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US Army Corps  
of Engineers  
Waterways Experiment  
Station

# RECNOTES

NATURAL  
RESOURCES  
RESEARCH  
PROGRAM

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## Effect of reservoir operations on recreational fisheries

by  
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Based on U.S. Fish and Wildlife Service surveys, recreational fisheries have an economic value of several hundred million dollars per state and are clearly important to many local economies (USFWS 1989). Actions taken to enhance reservoir fisheries can have significant economic impact.

The Corps of Engineers' Natural Resources Management System database reveals that angling is the second largest recreation ac-

tivity, with approximately 25 percent of the visitors to Corps projects participating in fishing activities. The Natural Resources Research Program (NRRP) is presently studying the effects of reservoir operations on fisheries in an effort to establish a link between those operations and the recreational and economic benefits that may reasonably be expected to result from any improvements to the sport fishery.

It is important to note that any resulting recommendations will not represent radical changes in reservoir operational procedures. It is anticipated that the operations deemed beneficial to recreational fisheries will fall well within operations guidelines for authorized project purposes.

The information derived from the long-term study will provide the Corps with a capability that can be incorporated into operations to benefit recreational fisheries. Also, reservoir managers will be better equipped to evaluate operational trade-offs with information on visitation and monetary benefits associated with improved fisheries.

*RecNotes* readers are encouraged to submit their opinions and comments regarding the methodology, benefits, and utility of this study. Comments should be addressed to the attention of the author.

STATEMENT OF WORK  
Approved for public release  
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Bass collected by electrofishing

INTRODUCTION

# NRRP

NATURAL RESOURCES  
RESEARCH PROGRAM

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## Operations and fisheries—previous studies

A number of studies of the effects of reservoir operations on fisheries have been performed. A review of 350 scientific articles on operations and fisheries, conducted by Ploskey (1986), provides the best summary on this topic.

Most studies suggest that reservoir operations which enhance fisheries include slowly rising or stable water levels during the spring spawning season. Water levels should rise during the early to mid-summer months to flood shoreline vegetation and create rearing habitat. Such operations have generally been shown to produce strong year classes of sportfish (Heman, Campbell, and Redmond 1969; Keith 1975; Groen and Shroeder 1978; Ploskey 1986; Willis 1986; Wright 1991). Fall drawdowns to concentrate prey species are often recommended to improve predator foraging efficiency.

## Current study—approach and scope

This effort differs from most studies in its long-term perspective. The recruitment of fishes, occurring several years after operational changes, will be measured. Many previous studies were short term and did not follow the strong year classes produced until they were "recruited" at a harvestable size. A long-term study will provide guidance on how operational changes can enhance recruitment of sportfish at a harvestable size. Similarly, reservoir characteristics where operational changes may not have the potential to enhance fisheries will be identified.

One critical aspect of this study is identifying predator-to-prey relationships and other mechanisms that favor recruitment of sportfish. This information is of importance because operations to enhance sportfish production may be ineffective unless prey and habitat are present in quantities that allow sportfish to recruit at a harvestable size.

Another aspect of the study is measuring the increased recreation visitation and economic benefits associated with operations that enhance fisheries.

As part of the long-term onsite reservoir study, fisheries, visitation, and economic data will be collected during normal (existing) operations, during operations optimal for fisheries, and for a period following optimal operations.

Short-term effects will be measured yearly to evaluate year-class strength of sportfish and the availability of prey. Long-term effects will be monitored after operational changes, to measure the recruitment of sportfish caused by operational changes. An angler creel survey and economic modeling will be used to detect the shifts in angling and other recreation visitation and the economic benefit resulting from the operational changes.

These studies will provide useful information for project managers by documenting the extent that operational changes can enhance fisheries, providing insight concerning where such changes are appropriate, and actually measuring recreation visitation and economic benefits associated with operations that enhance fisheries.

## Study site requirements

Study site prerequisites dictated that the reservoir be of a

size representative of Corps reservoirs, approximately 10,000 to 30,000 acres. This size is considered to be small enough to sample effectively within the time, manpower, and cost constraints, yet large enough to give data indicative of how larger reservoirs and fisheries might react to similar operational changes. Also, the reservoir should be of a design that allows water levels to be efficiently controlled, and sufficient unallocated water should be available to allow experimentation. Operations should be unaffected by reservoirs upstream, and cooperation with other state and local agencies is important.

## Progress to date

WES scientists have analyzed biological and nonbiological data in large reservoir data sets and agree with the findings of previous researchers that operations can affect fisheries.

WES researchers have selected a study site in the Tulsa District where operations can be experimentally changed. This long-term effort will take place at Hugo Lake, located in the southeastern corner of Oklahoma. The scope of work has been prepared, and the Oklahoma Department of Wildlife Conservation has agreed to become an active study partner. The support of Bass Anglers Sportsmen's Society and other interested parties is being sought. The field test portion of the study will begin in fall 1994.

