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Use of the Recreation Opportunity Planning System to Inventory Recreation Opportunities of Arid Lands

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Abstract.--Recreation opportunity planning, which is being adopted by some land management agencies for recreation input to land management planning, is reviewed for its applicability to arid land situations. Particular attention is given to the inventory and analysis phases of the system and to what we have learned about its implementation during its development.

Recreation use of arid lands in the USA is growing rapidly. Those lands provide many recreational opportunities which range from primitive and unconfined forms of recreation through those forms provided at tourist resorts. They also provide unique recreational opportunities in distinctive landscapes with widely appealing and rather predictable climates. Pressures of increasing use have caused arid land managers to intensify their recreation planning and management activities on areas such as the deserts of southern California and western Arizona and the canyonlands of southern Utah. These resource managers, like their counterparts in more temperate environments, need planning and management techniques which enable better assessment and evaluation of recreation resource capabilities, integration of recreation with other resource uses, and management of the resources for recreation. Recreation opportunity planning, using the recreation opportunity spectrum concept, can help meet these needs of planners and managers of arid lands.

Recreation opportunity planning is an activity within the recreation production and evaluation process and it enables the rational allocation and management of recreation resources. To gain a more complete understanding of recreation opportunity planning we will review this production and evaluation process to show where recreation opportunity planning fits within it.

At a national outdoor recreation outputs workshop conducted at Harpers Ferry in West Virginia, an attempt to define this production and evaluation process was made.[3] A simplified diagram of this process is shown in figure 1 and is briefly discussed below.

The production of recreation opportunities begins with primary resources of land, labor, and capital. These resources are used in management actions such as building trails, constructing camping facilities, grazing domestic livestock, and providing sanitation and information services. Each action has an influence on the type, amount, and quality of recreation opportunity that is provided. In combination such actions (or non-actions) create the environment for recreation and thus the activity opportunities available and the probable experiences that will be realized. They, therefore, create the recreation opportunities supplied or produced. In this way, management actions are used to transform basic resources into recreation opportunities which recreationists then use to produce specific recreation experiences.

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[1]Paper presented at the workshop on Arid land resource inventories: Developing cost-efficient methods. LaPaz, Mexico. November 30-December 6, 1980.

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[3]Driver, B. L. and D. Rosenthal. The outdoor recreation production process. Unpublished report. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.

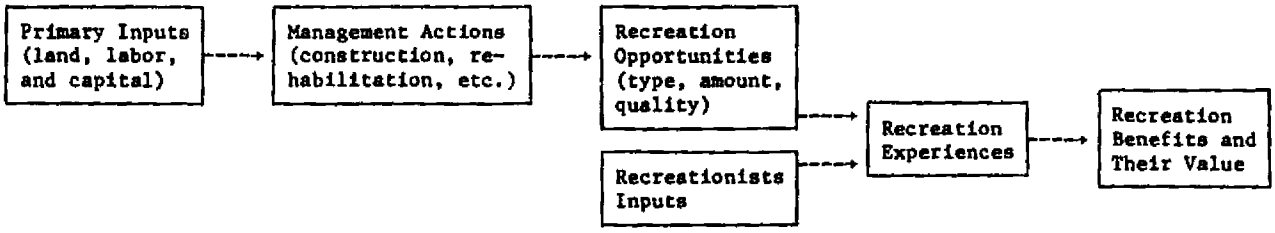

Figure 1.--The recreation opportunity production and evaluation process.

The recreationists' consumption of these recreation opportunities gives the reason for their production and provides an indication of the factors to be considered in defining the opportunities to be produced. In their consumption behavior (Driver and Tocher 1970, Brown, Dyer, and Whaley 1973, Hendee 1974, Driver and Brown 1975), recreationists are seen as coming to an area with specific expectations and desires for specific types of satisfaction. They engage in recreation activities at areas where they believe the combination of resource, social, and managerial characteristics that will enable them to realize their desires are offered. When they leave the area, they leave after having had experiences that, if satisfactory, will lead to subsequent personal and societal benefits.

The evaluation phase of the process defines the social worth of recreation opportunities and subsequent recreation experiences. It is used to identify and quantify the economic and non-economic individual and societal benefits of recreation opportunities and experiences.

