

# 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.

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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.

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# Recreation Demand and User Preference Analysis

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

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Bureau of Reclamation  
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# 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.<sup>1</sup> 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 21<sup>st</sup> 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.<sup>2</sup>

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<sup>1</sup> National Recreation Lakes Study Commission, June 1999.

<sup>2</sup> *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.<sup>3,4</sup>

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.<sup>5</sup>

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

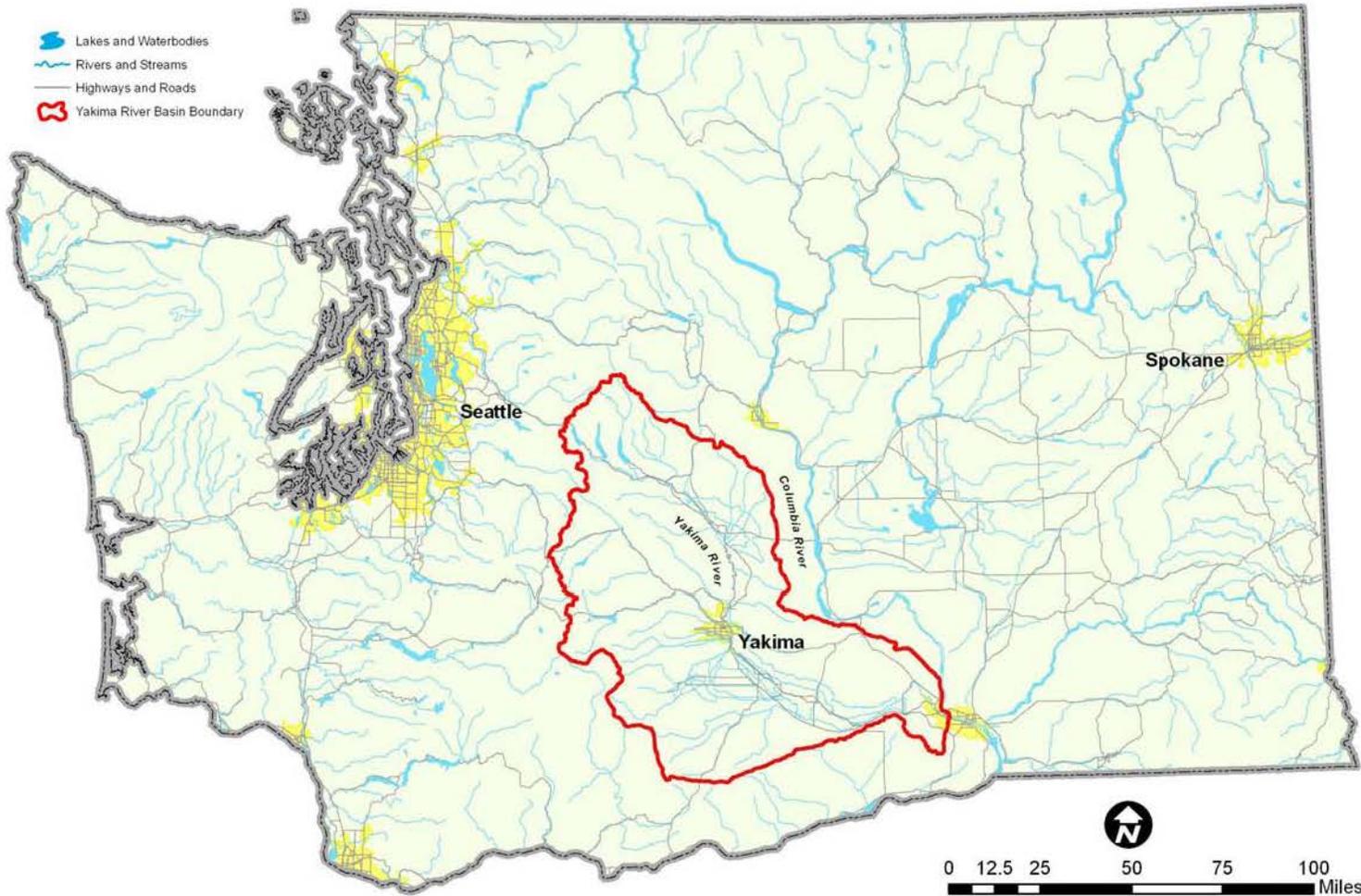
Feasibility studies are detailed investigations specifically authorized by law to determine the desirability of seeking congressional authorization for implementation of a preferred alternative. Feasibility studies include additional

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<sup>3</sup> National Recreation Lakes Study Commission, 1999.

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

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



Yakima River Basin Location

Figure 1

This reference graphic is intended for informational purposes only. It is meant to assist in feature location relative to other landmarks. Geographic features may have been intentionally simplified in an attempt to provide a more readable product. No representation is made as to the accuracy of this document.

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.

