

# Attachment 2

Water Recreation Opportunity Spectrum

WROS

(Draft)

**Water Recreation Opportunity Spectrum  
(WROS)  
Draft  
Guidebook**

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## **Preface**

### **Water Recreation Opportunity Spectrum (WROS) Guidebook**

**The U.S. Department of the Interior, Bureau of Reclamation, Office of Policy has funded and contracted with Dr. Robert Aukerman and Dr. Glenn Haas at Colorado State University, through Aukerman and Associates LLC, to develop the Water Recreation Opportunity Spectrum (WROS). The WROS is an inventory, planning, and management tool.**

**This guidebook is intended to help recreation and resource professionals make better decisions about the planning, allocation, and management of water recreation opportunities associated with lakes, reservoirs, rivers, bays, estuaries, coastal zones, and marine protected areas.**

**The Water Recreation Opportunity Spectrum system is built on the premise of change and adaptation; that is, WROS is a dynamic system that will adapt with change in (a) public recreation demand and values, (b) best available science, (c) social and economic values and circumstances, and (d) professional experience and knowledge gained from applying this system over time. Thus, this WROS guidebook should be considered a learning document that will improve with application and testing.**

**The WROS system has been developed for the conservation of water recreation diversity on Reclamation projects. Yet, perhaps of even greater value is that WROS can help facilitate interagency communication and collaboration at the community and regional levels involving local, state, and federal agencies, the private and non-profit sectors, as well as the international community.**

## Table of Contents

### 1. Introduction

#### **The Foundation of the WROS System**

The average visitor does not exist  
Don't try to be all things to all people  
Managers provide recreation opportunities  
Provide a seamless system of water recreation opportunities

#### **An Overview to the WROS System**

The goal of WROS  
The components of WROS  
The multiple purposes of WROS

#### **Design Criteria Used in Developing the WROS System**

#### **The Standard for WROS Decision Making**

Sound professional judgment  
Preponderance of the evidence  
Rule of reasonableness  
Sliding scale of analysis  
Scale of degree or extent

#### **Frequently Asked Questions**

Will WROS help make better decisions?  
Will WROS constrain reservoir operations?  
How does reservoir drawdown effect WROS?  
Will WROS change by season?  
How does WROS protect important natural and cultural resources?  
Can the public understand WROS?  
How does WROS relate to tourism?  
How can recreationists and tourists use WROS?  
Does WROS give managers flexibility?  
Can the WROS classification be divided in sub-classes or zones?  
How does WROS deal with an exception or unique field situation?  
Does WROS require a special planning process?  
Can WROS help make day-to-day management decisions?  
How does WROS help justify budgets and personnel?  
What if conditions are not consistent with guidelines and  
How does WROS interface with site-level planning?  
How does WROS blend with ROS?

How does WROS interface with ROS in dealing with streams and rivers?

### **Glossary of Key Terms**

2. **Parts of the WROS System**
3. **WROS Inventory: Mapping the Supply of Recreation Opportunities**

Defining the Scope  
Mapping the Supply of Recreation Opportunities  
Assignment of Current WROS Classes  
Inconsistency Analysis

4. **WROS Planning: Integrating WROS into a Planning Process**

Identification of Issues, Concerns, Opportunities, and Constraints  
Development of Planning Criteria  
Inventory Data and Information Collection  
Formulation of Alternatives  
Evaluation of Alternatives  
Implementation and Monitoring of RMP

5. **WROS Management: Guidelines and Standards**

### **Appendices (NOT INCLUDED AT THIS TIME)**

- F. Water Recreation Benefits
- G. Reclamation's Chapter 3: Planning Process from the RMP Guidebook
- C. Decision Tools from the Federal Interagency Task Force on Visitor Capacity
- F. Directory of other Related Systems and Information Sources (pending)

## 1. Introduction

The outdoor recreation profession has become much more sophisticated in the forty years since the government's first comprehensive assessment entitled the Outdoor Recreation Resources Review Commission (1958-1962).

*"Water is a focal point of outdoor recreation. . . . Urban or rural, water is a magnet. Wherever they live, people show a strong urge for water-oriented recreation. There are many other reasons (purposes) for water resource programs, and recreation use often is incidental and unplanned. To say this, however, is to note how great are the opportunities." (1962: pg. 87)*

No longer is water recreation management a matter of simply building a boat ramp, dock, parking area, or bathhouse. Water recreation management involves a thorough understanding of the water resource and its capability, current and future visitors, the type of experience being sought, regional recreation demand and supply, resource management planning, economic and non-economic valuation, visitor capacity, and other dimensions.

The Water Recreation Opportunity Spectrum (WROS) is a tool for planners and managers to make better decisions. It is modeled after the Recreation Opportunity Spectrum system (ROS), yet tailored to water resources such as reservoirs, lakes, rivers, bays, estuaries, wetlands, coastal zones, and marine protected areas.

This document was developed for the Bureau of Reclamation as a handbook or resource guide. Its purpose is to provide operational guidance for how to implement WROS in the inventory, planning, and management of recreation opportunities on or adjacent to water resources. The document is intended to be adaptive and learn from new research and the practical field experience of its application.

This Operations Manual has three sections including (a) the foundation and overview of WROS, (b) a description of its component parts and how they interface with a comprehensive resource management planning process, and (c) management guidelines and standards. The appendix also contains important related information on the Reclamation RMP planning process, visitor capacity, scenic resource assessment, and visitor monitoring.

## The Foundation of WROS

There are several popular cliches in the outdoor recreation profession that serve as the foundation for WROS.

**The Average Visitor Does Not Exist.** Recreation science has revealed that there is great diversity among outdoor recreationists in what they desire for a recreation experience, expect upon arriving at a recreation site, and perceive and enjoy during the actual participation. Not only is there diversity among different recreation activity participants such as boaters, fishers, and campers, but there is also diversity among these specific activity participants. For example, the recreation experience from sailing on a 200-acre urban reservoir for a few hours would certainly be different from that of sailing on a 50-mile long rural reservoir for several days.

Much like the private sector will group and target segments consumers based upon some shared buying preferences, outdoor recreationists can be segmented into groups of people desiring particular recreation experiences. The recreation demand for different types of recreation experiences is diverse.

Recreationists will also differ on other non-recreational characteristics such as their place of residence, travel distance, socio-economic situation, racial and ethnic background, education, and knowledge of available opportunities.

The implication is that to plan and manage for a mythical average user is not appropriate because such an approach will leave out or not accommodate the diversity of the public interested in water resources. The conservation of recreation diversity is a fundamental purpose of the WROS system.

**Don't Try to be All Things to all People.** A specific lake, reservoir, or other water body is a single resource within a regional, and even national, system of water recreation opportunities. Each water resource has special capabilities and opportunities to make an important contribution to the integrity of the larger system. Any individual lake or reservoir cannot be all things to all people, but rather managers must identify what is the recreational role or niche within the context of local, regional, and in some cases national interests.

The implication is that it is not practical to plan and manage each water resource so it provides all opportunities for all visitors. Each water resource needs to serve a particular recreational role or niche within a larger system of diverse water recreation opportunities. The conservation of recreation diversity across a larger system will benefit the public and effectiveness and efficiency of each specific water resource.

**Managers Provide Recreation Opportunities.** The concept of recreation continues to evolve. Four decades ago recreation was viewed principally as an activity such as boating or skiing. In the 1970s, recreation science determined that recreationists were motivated and seeking a particular type of recreation experience, and that a recreation activity was a means to an experiential end. It was also determined that the conditions of the resource and how the recreation setting was managed could influence what kind of experience a person was likely to have. In the 1990s, recreation science further contributed that recreation experiences led to longer-term benefits for individuals, families, communities, as well as benefits to the economy and the environment.

Today, it is stated that managers provide recreation opportunities; that is, an opportunity for a visitor to participate in a type of recreation activity in a specific setting defined by its important physical, social, and management attributes, in order to realize a particular type of experience and subsequent benefits. Figure 1 depicts the key components and their linkage.

**Figure 1. A Recreation Opportunity**

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<i>Recreation Activity</i>	+	<i>Setting</i>	=	<i>Experience</i>	>>>	<i>Benefits</i>
-many activities		-physical attributes -managerial attributes -social attributes		-many dimensions -multiple senses		-individual -community -economic -environmental
		<i>Manager's Manage</i>		<i>Recreationist's Consume</i>		<i>Society Gains</i>

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As conveyed in Figure 1, managers manage recreation activities and settings in order for recreationists to consume a high quality, safe, and enjoyable recreation experience. The activities and setting attributes are considered the inputs to the system, while the experience and subsequent benefits are the outputs.

**Provide a Seamless System of Water Recreation Opportunities.** The American public is much more interested in enjoying high quality recreation opportunities than in understanding the names and missions of each local, state, and federal agency that manages water resources. While public respect and understanding for an agency mission is desired and indeed important, agencies should also strive to collaborate and contribute to the conservation of a larger system or network of water recreation opportunities.

The implication is that to plan and manage for a seamless system of water recreation opportunities requires a set of recreation terms, concepts, and tools that are understood by all

water recreation providers. This does not suggest that agencies need to change or replace existing approaches to planning or managing water recreation, but does recognize the advantage of also employing a shared or common system (i.e., terms, concepts, tools) to inventory, plan, and manage water recreation opportunities across agency jurisdictions. WROS, as well as ROS, is intended to be such an interagency tool for the conservation of recreation diversity and for assuring a seamless delivery system of opportunities.

