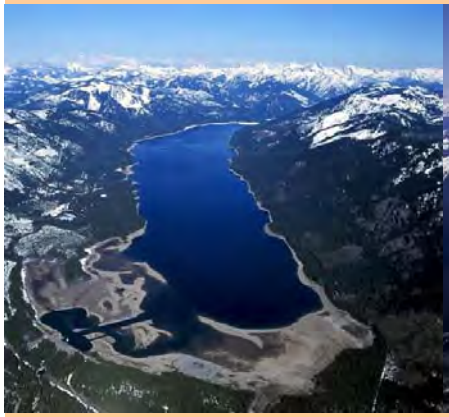
RECLAMATION

Managing Water in the West

Technical Series No. TS-YSS-10

Recreation Demand and User Preference Analysis

A component of
Yakima River Basin Water Storage Feasibility Study, Washington
Pacific Northwest Region



Keechelus

Bumping Lake

Kachess

U.S. Department of the Interior
Bureau of Reclamation
Denver, Colorado

February 2007

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Technical Series No. TS-YSS-10

Recreation Demand and User Preference Analysis

Yakima River Basin Water Storage Feasibility Study, Washington Pacific Northwest Region

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U.S. Department of the Interior
Bureau of Reclamation
Denver, Colorado

February 2007

Contents

Contents (continued)

Appendices

Tables

Contents (continued)

Tables (continued)

Figures

Acronyms

Analysis Report	Recreation Demand and User Preference Analysis
BLM	Bureau of Land Management
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
EIS	environmental impact statement
FS	U.S. Forest Service
IAC	Interagency Committee for Outdoor Recreation
NPS	National Park Service
NSRE	National Survey on Recreation and the Environment
NVUM	National Visitor Use Monitoring Project
Reclamation	Bureau of Reclamation
RPA	Regional Planning Act Assessment
RV	recreational vehicle
SCORP	State Comprehensive Outdoor Recreation Plan
Service	U.S. Fish and Wildlife Service
TVA	Tennessee Valley Authority
USDA	U.S. Department of Agriculture
WDFW	Washington Department of Fish and Wildlife
WROS	Water Recreation Opportunity Spectrum

Introduction

The mission of the Bureau of Reclamation (Reclamation) is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. Reclamation was established by the Reclamation Act of 1902 to develop water resources in the 17 Western States. Over the years, Reclamation has gravitated from development of single-purpose agricultural projects toward a multipurpose approach to water resource development. Reclamation administers more than 8 million acres of land and water, 288 Federal lakes, and more than 300 developed recreation areas. Federal and non-Federal partnerships have and will continue to be the primary providers of recreation and concession-managed activities on land and water areas under Reclamation jurisdiction. About 70 non-Federal partners, mostly States and cities, manage about 200 of Reclamation's recreation areas. Reclamation retains management responsibilities for recreation at 51 projects.[1] Many of the other recreation areas are managed by other Federal agencies such as the National Park Service (NPS) or U.S. Forest Service (FS). In some instances, existing Reclamation legislation supports development and management of recreation resources on its lands by non-Federal partners but prevents Reclamation from providing the same services in lieu of managing partners. In other instances, Reclamation has specific authority to plan, develop, and maintain recreation resources on its lands.

Today, water for recreation is in relatively static supply because large-scale Federal water development in the United States is essentially complete. Currently, Reclamation, the U.S. Army Corps of Engineers (Corps), and Tennessee Valley Authority (TVA) reservoirs accommodate one-third of the total visitation to the Federal estate, but these same agencies administer only 2 percent of the total Federal estate acreage. Approximately 90 million people visit Reclamation's designated recreation areas annually. Visitation is increasing at an average rate of 1.2 million visitors per year, and over 100 million people are projected to visit these recreation areas by early in the 21st century. Reclamation projects stimulate an estimated $24 billion in economic activity each year. Benefits in agriculture, recreation, hydropower, municipal and industrial water service, and other related areas, including the construction industry, are the direct result of Reclamation's management of a limited natural water supply. These multipurpose benefits result in about $5 billion in State and Federal tax revenues. An estimated 700,000 person years of employment are produced each year by Reclamation.[2]

[1] National Recreation Lakes Study Commission, June 1999.

[2] *Recreation Challenges of the Twenty-First Century*, Bureau of Reclamation, February 1998.

Nationwide, recreation use of available sites will continue to increase over time. This is a reflection of the "baby boomer" generation, increased leisure time, new recreation technologies, and increased public information about recreation opportunities in rural communities. It has been estimated that there will be a 50- to 100-percent increase in public demand for water-based recreation opportunities at State and Federal facilities over the next 20 years. Without major changes in infrastructure and management programs, the health and safety of the visiting public and the integrity of the natural environment may be compromised.[3, 4]

Across the United States, about 161 million acres, 7 percent of the country's total land area, is covered by water, mostly freshwater. Streams, rivers, natural lakes, ponds, reservoirs, and other forms of water cover are not only essential for aquatic microbiota, aquatic and terrestrial wildlife, household consumption, agriculture, and manufacturing, but they are also important and highly valued as recreation resources.[5]

Reclamation is currently preparing a Yakima River Basin Water Storage Feasibility Study to examine the feasibility and acceptability of storage augmentation for the benefit of fish, irrigation, and the municipal water supply within the Yakima River basin in two respects: (1) diversion of Columbia River water to the potential Black Rock Reservoir for further water transfer to irrigation entities in the lower Yakima River basin as an exchange supply, thereby reducing irrigation demand on Yakima River water and improving Yakima Project stored water supplies, and (2) creation of additional storage within the Yakima River basin. In considering the benefits of additional storage in the Yakima basin, the objectives are to improve anadromous fish habitat, assure a more reliable water supply for proratable (junior) irrigation water rights holders, and provide for future municipal needs. Refer to figure 1 for the location map of the Yakima River basin.

This Recreation Demand and User Preference Analysis (Analysis Report) is one integral part of that overall feasibility study.

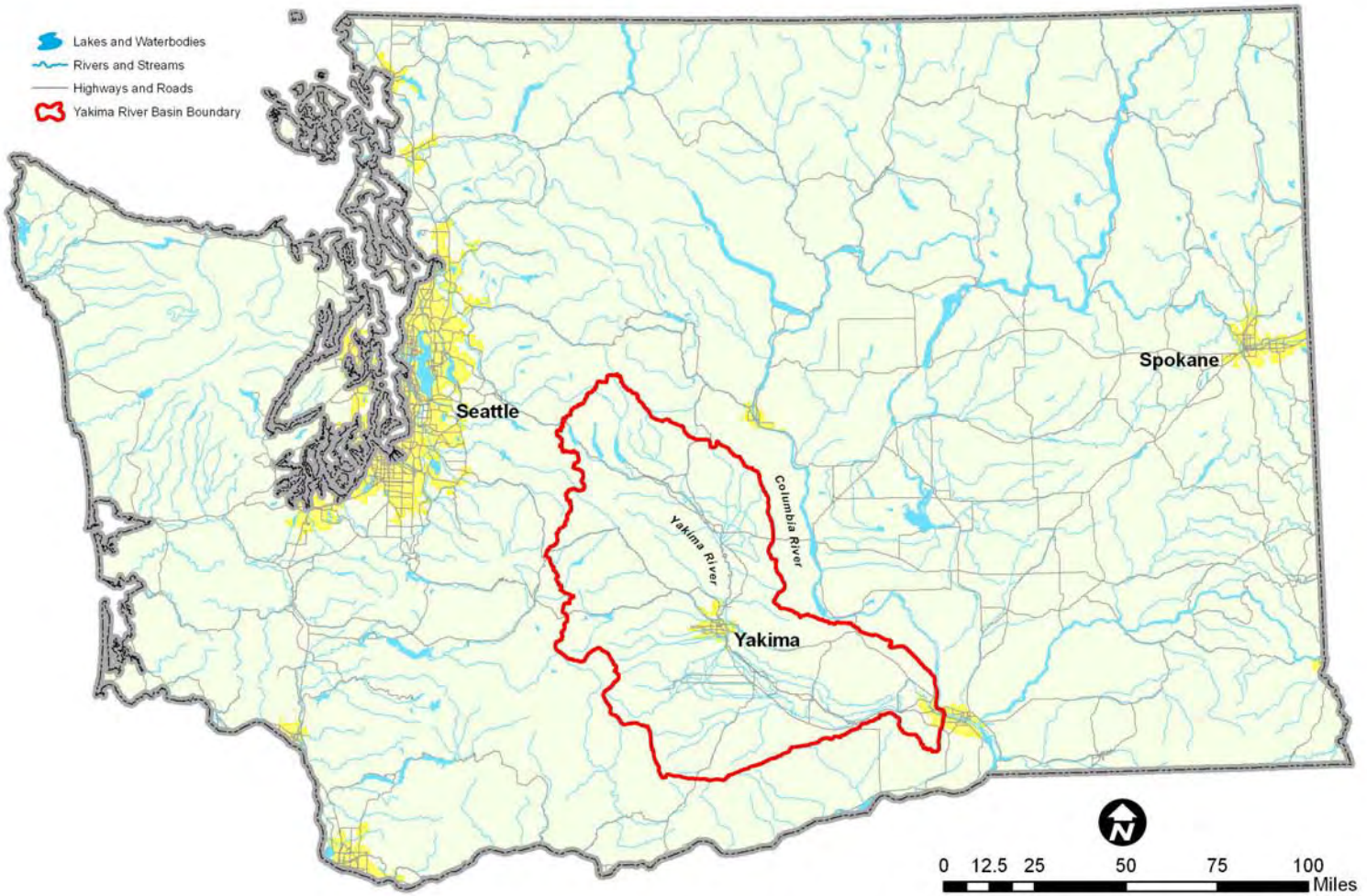
Study Authority

Feasibility studies are detailed investigations specifically authorized by law to determine the desirability of seeking congressional authorization for implementation of a preferred alternative. Feasibility studies include additional

[3] National Recreation Lakes Study Commission, 1999.

[4] Bureau of Reclamation, *Recreation Management Condition Assessment, Clark Canyon Reservoir and Barretts Diversion Dam, Pick-Sloan Missouri River Basin Program*, August 2002.

[5] Cordell, et al., *Outdoor Recreation for the 21st Century America, A Report to the Nation: The National Survey on Recreation and the Environment*, 2004.



Yakima River Basin Location

Figure 1

data collection and analysis and consider a reasonable range of alternatives. Feasibility studies must be consistent with the *Economic and Environmental Principles and Guidelines for Water and Related Resources Implementation Studies*.

Section 214 of the Act of February 20, 2003 (Public Law 108-7), states that:

> *The Secretary of the Interior, acting through the Bureau of Reclamation, shall conduct a feasibility study of options for additional water storage in the Yakima River Basin, Washington, with emphasis on the feasibility of storage of the Columbia River water in the potential Black Rock Reservoir and the benefit of additional storage to endangered and threatened fish, irrigated agriculture, and municipal water supply. There are authorized to be appropriated such sums as may be necessary to carry out this Act.*

Structure of Analysis Report

The following briefly describes, by section, the structure of the Analysis Report:

Introduction – Provides an overview of Reclamation's water-related recreation program, discusses water-based recreation on a national level, and briefly describes Reclamation's Yakima River Basin Water Storage Feasibility Study.

Study Authority – States Reclamation's authority to prepare the Yakima River Basin Water Storage Feasibility Study.

Structure of Analysis Report – Briefly describes, by section, the structure of this Recreation Demand and User Preference Analysis.

Purpose and Objectives – Details the primary purpose of the Analysis Report and key objectives for its preparation.

Scope and Methodology – Briefly describes what items the Analysis Report addresses and what it does not address. Describes the level of analysis, regional focus of the Analysis Report, key water-related recreation activities, and how professional judgment, existing information, expert opinion, and Reclamation's Water Recreation Opportunity Spectrum (WROS) were used in preparing the Analysis Report.

Findings of Analysis – Provides an overview of the study area, describes the recreation setting, and discusses national, regional, and Washington State recreation participation levels and demand

projections. The Analysis Report describes the issues, concerns, observations, and trends influencing water-based recreation. Demographic characteristics and setting attributes contributing to user satisfaction of a recreation site are also discussed.

Projections of Recreation Demand and User Preference – Provides recommendations and projections on the types of recreation activities needed in the Yakima River basin to meet existing and future demand and user expectations.

Purpose and Objectives

The primary purpose of this Analysis Report is to determine recreation demand and user preferences within the Yakima River basin. The information will assist Reclamation and its partners in determining a viable recreation strategy within the alternatives that may be contemplated in the storage study feasibility environmental impact statement (EIS). A secondary purpose of this report is to collect existing data that can provide a baseline for assessing the potential impacts to recreation resources for each of the EIS alternatives.

The key objectives of the Analysis Report are to:

- Identify the significant recreation issues, concerns, and observations within the Yakima River basin.

- Present results of a literature search of planning documents such as the *Washington State Comprehensive Outdoor Recreation Plan*, State and local tourism studies and brochures, and research studies from a variety of universities, Federal agencies, and other sources.

- Present recreation participation and trend data from local, State, and Federal agencies, and private tourism, resort, and special interest groups (e.g., fishing clubs) in the area.

- Present a current recreation visitor profile for the Yakima River basin in terms of population, age structure, urban versus rural residence, types and frequency of participation in recreation activities, preferred settings, preferred experiences, and visitation characteristics.

- Complete a WROS inventory of seven primary reservoirs and five primary rivers in the Yakima River basin. The primary lakes inventoried were Cle Elum, Kachess, Keechelus, Bumping, Clear, Easton, and Rimrock. The five primary rivers inventoried were the Naches, Yakima, Cle Elum, Bumping, and Tieton Rivers. These primary reservoirs and rivers were selected because they will be the water bodies most likely

affected by the yet-to-be selected preferred Yakima Storage Study alternative. Refer to figure 2 for locations of the rivers and lakes within the Yakima River basin that are mentioned above.

- Complete a WROS inventory of flat water reservoir and river comparables outside the Yakima River basin area to get a more accurate picture of the supply of recreational opportunities in the area and to help assess the demand for certain types of recreational opportunities within the basin.

- Develop projections to determine likely population and significant social, economic, or demographic changes that may affect recreation demand within the Yakima River basin (e.g., population changes, ethnicity, major industry changes, population density, age structure changes, transportation linkages, migration and immigration patterns, and resident and nonresident tourism patterns).

- Present a compilation of developed recreation demand projections for the key recreation activities and WROS classes within the Yakima River basin. These projections are essential for measuring the economic value of recreation and the quality of the recreation experience for each alternative that may be considered in the EIS and other planning documents.

- Present a profile of important attributes and conditions that define a special and attractive recreation destination.

- Fulfill a need identified by Reclamation and the State of Washington to assess the demand for recreation opportunities in the Yakima River basin.

Scope and Methodology

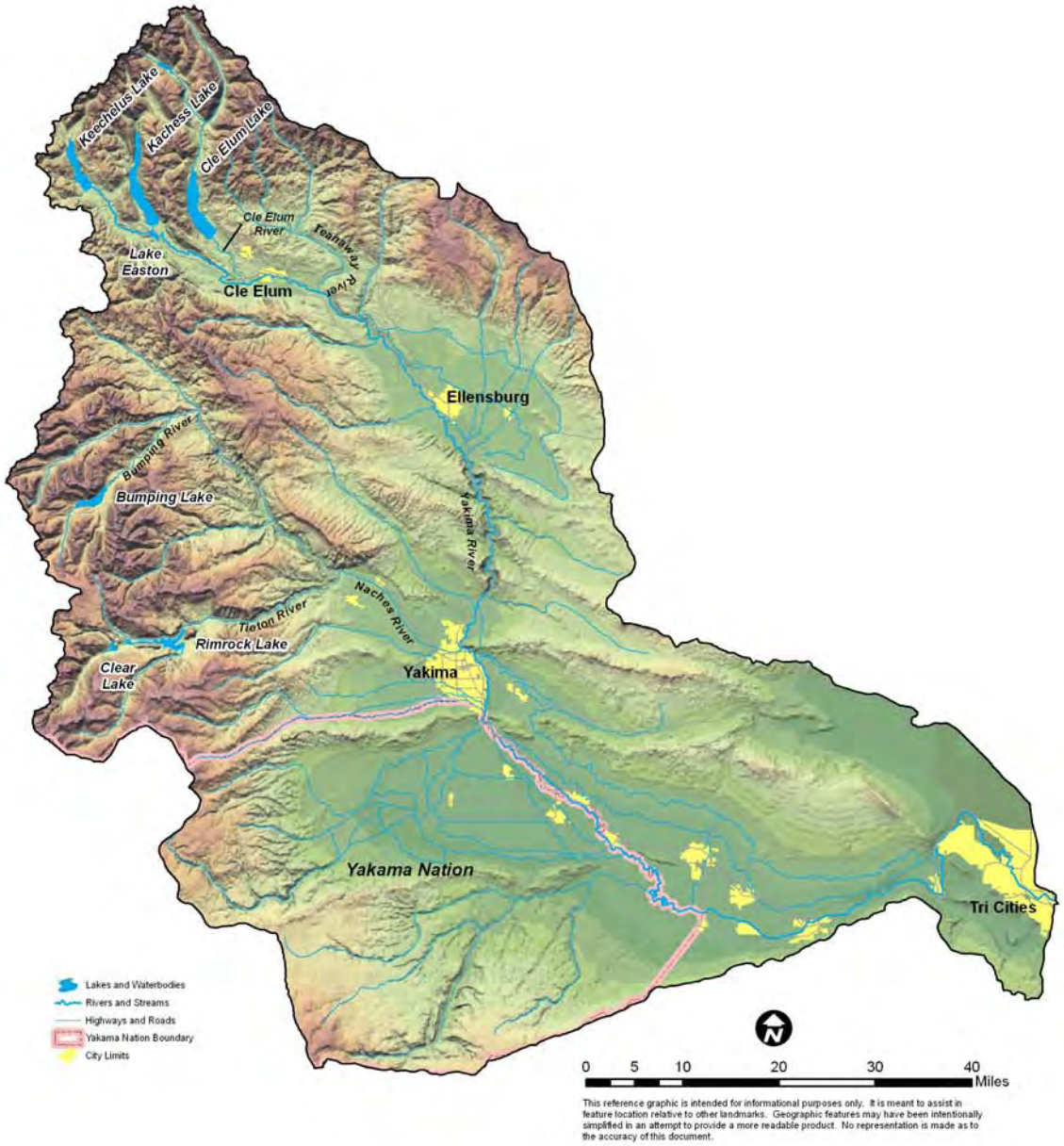
Scope

The Analysis Report deals primarily with the:

- Assessment of the current water-based recreation supply within the Yakima River basin and, for comparison purposes and, on a limited basis, the supply of water-based recreation opportunities immediately east of the Yakima River basin.

- Assessment of future demand for water-based recreation activities within the Yakima River basin based on available trend projections.

- Identification of existing issues and concerns related to recreation management.



Yakima River Basin Features

Figure 2

- Analysis of existing recreation information from a variety of sources.
- Water-based recreation opportunities that occur on or adjacent to rivers and reservoirs.

The Analysis Report does not:

- Identify a preferred recreation development strategy.
- Identify a recreation implementation and monitoring strategy.
- Quantify the number of recreation facilities needed and locations where facilities may be provided.
- Include a discussion of demand or supply of recreation opportunities that are dependent on a municipal water supply (i.e., water needed for golf courses, soccer and baseball fields, city parks, and greenways).
- Address the potential recreation impacts of Yakima River basin storage alternatives.
- Address the economic value of recreation to the Yakima River basin.
- Describe the long-term social or economic benefits that the potential Black Rock Reservoir might have to the local economy.
- Address potential changes in land uses or potential developments on private property within the Yakima River basin (e.g., report does not consider possible subdivision development or resorts as a result of Yakima River basin storage alternatives that may be selected in the future).
- Utilize any form of general public or recreation user survey instrument to measure recreation demand and user preference in the Yakima River basin.

Methodology for Determining Demand and User Preference

The Recreation Demand and User Preference Analysis for the Yakima River Basin used what is considered in the recreation profession as a Level 1 and regional-scale water-related recreation analysis. This section describes each of the major components.

Level 1 Analysis

It is common in public resource planning and management to use a sliding scale rule of analysis. The sliding scale rule states that the level of analysis should be commensurate with the potential consequences of the decision or action to be taken. Typically, three levels of analysis are considered: slight, ordinary, and extraordinary. The levels of analysis differ by the (1) level and type of information necessary, (2) tools and techniques used, (3) time and effort required, (4) level of certainty and risk, and (5) level of scientific basis. Figure 3 depicts the sliding scale of analysis.

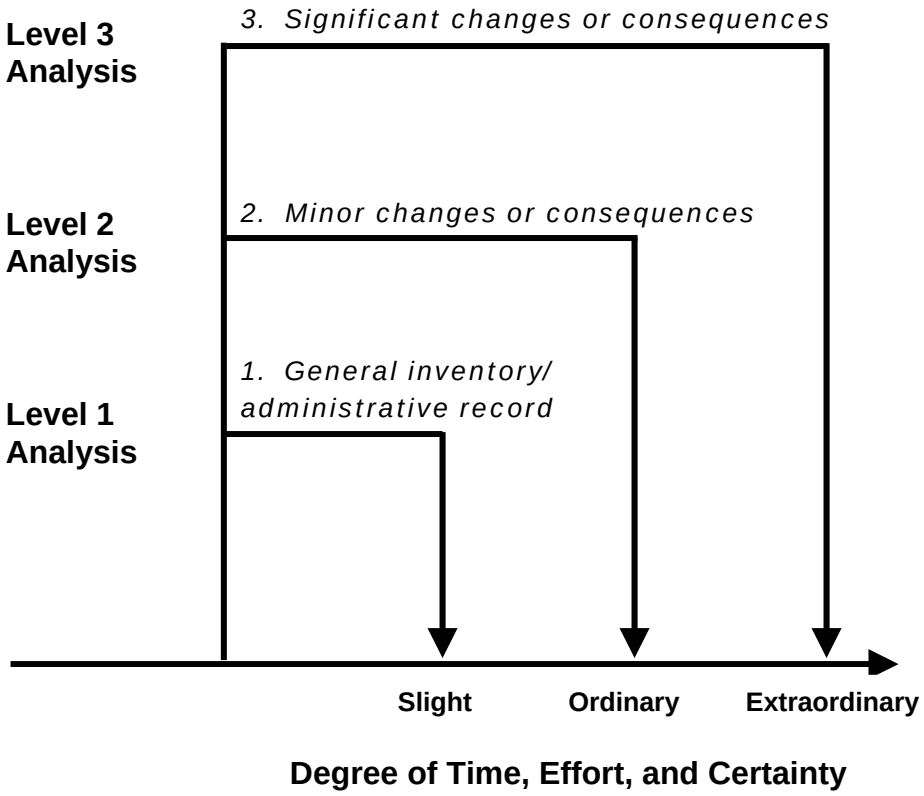


Figure 3.—Sliding scale of analysis.

In this Analysis Report, a Level 1 analysis was used to address recreation demand and user preference. This Analysis Report is part of a feasibility study that may lead to more intensive Level 2 or 3 analyses. The output of this analysis is a set of percentages that reflect the anticipated increase or decrease in the demand for the key water-related recreation opportunities in the basin. This information will provide decisionmakers with a sense of the magnitude of recreation demand, value, and benefits that might accrue from any water storage or diversion option.

Regional Scale

The scale or geographic area of analysis was the Yakima River basin. The key question being addressed in this analysis is, "What is the recreation demand and user preference for the Yakima River basin, and not for any specific site or facility?"

Figure 4 serves two purposes. First, it shows that the analysis considered recreation demand and preference information from the perspective of a nation, State, and region within the State. Second, it depicts that the level and focus of analysis was on the basin and not the potential sites for water alterations (e.g., Black Rock, Wymer).

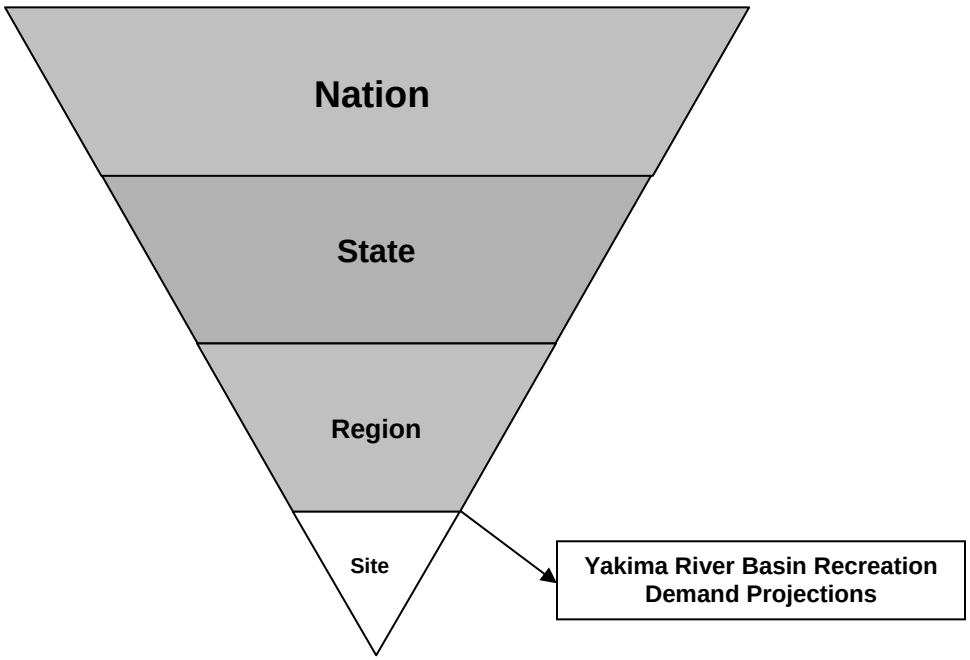


Figure 4.—A regional scale of focus.

Key Water-Related Recreation Activities

For the benefit of the local community, land and water resource managers, and decisionmakers, the section of the Analysis Report entitled "Findings of Analysis" describes trends and participation levels for a variety of outdoor recreation activities. However, recommendations concerning what outdoor recreation activities are needed in the Yakima River basin to meet future demand and public expectations were narrowed to those activities that are popularly associated with reservoirs, rivers, and lakes in the basin. More specifically, the recommendations section only considered the most significant popular activities

that take place on the water or closely associated with the water resource (e.g., camping, hiking, picnicking). The key water-related recreation activities included were fishing, waterfowl hunting, rafting/kayaking, water skiing, motorboating, developed camping, rustic/primitive camping, hiking, jet skiing, wildlife viewing, picnicking, bicycling, swimming, and sailing.

Existing Information and Expert Opinion

Typical of a Level 1 analysis, the assessment of recreation demand and user preference relied on existing information (e.g., data, reports, applications, environmental documents, national and State studies, agency plans, and informal expert interviews). No original data were collected through surveys or systematic public interviews.

Approximately 15 agency officials—very experienced with the tourism and outdoor recreation situation in the basin—were interviewed in the course of the field work. The primary purpose of the expert interviews was to get a better understanding of the existing information and to identify any trends or changes taking place in terms of recreation use, visitation patterns, visitor demographics, equipment, and other factors.

WROS Inventory System

Reclamation, in collaboration with other Federal and State water resource agencies, has recently developed a new tool called the Water Recreation Opportunity Spectrum System (Reclamation, July 2004). The WROS Executive Summary is included in appendix A, and the complete *User's Guidebook* can be downloaded from <www.usbr.gov/pmts/planning/wros/index.html>.

WROS is a national interagency tool that provides planners and managers with a framework and procedure for making better decisions for conserving a spectrum of high quality and diverse water recreation opportunities. In this analysis, WROS was used to inventory (i.e., map) the current supply of water recreation opportunities within the Yakima River basin and to develop a regional profile of the current gross water surface acreage of WROS zones commonly referred to as urban, suburban, rural developed, rural natural, semiprimitive, and primitive.

WROS was also applied to key "comparable" reservoirs and river segments outside the Yakima River basin, which are identified later in this report. Reclamation selected comparables east of the basin that were similar in terms of geography, topography, climate, ecotype, elevation, vegetation, and recreation use.

By inventorying what recreation opportunities already exist within the basin and across the comparables in a designated area (i.e., the current supply) and having information about the type and amount of recreation visitation (i.e., current

demand), decisionmakers are better able to understand current demand and to estimate future demand for new water storage or diversion options, including different types of recreation activities and settings.

Sound Professional Judgment

There is no formula or way to scientifically determine with a high level of certainty the future of any human endeavor, including future outdoor recreation demand or preference. Thus, based upon the (1) available information, (2) WROS inventory, and (3) expert interviews, the principal investigators used sound professional judgment to estimate future recreation demand and user preference for the Yakima River basin. A low and high range of percentage increase or decrease was provided for each of the key activities.

Findings of Analysis

Overview of the Study Area

The Yakima River flows for over 200 miles through south-central Washington and, with its tributaries, drains about 6,150 square miles or 4 million acres. Refer to figure 5 for the main features within the basin. The river originates in Kittitas County from Keechelus and Kachess Lakes on the east side of the Cascade Mountains near Snoqualmie Pass. The Yakima River flows southeast through the Kittitas and Yakima Valleys, ultimately discharging into the Columbia River near Richland. Tributaries include the Cle Elum, Teanaway, and Naches Rivers, as well as numerous creeks and irrigation returns. The confluence of the Yakima and Naches Rivers at the city of Yakima divides the Yakima River into "upper" and "lower" portions. Much of the water is diverted for irrigation in the Yakima Valley, but some is recovered through surface and subsurface routes.

The Yakima River basin is bounded on the west by the Cascade Range, on the north by the Wenatchee Mountains, on the east by the Columbia River, and on the south by the Horse Heaven Hills. Elevations in the basin range from 8184 feet above mean sea level in the Cascades to 340 feet at the confluence of the Yakima River and the Columbia River.

Average annual precipitation ranges in the Yakima River basin vary widely, from 91 inches annually at Snoqualmie Pass (at the headwaters of the Yakima River in the Cascade Range) to 8 inches annually in the city of Yakima. Most of the water in the Yakima River comes from snowmelt and is caught in a series of reservoirs to ensure sufficient water supply later throughout the irrigation season. From 50-100 percent of the water delivered to the lower basin from the Naches River and upper Yakima River is diverted for irrigation and hydropower generation during the irrigation season.

About one-half of the Yakima River basin is within and occupies most of Yakima County. The upper part of the basin lies in Kittitas County and occupies most of that county. The southeastern part of the basin occupies about one-half of Benton County and the southern part of the basin extends slightly into Klickitat County.

The entire basin lies within areas either ceded to the United States by the Yakama Nation or areas reserved for the use of the Yakama Nation. The Yakama Reservation occupies about 40 percent of Yakima County and about 15 percent of the basin.

Nearly 40 percent of the basin is forested, another 40 percent is rangeland, 15 percent cropland, and the remaining acreage includes other land uses including lands uses associated with river corridors and flat water reservoirs and lakes. The single largest landowner is the U.S. Government, with 1.5 million acres or 38 percent of the land areas. Much of the forested land is Federal land within the Wenatchee National Forest. Other large Federal landholdings include the Yakima Training Center, the Hanford Nuclear Reservation, and the Bureau of Land Management (BLM) lands. Other public ownerships (State, county, and local governments) total over 400,000 acres. Lands owned by Native Americans total about 800,000 acres. Private ownership totals nearly 1.7 million acres.

Irrigated agriculture, the main economy of the basin, occupies about 1,000 square miles. Cattle grazing is the main use of 2,900 square miles of rangeland. Timber harvest, cattle grazing, and recreation are the major uses of the 2,200 square miles in the forested areas of the basin to the north and west. About one-fourth of the forested area is designated as wilderness.

The economy of the basin is tied most directly to agricultural production. Cereal crops, irrigated pasture, and hay production predominate in Kittitas County, while Yakima and Benton Counties produce fruits, vegetables, grapes, and other specialty crops such as hops and mint. In fact, Yakima County ranks near the top of the Nation in production of many fruits, vegetables, and specialty crops. Another significant agricultural commodity is cattle, including both dairies and beef production. Manufacturing processes associated with agriculture also contribute substantially to the economic base. Services, trade, transportation, and forestry are important elements of the economy as well.[6]

Recreation Setting

The recreation setting of the Yakima River basin varies from designated wilderness areas to urban greenways. Features of the Yakima River basin are mainly situated in roaded natural settings. Interagency Committee for Outdoor

[6] www.access.wa.gov.