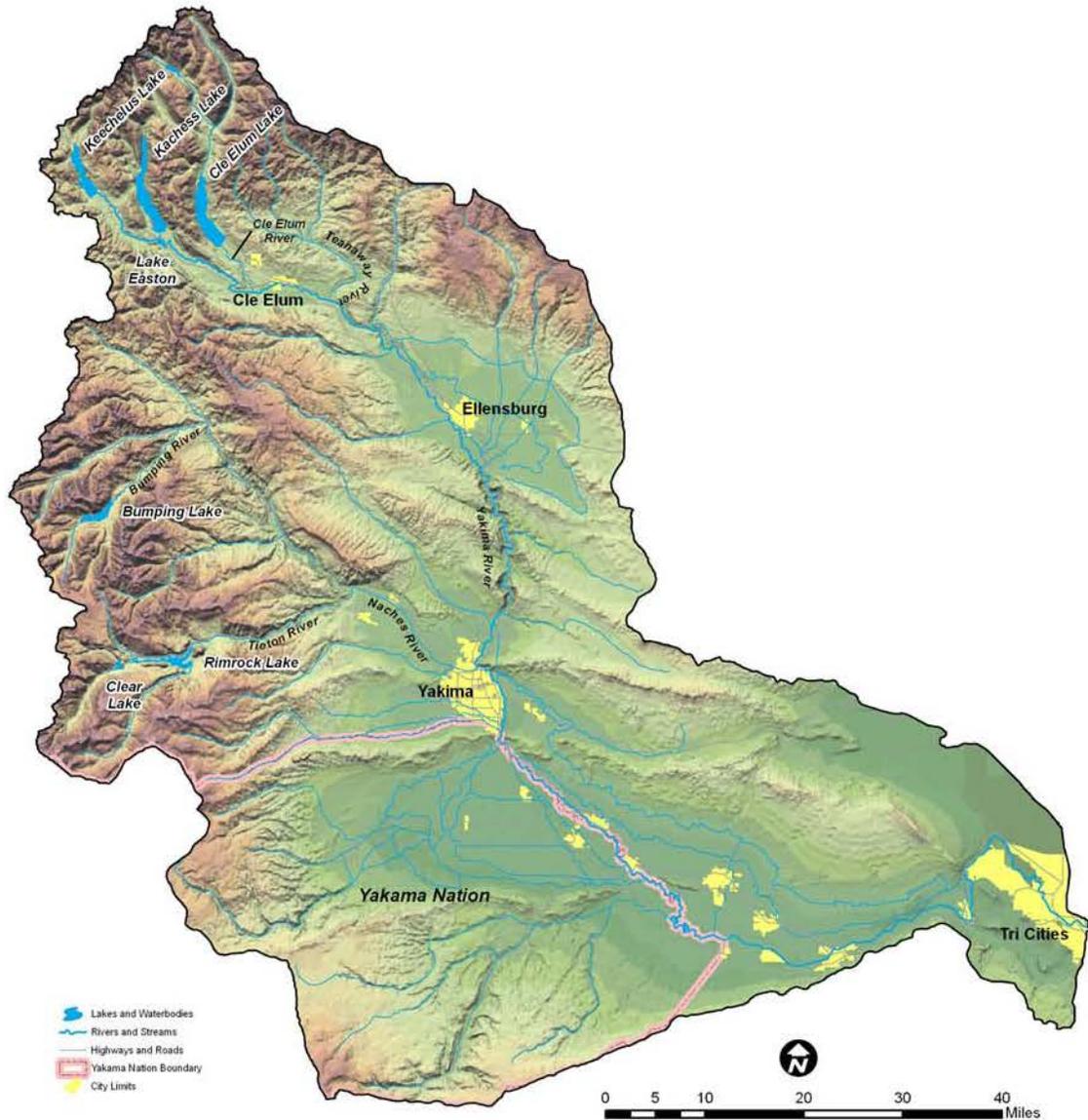
- Complete a WROS inventory of flat water reservoir and river comparables outside the Yakima River basin area to get a more accurate picture of the supply of recreational opportunities in the area and to help assess the demand for certain types of recreational opportunities within the basin.
- Develop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



This reference graphic is intended for informational purposes only. It is meant to assist in feature location relative to other landmarks. Geographic features may have been intentionally simplified in an attempt to provide a more readable product. No representation is made as to the accuracy of this document.