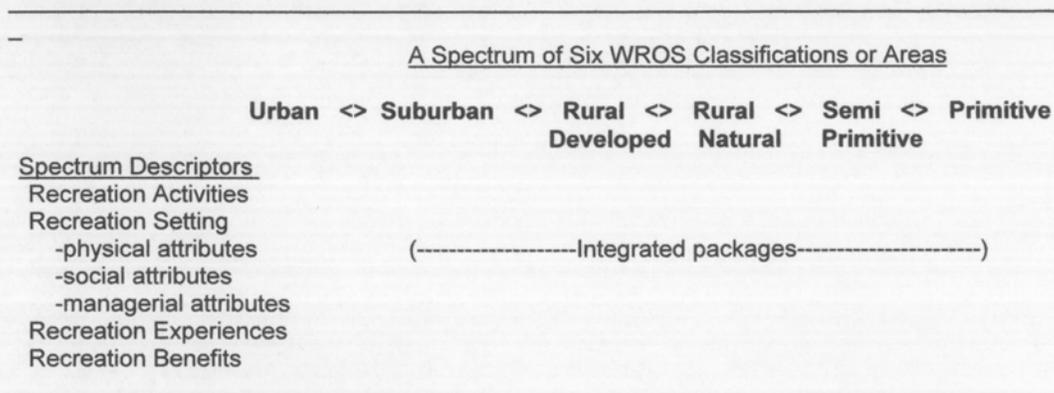
### An Overview of WROS

WROS stands for the water recreation opportunity spectrum. It is a tool for water resource planners and managers in public agencies, as well as for utilization by private industry, water conservancy associations, cities and rural communities, special interest groups, and interested publics. This section provides an overview of the important aspects of the WROS system.

**The Goal of WROS.** As indicated in the preceding section, there is diversity among recreationists, water resource settings, and the agencies who manage these resources. This diversity is good and should be conserved. Likewise, there is recognition that each specific water resource (e.g., lake, reservoir, bay) has a niche and contribution to make towards a larger system of diverse opportunities desired by the public. Thus, the overarching goal of WROS is to provide planners and managers with a framework and procedure to make better decisions for conserving a system of high quality and diverse water recreation opportunities.

**The Components of WROS.** WROS is a spectrum of six water recreation opportunities; that is, six integrated packages containing appropriate activities, settings, and experiences for each WROS class. Figure 2 depicts the WROS framework.

**Figure 2. The Water Recreation Opportunity Spectrum**



*Recreation activities* are the leisure pursuits most commonly understood and referred to. There are hundreds of examples of recreation activities and the list continues to grow with new technology and changing public interests. Of course, not all activities can be provided in the same location and a manager must decide which activities are appropriate for an area. WROS helps managers consider the question of appropriateness by offering a general illustration of what recreation activities may be appropriate in each WROS class (see Figure 3). It is important to note that Figure 3 is a general example to illustrate the framework of WROS, and that there are many situations where a particular activity listed below is not appropriate and is appropriate. Sound professional judgment and due consideration of the local situation is needed for managers to decide what are appropriate recreation activities.

**Figure 3. A Generalized Representation of Recreation Activities by WROS Classes**

	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
<u>Water-based Activities</u>						
water skiing						
jet boating						
personal water craft						
snowmobiling						
low speed motor boating						
fishing						
houseboating						
rafting						
canoeing						
kayaking						
swimming						
diving/snorkeling						
para-sailing						
<u>Land-based Activities</u>						
developed campgrounds						
rustic campgrounds						
backpacking						
off-highway vehicles						
horseback riding						
wildlife viewing						
hunting						
golfing						
swim beaches						
picnicking						
interpretive walks						
hiking						

A *recreation setting* is comprised of physical, social, and managerial attributes. It is the combination of the attributes that shape or mold a specific activity into a particular experience. Manager's spend most of their time and effort managing the recreation setting, and the management guidelines and standards presented later in this manual provides more detailed guidance. Figure 4 illustrates various physical, social and managerial attributes that can effect the desired recreation experience for an area.

**Figure 4. Examples of Recreation Setting Attributes**

<u>Physical Attributes</u>	<u>Social Attributes</u>	<u>Managerial Attributes</u>
aquatic vegetation	recreationists (type, number)	recreation facilities
water quality/quantity	visitor expectation	water storage facilities
soils/rocks/cliffs	pattern of use	water storage operations
topography/slope	behaviors	rules/regulations
fish and wildlife	visitor safety issues	interpretation
natural sounds	visitor conflicts	fees and charges
visual resources	vandalism and litter	site design
water flows	historic sites	length of season
lightscapes	cultural resources	recreation maintenance
terrestrial vegetation	private land and uses	recreation programs
endangered species	special uses	law enforcement/security
human development	special values	signage
-- industrial/commercial		
-- municipal/residential		
-- built structures		
-- infrastructure		

A *recreation experience* is the psychological and physiological response from participating in a particular recreation activity and setting. It is an output of management's efforts and represents what is consumed by the recreationist. WROS helps planners and managers to focus on the recreation experience that is being provided, and provides a general description of recreation experience for each WROS class.

Recreation science has contributed to identifying the important dimensions of a recreation experience, often referred to as motivations, psychological outcomes, or multiple satisfactions. It is also recognized that humans use all five human senses to perceive or experience a situation; that is, a recreation experience can be affected by what one sees (e.g., wildlife, litter), hears (e.g., natural sounds, loud engine noises), smells (e.g., grasses and trees, barbecue, pollution), touch (e.g., water temperature, beach sand, broken glass), and taste (e.g., water, food, exhaust). Figure 5 provides a general description of the important dimensions and senses that define the recreation experience in each WROS class or zone.

**Figure 5. (NEEDS TO BE INSERTED)**

*Recreation benefits* are subsequent improvements from participating in quality outdoor recreation and tourism. These improvements or benefits may accrue to the individual recreationist, the social or family unit participating, the workplace, community, economy, and the environment. WROS does not explicitly include a step to measure or inventory recreation benefits at this time, but does encourage managers to (a) engage local communities in identifying important recreation benefits in the planning process, (b) include a description of the important benefits in the management plan, and (c) reference benefits in various public education and community communications. An example of how water recreation benefits the public has been developed by the U.S. Army Corps of Engineers and is included in Appendix A. It is expected that the recreation benefits section will be strengthened in the future as WROS is field tested and further refined. Figure 6 illustrates benefits that accrue from recreation and tourism.

**Figure 6. Examples of Recreation Benefits**

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<b>Individual or Personal Benefits</b> physical exercise family togetherness self confidence skill development reflection/contemplation increased wellness/happiness increased quality of life	<b>Community Benefits</b> sense of place Improved work performance community pride and spirit community attraction/appeal youth development increased quality of life
<b>Economic Benefits</b> support of local merchants economic stimulation increased new monies from outside area increased property values increased tax revenue increased investor appeal	<b>Environmental Benefits</b> increased knowledge of resources increased respect for environmental increased stewardship/ involvement increased collaboration increased political/social support increased conservation of nature

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**The Planning and Management Benefits of WROS.** WROS is an inventory, planning, and management tool. As such, it has many values and roles to both the managing agencies as well as to local communities, recreationists, and the private sector (e.g., tourism). The multiple purposes of WROS are to:

- ! inventory and map water recreation opportunities,
- ! integrate recreation into agency planning process,
- ! assess recreation demand with the supply of available opportunities,
- ! provide a visual map (GIS compatible) of proposed planning alternatives,

- ! evaluate benefit and costs of proposed alternatives,
- ! communities and private sector identify and manage a tourism niche,
- ! plan and manage regional system of water recreation opportunities,
- ! identify and protect important natural and cultural resources,
- ! increase public awareness of recreation choices and available opportunities,
- ! decide type and location of visitor management activities,
- ! prioritize, design, and locate facilities,
- ! develop visitor capacities,
- ! justify budget and personnel needs,
- ! legally justify planning and management decisions,
- ! interagency communication, consistency, collaboration, and coordination,
- ! conserve a diversity of water recreation opportunities, and
- ! assure high quality recreation experiences and benefits for current and future visitors, and the local community.

### **Design Criteria Used in Developing WROS**

There were a variety of important considerations identified early in the development of WROS. The following design criteria were used to help assure that WROS would be efficient, effective, and of value to water resource planners and managers:

- ! interface with Reclamation's Resource Management Planning process and other NEPA-compliant, planning processes used by other federal agencies,
- ! interface with the ROS system used by the U.S. Forest Service and BLM,
- ! be consistent with the prevailing expert opinion in the recreation profession,
- ! be relatively easy and inexpensive to use,
- ! be able to integrate with other planning tools, data bases, and processes,
- ! be appealing and understandable to recreating publics, communities, private sector, and stakeholders,
- ! provide objective criteria for reasoned and deliberate decision making,
- ! accommodate flexibility and adaptation to special situations at field level,
- ! use best available social and biophysical science,
- ! accommodate change and adaptation through monitoring, research, and experience,
- ! should be reasonably applicable to a variety of water resource settings in the Nation, and help to assure a high quality, safe, and enjoyable recreation experience.

## The Standard for WROS Decision Making

WROS is a framework that is flexible and can be adapted to specific field situations. WROS does not replace management discretion and decision making, but rather, it is a tool to help make better decisions that are principled, reasoned, systematic, logical, tractable, and defensible.

While local planners and managers are empowered to adapt WROS to the local situation, it is important that these decisions are carefully considered in order to maintain the system's national integrity. This section provides guidance on decision making based upon several fundamental principles found in the field of decision science, federal law (e.g., Administrative Procedure Act, National Environmental Policy Act), and applied by the judicial system in the United States.

The standard for WROS decision making incorporates (a) sound professional judgment, (b) preponderance of the evidence, (c) a rule of reasonableness, (d) a sliding scale of analysis, (e) a scale of degree or extent, and (f) scale of appropriateness. Recreation planners and managers should base their decisions on sound professional judgment and preponderance of the evidence within the practicality of reasonableness, a sliding scale of analysis, and due consideration of appropriateness.

