- HERITAGE RIVERS BIBLIOGRAPHY -

SELECTED REFERENCES FROM
ARC BRANCH, PARKS CANADA
CARD INDEX
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Since 1971, Parks Canada has taken a particular interest in the protection of Canada’s river heritage. From 1971 to 1973, Parks Canada surveyed more than 65 of Canada’s major wild rivers. Since then, Parks Canada has produced a series of public information booklets based on the Wild River Survey reports. During the past year, Parks Canada has taken a lead role in consultations with provincial and territorial agencies towards the establishment of a Canadian Heritage Rivers System. This initiative is continuing to take shape at the time of writing this report.

During the summer of 1979, the ARC Branch, Parks Canada, through the summer student employment program, carried out bibliographic research over a six week period to identify and record references related to heritage rivers for future internal use. Because of the time constraint, research was largely confined to Canadian, United States and British sources which were readily available either in Ottawa or through interlibrary loan. A card file, containing several hundred references, many with annotations copied directly from a variety of bibliographic sources, was prepared. Where references are held by Parks Canada or the Department of Indian and Northern Affairs Library, the location of these studies within these agencies was also noted.

ARC Branch has received a number of requests during the past few months for information on heritage rivers, including requests for reference materials, research documents and background reports. In response to these requests, the ARC Branch reference cards on heritage rivers have been organized into a number of categories and references from each category have been copied to allow for distribution of the information. Photocopies of those selected cards which follow should be viewed as a working tool designed to provide interested agencies and individuals with the opportunity to make use of the information collected by ARC Branch during the past summer. It should be emphasized that this information is simply a reproduction of existing bibliographic reference materials and their accompanying annotations and does not represent any new research or analysis by the ARC Branch.

It is hoped that the information contained in this document will assist in the establishment of river systems in Canada which will ensure their conservation, interpretation and proper management.

*Bibliographical sources whose annotations are utilized in this document are credited by means of an asterisk (*) in Section I-6, Bibliographies Related to Heritage Rivers, pp. 241-45 and elsewhere as required.
1. CLASSIFICATION AND SELECTION TECHNIQUES FOR HERITAGE RIVERS
A. CLASSIFICATION SYSTEMS


Abstract: Includes a descriptive analysis of the five main rivers and streams in Arkansas as the basis for a program to preserve streams in Arkansas for their "economic, aesthetic, historic, recreational and intangible values".

Keywords: Waterway Preservation, Arkansas, Waterway Classification.


Contains a section on a method for classifying rivers as to the difficulty the river user experiences while attempting to navigate the river. Difficulty ratings are also defined by the type of water craft used to float a river.


Determines the feasibility of classifying water bodies and segments of water bodies by potential use. Identifies criteria for a water classification system and evaluates existing natural resource classification systems. Finds that satisfactory classification by potential optimum use requires a comprehensive planning process that identifies conflicts and is basically a decision-making system.


Presents a multidisciplinary effort to develop river classification alternatives. Physical, economic, and community density factors were each given a numerical value on six natural river stretches along the Priest River and Priest Lake in Idaho. The values were then used to compare the suitability of each of the stretches with the 3 classification criteria (wild, scenic, recreational) specified under the National Wild and Scenic Rivers Act.


Proposes a method to inventory and evaluate river recreation resources based on size, condition, and recreation use of the rivers. Delineates four classes of rivers: wild, semiwild, semiharnessed/developed, and harnessed/developed.


Describes the experience of running a wild river and the fragility of the river resource. Suggests a classification system for types of recreation use of rivers. Urges national legislation to preserve wild rivers for the future.

Florida Department of Natural Resources. A system of scenic and wild rivers as a part of the Florida recreation and parks programs published by the Division of Recreation and Parks, Florida Department of Natural Resources, Larson Building, Tallahassee, Florida. Copy location: ARC library.


Describes a system for evaluating rivers for classification in State programs. The system described was developed for Indiana rivers. Rivers must first meet minimum standards for naturalness and suitable adjoining land areas. Then they are rated on bank vegetation, stream course alterations, man-made structures and roads near and across the river, aesthetic quality of the water, and special natural features. Sample rating for the Tippecanoe River is included.


Manitoba Department of Tourism, Recreation and Cultural Affairs, Parks Branch, 1972. Wild River Study: East Side of Lake Winnipeg.

Provides a description and analysis of four rivers on the east side of Lake Winnipeg to determine their suitability for "Wild River" status. Recommendations pertaining to park land classifications were developed and based upon information collected through aerial reconnaissance and application of a modified version of the Leopold Inventory Technique.
Outdoor Recreation Council of British Columbia.


This draft report calls for the classification of trails, rivers and shorelines, reviews, legislation and mechanisms for conserving linear recreation corridors, and calls for the development of a Trail, River and Shoreline Conservation Program for British Columbia.


Several articles are presented in this issue devoted to river recreation, the concentration being on evaluation and classification of wild and scenic river systems.

Presents a method to inventory and rank landscapes for recreational use. Utilizes four criteria to evaluate them: water, cover, slope, and relief. Delineates a four-fold process to both itemize and scale landscape types. The recreational potential of sites is based on the presence or absence of limiting factors that affect their development for recreational uses.

A.H. Underhill
*Wild and Scenic Rivers Study*
wild rivers, classification
U.S. dept. of Interior, Bureau of Outdoor Recreation

US Bureau of Outdoor Recreation
*Wild and Scenic Rivers*
criteria, legislation, types, administration, use, preservation
June 1975,
Bureau of Outdoor Recreation, U.S. dept. of Interior,
Washington, D.C. 20240

U.S. Dept. of Interior.
*Guidelines for evaluating wild, scenic and recreational river areas proposed for inclusion in the national wild and scenic rivers system under Section 2, Public Law 90-542.*
Wild and scenic rivers act, Criteria
Feb., 1970,
U.S. Dept. of Interior
Paper recommends that in evaluating a river for possible inclusion in the system or for determining its classification, the river and its immediate land area should be considered as a unit, with primary emphasis upon the quality of the experience and the overall impressions of the recreationist using the river or the adjacent riverbank. These guidelines define the criteria for classification, designation and administration of each of wild, scenic and recreational river. The criteria are outlined in terms of degree of development (man-made structures), accessibility, length of river or river segment, recreational potential, aesthetics, and water quality. All rivers included in the national system should meet the "Aesthetics - General Criteria" as defined by the National Technical Advisory Committee on Water Quality in the Federal Pollution Control Administration's Water Quality Criteria, 1968. The management objectives of each class of river are outlined. (Abstract from Dooling, 1975).
B. INVENTORY OF RIVER RESOURCES


Shoreline beaches along the Colorado River in the Grand Canyon are regularly used by river-running parties as overnight campsites. The availability of campsites in river sections where they are scarce, small, or both, limits the number and size of parties that can be permitted without risking unacceptable environmental degradation. Therefore, a comprehensive inventory of usable campsites was made and it revealed that 345 campsites are available for overnight camping by river-running parties.


Canada Dept. of Indian Affairs and Northern Development. 1973.
Wild Rivers survey, 1972 — summary report. DIAND

Abstract: In the summer of 1972, 3,300 miles of Canadian "wild" rivers were surveyed from the Yukon Territory to Newfoundland and Labrador. The rivers were chosen on the basis of:
(1) National Park Natural Region representation (National Park System Planning Manual) in terms of Canada's 39 natural regions; (2) historic routes; and (3) simplicity of studying those rivers which could be feasibly examined from the study centre in one field season. Reports on each river include a written descriptive section and a quantitative inventory/analysis section. This second summer continued to apply a modified version of Leopold's technique for evaluating wild river sites. This summary report includes an outline of the major geographic, historical, recreational, etc. features of the rivers studied during the summer of 1972.

Keywords: Wild Rivers, Waterway Preservation, Canada, Waterway Evaluation.
Canada Department of Indian and Northern Affairs. Parks Canada

Wild Rivers: Alberta, Ottawa, 1974

Wild Rivers: Central British Columbia, Ottawa, 1979

Wild Rivers: Newfoundland and Labrador, Ottawa, 1977

Wild Rivers: Quebec North Shore, Ottawa, 1976

Wild Rivers: Saskatchewan, Ottawa, 1974

Wild Rivers: The Barrenlands, Ottawa, 1979


Canada Wildlife Service,
Special Habitat Evaluation Group
An inventory of wildlife habitat of the Mackenzie Valley and the Northern Yukon, 1971,
152 p.
Ministerial library 14th floor
QH 541 – 5P6,C-35 no 73-27

Carbyn (LN).
Natural features of the Willow Creek area;
Documentation Center 25th floor
QH0005 17n

R.E. Carlson
Natural,Archaeological, and Historical Resources of the Wabash River Basin, Indiana, Illinois.
identification, evaluation, preservation, methods 1969 c.

Indiana University
Bloomingdale, Indiana 47401
or
U.S. Depart. of Interior, National Park Service

Collins, H.
Newfoundland and Labrador Canoe Route:
Inventory.40 p.Volx Eagle River Labrador.
Documentation Center 25th floor
6B 1205 LSS

"The Colorado River...from its sources to the Sea", in Arizona Highway 44(5) historical significance, legislation, state agencies, federal agencies, Colorado river compact, Indian lands May, 1968 3 pp

Ministerial lib 14th floor 5964.53 D57

Dunn, M. Scenic Routes and Recreation Planning - the Teme Valley Experiment 1973, University of Birmingham Center for Urban and Regional Research, Research Memorandum 27, 1973

document No. 10775 ARC library copy location

Heldt, George Platte River Basin-Nebraska: Level B Study U.S. Bureau of Outdoor Recreation 1975 Study Office Missouri River Basin Commission 521 South 14th St., Suite 204 Lincoln, Nebraska 68508


Ministerial lib 14th floor 2467

A pilot study of 15 Yukon rivers was carried out during the summer of 1971 to apply the inventory technique developed by Luna Leopold. The Leopold technique and the descriptive analysis is provided. General geography, points of interest, navigational hazards, etc. are discussed.


In the summer of 1972, 3,300 miles of Canadian "wild" rivers were surveyed from the Yukon Territory to Newfoundland and Labrador. The rivers were chosen on the basis of: 1), National Park Natural Region representation (National Park System Planning Manual) in terms of Canada's 39 natural regions; 2), historic routes; and 3), simplicity of studying those rivers which could be feasibly examined from the study centre in one field season. Reports on each river include a written descriptive section and a quantitative inventory and analysis section. The summary report includes an outline of the major geographical, historical and recreational features of the rivers studied during the summer of 1972.


Describes a method used to categorize resource features for evaluation of recreation site potential along the St. Croix and Namekagon Rivers in Wisconsin and Minnesota. Three environmental factors were studied: (1) regional characteristics (geology, topography, soils, vegetation), (2) river criteria (length, gradient, width, rapids, sinuosity, island) and (3) cultural features (roads, railroads, towns, residences). The optimum location for developing user facilities can be determined by using this method.

Kovacs, Tom.
Musquodoboit Valley Recreation Land Use Analysis 1969
Dept. of Energy, Mines & Resources Policy & Planning
Division Nova Scotia
Also contains Recreation Potential of the Musquodoboit Watershed by Kess Vorburg, Cottage Potential of the Musquodoboit Watershed by Kess Vorberg and R.A. Gillis.
Documentation Center 25th floor
HC 0070 R3K 84m

MacBerson.
Historical Development of the Lower Red Deer Valley Alberta
240 p
Documentation center 25th floor
QE 0045 M24H


Mann, Roy.
David and Charles
Brunel House,
Newton Abbot
Devon, England

Abstract: Following enactment of Maryland's Scenic Rivers Act, a Scenic Rivers Review Board was given the responsibility to annually inventory potential scenic river sites. This report is the first of the annual findings and recommendations; it includes the description and evaluation of five recommended Scenic Rivers. Outlines the methods of compiling information and the criteria used (based on categories of physical, biological and water quality, and human use and interest).

Keywords: Waterway Evaluation, Scenic Rivers, Maryland.


Summarizes a 1972 inventory of wild rivers in Canada. Study rivers were chosen for their potential national park-natural region representation, association with historic routes, or logistics. Results are presented by region: western mountain area, barrenlands area in the northwest, Canadian shield (central), Canadian shield (eastern), and Appalachians area in Newfoundland. Evaluation of river sections is based on river location, water and channel characteristics, valley characteristics, historical/cultural features, scenic quality, and recreation quality.


Newfoundland and Labrador Development Corporation Limited and Regional Economic Expansion Happy Valley - Goose Bay Regional Profile including Northwest River and Mud Lake Labrador, Canada. January 1976. Documentation Center 25th floor 0623 K81
Ministerial lib. 14th floor QL 61 059

Ontario Department of Lands and Forests, Conservation Authority Branch, Crowe Valley Conservation Report: Water Wildlife, 1963
Toronto
Ministerial lib 14th floor QL 61 059 c

Ontario Dept. of Lands and Forests, Conservation Authority Branch, Sauble Valley conservation reports: Water Wildlife, 1962 Toronto
Ministerial lib 14th floor QL 61 C606SW


"Sares" has completed an inventory of lakes and is now developing a data collection system for rivers and river shorelands. Information is designed to help identify: (1) conflicting land and water uses; (2) how recreational potential of water resources can be improved through land and water management programmes; and (3) water bodies suitable for inclusion in a recreational enhancement programme.

Two types of information are collected. First, information pertaining to channel morphology, existing land and water uses is summarized for five mile reaches in addition to identification of aesthetic, cultural, biological and physical features. Second, information relating to recreation, soil, ungulate, waterfowl, forestry and sport fish capability is gathered. No method by which a measure of capability is determined is presented, although use of C.L.I. data is implied.

Ontario Department of Lands and Forests.  


Porter, T., Riche, L., Traverse, A.  

Pringle, Laurence P.  Wild River, Philadelphia Lippincott 1972 128p  
An examination of North American Stream Ecology, Ministerial hb 14th. QHS41 .5.S7 p75


SOUTH CAROLINA DEPARTMENT OF CARKS, RECREATION AND TOURISM AND WILDLIFE AND MARINE RESOURCES DEPARTMENT.  
1978. SOUTH CAROLINA RIVER TRAILS STUDY. 93 P. COLUMBIA, SOUTH CAROLINA.

Describes and presents the results of a study to designate a system of river trails in South Carolina. Included in the study were a demand/need questionnaire survey to measure river use, a resource inventory and evaluation to select rivers for study, and a selection process to determine which rivers should be included in the trails system. Also includes a section on recreational development considerations to reduce user impacts and an appendix with samples of forms used in the study.

S. Snook  
"River-to-River Road, George Rogers Clark Recreation Way in scenic roadways, rivers, Illinois, Ohio River, Mississippi River Recreation Resources"


State Dept. of Environmental Resources Pennsylvania Scenic Rivers Inventory. Scenic rivers, criteria, planning priorities 1976 Pennsylvania Dept. of Environmental Resources PO Box 1467 Harrisburg, PA 17120

Wang, D., V. Harvey, L.F. Pettipas, Manitoba Dept. of Tourism Recreation and Cultural Affairs, The Assiniboine Route of Manitoba Oct. 1975. 146p Corridor Study, historical resources, natural resources, heritage ARC library

Ward, J.C. Riviere a Saumon dans le Parc National Perillon 1974. 15p. Documentation Center 25th Floor 6B 1705 V71
C. EVALUATION OF HERITAGE SIGNIFICANCE
AND RECREATION POTENTIAL

Anderson, D. L. "The Recreational Capability and Use of Wabamun Lake and
the Eastern Half of Lesser Slave Lake." University of Alberta,
Edmonton, 1967.

and the Valuation of Recreational Resources." Land Economics,
50: 51-57.


To determine the mathematical relation between use levels and user satisfaction, the quality
of recreation experiences were examined for two groups of lake users in southeastern
Michigan. Carrying capacity limits for boating were established, based on mailed question­
naires, personal interviews, and aerial photographs. Satisfaction was as important a
variable in setting use limits as was the actual space available.

Baker, W. M. 1961. Assessing and allo­
cating renewable resources for rec­
reation. Resources For Tomorrow, Conf.
Background Pap. II(8):981-1001. Queen'
Printer, Ottawa.


Develops an objective method to evaluate the recreational potential of riparian corridors
and to inventory existing river characteristics. Sixty-seven variables in eight catego­
ries were evaluated along river segments of the Pine, Manistee, and Looking Class Rivers in
Michigan. Each variable was ranked for 16 recreation activities. A literature review of
techniques for assessing recreation values is included.


In addition to this inventory and evaluation system, a good bibliography of analysis techniques for river recreation resources and potentials is provided.


Canada Parks Canada, Western Region.
The Kicking Horse River: A description and evaluation of Recreational Potential for Canoeing and Kayaking. 1977. 75 p. documentation Center 25th floor

Canada Parks Canada, Western Region.
GB 1201.15 C16a Documentation Center 25th floor

Copies of these reports can be obtained by writing the Director, Western Region Parks Canada, 134 - 11th Avenue S.E. Calgary, Alberta T2G 0X5 Attention: B.F. Leeson.

Canada, Parks Canada. The English River; An Assessment of its National Significance, by Mondor C.A. Coordinator Area Identification Section, Parks System Planning Division, National Parks Branch July 28, 1976. 30 p. copy location ARC library


Identifies the need for a technique suitable for evaluating and demonstrating the recreational potential of rivers in a comprehensive and comparative manner. Paper describes the initial stages of the development of such a technique for the U. S. Forest Service. The method is based on the quantitative assessment of the nature and distribution of a wide range of physical and cultural characteristics which affect a river's suitability for 16 different recreational activities.

In the past most river recreation was managed from the viewpoint of rectangular land areas rather than complete river systems. Managing from a river-oriented viewpoint gained momentum with the passage of the Federal Wild and Scenic Rivers Act, but no widely adopted method of assessing river recreation potential has yet been developed. Several approaches to potential assessment are summarized. The RIVERS Method involves assessing 67 variables for each mile of river and evaluating the potential for 16 recreational activities.


Although many ways of assessing river recreation potential have been suggested, no universally applicable method has been devised. The RIVERS Method, currently under development for the USDA Forest Service, attempts to evaluate and compare the potential of all types of rivers for recreation activities.


A method was developed to evaluate aesthetic and recreational potential of streams and watersheds based on previous work by the U.S. Soil Conservation Service and on the principles of terrain analysis, land use planning, and outdoor recreation economics. Evaluations of stream recreation potential for activities such as camping, fishing, and hiking were made. Concludes that aesthetic and recreational values can be identified, inventoried, and used to evaluate a watershed's development potential; and that accurate estimates of participation demand, acreage requirements for various activities, and benefits gained (by both users and developers) from recreational developments can be projected.


Presents a system designed to evaluate the recreational and aesthetic potential of small natural streams and their watersheds, which are located near urban centres. Evaluations concerning a stream's recreational potential were made for: camping; fishing; picnicking; development of trail systems; aesthetic enjoyment; and the establishment of natural, scenic and historic areas. Additional procedures were developed for estimating: visitation to a developed site; future participation demand and proportion of that demand which could be satisfied at a specific site; and the economic benefits that would accrue if the sites were developed. The evaluation of recreation potential is based upon application of weighted value ratings.


Briefly describes efforts to designate a 170-mile stretch of the Missouri River in north-central Montana into the National Wild and Scenic Rivers Act. Also summarizes the findings of a study to determine suitability of the River for inclusion in the system.
Explores the possibility of developing criteria and standards based upon the individual and
groups threshold functions by which alternative river recreation sites are accepted or rejected.
Explains experimental procedures used to develop the threshold functions. Presents illustrative results of pilot studies. Suggests applications and needs for further research.

Ditton, Robert B.


Abstracts: Utilizing a sample of 250 individuals from a data base that describes water-based recreation patterns of 2174 heads of household in northeastern Wisconsin, this paper presents the findings of two cluster analyses. The first is based on participation frequencies for eight activities; the second is based on 23 variables combining type of environment with activity frequencies. For both analyses a replication with a second subsample of 250 individuals was carried out indicating stability of the clusters derived. A range of computer programs developed by Wishart (1970) was used for analyzing the data. The first analysis identified eight mutually exclusive clusters of individuals; clusters distinguished from each other by the kind and frequency of their water-based recreation activity. Each cluster was named and characteristics that distinguished the cluster from the total sample were described.

The second analysis based on kind, frequency, and type of environment yielded nine clusters. These clusters were named and cluster characteristics described. Inclusion of the location variable added all important-dimension to cluster analysis and enabled more useful descriptions of participant groups than has previously been done.

After the remaining 1924 individuals were assigned to one of the nine clusters based on their standing on multiple participation variables, each cluster was cross tabulated with 13 predictor variables. With cross tabulations, the exact makeup of the clusters could be established and used for predictive purposes. Some theoretical, methodological, and practical implications of cluster analysis and the clusters derived are discussed.


DUFFIELD, BENNY. 1972. COMPARISONS OF FLOAT TRIP RECREATION OPPORTUNITIES BY VISITORS TO THE ELEVEN POINT RIVER. M.S. THESIS. DEP. FOR., UNIV. MISSOURI, COLUMBIA, MISSOURI.

PRESENTS THE RESULTS OF A STUDY OF DIFFERENT TYPES OF FLOAT TRIP VISITORS TO THE ELEVEN POINT RIVER IN SOUTHERN MISSOURI TO DETERMINE HOW THEY COMPARE THE QUALITY OF THEIR RECREATION EXPERIENCE THERE TO OTHER FLOAT RIVER OPPORTUNITIES IN MISSOURI. DISCUSSES IMPLICATIONS OF COMPARISONS OF QUALITY FOR DETERMINING CARRYING CAPACITY. CONCLUDES THAT THE ELEVEN POINT IS CONSIDERED A HIGH QUALITY FLOATING STREAM AND THAT THE QUALITY OF EXPERIENCE IS DECLINING WITH INCREASED PERCEPTION OF TRASH, PEOPLE AND SITE DETERIORATION.


Develops and tests an econometric model to estimate future demand at water recreation sites (lakes and streams). To test the model, 1,000 families living in St. Louis, Missouri, were randomly selected and surveyed in 1964. The model correlates socio-economic characteristics of survey group with water-oriented outdoor recreation activities such as swimming, fishing, boating, and water-skiing. Concludes income, age, sex, education, and occupation affect an individual's level of recreation participation and types of recreational activities pursued.


Reports the responses of visitors, developers, and the voters of San Antonio to a recreation-business development complex along the San Antonio River in downtown San Antonio, Texas. Visitors describe the river-oriented development as beautiful, uncrowded, safe, and non-commercial. They claim it offers opportunities for a variety of leisure pursuits such as solitude, excitement, and sightseeing. Developers see the development as an informally designed landscape with provisions for many activities (business and recreation). Voters feel the development is a tourist attraction, is safe and clean, and they favor expanding the river development even if taxes would have to be raised to help pay for it.


Develops criteria to enable cities to evaluate the potential for business-recreation development along downtown waterfront locations. Suggests that development will stimulate revival of downtown areas and will allow diverse interests to coordinate leadership on resource management. Examples of waterfront redevelopment in various American cities are presented.

Cites examples of current recreational developments of urban waterways: San Antonio River Walk, Wichita River Parkway, Trent-Severn-Rideau Waterway (Ontario), and New York State Canal Recreation Development Program. Documents benefits: protection of natural amenities, revitalization of downtown, provision of leisure activity, and increases in jobs, incomes, and taxes generated through commercial enterprises related to development.


Reviews techniques for describing and evaluating recreational rivers in Canada. Considers methods developed and/or tested in Canada and methods developed elsewhere that have been applied in Canada.


Provides a review of eight key elements in the river recreation system of concern to river recreation planners, managers, and researchers. Discusses four general types of knowledge needed by planners and managers to facilitate the operation of river recreation systems. These include the river resource, baseline data on use of the rivers, impacts of river recreation use, and knowledge on how managers and planners interact with a river recreation system.

Study isolates pertinent spatial and recreational characteristics of small waterways related to boating. Utilizes unpublished data on the Trent-Severn Waterway in Ontario to establish elements of a descriptive model suitable for general application. The topological unity of the Waterway at various levels of navigability and its dendrite, quasi-linear form are established and described using a variety of indices derived from graph theory. Further, the Waterway is divided into functional regions based upon boating destinations. Boat and boater characteristics are shown to differ considerably among regions. (Abstract from Dooling, 1975, p. 7).


Describes the results of aerial photo techniques tested on the north slope of the Uinta Mountains in Utah to measure physical characteristics of mountain lakes and streams. Compares the accuracy of photo determination with field measurements of lake depth. Describes procedures for all-photo measurements in the inventory. Concludes that a substantial amount of descriptive data can be obtained from aerial photos.


Describes and evaluates systems suitable for measuring the recreational potential of waterways—particularly canoeing, kayaking, rafting, and activities associated with these forms of recreational boating. These systems were tested on the Gammon River in Manitoba in 1974.


Acquaints the reader with some aspects of mountain river hydrology, channel morphology, and the hydraulic principles affecting whitewater features. Also, briefly discusses a system developed to rate the paddling difficulty of whitewater.


Outlines the steps taken to determine the recreational potential of several Canadian mountain rivers. First, a detailed inventory and evaluation of the rivers was completed. Then, management and operational guidelines pertaining to canoeing, kayaking, and rafting were developed. General management concerns included: requiring registration systems, establishing public safety programs, establishing recreational carrying capacity limits and procedures, establishing restrictions and guidelines for on-shore activities related to boating, and assessing public information requirements. Also river users should be surveyed to help develop the management plans. A questionnaire used for this purpose on Canadian rivers is presented.
HOOPER, R. A.
1979. THE NAVIGABLE MOUNTAIN RIVERS STUDY: SUMMARY AND CONCLUSIONS.
116 P. NATURAL HISTORY RESEARCH DIVISION, WESTERN REGION PARKS CANADA, CALGARY, ALBERTA, CANADA.

