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B793: Estimation of the Cost of Providing Publicly-Supported Outdoor Recreational Facilities in Maine

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**ESTIMATION OF THE COST OF
PROVIDING PUBLICLY-SUPPORTED
OUTDOOR RECREATIONAL
FACILITIES IN MAINE**

By

Stephen D. Reiling and Mark W. Anderson

**MAINE AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF MAINE AT ORONO**

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The discussion at the meeting focused on the increasing cost of providing public outdoor recreational opportunities and the uncertainty about future funding levels for provided recreational opportunities. The participants concluded that the actual costs incurred by public agencies to provide recreational facilities should be recognized as a public cost and included in the public sector's budget. As a result, a cooperative agreement was written to undertake a cost of provision study. The agreement was signed in part by the Northeast Forest Experiment Station in Barre, VT and the study was conducted by the Department of Agricultural and Resource Economics at the University of Maine at Orono. This report is the result of that study.

The public agencies and key personnel who participated in the study were:

Director of Parks and Recreation, Bangor, Maine
Thomas J. Cluffness, Environmental Resource Planner
Shawn Green, Director of Conservation and Recreation
Frank Jones, Director of Recreation Division

Eastern State Park, Millbrook, Maine

A. Lee Hays, Senior Director

Walter L. Conroy, Jr., Director

Forest North Maine District, White Mountain National Forest, Bethel, Maine

MAINE AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF MAINE AT ORONO

PREFACE

During the spring of 1981, a meeting was held in Augusta to discuss the outdoor recreational facilities provided by public agencies in Maine. The meeting was organized by Lloyd Irland, who was then the Director of the Maine Bureau of Public Lands. Representatives of several agencies were in attendance, including some from the Baxter State Park, the Maine Bureau of Parks and Recreation, the Bureau of Public Lands, the North Maine Woods Association (a private firm that manages the recreational use of large tracts of privately-owned forestland in Northern Maine), the U.S. Forest Service, and the University of Maine at Orono.

The discussion at the meeting focused on the increasing cost of providing public outdoor recreational activities and the uncertainty about future funding levels for providing recreational opportunities. The participants concluded that the actual costs incurred by public agencies to provide recreational facilities should be documented to provide an informational base for decision making within the agencies and legislative bodies. As a result, a cooperative agreement was written to undertake a cost of provision study. The agreement was funded in part by the Northeast Forest Experiment Station in Durham, NH and the study was conducted by the Department of Agricultural and Resource Economics at the University of Maine at Orono. This report is the result of that study.

The public agencies and key personnel who participated in the study are:

Maine Bureau of Parks and Recreation, Augusta, Maine

Thomas J. Cieslinski, Environmental Resource Planner
Edward Beach, Director of Operations and Maintenance
Frank Farren, Director of Snowmobile Division

Baxter State Park, Millinocket, Maine

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Irvin C. Caverly, Jr., Director

Evans Notch Ranger District, White Mountain National Forest, Bethel, Maine

Mark A. Boche, District Ranger
Richard M. Lewis, Assistant Ranger

Acadia National Park, Bar Harbor, Maine

Warner Forsell, Chief of Operations
Robert Vallette, Business Officer

This study could not have been conducted without the valuable assistance of these people. In addition, we are also indebted to a number of other individuals who have commented on the research methodology and results of the study. Special thanks are due to Kenneth C. Gibbs, Department of Resource Recreation Management, Oregon State University; Richard W. Guldin, Southern Forest Experiment Station, New Orleans; and Herbert E. Echelberger, Northeast Forest Experiment Station, Durham. Finally, we wish to acknowledge the intellectual and financial support provided by Wilbur F. LaPage and Herbert E. Echelberger. We also appreciate the extra efforts of Joan Bouchard and Barbara Lucia for their project support and manuscript typing.

TABLE OF CONTENTS

	PAGE
CHAPTER 1	1
INTRODUCTION	1
Objectives and Scope of the Project	3
Organization of the Report	4
CHAPTER 2	6
METHODOLOGICAL ISSUES IN COST OF PROVISION STUDIES	6
Opportunity Cost of Land	6
Capital Improvement Costs	10
Operation and Maintenance Costs	18
Measurement of Recreational Use	19
CHAPTER 3	22
MAINE BUREAU OF PARKS AND RECREATION	22
Organizational Structure	22
Facilities Studied and Accounting Procedures	22
Provision Costs for Individual Facilities	26
Sebago Lake State Park	26
Lake St. George State Park	30
Reid State Park	33
Peaks-Kenny State Park	34
Camden Hills State Park	38
Allagash Wilderness Waterway	41
Snowmobile Division	42
A Comparison of Amortization and Sinking Fund	46
Summary and Conclusions	49
CHAPTER 4	51
BAXTER PARK	51
Organizational Structure	52
Facilities Studied and Accounting Procedures	52
Provision Costs for Camping	55
Provision Costs for Day Use	59
Trail Maintenance Costs	60
A Comparison of Amortization and Sinking Fund	60
Summary and Conclusions	60

TABLE OF CONTENTS (Continued)

	PAGE
CHAPTER 5	63
EVANS NOTCH RANGER DISTRICT	63
Organizational Structure	63
Facilities Studied and Accounting Procedures	63
Provision Costs for Camping and Day Use	68
A Comparison of Amortization and Sinking Fund	70
Summary and Conclusions	70
CHAPTER 6	73
ACADIA NATIONAL PARK	73
Organizational Structure	73
Facilities Studied and Accounting Procedures	73
Costs of Provision for the Selected Facilities	76
A Comparison of Amortization and Sinking Fund	78
Summary and Conclusions	79
CHAPTER 7	82
SUMMARY AND CONCLUSIONS	82
An Overview of the Methodology and the Empirical Results	82
Implications of the Results and Suggestions for Future Research	85
REFERENCES	91

ESTIMATION OF THE COST OF PROVIDING PUBLICLY-SUPPLIED OUTDOOR RECREATIONAL FACILITIES IN MAINE

Stephen D. Reiling and Mark W. Anderson*

CHAPTER 1

INTRODUCTION

Federal, state and local government agencies have historically played a significant role in providing outdoor recreational facilities for public use. Public agencies provide campgrounds, picnic areas, hiking trails, access to swimming and boating sites, interpretive facilities and programs, and numerous other types of recreational facilities. Until recently, very little attention was devoted to the costs associated with the provision of these facilities. Public funds were allocated to the construction and operation of the facilities without much concern for the economic consequences of these actions. However, during the last decade several studies have documented the cost of providing publicly supplied outdoor recreational facilities and some of the consequences. These studies have analyzed a wide range of facilities managed by state and federal agencies.

Several factors can be cited to explain the increasing interest in cost studies. First, legislation enacted at the federal level has mandated that the costs and benefits of resource management actions be identified. In addition, policy makers, resource managers, and the general public have become more aware of the potential tradeoffs and conflicts inherent in resource allocation decisions. The policy debate surrounding the issue of expanding the National Wilderness Preservation System is a case in point. Clearly, documentation of the costs as well as the benefits associated with the alternative policy choices is germane to the resource allocation debate.

Resource economists have also contributed to the interest in cost of provision studies by raising questions regarding the relationship between the cost of provision and the fees or prices charged to the users

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of the facilities. These questions relate to both efficiency and equity criteria. It is well established that the use of public facilities is subsidized in that users only pay part of the costs incurred to provide the facilities. Hence, the quantity of facilities demanded by the public is greater than it would be if users were charged a fee based on the full cost of provision. This contributes to overcrowding, congestion and public pressures to expand the supply of facilities to alleviate these problems. This type of distortion of signals may result in an over allocation of public resources to recreational facilities. Of course, the subsidized use of public facilities can also distort the demand for complementary and substitute goods. This point is particularly relevant to commercial outdoor recreation enterprises that offer services similar to those provided by the public agencies. Both the quantity and quality of the commercial facilities may be adversely affected.

While efficiency criteria favor the implementation of fees based on the social cost of provision, equity considerations have been used to counter this argument. Some have attempted to justify the subsidized use of public facilities on the grounds that it makes the facilities available to low income individuals and families. This argument has merit when it is applied to urban recreational facilities accessible to low income populations. However, this argument is weak for two reasons when it is applied to resource based facilities. First, user fees for the facilities generally comprise a small part of the total costs incurred by the people who utilize the facilities. Transportation and equipment costs are often quite large and often preclude the use of the facilities by low income families. Hence, even zero user fees may be ineffective in increasing the use of the facilities by the poor. Other studies have reported that the users of many resource-based facilities are primarily people in the middle and upper income brackets. For example, Lewis (1977) reported that the median income of participants in all 28 outdoor recreational activities he studied was significantly greater than the median income of the U.S. population. Therefore, one can legitimately ask whether all users of the public facilities should be subsidized. Even though increasing the level of use of resource based facilities by low income people is probably a desirable social

goal, subsidized use for all users is an ineffective and inefficient method of achieving the goal.

Finally, cost of provision studies have become more prevalent for pragmatic reasons. The change in fiscal philosophy that is occurring at all levels of government has implications for recreation agencies. Public funds to construct new facilities and operate existing ones are becoming more uncertain. Cost of provision studies can help to identify cost saving measures as well as provide information that can be used to evaluate fee policies and their impact on agency revenues. User fees may become a more important source of revenue in the future, as recommended by a recent U.S. General Accounting Office Report (1980). There is some evidence to indicate that users fees are already being used to increase revenues. Tindall (1982) reported that fees collected in conjunction with the operation of state parks systems in the U.S. increased at an annual rate of over 14 percent between 1975 and 1980. This represents a real increase in fees since the rate of increase was greater than the inflation rate for the period. However, revenue from user fees still only provides a small part of the budget revenues of most state park agencies.

Objectives and Scope of the Project

The objective of this project is to measure the cost of providing various outdoor recreational facilities in Maine. The project was initiated in the Spring of 1981 following a meeting of personnel from several of the public agencies that provide recreational services and facilities. Several concerns were voiced at that meeting, including the need to revise user fees, uncertainty regarding the level of future agency funding, lack of information about provision costs, the need to document provision costs for legislative bodies, and questions regarding whether users should pay a larger share of the costs of providing the recreational facilities. A cost of provision study of a wide range of public recreational facilities seemed to be a first step in addressing many of these concerns. A cooperative agreement was written in which the Department of Agricultural and Resource Economics at the University of Maine at Orono would perform the study with funding provided by the U.S. Forest Service. Agencies participating in the study include the

Maine Bureau of Parks and Recreation, Baxter State Park, Evans Notch Ranger District of the White Mountains National Forest, and Acadia National Park. The actual facilities included in the study are shown in Figure 1.

Organization of the Report

Even though several cost of provision studies have been conducted, there are some methodological issues associated with conducting such a study. These issues are discussed in Chapter 2 of the report. Previous cost of provision studies are briefly reviewed and the procedures used in this study are identified and explained. The actual findings of the study are presented in Chapters 3 through 6. The costs of facilities provided by the Maine Bureau of Parks and Recreation are presented in Chapter 3 and Baxter State Park costs of provision are explained in Chapter 4. The cost of providing selected facilities in the Evans Notch Ranger District and Acadia National Park are reported in Chapters 5 and 6, respectively. Finally, conclusions and implications of the study are discussed in Chapter 7.

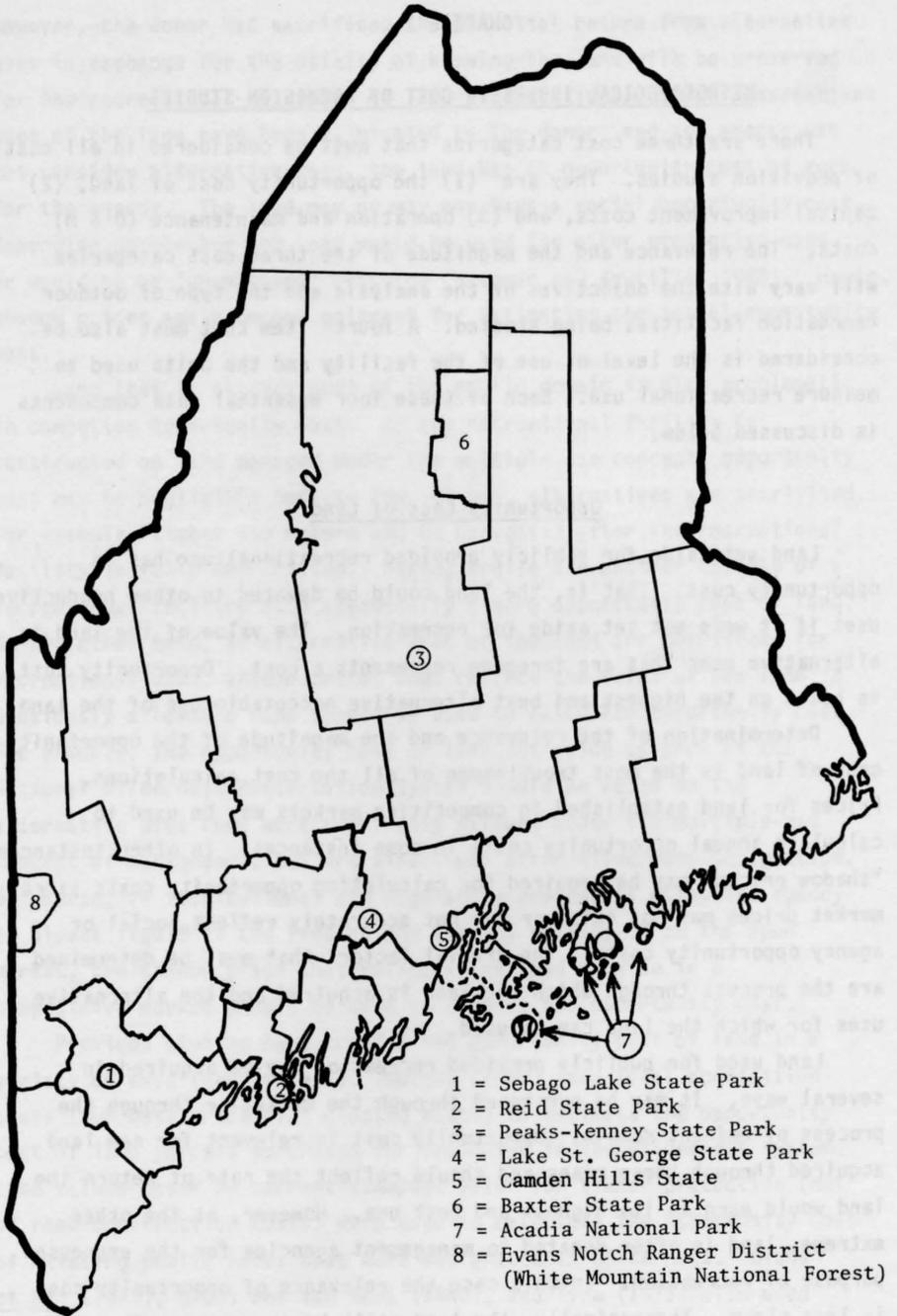


Figure 1. Location of the Publicly Provided Outdoor Recreational Facilities Studied in Maine.

CHAPTER 2

METHODOLOGICAL ISSUES IN COST OF PROVISION STUDIES

There are three cost categories that must be considered in all cost of provision studies. They are (1) the opportunity cost of land, (2) capital improvement costs, and (3) operation and maintenance (O & M) costs. The relevance and the magnitude of the three cost categories will vary with the objectives of the analysis and the type of outdoor recreation facilities being studied. A fourth item that must also be considered is the level of use of the facility and the units used to measure recreational use. Each of these four essential data components is discussed below.

Opportunity Cost of Land

Land set aside for publicly provided recreational use has an opportunity cost. That is, the land could be devoted to other productive uses if it were not set aside for recreation. The value of the land in alternative uses that are foregone represents a cost. Opportunity cost is based on the highest and best alternative acceptable use of the land.

Determination of the relevance and the magnitude of the opportunity cost of land is the most troublesome of all the cost calculations. Prices for land established in competitive markets may be used to calculate annual opportunity costs in some instances. In other instances, "shadow prices" may be required for calculating opportunity costs since market prices may not exist or may not accurately reflect social or agency opportunity costs. The crucial factors that must be determined are the process through which the land is acquired and the alternative uses for which the land can be used.

Land used for publicly provided recreation may be acquired in several ways. It may be purchased through the market or through the process of eminent domain. Opportunity cost is relevant for new land acquired through these means and should reflect the rate of return the land would earn in its highest and best use. However, at the other extreme, land is often donated to management agencies for the expressed purpose of recreation. In this case the relevance of opportunity cost is less clear. Theoretically, the land still has an opportunity cost;

however, the donor has sacrificed the potential return from alternative uses in exchange for the utility of knowing the land will be preserved for the recreational enjoyment of future generations. Since alternative uses of the land have been eliminated by the donor, and the agency can not consider alternative uses, the land has an opportunity cost of zero for the agency. The land may or may not have a social opportunity cost, depending on whether the land would be used for other productive uses or would be an "unemployed" resource (Haveman and Krutilla, 1968). Hence, shadow prices again become relevant for estimating the social opportunity cost.

Land that is already part of the public domain is also problematic in computing opportunity cost. If the recreational facility is constructed on land managed under the multiple-use concept, opportunity cost may be negligible because few, if any, alternatives are sacrificed. For example, timber can mature and be harvested after the recreational facility is fully depreciated. Hiking trails are another example of a recreational facility with essentially a zero opportunity cost of land. On the other hand, if alternative uses of the land are sacrificed for recreational uses, shadow prices that reflect the value of the land in previously allowable uses should be used to calculate opportunity cost. For example, the opportunity cost of land set aside as part of the National Wilderness Preservation System should be based on the alternative uses that were previously allowed under the multiple-use concept of management, but are disallowed after wilderness designation. Of course, if institutional and regulatory procedures allow the agency to divest itself of the land at any time by selling it on the open market, the shadow price that reflects the land's value in a competitive market should be used to compute the opportunity cost.

Previous studies have treated the opportunity cost of land in a variety of ways (see Table 1). Guldin (1980) used total acquisition costs (purchase price plus closing costs) to estimate the opportunity cost of land parcels purchased for inclusion in the wilderness system. Land values based on current stumpage value for timber production (net of road construction costs) were used to calculate the opportunity cost of existing public lands that were designated as wilderness. Gibbs *et al.* (1979), Gibbs and van Hees (1980), and Tyre (1975) also used timber production as the highest and best use of U.S. Forest Service

TABLE 1

A Summary of the Methods Used in Previous Cost of Provision Studies

Study/Management Agency	Types of Facilities Studied	Land Cost	Cost Accounting Approaches	
			Capital Cost	O & M Costs
Gibbs and van Hees (1980).U.S. Forest Service	111 Campgrounds Level 1-5 in Wash. & Oregon	Timber Opportunity Costs	Replacement Cost Amortized 20 Years at 10%	Personnel, Vehicles, Contracts & Tools
Gibbs, <i>et al.</i> (1979)/Oregon State Dept. of Forestry	9 Developed Campgrounds in Oregon	Timber Opportunity Costs	Replacement Cost Amortized 15 Years at 10%	Personnel, Vehicles, Contracts & Tools
Reiling, <i>et al.</i> (1980)/U.S. Forest Service, Oregon, & Idaho State Parks	38 Campgrounds in Oregon and Idaho	Not Calculated	Replacement Cost Amortized (various rates) for Weighted Average Life of Facility	All Variable Costs
Guldin (1980).U.S. Forest Service	4 Wilderness Areas in New England	Land Acquisition or Timber Opportunity Costs	Amortized Capital and Planning Costs at 6-3/8%	Labor, Fire Protection Payments in Lieu of Taxes
Tyre (1975)/U.S. Forest Service	218 U.S.F.S. Recreation Facilities in South	Timber Opportunity Costs	Replacement Cost Amortized 6% Over 20 Years	Overhead
Manthy and Tucker (1972)	Campground, Fishing & Hunting in Michigan	Not Calculated	Capital Improvement Expenditures	Salaries, Wages, Equipment and Supplies/Also Associated User Costs

TABLE 1 (Continued)

Study/Management Agency	Types of Facilities Studied	Land Cost	Cost Accounting Approaches	
			Capital Cost	O & M Costs
Irland (1980)/ Maine State Park, North Maine Woods, Fish & Wildlife Service	4 Maine Backcountry Systems	Calculated But Not Used to Determine Unit Costs	None	"Management Costs"
Downing (1979)/ U.S. Forest Service	Dispersed Recreation Along Roads in National Forests	None	None	Administrative, Fire Suppression, Road Maintenance

lands to calculate the opportunity cost for recreation. In contrast, Reiling et al. (1980), Downing (1979), and Manthy and Tucker (1972) did not include the opportunity cost of land in their cost of provision studies.