**Sound Professional Judgment.** It is defined as a reasonable decision that has given full and fair consideration of the appropriate information, that is based upon principled and reasoned analysis and the best available science and expertise, and complies with applicable laws.

The terms in the definition take advantage of judicial doctrine and terminology (Black 1991). A *reasonable decision* is a decision that is fit and appropriate under the circumstances. It is a decision that natural resource decision makers, of ordinary prudence and competence, under similar circumstances, would not view as excessive or immoderate. It is important to remember that the judiciary does not compare a person's decision against some single absolute right decision conceived by the court; that is, the court's function is not to make administrative decisions but rather to judge the reasonableness of an agency decision using such judicial doctrine as reasonable care, due diligence, and sufficient evidence. *Full and fair consideration of the appropriate information* is the condition of considering the whole situation and making a sound decision. *Principled and reasoned analysis* is the condition of not being arbitrary and capricious, perhaps the most frequent allegation in natural resource-related litigation. *Best available science and expertise* is the condition of utilizing the best information and experience that is reasonably available to improve certainty. *Complies with applicable laws* is the expectation that a decision maker duly considers and is in conformance with relevant laws and regulations (e.g., NEPA).

**Preponderance of the evidence.** It is defined as a condition whereby the majority of the information, data, trends, professional opinion, and other facts and circumstances of a situation support the reasonableness of a particular decision or course of action more so than another decision or course of action. It is a situation where the weight or benefit of one course of action is greater than the weight or benefit of another course of action.

**Rule of Reasonableness.** It is defined a decision which professional recreation managers of ordinary prudence and competence, under similar circumstances, would not view as excessive or immoderate.

**Sliding Scale Rule of Analysis.** This sliding scale rule states that the level of analysis used to implement WROS should be commensurate with the potential consequences of the decision; that is, managers need flexibility to make decisions based upon a level of analysis that is commensurate with the purpose and potential consequence of the decision. For example, the greater the possibility that a decision may significantly alter natural or heritage resource conditions, local economies, water operations, or the type of quality of the water recreation opportunity, the greater the level of analysis and deliberation. A sliding-scale of analysis can range from modest, ordinary, and extraordinary and vary by the (a) level and type of information necessary, (b) tools and techniques used, (c) time and effort required, (d) level of certainty and risk, and (e) level of scientific input.

**Scale of Degree or Extent.** It is defined as a spectrum or range of qualitative descriptors used in the WROS inventory stage to assess the current situation and delineate the current WROS zones of opportunities. In the WROS inventory stage, a series of inventory sites on the water resource are selected and qualitatively assessed by a team of experts. At each inventory site, the scale of degree or extent that selected physical, social, and managerial attributes are present is measured by using the inventory tools in Figure 9, 10, and 11. The degree or extent that each attribute is present in each WROS class is expressed by the following terms.

**Figure 6. Scale of Degree or Extent by WROS Class**

<b>Urban</b>	<b>Suburban</b>	<b>Rural Developed</b>	<b>Rural Natural</b>	<b>Semi Primitive</b>	<b>Primitive</b>
100-90%	90-70%	70-50%	50-30%	30-10%	10-0%
Dominant Extensive A Great Deal Extremely	Very Prevalent Widespread Very obvious Very	Prevalent Common Apparent Moderately	Occasional Infrequent Periodic Somewhat	Minor Little Seldom Slightly	Very Minor Very Little Rare Not at all

## Frequently Asked Questions

**Will WROS help make better decisions?** WROS is a framework and procedure to help make better decisions. It is not intended to make decisions or to take the place of sound professional judgment, but is intended to make better decisions that are more principled, reasoned, systematic, deliberate, trackable, and legally defensible.

**Does WROS give managers flexibility?** WROS is flexible. WROS recognizes that there will be special circumstances and situations in which flexibility and adaptation is necessary. There may be instances where the mapping criteria or certain standards will not work. That is acceptable. On the other hand, maintaining the integrity of WROS as a national professional tool is very important. Changes and adaptations to WROS should only be made with reasonable care and clear justification

**Will WROS constrain reservoir operations?** WROS does not constrain any resource, utilization, purpose, or public or private use of water resources, but rather will help to optimize the net public benefits for reservoir operations. It is a tool which helps to integrate recreation considerations into complex water use allocation decisions, and helps to recognize and assess the tradeoffs and consequences of proposed alternatives.

**How does reservoir drawdown effect WROS?** Reservoir drawdown and other operations can effect the type and amount of recreation opportunities on a reservoir, and the WROS classification. For example, the water surface acres classified as rural natural in early Spring (high water level) may change to rural natural in the late summer and then change to semi-primitive in winter. For many reservoirs it would be useful to have two or more WROS maps (e.g., early, middle, and late season) to help understand change in recreation opportunities. The reservoir drawdown effect on WROS should not be viewed as a constraint or limitation, but rather as one of many factors that contributes to the diversity of WROS.

**Can WROS change by season?** Yes. Features such as ice, snow, road closures, wildlife migration, and special activity seasons such as big game hunting can effect WROS. For many reservoirs it would be useful to have two or more WROS maps (e.g., summer, shoulder, winter season) to help understand change in recreation opportunities.

**How does WROS help protect important natural and cultural resources?** Early in the mapping of the WROS classifications, areas of known or suspected important natural and cultural resources are identified. These areas are provided special deliberation in terms of the types and amounts, if any, of recreation opportunities that may be appropriate. Special management and mitigation measures, along with heightened monitoring may be required. It is important to understand that the loss of an important natural and cultural resource is also, in effect, the loss of a recreation opportunity to experience and enjoy these very features.

**Can the public understand WROS?** The public can understand that there is a range or spectrum of opportunities from urban cities to remote primitive settings. Most can also relate to participating in a favorite activity in a specific setting and being rewarded with a memorable experience. Perhaps most importantly, large water resources can be mapped with the five WROS classifications, making for a very effective visual presentation for public review and discussion in a planning process or as a visitor information tool at a boat launch. On the other hand, WROS is a tool for agency professionals and there may be situations where the WROS class delineations or names (e.g., primitive) may not be appropriate for the general visiting public.

**How does WROS relate to tourism?** While academic distinctions label a person fishing in a stream next to their home as a recreationist, while the friend who travels 50 miles or more as a tourist, these distinctions serve little purpose in the WROS system. Tourists pursuing outdoor recreation opportunities are recreationists. Thus, the WROS is, in effect, also a tourism opportunity spectrum for water recreation opportunities.

**Can recreationists and tourists use WROS?** Yes, WROS can provide an informative map for the public indicating the supply of available recreation opportunities in an area. A major problem in managing public lands and waters is that recreationists and tourists don't have the information and are not aware of what recreation opportunities are located where. While many maps show facilities and transportation, few convey the type of experience or how the area is being managed. Often a visitor capacity problem is really a visitor distribution problem due to the visitors not being aware of alternative locations and times to visit. WROS can help to show the diversity of water recreation opportunities for a single water resource, or better still, for a large region or watershed.

**Can a WROS classification be subdivided into sub-classes or zones?** The WROS reflects a national spectrum of opportunities from urban cities to remote primitive areas. Each of the six classifications can be viewed as a small spectrum within a larger national spectrum. Yes, there may be situations where it is advantageous to subdivide one of the WROS classifications in order to more effectively deal with a particular field situation. To further refine one of the WROS classifications is acceptable and encouraged.

**How does WROS deal with exceptions or unique field situations?** WROS recognizes that it is not practical or desirable for a national system to try to address every field situation. WROS is not intended to replace sound professional judgment and reasonable decisions. On the other hand, WROS provides a framework for analyzing special situations and for making good decisions. It would be advisable to document the circumstances and rationale used in the administrative record.

**How does WROS interface with site level planning?** WROS is a national level tool that generalizes to large water resources. WROS provides guidance for the entire spectrum of opportunities in its management guidelines and standards, yet recognizes that another planning level might be necessary to make site specific decisions about the type, location, design, or appropriateness of facilities or actions. Site design plans, interpretive plans, monitoring plans, and engineering and architectural plans can tier off of WROS and provide the necessary detail.

**How does WROS accommodate special areas or sub-units.** WROS is a national level tool that generalizes to large water resources, yet recognizes and accommodates special circumstances at the site level. There will be instances where areas within an WROS zone will be provided additional management direction to accommodate the special needs, circumstances, or opportunities associated with the area. WROS encourages managers to “tier down” and provide additional management direction. Examples of such special areas or sub-units include:

- Security areas
- No-wake zones
- No motor zones
- Travel corridors
- Destination area
- Overnight area
- Archeological site
- Special use permit area
- Wildlife protection areas
- Seasonal resource protection area
- Special recreation use area
- Hazard area
- Conflict mitigation area
- Administrative sites
- Cultural resource area
- Boater safety area

**Does WROS require a special planning process?** WROS does not require a special planning process, but rather can be viewed as the recreation arm or branch, and where the main stem of the tree represents the agency’s primary planning process (e.g., Reclamation’s resource management planning process). A primary benefit of WROS is to help integrate recreation considerations into a larger comprehensive planning effort where multiple uses and allocation decisions are necessary.

**Can WROS help make daily management decisions?** Yes. The WROS map representing the desired recreation opportunities, or the preferred alternative, can help remind managers of the appropriate activities, setting attributes, and experiences for each zone. Invariably, there are requests and appeals for special exceptions that may not be appropriate for a specific time or location. An understanding WROS can help make such decisions and provide a logical and defensible explanation. Furthermore, the management guidelines and standards are very useful for daily or annual operation and maintenance activities, budget planning and justification, assigning volunteer work crews, responding to media and local tourism boards, dealing with visitor capacity and conflict issues, or mitigating unforeseen impacts.