### 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.

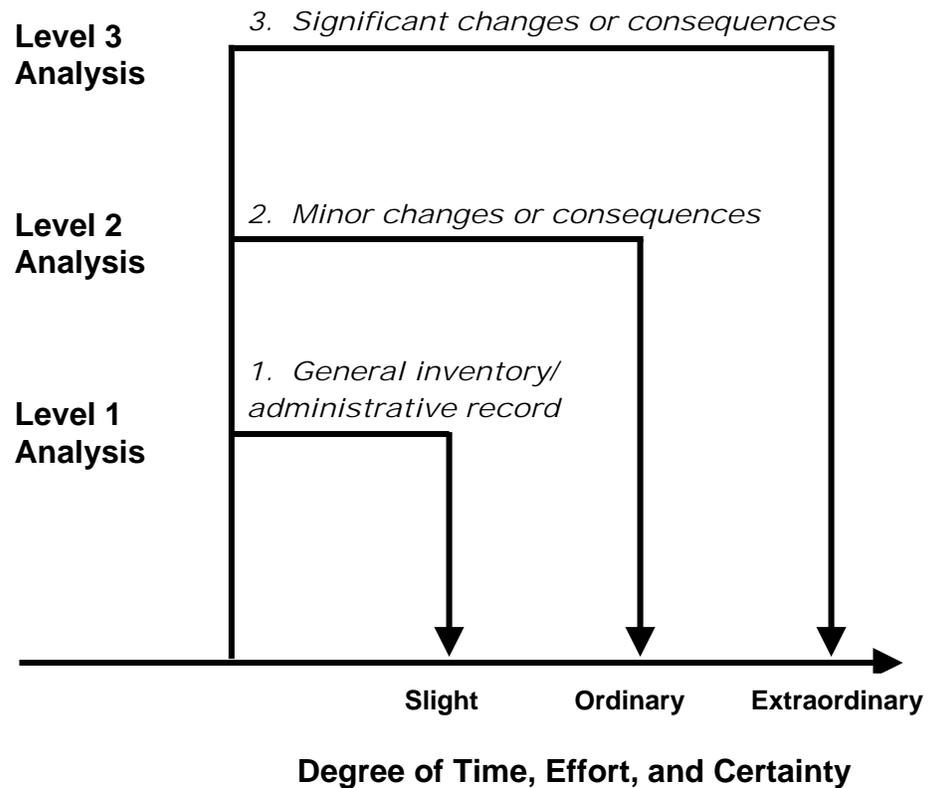


Figure 3.—Sliding scale of analysis.

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).

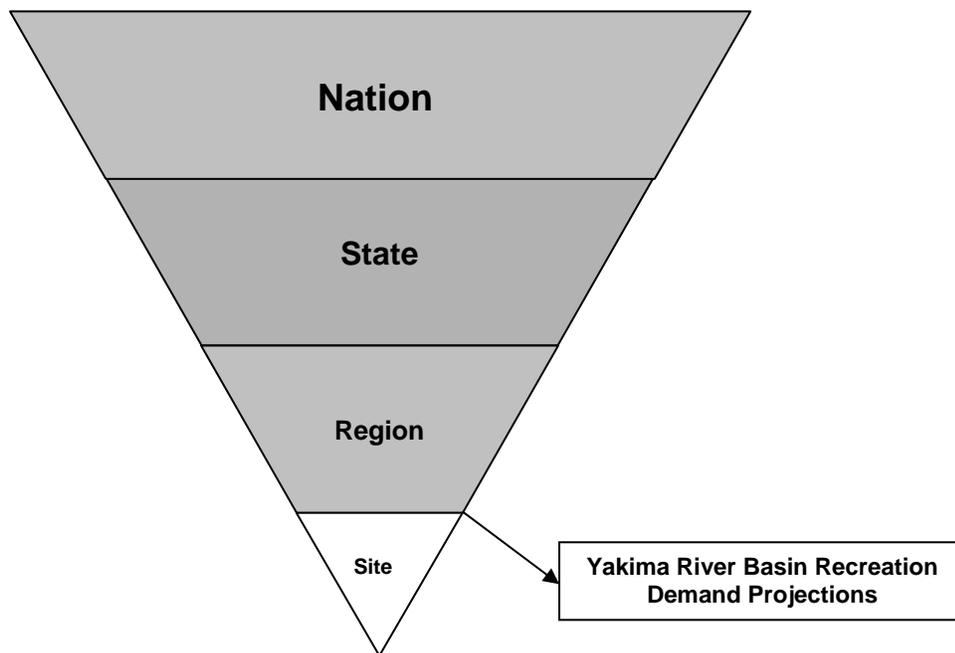


Figure 4.—A regional scale of focus.

## 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](http://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.<sup>6</sup>

## **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

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<sup>6</sup> [www.access.wa.gov](http://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.