Recreation surveys indicate the number one preferred recreation setting is water oriented. Public demand for access to rivers, streams, and reservoirs continues to increase yearly. Major recreation access points and developed recreation areas within the Yakima River basin are depicted in figure 5.

Recreationists are attracted to the basin by the quality of the scenery, water, and recreation opportunities. Primary recreation activities include fishing the reservoirs and rivers for cold water sport species, whitewater boating and kayaking, motorized boating, and other related activities such as camping, hiking, picnicking, and wildlife viewing.

Bumping, Rimrock, and Clear Lakes are in the Snoqualmie National Forest. The rugged mountain terrain, surrounded by coniferous forests, creates magnificent scenic settings. Cabins, camping, boating, and fishing are available at Bumping Lake. Much of the shoreland at Clear Lake is reserved for group camp use.

Rimrock Lake is used intensively by fishermen and other recreationists. There are private cabins and several campgrounds. Good fishing is available in the reservoir for rainbow and other trout and in the stream below the dam for rainbow trout and whitefish.

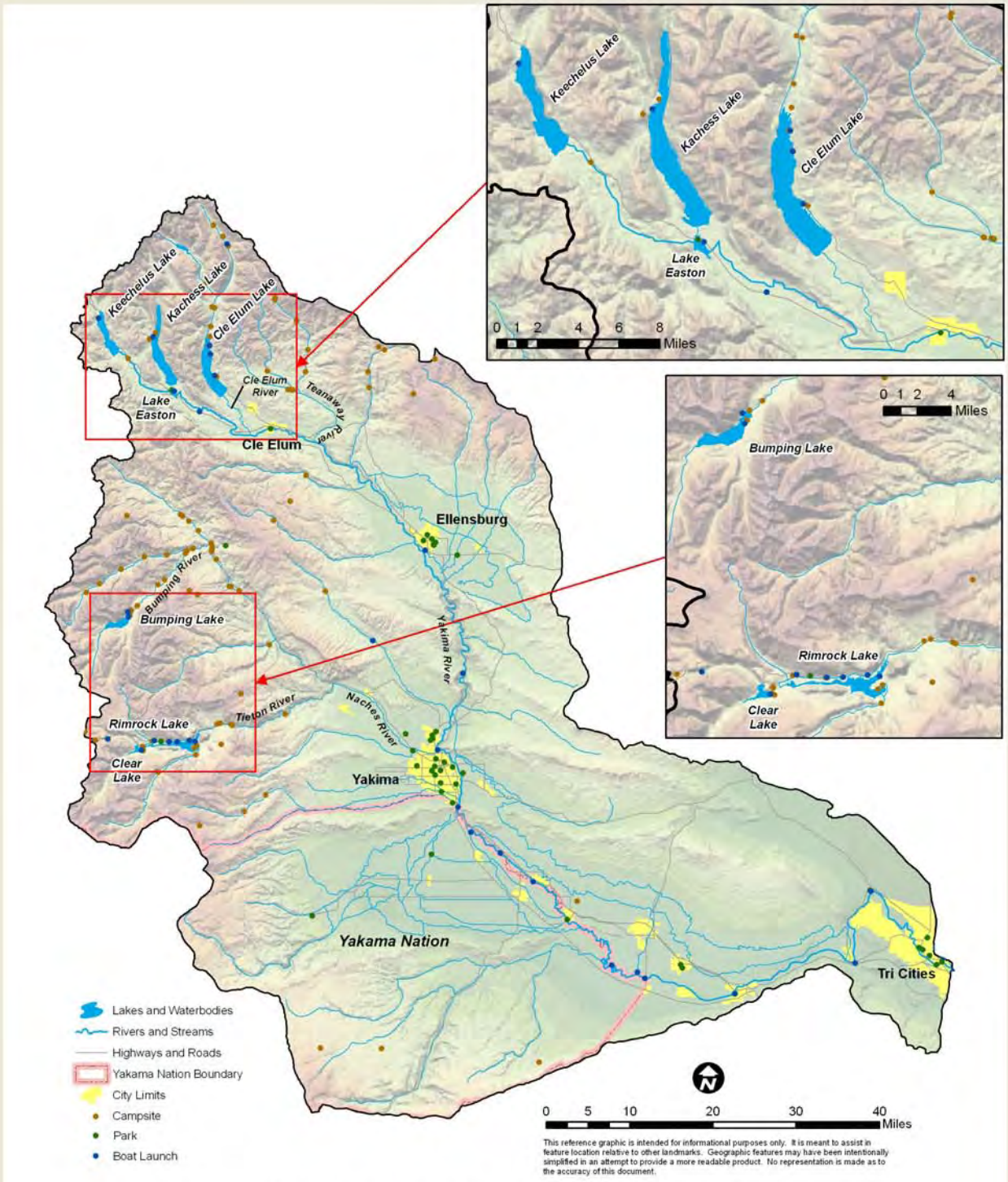
Cle Elum, Kachess, and Keechelus Reservoirs are in the Wenatchee National Forest. Cabins, camping, swimming, boating, picnicking, and fishing for some species, primarily for trout and freshwater ling, are available at all three reservoirs. Since construction of the dams, fishing has improved greatly in the streams below the dams.

Sunnyside, Prosser, Roza, and Easton Diversion Dams on the Yakima River have recreation associated with their impoundments. Sunnyside is limited to sightseeing and fishing. Prosser and Roza diversions both provide excellent fisheries, and Roza also has boat launching facilities.

The Easton Diversion Dam area is much larger than the other three, as it has 112 acres of land and 240 acres of water surface. There is a State park that provides facilities for camping, swimming, and boat launching and mooring. Recreational use is heavy. The reservoir also has a good fishery.[7]

Construction of the dams and other developments is generally accepted as causing a decline in the number of salmon and bull trout in the basin. Two species of salmon—spring Chinook and steelhead—are listed as endangered and one resident bull trout is listed as threatened. Salmon fishing is also a recreational activity in the Yakima basin with varying amounts of participation, depending on the type of water year.

[7] http://www.usbr.gov/dataweb/.



Yakima River Basin Recreation Access Points and Recreation Areas

Figure 5

The larger cities of Yakima, Ellensburg, and the Tri-Cities (Richland, Kennewick, and Pasco) in the basin offer the typical types of urban recreation opportunities such as hiking, bicycling, walking for pleasure, family gatherings, golfing, and field-oriented activities (soccer, baseball, football, etc.). These cities and other urban areas in the basin supply these activities through a variety of developments throughout the Yakima River basin (i.e., greenways, trails, golf courses, city parks, sport complexes, etc.). The quality of many of these recreation opportunities are enhanced by the rivers that flow through these metropolitan areas.

Demographic Change

Recreation demand and user preferences will change over time due to many factors. One large category affecting change is that of demographic trends in our society. In *Plan 2015: A Blueprint for Yakima County Progress*, the following was reported:

> *It is apparent that some fairly significant change in community demographics is underway. Age, sex, race, ethnic background, educational level, and income of county residents is changing in ways that could have implications for how we plan . . . (pg. V-2, May 1997).*

This section identifies several trends that were discernible from existing information sources.

Population Growth

It is commonly acknowledged in the outdoor recreation profession that population growth is one of the most significant variables affecting change to recreation demand and user preferences. It is not only change in population growth within a particular area, such as the Yakima River basin, but also change in the population in the locales of the visiting recreationists. Below are some key population change trends.

- Population growth in the United States from 1990–1999 was 9.6 percent. The western region led the Nation, with a 15-percent population increase during this time period.

- People recreating in Washington primarily reside in Washington and Oregon. The percentage of population growth in these States from 1990–1999 was 18.3 percent and 16.7 percent, respectively.

- Washington and Oregon rank 13th and 14th, respectively, in the Nation for projected population growth from 1995–2025. The population in

Washington is projected to increase by 43.8 percent, and the population in Oregon is projected to increase by 38.5 percent.

- Some people recreating in Washington reside in California and Idaho. California is ranked first for largest projected population growth from 1995–2025 (55 percent), and Idaho is ranked seventh (49 percent).[8]

- The population increase in Washington from 2005–2015 is projected to be 11.6 percent; and from 2015–2025, it is projected to be 24.8 percent.[9]

- It is anticipated that the greatest population growth in Washington by 2025 will take place in metropolitan counties, counties within a reasonable commute time to metropolitan areas, and those areas that combine important services with recreation opportunities.[10]

- Table 1 provides a comparison of the counties in the Yakima River basin. Population growth from 1990–2005 has ranged from a 1.4-percent average annual increase for Yakima County to a 2.7-percent average annual increase for Benton County.

Table 1.—Comparison of Counties in Yakima River Basin by Selected Demographic Factors from the State of Washington's Office of Financial Management (April 1, 2005)

Comparison Factors	Kittitas County	Yakima County	Benton County
2005 population	35,200	226,000	151,600
Percent population change from 2000–2005	+9.7% (1.9% avg. per year)	+3.0% (0.6% avg. per year)	+10.9% (2.2% avg. per year)
Percent population change from 1990–2005	+37% (2.5% avg. per year)	+21% (1.4% avg. per year)	+40% (2.7% avg. per year)
2005 median age	32 years	32 years	35 years
2001 per capita income	$21,728	$22,872	$27,454

- Several other population-related observations were made from interviews conducted during this project, although without support of any data or documentation. There is an increasing number of "metro commuter" families moving into Kittitas County along the portions of Interstate 90. Development and population growth along portions of Interstate 82 in Yakima is increasing. Yakima County is becoming a popular retirement area because of its climate, road system, services, and recreation opportunities (Greater Yakima Chamber of Commerce).

[8] U.S. Census Bureau.

[9] Hall and Kruger, 1994.

[10] Johnson and Beale, 1994.

Ethnicity

- In 1998, the profile of ethnicity for Washington was white/non-Hispanic 79 percent, Hispanic 6 percent, white/Hispanic 5 percent, Asian 5 percent, African American 3 percent, and American Indian 2 percent.

- The percentage increase in the Hispanic population in Washington from 1990–1998 was more than 60 percent, in contrast to a 10-percent increase for white/non-Hispanics.

- The number of Hispanic and Asian residents in Washington will more than double between 1995–2025.

- In the *2000–2005 Under Construction: Blue Prints for the Future*, the following was stated (Yakima Parks and Recreation Department, page 12):

  > *In 1980, the Bureau of the Census counted 25,387 Hispanics in Yakima County. In 1990, the Census count increased to 45,114, a 43.7 percent increase. An OFM estimate in 1998 projected 75,500 persons of Hispanic origin or a increase of 67 percent since 1990.*
  >
  > *The changing cultural face of Yakima is also reflected in the Yakima School District. In 1981, the District was 11.4 percent people of Spanish descent; by 1991, it was 32.7 percent. <u>This may be the most dramatic characteristic of change in Yakima's future</u> (emphasis added).*

User preferences will likely change to reflect the recreation preferences of the expanding Hispanic and Asian populations in the basin. It is reasonable to assume that the population of these two ethnic groups will increase by 6-8 percent per year for the foreseeable future. Table 2 shows a comparison of three segments of the United States population participating in land-based outdoor activities for the years 2000 to 2004. Information on participation in water-based outdoor activities for Hispanics is not available. One can assume that participation levels for water-based outdoor activities by Hispanics is also increasing as the general population of Hispanics increases in the Yakima River basin.

Age

- The population in the United States is aging. The median age in 1999 was 35 years. The median age for residents in Washington in 1999 was 35 years.

- Washington is expecting significant growth in older populations, from approximately 1.5 million residents over age 50 in 2000 to 2.5 million by 2020 (Interagency Committee for Outdoor Recreation [IAC], 2003).

Table 2.—Comparison of Percentages of Three Segments of the United States Population Participating in Land-Based Outdoor Activities, 2000–2004

Type of Activity	Whites Not of Hispanic Origin	Hispanics of Mexican Origin	Hispanics Not of Mexican Origin
Walking for pleasure	85.5	62.0	74.6
Family gatherings	75.1	68.0	68.2
Gardening or landscaping for pleasure	70.2	45.0	45.8
Driving for pleasure	59.1	28.3	34.6
Picnicking	56.7	49.1	45.3
Yard games (e.g., horseshoes)	45.8	17.3	23.2
Attending outdoor concerts, plays, etc.	44.4	23.0	34.9
Bicycling	40.6	33.7	35.1
Visiting a wilderness or primitive area	37.6	21.2	22.3
Day hiking	34.4	49.3	41.5
Visiting a farm or agricultural setting	31.9	16.9	19.1
Developed camping	30.7	19.1	19.2
Mountain biking	23.1	18.5	18.0
Driving off-road	21.1	10.9	12.3
Primitive camping	19.4	9.0	9.8
Hunting	14.0	5.0	5.3
Backpacking	11.8	8.3	10.2
Horseback riding on trails	11.0	5.2	5.7
Big game hunting	11.0	2.9	3.0
Small game hunting	9.1	2.1	2.9
Horseback riding (general)	8.9	8.0	7.9
Mountain climbing	6.9	4.2	4.5
Rock climbing	4.9	3.9	2.5
Migratory bird hunting	3.0	0.7	1.1
Orienteering	2.1	0.8	0.6

Source: *Recreation Statistics Update, Update Report No. 4*, November, 2004, Hispanic Participation in Land-Based Outdoor Recreation Activities, FS 2005 Forest and Rangeland Renewable Resources Assessment Update Report..

- Kittitas and Yakima Counties had an average age of 32 years in 2005, while Benton County had an average age of 35 years in 2005.

- Yakima County had a younger population base than most of Washington, with a median age of 32 years, largely due to the median age of Hispanics being 20.3 years and American Indians being 23.7.

- The city of Yakima estimated in 2000 that 29.2 percent of its residents were 19 years or younger, and 27.8 percent were 50 years or older (Yakima Parks and Recreation Department).

Income

- The median income of Washington residents increased slightly between 1984 and 1994, but a significant increase occurred in 1996 through 1998. The median income in 1998 was almost $48,000.

- Table 1 indicates that the average per capita annual income in Kittitas County is $21,728; in Yakima County, it is $22,872; and in Benton County, it is $27,454.

- The city of Yakima estimated in 2000 that 48.9 percent of its families had an annual income of less than $25,000; and 17.3 percent had an annual income of more than $50,000 (Yakima Parks and Recreation Department).

The key demographic drivers shaping the change in the Yakima River basin will be the above-national average increase in population growth and Hispanic ethnicity. Recreation demand will increase not only because of an increase of population growth due to migration to the area and births among residents in the basin, but also from the adjacent States from where many of Washington tourists reside. It is reasonable to assume that the population in the Yakima River basin will increase 2.0 percent per year for the foreseeable future.

Issues, Concerns, and Observations

Certain issues, concerns, and observations can be made that should assist reservoir and river managers in formulating future recreation management strategies. Some observations indicate that specific actions would not compromise other nonrecreational uses, and other observations may lead managers to alter site attributes to increase user satisfaction levels or alter streamflows and reservoir elevations to enhance visitor experiences. Several key issues, concerns, and observations, which have been taken from several sources, are paraphrased below.

General Issues, Concerns, and Observations

- There is a water level that may be too low, at which river access, fisheries habitat, aesthetics, backwater areas, wildlife, boating, and visitation are negatively affected. This water level would result in an associated decrease in recreation satisfaction and values.

- There is also a water level that may be too high, at which recreational fishing, shoreline stability, turbidity, water quality, public safety, facilities, beaches, habitat, and visitation are negatively affected. This water level would result in an associated decrease in recreation satisfaction and values.

- Recreation participation is experiencing growth in all types of settings, with multiple activities often occurring in the same setting. This often results in conflicts requiring carefully considered management strategies.

- Recreationists are more often participating in multiple activities during their leisure time rather than in a single activity. The number of trips is increasing, as are the number of days spent participating in recreation activities.

- Decreasing public funding for outdoor recreation access, service, and facility development and maintenance will represent major long-term challenges for managers.

- There is a point during river and reservoir operations where the level of recreation satisfaction will decline and recreationists will move to other areas or participate in other recreation or nonrecreation activities.

- There is a belief that, with increasing dialogue among water users, a broader societal perspective among decisionmakers, and more flexible and creative lake/reservoir operations, "major improvements can be accomplished without abandoning any water resource purpose or benefit."[11]

- More diversity in terms of race, culture, age, income, and other factors will change the demand for outdoor recreation but should not diminish the size of the overall market. Diversity will result in different preferences, expectations, and ways of seeking and participating in recreation activities.

- Nationwide, recreation use of available sites will continue to increase. This is a result of the effect of the "baby boomer" generation, increased leisure time, new recreation technologies, and increased public information about recreation opportunities in rural and urban

[11] LaGrassa, 1991.

communities. Increased demands on existing public lands, forests, and parks will necessitate creative solutions and partnerships to keep up with demand.

- Without major changes in infrastructure and recreation management programs, the health and safety of visitors and the integrity of the natural environment may be compromised.[12]

- Heavy pressures are likely to continue at water settings that have always been a major attraction for a wide variety of outdoor recreation activities.

- There is a trend in protecting agricultural lands in and around urban areas for open space and parklands. The addition of recreation values to agricultural lands (e.g., fee hunting), irrigation ditches, reservoirs, etc., is helping to justify protective farmland easements and other land and water conservation methods.

- As recreation demand increases, major outdoor recreation providers must continue to provide traditional outdoor opportunities closer to urban areas where most of the people seeking the activity live.

- As recreation demand increases, development and the extraction of resources may increasingly be viewed as conflicting with recreation and conservation interests.

- As public agencies continue to open the planning process to public involvement, organized groups representing specific outdoor recreation interests will become more involved in the decisionmaking process.

- If recreationists are dissatisfied with a recreation site in a particular area, and newer facilities are constructed at an alternate site, those recreationists will likely migrate to the newer site if other site attributes are favorable.

Yakima River Basin Issues, Concerns, and Observations

- Increased interest in promoting and marketing recreation opportunities will attract new visitors and most likely result in repeat visitation with associated benefits to the local economy.

- Tourism is maturing and becoming recognized in the Yakima River basin as a major economic force. The tourism industry, both Statewide and in the basin, is improving its marketing and visibility. The Yakima Valley Visitor's and Convention Bureau and the Greater Yakima Chamber of Commerce are taking steps that will

[12] National Recreation Lakes Study Commission, 1999.

increase Statewide recognition and recreation visitation to the area. The promotion of the area for its vineyards is an excellent example of success.

- The area's mild climate, days of sunshine, excellent roads, rural atmosphere, numerous attractions, diverse special events, and food and lodging are major factors that will increase nature-based tourism in the future.

- The numerous special designations in or near the Yakima River basin are important to a vibrant and diverse nature-based tourism industry. For example, designations such as national park, State parks, wildlife refuges, scenic byways, trails, wilderness areas, open space, bike ways, and historic sites all work together to comprise the tourism system in the basin.

- Agricultural products, orchards, vineyards, and fruit stands are also recreation resources and an attraction to water-based recreationists.

- The Columbia River's recreational access points, facilities, and boat launch lanes are few and modest in development and, thus, likely impacts both local and nonlocal visitation.

- Warm water fishing in the lakes east of the Yakima River basin and downstream on the Yakima River is very popular with Washington residents.

- There appears to be an unmet demand for boat storage, modern recreation vehicle (RV) camping, marina services and boat rentals, floating campsites, group areas for day use and camping, beaches, and motorized trail activities.

- Reservoir levels will likely affect recreation by changing the type of use taking place (e.g., water skiing to canoeing, more shoreline beach activities), the origin of visitors (e.g., fewer nonlocal visitors), and the number of visitors. This change and fluctuation is not necessarily negative because different types of people and uses can be served at different times of the year.

- It is likely that using the Yakima River for fly fishing and rafting/ kayaking will continue to grow. At some point in time, it may be necessary and prudent to regulate recreational use on the river to prevent user conflicts and decrease pressure on the fish from overuse.

- The measurement of current recreation visitation (demand) to the water resources in the Yakima River basin is weak. Surveys of public preferences for future recreation activities and settings, economic values, and future participation patterns do not exist for the basin. Managing agencies do not have the resources for a site-level recreation monitoring program.

Recreation Trends Influencing Water-Based Recreation

Water resource managers need to understand that recreation-related trends might influence future demand for creation of new or different types of public outdoor recreation opportunities. A lack of understanding of current and anticipated water-related recreation use trends hampers a water resource manager's ability to effectively manage recreation. The trends dealing with specific activities listed below focus on projected future participation levels. The number of trips and days spent on trips by recreation users for the selected activities are not discussed here although that information is available. Following are several key trends related to participation levels that may influence future water recreation management.

- *Urban Recreation Activities* – As society becomes more urbanized, travel patterns (including length of stay, repeat visitation, and distance traveled) will be increasingly dependent on the quality of the recreation opportunities and the recreation settings provided.[13] Urban residents typically have fewer outdoor recreation opportunities than rural residents, which results in increased demand for outdoor recreation opportunities and activities closer to urban areas

- *Trail, Street, and Road Activities* – Activities occurring on trails, streets, and roads continue to be popular. Walking, hiking, running, jogging, and bicycling outdoors can be done in a rural setting, but are most often done in an urban environment.

- *Water-Based Recreation Activities* – Projections for many water-based activities, such as visiting beaches or water areas, canoeing, motorboating, nonpool swimming, and rafting, show increases over projected population growth through the year 2050.

- *Consumptive Wildlife-Related Activities* – Hunting is expected to decline in popularity from 19 million to 16.5 million participants over the next 50 years. The National Survey of Fishing, Hunting, and Wildlife Associated Recreation reported a 4-percent decline in anglers nationwide from 1991 to 2001 (a 3-percent decline from 1996 to 2001). This reflects a trend but not a significant[14] one.

- *Nonconsumptive Wildlife Activities* – Nonconsumptive wildlife activities, such as birdwatching, photography, and other types of wildlife viewing, are projected to increase more than the population growth through the year 2050. The largest factor contributing to the increase in nonconsumptive wildlife recreation seems to be the increasing age of the general

[13] Tarrant, Michael A. et al., 1999, as cited in U.S. Department of Agriculture (USDA), 2003.

[14] Statistical comparisons are made at the 5-percent level. This means that for 95 percent of all possible samples, the estimate for 1991 cannot be shown to be different from the estimate of 2001.

population. Residential (close to home) wildlife watching rebounded slightly from its 1991–1996 declines.[15]

- *Developed Land Activities* – Developed land activities, such as camping, family gatherings, visiting historical places, and walking, are expected to increase at a rate greater than population growth through 2050 for all regions of the United States. In the northern States, participation levels for biking and picnicking are also expected to increase, but at a slower rate.

- *Primary-Purpose Trips* – Although water-based recreation activities are projected to increase, primary-purpose trips are expected to decrease. In other words, recreationists are not making trips to participate in a single activity; they are participating in multiple activities during their leisure time and staying longer.

- *Demographic Factors* – Recreation research shows that demographic factors, such as age, race or ethnicity, gender, wealth or income, education, and previous experience, influence recreation behavior. The largest change expected in factors influencing recreation behavior relates to increases in population and real income. Population, age, and gender ratio are expected to change relatively little, whereas the percentage of whites in the population should decline as other racial groups grow at faster rates.[16]

Of the outdoor recreation activities discussed, those projected to grow fastest through 2050 measured by participation levels are visiting historical places, wildlife viewing, sightseeing, and biking. The slowest growing activities are projected to be hunting and fishing. Hunting is the only activity projected to decline substantially below projected population increases. Demographic factors will continue to influence how water-based recreation is managed. Future vacationers are expected to stay longer at their destinations and to participate in a variety of recreational pursuits rather than in one primary activity.

National Recreation Providers

Outdoor recreation in the United States is provided primarily by four entities: Federal, State, and local governments and the private sector. Recreation occurs in rural settings, such as parks, forests, lakes and streams, and in urban settings, such as urban parks and sports complexes that meet the immediate needs of urban recreationists. Following is a brief discussion of the four main providers of recreation opportunities in the United States.

[15] National Survey of Fishing, Hunting, and Wildlife Associated Recreation, 2001.

[16] Hof et al., 1983; Walsh et al., 1992, as cited by USDA, 2003.

Federal

The Federal Government is the largest provider of public outdoor recreation, providing approximately 650 million acres (about 28 percent of the total land area of the lower 48 contiguous States). Most Federal land management agencies offer recreation that is primarily land based rather than water based. However, those land management agencies, the BLM, FS, and U.S. Fish and Wildlife Service (Service), also manage recreation facilities and opportunities near streams, rivers, and lakes. Water management agencies such as Reclamation, the Corps, and TVA, primarily focus on managing water-based and water-related recreation activities. The NPS manages not only land-based recreation facilities and opportunities but also activities that focus on water resources at national rivers, national seashores, and national lakeshores. National recreation areas and national Wild and Scenic Rivers are managed by a variety of agencies.

State

State acres available for recreation include State park lands (11.8 million acres), State forest lands (50.28 million acres), State wilderness lands (1.67 million acres), and State fish and wildlife lands (11.6 million acres).[17] Recreation facilities and opportunities provided by States are typically provided at larger State park areas and smaller historical sites. Areas provided in the State park system are typically smaller than the federally managed parks and somewhat larger than the more intensely developed local parks. State governments also play a significant role in conserving and managing the State's wildlife populations. State fish and wildlife lands tend to provide more primitive opportunities and more dispersed settings than those found in State park systems. State forests offer outdoor recreation opportunities that are typically more primitive and dispersed. However, the recreation aspects of State forests are not often known because management of State forests usually focuses on timber production and other timber-related activities. Like State forest and fish and wildlife lands, State wilderness areas offer more primitive and dispersed recreation opportunities than State park systems.

Local

The total number of acres available for recreation by local entities throughout the United States is unknown. Refer to sections below for a breakdown of acres within the Yakima River basin that are in local ownership and that could be available for recreation purposes. Because the recreation areas provided by local and municipal entities are small compared with State-managed areas, the acreage for recreation provided by local and municipal entities is probably significantly less than that provided by State governments. Nevertheless, the President's

[18] The 11.6 million acres estimated for State fish and wildlife lands is an average of two reports, each reporting different estimates. A 1995 BLM report estimated 9.3 million acres, and a 1989 Recreation and Park Association assessment estimated 14 million acres, as documented by USDA, 1999.

Commission on America Outdoors estimated in 1987 that 60 percent of the Nation's recreation areas were provided by local government, most of which were highly developed and managed for intensive use.[18]

Private

Nearly 60 percent of the land in the United States is privately owned.[19] Private lands support a large variety of recreation activities. Much of the Nation's private land is open to recreation without restrictions. Other private land is available to the recreating public through leasing or by obtaining permission. The 181 million acres of private land available for recreation includes 130.48 million acres open to the general public and 50.57 million acres leased to individuals and groups. Access to private rural lands is important because public lands cannot meet the existing and future recreation demand. Without private lands, the natural resources of existing rural and urban public parks may become overused and degraded.

Washington State Recreation Providers

Government entities own 40 percent of all land-based acreage in the State of Washington. Of this 40 percent, the Federal Government owns 12.9 million acres of the public lands (28 percent of the State's total land-based acreage); the State government owns 3.7 million acres of the public lands (13 percent of the total land-based acreage); local governments own 659,000 acres of the public land (0.1 percent of the total land-based acreage); and tribal governments own 2.7 million acres of the public lands (6 percent of the total land-based acreage). In other words, government entities own and manage approximately 47 percent of Washington State's total land acreage. The rest of the State's land base (approximately 53 percent) is owned by private parties or other nongovernment entities.

The FS (9 million acres), NPS (2 million acres), and the Washington Department of Natural Resources (3 million acres) are the primary government entities that manage the State of Washington's publicly owned land base. The Washington State Parks and Recreation Commission has reported that it owns 107,608 acres of recreation lands in the State.

The management of recreation lands by the different land and water entities within the State of Washington is similar to the way lands are managed on a national level. The Federal Government provides primarily land-based recreation facilities and opportunities that are less developed than State, local, or private entities. However, Federal agencies do manage lands and facilities that are near rivers and reservoirs or lakes. State agencies offer facilities and opportunities that

[18] Betz, Carter J. et al., 1999, as cited in USDA, 2003.

[19] Teasly, Jeff R. et al., 1999, as cited in USDA, 2003.

are typically smaller than federally managed parks and somewhat larger than the more intensely developed local parks. Local parks are intensely developed and managed for intensive use. Private lands offer recreational opportunities that are typically leased to individuals or groups for recreational purposes.

Recreation Participation Levels

Information pertaining to the types of existing recreation facilities and opportunities, future trends, and recreation participation levels can assist in establishing a baseline for assessing future recreation demand in the Yakima River basin. The principal recreation providers (i.e., Federal, State, local, and private) can also be used to describe the recreation environment. By documenting the existing national, Pacific Coast, and Washington State recreation participation levels and subsequently identifying future trends, user preferences, and other factors, land and water resource managers can focus their efforts on establishing the appropriate types and quantities of recreation facilities and opportunities. These facilities and opportunities could be provided in concert with an appropriate water supply to provide the public with a variety of quality recreation experiences within the Yakima River basin.

Comparisons are made between national, State, and regional participation and trend information to validate the demand decisions identified in this Analysis Report. However, one should keep in mind that certain activity participation and trend information cannot be readily compared with a high level of certainty due to the way information was collected and documented. In some instances, certain activities may be grouped into specific categories; and, in other instances, the activity may be addressed separately (e.g., sailing, motor, and nonmotorized boating for pleasure may have been grouped into a boating category in one instance but reported as separate activities in other instances).

National Participation Levels

Identifying recreation participation levels is important for effective management of the natural environment for recreation purposes. It can help land and water management agencies forecast changes that may be required to meet demand.

A 1999 national survey identified swimming, fishing, and boating as the three most popular water-based activities, with swimming and fishing among the top five most popular outdoor recreation activities overall.[20]

Table 3 shows the percent and number of people 16 years and older in United States participating in 12 types of outdoor recreation activities in 1999–2000. As

[20] Recreation Roundtable, 2000, as cited in USDA, 2003.

Table 3.—Percent and Number of People 16 Years and Older in the United States Participating in 12 Types of Outdoor Recreational Activities, 1999–2000

Type of Outdoor Activity	Percent of Population 16 and Older	Number in Millions
Participated in any type of activity	**97.5**	**202.1**
Trail/street/road activities	88.8	184.1
Traditional social activities	81.6	169.2
Viewing and photographing activities[1]	76.8	159.2
Viewing and learning activities	70.3	145.7
Driving for pleasure activities	66.1	137.0
Swimming activities	63.1	130.8
Outdoor adventure activities	57.3	118.8
Boating/floating/sailing activities	40.7	84.4
Fishing	37.0	76.7
Snow and ice activities	27.2	56.5
Outdoor team sports	21.0	43.5
Hunting	14.2	29.4

[1] Estimates for this category of activities were adjusted (by +1.751) to compensate for a problem with a screener question.

Source: 1999–2000 National Survey on Recreation and the Environment, FS and the University of Tennessee, Knoxville, Tennessee.

the table states, 97.5 percent of those individuals 16 and older participated in some sort of outdoor recreation activity. Most of those activities are available within the Yakima River basin.

Table 4 shows the results of a 1999–2000 national survey that identified the percent and number of people 16 years and older in the United States that participated in land-based outdoor activities. Trail/street/road, team sports, backpacking and camping, viewing and learning, viewing and photographing, hunting, driving for pleasure and sightseeing, and traditional social activities are described in table 4. The percentages do not total 100 percent because recreationists often participate in more than one activity on a particular visit/trip. Many of those activities, such as camping, hiking, walking, bicycling, viewing natural scenery, backpacking etc., are greatly enhanced by the presence of a reservoir or river water source.

The same 1999–2000 national survey also identified people 16 and older that participated in water-based outdoor activities. Boating, floating, fishing, and swimming activities are the types of water-based activities identified in table 5. These types of activities are more dependent on a reliable water supply throughout a recreation season than those depicted in above-mentioned table 4.