**How does WROS help justify budgets and personnel?** A key component of the WROS is a set of management guidelines and standards for many of the components requiring time or effort (i.e., budget and personnel). For example, the maintenance and patrol standards will be different in a semi-primitive versus rural developed WROS class. While many of the guidelines and standards are of a qualitative nature, continuing research and professional experience with WROS will help in developing more quantitative standards which can be expressed as cost items in a budget or personnel request.

**What if current conditions are not consistent with the WROS guidelines and standards?**

WROS helps to identify where inconsistencies might exist; that is, locations or situations where the current conditions are not consistent with the WROS management guidelines and standards. Inconsistencies are often found in the initial application of WROS to an area, and over a number of years they would be expected to decline as management makes adjustments. Inconsistencies can be mapped and prioritized on a scale of a negligible, minor, moderate, or major consequence. WROS does not obligate and direct any action, but rather helps to identify the type and location of inconsistencies and helps to justify their mitigation over time.

**How does WROS blend with ROS?** ROS was developed for forest-based settings managed by the U.S. Forest Service and BLM, in which water resources were basically subsumed and merged with the adjacent lands. WROS builds upon ROS and provides more detailed guidance for large water resources such as lakes, reservoirs, rivers, bays, estuaries, inlets, and marine protected areas. Both ROS and WROS use a similar type and number of classifications or zones, names, mapping criteria, descriptions of recreation experiences, and the steps in the process. In cases where large land areas (e.g., wilderness, national forest) are adjacent to the water resources being planned for and are part of the planning area, ROS can be used and blended with the WROS classes. Or in cases where the planning area contains a relatively small terrestrial area and the primary visitation is water based recreation, then WROS can be used for the adjacent lands.

**How does WROS interface with the ROS in dealing with streams, rivers, and wetlands?**

ROS was developed for large terrestrial landscapes and provided a small amount of management direction for some water resources (e.g., wild and scenic rivers). WROS is a logical extension of ROS and has greatly expanded the water recreation management guidelines and standards. WROS focuses on relatively large water resources that provide distinct and highly valued water recreation opportunities from high mountain reservoirs to coastal bays and international marine protected areas.

A reasonable rule of thumb is that if the stream, river, or other water resource is incidental to the primary recreation opportunities in the planning area, ROS may be the preferred tool. Conversely, WROS may be the preferred tool where the water recreation opportunities are significant (not incidental), distinct from adjacent land-based recreation, and highly valued to the visitors and local communities

## Glossary of Key Terms

**Recreation diversity.** Recreation diversity is the type, variety, distribution, quality, and abundance of outdoor recreation opportunities. Diversity is accommodated through that management of a spectrum of recreation opportunity classes, zones, or units named in WROS system as urban, rural developed, rural natural, semi-primitive, and primitive.

**Recreation activity.** Recreation activity is a type of leisure-time pursuit that a person participates in voluntarily to secure a pleasurable experience.

**Recreation setting.** Recreation setting is a geographic location comprised of physical, social, and managerial attributes where a person participates in a particular activity to have a specific type of recreation experience. Managers manage the recreation setting.

**Recreation experience.** Recreation experience is the psychological and physiological response from participating in a particular recreation activity in a specific recreation setting. Recreationists consume a recreation experience (activity + setting = experience).

**Recreation benefits.** Recreation benefits are the positive gains or improvements from people participating in recreation opportunities, which may include benefits for the individual, community, economy, or environment.

**Recreation opportunity (RO).** Recreation opportunity is the choice for a person to participate in a particular activity in a specific setting, in order to realize a particular type of experience and subsequent benefits.  $RO = (activity + setting = experience \ggg \text{benefits})$ .

**Physical attributes (Setting).** Physical attributes are features or characteristics of a recreation setting that may help to define and distinguish the recreation experience. Physical attributes can be divided into natural features or built structures of a more permanent or fixed nature. Examples of natural resource attributes include water quality, aquatic vegetation and terrestrial vegetation, topography, shoreline curvature, fish and wildlife habitat, soils, natural soundscape, and air quality. Examples of built structures include all those municipal, commercial, industrial, residential, agricultural, and major recreation buildings and infrastructure common to any city or community (e.g., dam facilities, water and power conveyances, water control apparatus, residential subdivisions, industrial complexes, commercial centers, air and ground transportation systems, developed resorts and marinas, theme parks, shipping and cargo facilities).

**Social attributes (Setting).** Social attributes are the features or characteristics of a recreation setting that may define and distinguish the recreation experience. Social attributes may include such features as (a) recreational use and users (e.g., the type, amount, time, location, distribution, origin, behaviors, quality), (b) non-recreational use and users (e.g., business people, educational groups, agency personnel, scientists, farmers and ranchers, local residents), and (c) special values

associated with the culture, historic, and spiritual or religious significance.

**Managerial attributes (Setting).** Managerial attributes are the features or characteristics of a recreation setting that may define and distinguish the recreation experience. Management attributes may include facilities (e.g., ranging from water markers to full-service marinas and campgrounds), rules, regulations, water operations, educational programs, fees and charges, interpretation, signage, law enforcement, design, lighting, concessions, and special use permittees.

**Suitable recreation Acres.** Suitable recreation acres are those acres within a project or planning area that can or will accommodate some type and level of recreation use. Unsuitable recreation acres may be those acres that include security closures, pose public safety hazards, contain sensitive wildlife habitat or heritage sites, have incompatible industrial activity, or are inaccessible locations due to topography or private land.

**Visitor (recreation) capacity.** Visitor capacity is the supply, or prescribed number, of visitors that will be accommodated in an particular area.

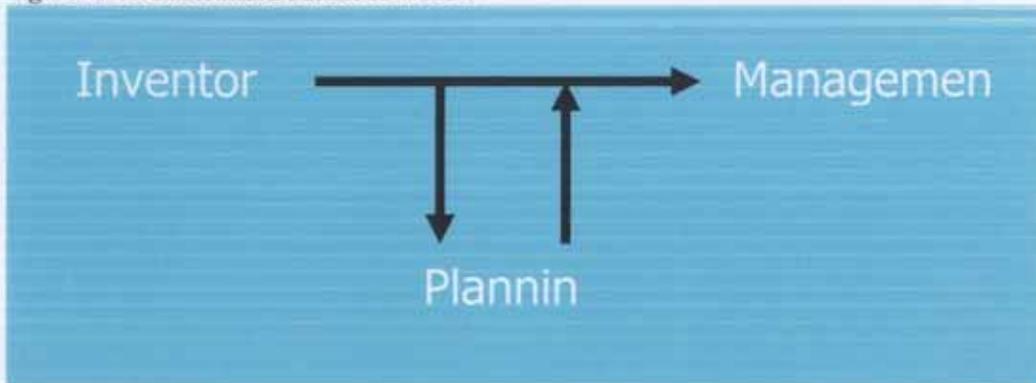
**Water resources.** Water resources is the term used in this guidebook to refer to all types of water resources that the WROS system considers including lakes, reservoirs, bays, estuaries, rivers, coastal zones, and protected marine areas.

**WROS Class, Classifications, and Zones.** WROS is a system of six classes or types of recreation opportunities. The word *class* refers to the narrative description of the six types of recreation opportunities. When a WROS class is applied to a geographic area, the terms WROS classification or WROS area is used; that is, each acre suitable for recreation purposes in the planning area is within a WROS classification or area.

## 2. An Overview of the WROS System

The overarching goal of WROS is to provide planners and managers with a framework and procedure to make better decisions for conserving a system of diverse water recreation opportunities. It is a framework to inventory, plan, and manage a spectrum of six different water recreation opportunities. This section provides an overall view of the major steps and stages of the WROS, with later sections providing the operational details. Figure 7 is a general model of the major steps of the WROS system and the three stages of inventory, planning, and management.

**Figure 7. A Generalized Model of WROS**



The following paragraphs overview the steps involving inventory, planning and management.

*Defining the scope* of the WROS application (Step 1) involves a series of pre-planning decisions and actions that are necessary. For example, decisions need to be made about the size of the planning area, the scale or level of detail, what is the intended need or purpose of the WROS application, what land and water is suitable for recreation purposes, and the month or season(s) of focus for the WROS application. Pre-planning actions would involve building a comprehensive base map and perhaps GIS overlay, and assembling all materials such as legislation, regulations, operating procedures, available science, monitoring reports, visitation data, air photos and other resources. Furthermore, decisions need to be made related to the amount of time and effort for the WROS application, who will serve on the WROS team, the type and level of public involvement if any, and what decision criteria will be used.

*Mapping the Current Supply of Recreation Opportunities* (Step 2) of the planning area means to determine what WROS class or classes the area is currently supplying. This step involves a field inventory with a team of experts. At selected sites on the water resource, the team independently completes three inventory (i.e., decision tools) in order to arrive at a consensus of the current

WROS classification for the site. There is one inventory or decision tools for each the physical, social, and managerial attributes. Thus, when the individual site decisions are aggregated for the entire planning area, one in effect has produced four WROS maps or GIS layers depicting the physical setting, social setting, managerial setting, and the combined overall current WROS zones.

With regard to mapping the current *physical setting*, the planning area is examined using criteria related to distance from urban development, size of the area, and the degree of development, natural resource modification, natural ambiance, and public access (see Figure 9). The output is a WROS physical capability map that reflects what recreation opportunities the planning area could theoretically provide, without considering the current social or managerial situation. This information is important in developing a reasonable range of management alternatives in the resource management planning process; that is, what are reasonable options that the area can physically accommodate.

