Chapter 2:

WROS Inventory

Above and center, expert teams are important in the recreation inventory

Below, signs are often needed but can change the visual setting

This chapter provides operational details of how to conduct a WROS inventory to map the current supply of recreation opportunities based upon measurement of the current physical, social, and managerial attributes in the area. Chapter 2 has three sections that (1) define the scope of the inventory, (2) describe the attributes and protocol used in the WROS inventory, and (3) detail the inventory steps to mapping the current supply of recreation opportunities.

Defining the Scope

A variety of important decisions should be made and actions taken early to define the scope of the effort to be undertaken and what level of analysis will be required. Listed below are key questions and actions that are precursors to the actual WROS inventory.

Develop a comprehensive base map. The WROS inventory requires a quality base map and a compilation of all related documents and materials. Developing a comprehensive base map will define the study area as well as assist managers in understanding the level of effort that may be required. Some of the features that may be important include:

- water-surface area
- seasonal water levels
- water depths
- topography
- primary and secondary roads
- power transmission lines
- aquatic and terrestrial vegetation
- hazards and shallows
- cultural and historic structures
- important fish and wildlife habitat
- water operation facilities
- special resources or values
- private land and rights of way
- navigational lights, markers
- subdivisions, communities
- buildings and structures
- recreation facilities
- diversions, channels, riprap
- dam security area
- public health and safety areas

The various documents and materials that might be collected 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 statistics, trends, studies, road counts, surveys.
- Regional map showing the location of other water recreation opportunities.
- Reports, studies, trends, or other materials from county, State, or Federal partners.
- List of important contacts (e.g., local, State, and Federal agencies; local communities; tourism offices; special interest groups; universities).

Define the geographic location or study area for the WROS inventory. While agencies have jurisdictional boundaries, the visiting public often enjoys multiple local, State, and Federal areas on a single visit. The public's "visitation range" is often larger than a single agency's jurisdiction, and includes adjacent lands and waters where visitors spend time traveling, recreating, or viewing. Thus, the question is how large should the study area be to make good management decisions on the lands and waters within a manager's jurisdiction?

A reasonable rule of thumb is to define the study area for the WROS inventory to include those lands and waters that may affect the quality of the water recreation opportunity. It might also be helpful to think from the perspective of the visitor: (1) What is the visitation range (i.e., analogous to a wildlife's home range) or area that most visitors also visit when they are visiting the general area? (2) Where do visitors go and what do they do beyond the primary water resource in question? (3) Are there land uses adjacent to or within the study area that may affect the recreation opportunities?

Detailed WROS inventory, planning, and management will only occur within the study area and within the jurisdiction of the managing agency. Yet, it may be necessary and beneficial to consider, particularly during WROS inventory and planning stages, the larger area of influence beyond the study area in order to help decide how to manage the recreation opportunities in the study area.

Decide the level of resolution or appropriate scale of the base map. In theory, one could conduct a WROS inventory on any size area (e.g., 50 square miles, 10,000 acres, 1 acre). The real question is what scale is practical, usable, and compatible with other resource inventories and accommodates a GIS interface.

A reasonable scale for WROS inventory mapping is a minimum of 160 acres, or 1/4 of a section; that is, a WROS zone should be at least 160 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 1:24,000 scale might be better for small study 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.

Decide the time period for applying WROS. Water recreation opportunities and management direction change during the year because of weather, water uses, type and pattern of visitation, facility closures, water operations, personnel staffing, and many other factors. Thus, an important decision relates to the period of time to which WROS is being applied. It is reasonable to develop WROS inventory maps for the major recreation seasons, for the high and low water periods, or for periods when major changes are anticipated. A reasonable rule of thumb is that the time period will be defined by the important public concerns and management issues that are driving the analysis or planning process.

The effective WROS area consists of those acres that are available and suitable for recreation purposes.

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

The WROS inventory will describe the type and location of current water recreation opportunities and identify inconsistencies that may be affecting the quality of the current opportunities. 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 another desired water recreation opportunity.

Determine the effective WROS area under consideration. The effective WROS area consists of those acres that are available and suitable for recreation purposes. Identifying and demarking on the base map all the areas that are not suitable for recreational purposes is important early in the inventory process. For example, unsuitable lands and waters could include security areas, water storage and power facilities, private inholdings, municipal or industrial operations, commercial shipping or barge lanes, ecologically sensitive areas, public hazard areas, cultural and historic sites, wildlife nesting areas, shallows and wetlands, or locations that are undesirable because of smells, sounds, and views.

Water operation facilities and security areas often remove an area from recreation use

Wildlife nesting areas and migration patterns should be considered in WROS

Adjacent land uses need to be identified early in WROS

The effective supply of recreation opportunities can change weekly (e.g., no commercial transport on weekends) or seasonally because of fish and wildlife migration, hunting seasons, facility closure, reservoir drawdown, weather, and many other factors.

Identify any other important planning considerations that may affect WROS. The application of WROS will be affected by other considerations in defining the scope. Examples include: 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? What constitutes the WROS team and what is the responsibility of each member? Who is the decision maker or the responsible official? What criteria will be used to arrive at a decision? What is the planning horizon or the number of years into the future that should be targeted? What will be the nature of external collaboration with the visitors, community, private sector, and other stakeholders? What external experts will be used, if any, and what will be their role? What changes to the current water operations, recreation opportunities, adjacent land use, or other considerations are not reasonable or are beyond the scope of the planning effort?

Develop a basic profile of the planning area. Figure 11 is an example of a profile tool to assemble and record important recreation and water resource information useful in WROS

Figure 11. An Example of a Basic Water Resources Profile Tool

Name of Water Resource:_____ **County/State:**_____

Managing Agency/Office:

_____

Estimate the average river flows (cfs) or water elevation for each season over the last 5 years:

Spring: _____ Summer: _____ Winter: _____ Fall: _____

River Flow, if applicable. **Current cubic feet per second:**_____

Check the item below that best describes the river flow.

Very high flow: Very fast moving deep water, some very big rapids, water very high or over the banks, a few exposed large rocks

_____ *High flow*: Fast moving moderately deep water, many big rapids, water close to top of bank, a number of big exposed rocks

_____ *Medium flow*: Steady moving moderately deep water, many large exposed rocks in rapids, water slightly down from high water line

_____ *Low flow*: Slow moving water, many exposed rocks, river bottom exposed for a few feet out from the high water line

_____ *Very low flow*: Very slow moving shallow water, exposed mud flats, river rocks and bottom often exposed, water barely covering bottom in rapids, must choose floatable areas, bottom exposed for several feet out from high water shoreline

Lake or Reservoir Elevation, if applicable. **Current water elevation:**_____

Check the item below that best describes the lake or reservoir.

_____ *Very high water*: Reservoir full to overfull. Some flooding occurring. Trees and bushes in the water. Water high on boat ramps. Water often muddy and carrying sticks and other debris.

_____ *High water*: Reservoir full to nearly full

_____ *Medium water*: Reservoir below full. High water line exposed. Some sand bars and mud areas exposed.

_____ *Low water*: Lots of exposed shoreline area, mud flats, and sand bars. Some exposed rocks, stumps, and other hazards near the water surface. Trees and bushes that are submerged during very high water are now out of water. Water low on the boat ramps.

_____ *Very low water*: Lots of exposed shoreline, mudflats, rocks, and stumps. Water very low on the boat ramps. Sometimes ramps and docks are out of the water and unusable. Difficult, if not impossible, to get to the water from the shore. Sometimes coves are dry, and a good part of the reservoir bottom is dry with only a stream showing.

Most Popular Recreation Activities by Season:

	SPRING	SUMMER	FALL	WINTER
1st.	_____	_____	_____	_____
2nd.	_____	_____	_____	_____
3rd.	_____	_____	_____	_____
4th	_____	_____	_____	_____

Figure 11 Continued. An Example of a Basic Water Resources Profile Tool

Total Annual Visitation

Number of annual visitors:_____ Number of annual visitor days ____ ____ ___

% of visitors who are day-users:_____ Average length of stay: _____ ___

Visitation Percentages 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 ____

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

1.

2.

3

4

5.

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

Number 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

Evaluator's Name: _____ Phone: Date:____ _____

The WROS Inventory Attributes and Protocol

The WROS inventory produces a map delineating the type and location of the current WROS classes; that is, a map that shows the current supply of available recreation opportunities. This section explains the WROS inventory protocol and the attributes used in the inventory and details the steps necessary for a WROS inventory of the current situation.

Figure 12. The WROS Inventory Protocol

WROS Inventory Protocol

Mapping the Supply of Recreation Opportunities

Name of Water Resource _____ *Date* _____

User Name and Title _____

Inventory Site No *Local Name* _____

UTM Coordinates _____

Planning Period Under Consideration _____

As previously described in chapter 1, a recreation setting consists of physical, social, and managerial attributes that affect the quality or nature of the recreation experience. (See figure 4.) Since it is not practical to inventory every possible setting attribute, WROS uses 15 attributes as the basis for delineating the type and location of the existing WROS classes. Five physical, six social, and four management attributes have been chosen because each can have a major influence on the type of recreation opportunity that is currently available. With due deliberation and justification, there also may be situations where managers add or delete attributes to the inventory protocol.

The inventory attributes are packaged into the WROS Inventory Protocol (Protocol). The Protocol is an inventory "booklet" completed by each trained person at each inventory site. Figure 12 depicts the front page of the Protocol. Inside the Protocol is a page for each of the physical, social, and managerial attributes. Figures 13, 14, and 15 show the three pages in the Protocol, the 15 inventory attributes used to delineate the WROS class, and the scale of degree previously discussed in chapter 1. (Note that the scale of degree presented in figure 10 is reversed for two attributes and is replaced with a mileage measurement for the distance attribute.)

Figure 13. WROS Physical Inventory

Physical attributes are features that are relatively permanent or fixed within the landscape and are not likely to change soon.
Field Notes:

Circle the degree, extent, or magnitude that the following attributes are present at this site.

Degree of Development Degree that dams, major bridges, marinas, parks, resorts, highways, or other municipal, industrial, or commercial structures are present	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Sense of Closeness to a Community Degree that visitors sense that they are close to the sights, sounds, and smells typical of a community	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Degree of Natural Resource Modification Degree that the visitors are aware that the natural resources have been altered by human activity, technology, or development	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Distance from Development on or Adjacent to the Water Resource Mileage from dams, major bridges, marinas, resorts, or other municipal, industrial, commercial, or residential areas	Less than 0.5 mile	0.5-2 Miles	2-5 Miles	5-8 Miles	8-10 Miles	More than 10 miles
Degree that Natural Ambiance Dominates the Area. Degree that there is a sense of tranquility and opportunity to see, hear, and smell nature	Very minor, very little, or rare 0-3%	Minor, little, or seldom 3-10%	Occasional, infrequent, or periodic 10-20%	Prevalent, common, or apparent 20-50%	Very prevalent or widespread 50-80%	Extensive, dominant 80-100%
Circle the number that best represents your overall judgment of the area. Scores with one decimal point such as 5.5 are acceptable.	1 2 **Urban**	3 4 **Suburban**	5 6 **Rural Developed**	7 8 **Rural Natural**	9 10 **Semi Primitive**	11 **Primitive**

Figure 14. WROS Social Inventory

Social attributes are features associated with visitor's activities, behaviors, and perceptions of the area
Field Notes:

Circle the degree, extent, or magnitude that the following attributes are present at this site.

Degree of Visitor Presence Degree that the sights, sounds, and smells of other visitors, their equipment, their impacts, or litter are present	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Degree of Visitor Concentration Degree that visitors congregate on the shore or water in the area (e.g., coves, beaches, swim areas, good fishing spots, campareas)	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Degree of Recreation Diversity Degree that there is a mixture of recreation activities being participated in or equipment being used	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Degree of Visitor Comforts Degree that visitors know that conveniences, comforts, safety, and security are nearby	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Degree of Solitude and Remoteness Degree that visitors view themselves as being alone and far away from civilization in a wild and remote place	Very minor, very little, or rare 0-3%	Minor, little, or seldom 3-10%	Occasional, infrequent, or periodic 10-20%	Prevalent, common, or apparent 20-50%	Very prevalent or widespread 50-80%	Extensive, dominant 80-100%
Degree of Non-Recreational Use, If Any Degree that the sights, sounds, and smells of non-recreational use and users are present (i.e., activities associated with commerce, work places, industry, roads, airplanes, agriculture, or communications)	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Circle the number that best represents your overall judgment of the area. Scores with one decimal point such as 5.5 are acceptable.	1 2 3 **Urban**	4 **Suburban**	5 6 **Rural Developed**	7 **Rural Natural**	8 9 10 **Semi Primitive**	11 **Primitive**

Figure 15. WROS Management Inventory

Management attributes are those features that are provided for, managed, and can be changed by the managing agency or its partners.

Field Notes:

Circle the degree, extent, or magnitude that the following attributes are present at this site.