## Benefits of the study

The main benefits to be derived from this study include

- Determining the impact of operations on recreational fisheries.

# HQUSACE Natural Resources Management Perspective

## “On Capitol Hill”

On May 26, 1994, the Senate Committee on Environment and Public Works held a hearing that was of interest to the Corps Natural Resources Management community. First, Dr. John S. Zirschky, Acting Assistant Secretary of the Army (Civil Works), testified regarding the proposed Water Resources Development Act of 1994. Contained in his remarks were a number of comments of interest to us. I have taken the liberty of quoting relevant comments from Dr. Zirschky's testimony so that I can share them with you.

... many people may not be aware that we're the number two provider of recreation in this country, after the U.S. Department of Agriculture, Forest Service. We operate over 4,000 recreation areas that are visited by over 372 million people a year.

Right now we're working on trying to get a mission statement for our recreation employees. Past administrations have not been willing to acknowledge that they have a mission. We ... hope to have that approved by next month. We're also working on trying to expand the career opportunities for people in our recreation programs.

On the environment, I know that's an issue of concern to you ... we look forward to working with you on this year's Water Resources Development Act to expand that mission.

In response to the questions, What are your goals for Civil Works? That is, what do you want to accomplish?, Dr. Zirschky stated:

I'd say restoring morale would be probably the first one. The two previous failed attempts at reorganization have left the Corps a bit demoralized. A lot of people in our field, for example, want to do environmental work, and the previous administrations perhaps have not been as supportive as they should have been. So people out there want to do work. They know they're the Nation's engineering firm. They just haven't been given that mission, so I'd like to help them get that mission.

I'd like us to take another look at recreation. I think past administrations have sort of frowned on it. This administration is taking a look at it. Recreation has enormous economic benefits. When we have 370 million visits to our parks alone ... it has significant effects to the economy.

In response to the question, So what's the cause of the morale problem, as you see it?, Dr. Zirschky stated:

Uncertainty about the future, where is the Corps going. Two plans to close division and district offices have left people worried about their jobs. That's still a problem ... To try and help clear up some of those uncertainties, we announced last week that we're going to look at reorganization from the standpoint not of closing offices, but to try and change our business practices, to streamline more ... We're spending too much money generating reports and studies and not enough doing work on the things that we're good at.

In response to the question, Are there some areas where there's a significant staff interest that has not been pursued that perhaps is causing a morale problem?, Dr. Zirschky stated:

There's the perception of micromanagement in Washington, that all the authority has been pulled up to Washington. I've had GS-11s tell me that decisions that they used to make are now made in my office, the Secretary's office. We're trying to send that decision making authority back to the field offices.

In a separate panel, I was asked to provide an overview of the Corps recreation program. Don Dunwoody, Missouri River Division, and Scott Jackson, Waterways Experiment Station, were there to back me up. Since folks who have gotten copies of this material have found it to be helpful in further describing the Corps' recreation program, I will share a slightly edited version with you here. I will point out that this testimony, like all testimony presented to Congress, was cleared by the Office of Management and Budget.

The objectives of the Corps Recreation Program are: to provide outdoor recreation opportunities on Corps administered land and water on a sustained basis; and to provide a safe and healthful environment for project visitors.

The Corps has a large and diverse recreation program consisting of 463 water resource projects in 43 states, 4,300 recreation areas, and 11.5 million acres of land and water. The Corps operates these projects with approximately 1,900 park managers and rangers. Corps recreation facilities include



campgrounds, picnic areas, boat ramps, trails, etc. Most of our projects are located east of the Rocky Mountains, where almost 80% of the nation's population resides. The majority of these projects are within one hour's drive of a major metropolitan area.

The Corps is the nation's second largest Federal provider of outdoor recreation (behind the U.S. Forest Service) with more than 370 million annual visits. Over 25 million people (10% of the U.S. population) visit a Corps project at least once each year. The Corps hosts over 30% of the recreation/tourism occurring on Federal lands on just 2% of the nation's Federal land base, using less than 9% of the Federal funds expended for recreation. Our visitors mirror the character and diversity of the American public. Increased ethnic diversity, an aging population, and changes in leisure time and activities are all reflected in Corps recreation visitation.

The Corps is in a unique position to optimize the precepts of the National Performance Review regarding the provision of quality Customer Service. We provide high-quality outdoor recreation opportunities to a large cross section of America. Our visitors receive the immediate and tangible benefits of valuable Government goods and services, consistently and reliably across the country. We have the capability to meet the needs of persons with disabilities.

Recent research conducted by the Corps Waterways Experiment Station using IMPLAN, a regional input-output model developed by the U.S. Forest Service, indicates that visitors to Corps lakes expend significant amounts of dollars on goods and services and contribute significantly to the national economy. The Corps recreation program is an important part of the U.S. Travel and Tourism industry, the second largest service industry in the country. The Corps represents over 1.4% of the direct sales in this important \$200 billion industry.