Table 4.—Percent and Number of People 16 Years and Older in the United States Participating in Land-Resource-Based Outdoor Activities, 1999–2000

Activity	Percent of Population 16 and Older	Number in Millions
Trail/street/road activities		
Bicycling	39.2	81.3
Mountain biking	20.3	42.1
Walking	81.8	169.6
Horse riding and equestrian	10.7	22.2
Hiking	32.3	66.9
Team sport activities		
Softball, soccer, baseball, etc	22.5	46.6
Backpacking and camping activities		
Backpacking	12.6	26.1
Developed camping	19.5	40.4
Primitive camping	12.2	25.3
Visiting a wilderness or primitive area	33.4	69.2
Gather mushrooms, berries, or other natural products	26.2	54.3
Viewing and learning activities		
Visiting a nature center, nature trail or zoo	56.2	116.5
Visiting a prehistoric or archaeological site	19.7	40.8
Visiting a historic site	45.1	93.5
Viewing and photographing activities		
Bird watching	32.8	67.9
Viewing other wildlife	42.8	88.7
Viewing wildflowers and natural vegetation	45.2	93.7
Viewing natural scenery	54.8	113.6
Hunting		
Big game	7.7	15.9
Small game	7.4	15.3
Waterfowl	2.3	4.8
Driving for pleasure and sightseeing		
Sightseeing	52.2	108.2
Driving for pleasure through natural scenery	52.5	108.8
Off-road 4-wheel driving, all terrain vehicle or motorcycle	16.6	34.4
Traditional social activities		
Family gathering	73.1	151.5
Picnicking	55.8	115.7

Source: 1999–2000 National Survey on Recreation and the Environment, FS and the University of Tennessee, Knoxville, Tennessee.

Table 5.—Percent and Number of People 16 Years and Older in the United States Participating in Water-Resource-Based Outdoor Activities, 1999–2000

Activity	Percent of Population 16 and Older	Number in Millions
Boating/floating/sailing		
Sailing	4.8	9.9
Canoeing	9.3	19.3
Kayaking	3.1	6.4
Rowing	4.5	9.3
Motorboating	23.2	48.1
Water skiing	7.9	16.4
Jet skiing	9.1	18.9
Floating, rafting	9.6	19.9
Sailboarding/windsurfing	0.8	1.7
Surfing	1.6	3.3
Fishing		
Fresh water	29.1	60.3
Cold water	12.9	26.7
Warm water	22.6	46.8
Salt water	9.3	19.3
Migratory ocean-to-fresh water	3.7	7.8
Swimming		
Swimming/lake, river, ocean	43.2	89.6
Swimming in fresh water	29.1	60.3
Swimming in salt water	24.2	50.2
Snorkeling	6.4	13.3
Scuba	1.5	3.1
Visiting a beach	37.2	77.1
Visiting a waterside	25.7	53.3

Source: 1999–2000 National Survey on Recreation and the Environment, FS and the University of Tennessee, Knoxville, Tennessee.

An additional study completed by the FS as part of The National Survey on Recreation and the Environment (NSRE) 2000 identified the percent change in participation for certain outdoor recreation activities. One should keep in mind that the population of the United States has increased substantially since 1994. That would account for more individuals participating in a certain activity; however, the percent of people participating in certain activities increased substantially beyond what an increase in the total population would account for. Table 6 shows the participation trends from 1994–95 and 2000–02.

Table 6.—National Participation Trends from 1994–95 and 2000–02

Resource Base Activity	1994–95 Participants (in Millions)	2000–02 Participants (in Millions)	Percent Change 1995–2002
Land Resource Based Activities			
Bird watching	54.1	69	27.5
Hiking	47.8	70.9	48.3
Backpacking	15.2	22.8	50.0
Primitive camping	28.0	34.1	21.8
Off-road driving	27.9	37.3	33.7
Walking	133.7	176.9	32.3
Sightseeing	113.4	110.4	-2.6
Developed camping	41.5	56.3	35.7
Picnicking	98.3	116.1	18.1
Bicycling	57.4	84.2	46.7
Horseback riding	14.3	20.7	44.8
Hunting	18.6	24.1	29.6
Water Resource Based Activities			
Motorboating	47.0	51.9	10.4
Swimming (river, lake, ocean)	78.1	89.1	14.1
Water skiing	17.9	17.3	-3.4
Fishing	57.8	72.7	25.8
Sailing	9.6	10.9	13.4

Source: FS RPA Assessment 2000 as cited in Colorado State Comprehensive Outdoor Recreation Plan, 2003.

Table 7 shows the most current information available related to participation percentages in the United States for outdoor recreation activities for the year 2004. Comparing table 7 with tables 4, 5, and 6 can provide some insight as to the trends in outdoor recreation participation that one can assume will continue into the first part of the 21st century.

Overall, most of the outdoor recreation activities experienced an increase in participation from 1995 to 2004 as indicated from tables 4, 5, 6, and 7. The only activities showing a decrease in participation were sightseeing and water skiing, although the change is not major. Activities such as hiking, walking, and bicycling have been the fastest growing activities over the years. These activities are easier to do and less expensive. Except for water skiing, all water-based recreation participation levels have increased significantly from 1995 to 2004.

Table 7.—Participation Rates for Outdoor Activities in 2004

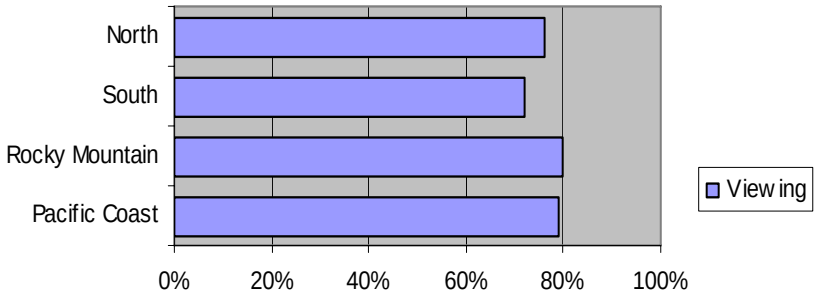
Type of Activity	Percent Participating	Participants (Millions)
Viewing/photographing natural scenery	70.6	151.2
Visiting nature centers, etc.	63.5	135.9
Driving for pleasure	61.2	130.9
Viewing/photographing other wildlife	58.2	124.6
Viewing/photographing wildflowers, trees, etc.	57.0	122.0
Visiting beach	56.9	121.8
Swimming in lakes, streams, etc.	54.2	116.1
Visiting historic sites	53.1	113.6
Picnicking	52.4	112.1
Boating	44.2	94.6
Viewing/photographing birds	39.8	85.2
Day hiking	38.0	81.3
Bicycling	37.6	80.5
Fishing	37.5	80.3
Visiting a wilderness or primitive area	33.6	71.9
Viewing/photographing fish	32.1	68.7
Developed camping	31.1	66.5
Freshwater fishing	30.9	66.1
Motorboating	30.3	64.9
Snow/ice activities	29.2	62.4
Driving off-road (defined as off of paved or graveled roads)	22.5	48.1
Visiting prehistoric/archeological sites	21.6	46.2
Mountain biking	19.8	42.5
Primitive camping	15.5	33.1
Rafting	15.5	33.1
Jet skiing	13.4	28.7
Hunting	13.1	28.1
Cold water fishing	13.0	27.7
Canoeing	12.6	26.9
Backpacking	12.1	25.8
Horseback riding (general)	8.9	19.1
Horseback riding on trails	7.1	15.2
Kayaking	7.0	15.0
Downhill skiing	6.8	14.5
Snowmobiling	6.3	13.5
Snowboarding	5.9	12.6
Cross-country skiing	2.7	5.7

Source: *Recreation Statistics Update, Report No. 1*, August 2005, FS, 2005 Forest and Rangeland Renewable Resources Assessment.

Pacific Coast Participation Levels

The following figures show the results of participation levels for certain outdoor recreation activities in specific regions of the United States. The regions defined are FS Resource Planning Act Assessment (RPA) regions. The figures reflect information taken from the National Survey on Recreation and the Environment 2000. The States within the Pacific Coast Region include the entire States of Washington, Oregon, California, Nevada, Hawaii, and Alaska. The different regions differ in climate, topography, and culture that lead to regional variations in outdoor recreation use patterns. The regions also differ in population. The North has about 92 million people 16 and older, the South has 62 million, the Rocky Mountains has 15 million, and the Pacific Coast has 31 million.[21]

Figure 6 shows the participation percentages in viewing activities. Viewing activities can include, among other things, visiting a nature center, visiting a prehistoric site, bird watching, wildlife viewing, and studying nature. Regional participation in one or more viewing activities ranged from 74 to 80 percent. However, variations for individual activities between regions can be greater. As an example, studying nature near a water area was lowest in the Rocky Mountains (25 percent) and highest in the Pacific Coast (66 percent). Even with the variations in opportunities to participate in different activities across regions, the regional percentages for viewing nature are very similar.

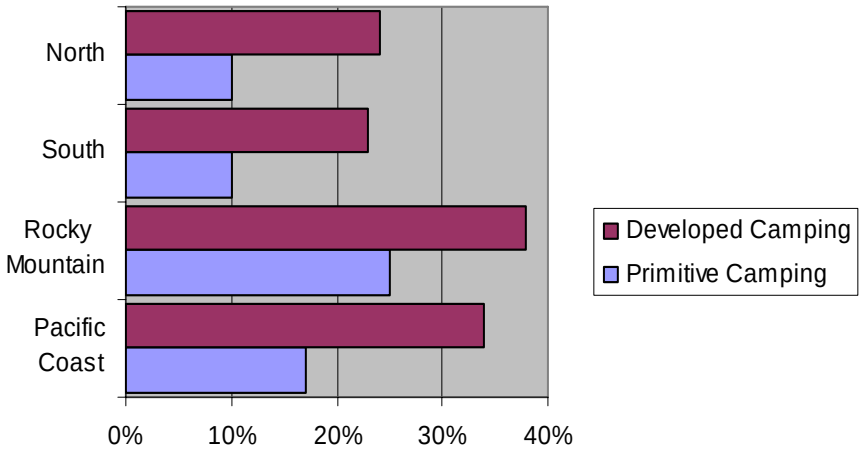


Source: USDA Forest Service RPA Assessment 2000.

Figure 6.—Percent of participation in viewing activities by region.

Developed camping participation levels in the Pacific Coast (34 percent) and Rocky Mountain Region (38 percent) are greater than the participation levels for the other two regions (South, 23 percent and North, 24 percent). The same can be said of primitive camping (i.e., more people participate in primitive camping in the western two regions). This variation may be because there are more public lands available for camping in the Western United States. Figure 7 shows the percent of participation in camping activities, by regions, in the United States.

[21] FS, Report on National Survey on Recreation and the Environment, 2000.



Source: USDA Forest Service RPA Assessment 2000.

Figure 7.—Percent of participation in camping activities by region.

Hunting participation levels are greatest in the Rocky Mountains (13 percent) and in the South (11 percent) compared to the Pacific Coast (5 percent), which had the lowest participation level for hunting. The regional differences may be due to cultural differences as well as the availability of public land for hunting. Large amounts of public lands are available in the Rocky Mountains for hunting while hunting often occurs on private lands in the other regions. The low percentages for hunting in the Pacific Coast are likely related to scarce opportunities as well as cultural differences. Of the 212 million people in the United States, 6 percent of the total population went hunting. Participation rates ranged from a high of 12 percent in the West North Central Region to 2 percent in the Pacific Coast Region, which includes the State of Washington.[22]

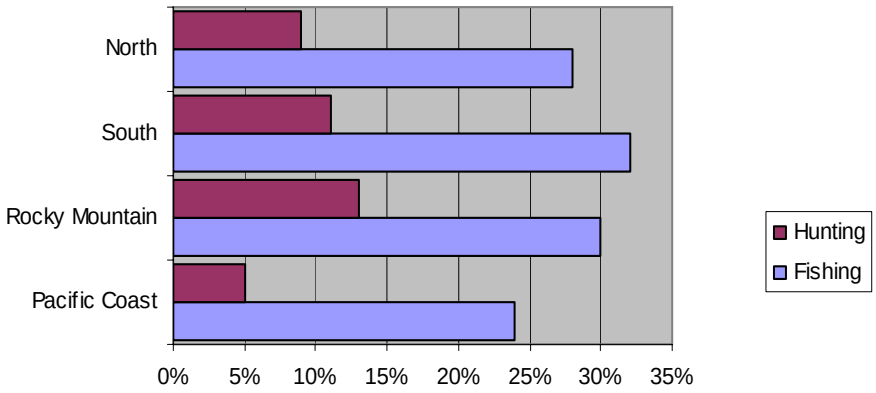
Regional participation levels for fishing range from 24 percent in the Pacific Coast to 32 percent in the South. Figure 8 shows the percent of participation in hunting and fishing by regions within the United States. In 2001, 212 million people 16 years or older lived in the United States. The national participation rate for fishing was 16 percent. One out of every six people went fishing. The participation rate for fishing in the Nation ranged from a high of 27 percent in the West North Central Region to a low of 11 percent in the Middle Atlantic Region.

The participation rate for fishing in the Pacific Coast Region, which includes the State of Washington, was 12 percent.[23]

Boating participation levels range from 26 percent in the Rocky Mountain Region to 30 percent in the North Region. Motorboating is the most popular of any of the

[22] Service, *National Survey of Fishing, Hunting and Wildlife-Associated Recreation*, 2001.

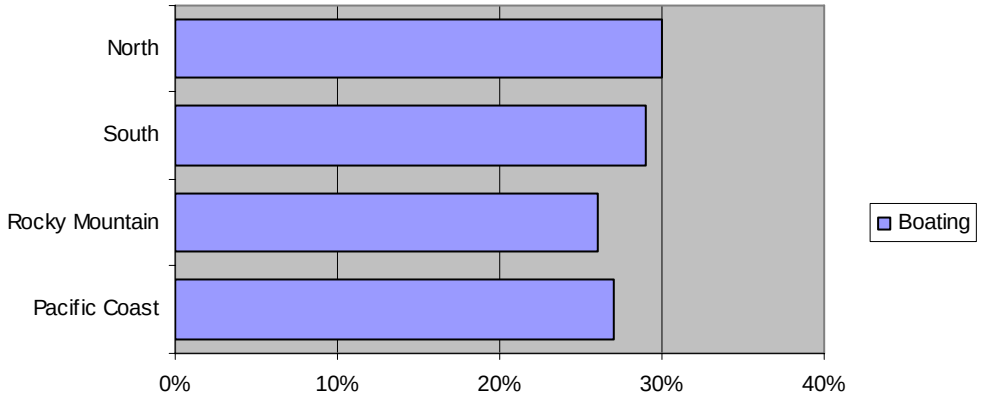
[23] Ibid.



Source: USDA Forest Service RPA Assessment 2000.

Figure 8.—Percent of participation in hunting and fishing by region.

boating activities included in the group of activities. About 25 percent of the people in the South and 20 percent in the Pacific Coast Regions participate in motorboating. The most popular nonmotorized boating activity reported was canoeing (4 percent) and rowing (3 percent) and occurred in the Pacific Coast Region. Figure 9 shows the percent of participation for boating activities by regions of the United States.



Source: USDA Forest Service RPA Assessment 2000

Figure 9.—Percent of participation in boating by region.

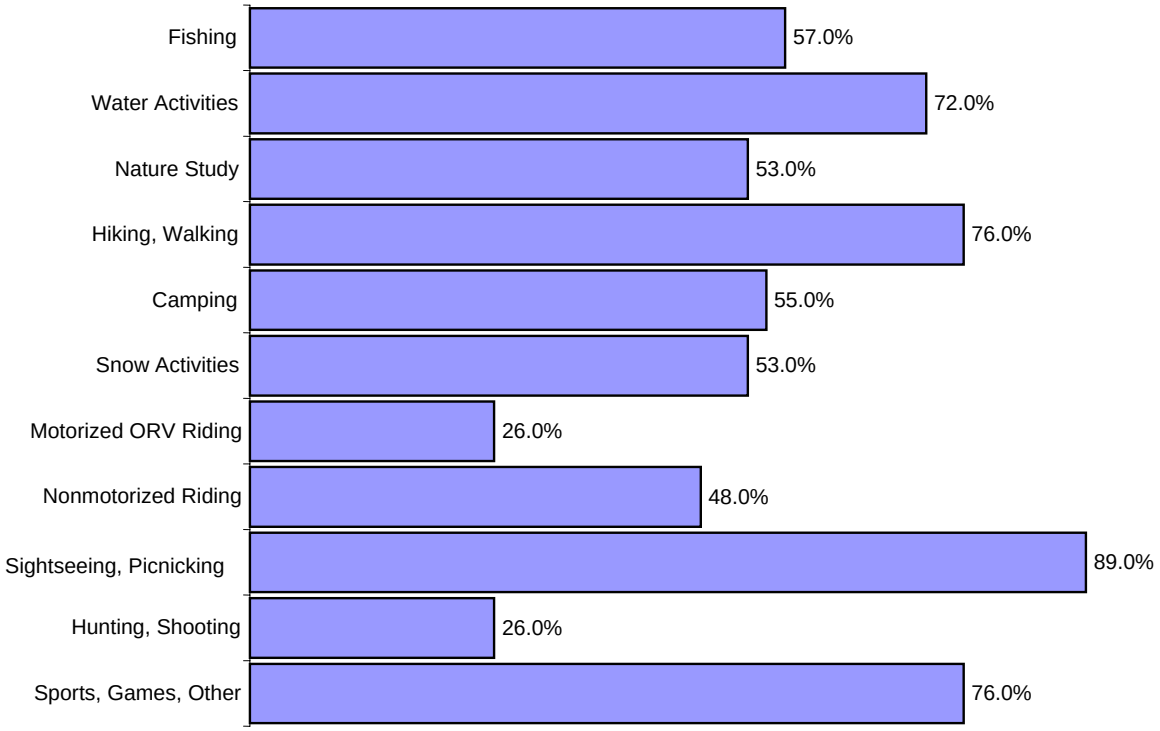
Washington State Participation Levels

Information pertaining to the existing State recreation environment, participation, and future demand is available primarily from three sources: (1) the 2002–2005 Washington State Comprehensive Outdoor Recreation Plan; (2) the IAC for

Outdoor Recreation, Washington Outdoors: Assessment and Policy Plan 1990–1995; and (3) IAC, Estimates of Future Participation in Outdoor Recreation in the State of Washington, An Addendum to the State Comprehensive Outdoor Recreation Plan SCORP, March 2003.

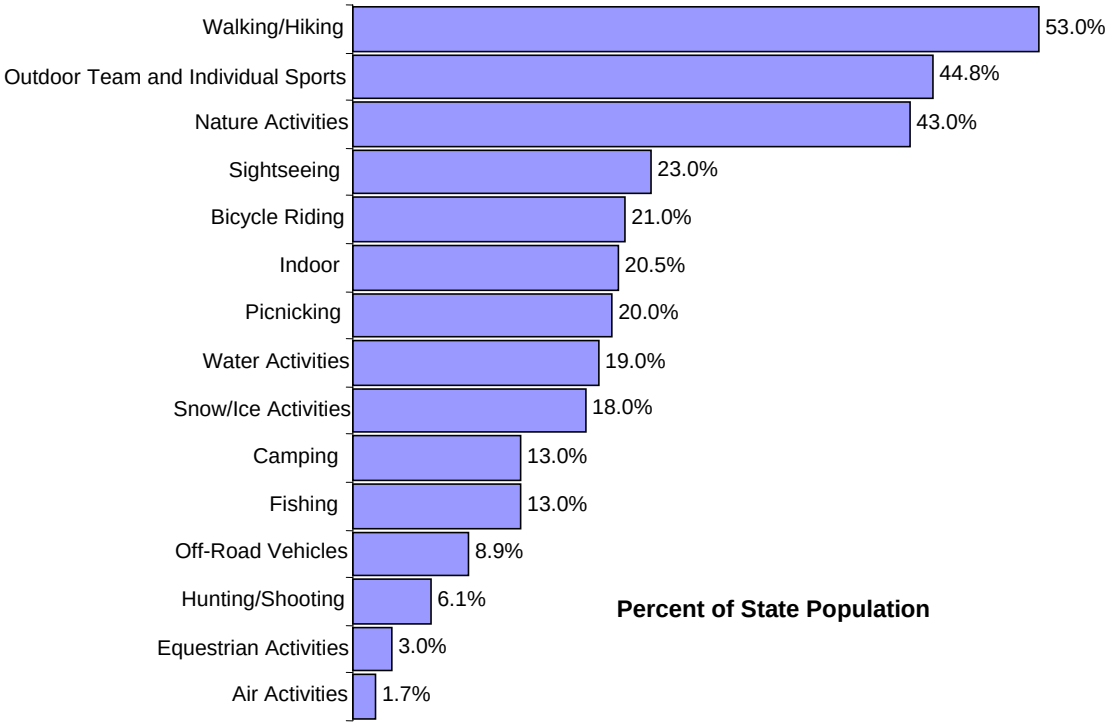
IAC identified 11 generalized recreation activity categories to determine participation levels of State households surveyed. The most popular activity categories were sightseeing/picnicking, hiking/walking, sports/games/other, and water activities. Refer to figure 10 for participation levels for the 11 recreation categories as a percent of the total State population.

As part of the effort to determine actual public behavior as opposed to public preference, the IAC contracted for the design and implementation of a Statewide outdoor recreation survey to determine the participation levels as a percent of the State population. Figure 11 reveals that most people in the State pursue close-to-home, low-cost activities such as walking/hiking, outdoor team sports, nature activities, sightseeing, and bicycling.



Source: Interagency Committee for Outdoor Recreation,
Washington Outdoors: Assessment and Policy Plan 1990-1995

Figure 10.—Recreation participation by activity category.



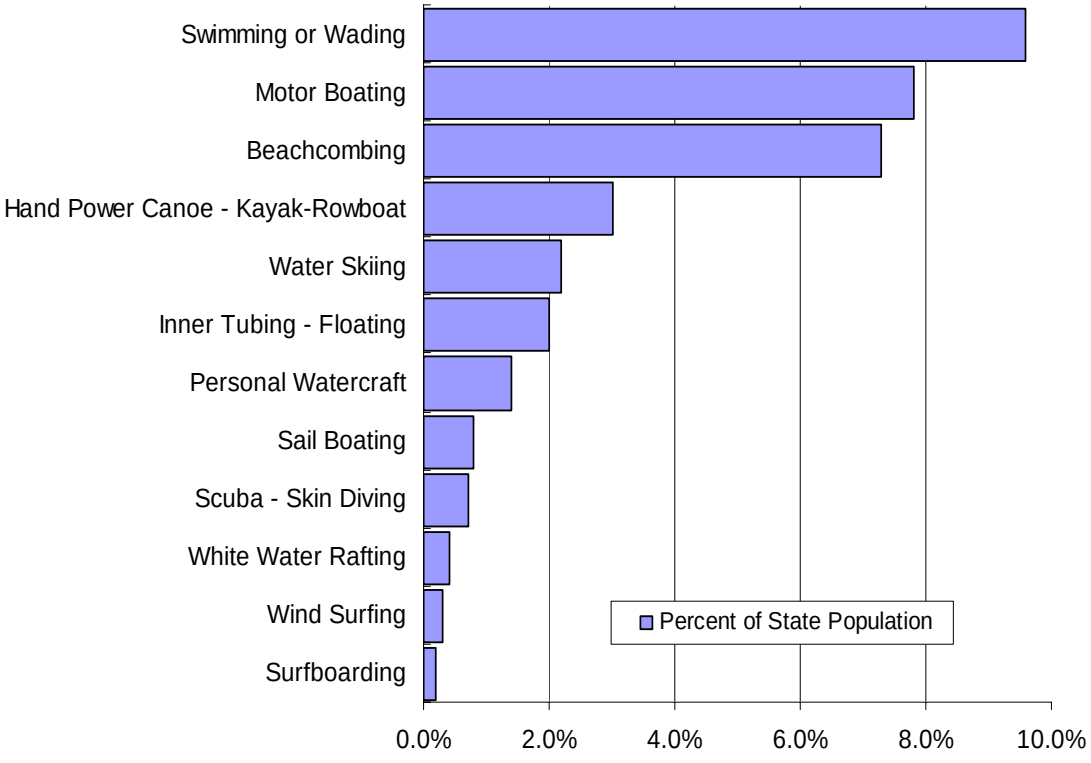
Source: Interagency Committee for Outdoor Recreation, *Estimates of Future Participation in Outdoor Recreation in Washington State*, March 2003, Addendum to the State Comprehensive Outdoor Recreation Plan

Figure 11.—Participation in general recreation categories as a percent of State populations.

A further breakdown of water-based recreation participation levels as a percent of the State's population is found in the March 2003 addendum to the 2002–2005 SCORP. Figure 12 shows 12 water-based recreation activities and their participation levels.

A further breakdown of water-based recreation participation levels as a percent of the State's population is found in the March 2003 addendum to the 2002–2005 SCORP. Figure 12 shows 12 water-based recreation activities and their participation levels.

The IAC projected the State of Washington's future participation levels in outdoor recreation for a 10- and 20-year period. The 22 outdoor activities selected by the IAC are listed in table 8. Walking, nature activities, bicycle riding, canoeing/kayaking, nonpool swimming, and visiting a beach were the activities that are projected to grow the fastest over the 20-year period. Hunting and fishing appear to be on the decline in the State of Washington. The decline in hunting and fishing appears to be the norm within the United States; although in some States, the number of people hunting and fishing is growing, but it is not



Source: Interagency Committee for Outdoor Recreation, *Estimates of Future Participation in Outdoor Recreation in Washington State*, March 2003, Addendum to the State Comprehensive Outdoor Recreation Plan.

Figure 12.—Participation in water activities as a percent of the State's population.

keeping up with population growth within those States. Table 8 shows the estimated participation changes for certain recreation activities in Washington over a 10- and 20-year period.

Local Recreation Environment

Information concerning local outdoor recreation trends, participation percentage levels, and factors that may influence future recreation development activities is very limited for the Yakima River basin. For the purposes of this report, it is assumed that trends in outdoor recreation and participation levels for the United States, Pacific Coast Region, and the State of Washington also apply to the basin. This section briefly describes the existing recreation opportunities that are located near or adjacent to flat water reservoirs or lakes and the major rivers within the basin. The current recreation environment or supply is discussed in more detail in the Black Rock Dam and Reservoir Recreation Needs Assessment, attached as appendix B. In addition, the "Issues, Concerns, and Observations" section of this report can be used to describe the recreation/tourism environment within the basin.

Table 8.—Estimates, as a Percent of Change in the Number of People Participating in the Future Compared to Current Levels

Type of Activity	Estimated 10-Year Change (2003-2013)	Estimated 20-Year Change (2003-2023)
Walking	+23%	+34%
Hiking	+10%	+20%
Outdoor team and individual sports	+6%	+12%
Nature activities	+23%	+37%
Sightseeing	+10%	+20%
Bicycle riding	+19%	+29%
Picnicking	+20%	+31%
Motor boating	+10%	No estimate
Nonpool swimming	+19%	+29%
Visiting a beach	+21%	+33%
Canoeing/kayaking	+21%	+30%
Downhill skiing	+21%	No estimate
Cross-country skiing	+23%	No estimate
Snowmobile riding	+42%	No estimate
Fishing	-5%	-10%
Camping – primitive dispersed	+5%	No estimate
Camping – backpacking	+5%	+8%
Camping – developed (RV style)	+10%	+20%
Off-road vehicle riding	+10%	+20%
Hunting-shooting	-15%	-21%
Equestrian	+5%	+8%
Air activities	No estimate	No estimate

Source: IAC, March 2003, *Estimates of Future Participation in Outdoor Recreation in the Washington State, an Addendum to the SCORP*.

The Yakima River basin is within easy access of millions of residents from Oregon and Washington for day-use, weekend, and longer visitation. It is also a major passthrough area for potential recreationists traveling the interstate highway system. The Yakima River basin supplies a variety of quality water-based recreation opportunities in a variety of outdoor settings (i.e., urban types of settings to rural developed and natural settings). Flat-water recreation is primarily available in the western and northern portion of the basin at Cle Elum Reservoir, Bumping Lake, Kachess Reservoir, Keechelus Reservoir, Clear Lake, Easton

Lake, and Rimrock Reservoir. The five primary rivers discussed within the basin that supply recreation opportunities are the Tieton, Naches, Cle Elum, Bumping, and Yakima Rivers. Although there are other smaller flat water reservoirs or lakes and rivers in the basin that offer similar types of water-based recreation activities, the only water bodies discussed in this section and this report are the ones specifically mentioned above.

The Yakima River basin has a national reputation for its high quality fly fishing, primarily on the Yakima River. Fly fishing is one of the fastest growing activities on the Yakima River, otherwise known as the place to "Chase Rainbows." The Yakima River is what anglers in Washington State call a "blue ribbon" trout stream (*Yakima Valley Visitors Guide*, Yakima Valley Visitors and Convention Bureau, 2005). The prime periods for fishing the river are February through May and September and October, although fishing occurs on the river throughout the year. Spring fishing is the best time to fish the Yakima River, because water levels are low and the fish have been less active and are ready to eat insects starting their annual hatch. Fishing the Yakima River in September and October is also good due to the low water levels (personal communication, Gary Fairfield, June 8, 2005). Refer to the Yakima River streamflow hydrographs in appendix C.

Spiking of streamflows negatively affects fishing for the short term (i.e., 1 or 2 days). Flows of 680 cubic feet per second (cfs) at Ellensburg are considered low water, and flows of 2,000 cfs or below are considered good for wading for fish (personal communication, Dan Snyder, local fly fisher, June 9, 2005). Streamflows of 800 cfs are ideal for fishing, and flows of 4,000 cfs are considered raging water (personal communication, Robert Cooper, local fly fisher, June 9, 2005).

During the summer recreation season, the quality of the fishing experience is affected by other types of recreational use such as tubing and rafting for pleasure (personal communication, Gary Fairfield local angler, June 8, 2005; Dan Snyder, local angler, June 9, 2005). The peak rafting season on the Yakima River occurs in late June until September due to the warmer temperatures and summer vacation for students.

The Yakima River below the city of Yakima to the Tri-Cities is great for small-mouth bass fishing in the spring (personal communication, Dan Snyder, June 9, 2005).

Fishing in the Tieton River is not as good as fishing in the Yakima and Naches Rivers due to the small stream size, fast water, wood debris, and cloudiness of the water (personal communication, Gary Fairfield, June 8, 2005). The Tieton River is not good due to angry water and white coloration (personal communication, Robert Cooper, local fly fisher, June 9, 2005). River rafting is best during a 3-week period in September when Reclamation releases stored water in Rimrock Lake for downstream beneficial uses. The rapids during that time are rated as a

Class III. Refer to appendix D for a description of the different white water classes. Also refer to appendix C for streamflow hydrographs.

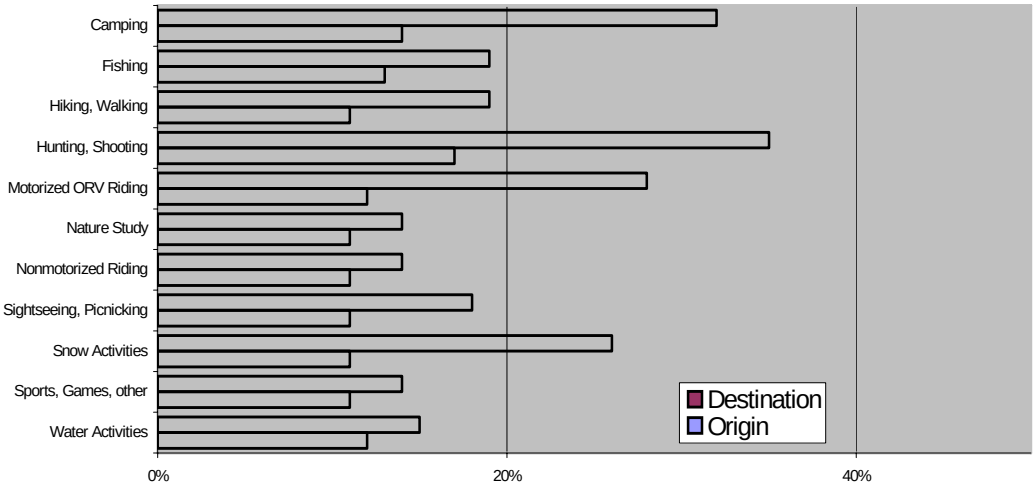
Fishing the Naches River is not as good as fishing in the Yakima River, and there is very little rafting. The lands adjacent to the river are privately owned, which limits access and put in and take out sites along the river corridor.

