ Indicates whether the capacity limiting factor(s) is based on facility, physical/spatial, ecological, and/or social constraints.

² Indicates whether the overall current use level is considered to be below, approaching, at, or exceeding capacity.

³ Indicates year when site/area is estimated to reach capacity on annual basis (EDAW 2001).

NA indicates annual capacity will not be reached during the term of a new FERC license (assumed to be 30 years).

Source: provided by EDAW, Inc.

Site-level and reservoir-level recreation capacity results are summarized below.

Site-Level Capacity

- Of the 14 recreation sites assessed in this analysis, use levels at most sites (10 sites or 71 percent) were below or approaching their capacity. Of the remaining 4 sites (29 percent), use levels exceed capacity at each.
- The 4 sites where use levels exceed capacity are Speelyai Bay (day use), Cresap Bay (day use), Cresap Bay (campground), and Cougar Camp (campground).
- Of the 4 capacity types considered, facility capacity was considered a limiting factor at most of the sites. Several of the sites also had more than 1 limiting factor.

Reservoir Capacity

- Overall, recreation facility use is approaching capacity at all 3 of the reservoirs in the study area. However, most visitors do not perceive significant levels of crowding, suggesting that use levels have not exceeded the social capacity of the area.
- The primary limiting factor at all 3 of the reservoirs is land-based facility capacity (e.g., number of campsites, parking spaces, etc.).
- On the reservoirs, boating density is not considered a constraint at this time. Based on general standards, existing boating use is considered to be below capacity at Lake Merwin and Swift Reservoir, and approaching capacity at Yale Lake.

7.5.5.2 Summary of Recreation Site Development Suitability

Recreation site development suitability at each of the 3 project reservoirs was assessed using GIS technology to overlay and prioritize (high to low) a number of important opportunity and constraint factors. A recreation development suitability map was prepared for each reservoir. This GIS-based analysis is a planning tool intended to identify areas for possible recreation development in the 39,160-acre (15,850 ha) study area should new recreation facility development be needed to satisfy existing or future recreation needs. Because of the larger pixel size and larger scale of some of the GIS data layers, this analysis is not intended to be used to site small-scale or linear development.

Potential areas of High Suitability for recreation development in the study area (excluding Water and Excluded Areas [Project Facilities and residential areas]) include the following acreage totals and percentages for each reservoir:

- Lake Merwin 227 acres (3 percent)
- Yale Lake 256 acres (3 percent)
- Swift Reservoir 194 acres (2 percent)

Larger areas in the study area to consider for potential future recreation development include:

- Area south of Speelyai Canal on Yale Lake.
- Lands adjacent to Cougar Camp Day Use Area on Yale Lake.
- Ham Flat on Lake Merwin adjacent to Cresap Bay Campground.
- Area on north and south side of Dog Creek on west side of Yale Lake.
- Area at mid-reservoir on eastern shoreline of Yale Lake.
- Area on north shore of Lake Merwin (W. ½ Sec. 19 & E. ½ Sec. 24).

7.5.5.3 Summary of the Recreation Planning Framework

In recreation planning, there are a variety of different types of outdoor recreation experiences that can be thought of as a continuum, ranging from very primitive experiences to very urban ones. This continuum can be defined by categories used to describe a given recreation setting and its experience. These categories are defined by a combination of criteria describing the physical, social, and managerial settings for each category. The USFS Recreation Opportunity Spectrum (ROS) planning framework was adapted and used as a basis for a planning framework in the project area.

Four existing recreation land classifications (Semi-Primitive, Roaded Natural, Rural, and Project Facilities) were developed in consultation with the RRG for the Lewis River project area planning framework. The total miles of shoreline and percent of the study area are noted for each below.