In 1991, visitors to Corps lakes spent over \$10 billion. The direct and indirect effects of this economic activity resulted in \$12.4 billion in employee income and 617,000 full- and part-time jobs with an average salary of \$18,300. This represents 0.4% of non-Federal employee income and 0.5% of the jobs in the United States. With a current budget of \$170 million, the Corps recreation program expends less than \$300 per job. Such analysis employing indirect effects tends to overstate the overall economic activity. However, this gives some sense of the value of the Corps recreation program.

Cooperation among the Federal land management agencies, State recreation and tourism agencies, and the research community is increasing significantly. An interagency reservation system, involvement in the tourism industry, and a professional recreation management job series are just a few examples of recent cooperative activities. Another example is the work to expand the understanding and use of the benefits of leisure in the United States—a concept already in use in other countries such as Canada.

Public involvement is also increasing significantly through active participation in the management of Corps areas. We anticipate further activity through the challenge cost share and contributions programs for which we received authorization under the Water Resources Development Act of 1992. The best example of public involvement is evident in our volunteer program, where nearly 75,000 people donate their time and talents at our lakes each year.

Increased environmental awareness has resulted in proposals such as a National Lakes System as proposed by the American Recreation Coalition.

There will likely be little or no increase in the availability of public lands for outdoor recreation. We must protect the existing finite land and water resources to ensure their availability for future generations.

I hope you find this information helpful, and I suggest you share it with anyone who has an interest.



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Management Branch, HQUSACE

- Identifying operations that can enhance fisheries, or mitigate detrimental effects.
- Defining operational changes that will enhance fisheries or mitigate detrimental effects.
- Relating changes in visitation and economic activity to enhanced fisheries.
- Providing a framework to support existing management strategies for enhancing recreational fisheries through reservoir operations.

It is anticipated that the study results will identify and validate minor operational changes that can produce substantial improvements in the stock structure of recreational fisheries. By identifying the operations that enhance recreational fisheries, it will be possible to determine the potential of operational changes to enhance fisheries in a particular reservoir.

In addition, the study will measure the response of anglers and other recreation project visitors to improved fishing, as well as the economic benefits. This will be

of substantial benefit, in that managers of other Corps projects can apply the biological and economic information gained in this study to their future operational decisions.

## References

- Groen, C. L., and Shrceder, T. A. 1978. "Effects of Water Level Management on Walleye and Other Coolwater Fishes in Kansas Reservoirs," *Selected Coolwater Fishes of North America*, Special Publication 11, R. L. Kendall, ed., American Fisheries Society, Bethesda, MD, pp 278-283.
- Heman, M. L., Campbell, R. S., and Redmond, L. C. 1969. "Manipulation of Fish Populations Through Reservoir Drawdowns," *Transactions, American Fisheries Society*, Vol 98, pp 293-304.
- Keith, W. E. 1975. "Management by Water Level Manipulation," *Black Bass Biology and Management*, R. H. Stroud and H. Clepper, eds., Sports Fishing Institute, Washington, DC, pp 489-497.
- Ploskey, G. R. 1986. "Effects of Water-Level Changes on Reservoir Ecosystems, with Implications for Fisheries Management," *Reservoir Fisheries Management: Strategies for the 80's*, G. E. Hall and M. J. Van Den Avyle, eds., American Fisheries Society, Bethesda, MD, pp 86-97.
- U.S. Fish and Wildlife Service. 1989. "1985 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation," Washington, DC.
- Willis, D. W. 1986. "Review of Water Level Management on Kansas Reservoirs," *Reservoir Fisheries Management: Strategies for the 80's*, G. E. Hall and M. J. Van Den Avyle, eds., American Fisheries Society, Bethesda, MD, pp 110-114.
- Wright, G. L. 1991. "Results of a Water-Level Management Plan on Largemouth Bass Recruitment in Lake Eufala, Oklahoma," *Warmwater Fisheries Symposium I*, General Technical Report RM 207, J. L. Cooper and R. H. Hamre, eds., U.S. Forest Service, Fort Collins, CO, pp 126-130.



**Dr. James P. (Phil) Kirk** is a fisheries biologist with the U.S. Army Engineer Waterways Experiment Station. His interest is practical fisheries management in large and small impoundments. Formerly, he was a black bass biologist in the South Carolina Wildlife and Marine Resources Department. Dr. Kirk holds Bachelor and Master of Science degrees in Wildlife Biology and a Ph.D. in Fisheries from Auburn University.

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# Evaluating the effectiveness and efficiency of operations and maintenance at recreation areas

by

*Theodore H. Schaefer*

*U.S. Army Engineer District, Omaha*

During the last decade, studies have been conducted to determine the cost of providing publicly supplied outdoor recreation facilities. These studies have analyzed a wide range of facilities and have focused attention on social and economic issues related to public provision of outdoor recreation opportunities. Studies of this type may be even more important in the future, as fiscal environments change and budgets are reduced. The result of efforts to reduce recreation facilities and services, and to implement a system of user fees to help recover provider costs, has often been proposed (Titre 1993).