The 8-mile section of the Cle Elum River below the dam is a tributary to the Yakima River. This section is bordered by private land, a county road, small local businesses, and the small community of Roslyn. The area is also the location of the large resort development of Suncadia, with 3,000 planned residential units and 3 golf courses. Public access to the Cle Elum River is very limited because of the private land and development. There are no public or private campgrounds and no public access launch sites, so recreation demand is limited to fishing and boating by local residents. Estimates of the amount of recreation use of the river are not available. The Cle Elum River below the dam is used as an educational opportunity to teach elementary and high school students and their teachers about salmon and their life stages. The salmon come to this reach of the river to spawn, and the physical setting is naturally adaptable to seeing the salmon spawn mainly in the fall (September and October).

The Yakima River basin also has a Pacific Northwest regional reputation for motorized recreation opportunities associated with trail bikes, all-terrain vehicles, jeeps, and snowmobiles primarily on FS lands on the west side of the basin. National Forest managers report increased participation in RV camping, off-highway activities, driving for pleasure, jet skiing, and snowmobiling. Also reported is an increase in the number of Hispanic outdoor recreation participants, particularly on the Naches Ranger District adjacent to the city of Yakima (personal communication, Mike Rowan and staff, FS, Naches Ranger District, June 10, 2005). Picnic sites and campgrounds are close to or exceeding capacity on summer weekends and exceed capacity on holiday weekends. Recreation demand slows during the week but can reach 50- to 75-percent capacity depending on the weather (personal communication, Pam Novitsky, FS, Cle Elum Ranger District, June 9, 2005).

To compare the recreation participation that is generated (origin of demand) and the recreation participation it accommodates (destination of demand), the IAC divided the State into four regions. The Yakima River basin lies primarily within Region 3, as described by the IAC. Region 3 satisfies a demand from other regions in the State for all activities reported in figure 13.

Region 3 seems to be a destination area for recreationists from other more populated regions within the State. As stated earlier, the State of Washington's population is expected to increase by 11.6 percent from 2005 to 2015 and 24.8 percent from 2015 from 2025. Accommodating and satisfying the State's demand for outdoor recreation activities within the Yakima River basin is an important factor in the region's overall economy.



Source: Interagency Committee for Outdoor Recreation (IAC), *Washington Outdoors: Assessment and Policy Plan 1990-1995*.

Figure 13.—Demand in Region 3 by activity.

The types of recreation activities that are popular on a national and regional scale are also the types that occur on or adjacent to the water bodies in the Yakima River basin. The State of Washington and local and Federal Government agencies currently supply the facilities, opportunities, and infrastructure necessary to accommodate the most popular recreation activities. However, as the population increases and the recreation participation levels increase for many outdoor activities over the next half century, many of the existing recreation sites may experience overuse and degradation unless additional facilities and opportunities are provided to meet demand and public expectations. To accommodate future demand, recreation providers will have to cooperate to provide the necessary and appropriate facilities and opportunities.

Water Recreation Opportunity Spectrum Inventory and Existing Conditions

As previously stated in the "Methodology for Determining Demand and User Preference" section of this report, WROS is a national interagency tool that provides planners and managers with a framework and procedure for making better decisions for conserving a spectrum of high quality and diverse water recreation opportunities. As stated earlier, the "Executive Summary" from the WROS *User's Guidebook* provides more details and is included in appendix A; and the complete *User's Guidebook* can be downloaded from <www.usbr.gov/pmts/planning/wros/index.html>.

In this Level 1 analysis, WROS was used to inventory (i.e., map) the current supply of water recreation opportunities and to develop a regional profile of the water resources across the spectrum of six WROS zones named

urban, suburban, rural developed, rural natural, semiprimitive, and primitive. Refer to appendix E for a brief description of each WROS zone.

It is typical in recreation resource planning to examine "comparables" to help project demand and user preference. The criteria used to select comparables in this analysis were (1) the major existing reservoirs and rivers in the Yakima River basin and (2) other water resources near the basin that were similar in terms of geography, topography, climate, ecotype, elevation, vegetation, and recreation use. The latter criteria allowed for the inclusion of the Columbia River from the Tri-Cities to Wenatchee, as well as Wanapum and Pot Holes State Parks and Moses Lake.

By having an inventory of the existing recreation experiences in the area (i.e., the current supply) and having information about the type and amount of recreation visitation (i.e., current demand), decisionmakers are better able to understand current demand and to estimate future demand for new water storage or diversion options. The information from the WROS inventory can be very useful in developing future development and management alternatives, including different packages of appropriate recreation activities, facilities, infrastructure, programs, and regulations.

Table 9 displays the current supply of water-based recreation opportunities in the Yakima River basin study area across the six WROS classes. For the nine comparable lakes and six comparable rivers, the number of "water surface acres" and "river miles" by WROS class is presented, respectively. The percentage distribution of total water surface acres and river miles by WROS class is also presented. Maps for each comparable that depict the location of each WROS class are included in appendix F.

A total of 36,235 water surface acres and 413 miles of rivers were included in the Level I WROS inventory conducted in this project. The inventory indicates that the current supply of water recreation opportunities is primarily rural developed and rural natural.

Over half (53.3 percent) of the water surface acreage on the comparable lakes are providing rural developed recreation opportunities, followed by rural natural (37.3 percent) and suburban (9.4 percent). None of the lakes provide urban, semiprimitive, or primitive recreation opportunities.

Similarly, over half of the river miles (59.6 percent) are providing rural developed recreation opportunities, followed by rural natural (26.9 percent) and suburban (10.4 percent). Three percent of the river miles provide urban recreation opportunities. None of the river miles provide semiprimitive or primitive recreation opportunities.

One driving factor defining these opportunities was the level of development, such as major highways (e.g., Keechelus, Moses Lake, Yakima River), residential

Table 9.—Inventory of the Current Supply of Water Recreation Opportunities Based upon the WROS System

Water Resources	Urban	Suburban	Rural Developed	Rural Natural	Semi primitive	Primitive
LAKES	**Water surface acres by WROS Class**					
Keechelus Lake			2,360 acres			
Kachess Lake			1,684 acres	2,595 acres		
Cle Elum Lake			4,478 acres			
Lake Easton			205 acres			
Rimrock Lake			2,351 acres			
Bumping Lake			472 acres	849 acres		
Clear Lake				231 acres		
Moses Lake		3,417 acres	2,551 acres	760 acres		
Potholes Lake			5,220 acres	9,062 acres		
Total water surface acres		3,417 acres	19,321 acres	13,497 acres		
(% of total)		(9.4%)	(53.3%)	(37.3%)		
RIVERS	**River miles by WROS Class**					
Yakima River		29 miles	144 miles	30 miles		
Columbia River[1]	13 miles	11 miles	54 miles	42 miles		
Bumping River			3 miles	13 miles		
Tieton River			1 mile	20 miles		
Naches River		3 miles	36 miles	6 miles		
Cle Elum River			8 miles			
Total river miles	13 miles	43 miles	246 miles	111 miles		
(% of total)	(3.1%)	(10.4%)	(59.6%)	(26.9%)		

[1] The Columbia River surface acres available for recreation for each of the WROS classes identified in the inventory are also displayed in the legend on the Columbia River Map in appendix F. There are a total of 34,050 acres of flat water between Wenatchee and the Tri Cities that are available for recreational purposes.

areas (e.g., Moses Lake, Cle Elum, Tri-Cities), recreation facilities such as campgrounds and boat launches (e.g., all lakes, Wanapum), and smaller roads paralleling the shoreline (e.g., Rimrock, Columbia River).

A second driving factor was the level of recreation use. Washington State Parks reported that for the parks within the project area, the annual visitation was slightly greater than 10 percent from 1997 through 2002; that is, the annual visitation to State parks increased an average of 2 percent annually over the last 5 years.

While the annual visitation to each lake within the study area is not measured by the FS, interviews were conducted with five district recreation staff. Based upon their expert opinion, the FS managers indicated that the level of recreation demand is approaching or at capacity (i.e., 75–100 percent of capacity) during the summer weekends, and with a few exceptions, considerably less during the weekdays and shoulder seasons (i.e., 25–50 percent of capacity). There may also be situations on major holidays or during special events when the level of boating demand (i.e., the number of boats on the lake at one time) is exceeding the supply of boating opportunities. It was also learned from the managers that, in their opinion, recreation demand has been increasing over recent years (personal communication with recreation staff at the FS's Cle Elum and Naches Ranger Districts, 2005).

In summary, there are five findings from the WROS analysis:

1. The current supply of water recreation opportunities in the Yakima River study area is predominantly rural developed and rural natural.
2. There are no semiprimitive or primitive water recreation opportunities and relatively few urban and suburban opportunities.
3. The level of recreation demand (i.e., visitation) continues to increase each year for this current supply of opportunities.
4. The current visitation indicates a user preference for rural natural and rural developed opportunities as well as an apparent level of visitor satisfaction supported by finding number 3 above.
5. There are times and locations during the peak recreation season when recreation demand approaches or exceeds the recreation capacity or available supply of opportunities.

Setting Attribute Considerations

Attributes that influence recreation, such as water quality and streamflows, are important aspects of the existing and future recreation environment. Recreation setting or site attributes[24] are usually specific to a type of recreation area. To adequately satisfy the long-term demand for outdoor recreation, managers must supply and properly maintain the natural and manmade site attributes that are important to the recreation users. The following discussion concentrates on the public satisfaction levels with certain attributes associated with a particular recreation setting. If users are not happy with a particular attribute, they are likely to seek alternative sites or substitute activities. The following are setting attributes that might contribute to user satisfaction of a site.

[24] For the purposes of this document, an attribute is defined as a site condition users consider important for a quality recreation experience and will result in return visits to the site (e.g., solitude, scenery, adequate riverflow or reservoir elevation, shower, restroom, and boat ramp).

- *Fees* – Fees charged for the use of a site and its facilities should be reasonable and commensurate with the services provided.

- *Carrying Capacity* – The physical,[25] social,[26] environmental,[27] and facility[28] capacities should not be exceeded.

- *Public Information* – Appropriate information should be provided in the form of brochures, pamphlets, identification and location of emergency services, clear directional signs, and up-to-date Web sites, which can provide information about the site prior to the visit and the opportunity to make reservations.

- *Access* – Appropriate public access should be provided to the site or river segment and within the site (e.g., access for persons with disabilities, boat ramps, trails, parking).

- *Streamflows/Reservoir Levels* – Appropriate streamflows and reservoir water elevations should be provided for activities within a recreation setting, keeping in mind that different activities may require different streamflows and reservoir elevations.

- *Water Quality* – Appropriate Federal, State, and local water quality standards should be met. The following factors should be monitored to maintain user satisfaction levels: (1) hygienic factors such as bacteria (total bacteria, fecal coliform bacteria, ecoli, enterococci), toxic substances, etc.; (2) aesthetic factors such as color, turbidity/suspended solids (algae, oil, and grease content), odor, temperature, and acidity (ph and alkalinity levels); and (3) indirect factors that stimulate undesirable aquatic plant growth (e.g., ammonia, phosphorus, and nitrogen levels) (Reclamation, 2002).

- *Health and Safety* – The recreation setting should be free of manmade hazards, natural hazards should be identified in accordance with all legal requirements, and appropriate sanitation facilities should be provided.

- *Facilities* – The appropriate quantity and types of amenities that complement the recreation setting should be provided. For example, at an urban or suburban type of setting, amenities might include restrooms,

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[25] Physical carrying capacity can be described as the area that is available to a recreation user for participating in a specific recreation activity.

[26] Social carrying capacity can be described as the impacts that resource users have on one another. The number, type, and location of recreation users encountered by other resource users sometimes affect the recreation experience one is seeking to enjoy.

[27] Environmental or ecological carrying capacity can be described as the impacts that a level of recreation use will have on plants, animals, soils, water, air, etc.

[28] Facility carrying capacity can be described as the ability of an existing facility to accommodate the current level of recreation use.

potable water, fire pits, picnic tables and shelters, electrical hookups, telephones, camp hosts, law enforcement personnel, adequate parking, and interpretive services. In addition, facilities should be clean and well maintained.

- *Scenic and Visual Qualities* – Unique scenic and visual qualities available within a particular recreation setting should be protected to ensure that the public can continue to use and enjoy the surrounding environment and to ensure repeat visitation to the site.

- *Diversity of Opportunities* – Multiple types of recreation opportunities should be available within the site or immediate vicinity to allow families and groups to participate in a variety of activities during their visit.

Table 10 contains examples of additional site attributes that are important to recreational users.

The setting attributes mentioned above contribute to user satisfaction with a particular recreation site. Maintaining these attributes will increase the quality of the experience for users and result in return visits to the recreation site and increased benefits to local economy. Managers should concentrate their time and funding resources on providing attributes that would have high visitor satisfaction. In addition, as the United States population becomes more ethnically, socially, and economically diverse, recreation managers will have to modify the attributes of many outdoor settings to accommodate new demands and user preferences.

Local Carrying Capacity Considerations

Carrying capacity is the ability of a recreational resource to support a user population at a measurable threshold based on specific goals and objectives (Pfhister and Frenkel, 1974). Carrying capacity will vary with the amount of instream flows in a river or water elevations of a reservoir. The volume and velocity of flows, as well as the amount of usable water surface acreage of a reservoir, are important in sustaining a quality recreation experience over an extended period of time. The amounts, timing, and duration of flows in the river or water elevations at a reservoir needed to conduct a certain type recreation activity differ among the many recreation users. Optimum flows or reservoir elevation required for a quality recreation experience for one recreation activity is not necessarily optimum for another (e.g., optimum flows for river rafting are not necessarily optimum for swimming or fishing). Ideally, instream flows and reservoir water elevations could be established that benefit the greatest number of recreation users at any one time while not negatively impacting environmental resources. One can assume that bankfull flows and reservoir full pools would benefit most of the water-related recreation activities. Following are some observations dealing with social, physical, environmental, and facility types of carrying capacities as described earlier.

Table 10.—Percent of Population over the Age of 15 Indicating the Importance of Recreation Site Attributes as They Contribute to Making the Site an Ideal Recreation Setting by Level of Importance and by the FS RPA Region, 1994–95

Site Attribute and Level of Importance	Pacific Coast Region
Nearness to Home	
Not important	12.9
Moderately important	48.9
Very to extremely important	38.2
Good Roads and Parking at the Area	
Not important	6.3
Moderately important	37.9
Very to extremely important	55.7
Cleanliness of Restrooms, Facilities, and Grounds at the Area	
Not important	1.6
Moderately important	21.3
Very to extremely important	77.2
Helpfulness of Area Employees	
Not important	5.6
Moderately important	39.1
Very to extremely important	55.3
Safety and Security at the Area	
Not important	3.1
Moderately important	22.1
Very to extremely important	74.7
Quality of Scenery at the Recreation Area	
Not important	1.1
Moderately important	22.3
Very to extremely important	76.6
Reasonable Fees for Use of the Area	
Not important	3.5
Moderately important	32.4
Very to extremely important	64.1
Map, Informational Signs, and Bulletin Boards at the Area	
Not important	5.6
Moderately important	40.5
Very to extremely important	53.9
Opportunity to Bring Pets into the Area	
Not important	44.6
Moderately important	32.7
Very to extremely important	22.6

Source: National Survey of Recreation and the Environment, FS, 1994-95.

- Social carrying capacity differs among users and depends on the type of experience being sought and the tolerance of the individuals or groups using the resource. Flows in the river system and water elevations in a reservoir may affect the social carrying capacity of that water body. If the usable surface acres of a river or reservoir increase, the ability of the recreationists to tolerate the presence of another user also increases. Likewise, if usable surface acres are decreased, the water body will not socially accommodate as many recreation users. If use increases over time, and the river and reservoir acres remain constant, the river and reservoir will eventually reach its social capacity limit (i.e., recreationists will not tolerate the sights and sounds of other users).

- Physical carrying capacity of a water body can be increased or decreased by regulating flows that pass through the system (i.e., the usable acres available to a recreation user to participate in a specific activity can be increased or decreased by regulating the volume of water released into the system).

- Environmental carrying capacity limits can be affected by the volume of water in a river or a reservoir and the timing of water releases into or out of the system. High volumes of water or, in some instances, low volumes, may negatively affect fish habitat and waterfowl nesting areas. High streamflows or reservoir elevations combined with excessive bank fishing over extended periods of time may cause unnecessary bank erosion. In addition, recreation activities may affect fish and wildlife in a variety of ways, such as disruption of waterfowl nesting and feeding areas, alteration of waterfowl flight patterns, destruction of aquatic vegetation, and increased pollution from boat motors and human litter and waste.

- Facility carrying capacity can be affected by increasing streamflows or reservoir water elevations (e.g., if streamflows were optimized to enhance boating activities over extended periods of time, existing use of limited launch sites and support facilities may increase. This may cause overuse and deterioration of existing facilities.

Water Quantity Considerations

As discussed earlier, adequate streamflows and water reservoir elevations are setting attributes that can determine user satisfaction with a particular recreation site. Sufficient streamflows and water elevations increase the quality of the experience for users participating in water-based recreation activities. Different recreation activities require different flows within different river segments and different reservoir water elevations (e.g., it is important to manage river segments according to streamflows, access points, types of use, and physiography of the river).

The quality of the recreation experience for most activities will be affected by streamflows and reservoir water elevations that are available during the different types of water years (i.e., wet, average, or dry). As an example, under existing conditions, the quality of a rafting experience and the months available to the users to achieve that experience in a wet year may be greater for the entire recreation season than in an average or dry year. If seasonal instream flows and reservoir elevations are greater than historic conditions, the opportunities for achieving a favorable recreation experience may be enhanced.

Under normal circumstances, if flows and reservoir elevations are maintained at a level that typically represents bankfull flows and reservoir full pools throughout the summer recreation season, the majority of water-based recreation activities will be enhanced. Maintaining consistent flows and reservoir elevations will increase the quality of the recreation experience for most users. The quality of the recreation experience will be impacted the most during dry and severely dry water years.

Recreation Water Quality Considerations

As discussed earlier, water quality can be considered a recreation setting attribute that can be used to measure user satisfaction within a particular site. Water-based recreation activities, such as swimming, are directly impacted by water quality and should not be permitted if public health standards are not maintained. Water-related activities such as camping, hiking, bicycling, etc., are indirectly impacted by water quality and are usually discussed in terms of visual effects, such as algae growth and clarity, or the impact of odors encountered by a user.

Monitoring for water quality is an important aspect for long-term management of water resources. Often, recreationists do not know there is a water quality problem until it has degraded to a point that an area is closed to the public. At that point, user satisfaction with the site declines, and visitation decreases. Unless efforts are immediately initiated to correct the problem, and those efforts routinely reported to the public, the public will have a tendency to avoid the site. Closing a recreation area because of poor water quality conditions can be avoided by initiating a water quality monitoring program.

Following are the water quality factors that should be monitored:

- Hygienic factors such as bacteria (total bacteria, fecal coliform bacteria, ecoli, enterococci), toxic substances, etc.
- Aesthetic factors such as color, turbidity/suspended solids (algae, oil, and grease content), odor, temperature, and acidity (ph and alkalinity levels)
- Indirect factors that stimulate undesirable aquatic plant growth (e.g., ammonia, phosphorus, and nitrogen levels)

Projections of Recreation Demand and User Preference

Yakima River basin rivers and reservoirs continue to be important to residents and nonresidents who participate in water-based recreational activities. Water resource managers need to consider future recreation trends and how these trends might influence future demand for creation of new or different types of water-based outdoor recreation facilities and opportunities. Decisionmakers also need to understand the different attributes that make a particular recreation site appealing to a recreation user. Streamflows, water surface elevations, capacity limitations, and water quality are some of the most important attributes that can contribute to a user's satisfaction of a water recreation site.

The primary purpose of this Recreation Demand and User Preference Analysis was to estimate the future outdoor recreation demand and user preference for the Yakima River basin to assist Reclamation and its partners in determining viable recreation strategies within the alternatives that may be contemplated in the Storage Study. Based upon a Level 1 analysis (e.g., based upon existing information and expert opinion), this section identifies those key factors that the investigators believe will significantly influence future recreation demand and user preference in the Yakima River basin. Table 11 (shown later in this report) provides a set of estimates for the projected percentage change in recreation participation over the 20 years from 2005 through 2025.

Key Factors Influencing Future Projections

This report identifies many factors that will influence the future recreation demand and user preferences in the Yakima River basin. Those deemed most significant are listed here.

- Regional, State, and local area population growth will continue at a 1.5- to 2.5-percent annual increase. The increase in population within the prime recreation market area of the Yakima River basin (i.e., Washington, Oregon, Idaho, British Columbia, and California) will be greater than national averages and ensure continued increases in outdoor recreation participation on public lands and waters.

- Hispanic and Asian populations in the basin will continue to grow much faster than non-Hispanic/white populations. Participation in outdoor recreation by these populations will also increase faster than non-Hispanic white populations.

- Senior populations will continue to grow in the basin given the area's climate, roads, services, agricultural and open space setting, and outdoor recreation opportunities. Senior populations have above average leisure

time and discretionary income and thus will help to increase local recreation participation. Seniors will increase the demand for recreation settings with comforts, security, and conveniences.

- Tourism development and visitation will grow significantly in the Yakima River basin (i.e., nature-based, agricultural-based, historical- and cultural-based tourism). The popularity and recognition of the Yakima River basin as an attractive destination will significantly increase among Pacific Northwest and national travelers.

- The area's reputation for blue-ribbon river fishing, summer and winter off-highway vehicle use, and special land use designations such as Wild and Scenic Rivers, State and national parks, and scenic byways, will significantly help to increase public awareness and the popularity of the area.

- Nonconsumptive wildlife activities such as birdwatching, photography, and other types of wildlife viewing are projected to increase.

- Developed land activities such as camping, family gatherings, visiting historical places, and sightseeing are expected to grow faster than the population.

- Although water-related activities and length of stay are projected to increase, primary purpose trips are expected to decrease.

- The current supply of rural developed and rural natural recreation opportunities will continue to have increased visitation. Increased visitation and a greater variety of recreation activities being accommodated at any one location will tend to reduce the percent of rural natural recreation opportunities in the basin and increase the rural developed recreation opportunities; in some instances, this will lead to a more suburban type setting.

- The current supply of recreation facilities (e.g., campgrounds, marinas, launches) is not expected to increase in number to any extent, nor will the projected State and Federal budgets be sufficient to maintain the quality of the current recreation facilities. That is, it is likely that the current supply of public recreation and facilities will continue to age and decline in condition.

- National, regional, State, and local participation rates in outdoor recreation will continue to increase among all ages, income, and ethnic groups. State park visitation in eastern Washington has witnessed a 2-percent annual increase on average from 2000 to 2005.

- Energy costs will influence people to take fewer trips, travel fewer miles from home, and to stay longer at prime destinations. Given the population

base within the recreation market area for the Yakima River basin, energy costs would not be expected to decrease visitation and actually may well increase visitation by encouraging the Pacific Northwest travelers to stay within the region and not travel beyond (i.e., may reduce recreational leakage both in terms of participation and economics).

- Water resources will continue to be a prime attraction for day-use and overnight outdoor recreation participants. People will continue to seek opportunities to enjoy the outdoors and to experience a natural setting in contrast to their daily work and living environs.

Projected Recreation Demand for Key Activities

There is no formula or way to scientifically determine with a high level of certainty the future of any human endeavor, including the future of recreation demand and preference. Thus, based upon a 6-month Level 1 analysis of the Yakima River basin, with due consideration of (1) the existing available information, (2) the WROS inventory of comparables, and (3) informal interviews with local experts, the investigators used sound professional judgment to estimate future recreation demand.

Table 11 includes a low and high range of projections for the key outdoor recreation activities in the Yakima River basin.

In terms of the recreation settings that these activities will take place in, it is projected that the diversity or spectrum of recreation opportunities will be reduced over the next 20 years. That is, it is projected that the amount of water surface acres and river miles providing rural natural recreation opportunities in the Yakima River basin will decrease in the future and shift to suburban and rural developed recreation settings. The likely causes of this change will include increased population growth, increased urbanization and development, increased visitation causing occasional crowding and conflicts, and the lack of coordinated interagency regional recreation planning and management.

This evolution of the water resources in the Yakima River basin from being rural natural to rural developed and suburban is not necessarily negative or undesirable but should be planned for. and the impact should be carefully examined. This change will be attractive to some people and not attractive to others. For example, many recreationists traveling from the Puget Sound area likely want to "get away" and visit a rural natural or even semiprimitive setting, so the loss of rural natural recreation opportunities will displace these visitors to another area outside the basin. Conversely, some local people might prefer the more developed recreation settings and participate more.

Table 11.—Projected Percentage Change in Recreation Participation for the 20-Year Period from the Base Year of 2005 Through 2025[1]

Key Activities in the Yakima River basin	Low-Range Estimate of the Percentage Change in Participation over 20 years	High-Range Estimate of the Percentage Change in Participation over 20 years
Picnicking	+20%	+30%
Walking for pleasure/day hiking	+25%	+35%
Rustic/primitive camping	+10%	+15%
Developed/full-service camping	+20%	+30%
Fishing	+5%	+15%
Bicycle riding	+25%	+30%
Motorboating	+20%	+25%
Beach swimming	+20%	+30%
Rafting/kayaking	+25%	+35%
Sailing	+30%	+40%
Waterfowl hunting	-10%	-20%
Wildlife viewing	+35%	+50%
Personal water craft	+10%	+20%
Water skiing	+5%	+10%

[1] The predominant factors influencing the estimated 20-year recreation projections for the Yakima River basin included popular growth, increase in the number of retirees and Hispanic families, the national reputation of a blue-ribbon fishery, increasing residential development and metro commuters from the Puget Sound area, and a developing tourism industry in the basin which will attract tourists and recreationists from Washington and the surrounding States.

In the case of waterfowl hunting, in addition to the factors mentioned above, the increase in development, urbanization, and loss of waterfowl habitat will also contribute to a decline in waterfowl hunting participation.

Projections of the net effect of these changes in the recreation settings on visitation, travel patterns, and the tourism economy are beyond the scope of this analysis, but suffice it to say that a change in recreation settings will change the level of recreation demand and the clientele who are attracted to the basin.

In conclusion, it is reasonable to project a 2- to 3-percent average annual increase in outdoor recreation demand for the Yakima River basin over the next 20 years due to a variety of factors discussed earlier. Of course, the amount of growth will vary by key activities popular in the basin. For example, the projected change in participation may range from a 35-percent increase in walking for pleasure/hiking to a 20-percent reduction in waterfowl hunting. It is also projected that the water resources will become more developed and urbanized in the next 20 years and that there will be a shift in the supply and amount of recreation opportunities from

rural natural to rural developed and suburban. This shift is likely to have a longer-term effect (i.e., beyond 20 years) on the recreation demand and the clientele who are attracted to the basin.

Federal, county, and city governments need to cooperate in providing the appropriate number and types of recreation facilities and opportunities to meet future recreation demand in the Yakima River basin. A particular recreation site or area cannot be all things to all people. Decisionmakers should cooperate in providing a wide variety of recreational opportunities on a regionwide basis. Increased dialog among water users, a broader societal perspective among decisionmakers, and more flexible and creative river and lake operations can result in major improvements to the recreation environment within the Yakima River basin without abandoning existing water resource purposes.

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Appendix A

WROS Executive Summary

Executive Summary

Water Recreation Opportunity Spectrum (WROS)

Diversity is an asset in America. From our work forces and financial portfolios to our natural resources and recreation opportunities, there is strength in conserving diversity.

Half a century ago, when people said they were going camping, fishing, or boating, it was clear what they intended. Today, due to many factors such as new technology and equipment, more facilities, and diverse public tastes and preferences, there are many types of camping, fishing, and boating. The outdoor recreation industry and profession have become much more complex and sophisticated.

Research has shown that recreationists not only seek to participate in recreation ***activities***, but also seek specific recreation ***settings*** in order to enjoy a special kind of recreation ***experience*** and subsequent ***benefits.*** These four components (i.e., activities, settings, experience, benefits) constitute a **recreation opportunity;** that is, ***the opportunity for a person to participate in a particular recreation activity in a specific setting in order to enjoy a particular recreation experience and the benefits this affords.*** For example, one family might desire camping in a modern, full service campground on a reservoir in order to spend quality time with the family, to rest and relax, and to see nature's beauty. Another family might desire camping in a rural location where they can test their fishing skills, enjoy solitude, and see nature's beauty. Both families want to go camping, but in very different settings leading to different kinds of experiences and benefits; that is, they are seeking different kinds of recreation opportunities.

A Recreation Opportunity

Recreation Activity	+	***Setting***	=	***Experience***	>>>	***Benefits***
many activities		physical attributes managerial attributes social attributes		many dimensions multiple senses		individual community economic environmental
Managers Manage				*Recreationists Consume*		*Society Gains*

The preceding insert depicts the linkage of the four components that define a recreation opportunity. It also conveys that a manager manages recreation activities and settings, while a recreationist consumes a recreation experience, and society benefits from an active outdoor public.

The Water Recreation Opportunity Spectrum (WROS) is a tool to understand the type and location of six types of water related recreation opportunities, otherwise known as WROS classes. The six WROS classes range across a spectrum of Urban, Suburban, Rural Developed, Rural Natural, Semiprimitive, and Primitive classes. Each WROS class is defined by a particular "package" of activities, setting attributes, experiences, and benefits.

WROS enables the six recreation opportunity classes to be inventoried and mapped by using expert opinion and an inventory protocol to assess the physical, managerial, and social attributes of the setting. The attributes that differentiate the WROS classes include:

The Water Recreation Opportunity Spectrum

Physical attributes	Managerial attributes	Social attributes
Degree of development	Degree of management presence	Degree of visitor presence
Sense of closeness to urban setting	Degree of public access facilities	Degree of nonrecreational use
Degree of resource modification	Degree of developed recreation facilities	Degree of visitor concentration
Distance to development on or adjacent to a water resource	Degree of visitor services and conveniences	Degree of diverse recreation activities
Degree of natural ambiance		Degree of visitor comforts
		Degree of solitude/remoteness

WROS is also adaptive and flexible. For example, WROS allows for special local attributes to be considered in the inventory stage or for a manager to divide the WROS classes into subclasses or units.

The overarching goal of WROS ***is to provide planners and managers with a framework and procedure for making better decisions for conserving a spectrum of high quality and diverse water recreation opportunities***. WROS improves our understanding of the complexity of outdoor recreation management, strengthens sound professional judgment, and enables a manager to make better and more defensible decisions.

WROS is an indispensable tool for inventorying, planning, and managing water resources where recreation is an important public use and benefits the local communities. More specifically, WROS is valuable for:

Inventorying and mapping the current available recreation opportunities
Helping tourists and recreationists choose where to recreate

- Assessing the effects of proposed land use and water management changes
- Improving public input and communication with stakeholders
- Improving management efficiency and effectiveness
- Improving regional interagency collaboration
- Improving the defensibility of management decisions

This Users' Guidebook provides the operational details for applying WROS. It is divided into four chapters. ***Chapter 1: Introduction*** provides a foundation and overview of WROS and discusses the important standards for WROS decision making. ***Chapter 2: WROS Inventory*** presents the steps and information needed to inventory a water resource and map the type and location of current WROS classes. ***Chapter 3: WROS Planning*** discusses how WROS integrates with and supplements the key steps of a public resource planning process. ***Chapter 4: WROS Management*** provides a set of guidelines for each of the six WROS classes across more than 115 setting attributes.

Appendix B

Black Rock Dam and Reservoir Recreation Needs Assessment

Note: The visitation use figures for this appendix are primarily from 2002. They have not been updated for inclusion into this 2006 Recreation Demand and User Preference Analysis.