From a practical standpoint, the measurement of the social opportunity cost is a difficult process. In most cases the stumpage value of timber represents an over estimate of the social opportunity cost. The social opportunity cost of land removed from timber harvesting for wilderness use may range from zero for lands that are at the margin for timber harvesting, to an upper limit represented by the annualized stumpage value of timber. The correct measure of the social opportunity cost is equal to the net change in consumers' surplus and landowners' economic rent associated with the removal of land from timber harvesting.

The magnitude of the opportunity cost of land has varied considerably in previous studies. In general, opportunity cost as a percent of total provision costs is larger for dispersed, underdeveloped recreation areas, and is smaller for facilities that use land more intensively, such as campgrounds.

For the purposes of this study, the opportunity cost of land devoted to recreational use has been excluded from the analysis. This decision is based on several reasons. First, a large part of the land used by agencies for recreational facilities was donated to the agencies. This applies to all the land in Baxter State Park and a large part of the lands managed by the Maine Bureau of Parks and Recreation and Acadia National Park. Furthermore, since U.S. Forest Service lands included in this study are managed under the multiple-use concept, there is some doubt whether other uses of the land are completely excluded with the passage of time. Hence, the opportunity cost of the land may approach zero. Finally, this study is designed to measure the more tangible costs associated with providing recreational opportunities. Since opportunity cost is not a "real" cost that must be paid by the agency, it was decided to exclude it from the analysis.

Capital Improvement Costs

The provision of capital improvements, such as roads, buildings, trails, campsites, and picnic sites at a publicly provided facility, is

also a major cost category. Of course, the magnitude of improvement costs varies with the type and quantity of improvements provided. Improvement costs are relatively low for some facilities but are quite large for others. For example, Gibbs and van Hees reported amortized annual improvement costs of only \$200 per campsite (in 1980 dollars) for primitive (level 1) U.S. Forest Service campsites and \$1,600 per campsite for highly developed (Level 5) campsites (see Table 2).

The cost of improvements must be spread out over the useful life of the facility. Previous studies have usually assumed a useful life of fifteen or twenty years for most facilities. Reiling *et al.* (1980) estimated a weighted average useful life of a facility on the basis of the useful life of all improvements contained within the recreational facility.

There are two basic issues that must be addressed to estimate improvement costs. First, one must choose the most appropriate measure of capital improvement costs and, second, one must decide on the most appropriate method to recover the improvement costs.

There are two ways to measure the cost of capital improvements. The first is the original construction cost of the improvements and the second is the current replacement cost of the improvements, assuming the facility already exists. Both measures have advantages and disadvantages, depending on the objectives of the analysis. Clearly, original construction costs should be used if the agency is most concerned with measuring and/or recovering actual sunk costs. Annual payments required to recover original construction costs, with or without interest, can be calculated and included in annual total cost estimates.

However, there are some practical and conceptual problems associated with using original construction costs for improvements already in place. From a practical viewpoint, it is often extremely difficult to accurately estimate original construction costs from historical data. For example, the historical cost data may not be available. Furthermore, even if the data are available, it may not be possible to accurately reconstruct the costs. As new improvements are added to the facility, they often replace older improvements as well as adding to the total stock of capital improvements. Hence, the cost of replaced facilities should be subtracted out to prevent over estimation of construction costs of existing improvements. This is often difficult. Another problem

TABLE 2

Costs of Various Outdoor Recreation Facilities

Study	Year of Data	Total Costs Reported ¹	Cost Per Visitor Day		Cost Per Site	
			Dollars Reported ¹	1980 ² Dollars	Dollars Reported ¹	1980 ² Dollars
Gibbs & van Hees (1980)						
Level 1	1977	843	0.28	0.35	163.31	205.77
Level 2	1977	5,166	1.44	1.81	769.64	969.74
Level 3	1977	12,929	1.74	2.19	744.61	938.02
Level 4	1977	50,118	1.33	1.67	1,007.96	1,270.02
Level 5	1977	65,106	3.01	3.79	1,328.69	1,674.14
Gibbs <u>et al.</u> (1979)	1977	18,868	1.69	2.12	430.86	542.88
Reiling <u>et al.</u> (1980)						
U.S.F.S.-Oregon	1974	23,169	8.02 ³	12.35	558.00	859.00
U.S.F.S.-Idaho	1975	15,082	8.94	12.60	511.00	721.00
State Parks-Idaho	1975	24,818	9.82	13.84	730.00	1,029.00
State Parks-Oregon	1978	199,013	10.24	12.08	1,022.00	1,206.00
Guldin (1980)						
Bristol Cliffs	1977	24,607	17.22	21.69	6.58 ⁴	8.29
Lye Brook	1977	82,160	11.72	14.76	5.75	7.25
Presidential Range-Dry River	1977	48,891	2.10	2.64	2.40	3.02
Great Gulf	1977	35,642	1.91	2.40	6.42	8.09

TABLE 2 (Continued)

Study	Year of Data	Total Costs Reported ¹	Cost Per Visitor Day		Cost Per Site	
			Dollars Reported ¹	1980 ² Dollars	Dollars Reported ¹	1980 ² Dollars
Tyre (1975)						
Observation	1970	12,119	1.62	3.14	-- ⁵	--
Boating	1970	34,413	3.37	6.53	--	--
Swimming	1970	69,945	4.36	8.26	--	--
Picnic	1970	180,169	2.14	4.15	--	--
Campground	1970	478,301	1.28	2.48	--	--
Recreation Road	1970	1,436,262	3.81	7.39	--	--
Trail	1970	86,658	2.29	4.44	--	--
Nature Lake	1970	370	0.09	0.17	--	--
Rivers & Streams	1970	13,025	0.13	0.25	--	--
Undeveloped Area	1970	23,295	0.07	0.13	--	--
Wilderness	1970	30,728	6.03	11.69	--	--
Scenic	1970	22,394	0.87	1.68	--	--
Memorial	1970	23,968	2.20	4.26	--	--
Nat'l Recreation	1970	12,958	2.00	3.88	--	--
Archeological	1970	443	0.37	0.71	--	--
Geological	1970	3,480	2.90	5.62	--	--
Historical	1970	4,323	2.40	4.65	--	--
Manthy & Tucker (1972)						
Primitive Campground	1968	N/A	0.51	1.10	150.25	323.04
Modern Campground	1968	N/A	1.15	2.47	199.56	429.05
Irland (1980)						
Baxter	1978	534,000	3.79	4.47	2.66 ⁴	3.14
North Maine Woods	1978	135,000	3.00	3.54	0.08	0.09
Moosehorn	1978	80,000	3.29	3.88	3.53	4.17
Allagash	1978	207,000	1.36	1.60	5.95	7.02

TABLE 2 (Continued)

Study	Year of Data	Total Costs Reported ¹	Cost Per Visitor Day		Cost Per Site	
			Dollars Reported ¹	1980 ² Dollars	Dollars Reported ¹	1980 ² Dollars
Downing (1979)						
Greenwater	1978	5,729	0.35	0.41	-- ⁵	--
Clackmass	1978	20,591	1.18	1.39	--	--
Shellrock	1978	1,500	0.53	0.62	--	--

¹"Dollars Reported" refers to the value of the dollar in the year the data were collected.

²The GNP price deflator was used to inflate reported dollars to 1980 dollars.

³Per camper unit rather than per visitor day.

⁴Cost per acre.

⁵Not calculated.

associated with use of original construction costs is that the cost estimates do not provide information regarding the current cost of expanding existing facilities or constructing new ones. Hence, the historical information is of limited use for estimating current costs for policy decisions.

Use of original construction costs to estimate improvement costs also has a conceptual flaw for some uses. If the cost of provision data are being calculated as part of a study to establish efficient fee policies to guide future resource allocation decisions, original construction costs are meaningless. Howe (1971) argues that replacement costs should be used to calculate improvement costs when the purpose is to establish efficient pricing methods. Use of replacement costs for determining fees forces potential users to consider the full costs they impose on the agency (and society) if additional capacity is required. If users are willing to pay amortized replacement costs, along with all other relevant costs, and if excess demand still exists, expansion of the recreational facilities is justified. Hence, one must again consider the purpose for which the results of the study will be used in deciding whether replacement costs or original costs should be used to calculate the costs of capital improvements for the facility. All previous studies used replacement costs for estimating the capital improvement component of provision costs (see Table 1).

The other issue to be addressed is the most appropriate method to use to repay capital improvement costs. Again, two alternatives exist: amortization and a sinking fund. Amortization can be used to calculate the annual payment required to recover the capital improvement cost, plus interest, over the life of the facility. Amortization is the method used to recover capital improvement costs for federal water resource development projects. Alternatively a sinking fund can be viewed as an investment account into which annual payments are made during each year of the life of the improvement. At the end of the useful life, the annual payments, plus the interest earned on the payments, are equal to the improvement costs.

An example may be useful to illustrate the two techniques. Suppose an agency has decided it wants to collect user fees to recover the cost of a capital improvement costing \$10,000. Assume the expected life of

the improvement is 15 years and the relevant interest rate is 10 percent. Using amortization, the annual payment required to recover the original \$10,000 and interest on the unpaid principle is \$1,315. That is, \$1,315 should be collected annually through user fees to recover the principle plus interest during the life of the facility. On the other hand, the annual payment that must be paid into the sinking fund account is only \$315. That is, a payment of \$315 per year and the interest that accumulates on the payments over the 15 year life will result in a sinking fund balance of \$10,000 at the end of the economic life of the improvement. Hence, amortization results in repayment of the original investment outlay plus interest, whereas the sinking fund allows interest on payments to accumulate to recover the investment cost.¹ Therefore, the annual payments under the sinking fund approach are much lower than those required by amortization. The difference in the size of the payments required under the two methods increases as the interest rate increases.

The size of payments made into a sinking fund is not only less than that required by amortization, it is also less than the size of payments that would be required to recover straight-line depreciation charges. Depreciation charges for the above example would be \$667 per year (assuming a salvage value of zero), which is more than double the sinking fund payment. Hence, the sinking fund approach is the least expensive way of accounting for improvement costs.

The question of whether amortization or a sinking fund should be used to recover improvement costs again depends on the purpose of the study. Clearly, amortization should be used if the objective is to estimate the full social cost of provision. As noted above, amortization results in recovery of the original investment and interest on the invested funds. Interest payments should be included to reflect the opportunity cost of the capital used in the facility. All previous studies have used amortization to estimate annual improvement costs.

¹The formula for calculating the annual amortization payment is $\frac{i}{(1+i)^T - 1} + i$, while the formula for calculating the annual sinking fund payment is $\frac{i}{(1+i)^T - 1}$, where i and T refer to the interest rate and years of useful life of the investment, respectively.

If an agency has been charged with the responsibility to operate its recreation facilities in a self-supporting manner, it may finance new capital improvements through the sale of revenue bonds. In this situation, amortization should again be used to calculate the annual payment. Using the example above, if an agency issues a \$10,000 bond to finance the capital improvement, it is obligated to repay the \$10,000 and interest when the bond matures in fifteen years. The amortization process will indicate the annual payment required to repay the \$10,000 with interest.

The sinking fund may be an acceptable method to recover capital costs in certain situations. If an agency is given the responsibility to be self sufficient, it would have to finance the replacement of existing facilities from accumulated revenues. A sinking fund could be used to accumulate the sum required to replace the facility, based on the remaining years of life of the facility, the replacement cost of the facility, and the appropriate interest rate. Use of the sinking fund in this manner would allow the agency to continually accumulate the funds required to replace existing facilities at the end of their economic life.

Even if the sinking fund payments are based on original construction costs, the fund can be managed in such a way as to accumulate the replacement cost of a facility if the difference between original costs and replacement costs is due to inflation. The nominal interest rate is the sum of two components: the prevailing "real" rate of interest and a component reflecting the expected inflation rate during the life of the investment. If the real interest rate is used to calculate the annual sinking fund payment to recover original costs, but the fund is invested to yield a rate of return equal to the nominal interest rate, the accumulated sum in the sinking fund at the end of the useful life of the improvement will be approximately equal to the replacement cost of the improvement.

In summary, the appropriate methods to measure and repay capital improvement costs depend on the objectives of the study and the fiscal arrangements under which the agency is operating. Replacement costs and amortization should be used to determine the full social cost while a sinking fund can be used by agencies that are required to operate and

replace existing recreational facilities without subsidies from other sources of government revenue. We have calculated and reported capital replacement costs using both the sinking fund and amortization methods. The sinking fund was used to indicate the minimum payment required to allow the agencies to replace the existing facilities with revenues generated from user fees. Hence, the agency could be self supporting in the provision of the existing facilities. Amortization payments were also calculated to reflect the social opportunity cost of capital. It should be noted that a "real" interest rate of three per cent was used to calculate both the sinking fund and amortization payments. This represents a departure from the procedures of previous studies that used interest rates ranging from 6.875 percent to 10 percent. Hence, the capital recovery costs reported in this study, even for amortization, are lower than those reported in previous studies.

Operation and Maintenance Costs

Estimation of operation and maintenance (O & M) costs is less problematic from a theoretical viewpoint, although practical problems exist. O & M cost estimates should include all direct labor, equipment, vehicular, supplies, utilities, fuel, administrative overhead, and other operating expenses incurred to provide a facility. One problem is that these costs may be difficult to estimate for a specific facility (such as a campground or trail system) located in a larger management unit, such as a ranger district in a national forest. That is, allocation of O & M costs to a specific facility within a management unit may be difficult, especially on an ex post basis. In some instances, accurate estimates of O & M costs for a given facility can be made after the fact based on historical records and the knowledge of agency personnel.

Another problem area is the calculation of administrative overhead. One must determine how far up the administrative structure of the organization one must go to estimate administrative overhead. For example, should a fraction of the costs associated with recreation planning by the National Park Service staff in Washington, D.C. be allocated to a specific facility in a national park? Agency personnel are in the best position to answer this question.

Finally, the researcher should be aware that the labor costs budgeted for recreation may under estimate actual labor costs. In some instances, agency personnel assigned to other functions (such as fire suppression) are utilized to perform maintenance and other tasks at recreation areas during slack periods. Manpower programs such as CETA and the Job Corps have also contributed labor services to the operation of public recreation facilities. Gibbs and Reed (1982) found that "borrowed" and "contributed" labor accounted for over one-fourth of the labor services utilized at the recreational facilities they studied. Volunteer labor is also an important input for some facilities. Even though these labor services are not charged against the agency budgets for provision of recreation, they represent an important cost component in some instances. The concepts of opportunity cost and shadow prices are again relevant for estimating the social costs of these labor services.

Operation and maintenance costs have generally been calculated uniformly in previous studies. Variations in the type of costs included in the estimates are largely due to the differences in facilities analyzed. Previous studies have included direct labor expenses, service contracts, supplies, and in some instances, a proportional share of the administrative expense of the agency. Fire suppression costs were included in studies of wilderness and dispersed recreation areas (Downing, 1979 and Guldin, 1980).

We have attempted to account for all O & M costs associated with the provision of the facilities included in this study. In addition to normal O & M costs, we have also estimated overhead costs for each facility. We have also accounted for contributed and borrowed labor where appropriate. We believe the O & M cost data presented in subsequent chapters are the best available from the agencies on an ex post basis.

Measurement of Recreational Use

Once the total cost of a recreational facility has been determined, it is often useful to relate the cost to the size and level of use of the facility. Gibbs and Reed (1982) calculated costs on a per-site, a per-unit-of-capacity, and a per-unit-of-use basis. This standardizes

the costs and facilitates comparisons among facilities. Measurement of costs per unit of use is also useful for comparing with the current user fee. Unfortunately, unlike most market goods, there is no standard unit of recreation use or consumption. User fees are assessed in a number of different ways, such as per car, per party, and per person.

The most widely used measure of recreation use is the recreation visitor day (RVD), which represents twelve hours of recreational use of a facility. It may consist of one person who spends twelve hours at the facility or twelve people who spend one hour at the site.

The use of RVDs as a measure of use is problematic for two reasons. First, RVDs may not accurately reflect the relationship between the level of use and the costs of accommodating that use. As an extreme example, twelve people who arrive at a site at the same time and use it for an hour may have a vastly different impact on costs than one person who uses the facility for twelve hours. We would hypothesize that O & M costs would be larger for the twelve people who stay one hour than for the one person who stays twelve hours.

The second problem with RVDs is that user fees are often assessed on the basis of other use measures. For example, the U.S. Forest Service uses RVDs to measure the level of use of a campground; however, fees are assessed on the basis of an occupied site. A party of four using a site for twenty-four hours accounts for eight RVDs but the fee associated with the use of the site is the fee assessed for one night. If the objective of the study is to modify or plan new fee schedules, a conversion factor must be used to estimate the number of occupied sites from the existing RVD use data. Some standard conversion factors are available, but they may not be applicable to individual facilities because of the variations in use pattern (e.g. transient versus destination facilities). In some cases, surveys may have to be conducted to determine the conversion factor for a given facility.

It is impossible to specify a "correct" measure of recreation use. Occupied sites or camper units (Reiling, et al. 1980) is a useful measure for campgrounds. However, other measures are clearly required for other types of facilities such as hiking trails and boat launching facilities. Alternative measures include recreation days (the number of people who visit the site, regardless of their length of stay), hiker miles, and

number of boat launchings. Whenever possible, the measure of use should correspond to the unit of measure that is currently used or will be used to assess fees.

Another problem associated with use data is accuracy. Use data are usually estimated by indirect techniques such as traffic counters, trail counters, and sample counts. The resulting estimates may or may not be accurate. Since the level of use has a major impact on costs per unit of use, surveys may be required to validate the accuracy of existing use data. Accurate use data are especially important for studies designed to establish costs for fee determination.

The accuracy of the use data presented in this study varies considerably among the facilities studied. The data are very accurate for those facilities with limited access, such as Baxter Park and several of the Maine Bureau of Parks and Recreation facilities. Use data for some individual facilities and dispersed recreation in Acadia National Park and the Evans Notch Ranger District are probably less accurate because of the difficulty of collecting reliable use data.

Several units of use are used in the study. While the recreation visitor day is the most common measure used, other measures used include the number of vehicles, the number of recreation visits, and the number of occupied campsites in campgrounds.

Clearly, there is no one "correct" way of estimating the cost of providing public outdoor recreation facilities and services. Social costs of provision may differ significantly from costs budgeted by the agency. The methods of calculating and recovering these costs may vary also, depending on the fiscal responsibilities of the agency. These factors must be kept in mind during the design and conduct of the study. Agency personnel can then calculate provision costs that are relevant to its particular situation. The results of these studies should be valuable input for decisions regarding future policies for providing facilities and the fees associated with their use.