The challenge is to do more, and to provide more with fewer resources. Only an efficient operation can accomplish this. Costs must be carefully weighed against benefits. Pressures of high energy costs, restrictive budgets, and administrative accountability have caused managers to seek greater efficiency and cost-effectiveness in resource usage (Schuster and Gibbs 1983).

Cost estimates for each type of recreation site should be based on total planning costs, land opportunity costs, construction costs, capital improvement costs, and operation and maintenance (O&M) costs. This five-

step cost estimate procedure is the ideal way to produce cost estimates for a recreation area. Quite often, not all of the information is available, and the manager is forced to analyze costs in a different manner. Any method used to analyze an agency's economic impact requires a good database. The manager should consider keeping records on costs, attendance, standards, and general information (Hope 1987).

It has often been said that the cornerstone of "good management" is a cost-efficient response to tight and often diminishing budgets. Some questions the manager should ask are:

- Was our management action done in the most efficient manner to rationally allocate our limited resources?
- Was our management action effective in terms of the public served?

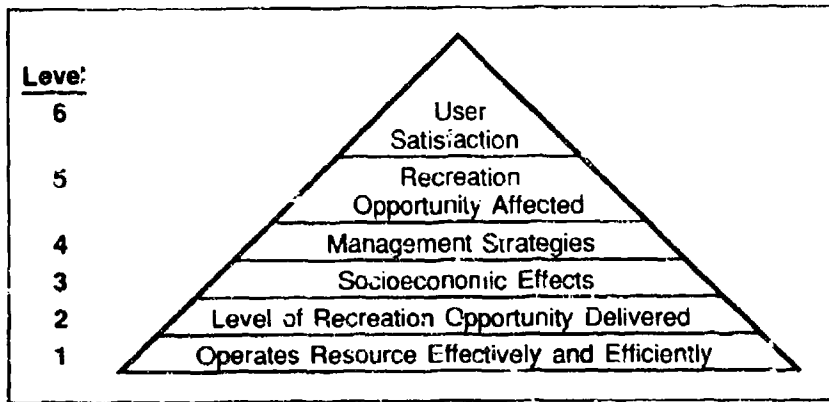
The Corps has the responsibility to manage the land and water resource. The manager has a responsibility to direct and control use activities in the interest of the resource. Greater accountability of government actions will result in tighter recreation fiscal policies.

To achieve greater efficiency, yet remain responsive to public desires, a need exists for decision-

making assistance. Lake managers need a systematic approach with guidelines based on efficient and effective criteria that can be applied to determining optimal mixes of recreation facilities and services. The approach must not be time-consuming or costly for this research to be undertaken (Titre 1993).

## Hierarchy of resource management

The Omaha District prepared a managerial hierarchy for use in developing a process of sound park and recreation management. The intent is for the manager to review each level in the hierarchy as he moves from the bottom to the top of the triangle. There is a series of points to be reviewed at each level. If a positive decision is made at one level, the manager moves on to the next level in the hierarchical model. Progressing through the system, a rationale is developed by the manager that provides the information at each level needed to make "sound" management decisions. The goal should be to match the cost for operating the recreation area against user satisfaction of the area.



● **Level 1 - Review resource effectively and efficiently**

- Land cost (optional)
- Capital improvements; amortize the cost of improvement over the life of the improvement expressed as an annual incremental cost
- O&M costs
  - 1) Hired labor
  - 2) Supervision and administration
  - 3) Supplies and materials
  - 4) Certain equipment
  - 5) Contracts
    - a) Service
    - b) Fee collection
    - c) Mowing
    - d) Refuse collection
    - e) Cleaning
  - 6) Law enforcement
  - 7) Special Recreation User Fees (SRUF) Program

