FISHING FOR IMPROVEMENTS: MANAGING FISHING BY BOAT ON NEW YORK CITY WATER SUPPLY RESERVOIRS AND LAKES

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Abstract.—In 2003, the New York City Department of Environmental Protection Bureau of Water Supply undertook a 5-year initiative to improve fishing by boat on its water supply reservoirs and controlled lakes in upstate New York. The project includes: revising administrative procedures; cleaning up boat fishing areas on reservoir shores; improving two-way communication with anglers; inventorying, assessing and improving boat storage areas; and creating a long-term management plan for deep-water fishing access. A focal point of the project is the development of Boat Area Rapid Assessment (BARA), an evaluation tool for establishing boat storage area carrying capacities.

1.0 INTRODUCTION

The New York City Department of Environmental Protection Bureau of Water Supply (DEP) is responsible for ensuring a continuous supply of high-quality drinking water to 9 million New York State residents. This water comes from a 2,000-square-mile upstate watershed that encompasses most of the Catskill Mountains and lands east of the Hudson (EOH) River in the counties of Dutchess, Delaware, Greene, Putnam, Schoharie, Sullivan, Ulster, and Westchester. DEP owns nearly 124,000 acres of land in the watershed for the purpose of source water protection. These water-supply lands are interspersed with private and public holdings and are located in more than 60 municipalities.

Public access to some water-supply lands for certain low-impact recreation is allowed by permit in designated areas. Public access to water-supply lands for recreation is established in the Water Supply Act of 1906, which requires DEP to accommodate ice fishing, shoreline fishing, and fishing by boat, and the 1997 New York City Watershed Memorandum of Agreement, which assures public access for historical hiking, fishing, and hunting on newly purchased water-supply lands by permit and where appropriate for public safety and water supply protection. These recreation opportunities are also provided to benefit watershed communities economically and culturally, to promote appreciation and understanding of watershed conservation, and to foster a land stewardship ethic among recreational users who are often water supply neighbors and watershed residents (New York City Department of Environmental Protection Bureau of Water Supply, 2003).

1.1 Introduction

Fishing by boat on water-supply reservoirs and lakes has been a popular activity for several decades. For many years DEP's approach to boat fishing has included permanent, on-site storage of anglers' privately owned, nonmotorized rowboats on the shore of the reservoir or controlled lake where the angler wishes to fish. On-site storage is required to reduce the possibility of contamination by substances or organisms, such as zebra mussel larvae, from other water bodies. To place a boat on water-supply lands, anglers must have their vessels inspected, steam-cleaned, and registered at one of five DEP offices around the watershed. Areas of shoreline are

designated as boat storage areas; in many cases these storage areas were *de facto* created by anglers placing their boats in what they found to be desirable locations that were later designated as boat storage areas. Anglers typically secure their boats by securing them to trees with chains or cables and locks. Boat storage and angler access near infrastructure is restricted by 500-foot no-entrance zones around intakes, dams, and similar features.

1.2 Background

In spring 2003, the Bureau of Water Supply was reorganized. Boat management was reassigned to a different division and the boat management process was required to be reviewed. At that time, approximately 12,000 private boats were believed to be stored on the shores of 21 controlled lakes and reservoirs for fishing use. An accurate count of boats on water-supply lands was difficult to obtain; enforcement of registrations had not been consistent at all locations, documentation of registrations varied between issuing offices, and records in some cases were difficult to access due to database limitations. Anglers were required to have three separate permissions to use a boat for fishing on water-supply lands: a DEP fishing permit for the angler, a boat registration carried by the boat owner, and an annual boat validation sticker displayed on the boat.

At that time, public complaints about fishing by boat were not excessive but some issues raised by anglers and neighboring property owners were recurrent. These included boat crowding, trash in boat storage areas, unused boats blocking desirable storage spots, poor enforcement of registration and use rules, and unsightliness (New York City Department of Environmental Protection Bureau of Water Supply, 2004).

Review of boat storage areas revealed conditions of concern to water quality protection, public safety, and recreational enjoyment. Boat storage areas frequently included exposed and eroded soil, social path networks, tree mortality due to girdling and constriction from chains used to secure stored boats, and non-native invasive vegetation. Some boat storage areas also were poorly located in relation to parking opportunities, such as on the opposite side of a four-lane highway on a blind turn, with ingress to the storage area blocked by continuous vehicle guide rails.