CHAPTER 3

MAINE BUREAU OF PARKS AND RECREATION

The Maine Bureau of Parks and Recreation is the leading state agency for providing outdoor recreation opportunities in Maine. It has broad responsibility for outdoor recreation planning in Maine and manages numerous outdoor recreational facilities in the State, including state parks (which may contain both day use and camping facilities), historic sites, boat launching facilities, a snowmobile trail system, the Allagash Wilderness Waterway and other facilities. It also provides technical and financial assistance to municipal recreation agencies. The type of facilities managed by the Bureau range from primitive facilities in the Allagash Wilderness Waterway and the Bigelow Preserve to highly developed camping and cultural facilities in the tourist-oriented coastal area of the State.

Organizational Structure

The central office of the Bureau is located in Augusta where administrative support and planning activities are performed. Parks, historic sites, and other facilities are administered through six districts, with the Allagash Wilderness Waterway being a separate administrative unit. A supervisor for each district reports to the Director of Operations and Maintenance in the Augusta office. The Bureau manages 38 parks that contain camping and/or day use recreation facilities in the State. Most of these have seasonal managers and staff, although some larger facilities have full-time managers with additional seasonal personnel.

The Snowmobile Division is a separate administrative unit within the Bureau. It serves two functions. The Division assists in the planning and funding of intermunicipal snowmobile trails, which are often operated by regional snowmobile organizations and it maintains four snowmobile trails in the State and contracts for the maintenance of a fifth trail. These activities are funded through a dedicated revenue fund financed by a fraction of the State gasoline tax revenue.

Facilities Studied and Accounting Procedures

Five state parks were chosen for inclusion in this study. The parks were chosen on the basis of location and the types of facilities and

services offered. The parks studied and the type of facilities provided include: Sebago Lake (camping and day use); Lake St. George (camping and day use); Reid (day use); Peaks-Kenny (camping and day use); and Camden Hills (camping and day use). The Allagash Wilderness Waterway is also analyzed, along with the costs incurred by the Snowmobile Division to operate and maintain four trails.

As noted in Chapter 2, a problem can exist in determining provision costs when a facility has multiple functions or outputs. Although four of the state parks studied have both day use and camping facilities, the budgets for these parks are not disaggregated by activity. Hence, the budgets had to be broken down into camping and day use expenses for this study. This breakdown was accomplished by meeting with the park manager and/or district supervisor responsible for each park. These individuals were asked to allocate a proportion of each line item in the budget to camping and day use activities on the basis of their knowledge of the park. The estimates of day use and camping costs presented below are based on the judgment of those personnel.

Another problem is the allocation of overhead expenses to specific facilities. For the Bureau, overhead expenses had to be allocated at two levels. First, the overhead associated with the district offices had to be allocated to the parks in the districts, and second, the overhead associated with the Augusta headquarters had to be allocated to all facilities and services offered by the Bureau. Portions of five service support centers in Augusta were allocated to park operations in general. These service support centers and the percent allocated to park operations include Administration (35%), Design and Development (25%), Operation and Maintenance (100%), Planning and Research (15%), and Supply Depot (100%). The allocation of support service center expenses to park operations was made by Bureau personnel. Those service support costs not assigned to the operation of parks support other recreational responsibilities of the Bureau. The percentage and amount of overhead assigned to park operations are reported in Table 3.

All overhead costs were allocated to the individual parks included in the analysis in proportion to the individual park's budget as a percent of the total district or Park operation budgets. For example, the budget for Sebago Lake State Park represented 11.0 percent of the

TABLE 3

Percentage and Amount of Five Support Service Cost Centers Allocated to Operation of State Parks, Maine Bureau of Parks and Recreation, FY 1980-81

Support Service Center	Total Budget	Percent Allocated to Park Operations	Amount Allocated to Park Operations
Administration	\$ 56,937	35	\$ 19,928
Design and Development	223,685	25	55,921
Operation & Maintenance	147,338	100	147,338
Planning and Research	30,499	15	4,575
Supply Depot	<u>28,312</u>	100	<u>28,312</u>
Total Augusta Overhead Expenses	\$486,771		\$256,074

park operations budget, and 70.8 percent of the District A. budget. Therefore, 11.0 percent of the total amount allocated to Park operations was allocated to the Sebago Lake Park. In addition, 70.8 percent of District A overhead expenses was allocated to Sebago Lake. The amount of overhead expenses allocated to each of the five parks and the Allagash Wilderness Waterway is reported in Table 4.

Personal Services and other operation and maintenance costs for each park were obtained from the Bureau's budget and expenditure reports. An annual payment to a sinking fund was also calculated for buildings and equipment, paved roads, and vehicles. Current replacement values for buildings and equipment were determined from insurance inventories maintained by the Bureau. The useful life of buildings and equipment was assumed to be 20 years. Replacement costs for paved roads were estimated to be \$5,913 per mile, based on recent contracts let by the Bureau for road resurfacing. A useful life of eight years was assumed for roads. Vehicle replacement costs were derived from purchases made by the Bureau in 1980-81, net of an estimated salvage value of \$1,000 per vehicle, which is based on recent Bureau experience. Bureau vehicles

TABLE 4. Allocation of Augusta and District Overhead Expenses to Individual Parks and Facilities, Maine Bureau of Parks and Recreation, FY 1980-81

Type of Overhead	Park/Facility					
	Sebago Lake	Reid	Allagash Wilderness Waterways	Camden Hills	Lake St. George	Peaks-Kenny
Augusta						
Administration ¹	\$ 2,192 (11.0%)	\$ 1,435 (7.2%)	\$ 1,833 (9.2%)	\$ 1,036 (5.2%)	\$ 598 (3.0%)	\$ 418 (2.1%)
Design and Development ¹	\$ 6,151 (11.0%)	\$ 4,026 (7.2%)	\$ 5,145 (9.2%)	\$ 2,908 (5.2%)	\$ 1,678 (3.0%)	\$ 1,174 (2.1%)
Operation and Maintenance ¹	\$16,207 (11.0%)	\$10,608 (7.2%)	\$13,555 (9.2%)	\$ 7,662 (5.2%)	\$ 4,420 (3.0%)	\$ 3,094 (2.1%)
Planning and Research ¹	\$ 503 (11.0%)	\$ 329 (7.2%)	\$ 421 (9.2%)	\$ 232 (5.2%)	\$ 137 (3.0%)	\$ 96 (2.1%)
Supply Depot ¹	\$ 3,114 (11.0%)	\$ 2,038 (7.2%)	\$ 2,605 (9.2%)	\$ 1,472 (5.2%)	\$ 849 (3.0%)	\$ 595 (2.1%)
Total Augusta Overhead Expenses	\$28,167	\$18,436	\$23,559	\$13,316	\$ 7,682	\$ 5,377
District Overhead Expenses ²	\$11,667 (70.8%)	\$11,754 (42.0%)	-- ³ -- ³	\$21,636 (40.0%)	\$ 5,037 (18.0%)	\$ 9,170 (16.0%)
Total Overhead Expenses	\$39,834	\$30,190	\$23,559	\$34,952	\$12,719	\$14,547

¹Percentages refer to individual park budget as a percent of park operations budget. These percentages were used to compute the figures reported in this row.

²Percentages refer to the individual park budget as a percent of district budget. These percentages were used to compute the figures reported in this row.

³Not assigned to a district.

have an average expected useful life of seven years. A three percent real rate of interest was used in the sinking fund formula to calculate capital recovery costs. These costs are reported below for each of the facilities analyzed.

Finally, as noted in the methodology section, the use data obtained from management agencies are often based on estimates obtained from indirect measurement methods. The Bureau of Parks and Recreation estimates visitors by multiplying the number of vehicles or parties that enter the park by the standard factors of 4.0 persons per camping party and 4.5 persons per day use party. However, recent surveys at the various parks indicate that these standard factors are too high. Those surveys conducted at the parks studied here indicate that the average size of the parties ranged from 2.6 persons for camping parties at Camden Hills State Park to 3.9 persons for camping parties at Peaks-Kenny State Park. The average size of party obtained from these surveys was used to recalculate the number of visitors at the parks. Hence, the use data used in this report differ from those normally reported by the Bureau of Parks and Recreation. The data used below are believed to be more accurate than the other published data.

Provision Costs for Individual Facilities

Sebago Lake State Park

Sebago Lake State Park is probably the most heavily used park managed by the Bureau of Parks and Recreation. It is a popular day use and destination camping facility in southern Maine. More than 84,000 visitor days of camping and 150,000 visitor days of day use activities occurred in the park in FY 1980-81. The heavy use reflects, in part, the proximity of the park to the major population centers of Portland and Lewiston/Auburn. The level of use requires that the park have two year-round managers; one manages the day use facilities and the other oversees the campground operation.

The park contains 287 campsites with both flush toilets and chemical latrines. Other facilities, such as an amphitheater, three bathhouses and a swimming beach are also provided. The current replacement value of buildings and equipment allocated to camping and day use is \$445,300 and \$370,100, respectively. The replacement cost of

roads and parking lots is \$12,264 in the campground and \$11,649 in the day use area. The value of vehicles allocated to the two activities is \$28,558 for the campground and \$16,844 for the day use facility. The total replacement cost for the park is \$884,715. The camping fee in the campground in FY 1980-81 was \$4.50 and \$6.00, respectively, for residents and nonresidents. Day use fees were \$1.50 per vehicle for both residents and nonresidents.

The total cost of providing and operating Sebago Lake State Park for FY 1980-81 and the allocation to day use and camping activities are reported in Table 5. The total costs are subdivided into personal services, other operation and maintenance (O & M) costs, overhead costs, and capital recovery costs. The latter is based on annual payments to a sinking fund that will yield a three percent real rate of interest. The allocation of each line item of O & M costs to camping and day use activities was provided by Bureau personnel.

Total operation and maintenance costs (which includes personal services and other O & M costs) for the campground operation in FY 1980-81 were about \$122,000. Over 87 percent of these costs was incurred as compensation for personal services. Vehicle-related costs and utilities accounted for a large part of the remaining O & M costs. The same pattern exists for the day use facility. Personal services accounted for 90 percent of total O & M costs for the day use operation. Total operation and maintenance costs for the park were \$194,000; of this amount, over \$170,000 were paid in wages and fringe benefits.

Total overhead expenses for the park were \$39,834. This amount was allocated to camping and day use on the basis of the allocation of total O & M costs. Since the campground accounted for 62.8 percent of total O & M costs, 62.8 percent of the overhead was allocated to the camping facility. Overhead charges for the park were quite large, which indicates that this component of cost is fairly significant in terms of the total cost of providing the facility.

Capital recovery costs, based on the sinking fund, were about \$38,800 for the park as a whole. This indicates that a payment of that amount would have to be paid into the fund each year to generate the capital needed to replace the capital items at the end of their useful life. As will be illustrated below, this payment would be larger if

TABLE 5

Camping, Day Use and Total Costs of Provision, by Cost Category, Sebago Lake State Park, FY 1980-81

Cost Category	Camping	Day Use	Total
Personal Services			
Permanent Regular Salary	\$ 12,543	\$ 12,543	\$ 25,086
Seasonal Regular Salary	76,175	41,018	117,193
Overtime	1,816	1,816	3,632
Health Insurance & Retirement	15,156	9,270	24,426
Clothing and Telephone Allowance	432	265	697
Subtotal	\$106,122	\$ 64,912	\$171,034
Other Operation & Maintenance Costs			
Professional Services	\$ 127	\$ --	\$ 127
Travel	133	--	133
Gasoline and Oil	4,261	2,295	6,556
Miscellaneous Vehicle Expenses	682	682	1,364
Telephone and Electricity	7,397	2,309	9,706
Repairs	23	23	46
General Operating, Postage and Office Supplies	337	337	674
Other Supplies	2,780	1,497	4,277
Workmen's Compensation	60	37	97
Subtotal	\$ 15,800	\$ 7,180	\$ 22,980
Total Operation & Maintenance Costs	\$121,922	\$ 72,092	\$194,014
Overhead			
State	\$ 17,689	\$ 10,478	\$ 28,167
District	7,327	4,340	11,667
Subtotal	\$ 25,016	\$ 14,818	\$ 39,834
Capital Recovery Costs			
Buildings and Equipment	\$ 16,476	\$ 13,694	\$ 30,170
Roads	1,374	1,305	2,679
Vehicles	3,725	2,197	5,922
Subtotal	\$ 21,575	\$ 17,194	\$ 38,769
Total Costs	\$168,513	\$104,104	\$272,617

capital costs were amortized. The campground accounted for about 56 percent of the capital recovery costs.

Operation and maintenance costs accounted for 72 percent of the total costs of the campground operation and 69 percent of the total cost of the day use facilities. Overhead costs for the campground and day use area comprised 15 percent and 14 percent, respectively, of the total cost of the two facilities. Finally, capital recovery costs accounted for 13 percent of total campground costs and 17 percent of day use total costs. In total, over \$270,000 of costs were associated with the provision of Sebago Lake State Park in FY 1980-81.

Average costs of provision for Sebago Lake are reported in Table 6. For the camping operation, O & M costs averaged about \$425 per campsite, \$5.47 per occupied site and \$1.44 per visitor day. Total costs for the campground averaged \$587.16 per campsite, \$7.57 per occupied site and \$1.99 per visitor day. Since fees are charged on the basis of occupied sites, the cost per occupied site can be compared with the fee to determine the percent of costs covered by the fee. The resident fee of \$4.50 per occupied site covered about 82 percent of O & M costs and 60 percent of total costs. The nonresident fee of \$6.00 covered all O & M costs and 79 percent of the total costs of provision.

TABLE 6

Average Costs of Provision for Camping and Day Use Facilities, Sebago Lake State Park, FY 1980-81

Cost Category	Camping Costs			Day Use Costs	
	Per Campsite	Per Occupied Site	Per Visitor Day	Per Vehicle	Per Visitor Day
Personal Services	\$369.77	\$4.76	\$1.25	\$1.55	\$.43
Other O & M Costs	<u>55.06</u>	<u>.71</u>	<u>.19</u>	<u>.17</u>	<u>.05</u>
Total O & M Costs	\$424.83	\$5.47	\$1.44	\$1.72	\$.48
Overhead	\$ 87.16	\$1.12	\$.30	\$.35	\$.10
Capital Recovery Costs	\$ <u>75.17</u>	\$ <u>.97</u>	\$ <u>.25</u>	\$ <u>.41</u>	\$ <u>.11</u>
Total Costs	\$587.16	\$7.56	\$1.99	\$2.48	\$.69

O & M costs per vehicle and per visitor day for the day use facility averaged \$1.72 and \$.48, respectively. Total costs were \$2.48 per vehicle and \$.69 per visitor day. The user fee of \$1.50 per vehicle covered 87 percent of O & M costs and 60 percent of total day use costs.

The comparison of costs and user fees for Sebago Lake is interesting. As noted above, Sebago Lake is the most intensively used park managed by the Bureau of Parks and Recreation. Since the total cost of provision per unit of use is often inversely related to the level of use, one would hypothesize that costs per unit of use would be lower for Sebago Lake than for the other parks. Therefore, the fee paid at Sebago Lake should cover a larger proportion of the costs of provision than for the other parks. In fact, Bureau personnel were confident that the fees paid at Sebago Lake would cover all costs of provision. However, the above analysis indicates that this is not the case.

Lake St. George State Park

Lake St. George State Park, which is located about 30 miles east of Augusta on Route 3, is a relatively small facility. It includes a day use area and a campground with 31 campsites. It has flush toilets, a bathhouse, and a swimming area. There were 7,295 visitor days of camping activity and 20,502 visitor days of day use activity in the park during FY 1980-81.

The relatively small size of the park is reflected in the FY 1980-81 replacement value of the facility. The replacement values for the campground were \$105,632 for buildings and equipment, \$800 for roads, and \$12,266 for vehicles. Replacement values for the facilities in the day use area were \$64,468 for buildings and equipment, \$489 for roads, and \$7,486 for vehicles. Total replacement value for the park was \$191,141.

Estimation of the costs of provision for Lake St. George presented some special allocation problems because some personnel assigned to Lake St. George provide services to other parks in District C and to the Bureau of Parks and Recreation as a whole. For example, all new vehicles purchased by the Bureau are received at Lake St. George for initial maintenance checks. Through discussions with the park manager and the district supervisor, O & M costs associated with the maintenance services performed for the Bureau as a whole and for District C were separated

from the O & M costs associated with the operation of campground and day use areas at Lake St. George. Only the costs associated with operating the recreational facilities at Lake St. George are reported below.

The costs associated with the provision and operation of Lake St. George State Park for FY 1980-81 are reported in Table 7. Total operation and maintenance costs were \$27,292 and \$16,644 for the camping and day use facilities, respectively. Personal services again accounted for the majority of O & M costs. Personal services were 96 percent of the total O & M costs for the campground and 95 percent of total O & M costs for the day use facility.

Overhead costs totaled \$12,719 for the park; overhead assigned to the campground was \$7,900, or 62.1 percent of total overhead, since the campground accounted for 62.1 percent of the total O & M costs for the park. Capital recovery costs totaled \$5,598 for the campground and \$3,416 for the day use area. Buildings and equipment accounted for 70 percent of the capital recovery costs for the facility.

Total provision costs for the facilities in FY 1980-81 were \$40,790 and \$24,879 for the campground and day use area, respectively. Personal services accounted for about 64 percent of the total cost of providing the camping and day use facilities. Overhead costs comprised 19 percent of total costs and capital recovery costs were 14 percent of total costs for the day use area and campground.

Average costs are reported in Table 8 for the campground and day use area. Campground costs averaged about \$1,316 per campsite, \$17.44 per occupied campsite, and \$5.59 per visitor day. Costs for the day use area were \$4.50 per vehicle and \$1.23 per visitor day. The average costs for Lake St. George are much larger than those reported above for Sebago Lake. For example, the costs per campsite at Lake St. George are 124 percent greater than Sebago Lake. Average costs per vehicle for the day use facility are about 80 percent greater at Lake St. George than at Sebago Lake. One reason that costs per unit of use were so high at Lake St. George is that the intensity of use is much lower than at Sebago Lake. Since about one-third of the reported costs of provision for Lake St. George are fixed and, therefore, do not vary with the intensity of use, it is probable that the total costs per unit of use would decline as the level of use of the facility increased.

TABLE 7

Camping, Day Use, and Total Costs of Provision, by Cost Category,
Lake St. George State Park, FY 1980-81

Cost Category	Camping	Day Use	Total
Personal Services			
Permanent Regular Salary	\$ 4,762	\$ 4,762	\$ 9,524
Seasonal Regular Salary	16,778	8,389	25,167
Overtime	720	360	1,080
Health Insurance & Retirement	3,772	2,286	6,058
Clothing and Telephone Allowance	157	95	252
Subtotal	\$26,189	\$15,892	\$42,081
Other Operation & Maintenance Costs			
Professional Services	\$ 21	\$ --	\$ 21
Gasoline and Oil	177	266	443
Miscellaneous Vehicle Expenses	67	100	167
Telephone and Electricity	690	193	883
Miscellaneous Rental and Repairs	--	80	80
General Operating & Other Supplies	121	96	217
Workmen's Compensation	27	17	44
Subtotal	\$ 1,103	\$ 752	\$ 1,855
Total Operation & Maintenance Costs	\$27,292	\$16,644	\$43,936
Overhead			
State	\$ 4,772	\$ 2,910	\$ 7,682
District	3,128	1,909	5,037
Subtotal	\$ 7,900	\$ 4,819	\$12,719
Capital Recovery Costs			
Buildings and Equipment	\$ 3,908	\$ 2,385	\$ 6,294
Roads	90	55	144
Vehicles	1,600	976	2,576
Subtotal	\$ 5,598	\$ 3,416	\$ 9,014
Total Costs	\$40,790	\$24,879	\$65,669

TABLE 8

Average Costs of Provision for Camping and Day Use Facilities, Lake St. George State Park, FY 1980-81

Cost Category	Camping Costs			Day Use Costs	
	Per Campsite	Per Occupied Site	Per Visitor Day	Per Vehicle	Per Visitor Day
Personal Services	\$ 844.81	\$11.13	\$3.59	\$2.87	\$.78
Other O & M Costs	35.61	.47	.15	.14	.04
Total O & M Costs	\$ 880.42	\$11.60	\$3.74	\$3.01	\$.82
Overhead	\$ 254.84	\$ 3.36	\$1.08	\$.87	\$.24
Capital Recovery Costs	\$ 180.58	\$ 2.38	\$.77	\$.62	\$.17
Total Costs	\$1,315.84	\$17.44	\$5.59	\$4.50	\$1.23

Of course, the fees paid by users of Lake St. George do not cover the costs of provision. The \$6.00 site fee for nonresident campers only covered 52 percent of O & M costs and 34 percent of total provision costs in FY 1980-81. The resident camping fee of \$4.50 per site covered 39 percent and 26 percent of O & M, and total costs, respectively. The day use fee of \$1.50 per vehicle only covered 50 percent of O & M costs and 33 percent of total provision costs for the day use area.