SYNTHESIZES SEVENTEEN REPORTS WHICH WERE PREPARED DURING A FIVE YEAR STUDY ON THE CANOEING AND KAYAKING POTENTIAL OF CANADIAN RIVERS IN WESTERN REGION NATIONAL PARKS. THE STUDY INVOLVED THREE PHASES: 1) RIVERS WITH HIGH POTENTIAL WERE SELECTED AND FROM THE INITIAL 44 RIVERS OR RIVER SEGMENTS, 8 WERE SELECTED FOR FURTHER STUDY, 2) THE 8 RIVERS WERE ASSESSED IN DETAIL AS TO THEIR RECREATIONAL POTENTIAL AND AN EVALUATION FORM RATING 10 COMPONENTS WHICH AFFECT RECREATIONAL POTENTIAL AND A DETAILED RESOURCE ATLAS WERE PREPARED FOR EACH RIVER, 3) THE DEVELOPMENT OF OPERATIONAL AND MANAGEMENT GUIDELINES FOR THE 8 RIVERS.


Study on three Nevada lakes--Lake Tahoe, Pyramid Lake, and Lahontan Reservoir--to determine interrelations of demand for water-based recreation for specific sites. Author concludes that distance might not be a reliable substitute for price and that distance variables may often be highly interrelated. Suggests that other methods should be investigated in any further attempts to measure demand and demand interrelations for recreation areas. States that research should be conducted to measure recreational activities separately rather than as a whole because activities could be competitive.
Uniqueness ratios were calculated for 18 rivers in New Brunswick using Leopold's basic concept. Rivers were ranked on quality, aesthetic appeal and human interest and total attractiveness. User conflicts related to recreation canoeing and associated activities were identified. The river's natural attractiveness, scope of significance, average canoeability, and the apparent likelihood of misuse were considered and each of these factors were rated and summed.


Suggests there are numerous wilderness-like recreation opportunities adjacent to Minnesota's Boundary Waters Canoe Area in the remainder of the Superior National Forest. If these opportunities were made known to potential recreation campers to northeastern Minnesota, demand and overuse in some portions of the Area could be substantially lessened. Notes the implications of these findings to water-based recreation management generally. Discusses some of the kinds of information needed to help recreation users choose among alternative areas and sites within areas.


"Suggests there are numerous wilderness-like recreation opportunities adjacent to the Boundary Waters Canoe Area in the remainder of the Superior National Forest. If these opportunities were made known to potential recreation campers to northeastern Minnesota, demand and overuse in some portions of the BWCA could be substantially lessened. Discusses some of the kinds of information needed to help recreationists choose among alternative areas."

(Stankey and Lime, 1973).


Develops and tests aerial photographic techniques on the Connecticut River to identify and classify river-oriented recreation sites. Analyzes two sets of aerial photos for land uses and development trends. Identifies 102 land use types, and presents a statistical summary of the land (by political unit) for analyzing the recreation potential of the River.
Develops and tests aerial photographic techniques for identifying and classifying river-based recreation sites on the Connecticut River. System is used to describe and to note changes in vegetation and land use characteristics.

Describes aerial photogrammetric techniques which were developed and tested for identifying and classifying river-based recreation sites. A basis for classifying: agricultural and open lands; forest lands; wetlands; mining, exposed rock on waste disposal areas; urban land use; outdoor recreation facilities; and river bank lands is provided. The study demonstrates the feasibility of analyzing the recreational potential of large rivers from aerial photographs.
MCNEILL, RICHARD E
1973. INVESTIGATIONS IN THE DEVELOPMENT OF TECHNIQUES OF MEASURING AND ANALYZING DATA OF RIVER RECREATION USERS BY AERIAL AND GROUND METHODOLOGY.
31 P. BIOL. DEP., FERRIS STATE COLLEGE, BIG RAPIDS, MICHIGAN.

REPORTS THE RESULTS OF A PROJECT TO EXPLORE THE POTENTIAL OF USING AERIAL TECHNIQUES TO INVENTORY WATERCRAFT USE ON THE PINE, MANISTEE, PERE MARQUETTE, AND ABSALBLE RIVERS IN MICHIGAN. THE VARIOUS TYPES OF AERIAL RECORDING METHODS EXPERIMENTED WITH WERE A SIMPLE HAND-HELD MECHANICAL COUNTER, VIDEO TAPEING AND 35 MM STILL PHOTOGRAPHS USING BLACK AND WHITE AND COLOR FILM. GROUND COUNTS USING VIDEO TAPEING, PHOTOGRAPHS AND VISUAL OBSERVATIONS WERE MADE ON THE PERE MARQUETTE RIVER TO COMPARE WITH AERIAL DATA DURING HIGH USE PERIODS AND TO COLLECT INFORMATION ON THE ACTIVITIES OF THE RIVER USERS. PRESENTS THE DATA OBTAINED AND DiscUSSES THE IMPLICATIONS. EVALUATES THE AERIAL TECHNIQUES FOR COLLECTING RIVER USE DATA.


A pilot test of a demand model to measure recreationists' willingness to pay for various activities (boating, fishing, etc.) was conducted at Lake of the Ozarks in Missouri. The test identified four factors as necessary components of the demand model: population, population density, distance from the recreation site, and mean income of recreationists. Factors such as mobility and availability of alternative recreational activities did not appear to be useful factors for this model.


The authors argue that the potential of urban rivers for recreational purposes has not been fully realized. Cites the importance of public opinion in urban river reclamation. Urges development of riparian corridors to take advantage of rejuvenated waters. Discusses efforts in Delaware and Texas to implement greenways along urban rivers.


Murray, Malcolm A. "The Recreational Possibilities for the North Branch of Thames, Ontario, Canada." Syracuse University, 1950.


The recent rise of interest in river recreation must be seen against a background of fear of wild rivers as part of the uncontrolled wilderness. Revolutions in ideas, equipment, and technique paved the way for the transformation of river running from a high-risk expedition to family fun. Suggests the future will see increasing competition for the recreational potential of rivers, particularly for float trips.

State of Ohio, Dept. of Natural Resources. Tuskarawas River and Ohio and Erie Canal Recreation and Development Study. June 1970 prepared by: Stanley Consultants, Cleveland, Ohio. 40p
Copy location ARC Branch 23 Floor
Ontario Ministry of Natural Resources.


Reflects on the impact and effect of urban water development on users. Generally, user attitudes to urban river development are positive. Suggests diversity in design and development for success of urban river walkways.


Investigates the scientific and historical value of antiquities in the Salmon River Canyon. The Canyon shows evidence of a lengthy intercultural period and a rich history of man-environment relations. Discusses archeologically significant finds within the Canyon; past archeological research; funding problems; and time commitments required in archeological research. Has implications for interpretive management.
C.S. Saladino, University of Nevada
Recreational Potential of the Truckee River Basin from Lake Tahoe to Pyramid Lake.
visual survey, design alternatives, recreational master plan, photos, motion through landscape 1969c
University of Nevada
Agricultural Experiment Station
Reno, Nevada 89507

SCHREYER, RICHARD, NIELSON, MARTIN L.
1973. WESTWATER AND DESOLATION CANYONS: WHITewater RIVER REcreation STUDY.
196 P. INSTITUTE FOR THE STUDY OF OUTDOOR RECREATION AND TOURISM, DEP. FOR. AND OUTDOOR RECREATION, COLL. NAT. RESOUR., UTAH STATE UNIV., LOGAN, UTAH.


SMITH, DANIEL S.
1974. ANALYZING NEW YORK STATE STREAMS FOR POSSIBLE INCLUSION IN THE STATE WILD, SCENIC AND RECREATIONAL RIVER SYSTEM.
NAT. RESOUR. RES. SERIES 5, 109 P. DEP. NAT. RESOUR., CORNELL UNIV., ITHACA, NEW YORK.

INTENDED TO SERVE AS A GUIDE TO PRIVATE INDIVIDUALS AND GROUPS CONDUCTING DETAILED STUDIES ON NEW YORK RIVERS TO NOMINATE THEM FOR POSSIBLE INCLUSION IN THE NEW YORK STATE WILD, SCENIC AND RECREATIONAL RIVERS SYSTEM. PROVIDES STATE RECOMMENDED GUIDELINES FOR RIVER INVESTIGATION FROM THE RESEARCHING TO THE DEVELOPMENT OF A COMPLETE RIVER STUDY. ALSO DESCRIBES ALTERNATIVE METHODS OF STREAM PRESERVATION. APPENDICES INCLUDE A REPORT OUTLINE FOR THE STUDY RIVER REPORT AND EXAMPLES OF RIVER STUDY FORMS.
Using a computer simulation model of water quality factors, a method was developed for assessing alternative urban riverine sites for recreation. The model gives statistical summaries of simulated water quality that can reflect changes in adjacent land use patterns and socio-economic characteristics of the landowners. Other modeling techniques used to estimate urban recreational use are also discussed. Evaluates the recreational potential for noncontact activities on the Allegheny River through Pittsburgh.


A system of filter matrices is described and its application to rivers in the Appalachian plateau evaluated. Based upon subsequent aerial observation and input from users, the system appears applicable in identifying streams that could logically be considered for inclusion in the National Wild and Scenic River System.


Presents the results of research into the supply and demand of urban oriented nonreservoir recreation. Provides a detailed account of the data base used, the methods of collecting the data, and the analytical procedures followed in developing various recreation use prediction models. Recommends that the methods described be tested elsewhere, evaluated, and developed into a standardized procedure for use by the U.S. Army Corps of Engineers.


Abstract: Three sections of two rivers, the Salmon and the Selway, of central Idaho were identified as suitable for wilderness river recreation. To permanently allocate these river sections to the recreational purpose would mean (a) banning man-made developments from the river and a strip of land extending two miles inland from each bank, and (b) exercising control over use of the river and surrounding corridor. Before this allocation can be justified, it was deemed necessary to (1) examine the natural resources involved, (2) analyze the alternative needs for these resources, and (3) evaluate the consequences of allocating the river resources to the alternative needs. In this study, features of the river sections are described and evaluated in the context of four issues: the national need for wild river recreation; the regional need for electrical power; the regional need for salmon spawning areas; and the local need for economic growth resources. Recommendations included: (1) wild river designation be given to the three wild river sections and appropriate control measures be applied; (2) wild river designation be accompanied by general recreation development plan, for optimum utilization of the entire area's resources; and (3) forestry as an industry continue to receive support as a vital alternative and supplement to recreation to enhance local economic growth.

Keywords: Waterway Evaluation, Economics Analysis, Wild Rivers, Idaho, Hydro-Electric Power, Use Conflicts, Recreational Potential.


WILLIS, ROBERT L.

PRESENTS THE RESULTS OF A STUDY TO TEST RECREATIONAL INVENTORY TECHNIQUES AND ESTIMATE PRESENT AND POTENTIAL RECREATIONAL USE ON THE GREEN AND ROCKCASTLE RIVERS OF KENTUCKY. THREE INVENTORY TECHNIQUES WERE EVALUATED BY A QUESTIONNAIRE SURVEY AND THE DATA USED TO GIVE ESTIMATES OF PRESENT ANNUAL USE AND EXPENDITURES FOR THE 2 RIVERS. POTENTIAL ANNUAL USE AND EXPENDITURES WERE ESTIMATED BY A PHYSICAL HABITAT EVALUATION.
Describes one of the earlier methodologies which utilized shoreline characteristics to assist in the determination of recreational potential. Based upon the visible and physical features, a thirteen part shoreline typology was developed. The typology identifies: the slope and material of the wet beach, dry beach, bluff and upland areas, evidence of erosion, type of vegetation, and types of soil. An inventory of the entire Lake Superior shoreline was undertaken and optimum uses for each shoretype were recommended.
D. ASSESSMENT OF ENVIRONMENTAL INTANGIBLES


Suggests that stream preservation efforts are based on perpetuation of intangible values, both aesthetic and scenic, that contribute to the scope and quality of the human environment. Believes previously used criteria for assigning values to intangibles are inadequate because States continue to lose ground to development interests.


Contains 167 references, most of which date from 1965. Papers are categorized into: (1) literature review, (2) inventory methods, (3) public involvement, or (4) miscellaneous. Many annotations include a "critical comment".


Abstract: Discusses Luna Leopold's methodology for quantitatively evaluating wild rivers. This method was used in the 1971 pilot project in the Yukon Territory. Includes discussion of the concept of wild river evaluation, how Leopold's technique was chosen, the study area, and the application of the technique during the pilot study, and concludes with recommendations concerning changes in the technique for follow-up river surveys.

Keywords: Wild Rivers, Waterway Evaluation, Yukon Territory.
In the summer of 1972, 3,300 miles of Canadian "wild" rivers were surveyed from the Yukon Territory to Newfoundland and Labrador. The rivers were chosen on the basis of: (1) National Park Natural Region representation (National Park System Planning Manual) in terms of Canada's 39 natural regions; (2) historic routes; and (3) simplicity of studying those rivers which could be feasibly examined from the study centre in one field season. Reports on each river include a written descriptive section and a quantitative inventory/analysis section. This second summer continued to apply a modified version of Leopold's technique for evaluating wild river sites. This summary report includes an outline of the major geographic, historical, recreational, etc. features of the rivers studied during the summer of 1972. The quantitative inventory is not included. (note: a summary report of the 1973 wild rivers survey will be completed during this spring, 1974. The summer of 1973 was the third and last field study of wild rivers for the time being. The analysis of the quantitative data will be the focus of attention during the ensuing months. In addition to the three summary reports, there is an unpublished special report concerning each study river.).

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Reviews the state of the art of evaluating intangible benefits and costs associated with the use of the environment. Cites Leopold's inventory technique to assess environmental quality of rivers as being more illustrative rather than analytic. Distinguishes between two types of classification techniques: monetary evaluations of environmental intangibles and non-monetary evaluations of the physical environment.

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Applies Leopold's river inventory system for uniqueness to 58 natural streams in Kentucky. Concludes that the concept is useful to evaluate the uniqueness of a group of streams. Encourages further integration of the uniqueness concept into benefit-cost analysis and makes specific recommendations for further research.

A method that utilizes color slides and a semantic differential rating scheme was developed to measure people's preferences for natural landscapes. Concludes that: scenes with running water are preferred over scenes with still or no water; stark beauty of a desert, lava flow, or winter pasture is not perceived as beauty by most people; some types of visual pollution (i.e., billboards) are not recognized as such by many people; occupation and lifestyle have more of an effect on an individual's concept of natural beauty than does age or sex; and people generally agree on what is very beautiful or very ugly but not on the in-between.


Paper provides a review and analysis of quantitative ranking systems developed during the 1960's for measuring environmental quality. Includes consideration of systems to evaluate resources for policy planning, planning decisions, and for single uses.

In 1969 Luna E. Leopold published a system for quantitatively comparing landscape aesthetics. This system had several features such as the uniqueness ratios and distinctive graphical procedures for deriving river and valley character. An examination of Leopold’s checklist for landscape factors reveals that the system for rating each factor is inconsistent. Inconsistency is justified as not introducing bias and personal preferences into the analysis. The use of uniqueness ratios appears to have been required in order to accommodate the inconsistent scaling of factors to numerical analysis. The addition of uniqueness ratios produces difficulties of comprehension and interpretation. The graphical procedures use a small amount of information and complex graphical techniques to produce scales of river and valley character. Analysis of the system suggested that consistent rating of environmental factors and the addition of factor scalings might have produced comparable results more effectively.

Criticizes Leopold’s inventory method to quantify the aesthetic factors of rivers. Statistical tests show small correlation between uniqueness ratios in Leopold’s method and other rating methods. Anomalies were also found in graphic derivation of Leopold’s technique. Suggests that a number-ranking system would be a more efficient evaluation tool.

Horn, Thomas F. 1978 "Significance of the Chautaugua Lake (N.Y.) muskellunge fishery to regional tourism in 1975." Cornell University MS Thesis 121p


Provides a discussion of the conceptual and methodological aspects of the Leopold Inventory Technique. Included is a discussion of the rationale for selection of the technique. An analysis of quantitative data collected during the first summer of field work is made. Results indicated that modifications in the factors considered and sample design were required. Modifications were related to the determination of scores based on factors having direct relevance to aesthetic appeal and calculation of desirability scores. The paper concludes with recommendations concerning other required changes in the methodology.


Reviews wild river evaluation techniques and selects a modified version of Leopold's inventory method to use in collecting data on Canadian rivers. Recommends that historical, geological, biological, and recreational capability information be added to the inventory technique. Field test concludes Lewes-Yukon and Ogilvie-Peel Rivers as high-priority considerations for Canadian wild and scenic river status.
OBSERVATION RIVERS

Tennis were sent out in canoes along selected rivers and, at a sample of points, measured and assessed a number of resource variables - e.g., depth of water, gradient, velocity, turbulence, density of flora, etc. - and gave an overall assessment of quality on a 1-10 scale. With the resource variables as independent and the overall assessment as dependent variable, three methods of analysis were used to explore the relationships: multiple linear regression, analysis of variance model, and an Automatic Interaction Detector model. The third approach was most satisfactory, explaining 76.1% of the variance. It is concluded that such a model could be used to predict site quality from purely physical resource data, for use in planning contexts.


An empirical, Clawson style demand curve for and rent fishing based upon data relating to Scotland Water, Hutton, England


Reports on a study to aid resource allocation decisions involving amenity aspects of the river environment of Hell's Canyon on the Snake River in Idaho. A comparative evaluation of the unique geomorphologic-hydrologic characteristics of the site and hydro-electric alternatives is made. Introduces a means of quantifying the costs and benefits of preserving the Canyon.

Linton (D) "The Assessment of Scenery as a Natural Resource" Scottish Geographical Magazine 84(3) 1968 219-238

Lowenthal D, "Not every Prospect Please: What is our Criterion for Scenic Beauty?" Landscape 1962-3 19-23

Develops a way to quantify the presence or absence of factors that contribute to aesthetic values of a river landscape as expressed by a uniqueness ratio. Discusses inherent difficulties in such research but suggests that the techniques can be a valuable procedure in river-basin planning.


Discusses the development of an inventory method to compare the aesthetic uniqueness of Hell's Canyon of the Snake River in Idaho with 11 other river valleys in Idaho.


Landscape Evaluation: A method for landscape evaluation is put forward in which 46 characteristics are measured, divided into physical, biological and water quality and human use and interest factors. Each site is given 2 score of 1-5 on each variable by the researcher/planner. The reciprocal of the total score in each group for each factor is the 'uniqueness' ratio. Adding all the uniqueness ratio's on all 46 factors gives the 'Total uniqueness ratio'. Graphical methods are then used to combine various factors to assess landscape characteristics. For example width of valley is plotted against height of mountains. The plotted points are projected into a 45 degree line, giving a new axis labelled 'landscape scale'. 'Scenic outlook' is plotted against this to provide yet another 45 degree scale and so on.

Develops a quantitative inventory and evaluation technique based on the assumption that a unique landscape has more significance than a common one. Defines the physical, biological, and cultural characteristics of 12 Idaho rivers and 4 National Park rivers in terms of 46 variables. A measure of uniqueness is derived by summing the calculated ratios for each variable.


Abstract: A preliminary attempt to quantify some aesthetic aspects of rivers. Because the U.S. Federal Power Commission had been studying an application for a permit to construct one or more additional hydropower dams in the vicinity of Hells Canyon of the Snake River in Idaho, data were collected to provide information on factors related to non-monetary values in the region. Forty-six factors are considered in the analysis and are of three types: physical features, biologic features, and human interest factors. Each factor is evaluated on a scale of 1 to 5 for each of the 12 sites. A subsequent analysis of sites consists of two parts which determine the "uniqueness" and rank of each site. Further graphical comparison of a few selected river and valley characteristics was made with the rivers in four national parks; for the features studied, Hells Canyon was found to be "unique" and comparable only to the Grand Canyon of the Colorado River.

Keywords: Waterway Evaluation, Hydro-Electric Power, Stream Measurement, Idaho.


Discusses the aesthetic role of water on landscape. Proposes a visual classification system for fresh water resources based on landscape, setting, and waterscape. Cites criteria for natural and man-made landscape evaluation. Recommends intra-agency adoption of aesthetic evaluation policies for water so that water-oriented landscapes may be defined and evaluated using aesthetic criteria as major tools. Encourages research that incorporates aesthetic evaluation with benefit cost analysis.

Illustrates the elements of visual assessment of river landscapes: (1) landforms, (2) vegetation patterns, (3) water presence and expression, (4) human use and impacts, and (5) other influences. Discusses how to inventory landscapes at large and small scales of application, and with implications of planning and design policies. Points up problems of evaluating landscape quality using criteria such as aesthetics applied to landscape, professional judgment, and perceptual studies.


Develops a quantitative method for objectively assessing aesthetic values in a fluvial landscape. The LAND system is an extension of Leopold's river inventory scheme. Five evaluative indices are utilized to assess environmental beauty: uniqueness, aesthetic value, scenic beauty, recreation potential, and wilderness. Initial testing of the system indicates that participants consistently derive similar numerical values for beauty regardless of their educational background.


Study focuses on two tasks: developing a method to evaluate the aesthetic value of wild and scenic rivers and developing demand models for outdoor recreation to estimate how much recreation demand is related to aesthetics. Concludes that quantification of aesthetics is an imperfect art that requires more research.
Describes the procedure used to estimate demand for outdoor recreation on rivers. Also describes the development of a Likert-type scale to distribute the net resource values estimated in the demand analysis according to perceptions that users indicated as being important to the wild and scenic river experience.


Methods of evaluating various aspects (physical, cultural, hydrologic, and aesthetic) of watersheds were tested on six rivers representing a variety of natural environments. Criteria to inventory and classify natural environments as well as methods to evaluate cultural (scenic and historic) values were identified. Application of methodology to watershed management and planning is stressed.


Develops a technique for inventorying, evaluating, and analyzing Kansas' streams for visual quality and recreational potential. Concludes that the most significant streams, in terms of visual quality, are located in the eastern one-third of Kansas where water, topography, and vegetation combine for visual diversity.


Presents a procedure to inventory and evaluate the scenic and recreational resources of prairie rivers. The inventory procedure considers four groups of resource components: scenery (characteristic and non-characteristic landscapes); features (geologic, geomorphologic, biologic etc.) hydrology; and shoreline characteristics. Collected data was evaluated through use of matrices showing magnitude and significance of features in the landscape, and use tolerance. Land capability classes were developed to aid in application of a land use zoning scheme.


SCHIEFTER, Karl, and ROB N. DUNN

An account of the wild river values of this area in Quebec between the Moisie and Sheldrake Rivers. Recommends the river wilderness for national park potential - a wild river for canoeing on a 100-mile chain of rivers and lakes.


Develops two methods of evaluating wild and scenic river potential to include intangible, nonmonetary benefit values. Each method was tested on two adjacent river basins in Washington—the Upper Skagit (a currently developed basin) and the Sauk-Suittle (a wild river basin). The results of each test indicated that the Sauk-Suittle River should be left wild and the Skagit River could be more fully developed.
TIPPY, ROGER

Discusses preservation values of river basins: "recreation, fish and a set of thoroughly intangible factors incorporating wilderness, natural beauty, historic and scientific values"; and the conflicting development values: "storage for agricultural and domestic consumption, flood control, navigation, hydro-electric power, slack water recreation, and soil conservation." Introduces the formation of a "wild rivers study team" in 1963 by the U.S. Forest Service and lists five evaluation criteria regarding a river's condition, capacity, quality, highest use, and present status. Discusses several legislative steps which finally has resulted in the passage of the Wild and Scenic Rivers Act (1968).


Three values are identified as reasons for preserving streams: recreation, fish, and a set of intangibles such as wilderness, natural beauty, and historic and scientific values. Major development values of rivers are: agricultural and domestic consumption, flood control, navigation, hydroelectric power, dams, and soil conservation. Conflicts between preservationists and developers often occur thereby establishing a need for comprehensive river basin planning. Ideally planners should either present decision-makers with a choice of alternatives for a given river or a single answer that does not dissatisfy one interest group more than another. The comprehensive planning program for the Upper Missouri River basin could guide other river basin planning efforts.


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Council on Environmental Quality. The Delaware River Basin: The Environmental Assessment of Three Centuries of Change - (Stock No. 4111-00018) Environmental Impact, water resources, resource conflicts, early settlements 1975

U.S. Government Printing Office
Washington, D.C. 20402
87 pp
$1.55

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US Alaska Planning group.
copy location ARC lib

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U.S. National Park Service
USDI Final Environment Statement
St. Croix National Scenic RiverWay Master Plan,
National Park Service State of Minnesota & Wisconsin
prepared by Midwest Regional Office National Park Service
dep't. of Natural Resources of State of Minnesota & Wisconsin
fob 1976 200 p
copy loc ARC Library

USDI National Park Service
Lower St. Croix National Scenic RiverWey Environmental Impact Statement Minnesota Wisconsin
June 26, 1974 97 p
Location ARC Branch
USDI Preliminary Environmental Statement
Proposed Toughkiligany National Scenic River, prepared by the Northeast office, Bureau of the Interior. USDI.

USDI Forest Service
Draft Environmental Impact Statement Tuolumne River Wild and Scenic River Study, 117 p
copy location ARC Branch

USDI National Park Service
Buffalo National River, Arkansas
Final Environmental Statement/proposed Master Plan
Sept 1975 304 p
copy location ARC Branch

USDA Forest Service
Copy location ARC Branch

USDI Environmental Assessment/River Management Plan
Copy Location ARC library

USDI National Park Service
Draft Environmental Statement: Grand Canyon National Park Arizona
Dec 8, 1977 50 p.
copy location ARC Branch

USDA Forest Service
TuLame Wild and Scenic River/Environmental Impact Statement
TuLame County California
copy location ARC Branch

USDI National Park Service
Wilderness Recommendation Buffalo National River, Arkansas
Draft Environmental Statement, Dec 20, 1977. 205 p
copy location ARC Branch
Copy location: ARC library.

This annotated bibliography presents some 78 references on environmental impact assessment. The annotations are designed to give an objective picture of the salient information or arguments contained in each reference. A brief overview comparing different concepts and methodologies is included.

Wild rivers, methods for evaluation.