Recreation opportunity planning provides a rational framework for determining how recreation opportunities should be produced. It focuses on the settings for recreation that are provided by management and that are used to deliver recreation opportunities to recreationists. It is a relatively new planning framework that is based on making the recreation opportunity spectrum an operational concept.[4]

INVENTORY FOR RECREATION OPPORTUNITY PLANNING

A recreation opportunity is the chance to engage in a recreation activity in a specific setting to realize a desired recreation experience. Recreation opportunity planning generates demand and supply information about the type, quantity, and quality of these recreation opportunities for use in resource allocation and management decision making. A primary feature of this planning is its arraying of the types of recreation opportunities along a spectrum. This recreation opportunity spectrum, at the most aggregated level, usually has been divided into five classes as shown in figure 2 (Driver and Brown 1978). The semi-primitive class often has been divided into two subclasses, semi-primitive motorized and semi-primitive non-motorized. This subclassification illustrates that any of the spectrum classes can be subdivided to meet the needs of decision makers.

Currently the most widely applied components of recreation opportunity planning are the inventory and analysis phases.[5] These portions of the planning system, with emphasis on arid lands, are the focus of the remainder of this paper.

The recreation opportunity inventory enables identification of current and potential types, amounts, and qualities of recreation opportunity (Brown, Driver and McConnell 1978). It begins with identification of the attributes of the recreational setting which need to be assessed. Those attributes which must usually be considered are:

1. roads, trails, and other transportation features
2. buildings and other man-made structures
3. sources of man-made sound
4. relatively irreversible evidences of man
5. renewable resource modifications
6. vegetation patterns and types
7. soil types
8. topographic relief
9. water bodies and channels
10. wildlife species, numbers and patterns
11. specific natural features enabling recreation activities

Modern-Urban	Rural	Roaded Natural	Semi-Primitive	Primitive

Figure 2.--A common division of the recreation opportunity spectrum.

[4]Building on ideas expressed by J.V.K. Wagar (1951), W.R. Burch, Jr. (1964), S.R. Tocher, J.D. Hunt, and J.A. Wagar (1965), and J.A. Wagar (1966), Driver and Brown (1978) and Clark and Stankey (1979) have provided the framework for making the recreation opportunity spectrum concept operational through recreation opportunity planning.

[5]An overview of the entire recreation opportunity planning system occurs in Brown (1979).

12. recreation user numbers, densities, and behaviors
13. recreation management activities being practiced
14. other land uses

Data on these attributes are used in recreation opportunity planning in several ways. For example, the planner often wants to know which recreation experiences (such as finding solitude, affiliating with family or friends, or self-testing) most likely can be realized at the present time by recreating on specific tracts of land. To obtain this information, data about transportation features, buildings and other man-made structures, sources of man-made sound, relatively irreversible evidences of man, renewable resource modifications, recreation use, and recreation management activities are combined. These data are then analyzed using specific standards which enable zoning a tract of land into one of the recreation opportunity spectrum classes. Each of these classes has inherent in it higher probabilities for some experiences than for other experiences. Alternatively, if the planner's interest is in the most probable potential recreation experiences, the planner can analyze data on the same attributes as for current recreation experiences, except for the last two, both of which define current conditions, not potential conditions. Or, if the planner is interested in identifying the potential for specific recreation activities, the requirements for each activity must be looked at. Recreation opportunity inventory can help do this by providing information about recreational features, such as slope, snow conditions, water bodies and wildlife.

The planner's determination of quantity of each recreation opportunity available requires data on vegetation, soils, water, wildlife, specific recreational features, and recreational facilities. Based upon the ability of each attribute to support recreation, a judgment is made regarding the quantity of each recreation opportunity available. Determination of the quality of each recreation opportunity is most dependent upon information about specific recreational features and facilities.

Once information on current and potential recreation opportunity type, amount, and quality is assembled, the planner can determine production possibilities for different tracts of land. This can lead to development of resource use alternatives in either a single or multiple use framework.[6]

To date most use of recreation opportunity planning has occurred on temperate and semi-arid forest environments of North America. Only a few applications have been made in arid grass and desert lands (Brown, Driver, Bruns, and McConnell 1979). However, our experience with recreation opportunity planning, and particularly the inventory and analysis phases, suggests that the system is widely applicable to arid lands. Also, as recreation opportunity planning has been applied, we have learned how it can be improved when applied to arid and non-arid lands.