Reid State Park

Reid State Park is one of the most popular day use parks in Maine. Located on the coast south of the town of Bath, the park contains one of the larger stretches of sandy beach on the Maine coast. Its relative uniqueness and its proximity to population centers and the tourist-oriented area along U.S. Route 1 makes Reid one of the most heavily used day use parks in Maine. During FY 1980-81, there were almost 49,000 vehicles and 166,000 visitor days of use recorded for the park. The main attraction is the protected beach and ocean swimming.

The current replacement value of Reid is \$470,919, about 94 percent of which is associated with buildings and equipment. Roads and vehicles comprise two percent and four percent, respectively, of the current value of improvements.

The cost associated with the provision of Reid State Park are reported in Table 9. As was the case for other state parks, personal services at Reid State Park account for a large percentage of the costs of provision. Personnel costs totaled almost \$112,000, which comprised about 94 percent of total O & M costs and 66 percent of the total costs of provision. The costs of operating vehicles and utilities were other major O & M expenses. Overhead costs totaled over \$30,000, which represents 18 percent of total provision costs. Capital recovery cost was the lowest of the major cost categories. Based on the sinking fund concept, annual capital recovery costs were about \$20,000, or about 12 percent of total provision costs. Capital costs for buildings and equipment accounted for over 82 percent of total capital costs.

Average costs for the day use park, reported in Table 10, indicate that the total cost per vehicle was \$3.47 and \$1.01 per visitor day. Personal services amounted to \$2.29 per vehicle and total O & M costs were \$2.44 per vehicle. The user fee of \$1.50 per vehicle only covered 61 percent of total O & M costs and 43 percent of total provision costs.

Peaks-Kenny State Park

Peaks-Kenny State Park is located on Sebec Lake, just north of the town of Dover-Foxcroft. The park provides both camping and day use opportunities with a lake front setting. The campground is a destination-type facility; since it is more remote than many of the other parks studied, campers must travel a greater distance and usually stay longer during their visit. There are flush toilets and 56 campsites in the campground and a bathhouse in the day use area. The intensity of use at Peaks-Kenny is the lowest of the five parks studied. There were about 2,700 visitor days in the campground and 19,800 visitor days in the day use area. The low level of use reflects the relatively remoteness of the park. A small day use area at Katahdin Iron Works is also maintained by the park staff at Peaks-Kenny. However, the level of use and expenditures associated with the Iron Works are so small that the use data and the cost data presented below have not been adjusted.

The total value of capital improvements at Peaks-Kenny was \$344,595 FY 1980-81. About 51 percent (\$175,743) of this value was attributed to buildings, equipment, roads, and vehicles in the campground and the

TABLE 9

Costs of Provision for Day Use Facilities,
by Cost Category, Reid State Park, FY 1980-81

Cost Category	Amount
Personal Services	
Permanent Regular Salary	\$ 35,321
Seasonal Regular Salary	54,985
Overtime	4,679
Health Insurance and Retirement	16,541
Clothing Allowance	<u>388</u>
Subtotal	\$111,914
Other Operation and Maintenance Costs	
Professional Services	\$ 21
Gasoline and Oil	2,564
Miscellaneous Vehicle Expenses	375
Telephone and Electricity	1,654
Repairs	273
Postage and General Operating Expenses	157
Other Supplies	1,103
Workmen's Compensation	<u>1,047</u>
Subtotal	\$ 7,194
Total Operation & Maintenance Costs	\$119,108
Overhead	
State	\$ 18,463
District	<u>11,754</u>
Subtotal	\$ 30,190
Capital Recovery Costs	
Buildings and Equipment	\$ 16,343
Roads	1,076
Vehicles	<u>2,558</u>
Subtotal	\$ 19,977
Total Costs	\$169,275

TABLE 10

Average Costs of Provision for Day Use Facilities,
Reid State Park, FY 1980-81

Cost Category	Day Use Costs	
	Per Vehicle	Per Visitor Day
Personal Services	\$2.29	\$.67
Other Operation and Maintenance Costs	<u>.15</u>	<u>.04</u>
Total Operation and Maintenance Costs	\$2.44	\$.71
Overhead	\$.62	\$.18
Capital Recovery Costs	<u>\$.41</u>	<u>\$.12</u>
Total Costs	\$3.47	\$1.01

remaining 49 percent (\$168,852) was associated with day use facilities. The total value of buildings and equipment in the park was about \$314,000.

Cost of provision data are reported in Table 11 for the campground and day use area at Peaks-Kenny. The labor intensive nature of park operations is again evident. Personal Services accounted for 87 percent of campground O & M costs and 44 percent of the total costs of providing the campground. Labor's share of O & M and total provision costs are even larger for the day use facility (91 percent and 46 percent respectively). Overhead costs accounted for 24 percent of the total costs for both the campground and day use facility. Capital recovery costs associated with the sinking fund accounted for 25 percent of the total costs of providing the campground and day use area.

Average costs for Peaks-Kenny are reported in Table 12. The total cost per campsite (\$560) for the campground at Peaks-Kenny was about the same as that reported above for Sebago Lake. However, the costs per occupied site were about 53 percent higher at Peaks-Kenny (\$11.57 vs. \$7.56). In general, the average costs associated with the campground at Peaks-Kenny lie between the extremes reported above for Sebago Lake and Lake St. George.

TABLE 11

Camping, Day Use, and Total Costs of Provision, by Cost Category, Peaks-Kenny State Park, FY 1980-81

Cost Category	Camping	Day Use	Total
Personal Services			
Seasonal Regular Salary	\$11,208	\$11,208	\$22,416
Overtime	474	474	948
Health Insurance & Retirement	2,011	2,011	4,022
Clothing Allowance	46	46	92
Subtotal	\$13,739	\$13,739	\$27,478
Other Operation & Maintenance Costs			
Professional Services	\$ 25	\$ --	\$ 25
Gasoline and Oil	728	728	1,456
Miscellaneous Vehicle Expenses	77	77	154
Telephone and Electricity	1,019	440	1,459
Repair, Postage & Other Supplies	116	79	195
Workmen's Compensation	39	39	78
Subtotal	\$ 2,004	\$ 1,363	\$ 3,367
Total Operation & Maintenance Costs	\$15,743	\$15,102	\$30,845
Overhead			
State	\$ 2,744	\$ 2,633	\$ 5,377
District	4,677	4,493	9,170
Subtotal	\$ 7,421	\$ 7,126	\$14,547
Capital Recovery Costs			
Buildings and Equipment	\$ 5,929	\$ 5,696	\$11,625
Roads	608	584	1,192
Vehicles	1,314	1,262	2,576
Subtotal	\$ 7,851	\$ 7,542	\$15,393
Total Costs	\$31,015	\$29,770	\$60,785

TABLE 12

Average Costs of Provision for Camping and Day Use Facilities, Peaks-Kenny State Park, FY 1980-81

Cost Category	Camping Costs			Day Use Costs	
	Per Campsite	Per Occupied Site	Per Visitor Day	Per Vehicle	Per Visitor Day
Personal Services	\$243.33	\$ 5.12	\$1.31	\$2.22	\$.69
Other O & M Costs	<u>35.80</u>	<u>.75</u>	<u>.19</u>	<u>.22</u>	<u>.07</u>
Total O & M Costs	\$281.13	\$ 5.87	\$1.50	\$2.44	\$.76
Overhead	\$132.52	\$ 2.77	\$.71	\$1.15	\$.36
Capital Recovery Costs	<u>\$140.19</u>	<u>\$ 2.93</u>	<u>\$.75</u>	<u>\$1.22</u>	<u>\$.38</u>
Total Costs	\$553.84	\$11.57	\$2.96	\$4.81	\$1.50

The average costs for day use facilities at Peaks-Kenny were higher than those reported above for other parks. Costs per vehicle were \$4.81 while costs per visitor day averaged \$1.50.

The resident and nonresident campground user fees charged at Peaks-Kenny in FY 1980-81 were \$4.00 and \$5.00 per site night, respectively. The nonresident fee was sufficient to recover 85 percent of campground O & M costs and 43 percent of total campground costs. The resident camping fee recovered 68 percent of O & M costs and 35 percent of total provision costs. The day use fee of \$1.50 per vehicle recovered only 61 percent of O & M costs and 31 percent of the total cost of providing the day use facilities.

Camden Hills State Park

Camden Hills State Park, which is located on U.S. Route 1 in Camden, also offers both camping and day use activities. Because it is located on a major tourist thoroughfare, the park attracts a relatively large number of transient camping parties which stay at the park for one or two nights as part of a longer vacation. There are 112 campsites in the campground along with flush toilets and showers. The resident and non-resident campground fees in FY 1980-81 were \$4.00 and \$5.00 per site night, respectively.

In addition to the usual picnic facilities in the day use area, the park also offers a vehicular road to the summit of Mount Battie, which provides a panoramic view of Penobscot Bay and the surrounding area. Hiking trails are also provided on Mount Megunticook, the second-highest coastal peak in the eastern United States. The day use fee at Camden Hills is \$0.75 per vehicle. It is noteworthy, however, that this fee is only assessed for use of the vehicular road to the summit of Mount Battie and for the picnic area. The use of the hiking trails is free.

Camden Hills is also one of the more intensively used state parks in Maine. There were about 30,000 visitor days of use associated with the campground and over 150,000 visitor days of day use activity in FY 1980-81. The replacement value of all facilities in the park in 1981 was about \$280,000, seventy-four percent of which was associated with facilities in the campground.

As was the case at Lake St. George, the personnel assigned to Camden Hills provide some products and services for other parks in the district, particularly vehicle maintenance and gasoline for district vehicles. The costs associated with these services were separated from the day use and campground operations at Camden Hills by the park manager. The expenses incurred for district activities have been omitted from the cost data presented below.

Cost of provision data for the major cost components are reported in Table 13. Personal services at Camden Hills again accounted for the bulk of total O & M costs for the park (91% for the campground and 96% for the day use area). Operation and maintenance costs accounted for 59 percent of the total costs of providing the campground and the day use area. Total overhead costs for the entire park were almost \$35,000 or 29 percent of total park costs. Capital recovery costs for the campground were about \$10,000 or about 11 percent of total camping costs. Capital costs for the day use facility were also 11 percent of total costs. Once again, overhead costs accounted for a larger percentage of total costs than capital recovery costs. The total cost of providing the park in FY 1980-81 was about \$119,000.

Average costs are reported in Table 14. Costs per campsite for the Camden Hills campground of \$830 were greater than at Sebago Lake and Peaks-Kenny, but less than at Lake St. George. Costs per occupied site at Camden Hills were second-lowest among the campgrounds studied (\$7.90

TABLE 13

Camping, Day Use, and Total Costs of Provision, by Cost Category, Camden Hills State Park, FY 1980-81

Cost Category	Camping	Day Use	Total
Personal Services			
Permanent Regular Salary	\$10,859	\$ 4,654	\$ 15,513
Seasonal Regular Salary	30,475	7,619	38,094
Overtime	1,235	309	1,544
Health Insurance & Retirement	7,416	2,190	9,606
Clothing Allowance	271	80	351
Subtotal	\$50,256	\$14,852	\$ 65,108
Other Operation & Maintenance Costs			
Gasoline and Oil	\$ 752	\$ 188	\$ 940
Miscellaneous Vehicle Expenses	440	110	550
Telephone and Electricity	1,278	142	1,420
Repair, Postage, Printing, and General Operating Expenses	864	216	1,080
Fuel Oil	692	--	692
Other Supplies	761	190	951
Subtotal	\$ 4,787	\$ 846	\$ 5,633
Total Operation & Maintenance Costs	\$55,043	\$15,698	\$ 70,741
Overhead			
State	\$10,360	\$ 2,956	\$ 13,316
District	16,833	4,803	21,636
Subtotal	\$27,193	\$ 7,759	\$ 34,952
Capital Recovery Costs			
Buildings and Equipment	\$ 7,096	\$ 2,025	\$ 9,121
Roads	1,201	343	1,544
Vehicles	1,956	561	2,517
Subtotal	\$10,253	\$ 2,929	\$ 13,182
Total Costs	\$92,489	\$26,386	\$118,875

TABLE 14

Average Costs of Provision for Camping and Day Use Facilities, Camden Hills State Park, FY 1980-81

Cost Category	Camping Costs			Day Use Costs	
	Per Campsite	Per Occupied Site	Per Visitor Day	Per Vehicle	Visitor Day
Personal Services	\$448.72	\$4.29	\$1.65	\$.33	\$.10
Other O & M Costs	<u>42.74</u>	<u>.41</u>	<u>.16</u>	<u>.02</u>	<u>.01</u>
Total O & M Costs	\$491.46	\$4.70	\$1.81	\$.35	\$.11
Overhead	\$242.79	\$2.32	\$.88	\$.17	\$.05
Capital Recovery Costs	<u>\$ 91.54</u>	<u>\$.88</u>	<u>\$.33</u>	<u>\$.07</u>	<u>\$.02</u>
Total Costs	\$829.99	\$7.90	\$3.02	\$.59	\$.18

compared to \$7.56 for Sebago Lake). The \$4.00 resident camping fee represented 85 percent of O & M costs and 51 percent of total costs per occupied site. The nonresident fee of \$5.00 covered all O & M costs and 63 percent of total campground costs.

Day use costs per vehicle and per visitor day were the lowest of all day use areas included in the study. Day use costs per vehicle were only \$.59 and day use costs per visitor day were only \$.18. Since the day use fee is \$.75 per vehicle, the fee more than covered all costs of provision for the day use area.

Allagash Wilderness Waterway

The Allagash Wilderness Waterway is a backcountry area that offers canoeing and primitive camping experiences. The Waterway begins at Chamberlain Lake, near the northwest corner of Baxter State Park, and flows north for about 80 miles to the town of Allagash in northern Maine. Although the Waterway is managed by the Bureau of Parks and Recreation, it lies within the boundaries of land managed by the North Maine Woods Association. The Bureau manages 66 primitive campsites and rangers are stationed at intervals along the Waterway during the season. Pit toilets are provided at some of the campsites. During FY 1980-81, there

were 47,208 visitor days of recreation in the Waterway. Virtually all of the use is associated with parties who stay overnight in the area as they canoe along all or a stretch of the Waterway.

The replacement value of buildings, equipment, and vehicles for the Waterway was \$390,148. There are no roads provided solely for the Waterway. Existing roads are part of the network of the North Maine Woods Association and would exist in the absence of the Waterway. Therefore, no replacement value was placed on the road system.

The FY 1980-81 costs of providing the Allagash Wilderness Waterway are reported in Table 15. Operation and maintenance costs totaled over \$175,000 in FY 1980-81. The cost of personal services accounted for \$153,000 or 87 percent of O & M costs. Again, the labor intensive nature of operating the parks is evident.

State Overhead costs for the Waterway were \$23,559, or about 11 percent of total costs. No district overhead costs were allocated to the Waterway since the Waterway is a separate administrative entity. The services performed as part of the district overhead for the other parks are performed by the permanent employees of the Allagash Waterway. Capital recovery costs also accounted for 9 percent of total costs, while O & M costs comprised the remaining 80 percent of total costs.

Fiscal year 1980-81 average costs of provision for the Allagash Wilderness Waterway are shown in Table 16. Costs per visitor day are the most meaningful since management of the Waterway entails much more than the operation of the 66 primitive campsites. Operation and maintenance costs per visitor day were \$3.72 while total costs averaged \$4.62 per visitor day. Total costs averaged \$3,300 per campsite and almost \$16 per occupied campsite.

User fees for the Waterway are assessed on a per-person-per-day basis. The fee is one dollar for Maine residents and two dollars for nonresidents. The nonresident fee covered 54 percent of O & M costs per visitor day and 43 percent of total costs per visitor day. The resident fee only covered 27 percent of O & M costs and 22 percent of total costs.

Snowmobile Division

The Snowmobile Division of the Bureau provides funding for the construction of snowmobile trails in the State. These trails are usually

TABLE 15

Total Costs of Provision, by Cost Category,
Allagash Wilderness Waterway, FY 1980-81

Cost Category	Amount
Personal Services	
Permanent Regular Salary	\$ 46,338
Seasonal Regular Salary	63,495
Overtime	19,887
Health Insurance and Retirement	22,785
Clothing and Telephone Allowance	<u>774</u>
Subtotal	\$153,279
Other Operation and Maintenance Costs	
Professional Services	\$ 3,233
Travel	458
Gasoline and Oil	5,627
Miscellaneous Vehicle Expenses	2,682
Telephone and Electricity	873
Radio Repairs and Other Repairs	5,782
Rentals, Office Supplies, Postage & Printing	1,808
Other Supplies	1,337
Workmen's Compensation	544
Foodstuff	<u>51</u>
Subtotal	\$ 22,395
Total Operation and Maintenance Costs	\$175,674
State Overhead	\$ 23,559
Capital Recovery Costs	
Buildings and Equipment	\$ 12,606
Vehicles	<u>6,150</u>
Subtotal	\$ 18,756
Total Costs	\$217,989

TABLE 16

Average Costs of Provision, Allagash Wilderness
Waterway, FY 1980-81

Cost Category	Costs		
	Per Campsite	Per Occupied Site	Per Visitor Day
Personal Services	\$2,322.42	\$11.15	\$3.25
Other Operation & Maintenance Costs	<u>339.32</u>	<u>1.63</u>	<u>.47</u>
Total Operation & Maintenance Costs	\$2,661.74	\$12.78	\$3.72
Overhead	\$ 356.95	\$ 1.71	\$.50
Capital Recovery Costs	\$ <u>284.18</u>	\$ <u>1.36</u>	\$ <u>.40</u>
Total Costs	\$3,302.87	\$15.85	\$4.62

designed to connect existing trail systems that have been provided and maintained by municipalities or local snowmobile clubs. Once constructed, some of the trails are maintained and groomed by local clubs. However, the Division itself maintains and grooms four trails: a 50-mile trail at Squaw Mountain in Greenville; a 38-mile trail in the Mount Blue-Rangeley area; a 44-mile trail in Beddington; and a 25-mile trail in the Evans Notch Ranger District of the White Mountains National Forest near Bethel.

One of the major cost components associated with maintaining snowmobile trails is grooming. Grooming costs vary considerably with variations in snowfall. The number of snowfalls and the quantity of snow associated with a given snowfall determine the frequency of trail grooming efforts. Because the winters of 1979-80 and 1980-81 had abnormally low levels of snowfall, it was decided to base cost estimates for this study on the winter of 1978-79. This is the most recent season with near normal levels of snowfall.

