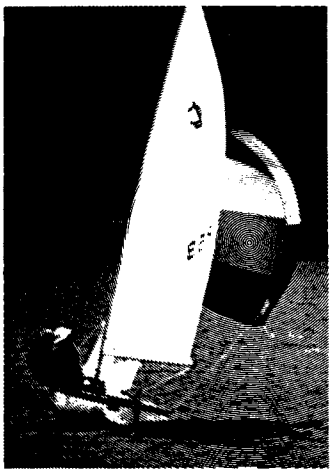
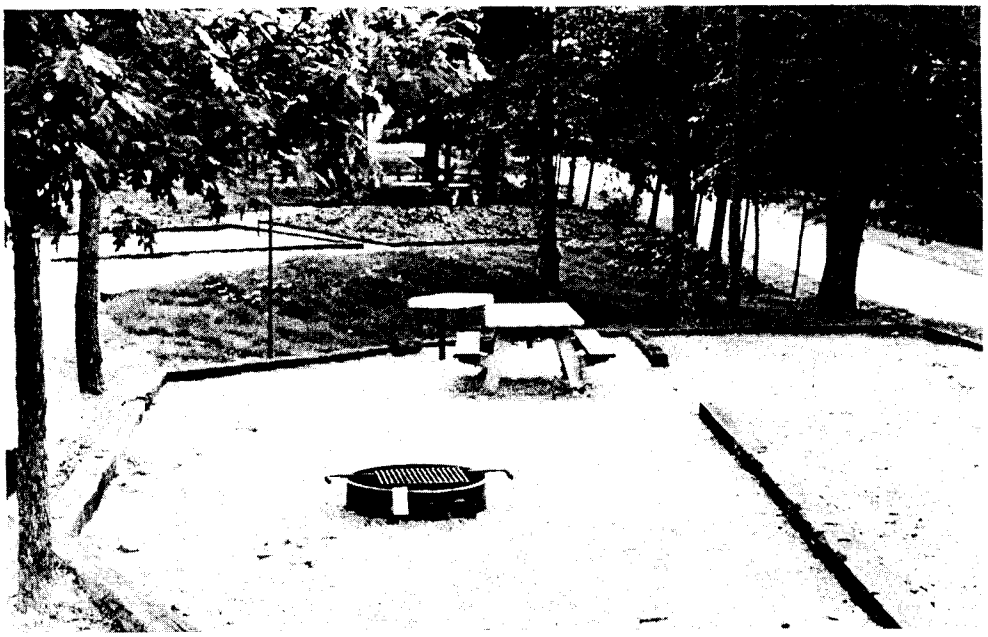
US Army Corps of Engineers
Waterways Experiment Station



ENVIRONMENTAL LABORATORY

RECNOTES
NATURAL RESOURCES RESEARCH PROGRAM

VOL R-84-4 INFORMATION EXCHANGE BULLETIN JUL 1984



An innovative site rehabilitation program was recently completed at W. Kerr Scott Lake recreation areas. The campsites, such as those shown above, were planned for user convenience and safety, aesthetic value, and preservation of natural landscape and trees. The following article is a summary of a presentation made at the South Atlantic Division Park Ranger Conference, which was held on March 5-8, 1984, in Helen, Georgia.

RECREATION AREA REHABILITATION

R. G. Absher, Jr., and Kenneth G. Austin
W. Kerr Scott Lake, Wilmington District

W. Kerr Scott Lake, North Carolina, one of the smaller projects in the Corps' South Atlantic Division, has a total area of 5000 acres, which includes a 1500-acre lake with 55 miles of shoreline. The dam and reservoir were completed in 1962 and opened to the public in 1963. In 1983, just over one million people visited the 15 recreation areas at the lake.

Congested recreation facilities and overcrowding for much of the 15 years after construction caused heavy strains on the resource; the situation was compounded by an increase in campers with RVs and motorhomes. Some of the indications of the overuse were:

- Soil compaction at camp and day-use sites.
- Erosion of frequently used footpaths.
- Exposed roots and loss of vegetation.