Degree of Management Presence Degree that management personnel, boat patrols, signage, equipment, beacons, water markers, buoys, entry stations, wakeless zones, closures, speed zones, regulations, security lighting, administrative offices and compounds, or interpretive programs are present.	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Degree of Public Access Degree that developed access facilities are present such as boat ramps, paved roads and trails, or swim beaches.	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Degree of Developed Recreation Facilities and Sites Degree that developed campgrounds, pump stations, paved parking, amphitheaters, picnic sites, play areas, nature trails, flush toilets, showers, docks, piers, visitor centers, marinas, or resorts are present.	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Degree of Visitor Services and Conveniences Degree that restaurants, fuel, boat rentals, guide services, lodging, stores, medical services, utilities, lighting, telephones, or fax machines are within a few miles.	Extensive, dominant 80-100%	Very prevalent or widespread 50-80%	Prevalent, common, or apparent 20-50%	Occasional, infrequent, or periodic 10-20%	Minor, little, or seldom 3-10%	Very minor, very little, or rare 0-3%
Circle the number that best represents your overall judgment of the area. Scores with one decimal point such as 5.5 are acceptable.	1 2 3 4 5 6 7 8 9 10 11					
	Urban	**Suburban**	**Rural Developed**	**Rural Natural**	**Semi Primitive**	**Primitive**

Using collaborative expert opinions to conduct an inventory

Team members evaluating the setting

The team needs to prepare for the WROS inventory

Mapping the Current Supply of Recreation Opportunities

Mapping the current supply of recreation opportunities in the study area means determining what WROS class or classes the area is currently supplying. The following steps are recommended for Levels 2 and 3 WROS analysis. (See figure 9 in chapter 1.) Level 1 analysis is typically conducted in the office by a recreation staff person, and many of these steps do not apply.

1. Assemble a small core team (i.e., four to six members) of experienced professionals representing different staff functions (e.g., recreation management, natural and cultural resources, maintenance, law enforcement, or interpretation). These members would probably be the agency experts most familiar with the recreation phenomena over the years. Having several professionals from another area, agency, or private firm that have had experience with applying WROS is highly recommended. Because the purpose of the inventory is to describe and map the nature of the current recreation opportunities, there may be an advantage to having several local and long-term recreation users participate. The total team might range in size from 6 to 12 members for a Level 2 or 3 WROS analysis.

2. Introduce the team to the planning area, base map, WROS system, time of year under consideration, and the inventory protocol used for mapping the supply of current recreation opportunities. Thorough understanding of the descriptions of the recreation experiences for each WROS class (see figures 6 and 7 in chapter 1) is important early in the process, particularly for those inexperienced with WROS. The *WROS Users' Guidebook* would be a valuable training tool.

3. Once familiar with WROS, the team should prepare for the field inventory. The field inventory requires accessing a boat large enough for the team to experience the inventory sites and comfortably discuss their observations and ratings. Pontoons, patio boats, and houseboats work well for this task. While maps, air photos, reports, GIS analyses, and other office information are very helpful for Level 1 analysis, they are not sufficient for level 2 and 3 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.

4. The field inventory typically begins in the vicinity of the most highly developed portion of the water resource (e.g., marina, subdivision, industrial activity, or developed park complex).

5. At each inventory site, the boat should be stopped, the engine turned off, and the team should take a few minutes to "experience" the setting. After a few minutes, the team members familiar with the location have a chance to present their views of the type and nature of the recreation use for the planning period in question (e.g., describe how, when, and why recreationists use the area, and the type and amount of management, and who the recreationists are). 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 under consideration at the inventory site. For example, the inventory site might include the water and land resources within 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 of the period that is under consideration (e.g., weekend, May, summer).

Each rater evaluates the recreation setting

6. Each team member is provided a copy of the WROS Inventory Protocol. The attributes listed on the left side of the Protocol are considered the important characteristics of the setting. Each rater is asked to ***circle the degree, extent, or magnitude that the following attributes are present at this site.*** To the right of each attribute is the scale of degree previously discussed in chapter 1 and displayed in figure 10.

   There will be instances when a listed attribute is not considered relevant or when some other attribute should be added for consideration. As described in chapter 1, WROS is flexible and operates on the standards of the rule of reasonableness and sound professional judgment.

Long time lake users can help in the inventory

7. Working individually, each rater completes the WROS physical inventory page in the Protocol (see figure 13) by considering each attribute in the left column and then circling or checking the cell that best describes the attribute's presence at that site. Note that, on the physical inventory, the *distance from development* attribute is measured in miles, and the *degree of natural ambiance* reverses the scale of degree from *very minor* on the left to *dominant* on the right.

After each attribute is checked or circled on the scale of degree, each rater is asked at the bottom of the page to ***circle the number which best represents your overall judgment of the area.*** Each person individually circles a number, ranging from 1 to 11, that best represents his or her overall judgment of the WROS class at the inventory site. The odd numbers represent the six WROS classes, while the even numbers represent the mid-point between two WROS classes.

This decision should be based on the sound professional judgment of the raters, preponderance of the evidence, and how the attributes were circled in the cells above. There is no formula or mathematical calculation to arrive at this overall judgment for the area.

Local groups know a great deal about the lakes recreation use. They are experts to be included in the WROS inventory

8. After all raters complete their physical inventory, a "straw" vote is taken and each person states the overall number at the bottom. After all raters have a chance to express what factors influenced their scores, a second straw vote is taken and duly recorded on a master form. Typically, the results of the second vote (i.e., the overall numbers expressed after some discussion) will converge and there will be team consensus. Recording the average score to one decimal point is acceptable.

   In cases where there is significant divergence, more discussion is advised until team consensus is approached. In some cases, it may be helpful to dismiss the two extreme outliers or revisit the inventory site after the other sites on the water resource have been inventoried or make a final decision after more information is made available back in the office.

9. 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 is being provided at this location?*** It is important during the inventory process, particularly for those inexperienced with WROS, to periodically reread the descriptions of the recreation experiences for each WROS class. (See figures 6 and 7 in chapter 1.)

10. The process used for completing the physical inventory is repeated for the social and managerial inventory (see figures 14 and 15) contained within the protocol.

11. The results of these efforts 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 that is maintained during the field inventory, and the team forms are collected and filed for the administrative record.

    The first site inventoried may take 30 to 45 minutes with inexperienced people. The time at each subsequent inventory site will shorten to perhaps 15 minutes after a half-dozen trials by the team. The first three or four inventory sites should be viewed as practice tests or trials. Thus, it is advisable to return to these sites after the entire water resource has been surveyed to see if adjustments would be appropriate.

12. After the initial site inventory is complete, the team travels by boat to the next inventory site. Two strategies have worked well. One, the next inventory site can be chosen when there is an apparent change in the physical, social, or management attributes of the setting or when the team has traveled a significant distance (e.g., several miles) from the previous site. Two, the next inventory site might be the location with the least development (compared to the first inventory site) and in the most remote part of the water resource. This allows the team to get a sense for the WROS diversity in the study area, although the logistics of travel and time may not be reasonable.

13. If there are very popular shoreline locations (e.g., campgrounds, swimming beaches) or very popular islands, it may be helpful to do a site inventory from land. Also, on a very large water resource (e.g., 100-mile-long study area), it may be decided to do initial WROS inventories every 5 or 10 miles, while recognizing that a more detailed or finer-level inventory might be necessary for parts of the body of the water resource on a follow-up trip.

14. The final results of the field inventory include (1) a working map of the study area that identifies the inventory sites, (2) the team's overall ratings from 1 to 11 for the physical, social, and managerial inventories, and (3) a file of the completed protocols for the administrative record.

Above, it is important to inventory on the water.

Below, WROS engages stakeholders to ensure better decisions.

15. This typically concludes the work of the WROS inventory team created in step 1 of this section, although some or all of the participants may remain involved in other aspects of WROS. At this point, the responsible recreation staff person needs to (1) delineate the current overall WROS classes and (2) identify and prioritize inconsistencies that may exist in the current situation. These two considerations are discussed in the following sections, and examples are provided of the final WROS maps depicting the type and location of the current recreation situation.

Delineation of Current Overall WROS Class

At this point in the WROS inventory, each inventory site has an agreed-upon team rating for its physical, social, and managerial attributes. Figure 16 is an example of how each inventory site and its ratings can be displayed. The next step is for the expert team to use sound professional judgment in aggregating the three attribute ratings to make an overall judgment as to which WROS class best represents the current situation or the supply of recreation opportunities. There will be instances when the physical, social, and managerial WROS ratings are the same (e.g., inventory site 1). More often, particularly when WROS is first applied, the ratings will be different (e.g.,

Figure 16. A Tool for Displaying the Setting Attribute Ratings and Overall WROS Classification.

Inventory Sites	Setting Attribute Ratings: Physical	Social	Managerial	WROS Classification
1. Auk's Resort	3.0	3.0	3.0	Suburban (S3)
2. Haas's Houseboats	5.3	4.5	4.0	Rural Developed (RD5)
3. Lovejoy's Landing	6.1	5.7	5.1	Rural Developed (RD6)
4. Welch's Hunting Camp	10.2	9.3	8.2	Semi Primitive (SP9)

inventory sites 2, 3, and 4). When two or three of the setting attribute ratings at a site are similar, the decision about the overall WROS classification is relatively easy to make. It is more difficult to decide the overall WROS classification if the physical, social, and managerial classifications at a site differ considerably (e.g., inventory site 4).

In instances where there are differences among the setting attribute ratings, the 11-point scale in the Inventory Protocol offers a major advantage. An 11-point scale allows for a finer level of assessment than a 6-point scale and identifies areas where there are transitions, gradations, or "leanings" towards one WROS class versus another. It allows for a higher level of accuracy during the inventory stage and helps managers to consider alternative ways to manage the area in the future. In effect, an 11-point scale gives the expert team the option to indicate up to 16 gradations of recreation opportunities, depicted as follows:

WROS INVENTORY SCALE

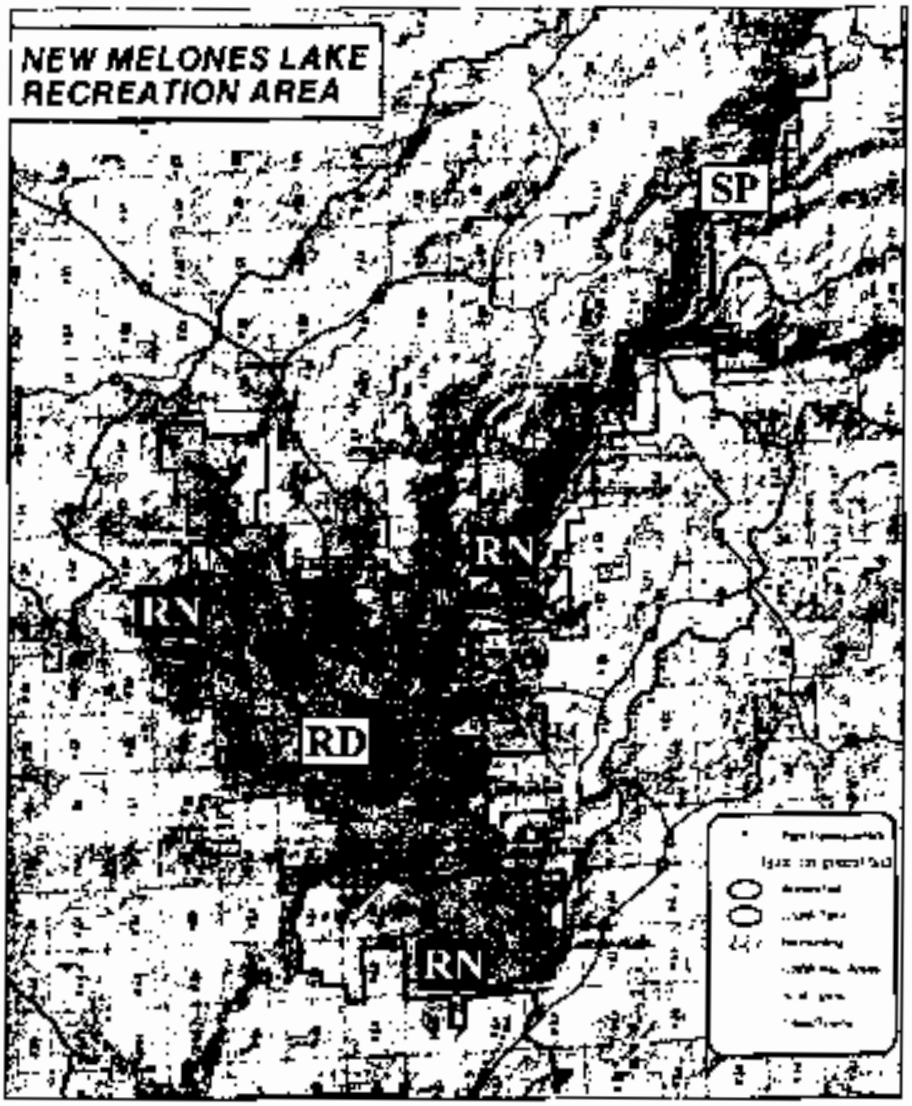
1	2	3	4	5	6	7	8	9	10	11
U		S		RD		RN		SP		P