● **Level 2 - Review recreation opportunity delivered**

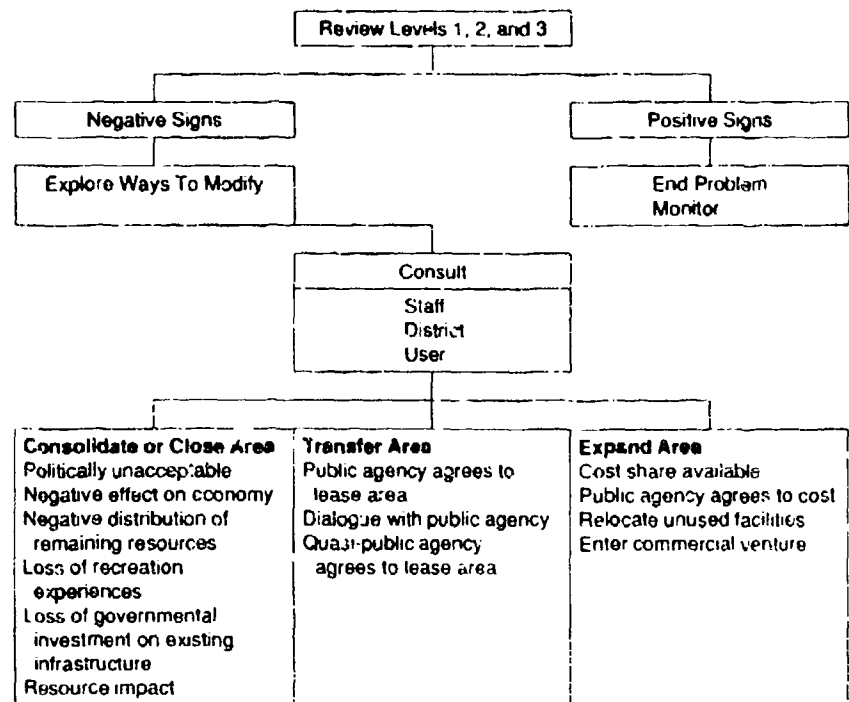
- Inventory of facilities (tables, grills, water ramps, etc.)
- Inventory of services (interpretive, campground hosts, law enforcement, safety, etc.)
- Amenities
- Density
- Type of opportunity

● **Level 3 - Review the effect of site on local/regional economy**

- Site/area impacts (up to and including 100-mile radius)

- Site/area inventory of visitors indicates the percentage that are local or come from counties that border the lake
- Site/area impacts regional economy (101- to 200-mile radius) through the purchase of sales and services
- No vandalism or other visitor use problems are known to be associated with the area

● **Level 4 - Develop management strategies**



● **Level 5 - Evaluate recreation opportunities affected**

- Displacement of current clientele
- Crowding
- A new noncompatible group
- Racial; white/nonwhite; Indian/non-Indian
- Amenities gone
- Prices increase by what the market will bear
- Modify opportunities

● **Level 6 - Measure user satisfaction**

- Impromptu visits and questions to visitors in the area
- Number of return visits
- Use of telephone surveys
- License plate sampling
- Formal questionnaire

This was the Omaha District's first attempt to develop a tool to assist lake managers in evaluating

their recreation areas for the effectiveness and efficiency of maintenance and operations. An instrument was developed to collect and tally the data.

Section I of the instrument contained recreation area statistics, visitation, and O&M costs. This information may duplicate some of the data furnished through the Natural Resources Management System. However, when recorded on the instrument, it provides a ready source of information for the manager. This portion of the instrument should be completed by the park manager or the most knowledgeable member of the ranger staff.

Prorating the capital costs (SRUF and others) over the facility life provides a way of including those costs in annual O&M so that area costs reflect a true expenditure. Managers can compare costs of similar areas for similar periods of time and decide if there are any "red flags" that should be investigated.

Cost per visitor day was used to analyze the recreation areas at Lewis and Clark Lake. The preferred method of analysis is cost per campsite or per picnic table. The dissimilarity of many recreation areas makes the collection and analysis of this information difficult. For areas that are separate campground's or areas where camp areas may be separated from day use, the cost per camp pad should be used. Costs per picnic table may be the appropriate method to use for day-use areas. Consistent cost collection will build up a valuable database. The manager must ensure that the data collected are the most accurate available.

Information in Section II of the instrument was collected by permanent and seasonal ranger staff to identify visitor activities and experiences. While this information was not scientifically collected, field observations and informal discussions with the project visitor can provide the manager with a wealth of user information. This type of data collection should continue.

Section III of the instrument investigated the socioeconomic factors of the area. The ranger staff was asked to provide the responses to 14 factors based on a five-point response scale. This section demands some subjective decisions. Short of developing a sophisticated survey that would be conducted with project visitors, business leaders, or the local/regional public, the method used will provide some valuable information.

Many pieces of data must be collected and reviewed before the instruments can be completed. These data are only one measure of effectiveness and efficiency, because they are not scientifically collected. So, it is in the manager's best interest to make sure the data are the most accurate available. Together with field observations, user inquiries, and sound management principles, these data can provide the information for road-mapping the future of recreation areas.

Finally, it is important to remember that one season's worth of data, no matter how carefully collected, is only that! It is not a trend, nor is it conclusive. Many seasons' worth of data may begin to show some significant trends.

Almost overnight, our economy has changed from producing a

product to producing a service. As a result, customers in this new era focus on service quality far more than any other factor. Therefore, our strategy must be to learn and remain attentive to our customers' requirements. You can do this by using either a formal or informal process of asking questions and listening to your customers. "Superior performance, however you measure it, is a matter of meeting your customers' requirements. You can't meet the requirements if you don't know what they are." (Cannine and Chaplin 1991).