In 1979 project personnel began the task of rehabilitating the facilities with the objectives of increasing visitor convenience at the sites, improving the aesthetics, and implementing designs to protect the resource.

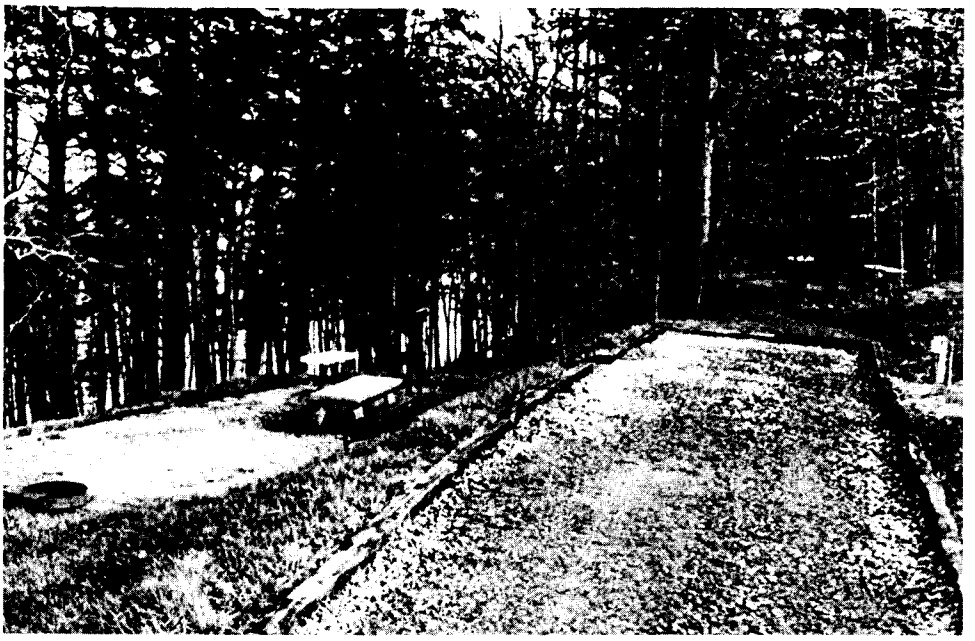


Figure 1. Some campsites were rehabilitated with the parking area on one level and the living area on another

CAMPSITE AREAS

The location of each of 47 campsites was studied, and a layout was tailored to fit the topography, which blended the site into its surroundings and minimized the amount of fill required for construction. A bi-level design was used at some campsites with the parking area on one level and the living area on another (Figure 1). Many sites were located on one level, which made them accessible to the handicapped visitors. In some places, as many as three campsites were placed close together for use by large parties.

The perimeters of camping pads and adjacent living areas were marked with crossties; crossties were also used to separate the two areas when they were side by side on the same level. The camping pads were covered with crusher-run coarse gravel to support the vehicle traffic, and small pea gravel was used in the living areas because it is easier to walk on. (Smaller-sized gravel screenings were found to be too fine to permit drainage and water puddles were a problem.)

Facilities in the living areas were planned for convenience, safety, and user needs and preferences. Electrical and water hookups were provided for RVs. Both a picnic and a service table (Figure 2) were placed in each living area; both were built high enough to accommodate persons in wheelchairs. Pedestal charcoal grills were located near the tables, but fire rings (Figure 3) were also installed nearby for those who preferred campfires. The grills and the fire rings were designed for easy use and cleaning.

Serviceable trash cans and picnic tables were salvaged. Other picnic tables and the serving tables were fabricated in the Corps shops, usually when inclement weather halted outdoor activities.

Only the installation of electric and water hookups was done under contract. Because much of the other activities was labor intensive, workers were hired under the Jobs Bill Program to supplement project personnel.