- Semi-Primitive (SP) – Occasional evidence of human activity, including some minor structures. Predominantly natural environment (57.5 miles [93 km] of shoreline, 45 percent of study area).
- Roaded Natural (RN) – Moderate evidence of human activity, including occasional docks and other minor structures; occasional single-family homes or cabins. The setting is predominantly natural in appearance, but may include regularly maintained, light duty roads (47.4 miles [76 km] of shoreline, 37 percent of study area).
- Rural (R) – Human activity/presence is highly evident. Man-made structures are frequent and may be dominant features of the landscape. Natural environment is substantially modified but is still rural in nature (12.4 miles [20 km] of shoreline, 10 percent of study area).
- Project Facilities (PF) – Human activity/presence and man-made structures are dominant features of the landscape. This highly modified environment includes project facilities such as dams, powerhouses, substations, and transmission lines (10.3 miles [16.6 km] of shoreline, 8 percent of study area).

As further developed in the RRMP in the coming month, this planning framework will provide direction for existing and possibly future recreation management activities by defining the types of recreation experiences that a given area may be managed for.

It also describes the types and levels of use that may or may not be considered acceptable within each classification area.

The planning framework classifications also serve as a foundation for a Limits of Acceptable Change (LAC)-based monitoring process. The LAC-based process establishes a monitoring procedure intended to protect and maintain specific recreation experiences. This process is further described below.

7.5.5.4 Summary of Recreation Area Monitoring Framework

A monitoring framework based on LAC indicators and standards defines the type of visitor experience and appropriate site conditions to be provided and maintained, and monitors conditions over time. Monitoring should be used to assess whether acceptable conditions have been maintained and if further actions are needed. Two of the key elements in the LAC-based process are indicators and standards, which define the desired experience and allow for appropriate monitoring of conditions over time. Indicators are specific, measurable variables used to define the desired experience (e.g., number of encounters with other users) and site condition. Standards define the minimum acceptable condition for each indicator (e.g., 3 encounters), also referred to as a trigger. Standards will vary depending on the experience being provided.

Key considerations regarding indicators and standards include the following:

Indicators

- Reflect important key issues that should be monitored;
- Specific variables are indicative and realistic of field conditions;
- Allow one to define desired conditions and assess effectiveness of management practices; and
- Should be: (1) measurable; and (2) responsive to possible management actions.

Standards

- Should be refined based on field conditions prior to full implementation;
- May use a judgmental process;
- Should not be idealistic goals, but conditions that can be achieved over time;
- May be a statement of existing conditions desired or status quo; and
- May be expressed in terms of probabilities (allows for some variability)

In developing the indicators and standards, careful consideration was given to how each indicator would actually be monitored should a program be implemented. In practice, decisions regarding future management may be made at the time that standards are exceeded, based on the field conditions at that time. In all cases, the entire suite of indicators should be reviewed and examined before management actions are taken. Decisions should never be made based on one isolated indicator. Monitoring outcomes may trigger actions described in the RRMP.

Proposed monitoring standards for key indicators and each planning framework classification are shown in Table 7.5-3. These standards were developed based on existing conditions and judgments regarding acceptable conditions. The specific values shown in the table are related to the method of measurement.

Table 7.5-3. Recreation monitoring indicators and standards by planning framework classification.