*For a complete copy of the study results and the instruments used, contact the author at (402) 221-4139 or FAX (402) 221-4230.*

## References

- Cannine, Joan K., and Chaplin, Donald. 1991. *Keeping Customers for Life*, American Management Association, New York.
- Hope, Daniel, III. 1987. "Economic Implications of Recreation at the Local Level," paper presented at National Recreation and Parks Association Annual Congress, September 18, 1987, New Orleans, LA.
- Schuster, Ervin G., and Gibbs, Kenneth C. 1983. "Costs for Developed Recreation Sites in the Northern Region, USDA Forest Service," Research Paper INT 317, Intermountain Forest and Range Experiment Station, Ogden, UT.
- Titre, John. 1993. "Guidelines for Measuring Efficiency and Effectiveness," Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.



# NRRP/NRTS bulletin board service available

A computer bulletin board service is available for Corps employees involved in recreation and natural resources activities.

The Natural Resources Research Program/Natural Resources Technical Support Program bulletin board service (NRRP/NRTS BBS) is designed to give users better access and understanding of the NRRP and NRTS programs and their resulting products. The NRRP/NRTS BBS is open 24 hours a day, 7 days a week, and can be reached by dialing telephone number (601) 634-2683. All that is required to use the NRRP/NRTS BBS is a computer, communication software, telephone line, and a Hayes-compatible modem. Use the following modem settings:

<b>Baud rate:</b> 300 to 54,700 bps
<b>Parity:</b> none
<b>Stop bits:</b> 1
<b>Video mode:</b> ANSI

To log on, follow the commands on the screen. The first time you log on, you will be asked to complete a short questionnaire and select a password for future calls. After you log on, you will have 60 minutes of usage per day.

The NRRP/NRTS BBS is divided into the following three areas that provide a wealth of information on recreation and natural resources activities.

- **Bulletins:** Similar to notices posted on a bulletin board, these bulletins provide updates on the latest NRRP, NRTS, and BBS operations.

Examples of typical bulletins that will be posted and updated from time to time are:

***NRRP quarterly update.***

The latest news about the NRRP, including items such as soon-to-be-released products, upcoming fieldwork, and calendar of Corps and non-Corps natural resources and recreation events.

***NRTS quarterly update.***

The latest news about NRTS, including details of recent NRTS technical assistance activities and studies of natural resources and recreation operation problems.

- **Conferences:** NRRP/NRTS BBS conferences allow you to communicate with other BBS users and NRRP/NRTS researchers on a host of recreation and natural resources activities and events.

***NRRP discussion.*** Open to discussing any NRRP topics—past, present, or future. This conference is also a great way to present or learn about innovations that have been used at other Corps projects. Do you have a recreation or natural resources problem for which you need a solution? Other BBS users may have already faced and solved it. So post it here!

***NRTS discussion.*** Open to discussion of any NRTS top-

ics. The results of NRTS technical responses will be posted here, as well as other NRTS efforts

***NRRP Field Review Group (FRG) and District POCs.***

This conference is dedicated to discussion of NRRP issues between NRRP FRG members, District points of contact, Technical Monitors, and NRRP and Environmental Resources Research and Assistance Programs managers. Participation in this conference is limited to affiliation with the above-mentioned positions.

**General discussion.** This is a catch-all conference on topics that are not relevant to the above-mentioned conferences. All discussion items are welcome; these are not limited to natural resources or recreation issues and events.

- **Files:** Presently, the NRRP/NRTS BBS has, available for downloading, files that provide detailed information about NRRP and NRTS results and activities. Examples of these files include past issues of *RecNotes* and *Environmental Executive Notes*, NRRP work unit documentation, and NRTS semi-annual summaries.

*For more information on the NRRP/NRTS BBS, contact Russ Tillman at (601) 634-4201.*

# Good News!!

by Judy Rice, Headquarters, USACE

*[The following mission statement for the Corps Natural Resources Management Program was signed by Dr. John H. Zirschky, Acting Assistant Secretary of the Army for Civil Works (ASA(CW)), on July 8, 1994. It is based on a version developed by a team of Corps natural resources management field staff several years ago and, as such, documents the perspective of our professional managers as official agency philosophy. Many people labored long and hard to realize the goal of a formal mission statement. By assuring agency emphasis and legitimacy for our program, it will serve as the foundation for our future efforts in the natural resources arena. I personally celebrate the signing of our mission statement by the ASA(CW) as the proper recognition of a vital and integral component of the Corps' Civil Works Program.]*

The Army Corps of Engineers is the steward of the lands and waters at Corps water resources projects. Its Natural Resources Management Mission is to manage and conserve those natural resources, consistent with ecosystem management principles,

while providing quality public outdoor recreation experiences to serve the needs of present and future generations.

In all aspects of natural and cultural resources management, the Corps promotes awareness

of environmental values and adheres to sound environmental stewardship, protection, compliance and restoration practices.

The Corps manages for long-term public access to, and use of, the natural resources in cooperation with other Federal, State and local agencies as well as the private sector.