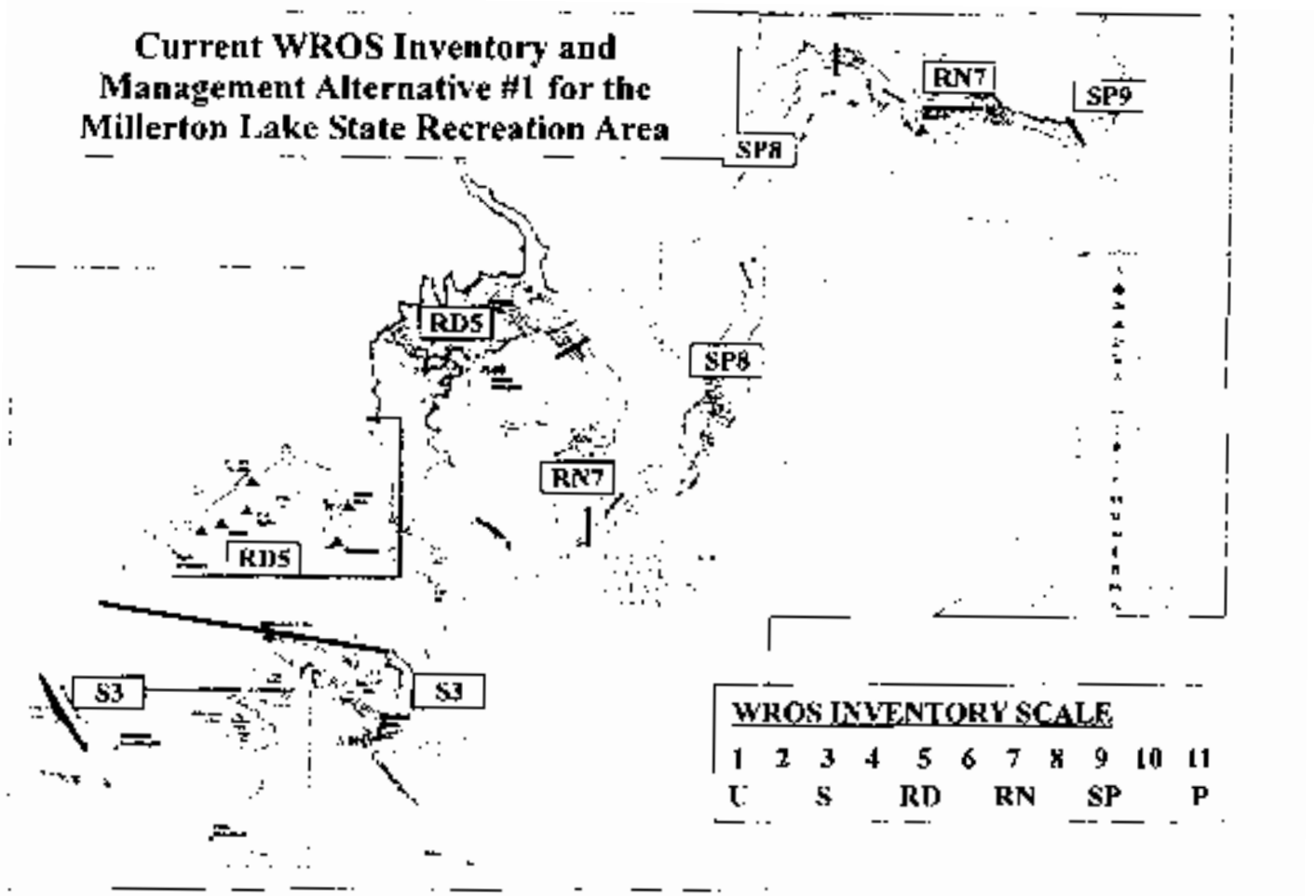
U1	U2	S2	S3	S4	RD4	RD5	RD6	RN6	RN7	RN8	SP8	SP9	SP10	P10	P11

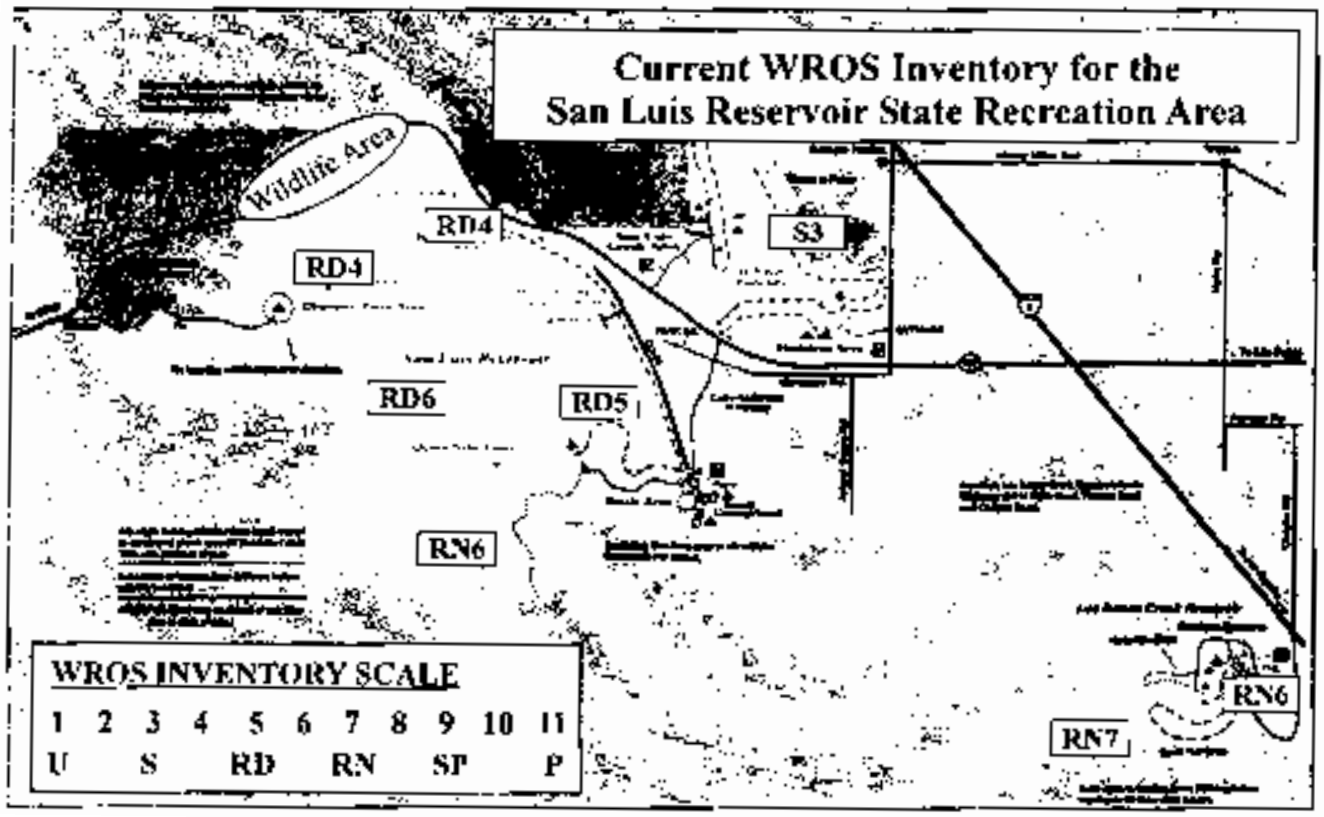
The six primary WROS classes are U1, S3, RD5, RN7, SP9, and P11. The other ratings reflect a transition or leaning between two primary WROS classes. For example, RD6 is a score to the right of the primary rural developed WROS class (RD5), suggesting that there are some attributes in this area that are more typical of a rural natural setting that pull the overall rating from RD5 to RD6. Likewise, RN6 indicates that there are some attributes at the site that are more typical of a rural developed WROS class and these attributes pull the overall rating from the primary rural natural WROS class of RN7 to RN6.

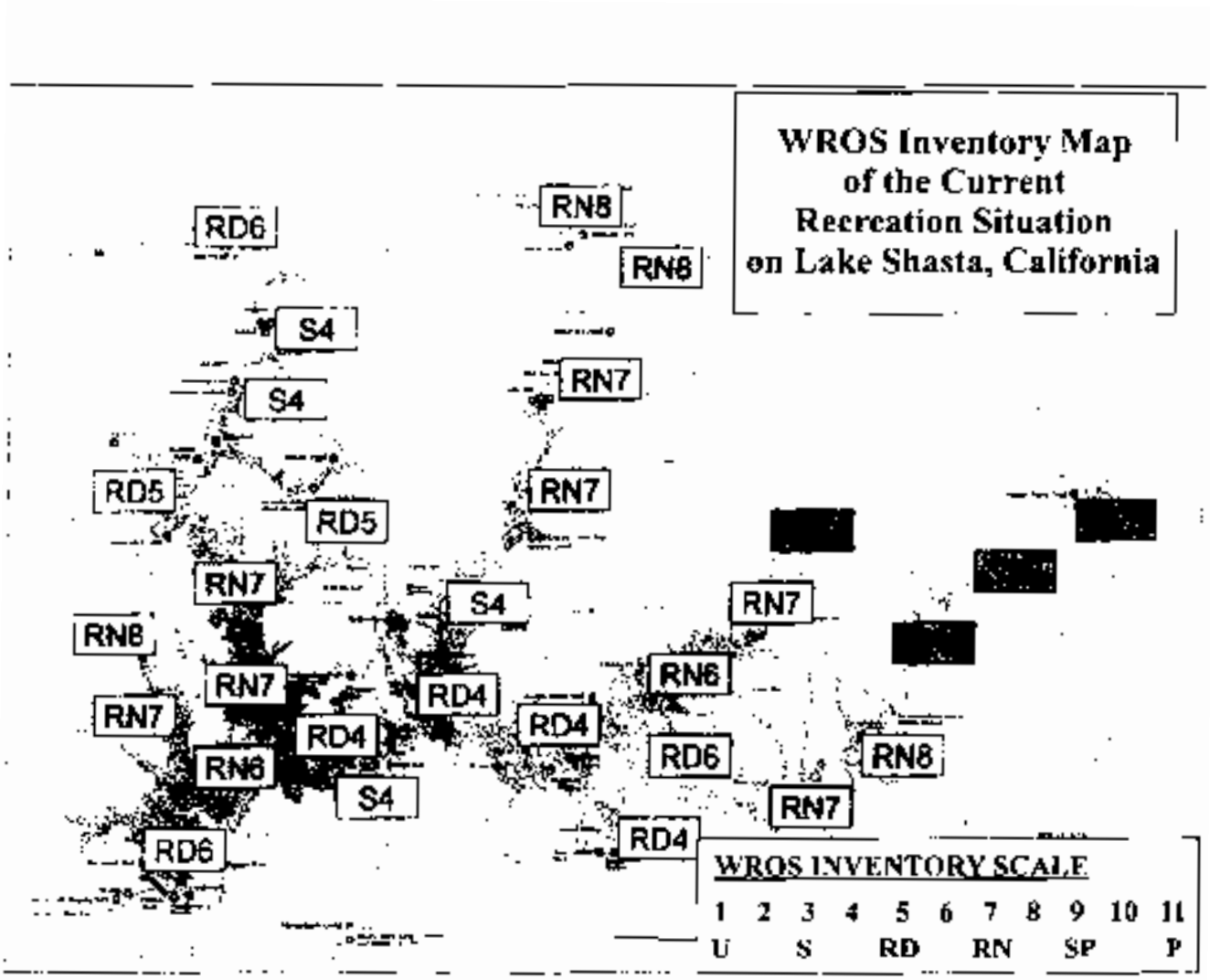
A major advantage of using an 11-point scale in the inventory stage is that it conveys more detail and suggests the feasibility of altering the management of an area from one WROS class to another. Depending on the rating for an area (e.g., RN6, RN7, or RN8), the greater the probability that a small shift in one or more of the physical, social, or managerial attributes will cause a shift in the WROS class.

The following four maps illustrate how the overall WROS classes can be depicted and show the type and location of water recreation opportunities currently available. The New Melones map is the most basic and uses the initials of the six WROS classes, while the Lake Shasta, Millerton Lake, and San Luis maps show a finer level of detail and how the six WROS classes can be subdivided for purposes of the WROS inventory.