Black Rock Dam and Reservoir Recreation Needs Assessment[1]

Introduction

Black Rock dam and reservoir is one alternative to try to meet the goals of the Yakima River Basin Water Storage Feasibility Study. Those goals are to improve anadromous fish habitat, improve the water supply for proratable irrigation water rights in dry years, and meet future municipal water supply needs. Black Rock dam and reservoir would provide storage of Columbia River water until delivering the water to the irrigators in the lower Yakima Valley to the west. The water currently diverted by these irrigators from the Yakima River would remain in the river to be used to improve the fish habitat in the river and reservoirs, supply water to all the proratable irrigators in the Yakima River basin, and supply future municipal water needs. While storing this Columbia River water, there would be opportunities for recreation. Those opportunities could be boating swimming, fishing, camping, and other activities as identified as needed through further investigation.

The location of the potential Black Rock dam and reservoir is in the Black Rock Valley near the intersection of State Highways 24 and 241, about 30 miles east of Yakima, Washington. The active storage capacity is 1,300,000 acre-feet with a maximum water depth of about 500 feet at the face of the dam. This storage capacity is more than the existing storage in the Yakima Project (table 1). At more than four times the capacity of the largest existing reservoir in the project, the Black Rock reservoir would provide a surface area of about 8,640 acres (about 9 miles long and 1 mile wide) with about 30 miles of shoreline and has the potential to provide recreation benefits. Flat water boating, fishing, camping, personal watercraft use and water skiing opportunities could be provided.

Affected Region (Washington Counties)

The purpose of this recreation needs assessment is to examine the recreation potential and need for additional recreational opportunities at the potential Black Rock reservoir. The affected area for recreation is the four-county region of Benton, Grant, Kittitas, and Yakima Counties. This contiguous region contains most of the nearby flat water lakes and reservoirs that are likely to be substitute/competition recreation sites for a reservoir in Black Rock Valley. In addition, the economies of these counties would be the ones most affected by any increased recreation visitation due to Black Rock.

[1] The primary author of the Black Rock Dam and Reservoir Recreation Needs Assessment was Rich Lichtkoppler, Economist, Bureau of Reclamation, Technical Service Center, Denver, Colorado.

Table 1.—Yakima Project Storage Capacity and Surface Area

Reservoir	Storage: Active Capacity (acre-feet)	Water Surface Area[1] (acres)
Cle Elum	436,900	4,750
Kachess	239,000	6,535
Keechelus	157,800	2,560
Bumping Lake	33,700	1,300
Rimrock	198,000	2,790
Subtotal	1,065,400	17,935
Black Rock	[2]1,700,000	9,620
Grand total	2,765,400	27,555

[1] Water surface area varies with the drawdown of water for irrigation.
Source: Bureau of Reclamation.
[2] In the feasibility planning stage only. No decision has been made to develop this potential reservoir.

Outdoor Recreation Needs

Conceptually, recreation needs for an area are determined by examining the demand for recreation expressed in visitor days, water surface area, or some other measure, in comparison to the supply of recreation similarly expressed. Any excess demand over supply establishes a need. If existing recreation sites are underutilized, the current and future needs may be partially or wholly met from those sites. On the other hand, if existing sites are at or near full capacity, then excess demand must be met by development of a new site with infrastructure to accommodate recreation use.

An area's excess demand establishes the "ceiling" for benefits that can be claimed for a potential new project. If projected visitation at a new site is less than or equal to the area's need, then the entire amount of visitation is benefit producing. If the projected visitation is greater than the established need (excess demand), then the new site will be drawing visitors from other substitute sites. Displacement from one site to another does not contribute to net increases in recreation or benefits.

Because of budget constraints, the State of Washington no longer is able to develop a State Comprehensive Outdoor Recreation Plan that provides a *Demand - Supply = Needs* analysis at the county or planning district level of detail (Interagency Committee for Outdoor Recreation, October 2002). Their most recent effort concentrated on examining recreation participation at the State level. Thus, they identified current use and projected expected future patterns of recreational behavior rather than probing for recreational preferences that could be utilized to identify actual needs.

People tend to use the recreation facilities and opportunities that are available to them, although these choices may not necessarily reflect actual preferences. In any case, the Washington State Interagency Committee for Outdoor Recreation

expects motorboating to grow by 10 percent Statewide over the next 10 years (2003-2013)—only about a 1-percent increase per year.[2] After that, the demand for motorboating is expected to level off or decline during the following 10 years. Hand-powered boating (canoes, kayaks, row boats, etc.), nonpool swimming, and visiting beaches are water-dependent activities that are each expected to grow by about 20 percent during the next 10 years and then achieve a total growth rate of 30 percent over 20 years for each of these activities. Unfortunately, these are Statewide projections and are not specific to the four-county affected area under consideration here. However, it is assumed that this level of increased demand is similar for the four-county affected area and that increasing the supply of flat water recreational opportunities would result in some positive benefits. Use of the Statewide projection is further supportable because the area's current recreation sites draw visitors from across the State.

Development of Black Rock dam and reservoir with recreation as an expected benefit would certainly add to the supply of flat water available for recreation in the region. It may be a case of – *if you build it, they will come*. Informal anecdotal evidence gathered from recreation managers in the region suggests that this statement is true. Agreement on whether a new reservoir is actually needed for recreation is mixed. While some State wildlife refuges are reported as being under-utilized for recreation, U.S. Forest Service sites and Washington State Parks seem to be busy or near capacity for most of the summer season. Recreation manager estimates of the proportion of visitors that come from outside the local region range from 40 percent to 90 percent, with visitors coming from both eastern and western Washington.

However, the total amount of use of the potential reservoir that would represent new visitors to the region coming from outside the region is unknown at this time. Thus, the expected contribution to regional economic development is also unknown. It is likely that if the Black Rock reservoir is built and recreation facilities are developed, then some of the visitor use would be at the expense of other substitute, water-oriented recreation sites within the four-county region. People may seek to avoid more crowded areas and come to Black Rock reservoir. The total amount of recreation use may or may not change, but it is expected that a quality improvement (less crowding at least initially) would occur. It is also expected that development of the recreation potential of Black Rock would contribute some positive amount of benefits to a national economic development account analysis. But, again, some amount of the recreation benefits would probably be due to substitution effects and come at the expense of other recreation sites so that the net increase is hard to quantify without more thorough analysis.

Another point to consider in estimating recreation benefits is that the potential Black Rock reservoir, and probably any reservoirs contemplated in any of the storage study alternatives, will be operated at least in part for irrigation demands. This means that the reservoir would be drawn down many feet during the warm

[2] Interagency Committee for Outdoor Recreation, March 2003.

summer months, and such drawdowns would significantly reduce both the area and volume of water available for recreation. Mudflats could be exposed and the water's edge could be far from the high water level of the reservoir. Recreational facilities could end up a long way from the water, reducing visitor access and desirability for recreation at this reservoir.

Recreation Supply

Recreation Resource Inventory (Flat Water) Alternative Sites

Public sector recreation sites, facilities, and services are enumerated in attachment 1. More than 210 water access sites have been identified as providing public right of entry to more than 50 water bodies within or bordering the four-county area. Most are managed by public agencies at the local, State, and national levels of government. The water bodies range from small lakes and ponds consisting of a few tens of acres to large reservoirs providing tens of thousands of acres of water surface for recreation. The access sites in attachment 1 offer a range of facilities and amenities, but the item they all have in common is that there is a boat launching ramp providing recreational access to the water for the public. Included in this supply are many of the miles of rivers, reservoirs, and streams that makeup the Yakima River and parts of the Columbia River watersheds. In addition, there is a large number of other water-oriented recreational areas throughout Washington and bordering Oregon. Thus, the Statewide supply is much greater than what is enumerated in attachment 1.

Federal providers of recreation sites include the Bureau of Land Management (BLM), the U.S. Army Corps of Engineers (Corps), the U.S. Forest Service (FS), and the U.S. Fish and Wildlife Service (Service). Washington State has by far the largest number and most widely distributed access points with the Washington State Parks, providing seven parks and the Washington Department of Fish and Wildlife (WDFW) managing 85 sites. Most of the WDFW sites primarily provide access for hunting and fishing via small boat (motor powered or not) on small 20- to 40-acre ponds, but some sites can also be used for nonconsumptive motorboat based recreation. Local county or municipal governments provided some additional access points and a few private sites open to the public on a paying basis account for the remainder of publicly available water access points in the four-county region. No attempt has been made to identify other private sector sites, facilities, and services because these resources are generally not available to the public or provide private access to water areas also served by public facilities.

Bureau of Reclamation Developed Areas Providing Recreation Opportunities

Most of the reservoirs developed by Bureau of Reclamation (Reclamation) provide recreation benefits by offering recreational opportunities for a wide range of water-oriented activities. Boating, camping, fishing, hiking, hunting, picnicking, photography, water sports, wildlife watching, and more are available at these reservoirs. But, since these reservoirs are primarily operated by Reclamation to meet irrigation and power generation responsibilities, lower water levels and restricted flows sometimes negatively affect recreational use of some reservoirs and streams. Reclamation's main areas of expertise include water management for irrigated agriculture and hydroelectric power generation. Reclamation manages very few of its reservoirs for recreation. Reclamation is encouraged by law to collaborate with nongovernmental entities to manage its recreation resources. In partnership situations, Reclamation can provide 50–50 percent cost sharing for planning, construction, management, operation, and maintenance of recreation facilities and areas. Partnerships with other government agencies can provide the expertise and experience in park and outdoor recreation management necessary to provide quality recreation opportunities. The FS and WDFW are the primary agencies managing recreation at Reclamation developed areas. Table 2 lists the main Reclamation developed areas that provide recreation opportunities in the four-county region.

Banks Lake is a part of the Columbia Basin Project located in northern Grant County. The Ice-Age channel (Grand Coulee) of the Columbia River was dammed at both ends and water from the Columbia River was pumped up to fill this reservoir. This reservoir provides water for irrigation, power generation, recreation, and fish and wildlife. Banks Lake is well known for its fishery, which is a popular recreational attraction. The reservoir is 27 miles long and has about 27,000 acres of water surface. Fishing, boating, and camping are popular activities among the many available at this reservoir. Steamboat Rock State Park is located on the lake. Additional access is provided by the WDFW (parking and boat ramps), Coulee City (campground and marina), and a couple of private marinas. Currently, an environmental impact statement examining re-operation of Banks Lake to provide additional water flows to support endangered fish in the Columbia River is being completed by Reclamation. A lowering of the operational range of the reservoir may affect some boating access sites, but recreational use of the lake would continue.

Bumping Lake is a 1,300-acre water feature of the Yakima Project located in northwest Yakima County. This reservoir was formed by the development of Bumping Lake Dam, which is owned and operated by Reclamation. Recreational opportunities include boating, camping, fishing, hunting, picnicking, etc. The lake is within the Naches Ranger District of the Wenatchee National Forest. Recreation resources are managed by the FS. Visitor use data for 2002 show that the boat launch received 2,984 visits and the associated campgrounds in the area received 7,723 visits. In addition, incidental monitoring in conjunction with

Table 2.—Bureau of Reclamation Developed Areas with Recreation Facilities

Reservoir/ Recreation Area	Location	Water Surface Acres	Managing Agency	Reclamation Project
Banks Lake	Grant County	27,000	WDFW and Washington State Parks, Coulee City, and Private Firms	Columbia Basin
Bumping Lake	Yakima County	1,300	FS, Wenatchee National Forest	Yakima
Billy Clapp Lake	Grant County	1,010	WDFW and Washington State Parks	Columbia Basin
Clear Lake	Yakima County	260	Bureau of Reclamation, Upper Columbia Area Office	Yakima
Cle Elum Lake	Kittitas County	4,750	FS, Wenatchee National Forest	Yakima
Desert Wildlife Area[1]	Grant County	[2]35,100	WDFW	Columbia Basin
Easton Diversion Dam	Kittitas County	240	Washington State Parks, Lake Easton State Park	Yakima
Franklin D. Roosevelt Lake	Grant, Douglas, Ferry, Lincoln, Okanogan, Stevens	60,000	National Park Service	Columbia Basin
Kachess Lake	Kittitas County	6,535	FS, Wenatchee National Forest	Yakima
Keechelus Lake	Kittitas County	2,560	FS, Wenatchee National Forest	Yakima
Potholes Reservoir	Grant County	27,800	WDFW	Columbia Basin
Quincy Wildlife Area[3]	Grant County	[4]	WDFW	Columbia Basin
Rimrock Lake	Kittitas County	2,790	FS, Wenatchee National Forest	Yakima
Roza Diversion Dam	Kittitas County	100	BLM	Yakima

[1] Includes Winchester Reservoir, Winchester Waterway, Frenchman Hills Wasteway, and several small ponds and marshes.

[2] = total land and water area.

[3] Includes Evergreen Reservoir and Babcock Ridge, Burke, Quincy, and Stan Coffin Lakes.

[4] = not available.

Source: Reclamation

regular maintenance activities indicates that considerable numbers of visitors use the lake for day-use activities such as picnicking. There is no registration or fees collected for these activities, so data regarding actual visitor use are not available.

Billy Clapp Lake was formed behind Pinto Dam and serves as a 6-mile-long segment of the Main Canal delivering water for irrigation to portions of the Columbia Basin Project. Lands around this lake are included in a wildlife reserve

program – the Stratford Game Reserve. The WDFW provides a boat ramp at the south end of the lake. Boating, fishing, and hunting opportunities are available here. The lake covers approximately 1,010 acres, and adding accompanying lands makes the total reserve 4,000 acres. This and other wildlife areas within the Columbia Basin are an important part of the Pacific Flyway, providing feeding and breeding grounds for migrating waterfowl.

Clear Lake is located on the North Fork of the Tieton River in northwest Yakima County. This lake is part of the Yakima Project and is within the Naches Ranger District of Wenatchee National Forest. This FS district office manages recreation. Clear Lake covers 260 acres and drains into the Rimrock Reservoir. Safety concerns required the draining of the lake in 1990. Public support for the recreation value of this lake resulted in the rebuilding of the dam. This lake is now primarily used for recreation (boating and camping), with most of the discharge going over the spillway. The Clear Lake boat launch accounted for 2,920 visits, and the campground produced 8,589 visits in 2002.

Cle Elum Lake is also part of the Yakima Project and also within the Wenatchee National Forest, but it is in the Cle Elum Ranger District. The lake is on the Cle Elum River, which drains into the Yakima River. The lake provides approximately 4,750 acres of water surface at full pool. Boating, camping, fishing, picnicking, and swimming are the primary recreational opportunities available. Stream fishing below the dam has improved since the construction of the Cle Elum Dam. Recreation is managed by the FS out of its Cle Elum Ranger District Office.

Desert Wildlife Area is a 35,100-acre area of desert uplands with shrub steppe vegetation and wetlands with marsh vegetation found west of the Potholes Reservoir. This natural basin was a desert prior to the development of the Columbia Basin Project. The area now collects irrigation wastewater from the project. It is an important waterfowl breeding area, which also provides good habitat for a wide range of fish, mammals, and other birds. Winchester Reservoir, Winchester Wasteway, Frenchman Hills Wasteway, and many small ponds and marsh areas are part of this area, which is managed by the WDFW. Boating, camping, fishing, hunting, and water sports are the primary recreational opportunities available here.

Easton Diversion Dam impounds Lake Easton on the Yakima River. Lake Easton State Park is located on this 240-acre reservoir and provides access for boating, camping, fishing, picnicking, and water sports. This park is easily accessible from I-90 and reported more than 200,000 day-use visits and over 30,000 overnight visits in 2002.

Franklin D. Roosevelt Lake was formed by the building of Grand Coulee Dam on the Columbia River. This dam is the principal component of the Columbia Basin Project and has created a 60,000-acre reservoir with nearly 500 miles of shoreline. This vast resource provides a wide range of water-oriented recreational

opportunities. Recreation management of the reservoir is split between the Colville Confederated Tribes, the Spokane Tribe of Indians, and the National Park Service (NPS) because the reservoir lies partly within two American Indian reservations and lands administered by the NPS. This National Recreation Area regularly receives between 1.0 and 1.5 million recreation visits annually.

Kachess Reservoir and Dam are part of the Yakima Project. This reservoir is located on the Kachess River in northwest Kittitas County. Kachess Reservoir covers approximately 6,535 acres and has 24 miles of shoreline. Opportunities for boating, fishing, hunting, picnicking, and water sports are available. The FS manages recreation out of its Cle Elum District of the Wenatchee National Forest.

Keechelus Reservoir is located on the Yakima River at the site of a natural lake in northwest Kittitas County. The Keechelus Dam was built at the lower end of this natural lake and it has expanded the water surface to 2,560 acres. Opportunities for boating, fishing, hunting, picnicking, and water sports are available here. This recreation resource is also managed by the FS from its Cle Elum District of the Wenatchee National Forest. Cle Elum, Kachess, and Keechelus Reservoirs are all accessible from I-90.

Potholes Reservoir was formed by the development of the O'Sullivan Dam built on Crab Creek about 15 miles south of Moses Lake. The reservoir covers about 27,800 acres. It is part of the Columbia Basin Project. The dam impounds return irrigation flows from the upper portion of the basin for use in irrigating the lower part of the basin. The "potholes" were formed during the Pleistocene flooding of the area. These potholes are large depressions from 30 to 70 yards wide and 10 to 60 feet deep. The building of the O'Sullivan Dam raised the water table in the area during the 1950's and filled the depressions creating the pothole lakes. Boating, camping, and fishing are the primary recreational opportunities at this large reservoir. Potholes State Park is located on this reservoir and provides facilities for these activities.

Quincy Wildlife Area is a 15,266-acre land and water area managed by the WDFW. It is located in west-central Grant County. The area includes Evergreen Reservoir and Burke, Quincy, Babcock Ridge, and Stan Coffin Lakes. Boating, camping, fishing, hunting, picnicking, and water sports are the primary recreational opportunities offered.

Rimrock Lake was created in 1925 by the completion of the Tieton Dam on the Tieton River. This reservoir provides about 2,790 acres of water surface for recreation. This Reclamation reservoir is within the Wenatchee National Forest and recreation is managed by the FS out of their Naches Ranger District office.

Recreational use of the reservoir was reported as 2,444 visits to the Horseshoe Cove and Rimrock boat launches and 12,973 visits to the Rimrock Peninsula Area Campgrounds.

Roza Diversion Dam is located in southwest Kittitas County and creates about 100 acres of water surface to divert water from the Yakima River for electric power generation and irrigation as part of Reclamation's Yakima Project. This relatively small lake is used for boating, camping (five sites, limit 7 days), fishing, hunting, and water sports.

The BLM manages recreation on the 100-acre impoundment behind Roza Diversion Dam on the Yakima River. This agency does not have the resources to accurately collect and report visitor use. Anecdotal evidence indicates that the site is a popular location all summer for fishing and also is a busy take-out point for folks floating the river. Regular maintenance and management activities at the site allow BLM personnel to determine that the site is very busy the entire summer season. Many visitors are from the Seattle and northwest Washington environs. Fishing using drift boats and fishing guides and floating the river are popular activities at this site. Visitors can launch their boats at Lmuma Creek and take them out at Roza Dam.

The BLM manages two other recreation sites in the Yakima River Canyon in Kittitas County south of Ellensburg – Umtanum and Lmuma Creek. Each recreation area has a small campground (eight and seven sites, respectively) and the camping stay limit is 7 days. All three recreation areas support boating, camping, fishing, and picnicking with developed picnic areas and restrooms. Lmuma Creek and Roza also provide boat launches.

There is a $2.00 per day fee for the use of the Lmuma Creek and Roza recreation sites. There is no charge to use the Umtanum site.

Developed Facilities for Recreation

Washington Department of Fish and Wildlife

Developed facilities at the 143 WDFW recreation sites vary from site to site within the four-county area (attachment 1). These access points are found on flowing rivers, natural lakes, and reservoirs, so both flowing water and flat water recreation opportunities are available. Most sites have at least one boat launch and a parking area. The boat launches can range from a natural boat launch (undeveloped) to gravel surfaced to a solid paved type. Most sites have only one boat launch, but there can be as many as four depending on the site. Many sites only provide access to the water's edge for hunting and fishing or wildlife observation. Parking lots may be a simple open area or most commonly a graveled lot. Some more developed sites have paved and striped parking areas. Usually, a vault-type restroom is provided but more primitive locations may not have any restroom facilities. Camping is permitted at many recreation sites although there may be a limit to the number of days allowed at a particular location.

Contact with staff in the State office in Olympia revealed that WDFW does not have any methodology in place to count or report on visitor use of their recreation sites. They are planning begin to collect this information but a lack of funding and personnel have hampered their efforts. Discussions with regional staff confirmed this fact. The Region 3 manager stated that a large flat water lake was needed to provide boating and other flat-water based recreational opportunities in his region (includes Benton, Kittitas, and Yakima Counties).[1] The Region 2 manager also stated that his agency does not have the funds or personnel to collect and report visitor use at the many sites and areas in his region.

Funds are limited, and continued operation and maintenance is the priority. He also estimated that his region receives hundreds of thousands of visits each year, but this is only a guess on his part.[2]

A vehicle use permit is required to access any of the 625 recreation sites provided and managed by WDFW. The permit is good for the calendar year and allows access to the approximately 800,000 acres of prime wildlife habitat owned by the State. A permit is issued free with the purchase of a hunting or fishing license or available separately for $10.00. Funds collected are used to operate and maintain the access sites, which are currently operating at a level that represents only 34 percent of the operations and maintenance funding need.

Washington State Parks

There are seven Washington State Parks in the four-county region that offer flat water recreational opportunities such as motorboating and fishing (table 3). In 2002 visitation ranged from more than 130,000 at Sacagawea State Park to over 938,000 at Sun Lakes State Park. Gingko, Potholes, Sacagawea, and Yakima are the State Parks closest to the location for the potential Black Rock reservoir and are located north, northwest, southeast, and west of the Black Rock reservoir site. These four parks had a combined visitation of over 1,390,000.

Ginkgo Petrified Forest State Park (includes Wanapum State Park) is located in eastern Kittitas County on the Columbia River. The park encompasses 7,470 acres of land and has over 5 miles of shoreline on the Wanapum Reservoir, which was formed by the Wanapum Dam constructed on the Columbia River.

Boating, camping, and picnicking are very popular activities at this park. Total visitor use has ranged between 500,000 to 595,000 for the last 3 fiscal years. On an annual basis, the park has the typical head and shoulders visitation pattern – very heavy use in the summer season and light use in the colder months. The park's day-use parking area and boat launching areas will be closed 10 to 15 days

[1] Phone communication with Jerry Francisco on 9/5/03.

[2] Phone communication with Kerry Taylor, September 10, 2003.

Table 3.—Washington State Park Visitor Use 2002

State Park	2002 Visitor Use
Gingko Petrified Forest State Park	613,098
Lake Easton State Park	233,530
Potholes State Park	352,105
Sacagawea State Park	132,265
Steamboat Rock State Park	352,105
Sun Lakes State Park	938,093
Yakima Sportsman State Park	295,823
Total	2,917,019

Source: Washington State Parks

each year, because of exceeding their full capacity.[3] (Once the parking areas are 100 percent full, some additional vehicles will be allowed to park along the road to the parking areas. When all this space is taken, the park is closed, and additional vehicles have to be turned away). There are usually an additional 10 days when the parking areas come close to being 100 percent full. The boat launching area (with only two ramps) is scheduled to be expanded in the near future. The campgrounds (50 sites with utilities) and day-use parking area are also in need of expansion. There is space to accomplish future growth, but funding has not yet been secured.

Lake Easton State Park is a forested park on the shore of Lake Easton in northwest Kittitas County. It provides outstanding views of surrounding mountain scenery. This lake and State park are downstream from Reclamation's Kachess and Keechelus Lakes and is easily accessible from I-90. Camping, fishing, picnicking, and swimming are offered at this park. Boating is allowed. There is one boat ramp and a small dock. Motorized boating is allowed, but the lake is shallow with many tree stumps near the surface, so high speeds are discouraged. Recreational use was more than 230,000 visits in 2002.

Potholes State Park is a 640-acre camping park located in southern Grant County on the shores of Potholes Reservoir; the park has over 35 miles of shoreline. This 27,800-acre reservoir is also known as O'Sullivan Reservoir and is part of the Columbia Basin Project. In 2002, there were more than 350,000 visits to this park. Water levels can vary dramatically throughout the irrigation season. The pothole lakes, for which the park and reservoir were named, are about a ½-hour drive from the park. The Columbia National Wildlife Refuge is 2 miles east of the park and provides excellent wildlife viewing and birding opportunities.

[3] Phone conversation with Ginkgo Park staff, Jim Mitchell, September 9, 2003.

The park has four boat ramps and about 100 feet of dock to support all types of boating and water sports plus fishing, picnicking, wildlife watching, etc. Swimming from sand beaches is a popular activity. Camping is available at 61 tent spaces and 60 additional spaces with utility hookups. There is a dump station in the park. The campgrounds have four restrooms and four showers.

Sacagawea State Park is located near the confluence of the Columbia and Snake Rivers. It a 284-acre, marine, day-use park with 9,100 feet of shoreline. There is no overnight camping but overnight moorage is allowed and visitors are allowed to stay on their boats at the 70 feet of moorage. There are two boat ramps and 200 feet of dock. There are extensive picnic facilities: 2 large picnic shelters, 7 sheltered picnic tables, and 123 unsheltered picnic tables. A daily permit costs $5.00 and allows for parking, watercraft launching, and trailer dumping. Fees are also required for overnight moorage. The park hosted over 130,000 visits.

Steamboat Rock State Park occupies 3,522 acres on a basalt butte rising 800 feet above the water surface of Banks Lake. This park is on a peninsula that juts out into Banks Lake from its northeastern shore. The park has nearly 9.5 miles of shoreline. Boating, camping, and fishing are the main attractions of the park; but, the park is also becoming more popular for its rock climbing opportunities. The park's seven boat ramps and 320 feet of dock provide access to about 27,000 acres of water surface. Northrup Creek water access (boat ramp) is available 24 hours a day. Camping facilities include 26 tent spaces, 100 developed campsites with full utility hookups (1 dump station, 6 restrooms and 8 showers), and 12 primitive boat-in campsites with vault toilets and drinking water. There is a sandy swim beach, 13.1 miles of hiking and biking trails, and 10 miles of horse trails. Steamboat Rock is a very popular park. This park received over 580,000 visits in 2002. Typically, the park receives over one-half million visitors a year.

Sun Lakes State Park is just south of Dry Falls, a 400-foot-high, 3.5-mile-wide stark cliff that once was a waterfall ten times the size of Niagara Falls. Dry Falls is the location of Dry Falls Dam, which is the southern boundary of Banks Lake. This 4,027-acre park features boating and camping opportunities. There are nine lakes providing almost 14 miles of shoreline for recreational use. Two boat ramps and a 20-foot dock provide boating access. The park provides 162 tent camping sites and 18 sites with utility hookups. There is one dump station and eight restrooms and eight showers. Visitation was nearly 940,000 in 2002.

Yakima Sportsman State Park was first developed as a facility and natural area by and for the Yakima Sportsman Club, which was a fishing, hunting, and shooting organization. This 247-acre park was donated to Washington State Parks in 1956. Located within the Yakima River flood plain, this park offers birding, camping, fishing, and picnicking as the primary recreational activities. Camping facilities include 28 tent camping sites, 37 developed campsites with utility hookups, a dump station, 2 restrooms, and 4 showers. Although there are ponds and the Yakima River nearby, there

are no provisions for boating. The park is irrigated and supports a wide variety of vegetation, including hardwoods, and wildlife. The park is a green oasis in an otherwise dry desert area and hosted nearly 300,000 visitors in 2002.

Almost 30 percent of the park's operating budget is funded through fees and permits. In general, fees are charged for the use of specific facilities relating to boating, camping, and winter use for snowmobiling and nonmotorized winter sports. The Washington State Parks and Recreation Commission requires a vehicle parking permit to park in State parks Statewide. The daily fee is $7.00, with an annual permit costing $70.00. These fees were discounted to $5.00 and $50.00, respectively, until 2006. In addition, there are other fees to cover the use of special facilities and services.

A daily boat launching fee of $5.00 is charged at boat ramps. An annual launching permit is $50.00. There are additional charges for moorage depending on the size of the boat and length of time moored.

As of 2002, camping fees were as follows: standard campsite $15.00; utility campsite (recreation vehicle [RV] hookups) $21; primitive campsite, $10.00. An additional $1.00 for camping is also charged at certain high-use parks between April 1 and September 30. An additional $2 per adult per night is charged when there are more than four adults per campsite, maximum eight adults per campsite. In addition, $10.00 per night is charged for a second vehicle unless it is towed by a recreational vehicle. There is a $5.00 charge for use of the dump station unless you are camping. For campers, this fee is included in the camping fee. Group camping facilities and group picnic facilities are available, and there is a charge for their use.

These are the general systemwide park fees. They may vary by park depending on local conditions and services provided.

National Park Service

Lake Roosevelt National Recreation Area was created by the development of the Grand Coulee Dam on the Columbia River and is a major recreation resource in northeast Washington. This dam impounds water on the Columbia, Kettle, and Spokane Rivers and has created a reservoir that has 60,000 surface arcres and 500 miles of shoreline. Lake Roosevelt borders the Colville Indian Reservation and the Spokane Indian Reservation and reaches almost to Canada. The portions of the lake that lie within these reservations are managed by the Colville Confederated Tribes and Spokane Tribe. The NPS manages the considerable remainder as Coulee Dam National Recreation Area. The NPS has nearly 2 dozen developed sites providing a variety of recreation services including boat launches, campgrounds, and picnic areas. Only a small portion of this recreation area borders the northernmost part of Grant County behind Coulee Dam. Here, boat access to the water is available at Crescent Bay near the town of Grand Coulee.

The NPS regularly collects and reports visitor use data for Lake Roosevelt National Recreation Area. The recreation area received between 1.1 and 1.5 million recreation visits annually from 1990 through 2002. Table 4 displays the recreation visits and overnight stays. Except for 2001, visitation has been over 1.4 million recreation visits since 1997. Since 1987 use has been over one million visits each year. Overnight use of the park has been over 140,000 overnight stays since 1997, again except for 2001. The national emergency of September 11, 2001, resulted in lower than normal visitor use for 2001.

Table 4.—Lake Roosevelt National Recreation Area Visitor Use

Year	Recreation Visits[1]	Overnight Stays[2]
1990	1,542,515	155,703
1991	1,771,420	149,476
1992	1,121,973	142,573
1993	1,198,605	160,747
1994	1,515,674	171,900
1995	1,341,016	174,263
1996	1,045,455	145,626
1997	1,431,960	177,360
1998	1,545,150	176,528
1999	1,403,793	169,679
2000	1,415,627	169,787
2001	1,252,160	132,070
2002	1,444,751	146,559

[1] A recreation visit is the entry of any person onto the lands or waters administered by the National Park Service for the purpose of recreation.

[2] An overnight stay is one night spent within a park by a visitor. A visitor is an individual who may generate one or more visits.

Source: NPS, Public Use Statistics Office.

Boat launch facilities managed by the NPS have fees of $6.00 for a 7-day pass or $40.00 for an annual pass. The annual pass is discounted to $30.00 if purchased from January 1 through April 30. These passes may be purchased through the mail. Camping is on a first-come first-served basis at all NPS campgrounds. Up to 2 vehicles and 10 people per site are allowed. A camping fee of $10.00 per night per site is charged. A reduced cost of $5.00 per night is charged from October 1 through April 30.

United States Army Corps of Engineers

The Corps developed McNary Lock and Dam to impound the Columbia River and created Lake Wallula, which extends for 46 miles up the Columbia River. This reservoir has a surface area of 38,800 acres with 242 miles of shoreline. Approximately 16,900 acres of associated public lands surround the lake and are used for public recreation, wildlife habitat, wildlife mitigation, and water-connected industrial development. About 2,400 acres are leased to State or local agencies for recreational purposes. Another 3,500 acres are leased to the Service as part of McNary National Wildlife Refuge. Public boat launching facilities are located at 17 locations, and another 8 access sites are managed by private commercial concessionaires or boat clubs. The recreation sites include: McNary Dam, Columbia Park, Howard Amon Park, Hover Park, Leslie R. Groves Park, Two Rivers Park, Washington Boat Launch, and the Yakima River Delta Wildlife Nature Area.