The Corps integrates the management of diverse natural resource components such as fish, wildlife, forests, wetlands, grasslands, soil, air, and water with the provision of public recreation opportunities. The Corps conserves natural resources and provides public recreation opportunities that contribute to the quality of American life.

## GPS and GIS technologies find cultural resource applications at Fort Jackson, South Carolina

by Fred Briuer  
U.S. Army Engineer Waterways Experiment Station

Land managers with the Directorate of Public Works at Fort Jackson, SC, are using two very sophisticated technologies—Global Positioning Systems (GPS) and Geographic Information Systems (GIS)—to better protect and preserve the installation's natural resources. Both technologies were originally developed as scientific tools for America's defense and space programs but have been found to offer an incredible number of other applications.

GPS is by far the most accurate navigational system ever devised. The ability to locate oneself on the face of the earth is based on the principle of using satellites in space as highly accurate and reliable reference points

for triangulating any position on the earth. With two sets of small and highly portable instruments, two scientists from the U.S. Army Engineer Waterways Experiment Station (WES) were able to precisely locate more than 150 archaeological and historical sites that Fort Jackson land managers have responsibility for protecting.

Re-establishing the precise location of these sites was accomplished with GPS in a fraction of the time required by larger crews using traditional surveying instruments. Additional benefits were the improved mapping accuracy and automatic conversion of the locational information into a digital format for computer analysis.

GIS technology makes use of a powerful set of computer tools for collecting, storing, retrieving, analyzing, and displaying electronic information that can be mapped as spatial data. In another cooperative effort between Fort Jackson and WES personnel, this technology was successfully applied to develop sets of map layers which provide critical information about each of the 150 archaeological sites. These maps will also give land managers at Fort Jackson important information for other decisions, such as those involving wetlands, threatened and endangered species, and potential hazardous and toxic waste sites.

Fort Jackson's initial investment in GPS and GIS technologies increases the reliability of information which is critical to managing the installation's natural and cultural resources. These innovations also offer the potential for managers and scientists to team their efforts in working "smarter rather than harder."

# The world is coming to Lake Sidney Lanier!

Lake Sidney Lanier has been selected as the venue for the flatwater rowing and canoe/kayak events of the 1996 Olympic Games and for the sailing events of the 1996 Atlanta Paralympic Games.

## 1996 Olympic Games

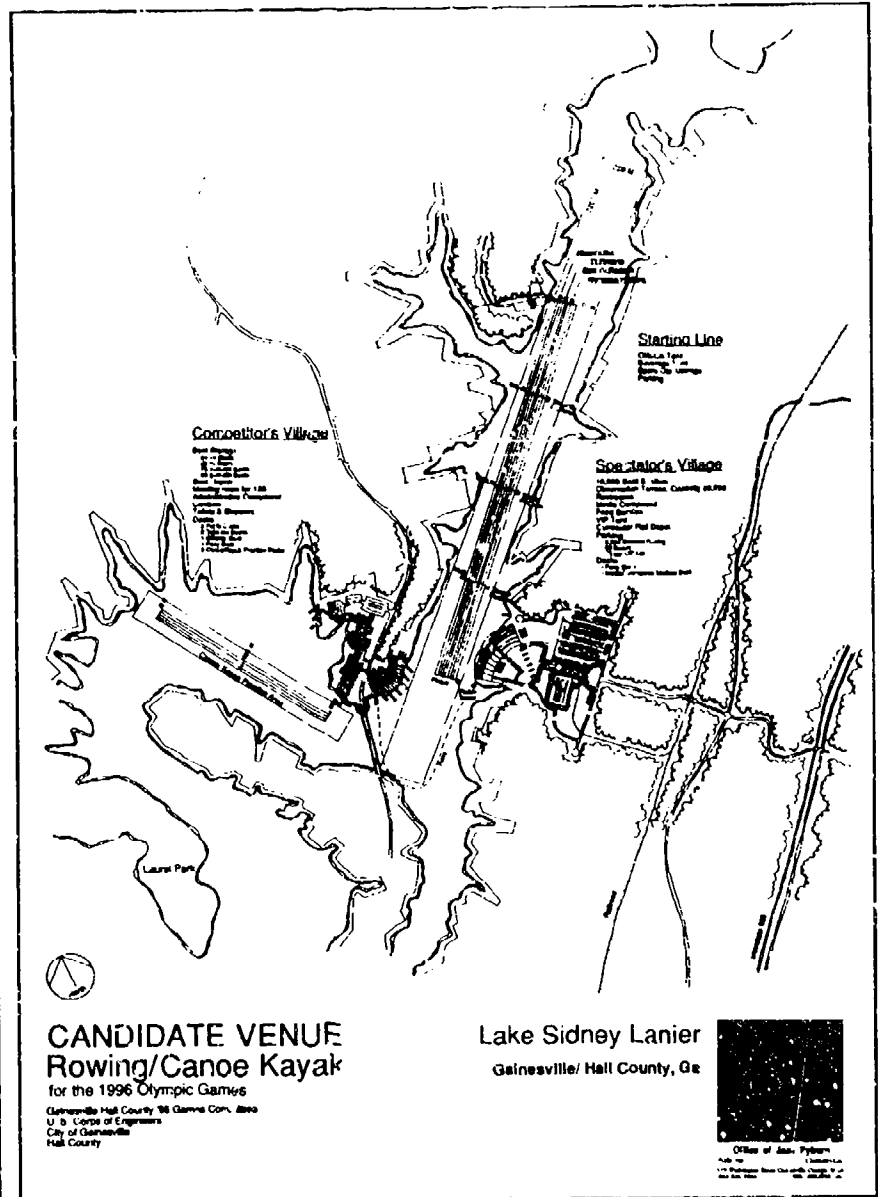
The Atlanta Committee for the Olympic Games (ACOG) recently announced that the flatwater rowing and canoe/kayak events will be held at Lake Sidney Lanier between July 19 and August 4, 1996. Local sponsors for the proposed site are Hall County, Georgia, and the City of Gainesville, Georgia. Minor revisions to the master plan and shoreline management plan are required to accommodate the proposed development. Mobile District is working with the local sponsors and the ACOG to ensure that all necessary actions are complete prior to issuing the necessary lease. In addition, Savannah District has the responsibility for applicable permits for those Olympic venues occurring within the Georgia state boundaries. Savannah District is working closely with the ACOG to ensure that impacts are avoided where possible and that necessary time is built into each venue and development schedule.