B. Wilkins, Cornell University Ithaca, N.Y.
Water Resources Development and Wilderness values—A study of the Upper Hudson, 1972
wild rivers, resource conflicts, primitive area, alternatives, Public agencies, environmental analysis, user survey, adirondacks 1972
U.S. Dept. of Interior, Office of Water Resources Research

J.W. Kvenscher. Duke University, School of Forestry, Durham, N.C.
Environmental considerations in land and water use planning in river basins, criteria, land use, water use, classification system eno river basin, wildland corridor 1972C
U.S. Dept. of Interior
Office of Water Resources Research
Washington, D.C.
Final report from the study reported on in Zube, et al. (1973). Following extensive tests it is concluded that photographs are reliable instruments for eliciting response to landscapes in general, but less reliable when applied to particular landscape features. The thirteen groups of subjects showed high levels of agreement in their assessments of scenic values. Twentythree 'Landscape dimensions' explained 70% of variation in preference.
E. ECONOMIC EVALUATION OF RIVER RESOURCES


Presents the results of an interview study of Kentucky stream fishermen. Notes the decline of natural stream fisheries. Develops a method to estimate the economic and recreational value of streams to fishermen. When estimating net benefits for economic justification, the recreational value of "lost" natural stream fisheries should be deducted from the value gained through reservoir recreation. Concludes that the unit value of a fisherman-day varies as a function of both the geographical location of a stream and its state of naturalness.


CORTELL AND ASSOCIATES, INC. 1977. RECREATION AND INSTREAM FLOW. VOLUME 1, FLOW REQUIREMENTS, ANALYSIS OF BENEFITS, LEGAL AND INSTITUTIONAL CONSTRAINTS. 96 P. BUR. OUTDOOR RECREATION, WASHINGTON, D.C.


Presents procedures for evaluating criteria for water and related land resources. Federal agencies use the interim unit day value approach almost exclusively. This approach has little theoretical or empirical justification and does not encourage efficient allocation of resources. It is recommended that models be developed to predict individual willingness-to-pay for many types of recreation as functions of site characteristics, the characteristics of the individual user, the availability of substitute activities and sites, and the location of the individual in relation to the resources under study. The total value of the resource would be a function of these variables, the number of users, and the distribution of users within the market area. These functions may be derived from regional travel cost demand functions or could be explicit willingness-to-pay functions derived from the survey method.


Sociological data and management-oriented information was collected from hunters in the Salmon River Basin during the 1969 hunting season. Expenditures associated with hunting were assessed. Hunter behavior, preferences, opinions, and place of residence were determined. Concludes that hunter expenditures associated with the wildlife resources are vital to the economy of the Salmon River Basin. Any development affecting wildlife resources—providing new access roads, improving existing roads, building more campgrounds and related facilities, or allowing more outfitters and guides—would have a negative economic impact on the Basin.


Directs the Idaho Water Resources Institute to develop criteria for evaluating proposed rivers for inclusion in the National system. Identifies three major research areas for wild and scenic rivers studies: (1) importance of aesthetics in river evaluation; (2) development of quantitative methods to measure economic benefits and trade-offs gained from wild or scenic river status; and, (3) alternative methods of river evaluation.


Presents a timber inventory of the Salmon River basin to determine the impact that the wild and scenic river classification would have on timber harvesting activities in the area. Notes that timber-market boundaries rather than geographic boundaries are more relevant when examining and comparing the effects river classification would have on the timber industry. Concludes designation in the National Wild and Scenic River System would have little effect on timber harvesting activities.


Discusses the importance of grazing in the Salmon River basin and the effects Federal wild and scenic river designation might have. Develops an evaluation method to determine the impact of designation on grazing and concludes that little conflict would exist.


Kavanagh N. "The Economics of Recreational Uses of Rivers and Reservoirs" Water and Water Engineering, 72 1968 401-408


Reviews the benefit-cost analysis decision criterion and the concept of opportunity cost. Outlines how to measure recreational benefits using the Hotelling-Clauson-Knetsch model. Discusses data and research needs for using benefit-cost analysis as a tool for making river management decisions. Concludes that the ability to use benefit-cost analysis in river management exists and should be exercised.


States that current methods of evaluating recreation benefits are incapable of indicating how the demand curve changes with the type of recreation. The role of conventional prices in outdoor recreation is muted because a large portion of the cost is publicly provided. The availability of goods and services is as important for recreation as it is for other goods and services. There are two main considerations for estimating the values of the recreation opportunities that may be provided: (1) number of people it affects, and (2) user's willingness to pay.


Report describes a methodology to evaluate the economic, aesthetic and social values related to wild rivers (as designated by the U.S. Wild and Scenic Rivers Act (1968)). First an inventory of the natural and human resources of the study area (Salmon River) was made. The methodology then utilizes this data and involves fourteen subprojects, each concerned with river-related uses. These independent subprojects were then combined to create a series of economic models to determine and compare resource patterns consistent with Wild and Scenic Rivers. The report is a summary of the preliminary findings.


The Salmon River in Idaho is used as an example in formulating a three-step process for examining environment-development conflicts. The process involves: (1) inventorying resources to determine areas of conflict affecting wild and scenic river status, (2) determining through an evaluation process which resources uses are viable for the river, and (3) comparing various resource uses to determine their economic trade-off values.


Recreation is accepted as a legal, competing use for water. Planning guidelines accent the need for ways to evaluate trade-offs among all water uses. A method to subjectively evaluate the effects of different instream flows on river-related recreation activities is proposed. This method should be adaptable to current water resource planning guidelines and be simple to apply.

This research project consisted of five tasks undertaken to fulfill the primary objectives of developing and evaluating two methods of analysis that would incorporate intangible values: 1), review of benefit-cost methodology for application to wild rivers and analysis; 2), evaluation of current benefit valuation procedures; 3), develop "benefits foregone subjective decision method", 4), develop quantitative "nonmonetary expression of benefits" method; and 5), a comparative analysis of methods for both fully developed and undeveloped wild river basins.

The methods have been applied to the Sauk River, which is the undeveloped, wild branch of the Skagit River in Washington, and the upper Skagit River, which is the northern branch already dammed in three places for flood control and power production purposes. Each of the two methods has indicated that the current level of development in the Sauk Basin is optimal and should be preserved, the upper arm of the Skagit should be developed even more fully than it already is. (Abstract from Dooling. 1975).


Analyzes future economic demand for water-based recreation in the United States. States that recreationists and industry should compete equally for use of water. Relates factors of water quality and access problems to recreational use of water resources.

Criticizes the objectivity of the economic assessment made for the New Melones Dam on the Stanislaus River in California. Gives a brief legal history of the dam controversy. Compares and analyzes Army Corps of Engineers benefit cost estimates with authors' own estimates. Notes lack of quantification of adverse environmental impacts in Corps' analysis and concludes Corps' overestimated benefits and underestimated costs of the project.
Opening chapters review economics-based methods of evaluating recreation facilities, and the role of perception, values and attitudes in recreational choice.

From the survey three key dependent variables are used: investment (in fishing equipment), participation (fishing days in one year), and personal value (rating of fishing on a 7-point scale from 'very valuable' to 'not at all valuable'). Factor analysis and multiple regression analysis are used to explore the relationships between these and other variables. Background characteristics of the fishermen and other recreation activities are also described. The prime factor influencing the decision to go fishing emerges as 'the opportunity to enjoy the aesthetics of the outdoors'; other important factors being social and 'getting away from it all' (see J.B. Stevens, 1966).
Schott, Robert W. "The impact of Recreational Boating on the Economy of Michigan", Dept. of Park & Recreation Resources Michigan State University 1975


Presents a critical review of the cooperative study by the U.S. Department of Interior's Bureau of Reclamation and National Park Service and the Army Corps of Engineers in the early 1960's. The study analyzes alternatives for developing the last major natural stretch of the upper Missouri River, scrutinizes recreation benefits at reservoirs and on wilderness waterways, and suggests willingness to pay and opportunity costs as two approaches to better measure such benefits.


Several bureaus in the Dept. of Interior and Army Corps of Engineers undertook a joint study in the 1960's to analyze a set of alternatives for developing one of the last major natural stretches of the Missouri River characterized by outstanding scenic beauty and historic value. This article takes issue with the study's methods of presenting these alternatives and its calculations of recreation benefits at reservoirs and on the waterway. Also discussed were willingness-to-pay and opportunity cost approaches as alternative measures. This is a very timely article and well presented.


Reports on the socio-economic characteristics of persons using inner tubes to float the Apple River in west-central Wisconsin during 1971-1972. In 1971 social profiles and user attitudes were identified; in 1972 the economic impact of floaters on the local community was examined. Discusses interest of weekend and weekday users for more lodging and eating facilities in the immediate area. But found floaters contributed little revenue to the local economy.
It is increasingly important that the value of water resources for nonconsumptive uses, such as recreation, be quantified. Numerous methods of site evaluation have been attempted but all have encountered problems stemming from the use of proxies for consumers willingness to pay for site use. A fee experiment for a specific site on the Yellowstone River is specified in detail. This method avoids the problems associated with proxies for consumer willingness to pay.


2. MANAGEMENT TECHNIQUES
A. RESOURCE CONSERVATION


Drawing from an ecological study on the Colorado River, four river recreation management concerns are discussed: (1) river research versus river management—their interrelations and priorities, (2) extensive resource inventories—their role as indicators of environmental deterioration, (3) human impact—its identification and proposed mitigation, and (4) suggested guidelines for identifying unique and ecologically sensitive areas. Also discussed are other environmental degradants not directly associated with human impact, but nevertheless a source of concern for river managers, such as habitat destruction by wild burros.


This special supplement provides a perspective to the protection of Alberta Rivers and outlines in some detail the protection measures for rivers of natural, historical and recreational value in Canada and the United States. A list of very recent references on river corridors—their resources and management—is also provided.


Aukerman, Robert. 1971. WATER QUALITY CRITERIA FOR SELECTED RECREATIONAL USES—SITE COMPARISONS. PH.D. DISSERTATION. UNIV. ILLINOIS AT URBANA, CHAMPAIGN, ILLINOIS. 338 P.

Compares recreation users at nine sites on their attitudes, beliefs, and behavior concerning water quality characteristics. Identifies water quality components which affect recreation user perception. Undertakes to develop aesthetic water quality criteria for recreation uses, which could be used to enhance the quality of the recreation experience.
AUKERMAN, ROBERT, SPRINGER, WILLIAM.
1976. EFFECTS OF RECREATION ON WATER QUALITY IN WILDLANDS.
EISENHOWER CONSORTIUM BULLETIN 2, 25 P. DEP. RECREATION
RESOUR., COLL. FOR. AND NAT. RESOUR., COLORADO STATE UNIV.,
FORT COLLINS, COLORADO.

PRESENTS THE RESULTS OF A STUDY TO EVALUATE THE WATER
QUALITY IMPACT OF RECREATIONAL USE ON A SAMPLE OF
CAMPGROUNDS ON THE CACHE LA Poudre RIVER IN COLORADO.
FINDINGS INDICATE THAT RECREATIONAL USE WAS NOT A
SIGNIFICANT CAUSE OF BACTERIAL WATER POLLUTION. FOR THE
INSIGNIFICANT WATER POLLUTION THAT DID OCCUR, ALMOST AN
INVERSE RELATIONSHIP WAS FOUND BETWEEN CASES OF BACTERIAL
DENSITY INCREASES AND LEVELS OF CAMPGROUND UTILIZATION.
SIGNIFICANTLY MORE CASES OF BACTERIAL POLLUTION WERE FOUND
WITH MOTORIZED CAMPERS THAN WITH BACKPACK CAMPERS. BACTERIAL
INCREASES OBSERVED AT FOOTPATH CAMPGROUNDS WERE MUCH LESS
THAN OBSERVED AT CAMPGROUNDS ACCESSIBLE BY A ROAD SYSTEM.

Beamish, Richard. "Protecting our Natural Rivers"
Copy location ARC Library

Blood (Donald A.) and Associates, Ecological Consultants. The functional
Approach to Resource Conservation in Canadian National Parks. Keynote
Adress delivered at Conference of Resource Conservation Section, Parks
Canada, Ottawa, February 26, 1979

Brookbanks, Eric, & Simms, Robert. "Landscape Planning of the
1974, pp. 943-947.

British Trust for Ornithology
"The Impact of Lowland River Management" in
ARC Library
6pp.
71.25
Rivers, Recreational Value, Amenity Value,
Conservation.

Carothers, S. W. 1974. An ecological
survey of the Colorado River and its
tributaries between Lee's Ferry and the
Grand Wash Cliffs, Phase 1. North.
rep., 172 p. Natl. Park Serv., Grand
Canyon Natl. Park, Flagstaff, Arizona.
CAROTHERS, S. W., AITCHISON, S. W., KARPISCHAK, M. M., RUFFNER, G. A., SHARBER, N. J.
USDI NAT. PARK SERV., COLORADO RIVER RES. SERIES TECH. REP. 10, 251 P. GRAND CANYON NAT. PARK, GRAND CANYON, ARIZONA.

REPORTS THE RESULTS OF A 2 YEAR ECOLOGICAL STUDY OF THE RIPARIAN ZONE OF THE COLORADO RIVER BETWEEN LEES FERRY AND GRAND WASH CLIFFS, ARIZONA. AMONG THE TOPICS STUDIED WERE VEGETATION CHANGES RESULTING FROM CONTROLLED WATER RELEASE FROM GLEN CANYON DAM AND INTERRELATIONSHIPS OF HUMANS WITH THE BIOTA. FINDS THAT HUMAN IMPACT APPEARS TO BE A FUNCTION OF VISITOR ACTIVITIES AND RECOMMENDS MEASURES TO REDUCE HUMAN IMPACTS.


Doyle (Robert E.) "Rivers Wild and Pure: A Priceless Legacy" National Geographic Magazine Vol. 152 #1 1977 July p.2-59 copy location ARC library -


Abstract: A stream classification system adopted in 1959 identified seven Montana waterways as "Class 1 - streams of national as well as state-wide significance." This study describes the current ownership and land-use patterns along six of these streams. Between 45 and 85 percent of the stream banks are in private ownership. Current land uses are predominately ranching and forested lands. Several situations are identified which could threaten the environmental corridors of the Blue-ribbon streams. An investigation of stream user attitudes indicates that a majority are attracted by the natural

Describes procedures to evaluate Maryland rivers for potential scenic river protection. Criteria for protection include physical, biological, and human conditions along a river and its corridor.


HEINSELMAN, MIRON L.

Outlines the ecological and human history of the Quetico-Superior Canoe area to explain the reasons for the area's diversity in a manner suited to a canoe traveller's understanding. Provides a source of education for the visitor on the role that fire has played in the natural history of the area, thus forming a basis of communication for future management policy which might include techniques of prescribed burning.

HENDEE, JOHN C., AND DALE R. POTTER

Identifies several broad problem areas and specific questions to which research on human behavior aspects of wildlife should be directed: (1) hunting satisfaction; (2) non-consumptive use of wildlife; (3) the hunter population; (4) access and hunter opportunity; (5) wildlife economics; and (6) political legal issues. States that rigorous social-wildlife research is scarce yet necessary for successful and meaningful wildlife management. Nearly 70 literature citations are included. (Also see, by Dale R. Potter, Kathryn M. Sharpe, and John C. Hendee, "Human behavior aspects of fish and wildlife conservation - an annotated bibliography". 288p. Pac. Northwest For. Exp. Sta., Portland, Ore. USDA For. Serv. Gen. Tech. Rep. PNW-4, 1973).

Hendee, John C., and George H. Stankey.
Recreational values (e.g., trout fishing, boating, camping) of rivers are dependent on streamflow characteristics, water quality, and character of channel, bed, and banks. Generally, recreational value is enhanced by a relatively uniform streamflow. Suggests techniques such as preserving streamside vegetation to maintain water temperatures, controlling disposal of heated water to streams, and maintaining stream flow during drought periods, to manage streams for recreational values.


Abstract: This paper describes a sampling technique for taking measurements along selected transects across streams. When tested on three streams in Utah, the results provided acceptably precise estimates of stream length and width, surface area, pool area, riffly area, depth, and stream bed composition, as well as of the stability and vegetative cover of the stream banks. Such data will permit land managers and fisheries biologists to evaluate the fishery potential of selected streams and to diagnose basic deficiencies in fish habitat.

Keywords: Water Evaluation, Angling, Stream Measurement, Utah.


HUDSON, MICHAEL.  
1977. FORTYMILE RIVER: BIOLOGICAL ASPECTS OF CARRYING CAPACITY.  
52 p. USDI BUR. LAND MANAGE. FORTYMILE RESOURCE AREA, TOK, ALASKA.  

PRESENTS THE RESULTS OF A TRAMPLING EXPERIMENT CONDUCTED ON THE FORTYMILE RIVER IN ALASKA TO DETERMINE BIOLOGICAL ASPECTS OF THE RIVER'S RECREATION CARRYING CAPACITY. ON EACH OF 4 SELECTED STUDY PLOTS, 3 TRANSECTS WERE TRAMPLED A TOTAL OF 50, 250 AND 1000 TIMES DURING 10 VISITS. RECORDED EFFECTS OF TRAMPLING ON PLANT SPECIES DURING THE FIELD WORK, AND NOTED TOTAL EFFECTS OF THE TRAMPLING UPON PLANT COMMUNITIES AS WELL AS THE PATH WIDTH AND DEPTH AT THE TERMINATION OF FIELD WORK.  


Notes that much information is available about the protection and maintenance of recreation sites, but the large number of resource variables and the highly specific nature of many research findings make it difficult to condense this information into a compendium of site management guidelines. Maximum use is apparently not being made of available site management information. Reasons include the highly scattered nature of information, difficulty in obtaining pertinent material, and research findings not always directly applicable to the problem at hand. A suggested reading list with 60 annotated articles on the subject is presented.  

Main attraction of the area for a national park would be hiking, canoeing, together with fishing and the simple appreciation of scenery and other aesthetic values, therefore, recommends development of canoe routes, hiking and cross-country ski trails. Mentions campsites and their effect on the fragile environment.


The intent of Wild River legislation was to protect certain rivers for the benefit and enjoyment of present and future generations. Suggests that to accomplish this goal, river developers and managers must consider: (1) a riverway's ordered nature and inherent limitations; (2) which specific environments (soils, vegetation) and related variables (aspect, slope) along the river are best able to absorb recreational use; and (3) how much modification (vegetation and soil degradation) of a particular environment to accept before use is altered or limited.


A discussion of the Hells Canyon and Middle Snake areas, whose future will be determined by Congress. Three possible alternatives are: the construction of one or more dams immediately, the so-called "Moratorium Bill," the establishment of the Hells Canyon-Snake National River.
MANNING, ROBERT E.
1979. IMPACTS OF RECREATION ON RIPARIAN SOILS AND VEGETATION.
WATER RESOUR. BULL. 15(1):30-43.
REVIEWS AND SYNTHESIZES THE LITERATURE DEALING WITH THE
PHYSICAL IMPACTS OF RECREATION USE ON RIPARIAN SOILS AND
VEGETATION. DISCUSSES PRINCIPAL MODES OF IMPACTS, SPATIAL AND
TEMPORAL PATTERNS OF IMPACT, AND STRATEGIES FOR MEASURING
IMPACT. THROUGHOUT THE PAPER, MANAGEMENT IMPLICATIONS OF
RESEARCH FINDINGS ARE CONSIDERED.

MCKEE, P. L. BRICKLER, S. K.
1977. BOTTOM SEDIMENT ANALYSES OF THE RECREATIONAL WATERS OF
UPPER SABINO CREEK.
IN HYDROLOGY AND WATER RESOURCES IN ARIZONA AND THE
SOUTHWEST. VOL. 7. P. 109-114. SCHOOL OF RENEWABLE NATURAL
RESOURCES, UNIVERSITY OF ARIZONA, TUSCON, ARIZONA.
PRESENTS THE RESULTS OF AN ANALYSIS OF THE BOTTOM SEDIMENTS
OF UPPER SABINO CREEK IN ARIZONA WHICH HAS SERIOUS WATER
QUALITY PROBLEMS CREATED BY RECREATIONAL DEMANDS. FINDS
THAT BOTTOM SEDIMENT FECAL COLIFORM BACTERIA ANALYSES
INDICATE THAT THE CREEK IS MORE HAZARDOUS TO RECREATION
USERS THAN IS INDICATED BY SURFACE WATER BACTERIA ANALYSES
ALONE. CONCLUDES THAT BOTTOM SEDIMENT BACTERIA ENUMERATION
IS IMPORTANT TO INCLUDE IN ALL RECREATION WATER QUALITY
ANALYSES.

Mills, Harlow B., Man's Effect on Wildlife of the Illinois River,
Urbana Dept. of Registration and Education Natural History Division
1966. Ministerial Library 14th Floor Sh.222. 144 MS4

"The Watershed as a Resource Management Unit: A Selected
Bibliography," Bruce Mitchell, Department of Geography,
University of Waterloo. Joan Mitchell, Technical Services,
Waterloo Lutheran University, May 1972. 68.

Suggests that variability in the river environment is a major determinant of the quality of river recreation experiences. Four main sources of variation exist for river canoeing: psycho-social, landscape, river, and the activity itself. By considering how these sources of variation interact, suggests that it should be possible to affect the quality of the recreation experience and accomplish other management objectives as well.


Contains a proposal for a "National Nature Preserve" along a one mile wild strip of land of the South Saskatchewan River in the Suffield Area of Alberta. Develops recommendations pertaining to recreational use on the river and along adjacent shoreland areas. No rigorous inventory or evaluation procedure was applied.


Describes virgin (natural) plant communities of the Interior Zone of the BWCA where wilderness goals and ecological techniques are applicable. Data from all vegetative components of 106 virgin upland stands were used to construct a community classification through a combination of agglomerative clustering and principal components analysis. Discusses the relation of communities to their environment and to past wildfires. Contains a list of forty references pertaining to vegetation classification and principles of ecology. (Also see, by same authors, "Wilderness ecology: a method of sampling and summarizing data for plant community classification." N. Cent. For. Exp. Sta., St. Paul, Minn. USDA For. Serv. Res. Pap. NC-49, 14p., illus., 1970).

PARTLOW, JIM (School of Landscape Architecture, Univ. of Guelph)
1971    Aesthetic inventory of Lake Superior Provincial Park.

The study was a land inventory to define the unique areas in Lake Superior Provincial Park and to explain why these areas are significant. Reviewed three aspects of the park: aesthetic quality, botanical communities, geomorphology and geology. Identified the best waterfalls and lookouts. Management plans and proposals related to trails, a scenic road, recreational activities (hiking, canoeing, viewing, fishing), and logging.


REED, N. P.
1977. An offer too good to refuse. PARKS AND RECREATION 12(2): 15A-17A.

Focuses on the benefits that can be obtained from implementation of the Federal Water Pollution Control Act Amendments of 1972. Discusses and gives examples of how the Bureau of Outdoor Recreation, the Fish and Wildlife Service and the National Park Service can use specific provisions to protect natural resources, encourage recreation programs and benefit fish and wildlife. Examines the programs being pursued by these 3 departments under the Act.

Documentation Center, 25th floor
HE0453.C2R37

SCHMIDLY, DAVID J. DITTON, ROBERT B.
1973. RELATING HUMAN ACTIVITIES AND BIOLOGICAL RESOURCES
IN RIPARIAN HABITATS OF WESTERN TEXAS.
IN STRATEGIES FOR PROTECTION AND MANAGEMENT OF FLOODPLAIN
WETLANDS AND OTHER RIPARIAN ECOSYSTEMS SYMP. PROC. USDA FOR.
SERV. GEN. TLCH. REP. WO-12, P. 107-116. WASHINGTON D.C.

DISCUSSES THE RECREATIONAL AND WILDLIFE VALUES OF RIPARIAN
HABITATS ALONG THE RIO GRANDE RIVER IN WESTERN TEXAS.
EVALUATES SEVERAL HUMAN ACTIVITIES THAT HAVE THE POTENTIAL
TO OR HAVE IMPACTED ON RIPARIAN RESOURCES IN THE REGION
INCLUDING: 1) IRRIGATION DIVERSIONS AND STREAM
CHANNELIZATION, 2) LAND'FLOODING FROM RESEVOIR CONSTRUCTION,
3) LAND CLEARING, 4) OVERGRAZING, 5) INTRODUCTION OF EXOTIC
PLANTS AND FISHES, 6) INCREASES IN HUMAN RECREATION ACTIVITY
AND 7) PESTICIDE BUILDUPS.

SCOTTER, GEORGE W., N.M. SIMMONS, H.L. SIMMONS, AND S.C. ZOLTAI

In this study's discussion of the Nahanni National
Park proposal (p. 145-170), the authors endorse the suggestion that
the new park be given a "wild rivers wilderness theme" and that "the
traditional forms of park developments" be avoided. They emphasize the
incompatibility of roads and automobiles in this theme. "The use of
canoes, kayaks, rafts, and other unpowered river craft should be
encouraged." Various facility proposals include: (1) "minor camp­
sites consisting only of well-hidden fireplaces, tent clearings, and
trash barrels"; (2) possibly "mountaining cabins"; (3) "backpacking
should be encouraged by establishing hiking trails from the rivers
to ... points of interest"; and (4) "interpretive displays." The
authors also recommend that "no fire control be practiced within the
potential National Park site."

Simmons, I. "Protection and development
in the National Parks of England and Wales: the
role of the physical Environment" Geographia
Polonica Warszawa 1976 no. 34 p. 279-290
1 tab, 1 carte, bibl (4 ref)

Geomorphologie appliquée et evaluation de
l'utilisation du sol. Identification des
influences directes et indirectes de l'espace
naturelle sur la planification. L'aménagement peur
les loisirs pleinair et les parcs naturels en
Angleterre et au Pays de Galles
résumen tiré de International Geographical bibliography 1977 vol.82

Slass, George J. Water Related Environmental Planning.
#365. Council of Planning Librarians. Monticello,
location: Ministerial library 14th Floor.

Stankey (H. George) "A Strategy for the Definition and Management of
Wildlife Quality" in Natural Environments Studies
in Theoretical Applied Analysis edited by John V.
Krutillla published for Resources for the Future
The John Hopkins University Press 1972, Chapter 3
Baltimore.