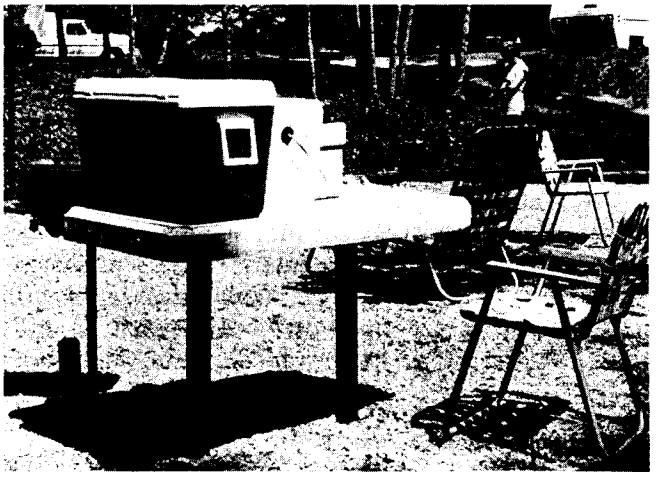


Figure 2. Serving tables were installed at sites to free space on picnic tables

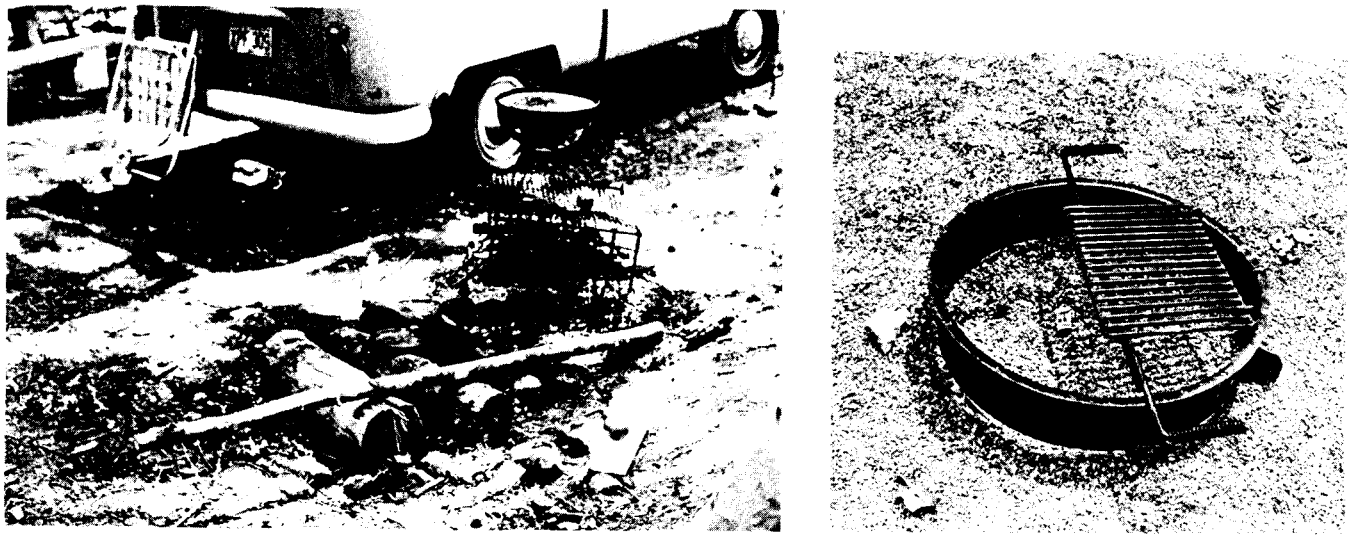


Figure 3. Undesignated campfire use presented a safety and resource problem prior to site rehabilitation (left photo). Fire rings were installed to provide the user with a designated site for campfires (right photo)

DAY-USE AREAS

Improved walkways were built in areas showing soil compaction, and locations of walkways were planned to protect nearby vegetation. A meandering walkway was constructed from a parking lot to a swimming beach to replace a footpath damaged by heavy use. Where use of a slope between a parking lot and a picnic shelter had caused severe erosion, a retaining wall was built to stop the erosion and foot traffic was routed to a side of the slope. In a level area, crossties were used for a footpath between a parking lot and picnic shelters.