Current WROS Inventory and
Management Alternative #1 for the
Millerton Lake State Recreation Area
RN7
SP9
SP8
RD5
SP8
RN7
RD5
S3
S3
WROS INVENTORY SCALE
1 2 3 4 5 6 7 8 9 10 11
U S RD RN SP P


Current WROS Inventory for the
San Luis Reservoir State Recreation Area
Wildlife Area
RD4
RD4
S3
RD6
RD5
RN6
RN6
RN7
WROS INVENTORY SCALE
1 2 3 4 5 6 7 8 9 10 11
U S RD RN SP P



Inconsistency Mitigation

An inconsistency is a situation where the physical, social, and managerial ratings are different (e.g., sites 2, 3, and 4 of figure 16); that is, where the physical, social, and managerial attributes are not aligned or are not consistent. For example, the physical and social attributes might depict a rural developed WROS class, yet the lack of management signage, facilities, and patrols might be more consistent with a primitive WROS class. Another example might be weekends in June when the social attributes depict a suburban WROS class (e.g., large numbers of diverse recreationists), while the physical and managerial attributes depict a rural natural WROS class. A final

example is an area where the physical and social attributes depict a semi primitive WROS class, but the managerial attributes (e.g., floating toilets and flashing strobe safety lights) depict a rural developed WROS class. Depending on the inconsistency, mitigation might be necessary or desired.

Mitigation might involve a change in current management actions to eliminate inconsistencies and improve the recreation experiences being provided. The guidelines in ***Chapter 4: WROS Management*** can assist managers in both identifying and mitigating inconsistencies.

Figure 17 depicts an inconsistency mitigation tool with two dimensions: (1) the degree of impact and (2) 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, holiday weekends). Alternatively, there are inconsistencies with high impact that can be easily mitigated (e.g., remove unnecessary buoys, restoration of eroded campsites, or institute a speed limit). Figure 17 is a tool to help sort the inconsistencies by their relative degree of impact or consequence, to assess the ability of management to mitigate, and to develop a prioritization scheme.

The output of inconsistency mitigation is a list, and perhaps a map, that identifies the type, location, and degree of inconsistencies. Those inconsistencies with a high degree of severity, extent, or consequence and a

Figure 17. A WROS Inconsistency Mitigation Tool

	Degree of impact or inconsistency			
Degree of reasonableness to mitigate	Negligible	Minor	Moderate	High
None				
Low			*Priority D*	*Priority C*
Moderate			*Priority C*	*Priority B*
High			*Priority B*	*Priority A*

high degree of reasonable mitigation should be given the highest priority (i.e., Priority A) of attention by management. Guidance on how to mitigate inconsistencies and to align the setting attributes is provided in *Chapter 4: WROS Management*.

Maps and photos are important tools in the inventory process

This concludes the WROS inventory stage. From here, the user of this guidebook has two options.

One, if there is no formal planning process underway or anticipated in the near future, the manager can take the WROS inventory information, proceed to *Chapter 4: WROS Management*, and begin to implement its direction. For example, inconsistencies can be mitigated, visitor maps and brochures can be improved to show the type and location of WROS classes, rules and regulations can be explained to the public more clearly as to why certain actions are desirable to protect the integrity of certain recreation opportunities, local residents and special interest groups can be advised of the increased clarity in management direction, a monitoring program can be initiated, the WROS classes can be added to a geographic information system, tourism welcome centers and web sites can more clearly inform the prospective visitor as to what recreation opportunities are available, and the WROS guidelines can be used to develop and justify an annual operating plan and budget. Note that if the proposed changes in management are considered major and significant, a NEPA-compliant planning process would be necessary.

Two, if there is a planning process underway or anticipated in the near future, the manager can take the WROS inventory information, proceed to *Chapter 3: WROS Planning*, and begin to integrate the inventory information to describe the current situation.

Chapter 3: WROS Planning

WROS Planning

Above, wildlife resources are often significant public issues and attractions on or near water

Below, accessibility is often a significant public issue

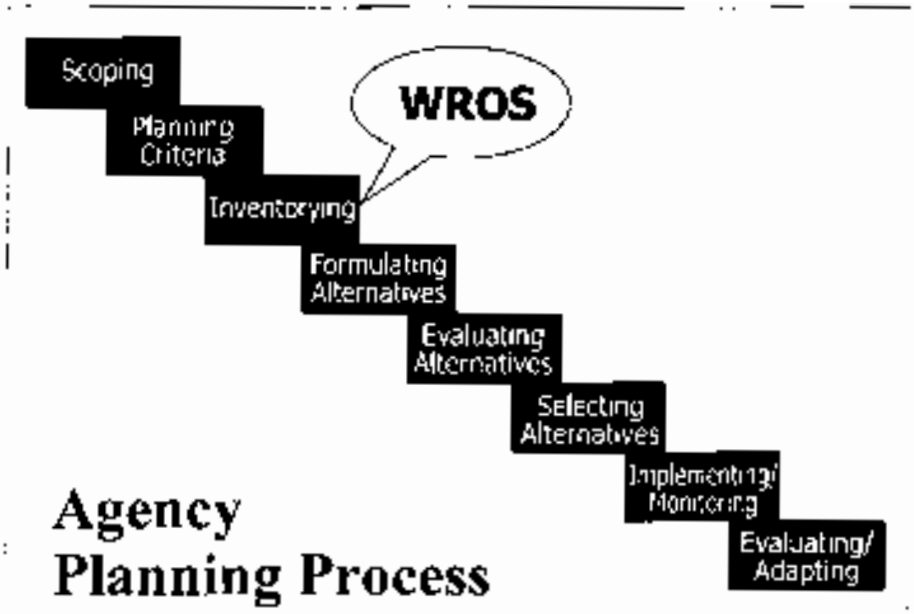
WROS is not a special or unique planning process. WROS is a tool that helps bring water recreation considerations into a comprehensive and integrated planning process. Metaphorically, WROS is like a tree branch that connects to the main stem or trunk of the tree; that is, WROS is one of many inventory tools that feed into an agency planning process. Reclamation, along with all local, State, and Federal land and water agencies, has regulations and procedures describing in detail each step of its planning process. This chapter discusses how WROS integrates with and supplements the key steps of a public recreation or resource planning process.

Scoping

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

Planning Criteria

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



Inventorying

- Integrate inventory maps depicting the overall current WROS classifications for the study area and all associated information in the development of WROS inventory. (See *Chapter 2: WROS Inventory* in this guidebook.)
- Develop WROS GIS overlays, if possible, that are compatible with other GIS overlays (e.g., vegetation, recreation facilities, roads, wildlife habitat, topography, private land, and heritage resources)
- Identify current and future recreation demand. Measuring the demand for any public good or service is both an art and a science. It involves identifying current use and users in the study area, their use locations, type of activity, duration, travel patterns, origins, participation percentages, 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.

  Figures 18 and 19 depict several dimensions of measuring recreation demand: who, what, and how

Figure 18. A Recreation Demand Measurement Matrix

	What to Measure?			
Who to Measure?	Preferred Recreation Activities	Preferred Recreation Settings	Preferred Recreation Experiences	Preferred Recreation Benefits
Current Visitors				
Local Community Residents and Stakeholders				
Regional Residents and Stakeholders				

- Many local, State, and Federal agencies are challenged to measure recreation and tourism demand. Thus, it would be helpful to examine a variety of information sources such as:
    - The Statewide Comprehensive Outdoor Recreation Plans (SCORPs) developed by each State park agency to secure Land and Water Conservation Fund monies
    - The National Survey on Recreation and the Environment (NSRE) managed by the U.S. Forest Service's Southeast Forest Experiment Station (www.srs.fs.fed.us/trends)
    - The U.S. Fish and Wildlife Service's hunting, fishing, and watchable wildlife participation database
    - State and county tourism reports of visitation and economic impacts
    - Other public agency plans, studies, and visitation counts
    - County land use or recreation master plans
    - Special studies by various outdoor recreation groups and special interest groups (e.g., Ducks Unlimited, Trout Unlimited, Bass Anglers Association, American Recreation Coalition, American Canoe Association, Sporting Goods Manufacturing Association, and Outdoor Industry Association)
    - University and agency research publications

Figure 19. Measuring Recreation Demand Involves Different Types of Tools

Types of Recreation Demand Variables to Measure	Primary Tools	Secondary Tools
Recreation Behaviors • What activities do visitors participate in and when, where, and for how long? • What settings do people visit and when, where, for how long, and for what activities? • What are the characteristics of the visiting groups (e.g., size, age structure, family or friends, type of equipment, favorite locations)?	• Road/trail counters and turnstiles • Cameras and videos • Air photos • Registrations and reservations • Field ranger observation logs • Volunteer host logs • Rentals, purchases, leases • Visitor diaries • Questionnaires, interviews, focus groups, open houses	• National, State, or community surveys • Maintenance and law enforcement reports • Local or State traffic counts • Local sales and taxes on related recreation goods and services • Local or State tourism visitation data • Observations by residents, long-time visitors, business people, and stakeholders
Public Preferences • What are the most preferred recreation opportunities? • What are the preferences among currently available recreation opportunities? • What is the importance of the natural and cultural resources in the area (e.g., wildlife, fish, history)? • What are the future trends? • What is the economic value of the recreation opportunities? • What are the reasons for not visiting the area? • How did the visitor learn about the area (i.e., information sources)?	• Mail questionnaires • On-site questionnaires • On-site interviews • Telephone interviews • Focus groups • Public open houses • Suggestion boxes • Field ranger observation and conversation logs • Comment cards • Expert panels	• National, State, and county surveys • Letters, editorials, and conversation logs • Other local, State, or Federal plans or impact statements • Newspaper surveys

- Identify current and anticipated non-recreational use and users in the study area, location, duration, type of effect, and anticipated changes. County records on taxes, building permits, development plans, land use zoning, commerce trends, and other local and State reports can be helpful.
- Inventory all human-built structures (recreation and nonrecreation), infrastructure, services, programs, personnel, budgets, partners, and expected operational changes.
- Assess the regional recreation supply of water recreation opportunities including those provided by other agencies and the private sector within the "visitation" region. Figure 20 illustrates how the regional supply of opportunities can be depicted.
- Compare current resource and social conditions with the desired quality standards and map locations of known or likely impairment.

Figure 20. A Hypothetical Comparison of Reservoirs Based on the Percent of Water Surface Acres by WROS Class

Regional Lakes (surface acres/ shoreline miles)	Urban (%)	Suburban (%)	Rural Developed (%)	Rural Natural (%)	Semi Primitive (%)	Primitive (%)
Folsom (11,400/75)	0	20	70	10	0	0
Pardee (2,257/37)	0	0	30	60	10	0
Comanche (7,700/53)	0	0	75	25	0	0
New Hogan (4,400/50)	0	0	60	40	0	0
Tulloch (1,260/31)	0	80	20	0	0	0
Don Pedro (12,960/160)	0	0	50	50	0	0
Lake McClure (7,400/80)	0	0	70	30	0	0
Millerton (4,900/51)	0	10	60	20	10	0
Gross Averages	**0**	**10**	**57**	**32**	**2**	**0**

Formulating Alternatives

- The WROS map generated in the WROS inventory depicts alternative 1, or the current recreation management situation, often referred to as the "no action" or "no change" alternative
- For each additional alternative considered in the planning process, a revised WROS map is generated to depict change from the current situation
- A matrix is developed to understand key differences and to ensure consideration of a reasonable range of alternatives. Figures 21, 22, and 23 provide examples of how WROS can be used to help create a reasonable range of alternatives and also how to display and evaluate alternatives.

Evaluating Alternatives

- Figures 21, 22, and 23 are examples of how WROS can be used 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 or impacts of each alternative. In this instance, the planning criteria can also be considered "key indicators" to assess the degree of change from one alternative to other alternatives, in particular, to compare the no action (existing condition) alternative to the other alternatives.
- Each alternative will have different strengths and weaknesses, and it is likely that one or two of the alternatives among the range provided will be preferred. It is beneficial to examine the preferred alternatives more closely in order to mitigate their most significant negative consequences or impacts and to integrate the strengths from other alternatives. This facet of evaluating the alternatives has been called mitigation assessment and enhancement analysis.