It should also be noted that no construction costs were incurred to develop the snowmobile trails because the trails are comprised of unused woods roads; hence, no land clearing or grading was required. In addition, since the rights-of-way for the roads were donated by the land owners, no expenses were incurred to obtain them. Hence, the only capital costs associated with the trails are those related to the

vehicles and equipment used to maintain and groom the trails.

Costs of provision data for the trails are reported in Table 17. Grooming costs include the cost of personnel who do the grooming as well as the cost of gasoline, oil, supplies, and parts for the equipment.

TABLE 17

Total Costs, by Category, and Average Costs Per Mile for the Provision of Snowmobile Trails, Snowmobile Division, FY 1978-79

Cost Category	Trail				Total
	Squaw Mountain	Mt. Blue-Rangeley	Beddington	Evans Notch	
Operation and Maintenance Costs					
Grooming	\$ 4,582	\$ 4,051	\$ 2,034	\$ 5,896	\$16,563
Printing of Maps	533	533	533	--	1,599
Other O & M Costs	<u>5,229</u>	<u>3,967</u>	<u>4,590</u>	<u>2,606</u>	<u>16,392</u>
Total O & M Costs	\$10,344	\$ 8,551	\$ 7,157	\$ 8,502	\$34,554
State Overhead	\$ 2,576	\$ 1,954	\$ 2,261	\$ 1,284	\$ 8,075
Capital Recovery Costs					
Equipment	\$ 1,912	\$ 1,912	\$ 1,912	\$ 1,912	\$ 7,648
Vehicles	<u>567</u>	<u>567</u>	<u>567</u>	<u>567</u>	<u>2,268</u>
Subtotal	\$ 2,479	\$ 2,479	\$ 2,479	\$ 2,479	\$ 9,916
Total Costs	\$15,399	\$12,984	\$11,897	\$12,265	\$52,545
Total O & M Costs Per Mile	\$ 207	\$ 225	\$ 163	\$ 340	\$ 220
Total Costs Per Mile	\$ 308	\$ 342	\$ 270	\$ 490	\$ 335

Personnel costs accounted for about 70 percent of total grooming costs. Grooming costs accounted for about 48 percent of total O & M costs. Other operation and maintenance costs include all personnel and material costs associated with all other maintenance activities, such as minor repair of bridges and trails, removing underbrush, and maintaining trail signs. These costs were allocated among the four trails on a per-mile basis. It is interesting to note that other O & M costs for the four trails are about the same as grooming costs. This is significant since some previous studies have not included these additional O & M costs in cost of provision studies.

State overhead costs totaled \$8,075 for the four trails. These costs include the time devoted to the administration and coordination of management functions for the trails. Overhead costs were also allocated among the four trails on a per-mile basis. Capital recovery costs for the four trails are identical because a separate set of equipment and vehicles is utilized at each trail. Capital recovery costs were \$2,479 per trail.

The total cost of providing and maintaining the four trails in FY 1978-79 was about \$52,500 or about \$335 per mile. The variation in total costs among the four trails is due to variations in grooming costs and the length of the trails. Variations in total O & M costs per mile and total costs per mile are due almost exclusively to variations in grooming costs. Overall, O & M costs accounted for about two-thirds of the total costs of provision. Overhead and capital recovery costs comprised about 15 percent and 19 percent, respectively, of total costs.

Data are not available to estimate the level of use of the snowmobile trails maintained by the Snowmobile Division. In addition, user fees are not levied for use of the trails so revenue is not collected from the users. The Snowmobile Division is funded through a dedicated revenue account funded from a fraction of the State gasoline tax. The fraction of the gasoline tax was designed to reflect the portion of gasoline used by snowmobiles. Even though the trail users do not pay a use fee, the maintenance of the overall operation is funded by the general category of users. Nevertheless, the data presented above provide a good profile of the costs associated with the operation of the four snowmobile trails.

A Comparison of Amortization and Sinking Fund

In Chapter 2 it was noted that there are two ways to treat capital recovery costs. One approach is the sinking fund technique, which has been used to estimate annual capital recovery costs in the previous tables. The other method is amortization, which can be used to calculate the annual payment required to recover the replacement cost plus interest on the funds used for capital improvements. Annual payments are larger for amortization than for the sinking fund because the former requires that interest be paid on the capital, whereas the latter utilizes the

accumulated interest to recover all of the original capital. Amortization accounts for the opportunity cost of capital while the sinking fund does not. A comparison of capital recovery costs based on the sinking fund and amortization is presented in Table 18. The annual payments reported in the table are based on an interest rate of three percent for both cost recovery techniques.

TABLE 18

A Comparison of Annual Capital Recovery Costs Associated with the Sinking Fund and Amortization Methods, Maine Bureau of Parks and Recreation Facilities, FY 1980-81

Park/Facility	Capital Recovery Costs		
	Camping	Day Use	Total
<u>Sinking Fund</u>			
Sebago Lake	\$21,575	\$17,194	\$38,769
Lake St. George	5,598	3,416	9,014
Reid	--	19,977	19,977
Peaks-Kenny	7,851	7,542	15,393
Camden-Hills	10,253	2,929	13,182
Allagash Wilderness Waterway			18,756
Snowmobile Trails			9,916
<u>Amortization</u>			
Sebago Lake	\$36,158	\$29,153	\$65,311
Lake St. George	9,159	5,590	14,749
Reid	--	34,104	34,104
Peaks-Kenny	13,123	12,609	25,732
Camden Hills	16,777	4,791	21,568
Allagash Wilderness Waterway			30,391
Snowmobile Trails			12,480

Amortization payments range from 25 percent to 71 percent larger than the sinking fund payments required to recover capital costs. Overall, capital recovery costs for park operations increase from \$125,000 for the sinking fund to \$204,000 for amortization. This represents an increase of 64 percent. The increase would be even larger if an interest rate greater than 3 percent were used to calculate the annual payments. Hence, the method of capital recovery and the interest rate used in the study can have a major impact on capital recovery costs.

Average total costs of provision based on the sinking fund and amortization methods are compared in Table 19. For purposes of

TABLE 19

A Comparison of Average Total Costs Based on the Sinking Fund and Amortization Methods of Calculating Annual Capital Recovery Costs, Maine Bureau of Parks and Recreation Facilities

Park/Facility	Camping Costs			Day Use Costs	
	Per Campsite	Per Occupied Site	Per Visitor Day	Per Vehicle	Per Visitor Day
<u>Sinking Fund</u>					
Sebago Lake	\$ 587.16	\$ 7.56	\$1.99	\$2.48	\$.69
Lake St. George	1,315.84	17.44	5.59	4.50	1.23
Reid	--	--	--	3.47	1.01
Peaks-Kenny	553.84	11.57	2.96	4.81	1.50
Camden Hills	829.99	7.90	3.02	.59	.18
Allagash Wilderness Waterway	3,302.87	15.85	4.62	--	--
<u>Amortization</u>					
Sebago Lake	\$ 637.97	\$ 8.22	\$2.16	\$2.78	\$.77
Lake St. George	1,430.68	18.85	6.08	4.88	1.32
Reid	--	--	--	3.75	1.10
Peaks-Kenny	647.98	13.53	3.47	5.63	1.76
Camden Hill	884.05	8.45	3.21	.64	.19
Allagash Wilderness Waterway	3,479.15	16.71	4.86	--	--

discussion, we will concentrate on the comparison of camping costs per occupied site and day use costs per vehicle since these are the units of use currently used to assess user fees. The increase in total camping costs per occupied site was \$.55 at Camden Hills State Park when amortization was used to compute total costs. This was the smallest increase among the various parks and facilities. The largest increase was \$1.96 per occupied site at Peaks-Kenny State Park. The use of amortization as a substitute method of calculating capital recovery costs resulted in an increase of total costs per occupied site of less than one dollar at three of the five facilities.

The same pattern holds with respect to the increase in day use costs per vehicle. Amortization increased the costs per vehicle by only five cents at Camden Hills. The largest increase of \$.82 occurred at Peaks-Kenny. The increase in day use costs per vehicle was less than

\$.50 at four of the five facilities. Hence, the use of amortization rather than a sinking fund to calculate capital recovery costs does not have a major impact on camping costs per occupied site or day use costs per vehicle. The variation in costs among the various facilities studied is much greater than the change in total costs per unit of use associated with the method used to recover capital costs. Nevertheless, as noted earlier, the difference between amortization and sinking fund payments would be much greater if interest rates in the range of six to ten percent were used in place of the three percent interest rate used above.

Summary and Conclusions

Several results of the above analysis are deserving of a few summary comments. First, as noted earlier, the operation of state parks is a highly labor intensive activity. Part of this is due to the fact that gatehouses are used to control access at most of the facilities. However, a large quantity of other labor services is also required. Labor costs accounted for over 90 percent of total O & M costs at many of the parks. Therefore, any attempt to reduce O & M costs will have to be accomplished through reductions in personnel.

Another important finding is the magnitude of overhead costs. These costs ranged from about 15 to 30 percent of the total costs of provision. We believe our analysis was well designed to accurately estimate the level of overhead costs for the Bureau. The results suggest that overhead costs are an important component of total costs and, therefore, they should be included in future cost of provision studies.

The capital recovery costs reported above are lower than the same costs reported for comparable facilities in earlier studies. As already noted, this is partially due to the use of a sinking fund to recover capital costs. However, the interest rate used in this study is also a factor behind the low capital recovery costs when amortization is used. An example can be used to illustrate this. Annual amortization payments for Sebago Lake State Park are \$65,311 for a three percent interest rate. If an interest rate of 10 percent were used, the annual amortization payment would be \$104,000 or about 60 percent larger. This illustrates the sensitivity of the amortization payment to the interest rate. Since

most previous studies used interest rates in the range of 6-10 percent, the amortized payments reported in those studies are much larger.

Another factor that should be noted is that the costs reported above represent minimum levels for the costs of provision. While O & M and overhead costs represent actual costs, the procedures used to measure the other costs tend to minimize costs. The use of a sinking fund rather than amortization to estimate capital recovery costs is one case in point. Another example is that road resurfacing costs were used as the replacement cost of roads. This figure is less than the cost of completely replacing the roads or constructing new ones of equal length. Finally, opportunity costs are not included in the cost estimates. The combination of these factors decreases the costs of provision of the facilities. Therefore, the cost data should not be viewed as including either artificially high costs or costs that are irrelevant to the management agency.

Finally, a comment regarding the quality of the data is in order. The accounting system used by the Maine Bureau of Parks and Recreation is well suited for cost of provision studies since costs are budgeted for each individual facility. Therefore, we believe the cost estimates provided for the Bureau's parks are quite accurate. Although one could refine the procedures used to allocate costs to camping and day use facilities and the procedures used to allocate overhead costs among the parks, we are confident that the procedures used resulted in accurate estimates of the costs of provision.

CHAPTER 4

BAXTER PARK

Baxter Park is the largest and probably the most unique state-operated park in Maine. Located in the north-central part of the State near Millinocket, the Park encompasses 200,000 acres of mountains, lakes, ponds, and streams. Mount Katahdin, the highest mountain in Maine, is located in the southern part of the Park and is the dominant recreation attraction. It is also the northern terminus of the Appalachian Trail. Overall, the Park contains over 150 miles of hiking trails that provide access to many scenic resources.

The Park was established on land purchased by and donated to the State by former Governor Percival P. Baxter. Baxter expressed his desire that the area be retained forever in its natural wild state. Governor Baxter favored recreational use of the park; however, it had to be consistent with the "forever wild" concept.

To insure that the Park would always be maintained in accordance with his instructions, Governor Baxter asked that it be administered separately from other Maine state parks, which are administered by the Maine Bureau of Parks and Recreation. He recognized that management plans of other state parks have to be modified occasionally to reflect the needs and desires of the tax-paying citizens of the State. However, since tax dollars were not used to establish Baxter Park, and since operating capital for the Park is provided primarily by trust funds established by the former governor, Baxter felt justified in his insistence that the Park always be managed in accordance with the established provisions.

Management of the Park is, by statute, the responsibility of the Baxter Park Authority. The three members of the Authority are the Maine Attorney General, the Director of the Maine Bureau of Forestry, and the Commissioner of the Maine Department of Inland Fisheries and Wildlife. The Authority is responsible for interpreting the Deeds of Trust and establishing broad management policies. Day-to-day management is performed by a professional resource and park management staff. The staff also makes policy recommendations for consideration by the Baxter Park Authority.

Organizational Structure

A simplified organizational chart for Baxter Park is presented in Figure 2.² All park activities are the responsibility of the Park Director, who reports directly to the three-member Baxter Park Authority. Management activities are sub-divided into four categories: administration, operations, maintenance, and the Scientific Forestry Management Area. The latter comprises the northwest part of the park which is managed to demonstrate modern scientific forest management methods. A park supervisor is responsible for park operations and for maintenance. The Park itself is divided into two administrative districts -- the northern district and the southern district -- each of which is administered by a district ranger. Two Baxter Park rangers assist each district ranger by overseeing the operation of several facilities (such as gatehouses and campgrounds) within the district. Finally, each facility is operated by campground rangers or gatehouse attendants. The number of personnel assigned to each facility ranges between one and four, depending on the type and level of use of the facility.

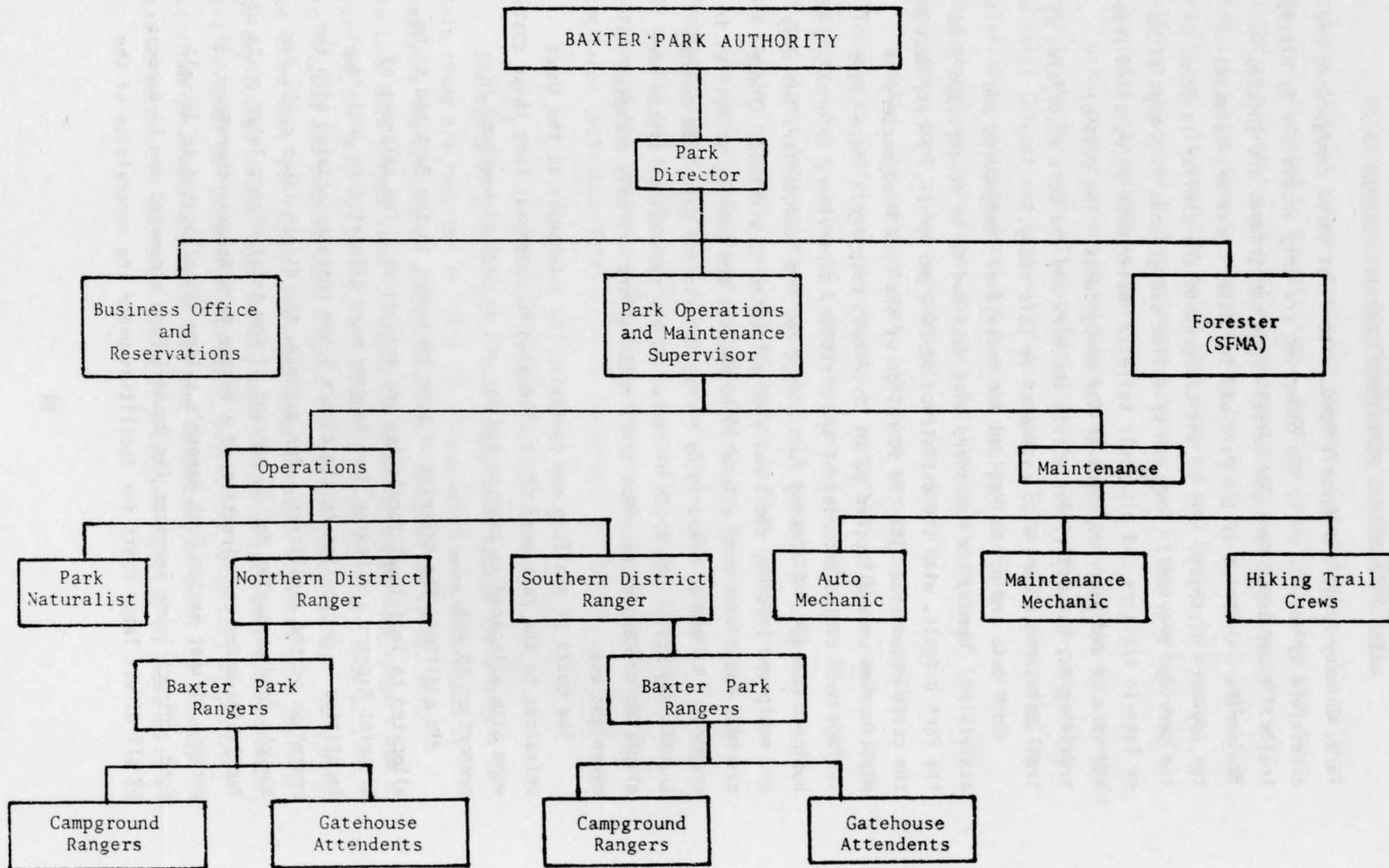
For the purposes of this study, it was assumed that the costs associated with park operations, maintenance and administration were attributable to the provision of recreational facilities within the Park and the attendant responsibilities of preventing resource degradation caused by recreational use. This assumption was supported by Park personnel; however, it may result in a slight overestimate of recreation provision costs to the extent that some personnel would still be needed to manage the resource if recreational facilities were not provided. However, the resulting error in the cost estimates presented below is considered to be small.

Facilities Studied and Accounting Procedures

Baxter Park contains nine campgrounds, five of which were chosen for analysis in this study. They are Abol, Roaring Brook, Trout Brook

²The organizational chart and the description that follows refer to the organization of the Park at the time of the study. Since that time the administrative structure of the Park has been modified. We have presented the old organizational chart since the costs of provision reported below are based on that organizational structure.

FIGURE 2. Simplified Organizational Chart for Baxter Park



Farm, Chimney Pond, and Russell Pond. The first three campgrounds are accessible by vehicle while the other two are only accessible by hiking trails. Trout Brook Farm and Russell Pond campgrounds are located in the northern district of the Park and the other three are situated in the southern district. All of the campgrounds are similar in terms of the services provided. They are primitive campgrounds with tent sites or lean-to shelters and pit/vault toilets. Water must be obtained from the streams and ponds adjacent to the campgrounds. The cost of providing day use activities within the Park and the cost associated with trail maintenance were also estimated in this study.

Cost data are not maintained for individual campgrounds and activities. Hence, the necessary cost data had to be constructed from the Park budgets, with the assistance of Park personnel. First, most of the costs associated with the operation of the Park Headquarters in Minlinocket were allocated to an "overhead" category. These costs include most of the salaries of the director, supervisor, naturalist, and business manager. A sinking fund charge for the headquarters building and equipment (radios, etc.) was also allocated to overhead. These overhead costs were then allocated to day use and camping activities in proportion to use as measured by recreation visitor days (56% camping and 44% day use). The costs of operating the reservation system were allocated to camping overhead since reservations are only accepted for overnight use.

The costs of staffing and operating the gatehouses at the three entrances to the Park were first allocated to overhead; then these costs were also allocated to camping and day use as part of overhead in proportion to use.

In addition, the salaries of some personnel in the Park had to be allocated to individual facilities and activities. The salaries of District Rangers and Baxter Park Rangers were allocated to individual facilities in proportion to the direct labor costs associated with the operation of the facilities. For example, the direct labor costs for Russell Pond accounted for 39 percent of the total direct labor costs of facilities under the direction of a Baxter Park Ranger; therefore, 39 percent of that Baxter Park Ranger's salary was allocated to Russell Pond. Direct labor services for Russell Pond accounted for 12 percent of all direct labor costs for facilities under the supervision of the

northern district ranger; hence, 12 percent of that individual's salary was also allocated to Russell Pond. Park personnel indicated that this method of allocation of middle management costs was more appropriate than allocating them in proportion to the level of use of the individual facilities. It should be noted that district and Baxter Park ranger salaries allocated to the gatehouses become part of the overhead costs associated with gatehouse operations.