2.0 IMPROVEMENT STRATEGY

In the summer of 2003, DEP developed a strategy to assess and improve boat fishing. Goals for this project are to meet legal commitments, integrate boat storage and use closely into the Bureau of Water Supply mission, offer outstanding deep water fishing opportunities, and minimize agency resource expenditures. The strategy includes five initiatives to be completed over 5 years and maintained thenceforth:

1. Clean up administrative procedures and documentation, permitting, boat areas and abandoned boats
2. Communicate with anglers by providing interpretation and outreach, and obtaining feedback
3. Inventory, assess, and prioritize boat storage area issues
4. Improve and maintain boat storage areas
5. Finalize a long-term management plan for deep water fishing access.

The strategy and ensuing project were informed by feedback from reservoir boat anglers and a review of other boat fishing programs, especially on the Saltonstall Reservoir of the New Haven, CT, water supply (Powell, 2002). Other relevant information was gathered from observations of boat fishing administration, management, and storage area conditions. The results of a Boat Working Group composed of DEP land management, water quality control, engineering, and police staff, which met in May 2003, also helped develop the project approach.

2.1 Clean-up

From 2003 to 2005, clean-up of administration methods and boat storage areas were priorities. Boat registration databases were improved by removing errors and duplicates. They were then integrated into

the existing centralized database used for all other land management and recreation activities. This allowed boat fishing information to be linked to other water-supply land activities, such as property inspections, hunting, hiking, and maintenance projects. Database processes for boat registration and management were developed and the system was made available at all offices involved in boat fishing. This helped assure consistent administration and documentation from office to office, as well as database integrity. It also allowed for more customer-friendly fishing; a special permit formerly required of anglers became unnecessary and was eliminated, and boat registrations were extended from 1-year duration to 2 years. Centralization also reduced the resources needed for boat administration, freeing up local office staff for other duties.

In the field, nearly 4,000 abandoned or dilapidated boats were removed from DEP storage areas. The first "reservoir clean-ups" were also held where volunteers assisted staff with trash removal from reservoir lands. These are now an annual event with at least one reservoir clean-up scheduled for each reservoir and lake in the warmer months. Attendance in the 2005 season was more than 220 participants at 20 locations with over 20 truck-loads of trash removed.

2.2 Communication

Also beginning in 2003, improved communications with boat anglers became a priority. Many anglers seemed unaware of registration obligations, responsible land use methods, and land managers' desire for angler feedback. To address this deficit, part of the biannual newsletter Watershed Recreation was dedicated to boat angler news. Registration renewal applications were also mailed directly to the boat owners before expiration to encourage compliance, and renewal applications included a boat owner survey to obtain information on boat use, program satisfaction, and improvement ideas. An email address was created for direct communication on recreation-related comments and questions; this address now receives an average of more than 400 emails per month, which are regularly reviewed. Staff also reached out to some key stakeholders, such as sporting clubs and advisory groups, for feedback and ideas.

2.3 Inventory and assessment

A baseline inventory and assessment of boat storage areas began in 2004. This was the first-ever comprehensive review of boat area conditions to be conducted. Goals were to: 1) rapidly inventory significant characteristics in existing boat areas; 2) identify which boat areas could be improved or should be phased out of use; 3) determine boat storage carrying capacities; 4) retain some boat storage capacity on each reservoir; and 5) develop initial boat area management criteria. As a first step, all boat areas were mapped using Global Positioning Systems (GPS) technology and represented with Geographic Information Systems (GIS) software in the land management database, geo-referenced to city property. A method was then developed to help achieve inventory and assessment goals. This method is called *Boat Area Rapid Assessment* (BARA).

2.3.1 Boat Area Rapid Assessment (BARA)

BARA is a systematic tool for inventorying boat storage areas and using the data to determine boat storage area carrying capacity. Initially, officials sought an existing boat storage area assessment tool suitable or adaptable to DEP's needs. Several elements made DEP's situation unique: storage of nonmotorized row boats for angling only; the steam-cleaning requirement; and the location of these storage facilities on unfiltered water supply waters. As a result, no suitable existing model was found.

Development of BARA was based on several information inputs: staff experience with and observation of DEP boat storage areas and boat use; previous research on the limits of acceptable change (Stankey et al., 1985) and visitor impact management (Graefe et al., 1990); input from an academic authority on conservation area recreation (Schuster, 2004); and "trial and error" on some boat storage areas EOH, where angler use is highest. BARA was also developed based on the assumption that anglers have historically placed their boats where storage is best for them,

where they have the best luck fishing, and where there is easy access to the water's edge.

