REPORT

MULTIPLE-USE PLANNING IN THE LITTLE SOUTH FORK OF THE CACHE LA POUDRE WATERSHED

Submitted by

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WE HEREBY RECOMMEND THAT THE REPORT PREPARED UNDER OUR SUPERVISION BY Norman C. Ritchey ENTITLED MULTIPLE-USE PLANNING IN THE LITTLE SOUTH FORK OF THE CACHE LA POUDRE WATERSHED BE ACCEPTED AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF FORESTRY.

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TABLE OF CONTENTS

TABLE OF CONTENTS---Continued

Chapter I

INTRODUCTION

The principles of multiple-use management of national forest lands recognize the equal priority of management direction for certain broad classes of renewable resource use: range, recreation, timber, water, and wildlife. The 105 square mile basin of the Little South Fork of the Cache la Poudre River in northern Colorado is unique in that, while a part of the overall multiple-use management program of the Poudre District of the Roosevelt National Forest, it has been assigned the function of a wildland research and demonstration area under cooperative agreement between the U. S. Forest Service and Colorado State University.

The characteristics of the basin dictate that research activities cannot constitute the sole use made of the area. There are significant timber, range, recreation, water, and wildlife resources that must also be considered. A portion of the headwaters area is within Rocky Mountain National Park under jurisdiction of the U. S. Park Service, and not the Forest Service, so that resource management on this headwaters area is directed toward a number of suitable recreation uses, protection timber management, modified wildlife management, and natural water flow. There are also small blocks of private lands in the basin, mostly along the stream courses, which will be used at the discretion of the owner with little or no control by the Forest Service.

It is not possible, therefore, to manage the area solely for wildland research without consideration of the other resources available or the public demands for them. The purpose of this paper is to develop an understanding of the resource coordination needs in the Little South watershed in relation to U. S. Forest Service management and Colorado State University research objectives for the area. An actual Forest Service multiple-use plan can only be prepared at the Ranger District level by the people most closely familiar with the management problems confronting the Forest Service. Consequently, the data given in the text of this report must be considered as a contribution to such a plan, rather than as the plan itself.

First an attempt must be made to understand what multiple-use is, how it evolved in public policy formulation, and how multiple-use planning is carried out in the U. S. Forest Service. A review of literature on multiple-use planning follows in Chapter II.

Chapter II

REVIEW OF LITERATURE

Multiple-Use As A Public Policy

Multiple-use is a public policy formulated by the U. S. Forest Service through fifty-five years of national forest management experience. Multiple-use policy is a defense mechanism against the wily "single interest" who seeks to modify national forest policy to place more emphasis on serving his needs. Strong pressure groups have traditionally been an important, effective, legal and/or semilegal policy-forming institution in the United States. However, in the case of national forest values their effectiveness is often checkmated by the equally strong opposing interest. In reality the strongest pressure group is the agency itself, seeking to manage land for what it feels is the overall good of the public, and also to preserve its own status as an agency of the Federal Government.

Over the years these strong outside pressures have become more intense: users of timber, water, minerals, land, and range forage; public recreationists, campers, hunters, fishermen, wilderness users; competing public agencies in water and recreation programs, local groups and interests, real estate promoters--all seeking to promote or satisfy their own needs with lesser consideration given to the rights of other people to use the resources and values obtainable from national forest lands.

The prediction for the future is for more intense pressures as scarcity of the resources and values obtainable from national forest lands becomes more and more a part of our modern life. In this respect the passage of the Multiple-Use Act of 1960--obtaining formal approval from Congress of multiple-use as a public policy--is a self-defense mechanism against increasing and opposing pressures from the various interest groups.

The Multiple-Use Act of 1960 (7)

Public Law 86-517
86th Congress, H.R. 10572
June 12, 1960

AN ACT

To authorize and direct that the national forests be managed under the principles of multiple use and to produce a sustained yield of products and services, and for other purposes.

...That it is the policy of the Congress that the national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and fish and wildlife purposes. The purposes of this Act are declared to be supplemental to, but not in derogation of, the purposes for which the national forests were established as set forth in the Act of June 4, 1897 (16 U.S.C. 475). Nothing herein shall be construed so as to affect the use or administration of the mineral resources of national forest lands or to affect the use or administration of Federal lands not within the national forests.

Sec. 2. The Secretary of Agriculture is authorized and directed to administer and develop the renewable surface resources of the national forests for multiple use and sustained yield of the several products and services obtained therefrom. In the administration of the national forests due consideration shall be given to the relative values of the various resources in particular areas. The establishment and maintenance of areas of wilderness are consistent with the purposes and provisions of this Act....