With regard to mapping the *current social and managerial attributes* (Step 3 & 4), another set of criteria are used to make these judgments for each of the inventory sites. Social attributes used to examine the setting include visitor socialization, presence, diversity, concentrations, conflicts and comforts (see Figure 10). Managerial attributes used to examine the setting include access facilities, management presence, visibility of recreation features, level of recreation development, and visitor services and conveniences (see Figure 10). The output is a WROS social setting map and a WROS managerial setting map of the planning area.

At this point of the inventory, a manager has three WROS maps: a current (a) physical capability map, (b) social setting map, and (c) managerial setting map. By overlaying the WROS boundary lines from all three maps, a manager can then *delineate the overall WROS classification* for the planning area (Step 5). The first time WROS is applied, the lines demarking the WROS boundaries on the three maps will not line up. This should be expected. Where the three maps do not line up are called inconsistencies in the WROS system, and are addressed in the next step. At this stage, a manager must use their judgment and knowledge of the current situation to delineate an overall current WROS map for the planning area.

Inconsistencies are locations or times when the integrated package of activities, setting attributes, and experiences are, to some degree, out of alignment. For example, it is common to find a situation where the physical and managerial attributes are in accordance with providing rural natural recreation opportunity (i.e., WROS class), yet for the majority of the season the social conditions mimic that of a urban WROS class. *Inconsistency resolution* (Step 6) is a step where the manager assesses the degree of negative consequences due to the inconsistency (e.g., low, moderate, high), and also considers reasonable mitigation measures particularly for those inconsistencies with high negative consequences.

At this juncture in the WROS system, a manager has two options. They can either take WROS inventory and mapping information and *implement a revised recreation management direction* (Step 8) in accordance with the mitigation measures and the WROS management guidelines and

standards, or they can proceed to integrate the WROS information into a comprehensive *resource management planning process* (Step 7). Another possibility not depicted in Figure 7 is that a manager could proceed with the first option in anticipation that a comprehensive planning process would be activated at some time in the future.

*Evaluation and adaption* (Step 9) is important because change is inevitable and there is a need to learn from past professional experiences. Monitoring and a program of social and biological research is important. Over time management direction will change due to such forces as new recreation technology, changing visitor demand, local community population growth, urban development, increased transportation and access, adjacent land use change, resource impacts, and demand for water and power. It is also very important to realize that the WROS system is not a static or finalized system, but rather through professional application the system will continue to evolve and be strengthened.

### **3. WROS Inventory: Mapping the Current Supply of Recreation Opportunities**

The purpose of this section is to provide operational details for how to conduct a WROS inventory in order to map the current supply of recreation opportunities. The inventory leads to the delineation of the current WROS classification for the planning area. The overall map is compiled from three other partial WROS maps or layers of the physical, social and managerial attributes. These three layers are superimposed, judgment used to delineate the overall current WROS classification, and inconsistencies mitigated. This section overviews important pre-planning considerations, procedures to develop the three maps, delineation of the overall WROS classes or zones, and how to deal with inconsistencies.

#### **Defining the Scope**

The step of defining the scope is a pre-planning and preparatory step. A variety of important decisions and actions must be taken early as the initial step in applying WROS. Below are listed key questions and guidance for consideration.

**What is the primary output of Defining the Scope?** The primary output of Step 1 is a working base map (or GIS database) for the WROS inventory and an assemblage of all related documents and materials. The base map should be current and show the following:

- |                                    |                                |
|------------------------------------|--------------------------------|
| water surface area                 | dam operation facilities       |
| seasonal water levels              | primary and secondary roads    |
| water depths                       | power transmission lines       |
| topography                         | private land and right of ways |
| aquatic and terrestrial vegetation | homes, buildings, structures   |
| hazards, shallows, stumps          | recreation facilities          |
| cultural and historic resources    | diversions, channels, riprap   |

important fish and wildlife habitat  
special or unique resources and values  
security or public safety areas

adjacent land uses  
suitable recreation use area

The various documents and materials include:

laws, regulations, policies  
maps, air photos, pictures, videos  
management and other operational plans  
special use permits, concession agreements, leases  
relevant scientific studies, inventories, and monitoring reports  
visitor use reports, statistics, studies, road counts, surveys  
regional map showing location of other water recreation opportunities  
reports, studies, trends, or other materials from county, state, or federal partners  
list of important contacts (i.e., local, state and federal agencies, local community, tourism sector, special interest groups, universities)

**What is the geographic location or planning area for the WROS inventory?** A water recreation opportunity is not confined to the surface area of a water resource, but also includes adjacent lands where visitors also spend time traveling, recreating, or viewing. For example, many boaters spend the night at an adjacent campground or resort, hunt or fish along the shoreline, and hike and participate in interpretive walks. A recreation opportunity can also be affected by land uses on adjacent land, in the distant viewshed, or even beyond the sight and sound of the visitor. Thus, the question is how much of the adjacent land and water resources should be included in the planning area.

A reasonable rule of thumb is to define the planning area for the WROS inventory to include those lands and waters that may have an effect on the quality of the water recreation opportunity. It might be also helpful to think from the perspective of the visitor; that is, what is the visitation range (i.e., analogous to a deer's home range) or area that most visitors also visit when they are visiting the general area? Where do visitors go and what do they do beyond the primary water resource in question? If the primary water resource is largely a day-use area, the WROS planning area may only extend a mile beyond the shoreline. If the primary area is a destination area for people from outside the local area on extended visitors, the WROS planning area may extend 10 miles from the shoreline. It would be better to err initially on the side of too large an area, and then downsize later in the inventory stage.

**What is the level of resolution or appropriate scale?** In theory, one could conduct a WROS inventory on any size area (e.g., square foot, one acre, 50 square miles). The real question is what scale is practical, useable, compatible with other resource inventories, and allows for a GIS interface.

A reasonable scale for the WROS inventory mapping is a minimum of 120 acres or 1/4 of a section; that is, a WROS zone must be at least 120 acres to be mapped as a separate and distinct WROS class. Furthermore, maps of a 1:50,000 scale have been found to be reasonable, although

a 1:24000 scale might be better for small water resource planning areas.

A reasonable rule of thumb is that the minimum size or acreage for an area should be practical and useful for planning and management purposes, and should be compatible with other inventory and mapping efforts.

**What is the temporal scale or time period for applying WROS?** Water recreation opportunities and management direction change during the year due to weather, water uses, type and pattern of visitation, facility closures, personnel staffing, and many other factors. Thus, an important decision relates to the period of time that the WROS is being applied. It is not unreasonable to develop a WROS for each major season, or for the high and low water periods.

A reasonable rule of thumb is that the temporal scale or time period for applying WROS is determined by consideration of the important issues, concerns, and opportunities that are driving the effort. What are the key reasons why a resource management planning process is being initiated, or what are the reasons for using WROS at this time.

**Will the WROS be used in a resource management planning process?** The WROS inventory can either be used as input into a comprehensive resource management planning process or directly used by managers to implement recreation management direction for the area. If the inventory will be used in a resource management planning process, then it is important to anticipate and be consistent with various planning criteria (e.g., scale, planning horizon, public process, timetable, level of analysis).

The WROS inventory will describe the current water recreation opportunity situation and identify inconsistencies that may be affecting the quality of the current opportunity. Thus, if a planning process is not to be implemented in the near future, WROS can directly and immediately help manage the current recreation situation by dealing with those inconsistencies of consequence or by changing the current situation to a new desired water recreation opportunity.

**What is the effective WROS area under consideration?** The effective supply of recreation acres are those that are available and suitable for recreational purposes. It is important early in the inventory process to identify and demarcate on the WROS base map all the areas that are not suitable for recreation purposes. For examples, unsuitable lands and waters could include security areas, water storage and power facilities, private lands, municipal or commercial operations and transport lanes, ecologically sensitive areas, public hazards areas, cultural and historic sites, nesting areas, shallows and wetlands, and undesirable locations due to smells, sounds, and views. The effective supply might change weekly (e.g., no commercial transport on weekends) or seasonally due to fish and wildlife migration, facility closure, or reservoir drawdown.

**What other important planning considerations will effect WROS?** The application of

WROS will be affected by other decisions made in Step 1. For example, what are the primary uses and commitments of the water resources; what are the major forces or interests driving the application of WROS at this time; what is the level of public concern or controversy; what is the timetable and schedule of major activities; how many person days and dollars are allocated to the effort; who constitutes the WROS team and what is the responsibility of each member; who is the decision making officer; what criteria will be used to arrive at a decision; what is the planning horizon or years into the future that should be targeted; what will be the nature of the external collaboration with the visitors, community, private sector, and other stakeholders; will external experts be used and what is their role; what changes to the current water operations, recreation opportunities, adjacent land use, or other considerations are beyond the scope the planning effort.

**What is the Recreation Use Situation?** Figure 8 may be a helpful tool to assemble and record important recreation use.