Situated on the Columbia River south of the Black Rock site is a park built by the Corps on property they control. Until October 2002, this park was known as Crow Butte State Park and was managed by the Washington State Parks Department. The visitation to Crow Butte State Park was nearly 125,000 from January through September 2002. Washington State Parks ceased to operate this park due to budgetary constraints since the State did not have ownership of the land or infrastructure. A nonprofit organization has recently begun to operate this park in cooperation with the Corps.

There is a fee for camping at Columbia Park. The charge ranges between $7.00 and $11.00 depending on the type of campsite (tent, RV, etc.). It costs $2.50 to use the dump station if the visitor is not also camping here. Day-use activities and use of the boat launches at this and other Corps recreation sites are free.

United States Fish and Wildlife Service

Several areas are managed by the Service in the four-county region and are available for flat water recreation. The largest is the Hanford Reach National Monument/Saddle Mountain National Wildlife Refuge in Benton, Grant, and Franklin Counties. The Hanford reach is the only nontidal, free-flowing stretch of the Columbia River within the United States. Most of this 195,000-acre monument and refuge are closed to the public or access is limited. There are few visitor use facilities. More open use of the monument and refuge is awaiting the completion and implementation of a comprehensive management plan.

Columbia National Wildlife Refuge is on the border between Grant and Adams Counties and provides approximately 23,000 acres of mixed lake, grassy uplands, sagebrush, and canyon and butte habitat. This refuge has 145 acres of ponds, 841 acres of lakes, and 17.8 miles of streams. Boating, fishing, hiking, hunting, picnicking, and RV use opportunities are available. Camping is available at Soda Lake Campground. There are boat launches at Blythe, Corral, Hutchinson, Lower Hampton, Soda, and Teal Lakes.

Umatilla National Wildlife Refuge consists of 29,370 acres of marshes, sloughs, open water, cropland, and sagebrush uplands. The refuge in located in the extreme southwest corner of Benton County along the Columbia River. Boats without motors are allowed on refuge ponds. Motorboating is permitted on the Columbia River portions of the refuge. There are excellent opportunities for hunting (deer, pheasant, and waterfowl in season), fishing, and wildlife observation. Approximately 70,000 visitors utilized the refuge for recreation in 2001.

Recreational visitor use at most wildlife refuges consists mainly of fishing, hunting (waterfowl, upland game, and big game), and wildlife observation. These are the primary recreational experiences that are allowed and supported with facilities and access to the refuges. Boating is usually part of one of these other activities. Human-powered or low speed motor-boating are the common modes of transportation on the lakes and streams of wildlife refuges. Big boats with large motors and high speeds, water skiing, personal watercraft (jet skis), and other water sports are inconsistent with the purposes and mission of the refuges.

United States Forest Service

Two of the six Ranger Districts of Wenatchee National Forest are in the four-county region—Cle Elum in northwest Kittitas County and Naches in northwest Yakima County. There are 12 water access sites managed by the FS in the four-county area. Bumping Lake, Clear Lake, and Rimrock Lake are located in the Naches District of Wenatchee National Forest. Cle Elum, Kachess, and Keechelus Lakes are in the Cle Elum District of this same forest.

Visitor use data for each individual recreation site (lakes, ponds, campgrounds, trails, etc.) in the forest are not available due to the expense of collecting this data. Empirical evidence indicates that recreational use of these lakes is very high during the summer season. Prior to 1996, the FS used its Recreation Information Management System to estimate and analyze visitor use in its forests for management purposes. Unfortunately, this process became too great of a burden on the limited recreation funding available to monitor use and manage and maintain the recreation program and facilities.

To estimate the recreational use occurring on the National Forests a nationwide program of visitation data and analysis has been implemented—The National Visitor Use Monitoring Project (NVUM). Every 4 years, one-quarter of the national forests implements this permanent 4-year cyclic sampling system to survey for recreational use at the forest, regional, and national levels. Recreational visitors to Wenatchee National Forest were surveyed October 2000 through September 2001. This period was an unusual recreation year in that it was period of lower than normal snow, which reduced winter use, and a severe fire season, which resulted in closures of parts of the forest due to major wildfires. Even so, the NVUM process estimated that the forest received more than

2.5 million National Forest visits.[4] The survey found that 4.3 percent of respondents used a boat launch within the forest.

The Cle Elum Ranger District contains Cle Elum, Kachess, and Keechelus Lakes. The FS manages recreation at these three Reclamation reservoirs and provides boating access to them.

The FS has 25 campgrounds in the Cle Elum District. There are group camping sites at both Kachess Lake (capacity 50 people) and Cle Elum Lake (capacity 100 people). Each lake also has another campground with individual sites (Kachess 120 sites and Cle Elum River 23 sites). Kachess Campground provides boating access to Kachess Reservoir. There are four separate boat launching sites on Cle Elum Lake, including the largest at Wish Poosh Campground. There is a four-lane boat launch on Keechelus Reservoir. Recreational use of the reservoirs of the Cle Elum District reveals that Lake Cle Elum Reservoir received 35,600 visits, Kachess Reservoir had 29,200 visits, and Keechelus Reservoir hosted 9,700 visits.

The Naches Ranger District includes 16 campgrounds in the Chinook Pass - Bumping Lake area. Three of these campgrounds providing 80 sites are at Bumping Lake. Two water access launching sites are at Bumping Lake, Bumping Lake Marina, and Bumping Lake Public Boat Landing. At the White Pass area, there are nine campgrounds. Clear Lake, Dog Lake, and Rimrock Lake are found in this part of Naches Ranger District. The first two have one boat launch each, and Rimrock Lake is served by two resorts, Silver Beach and The Cove, which provide boating access.

Recreational use of much of the National Forest lands now requires the payment of a user fee. Developed areas offering camping or boating usually assess a fee of between $5.00 and $10.00 per day depending on the forest and the facility and amenities provided. Daily forest passes are available for $5.00 and are valid for parking for the use of many trail heads, picnic areas, boat launches, and interpretive sites. Annual forest passes allow access to these same sites, cost $30.00, and are good for 1 year. Camping fees are usually between $10.00 and $15.00 per night per site depending on the level of development and amenities offered. Campgrounds range from small 3-site, hike-in areas that are free to large 120 site facilities that have utilities, RV sites, etc., and cost $14.00 per night. Some sites require a boat launching fee or moorage charges. Some concessionaire-operated sites on FS land may have higher fees.

[4] A National Forest visit is the entry of one person upon a National Forest to participate in recreational activities for an unspecified period of time. An estimated 2,532,617 National Forest visits (the 80-percent confidence level is plus or minus 14.0 percent) occurred on the Wenatchee National Forest. A National Forest visit can be composed of multiple site visits. Site visits were estimated at 2,726,705. These values and associated error rates are reported for the 80-percent confidence level.

Recreation Fees

Many public agencies at all levels charge fees for access to and the use of recreational sites and facilities. This practice has come about as means to help pay for the increasing operation and maintenance costs associated with providing public recreation areas and facilities. In general, the fees charged by pubic entities are comparable or lower than the charges found at privately provided recreation facilities of similar quality in the same market area. Usually, the fees charged for the use of public recreation resources and facilities are not sufficient to cover the entire cost of providing and maintaining these resources.

Recreation Summary

This investigation has identified 212 sites on over 5 dozen lakes, reservoirs, and river reaches that provide access and opportunities for boating, fishing, and other flat water recreational experiences within and bordering the four-county local area. Available data indicate that these recreational resources are heavily used by both residents of the four-county area and by visitors from outside the local area. Seven State parks alone accounted for over 2.9 million recreation visits in 2002 (table 3).

Reclamation's 1 dozen existing reservoirs with recreation facilities provide over 74,000 acres of water surface available for public recreation (table 2, not including Lake Roosevelt). The potential Black Rock reservoir is expected to add about 9,620 acres of water surface (at full pool), to this supply of nearby flat water recreation areas.

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Attachment 1 of Appendix B

Public Access Points for Water Oriented Recreation

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
1	Adams Road 239 Drain	Desert Wildlife Area		WDFW	Grant County						Yes		
2	Adrian - North	Gloyd Seeps		WDFW	Grant County								
3	Adrian - South	Gloyd Seeps		WDFW	Grant County								
4	Alkali Lake	Alkali Lake		WDFW	Grant County	1 gravel	0	10 gravel	15 gravel	1 vault	*	*	*
5	Ancient Lake	Ancient Lake		WDFW	Grant County								
6	Ankeny #1	Banks Lake	27,000	WDFW	Douglas County	3 gravel	-	10 gravel	15 gravel	20 vault	Yes	*	*
7	Ankeny #2	Banks Lake	27,000	WDFW	Douglas County	2 gravel	-	-	25 gravel	1 vault	No	*	*
8	Babcock Ridge Lake	Babcock Ridge Lake		WDFW	Grant County	1 natural	0	5 gravel	5 gravel	None	No	*	*
9	Banks Lake - Fordair	Banks Lake	27,000	WDFW	Grant County	1 asphalt	0	0	10 gravel	None	No	*	*
10	Barker Canyon – Banks Lake #7	Banks Lake	27,000	WDFW	Grant County	1 concrete plank	0	10 gravel	30 gravel	1 vault	Yes	*	*
11	Beda Lake	Beda Lake		WDFW	Grant County								
12	Bell Property			WDFW	Kittitas County								
13	Benton City			WDFW	Benton County								
14	Billy Clapp Lake	Billy Clapp Lake	1,010	WDFW	Grant County	2 concrete solid	1	5 Paved no striping	15 paved no striping	1 vault	No	*	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
15	Blue Lake	Blue Lake		WDFW	Grant County	1 concrete plank 1 gravel	0	10 gravel	40 gravel	2 vault	*	*	*
16	Blue Lake Resort	Blue Lake		Blue Lake Resorts	Grant County	1 gravel	0	10 gravel	10 gravel	*	Yes, and rental cabins	*	Yes
17	Blue Lake Resort	Blue Lake		WDFW	Grant County	Yes							
18	Blythe	Potholes Reservoir	27,800	WDFW	Grant County	2 concrete solid	0	1 paved and striped	140 gravel 9 paved no striping	3 vault	Yes	*	*
19	Blythe Lake	Blythe Lake	1,300	Service	Grant County	1 gravel	0	0	10 gravel	None	No	*	*
20	Buckshot Ranch	Priest Rapids Lake		WDFW	Grant County	2 concrete, plank	*	*	60 gravel	2 vault	Yes, 3-day limit	*	*
21	Buena			WDFW	Yakima County								
22	Bumping Lake Marina	Bumping Lake	1,300	FS	Yakima County	1 concrete, solid	1	5 gravel	5 gravel	2 vault	Yes	Yes	No
23	Bumping Lake Public Boat Landing	Bumping Lake	1,300	FS	Yakima County	1 concrete, plank	0	0	30 gravel	2 vault	Available at Bumping Lake Marina	No	No
24	Burke Lake - Eastside	Burke Lake		WDFW	Grant County	1 concrete plank	0	0	20 gravel	1 vault	Yes	*	*
25	Burke Lake - Southwest	Burke Lake		WDFW	Grant County	1 concrete, plank	0	5 gravel	10 gravel	2 vault	Yes	*	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
26	Burke Lake - Westend	Burke Lake		WDFW	Grant County	1 gravel	0	10 gravel	30 gravel	2 vault	*	*	*
27	Calache Lake	Calache Lake		WDFW	Grant County	1 natural	0	10 gravel	5 gravel	1 vault	*	*	*
28	Canal Lake - Northend	Canal Lake		WDFW	Grant County	2 concrete plank	0	10 gravel 5 paved and striped	15 gravel 1 paved and striped	1 vault	Yes	*	*
29	Cascade Park	Moses Lake		Moses Lake Parks and Rec Dept	Grant County	2 concrete solid	2	5 paved and striped	32 paved and striped	1 flush	Yes	Yes	Yes
30	Century Landing	Yakima River		Yakima Greenway Foundation	Yakima County	1 concrete plank	0	10 paved	0	1 vault	No	Yes	No
31	Charbonneau Park	Lake Sacajawea		Corps	Benton County	4 launches concrete solid and 51 open moorage	1	*	50 gravel 54 paved and striped	Yes, flush	Yes, tent and RV with full hookups	Yes	Yes
32	Clear Lake Recreation Area	Clear Lake	260	FS	Yakima County	1 concrete solid	1	5 gravel	20 gravel 3 paved and striped	1 vault	No	Yes	No
33	Coffin Lake	Stan Coffin Lake		WDFW	Grant County	1 concrete plank	0	5 gravel	5 gravel	1 vault	Yes	*	*
34	Columbia National Wildlife Refuge	145 acres ponds 841 acres lakes 17.8 miles of stream	986	Service	Grant County	*	*	*	*	*	No	Yes	No

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
35	Columbia Park	Lake Wallula		KennewickParks and Rec	Benton County	8 concrete solid	2	*	120 gravel	Yes	Yes RV	Yes	Yes
36	Columbia Park West	Lake Wallula		Horn Rapids Park	Benton County	3 concrete solid	1	57 paved and striped	38 paved and striped	1 flush	*	Yes	*
37	Columbia Point	Columbia River		Richland Parks and Rec	Benton County	4 concrete solid and 34 moorage	3	65 paved and striped	140, paved and striped	1 - with showers	*	Yes	*
38	Corral Lake - North	Corral Lake		WDFW	Grant County	1 gravel	0	10 gravel	15 gravel	1 vault	Yes	*	*
39	Corral Lake - Southwest	Corral Lake		WDFW	Grant County								
40	Coulee City Community Park	Banks Lake	27,000	Coulee City Parks and Rec Dept	Grant County	8 moorage 4 concrete solid	3	0	60 gravel	1 flush	Yes	Yes	Yes
41	Coulee Lodge Resort	Blue Lake		Coulee Lodge Resort	Grant County	1 concrete solid	1	30 gravel	35 gravel	1 showers with restrooms	Yes, RV hookups, rental cabins	*	Yes
42	Coulee Playland Resort	Banks Lake	27,000	Coulee Playland Resort	Grant County	25 moorage	3	*	*	*	Yes, RV, Tent	No	No
43	Crab Creek Launch	Potholes Reservoir N	27,800	WDFW	Grant County	1 gravel	0	10 gravel	10 gravel	*	Yes RV	*	*
44	Crater Lake	Crater Lake		WDFW	Grant County	cartop launch							
45	Crater Slough			WDFW	Grant County								

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
46	Crescent Bar	Wanapum Lake		Grant County PUD	Grant County	2 concrete solid	1	0	50 gravel	2 Portable sani-cans	Available across the street	*	*
47	Crescent Bar Resort	Wanapum Lake		Crescent Bar Development Inc.	Kittitas County	40 transient open moorage	*	*	*	*	*	*	*
48	Crescent Bay	F.D. Roosevelt Lake	60,000	NPS	Grant County	1 concrete solid	1	20 gravel	75 gravel	1 vault	No	*	*
49	Crow Butte	Lake Umatilla		Corps Ownership with Mgt. by Private Concession	Benton County	1 concrete plank 2 concrete solid	*	45 paved and striped	56 paved and striped	*	*	*	*
50	Darnell's Resort Motel	Lake Chelan		Private	Kittitas County	25 permanent open moorage	*	*	*	*	*	*	*
51	Dodson Frenchmen	Desert Wildlife Area		WDFW	Grant County					Yes	Yes		
52	Dodson Road			WDFW	Grant County	Yes				Yes	Yes		
53	Dog Lake Campground	Dog Lake		FS	Yakima County	1 ramp, natural	0	*	8 gravel	1 vault	Yes	Yes	No

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
54	Dry Creek	Cle Elum Lake		FS	Kittitas County	1 gravel	0	10 gravel	5 gravel	None	Yes	*	*
55	Dusty Lake	Dusty Lake		WDFW	Grant County						Yes		
56	Evergreen Reservoir	Evergreen Reservoir		WDFW	Grant County	1 concrete plank	0	0	30 gravel	2 vault	Yes	*	*
57	Evergreen Reservoir - East	Evergreen Reservoir		WDFW	Grant County	1 gravel	0	0	10 gravel	1 vault	Yes	*	*
58	Evergreen Reservoir-Northwest	Evergreen Reservoir		WDFW	Grant County	1 concrete plank	0	0	25 gravel	1 vault	Yes	*	*
59	Evergreen Reservoir-Southwest	Evergreen Reservoir		WDFW	Grant County	Yes				Yes	Yes		
60	Fidesco Harris - #1	Desert Wildlife Area		WDFW	Grant County					Yes	Yes		
61	Fidesco Harris - #2	Desert Wildlife Area		WDFW	Grant County					Yes	Yes		

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
62	Fidesco Harris - #3	Desert Wildlife Area		WDFW	Grant County					Yes	Yes		
63	Fiorito Ponds	Fiorito Ponds		WDFW	Kittitas County								
64	Fish Trap Lenore			WDFW	Grant County								
65	Fitzsimmons	Yakima River		WDFW	Yakima County	1 ramp, natural	0	5 gravel	15 gravel	1 vault	No	*	*
66	Fordair			WDFW	Grant County						Yes		
67	Frenchman Hills #1	Desert Wildlife Area		WDFW	Grant County						Yes		
68	Frenchman Hills #2	Desert Wildlife Area		WDFW	Grant County						Yes		
69	Frenchman Hills #3	Desert Wildlife Area		WDFW	Grant County						Yes		
70	Frenchman Hills #4	Desert Wildlife Area		WDFW	Grant County						Yes		
71	Gannon	Yakima River		WDFW	Yakima County	1 ramp, gravel	0	5 gravel	10 gravel	None	No	No	No
72	Ginko Petrified Forest State Park	Wanaapum Reservoir		Washington State Parks	Kittitas County	2	*			Yes	Yes, 50 RV hookups	Yes	
73	Ginko State Park	Wanapum Lake		State Parks	Kittitas County	1 asphalt	0	10 paved no striping	5 paved no striping	None	No	*	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
74	Glen Williams	Potholes Reservoir	27,800	WDFW	Grant County	2 concrete plank	0	50 gravel	100 gravel	2 vault	*	*	*
75	Gloyd - Farm Unit	Gloyd Seeps Wildlife Area		WDFW	Grant County						Yes		
76	Gloyd - Loan Ranch	Gloyd Seeps Wildlife Area		WDFW	Grant County						Yes		
77	Gloyd - Road 10	Gloyd Seeps Wildlife Area		WDFW	Grant County						Yes		
78	Gloyd - Road 12	Gloyd Seeps Wildlife Area		WDFW	Grant County						Yes		
79	Gloyd - Road 14	Gloyd Seeps Wildlife Area		WDFW	Grant County						Yes		
80	Gloyd - Road 16	Gloyd Seeps Wildlife Area		WDFW	Grant County						Yes		

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
81	Gloyd - Road 7	Gloyd Seeps Wildlife Area		WDFW	Grant County						Yes		
82	H Lake	H Lake		WDFW	Grant County						Yes		
83	Hammerstead			WDFW	Yakima County								
84	Hanford Reach National Monument/ Saddle Mountain National Wildlife Refuge	Columbia River	*	Service	Grant County	*	*	*	*	*	No	No	No
85	Harlan Landing	Yakima River		WDFW	Yakima County	1 ramp, concrete plank	0	12 paved and striped	17 paved and striped	*	No	Yes	No
86	Heart Lake	Heart Lake		WDFW	Grant County	1 concrete plank	0	0	10 gravel	1 vault	Yes	*	*
87	Heart Lake	Heart Lake		WDFW	Grant County	Yes					Yes		
88	Horn Rapids Park	Yakima River		Benton County Parks and Rec	Benton County	2 concrete plank	*	10 gravel	25 gravel	*	None	*	*
89	Howard Amon Park	Lake Wallula		Horn Rapids Park	Benton County	3 concrete solid	1	47 paved and striped	40 gravel 46 paved and striped	Within walking distance	*	Yes	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
90	I Road 645 Drain	Desert Wildlife Area		WDFW	Grant County					Yes	Yes		
91	I-82 Ponds # 1, #2, #3, #4, and #5			WDFW	Yakima County								
92	Jericho - Old Bridge	Crab Creek Wildlife Area								Yes	Yes		
93	Job Corps Dike – Potholes Reservoir N.	Potholes Reservoir	27,800	WDFW	Grant County	3 gravel	0	0	20 gravel	*	*	*	*
94	Kachess Campground	Lake Kachess	6,535	FS	Kittitas County	2 concrete solid and 1 gravel	0	5 paved and striped	8 gravel 39 paved and striped 6 paved no striping 7 Paved no striping	1 flush	Yes (183)	Yes	Yes
95	Katy Lake	Seep Lakes Wildlife Area		WDFW	Grant County						Yes		
96	Keechelus Boat Launch	Lake Keechelus	2,560	FS	Kittitas County	4 asphalt	0	0	22 paved and striped	1 vault	No	*	*
97	King Horn Slew			WDFW	Kittitas County								
98	Lake Easton State Park	Lake Easton	240	Washington State Parks	Kittitas County	1 concrete plank	1	14 paved and	10 paved and striped	*	*	*	Yes

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
								striped					
99	Laurent's Sun Village Resort	Park Lake		Laurent's Sun Village Resort	Grant County	1 asphalt	0	*	*	*	*	*	*
100	Laurent's Sun Village Resort – Blue Lake	Blue Lake		Laurent's Sun Village Resort	Grant County	1 concrete plank 1 gravel	3	10 gravel	10 gravel	1 restrooms with showers	Yes RV	Yes	Yes
101	Lavendar Lake	Lavendar Lake		WDFW	Kittitas County	1 gravel	0	15 gravel	10 gravel	1 vault	No	*	*
102	Lena Lake	Lena Lake		WDFW	Grant County						Yes		
103	Lenice			WDFW	Grant County					Yes	Yes		
104	Lenore Lake - North	Lake Lenore		WDFW	Grant County								
105	Lenore Lake - South	Lake Lenore		WDFW	Grant County	Yes				Yes			
106	Leslie Groves Park	Lake Wallula		Richland Parks and Rec	Benton County	4 concrete solid	1	15 paved and striped	50 paved and striped	*	No	Yes	Yes
107	Lind Coulee - East			WDFW	Grant County						Yes		
108	Lind Coulee – Island Site	Potholes Reservoir	27,800	WDFW	Grant County	1 gravel	0	0	10 gravel	1 vault	Yes	*	*
109	Lind Coulee - West			WDFW	Grant County	Yes				Yes	Yes		
110	Lmuma Creek	Yakima River		BLM	Kittitas County	1	0			1	7	Yes	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
111	Long Lake	Long Lake		WDFW	Grant County	1 gravel	0	0	10 gravel	1 vault	Yes, 15-day limit	*	*
112	Lower Goose Lake	Goose Lake		WDFW	Grant County	1 gravel	0	10 gravel	5 gravel	No	No	*	*
113	Lower Peninsula Park	Moses Lake		Moses Lake P and R Dept	Grant County	2 concrete plank	0	0	38 paved and striped	2 vault	No	Yes	*
114	Marco Polo Lake	Marco Polo Lake		WDFW	Grant County						Yes		
115	MarDon Resort	Potholes Reservoir	27,800	Mardon Resort	Grant County	1 concrete solid	1	10 gravel	10 gravel	*	Yes RV	Yes	*
116	Martha Lake	Martha Lake		WDFW	Grant County	1 gravel	0	Yes gravel	Yes gravel	1 vault	Yes, 3-day limit	*	*
117	Matton Lake	Matton Lake		WDFW	Kittitas County	1 concrete plank	1	25 gravel	25 gravel	1 vault	Yes	*	*
118	McCabe Pond	McCabe Pond		WDFW	Kittitas County								
119	McCormick			WDFW	Yakima County								
120	McLeary			WDFW	Grant County								
121	McLeary/ Pixlee	Park Lake		WDFW	Grant County	1 natural	0	15 gravel	*	*	*	*	*
122	Medicare East	Potholes Reservoir	27,800	WDFW	Grant County	1 gravel	0	0	20 gravel	*	*	*	*
123	Mellis Road (Burke)	Yakima River		WDFW	Yakima County	1 concrete plank	0	10 paved, no striping	30 paved, no striping	1 vault	No	*	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
124	Metz Marina	Columbia River		Metz Marina, Inc.	Benton County	162 permanent moorage 32 transient moorage 1 fixed hoist	0	20 gravel	15 gravel	Yes	-	*	*
125	Million Dollar North – Banks Lake #4	Banks Lake	27,000	WDFW	Grant County	1 gravel	0	15 gravel	50 gravel	1 vault	No	*	*
126	Million Dollar South- Banks Lake # 3	Banks Lake	27,000	WDFW	Grant County	1 gravel	0	10 gravel	20 gravel	1 vault	No	*	*
127	Montlake Park	Moses Lake		Moses Lake P and R Dept	Grant County	2 concrete solid	2	4 paved and striped	34 paved and striped	1 flush	*	Yes	Yes
128	Morgan Creek	Cle Elum Lake		FS	Kittitas County	1 gravel	0	10 gravel	2 gravel	None	Yes primitive	*	*
129	Moses Lake – North End Launch	Moses Lake		Grant County WDFW	Grant County	1 concrete plank	0	5 gravel	10 gravel	1 vault	*	*	*
130	Moses Lake – North Outlet	Potholes Reservoir	27,800	WDFW	Grant County	1 natural	0	15 paved and striped	15 gravel	1 vault	Yes, 3-day limit	*	*
131	Moses Lake Park	Moses Lake		City of Moses Lake	Grant County					Yes	*	*	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
132	Moses Lake – South	Potholes Reservoir	27,800	WDFW	Grant County					Yes	Yes		
133	Myron Lake	Myron Lake		WDFW	Yakima County								
134	Naylor Junction			WDFW	Grant County						Yes		
135	North End			WDFW	Grant County								
136	North McNary	Lake Wallula		Corps	Benton County	1 concrete solid	0	0	75 paved and striped	1 Portable sani-cans	-	Yes	*
137	Old Vantage Highway	Columbia River		WDFW	Grant County	1 concrete plank	0	15 gravel	60 gravel	None	-	No	*
138	Osborne Bay	Banks Lake	27,000	WDFW	Grant County	1 natural	0	10 gravel	30 gravel	*	Yes primitive	*	*
139	Overlook Camp	Sage Lake		WDFW	Grant County								
140	Parker Parking Lot			WDFW	Yakima County								
141	Perch Point	Potholes Reservoir	27,800	Washington State Parks	Grant County	1 gravel	0	0	20 gravel	2 portable sani-cans	Yes	*	*
142	Plymouth Park	Lake Umatilla		Corps	Benton County	2 concrete solid	3	0	18 paved and striped	2 portable sani-cans	Yes	Yes	Yes
143	Point site	Lind Coulee		WDFW	Grant County						Yes		
144	Pond # 1			WDFW	Yakima County								
145	Pond # 2			WDFW	Yakima County								
146	Pond # 3			WDFW	Yakima County								

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
147	Pond # 4			WDFW	Yakima County								
148	Pond # 5			WDFW	Yakima County								
149	Poplars – Banks Lake #5	Banks Lake	27,000	WDFW	Grant County	1 natural	0	10 gravel	5 gravel	*	No	*	*
150	Port of Kennewick Public Launching Ramp	Columbia River		Port of Kennewick	Benton County	4 concrete solid	1	0	30 gravel	None	-	*	*
151	Potholes – Lind Coulee Bridge Site West	Potholes Reservoir	27,800	WDFW	Grant County	2 gravel	0	0	60 gravel	1 vault	*	*	*
152	Potholes Reservoir – K.5 SE	Potholes Reservoir	27,800	WDFW	Grant County	1 natural	0	0	5 gravel	*	*	*	*
153	Potholes State Park	Potholes Reservoir	27,800	WA State Parks	Grant County	4 concrete solid	1	0	60 gravel	2 flush 1 restroom with showers	*	*	*
154	Quincy Lake	Quincy Lake		WDFW	Grant County	1 concrete solid	0	10 gravel	20 gravel	1 vault	Yes	*	*
155	Red Rock Lake	Red Rock Lake		WDFW	Grant County	1 natural	0	0	10 gravel	*	Yes	*	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
156	Rest Haven			WDFW	Yakima County								
157	Richland Yacht Club	Columbia River		*	Benton County	112 permanent moorage	*	*	*	*	-	*	*
158	River Campground	Priest Rapids Lake		Grant County	Grant County	1 concrete plank 2 concrete solid	1	50 gravel	100 Gravel	Yes	Yes	*	*
159	Riverfront Park Boat Launch (Prosser)	Yakima River		Prosser Parks and Rec Dept	Benton County	2 concrete solid	0	10 paved no striping	10 paved and striped	*	-	Yes	*
160	Road A - Potholes	Potholes Unit		WDFW	Grant County						Yes		
161	Rocky Ford - Hwy 17	Rocky Ford Creek		WDFW	Grant County						Yes		
162	Rocky Ford - Lower	Rocky Ford Creek		WDFW	Grant County					Yes	Yes		
163	Rocky Ford - Upper	Rocky Ford Creek		WDFW	Grant County					Yes	Yes		
164	Rowe			WDFW	Yakima County								
165	Roza Recreational Site	Yakima River	100	BLM	Kittitas County	2 concrete solid	0	135 paved and striped	21 paved and striped	4 vault	Yes	Yes	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
166	Sam Israel	Lake Lenore Wildlife Area		WDFW	Grant County								
167	Samson's Pit Site	Potholes Wildlife Area		WDFW	Grant County						Yes		
168	Sand Dunes Site	Potholes Wildlife Area		WDFW	Grant County						Yes		
169	Scatter Creek Campground	Cle Elum River		FS	Kittitas County	1 natural	0	5 gravel	5 gravel	1 vault	Yes	*	*
170	Silver Beach Resort	Rimrock Lake	2,790	FS	Yakima County	1 gravel	1	5 gravel	5 gravel	Flush restroom	No, but there is a motel and rental cabins	*	Yes
171	Smyrna - West	Crab Creek Wildlife Area		WDFW	Grant County						Yes		
172	Soda Lake Campground	Soda Lake		Service	Grant County	2 gravel	0	15 gravel	35 gravel	*	Yes	*	*
173	Soda Lake Dam	Soda Lake		Service	Grant County	3 gravel	0	0	10 gravel	*	No	*	*
174	South Emerald	Yakima River		WDFW	Yakima County	1 natural	0	0	5 gravel	None	-	*	*
175	South Emerald			WDFW	Yakima County								
176	South Teal Lake	South Teal Lake		WDFW	Grant County	1 gravel	0	0	15 gravel	*	-	*	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
177	Steamboat Rock State Park	Banks Lake	27,000	Washington State Parks	Grant County	4 concrete plank	1	120 paved and striped	105 paved and striped	1 flush	*	*	*
178	Sulfur Creek	Sulfur Creek		WDFW	Yakima County	1 natural	0	15 gravel	-	None	Yes	Yes	Yes
179	Sun Lakes State Park	Park Lake		Washington State Parks	Grant County	2 asphalt	1	20 gravel	10 gravel	1 flush	Yes	*	*
180	Sunbanks Resort	Banks Lake/ Osborn Bay	27,000	Sunbanks Resort	Grant County	1 concrete plank	1	0	15 gravel	Restrooms with showers	-	*	*
181	Sunland Estates	Wanapum Lake		WDFW	Grant County	1 concrete plank	0	10 gravel	30 gravel	None	No	*	*
182	Susan Lake	Susan Lake		WDFW	Grant County	2 natural	0	5 gravel	3 gravel	*	Yes limited to 15 days	*	*
183	Teanaway			WDFW	Kittitas County								
184	The Cove Resort	Rimrock Lake	2,790	FS	Yakima County	1 gravel	2	0	7 gravel	*	Yes (RV)	*	*
185	Thrall (Ringer Road)			WDFW	Kittitas County								
186	Twelve West Resort	Rimrock Lake	2,790	Twelve West Resort	Yakima County	1 gravel	1	0	15 gravel	2 vaults	Yes (RV)	*	*
187	Two Rivers Park	Lake Wallula		Benton City Parks and Rec	Benton County	2 concrete solid	3	20 gravel	20 gravel	1 Portable Sani-cans	-	Yes	Yes
188	Umatilla National Wildlife Refuge – Paterson Ramp	Lake Umatilla		Service	Benton County	2 natural	0	0	-	None	-	*	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
189	Upper Goose	Upper Goose Lake		WDFW	Grant County	1 concrete plank	0	0	15 gravel	No	*	*	*
190	Upper Goose Lake #2	Upper Goose Lake		WDFW	Grant County	1 natural	0	5 gravel	5 gravel	*	*	*	*
191	Vantage Boat Ramp	Columbia River		Kittitas County Public Works	Kittitas County	3 concrete solid	1	8 paved and striped	60 paved and striped	2 vaults	-	Yes	*
192	Vernita Bridge (north bank)	Columbia River		WDFW	Grant County	4 natural	0	0	50 gravel	None	-	*	*
193	Virgin Lake	Seep Lakes Wildlife Area		WDFW	Grant County						Yes		
194	W-20-F1			WDFW	Grant County	Yes							
195	Wanapum Dam (downstream)	Priest Rapids Lake		Grant County PUD	Grant County	1 concrete plank	0	0	75 gravel, l6 paved no striping	2 Portable sani-cans	-	*	*
196	Wanapum Dam (upstream)	Wanapum Lake		Grant County PUD	Grant County	1 concrete plank	1	0	10 paved no striping	2 Portable sani-cans	-	*	*
197	Wanapum State Park	Wanapum Lake		Wanapum Lake	Kittitas County	2 concrete plank	1	0	40 paved and striped	1 flush	Yes full hookups	*	*
198	Wapato Dam			WDFW	Yakima County								
199	Warden Lake – North	Warden Lake		WDFW	Grant County	2 gravel	0	20 gravel paved	40 gravel	1 vault	Yes	*	*