The first step in creating BARA was to identify boat storage area characteristics that are important to inventory and could be used to determine boat storage capacity. Thirteen characteristics were selected:

1. Access safety – Can recreational users get to the boat storage area from parking in relative safety? This was evaluated by giving each parking access a number score. One point was deducted for more than two lanes of traffic and one for the inability to see oncoming traffic at a distance great enough to allow sufficient reaction time. Parking areas on the opposite road side from the boat storage area lost two points, and one-half point was deducted for every 10 miles per hour of speed limit over 35 miles per hour. Boat storage areas for which the main parking access received a score of greater than or equal to negative three points passed the parking requirements. Parking areas that received less than a negative three were determined as unsafe for recreational use.
2. Parking capacity – How many vehicles can park to access the boat storage area? One vehicle parking spot was considered to be 16 feet in length and wide enough to have both sets of tires off pavement or outside the road shoulder line where lines existed.
3. Distance from parking to boat storage area – How many feet distant from parking are the stored boats? It is believed that a longer distance for anglers to walk will decrease use of a boat storage area.
4. Slope of boat storage area – What is the average slope (percent) of the storage area? A steeper average slope across a boat storage area could invite erosion directly into reservoirs and indicates accommodation of fewer boats. Slope was measured with a manual clinometer.
5. Slope of boat storage area at shoreline – What is the slope (percent) at shoreline in the storage area? Steeper shoreline slopes could be an obstacle for boaters trying to move their boats from storage to water and back, and is reason to accommodate fewer boats. Slope was measured with a manual clinometer.
6. Estimated extent of erosion – What percentage of the boat storage area is estimated to be eroded due to boat storage and use of stored boats? Erosion on the shores of water supply reservoirs is a significant threat to water quality. The presence of erosion is therefore regarded as a reason to limit boat storage.
7. Estimated extent of exposed soil – What percentage of soil in the area has been denuded and exposed due to boat fishing? Exposed soil can erode more easily than vegetated soil, and is considered a limitation on boat storage capacity.
8. Tree damage – Are 50 percent or more of the trees damaged due to boat fishing? This included any type of impact that could be reasonably attributed to the activity of fishing by boat in the area, but was most often girdling or constriction of trees by chains or cables used to secure boats.
9. Count of hitches – How many opportunities are there for anglers to secure their boats in the boat storage area? While securing boats to trees is undesirable from a land management view, trees were counted as boat hitches in this inventory for practical reasons; without trees most boat areas would have no hitching capacity. It was assumed that most anglers will not store boats in areas where they cannot secure them from theft.
10. Length of trail – What is the length of the pathway from parking area or road's edge to the closest boundary of the boat storage area measured in feet? It was assumed for this inventory that longer walking distances have a negative effect on the popularity of the storage area and that areas closer to available parking will have more boats.
11. Aesthetics – Do boats appear crowded?; Is there trash?; Is the storage area visible from the nearest roadway?; and Does there appear to be 50 percent or greater wear, erosion or vegetation loss in the storage area? These are all visible

detractions from a boat storage area. These characteristics are descriptive and are fulfilled by a yes or no.

12. Buffer potential – Can a 10-foot vegetated buffer be established along the shoreline? A minimum 10-foot wide vegetated buffer between the shoreline and stored boats is desirable to reduce direct inflow of runoff and the entrance of silt or contaminants into reservoirs. This characteristic evaluates whether or not a vegetated buffer may be established at some future time. At the time of inventory, boats in all areas were stored directly on the shore with little or no vegetated buffer under or around boats. In some places, rock slabs or insufficient distance between the reservoir shore and roadway precluded the creation of a vegetated buffer, while in other places current storage of boats on the shore was the only obstacle.
13. Potential for improvements – Can the area be improved for boat storage? This characteristic evaluated whether or not a boat area, given its limitations, was a good investment for remediation. In some cases, remediation of a boat area was not feasible. For example, off-side parking on the blind turn of a four-lane highway or extreme steepness would preclude improvement and these examples would be rated "no". An eroded storage area that could be remedied through water management techniques, for example, would receive a "yes".