An overlook near a busy highway was improved by the addition of picnic shelters and comfort stations with defined walkways between these facilities and the parking lot.

For canoeists, access and a parking lot were constructed on the Yadkin River well below the spillway area of the dam. Steps were built on the slope between the parking area and the water's edge.

OTHER IMPROVEMENTS

Aesthetics as well as convenience were considered in location and construction of a new amphitheater in a central area with easy access. A walkway was built so visitors can safely negotiate the steep terrain of a nature trail. The walkway will also reduce visitor impact on the landscape.

SUMMARY

Some of the major considerations for the rehabilitation program were:

- Locate and develop each campsite to maintain the unique qualities of the site, which will improve its aesthetic value and will minimize construction effort.
- Arrange facilities for safety and convenience. For example, a fire ring should not be placed between a picnic table and a serving table.
- Plan to accommodate the handicapped visitors. Picnic and serving tables should be high enough to be convenient from wheelchairs. Ease of movement by the handicapped should be considered in as many campsites and day-use areas as terrain will permit.
- Smooth rough edges and sharp corners on crossties to reduce the chance of tire damage or personal injury.
- Separate any side-by-side living area and parking area with a crosstie to prevent a vehicle being backed into picnic and serving tables.
- Consider trees as a valuable asset to the aesthetics of a campsite and to the comfort of the campers and preserve as many trees as possible during rehabilitation.
- Keep campers informed of rehabilitation plans and ask for their opinions and ideas. The Park Ranger and Technician play an important role in interpreting the rehabilitation program to the public and explaining the program objectives of providing improved public use and protecting the resource.

Since completion of the rehabilitation work, many campers have expressed appreciation for the added conveniences, and there has been an increase in use of the improved areas. In fact, camping at W. Kerr Scott Lake doubled from 1982 to 1983.

MINIMUM-MAINTENANCE VEGETATION MANAGEMENT

Stephen G. Shetron
Environmental Resources Division, EL

Each year, adequate vegetation maintenance at Corps projects becomes more difficult because of decreasing funds and increasing costs. The problems caused by these economic conditions become more pronounced at recreation areas where there is a high intensity of use (Figure 1). The need to minimize costs to maintain vegetation has also plagued others, especially land managers involved with maintenance of turf on golf courses and in cemeteries, highway rights-of-way, and recreation systems at numerous State and Federal parks.

Ideally, vegetation management should evolve into a system that requires the least capital expenditure, maintains an area that is aesthetically pleasing to the public, and conserves natural resources. A new Natural Resources Research Program work unit will provide guidance on low-cost methods for vegetation control and management. The work unit includes study of two approaches to vegetation management: use of plant-growth regulators and use of low-maintenance plants. The March 1984 issue of RECNOTES (Vol R-84-2) included a description of the study of plant-growth regulators. The following article describes the second approach, using low-maintenance vegetation to attain a minimum-maintenance vegetation management system.

First, what is low-maintenance vegetation? It has been defined as those species of plants that will grow and reproduce at a given location in a particular climate with little or no treatment by man and remain free of serious diseases and insect pests. Conversely, species of plants requiring intensive care, such as fertilization and irrigation, are considered high-maintenance vegetation.

A procedure for planning a successful minimum vegetation maintenance program must incorporate means of selecting plants adapted to the use requirements of the recreation area and the site under consideration. A minimum-maintenance program probably would involve the use of a blend of low- and high-maintenance vegetation (Figure 2).