Examines techniques and methods used to assess instream flow requirements for fish and other aquatic life, wildlife, recreation activities, and aesthetic values. Discusses the measurement of recreation activities and the assessment of those social attitudes that affect demand or potential demand for stream-associated recreation resources. Analyzes the aesthetics of flowing streams and adjacent landscapes. Measuring aesthetics is discussed with emphasis upon viewer evaluation and environmental qualities.

Sumner, David. 1975. Will the Dolores live up to its name? Sierra Club Bull. 60(7):4-5.

Chronicles the gradual erosionation of the Dolores River in southwestern Colorado. Notes diversity of ecologi. als along the river and describes a river trip from Cahone and Bedrock to the Colorado River in Utah. Urges preservation of the river in the National Wild and Scenic Rivers System.


Documents the problems involved in preserving six of the rivers that are either included in the National Wild and Scenic Rivers System or are being studied to be included. Discusses controversial issues and problems involved in preserving the areas yet managing them for various types of activities.


Suggests that preserving free-flowing water is a public value that should be considered in water resources planning decisions. Offers methods of incorporating these values into the decision-making process. States that at present, preservation is a value secondary to development and that existing laws favor short term uses of water (power generation, flood control, and irrigation) over long term uses. Maintains that technology will continue to increase leisure time and that preserving some of the remaining unharnessed stretches of rivers will help sustain important recreational opportunities.


Describes a quick, easy method for determining flows to protect the aquatic resources in both warmwater and coldwater streams based on their average flow. Detailed field studies were conducted on 11 streams in 3 States between 1964 and 1974. This work involved physical, chemical, and biological analyses of 38 different flows at 58 cross-sections on 196 stream-miles, affecting both coldwater and warmwater fisheries. The studies reveal that the condition of the aquatic habitat is remarkably similar on most of the streams carrying the same portion of the average flow.
Briefly describes the scenic and recreational attributes of the Chattahoochee River in the Atlanta metropolitan area. Discusses the combined efforts of local citizens and officials, State agencies, and Federal bureaus in acquiring land to preserve the Chattahoochee and its corridor.

U.S. DEPARTMENT OF INTERIOR, FEDERAL WATER POLLUTION CONTROL ADMINISTRATION. 1968. WATER QUALITY CRITERIA. 234 P. NAT. TECH. ADVISORY COMM. REP., FED. WATER POLLUTION CONTROL ADMIN., WASHINGTON, D.C.

A COMPREHENSIVE DOCUMENT ON WATER QUALITY REQUIREMENTS FOR USE IN WATER QUALITY STUDIES AND STANDARDS SETTING ACTIVITIES. A SUBDIVISION PROVIDES RECOMMENDED WATER QUALITY CRITERIA FOR RECREATIONAL USE AND AESTHETIC PURPOSES FOR RIVER PRESERVATION PROGRAMS.

U.S.D.A. Forest Service. National Forest Landscape Management
Volume 1. Agriculture Handbook Number 434. Washington,

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National Forest Landscape Management Volume 2 -
Chapter 1: The Visual Management System. Agriculture

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National Park Service and New England River Basins Commission.
Prepared by Roy Mann Assoc., Inc. April 1975.

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U.S. Senate Select Committee on National Water Resources. 1960. Water resources

Covers such topics as the rapidly increasing use of water-based areas, problems of intensive
use and crowding, planning for additional areas, public water supply legislation, and inade­
quate criteria for estimating future water-based recreation needs. Contains 17 recommenda­
tions by the National Park Service regarding Federal objectives for water-related recreation
areas. An Appendix contains recommendations for general policy by the Committee.

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NTIS, NWC-EES-72-057. $6.75. 35.

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Virginia Commission of Outdoor Recreation. Virginia's
Scenic Rivers. 803 E. Broad Street, Richmond,
Va. River Inventory, Scenic Rivers System,
(Plus Supplement to 1975).

B. INTERPRETATION PROGRAMS AND FACILITIES


The methodology of visitor employed photography (VEP) is explained as a device to inventory public perception of natural environments. A VEP study on the Huron River in Michigan is summarized and the use of VEP findings in the development of interpretive services and programs for river environments is discussed.


Suggests interpretation has special needs as it relates to river systems. These are discussed in light of the opportunities and problems associated with different sites, audiences, messages, and media. The appropriateness of media to river classifications is emphasized. Examples of interpretive services are used to illustrate the principle points of the discussion.
Ontario Department of Lands and Forests


Prepared to give the Quetico Advisory Committee some insight into what interpretation is, what must be considered in Quetico's interpretation and what specific possibilities are for interpretation assuming certain roles for Quetico and its area. Includes interpretive themes for Quetico: wilderness, history and prehistory, geology, biology, and ecology. Discusses numbers and types of visitors to Quetico, the possible information about Quetico and interpretive media to different types of visitors.


This guidebook covers the broad field of modern outdoor interpretation ranging from the philosophy and need for outdoor interpretation and education to such practical aspects as how and to what extent interpretive programs should be carried out on sensitive natural areas. Fourteen well-qualified authors cover various aspects of outdoor interpretation and show what is being done in many types of areas where outdoor interpretation and learning are being stressed. Includes: "Needed: nature appreciation and an outdoor conscience", Paul Brooks; "Meaning and general principles of outdoor interpretation", W. H. Carr; "Natural areas", C. H. W. Foster; and others.


Examines visitor employed photography (VEP) as a methodology to evaluate both the positive and negative aspects of canoeists' perceptual excitement on the Huron River in Michigan. Photographs and written comments were obtained for 2 study groups, the first asked to photograph anything positive and the second anything negative as they canoed the river. Through content analyses of the data, a series of positive and negative "universal photographs" (UP) emerged, and differences in perception between the 2 study groups were revealed. Analyses factors contributing to the formation of the UP's. Uses the UP's to form a perceptual excitement profile for the river. Proposes ways to apply the VEP method to the interpretive planning process.
C. RECREATIONAL USE OF HERITAGE RIVERS


AMES, ROBIN S., REAM, ROBERT R. 1978. RECREATIONAL USE OF THE LOWER FLATHEAD RIVER. 28 P. WILDERNESS INST. AND MONTANA FOR. AND CONSERV. EXP. STN., SCH. FOR., UNIV. OF MONTANA, MISSOULA, MONTANA.

PRESENTS THE RESULTS OF A 1977 SUMMER STUDY OF RECREATIONAL USE ON A SEGMENT OF THE LOWER FLATHEAD RIVER IN MONTANA. PRESENTS A WIDE RANGE OF INFORMATION ABOUT USE PATTERNS AND AMOUNTS OF USE. ALSO PRESENTS INFORMATION ON THE MANAGEMENT PREFERENCES OF USERS.


Discusses physical attributes of the AuSable River, biological impacts from human use, and economic impacts on the area from tourism. A survey of river users was conducted to determine user characteristics, conflicts among users, and other problems of use.


An urban regional Metropark system (Detroit area) continues to encourage use by canoeists of the Huron and Clinton Rivers. Unrestricted canoeing use has been encouraged by river inventory, maps, clean-up, and canoe rental concessions and facilities. Author suggests a need for different standards for urban rivers than for wild rivers. Believes these standards should include landscaped urban scenes and manufacturing sites as well as natural scenery. And, canoeing use should be unrestricted to alleviate social pressures of urban residents.


A conceptual framework of trout fishermen is developed around the concept "recreational specialization". This refers to a continuum of behavior from the general to the specialized. It is reflected by equipment, skills used, and preferences for specific recreation setting.


OUTLINES THE DEVELOPMENT OF THE WILD RIVER USE SIMULATION MODEL WHICH IS A COMPUTER SIMULATION FOR MEASURING AND EVALUATING ENCOUNTERS BETWEEN USER PARTIES AS TOTAL USE AND PATTERNS OF USE VARY. REPORTS THE RESULTS OF SEVERAL SIMULATION EXPERIMENTS ON A DEMONSTRATION WILD RIVER SYSTEM. THE FIRST SET, TESTS THE EFFECTS OF INCREASED TOTAL USE ON ENCOUNTER LEVELS BETWEEN PARTIES. THE SECOND SET EXAMINES THE REGULATION OF DAILY DISTRIBUTIONS OF USE DURING THE WEEK AS A METHOD FOR CONTROLLING PARTY ENCOUNTERS.


Describes problems, solutions, and use experience during the first 10 years of managing the Allagash wilderness waterway. Problems related to increasing use include establishing public routes of access, registering users, dispersing users along the route of travel, restricting group sizes, establishing total use limits, and disposing of litter.

Coppock (JT) "The Recreation Use of Land and Water in Rural Britain Today" Tijdschrift voor Economic and Social Geography. 57 pp. 1966 81-96.
Cite problems of increasing use on the Colorado River through Grand Canyon National Park, Arizona. Problems resulting from the disposal of waste are most acute. Current park management guidelines seek to control the number of users and to protect the most fragile environments. Two issues remain undecided for this section of the Colorado River: wilderness designation and the use of outboard/inboard motors.

REPORTS THE RESULTS OF A STUDY OF RIVER ROAD CAMPERS ALONG THE RIO GRANDE RIVER IN BIG BEND NATIONAL PARK IN TEXAS. A MAIL QUESTIONNAIRE WAS SENT TO A SAMPLE OF PERSONS WHO HAD OBTAINED BACKCOUNTRY PERMITS DURING THE YEAR FEBRUARY 1975-FEBRUARY 1976. PRESENTS INFORMATION ON 1) CHARACTERISTICS OF CAMPING PARTIES, 2) PATTERNS OF VISITATION, 3) ATTITUDES TOWARD ENVIRONMENTAL IMPACTS BY HUMANS AND LIVESTOCK, 4) REASONS FOR RIVER ROAD CAMPSITE CHOICE, AND 5) SATISFACTION WITH THEIR EXPERIENCE.

DONHEFFNER, PAUL, MUCKLESTON, KEITH. 1976. MOTORBOAT USE ON THE WILD ROGUE RIVER: AN INVESTIGATION OF USE BETWEEN WATSON CREEK AND BLOSSOM BAR. OREGON STATE UNIV. REP. WRII-52, 60 P. WATER RESOUR. RES. INST., OREGON STATE UNIV., CORVALLIS, OREGON.

REPORTS THE RESULTS OF A STUDY TO DETERMINE HISTORICAL AND PRESENT LEVELS OF PRIVATE MOTORBOAT USE ON A SECTION OF THE ROGUE RIVER CLASSIFIED AS "WILD". FINDINGS INCLUDE THE IDENTIFICATION OF INCREASED MOTORIZED USE, CONSIDERABLE VARIATION IN THE SPATIAL AND TEMPORAL PATTERNS OF MOTORIZED USE, REASONS FOR PRIVATE MOTORBOAT USE, AND PROBLEMS ENCOUNTERED BY PRIVATE MOTORBOATERS.


Three trends are postulated: (1) a decrease in the rate of demand for commercial outfitting services, (2) an increase in demand for "do-it-yourself" trips, and (3) an increase in governmental regulations. The competition between commercial outfitters and private groups on restricted rivers is explored. Suggests that commercial outfitters can be justified for both their "educational" and "public access" services; the outfitter who so justifies his existance can enjoy a greater freedom from worry over future survival.


Hamilton, Lawrence 1970. WATER USES AND WATER DEVELOPMENT IN FALL CREEK--POSSIBLE CONFLICTS. CORNELL UNIV. WATER RESOUR. AND MARINE SCI. CENT., PUBL. 31, 14 P. ITHACA, NEW YORK.

DESCRIBES THE FALL CREEK WATERSHED, ITS WATER USES AND PROBLEMS, AND RECREATIONAL, AESTHETIC AND SCIENTIFIC USES. DISCUSSES THE CONFLICTS BETWEEN THE DIFFERENT USES THAT MIGHT OCCUR WITH DEVELOPMENT OF FALL CREEK.


Information was collected for use in development of the Snake River management plan. Includes data on commercial and private boat use.

Describes trends in the recreational use of rivers by studying participation data and usage information. Identifies patterns of socio-economic and experiential characteristics of users. Evaluates existing data and assesses data needs on river recreation use and users.


Presents the results of a 2 year participant observation study of recreational activities at seven high-mountain backcountry lakes in Washington State. Findings include that access-related factors seem to account for the amount and kind of use at the lakes, that fishing was only one of a variety of reasons for visiting the lakes, and that for most anglers catching fish was not the main reason for fishing. Discusses implications of the findings for high-lake management. Discussion has relevance for river recreation management.


Describes a pilot sampling technique, originally tested on East Lake and Paulina Lake in Oregon in 1968, for estimating recreational use on large bodies of water. Includes recommendations for future sampling. Sampling technique included both ground observation and aerial counts of boats on the Lakes. Technique has application to measuring recreational use on rivers.


Presents results of a study conducted to estimate fishing use on a small trout stream in South Carolina. Simple random sample estimation procedures were tested and information was obtained for further refinement in use and cost estimation for trout fishing. Use was highly localized and only small costs were involved for fishing. Recreation and intangible benefits outweighed economic expenditures by fishermen.


Study purpose is to establish a baseline questionnaire/interview schedule and a monitoring system to standardize the collection of data. Data will provide information on river users--their behaviour and preferences--so as to assist in making rational management decisions.

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Discusses a 3 year 1975-1977 study of recreational use on the Kettle River in Minnesota. Developed a survey questionnaire and sampling system to solicit information on trip characteristics, user preferences and satisfaction, user experience, and user characteristics. Describes temporal and spatial patterns of use in graphic terms to facilitate comparisons. Measures user preferences for elements in the river environment. Uses cluster analysis to identify groups of elements which correlate according to preference.

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Presents the results of a mail questionnaire study of Minnesota canoe and kayak owners in 1977. Minnesota is one of 5 states requiring the registration of paddle canoes and kayaks. From the January 1977 registration data, the private craft owners residing in Minnesota were sampled for the study. Compares socioeconomic characteristics of canoe and kayak owners with the Minnesota population. Measures and evaluates canoeing/kayaking experience. Describes use characteristics for April-October 1977. Discusses implications of findings for management.

A summary of some of the results of social research conducted in the United States. These are summarized under two headings: (1) general conditions of wilderness use; and (2) general factors influencing wilderness experiences. This is a very general summary of some of the findings. Although limited in scope, is useful for gaining a general overview on the subject.


Data from a broader survey is used to investigate the relative importance of fishing in the recreation experience. When asked what particularly attracted them to the area, more mentioned scenery, lack of crowds, etc. rather than fishing.

Having been attracted by fishing, and doing a lot of it was not correlated with satisfaction - people were often disappointed.


Presents data on visitor use from a 1975 study on the upper Missouri River by the Bureau of Land Management. Describes patterns of visitor use and develops user profiles based on socio-economic characteristics. Makes suggestions on regulating river use and provides guidelines to develop an informational guide for river floaters.


The impact of "large" parties (9 persons or more) in the BWCA is discussed in terms of their effect on the resource and on the experience of other visitors. The amount of use by large groups and the visitors most likely to be effected by a reduction in party size limit are described. (Present BWCA party size limit is 15). Large parties do not represent a large proportion of total parties, but do account for a substantial percentage of total visitors and visitor days of use. Large parties typically travel by paddle canoe, visit the Area predominantly in mid-summer, do not reside in northeastern Minnesota, are organizational youth groups not based near the BWCA, and are outfitted to some extent. For current use patterns, the impact of large groups on the environment and on the experience of other visitors is greater than that of an equal number of people visiting the Area in small groups. Large parties characteristically stay longer, move camp more often, and penetrate farther back into the back country than small parties. Lime states that similar characteristics might exist for other roadless and dispersed recreation areas.


Presents results of surveys conducted in 1967 and 1972 of use on Maine's Allagash Wilderness Waterway. Data were collected on patterns of use and characteristics and motives of river users. Presents trends in visitor use since 1966. Concludes that because of congestion and user conflicts, efforts should be made to: (1) redistribute use over time and space, (2) separate small and large groups, and (3) develop separate sites for vehicle camping and picnicking from river floaters.


Recreation users on the Nation's rivers should be counted and classified. Procedures for documenting river use are reviewed and the merits and limitations of various approaches are discussed.


Mead, Richard R. and Ehrenreich, Joseph W. Recreational Uses of the Lower Colorada River Valley Los Angeles, Research Institute for Business and Economics University of Southern California 1969
Minnesota's Kettle River provides a wide range of recreation attractions—whitewater kayaking, canoeing, fishing, and boating—within 100 miles of the Minneapolis-St. Paul metropolitan area. Initial results of a 1975-1976 study to develop baseline visitor data and a means of monitoring use suggest a complex of uses, visitor types, and river conditions.


Presents results of a 1976 summer study of day users and campers hiking in the Narrows. Data were collected and analyzed on: (1) total recreational use of the area, (2) socio-demographic characteristics of users, (3) recreational activity patterns, and (4) perception of users to hazards in the Narrows. Results showed that campers in the Narrows tended to be former day users. Also, although more than half the users were aware of the severe flash flood hazard in the area during the summer months, they were unaware of the probability of such a flood occurring.


Focuses on describing the communication processes of outfitters and wilderness visitors. In particular, identifies visitors' information sources and levels of knowledge about the Area and their attitudes on several important management policy issues.


Reports results of a 1974 spring survey of recreation use on the Stanislaus, Mokelumne, and Merced Rivers of California. Also presents a method for collecting future recreation use data.

A household production model is used to show the impact of user experience on consumer behavior. Suggests that the more often an individual engages in an activity, such as white-water boating, the more skilled the person becomes at the activity and the more demanding the person is of a recreational site's services. Concludes that as experience and skill increase, a positive effect on the person's willingness to pay is observed but tends to level off as the desired degree of skill is reached.


Reviews literature on social carrying capacity and concludes that problems exist when trying to quantify capacity. Suggests that traditional user satisfaction models are probably inadequate to explain social carrying capacity. First-time users to a recreational area may have one threshold for crowding whereas persons who have visited a site more than once probably have a different threshold for crowding.


Examines participants at federal and state, and local and private facilities involved in 8 water related activities in Indiana. Finds no differences among activity participation rate groups with respect to 7 socioeconomic characteristics at the different properties. Finds that groups of highly active participants are responsible for a disproportionate amount of participation in every activity at both types of properties. Suggests that social action system variables be included to study differences in participation.


Summarizes 1974 field survey to determine recreational carrying capacity and use levels along the federally designated wild area of the Rogue River. Revealed differences between commercial and noncommercial river travelers with respect to occupation, number of previous river trips, and membership in conservation organizations. Differences were also noted in commercial and noncommercial user's attitudes towards levels of crowding and potential use restrictions. River campsites were inventoried with respect to availability of potable water and enough flat ground to accommodate a camping party of four.
Pfister, Robert E. and Robert E. Frenkel


Presents results of the fourth Statewide boating survey. Questionnaires were used to obtain information on the amount, distribution, and nature of recreational boating by registered boaters in 1971. Estimates probable future boating use in Michigan and develops computer mapping techniques to show current and future distribution of boat use. Logistical problems of three previous Michigan boating studies are reviewed and recommendations are given on ways to improve future studies.


Examines recreational use on a 74-mile section of the Upper Iowa River in northern Iowa during 1972-1973. Data collected through personal interviews with river users and aerial counts were analyzed to identify the characteristics of users, use patterns, and user perceptions. Canoeing was the most popular and camping was the second most popular activity. Most canoists used the river on weekends and holidays. Most users felt the river was becoming too crowded but wanted more facilities (campsites, tables, toilets, etc.) provided. Suggests that canoeing be dispersed more evenly to alleviate crowding.


Describes a 1972-1973 study of recreational use on the Upper Iowa River. Canoeing, camping, fishing, and trapping activities were recorded and each were found to occur in distinct areas of the River (i.e., canoeing did not occur where trapping was popular). Canoeists and campers used the River more than fishermen or trappers. More than half of the canoeing and camping was on weekends and holidays.


A pilot study of 11 trips was conducted during the 1974 river running season on the Colorado River through Grand Canyon. Final data was collected during the 1975 season by a stratified random sample of 46 commercial trips (39 motor and 7 oar) and 7 private trips. Four self-selected motor-oar combination trips provided additional data. Information sources included Park Service use records, trip reports by observers, and questionnaires and interviews from passengers and boatmen.


The effects of motor and oar trips in the Grand Canyon are discussed. Brief history of the controversy over motorized river travel is presented. Data on motor-oar differences come from two sources: people who were on either a motor or oar powered trip and people who were on a combination motor and oar powered trip. Combination trip passengers reported a clear preference for the oar trip. Implications for management are that (1) oar travel appears more compatible with the wilderness experience, and (2) a major increase in the proportion of oar travel would cause a number of changes in the river running scene.


Discusses the history of the private-commercial river trip controversy and summarizes arguments on both sides. Private and commercial users differ on a number of background variables and trips differ on structural characteristics. As a whole, the attitudes and perceptions of private users differ from those of commercial users, but are similar to those of commercial passengers taking oar-powered trips. Implications for management are discussed.


During the summer of 1971 mail-back questionnaires concerning the changes a proposed dam would have on recreational activities in the area were distributed to a sample of recreation users on the Snake River, Washington. Data showed that nearly all of the recreationists lived within 2 hours driving time from the River and that the River was their primary destination. Users were predominantly young to middle-aged and well-educated. The most popular recreation activities were sightseeing, fishing, hunting, picnicking, swimming, and relaxing. Most users felt present recreation opportunities were fair to excellent and that the dam would decrease the number and kinds of recreational activities available and cause overdevelopment of the area.

Studied competitive recreational uses on the Clear, Spirit, Okoboji, and Little Wall Lakes in Iowa during 1966-1967. Used pneumatic car counters, questionnaires, and time-lapse photography to describe recreational activity cycles on the lakes. Determined present and future areas of user conflict. Made the following recommendations to managers: limit boat size, zone lake areas by types of recreational uses, and manage waterfowl.


"Describes the demographic characteristics of wilderness users, the various kinds of wilderness users in the Boundary Waters Canoe Area, and outlines some of the important 'images' wilderness users hold for the area. One of the very first wilderness user studies." (Lucas and Stankey, 1973).


This is a field study of campers and canoeists who vacationed in the Quetico-Superior during the summer of 1958. Its primary objectives were to obtain data on who vacations in the area, for what reasons, and with what effects; what these vacationers think of the area; and what they would like done with it. This is an early study of wilderness users which applies less sophisticated techniques but the results still revealed patterns which later studies have shown. (Also, see by Gregory P. Stone and Marvin Taves, "Research into the Human Element in Wilderness Use", Proc. Soc. Amer. Foresters (Memphis, 1956): 26-32. Reprinted as "Camping in the Wilderness" in: Mass Leisure, P. 290-305. Eric Larrabee and Rolf Meyersohn (eds.). Glencoe, N.Y.: The Free Press, 1958).


Welton, Brad, and Dick Harlow. 1973. California B.I.M. white-water use study. 72 p. USD1 Bur. Land Manage. Folsom Dist., Folsom, California. Summarizes the summer 1973 study on volume and use on the Stanislaus River in northern California. Also covers recreational use data collected for Mokelumne, Consumnes, South Fork of American, Merced, and Tuolumne Rivers. Contains information on the Stanislaus River about hazards, congestion at access and special interest points along the river, camping and picnicking sites, water quality, firewood availability, sanitation facilities, and types and volume of whitewater recreation use. Concludes that increased use of the Stanislaus has caused lowered water quality and serious crowding problems. Also includes information on the volume of recreational use the Mokelumne, Consumnes, Merced, Tuolumne, and South Fork of the American Rivers received.


Witty, K., 1975. A Comparison of Recreational Use at Cache Creek on the Middle of Snake River 1969 and 1974. Oregon Department of Fish and Wildlife. Report contains findings of a river use and "recreational experience" survey. Findings indicated that viewing wildlife and being in natural environments contributed positively to the experience, while the presence of man-made features and encountering other parties were negative factors. Contains copy of questionnaire and discussion of sample design.
D. USER PREFERENCE AND CARRYING CAPACITY STUDIES

Documents increasing use of the Colorado River through Grand Canyon National Park for river running and resulting biological and sociological problems. Outlines a recent National Park Service research project to determine carrying capacities and the effect of the Glen Canyon Dam on the riparian environment. Suggests restrictive management of biologically sensitive areas within the Canyon as an alternative to limiting total numbers of rafters.


Preseets the results of a study to determine to what extent the opinions of organized recreation user group members differ from or agree with those of the resources' general user population. Questionnaires were administered to a sample of Minnesota Canoe Association Members and to a sample of watercraft users on the Kettle Wild and Scenic River. The 2 groups had generally similar preferences for river recreation environments and management alternatives consistent with the preferences. Organized group members tended slightly toward more natural environments and stricter management policies.

A survey of Minnesotan attitudes toward the use of the Mississippi River in Minnesota was conducted in 1971. Significant findings are that Minnesotans do not desire to curtail their uses of energy to improve the River's environmental quality, and that perceived present uses of the River are opposite to the uses of what the public desires.

Study conducted to determine numerically the visitor carrying capacity for river-running the Colorado River. Developed a scheduling system to be initiated with a carrying capacity system, subject to environmental constraints. Also examined monitoring, management and maintenance planning.


Surveys river runners on the Colorado River through the Grand Canyon in Arizona to establish a social carrying capacity. Includes socio-economic information about users; user motives, expectations, perceptions, and satisfaction; and perceptions of river managers.


Summarizes a study on the perceptions, expectations, and interactions of recreation users on the Colorado River through Grand Canyon National Park, Arizona. Suggests using both physical and biological factors to determine human carrying capacity of the Colorado River.


Demand for water-oriented recreation by metropolitan populations can be estimated by assessing socioeconomic characteristics such as income, education, sex, race, occupation, and amount of leisure time. Results from a questionnaire given to St. Louis, Missouri, residents indicate that families with white male heads of households engaged in more outdoor recreation than families headed by nonwhites and women; demand for outdoor activities decreases with age; and higher income groups have more leisure time, more opportunities for recreation, and travel farther from home for outdoor recreation than do lower income groups.