Implementing and Monitoring

- 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 matrix in figure 17

Figure 21. An Example Evaluation Matrix for Comparing Management Alternatives Using WROS

Evaluation Criteria	Alternative #1 U	S	RD	RN	SP	P	Alternative #2 U	S	RD	RN	SP	P
1. Recreation management prescription for each WROS class (e.g., objectives and quality standards)												
2. Number and percent of water and land acres by WROS class:												
a. Spring												
b. Summer												
c. Fall												
d. Winter												
3. Percent of water surface acres by WROS class for other water bodies in the region												
4. Major management actions and programs												
5. Boat capacity for selected locations												
6. Estimated budget and personnel needs												
7. Economic benefits:												
a. Projected visitor expenditures												
b. Public valuation												

Figure 22. A Bar Graph Comparison of Four Alternatives Based on the Percent of Water Surface Acres for each WROS Class

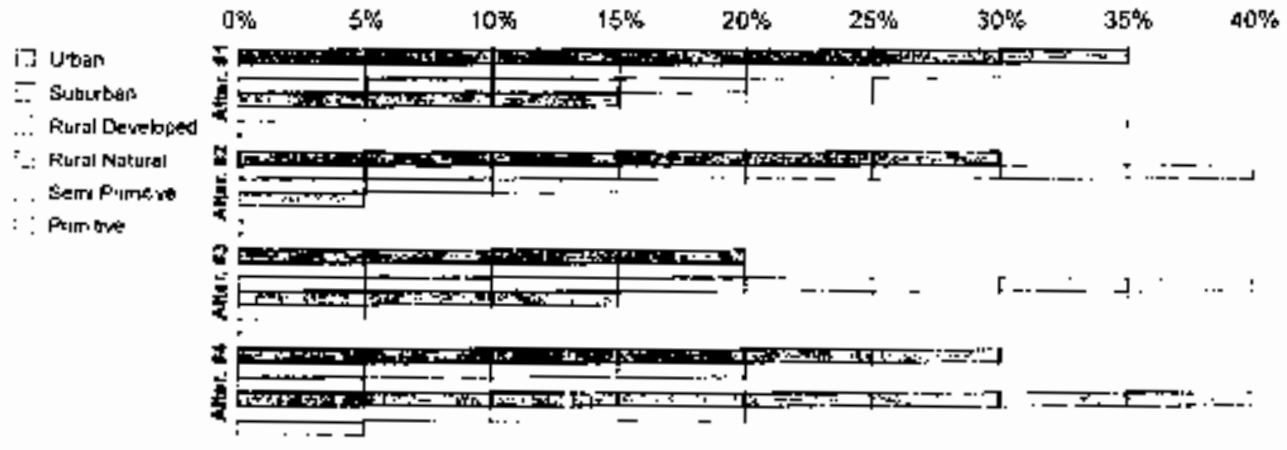


Figure 23. An Example of Using WROS to Compare Alternatives

in chapter 2 are useful in prioritizing and scheduling the implementation of activities and programs over time and across the study area.

- Monitoring is a vital tool to help managers learn from their efforts, to 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 monitoring as an on-going and routine management responsibility. The monitoring program need not be complex but does need to cover important components: (1) monitor selected standards at sample sites (see the guidelines in *Chapter 4: WROS Management*) and assess the current situation versus the desired or intended guidelines, (2) monitor the actual versus desired or intended water recreation opportunity for an area (e.g., type, amount, location, duration, and quality of recreation opportunity), and (3) monitor the actual versus planned annual budgets, personnel assignments, activities, actions, and programs.
- Preferably on an annual basis, a staff meeting should be held 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 discuss priority actions and locations. Adaptive management is an expectation in the WROS system. Change should be expected as a result of knowledge gained from monitoring as well as from new science, information, or circumstances. Yet, adaptation and change should be deliberate and based on the same standards for decision making as prescribed in chapter 1.

Evaluating and Adapting

- This is an on-going step of assessing the information gathered by monitoring and taking steps to alter the management to achieve the desired goals and objectives.

This concludes *Chapter 3: WROS Planning*. A preferred alternative has been chosen. The manager is now responsible for maintaining the integrity of the resource and the water recreation opportunities as set forth in the plan. *Chapter 4: WROS Management* provides guidelines to help ensure this integrity.

Chapter 4: WROS Management

WROS Management

Above, trails are important to access water

Center, monitoring recreation use is critical

Bottom, this patrol boat and the law enforcement it provides is a very important management tool.

Recall from *Chapter 1: Introduction*, that recreation managers provide *recreation opportunities*. Managers provide opportunities for visitors to participate in a type of recreation activity in a specific setting defined by its important physical, social, and management attributes to realize a particular type of experience and subsequent benefits. (See figure 1 in chapter 1.) This section contains recommended management guidelines for many setting attributes that, when considered together, compose and define the WROS class and its recreation opportunity. For example, if a manager is managing a section of a lake or river for rural developed recreation, the guidelines in the rural developed column should be duly considered.

Management guidelines are intended to provide guidance, yet be flexible and adaptable to special local situations. They serve as triggers or trip-wires to signal that further assessment or action may be necessary (e.g., more monitoring, patrols, or discussion). The fact that a guideline or standard is not being met does not, in and of itself, obligate or direct management action, but does signal that the appropriate level of due deliberation and diligence be taken. Guidelines also are critical for a quality monitoring program because they provide a reference point, baseline, or anchor by which managers can compare current actual conditions to the desired conditions reflected by the guidelines.

Deviation from the recommended guidelines will occur occasionally, yet a decision to deviate should be made only after careful and due deliberation of the facts and circumstances. It is important to thoughtfully address the basic questions: What is the justification for any deviation and will the deviation violate the integrity of the WROS system? Sound professional judgment and the rule of reasonableness (see chapter 1) should be the standards for decision making. It is also important to include a written detailed explanation in the administrative record for future administrative or judicial inquiries.

Management Guidelines

This section provides guidelines for the physical, social, and management attributes across each WROS class. This section will continue to evolve and improve over time with management experience and greater input from professionals.

For each specific attribute in this section, a qualitative or quantitative descriptor conveys the appropriateness or recommended degree or extent that

each attribute may be present for each WROS class. Figure 10 is repeated below for clarification of the descriptors used in following guidelines.

Figure 10. (Repeated from Chapter 1) The Scale of Degree used in WROS

Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
80-100%	50-80%	20-50%	10-20%	3-10%	0-3%
Dominant	Very prevalent	Prevalent	Occasional	Minor	Very minor
Extensive	Widespread	Common	Infrequent	Little	Very little
A great deal	Very obvious	Apparent	Periodic	Seldom	Rare
Extremely	Very	Moderately	Somewhat	Slightly	Not at all

Physical Setting Guidelines

Physical Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Degree of Development Degree that dams, major bridges marinas, parks, resorts, highways or other municipal, industrial, or commercial structures are present	Extensive or dominant	Very prevalent or widespread	Prevalent, common, or apparent	Occasional, infrequent, or periodic	Minor, little, or seldom	Very minor, very little, or rare
Sense of Closeness to a Community Degree that visitors sense that they are close to the sights, sounds, and smells typical of a community	Extensive or dominant	Very prevalent or widespread	Prevalent, common, or apparent	Occasional, infrequent, or periodic	Minor, little, or seldom	Very minor, very little, or rare

Physical Setting Guidelines - Continued

Physical Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Degree of Natural Resource Modification Degree that the visitor is aware that the natural resources have been altered by human activity, technology or development	Extensive or dominant	Very prevalent or widespread	Prevalent, common, or apparent	Occasional, infrequent, or periodic	Minor, little, or seldom	Very minor, very little, or rare
Distance from Development on or Adjacent to the Water Resource Mileage from dams, major bridges, marinas, resorts, or other municipal, industrial, commercial, or residential areas	Less than 0.5 mile	0.5-2 miles	2-5 miles	5-8 miles	8-10 miles	More than 10 miles
Degree that Natural Ambiance Dominates the Area. Degree that there is a sense of tranquility and opportunity to see, hear, and smell nature	Very minor, very little, or rare	Minor, little, or seldom	Occasional, infrequent, or periodic	Prevalent, common, or apparent	Very prevalent or widespread	Extensive, dominant, or a great deal
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
Visual quality objective	Maximum modification	Maximum modification	Modification	Partial retention	Retention	Preservation
Communication towers	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA

Physical Setting Guidelines - Continued

Physical Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Silos and stacks	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Dikes, levees, riprap, channelization	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Human-built structures and activities	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Commercial air traffic (e.g., noise, contrails, number)	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA

Social Setting Guidelines

Social Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Degree of Visitor Presence Degree that the sights, sounds, and smells of other visitors, their equipment, or their impacts on the site are present	Extensive or dominant	Very prevalent or widespread	Prevalent, common, or apparent	Occasional, infrequent, or periodic	Minor, little, or seldom	Very minor, very little, or rare
Degree of Visitor Concentration Degree that visitors congregate on the shore or water in the area (e.g., coves, launches, swim areas, good fishing spots, campareas)	Extensive or dominant	Very prevalent or widespread	Prevalent, common, or apparent	Occasional, infrequent, or periodic	Minor, little, or seldom	Very minor, very little, or rare

Social Setting Guidelines - Continued

Social Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Degree of Solitude and Remoteness Degree that visitors view themselves as being alone and far away from civilization in a wild and remote place	Very little	Little	Occasional	Prevalent	Very prevalent	Dominate or extensive
Degree of Non-Recreational Use, If Any Degree that the signs, sounds and smells of non-recreational use and users are present (i.e., activities associated with commerce, with power industry, roads, airplanes, agriculture, and communications)	Extensive or dominant	Very prevalent or widespread	Prevalent, common, or apparent	Occasional, infrequent, or periodic	Minor, little, or seldom	Very minor, very little, or rare
Reasonable standard for the percent of "extremely" or "very" satisfied visitors (see scale in Figure 10)	80 %	80 %	80 %	80 %	80 %	80 %
Reasonable standard for the percent of "extremely" dissatisfied visitors (see scale in Figure 10)	10 %	10 %	10 %	10 %	10 %	10 %
Reasonable standard for the percent of visitors who would like to visit the area again	70 %	70 %	70 %	70 %	70 %	70 %

Social Setting Guidelines – Continued

Social Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Reasonable standard for the percent of visitors who would tell others that this site is a good place to visit	80 %	80 %	80 %	80 %	80 %	80 %
Reasonable number of audio boat encounters per day	NA	NA	NA	NA	Less than 10 boats per day	Less than 3 boats per day
Reasonable number of visual boat encounters per day	NA	NA	NA	NA	Less than 10 boats per day	Less than 3 boats per day
Reasonable standard for percent of boating accidents per number of boat launches	.01%	.01%	.01%	.005%	.005%	.001%
Reasonable standard for the percent of emergency medical responses per number of recreation groups	.01%	.01%	.01%	.005%	.005%	.001%
Reasonable standard for the percent of verbal or physical conflicts per number of boat launches	.01%	.01%	01%	.005%	.005%	.001%
Reasonable standard for the percent of noise disturbances per number of recreation groups	10%	10%	10%	5%	1%	1%

Social Setting Guidelines – Continued

Social Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Reasonable standard for percent of visitors perceiving "extreme" or "very" high crowding (see scale in Figure 10)	25%	20%	20%	10%	5%	5%
Reasonable standard for the percent of repeat visitors indicating the resource is "extremely" or "very" adversely effected (see scale in Figure 10)	20%	20%	20%	20%	10%	10%
Reasonable standard for the percent of repeat visitors indicating the experience has been "extremely" or "very" adversely effected since a previous visit (see scale in Figure 10)	20%	20%	20%	20%	20%	20%
Reasonable standard for the percent of visitors complaining about the same specific issue	10%	10%	10%	5%	5%	5%

Managerial Setting Guidelines

Managerial Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Degree of Management Presence Degree that management personnel, boat patrols, signage, equipment, beacons, water markers, buoys, entry stations, wakeless zones, closures, speed limits, regulations, security lighting, administrative offices and compounds, or interpretive programs are present	Extensive or dominant	Very prevalent or widespread	Prevalent, common, or apparent	Occasional, infrequent, or periodic	Minor, little, or seldom	Very minor, very little, or rare
Degree of Public Access Facilities Degree that developed access facilities are present such as boat ramps, paved roads and trails, or swim beaches	Extensive or dominant	Very prevalent or widespread	Prevalent, common, or apparent	Occasional, infrequent, or periodic	Minor, little, or seldom	Very minor, very little, or rare
Degree of Developed Recreation Facilities and Sites Degree that developed campgrounds, pump stations, paved parking, utilities, amphitheaters, picnic sites, play areas, nature trails, flush toilets, showers, docks, piers, visitor centers, or concessions such as marinas or resorts are present	Extensive or dominant	Very prevalent or widespread	Prevalent, common, or apparent	Occasional, infrequent, or periodic	Minor, little, or seldom	Very minor, very little, or rare

Managerial Setting Guidelines - Continued

Managerial Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Degree of Visitor Services and Conveniences Degree that restaurants, fuel, boat repair, guide services, food stores, medical services, utilities, lighting, or telephones and faxes are within a few miles	Extensive or dominant	Very prevalent or widespread	Prevalent, common, or apparent	Occasional, infrequent, or periodic	Minor, little, or seldom	Very minor, very little, or rare
Reasonable maximum decibel levels	65-75 decibels	65-75 decibels	55-65 decibels	55-65 decibels	45-55 decibels	35-45 decibels
Reasonable maximum boat speed	35-45 mph	35-45 mph	35-45 mph	15-30 mph	5-15 mph (slow wake)	5 mph (no wake)
Reasonable launch time	Less than 30 minutes	Less than 30 minutes	Less than 30 minutes	Less than 15 minutes	No wait	No wait
Reasonable retrieval time	Less than 30 minutes	Less than 30 minutes	Less than 30 minutes	Less than 15 minutes	No wait	No wait
Quiet times	10 pm to 6 am	10 pm to 6 am	10 pm to 6 am	10 pm to 6 am	24/7	24/7
Reasonable minimum number of flat water acres per boat	1 to 10 acres	10 to 20 acres	20 to 50 acres	50 to 110 acres (1/4 sq. mi.)	110 to 480 acres (3/4 sq. mi.)	480 to 3200 acres (5 sq. mi.)
Reasonable separation between river boating groups	1/8 mile (220 yds)	1/4 mile (440 yds)	1/4 mile (440 yds)	½ mile or a 20 minute separation	2 miles or a 1 hour separation	4 miles or a 2 hour separation
Vehicle parking at beach and picnic sites	25+ per acre	20 to 25 per acre	15 to 20 per acre	10 to 15 per acre	NA	NA
Houseboat size maximum width	16 feet wide	16 feet wide	16 feet wide	16 feet wide	16 feet wide	NA
Space between houseboats on mooring buoys*	1.25 times the length of the boat	1.25 times the length of the boat	1.25 times the length of the boat	1.25 times the length of the boat	NA	NA