Potential Key Indicators	Standards by Classification		
	Semi-Primitive	Roaded Natural	Rural/Project Facilities
DEVELOPED RECREATION AREAS			
RESOURCE			
None identified at this time.	None required at this time (May develop standards at a later date if necessary)	None required at this time (May develop standards at a later date if necessary)	None required at this time (May develop standards at a later date if necessary)
SOCIAL			
Perceived Crowding	N/A	Currently not a problem. Based on future survey (10-15 years out), average crowding score of 4.0.	Currently not a problem. Based on future survey (10-15 years out), average crowding score of 4.7.
MANAGERIAL			
Boat Launch Capacity Utilization	N/A	75 percent occupancy during weekends in peak months (July and August)	75 percent occupancy during weekends in peak months (July and August)
Boat Use Levels – Reservoir Surface Water	25 acres/boat reservoir-wide	25 acres/boat reservoir-wide	25 acres/boat reservoir-wide
Day Use Site Capacity Utilization	N/A	75 percent occupancy during weekends in peak months (July and August)	75 percent occupancy during weekends in peak months (July and August)
Public Campground Capacity Utilization	N/A	up to 60 percent season long (summer) and/or up to 90 percent during weekends in peak months (July and August)	up to 60 percent season long (summer) and/or up to 90 percent during weekends in peak months (July and August)
BOAT-IN CAMPING AND DAY USE SITES			
RESOURCE			
Site Creep	10 percent expansion of area of impact	10 percent expansion of area of impact	10 percent expansion of area of impact
	5 percent expansion into sensitive habitat	5 percent expansion into sensitive habitat	5 percent expansion into sensitive habitat
Habitat Effect	3 site diameters from established impact area boundaries	3 site diameters from established impact area boundaries	3 site diameters from established impact area boundaries
Site Pioneering	Close as sites are identified	Close as sites are identified	Close as sites are identified
SOCIAL			
Perceived Crowding	Average crowding score of 2.0	Average crowding score of 2.8	Average crowding score of 3.5
MANAGERIAL			
Dispersed Site Utilization	Up to 50 percent season long (summer)	Up to 50 percent season long (summer)	Up to 50 percent season long (summer)

Note: The recreation season is defined as Memorial Day weekend to Labor Day weekend.

Subject to revision based on on-the-ground testing.

N/A = not applicable.

Source: provided by EDAW, Inc.

Levels of Monitoring

The RRMP Monitoring Program could include 2 levels of monitoring:

- Ongoing regular monitoring of recreation sites and use areas using readily available monitoring data collected during routine management of recreation resources such as paid fee receipts, camp host counts, observations made when trash is collected, road counts, etc.; and
- More in-depth recreation survey work conducted every 6 to 12 years such as visitor and non-visitor surveys (mail, contact, windshield, etc.).

Some monitoring indicators, such as dispersed undeveloped site pioneering, could be monitored more frequently (every year for example) so that management actions can be taken before the standard is exceeded.

PacifiCorp, Cowlitz PUD, and others could consider a number of data gathering and analysis techniques as appropriate. The use of camp hosts to perform more detailed counts is one method that could be employed to provide daily counts at selected sites at a low cost. Recreation facility condition could be determined by periodic on-site inspections of each facility or use area. More in-depth visitor surveys could be administered less frequently to further validate peak season capacity use data of project recreation areas, to validate that monitoring indicators have or have not been reached or exceeded, and to identify changing visitor and/or area resident visitor attitudes and perceptions over time.

Monitoring Management Actions

Based on the available data gathered during yearly and periodic monitoring, potential management actions for each management unit could be considered by PacifiCorp, Cowlitz PUD, and others. Management actions may include:

- Plan, design, expand, renovate, and/or construct facilities in one or more phases;
- Increase monitoring efforts as needed, such as collecting more detailed visitor counts at facilities in question;
- Begin planning and designing new facilities or renovation;
- Pursue or wait on new construction;
- Modify monitoring indicators if conditions warrant;
- Increase visitor information to redistribute use patterns; and
- Consider a full or partial reservation system.

Other management actions may also be considered as appropriate. Further details on the Monitoring Program may be defined during the development of the RRMP (REC 7).

7.5.5.5 Summary of Trail Feasibility Study

The Washington State Interagency Committee for Outdoor Recreation (IAC) made the original request for this study through the Lewis River collaborative relicensing process. The study request outlined a feasibility investigation for the development of a “spine” trail traversing the length of the 3 project reservoirs and connecting to other regional and local trails.

The overall objective of this study component is to investigate the feasibility of a non-motorized, multi-use “spine” trail extending from Merwin Park at the west end of Lake Merwin to Eagle Cliff Park at the east end of Swift Reservoir. Specific trail routing objectives are listed in the Methodology section (REC 5 Appendix 2). The study is intended to investigate the feasibility of a trail or trail segments that can be considered later in the relicensing process along with other potential recreation enhancements.