Develops a three-phase conceptual framework for understanding and measuring aspects of social carrying capacity. Pretrip phase includes study of trip activity profiles, participant profiles, and user motivations. On-site phase includes study of actual float-trip where the individual encounters physical and perceptual sensations and experiences. Post-trip phase involves study of an individual's recollections about the float trip.


Survey of Idaho residents to: (1) identify the importance of natural resources compared to other issues (e.g., education) and (2) identify the importance of wild rivers as a water use. Concludes that major resource priorities were in the areas of utilization and preservation and that Idahoans should approach resource use from a balanced perspective. The controversial area of wild and scenic river classification was supported even though attitudes were somewhat polarized. Suggests that attitudes should not be taken at face value alone but evaluated with respect to a person's overall priority rankings of various resource uses.


Presents results of a survey of St. Joe River basin landowners on their attitudes and opinions towards the proposed inclusion of the St. Joe River in the National Wild and Scenic River System. Ascertains landowner/recreationist conflicts and the extent to which landowner's management policies and practices will be affected by such conflicts. Concludes that increasing public recreation facilities will substantially reduce such conflicts. Encourages active participation by private landowners in decision-making processes.


Presents results of interviews with St. Joe River recreation users in 1971-1972. Focuses on the users attitudes and opinions toward the river's inclusion in the National Wild and Scenic River System. Responses favored river designation but concern was expressed for the intensity of development and recreational use the river might receive if designated.


Cooper, B.R. (1973) Factors Affecting Quality of Recreation Experience For Trout Fishermen of Maramec Spring Park, M.A. thesis, Department of Recreation and Park Administration, University of Missouri, Columbia.


Develops methods, models, and guidelines for planning and managing water-based recreation sites. Presents methods for collecting and processing data on the recreational behavior of boaters. Finds that capacity, measured as the number of boats on the lake system at the same time, is not a fixed number because most users seem to acclimate themselves to heavy use periods.


Increased river recreation has resulted in conflicts between landowners and users about project development. The authors suggest that controversies typically are due to different attitudes, values, and philosophies, and the failure of the managing agencies to incorporate such considerations in river programs. Most problems and conflicts are symptoms of an uninformed public.


Abstract: With the ever increasing recreational use of the Colorado River, harm to the river and its adjacent environments has taken the form of oil, gas, and noise pollution; littering; health and sanitation problems; and damage to vegetation, wildlife, historic sites, and prehistoric shrines. In 1968, pit toilets were provided at designated campsites. Problems of human waste sanitation became particularly acute. The National Park Service now requires that all non-burnable trash, garbage and wastes be carried out. The most fragile areas are closed to camping. The number of user-days have been limited. In 1971, two proposals remained undecided: designation of the Colorado River in wilderness classification and banning of motors for river-running trips.

Keywords: Water Pollution, User Satisfaction, Waterway Preservation, Boating, Arizona, Waterway Management, Waste Disposal.
USER INTERVIEWS (1982)

A series of self-completion and interviewer administered questionnaire surveys of boat owners and hirers, anglers and casual visitors included questions on disturbance caused by other users and crowding generally. 40% of anglers were disturbed by boats; only 7% of casual users claimed to be affected by crowding.


Visitor use patterns, biological conditions, and selected items of recreational impact (including litter, trampling, tree cutting, and human waste) were measured for 12 months. Use and impact were shown to be strongly and positively correlated. However, recreational impact was not significantly related to the biological "health" of the area. Cluster analysis was used to group areas into three categories based on degree of impact; only one of every four sites was heavily impacted. Principal component analysis identified human impact features as best discriminators between sites.


Describes environmental changes that have occurred along the Colorado River through Grand Canyon National Park, Arizona, since the Glen Canyon Dam was constructed. Cites major impact the dam has had on water level fluctuations and the subsequent effects this change has had on the vegetation, fish, beach formation, and rapids along the river. Also notes the increased effect of human use on the ecology of the Canyon. Suggests that quantification of river trip activity is needed to cope with human impact in the canyon/river environment.


Summarizes the findings of a 1971 Michigan study that examined the characteristics and attitudes of the river users (canoeists, fishermen, canoe outfitters, and cottage residents). Identifies primary areas of conflict as: (1) number and distribution of users, (2) motives of users, (3) user's perceptions of managerial problems, and (4) user reaction to controls on river use.


 Discusses seven broad types of problems experienced while researching the preferences of recreationists on three rivers in Michigan. Those problem areas concerned the tasks of: (1) selecting variables to be included in research designs; (2) deciding which research approach is best suited for particular purposes; (3) designing sample plans; (4) collecting data in the field; (5) understanding the dynamics of human preference formation; (6) defining the word preference; and (7) specifying clearly the preferences to be studied. Recommendations are offered for helping solve these problems.


Cites data from several studies to support the hypothesis that sport fishing helps people escape from stress experienced in home, neighborhood, and work environments. States that there are strong indications that stress levels within many individuals are increasing and that sport fishing is one way to relieve stress. Feels that more research into the value of sport fishing as a stress-relieving recreational activity is needed to enable managers of sport fisheries to better provide opportunities for this recreational activity.


Proposes formulating a computerized recreation land model that would incorporate consumer preferences in selecting recreation sites for development. The data base for the model would rest on physical characteristics of the proposed site. Two types of data are needed to operate the model: an assessment of environmental characteristics required for several activities and an inventory of land characteristics pertinent to site quality. Three groups of recreational activities are identified: water based, land based, and winter.


Field, Donald R and Joseph O'Leary 1973 Social groups as a basis for assessing participation in selected water activities. *Journal of Leisure Research* 5(2) 16-25

An analytical strategy is proposed in which a social group variable might be employed in conjunction with social aggregate variable of participation in leisure activities.
USER SURVEY: 33 CANOEISTS
SITE EXAMINATION

This small-scale survey of 33 canoe parties in the Boundary Waters Canoe Area involved fairly straightforward questioning on site preferences and dissatisfactions. Finding sites of the required size, and litter left by previous users were the main problems. Preferences were for island sites, pine cover, flat tent-areas, easily obtainable firewood, good landing areas, and wind protection. Measures were made of loss of vegetation, soil compaction, tree damage, and tree reproduction. Even light use affected these seriously and the article closes with a discussion of possible ways of persuading campers not to over-use sites.

Assumes that individuals have patterns of behavior that they consistently follow when making decisions about the kinds of recreation facilities to use and types of recreational activities to engage in while at a recreation site. Based on this assumption a simulation model was developed to reproduce the same behavior as an individual when given the same types of choices and decisions to make about the recreational sites. The model was designed with the same mechanisms individuals use to make decisions: memory, memory search, selection procedures, and a set of decision rules. These patterns of behavior can provide managers with a powerful tool to analyze choices and preferences of a population for predicting use rates at water recreation facilities.


Presents results of a study of 329 river floaters on the Rio Grande in Big Bend National Park to determine the inter-relation between motivations and satisfaction in a float trip experience. Describes the most important motivations as: enjoyment, learning about nature, stress release/solitude, intra-group affiliation, challenge/adventure/achievement/photography/autonomy, extra-group affiliation, self-awareness and status. Measures of satisfaction were obtained by comparing importance and performance ratings for each motive. Concludes that Rio Grande float trips are perceived differently by different individuals and are capable of providing a variety of types of float trip experiences.


Abstract: The wilderness is a common public resource designated for recreation, scenic, esthetic, conservation and historic uses.

Special interests such as commercial guide organizations, educational institutions, and social service organizations are seeking special use permits which limit free public access to wilderness. However, these organizations have not yet developed an adequate justification for this special use.

Assuming that first priority is given to the public, land managing agencies are not considering all alternative solutions to wilderness overuse. Nor are they receiving adequate public input regarding the public's need for access to wilderness.

Limiting access to those willing and desirous to meet wilderness on its own terms requires a management attitude which closes overpopulated access trails and roads and which demands independence in wilderness travel.

No citizen has to be denied access to wilderness arbitrarily or by lottery.

Public input processes and behavioral data gathering will provide information regarding the feasibility of this approach to wilderness carrying capacity.


Examines the problem of identifying the optimal use-level of recreation for a given water body. Recognizes the complex and dynamic concept of carrying capacity and reviews literature that relates to factors influencing capacity. Discusses applicability of Liebig's law of the minimum to carrying capacity. Reviews empirical research related to capacity conceptualization and measurement. Stresses the need for theoretical models for measuring capacity.


Develops methods, models, and guidelines useful to managers who are interested in measuring or predicting the recreational output of lakes. Presents several explanatory models representing individual and group behavior of pleasure boaters.


Describes research to determine if large increases in canoe use on the Pine River in Michigan contribute to accelerated stream bank erosion. Canoeing was not found to contribute to erosion directly, although people sliding down and camping on stream banks were a contributing factor.


Describes research on the Pine River in Michigan to determine if large increases in canoeing accelerated stream bank erosion. Most erosion was natural, but people sliding and camping on stream banks created some erosion. Heavy canoe traffic is not a causal factor in erosion.

Hartman, Thomas. Perceptions of a National Park Service manager of whitewater river recreation management.


Four types of carrying capacity are identified: physical, ecological, facilities, and social. The importance of both levels of technology and value judgments are noted for determining any of these capacities. The satisfaction model based on an explicit or implicit adoption of economic theory by both researchers and managers for determining social carrying capacity is lacking and an alternative model based on a determination of social norms is proposed. This model is discussed both in terms of recent social psychological studies of crowding as well as prior assessments of recreation carrying capacity. Finally, some practical suggestions for adopting this model are noted.

Nearly 3,000 canoers, tubers, and fishermen were interviewed as they left the Upper Bois Brule River in the late summer of 1975 to determine their perceptions of crowding, satisfaction, and reported contacts with other visitors. In spite of daily use levels that were as high as 308 visitors on a 10-mile stretch, there was no relation between use levels and satisfaction. This study replicates prior research by Nielson and Shelby on Colorado River visitors, and casts more doubt on an econometric model of carrying capacity based on an assumed relation between use level and satisfaction of river users. All visitor groups expressed similar motivations for their visits, such as being close to nature, but differed in their level of commitment and background.


Holder, Stuart S. "Analysis of Public Water-Based Recreation at Selected Multi-Purpose Lakes and Reservoirs: United States and Northeast Ohio." Kent State University, 1967.

Hooper, R.A. "Background, Recreational Expectations, Perceptions, and Management Preferences of Mountain River Paddlers - A Pilot Study."


Study about private and commercial users of the Chattooga River to develop: (1) a demographic profile of on-the-water-users, (2) a profile of water recreation users expectations, (3) a profile on users reactions to management options, and (4) a profile on users perception of river congestion. Study found that there is a difference between commercial and private users and their views toward management options. Commercial users rejected 8 out of 13 but private users rejected 15 out of 21 proposed management options and showed no majority concurrence on the remaining six. This difference may be accounted for partially because commercial users show their willingness to be managed by electing to use a commercial service.

Hunt, John D. Some thoughts on wild river recreation carrying capacity. Logan, Utah: ISORT, Utah St. Univ. 1974. 12 pp. ($1.00)


Suggests that people like rivers and riversides because they provide both a sense of orderliness and a sense of involvement and mystery. The recreation value of rivers extends far beyond fishermen, boaters, and other traditional users. Even unspectacular rivers provide a source of enjoyment and tranquility for many who use only the riverbank, view the river from afar, or who only know that it is "there" and available. Stresses that because these passive users experience benefits similar to active users, their requirements deserve attention in design and management decisions. Suggests that ways must be found to involve passive users in decision-making so their diverse needs and concerns will not be overlooked.


Discusses why people fish and engage in other recreation activities. Proposes that recreation management problems should be approached from a behavioral point of view. Identifies important forces that influence how people spend their leisure time and discusses progress in developing techniques for identifying and measuring recreational motives relevant to managers. Illustrates the use of these techniques to learn what motivates select groups of fishermen in Michigan. Concludes that increasing numbers of outdoor recreationists are using natural areas to temporarily resolve problems experienced at home and that serious consideration should be given to the degree to which opportunities should be provided in resolving these problems.


Defines sociological and ecological carrying capacity and discusses possible methods to limit use: water-surface and shoreline zoning, permits, commercial restrictions, and access controls. Discusses legal considerations of the above controls and cites past litigation regarding riparian versus public rights. Presents a model statute designed to strengthen water and shoreland planning in Wisconsin.


Discusses impacts and conflicts created by increasing recreational use of rivers in the western United States. Problems addressed include environmental, social, and administrative interrelations on rivers.


Discusses (a) what is meant by the concept of recreational carrying capacity, (b) what is known about capacities in terms of both how resources and experiences of visitors are affected by recreational use, and (c) what alternative procedures the administrator can use to manage both resources and visitors for capacity.
DISCUSSION


Article identifies 'problem areas', 'research areas' and management issues. Problem areas are divided into resources and people problems. Resource area requires identification of ecologically acceptable use levels for water quality, wildlife, vegetation, etc. On the 'people' side perception of crowding, perception of the resource, selection behaviour and reactions to management need to be studied to determine acceptable use levels. Management then has to decide which criterion sets the lowest use level for different locations and seasons, and plan for this. Much of the research work of Lime and Lucas is geared to this scheme.


Preliminary findings from an on-going programme by the author to study social carrying capacity in the BWCA. Paper summarizes findings concerning visitor attitudes and perceptions of crowding. Includes proposal for management actions to off-set visitor dissatisfaction from widespread congestion.


Summarizes trends in visitor use since the advent of the Wilderness Permit in 1966. Also reviews a 1971 study of visitor attitudes and perceptions of crowding. Concludes that shifts in use suggest a greater significance of the Boundary Waters Canoe Area as a national wilderness resource. Discusses several management actions to reduce crowding.

Luce, David W. Physical resource and social determinants of whitewater river recreation and some implications of these conditions for visitor management.


LUCAS, ROBERT C.


"About two-thirds of the Boundary Waters Canoe Area is available for logging under certain restrictions. This brief note explores the extent to which visitors were aware of logging and how many were bothered by seeing it." (Stankey and Lime, 1973).


This is one of the classic studies on wilderness and recreation. Is one of the first attempts to uncover the perception of wilderness by different groups of users. The author found that the boundaries of wilderness are extremely flexible and are by no means limited to map boundaries.
LUCAS, ROBERT C.

More people visit the Quetico-Superior wilderness each year, raising the question of recreational capacity. The factors limiting capacity are discussed with emphasis on visitors' perception of the recreational resources of the area. Data is presented on the importance of the wilderness and other qualities to various user groups; the area considered wilderness, and the characteristics of the wilderness. Wilderness qualities were the main attraction for canoe trippers; other visitors considered fishing or scenery primary. Canoeists saw the wilderness as smaller than other visitors. Canoeists also felt the wilderness was overcrowded at lower levels of use, and objected strongly to motor boats. A suggested method for estimating the wilderness capacity of the Quetico-Superior indicates total use is close to capacity, but more area is underused than overused. Use projections point to severe overuse. Management implications discussed include zoning, dispersal of canoeists, better flow of information and the eventual limitation of numbers of visitors.

LUCAS, ROBERT C., AND GEORGE B. PRIDDLE

"The concept of resources as cultural perceptions seems essential in the study of recreational resources - especially for the study of wilderness. The perception of the environment by recreational visitors to two similar wilderness lakelands, the Quetico-Superior Area on the Minnesota-Ontario border and Algonquin Provincial Park north of Toronto, proved quite parallel.

"Variation in wilderness perception was associated with several factors, but in different ways for different types of recreationists. People who came for canoe trips considered the wilderness aspects of the areas to be the major attraction. They perceived the wilderness as smaller than the officially established area, with a northward orientation, and they excluded roads, heavy canoeing use, and even light boating use. Limited logging away from lakeside zones did not detract appreciably from the canoeists' wilderness in the Quetico-Superior, but it did in Algonquin where cutting was more widespread. The other visitors (fishermen, etc.) considered wilderness qualities secondary to fishing and scenery. They perceived a large area as wild, including areas with low-standard roads, substantial boat and canoe use, and logging.

"Recreational use of wilderness areas is increasing rapidly. This poses a dilemma: the more use, the less wilderness. Our findings confirm the reality of this dilemma but suggest some partial solutions, mainly through dispersing users (now highly concentrated) and separating incompatible types."


Campground use on the Huron and Manistee National Forests was studied in relation to resource characteristics, location, facilities provided, and visitor attitudes about the environment. Applies regression analysis to explain variation in campground use per unit. Compares visitor ratings of quality to nationwide Forest Service recreation resource inventories.


The impact of visitor use on newly developed campsites tended to level off after the first 2 years. Visitor registration provided nearly complete use data, and the effects on soil, water quality, vegetation, and site size were measured and mapped. Physical measurements were combined into an impact-stage rating system by cover types. Management implications of the results are discussed.

33 wilderness campsites (developed in 1967 by the Forest Service) in the BWCA were studied for 5 years (1968-1972) to determine impact of visitor use. 23 sites had no previous use. During the study, the effects on soils, vegetation, and site size were measured and mapped twice each year. Photographs were taken periodically from permanent points. At selected sites, detailed soil and water quality data were also collected. Through visitor registration, nearly complete use data were obtained for the 23 locations. Visitors completed cards and questionnaires on site selection, appearance, and on their satisfaction with the sites. Results indicate the combination of impact changes (stage) tends to level off and that many of these changes come in the first 2 years. Apparently, most sites in key locations, where there are few alternative campsite choices, could be kept open. This assumes that soil conditions are not irreversible and that water pollution is not critical. Exceptions would be closed aspen-birch sites. Campsites with popular characteristics (rocky lodges, part open, etc.) could be hardened for continued use. To rotate them with closed canopy sites, particularly in aspen-birch stands, would seem self-defeating because more and more area would be opened to use due to a longer recovery time than impact time.

"Probes the extent to which paddling canoeists and motor boaters are satisfied with their method of travel. Examines the reactions of people toward other travel methods and discusses future patterns of use and management implications." (Stankey and Lime, 1973).

Probes the extent to which canoeists and motor boaters are satisfied with their method of travel. Examines the reactions of people toward other travel methods and discusses future patterns of use and management implications.
McCOOL, S.F.

McCOOL, STEPHEN F., AND LAWRENCE C. MERRIAM, JR.

This study found that the closer the interaction between individuals - and the more visible their acts, the more likely they were to comply with anti-littering regulations. "Local" residents were less sensitive to the litter problem and complied less with litter regulations than did visitors from far away. Compliance with anti-littering regulations is related to occupation: operatives and craftsmen are more likely to litter than are managers, professionals and students. Persons who interacted extensively with outfitters and/or were members of organized groups were less likely to litter than those who interacted less. Examines the need for managers to establish relationships with non-outfitted groups in order to gain compliance.


Defines those variables most meaningfully related to sensitivity about litter and compliance with littering regulations. Discusses the role of outfitters in communicating and reinforcing norms. Examines the need for managers to establish relations with non-outfitted groups in order to gain compliance.

MINNESOTA ENVIRONMENTAL QUALITY BOARD.
1978. VISUAL SENSITIVITY OF RIVER RECREATION TO POWER PLANTS 78 P. MINNESOTA ENVIRONMENTAL QUALITY BOARD, ST. PAUL, MINNESOTA.

Presents a methodology for assessing the visual impact of power plants on river recreation needs, which will allow comparisons of power plant locations relative to river recreation. Proceeds on 2 parallel tracks: 1) Landscape Character Track- determines the visual absorption potential of various landscapes from the assessment of power plant and river-related landscape characteristics, 2) Recreation Potential Track- assesses recreational activities, their sensitivity to visual intrusion and their relative importance. Uses the Rivers method to assess the recreation potential for a river.

INTERVIEW SURVEY ATTITUDE OF 100 FISHERMEN CHECKLISTS

Respondents were asked to rate the following as very important, important or not important: water quality, natural beauty, privacy, size of fish, weather, number of fish, access and facilities. The scores for each of these factors (very important = 3, important = 2, and not important = 1) were analysed against respondents' age, fishing experience, willingness to pay, average leisure time per week, educational level and rural or urban residence. The order of importance of the factors (in the order listed above) was almost precisely the same for all groups. It is suggested that the findings point towards the inclusion of 'environmental management' in the concept of 'fishery management'.

Murphy, Peter. "The Role of Attitude in the Choice Decisions of Recreational Boaters" Journal of Leisure Research 1975 Vol. 7 #3 p 216-224


Nash, Roderick. Changing conceptions of the meaning and purpose of protected wildland: Implications for river management.


O'RIORDAN, TIMOTHY PAGET, GREGG. 1973. SHARING RIVERS AND CANALS, A STUDY OF THE VIEWS OF COARSE ANGLERS AND BOAT USERS ON SELECTED WATERWAYS. SPORTS COUNCIL STUDY 16, 44 P. THE SPORTS COUNCIL, LONDON, ENGLAND.

REPORTS THE FINDINGS OF A 1976 STUDY TO DETERMINE THE NATURE OF THE INTERACTION BETWEEN ANGLERS AND BOAT USERS ON 4 REPRESENTATIVE LINEAR WATERWAYS IN ENGLAND AND THE WELSH BORDER. INFORMATION IS REPORTED FOR 3 RIVERS ON THE EXTENT OF CONTACT BETWEEN THE 2 GROUPS, HOW THEY FELT ABOUT IT GIVEN PATTERNS OF MOTIVATIONS AND EXPECTATIONS HELD, AND WHAT SOLUTIONS THEY OFFERED IF IT WAS SEEN AS A PROBLEM. INCLUDES AN APPENDIX ON A SURVEY CONDUCTED TO DETERMINE THE EFFECTIVENESS OF A VOLUNTARY TIME ZONING AGREEMENT ON 2 RIVERS IN THE NORFOLK BROADS.

1,100 SITE INTERVIEWS AT 3 LAKE AND COASTAL SITES

Recreationists (swimming, fishing, hiking, water-skiing, boating, and picnicking) were interviewed at beach-sites in Nova Scotia, Quebec and Saskatchewan. In addition to background data respondents were asked to rate the area as a recreation spot (from excellent to very poor), they were asked to describe the main advantages and disadvantages of the area and to rank the area with other cities visited. An open-ended question was asked about water-quality at the time of interviews and then whether water-quality problems reduced their visit rate. A series of questions about the effect of pollution on particular activities is followed by questions on improvements desired, willingness to pay more and whether they intended to return. Respondents were then asked how they would distribute 100 dollars between Housing, Education, etc. and Recreation lakes. Respondents then self-completed a form containing the attitude statements concerning pollution. The results are only briefly reported in tabulated form. It is concluded that users are aware of pollution and that varying levels of pollution affects use. Most users would be prepared to pay for improved water quality. The study also includes a scientific examination of water quality at each site.


During the summer float season of 1971, questionnaires were administered about the perceptions river managers have concerning the characteristics and attitudes of river floaters and the perceptions, attitudes, and characteristics river floaters have about themselves and river management. Data analysis show that Middle Fork River managers are in tune with floaters on their personal outlook of river management but have a poor idea of floaters' personal characteristics. Significantly more floaters than managers felt solitude should be an important part of the river experience.


A method to predict user preferences for the visual recreation environment is proposed. Quantitative preference functions that respond sensitively to individual differences and characteristics of the environment are developed.

Paper suggests a conceptual and mathematical strategy for modelling camp migration and provides a good discussion of the problems involved in operationalizing the model. Purpose of the travel behaviour model is to provide managers with the ability to predict the impact of alternative controls and camp migration and, consequently, intensity of use.


The aim of the study was to explore the application of elementary techniques of psychological measurement and statistics toward quantitative analysis. Extensive lists (running to over 100 items) were put to respondents, of reasons why people might visit the area. They were asked to indicate the importance of the factors on a nine-point scale. The same lists were then presented and opinions sought on their own experience in the area. The 'relative congruity' between the ideal and the actual experience is then examined. 'In general it is reaffirmed by this study that the average B.W.C.A. user wants more perception of wilderness and less hardship, discomfort and inconvenience'.


The Study considers two potential sources of bias in the measurement of attitudes, preferences, and perceptions of wilderness visitors: (1) situational bias; and (2) voluntary response bias. The source of such bias was explored by means of an experimental design allowing them to be observed in terms of a spectrum of wilderness experience. The study was conducted in the Boundary Waters Canoe Area.

The study was conducted to determine whether canoeists and wilderness managers differed in their wilderness motivations, attitudes, preferences, and perceptions. A detailed spectrum of the "wilderness experience" was obtained by employing psychological inventories, specifically McKechnie's Environmental Response Inventory. A number of differences showed up between the two groups both in terms of environmental disposition and human response to the wilderness experience. One of the more significant studies of this type.


Describes and illustrates a Markov-based linear programming method used for predicting and analyzing travel in Minnesota's Boundary Waters Canoe Area so management can control the rate of entry of travellers into the Area.


Increased recreational use of rivers has led to the examination of the carrying capacity concept and its management application as a basis to determine appropriate levels of seasonal use on Oregon's rivers. Proposes a set of principles based on the idea that an operational approach to carrying capacity is important in decision-making. States that although river management plans are not mandatory to implement the carrying capacity concept, they provide for a positive approach to river management.


The relation of campsite choice to the natural characteristics of campsites was analyzed along the Rogue River in Oregon. Two regression models—for commercial and noncommercial camping parties—were formulated relating campsite choice to 13 site characteristics of river terraces. Of the five significant variables selected for each model, three were the same: size of the campsite, size of the tributary providing potable water to the location, and a rating of beach area available for landing a boat.


"Users were interviewed during their trip to determine the degree of satisfaction they received while using particular segments of well-known canoe routes. The basic output of this Canoe Network Analysis are criteria that can be used to determine, in perceptual or attitudinal terms, the carrying capacity of a particular section of the park, taking into consideration the quality of the lakes, the number of potentially good campsites, and the number of people that can be accommodated before a 'crowded' situation would be experienced." (Stankey and Lime, 1973).


Roggenbuck, Joseph W. Methodological issues involved in the development of attitude scales for assessing the carrying capacity of whitewater.

Examines potential management strategies, perceptions of crowding, and sources of satisfaction for river users on the Green and Yampa Rivers in 1975. Different identifiable user groups varied in their responses to questions concerning recreational use of whitewater rivers as a function of differing expectations for the recreational experience.