What have we been learning? One thing is that the attributes of the land and its management that need to be inventoried are the same for all types of landscapes. That is, for all lands we need to inventory the same kinds of features.

Another thing we have learned is that while the features to inventory do not vary by landscape, many of the standards that make these attributes useful in different settings do vary. For example, one of the criteria for delineating recreation opportunities is remoteness of the area from sights and sounds of man. In general this has been operationalized as a distance from roads and trails having motorized use.[7] In the forested areas of the central Rocky Mountains a distance of three miles is sufficient to delineate an area providing opportunity for primitive and unconfined recreation (Brown et al 1978). In the more densely stocked forests of the Pacific Northwest and the Eastern U.S.A., a standard of less than three miles is sufficient. And, in the grasslands and deserts of the Southwestern U.S.A. and northern Mexico, a distance of greater than three miles, possibly as many as five or six miles, is sometimes necessary to provide the same recreation opportunity. This greater distance is necessary to diffuse the sights and sounds of man where there are few natural obstructions, as across a relatively flat grassland. This means that for both grassland and desert environments having little topographic relief larger areas are needed to provide primitive and unconfined recreation opportunities than are needed for forested environments. Where the topography is more varied, as in a canyonlands type landscape, the distance standards used on arid environments appear to be closer to those used for forest landscapes, and thus smaller areas can provide the same recreation opportunities as larger areas of other arid lands.

Another finding has been that the quantities of many recreation opportunities are lower in arid

[6]A more complete description of how to do recreation opportunity planning as part of total land management planning will be available soon in Chapter 500 of the USDA Forest Service Land Management Planning Handbook (FSH 1909.12).

[7]Waterways with motorized use and railroads are included. Also, non transportation considerations dealing with visibility or audability of human works are used where distance from transportation routes does not indicate the degree of remoteness necessary. Data necessary to identify remoteness comes from inventory of transportation and other man-made features. The data are evaluated using specific remoteness standards for each recreation opportunity spectrum class.

environments than in temperate environments. This is particularly apparent in comparing temperate forests with arid forests, grasslands, or deserts. For example, capacity is limited for primitive and semi-primitive recreation opportunities because of limited screening of other people by vegetation. Quantity is also limited for more developed and motorized recreation opportunities because of lack of moisture, and its subsequent consequences, in arid landscapes. Additional potential limits on quantity and impacts of recreation on arid environments have been identified by Hunt (1977).

Another, but more subtle thing which we have learned is that some attributes used to define the quality of recreation opportunities differ between arid and temperate environments. For example, climatic factors are important in all landscapes but coolness of the temperature seems to be a particularly important attribute in arid environments used for recreation.

Another thing that we have learned about recreation opportunity planning is that once a planner adopts the logic of it, it is relatively easy and efficient to use, whether it is used in a temperate or arid environment. The logic is explicit, the criteria for identifying recreation opportunity areas are held to a minimum, and one can select the required precision for data collection and analysis based on the level and kind of decision to be made.

We have also discovered that when recreation opportunity planning is used on a regional or national scale, computerized data processing is desirable. Therefore, we have begun to adapt a general cartographic mapping system, called the Map Analysis Package (MAP) (Tomlin and Berry 1979) to our purposes (Berry and Brown 1980).[8]

The MAP computer software package consists of a system of primary computer operations which can be linked to produce a new synthesis of mapped data. It presently employs a grid-cell data structure for all analytical operations, though data may be input in many forms. Many primary computer operations are available in the MAP program although only a few of them were necessary for our application in recreation opportunity planning.

The cartographic model for addressing recreation opportunities enables generation of maps and tabular data on current and potential recreation opportunities. It presents the advantages of allowing large quantities of data to be stored and retrieved easily, and it enables preparation and reprocessing of maps much more quickly than if they are produced by hand drawing.