## 1996 Paralympic Games

The 1996 Paralympic Games will hold their sail venue on Flowery Branch Bay of Lake Sidney Lanier on August 16-27, 1996. The Paralympic Games are designed for athletes with physical or visual impairments and represent four international federations: the blind, par-

aplegics and quadriplegics, people with cerebral palsy, amputees and others (including dwarfs). The 1996 Atlanta Paralympic Games will host 102 nations; 15 sports; 4,000 athletes; 1,000 coaches and team staff; 1,500 officials, technical personnel, and Paralympic Family; and 7,000 volunteers.

The last Paralympic Games, held in 1992, drew more than 1.5 million spectators. The Paralympic Games are closely coordinated with the Olympics and receive partial funding from the International Olympic Committee and the ACOG.



Candidate venue for rowing and canoe/kayak events for the 1996 Olympic Games. (Drawing provided courtesy of The Office of Jack Pyburn, Architect, Inc., Gainesville, GA)

## Recreation use estimation class held



A recreation use procedure class was held at Waterways Experiment Station in early March 1994. Class participants represented the Corps' New England Division and the Fort Worth, Huntington, Mobile, Nashville,

Pittsburgh, Rock Island, and St. Louis Districts.

Offered since 1984 through the Huntsville Division's PROSPECT Program, this course provides Corps personnel with procedures for devel-

oping sampling plans and collecting, analyzing, and reporting recreation use for developed recreation areas. Participants in this course are eligible to apply for Continuing Education Units from Mississippi State University.

# Calendar of events

- October 12-15, 1994      **National Recreation and Parks Association Congress,**  
Minneapolis, MN, POC: Frank Star (St. Paul District), (619) 290-5328
- October 22-26, 1994      **National Symposium on Urban Wildlife,**  
Embassy Suites Hotel, Seattle, WA, POC: Lowell W. Adams,  
(301) 596-3111
- October 26-29, 1994      **Third Annual National Watchable Wildlife Conference,**  
Mishawaka, IN, POC: Hannah Kirchner or David Case, (219) 258-0100;  
FAX (219) 258-0189

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## Russ Tillman joins ERRAP

Russell K. (Russ) Tillman has recently been assigned as Assistant Manager of the Environmental Resources Research and As-



sistant Programs (ERRAP), Waterways Experiment Station (WES). Russ is managing the Natural Resources Research Program (NRRP) and the Natural Resources Technical Support Program, which are administered as part of ERRAP. He succeeds Dr. A. J. (Andy) Anderson, who recently retired after 15 years as NRRP Manager and 20 years of Federal service with the Corps of Engineers.

Before coming to ERRAP, Russ worked in the WES Coastal Engineering Research Center (CERC) where he was involved in managing the Dredging Research Program (DRP) and was Principal Investigator of Technology Transfer work. While

involved with the DRP, he was Secretary for an American Society for Testing and Materials Committee on Navigation Dredging and served as Conference Management Chairman for the American Society of Civil Engineers' Dredging '94 Conference, scheduled to be held November 13-16, 1994, in Lake Buena Vista, Florida.

In 1993, Russ was the recipient of the Federal Laboratory Consortium's Award for Excellence in Technology Transfer. Prior to his CERC assignment, he was Assistant Manager of the NRRP from 1981 to 1984. He holds a Bachelor of Science degree from Texas A&M University and a Master of Business Administration from Mississippi College.

# NRRP

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## NATURAL RESOURCES RESEARCH PROGRAM

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