River-floaters in Dinosaur National Monument were interviewed during the summer of 1975. Trip motives, in descending order of importance to users, were: action/excitement, learning about nature, stress release/solitude, affiliation, autonomy/achievement, self-awareness, and status. User scores on the motive-scales were related to user perceptions of river crowding, opinions on appropriate maximum group-size, campsite development strategies, river management techniques, and user satisfaction. A number of correlations were statistically significant, though relations tended to be weak. Management implications are also discussed.


Contains a proposal to analyze and interpret user perception of the recreation carrying capacity on the Green and Yampa Rivers. Presents good conceptional basis for utilization of user surveys.

Discusses need for data on current behavioural patterns of river users, and identification of reaction to alternate management strategies. Suggestion is forwarded that this can be determined through generating information concerning the social and psychological factors which influence users' recreational expectations. Provides a questionnaire given to river users in the Dinosaur National Monument.


Discusses the development of a behavioral information data-bank to aid recreation managers who are responsible for white-water rivers. Behavioral information needed about users is: (1) who are they, (2) where do they come from (mentally and geographically), and (3) what do they want? This information would: (1) identify the kinds of experiences users want, (2) allow managers to receive direct feedback on special actions, and (3) help managers "to see" the people using the resource instead of just using "visitor days" and "camper nights" to describe them.


Reports the results of a 1975 study of users of the Green and Yampa Rivers in Dinosaur National Monument. Users were predominantly first time floaters and were overwhelmingly satisfied with the trip. Their most important expectations for the trip were found to be action/excitement, experiencing nature, and stress release/solitude. Recommends action managers can take to satisfy users but still minimize the effects of crowding and maintain a quality experience.


Contains a proposal for a study to generate information which will assist administrators in the Bureau of Land Management to make effective decisions concerning the management of whitewater rivers. The study will be carried out on the Green River through Desolation Gray Canyons and the Colorado River through Westwater Canyon. The proposed questionnaire is included in the submission. The format is a refinement of that contained in Scheyer (1976) (see: C - 2).

Proposes that the effectiveness of management decisions may be assessed by analyzing user input and scientific data. Defines recreation behavior and its main factors—past experience, expectations, and satisfaction. States that it is possible to associate recreational opportunities (canoeing, river running) with specific experiences (solitude, excitement) and that it is possible to manage for the experiences. Also includes results from a 1975 study on the Green and Yampa Rivers in Dinosaur National Park on recreation behavior and rivers.


Proposes that perceptions of crowding are a function of the differing expectations people may have for given recreation experiences. A study of whitewater river recreationists in Dinosaur National Monument showed that persons who score more highly in certain experience expectations are more sensitive to crowding, that different expectations show varying sensitivities to crowding and that various user groups differ significantly in the rated importance of these expectations. Also employs a wilderness attitude scale. Discusses implications for the assessment of recreation carrying capacity.

REPORTS THE RESULTS OF A DETAILED VISITOR SURVEY OF WHITETRIVER RECREATION IN WESTWATER CANYON ON THE COLORADO RIVER AND DESOLATION/GRAY CANYONS ON THE GREEN RIVER IN UTAH. THE RESEARCH WAS DESIGNED TO PROVIDE INSIGHTS INTO THE NATURE OF RIVER RECREATION IN GENERAL, NOT TO PROVIDE A SPECIFIC MANAGEMENT TOOL. THE RESULTS ARE DIVIDED INTO 7 SECTIONS: (1) DECISION FACTORS IN RIVER RUNNING, (2) RIVER TRIP CHARACTERISTICS, (3) USER PREFERENCES OF MANAGEMENT OBJECTIVES, (4) PERCEPTIONS OF OTHERS, (5) ATTITUDES TOWARD MANAGEMENT, (6) DEMOGRAPHICS OF RIVER USERS, AND (7) EXPECTATIONS OF RIVER USERS. IN SECTIONS 1-6 THERE ARE MULTIPLE ANALYSES OF THE DATA FOR SPECIFIC SUBSETS OF THE USER POPULATION.


Reports the results of a study conducted on the Rio Grande in Big Bend National Park. Study was organized into four parts: (1) visitor usage analysis; (2) subjective site evaluation; (3) biotic communities analysis; and (4) photographic recordings. Based on information uncovered in the study, recommendations are made for establishing a management framework. Various management strategies are also presented.


Various means of assessing recreational impacts on stream-side soils and vegetation have been employed to provide data to support and implement management decisions. Believes that past research in this area has usually been confounded by several problems. Suggests that the most critical research needs are: (1) selecting sampling points or sites to yield impact data representing an entire riverway; (2) randomly locating plots, points, and transects within a selected area; (3) locating suitable before-and-after or used-and-unused sites for control; (4) selecting and measuring the most important and most user-sensitive soil and vegetation features; and (5) measuring visitor use and how it correlates with impact data.

INTERVIEWS WITH PHOTOGRAPHS LANDSCAPE

100 black and white photographs were divided into the following zones: A. Sky, B. Immediate vegetation (leaves, etc. can be distinguished), C. Intermediate vegetation (individual trees can be distinguished), D. Distant vegetation


People visiting the Adirondack's of New York State were interviewed during the summer of 1967 to identify significant quantitative variables in photographs that relate to public preferences for landscapes. Using factor analysis and multiple regression techniques, an equation was developed that accounts for the majority of variation in preference scores of landscape photos. Both the applicability of the model to resource planning and management and its limitations are discussed. Method has possible application for identifying riverscape characteristics preferred by recreation users.


Reports results of two studies to evaluate potential motor/oar conflicts on the Colorado River through Grand Canyon National Park, Arizona: a pilot study in 1974 and a field study in 1975. Data from visitors traveling both by motor and oar power indicated that trip experiences differ on a number of characteristics including participant's background, opinions about motorized watercraft, number of encounters with other parties, and camping styles. Combination motor and oar powered trips were developed to observe same group behaviour in both situations and to identify individuals preferences for one type of trip or the other. Flouters on combined motor and oar powered trips expressed a preference for the oar trip.

The effects of different use levels on crowding are discussed based on data collected on river trips in the Grand Canyon. The carrying capacity model traditionally applied to wilderness recreation is outlined, and then compared to a more general crowding model derived from research in other areas. Use levels have a pervasive effect on intergroup contacts, which in many ways define the "character" of the river experience. However, neither use levels nor contacts affect perception of crowding, and none of these variables affect passengers overall rating of the trip.


This annotated bibliography includes over 200 citations covering both ecological and social dimensions of the capacity problem. The contents are as follows: (1) concept of carrying capacity, (2) biological investigations, (3) esthetic carrying capacity, (4) managing for carrying capacity, and (5) author index. Note that the bibliography covers up to 1973.


States that the Colorado River Basin offers a variety of recreational opportunities and, as such, can satisfy a wide range of user preferences and needs. All agencies responsible for managing and planning recreational use in the Basin and the public must be involved in determining the recreational carrying capacity of the Basin. Not only will their concerted efforts enhance existing opportunities but they will also open the door for new recreational pursuits. Presently the recreational planning efforts of various agencies have been isolated from each other, and the goals and objectives of these efforts frequently reflect the agencies biases.


Salmon River floaters were asked to answer a questionnaire that solicited their attitudes toward wilderness river recreation experiences and management. Factors relating to health and physical fitness, adventure, awareness of nature, communion with nature, and wilderness preservation were viewed favorably by nearly all respondents. Intensive management practices such as developed campsites, gravel roads and trails, picnic tables, garbage cans, and allowing power boats were rejected by almost all respondents.


Paper contains list of anticipated impacts from increased river use and recommendations for permit system to assist in mitigating impacts. Provides example of information and stipulations which are given to river users. Discussion is generally superficial.

U.S. DEPARTMENT OF THE INTERIOR

This publication compiles recreation area and facility space standards currently being used by many organizations throughout the U.S. Includes standards for trip canoeing and rivers, extended hiking trips and hiking trails. Includes a bibliography of 135 sources.

Utter, (Jack G.) Wilderness and Wild River Carrying Capacity Management
A proposed Case Study of Use Permit Allocation on the Middlefork of the Salmon River. Views Review Company Moscow Idaho 1976


Describes results of a study on individuals participating in commercial float trips on the Snake River in Grand Teton National Park. Regression analyses were used to identify independent variables that affect user satisfaction (seeing other rafts, man-made developments, interpretive talks, wildlife, etc.). Visitor satisfaction was high with respect to natural scenery, interpretive talks, wildlife, floating scenic waters, and relaxing on the trip. Seeing other rafts and crowding were somewhat neutral. Seeing man-made developments was a negative factor.

Describes efforts by the Forest Service to limit float-trip use since 1972 on the Middle Fork of the Salmon River, Idaho. Notes the problems of finding equitable means of allocating permits between commercial and noncommercial parties and dealing with people without reservations.


Best, Neil E. An ecologist's thoughts toward determining the recreational carrying capacity of white-water sections of the Upper Colorado River Drainage.

E. RECREATION MANAGEMENT AND RESEARCH METHODS


Thirteen Mile Woods is a highly scenic strip of forest land along the northern reaches of the Androscoggin River in New Hampshire. A survey of its visitors--canoeists, kayakers, picnickers, campers, fishermen, and snowmobilers--indicated their desire to maintain the area in its undeveloped condition. Land capability and administrative viewpoints indicated the same minimum development. Design capacity is discussed as a management concept for this land and river corridor.


Outlines the history of increasing interest in public recreation lands in the United States. Notes that conflicts in priorities arise, especially in the western States, between recreation and consumptive uses. Stresses the need for recreation planning that will balance such conflicts and will maximize inherent benefits of wildlands. Cites current research that will facilitate such planning: ecological studies, carrying capacity research, and human behavior studies.
Information inputs to making decisions about recreational use of rivers are described. Major recreational decisions and possible inputs to them are identified. A future scenario for recreational use of rivers is given and the needed research on information inputs is identified within the context of the scenario.


ON-SITE INTERVIEWS WITH 287 CAMPING GENERAL GROUPS, PLUS OBSERVATION


Recreation researchers have a variety of social research tools available to them. Often, however, the application of alternative tools in studying recreation issues is inconsistent with the strengths and weaknesses of the procedures. Alternative research strategies are discussed in terms of their ability to provide information to answer basic questions about recreation users and recreation problems. Implications for planners, managers, and policymakers are addressed.

Couch, Robert E. "Attitudes of Decision Makers Towards Development of an Urban River Park" Dept. of Recreation and Parks, Texas A & M University 1974

Dramatic increases in river recreation use make it mandatory for managers to utilize the latest knowledge for preventing site degradation and maintaining a desired experience. Suggests that such innovative management as scheduling use, hardening sites, and improving human waste disposal, can make it possible for a Wild and Scenic River Area to support more people without lowering the visitor's experience or the environmental quality.


Settlements and developments along the Snake River have harnessed large sections of the river for hydroelectric energy. Impoundments and dykes have likewise altered its channel and stream flow. Rivers are dynamic and they often change in subtle ways, such as the type of recreation use and users and the man-made structures along rivers. Scientific, informed approaches are needed to classify, evaluate, and manage rivers. Outdoor recreation experiences are influenced by both the uniqueness of the water resource and the quality of recreational experiences. Steps to integrate river recreation management into public planning for an entire river basin are suggested.


Goetz, Hank.
1977. A COOPERATIVE APPROACH TO RIVER MANAGEMENT: THE BLACKFOOT EXPERIENCE.

Describes the problems between landowners and recreationists associated with increasing recreational use of the Blackfoot River in Montana and the development of a solution through ad-hoc local planning. The cooperative recreational management plan devised is evaluated satisfactorily and offered as an approach to the management of other rivers with large proportions of private riparian ownership.

HIGGINS, JOSEPH F.
1977. A VISITOR DISTRIBUTION PROGRAM FOR THE BOUNDARY WATERS CANOE AREA.


Describe the response of private enterprise to the growing interest in river recreation—(1) increase in the number of outfitters, (2) increase in watercraft and gear production, (3) increase in the literature about the sport, and (4) increase in number of services that are provided the river-using public.
HYRA, RONALD.
1978. METHODS OF ASSESSING INSTREAM FLOWS FOR RECREATION.
INSTREAM FLOW INFORMATION PAPER 6, 16 P. + APPEND. USDI.
FISH AND WILDL. SERV., COOPERATIVE INSTREAM FLOW SERVICE
GROUP, FORT COLLINS, COLORADO.

DEScribes 2 techniques developed for performing recreation
instream flow studies. A simpler cross section method
provides a minimum flow recommendation for boating
activities making use of the river. A more sophisticated
incremental method may be used to develop recommendations
regarding stream flows required for various types of
recreation or to provide a recreational analysis of any
stream flow. Provides stream flow suitability criteria for
different activities for both methods.

IRVINE, RUSSELL, AND GARY SEALY
1971 A bibliography of selected topics related to park and
recreation planning and management. 187p., 29 chapters.
Ontario Dep. Lands and Forests, Parks and Recreation

Most relevant chapters include: "Beach and Lake Management";
"Carrying Capacity"; "Interpretation"; "Nature Trails and Centres"; "Park
and Recreation Systems Planning"; "Wildland Management"; and, "Wildlife
Management". This bibliography is annotated.

Jaakson, Reiner. "Planning for the Capacity of Lakes to
Accommodate Water Orientated Recreation." Plan Canada,

JAMES, GEORGE A.
n.d. Bibliography on recreation use sampling techniques. South-
eastern For. Exp. Sta., Asheville, N. Carolina. USDA For.

1973 An annotated bibliography of selected references relating
to physical and biological recreation site management. 17p.
(mimeo.). Southeastern For. Exp. Sta., Asheville, N. Caro-


Summarizes advances in existing techniques to quantitatively determine the demand for recreational opportunities and to estimate the value of such opportunities. Previous attempts to quantify recreational demand used projection models based on population, average income, and distance traveled to recreation sites. Some ways to estimate recreational values have been the market value method, cost method, willingness to pay, and gross expenditures method.


Identifies increasing use of backcountry rivers and the associated social and environmental problems. Urges sociological research on three topics: (1) how patterns of river use and characteristics of users vary within and between rivers; (2) how current and potential users define a high-quality river recreation experience; and (3) kinds of management techniques needed to increase user enjoyment and decrease resource damage.

Unedited draft copy not for general circulation. Reviews topics related to river recreation requiring further investigation.


PRESENTS THE RESULTS OF AN EFFORT BY THE SUPERIOR NATIONAL FOREST IN NORTHERN MINNESOTA TO USE INFORMATION AS A VISITOR MANAGEMENT TECHNIQUE. A BROCHURE DESCRIBING PAST USE OF THE BOUNDARY WATERS CANOE AREA WAS SENT TO A PORTION OF THE PREVIOUS YEAR'S VISITORS BEFORE THE USE SEASON. FOLLOWING THE USE SEASON, QUESTIONNAIRES WERE SENT TO A SAMPLE OF THOSE RECEIVING THE BROCHURE TO EVALUATE ITS EFFECTIVENESS IN REDISTRIBUTING USE. RESPONSES INDICATE THAT THE INFORMATION DID INFLUENCE USERS TO AVOID CROWDED AREAS AND PEAK USE PERIODS. CONCLUDES THAT INFORMATION SUPPLIED TO VISITORS WELL IN ADVANCE OF THE USE SEASON CAN BE AN EFFECTIVE TOOL IN REDISTRIBUTING WILDERNESS USE.


Three research problem-areas emphasizing social or people problems on rivers are described: (1) how patterns of river recreation use and characteristics of users vary on individual rivers, between different rivers, and with time; (2) how current and potential users define quality river recreation experiences; and (3) how patterns of river recreation use can be modified.

LIHE, DAVID W.
1977. WHEN THE WILDERNESS GETS CROWDED . . . ?

SUMMARIZES TRENDS IN THE USE OF THE BOUNDARY WATERS CANOE AREA IN NORTHERN MINNESOTA SINCE THE ADVENT OF THE WILDERNESS PERMIT IN 1966. ALSO GIVES SOME RESULTS OF RECENT STUDIES FOCUSING ON VISITOR ATTITUDES AND PERCEPTIONS. DISCUSSES MANAGEMENT ALTERNATIVES TO OFFSET THE WIDESPREAD CONGESTION AND GENERAL LOSS OF SOLITUDE FELT BY MANY VISITORS. DISCUSSES THE CONFLICT BETWEEN MOTORIZED AND NON-MOTORIZED TRAVEL THAT IS PREVALENT IN SOME PARTS OF THE BWCA.


Author feels growing use is the heart of the management problem. Research thus far has been either ecological or social. A few studies are footnoted relating to each of the two areas. The article concludes with an emphasis on the need for a broader spectrum of wilderness opportunities to cover a range user demands. A very general, informal discussion.


This is a brief, general overview of the applications for simulation models in the management of wilderness areas. It describes four main components to the models: (1) route networks; (2) user characteristics; (3) user-route interactions; and (4) user-user interactions.


Describes agency responses to the increasing demand for white-water recreation, development of management plans, and why planning and public involvement are needed. An example of conflicting interests and resulting political pressure is given.


"Reports on a study to determine the physical condition of campsites within the Boundary Waters Canoe Area and to help in the selection of future sites. Measurements were taken of various physical parameters at over 100 sites. Results for island and mainland sites and onroute versus offroute locations are given."


Excellent paper providing a model for the determination of recreational carrying capacity limits on wild rivers. Model relies heavily upon a definition of legislatively derived management objectives. Factors considered include: resource characteristics; management objectives; and the visitor's perceptual definition of expected experiences.

The utility of three approaches to the definition of management strategies are evaluated - space inventories, ecological impact studies, and social-attitude studies. Weakness in each approach are outlined and a basis for making the concept of acceptable limits of change is forwarded. Procedure is based on surveys of users whose values are compatible with institutionalized resource definitions.


This paper, presented on 11 February 1976 at the Interagency Whitewater Management Conference held in Salt Lake City, Utah, describes a model for predicting congestion levels and encounter frequencies in wilderness travel. Input required includes number of groups, group size and type by access point, day of the week, and time of day; average travel time for each trip segment; and average duration at stopping points. The model was adapted for river recreation management, and applied in a study of recreational float boating on the Green and Yampa Rivers in Dinosaur National Monument. The effects of 3 alternative policies on average number of encounters, probability of camping near other groups, and occupancy rate at Jone's Hole Campground were examined. Equalizing daily entrance rates produced a slight increase in encounter rates and a great increase in occupancy at Jone's Hole. Replacement of primitive camps by 2 developed ones slightly increased encounters, greatly reduced Jone's Hole occupancy, and did not affect the probability of camping near other groups. Increasing floater use by 25 per cent increased encounter rates by a similar fraction, increased Jone's Hole occupancy to near maximum, and had only moderate impact on the probability of camping near other groups.


Accelerating use of free-flowing rivers for recreational floating has led many managers to set visitor use limits. The Wilderness Area Simulation Model was modified to predict patterns of river recreation use occurring under a variety of use conditions and was tested on the Green and Yampa Rivers in Dinosaur National Monument for the week of June 23-29, 1975. The “Base Case” simulation and actual patterns of use were compared and were found to be in close agreement. A variety of experiments, such as changing daily entry rates and opening and closing campgrounds, were simulated.

NEW YORK STATE PARKS AND RECREATION AND NEW YORK STATE DEPARTMENT OF TRANSPORTATION. 1975. NEW YORK STATE CANAL RECREATION DEVELOPMENT PROGRAM. 104 P. NEW YORK STATE PARKS AND RECREATION, NEW YORK.

DESCRIBES THE NEW YORK STATE CANAL RECREATION DEVELOPMENT PROGRAM IN WHICH AN INTERCONNECTED STATEWIDE SYSTEM OF CANAL PARKS AND TRAILWAYS WILL BE DEVELOPED USING THE EXISTING AND ABANDONED CANAL SYSTEM. DISCUSSES POLICIES, POTENTIAL RECREATION ACTIVITIES, AND DEVELOPMENT AND OPERATION PLANS. PROVIDES A GUIDE TO ALL THE PROPOSED AND EXISTING PARK AND TRAIL PROJECTS ALONG THE CANAL SYSTEM.


Management issues relating to amount and kind of river-running use on the Colorado River in the Grand Canyon were investigated in 1975. Results show that use levels affect number of inter-group contacts, but number of contacts has little effect on perceived crowding or user satisfaction. Describes probable effects of an increase in oar trips.

Examines the impact of USDA Forest Service and National Park Service regulations on the market structure of commercial float trip companies under their respective jurisdictions. Discusses price and quantity aspects of demand and differences in regulations.

PETE RSON, GEORGE L

Discusses the development of a computer model of the travel process in the Boundary Waters Canoe Area and Quetico Provincial Park. Describes how the model is used by managers as a policy-planning tool to develop entry point quotas for the visitor distribution systems of these areas. Also describes how wilderness travel in these areas is controlled by a method of daily entry point quotas.


Scheduling recreation in wilderness areas is explored through mathematical modeling. A river system for recreational float trips is used as a hypothetical example.


Includes papers by managers and researchers on the issue of carrying capacity of whitewater rivers in the canyon country of Utah. Includes articles on the concept and meaning of protected wildlands, the physical resource and social determinants of whitewater recreation, and social inputs to carrying capacity decisions.
A three-phase study was conducted during 1974 in an effort to evaluate the needs and problems associated with canoeing in Ohio. The first phase was to gather information about other States' canoe programs to serve as a source of data on manager's viewpoints of how river recreation use and users should be managed. Phase two was to survey 1,000 Ohio canoe owners to identify their attitudes about management alternatives to problems of increased canoe use on Ohio's rivers. The final phase was to review and analyze phases one and two. Results of phase three identified the following alternatives to control use on the State's rivers: institute a permit system, increase the number of facilities and access points along some rivers, provide more campsites along rivers, and publish a "Guide to Ohio's Canoe Trails".


Whitewater river recreation management is used as an example of use restrictions in response to crowding problems in wildland recreation. Reviews the problems and successes of recreational use restrictions on whitewater rivers and the differences between use limitation strategies in river and terrestrial situations. Concludes that wildland recreation use regulation is necessary to preserve experiences as demands increase.
Canoeists used the Pine River in Michigan. They enjoyed the rapids and the wild, natural shoreline appearance and objected to littering and crowding. The present level of weekend and holiday use apparently satisfies the diversified desires of most canoeists. However, reduction of numbers or more even distribution during the day would increase the quality of experience and lessen the resource impact. Canoeists requested modest additional facilities but expressed little concern about severely eroding streambanks and a dam they had to portage around. Clear management implications include: (1) a plan to keep the stream environment "natural"; (2) implementation of a litter reduction program involving provision of more refuse containers, a requirement that all material carried in the canoe be either secured or floatable, and a banning of cans, bottles, and other non-burnable containers. Management options dealing with regulation of canoe numbers presents a problem because of conflicts between user groups such as fishermen vs. canoeists or canoeists out for a group outing vs. canoeists seeking solitude; and because an optimum level of use must be established first, in relation to the quality of the environment.


The paper suggests that wilderness managers can regulate ecological and social impacts by implementing one or more of five basic rationing systems. The author reviews reservations, fees, queing, lottery, and merit systems and points out the advantages and disadvantages of each. Guidelines for managers to help minimize the effects of "regimentation" are also discussed.


Suggests that the two equal and essential components that the river recreation planner must consider in decision-making are the managed space and the user who will inhabit that space. Believes use conflicts arise as the result of territorial interests of citizen groups. Notes that although the conflict between specific recreation users can never be fully resolved, the resource manager can adopt certain attitudes and actions to mitigate the conflict.


USDI. Manual for Management of Wild and Scenic Rivers (Draft) 43 CFR 6223 0-3(a)


This questionnaire is being used as a tool to further river recreation management research at the North Central Forest Experiment Station.


Considers the legal issues that may be associated with use allocation on backcountry recreational rivers. The basic authority of land management agencies is discussed and 3 legal topics that affect the authority of an agency to manage and allocate river use are reviewed: (1) navigability, (2) public rights doctrine, and (3) federal public rights.


Paper describes and illustrates a Markov - based linear - Programming method for predicting and analyzing travel in the Boundary Waters Canoe Area. The management problem the method deals with is controlling the rate of entry of travellers into the wilderness through various entry locations so as to avoid unacceptable congestion in the interior. A mathematical description of the travel model is provided. The management problem is explained and application of the model to the problem is discussed.

"Development Planning for Water Resources," Robert D. Dean and Carolyn Wilson, Division of Urban and Regional Studies, Memphis State University, December 1970. 69.


Discusses the Visitor Distribution Program implemented in Quetico Provincial Park of Ontario, Canada in 1977. Evaluates the effectiveness of the program in improving visitor distribution by controls on wilderness use levels and user activities.
This report first discusses general trail concepts. Next an inventory of trails over five miles in length is reviewed and the present and future demand for various trail types is discussed. Categories of trails defined include: hiking trails, nature trails, wilderness trails, canoe trails, horse trails, biking trails, snowmobile trails and ski trails. Any single trail classification may have a multiple use designation. General thoughts on trail development and certain technical data related to the development and maintenance of trails are presented. Potential long multiple use trail corridors are suggested for further research. Several recommendations are made relating to the development of trails in Wisconsin.


Details the history of Menominee Indian's management practices and use of the Wolf River in northeastern Wisconsin. Discusses land tenure changes, State leasing of land for public access and use, and current conflicts over inclusion of Wolf River in the National Wild and Scenic River System.


Describes recreation opportunities on rivers in the Hiawatha National Forest of the Upper Peninsula of Michigan and gives a brief history of land use. Notes Forest Service multiple use management techniques employed in three use zones of the Forest: general forest, travel influence, and water influence.


Examines issues surrounding river protection in the United States and proposes action alternatives for improving and strengthening river protection and conservation. Provides case studies on the Suwanee River in Georgia and Florida and the Housatonic River in Connecticut and Massachusetts.


Easements are being purchased by the U.S. government from persons owning land within the Clearwater component of the National Wild and Scenic River System. Describes a contract system which is entered into by the Forest Service and the land holder along the easement.