Our recreation opportunity cartographic model was developed and tested using a hypothetical data set. It is now being applied to an arid lands situation in the Steens Mountain area of eastern Oregon. Illustrative of the output of this recreation opportunity cartographic model are figures 3 and 4 which show current and potential recreation opportunities, respectively, for a 4500 hectare area using the hypothetical data set.

In producing figure 3 (current recreation opportunities), information about physical resources and their alteration by humans was combined with information about present recreational use and management activities. Figure 4 (potential recreation opportunities) was produced using only information about physical resources and their alternation by humans. In comparing these two figures we can see that present use and management characteristics have an effect upon the amount of semi-primitive and modern-urban opportunities that are presently provided. Presently less semi-primitive and more modern-urban opportunities are provided than would be determined by the character of the land base alone.

Other things learned from our current applications of recreation opportunity planning are that: (1) it can be easily adapted by different agencies, such as the U.S. Forest Service and the Bureau of Land Management, and thereby help establish a common recreation planning and management language

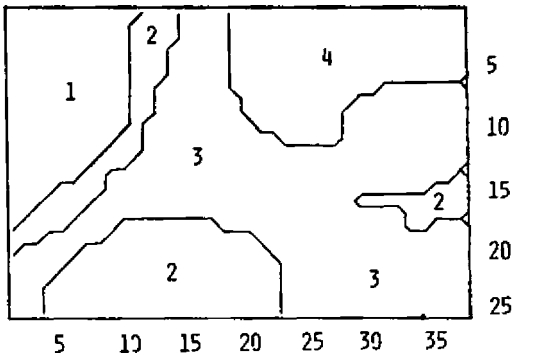

Figure 3.--Current recreation opportunities: (1) Modern-Urban, (2) Rural, (3) Roaded Natural, and (4) Semi-Primitive.

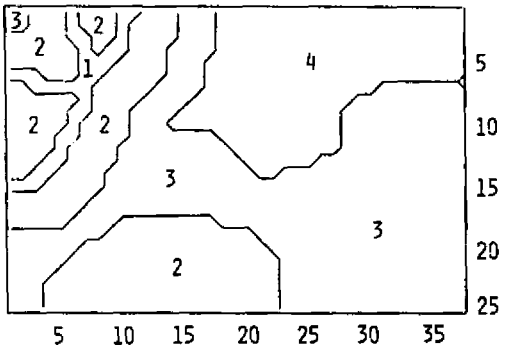

Figure 4.--Potential recreation opportunities: (1) Modern-Urban, (2) Rural, (3) Roaded Natural, and (4) Semi-Primitive.

[8]MAP is currently operational on IBM computers and is being adapted to CDC-CYBER computers.

across agencies; (2) the logic of the planning system is intuitively acceptable both to resource planners and to the public, such as when it is explained in public involvement review sessions; (3) the system provides improved bases and means for evaluating the impacts of different management activities on the type, quantity, and quality of recreation opportunities that can be provided; and (4) the concepts about the recreation opportunity spectrum which are used in recreation opportunity planning can also serve as guidelines for recreation resource management.

CONCLUSION

Recreation opportunity planning has been developed to provide a framework for making recreation inputs to land management planning. It is a planning process which fits within the broader recreation opportunity production and evaluation process and helps in making rational decisions about the allocation and management of recreation resources.

Our experience in using recreation opportunity planning, particularly its inventory and analysis phases, has indicated that it is widely applicable to arid land situations. Specific elements of the planning process do change, however, when it is applied to arid lands. For example, while the criteria for identifying types of recreation opportunity remain the same, their standards change when one moves from temperate to arid landscapes. Also, quantities of opportunity provided are often lower in arid environments than in temperate environments, and sometimes the factors considered in assessing quality of opportunity are different between arid and temperate environments.

A recent effort in development of tools for recreation opportunity planning has been development of the cartographic model which enables efficient storage, retrieval, and manipulation of mapped and tabulated data. This model is presently being tested in an arid lands situation in eastern Oregon.

Because recreation opportunity planning, including its inventory and analysis phases, fits within the general production and evaluation process that has been defined for recreation, and because it is a map based system that allows visualizing the impact of management actions on the type, amount, and quality of recreation opportunity provided, we feel the system has considerable promise for the recreation component of land management planning. Since both the USDA Forest Service and the USDI Bureau of Land Management are adopting the process, we expect its use to become even more widespread. It appears to be quite applicable to both temperate and arid landscapes.