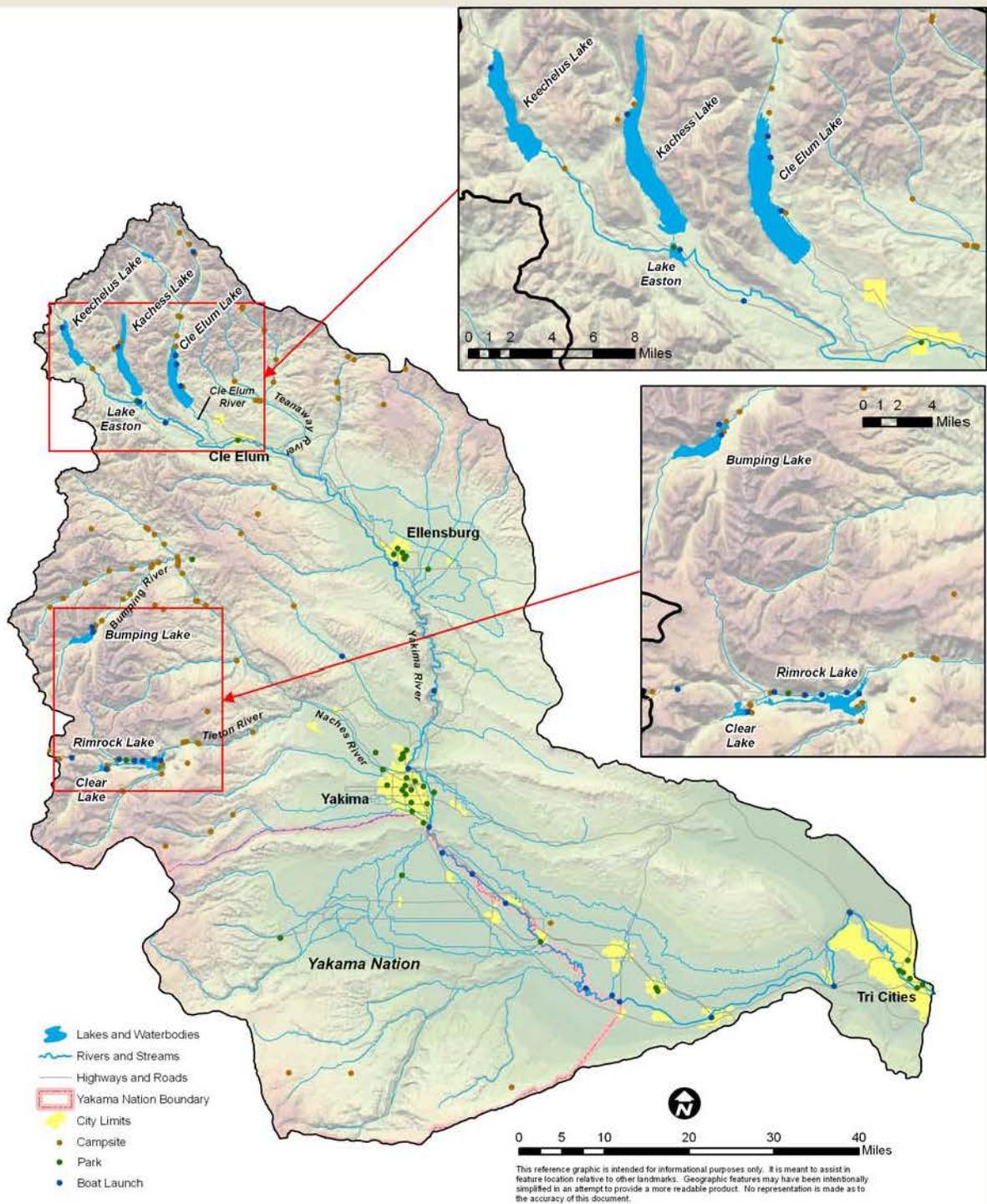
Sunnyside, Prosser, Roza, and Easton Diversion Dams on the Yakima River have recreation associated with their impoundments. Sunnyside is limited to sightseeing and fishing. Prosser and Roza diversions both provide excellent fisheries, and Roza also has boat launching facilities.

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.<sup>7</sup>

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.

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<sup>7</sup> <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 13<sup>th</sup> and 14<sup>th</sup>, 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).<sup>8</sup>
- 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.<sup>9</sup>
- 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.<sup>10</sup>
- 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).

<sup>8</sup> U.S. Census Bureau.

<sup>9</sup> Hall and Kruger, 1994.

<sup>10</sup> 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. This may be the most dramatic characteristic of change in Yakima's future (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**

<b>Type of Activity</b>	<b>Whites Not of Hispanic Origin</b>	<b>Hispanics of Mexican Origin</b>	<b>Hispanics Not of Mexican Origin</b>
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.”<sup>11</sup>
- 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

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<sup>11</sup> 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.<sup>12</sup>
- 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

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<sup>12</sup> 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.<sup>13</sup> 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<sup>14</sup> 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

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<sup>13</sup> Tarrant, Michael A. et al., 1999, as cited in U.S. Department of Agriculture (USDA), 2003.

<sup>14</sup> 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.<sup>15</sup>

- *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.<sup>16</sup>

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.

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<sup>15</sup> National Survey of Fishing, Hunting, and Wildlife Associated Recreation, 2001.

<sup>16</sup> 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).<sup>17</sup> 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

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<sup>18</sup> 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.<sup>18</sup>

## **Private**

Nearly 60 percent of the land in the United States is privately owned.<sup>19</sup> 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

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<sup>18</sup> Betz, Carter J. et al., 1999, as cited in USDA, 2003.