Other operation and maintenance costs, such as supplies and materials used in the Park were allocated to individual facilities in proportion to total (direct and indirect) labor costs. These costs were added to salaries to estimate total O & M costs for each facility. A sinking fund charge was calculated for each facility on the basis of the total replacement cost of the improvements in the facility.

Finally, the overhead costs allocated to camping were further allocated to individual campgrounds in proportion to labor costs at each facility. For example, if a given campground accounted for 20 percent of the direct labor costs for operating all campgrounds, 20 percent of the camping overhead costs was allocated to that campground.

The Park also paid a fee of \$30,000 to the Maine Department of Transportation to maintain the perimeter road. This fee was allocated to day use and camping activities in proportion to use and the camping portion of the fee was divided among the campgrounds in proportion to the labor costs associated with the individual facilities.

Provision Costs for Camping

The costs of providing the five campgrounds chosen for analysis in this study are reported in Table 20. These costs were determined by applying the procedures discussed above. Personal services, which include both direct labor services performed by campground rangers and a part of the salaries of Park and district rangers, ranged from \$12,000 to \$19,000 and totaled over \$76,000 for the five campgrounds. It should be noted that the figures reported under personal services only include salary costs. Other labor costs, such as health insurance and retirement, are included in "Other O & M Costs." Hence, the total cost of personal services is actually greater than the 68 percent of total O & M costs and 29 percent of the total costs of provision reported in Table 20.

TABLE 20

The Cost of Providing Selected Campgrounds, by Cost Category, Baxter Park, FY 1980-81

Cost Category	Campground					Total
	Abol	Roaring Brook	Chimney Pond	Trout Brook Farm	Russell Pond	
Operation and Maintenance Costs						
Personal Services	\$12,416	\$18,873	\$17,879	\$13,906	\$13,409	\$ 76,483
Other O & M Costs	<u>5,759</u>	<u>8,753</u>	<u>8,293</u>	<u>6,450</u>	<u>6,219</u>	<u>35,474</u>
Subtotal	\$18,175	\$27,626	\$26,172	\$20,356	\$19,628	\$111,957
Indirect Costs						
Overhead	\$20,175	\$30,636	\$29,141	\$22,665	\$21,918	\$124,535
Road Maintenance	<u>1,361</u>	<u>2,066</u>	<u>1,966</u>	<u>1,529</u>	<u>1,494</u>	<u>8,416</u>
Subtotal	\$21,536	\$32,702	\$31,107	\$24,194	\$23,412	\$132,951
Capital Recovery Costs						
Buildings and Equipment	\$ 3,022	\$ 3,612	\$ 3,050	\$ 2,252	\$ 3,332	\$ 15,268
Vehicles	<u>1,192</u>	<u>1,810</u>	<u>1,722</u>	<u>1,339</u>	<u>1,295</u>	<u>7,358</u>
Subtotal	\$ 4,214	\$ 5,422	\$ 4,772	\$ 3,591	\$ 4,627	\$ 22,626
Total Costs	\$43,925	\$65,750	\$62,051	\$48,141	\$47,667	\$267,534

Overhead costs were greater than O & M costs for the five facilities, ranging from \$20,000 to \$30,000 and totaling almost \$125,000 for the facilities studied. Overhead costs were high because they include part of the costs associated with operating the Park headquarters as well as the cost of gatehouse operations. These costs totaled about \$280,000 in FY 1980-81, and 56 percent of the amount was allocated to camping activities in the Park. Personal services accounted for about \$260,000 of the total overhead. Hence, total labor costs were much greater than those indicated under O & M costs. Overall, overhead costs accounted for over 46 percent of the total costs of provision for the five campgrounds studied.

On the other hand, capital recovery costs for the five campgrounds were quite low. This reflects the primitive nature of the campgrounds, which contain few capital improvements. Annual capital costs based on the sinking fund ranged from about \$3,500 to \$5,500 and totaled \$22,600 for the five facilities. Capital recovery costs accounted for only about 8 percent of the total costs of provision. Note that capital recovery costs have not been calculated for the perimeter road. The \$30,000 annual fee paid to the Department of Transportation pays for reconstruction of road sections as well as maintenance.

Costs per visitor day are reported in Table 21. Operation and maintenance costs per visitor day ranged from \$2.66 at Roaring Brook to \$6.29 at Trout Brook Farm. The campsite fee of \$2.00 per person per day is insufficient to recover O & M costs at any of the five campgrounds. On the other hand, the bunkhouse use fee of \$3.00 per person per day is large enough to recover O & M costs per visitor day at Roaring Brook and Russell Pond campgrounds. (It should be noted that nonresidents pay an additional fee of \$5.00 per vehicle when they enter the Park.)

Total costs per visitor day ranged from \$6.33 at Roaring Brook to \$14.87 at Trout Brook Farm. Clearly, the campsite and bunkhouse fees are much lower than the total cost of provision. For example, the campsite fee covers only 13 percent of the total costs at Trout Brook Farm, and 32 percent of the total costs at Roaring Brook campground. It should be noted, however, that the short fall between camping costs and camping fees is made up from trust funds provided by former Governor Baxter. Tax revenues are not used to operate Baxter Park.

TABLE 21

Average Costs of Provision Per Visitor Day, by Cost Category, and User Fees for Selected Campgrounds, Baxter Park, FY 1980-81

Cost Category	Campground				
	Abol	Roaring Brook	Chimney Pond	Trout Brook Farm	Russell Pond
Operation & Maintenance Costs					
Personal Services	\$2.10	\$1.82	\$ 3.71	\$ 4.30	\$2.02
Other O & M Costs	<u>.97</u>	<u>.84</u>	<u>1.72</u>	<u>1.99</u>	<u>.94</u>
Subtotal	\$3.07	\$2.66	\$ 5.43	\$ 6.29	\$2.96
Indirect Costs					
Overhead	\$3.41	\$2.95	\$ 6.05	\$ 7.00	\$3.30
Road Maintenance	<u>.23</u>	<u>.20</u>	<u>.41</u>	<u>.47</u>	<u>.22</u>
Subtotal	\$3.64	\$3.15	\$ 6.46	\$ 7.47	\$3.52
Capital Recovery Costs	\$.71	\$.52	\$.99	\$ 1.11	\$.70
Total Costs Per Visitor Day	\$7.42	\$6.33	\$12.88	\$14.87	\$7.18
User Fee Charged					
Campsite/Lean-To	\$2.00	\$2.00	\$ 2.00	\$ 2.00	\$2.00
Bunkhouse	--	3.00	3.00	--	3.00
Group Area	--	--	--	1.00	--

Analysis of the data again reveals the relationship between unit costs of provision and the intensity of use of the facilities. For example, Roaring Brook was the most intensively used campground and it also had the lowest unit costs. Similarly, Trout Brook Farm was the least intensively used facility and it had the highest unit costs of provision. This relationship seems to dominate all other cost factors. Earlier it was noted that Chimney Pond and Russell Pond campgrounds were only accessible by trail. One could hypothesize that the remoteness of the facilities may increase the unit costs of providing these facilities. However, this is not the case. Russell Pond had the second-lowest unit costs and the unit costs at Chimney Pond were \$2.00 less than Trout Brook Farm. Hence, the level of use at the remote campgrounds offsets the additional costs associated with their operation. This again

illustrates that many operating costs become fixed once the decision is made to operate the facility. O & M costs per user as well as total costs per user often decline as the level of use increases.

Provision Costs for Day Use

The total cost of providing all day use activities was also analyzed. There were no direct O & M costs associated with day use facilities. Although campground rangers may provide a few services to day users, most of their activities are related to campground operations. Hence, the only costs of day use activities are those associated with the overhead costs of operating the park headquarters and gatehouses, road maintenance, and capital recovery costs associated with the capital improvements provided. These costs are reported in Table 22.

TABLE 22

The Cost of Providing Day Use Activities, by Cost Category, Baxter Park, FY 1980-81

Cost Category	Total Cost	Costs Per Visitor Day
Indirect Costs		
Overhead	\$163,778	\$3.54
Road Maintenance	<u>13,200</u>	<u>.29</u>
Subtotal	\$176,978	\$3.83
Capital Recovery Costs		
Buildings and Equipment	\$ 7,776	\$.17
Vehicles	<u>11,564</u>	<u>.25</u>
Subtotal	\$ 19,340	\$.42
Total Costs	\$196,318	\$4.25

Day use overhead costs associated with park headquarters and gatehouse operations comprise the bulk (83%) of day use costs. Total day use costs were about \$196,000 in FY 1980-81. Day use costs per visitor day were \$4.25. Day use activities are free for residents while a fee of one dollar per vehicle is assessed for nonresidents.

Trail Maintenance Costs

The costs associated with trail maintenance work in the Park were also estimated for FY 1980-81. The salaries of Park personnel allocated to trail maintenance was \$21,852. This includes a portion of the salary of the maintenance supervisor as well as the salaries of the trail crews. Some contributed labor was also used for trail maintenance. The Youth Conservation Corps provided services that were valued at \$11,350 during the year. Other O & M costs were estimated to be \$10,135. Capital recovery costs and overhead were not calculated for trail work since the former was very small and overhead costs were accounted for in previous computations. Hence, the total cost of trail maintenance was \$43,337 in FY 1980-81.

A Comparison of Amortization and Sinking Fund

Annual capital recovery costs, based on the sinking fund and amortization techniques are compared in Table 23. Replacement of the sinking fund with amortization only adds marginally to the total costs of providing campgrounds. Total costs only increase about \$2,000 and costs per visitor day increase between \$.20 and \$.40. This small increase is due to the low interest rate used in the study and the small amount of capital improvements in the campgrounds. Amortization adds about \$8,000 to the total cost of providing day use facilities. However, this only increases the total costs per visitor day of day use by \$.18. Hence, the use of amortization rather than the sinking fund to calculate capital recovery costs does not significantly alter the cost of providing recreational opportunities at Baxter Park.

Summary and Conclusions

The size and the unique nature of Baxter Park require that the Park have a more complex organizational structure than most other outdoor recreational facilities. This structure has a direct influence on the procedures used to calculate the costs of provision as well as the magnitude of the costs. For example, overhead costs are larger than those reported for other agencies because of the costs associated with operating the Park Headquarters in Millinocket and the gatehouses that

TABLE 23

A Comparison of Annual Capital Recovery Costs Associated with Sinking Fund and Amortization Methods and the Impact on Total Costs and Average Costs of Provision, Baxter Park, FY 1980-81

	Facility/Activity					Day Use
	Campgrounds					
	Abol	Roaring Brook	Chimney Pond	Trout Brook Farm	Russell Pond	
<u>Sinking Fund</u>						
Buildings and Equipment	\$ 3,022	\$ 3,612	\$ 3,050	\$ 2,252	\$ 3,332	\$ 7,776
Vehicles	<u>1,192</u>	<u>1,810</u>	<u>1,722</u>	<u>1,339</u>	<u>1,295</u>	<u>11,564</u>
Subtotal	\$ 4,214	\$ 5,422	\$ 4,772	\$ 3,591	\$ 4,627	\$ 19,340
Total Costs	\$43,925	\$65,750	\$62,051	\$48,141	\$47,667	\$196,318
Sinking Fund Cost Per Visitor Day	\$.71	\$.52	\$.99	\$ 1.11	\$.70	\$.42
Total Cost Per Visitor Day	\$ 7.42	\$ 6.33	\$ 12.88	\$ 14.87	\$ 7.18	\$ 4.24
<u>Amortization</u>						
Buildings and Equipment	\$ 4,726	\$ 5,412	\$ 4,451	\$ 3,245	\$ 5,222	\$ 14,044
Vehicles	<u>1,424</u>	<u>2,162</u>	<u>2,056</u>	<u>1,599</u>	<u>1,546</u>	<u>13,808</u>
Subtotal	\$ 6,150	\$ 7,574	\$ 6,507	\$ 4,844	\$ 6,768	\$ 27,852
Total Costs	\$45,861	\$67,902	\$63,786	\$49,394	\$49,808	\$204,830
Amortization Cost Per Visitor Day	\$ 1.04	\$.73	\$ 1.35	\$ 1.50	\$ 1.02	\$.60
Total Cost Per Visitor Day	\$ 7.75	\$ 6.54	\$ 13.24	\$ 15.26	\$ 7.50	\$ 4.42

control access to the Park at the three entrances. These overhead costs add significantly to the cost of providing recreational opportunities.

The "forever wild" nature of the Park is evident in capital recovery costs. These costs are lower than the same costs reported for other agencies because of the low level of capital improvements provided in the Park. Capital recovery costs account for only eight percent of total camping costs and less than 10 percent of day use provision costs. Given the low level of capital improvements, the use of amortization rather than a sinking fund to calculate capital recovery costs has only a minor effect on capital recovery costs.

CHAPTER 5

EVANS NOTCH RANGER DISTRICT

Evans Notch is the eastern-most ranger district in the White Mountain National Forest. The ranger district headquarters is located in Bethel, Maine and about 40 percent of the land managed by the district is located in Maine. The White Mountain National Forest Headquarters is located in New Hampshire. Evans Notch, like all ranger districts in the national forest system, is managed under the multiple use concept, which includes recreation, wildlife and watershed management, along with timber management.

Organizational Structure

The Ranger District has primary responsibility for management of lands within its jurisdiction. Overall responsibility for district operations rests with the District Ranger who is assisted by two assistant rangers and other personnel. One of the assistant rangers at Evans Notch has, as part of his/her functions, the responsibility to manage and coordinate the recreation program of the District.

In addition to district personnel, a support staff at the forest headquarters assists the district in its recreation management activities. This staff provides technical assistance and data processing, and conducts forest-wide studies of recreational use. The National Forests are grouped together under regional centers for administrative purposes. The White Mountain National Forest is in the eastern region of the U.S. Forest Service and its regional headquarters is in Milwaukee, Wisconsin. Finally, the Forest Service's national offices are in the U.S. Department of Agriculture in Washington, D.C.

Facilities Studied and Accounting Procedures

The Forest Service identifies three basic types of recreational opportunities within the national forests. These are: developed sites for camping; developed sites for day use; and dispersed recreation within the national forests. Developed campsites are further defined by the type of facilities provided and the type of camping experience they offer. The five levels of camping experience provided by the

Forest Service are noted in Table 24. Generally, the Forest Service strives to provide campgrounds with relatively low levels of development (levels 1, 2, and 3), thus leaving the provision of more highly developed facilities to the private sector and other public agencies.

The recreation operating budgets for the Evans Notch Ranger District are maintained on a program basis; that is, budget expenditures are maintained for developed sites and for dispersed recreation. Therefore, the cost data presented below are calculated on a program basis. Costs were not allocated to individual campgrounds or day use areas because district personnel did not feel they could provide accurate allocations of costs among the various facilities.

The sites for developed camping include the five campgrounds in the Evans Notch Ranger District. The characteristics of these campgrounds are summarized in Table 25. All of the campgrounds are relatively small, ranging from seven sites at Crocker Pond to 24 sites at Hastings. Four of the five campgrounds represent experience level three facilities while Basin campground is developed to experience level four. User fees are charged at all campgrounds except Crocker Pond. A fee was not charged at that facility because budget constraints required that services be reduced below the minimum required by the Forest Service to designate the facility as a user fee area. In total, it is estimated that 4,134 occupied site nights occurred at the five campgrounds. This may underestimate the actual level of use because the above estimate is based primarily on fee collections at those campgrounds where fees were charged. Since user fees are paid on a voluntary basis, the actual level of use may be somewhat higher.

The primary day use areas in the Evans Notch Ranger District are the Gilead Picnic Area and the Cold River Overlook, the Cold River and Basin Pond Picnic areas and the boat ramp at Basin Pond. The dispersed recreation program includes all other recreational activities pursued in the District, including hiking, fishing, hunting, and wildlife observation. Use data for both developed day use and dispersed recreation are based on best available estimates, but they are not considered highly accurate or reliable. District personnel estimated that 3,900 visits occurred at the developed day use sites and 59,900

TABLE 24

National Forest Camp and Picnic Site Classification Scheme

Development and Experience Level	Site Modification	Recreation Experiences
1	<i>Minimal.</i> Rustic or rudimentary improvements to protect site rather than provide comfort to users. Synthetic materials avoided. Subtle, minimal controls; no obvious regimentation. Informal spacing extended to minimize contacts. Motorized access not provided or permitted.	Primitive forest environment dominates. Rudimentary and isolated sites beyond the sight or sound of inharmonious influences. Maximum opportunity for experiencing solitude, testing skills, and compensating for the routines of daily living. User senses no regimentation, feels physical achievement to reach site is important.
2	<i>Little.</i> Rustic or rudimentary improvements to protect site rather than provide comfort to users. Synthetic materials avoided. Subtle, minimal controls; little obvious regimentation. Informal spacing extended to minimize contacts. Motorized access provided or permitted, primarily over primitive roads.	Near primitive forest environment. Outside influences present but minimized. Feeling of accomplishment associated with low-standard access is important but physical exertion not necessarily required to reach site. Opportunity for solitude and chance to test outdoor skills.
3	<i>Moderate.</i> Facilities equally to protect site and comfort users. Contemporary/rustic design of improvements using native materials. Inconspicuous traffic controls usually provided for vehicles. Roads may be hard surfaced and trails formalized. Development density: about 3 family units per acre. Primary access to site over high-standard, well-traveled roads. Visitor Information Services, if available, are informal and incidental.	Forest environment is essentially natural. Solitude is combined with some opportunity to socialize. Controls and regimentation for safety and wellbeing of user sufficiently obvious to afford a sense of security but subtle enough to leave the taste of adventure.

TABLE 24 (Continued)

Development and Experience	Site Modification	Recreation Experiences
4	<p><i>Heavily Modified.</i> Some facilities strictly for comfort and convenience of users but no luxury facilities. Facilities may incorporate synthetic materials. Extensive use of artificial surfaces for roads and trails. Traffic controls for vehicles present and usually obvious. Primary access usually over paved roads. Development density: 3-5 family units per acre. Plant materials usually native. Visitor Information Services frequently available.</p>	<p>Forest environment is pleasing and attractive but not necessarily natural. Blends opportunities for solitude and socializing with others. Testing of outdoor skills mostly limited to the camping activity. Many user comforts available. Moderate contrast to daily living routines. Creates marked sense of security.</p>
5	<p><i>High degree.</i> Facilities, most for comfort and convenience of users, include flush toilets and may include showers, bath houses, laundry facilities, and electrical hookups. Designs may be formalized and architecture contemporary. Synthetic materials commonly used. Formal walks or surfaced trails. Regimentation of users is obvious. Access usually by high-speed highways. Development density: five or more family units per acre. Plant materials may be non-native. Formal Visitor Information Services usually available. Mowed lawns and clipped shrubs common. (EL5 sites are provided only in special situations or close to large cities where other lands are unavailable.)</p>	<p>Pleasing environment attractive to the novice or highly gregarious camper. Opportunity to socialize with others very important. Satisfies urbanites' needs for compensating experiences and relative solitude, but less intensively than in classes 1-4. Users are in a secure situation with ample provisions for personal comfort so they will not be called upon to use undeveloped skills.</p>

TABLE 25

Characteristics of Campgrounds in the
Evans Notch Ranger District

Campground	Number of Sites	Experience/Development Level	Fee Per Site Night	Occupied Site Nights in 1981
Wild River	11	3	\$3.00	827
Cold River	14	3	3.00	567
Crocker Pond	7	3	--	292
Hastings	24	3	3.00	1,318
Basin	<u>21</u>	4	4.00	<u>1,130</u>
Total	77			4,134

visitor days of dispersed recreation occurred on the District in FY 1980-81.