Proposes a zoning system based on grouping those activities that exhibit similar density requirements and speed characteristics. Defines three activity zones: (1) a Shoreline Activity Zone, (2) an Open Water Zone, and (3) a Wildlife Zone. Guidelines for implementing the system are noted as are some of the legal, administrative, and ecological constraints that will necessitate certain alterations in the application of the model to different water bodies.


Discusses the concept and values of wilderness and the Canadian attitude toward wilderness. Outlines what the author feels would constitute a reasonable approach to the satisfaction of wilderness demands, needs and values in Ontario: (1) suggests allocation of 3% of Ontario as wilderness and nature reserves (1/3 national parks, 2/3 provincial primitive parks and nature reserves, and primitive or natural zones in natural environment parks); (2) suggests that recreation be given primary consideration in planning forestry operations in multiple-use zones in natural environment parks, wild river parks and recreational reserves; (3) suggests that timber licenses be retired in provincial parks and a system similar to U.S. National Forests be set up; (4) suggests the development of wilderness travel routes over wide areas of the province in areas allocated to timber and mining where recreation would be a secondary use.


Stresses the need for clarifying problems faced by multiple-agency management of rivers. Suggests that universities take an active role in river research and identifies four general areas needing investigation: (1) environmental problems; (2) carrying capacity (the establishment of limits, management, and the results of management); (3) commercial and non-commercial uses and demands; and (4) jurisdictional arrangement (functional, geographical, agency).


Planning and management techniques for river corridors in multiple ownerships are described. The lower St. Croix National Scenic Riverway between Minnesota and Wisconsin is used as an example.

Discusses problems of management and some possible solutions in the BWCA. Includes such topics as: (1) needed research; (2) water pollution (restrictions on disposable containers, detergents, use of leaded gasoline, and development of a latrine which allows no leaching of waste); (3) management of vegetative cover (protection, fire, logging); (4) use restrictions (length of stay, size of parties, designated sites only, advance user reservations, specific routing, total number of people, reduced motor use, reduced snowmobile use, improved and/or reduced access points, rest rotation of campsites, closure and/or development of additional campsites, reduction of mechanized portages); and, (5) wildlife management.


Briefly discusses the historical significance of the Little Miami River in southwest Ohio. Describes the processes that a nonprofit organization, Little Miami, Inc., undertook to rally support for protection of the River. Provides examples of accomplishments by the organization, individuals, and public agencies to protect the River.


Offers guidelines for developing lake zoning ordinances and regulations. Provides administrators an understanding of the ecological problems involved in management of lakes for recreational purposes. Discusses the character of lakes, lake uses and activities, development cycle for lakes, space requirements for various uses, and the various means of regulation and control.


Describes the evolution of the Interagency Whitewater Committee in the West, its present functions, and the potential of such agency coordination for the future (in the East and the West). Emphasizes the need for considering a regional approach to river management.
G. SELECTED RIVER MANAGEMENT PLANS


Summarizes a plan for State control of the Allagash River. Objectives of the plan are to outlaw the use of motors on boats and canoes, limit the use of aircraft in the area, restrict the size and location of campsites, confine timber harvesting operations to an area 300 feet from the river bank, forbid new public access roads within the waterway, and restore historical sites along the River for recreational use.


Present guidelines for white water river management developed by a committee composed of representatives from the Bureau of Land Management, National Park Service, U.S. Forest Service, and U.S. Coast Guard. The guidelines presented include: use limitations and allotments; regulation of commercial and private operations; operational requirements; public health and safety; and standardized permits.


Purpose of study was to determine reaches of the Nooksack River best suited for various types and intensities of recreation use (preservation, intensive and extensive). Development of the recreation plan for the river involved five steps. First an inventory of physical, cultural and aesthetic features along the river was carried out. Second, the study area was broken into segments based on visual corridors, watershed parameters, channel patterns, and geographic features. Third, the presence of 55 natural, cultural, and aesthetic variables along reaches were recorded. Fourth, river characteristics concerning "landscape integrity" were qualitatively evaluated. Indicators used were uniqueness, diversity, fragility, seasonality, and human encroachment. Each of the indicators were evaluated against appropriate variables. (This procedure which provides the basis for the planning recommendations is not methodologically rigorous). Lastly, recommendations concerning types and intensities of use were forwarded for each segment of the river.


Describes tubing activities and high-density use on the Apple River near Somerset, Wisconsin. In 1971, an estimated 5,000 persons per hour floated on inner tubes down a short stretch of the Apple River. Concludes current overuse requires user control and management. Delineates a means of correcting the overuse problem through a method of self-management by the users.

Abstract: The Little Miami was one of the several important natural rivers mentioned in federal legislation for wild or scenic rivers. This report is a planning proposal for the river. The river classifications proposed for the Little Miami River include two Wild River Sections, one Scenic Recreation River class, and one Urban River class. The report includes recommendations concerning historic site and recreation development, preservation, land acquisition and funding. Appendices include: "water quality criteria for aquatic life and recreation", "survey of opinions concerning preservation, among residents of the Little Miami Valley", and "proposed criteria for classifying wild rivers, scenic recreation rivers and urban rivers".

Keywords: Waterway Planning, Land Acquisition, Waterway Classification, Waterway Preservation, Ohio, Scenic Rivers, Recreational Rivers, Urban Streams, Water Quality Criteria, Recreational Potential, User Attitudes.


Identifies the environmental resources on the St. Croix River in Wisconsin and Minnesota that are worthy of preservation/restoration, and suggests methods to optimize management of the resources. Evaluates type and density of recreational use in the area and relates it to present facilities and management goals. To increase the tax base of the area, the private sector is encouraged to develop support facilities compatible with wild and scenic river status.


Supplements the initial report. Contains information on shoreline controls, existing and proposed recreation facilities in the St. Croix-Namekagon area, and physical characteristics of the area.

Texas Parks and Wildlife Dept. Pathways and Paddleways conducted by Wayne D. Oliver, Clyde M. Beggs, Candy Ashier Finney, Ron Thuman under the direction of Ron D. Jones, Director of Planning, Austin, Texas 1971 50p. Copy location ARC

Document provides recommendations pertaining to recreation, range, timber, water, wildlife, soils, wilderness, minerals, land-use, transportation, fire control, and insect and disease control. Recommendations are of interest but lack substantiation. Plan approved in 1973 and is currently being revised.


Plan deals with a variety of management problems, along a ten mile reach of the Salmon River. Identified management problems include: use allocation, fishing (conflicts between fishermen and floaters, impact on anadromous fisheries), location of lunch stops, camping, sanitation, safety. Recommendations pertaining to the above are included.

USDA - Forest Service. n.d. "Illinois River Study: Alternatives for Inclusion into the Wild and Scenic River System:"

Public participation information brochure presents five alternatives to the rivers inclusion in the Wild and Scenic River system. Various social, economic and environmental implications are outlined for each alternative.

The plan provides: 1) an analysis of recreation resource, current and future supply-demand relationships, and recreational opportunities along the river, 2) evaluation of existing and future needs regarding management facilities and personnel, and 3) a discussion of recreation management provisions. Although the plan is directed primarily towards commercial rafting, it is of use due to the careful documentation of all recommendations.


Document provides a management plan for whitewater boating on a 47 mile reach of the Selway River from Paradise gauge station to Selway Falls. Provides a system for inventorying and classifying river campgrounds based primarily upon maximum campground capacity. Contains detailed discussion of floating requirements and conditions for commercial raft operators. Appendices include information brochure for private river users, discussion of hypothermia, and procedures for search and rescue.


Good discussion of recreational use characteristics and site capacity along the canyon. Develops basis for determination of capacity limits through consideration of: 1) management objectives, 2) visitor attitudes, 3) impact on physical resources, and 4) physical site limitations. Visitor attitudes were ascertained through a user preference survey.


Summarizes the discussions of State and Federal resource administrators responsible for river planning and management in the Northeast. Important topics discussed were: (1) the river study process; (2) the river designation process; (3) the development of a river management plan and implementation process; and (4) status of the National and Wild Scenic River System.

Deals with the problem of equitable allocation of use permits to private and commercial river users.

Includes regulations regarding boat specifications, required equipment standards for commercial raft operators, and pertinent park regulations (campsites, fire, water, access). Section on private users (canoes and kayaks) discusses policy regarding approved boats, experience required, party size and equipment.

Summary of management policies upon legislative approval.

Document is presented in four parts.
Part one deals with public safety under three areas - education, search and rescue, and detection and elimination of hazards. Parts two and three deal with services and facilities respectively. Part four discusses aspects of visitor management designed to direct the recreationists behavior or actions. The section deals with the establishment of carrying capacity limits, co-ordination of diverse government agencies to assist realizing goals, and types of intensities of recreational use.


The Buffalo River in Arkansas was designated as a national river in 1972. Report gives a description of accessibility, the watershed, river hydrology, morphology and "Floatability", and natural history. Applies U.S. National Parks land classification system along shorelands within national river boundary. Develops visitor use and resource management plans within constraints of land zones.


Comprehensive plan with clear definition of management objectives and factors affecting management strategies. Report also contains detailed policy and operation guidelines. Appendix contains good section on required visitor regulations.


Provides management policies and operations decisions relating to types and intensities of use and required visitor services. Some discussion of use capacities is included.
U.S. Forest Service
Inventory of physical, environmental, historical, archeological
and recreational assets; management objectives, ressource problems
and impacts and future recreational needs
Copy location: ARC Lib

US Bureau of Land Management
Vernal District River Management Plan-Green River:
from Flaming Gorge Dam, Colorado to
Utah, 40p.
Copy loc ARC Library

USDI Upper Missouri Wild and Scenic River Management Plan
Final Report Supplement, Dept. of the Interior Bureau of Land
Management. 159 p. Lewiston, Montana.
Copy location ARC library

USDI, Upper Missouri Wild and Scenic River Management Plan
Final Report, USDI Bureau of Land Management 76p
A management plan for the Upper Missouri Wild and Scenic River
Copy Loc. ARC library.

USDI Bureau of Land Management
Laguna - Martinez Management Plan Draft,
Yuma District Office, Yuma Resource Area, Yuma
Copy loc. ARC Branch

USDI Bureau of Land Management,
Ehrenberg - Cibola Management Plan.
Yuma District Office, Yuma Resource Area
Yuma, Arizona. 1975.
Copy location ARC Branch

USDA
Salmon River North fork to the Nezperce Forest
Copy Location ARC library

USDA Forest Service, River Plan Rogue,
Copy loc. ARC library

USDA Forest Service, Draft Wild and Scenic River Study, Tuolumne County,
California.
U.S. National Park Service
A Master Plan for the Proposed Voyageurs National Park
Planning, Canoe Routes, Kabetogama Peninsula, fur trade, natural features 1968
U.S. Dept. of Interior
National Parks Service
Washington, D.C.
ARC Library

U.S. State of Minnesota & Wisconsin
Wild Waters of the St. Croix:
A plan for Preservation and Management.
Location ARC Branch

copy location: ARC Branch 22th floor

USDI, St. Croix Master Plan National Scenic River—National Scenic Riverway. Minnesota, Wisconsin
location ARC 11b.

USDI, St. Croix final Master Plan—National Scenic Riverway
Oct 1976 59p
location ARC Branch

USDI, Lower St. Croix Final Master Plan—National Park Service
State of Minnesota & Wisconsin Feb. 1976 80 p
Location ARC Branch 22th floor
U.S. Department of Interior, National Park Service, 1976, Lower St. Croix final master plan p. 79
States of Minnesota and Wisconsin.

USDI, National Park Service,
Draft—Colorado River Management Plan
Grand Canyon National Park Oct 1975 p. 23

USDI, National Park Service
Buffalo National River Master Plan
copy location ARC Branch

USDA, Forest Service
River-Plan Middlefork of the Feather
copy location ARC Branch
Copy location ARC library 22th floor

USDA Forest Service Middlefork of the Clearwater including the Lochsa & Selway River Plan.
Location ARC Branch 22th floor

Copy Location ARC Branch 22th floor

Copy location ARC Branch 22th floor

USDA A Design for Wild & Scenic Rivers Middlefork Clearwater Selway House. 35 p
Location ARC Branch 22th floor

Deboer and Co.
Denver, Colorado 80200

Orange County General Planning Program Santa Anna River – Santiago Creek Greenbelt Plan
Orange County General Planning Program 211 West Ana Blvd.,
Santa Ana, Calif. 92701

Final Environmental Statement, USDI
Ministerial lib 14th QH 76.5.A4 US8

Ministerial lib 14th floor QH 76.5.A4 452
Ministerial lib. 14th CB 126 A445  
Archaeological reference Cited p. 48

**National Park Service Wilderness Recommendation; Buffalo National River, Arkansas, March, 1975. 54p.**  
copy location ARC Branch.


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**USDI Bureau of Outdoor Recreation**  
Study Report on the Wolf River, Wisconsin. prepared by the Lake Central Regional Task Group  
Sept 1964  
copy location ARC library

copy location ARC library

**U.S. Bureau of Outdoor Recreation**  
The Middle Missouri, A Rediscovery: A study of the Outdoor Recreation Potential  
rivers, recreational resources, regional planning, historic sites, national recreation areas, legislation, federal-state co-operation 1968  
U.S. Government Printing Office  
Washington 20402  
104 pp  
$1.25 1

**U.S. Bureau of Outdoor Recreation**  
heritage area studies, cooperative planning, natural resources, legislation, maps, tables 1968  
U.S. Govt. Printing Office  
Washington, D.C.  
20402  
ARC library  
98 pp $1.00
US Alaska Planning Group USDI
Forty Mile National Wild and Scenic River, Alaska
Final Environmental Statement.
copy location ARC Branch
Ministerial lib 14th QH 76.5.AY U54

US Alaska Planning Group
Ministerial lib 14th QH 75.5.A4 454

US Alaska Planning Group
Proposed Yukon Delta National Wildlife Refuge, Alaska Washington,
1974 550p
Ministerial lib 14th QH 76.5.A4

USDI Draft report on a study of the Youghiogheny River a possible
addition to the National Wild and Scenic Rivers System.
prepared by USDI Bureau of Outdoor Recreation, december, 1976. 85p
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U.S. Dept. of Interior
Bureau of Outdoor Recreation
Washington, D.C.
Little Beaver Creek, Ohio
Scenic River Report
National Wild and Scenic Rivers System,
Recommendation for Inclusion.
Dec. 1975

USDI The Upper Mississippi, A wild and scenic River Study
field level report informal review, draft, August 1976
USDI Lake Central region 3853 Research Drive, Ann Arbor
Michigan 275p
location ARC Branch

USDI Osark Rivers National Monument; A proposal.
copy location ARC Branch

USDI National Park Service, Proposal; Buffalo National River, Arkansas
1968 24 p
copy location ARC Branch

USDI Wild and Scenic River Study Upper Mississippi River, Minn.
Bureau of outdoor recreation sept. 1977 Washington 215p
location ARC Branch
Use along the section of the river under consideration is largely limited to short half-day float trips. Document contains a discussion of impacts of heavy river use on the natural and recreational environment. Alternate management strategies and the implications are described in some detail. The alternate strategies include: 1) no further action; a) active promotion and increased development of facilities; 3) limiting use and undertaking intensive management; and 4) management of river flood plain lands as a wilderness area.


3. LEGISLATION AND POLICIES GOVERNING HERITAGE RIVER RESOURCES
A. CANADIAN LEGISLATION AND POLICIES


Abstract: Proposes that B.C. should protect Wild, Scenic and Recreational Rivers through legislation that broadly adopts the American three-class concept with some slight modification. Outlines the criteria and recreational use for each of the three classes. The Gitndoix River (a tributary of the Skeena) is proposed as a Wild River; the Chilko-Chikcotin (a tributary of the Fraser) as a Scenic River; and the Cowichan (on Vancouver Island) as a Recreational River. The characteristics of each river to warrant their classification are discussed.

Keywords: Wild Rivers, Scenic Rivers, Recreational Rivers, Waterway Classification, Waterway Preservation, British Columbia.


Abstract: This illustrated booklet presents a general view of the present extent of national and historic parks in Canada. The location and number of Canada's scenic land routes, major historic water routes and major historic land routes are illustrated. Outlines the idea of extending the present parks system to include such park types as canal systems, national marine parks, national landmarks, and wild rivers. Additional new initiatives include historic waterways, historical land trails, and scenic and historic parkways. In this overall National and Historic Parks plan is envisioned a national system of varied types of parks distributed throughout Canada, providing for numerous recreational activities and purposes.

Keywords: Waterway Preservation, Waterway Classification, Canals, Historic Waterways, Canada.

Parks, Canada, has created a new Program—Agreements for Recreation and Conservation (ARC) to ensure the preservation of a broad range of human and natural heritage resources and to meet the changing leisure-time needs of Canadians. Describes the ARC Program and its charter to identify, plan, preserve, develop, and manage historic waterways, historic land trails, wild rivers, and heritage areas.


Discusses the historical role of rivers and river development in Canada, and future development threats to remaining free flowing rivers. Describes the wild rivers survey of Parks Canada and the river policies of the provincial governments. Notes some of the problems involved with wild river preservation in Canada.


Provision for wild river preservation at the provincial level is in its infancy. Though Ontario has established 5 wild river parks by order-in-council, protecting a minimum 400 foot corridor on either side of the river from development, it has not yet prepared any master plans for these areas. Interest in the development of all types of trail systems, including wild rivers, has grown as a result of federal-provincial parks conferences; New Brunswick, Alberta, and British Columbia are moving toward the sort of trail system planning which Ontario is presently developing. While provincial objectives tend to favour development of wild rivers to accommodate increasing demand, federal programmes emphasize preservation and protection from development pressures. The Sierra Club and other conservation groups are currently applying public pressure for protection of such rivers as the Missinaibi in Ontario, major portions of the Churchill in Saskatchewan and Manitoba, and portions of the milk and South Saskatchewan in Alberta.

Proposes that B. C. should protect Wild, Scenic, and Recreational Rivers through legislation that broadly adopts the American three-class concept with some slight modification. Outlines the criteria and recreational use for each of the three classes. The Gitndoix River (a tributary of the Fraser) as a Scenic River, and the Cowichan (on Vancouver Island) as a Recreational River. The characteristics of each river to warrant their classification are discussed. (Abstract from Dooling, 1975).
B. UNITED STATES LEGISLATION AND POLICIES


Data collected from 40 States that have taken recent action to protect natural river systems was analyzed to identify and try to devise methods to overcome the obstacles encountered by State agencies as a result of their actions to establish natural river programs. Four principle obstacles were: (1) opposition of the local community, (2) lack of administrative support from higher levels of State government, (3) competition for the river corridor resources with other uses, and (4) lack of visible constituents to offer support. Methods are suggested to overcome these obstacles. Concludes that no one alternative is a solution for overcoming the obstacles, and that each area should be dealt with individually.


A quick reference guide consisting of two parts: (1) self-explanatory outline of the Act, and (2) legal opinions that answer frequently asked questions about the interpretation of the various sections and phrases of the Act.


Analyzes the effectiveness of a wild rivers bill proposed in the 1965 U.S. Senate. Notes lack of river classification system, specific administrative objectives, and methods for evaluating changes in use patterns and user impacts on rivers. Compares wilderness management legislation with proposed river legislation.


The theme is the almost incredible multiplicity and the complex interrelation of overlapping governmental controls and private lawsuits affecting rivers and streams in the East. A basic formula or approach to help identify, understand, and distinguish these interwoven legal control mechanisms is presented. Certain basic principles, cases, and authorities are incorporated into fable form based upon Siegfried's Rhine Journey.


Entire section devoted to the implications of the Federal Water Pollution Control Act Amendments of 1972 to parks, recreation, and the leisure services delivery system.
The circumstances that led to the passing of the Wild and Scenic River Act in 1968 are reviewed. Also, the legislation that has been considered and passed with respect to adding rivers to the National Wild and Scenic Rivers System is discussed.


Reviews the 1965 court case, Colorado River Water Conservation District versus Rocky Mountain Power Company, in which the District sought to specify rates of flow necessary for fish life in order to prevent further water diversion by the Company. Colorado Supreme Court denied the District the water rights it claimed based on the decision that the State of Colorado has no legal authority to acquire water rights for fish propagation without making a diversion, such as a retaining pond, from the stream. This decision appears to conflict with a 1937 decision that empowered the District to hold sufficient water from natural streams to preserve fish for the benefit of the recreating public.
Several recent laws—the Water Resources Development Act of 1974, the Flood Disaster Protection Act of 1973, the Disaster Relief Act Amendments of 1974, the Housing and Community Development Act of 1974, and the Federal Water Pollution Control Act Amendments of 1972—will have a major impact on river management. These laws give the Federal agencies that are responsible for water resources planning new and improved authority for managing rivers with multiple purposes with multiple means. A brief summary of the parts of each act relevant to improving the management of river systems in urban areas is given. Opportunities for improving the urban environment, preserving green space and wetlands, and conserving and enhancing wildlife are also summarized.


The Tennessee Valley Authority, in cooperation with other agencies and organizations, has surveyed a number of streams, acquired public access, developed parking and recreational facilities, prepared descriptive brochures, rated canoeing difficulty, and regulated streamflows from its dams. Suggests that providing use, not restricting it, is the agency's present course.


A geographical and recreational description of the St. Croix watershed, including an inventory of recreation sites, general land uses, and ownership patterns is provided. Reviews laws and studies related to recreational use of the St. Croix. Presents selected recreation use statistics.


Ohio Conservation Foundation, Cleveland, Ohio, [n.d.] Your property and scenic easements. p. 17.

Examines the federal legislative mandate to protect free-flowing rivers and notes challenges to be faced in implementing the policy. Identifies research needs for wild and scenic rivers such as the attitudes of public agency personnel, the impacts of use controls on river users experiences, and the methods to assess intangible benefits of river experiences.


Reviews State of Minnesota river management and planning procedures, including the 1973 Minnesota Wild and Scenic Rivers Act that was aimed at preserving rivers for recreation. Discusses the characteristics and potentials of the Kettle and Mississippi Rivers as possible additions to the State's wild and scenic rivers system—both rivers are close to the St. Paul-Minneapolis metro area and are under pressure to be developed.

This article describes implementation of the Minnesota Wild and Scenic Rivers Act of 1973 by the Minnesota Department of Natural Resources. Though the Wild and Scenic Rivers System created by the Act did not initially include any rivers, the Kettle, the Mississippi (St Cloud to Anoka), and the North Fork of the Crow were designated for study. Draft management plans have been completed for the former two. Public hearings are being conducted to review these plans and discuss possible inclusion of the rivers. Descriptions of the history and characteristics of the two study rivers are provided.


Reviews provisions of Minnesota's Wild and Scenic Rivers Act. Discusses ways to preserve rivers through zoning and scenic easements. Notes the importance of effective communication with the public and the involvement of the public in carrying out program objectives.

THE NATIONAL WILD AND SCENIC RIVERS ACT OF 1968 HAD ITS ROOTS IN
RECOMMENDATIONS BY THE NATIONAL PARK SERVICE AND OTHERS DURING
THE LATE 50'S AND EARLY 60'S. A PRODUCT OF MUCH CONTROVERSY, THE
ACT IS DESIGNED TO ESTABLISH A SYSTEM OF RIVER SEGMENTS WHICH
WILL BE PROTECTED AND PRESERVED IN AN UNDEVELOPED OR LIGHTLY
IMPACTED STATE. 8 SPECIFIC RIVER SEGMENTS WERE INITIALLY
INCLUDED IN THE SYSTEM, AND 27 OTHERS IDENTIFIED FOR STUDY AS
PROMISING CANDIDATES. RIVERS CAN BE ADDED TO THE SYSTEM BY ACT
OF CONGRESS OR, WHERE NOMINATED BY STATE GOVERNMENTS AND NO
FEDERAL ADMINISTRATIVE COST IS INVOLVED, BY THE SECRETARY OF THE
INTERIOR. TO DATE, 2 RIVERS HAVE BEEN ADDED BY THE FORMER
PROVISION, AND 3 BY THE LATTER. IN JANUARY 1975 CONGRESS ADDED
29 RIVERS TO THE STUDY LIST. THE ACT RECOGNIZES 3 RIVER SEGMENT
CATEGORIES: WILD, SCENIC, AND RECREATIONAL. THE PROTECTED
CORRIDOR ALONG THE ORIGINAL 8 RIVERS IS LIMITED TO AN AVERAGE
WIDTH OF ONE-HALF MILE. PURCHASE OF SCENIC AND CONSERVATION
EASEMENTS, AS OPPOSED TO FEE TITLE PURCHASE, IS ENCOURAGED AS A
MEANS OF CONTROLLING ACQUISITION COSTS. ESTABLISHED RIVER UNITS
ARE ADMINISTERED BY THE FOREST SERVICE, THE NATIONAL PARK SERVICE,
OR ON RARE OCCASION, BY THE BUREAU OF LAND MANAGEMENT.


Approaches that may be useful in river preservation are presented. The National Wild and Scenic Rivers Act is discussed. The designation process is explained, classification criterion and objectives are presented, and the present status of the System is detailed. State Wild and Scenic Rivers programs are briefly reviewed and a list of State contacts is provided. Examples of local and private preservation efforts are presented as are processes that may be useful in mobilizing the grassroots support needed in a preservation effort.


Analyzes the levels of law the river manager should be familiar with; emphasis is on the recent Federal statutes affecting the use of the Nation's waterways. Also analyzes the effects of determining: (1) the navigability of a waterway, (2) the importance of the reservation doctrine, and (3) the effect of existing and future appropriations on river recreation management.


Order No. 67-11,956


Order No. 7742


Reviews origins of legislation that led to passage of the Rivers Act and formation of the National Wild and Scenic Rivers System. Discusses the importance of acquiring lands along the river to provide a protective river corridor. Also reviews management guidelines established to protect rivers.


Abstract: A summary of the status and action-in-progress of wild river waterway preservation in Wisconsin by state, federal and county governments. Shoreland, floodplain, and public land ownership zoning are important tools in defending the wild river concept; a summary of the status of zoning in counties is, therefore, provided. For example, shoreland and floodplain zoning reserve the flood plain, require setback of housing a minimum distance, provide minimum lot widths and prohibit substantial alteration of vegetation over more than 30 percent of the shore ownership. Lands fronting on the river have a 200-foot-wide aesthetic management zone. The U.S. Federal Wild Rivers Law and State Wild Rivers law are provided in an appendix.