Table 1 shows typical planning information needed for selecting vegetation best suited for a site and for determining techniques to ensure successful vegetation establishment at a reasonable cost. The planner must also have information to determine

Figure 1. Recreation campground affected by high-intensity use and site conditions. Bare ground resulted from long-term trampling and shading of grass

Figure 2. Aesthetically pleasing blend of minimum vegetation maintenance in area of low-intensity use (foreground) and increased maintenance in high-intensity-use camping area (background)

Table 1
Typical Information Needs for Planning a Vegetation Management Program

Candidate plant species	Growth and habitat requirements
	Soil for plant-growth medium
	Impacts of environmental stresses and plant stress tolerances
Site conditions	Soil substrate — Water-holding capacity — Bulk density — Soil fertility
	Drainage patterns
	Landscape features
	Use patterns — Areas of low-intensity use — Areas of high-intensity use
	Potential for soil compaction from use
General	Frequency and height of mowing
	Labor and equipment costs — Cultivating — Seeding — Mowing

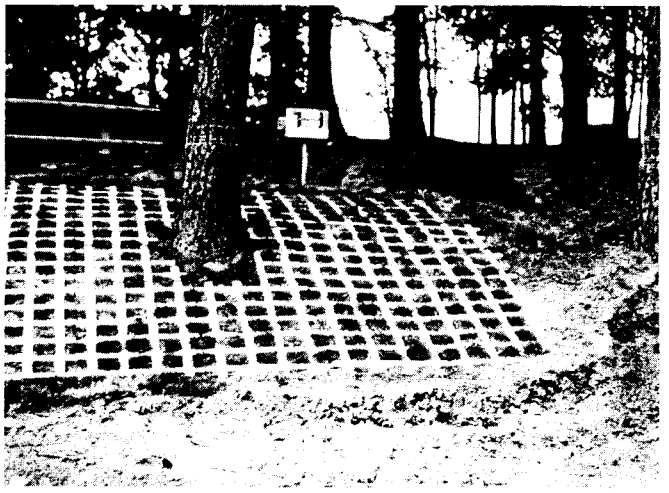


Figure 3. Expensive renovation measure justified by long-term reduction of soil erosion and vegetation maintenance costs

cost/benefits such as trading off high renovation expenditures with a long-term reduction of soil erosion and vegetation maintenance costs (Figure 3).

The objective of this part of the work unit (i.e., low-maintenance vegetation) is to develop and field-test a procedure including information development and synthesis into workable plans for minimum-maintenance vegetation management programs. The primary milestones are:

FY 1984 Determine the state-of-the-art of using of low-maintenance plants.

Develop a draft guidance manual that will provide a key for planning minimum-maintenance vegetation programs for Corps recreation projects.

FY 1985 Test the draft manual through applications at Corps recreation projects and revise the manual based on field experience.

Project managers may avoid visitor dissatisfaction and undesirable public behavior by communicating the reasons for certain actions as shown in the closure sign above. Other examples of the benefits of interpretation used for management communications are described in the following article.

MANAGEMENT THROUGH COMMUNICATION

Janet Akers Fritschen
Environmental Resources Division, EL

In 1982, the Environmental Resources Division conducted a study of boaters at Berlin Lake in Ohio for the Pittsburgh District (Ohio River Division). The purpose of the study was to investigate the effects of crowding on visitor satisfaction. Among the comments received from the study participants were:

"I do not boat on weekends ... [because other boaters have] no knowledge of inland rules."

"How about maintaining the lake at a fixed level?!"

"Why lower the lake in the dry summer and fill it in the spring when we get all our big rains? I thought it was a flood control dam."

These statements demonstrate visitor dissatisfaction. The dissatisfaction was due to a lack of understanding by project users of safety rules, the project's purpose, and the reasons for management actions. At best this creates poor public relations; at worst it may lead to undesirable public actions.

How can the Corps increase the public satisfaction and understanding of its policies and actions? Through communication. One channel of communication open to the Corps and supported by Corps regulations is interpretation.