*Preferable houseboats would be in dock slips

Managerial Setting Guidelines - Continued

Managerial Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Minimum number of acres per group campsite in developed campground	5	5	5	10	NA	NA
Campsites per acre in developed campground	5 to 10 per acre	5 to 10 per acre	3 to 5 per acre	3 per acre	NA	NA
Minimum distance between dispersed shoreline campsites outside of developed campgrounds	NA	NA	1/8 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 floating campsites outside developed campgrounds	NA	NA	1/8 mile (220 yds)	¼ mile (440 yds) and out of sight of other campsites	½ mile and out of sight and sound of other campsites	1 mile and out of sight and sound of other campsites
Picnic and day-use areas	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Designated beach areas	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Paved boat ramps	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Unpaved boat ramps	NA	NA	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA

Managerial Setting Guidelines - Continued

Managerial Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Overnight security lights	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Marine sanitation devices on boats	Appropriate and may be required	Appropriate and may be required	Appropriate and may be required	Appropriate and may be required	Appropriate and may be required	Appropriate and may be required
Modern restrooms (e.g., flush toilets, electricity)	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Rustic septic or vault toilets	NA	NA	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Floating camping platforms	NA	NA	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Designated campsites	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	Appropriate and may be very little
Interpretive signs	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Directional signs	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Regulatory signs	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Visitor centers	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Paved trails	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Unpaved trails	NA	NA	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	Appropriate and may be very few

Managerial Setting Guidelines - Continued

Managerial Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Water-based trails (e.g., boat, raft, scuba)	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Paved parking	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	NA	NA	NA
Unpaved parking	NA	NA	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Modern, full service RV and tent campgrounds	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Rustic or primitive campgrounds (e.g., no utilities)	NA	NA	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Large-group picnic and camping facilities	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Full service resorts	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	NA	NA	NA
Full service marinas	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	NA	NA	NA
Fuel services and storage	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Golf courses	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	NA	NA	NA
Sports fields	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	NA	NA	NA

Managerial Setting Guidelines – Continued

Managerial Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Community boat docks	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Youth camps and dude ranches	NA	NA	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Interpretive programs (e.g., trail or boat tours)	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Fishing tournaments	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	NA
Boat racing events	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	NA	NA	NA
Life guards	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Reservation systems (e.g., launch times, picnic, campsites, tours)	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
User fee systems (e.g., camping, tours, entrance, launches, services)	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
Administrative buildings (e.g., entrance stations, employee housing, equipment storage)	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Land-based food service concessions	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA

Managerial Setting Guidelines - Continued

Managerial Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Long-term use permitted	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Outdoor shooting or archery ranges	NA	NA	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Amphitheaters	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Wildlife viewing stations	Appropriate	Appropriate	Appropriate and may be common	Appropriate and may be occasional	NA	NA
General utilities (electricity, sewer, water)	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Access for persons with disability	Appropriate where reasonable	Appropriate where reasonable	Appropriate where reasonable	Appropriate where reasonable	Appropriate where reasonable	Appropriate where reasonable
Fireplaces/grills	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Fish cleaning stations	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	NA	NA
Fishery habitat improvements	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate but not intrusive	Appropriate but not intrusive
Vegetative management	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate but not intrusive	Appropriate but not intrusive
Wildfire management	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate but not intrusive	Appropriate but not intrusive
Resource monitoring	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate but not intrusive	Appropriate but not intrusive
Visitor monitoring	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate but not intrusive	Appropriate but not intrusive

Managerial Setting Guidelines - Continued

Managerial Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Minimum standard for monitoring visitor use (type, amount, location, duration)	Daily in primary season, weekly in secondary	Daily in primary season, weekly in secondary	Daily in primary season, weekly in secondary	Weekly in primary season, monthly in secondary	Weekly in primary season, monthly in secondary	Monthly in primary season, monthly in secondary
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
Limit on the number of visitors to protect the resources	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
Limit on the number of visitors to protect quality of experience	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
Limit on the number of visitors to protect special or important values	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate

Managerial Setting Guidelines - Continued

Managerial Attributes	Urban	Suburban	Rural Developed	Rural Natural	Semi Primitive	Primitive
Limit on the number of visitors to protect health and human safety	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
Management zoning (e.g., wakeless areas, no camping, security areas)	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	Appropriate and may be very little
Speed limits on boats	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
Law enforcement presence	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	Appropriate and may be very little
Volunteers	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
Cooperating associations	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
Reservoir drawdown	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	Appropriate and may be very little
In-stream flow or reservoir elevation modification	Appropriate and may be extensive	Appropriate and may be very prevalent	Appropriate and may be common	Appropriate and may be occasional	Appropriate and may be seldom	Appropriate and may be very little

Boating Capacity

In 2002, the Federal Interagency Task Force on Visitor Capacity on Public Lands and Waters delivered its final report to the Assistant Secretary for Fish and Wildlife and Parks, U.S. Department of the Interior. The Task Force was a 2-year effort to improve visitor capacity decision making affecting the lands and waters managed by the Bureau of Land Management, Bureau of Reclamation, Fish and Wildlife Service, Forest Service, and National Park Service. The report contains important background information on the concept of visitor capacity, a set of principles and decision criteria for decision making, seven tools to help make better and more defensible capacity decisions, and a directory of 100 locations in the United States that have numerical visitor capacities. Pages 10-22 of the report are particularly relevant to WROS and to this guidebook and are excerpted below. The full report can be obtained by contacting the National Recreation and Park Association in Ashburn, Virginia, or at www.nrpa.org. The citation for the final report is:

Haas, G. E. 2002. *Visitor Capacity on Public Lands and Waters: Making Better Decisions*. A Report of the Federal Interagency Task Force on Public Lands. Submitted to the Assistant Secretary for Fish and Wildlife and Parks, U.S. Department of the Interior, Washington, D.C. May 1, 2002. Published by the National Recreation and Park Association, Ashburn, Virginia. *ISBN 0-929581-66-0*

The excerpted pages are followed by a set of recommended boating capacity coefficients for each WROS class and a decision tool to help ensure that important factors are duly considered.

Visitor Capacity on Public Lands and Waters: Making Better Decisions (Excerpted)

2. Task Force Perspectives: An Evolving Tool

Management concepts and tools evolve over time with new science, information, and experience. Recent examples of evolving tools include ecosystem management, collaborative planning, and adaptive management. Similarly, the concept of visitor capacity has and will continue to evolve. Section Two describes how the Task Force views visitor capacity and provides an important foundation for those new to the concept or unfamiliar with public land planning.

Task Force Perspectives

Definition of a Visitor Capacity. Visitor capacity is defined as the supply, or prescribed number, of appropriate visitor opportunities that will be accommodated in an area.

The Task Force adopted the phrase visitor capacity because of its clarity, its brevity, and the public's familiarity with the concept in everyday life (e.g., restaurants, golf courses, special events, hotels, airlines).

Excerpt Figure 1. Definition of a Visitor Capacity

The supply, or prescribed number, of visitor opportunities that will be accommodated in an area.

The terms in the definition were chosen carefully. *Supply* means the quantity or amount available; *prescribed* means a decision by a person of authority; *number* means a specific number or numeric range; *appropriate* means in accordance with management direction; *visitor opportunity* refers to the integrated package of activities, settings, experiences, and benefits; *accommodate* recognizes that there are conditions and considerations that influence a decision and implies that the use of public resources is a privilege and has responsibilities; and *area* is an inclusive term that can refer to a facility, program, recreation system, or any geographic scale such as a site, unit, or region.

Purposes of a Visitor Capacity. A capacity is a concept and tool with widespread application and purpose in our everyday lives: restaurants, airports, golf courses, concerts, classrooms, low-income housing, hotel occupancy, lobster harvests, annual timber cuts, ozone alerts, air-travel operations, water storage, mortgage loans, insurance policies, power grids, military response, landfills, welfare benefits, prison facilities, urban housing density, emergency medical response, sport hunting, sport fishing, museums, amusement parks, group tours, and countless other manifestations.

The overarching function of a visitor capacity is to serve as one tool to help sustain natural and cultural resources, as well as the recreation opportunities and other benefits these resources afford the public. More specifically, the Task Force recognizes nine purposes of a visitor capacity (see Figure 2).

Types of Capacity Expression. A capacity is the number or numeric range related to the relevant social unit(s) detailed in the management objectives (or desired future conditions) for an area. In some cases a specific number may be appropriate, while in others a range may be more desirable. There are situations where multiple capacities will be decided for an area, or where capacities will vary by the time of year. Examples of capacity expressions include:

- *35 designated backcountry campsites*
- *15 permitted wildlife viewers per morning*
- *200 camping groups per night*
- *10 large groups of horseback riders per summer season*
- *15-18 people per interpretive program or walk*
- *2,500 permitted use-days per season*
- *1 educational permittee per summer season, 3 per winter season*
- *2 research permits per year*
- *75 boats at one time of less than 25 hp on reservoir X*
- *16 motorized OHV groups per day*
- *5 PWCs at one time beyond 250 yards of shoreline*
- *20 snowmobiles per 45-minute intervals; 240 per weekday*
- *15 persons per timed entry to historic home, museum, or cave*
- *50 roaded-natural and 15 semi-primitive campsites in unit X*
- *80-100 raft launches per weekday; 150-170 per weekend*
- *550 boat slips*
- *50 shoreline campsites when water level is below 2,550 elevation*
- *25 ice fishing groups at one time, 4 holes per party*
- *30-40 vehicles at one time at the trailhead*
- *200-250 persons at one time on the summit*

In any case, the numeric capacity represents supply of appropriate visitor opportunities that will be accommodated in an area beyond which important resources, recreational opportunities, or other important values may be at risk.

Excerpt Figure 2. Multiple Purpose of a Visitor Capacity

Supply measurement: a numeric capacity is a measurement of the supply of available recreation opportunities that will be accommodated in an area

Trigger for actions and resources: a capacity is a trigger point (i.e., a number or numeric range), whereby as current use approaches or exceeds the available supply, predetermined management responses can be activated or resources allocated. A numeric capacity is, in effect, a trigger or signal to justify and activate a suite of management responses. In some instances, use exceeding capacity may justify the expansion of the supply of appropriate recreation opportunities, and in other instances, it may justify the alteration or limitation of use or demand.

Public and resource risk management: a numeric capacity is a reasonable and responsible risk management tool for situations where nature or human activity creates a high-risk environment for the public, or where human behavior might put the natural or cultural resources at risk

Private sector and community predictability: a numeric capacity provides clarity for business people to act and plan accordingly. By comparing current demand with available supply, private sector permittees and communities can anticipate their growth trend and potential, plan appropriate investment opportunities or divestiture steps, or take collaborative actions with land managers to mitigate negative consequences of demand approaching or exceeding capacity.