Keywords: Wild Rivers, Wisconsin, Zoning, Waterway Classification.


Presents a brief history of the Wild and Scenic Rivers Act. Comments on the procedures followed to preserve rivers under the Act and the management guidelines followed to protect both the river and its corridor. Riverways that are protected by other Federal legislation, such as the Jacks Fork and Current Rivers in the Missouri Ozarks and the Buffalo River in Arkansas, are also mentioned. The effectiveness of measures used to protect these rivers are briefly compared with measures used to protect rivers under the Wild and Scenic Rivers Act. State scenic river programs as they relate to eligibility requirements for Federal land and water conservation funds are discussed also.

U. S. Congress. Watershed Improvement Programs--Loans. An Act to amend the Watershed Protection and Flood Prevention Act to provide that its loan provisions shall be applicable to certain other projects, and for other purposes. Public Law 468, 86th Cong., 2nd Sess., 1960.


U. S. Congress. Fish and Wildlife Conservation Areas. An Act to assure continued fish and wildlife benefits from the national fish and wildlife conservation areas by authorizing their appropriate incidental or secondary use for public recreation to the extent that such use is compatible with the primary purposes of such areas, and for other purposes. Public Law 714, 87th Cong., 2nd Sess., 1962.


U. S. Congress. Water Resources Planning Act. An Act to provide for the optimum development of the Nation's natural resources through the coordinated planning of water and related land resources, through the establishment of a water resources council and river basin commission, and by providing financial assistance to the States in order to increase State participation in such planning. Public Law 80, 89th Cong., 1st Sess., 1965.


UNITED STATES CONGRESS

Provides for classification and designation of a national system of wild rivers for canoeing, kayaking and rafting in a natural and wilderness environment.


U.S. Congress. Estuaries--Inventory--Study. An Act to authorize the Secretary of the Interior, in cooperation with the States, to conduct an inventory and study of the Nation's estuaries and their natural resources, and for other purposes. Public Law 454, 90th Cong., 2nd. Sess., 1968.


A collection of papers that reviews the Wild and Scenic Rivers Act of 1968, answers the most frequently asked questions regarding the Wild and Scenic Rivers System, discusses complementary State river programs, and outlines methods for implementing the various rivers programs.


Summarizes the main points of the Wild and Scenic Rivers Act, 1968. All or portions of 8 rivers were designated in the Act as original components of the system; 27 other rivers were designated as potential additions and these were protected up to 5 years by moratorium (Congress is considering a proposal to extend it another 5 years). The Act establishes three classifications of rivers: wild river areas; scenic river areas; and recreational river areas. Wild river areas are "those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted." This pamphlet also summarizes the administrative policies and degree of protection as outlined by the Act. A map of the National Wild and Scenic Rivers System is included. (Also see, from USDI, Bur. Outd. Rec. and USDA For. Serv., Wash., D.C. "Guidelines for Evaluating Wild, Scenic and Recreational River Areas.....". 12p. (mimeo.).).


Comprehensive outline of BLM management policy related to Wild Rivers, Scenic Rivers, and Recreational Rivers.

Abstract: This paper has been prepared as a quick reference guide for persons having an interest in the Wild and Scenic Rivers Act. It is divided into two parts: Outline of the Act, and Legal Opinions on the Act. It provides answers to some of the questions that have arisen regarding the interpretation of various sections or phrases of the Act.

Keywords: Wild and Scenic Rivers Act, Waterway Preservation.


Discusses America's wild and scenic rivers and efforts to protect and preserve them. Articles feature: a status report on river preservation and recreation programs; a summarization of various State stream protection programs (key contacts in State government charged with river protection are listed); a review of Federal Wild and Scenic River protection efforts; and a summary of the River Recreation Management and Research Symposium held in Minneapolis in January 1977.


Booklet is divided into four parts: (1) text of the Act, (2) section-by-section review of the Act, (3) texts of legislation enacted by Congress since the Act passed that pertain directly to the Act, and (4) Federal regulations and the Wild and Scenic Rivers Act.

DISCUSSES THE PUBLIC'S RIGHT TO USE WATERWAYS FOR RECREATIONAL PURPOSES IN THE UNITED STATES. RIGHTS VARY GREATLY FROM STATE TO STATE. A NUMBER OF FACTORS, INCLUDING NAVIGABILITY, OWNERSHIP OF THE BED OF THE BODY OF WATER, RECOGNITION OF A PUBLIC TRUST DOCTRINE, AND CUSTOM AND USAGE OVER TIME, ARE DETERMINANTS IN DEFINING THE RIGHTS OF THE PUBLIC TO USE SURFACE WATERS FOR RECREATION.


4. MISCELLANEOUS RESEARCH ACTIVITY
A. WATER QUALITY SURVEYS, STUDIES AND STANDARDS


Abstract: Study undertaken to develop aesthetic water quality criteria for recreation uses, which in turn could be used to enhance the quality of the recreation experience. Water quality components which affect recreation user perception were identified. Recreation users were compared at nine sites on their attitudes, beliefs, and behaviour concerning water quality characteristics.

Keywords: Water Quality Criteria, Water-Oriented Recreation, User Perceptions, User Characteristics.


It is suggested that there are differences in the evaluation of water pollution by recreationists using the water and technicians and managers concerned with its management. A survey of beach-users sought information on: activities, preferred sites, frequency of participation, and evaluation of and awareness of water quality and pollution. Each of the 12 interview sites are also evaluated by the interviewers using set criteria. A home interview survey was also administered, gathering information on beach usage. Respondents were found to be very aware of the pollution problem. Generally, pollution was associated with water appearance. It was found that people who swim evaluated the water as less polluted than those who did not. More frequent visitors to sites were more critical of the water quality. Attitudes toward water quality were related to attitudes toward 'man and nature', study relating to Alcock and Strodtbeck's subjugation/harmony/mastery division or man's relation to nature.

BARTON, MICHAEL A.

"The concentrated use of remote recreational areas, such as the Boundary Waters Canoe Area, threatens water quality. The importation of solid wastes, the discharge of enriched waters into remote areas from adjacent municipalities, the problem of human waste disposal, the release of gasoline from outboard engines, and the widespread use of insecticides all contribute to a potentially serious pollution problem. Natural inputs, such as sedimentation, must also be considered. Proposes a system for monitoring selected parameters (e.g., phosphorus, fecal coliform, etc.)." (Stankey and Lime, 1973).


Canada, Department of National Health and Welfare. 1968. Canadian Drinking Water Standards and Objectives.


Abstract: Presents a "state of the art" study on the water quality parameter known as turbidity.

Keywords: Water Quality Measurement.


Documentation Centre 25th Floor QH0096 H55


A field survey of 80 small stream reaches was conducted to determine the amount of recreational use of small streams in Wisconsin. Both streams affected and those not affected by wastewater discharge were surveyed. The data suggest that there is only one-fourth to one-half as much recreational use on discharge-affected streams as on nonaffected streams. Study concludes that discharges from wastewater treatment plants apparently degrade the water quality on many small streams in a way that is noticeable to recreational users.

KING, JOHN G.


Discusses the design of two-cylinder engines and reasons for the large amount of exhaust produced. Presents new techniques to control pollution from outboard motors.


Abstract: The report is a revision of Water Quality Criteria, the 1968 Report of the National Technical Advisory Committee (NTAC) to the Secretary of the Interior. The guidelines for the Academy's Committee were similar to those of the NTAC. The Committee's six Panels were: (1) recreation and aesthetics; (2) public water supplies; (3) freshwater aquatic life and wildlife; (4) marine aquatic life and wildlife; (5) agricultural uses of water, and (6) industrial water supplies. In the 1972 Report many new subjects are discussed in detail, including: the recreational impact of boating, levels of use, disease vectors, nuisance organisms, and aquatic vascular plants.

Keywords: Water Quality Criteria, Water-Oriented Recreation, Swimming, Recreational Impact, Water Pollution, Boating.


Abstract: This is a progress report on land and water pollution resulting from recreational use. It contains several recommendations, and describes related pollution problems and what industry is doing about them.

Keywords: Water Quality Criteria, Water Pollution.


Abstract: The large increase in water based recreation participation and the major attraction of clean water for outdoor recreation prompted this study. Specific investigation was the recreationist's perception of present water quality and quantity allied with an attempt to indicate the preferences and tolerance levels of water quality and quantity which would be acceptable in the recreational experience.

Need for this study was indicated because: (1) water quality and quantity contributions to the recreational experience have not been defined, (2) this definition is essential for making supply and demand predictions of forest-water oriented recreation and (3) identification of what recreationists consider to be water pollution could supplement existing water quality measures, help determine relative priorities of these measures, or even result in redefinition of some measures.

Keywords: Water Quality Criteria, Water Pollution, Water-Oriented Recreation, User Perceptions, Minnesota.

Personal interviews were conducted with 80 campers in each of 3 Minnesota State Parks to find how users perceived the quality of the water. Water quality factors were measured or observed as an indication of conditions experienced by the recreation users. Results indicate most people perceive water pollution on a visual basis only. Most felt that recreational activity did not contribute to water pollution. Two-thirds of the respondents felt their water recreation was not curtailed by water pollution.


Presents a seven-step framework for comprehensively assessing river quality: (1) determine existing and potential river quality, (2) analyze river hydrology, (3) select assessment methods, (4) collect data, (5) analyze data, (6) predict impacts on future planning, and (7) communicate results to clients. The Willamette River Basin in Oregon was used as a case study.


Presents a method for estimating direct recreation benefits from water pollution control using a model of biological-behavioral relations involved in sport fishing. Angling success per unit of effort was taken to represent the quality of the recreation experience. Direct recreation benefits were identified as fishing success per unit of effort that would result from the prevention of water pollution.


Oil contamination is widespread and detrimental to water quality and marine life. A case study of outboard motor fuel pollution near a resort area is discussed. Estimates are made on the amount of fuel-pollution and its effect on the aquatic environment and on the continuing role of the area as a popular resort.


U. S. Congress. *Water Quality Act of 1965.* An Act to amend the Federal Water Pollution Control Act to establish a Federal Water Pollution Control Administration, to provide grants for research and development, to increase grants for construction of sewage treatment works, to require establishment of water quality criteria, and for other purposes. Public Law 234, 89th Cong., 1st Sess., 1965.


**WILDER, H. B., SIMMONS, C. E.**


Presents the results from an initial effort to design and implement a program for a continuing inventory of the water quality conditions of streams in North Carolina. Under study is water quality variability, pollution loads, and trends at key locations on the state's major rivers. Describes data collection and analysis using the Neuse River as an example.
Abstract: A comprehensive document on water quality requirements to be used as a basic reference by those groups engaged in water quality studies and standards setting activities. Regional variations in climate, topography, hydrology, geology and other factors must be considered in applying these criteria in specific localities. The report is subdivided into criteria for five general areas of water use: (1) recreation and aesthetics, (2) public water supplies, (3) fish, other aquatic life, and wildlife, (4) agriculture, and (5) industry. Section 1, "recreation and aesthetics", serves as a basis for developing water quality standards for "wild", "scenic" and "recreational" rivers preservation programs. Recommended criteria for aesthetic purposes include: (1) all surface waters should contribute to the support of life forms of aesthetic value, and (2) surface waters should be free of substances attributable to discharges or waste (eg. floating debris, oil substances producing objectionable colour, odor, taste or turbidity. Several recommended criteria are set forth for recreational use, including both "primary contact" recreation (eg. swimming) and "secondary contact" recreation (eg. fishing, hunting, viewing).

Keywords: Water Quality Criteria, Aesthetics, Water-Oriented Recreation, Swimming.
"River of life - Water: The Environmental Challenge," U. S.
Department of the Interior Environmental Report, Conservation

U. S. Task Force on Environmental Health and Related Problems. A Strategy

standards for rivers. In River recreation management and research Symp. Proc. USDA
Minnesota.

An approach is presented for setting water quality standards for a river based on the
following functional relation: \( R = f(Q, C_Q, S, R_C) \). Where \( R \) = recreation activities (in
number of units), \( Q \) = water quality level, \( C_Q \) = cost of achieving or maintaining a specific
water quality level, \( S \) = recreational supply of the resource, and \( R_C \) = recreational consump­
tion. The approach is based on the assumption that the recreational use of a river is the
most demanding of a high water quality compared to the other uses of the river.

standards as determined for the Big
Muddy River in southern Illinois through
the process of model development. 200
p., illus. Ph.D. diss., Southern
Illinois University.


Theorizes that upgrading the polluted waterways in the United States would result in a $7.3
billion increase in recreation users benefits (fishing, boating, swimming). Roughly $4.3
billion of this would be a savings in travel and time costs. Estimates do not include
activities of youths 12 and under because of incomplete data concerning their water-based
activities. Suggests further study on younger age groups. Also suggests research on
benefits of incremental water quality improvement to determine what increase of benefits
would result from a certain degree of water quality improvement.
B. HERITAGE RIVER RESEARCH: MISCELLANEOUS STUDIES


Describes the dangers to the Allegash Wilderness Waterway and the efforts to save it.


Reviews the history of the struggle to preserve the Boundary Waters Canoe Area in Minnesota and of the latest threat from the mining industry.


Mining threatens the Boundary Waters Canoe Area.


Presents a detailed analysis of the Boundary Waters Canoe Area's resources, attractions, values and history. Explores in detail the alternatives facing the American people with respect to the area's future.


SPEARS, BORDEN (ed.).
1970 Wilderness Canada. vii + 174p., illus. Toronto: Clarke, Irwin Co. Ltd.


"Research Reports Supported by the Office of Water Resources Research, under the Water Resources Research Act of 1964. Published quarterly.

5. SELECTED RIVER GUIDEBOOKS
SELECTED RIVER GUIDEBOOKS


British Waterways Board. The Canal at Tring, Grand Union Canal, Improvements by British Waterways Board. 1975
British Waterways Board, Melbury House, Melbury Terrace, London, NW1 6JX


Burrell, B., 1968, Come up Canoeing, Outdoor West Virginia, 31 (12), pp. 2-6 (canoe trails)


Parks Canada. 1978. The Bow River Guide, Banff National Park. (Copies may be viewed at the park's information centres).

The Winisk River Canoe Route. Ref. 8 GV078W72.
Documentation Center, 25th Floor.


Clark, Ella E. Life on the Chesapeake and Ohio Canal


Darlington Amenity Research Trust
Canals Around Braunston
• canal, boating, fishing, surveys, user needs 1973 c.
University of Birmingham, Birmingham, Alabama.


HAMBLIN, W KENNETH RIGBY, J. KEITH.
N.D. PART 1: LEES FERRY TO PHANTOM RANCH IN GRAND CANYON NATIONAL PARK.
GUIDEBOOKS TO THE COLORADO RIVER SERIES, BRIGHAM YOUNG UNIV., PROVO, UTAH.

RIGBY, J. KEITH, HAMBLIN, W KENNETH WELSH, STANLEY R.
N.D. PART 2: PHANTOM RANCH IN GRAND CANYON NATIONAL PARK TO LAKE MEAD, ARIZONA-NEVADA.
GUIDEBOOKS TO THE COLORADO RIVER SERIES, BRIGHAM YOUNG UNIV., PROVO, UTAH.

RIGBY, J. KEITH, HAMBLIN, W KENNETH MATHENY, RAY, WELSH, STANLEY L.
N.D. PART 3: MOAB TO HITE, UTAH, THROUGH CANYONLANDS NATIONAL PARK.
GUIDEBOOKS TO THE COLORADO RIVER SERIES, BRIGHAM YOUNG UNIV., PROVO, UTAH.


Iowa Conservation Committee. n.d. Iowa canoe trips. Des Moines, Iowa.


Describes a one month canoe trip by six men in the Nahanni area. The trip is notable for the amount of hiking done by the participants.


Special issue of the "Montana Outdoors" magazine that emphasizes the Yellowstone River. Articles feature: the role the River has played culturally for the past 200 years; public opinion on future water use; water requirements for industry, fish, wildlife, and recreation; and nine Yellowstone Basin research projects that document the effects of increased water withdrawals on recreation, fish, and wildlife.


Nebraska Game and Fish Commission. n.d. Canoeing Nebraska. Lincoln, Nebraska.

NICKELS, NICK (ed.)
1973 Plan now paddle later. 72p. Lakefield, Ontario KOL2HO.

Emphasizes the phenomenal growth of canoeing as indicated by the replies from readers of his published canoe route information plus the fact that canoe and paddle manufacturing is booming. This book outlines a step-by-step approach to planning a canoeing vacation—includes maps, information, books and services getting into condition, a research service to readers that write in for information about a river, float plane registry, equipment, orienteering, choosing a canoe.

Canoe Canada. Nick Nickels. This complete guide to canoe routes in Canada has over 600 trips. For each route information is given on length, approximate trip time, access, appropriate maps and starting and finishing points. For most routes additional information is given on lakes encountered, portages diversions, camping sites and alternate routes. Paper $9.95

NOREECK, CARL, AND BARRY EDWARDS

A personal account of a prairie wilderness canoeing experience which identifies some components of wilderness outside of a forest environment. Proposes a river park along the South Saskatchewan River.

The art of canoeing and tales of the wilderness described and recounted by a widely experienced writer and traveller. Other books by Rustrum are "Paradise Below Zero", "The Wilderness Route Finder", and the "Wilderness Cabin".

Ohio Dep. of Natural Resources. n.d. Ohio canoe adventures. Division of Watercraft, Columbus, Ohio.

Olivier D.
History, Physiography, Recreation Trail: Guadelupe Waterway White Water Canoeing Aug 1971
In ARC library


PLURAM. Kabir Koupa: Rivieres Saint-Charles et Huron, entre Quebec et Lac St-Jean. For City of Quebec. DREE, Office de Planification et de Developpement du Quebec, et Ministere des Affaires municipales. Land use options, history, cycling, canoeing, skating, hiking. May, 1974. Ville de Quebec, Ministere des Affaires municipales.


GROSSER, J.R.

Notes and opinions formulated during a personal pleasure canoe trip on the Bloodvein River in Manitoba. The trip was a "first-class recreational experience" and the author recommends that the river be preserved in its natural state as a "wild river" park. An attempt is made at illustrating the aesthetic qualities and use potentials of the various river units by employing the recreational capability classification used by Canada Land Inventory. Suggests that the "protection of the shoreland and portage vegetative cover from depreciation through increased use should be a major planning concern." Describes the trip and recommends the canoeing potential of the river suggesting "focal points" for campsites and overnight stops and expressing opinions on use, development, and possible studies.

SCHWIND, DICK.
N.D. WEST COAST RIVER TOURING, ROUGE RIVER CANYON AND SOUTH.
THE TOUCHSTONE PRESS, BEAVERTON, OREGON.

Schryer, R. and M. Neilson
Westwater and Desolation Canyon
Whitewater River Recreation Study. 196 p ($6.00)


Canoeing in Ontario
Ian Scott and Davis Kerr
paper $2.25 $2.50

SEHLINGER, BOB.
1973 A CANOEING AND KAYAKING GUIDE TO THE STREAMS OF KENTUCKY.
THOMAS PRESS, INC., ANN ARBOR, MICHIGAN.

Black Flies and White Water
A. Tony Sloan
A collection of stories about canoeing expeditions in Canada's wilderness
$10.35

SOUTH CAROLINA WILDLIFE AND MARINE RESOURCES DEPARTMENT AND DEPARTMENT OF PARKS, RECREATION AND TOURISM.
1978. SOUTH CAROLINA RIVER TRAILS GUIDEBOOK. COLUMBIA, SOUTH CAROLINA.

STRUNG, NORMAN, CURTIS, SAM, PERRY, EARL.
N.D. WHITWATER.
MACMILLAN PUBLISHING CO., NEW YORK, NEW YORK.


TEJADA-FLORES, LITO
1978. WILDWATER: THE SIERRA CLUB GUIDE TO KAYAKING AND WHITEWATER BOATING.
SIERRA CLUB BOOKS, SAN FRANCISCO, CALIFORNIA.

U.S. Bureau of Outdoor Recreation Dept. of Interior

URBAN, JOHN T.
N.D. WHITENATER HANDBOOK FOR CANOE AND KAYAK.
APPALACHIAN MOUNTAIN CLUB, BOSTON, MASSACHUSETTS.


USDA - Forest Service. Middle Fork of the Salmon.
Presents detailed information pertinent to floating the Middle Fork of Salmon River.

USDA - Forest Service. The Salmon River of No Return.
Comprehensive description of the Salmon River, with special section on white water boating.

USDI - Bureau of Land Management. Lower Salmon River Guide.
Excellent presentation format for river guide pamphlets.

An attractively presented brochure on floating on hiking along the Rogue River.
USDI - Bureau of Land Management. *Running the Green River from Sand Wash to Green River, Utah.*

Good pamphlet with detailed maps showing rapids, hazards, points of interest, and points of access. Accompanying description of natural history along the river is included.

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USDI - Bureau of Land Management. *Three Faces of the Green River (Below Flaming Gorge Dam).*

The pamphlet describes three distinct areas in a 100 mile long reach of the Green River below Flaming Gorge Dam - Red Canyon, Browns Park, and the canyon through Dinosaur National Monument. Includes a description of natural and human history, river hydrology, river navigability, and detailed maps.

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Canoe Routes: Yukon Territory (1977) Richard and Rochelle Wright
Paper $5.35 $5.95

Canoe Routes: British Columbia (1977) Richard and Rochelle Wright
Paper $5.35 $5.95
6. BIBLIOGRAPHIES RELATED TO HERITAGE RIVERS
BIBLIOGRAPHIES RELATED TO HERITAGE RIVERS


ALTERNATIVES - PERSPECTIVES ON SOCIETY AND ENVIRONMENT


1973c. A two-year index of articles and authors on resources, pollution, conservation and wilderness. Alternatives 2(4), Summer.


An update to August, 1979 is also available in xerox copy format.


Describes how more than 1,000 articles and publications were identified, documented, and classified according to keyword descriptors. A computerized bibliographic retrieval routine was developed to enable an investigator to receive relevant bibliographic notations. Using this retrieval system to assemble bibliographies by topic, this project surveyed and analyzed research findings and their implications for water recreation planning and development. An interdisciplinary water recreation planning and development bibliography is included.


The bibliography, containing 36 abstracts, focuses upon the problems and progress in stream preservation programmes and retention and determination of recreational potential of free-flowing streams. A review of literature dealing with water quality criteria for primary and secondary recreational use is also provided.


Contains 770 annotations of papers, most of which were published between 1955 and 1965. Includes literature in the following areas: (1) supply of and demand for water of various qualities including the competitive use for industry, domestic, and recreation; (2) method and application of cost/benefit analysis; (3) economic impact of water resource and water development projects; (4) methods of determining the economic value of sport fisheries, wildlife, and other aquatic outdoor recreation resources; and (5) social values of water-based outdoor recreation.

Harker, George R. 1978. BIBLIOGRAPHY OF SELECTED LITERATURE ON RIVER RECREATION (PARTIALLY ANNOTATED). 126 p. DEP. RECREATION AND PARK ADMIN., WESTERN ILLINOIS UNIV., MACOMB, ILLINOIS.

Contains 712 references dealing with MISSISSIPPI RIVER RECREATION, RIVER RECREATION IN GENERAL, AND VARIOUS RELATED TOPICS. Categorizes papers into: 1) LEGAL AND INSTITUTIONAL FRAMEWORK, 2) CHARACTERISTICS OF RECREATIONISTS, 3) RIVER RECREATION MANAGEMENT, 4) USE MEASUREMENT METHODOLOGIES, AND 5) IMPACTS OF RECREATION ON RIPARIAN VEGETATION AND FLOOD PLAIN SOILS.

Bibliography (some abstracted) of legislation; literature reviews on water-based recreation problems; water-based recreation conference proceedings; research proposals for water-based recreation problems; social research on water-based recreation problems; research on resource impacts of water-based recreation; classification, inventory and evaluation of waterscapes and landscapes; urban water-based recreation; specific river plans and inventories; miscellaneous; guidebooks on rivers and river running.

*UPDATE TO
AN ANNOTATED BIBLIOGRAPHY ON RIVER RECREATION
NORTH CENTRAL FOREST EXPERIMENT STATION
1992 FOLWELL AVENUE
ST. PAUL, MN 55108
AUGUST 1979

*LUCAS, ROBERT C., AND GEORGE H. STANKEY

Includes brief annotations. Wilderness subject headings-include: philosophy and history; legislation and policy; problems of allocation and classification; general management problems; recreation use and users; management of users; management of ecosystems; and research.
MARSH, JOHN S.


Subject headings include: trail design and maintenance; trail use studies; trails in the U.S.; trails in Canada; trails in Europe; skiing and snowmobile trails; bicycle trails; and, water and canoe trails.


"NTISearch." The National Technical Information Services NTISearch computer answers particular questions by searching more than 300,000 abstracts of Government-sponsored reports completed since 1964. About 60,000 abstracts are added to the base annually.

Abstracts are received in storage packets, each bearing the report title, date, corporate and personal authors, number of pages, order number and document price - in addition to the abstract information.

F-2: USDI - Bureau of Land Management "Annotated Bibliography". Contains some recent published and unpublished information on carrying capacity, wilderness, primitive areas, and river management.


WATDOC n.d. A computer print-out of annotated references and keywords of documents relating to water resources. Environment Canada, Water Resources Br., Hull, Quebec.

This computerized method of storing bibliographical material is still only in its formative stages. Some Divisions of Parks Canada are contributing to the store of information, as are other Canadian government departments and a few universities. This computerized method has tremendous potential for maintaining up-to-date bibliographies, such as this bibliography on wilderness, and of course provides an efficient retrieval and storage system.

ZIEGLER, RONALD M. 1979. WILDERNESS WATERWAYS: A GUIDE TO INFORMATION SOURCES. VOLUME 1, SPORTS, GAMES, AND PASTIMES INFORMATION GUIDE SERIES. GALE RESEARCH COMPANY, DETROIT, MICHIGAN.
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