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
								and striped					
200	Warden Lake – Outfall	Warden Lake		WDFW	Grant County						Yes		
201	Warden Lake – South	Warden Lake		WDFW	Grant County						Yes		
202	Water Works			WDFW	Yakima County								
203	Wenas Lake	Wenas Lake		WDFW	Yakima County	1 concrete solid	0	0	30 gravel	2 vaults	WDFW	*	*
204	Winchester Lake - #1 Frontage Road	Winchester Wasteway	1,020	WDFW	Grant County	1 natural	0	5 gravel	5 gravel	None	Yes limited to 15 days	*	*
205	Winchester Lake - #2 Off Road 2	Winchester Wasteway	1,020	WDFW	Grant County	1 natural	0	0	10 gravel	None	Yes limited to 15 days	*	*
206	Winchester Lake - #3 Off Road 3	Winchester Wasteway	1,020	WDFW	Grant County	1 gravel	0	5 gravel	15 gravel	1 vault	Yes limited to 15 days	*	*
207	Winchester Wasteway – Dodson Road	Winchester Wasteway	1,020	WDFW	Grant County	1 gravel	0	15 gravel	40 gravel	*	*	*	*
208	Wish Poosh Campground and Picnic Area	Cle Elum Lake		FS	Kittitas County	4 concrete solid	0	0	31 Paved and striped	1 flush	Yes	Yes	Yes

#	Site Name	Water Body	Acres of Water Surface	Managing Agency/Site Manager	Location	# of Boat Launches and Type of Launch	# of Loading Floats	# of Car Parking Spaces and Type of Lot**	# of RV/Trailer Parking Spaces and Type of Lot	# of Restrooms and Type of Facility	Camping (# of Sites)	Picnicking	Swimming
209	Wye Park Boat Ramp	Lake Wallula		City of Richland	Benton County	2 concrete solid	1	0	25 gravel	Yes flush	-	Yes	*
210	Yakima River Benton City	Yakima River		WDFW	Benton County	1 natural	0	15 gravel	35 gravel	None	-	*	*
211	Yakima Sportsman State Park	Yakima River		Washington State Parks	Yakima County	None	*			2 and 4 showers	Yes 28 tent 37 utility	Yes	*
212	Zillah Bridge	Yakima River		WDFW	Yakima County	1 concrete plank	0	0	10 gravel	1 vault	-	*	*

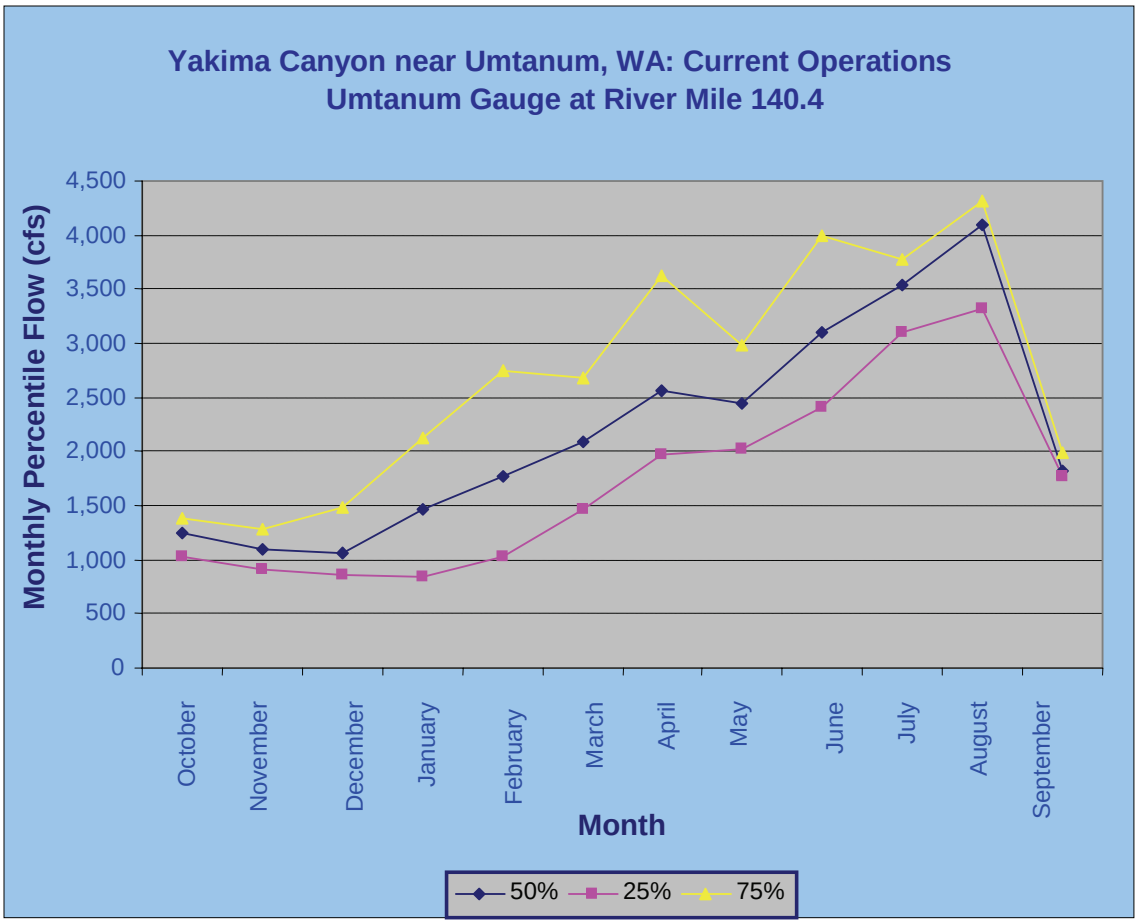
212 = # of sites

* = no facilities or no data or not applicable

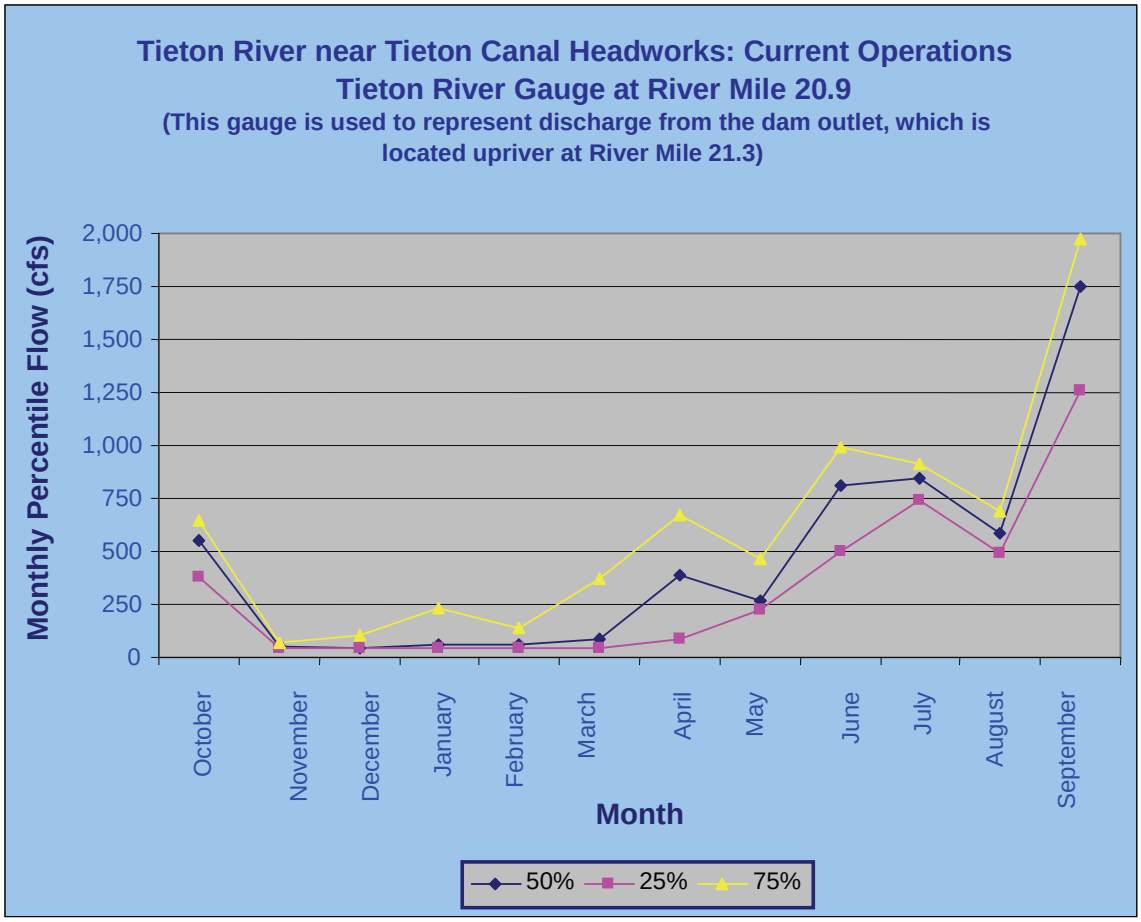
** Automobiles and other passenger vehicles can also use the space identified as RV/Trailer parking.

Appendix C

River Flow Hydrographs



The 1981-2003 period of record was used and the daily flows were generated from the RiverWare Model. This means that if you were to compare for any given day the actual daily flow that occurred, it would be somewhat different than that generated by RiverWare. The difference is a reflection of differences in modeled river operations criteria to what actually occurred on that day.



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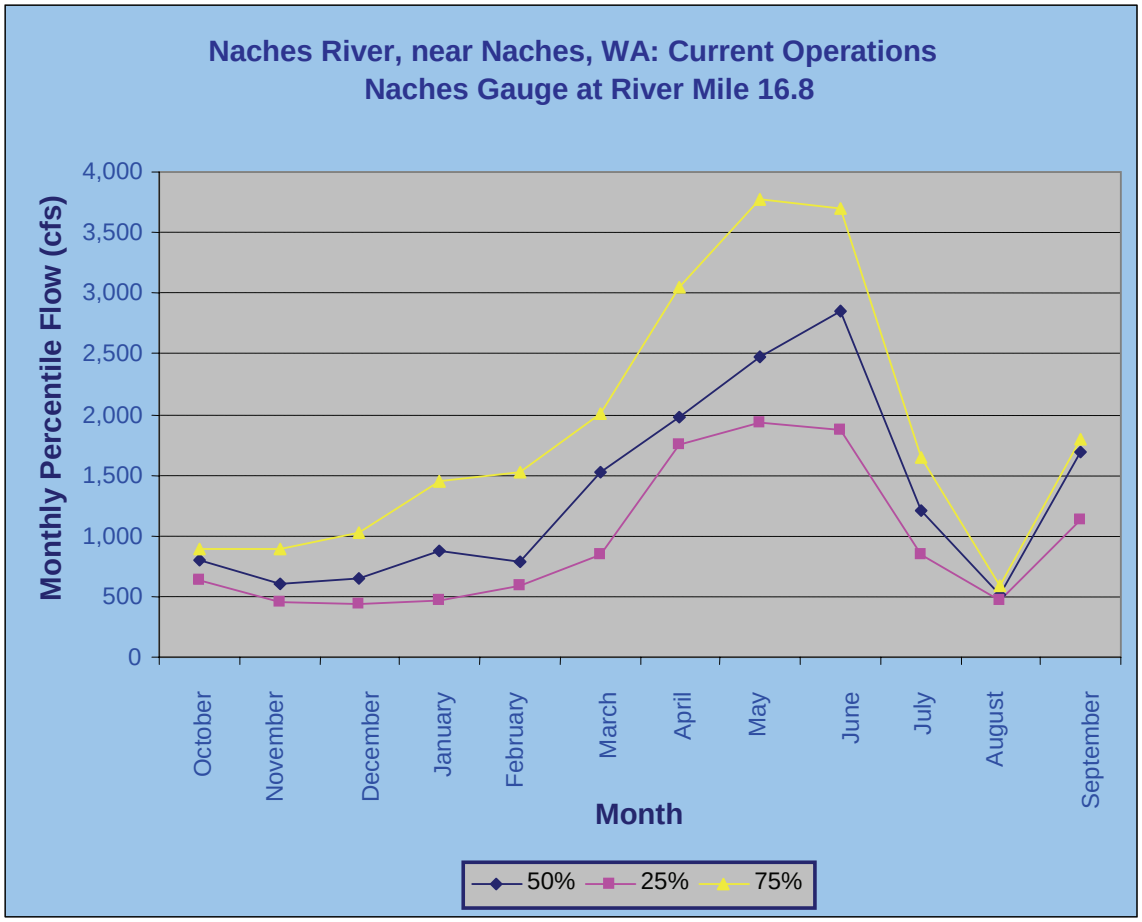
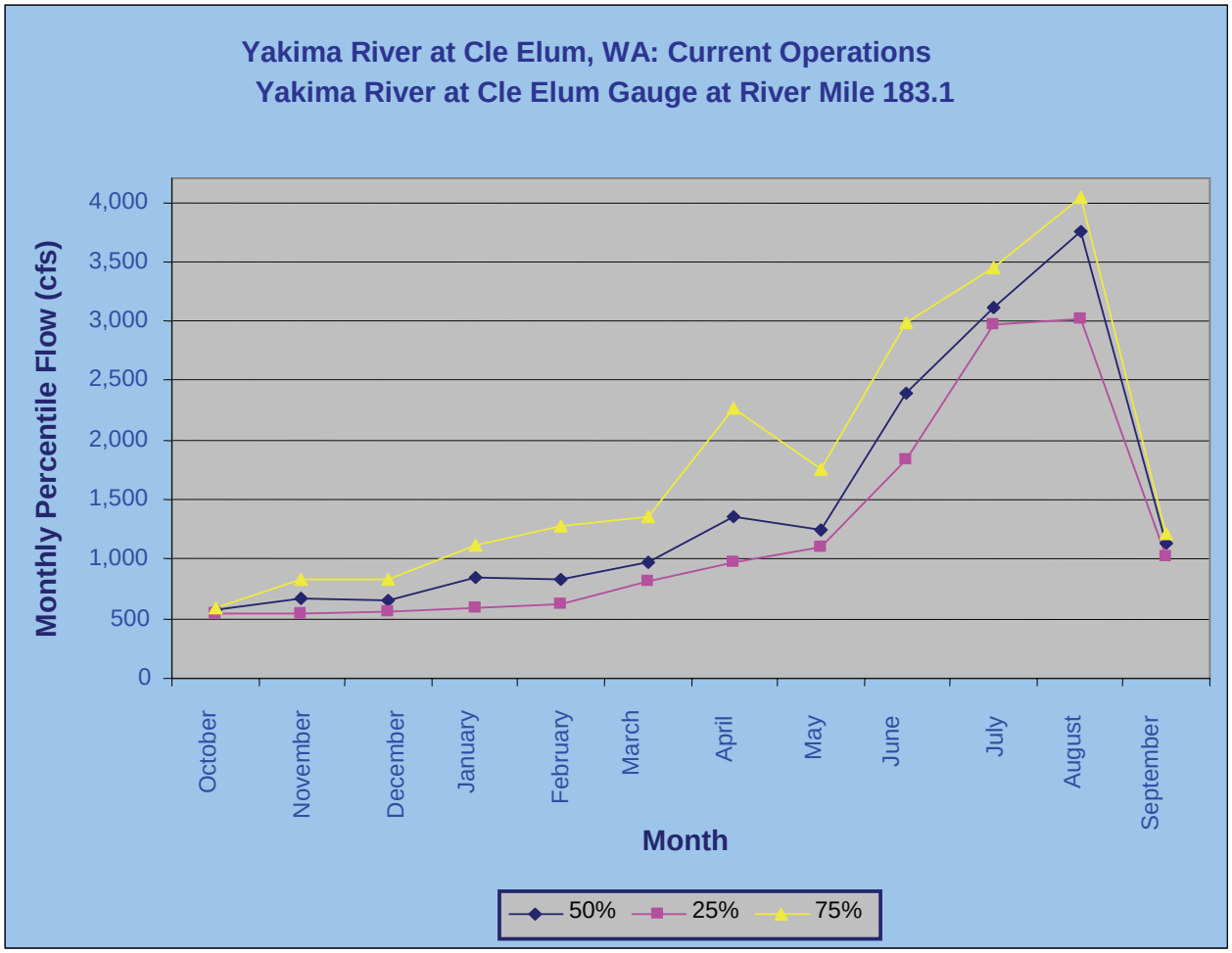


The 1981-2003 period of record was used and the daily flows were generated from the RiverWare Model. This means that if you were to compare for any given day the actual daily flow that occurred, it would be somewhat different than that generated by RiverWare. The difference is a reflection of differences in modeled river operations criteria to what actually occurred on that day.



The 1981-2003 period of record was used and the daily flows were generated from the RiverWare Model. This means that if you were to compare for any given day the actual daily flow that occurred, it would be somewhat different than that generated by RiverWare. The difference is a reflection of differences in modeled river operations criteria to what actually occurred on that day.

Appendix D

Whitewater Classification from American Whitewater

Whitewater Classification from American Whitewater

CLASS I: *Easy*	Fast moving with riffles and small waves. Few obstructions, easily avoided. Low risk. Easy self-rescue.
CLASS II: *Novice*	Straightforward rapids; wide, clear channels evident without scouting. Occasional maneuvering. Rocks and medium waves easily avoided by trained paddlers. Swimmers seldom injured.
CLASS III: *Intermediate*	Rapids with moderate, irregular waves that can swamp open canoes. Strong eddies and currents. Complex maneuvers and good control required in tight passages and around ledges. Large waves or strainers easily avoided. Scouting advisable for inexperienced parties. Self-rescue usually easy; group assistance may be required. Injuries while swimming are rare.
CLASS IV: *Advanced*	Powerful, turbulent and predictable rapids; large, unavoidable waves and holes or constricted passages. Fast, reliable eddy turns and precise boat handling needed to initiate maneuvers, scout rapids or rest. Rapids may require "must" moves above dangerous hazards. Strong Eskimo roll highly recommended. Scouting necessary first time. Self-rescue difficult; skilled group assistance often needed. Moderate to high risk of injury to swimmers.
CLASS V: *Expert*	Extremely long, obstructed or violent rapids with exposure to added risk Possible large, unavoidable waves and holes or steep, congested chutes. Eddies may be small, turbulent, difficult to reach or non-existent. Reliable Eskimo roll, proper equipment, extensive experience, high level of fitness and practiced rescue skills essential for survival. Scouting recommended but may be difficult. Swims are dangerous. Difficult rescue for experts.
CLASS VI: *Extreme and Exploratory*	These runs have almost never been attempted and often exemplify the extremes of difficulty, unpredictability and danger. The consequences of errors are very severe and rescue may be impossible. For teams of experts only, at favorable water levels, after close personal inspection and taking all precautions.

Appendix E

WROS Zone Descriptions

Urban

- Extensively developed municipal, industrial, commercial built structures
- Modern facilities and amenities
- Heavy concentration and interaction of people
- Extensive management presence
- City, neighborhood and waterfront parks; river trails; and formal gardens
- Mainly day use recreation
- Presence of recreation and nonrecreation activities
- Abundant and expansive marinas, concessions, and commercial services

Suburban

- Landscape largely human built
- Commercial and residential built structures
- Modern facilities and amenities
- Very prevalent management presence
- Community parks, greenways, trails, golf courses and open space
- Day use with very limited overnight camping opportunities
- Predominance of recreation activities with limited nonrecreation uses
- Numerous marinas and concessions

Rural Developed

- Widely dispersed homes, farms, ranches, second homes, lodges, roads and utilities
- Predominantly natural and pastoral landscapes with limited development
- Balance of day use and overnight camping
- Open space and pastoral setting
- Obvious management presence
- Limited number of marinas and concessions
- Infrequent tranquility and solitude
- Socialization and motorized use often more prevalent than other uses

Rural Natural

- Predominantly natural landscapes with infrequent development
- Rustic campgrounds with limited amenities
- Marinas, concessions, and services nearby but outside the area
- Occasional management presence
- Balance motorized/nonmotorized use
- Occasional use of outdoor skills required
- County and regional parks and open space
- Outdoor recreation and agriculture are the dominant land uses
- Socialization less important
- Periods of solitude and tranquility possible

Semiprimitive

- Large expanse of natural appearing landscapes
- Socialization not important
- Self-reliance, risk and outdoor skills may be needed
- Rustic trails, camping areas, trail heads, and unimproved launch sites
- Nonmotorized recreation often more prevalent than motorized use
- Infrequent management presence
- Pack it in, pack it out
- Frequent solitude and tranquility

Primitive

- Great expanse of natural-appearing landscape
- Predominantly nature-based recreation with no motorized use
- Extensive risk, self-reliance, and outdoor skills required
- Very infrequent management presence
- Little evidence of human impacts and nonrecreation use
- Socialization outside group is rare
- Pack it in, pack it out
- Solitude and tranquility dominant

Appendix F

WROS Inventory Maps

Keechelus Lake Existing Water Recreation Opportunity Spectrum Inventory

	Acres	% of Total
Urban (U)	0	0
Suburban (S)	0	0
Rural Developed (RD)	2360	100.00
Rural Natural (RN)	0	0
Semi Private (SP)	0	0
Primitive (P)	0	0
Total Water Surface Acres	2,360	100.00

Boat Launch

Camp

Park

0 0.25 0.5 1 1.5 Miles

2359.755684

RD

This map product is intended for informational purposes only, to assist in feature location with reference to other landmarks. Data of varying scales and degrees of accuracy have been combined in the production of this map product. No representation is made as to accuracy of this document. July 2005

Kachess Lake Existing Water Recreation Opportunity Spectrum Inventory

	Acres	% of Total
Urban (U)	0	0
Suburban (S)	0	0
Rural Developed (RD)	1684	39.35
Rural Natural (RN)	2595	60.65
Semi Private (SP)	0	0
Primitive (P)	0	0
Total Water Surface Acres	4,279	100.00

Boat Launch
Camp
Park

0 0.25 0.5 1 1.5 2 2.5 3 Miles

604.581335
RN

1683.733551
RD

1989.918327
RN

KEECHELUS LAKE
WENATCHEE NATIONAL FOREST
KACHESS RIDGE
CLE ELUM LAKE
SNOQUALMIE NATIONAL FOREST

This map product is intended for informational purposes only to assist in feature location with reference to other landmarks. Data of varying scale and degrees of accuracy have been combined in the production of this map product. No representation is made as to accuracy of this document. July 2005.

Cle Elum Lake Existing Water Recreation Opportunity Spectrum Inventory

	Acres	% of Total
Urban (U)	0	0
Suburban (S)	0	0
Rural Developed (RD)	4478	100.00
Rural Natural (RN)	0	0
Semi Private (SP)	0	0
Primitive (P)	0	0
Total Water Surface Acres	4,478	100.00

Boat Launch

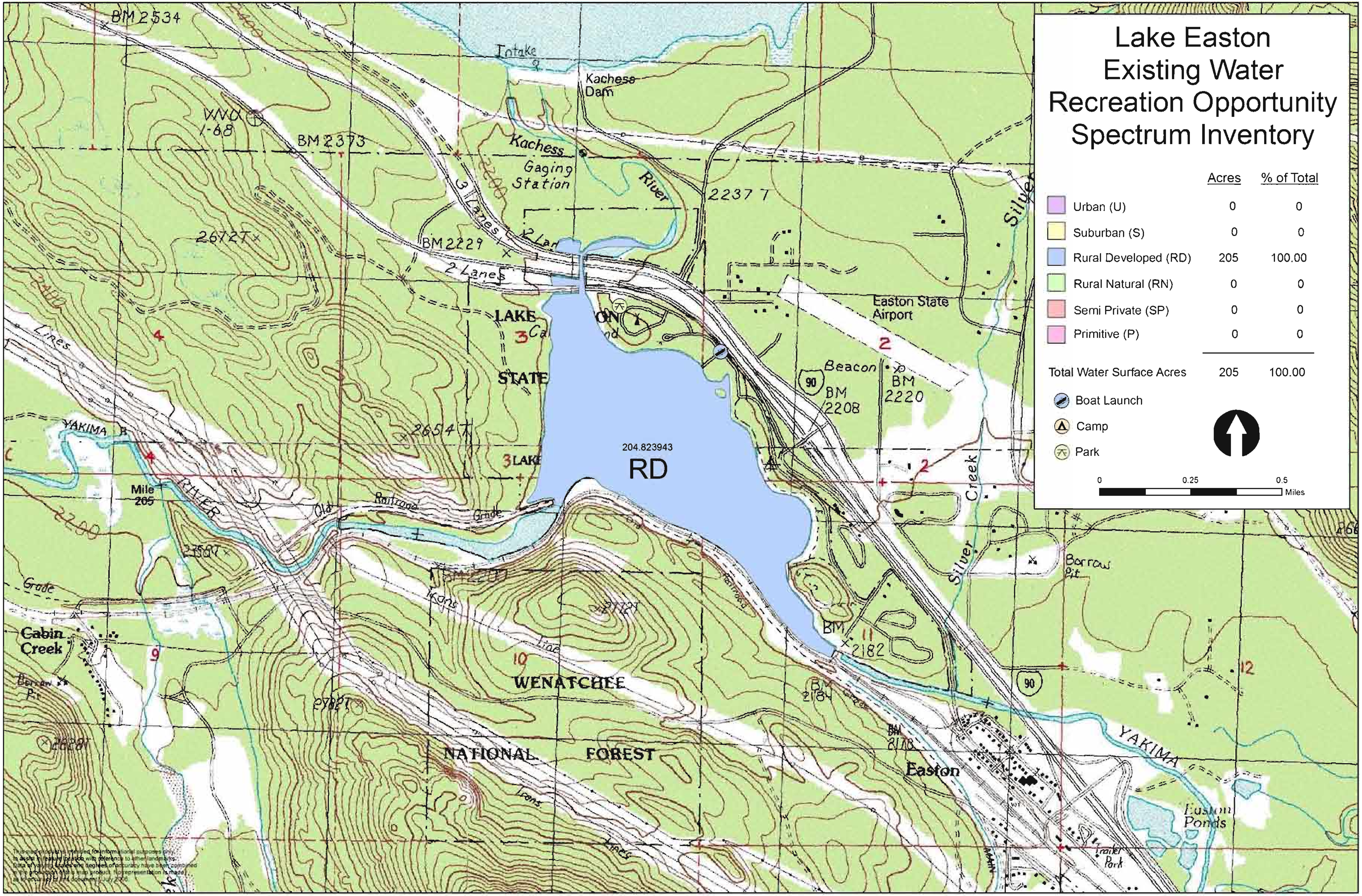
Camp

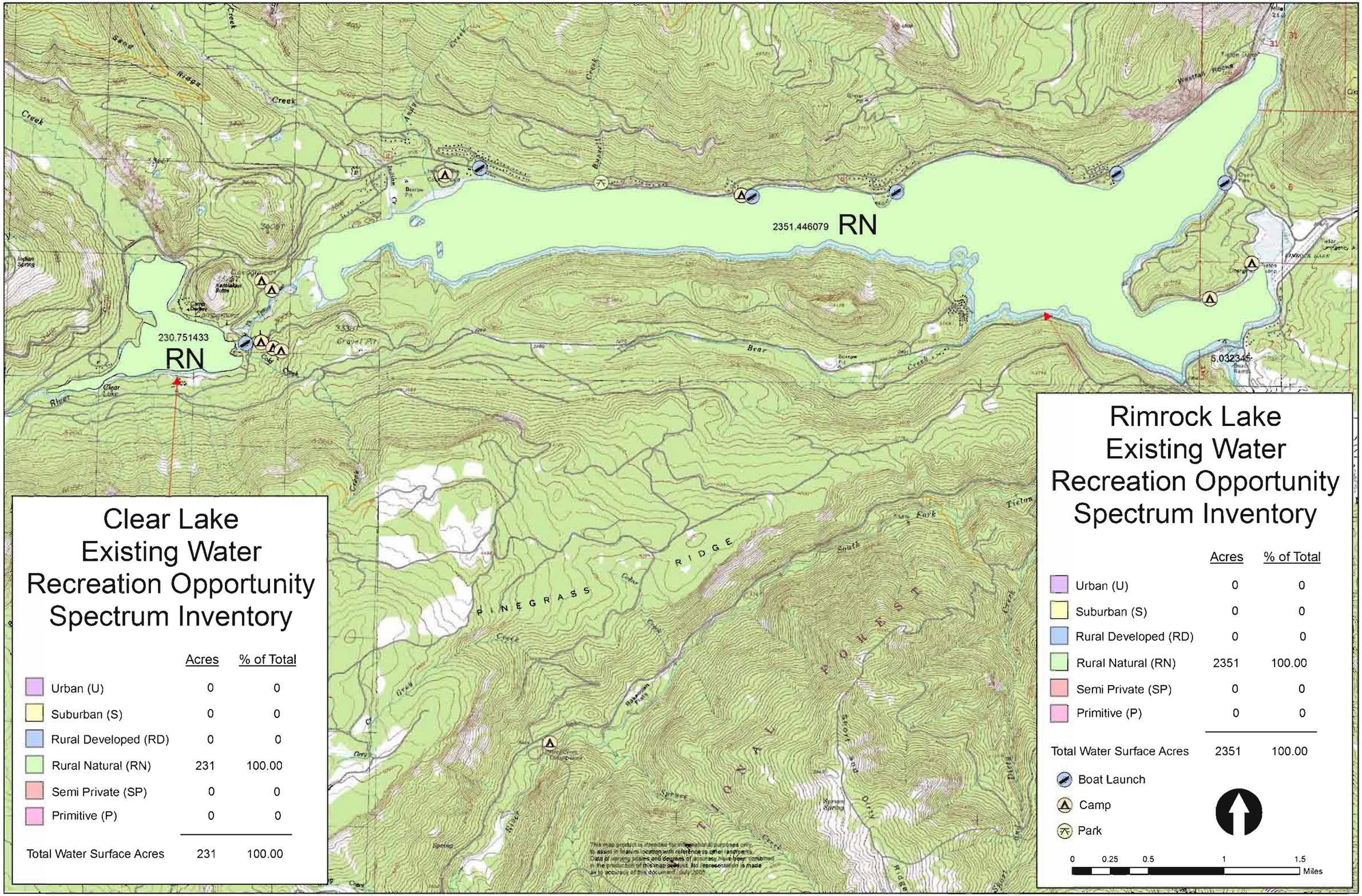
Park

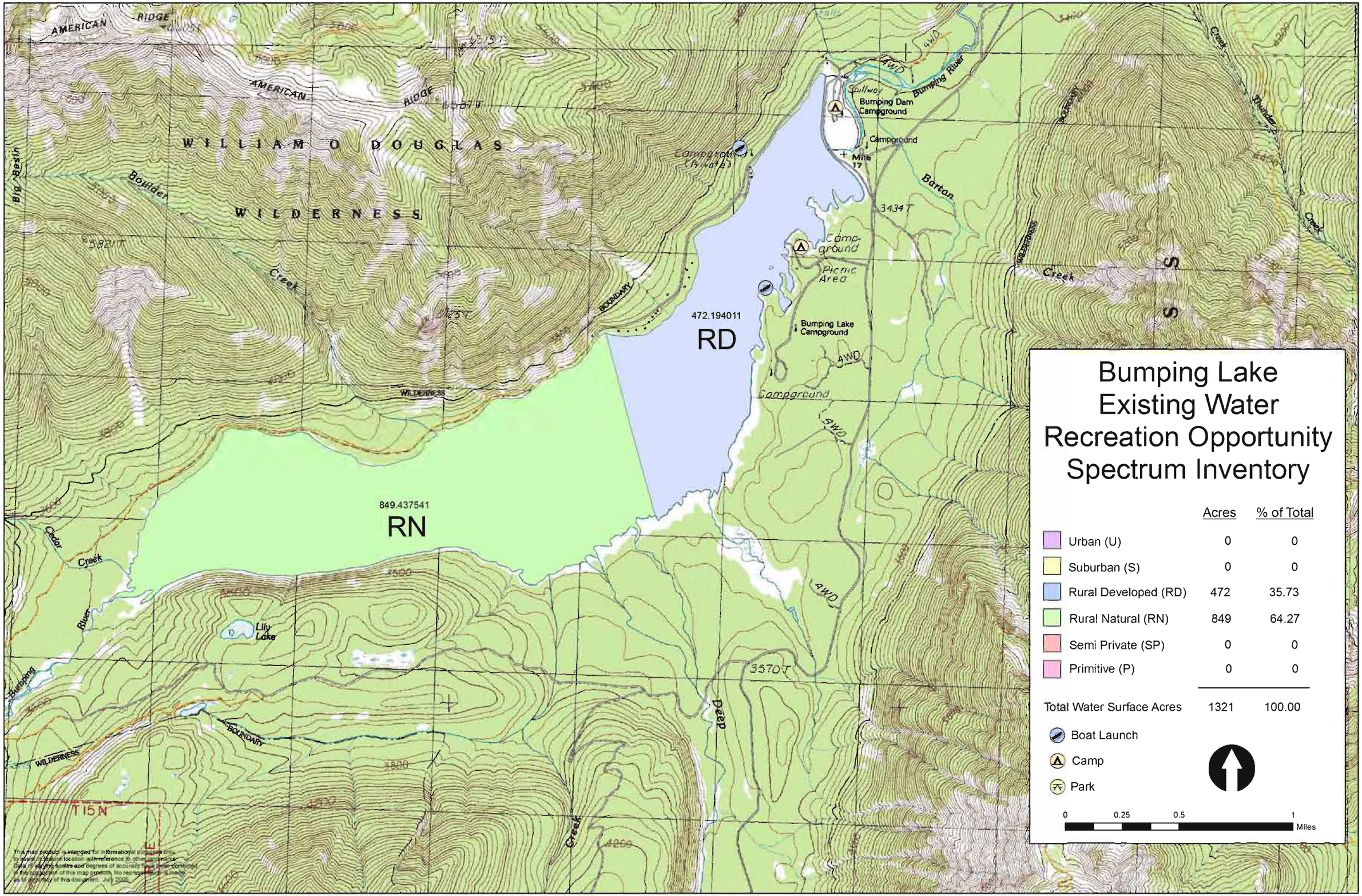
0 0.25 0.5 1 1.5 2 Miles

4477.684178

RD


Lake Easton
Existing Water
Recreation Opportunity
Spectrum Inventory
Acres % of Total
Urban (U) 0 0
Suburban (S) 0 0
Rural Developed (RD) 205 100.00
Rural Natural (RN) 0 0
Semi Private (SP) 0 0
Primitive (P) 0 0
Total Water Surface Acres 205 100.00
Boat Launch
Camp
Park
0 0.25 0.5
Miles
204.823943
RD
Kachess Dam
Intake
Kachess Gaging Station
Kachess River
Easton State Airport
Silver Creek
YAKIMA RIVER
WENATCHEE NATIONAL FOREST
Easton
Cabin Creek
Easton Ponds
Trailer Park
Borrow Pit
Old Railroad Grade
Mile 205
LAKE STATE