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Resúmen: Se revisa, respecto a su aplicabilidad a zonas áridas, la planeación de la Oportunidad Recreative, la cual está siendo adoptada por algunas agencias relacionadas con el manejo de tierras con objeto de determinar el insumo recreativo en la planeación para el manejo de tierras. Se da particular atención a las fases de inventario y de análisis del sistema y a lo que hemos aprendido relativo a su implementación en el curso de su desarrollo.

Large Area, Low Cost Resource Inventories — Canadian Programs, Methods, and Costs[1]

D.M. Welch, T. Pierce and E.B. Wiken[2]

Abstract. --The Canada Land Inventory, Ecological Land Survey and the Northern Land Use Information Series are described. For large areas and at scales typically smaller than 1:100,000, these interdisciplinary inventories cost between $1.00 and $16.00/km^2. Ecological Land Survey is most recommended for developing an environmental data base for a wide variety of interpretations.

INTRODUCTION: SOCIO-POLITICAL BACKGROUND

"Canada is a few acres of snow and not worth a soldier's bones." So Voltaire is reputed to have written in the 1760's. A century later a Canadian industrialist suggested that we had become "hewers of wood and drawers of water." The two sayings reflect traditional and yet conflicting views of our place in the scheme of things - first a wasteland and then a resource-rich colony. Only since World War II have we developed from exploitation to resource management and the need for national and regional policies designed to yield maximum benefits to all social and economic sectors.

It is common nowadays to require of resource projects that environmental and social impacts be considered and that multi-resource development opportunities be taken in hand. This trend focusses on holistic planning and management, on inter- and intra-regional comparisons of environments, resource bases and societies, and on the consequent need for a multi-resouce data base upon which to influence public thinking, establish policy and base management decisions. Several methods for collecting such data have evolved in Canada. They are presented to this conference in the belief that our hinterland offers the same challenges to resource inventory as do arid lands.

CANADIAN PERSPECTIVES

The majority of 23 million Canadians live in urban and rural areas in the south. Areas which exceed Mexico, such as the Northwest Territories, contain a scant fraction of the population (table 1; fig. 1).

Intensive land uses, such as living, moving and food, wood and mineral production occupy one-tenth of Canada (table 1). Other measurable uses, such as mineral exploration, parks and reserves account for one-fifth of our land and freshwater. The remainder is largely "left" to water catchment, wildlife production and migration, native hunting, trapping and fishing, and various forms of wilderness recreation, although many contemporary and future economic developments are under consideration. Examples are oil and gas exploration, pipelines, national parks, commercial hunting of whales and of terrestrial and marine furbearers, and northern highways.

RESOURCE PLANNING IN CANADA

Land use and resource planning and management in Canada are subject to several jurisdictions. Any region or resource sector may fall within municipal,

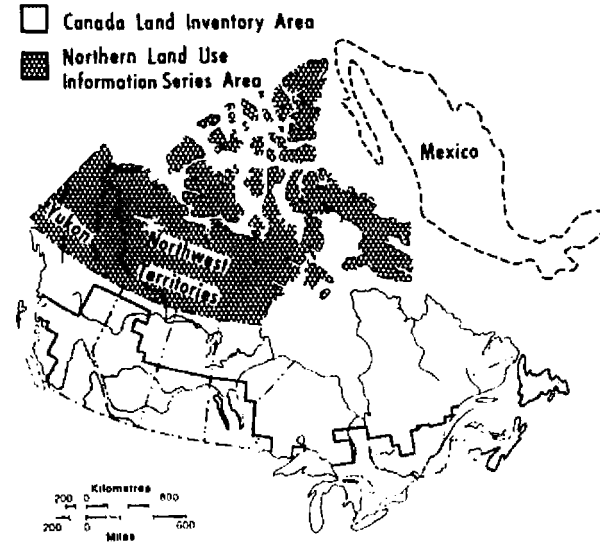

Figure 1.-- Canadian Perspectives.

[1]Paper presented at the Arid Land Resource Inventories workshop, La Paz, Mexico, Nov.30 - Dec.6, 1980.

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