Three of these variables (tree damage, aesthetics, and distance to parking) were found to be useful for inventory, but not directly relevant to establishing carrying capacity and were omitted from that assessment. Tree damage existed in nearly all storage areas, but it never exceeded 50 percent of all trees; thus, the 50 percent standard was not sensitive enough to capture tree impacts. Impact on trees was also observed to be related to how anglers treated the trees, but not related to the number of boats in the area per se. Although aesthetics was a management concern, aesthetics was also determined to be unrelated to boat carrying capacity. For example, trash and vegetated screening were not necessarily related to the number of boats in the area; aesthetic factors like wear and crowding would be adequately captured elsewhere in the assessment. Finally, the distance of the boat storage area from the primary parking opportunity, although a potentially useful descriptor, was not directly relevant to the number of boats an area could or should accommodate.

Several other inventory characteristics were initially considered but rejected. Measurement of soil compaction, exposure and erosion would to be too time consuming for a rapid assessment tool. A single slope measurement of each boat area was rejected as too broad to be useful. Vegetation composition (e.g., extent and type of invasive non-native species) and trash accumulation were determined to be maintenance issues independent of boat storage area carrying capacity. The existence of guide rails between boat areas and access points was documented, but not used in boat area assessment because these can be modified as needed; also, given their existence in several popular boat storage areas, guide rails were not likely to be a significant obstacle to access for many anglers. Original parking area safety standards were updated to prevent the elimination of too many storage areas. Finally, water depth and the quality of fisheries near the boat storage area were not included; it was assumed that over the decades, anglers had selected storage locations based at least in part on these characteristics, thereby making these variables unnecessary.

2.3.2 Establishing carrying capacity

BARA was used to establish each boat area's storage "carrying capacity", or maximum desirable number of stored boats, by revising a gross storage potential for each boat area in four consecutive steps according to the inventory data collected. The gross storage capacity of each area was the number of boats that could fit in each storage area regardless of all other characteristics. This was obtained by calculating the area of the location using GIS data. Since registered boats were 12 to 14 feet long and at least 4.5 feet wide according to DEP rules, and anglers needed room to move around boats, 72 square feet were allotted for each boat.

With this quantity of boats as a starting point, inventory data were systematically used site by site to create a final boat storage carrying capacity. This analysis was done in four sequential steps: 1) assess for elimination criteria; 2) establish an initial boat carrying capacity based on usable land area and hitching opportunities; 3) incorporate natural resource characteristics; and 4) recognize parking limitations.

1) Assess Elimination Criteria—Each boat storage area was assessed with regard to access safety and whether or not the opportunity existed to develop a vegetated shoreline buffer free of boats. These characteristics were considered first because they are not realistically mutable and are regarded to be of primary importance to visitor safety and water supply protection. In this step, areas scoring less than -3 for access safety or given a "no" for the vegetated buffer characteristic were eliminated. This meant that they were closed to any new boat storage, they were given a carrying capacity of 0 boats, and they were not evaluated in steps two through four.
2) Establish Initial Boat Carrying Capacity—For each boat area not eliminated in Step 1, the area required for the 10-foot wide vegetated buffer (10 × shoreline length) was deducted from the total boat storage area to calculate the boat storage area that would be available with a vegetated buffer in place. The total number of estimated hitches in this revised boat storage area was calculated by deducting the estimated number of hitches in the vegetated buffer, where no boats would be stored, from the total count of hitches. The estimated number of hitches in the vegetated buffer was derived by finding the average number of square feet per hitch in the boat storage area, then using this average to deduct the number of hitches that would be in the vegetated buffer. The remaining number of hitches was multiplied by two, since each hitch can accommodate two boats, to obtain an initial boat storage carrying capacity (Ki) for the area.
3) Incorporate Natural Resource Conditions—The natural resource conditions of the boat storage area were assessed in three steps that addressed erosion, soils, and slope; the presence of erosion, exposed soils, and steep slopes would reduce the area's boat carrying capacity. For each characteristic, the amount by which the boat carrying capacity was reduced at each natural resource impact level was determined by observation and trial and error. Assessors kept in mind that while boat quantities might need to be limited in some areas due to natural resource conditions, boat storage opportunities for anglers could not be severely curtailed.

   For erosion, a certain amount of boat storage capacity was deducted from Ki in proportion to the estimated level of erosion. At sites with severe erosion, this could result in a boat carrying capacity of 0 (see Table 1). After this assessment, the area was given a new carrying capacity, a number of boats Ki_1.