ER 1130-2-401, 15 March 1979:

> **Visitors must be provided information that will aid in their use and enjoyment of project facilities. Information provided should also help the visitor understand the project, its benefits and costs, and the role of the Corps of Engineers.**

ER 1130-2-428, 11 February 1983:

> **It is the policy of the U.S. Army Corps of Engineers that an Interpretative Service program will be implemented at each Corps operated project. All Interpretative Services activities will be designed to accomplish one or more of the objectives:**
>
> - **Aid project personnel in accomplishing management objectives.**
> - **Enhance the public's understanding of the role of the Army and the Corps of Engineers in development and administration of water resource projects.**
> - **Enhance the public's understanding of the purpose and operation of the project, its man-made, natural, and cultural features.**
> - **Develop public appreciation for proper use of project resources in an effort to reduce overall project O&M costs.**

Interpretation is also supported by Corps personnel. In 1981, a survey was conducted by the Recreation Research Program (currently Natural Resources Research Program — NRRP) to obtain a profile of Corps interpretive services and personnel ("Survey of Corps Interpreters," RECNOTES R-83-3). Most of the survey respondents, whether they had interpretation duties or not, expressed a favorable attitude toward interpretation. One of those who had no interpretation duties wrote:

> **Establish interpretation as a management priority within the Corps. Interpretation is effective communication both within the agency and outside the agency, not "frosting on the cake." Interpretation is not only environmental awareness but includes management objectives as well.**

Perhaps the most conclusive argument for interpretation is that its effectiveness is supported by research results. Two studies funded through the NRRP have demonstrated that management problems can be diminished through an effective interpretation program.* The studies were conducted by contractors during the summer of 1981. The contractors addressed problems that were considered to be both significant and widespread. Depreciative behavior was studied at John H. Kerr Dam and Reservoir, located on the Virginia-North Carolina border (Wilmington District). The effects of interpretation on boater safety were studied at Detroit Lake, located near Salem, Oregon (Portland District).

Editor's Note: Depreciative behavior includes deliberate or unintentional actions that reduce the value of a recreation area.

DEPRECIATIVE BEHAVIOR STUDY

For the depreciative behavior study, a simple brochure was designed to help reduce litter and damage to trees in a campground (Figure 1). During part of the study, the brochure was distributed by the gate attendant as campers registered. At other times, the brochure was given to visitors at their campsite by one of the researchers, who wore a Corps cap, shirt, and name tag. To measure the effectiveness of the interpretation message, each campsite was inventoried before campers arrived and after they left. All tree damage and litter were noted.

The results indicate that the brochure was effective. When distributed by the gate attendants, litter and tree damage were reduced by about 50 percent. When the brochure was distributed at the campsites, litter and tree damage were reduced by 80 percent. The results showed no relationship between message compliance and the type of camping group or type or location of the campsite. This suggests that interpretation would be successful in reducing litter and damage to trees in a variety of settings and situations.