**Figure 8. WROS Basic Profile Tool**

**Name of Water Resource:** \_\_\_\_\_ **County/State:** \_\_\_\_\_

**Managing Agency/Office:** \_\_\_\_\_

**River Classification (check one)**

- \_\_\_\_\_ Class I
- \_\_\_\_\_ Class II
- \_\_\_\_\_ Class III
- \_\_\_\_\_ Class IV
- \_\_\_\_\_ Class V

**Lake Classification (check one)**

- \_\_\_\_\_ Class I
- \_\_\_\_\_ Class II
- \_\_\_\_\_ Class III
- \_\_\_\_\_ Class IV
- \_\_\_\_\_ Class V
- \_\_\_\_\_ Class VI

**Primary Recreation Activities by Season:**

	SPRING	SUMMER	FALL	WINTER
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____

5. \_\_\_\_\_

**Amount of Total Annual Visitation**

# of visitors \_\_\_\_\_; # of visitor days: \_\_\_\_\_; # of visits: \_\_\_\_\_

% of visitors who are day-users: \_\_\_\_\_ Average length of stay: \_\_\_\_\_

**Percentage of Total Annual Visitors by Season**

Spring: % of annual visitors \_\_\_\_\_; % of Spring visitors who are day-users \_\_\_\_\_

Summer: % of annual visitors \_\_\_\_\_; % of Summer visitors who are day-users \_\_\_\_\_

Fall: % of annual visitors \_\_\_\_\_; % of Fall visitors who are day-users \_\_\_\_\_

Winter: % of annual visitors \_\_\_\_\_; % of Winter visitors who are day-users \_\_\_\_\_

**List Most Important Recreation-Related Management Concerns, Public Issues, or Opportunities (i.e., what, where, when, who, why, how?)**

- 1.
- 2.
- 3.
- 4.

**Number (supply or capacity) of available overnight recreation sites (e.g., developed campsites, designated backcountry sites, rental cabins, hotel rooms, overnight houseboat rentals):**  
\_\_\_\_\_ # or supply of overnight accommodations

**Average Occupancy Rate (%) for overnight recreation sites by season**

Spring: Weekdays (M-Th) Occupancy Rate: \_\_\_\_\_% occupied of total available  
Weekends (F-S) Occupancy Rate: \_\_\_\_\_% occupied of total available

Summer: Weekdays (M-Th) Occupancy Rate: \_\_\_\_\_% occupied of total available  
Weekends (F-S) Occupancy Rate: \_\_\_\_\_% occupied of total available

Fall: Weekdays (M-Th) Occupancy Rate: \_\_\_\_\_% occupied of total available  
Weekends (F-S) Occupancy Rate: \_\_\_\_\_% occupied of total available

Winter: Weekdays (M-Th) Occupancy Rate: \_\_\_\_\_% occupied of total available

Weekends (F-S) Occupancy Rate: \_\_\_\_\_% occupied of total available

**Seasonal Variation in River flows (cfs) or Lake drawdown/fluctuation (elevation)**

Spring:

Summer:

Winter:

Fall:

Evaluator's Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Date: \_\_\_\_\_

### **Mapping the Current Supply of Recreation Opportunities**

Mapping the current supply of recreation opportunities of the planning area means to determine what WROS class or classes the area is currently supplying. This step involves a field inventory with a team of experts. At selected sites on the water resource, the team independently completes three inventory forms (i.e., decision tools) in order to arrive at a consensus of the current WROS classification for the site. There is one inventory or decision tools for each the physical, social, and managerial attributes. Thus, when the individual site decisions are aggregated for the entire planning area, one in effect has produced four WROS maps or GIS layers depicting the physical setting, social setting, managerial setting, and the combined overall current WROS zones.

The following steps are recommended:

1. It is important to assemble a small core team (e.g., 4-6) of experienced professionals representing different staff functions (e.g., recreation management, natural and cultural resources, maintenance, law enforcement, interpretation). These members would likely be the agency experts most familiar with the recreation phenomena over the years. It would also be important to have some professionals (e.g. 2-3) from another unit or agency that have had experience with applying WROS.
2. In that the purpose of the inventory is to describe and map the

nature of the current recreation opportunities, there may be advantage to have several local and long-term recreation users participate.

3. Introduce the team to the planning area, base map, WROS system, time of year under consideration, and the decision tools used for mapping the supply of current recreation opportunities. It is important early in the process, and particularly for those inexperienced with WROS, to thoroughly understand the descriptions of the recreation experiences for each WROS class (see Figure 5). The WROS powerpoint presentation would be a valuable training tool as well as copies of the Guidebook.
4. Once familiar with the WROS, the team needs to prepare for the field inventory. The field inventory requires accessing a sufficient size boat for the team to be able to experience the inventory sites and comfortably discuss their observations and rating. While maps, air photos, reports, GIS analysis, and other office information are very helpful, it is not sufficient for WROS mapping. It is vital that the team literally “experience” the recreation phenomenon and ambiance (e.g., sights, sounds, and smells) of the inventory setting.
5. The field inventory typically begins in the vicinity of the most highly developed areas in the planning area. A rule of reason is that the WROS field inventory starts on the water resource that is most highly developed (e.g., marina, subdivision, industrial activity, developed park complex).
6. At each inventory site, the boat is stopped and the team has a chance to experience the situation. It is important to look around and to discuss among the team what is the nature of the setting (e.g., describe how, who, when, and why recreation use the area, describe the type and amount of management for the time period in question). Team members can ask questions or offer information that might be important. It is also important for the team to have a common understanding of the area or geographic space under consideration at the inventory site. For example, the inventory site might include the water and land resources in a 2 mile radius of the boat, or the area within the cove, or the area within the viewshed. It is also important to remind the team what time period is the focal point under consideration (e.g., weekend, May, summer, spring).

7. Each team member then individually completes the WROS physical inventory form (see Figure 9) by checking the categories deemed most appropriate and circling a number at the bottom of the page ranging from 1 to 11 which best represents one's overall judgment of the WROS class at the inventory site.
8. The variety of attributes listed on the left side of the inventory form are considered important characteristics of the setting, and each person is asked "*What is the degree, extent, or magnitude that the following attributes are present at the site?*" There will be instances where a listed attribute is not considered relevant or that some other attribute should be added for consideration. As described elsewhere in this Guidebook, WROS is flexible and operates on the standards of the rule of reason and sound professional judgment.
9. Across the top of the inventory form is a six-point scale of degree or extent. The first scale point on the left is represented by the words "*Dominant, Extensive, A Great Deal*" and the last column to the right by "*Very Minor, Very Little, Rare.*" (The scale and these terms are discussed in more depth elsewhere in the Guidebook).
10. After checking each of the attributes on the form, the rater considers which number at the bottom of the page, ranging from 1 to 11, best represents their overall judgment of the WROS class at the site.
11. After each member completes their form, a straw vote is taken by means of each person stating the overall number they selected. After each member has a chance to express what factors influenced their score, a second straw vote is taken and duly recorded on a master form. Typically, the second vote (i.e., the overall numbers expressed after some discussion) will converge and there will be team consensus around 2-3 numbers. In cases where there is greater divergence, more discussion is advised until team consensus is reached. In some cases, it may be helpful to dismiss the two extreme outliers or even to make a final decision after more information is made available back in the office.

12. It is important for the team leader to keep asking the team “which of the six WROS recreation experiences best describes the type of experience a visitor could get from visiting this location?” It is important during the inventory process, and particularly for those inexperienced with WROS, to periodically reread the descriptions of the recreation experiences for each WROS class (see Figure 5).
13. The process of completing the physical setting inventory form is repeated for the social and managerial setting inventory forms (see Figure 10 and 11).
14. The result are three numbers for each inventory site; that is, a number from 1 to 11 for the physical setting, social setting and managerial setting. These numbers are recorded on a master map being maintained during the field inventory and the team forms collated for the administrative record.
15. The first time WROS is applied with inexperienced people, the first inventory site may take 30-45 minutes. The time at each inventory site will shorten to perhaps 15 minutes after a half dozen trails by the team. The first six or so inventory sites should be viewed as preliminary or trails, and thus it is advisable to return to these sites after the entire water resource has been surveyed to see if adjustments would be appropriate.
16. After the initial site, the team travels by boat to the next inventory site. The rule of thumb is that another inventory site should be chosen when there is an apparent change in the physical, social, or management attributes of the setting, or when you have traveled some distance from the previous site. For example, another inventory site should be chosen when one is out of sight and has traveled several miles from the previous site.
17. On very large water resources, it may initially be decided that a WROS inventory be taken every 5 or 10 miles, while recognizing that a follow-up trip might be necessary to do a more detailed or finer level of inventory for parts of the area.

18. The final result of the field inventory will be (a) a *working map* of the planning area which identifies the inventory sites, (b) the team's three consensus numbers for the physical, social, and managerial settings, and (c) a file of the completed forms for the administrative record. This information is taken back to the office in order to make a final judgment about what WROS zones are located where in the planning area. This information may also be input into a GIS data base. A final WROS map of the current supply of recreation opportunities is developed for subsequent planning and management purposes.

### Delineation of Current Overall WROS Classes

At this point in the WROS inventory, there are three WROS classifications for each acre of the planning area: the (a) current physical capability WROS classification, (b) current social WROS classification, and (c) current managerial WROS classification. Figure 12 is an example of how each WROS zone can be displayed with each of the three classifications, as well as the overall judgment as to which WROS class provides the best overall description.

**Figure 12. Decision Tool for Displaying the Physical, Social, Managerial, and Overall WROS Classifications for each Unit**

Inventory Sites	WROS Classification Assignments			OVERALL WROS
	Physical	Social	Managerial	
Site 1	Urban	Urban	Urban	URBAN
Site 2	Semi-primitive	Rural Developed	Semi-primitive	SEMI-PRIMITIVE
Site 3	Suburban	Urban	Rural developed	URBAN

Site 4                  Semi-primitive                  Primitive                  Primitive                  SEMI-  
PRIMITIVE

---

There will be instances when the physical, social and managerial WROS classifications are the same (e.g., zone 1). More often, particularly when the WROS is first applied, the classifications will be different (e.g., zone 2-4).

When the three classifications are the same, or when two of the three are the same, the decision about the overall WROS classification is relatively easy. It is more difficult to decide the overall WROS classification if the physical, social, and managerial classifications differ (e.g., zone 3). The rule of thumb is to base the overall WROS decision on sound professional judgment and preponderance of the evidence or circumstances.