<sup>19</sup> Teasley, 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.<sup>20</sup>

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

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<sup>20</sup> 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
<b>Participated in any type of activity</b>	<b>97.5</b>	<b>202.1</b>
Trail/street/road activities	88.8	184.1
Traditional social activities	81.6	169.2
Viewing and photographing activities <sup>1</sup>	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

<sup>1</sup> 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
<b>Trail/street/road activities</b>		
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
<b>Team sport activities</b>		
Softball, soccer, baseball, etc	22.5	46.6
<b>Backpacking and camping activities</b>		
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
<b>Viewing and learning activities</b>		
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
<b>Viewing and photographing activities</b>		
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
<b>Hunting</b>		
Big game	7.7	15.9
Small game	7.4	15.3
Waterfowl	2.3	4.8
<b>Driving for pleasure and sightseeing</b>		
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
<b>Traditional social activities</b>		
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**

<b>Activity</b>	<b>Percent of Population 16 and Older</b>	<b>Number in Millions</b>
<b>Boating/floating/sailing</b>		
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
<b>Fishing</b>		
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
<b>Swimming</b>		
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**

<b>Resource Base Activity</b>	<b>1994–95 Participants (in Millions)</b>	<b>2000–02 Participants (in Millions)</b>	<b>Percent Change 1995–2002</b>
<b>Land Resource Based Activities</b>			
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
<b>Water Resource Based Activities</b>			
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 21<sup>st</sup> 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**

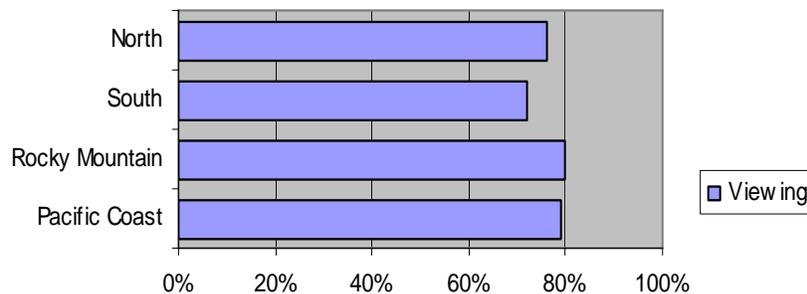
<b>Type of Activity</b>	<b>Percent Participating</b>	<b>Participants (Millions)</b>
Viewing/photographing natural scenery	70.6	151.2
Visiting nature centers, etc.	63.5	135.9
Driving for pleasure	61.2	130.9
Viewing/photographing other wildlife	58.2	124.6
Viewing/photographing wildflowers, trees, etc.	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.<sup>21</sup>

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.

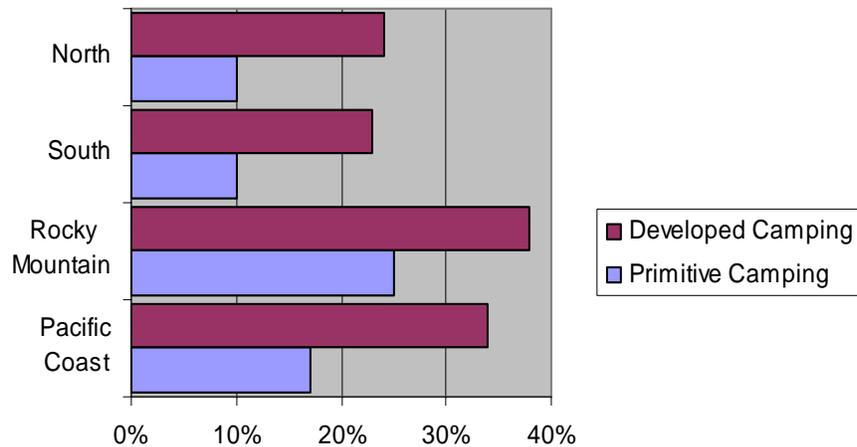


Source: USDA Forest Service RPA Assessment 2000.

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.

<sup>21</sup> 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.<sup>22</sup>

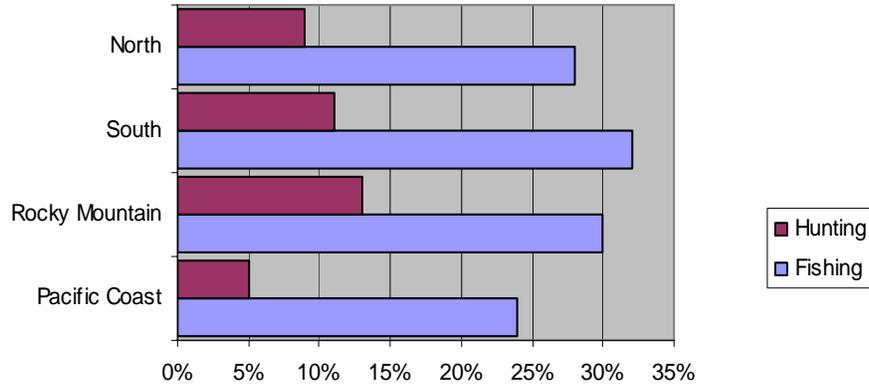
Regional participation levels for fishing range from 24 percent in the Pacific Coast to 32 percent in the South. Figure 8 shows the percent of participation in hunting and fishing by regions within the United States. In 2001, 212 million people 16 years or older lived in the United States. The national 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.<sup>23</sup>