The allocation of developed recreation program costs was accomplished with the assistance of the Assistant District Ranger for recreation. Camping was estimated to account for 75 percent of the developed recreation program costs; the remaining 25 percent of costs was allocated to developed day use activities. Separate budget figures were provided for dispersed recreation. Direct operation and maintenance costs were obtained from program budgets. It should be noted that a vehicle charge is included in O & M costs. This charge is levied at the National Forest headquarters based on estimates of expected vehicle use for the year. This charge includes vehicle replacement costs so vehicles are not included in the calculation of sinking fund payments. Capital recovery costs for roads were also omitted because an accounting charge is levied for road maintenance and construction associated with recreation use. This charge is included under "fire management" in the cost data presented below.

Two types of overhead costs were estimated. One is associated with the general recreation administration at the Ranger District level and the other is for overhead at the National Forest level for support services provided for recreation on the Ranger District. The latter overhead is computed by the Forest Service by multiplying recreation costs at the ranger district by a rate of 22 percent. No attempt was made to

allocate overhead costs at the regional or national level back to the District.

The sinking fund costs for capital recovery only include buildings and equipment since vehicle replacement and road maintenance charges for recreational activities are accounted for in O & M costs. Replacement costs for buildings and equipment were estimated by updating the Recreation Information Management Facility Condition Records for the Ranger District.

Provision Costs for Camping and Day Use

Costs of provision for developed and dispersed recreation in the Evans Notch Ranger District are summarized in Table 26. The costs are broken down into categories, similar to the presentation of the data in earlier chapters. Total O & M costs of campgrounds in the District in FY 1980-81 were \$26,818. Of this amount, \$21,400, or 80 percent of O & M costs, were associated with personal services. The vehicle use charge, materials and supplies, and contracts (for garbage collection) comprised the bulk of other O & M costs. Overhead costs for camping amounted to almost \$7,900, with 79 percent of this amount associated with overhead at the Forest headquarters. Capital recovery costs were \$13,067, based on a sinking fund and a three percent real interest rate. Total costs of provision for camping were \$47,764, which translates into \$620 per campsite and \$11.55 per occupied site night.

Costs of developed day use facilities totaled almost \$14,000 or \$3.58 per visit. Labor costs accounted for 51 percent of total costs, and total O & M costs comprised 64 percent of total costs. Overhead and capital recovery costs accounted for 19 percent and 17 percent, respectively, of total costs.

The total cost of accommodating dispersed recreational activities in the Evans Notch Ranger District was about \$16,000 in FY 1980-81. Again, labor services accounted for a large percentage of these costs (57%). Total O & M costs were 78 percent of total costs. The remaining 22 percent of total costs was associated with overhead charges for the District and Forest headquarters. Capital recovery costs were not attributed to dispersed recreation since capital improvements are not utilized in the pursuit of these activities. Total costs per visitor

TABLE 26

Costs of Provision for Developed and Dispersed Recreation,
by Cost Category, Evans Notch Ranger District, FY 1980-81

Cost Category	Developed Sites		Dispersed Recreation	Total
	Camping	Day Use		
Personal Services				
Salary	\$20,182	\$ 6,727	\$ 8,735	\$35,644
Travel Allowance	994	331	350	1,675
Uniform Allowance	<u>233</u>	<u>78</u>	<u>50</u>	<u>361</u>
Subtotal	\$21,409	\$ 7,136	\$ 9,135	\$37,680
Other Operation and Maintenance Costs				
Vehicle Charge	\$ 1,568	\$ 522	\$ 1,720	\$ 3,810
Materials & Supplies	1,323	441	190	1,954
Signs	241	80	200	521
Radio Maintenance	195	65	50	310
Contracts	1,200	400	--	1,600
Fire Management	<u>882</u>	<u>294</u>	<u>1,176</u>	<u>2,352</u>
Subtotal	\$ 5,409	\$ 1,802	\$ 3,336	\$10,547
Total Operation and Maintenance Costs	\$26,818	\$ 8,938	\$12,471	\$48,227
Overhead				
District	\$ 1,622	\$ 541	\$ 649	\$ 2,812
Forest	<u>6,257</u>	<u>2,085</u>	<u>2,886</u>	<u>11,228</u>
Subtotal	\$ 7,879	\$ 2,626	\$ 3,535	\$14,040
Capital Recovery Costs				
Buildings & Equipment	\$13,067	\$ 2,413	--	\$15,480
Total Costs	\$47,764	\$13,977	\$16,006	\$77,747

day for dispersed recreation were about 27 cents.

The total cost of providing both developed and dispersed recreational activities in the District in FY 1980-81 was almost \$78,000. Camping operations accounted for 61 percent of these costs, while developed day use and dispersed recreation comprised 18 percent and 21 percent, respectively, of total recreation provision costs.

A comparison of costs of provision and the current user fees charged for camping again indicates that user fees only covered part of the costs.

For example, the \$3.00 fee charged at three of the campgrounds covered only 26 percent of the total costs per occupied site night and 46 percent of O & M costs per occupied site night. Even the \$4.00 fee charged at Basin campground was not sufficient to cover the average O & M cost per site night for the five campgrounds. Since user fees are not charged for developed day use or dispersed recreation, none of the costs incurred to provide these services was recovered through user fees.

A Comparison of Amortization and Sinking Fund

Capital recovery costs based on the sinking fund and amortization methods are presented in Table 27. Total costs and unit costs for the two methods are also presented for comparison. Dispersed recreation is excluded from the table since there are no capital improvements associated with the provision of those services. Amortization increases capital recovery costs and total costs about \$10,500 over the amount required using the sinking fund method. This translates into an increase of about \$137 per campsite and about \$2.50 per site night.

Amortization only increases the capital recovery costs for developed day use by about \$2,000. However, this amounts to about fifty cents per visit for the facilities.

Summary and Conclusions

Once again, the accounting procedures used to estimate the costs of provision for the Evans Notch Ranger District had to be modified to account for the bookkeeping and budgeting procedures used by the Forest Service. For example, both vehicle and road costs are included in O & M costs rather than capital recovery costs. Hence, the costs reported in this chapter are not directly comparable with the data in previous chapters. In addition, costs of camping were not allocated to individual campgrounds because District personnel felt any breakdown of total camping costs would be too inaccurate to be of use in the study. The same problem existed with developed day use facilities.

Developed camping costs per campsite for the Forest Service campgrounds fall in the range of costs reported for the Maine Bureau of Parks and Recreation. Capital recovery costs per campsite for equipment and facilities at the Forest Service facilities are somewhat higher,

TABLE 27

A Comparison of Costs of Provision Based on the Sinking Fund and Amortization Methods of Calculating Annual Recovery Costs, Evans Notch Ranger District, FY 1980-81

Cost Component	Sinking Fund		Amortization	
	Developed Camping	Developed Day Use	Developed Camping	Developed Day Use
Capital Recovery Costs	\$13,067	\$ 2,413	\$23,601	\$ 4,359
Total Costs	47,764	13,977	58,298	15,923
Capital Recovery Costs Per Campsite	170	--	307	--
Total Costs Per Campsite	620	--	757	--
Capital Recovery Costs Per Site Night	3.16	--	5.71	--
Total Costs Per Site Night	11.55	--	14.10	--
Capital Recovery Costs Per Visit	--	.62	--	1.12
Total Costs Per Visit	--	3.58	--	4.08

however. This may be due to the relatively small size of the Forest Service facilities. Capital costs per campsite are often higher for small campgrounds than for larger ones, other things being equal.

Costs per occupied site night at the Forest Service facilities are also similar to those reported for the less intensively used state parks. The data again illustrate that costs per occupied site decrease as the level of use of the facilities increases.

Use of amortization rather than a sinking fund has more of an impact on capital recovery costs for the Forest Service campground than it did on Baxter State Park facilities. This is due to the higher level of capital improvements in the Forest Service facilities. Overall, amortization added almost \$2.50 to the costs per occupied site night.

Developed day use costs per visit were also quite large. Again, this is primarily due to the low number of visits that occurred at the day use area. Costs per visit would probably decline as use increased.

Dispersed recreation costs per visitor day were low, due to the large number of estimated visitor days of use, and the relatively low costs associated with providing the dispersed recreation opportunities.

CHAPTER 6

ACADIA NATIONAL PARK

Acadia National Park, located on the east-central coast, is the only national park in Maine. Most of the Park is located on Mount Desert Island, but the Park also includes land holdings on Isle au Haut and Schoodic Point. Acadia is a very popular destination tourist area. During the summer months, the population of the Island increases dramatically due to the influx of summer residents and other day use and overnight visitors to the Island and the Park.

The uniqueness of the Park is related to the interface between the land and the sea. The Island is quite mountainous; in fact, Cadillac Mountain is the highest coastal mountain on the east coast of the United States. It offers picturesque views of the surrounding land and seascape. The coastline is generally rocky with several scenic coves and harbors. A wide range of recreational facilities is available, including a twenty-mile ocean-side drive, camping and picnicking areas, swimming beaches, carriage trails for hiking, and technical and non-technical mountain climbing. These facilities and activities, along with the scenery, attract a large number of visitors each year.

Organizational Structure

The overall management of the Park is the responsibility of the Park superintendent. There are four major functional program areas under the superintendent. They are protection and resource management, interpretation, maintenance, and fee collection. Full- and part-time employees are utilized in each of the functional program areas. Like the Forest Service, the National Park Service has regional and national offices. Regional and national staff provide technical assistance to the Acadia staff. As in the case of the Forest Service, the cost of the services provided by regional and national offices is not included in the cost estimates presented below.

Facilities Studied and Accounting Procedures

The four facilities in Acadia National Park chosen for inclusion in this study are Blackwoods Campground, Seawall Campground, Sand Beach, and

facilities on Isle au Haut. Each is discussed briefly below.

Blackwoods is the largest campground in the Park. It contains 319 sites, all of which are drive-in sites designed for both tent and trailer camping. The campground also contains an amphitheater that seats 900 people which is used for interpretation and other programs. Blackwoods is located on the eastern side of the Island. Since this is the most popular tourist area, the level of use of Blackwoods is higher than at the other campground. The campground is filled to capacity on most summer nights. Total use at Blackwoods in FY 1980-81 was 161,346 recreation days or 39,353 occupied site nights.

Seawall is the only other campground in the Park (although there are numerous commercial campgrounds on Mount Desert Island). It is located on the southwestern end or "backside" of the Island. The campground has a total of 212 sites, 108 of which are drive-in sites and the remaining 104 are walk-in sites. There is a 350-seat amphitheater in Seawall Campground. Total use of the campground was 80,152 recreation days or 19,549 occupied site nights in FY 1980-81.

Sand Beach is a well protected sandy ocean beach of about one-quarter mile in length. It is a popular attraction during warm summer days. The only facilities provided at Sand Beach are a comfort station, bath house, parking lot, and a trail to the beach. Unfortunately, reliable use data are not available for Sand Beach. Park personnel estimate that visitation at Sand Beach may be as high as one million persons a year. This would mean that fully one-third of all the Park's visitors make at least a casual visit to Sand Beach.

The facilities on Isle au Haut are small and provide an opportunity for a backcountry recreation experience. The only facilities provided are three adirondack shelters, three chemical toilets, a well with a hand pump, and a trail system. A total of 978 people used these facilities in 1980-81.

As was the case with the other agencies included in the study, the procedures used to estimate the cost of provision for the above facilities had to be modified to reflect the unique character of the cost data available for Acadia National Park. Operation and maintenance costs were estimated with the assistance of the business manager and others involved in the management of the specific facilities. For example, personal services involved in the operation of each facility were

estimated by the business manager in consultation with the persons in charge of each of the functional areas in the budget. Salaries and wages of personnel were increased by eleven percent to account for fringe benefits. Supplies and materials were allocated to each facility in a similar manner. Separate utility costs were available for each facility.

Part of the general administration costs of the Park was assigned as overhead costs for the four facilities. Overhead costs included ten percent of the salaries of the superintendent and a clerk, and five percent of the business manager's salary, as recommended by park personnel. Overhead costs do not include a pro-rated share of equipment or building costs associated with general park operations since the data were not available. Overhead costs were allocated among the four facilities in proportion to each facility's direct labor costs as a percent of the total direct labor costs for the four functional program areas.

The current replacement cost for equipment and vehicles was obtained from the National Park Service Equipment Replacement Master Schedule for Acadia National Park. These costs were allocated to individual facilities on the basis of its share of total O & M costs. This procedure was necessitated by the functional accounting system used by the National Park Service. The implications of this allocation process are discussed below.

Estimation of the current replacement cost of buildings and structures in each of the facilities was the most difficult data collection task. Although the park staff was very cooperative, the accounting procedures used at the Park and the lack of complete historical records made it impossible to reconstruct the necessary information. Therefore, the replacement cost of most buildings was first estimated from a National Park Service planning document that listed the current costs of most types of developments undertaken in national parks. These estimates were then compared with actual costs available for some of the structures, and adjustments in the original cost estimates were made as needed. This process resulted in the best available estimates of current replacement costs, but they may be less accurate than the estimates of current replacement costs of other facilities included in this report. The estimated replacement costs are: Sand Beach, \$273,200; Isle au Haut,

\$25,000; Blackwoods Campground, \$1,435,500; and Sewall Campground, \$957,000.

Costs of Provision for the Selected Facilities

The annual costs of provision for the selected facilities in Acadia National Park are reported in Table 28. Total operation and maintenance costs ranged from \$18,800 for Sand Beach to \$84,770 at Blackwoods Campground. Once again, direct labor costs (personal services) represent

TABLE 28

Costs of Provision for Selected Facilities, Acadia National Park, FY 1980-81

	Facility			
	Blackwoods Campground	Sewall Campground	Isle au Haut	Sand Beach
Personal Services				
Maintenance	\$ 23,984	\$25,164	\$25,000	\$ 3,000
Reservation and Fee Collection	32,695	17,605	--	--
Law Enforcement*	10,530	5,670	--	7,800
Interpretation	1,300	1,300	--	--
Lifeguards	--	--	--	6,500
Subtotal	\$ 68,509	\$49,739	\$25,000	\$17,300
Other Operation and Maintenance Costs				
Utilities and Fuel	\$ 11,261	\$ 2,818	\$ 1,500	\$ --
Supplies & Materials	5,000	3,000	2,000	1,500
Subtotal	\$ 16,261	\$ 5,818	\$ 3,500	\$ 1,500
Total Operation and Maintenance Costs	\$ 84,770	\$55,557	\$28,500	\$18,800
Overhead (Park Administration)	\$ 3,832	\$ 2,512	\$ 1,287	\$ 850
Capital Recovery Costs				
Equipment & Vehicles	\$ 6,259	\$ 4,104	\$ 2,104	\$ 1,388
Buildings	53,423	35,504	930	10,167
Subtotal	\$ 59,682	\$39,608	\$ 3,034	\$11,555
Total	\$148,284	\$97,677	\$32,821	\$31,205

*Includes accident investigation, criminal investigation, patrol, and general law enforcement.

a large part of total O & M costs. For example, labor costs accounted for more than 80 percent of total O & M costs at all four facilities and was as high as 92 percent for Sand Beach. Direct labor costs as a percent of total costs ranged from 46 percent for Blackwoods Campground to 76 percent for Isle au Haut.

Overhead costs for the facilities were quite low because of the method used to estimate them. These costs were only estimated to be about two percent of total costs. On the other hand, capital recovery costs (based on a sinking fund with a 20-year life for buildings and a seven-year life for equipment and vehicles) for the selected facilities were generally higher, ranging from nine percent of total costs for Isle au Haut to about 40 percent of total costs for the other three facilities. There are two factors that account for the high capital recovery costs. First, the replacement cost of the buildings and structures at the two campgrounds and Sand Beach are quite high, thus resulting in high capital recovery costs for buildings and structures in those facilities. In addition, the Park maintains a very large inventory of vehicles and equipment, a large proportion of which are used for general purposes and can not be attributed to specific facilities. Examples include snow removal vehicles and equipment, construction equipment, office equipment, and communications equipment. A share of the replacement cost of all equipment and vehicles was allocated to the selected facilities on the basis of each facility's share of total O & M costs for the Park. Hence, the capital recovery costs for equipment and vehicles for the facilities include the general purpose equipment and vehicles without direct regard for whether they were actually used in a given facility. Therefore, the capital recovery costs for equipment and vehicles are similar to an overhead charge.

Total annual costs of provision for the four facilities ranged from \$31,205 for Sand Beach to \$148,000 for Blackwoods Campground. Personal services and capital recovery costs together accounted for 86 to 92 percent of the total costs of provision for the four facilities.

Average costs per recreation day for the four facilities are reported in Table 29. Costs at Blackwoods and Seawall Campgrounds were \$.92 and \$1.21, respectively, per recreation day. Isle au Haut had a cost of \$33.56 per recreation day. This high cost is due to the low level of use

TABLE 29

Total Costs of Provision Per Recreation Day, by Cost Category, for Selected Facilities, Acadia National Park, FY 1980-81

Cost Category	Facility			
	Blackwoods Campground	Seawall Campground	Isle au Haut	Sand Beach
Personal Services	\$.43	\$.62	\$25.56	\$.02
Other O & M Costs	<u>.10</u>	<u>.07</u>	<u>3.58</u>	*
Subtotal	\$.53	\$.69	\$29.14	\$.02
Overhead	\$.02	\$.03	\$ 1.32	\$ *
Capital Recovery Costs	<u>\$.37</u>	<u>\$.49</u>	<u>\$ 3.10</u>	<u>\$.01</u>
Total	\$.92	\$1.21	\$33.56	\$.03

*Less than one cent.

of the facilities. At the other extreme, costs per recreation day for Sand Beach were only three cents, due to the very high use level at the facility. An estimate of 1,000,000 recreation days in FY 1980-81 was used to calculate the costs per recreation day for Sand Beach.

Additional cost information for Seawall and Blackwoods Campgrounds is reported in Table 30. Costs are reported on a per-campsite and per-occupied-site-night basis. Both campgrounds had costs per campsite of about \$460. Costs per-occupied-site-night were \$3.77 for Blackwoods Campground and \$5.00 for Seawall Campground.

The National Park Service determines its campground fee schedule by comparing its services with the services provided and fees charged at commercial facilities in the geographical area. Based on this analysis, the fees for Blackwoods and Seawall were \$4.00 per occupied site night in FY 1980-81. (The fees were increased to \$6.00 in FY 1981-82.) Comparison of the cost of provision with the \$4.00 fee indicates that the fee was large enough to cover all O & M costs for both facilities, and total costs of provision at Blackwoods Campgrounds.

A Comparison of Amortization and Sinking Fund

Capital recovery costs associated with the sinking fund and

TABLE 30

Total Costs Per Campsite and Per Occupied Site Night for Blackwoods and Seawall Campgrounds, Acadia National Park, FY 1980-81

Cost Category	Blackwoods		Seawall	
	Costs Per Campsite	Costs Per Occupied Site Night	Costs Per Campsite	Costs Per Occupied Site Night
Personal Services	\$214.76	\$1.74	\$234.62	\$2.54
Other O & M Costs	<u>50.97</u>	<u>.41</u>	<u>27.44</u>	<u>.30</u>
Subtotal	\$265.73	\$2.15	\$262.06	\$2.84
Overhead	\$ 12.01	\$.10	\$ 11.85	\$.13
Capital Recovery Costs	<u>\$187.09</u>	<u>\$1.52</u>	<u>\$186.83</u>	<u>\$2.03</u>
Total	\$464.83	\$3.77	\$460.74	\$5.00

amortization methods of calculation are reported in Table 31. The added cost associated with amortization was quite large for Blackwoods and Seawall campgrounds because of the high replacement cost of these facilities. For example, the annual amortization payment for Blackwoods was about \$45,000 larger than the sinking fund payment. Total costs per campsite at Blackwoods were about \$140 higher when amortization was used; total cost per occupied site night at Blackwoods increased by \$1.13 with the use of amortization.