### Inconsistency Resolution

An inconsistency is a situation where a zone has two or more WROS classifications; that is, the WROS classifications are different and not aligned with the current overall WROS classification. For example, the physical and social attributes might depict a rural developed WROS class, yet the lack of management signage, facilities, and patrol might be more consistent with a primitive WROS class. Depending upon the nature of the inconsistency, mitigation might be necessary or desired.

Figure 13 depicts that inconsistency mitigation involves two dimensions: (a) the degree of impact, and (b) the degree of reasonableness to mitigate. There may be situations where inconsistencies have a high impact on the intended water recreation opportunity, yet there is no reasonable way to mitigate (e.g., major highways, commercial shipping). Alternatively, there are inconsistencies with high impact that can be easily mitigated (e.g., directional lighting, a no dogs off-leash policy).

Figure 13 is a tool to help analyze inconsistencies by their relative degree of impact or consequence, that ability of management to mitigate, and a prioritization scheme.

**Figure 13. Evaluation Matrix Tool for Inconsistency Resolution**

Degree of reasonableness to adapt	Degree of impact or inconsistency			
	<u>Negligible</u>	<u>Minor</u>	<u>Moderate</u>	<u>High</u>
None				

Low	<i>priority D</i>	<i>Priority C</i>
Moderate	<i>priority C</i>	<b>Priority B</b>
High	<b>Priority B</b>	<b>Priority A</b>

(a) Those inconsistencies with a high degree of severity, extent, or consequence and high degree of reasonable mitigation should receive priority level A management attention.

The output of inconsistency mitigation is an evaluation matrix which contains specific inconsistencies in the various cells. The inconsistencies categorized in the cells labeled a moderate or high degree of impact and moderate or high degree of reasonable mitigation, should receive priority attention by management. Each of the priority inconsistencies can be compared to the guidance provided in the Management Guidelines and Standards section of this guidebook in order to align the WROS direction and bring balance to the system.

This concludes the inventory stage of the WROS system. At this juncture there are two options. A manager can proceed to *implement management direction* to eliminate the priority inconsistencies, or integrate the compiled WROS inventory information into a *resource management planning process*.

#### **4. WROS Planning: Integrating WROS into a Planning Process**

WROS is not a special or unique planning process. WROS is a framework and procedure for compiling an inventory of current water recreation opportunities for due consideration in a comprehensive and integrated resource management planning process. Metaphorically, WROS is like a single tree branch which feeds into the main stem or trunk of the tree; that is, WROS is one among many inventory tools which otherwise feed into the appropriate agency planning process. Appendix B contains Reclamation's Chapter 3: Planning Process from the Resource Management Planning Guidebook.

The Bureau of Reclamation, along with all federal land and water agencies, have regulations and procedures describing in detail each step of their planning process. This section is a WROS supplement to key steps in the existing RMP Guidebook .

##### **Identification of Issues, Concerns, Opportunities, and Constraints**

- Identify significant recreation-related public issues, management concerns, opportunities, constraints.

- Identify recreation stakeholders and develop a plan for collaboration.
- Assess quality and quantity of best available recreation-related science and monitoring information.
- Identify those areas or times unsuitable for recreation use.

### **Development of Planning Criteria**

- Compile important laws, regulations, policies, resource commitments, concession contracts, maps, plans.
- Establish operating principles (e.g., recreation management, ecosystem management, NEPA, visitor capacity decision making).
- Define planning area, time horizon, available resources, procedural steps, and responsibilities
- Develop working base map, determine appropriate scale of analysis, establish GIS database, secure current air photos.
- Select the decision criteria to be used to evaluate alternatives and assess recreational tradeoffs (Appendix C contains examples of decision criteria).
- Identify other administrative units or projects (comparables or analogs) that have had similar recreation situations.

### **Inventory Data and Information Collection**

- Integrate inventory maps depicting the overall current WROS classifications for the planning area, and all associated information in the development of WROS inventory (see Section 3: WROS Inventory in this guidebook).
- Develop WROS GIS overlay that is compatible with other GIS overlays (e.g., vegetation, recreation facilities, roads, wildlife habitat, topography, heritage resources).
- Identify current and future recreational demand. Measuring the demand for any public good or service is both an art and science. It involves identifying current use and users in the planning area, their use locations, type of activity, duration, travel patterns, origins, and quality of recreation opportunities. It may also involve asking (i.e., using social surveys) what the public in the local or regional area would like to have available that is not currently available.

Many agencies are also challenged to measure recreation and tourism demand, and thus it would be helpful to examine a variety of information sources such as the Statewide Comprehensive Outdoor Recreation Plans developed by each state park agency, the National Survey on Recreation and the Environment managed by the Southeast Forest Experiment Station of the U.S. Forest Service ([www.srs.fs.fed.us/trends](http://www.srs.fs.fed.us/trends)), state tourism board annual reports, highway traffic counts, federal agency plans and annual visitation

counts, county recreation master plans, and university research. It may also be helpful to collaborate and cost share on a regional survey every five years to more accurately measure recreation demand in the area.

- Identify current and anticipated non-recreational use and users in the planning area, location, duration, type of effect, and anticipated changes. County records on taxes, building permits, commerce trends, and other local and state reports can be helpful.
- Inventory all human built structures (recreation and non-recreation) and infrastructure, services, programs, personnel, budget, partners, and expected operational changes.
- Assess regional recreation demand, supply, and trends including an inventory of recreation opportunities provided by other agencies/private sector within “visitation” region.
- Compare current resource and social conditions to desired quality standards and map locations of known or likely impairment.

**Formulation of Alternatives**

- The WROS map generated as part of the WROS Inventory (Section 3 in the guidebook) depicts the Alternative #1 Current recreation management situation or often referred to as the “no action” alternative
- For each additional alternative that is considered in the RMP process, a revised WROS map is generated to visually depict change from the current situation
- A matrix is developed to understand key differences and to assure consideration of a reasonable range of alternatives (Figure 14 is an example of a comparative matrix that is helpful in formulating and evaluating alternatives)

**Figure 14. Formulation and Evaluation Matrix for RMP Alternatives**

	<u>A Reasonable Range of Alternatives</u>			
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
<u>Comparison of Alternatives</u>				
Recreation Management Prescription(s) goals, objectives, standards				
Number and Percent of WROS acres				
Urban				
Suburban				
Rural developed				(insert information to allow comparison)
Rural natural				
Semi-primitive				
Primitive				
Major Management Actions and Programs				
Visitor Capacity for Selected Locations				

Estimated Budget and Personnel  
Needs  
Economic Benefits  
Projected visitor expenditures  
Public Valuation (WTP)

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### **Evaluation of Alternatives**

Figure 14 can serve as an evaluation matrix to help evaluate the proposed alternatives. Furthermore, the decision criteria identified in the previous planning step (i.e., development of planning criteria) are used to evaluate the positive and negative consequences of each alternative.

It is likely that each alternative will have different strengths and weaknesses, and that several alternatives may be more highly favored among the larger group. It is helpful to examine the highly favored alternatives specifically in terms of how to mitigate the most significant of their negative consequences, and consider how to integrate the strengths from other alternatives into the favored alternative. This facet of evaluating the alternatives has been called mitigation assessment and enhancement analysis, and an example decision tool can be found in Appendix B.

### **Implementation and Monitoring of RMP**

This step involves the implementation of the selected or preferred alternative, which includes implementing the WROS strategy proposed in the alternative. Inconsistency mitigation and the Figure 13 matrix is useful to prioritize and schedule the implementation of activities and programs over time and across the planning area.

Monitoring is a vital tool to help managers learn from their efforts, be responsive, and to make good changes during implementation (i.e., adaptive management). It is important to integrate monitoring activities into the responsibilities of all personnel and to view it as an on-going activity. The monitoring program need not be complex but does need to cover important components: (a) monitor selected standards at sample sites (e.g., WROS Management Guidelines and Standards) and assess current levels versus desired or intended standard or quality levels, (b) monitor the actual versus desired or intended WROS water recreation opportunity for an area (e.g., type, amount, location, duration, and quality of recreation opportunity), and (c) monitor the actual versus planned annual budgets, personnel assignments, activities, actions, and programs.

At least annually, a staff meeting is desirable to review the monitoring data, identify potential reasons for achieving or not achieving planned targets and standards, propose strategies to mitigate negative consequences or new circumstances, and to discuss priority actions and locations.

Adaptive management is an expectation in the WROS system. Change should be expected due to the knowledge gained from monitoring, as well as from new science, information, or circumstances. Yet, adaptation

and change should be deliberate and use the same standard for WROS decision making as prescribed in Section ----- of this guidebook.

## 5. WROS Management: Guidelines and Standards

The following section contains matrices of the recommended guidelines and standards for each WROS classification. This section is intended to provide guidance and yet should be flexible and adaptable to special local situations. The overall judgment as to deviation from these guidelines and standards should be *What is the justification for any change and will any change allow the visitors to have the experience that the WROS class is intended to provide?* A written detailed explanation would be appropriate for the administrative record.