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

<sup>22</sup> Service, *National Survey of Fishing, Hunting and Wildlife-Associated Recreation*, 2001.

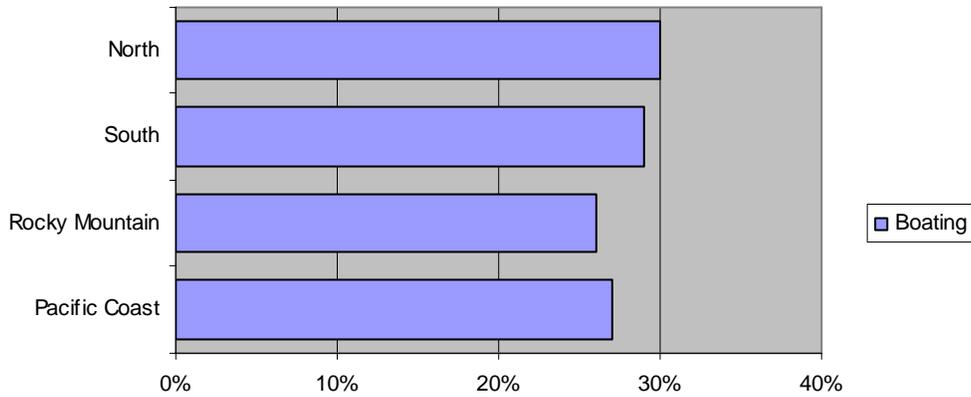
<sup>23</sup> Ibid.



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.

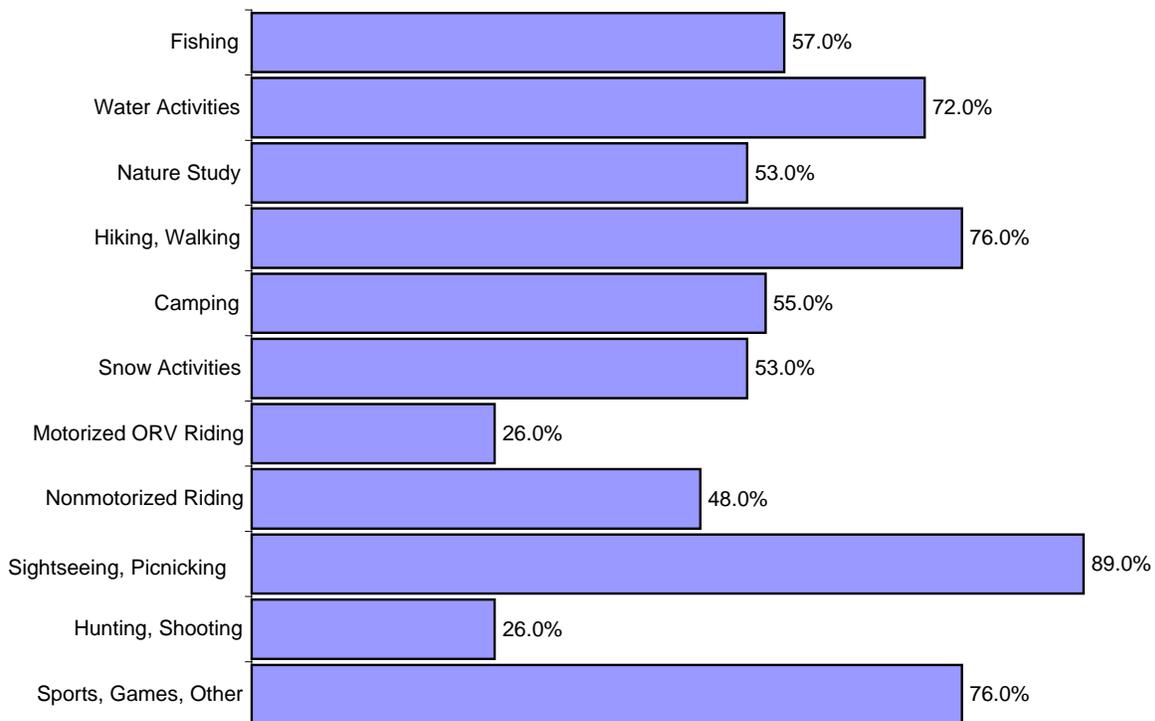
### Washington State Participation Levels

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.