At the other extreme, amortization only added about \$1,200 to the total costs of provision for Isle au Haut due to the low replacement cost of the facilities provided at that site. Amortization only resulted in a one-cent increase in the total costs per recreation day for Sand Beach. Hence, the impact of substituting the amortization method for the sinking fund approach to recover replacement costs was highly variable among the facilities due to the variability in the level of capital investment among the facilities.

Summary and Conclusions

The cost of provision data for the facilities studied in Acadia National Park exhibit some of the same trends that were found in the study of facilities provided by other public agencies. First, as was the case

TABLE 31

A Comparison of Annual Capital Recovery Costs Associated with the Sinking Fund and Amortization Methods, Acadia National Park, FY 1981

Cost Category	Facility			
	Blackwoods Campground	Seawall Campground	Isle au Haut	Sand Beach
<u>Sinking Fund</u>				
Equipment & Vehicles	\$ 6,259	\$ 4,104	\$2,104	\$ 1,388
Buildings	<u>53,423</u>	<u>35,504</u>	<u>930</u>	<u>10,167</u>
Total	\$ 59,682	\$39,608	\$3,034	\$11,555
Capital Cost Per Recreation Day	\$ 0.37	\$ 0.49	\$ 3.10	\$ 0.01
Total Cost Per Recreation Day	\$ 0.92	\$ 1.21	\$33.56	\$ 0.03
Total Cost Per Campsite	\$ 464.84	\$460.74	--	--
Total Cost Per Occupied Site Night	\$ 3.77	\$ 5.00	--	--
<u>Amortization</u>				
Equipment & Vehicles	\$ 7,698	\$ 5,048	\$2,588	\$ 1,707
Buildings	<u>96,488</u>	<u>64,123</u>	<u>1,680</u>	<u>18,363</u>
Total	\$104,186	\$69,171	\$4,268	\$20,070
Capital Cost Per Recreation Day	\$ 0.65	\$ 0.86	\$ 4.36	\$ 0.02
Total Cost Per Recreation Day	\$ 1.19	\$ 1.59	\$34.82	\$ 0.04
Total Cost Per Campsite	\$ 604.35	\$600.19	--	--
Total Cost Per Occupied Site Night	\$ 4.90	\$ 6.51	--	--

with other agencies, labor costs accounted for a major part of the total costs of provision. Capital recovery costs for the two Acadia campgrounds were also quite high due to the level of development of the facilities. On the other hand, overhead costs were generally lower for Acadia facilities than for the state parks studied. This difference,

however, is largely due to differences in the data available and the methods used to estimate overhead costs for Acadia.

We should also point out that one should be cautious in the interpretation of the cost data. The costs reported for Isle au Haut are a case in point. Costs per recreation day for Isle au Haut were very high compared to the other facilities studied in the Park. However, the total cost of providing the facilities at Isle au Haut was only \$33,000 and Isle au Haut's proportional share of the equipment and vehicles sinking fund payment comprised over \$2,000 of the total. Hence, the savings to the Park, if the facilities at Isle au Haut were closed, would only be about \$30,000. Furthermore, the level of use of these facilities was low because they are designed to provide a more remote type of recreational experience that stresses solitude. As noted in previous chapters, the costs associated with the provision of remote or backcountry facilities are generally much higher (per unit of use) than those associated with providing more highly developed and more intensively used facilities such as the others studied in Acadia.

Finally, we want to emphasize that the accounting system used by the National Park Service is not as useful as accounting systems used by other agencies for estimating costs of provision for individual facilities within the Parks. Consequently, we are not as confident about the procedures used to estimate costs and the estimates derived from the procedures. Nevertheless, the cooperative assistance of the park staff partially offset the problems associated with the accounting system. Consequently, we believe the cost estimates reported above are the best obtainable and are accurate enough to serve as benchmarks for addressing policy issues associated with the costs of providing public outdoor recreational facilities and opportunities.

CHAPTER 7

SUMMARY AND CONCLUSIONS

The objective of this study was to estimate the cost of providing a wide range of publicly supplied outdoor recreational facilities operated in Maine. Selected facilities operated by the Maine Bureau of Parks and Recreation, Baxter State Park, the Evans Notch Ranger District of the White Mountain National Forest, and Acadia National Park were analyzed. Three topics are discussed in this chapter. First, the methodology and the empirical results of the study are reviewed and summarized. The second section addresses some of the economic consequences associated with the current pricing policies in light of the cost of providing the facilities. Finally, some suggestions for further research required to address policy issues facing the agencies are discussed.

An Overview of the Methodology and the Empirical Results

Previous cost of provision studies for outdoor recreation facilities have generally measured the social costs of provision for the facilities. Knowledge of the social costs is important. However, these studies have not been used extensively by recreation agencies because the agencies questioned the relevance of some of the social cost categories. For example, agencies do not have to pay the social opportunity costs of land used for recreation from their budgets. Hence, the social costs of provision are higher than the costs incurred by the agency.

In this study, a slightly different cost accounting approach was taken and the costs reported above more closely reflect the costs incurred by the agency. For example, social opportunity costs of land were not included in the cost estimates. In addition, a sinking fund was used to calculate capital recovery costs. This technique ignores the social opportunity cost of capital used to construct the facilities. However, amortization costs, which reflect the social opportunity cost of capital, were also calculated to illustrate the difference in capital recovery costs associated with the two methods. The sinking fund was used as the primary capital recovery cost technique because it represents the least-cost alternative available to the agencies if they were required to operate existing facilities on a self-supporting basis in the future.

A small portion of the costs reported above were included in the analysis even though they were not paid directly by the providing agency. One example is the value of services provided by CETA or Job Corps personnel. These costs were included in the analysis on the assumption that the agencies would have to pay the cost of replacing the services performed by CETA/Job Corps if the services were no longer provided. On the other hand, a large amount of effort was devoted to a thorough analysis of all agencies costs associated with the provision of the facilities studied. Most of the previous studies have not calculated agency overhead costs to specific facilities. In this study, a conscious effort was made to estimate overhead costs as accurately as possible. Estimates of overhead costs for the state agencies are considered to be quite accurate; the estimates for the federal agencies are more suspect because of insufficient information to allocate regional and national overhead costs back to individual facilities in a given park or ranger district.

In summary, the costs reported in this study underestimate the social cost of provision. Opportunity costs of land have been excluded even in those instances where it is clear that the measurement of these costs is appropriate from a social viewpoint. The opportunity costs of capital were also excluded. Since the costs reported above more closely approximate the actual agency costs, they are more appropriate for addressing policy issues facing the agencies that provide the facilities.

In reviewing the empirical results of the study, one has to remember that the costs estimated for the various agencies and facilities are not strictly comparable for several reasons. First, because of differences in the data base available, cost accounting procedures varied among the agencies. In addition, the type of experiences offered and the organizational structures of the agencies also varied. These factors have a significant impact on total costs of provision and total costs per unit of use. For example, the costs reported for Baxter State Park are generally higher than those reported for other facilities. However, this is largely due to the nature of the Park. It offers a more primitive backcountry experience than most of the other facilities and additional personnel are required for visitor safety and other management considerations. Hence, it can be misleading to compare the cost structure of one facility with that of other facilities because of

differences in management objectives and policies.

However, the results of the study do allow us to make some general statements about the cost of providing recreational facilities. First, even though the costs reported above approximate actual agency costs rather than social costs, the reported total costs of provision are still quite high. The contribution of the different cost components to the total cost of provision varies somewhat but labor costs comprised a large share of O & M costs and total costs for all facilities. Labor costs typically accounted for over 80 percent of O & M costs and over 50 percent of total costs, especially when one recognizes that a large part of overhead costs represents labor costs for most agencies. Overhead costs were also quite high for those agencies where they could be accurately allocated. For example, overhead costs accounted for close to 50 percent of the total costs of provision at Baxter State Park. This is largely due to the administrative structure of the Park and the method used to allocate the costs to specific facilities.

Capital recovery costs varied directly with the level of development in the facilities. However, capital recovery costs as a percent of total costs were generally in the range of seven to fifteen percent.

Total costs per unit of use also varied considerably. In general, costs per unit of use varied inversely with the intensity of use. This is due to the fact that fixed costs, such as capital recovery and overhead costs, comprised a large part of total costs. Even some variable costs become "lumpy" or semi-fixed once the decision is made to operate the facility. That is, some variable costs do not increase proportionally with the level of use of the facility. Total costs per unit of use for the more primitive facilities were generally higher than those estimated for more highly developed facilities. This, again, is due to the higher intensity of use of the more developed facilities. It is also partially due to the economies of size associated with the facilities since the primitive facilities are smaller.

The results also clearly indicate that, in almost all cases, the fees charged for use of the facilities do not cover the agency's costs to provide the facilities. While the fee level at some facilities was sufficient to cover O & M costs, it was not sufficient to cover total costs, with the exception of Camden Hills day use facilities. The

shortfall between total costs and user fees was quite large for some facilities. It ranged from four dollars per person per day to over twelve dollars per person per day for the campgrounds in Baxter State Park. Hence, the shortfall, and the need for additional revenue sources is quite large for many of the facilities and agencies.

In summary, it is clear from the results of the study that the provision of public outdoor recreational opportunities and facilities is an expensive and a labor-intensive activity. It is also clear that major cost savings can only be achieved by cutting personnel, either at the facilities or at other administrative levels that contribute to overhead costs. The level of current user fees is insufficient to recover a major portion of the costs. Whether or not users would be willing to pay the fees required to pay the full cost of provision is an empirical question about which no information is available. However, given the current budgets constraints facing agencies, a study to measure the willingness to pay of the users would be a worthwhile undertaking. Such a study is discussed in more detail below.

Implications of the Results and Suggestions for Future Research

The results of this study indicate that, in general, the fees charged by agencies that provide the recreational opportunities discussed above, do not cover the full costs of provision. While this fact has been known in the past, the magnitude of the difference between fees and costs is now documented. However, there are also some consequences associated with the underpricing of facilities that are not usually recognized. We present three consequences of underpricing that are often overlooked. In presenting this material, it is necessary that we adopt a more technical style and use techniques and terms common to the study of economics.

First, non-price rationing of recreational facilities is inefficient in that the total benefits to users are less under non-price rationing than under price rationing. This is illustrated in Figure 3 using campsites as an example. Let DD represent the demand curve for campsites in a given day. Also, assume that the marginal cost of providing the campsites in a given day is equal to P_g , which also represents the fee

charged by the agency. At P_g , Q_g campsites are demanded; however, only Q_c sites are available and excess demand is equal to $Q_c - Q_g$. If user fees were used to clear the market, the efficient fee would be P_m and the total benefits, as measured by the area under the demand curve, would be ODA_c .

Now, assume that some method other than user fees is used to ration the scarce campsites. Assume, also, that the rationing process results in a random distribution of the campsites to those campers who value the campsites at or above P_g . The total demand curve can then be separated into two components: the demand curve of successful persons (those that obtain a campsite through non-price rationing) and the demand curve of unsuccessful persons. They are represented as DD_s and DD_u , respectively, in Figure 3.

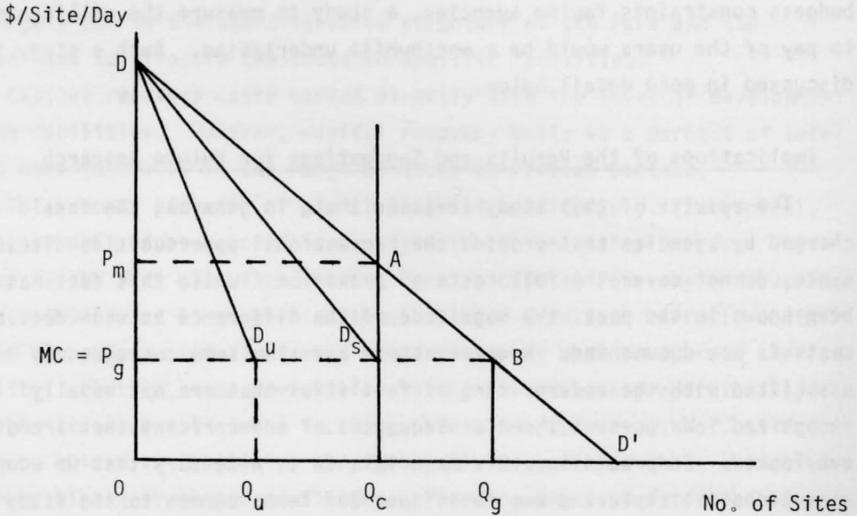


Figure 3. A comparison of the total benefits associated with price and non-price rationing of scarce recreational sites.

The total benefits associated with non-price rationing are represented by the area $ODD_s Q_c$. Note that this measure of total benefits is less than the level that could be achieved by using price to ration the sites. In fact, these results can be generalized by noting that any method of rationing that does not achieve the same distribution of output

as that achieved by price rationing results in a decrease in total benefits accruing to potential and/or actual users. This, then, represents a strong argument in favor of using prices to ration scarce recreational opportunities.

The above illustration is also useful for showing how the use of non-market clearing prices can result in confusion for the public agencies that provide the good or service (Vars, 1975). For example, those consumers on the lower portion of the D_s curve in Figure 3 can, and often do, argue that an increase in the fee structure would force them out of the market. Thus, they strongly oppose higher fees. On the other hand, those consumers on the upper portion of the D_u curve often articulate their high willingness to pay for a campsite and argue in favor of higher prices and/or more facilities. Hence, the use of non-clearing prices can distort and confuse the signals received by the public agency because of the contradictory opinion expressed by different segments of the population of users or would-be users.

Underpricing also compounds the problem of determining the economically optimal level of capacity for a given facility. Normally, the optimum capacity is defined such that the marginal costs of an additional unit of capacity are equal to the marginal benefits produced by the additional unit. However, Mumy and Hanke (1975) have shown that the standard marginal equality for determining capacity applies only when marginal cost pricing is used to allocate the output or capacity. When the output is underpriced, the standard investment rule no longer defines the optimal level of capacity. A new decision rule should be used. Assume, for the purposes of illustration, that operation and maintenance costs are zero in the operating phase of the project and that the investment will last only one time period, i.e., one year, and that the capacity depreciates instantly at the end of the time period.

The demand curve and the marginal cost curve for capacity are shown in Figure 4. The original decision rule, which equates marginal benefits and marginal costs, indicates that the optimal capacity is Q_1 and it should be priced at P_1 . However, suppose the government is pricing the units of capacity or output at P_g , which results in excess demand of $Q_1 - Q_g$ if the original decision rule is used to determine capacity. Some method, other than price, must be used to allocate the scarce output or capacity.

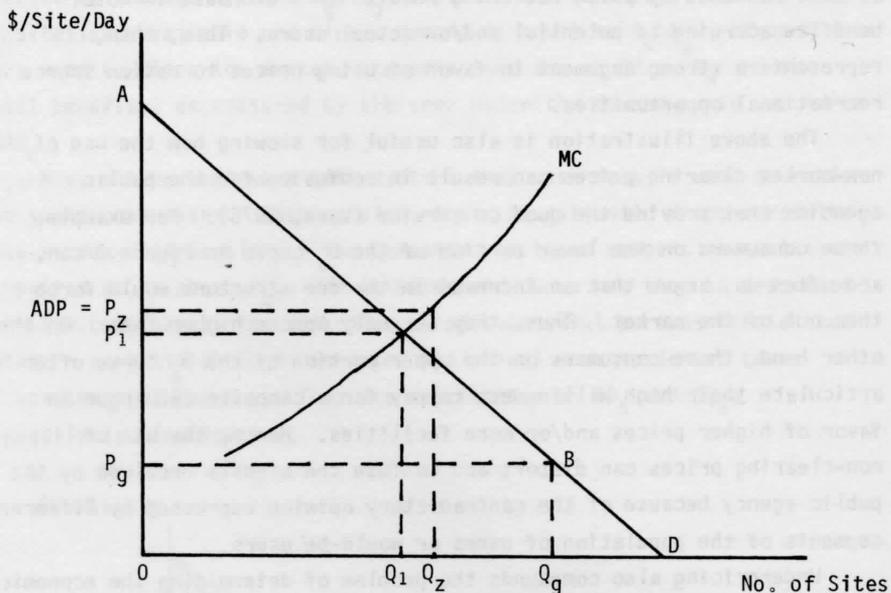


Figure 4. Optimal investment criterion when the product is underpriced.

Let us again assume that all individuals represented by the points on the demand curve between A and B have an equal probability of obtaining a unit of output. That is, the capacity will be randomly allocated to consumers who value the output at or above the government established price of P_g . Given this assumption, the demand function no longer represents the marginal benefit curve. Instead, given the random distribution of output, the expected value of the benefits for all units of output is the average demand price (ADP) which equals $\frac{OA - OP_g}{2}$, or P_z . Since P_z is the mathematical expected value of benefits, capacity should be chosen such that $P_z = MC$; this solution results in an optimal level of capacity of Q_z in Figure 4.

The situation illustrated in Figure 4 results in a larger level of capacity when the new criterion is used to determine the capacity. However, this is not always the case. It depends on the shape of the marginal cost curve for capacity. A marginal cost curve that rises very rapidly can result in an optimal level of capacity that is less than the

capacity determined by the intersection of demand and marginal cost.

It should also be noted that the optimal level of capacity obtained from the new criterion is positively related to the price actually charged for the output, P_g . As P_g increases, the ADP also increases. Hence, assuming that the marginal cost curve for additional units of capacity is not vertical, the intersection of ADP and marginal cost will occur at larger levels of capacity. Also note that the new investment criterion is applicable only when ADP intersects the marginal cost curve at a level of capacity that is less than the quantity actually demanded at the price charged for the facilities, P_g . Otherwise, the criterion would result in excess capacity.

The issues discussed above illustrate three important and often overlooked consequences of underpricing and the excess demand associated with it. All of these factors and the reasons for their existence are important in evaluating alternative policies regarding the pricing and the provision of public outdoor recreational facilities.

Finally, we would like to conclude the report with a suggestion for future research. This study has documented the costs associated with the provision of several outdoor recreational facilities. It has also shown that, in most cases, the fees charged during the year of the study did not cover the costs of provision. As noted in the introduction, this situation may become more problematic in the future, given the increased competition for federal and state tax dollars. It would seem prudent for agencies to develop plans to deal with the potential problems that may occur in the future. The options open to agencies are limited. Possible options included the implementation of cost saving measures, and/or revenue enhancement methods. Based on the previous analysis, we believe that the opportunities for cost savings are rather limited. As noted several times previously, labor costs comprise a high percentage of the variable costs of provision. It is extremely difficult to cut personnel because most facilities are not currently overstaffed. Personnel cuts could result in significant deterioration of the facilities and the quality of the recreational experience provided. Consequently, we believe agencies should concentrate on options that may increase agency revenues. Foremost among these options is higher user fees.

User fees charged at public recreation facilities traditionally have been lower than those charged by the private sector. This may or may not

be justified on the basis of the cost differential in the two sectors. We suspect that costs of provision are actually higher in the public sector than in the private sector. Because of this, we believe the time is long overdue for a study to measure the willingness to pay of users for the right to recreate at the public facilities. Although some have argued that higher fees would result in significant decreases in attendance, this is an empirical question which can and should be investigated.

Recently, the methodological tools required to conduct such a study have been refined and tested. The contingent valuation method of measuring the willingness to pay of users has been applied to a wide range of resources and environments. This technique could be applied directly to outdoor recreation facilities of the type studied in this report. We believe such a study should be undertaken to determine the potential that higher user fees may have for enhancing the revenue base of the agencies that provide the facilities and incur the costs. Equity questions could be addressed in the same study. We believe such a study would benefit the managers of recreational facilities and would also be a major contribution to the growing body of recreational economic research.

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