Management Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Routine patrol	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate
Wakeless speeds	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate
Closures	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate
Buoys	appropriate	appropriate	appropriate	appropriate	appropriate	NA
High Speeds	appropriate	appropriate	appropriate	appropriate	NA	NA
Signal Lights	appropriate	appropriate	appropriate	appropriate	NA	NA
Interpretive markers	appropriate	appropriate	appropriate	appropriate	NA	NA
Visitor centers	appropriate	appropriate	appropriate	NA	NA	NA
Interpretive Programming	appropriate	appropriate	appropriate	appropriate	NA	NA
Designated beach areas	appropriate	appropriate	appropriate	appropriate	NA	NA
Paved boat ramps	appropriate	appropriate	appropriate	appropriate	NA	NA
Overnight security lighting	appropriate	appropriate	appropriate	NA	NA	NA
Marine sanitation devices	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate
Floating sanitation platforms	NA	NA	appropriate	appropriate	appropriate	NA
Floating camping platforms	NA	NA	appropriate	appropriate	appropriate	NA
Volunteers/ hosts/ friends groups	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate

Boat fuel sales	appropriate	appropriate	appropriate	appropriate	NA	NA
Boat moorings	appropriate	appropriate	appropriate	appropriate	appropriate	NA
Boat docks	appropriate	appropriate	appropriate	appropriate	NA	NA
Community piers	appropriate	appropriate	appropriate	NA	NA	
Sanitation pump stations	appropriate	appropriate	appropriate	appropriate	NA	NA
Drinking water	appropriate	appropriate	appropriate	appropriate	NA	NA
Electrical hookups	appropriate	appropriate	appropriate	NA	NA	NA
Bath Houses	appropriate	appropriate	appropriate	NA	NA	NA
Picnic shelters	appropriate	appropriate	appropriate	appropriate	NA	NA
Flush toilets	appropriate	appropriate	appropriate	NA	NA	NA
Pit/Vault toilets	NA	NA	NA	appropriate	appropriate	NA
Playground	appropriate	appropriate	appropriate	NA	NA	NA
Paved parking	appropriate	appropriate	appropriate	NA	NA	NA
Sports fields	appropriate	appropriate	appropriate	NA	NA	NA
Fireplace/grill	appropriate	appropriate	appropriate	appropriate	NA	NA
Fish cleaning stations	appropriate	appropriate	appropriate	appropriate	NA	NA
Full service resorts	appropriate	appropriate	appropriate	NA	NA	NA
Full service marinas	appropriate	appropriate	appropriate	NA	NA	NA
Youth camps/ dude ranches	NA	NA	appropriate	appropriate	appropriate	NA
Rustic campgrounds	NA	NA	NA	appropriate	appropriate	NA
Fishing tournaments	appropriate	appropriate	appropriate	appropriate	appropriate	NA
Boat racing	NA	appropriate	appropriate	appropriate	NA	NA
Life Guards	appropriate	appropriate	NA	NA	NA	NA
Reservations for launch times/campsites	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate
User fee systems	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate
Food service concessions	appropriate	appropriate	appropriate	appropriate	NA	NA
Golf course	appropriate	appropriate	appropriate	NA	NA	NA
Shooting or Archery range	NA	NA	appropriate	appropriate	NA	NA
Amphitheatre	appropriate	appropriate	appropriate	NA	NA	NA
Paved trail	appropriate	appropriate	appropriate	NA	NA	NA
Unpaved trail	NA	NA	appropriate	appropriate	appropriate	appropriate
Wildlife habitat improvement	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate
Fishery habitat improvement	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate
Vegetation Management	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate
Wildfire management	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate
Resource monitoring	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate
Visitor Monitoring	appropriate	appropriate	appropriate	appropriate	appropriate	appropriate

Communication tower	appropriate	appropriate	appropriate	appropriate	NA	NA
Silos/stack	appropriate	appropriate	appropriate	appropriate	NA	NA
Break wall, riprap, channelization	appropriate	appropriate	appropriate	appropriate	appropriate	NA
Maximum Decibel levels	75	75	75	60	50	45
Reasonable maximum boat speed	-----	-----	-----	-----	10 mph	5 mph
Reasonable number of audio encounters per day	-----	-----	-----	-----	LT 10 boats per day	LT 3 boats per day
Reasonable number of visual encounters per day	-----	-----	-----	-----	LT 10 boats per day	LT 3 boats per day
Reasonable launch time	LT 30 minutes	LT 30 minutes	LT 30 minutes	LT 15 minutes	No wait	No wait
Reasonable retrieval time	LT 30 minutes	LT 30 minutes	LT 30 minutes	LT 15 minutes	No wait	No wait
Quiet times	10pm—6am	10pm—6am	10pm—6am	10pm--6am	24/7	24/7
Reasonable Minimum Number of Flat Water Ares per Boat	1 – 10 acres	10 – 20 acres	20-50 acres	50 – 110 acres (1/4 sq. mi.)	110 – 480 acres (3/4 sq. mi.)	480 – 3200 acres (5 sq. mi.)
Reasonable Minimum Number of River Miles per Boat	1/8 <sup>th</sup> mile (220 yds.)	1/4 <sup>th</sup> mile (440 yds)	1/4 <sup>th</sup> mile (440 yds)	½ mile or 20 minute separation	2 miles or 1 hour separation	4 miles or 2 hour separation
Beach/Picnic site vehicle parking	25+ per acre	10-25 per acre	10-25 per acre	10-15 per acre	NA	NA
Visual quality objective	Maximum modification	Maximum modification	Modification	Partial retention	Retention	Preservation
Group campsites per acre in developed campground	NA	2	1	1	NA	NA
Family campsites per acre in developed campground	NA	5-10 per acre	3-5 per acre	3- per acre	Out of sight and sound of other parties	Out of sight and sound of other parties
Minimum distance between dispersed shoreline campsites	NA	NA	1/8th mile (220 yds.)	¼ mile (440 yds)	½ mile or out of sight and sound of other parties	1 mile or out of sight and sound of other parties
Minimum distance between on-water overnight sites (e.g. houseboats, sailboats, cabin cruisers)	NA	NA	1/8th mile (220 yds.)	¼ mile (440 yds)	½ mile or out of sight and sound of other parties	1 mile or out of sight and sound of other parties

Minimum routine maintenance	Daily in high use season/weekly in low season	Daily in high use season/weekly in low season	Daily in high use season/weekly in low season	Weekly in high use season/bi-weekly in low season	Weekly in high use season/monthly in low season	Monthly in high use season
Water quality standards	Meet or exceed state standards	Meet or exceed state standards	Meet or exceed state standards	Meet or exceed state standards	Exceed state standards	Exceed state standards
Air quality standards	Meet or exceed state standards	Meet or exceed state standards	Meet or exceed state standards	Meet or exceed state standards	Exceed state standards	Exceed state standards
Level of natural or cultural resource impairment	None	None	None	None	None	None
Reasonable Standard for the Percent of Highly Satisfied Visitors	80+%	80+%	80+%	80+%	80+%	80+%
Minimum standard for monitoring visitor use (type, amount, location, duration)	Daily in primary season	Daily in primary season	Daily in primary season	Weekly in primary season	Weekly in primary season	Monthly in primary
Minimum standard for monitoring visitor satisfaction/perceptions/preferences	Every 3 years	Every 3 years	Every 3 years	Every 3 years	Every 3 years	Every 3 years
Minimum standard for monitoring regional recreation demand and supply trends	Every 3 years	Every 3 years	Every 6 years	Every 6 years	Every 6 years	Every 6 years

### Boating Capacity Range Indicator Decision Tool

**Directions:** The purpose of the decision tool is to help managers consider important factors affecting boating capacity and to help assure and document the reasoned analysis used in making a visitor capacity decision. For those acres that are suitable for boating recreation within the WROS zone in question, consider the following factors that may affect boater capacity. **Circle the descriptor** that best matches the situation. The preponderance of the answers will advise which part of the capacity range provided in WROS system may be more reasonable.

Typical size of boats	<15 feet	16 – 25	>25
Typical speed of boats	<10 mph	10 – 25	>25
Diversity of Boating:			
a. different types of boats	low	moderate	high
b. different size of boats	low	moderate	high
c. different speed of boats	low	moderate	high
Boater visitation pattern (one-way — multi-directional)	simple/ predictable	moderate	complex/ unpredictable
Level of boater stewardship/ civility/respect for resource and others visitors	high	moderate	low
Shoreline configuration	simple/ circular	moderate	complex/ meandering
Boater destination or pass-through area	pass-through corridor/in-transit	mixed	destination area/overnight area
Extent of sensitive resources/ Potential for impact	low	medium	high
Compatibility with adjacent recreation/non-recreation land uses	high	moderate	low
Islands/shallows/hazards	infrequent	occasional	frequent
Historic public safety record/	infrequent	occasional	frequent

accidents/complaints/conflicts

incidents

incidents

Level of boater management/rules/  
information/education/compliance

high

moderate

low

Other factors:

1.

2.

---

**Suggested Capacity Range =**

**lower range  
(more boats)**

**mid-range**

**higher-range  
(fewer boats)**

## Reasonable Boating Capacity Coefficients

### One Boat at One Time (BAOT) per "X" water surface acres:

	<u>Low range</u>		<u>High range</u>
Urban:	1 acre/boat	-----	10 acres/boat
Suburban	10 acres/boat	-----	20 acres/boat
Rural developed	20 acres/boat	-----	50 acres/boat
Rural natural	50 acres/boat	-----	110 acres/boat (1/4 sq mile)
Semi-primitive	110 acres/boat	-----	480 acres/boat (3/4 sq mile)
Primitive	480 acres/boat	-----	3200 acres/boat (5 sq miles)

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a. 640 Acres = one square mile

b. boating capacity coefficients based upon collaborative expert opinion, published literature, and sound professional judgment

## **Appendices**

- Water Recreation Benefits
- Reclamation's Chapter 3: Planning Process from the RMP Guidebook
- Decision Tools from the Federal Interagency Task Force on Visitor Capacity
- Reference to other Related Systems and Sources of Information (pending)
- Visitor Monitoring Guidance (pending development)