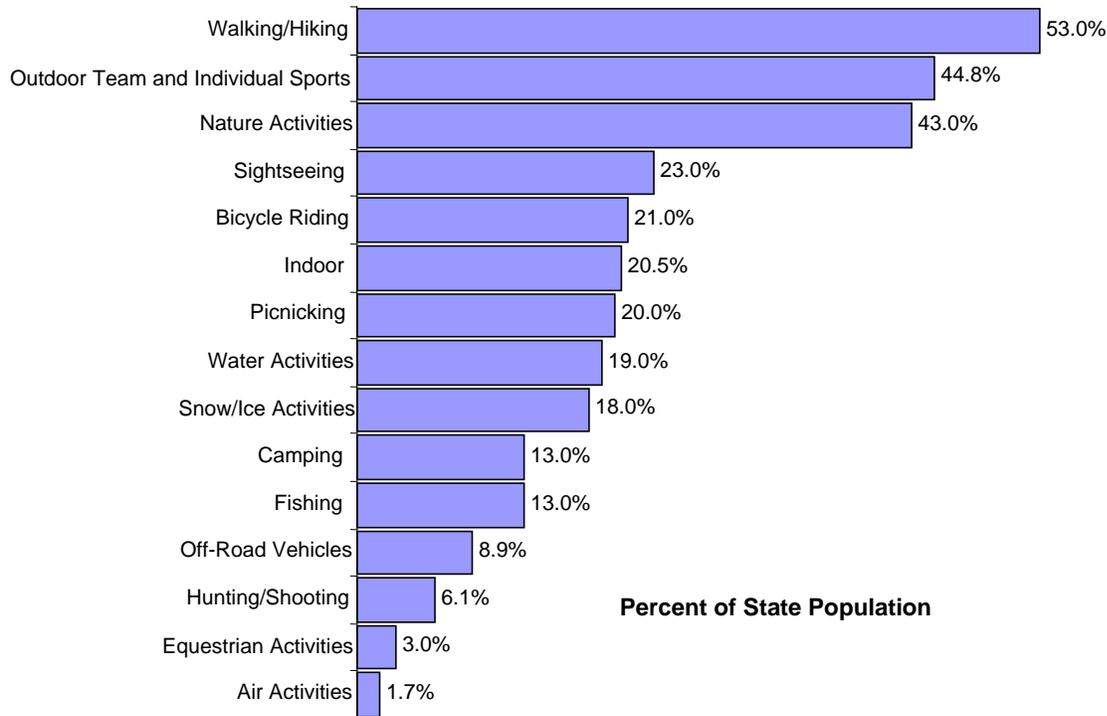
IAC identified 11 generalized recreation activity categories to determine participation levels of State households surveyed. The most popular activity categories were sightseeing/picnicking, hiking/walking, sports/games/other, and water activities. Refer to figure 10 for participation levels for the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



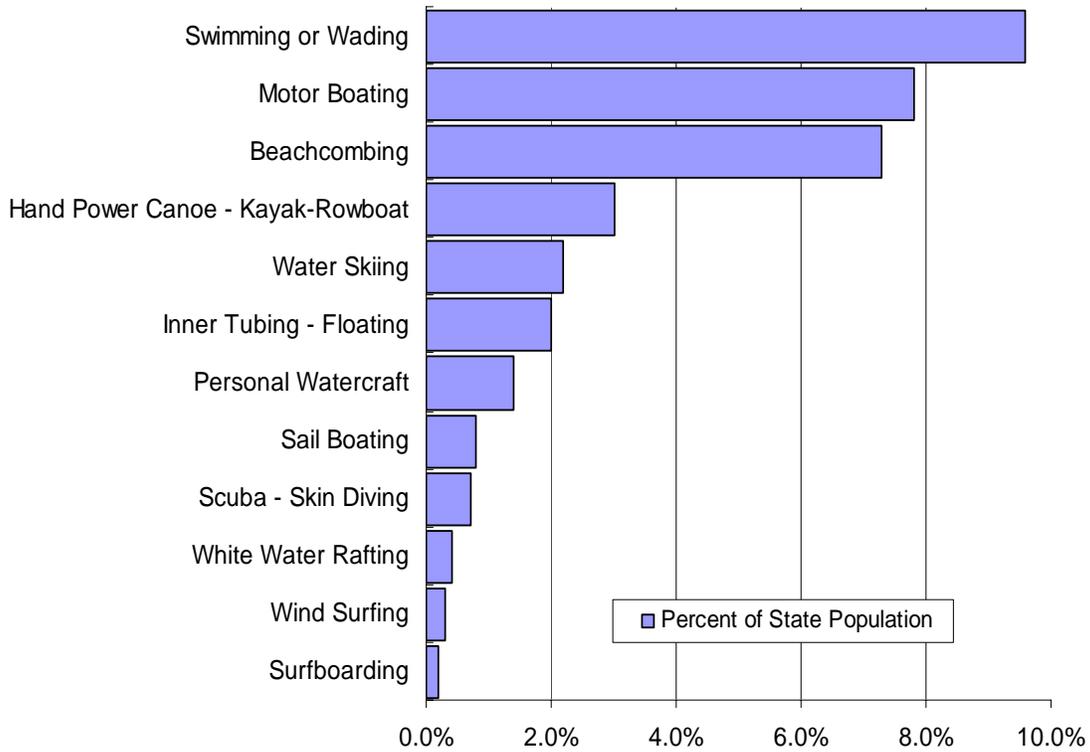
Source: Interagency Committee for Outdoor Recreation, *Estimates of Future Participation in Outdoor Recreation in Washington State*, March 2003, Addendum to the State Comprehensive Outdoor Recreation Plan