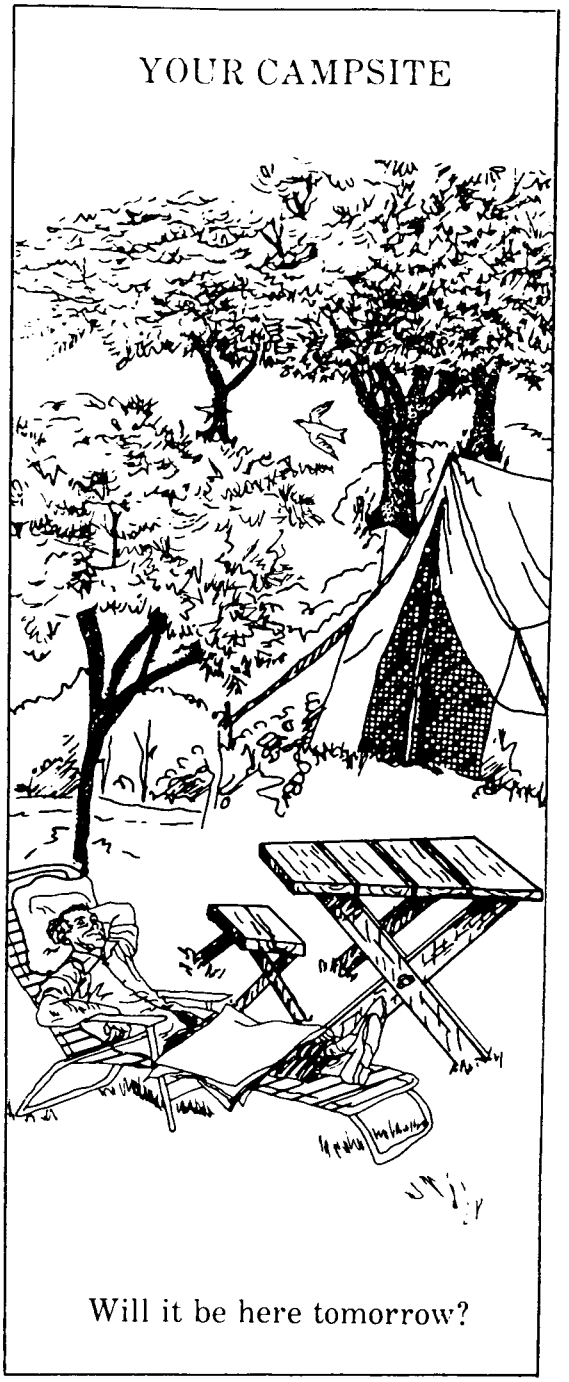


Figure 1. Campsite tree damage and littering at the John H. Kerr Project were reduced by 50 percent through the use of a simple brochure

* These studies are summarized in greater detail in the NRRP Instruction Report (IR) R-84-1, entitled "Supplements to A Guide to Cultural and Environmental Interpretation in the U.S. Army Corps of Engineers."

BOATER SAFETY STUDY

The boater safety study at Detroit Lake incorporated a number of messages that were aimed at increasing compliance with boating safety rules. The messages were contained in a variety of media: maps, flyers, brochures, posters, decals, signs, and broadcasts via short-range message repeaters. All materials were designed to attract visitor attention and were distributed or displayed in a variety of locations around the lake. The effectiveness of the messages was evaluated through direct observation of visitor boating behavior and through personal interviews. For comparison purposes, visitor behavior and knowledge of boating rules were measured before and after the interpretation materials were in place.

Analysis of the data indicated that interpretation was effective in increasing knowledge of and compliance with certain boating safety rules. In marked danger zones, the total number of boats decreased by 22 percent, the number of speedboats decreased by 53 percent, and the number of boats with waterskiers decreased by 77 percent. In interviews, boaters demonstrated an increased knowledge of established danger zones.

CONCLUSION

Corps regulations and Corps personnel promote the use of interpretation in project operations. Research results have shown that interpretation can be an efficient and effective tool for project management. Based on the studies described above, it is evident that a strong and effective interpretation strategy may be able to greatly reduce law enforcement and maintenance requirements while increasing visitor satsifaction. But what is needed for an effective interpretation strategy? In the study of Corps personnel described earlier, the requirement cited most often by the respondents was not additional training, funds, or personnel, but the support and commitment of their superiors.

NATURAL RESOURCES RESEARCH PROGRAM

This bulletin is published in accordance with AR 310-2. It has been prepared and distributed as one of the information dissemination functions of the Environmental Laboratory of the Waterways Experiment Station. It is primarily intended to be a forum whereby information pertaining to and resulting from the Corps of Engineers' nationwide Natural Resources Research Program can be rapidly and widely disseminated to OCE and Division, District, and project offices as well as to other Federal agencies concerned with outdoor recreation. Local reproduction is authorized to satisfy additional requirements. Contributions of notes, news, reviews, or any other types of information are solicited from all sources and will be considered for publication as long as they are relevant to the theme of the Natural Resources Research Program, i.e., to improve the effectiveness and efficiency of the Corps in managing the natural resources while providing recreation opportunities at its water resources development projects. This bulletin will be issued on an irregular basis as dictated by the quantity and importance of information to be disseminated. Communications are welcomed and should be addressed to the Environmental Laboratory, ATTN: A. J. Anderson, U.S. Army Engineer Waterways Experiment Station, P.O. Box 631, Vicksburg, Mississippi 39180, or call AC 601, 634-3657 (FTS 542-3657).

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