   The presence of exposed soils was treated similarly, with Ki_1 being further modified to reflect conditions regarding exposed soils. The more estimated exposed soil there was in the storage area, the more the boat carrying capacity was reduced (Table 2). The result of this assessment step was the new carrying capacity, a number of boats Ki_2.

Table 1.—Reduction in boat area carrying capacity according to erosion level

Percentage of boat storage area eroded	Number of boats deducted from Ki
0 – 10 %	–0
11 – 15 %	–20
16 – 20 %	–40
21 – 25 %	–65
26 – 30 %	–96
> 31%	K = 0

Table 2.—Reduction in boat carrying capacity according to amount of exposed soil

Percentage of boat storage area with exposed soil	Number of boats deducted from Ki_1
0 – 10 %	–0
11 – 20%	–20
21 – 30 %	–40
31 – 40 %	–80
> 41 %	K = 0

The slope of the boat storage area was again treated similarly, with Ki_2 modified to reflect the slope of the storage area. The greater the slope of a storage area, the more boat carrying capacity was reduced (Table 3). Where the average slope across the boat area equaled or exceeded the slope at the shoreline, the deduction in boat carrying capacity was proportionately greater than in situations where the shoreline slope exceeded the average slope across the whole storage area. This is because greater shoreline slopes were regarded to be self-selecting, with fewer anglers willing to maneuver their vessels in and out at a steep shoreline. Also, the potential threat of erosion from steeper slopes across the whole boat area was considered a bigger problem. The result of this assessment step was a new carrying capacity for the boat area, a number of boats Ki_3.

4) Recognize Parking Limitations—The boat area carrying capacity Ki_3 was now assessed in terms of parking availability. A minimum of 10 boats per parking space was selected as the per boat parking ratio based on existing boat/parking space ratios, and staff observations that relatively few boats were ever simultaneously in use, even on the busiest fishing days. Where Ki_3 exceeded parking, the carrying capacity was reduced to create a storage capacity of no more than 10 boats per parking space. The intent was to assure adequate parking for each boat storage area at maximum use.

Table 3.—Reduction in boat carrying capacity according to storage area slope

Slope in percent, where % slope at shoreline > average slope of boat storage areas	Number of boats deducted from Ki_2
1 – 20 % (slope at shoreline)	–0
21 – 30 %	–30
31 – 40 %	–60
> 41 %	–120
Slope in percent, where % slope at shoreline < average % slope of area	**Number of boats deducted from Ki_2**
0 – 15 % (slope of area)	–0
16 – 20 %	–10
21 – 25 %	–30
26 – 30 %	–60
> 31 %	–120

2.4 Improve, Maintain and Close Boat Storage Areas

By late 2005, certain boat storage areas that had been assessed with BARA could be maintained according to the established carrying capacities and prioritized for improvement or eventual closure. Carrying capacities were established for most of the boat storage areas EOH, documented in the land management database, and linked to the boat storage area so that staff could register boats for specific locations according to storage availability. The database tracks total carrying capacity for each area as well as current availability. The database also notes what characteristics of those evaluated present challenges at each boat storage area in anticipation of re-evaluation and the opportunity to undertake improvements.

Storage areas that were identified in BARA as unsafe due to access issues and having no potential land to develop vegetated shoreline buffers were priorities for elimination. Exceptions were storage areas that did not pass Step 1 of BARA but were located on reservoirs were there was no alternative storage space available. In these cases, the storage areas would be closed to new boats but existing boats could stay. It is anticipated that most of these storage areas will be eliminated over time by attrition as anglers remove boats on their own. If new storage opportunities can be identified, anglers may be asked to move their boats from these areas.

2.5 Management plan

Developing a management plan for boat fishing activity is the final stage of the strategy.

A primary part of the final management plan will be to integrate use of the database and inventory characteristics into regular inspection and maintenance of boat storage areas. Maintenance of boat storage areas currently includes only inspection of boat registrations with no attention to land or recreation resource conditions. The inventory effectively provides a baseline of boat storage area conditions; these should be monitored with remediation undertaken as needed, including changing boat storage carrying capacities as indicated by changes in inventory characteristics and improvement work in boat areas. The management plan should also describe the means to close and create new boat areas. The boat management plan should be integrated into land management at the reservoir level, coordinating boat fishing with other recreational uses (i.e., hunting), forest management, and property maintenance, and be related to recreational use levels and patterns, and user demographics, in the watershed community context.