**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.

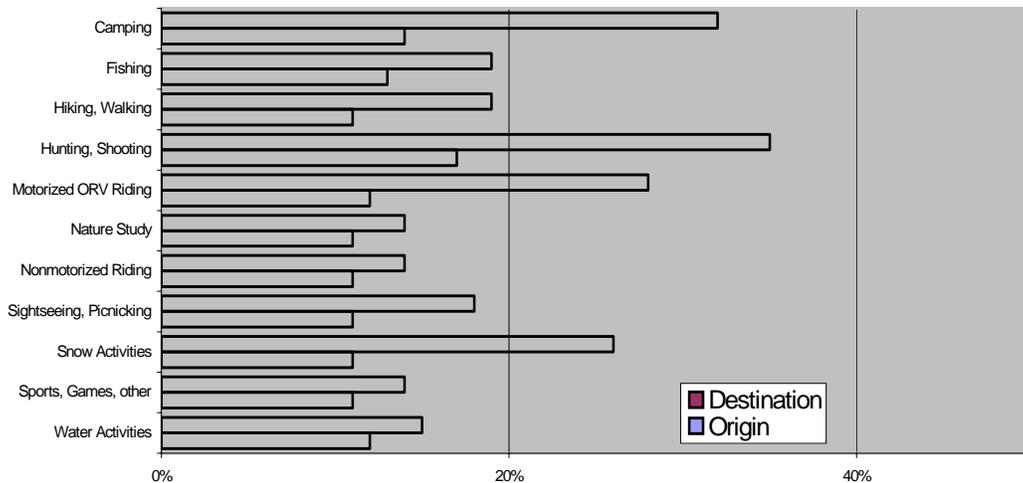
Fishing the Naches River is not as good as fishing in the Yakima River, and there is very little rafting. The lands adjacent to the river are privately owned, which limits access and put in and take out sites along the river corridor.

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 to 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](http://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
<b>LAKES</b>	<b>Water surface acres by WROS Class</b>					
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%)		
<b>RIVERS</b>	<b>River miles by WROS Class</b>					
Yakima River		29 miles	144 miles	30 miles		
Columbia River <sup>1</sup>	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%)		

<sup>1</sup> 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<sup>24</sup> 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.

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<sup>24</sup> 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,<sup>25</sup> social,<sup>26</sup> environmental,<sup>27</sup> and facility<sup>28</sup> 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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<sup>25</sup> Physical carrying capacity can be described as the area that is available to a recreation user for participating in a specific recreation activity.

<sup>26</sup> 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.

<sup>27</sup> 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.

<sup>28</sup> 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 (Pfister 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
<b>Nearness to Home</b>	
Not important	12.9
Moderately important	48.9
Very to extremely important	38.2
<b>Good Roads and Parking at the Area</b>	
Not important	6.3
Moderately important	37.9
Very to extremely important	55.7
<b>Cleanliness of Restrooms, Facilities, and Grounds at the Area</b>	
Not important	1.6
Moderately important	21.3
Very to extremely important	77.2
<b>Helpfulness of Area Employees</b>	
Not important	5.6
Moderately important	39.1
Very to extremely important	55.3
<b>Safety and Security at the Area</b>	
Not important	3.1
Moderately important	22.1
Very to extremely important	74.7
<b>Quality of Scenery at the Recreation Area</b>	
Not important	1.1
Moderately important	22.3
Very to extremely important	76.6
<b>Reasonable Fees for Use of the Area</b>	
Not important	3.5
Moderately important	32.4
Very to extremely important	64.1
<b>Map, Informational Signs, and Bulletin Boards at the Area</b>	
Not important	5.6
Moderately important	40.5
Very to extremely important	53.9
<b>Opportunity to Bring Pets into the Area</b>	
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<sup>1</sup>**

<b>Key Activities in the Yakima River basin</b>	<b>Low-Range Estimate of the Percentage Change in Participation over 20 years</b>	<b>High-Range Estimate of the Percentage Change in Participation over 20 years</b>
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%

<sup>1</sup> 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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