Visitor trip planning: a numeric capacity, particularly when compared to real-time use levels, can be very helpful information to a discerning recreationist. For example, visitors might find it useful to be informed that a beach, backcountry lake area, or battlefield is at 30%, 90%, or 120% of visitor capacity. This information may result in a "voluntary redistribution" of people across place or time while still allowing freedom of choice, and help the quality of the experience

Administrative and historic record: complex decisions need to have supporting documentation detailing how and why decisions were made, and the process that was used. This record becomes the historic anchor from which to learn by experience and to compare yesterday with today's new information, data, and circumstances. It also is vital in responding to judicial inquiries for demonstrable evidence of the sound professional judgment

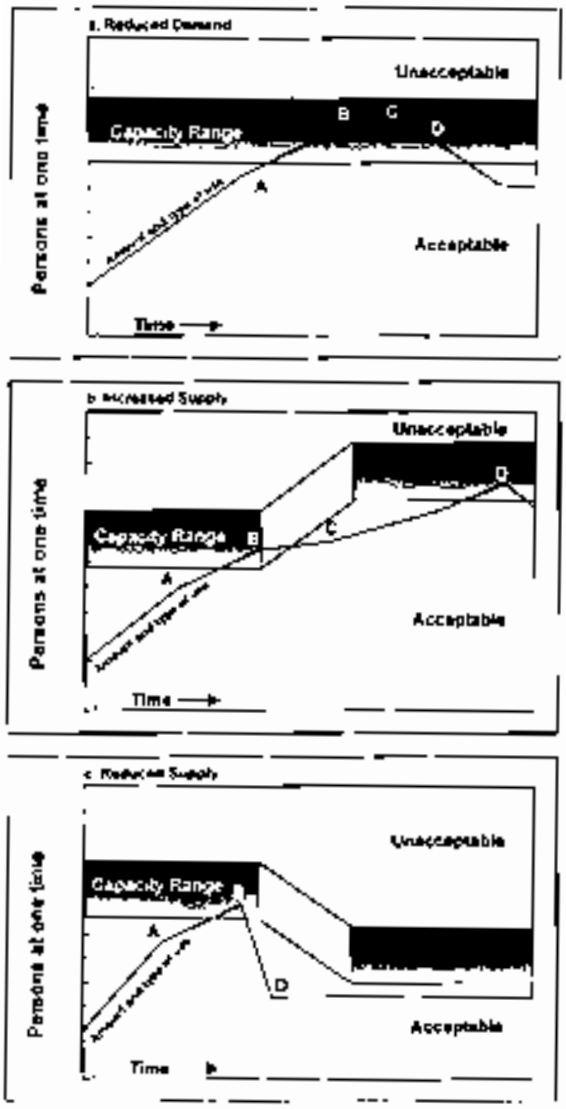
Regional recreation planning: numeric capacities are fundamental for regional recreation planning, recreation demand and supply analysis, multi-jurisdictional allocation decisions, coordinated visitor trip planning information systems, identification of recreation facility needs and investment opportunities, and identification of alternate or substitute opportunities reasonably nearby when access is limited at a particular site

Allocation decisions: a numeric capacity is the supply of available recreation opportunities and is fundamental for making allocation decisions involving where, when, or how many of a particular recreation opportunity can be accommodated (e.g., outfitter and guide permittees, birders, concessionaires, mountain bikes, personal water craft, youth groups). Similarly, a numeric capacity metric is fundamental for making multiple use allocations decisions (e.g., timber harvesting, research closures, reservoir drawdown).

Limiting public use: a numeric capacity can serve as the measurement of allowable use or access that is permissible for a certain time or place.

Triggering a Change in Supply or Demand.

Excerpt Figure 3. Capacity Can Trigger



A capacity can trigger a change in either the demand for, or supply of, visitor opportunities. During a planning process in which a visitor capacity is established, it would also be helpful to establish one or more trigger points that serve as agreed-upon visitation levels for activating a management review. That is, as visitor use (demand) increases towards or is within the capacity range, it would activate a pre-determined trigger(s) to signal consideration of alternative management responses.

Figure 3 graphically depicts how a capacity can trigger a change in the supply or demand in visitor opportunities. Figure 3a depicts a desire to decrease the amount of visitor opportunity through one or more management actions (i.e., reducing visitor demand of an area). Figure 3b depicts a desire to increase the amount of visitor opportunity (i.e., increasing the supply or capacity of an area) through one or more management actions, while Figure 3c depicts the desire to reduce the supply of visitor opportunity (i.e., reducing the supply or capacity of an area).

There are many management actions, and combinations of actions, that can affect the demand or supply of visitor opportunities in an area. Examples would include a change in the design, location, or type of facilities and infrastructure; site hardening; facility or site rehabilitation and restoration; a change in management presence or regulations; an increase in visitor interpretation or stewardship programs such as Leave No Trace, Tread Lightly, and OHV Safety Rider; an increase in interagency marketing efforts to provide better information about the available recreational opportunities in the region; a reallocation or tradeoff of visitor opportunities on nearby lands to mitigate for the change of opportunities on other lands; an alternative transportation system; an inducement for visitors to distribute themselves willingly across time or place of visit; a reservation system; a differential fee program; a real-time intelligent visitation system conveying the current use/capacity level ratio (e.g., 20%, 80%, 120% of capacity); designating location or time of visit (e.g., assigned campsite, climbing route, boat launch time, limited hunting unit, Tuesday mountain biking and Thursday horseback riding); and time or area closures.

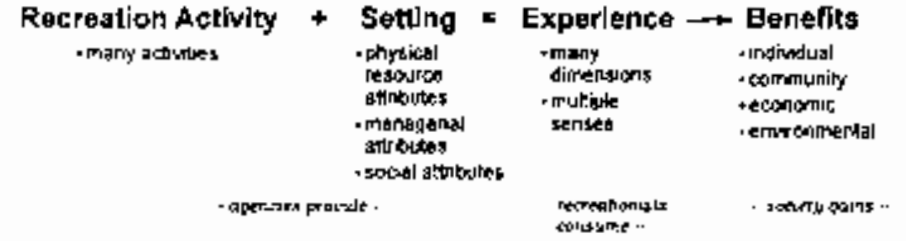
The Task Force wishes to highlight two important cautions. First, public land managers manage an area to provide a particular type of opportunity to the public. Each recreation opportunity is an integrated package of activities, settings, experiences, and benefits (see Figure 4). Thus, to change the setting might also change the type of experience being provided the public. For example, changing the infrastructure and low-site density of a primitive campground to one with paved roads, flush toilets, and high-site density would change the type of recreation experience. Any change in supply or demand must therefore be consistent with the agency's mandate, mission, policy, and management objectives for the area in question.

Second, the Task Force embraces adaptive management and recognizes that visitor capacities will change with new science, professional experience, monitoring information, technology, trends, opportunities, and circumstances. Adaptive management embraces the concept that the quality of sound professional judgment is enhanced over time with clear and specific decisions, followed by adequate monitoring, learning, and adaption. However, any changes must not be arbitrary. A reasonable rule of thumb is that a change in capacity requires a level of information, science, analysis, certainty, and deliberateness that is greater than what was used to make the previous capacity decision.

Conserving Resources and Recreation Opportunities. The overarching function of a visitor capacity is to help conserve resources, as well as the opportunities and values they afford. For some, the goal of sustaining recreation opportunities is not viewed as being compatible with the goal of sustaining resources. However, the Task Force sees the relationship as synergistic.

Public land managers provide recreation opportunities to the public. A recreation opportunity can be defined as the opportunity for a person to participate in a particular activity in a specific setting, in order to realize a preferred type of experience and subsequent benefits. Figure 4 depicts that a recreation opportunity is an integrated package of activities, settings, experiences, and benefits.

Excerpt Figure 4. A Recreation Opportunity



The setting is further composed of three components: physical resource attributes, social attributes, and management attributes. Managerial attributes affecting an experience might include recreation facilities, roads, power lines, interpretive programs, signage, fees, rules, regulations, patrol, cleanliness, closures, reservation systems, concessions, and O&M activities. Social attributes affecting an experience might include other visitors (recreation and non-recreation) to an area, their behaviors, equipment, group size, sounds, and artifacts of previous visitors. Natural resource attributes affecting an experience might include the type and variety of wildlife, fish, topography, vegetation, water, air, sounds, soils, canyons, coral, cave formations, and colors.

The intersection of natural resources with a recreation opportunity is conveyed in the physical resource attributes. That is, a particular recreation opportunity is dependent upon a variety of physical resource attributes important to that experience. Impairment of important resources (natural or cultural) is also impairment of recreation opportunities.

Conversely, the provision of recreation opportunities contributes to a citizenry that is more knowledgeable, caring, and supportive of resource management and protection. In a society where the public is sovereign, impairment of public support is a tantamount to impairment of natural and cultural resources. Stated otherwise, conserving resources depends upon conserving appropriate recreation opportunities.

There are three important considerations in a successful synergistic relationship.

Appropriate Use. Public land managers should favor those recreation opportunities that are dependent upon the important natural or cultural resource attributes for which the area has been designated or is being managed to protect. Other recreation opportunities may not be appropriate and should be given less priority, if provided for at all. For example, the Fish and Wildlife Service has a mandate to focus on six "wildlife-dependent" recreation opportunities for its refuges, beyond which other opportunities are reviewed for appropriateness and compatibility. The Task Force provides an "appropriate use" decision-making protocol later in this report.

Clarity. Public land managers need to develop management objectives, desired future conditions, and standards that are unambiguous and measurable. Qualitative expressions are necessary and helpful to provide contextual understanding, but the precision and clarity offered by quantitative or numeric expressions are also needed. A successful

relationship between resources and recreation requires clear operational definitions of such terms as sustainable, impairment, adverse, significant, substantially unnoticeable, unacceptable change, appropriate use, recreation experience, and visitor satisfaction.

Learning and Adaptation. The scientific relationship between resources and recreation is not well understood. In fact, the multiplicity of factors and interactions may be beyond scientific determination and even human comprehension. This possibility adds importance to the process of monitoring, learning, and adapting. Public land managers must prepare to learn and adapt to new knowledge, information, and circumstances. Learning over time requires the ability to look backwards and to understand the details of yesterday in comparison to today. Thus, it is important to maintain an administrative and historic record of unambiguous and measurable management objectives, desired future conditions, standards, and capacity.

The Substantive Standard for Visitor Capacity Decision Making

Sound professional judgment is the substantive standard for decision making by responsible public officials.

Excerpt Figure 5. Sound Personal Judgement

A reasonable decision that has given full and fair consideration to all the appropriate information, that is based upon principled and reasoned analysis and the best available science and expertise, and that complies with applicable laws.

Inputs to a Capacity Decision. Sound professional judgment relies on many informational inputs. Those particularly relevant to a visitor capacity decision might include:

- management objectives (including all legislative and policy guidance);
- desired future conditions and quality standards (resource, social, management);
- current and future recreation demand (who, where, what, when, how, why);
- current resources, conditions, uniqueness, capability, and trends;
- current management capability and suitability;
- current type, amount, and design of facilities and infrastructure;
- appropriateness (compatibility) of current or proposed recreation opportunities;
- regional supply of the same and similar recreational opportunities;

- foreseeable changes in recreation and nonrecreational uses;
- existing allocations to permittees and other land uses/users;
- significance of the visitation issues and concerns;
- potential for natural or cultural resource impairment;
- type and amount of best available science and information;
- level of uncertainty and risk surrounding consequences of decision; and the
- expected quality of the monitoring program.

Notes of Clarification: The literature contains reference to many "carrying capacities" such as biological, physical, design, social, recreational, facility, transportation, infrastructure, program, and public safety. The Task Force views visitor capacity as an omnibus metric that gives due consideration to all these factors and others in the decision process listed above. The degree of influence of each factor will vary across situations. For example, in one situation the biological considerations might weigh heavily, while in another they might not be relevant. In another situation, it might be the accumulative effects of the social, transportation, and biological considerations that significantly influences the visitor capacity decision.

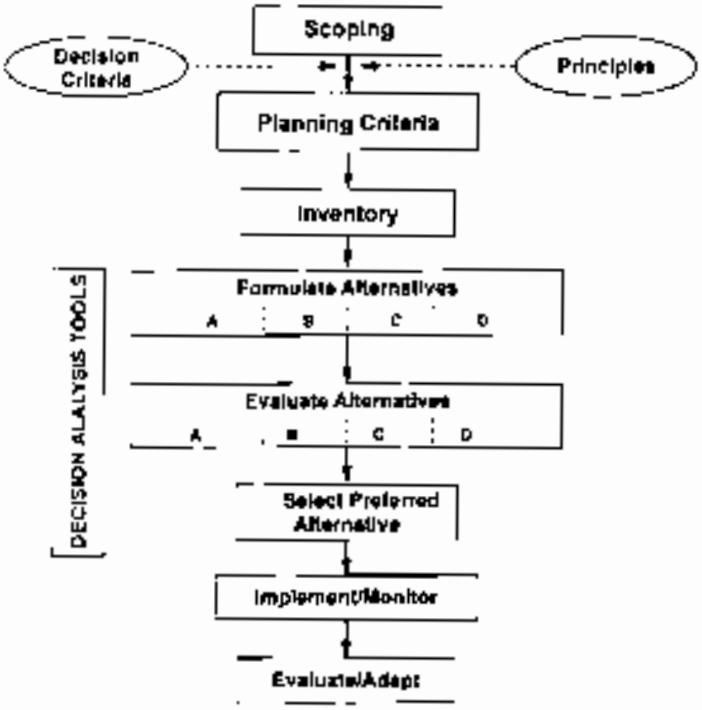
The Procedural Standard for Visitor Capacity Decision Making

While sound professional judgment is the substantive standard for capacity decision making, a rational public planning process is the procedural standard for capacity decision making. In addition to the procedural planning guidance provided by the National Environmental Policy Act (NEPA), each agency has tailored the NEPA guidance to their own agency's needs and perspectives to create similar but unique planning processes, terminology, sequencing, and other varying features.

The Task Force does not propose a new planning process, but rather views a capacity decision as simply one decision among many that is made as part of an existing agency's planning process. Thus, rather than including the planning model for each federal agency, a generic planning model (Figure 6) is presented to illustrate the link between the Task Force outputs shaded in white and a public planning process. A narrative description on the following page further clarifies this link.