2351.446079
RN
230.751433
RN
5.032345
Clear Lake
Existing Water
Recreation Opportunity
Spectrum Inventory
Acres
% of Total
Urban (U) 0 0
Suburban (S) 0 0
Rural Developed (RD) 0 0
Rural Natural (RN) 231 100.00
Semi Private (SP) 0 0
Primitive (P) 0 0
Total Water Surface Acres 231 100.00
Rimrock Lake
Existing Water
Recreation Opportunity
Spectrum Inventory
Acres
% of Total
Urban (U) 0 0
Suburban (S) 0 0
Rural Developed (RD) 0 0
Rural Natural (RN) 2351 100.00
Semi Private (SP) 0 0
Primitive (P) 0 0
Total Water Surface Acres 2351 100.00
Boat Launch
Camp
Park
0 0.25 0.5 1 1.5
Miles
This map product is intended for informational purposes only, to assist in feature location with reference to other landmarks. Data of varying scales and degrees of accuracy have been combined in the production of this map product. No representation is made as to accuracy of this document. July 2005



Moses Lake Existing Water Recreation Opportunity Spectrum Inventory

	Acres	% of Total
Urban (U)	0	0
Suburban (S)	3417	50.78
Rural Developed (RD)	2551	37.92
Rural Natural (RN)	760	11.30
Semi Private (SP)	0	0
Primitive (P)	0	0
Total Water Surface Acres	6,728	100.00

Boat Launch
Camp
Park

0 0.25 0.5 1 1.5 2 2.5 3 3.5 Miles

759.981838
RN

906.615032
RD

3078.157662
S

S
338.685299

1644.415141
RD

This map product is intended for informational purposes only, to assist in feature location with reference to other landmarks. Data of varying scales and degrees of accuracy have been combined in the production of this map product. No representation is made as to accuracy of this document. July 2008.

Potholes Reservoir Existing Water Recreation Opportunity Spectrum Inventory

	Acres	% of Total
Urban (U)	0	0
Suburban (S)	0	0
Rural Developed (RD)	5220	36.55
Rural Natural (RN)	9062	63.45
Semi Private (SP)	0	0
Primitive (P)	0	0
Total Water Surface Acres	14,282	100.00

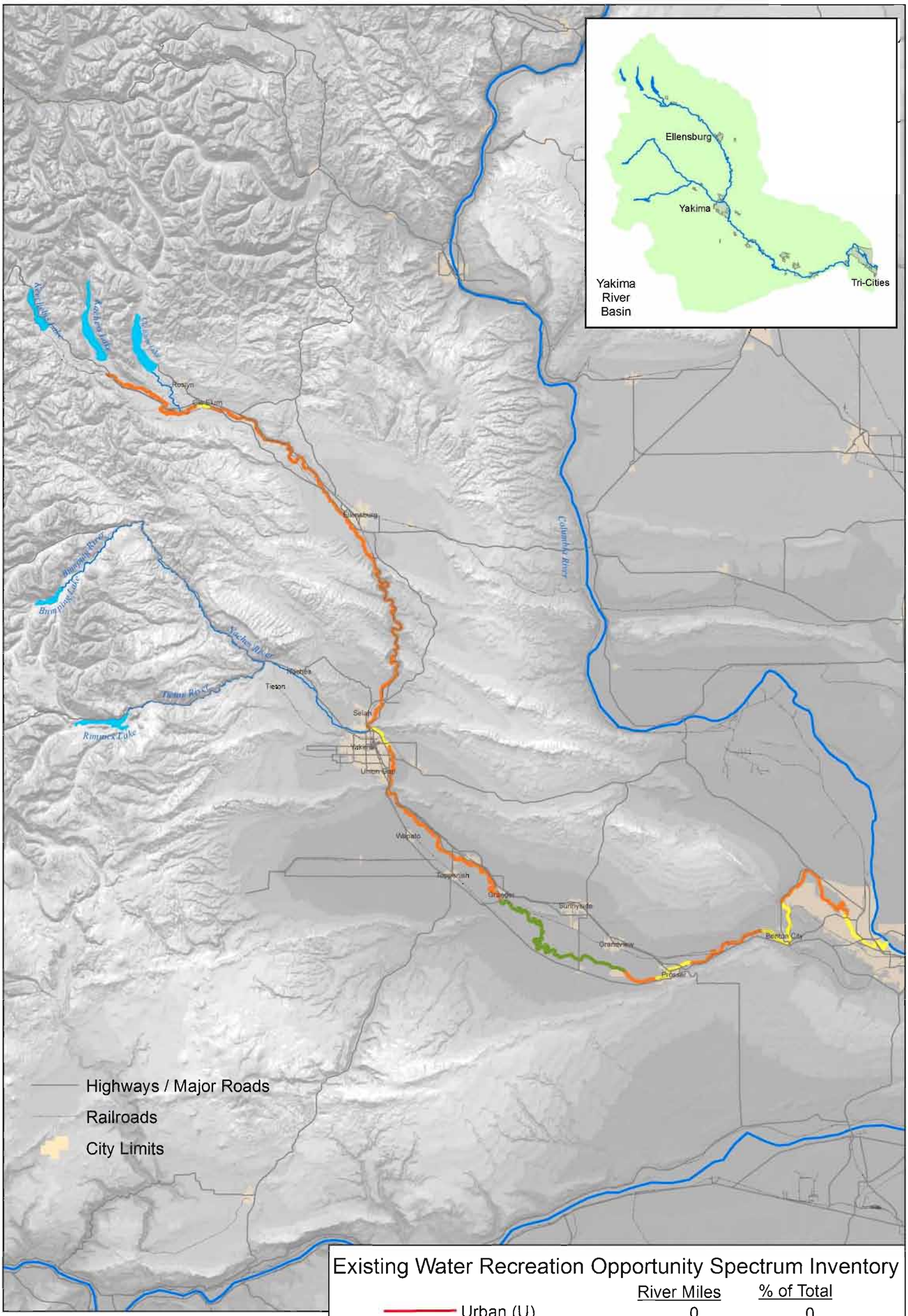
Boat Launch
Camp
Park

0 0.25 0.5 1 1.5 2 2.5 Miles

9061.515378
RN

5220.057107
RD

This map product is intended for informational purposes only, to assist in feature location with reference to other landmarks. Data of varying scales and degrees of accuracy have been combined in the production of this map product. No representation is made as to accuracy of this document. July 2005.

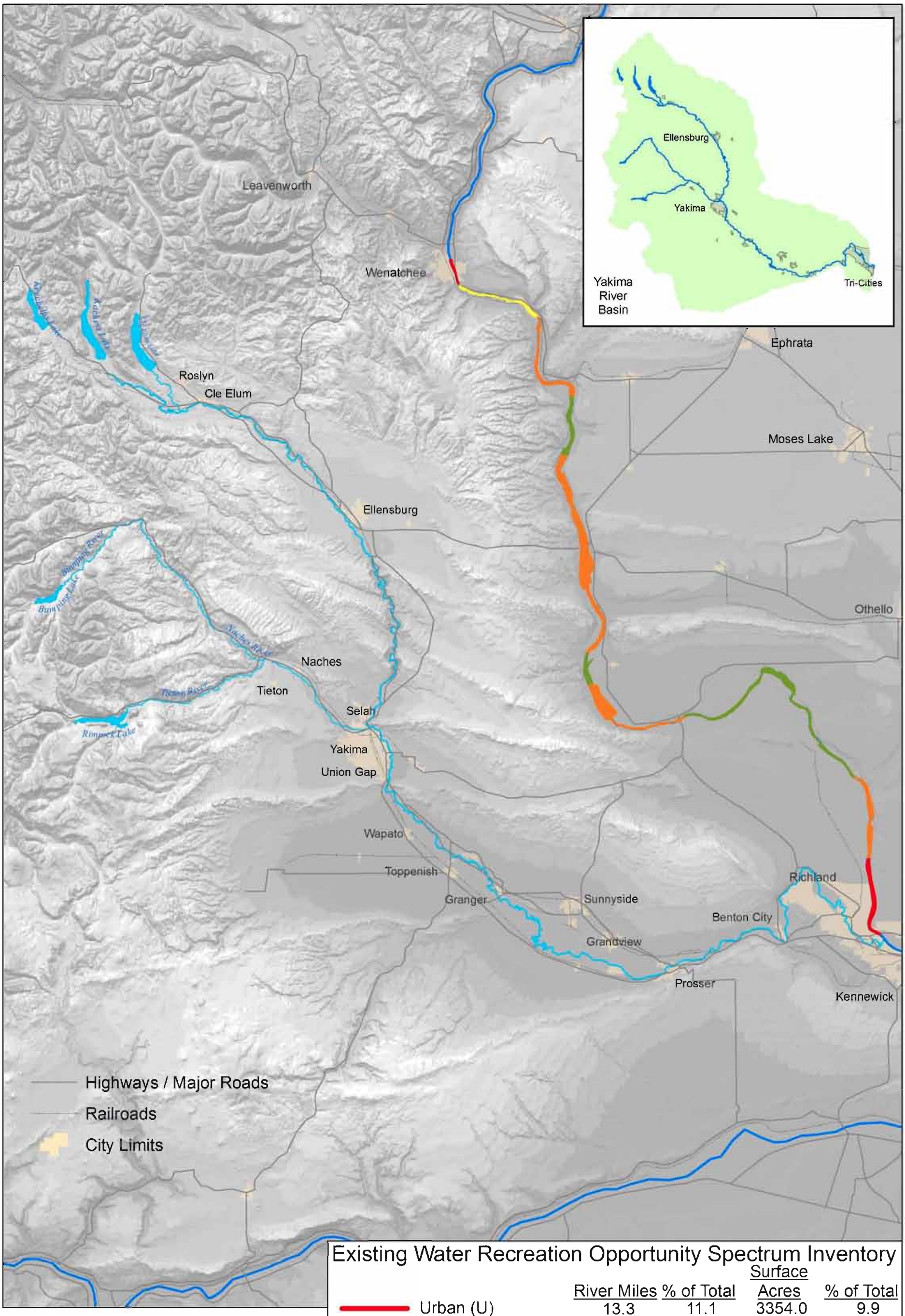


Yakima River

8 4 0 8 Miles

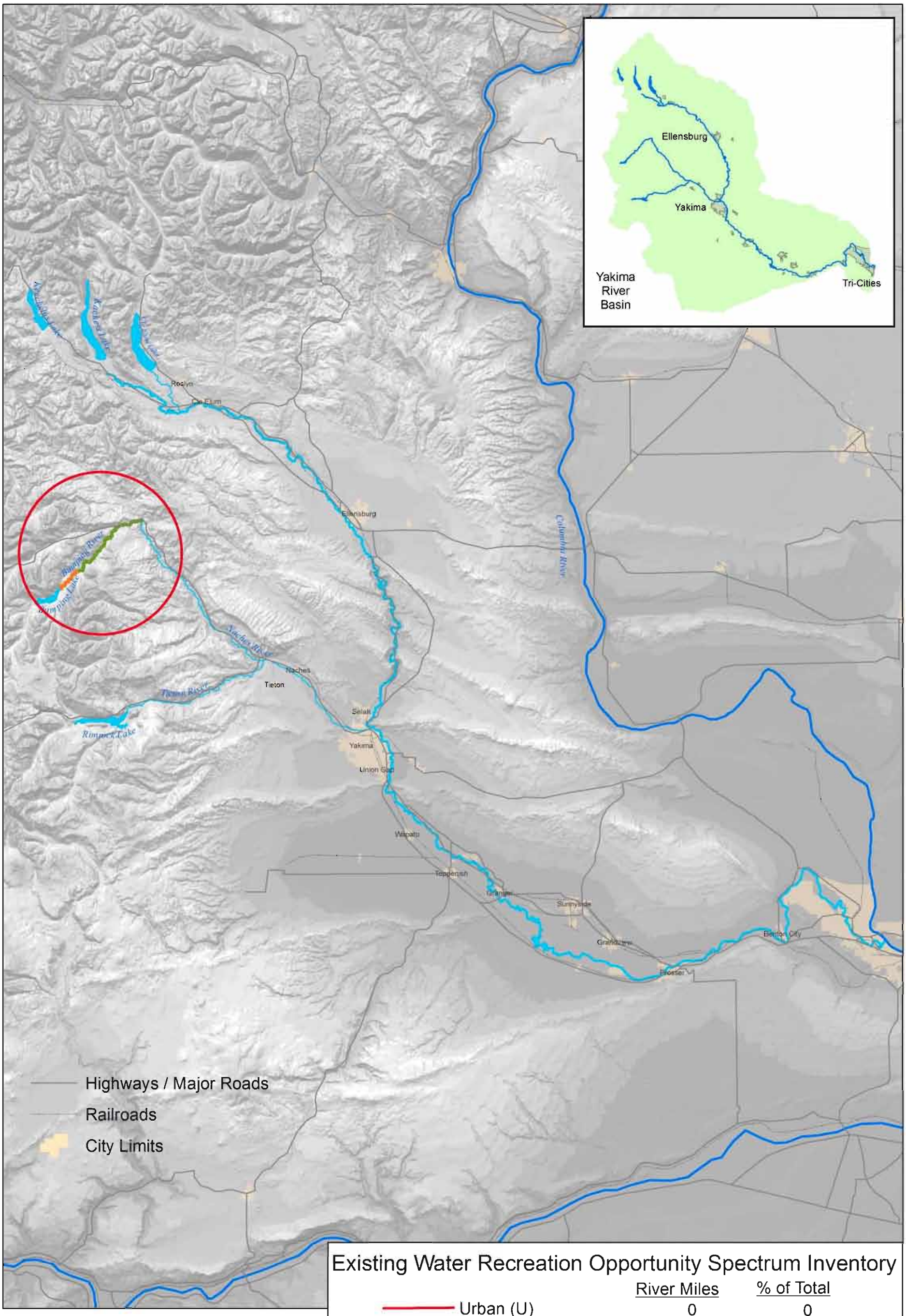
Existing Water Recreation Opportunity Spectrum Inventory

	River Miles	% of Total
Urban (U)	0	0
Suburban (S)	29.4	14.4
Rural Developed (RD)	143.9	70.7
Rural Natural (RN)	30.3	14.9
Semi Primitive (SP)	0	0
Primitive (P)	0	0
Total River Miles	203.6	100.0



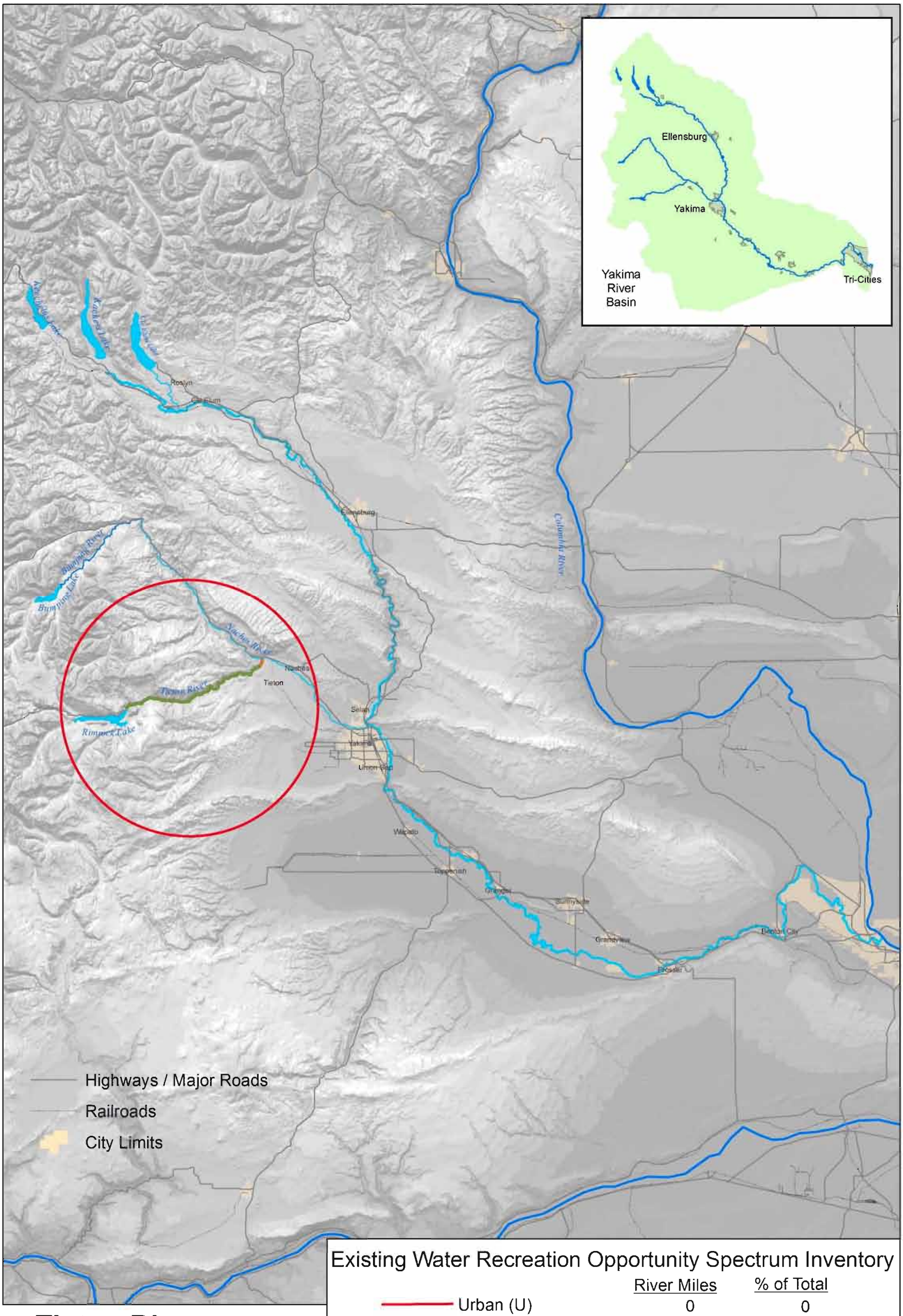
Existing Water Recreation Opportunity Spectrum Inventory

	River Miles	% of Total	Surface Acres	% of Total
Urban (U)	13.3	11.1	3354.0	9.9
Suburban (S)	10.5	8.8	1753.2	5.1
Rural Developed (RD)	53.9	45.0	18,544.8	54.5
Rural Natural (RN)	42.0	35.1	10,398.4	30.5
Semi Primitive (SP)	0	0	0	0
Primitive (P)	0	0	0	0
Totals	119.7	100.0	34,050.4	100.0



Existing Water Recreation Opportunity Spectrum Inventory

	River Miles	% of Total
Urban (U)	0	0
Suburban (S)	0	0
Rural Developed (RD)	3.4	21.3
Rural Natural (RN)	12.6	78.7
Semi Primitive (SP)	0	0
Primitive (P)	0	0
Total River Miles	16.0	100.0

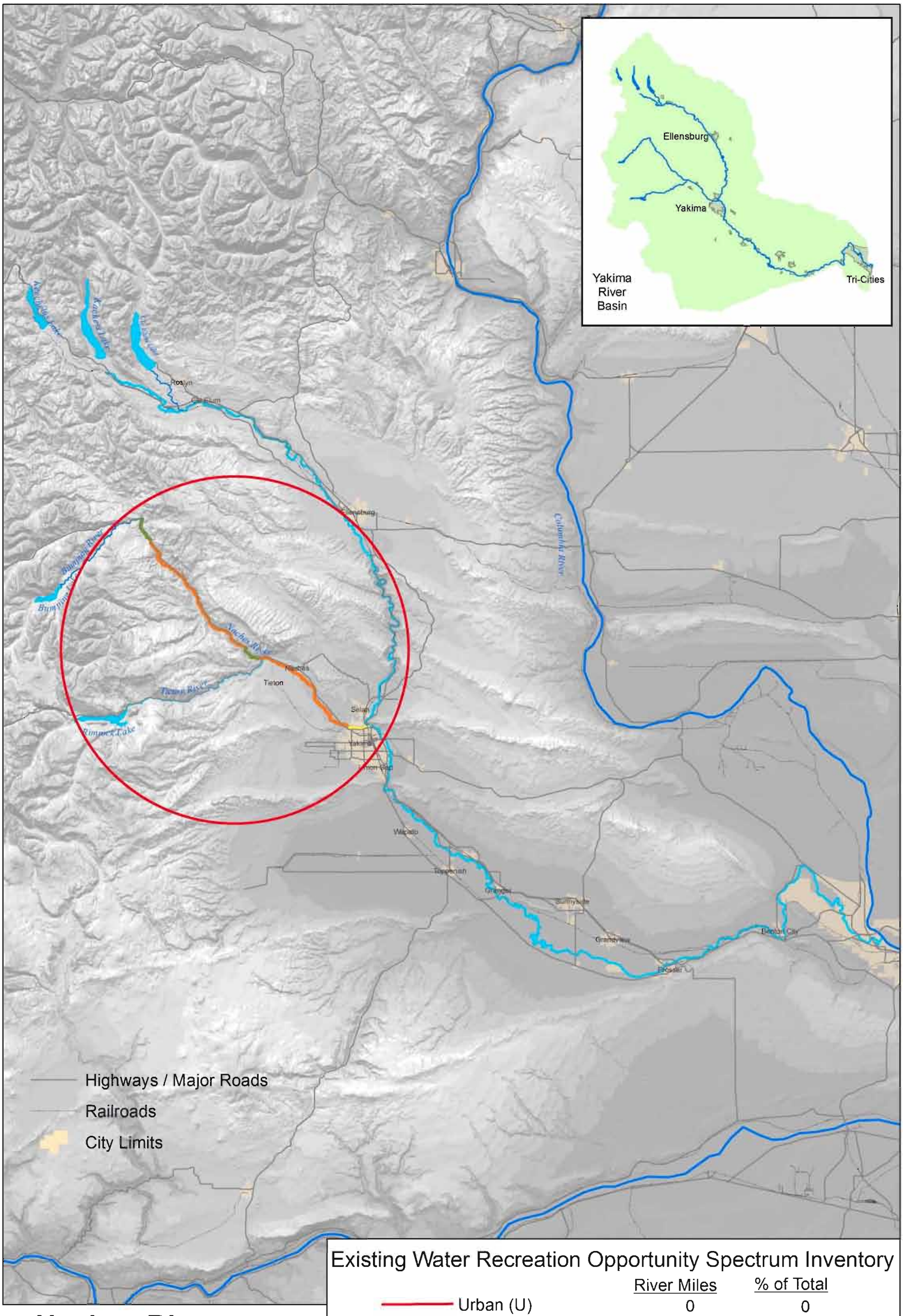


Tieton River

8 4 0 8 Miles

Existing Water Recreation Opportunity Spectrum Inventory

	River Miles	% of Total
Urban (U)	0	0
Suburban (S)	0	0
Rural Developed (RD)	1.1	5.2
Rural Natural (RN)	20.0	94.8
Semi Primitive (SP)	0	0
Primitive (P)	0	0
Total River Miles	21.1	100.0

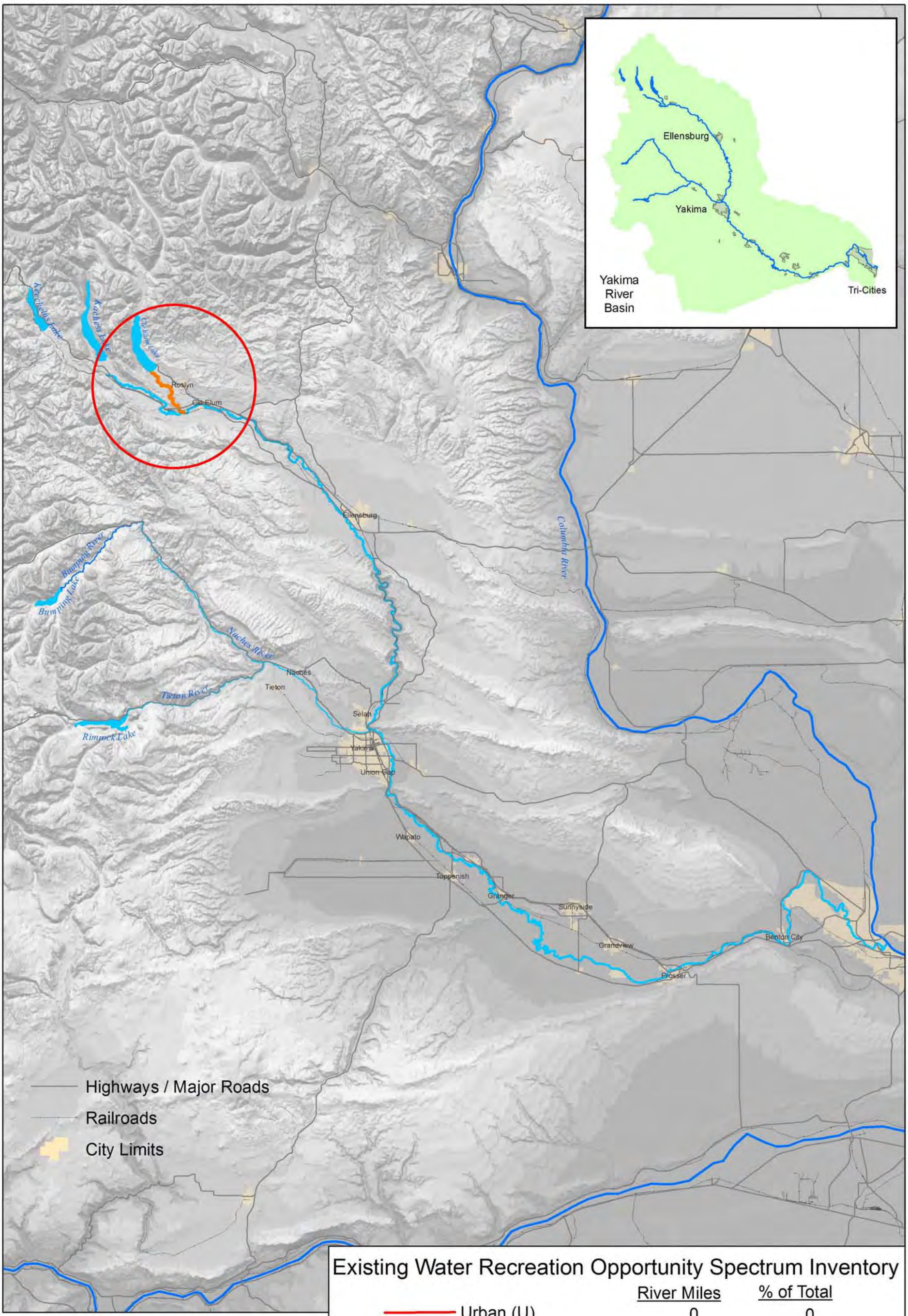


Naches River

8 4 0 8 Miles

Existing Water Recreation Opportunity Spectrum Inventory

	River Miles	% of Total
Urban (U)	0	0
Suburban (S)	2.9	6.5
Rural Developed (RD)	35.8	80.1
Rural Natural (RN)	6.0	13.4
Semi Primitive (SP)	0	0
Primitive (P)	0	0
Total River Miles	44.7	100.0



Cle Elum River

8 4 0 8 Miles

Existing Water Recreation Opportunity Spectrum Inventory

	River Miles	% of Total
Urban (U)	0	0
Suburban (S)	0	0
Rural Developed (RD)	8.1	100
Rural Natural (RN)	0	0
Semi Primitive (SP)	0	0
Primitive (P)	0	0
Total River Miles	8.1	100.0