3.0 BARA IMPLEMENTATION

Initially BARA was developed based on conditions observed around reservoirs and lakes EOH. Storage problems are more numerous on the reservoirs EOH and therefore BARA was used here first. It was determined that the improvement strategy and BARA adequately identified problems and produced carrying capacities realistic to actual conditions. In 2006 BARA was implemented on reservoirs west of the Hudson River (WOH). It became evident that due to the vast differences between the EOH and WOH reservoirs, BARA had to be updated. Reservoirs WOH are larger and have more space for storing boats, but ironically storage is not in high demand because the number of recreation users is lower. Although space is not an issue, WOH storage areas needed improvement and BARA was updated in order to ensure the accurate estimation of boat storage capacities.

3.1 BARA updates

Much of BARA remained unchanged in an effort to establish standard procedures across the entire watershed, but some changes were made to accommodate different issues in the WOH storage areas. These changes include:

- The characteristic evaluating the condition of trees was changed from '50 percent of trees damaged' to an observation of the overall condition of trees in an area. Conditions of the trees were given a rating of excellent, good, satisfactory, or poor where excellent indicated virtually no tree damage, and poor indicated significant damage area wide. This is a descriptive characteristic that does not limit the number of boats stored in an area.
- 'Distance walked by anglers' was added as a characteristic after discovering that simply measuring the distance between the parking area and the shoreline did not reflect the actual distance walked by anglers, especially on Ashokan reservoir. Due to excess space WOH, boats would sometimes be scattered along shorelines for great distances. This characteristic gives a more realistic estimation at how far anglers are actually walking to get to their boats. This is also a descriptive characteristic that does not limit the number of boats stored in an area.
- 'Percent of storage area that is wet' was added because it was observed that significant portions of certain storage areas WOH contained streams or wetlands. Since boat storage in or near waters that flow into the reservoirs poses a threat to water quality, this characteristic was noted. The percentage of an area that is wet is estimated, then the square footage of this estimated wet area is calculated. The total wet amount is then subtracted from the total area, reducing the carrying capacity of the storage area.

3.2 Results

Currently, nearly 9,000 people own 11,400 boats on water-supply lands, out of 110,000 estimated recreational users of city water supply property. Of the total 435 boat storage areas, 420 have been inventoried using BARA. Carrying capacities have been calculated for all of the 178 storage areas EOH; 68 of these have been closed to new boat storage, and one has been substantially improved. Of the 257 storage areas WOH, 12 have been retired and analysis is 100 percent complete. In the fourth year of the 5-year initiative, steps one, two, and three of the

improvement strategy—clean-up, communication, and inventory—are complete and the results are being actively maintained. Improvement of boat storage areas is 10 percent complete and creation of a final boat management plan in 20 percent complete. Improvements of the other 90 percent of boat storage areas is expected to be gradual over several years as resources can be made available. Alternative means of providing deep water fishing access, such as fishing piers or providing boats for general public use, have been raised as a result of this project. A brief draft plan for boat management has been created. In 2008, carrying capacity determination will continue on the WOH reservoirs and the Boat Management Working Group will reconvene to review what has been done to date.

4.0 DISCUSSION

A main point of interest in this project is the selection and use of the boat area inventory characteristics. Conducting the inventory on reservoirs WOH showed that the inventory characteristics and their value in calculating carrying capacity needed modification; shorelines are generally steeper WOH, angler use of boat storage areas is more diffuse, distances from parking to boat storage areas are longer, and boat storage areas are larger with fewer boats. Further investigation may prove that the differences between EOH and WOH storage areas are too great and that other evaluation measurements need to be developed.

It is possible that management strategies for some reservoirs WOH may not be immediately required due to low current usage levels. DEP needs to determine if it is in the agency's interest to set up designated boat areas first, then apply BARA and work towards improvements. All of this will be determined in the future as we work towards implementing a long-term boat management strategy across the entire watershed.

Since current boat storage areas were largely created by the anglers themselves, it would be interesting to use the inventory characteristics to describe what makes a good boat storage area from the anglers' point of view. Can we determine from the existing boat areas what characteristics of boat storage areas are most important to anglers? How are the different features of a boat storage area weighted relative to each other? For example, is a short distance from parking to the storage area more important than the steeper slope of the area to the angler? Location of good fisheries, deep water, and other characteristics would likely need to be included in such an analysis and all of this information would help reservoir managers improve and create better new boat storage areas.

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