Generic Public Land Agency Planning Process. The purpose of this generic planning process is to generally show where the products (bolded) of this Task Force fit within a public planning process, and to illustrate where numeric capacities are part of each alternative for due consideration in assessing consequences and selecting a preferred alternative.

Excerpt Figure 6. Planning Process



Scoping

- identify significant public issues, management concerns, problems, and opportunities
- identify stakeholders and a plan of collaboration
- assess the quality and quantity of scientific data and monitoring information

Planning criteria

- laws, regulations, agency mission, and policies
- principles (e.g., biodiversity, ecosystem management, visitor capacity, social justice)
- planning horizon, resources, process, and scale
- decision criteria to assess consequences of alternatives
- identification of units that have had similar experiences for consultation (comparables or analogs)

- Inventory of the affected planning area
- resources, types, locations, conditions, uniqueness, and ecosystem function
- social use and users, locations, type and quality of experience, regional demand/supply, and trends
- management infrastructure, services, programs, personnel, budget, partners, and expected changes
- recreation opportunities provided by other agencies/private sector within the "visitation" region

Formulate a reasonable range of alternatives, with each containing

- management prescriptions with narrative description and objectives
- desired future conditions and standards for important resource, social, and managerial attributes
- application of prescription(s) to all or part of planning area (zoning)
- selected management tools and actions, budget requirements, and expected level of monitoring
- numeric capacity range(s) and allocations (if and where appropriate)
- decision analysis tools that can help create a reasonable range of alternatives

Evaluate alternatives (see figure 7)

- application of decision criteria to assess consequences
- application of decision analysis tools

Excerpt Figure 7. Evaluate Alternatives

	A	B	C	D
• Management Objectives				
• Desired Conditions				
• Indicators and Standards				
• Management Actions				
• Zones				
• Capacities				
• Allocations				
• Budget Requirement				
• Other Descriptors				

- best available science and sliding scale of analysis
- consideration of trade-offs and mitigation actions

Select preferred alternative
- principles and decision criteria
- sound professional judgment

Implement and monitor
- implement planned management activities/programs
- monitor actual visitation (number and type)
- monitor natural and human-induced change to the natural and cultural resources
- monitor resource, social, and managerial indicators

Evaluate and adapt
- systematically evaluate monitoring data and new information, science, and circumstances
- application of appropriate decision criteria and decision tools to proposed changes
- sound professional judgment

3. Principles and Decision Criteria

This section addresses the first output of the Task Force: principles and decision criteria for visitor capacity decision making.

Principles for Visitor Capacity Decision Making

The Administrative Procedure Act (1946: 60 Stat. 237, 5 U.S.C.A.) set forth the legal standard that decisions must be principled and reasoned; that is, arbitrary decisions are in violation of federal law. Professional principles help meet this responsibility by clarifying institutional values, philosophy, and perspectives. They serve as a guide and rule of thumb for making decisions and taking action, and, very importantly, they help stakeholders understand and meaningfully participate in a planning process.

Below are principles that reflect important and central values for visitor capacity decision making. Full and deliberate consideration of these

principles will contribute to a logical, reasoned, transparent, and defensible decision.

- Management direction principally defines the visitor capacity, regardless of whether the management direction or visitor capacity is explicitly stated or not stated at all.

- A visitor capacity helps to sustain the integrity of natural and cultural resources, as well as the important recreational and nonrecreational benefits they afford to local, regional, and national publics.

- A visitor capacity is a complex decision that is based upon sound professional judgment; i.e., defined as a decision that has given full and fair consideration to all appropriate information, that is based upon principled and reasoned analysis and the best available science and expertise, and that complies with applicable laws.

- A visitor capacity decision is made by a responsible official as part of a public planning process; and in some instances, may benefit from the thoroughness and legal sufficiency afforded by a NEPA-compliant planning process.

- A visitor capacity quantifies the supply of available visitor opportunities that an area can accommodate, and may also address the allocation of opportunities across the variety of affected visitors types of recreationists, commercial operators, educational programs, scientists, and others.

- A visitor capacity decision considers the larger regional landscape and system of opportunities affecting the particular area of recreation concern.

- A visitor capacity provides clarity for focused dialogue and an analysis of consequences across the proposed management alternatives under consideration in a planning process.

- A visitor capacity decision uses a sliding-scale rule, in which the level of analysis is commensurate with the potential consequence of the decision.

- A visitor capacity serves as a trigger or signal for managers, permittees, the general public, and all stakeholders.

- Visitor use approaching a capacity triggers consideration of a full range of reasonable management responses.

- A visitor capacity decision needs to be adaptive to new science, information, uses, technology, trends, conditions, and other circumstances of importance.

- The effectiveness of a visitor capacity depends on an adequate program of monitoring that is commensurate with the level of potential consequences, risk, and uncertainty.

Decision Criteria for Visitor Capacity Decision Making

Arbitrary decisions are those made without principle and reason. In natural resource planning nomenclature and in this report, reasons for decisions are referred to as decision criteria.

Making Complex Decisions Less Complex. A capacity decision is a complex decision. The field of decision science provides many insights into making decisions. For example, one reason why decisions are complex is because while one person approaches a situation from one perspective and set of concerns, another person approaches the same situation from another perspective and set of concerns. Individuals will also view a situation differently because each carries their own "suitcase" of biases, prejudices, perceptions, stereotypes, backgrounds, knowledge, past experiences, and other mental artifacts.

Another reason why decisions are complex is because humans have a limited mental capacity and memory to consider the multiple factors that are important. This limitation works against a full and comprehensive analysis.

Thus, an explicit list of decision criteria can serve several important functions in rational public planning. First, an explicit list of decision criteria, developed early in the planning process with public input, helps to make a decision process transparent and trackable to stakeholders. These criteria help to establish the *ground rules*, the *rationale* in a rational process, and *the pieces of the puzzle* to be considered in the decision. Second, decision criteria can help in creatively developing a full set of reasonable alternatives. In the formulation of the alternatives, the decision criteria will identify

important content areas to be included in the description of the alternatives. Third, an explicit list of decision criteria helps assure a full, fair, adequate, and deliberate evaluation and assessment of the consequences of each alternative. Fourth, decision criteria can improve communications and increase meaningful public participation, understanding, and support. Fifth, an explicit list of criteria is important when more advanced decision analysis is desired such as weighting, ranking, or mathematical computations. Sixth, an explicit list is demonstrable evidence for the administrative record. And finally, criteria are important for adaptive management because they help us understand and learn from past decisions and experiences.

Choosing Decision Criteria. A decision maker has a responsibility to use sound judgment, which is defined as "full and fair consideration" of the important issues and concerns expressed by managers and stakeholders. The number and selection of criteria used to evaluate and assess the consequences of each alternative need to fully reflect and duly consider the circumstances at hand, as well as being commensurate with the potential consequences of the decision to be made. A reasonable rule of thumb is that as the magnitude of the potential consequences of the decision increase, the number of criteria needed to adequately assess the situation also increases.

Sample Decision Criteria. As previously discussed in the planning section, a visitor capacity is one feature among many that can define and discriminate proposed alternatives. The following list illustrates a wide variety of decision criteria that can be used to evaluate alternatives. It is not intended to suggest that every criteria be used for each planning effort, nor is it intended to suggest that a special set of criteria is needed for a capacity decision.

Excerpt Figure 8. Sample Decision Criteria

Effects Ecological Integrity. The degree to which each alternative:

- affects unique or sensitive resources locally, regionally, or nationally
- affects the ecological integrity of site, local vicinity, or bio-region
- impacts the desired future conditions or quality standards (i.e., extent of physical/audio footprint, duration, timing, reversibility, cumulative effects)
- affects the important or priority resources or values the area is being managed to protect
- helps build or connect a larger regional system of resources
- has irreversible effects on resources, or effects that cannot be restored or recovered

continued

Excerpt Figure 8. Sample Decision Criteria – Continued

Supported by Science. The degree to which each alternative:

- is supported by scientific study and expert consensus
- is supported by agency professionals, advisors, and consultants
- has a level of analysis that is commensurate with potential consequences
- is based upon reasonable assumptions and trends
- may involve highly uncertain risks or consequences
- is based on unavailable or incomplete scientific information
- will secure needed scientific information in the future
- has an adequate monitoring program involving resource, social, and managerial attributes

Level of Public Support. The degree to which each alternative:

- is controversial among visitors, locals, regional and national publics
- is supported by visitors, locales, regional and national publics
- contributes to the desired welfare of stakeholders (e.g., local communities, the tourism industry, adjacent landowners, educational/research institutions, private operators, concessionaires, and special interest groups)
- builds meaningful and appropriate partnerships with collaborators
- causes harm or a unfair negative consequences to less advantaged people
- allows for options and opportunities for future generations

Effects Integrity of Recreation Experience. The degree to which each alternative:

- affects the integrity of the recreation experience that the area is being managed for
- is appropriate and consistent with the management objectives for the area
- may compromise desired future conditions or quality standards (i.e., extent of physical/audio footprint, duration, timing, reversibility, cumulative effects)
- affects unique or rare recreation opportunities locally, regionally, or nationally
- provides for unique or rare recreation opportunities locally, regionally or nationally
- contributes to a large regional system of recreation opportunities
- is based upon reasonable future social trends and assumptions
- makes recreation opportunities more available to less advantaged publics
- attracts visitors who otherwise would not visit
- considers the latent or unmet demand of those publics not visiting
- provides an appropriate recreation experience by the least intrusive means
- allows for personal choice, freedom, and spontaneity among visiting publics

Management Suitability and Capability. The degree to which each alternative:

- affects the commemorative integrity or legislated purpose of the area
- affects public health and safety or contributes to public risks
- addresses consequences of delaying or not taking action
- can be changed or adapted, given new science, information, or circumstances
- complements other important resource uses, users, or values (e.g., educational, commercial, research, extractive, restoration)
- establishes a precedent for future action
- represents a future decision or commitment in principle
- has cumulative effects that are likely to be significant
- requires reallocated or increased resources in services, personnel, facilities, programs, or equipment
- is administratively feasible (e.g., budget, personnel, equipment, facilities, O&M standards)
- affects other management programs and services
- has consequences that can be mitigated (i.e., avoid, minimize or limit extent, compensate, restore, rehabilitate, reduce, or eliminate)

End of Excerpt

Reasonable recreation boating capacity coefficients

To help managers make better and more defensible boating capacity decisions, a set of boating capacity coefficients has been developed based on collaborative expert opinion, professional experience, published articles and plans, sound professional judgment, the rule of reasonableness, and the sliding scale rule of analysis discussed in chapter 1 of this guidebook. The boating coefficients in Figure 24 would be reasonable for a Level 1 analysis (see Figure 9).

A boating capacity coefficient is defined as the number of water surface acres adequate for each recreational boat in a particular WROS class. These coefficients can be multiplied by the suitable or available water surface acres for each WROS class on a body of water to help justify and defend a boating capacity decision. Additional scientific study and monitoring can help refine these boating capacity coefficients.

Boating capacity decisions are important.

A boating capacity is defined as the number of recreational boats at one time (BAOT) that will be accommodated in an area, or the BAOTs for an area. BAOT refers to the number of boats that are untethered from the shoreline or any docking apparatus whose occupants are pursuing recreational opportunities. The following coefficients do not account for the inactive recreational boats moored at a dock, marina, or along the shoreline, nor do they account for non-recreational boating activity (e.g., commercial fishing, shipping, and law enforcement).

Because of the many factors that influence a boating capacity decision, a range of reasonable coefficients is provided for each WROS class in figure 24. A decision tool is also provided in figure 25 to help ensure that important factors are duly considered by managers deciding what part of the range may be most appropriate for the area in question.

Figure 24. A Range of Reasonable Boating Capacity Coefficients

WROS Class	Range of Boating Coefficients	
	Low end of range	High end of range
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. mi.)
Semi primitive	110 acres/boat	480 acres/boat (3/4 sq. mi.)
Primitive	480 acres/boat	3,200 acres/boat (5 sq. mi.)

Figure 23. A Boating Capacity Range Decision Tool

The purposes of this decision tool are to help ensure that managers consider important factors affecting boating capacity and to help document the reasoned analysis used in making a boating capacity decision. For each WROS zone, consider the following factors that may affect boating capacity. *Circle the descriptor that best matches the situation.* The preponderance of the answers will indicate which part of the capacity range may be more reasonable.

Typical size of boats	<15 feet	16 to 25 feet	>25 feet
Typical speed of boats	<10 mph	10 to 25 feet	>25 feet
Diversity of boating:			
1. different types of boats	low	moderate	high
2. different size of boats	low	moderate	high
3. different speed of boats	low	moderate	high
Boater visitation pattern	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/ accidents/complaints/conflicts	infrequent	occasional	frequent
Level of boater management/rules/ information/education/compliance	high	moderate	low
Other factors:			
Suggested capacity range	**lower end (more boats)**	**mid-range**	**higher end (fewer boats)**