The Trail Feasibility Study was completed in 2 phases. The first phase (see REC 5 Appendix 2 of this report) presents the results of the desktop analysis and field reconnaissance components, physical analyses of alternative trail routes, and a map of the most feasible trail corridor. The second phase (see REC 5 Appendix 3 of this report) involved additional steps to resolve identified trail issues and address comments received from the RRG, TRG, and other interested parties. This phase provided additional detail to a level from which decisions may be made for relicensing purposes.

Phase 1 Results

The results of Phase 1 are presented in 2 sections:

- Lewis River Trail: Most Feasible Route
- Other Potential Lewis River Trail Routes Considered

Figures included in the Phase 1 report show the potential trail corridor extending from Merwin Park at Lake Merwin to Eagle Cliff Park at Swift Reservoir. The potential spine trail route is shown in the context of other human-made and natural features in the project area such as roads, property ownership, streams, and topography to highlight trail compatibility and potential conflicts.

The Phase 1 study report includes a summary of the 3 most feasible trail segments by reservoir. Each summary contains a description of the physical siting of the most feasible route. Resource constraints/conflicts and additional information needs are identified, including:

- Trail segments requiring clarification and decision-making
- Resource issues
- Land ownership issues
- Other issues/constraints

The discussion of these issues was expanded in Phase 2 of the study as the result of review of the study report by relicensing participants in Phase 1. The 3 most feasible trail segments by reservoir include:

- Segment 1, Lake Merwin: Merwin Park to Cresap Bay on Lake Merwin (only portions of this segment appear feasible).
- Segment 2, Yale Lake: Yale IP Road to west end of Swift Reservoir.
- Segment 3, Swift Reservoir: West end of Swift Reservoir to Eagle Cliff Park.

The Phase 1 study results (see REC 5 Appendix 2 of this report) also include a discussion of all of the potential trail routes considered. Each of these trail routes is described according to a number of variables and highlights the preliminary preferred route.

The 3 most feasible trail segments identified in Phase 1 were reviewed by the relicensing Recreation, Cultural, and Terrestrial Resource Groups. Following this review and identification of additional resource constraints or opportunities, these potential trail segments were modified to reflect comments from public agencies, project biologists, and local residents. Two additional field checks were conducted to assess alternative trail alignments around sensitive wildlife habitat areas and to identify potential trailhead locations.

After the potential trail segments were finalized, the anticipated number and type of users were assessed. This assessment was done using projected recreation demand data and current recreation visitation to the study area. Finally, construction, operation, and maintenance costs were estimated using data gathered from a number of sources.

As in Phase 1, the results of Phase 2 are presented in 2 sections:

- Summary of the Most Feasible Trail Segments
- Other Potential Trail Routes Considered

Phase 2 resulted in the siting and assessment of a potential trail system comprised of 5 trail segments totaling approximately 38.3 miles. In addition to the trails themselves, potential sites for support facilities, such as trailheads, were located. The original objective to identify a single “spine” trail along the length of the projects from Merwin Park to Eagle Cliff Park was not realized; however, 5 shorter trail segments were identified as both physically and biologically feasible. Three of these segments are along Lake Merwin, one is along Yale Lake, and one is along Swift Reservoir. The Phase 2 report also includes an updated discussion of all of the potential trail routes considered, including the original single “spine” trail. After the 5 most feasible trail segments were identified, a classification system was developed for the trail network to better reflect existing conditions within the trail corridor and better estimate costs for trail development and maintenance. The classification system includes 4 trail types: New Trail, Existing Company Gravel Maintenance Roads, Maintained Gravel Logging Roads (Not PacifiCorp), and Yale IP Road. Total estimated construction and development costs were estimated to range from \$573,300 to \$914,800, depending on various trail route and surfacing alternatives selected. Total annual operation and maintenance costs were estimated to be \$75,350.

7.5.6 Schedule

The Recreation Capacity and Suitability Analysis is complete. The Phase 1 and Phase 2 of the Trail Feasibility Study are now completed.

7.5.7 References

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