....Sec. 4. As used in this Act, the following terms have the following meanings:

(a) "Multiple use" means: The management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustment in use to conform to changing needs and conditions; that some land will be used for less than all of these resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

(b) "Sustained yield of the several products and services" means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the national forests without impairment of the productivity of the land.

Meaning and Implication of Multiple-Use as Defined in the Act

There have been many definitions of multiple-use but the above Act gives the official and legal definition. The wording suggests that there is no ideal in resource management and that many problems may arise in applying it to national forest management. The definition of multiple-use in the Multiple Use Act attempts to head off many of these problems in its wording. To understand this requires a careful analysis of each phrase in the definition:

"....Management of all the various renewable surface resources.. .." This wording implies that nonrenewable, nonsurface resources are not a management function of the U. S. Forest Service in the Department of Agriculture. In reality this is not true because all matters that

affect use of national forest lands is of concern to the administrative agency. In past years mineral management and inspection functions on all public lands has been a function of the Bureau of Land Management in the Department of Interior. In the case of multiple-use planning the presence of commercial or potentially commercial mineral deposits must be taken into account. More recently the Forest Service has placed professional geologists and mining engineers on its regional office staff for advisory and inspection purposes. Therefore, minerals as an example of a nonrenewable, nonsurface resource are very much a part of multiple-use management on the national forests.

"....Utilized in the combination that will best meet the needs of the American people...." Analysis of this statement would seem to indicate that the needs of the American people need to be defined before the multiple-use planner can decide on what the best combination of uses should be. Specific information of this nature is given the planner in the form of policy statements from the Chief of the Forest Service (Washington Office) and in the form of broad multiple-use planning guidelines for an entire region from each Regional Forester (Regional Office) of the Forest Service.

The idea of using the needs of the American people to determine the best combination of uses is an excellent philosophy of public service. However, the important question is what weight should be given to each resource need, a question which cannot be precisely answered because the multiple-use principle dictates equal priority. In reality the determination of such needs is more often dictated by the land resources or potentials which are available site by site over the planning unit. In part the resource needs are also determined by

the opinions, backgrounds, education, and attitudes of all of the people within the Forest Service.

In the above respect, Forest Service multiple-use programs have received some criticism. Reich (5), for example, made the statement that:

> ....the great danger is that an entrenched bureaucracy will become shortsighted in its perception of the public good....

The point taken is a valid one and must always be kept in mind by those people involved with multiple-use planning, decision-making, and management of the public lands, especially in cases where agency or clientele goals tend to conflict with social goals.

Further validity of this point is shown in Wolf's (13) article in the Journal of Forestry where he appealed to foresters to consider the entire range of benefits or values obtainable from the land--not just timber management alone or the idea of timber production as the dominant use of a wildland area. He writes:

> The concept of multiple use is quite clear. No use has an automatic or ordered priority over other uses; it is the proper combination and harmonized management that is sought.
>
> Even more important is the fact that foresters have long embraced multiple use without a conscious realization of its full import for forestry. This has led us into a shizoid pattern. To make multiple use revolve around trees is like trying to make the sun a satellite of the earth.
>
> If multiple use is a reality and a rational concept (and it is) forestry is but one of the arts in its application.

"....Making the most judicious use of the land for some or all of these resources or related services...." The land itself may not be suitable or sufficiently capable for the production of all resources

and services for the public. The above statement in the Multiple Use Act allows for the fact that suitability and capability of the land for resource production must also be considered in a multiple-use plan which further implies that some sort of inventory or survey of the land and its resources must be made prior to any land management planning.

There obviously cannot be all uses on the same acre, so that the following statement has been inserted in the law: "....Over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions...." The statement also admits to the fact that public needs change over time and that a multiple-use plan would have to be flexible enough to allow such changes to take place. This adjustment is provided for by provisions in each plan which calls for the plan's revision after a certain number of years. For example, were changing technology in the livestock industry to make it no longer economical to utilize the range forage of the mountain rangelands in the national forests for later sale to nationwide markets through feedlot operations, the use pattern of the national forests would have to be adjusted. The multiple-use plan in being revised would have to explore the idea that perhaps increasing local markets might offset the lack of a nationwide market, or of converting the range area to some other alternative use: big game production, grazing of pack stock, or some other recreational use.

"....That some land will be used for less than all of the resources...." While all of the resources and values can be obtained over a very large area or planning unit, only one or a few complementary resources or values can be obtained from the same acre. In

many cases maximum output of two competitive resources is sacrificed so that both might coexist on the same acre. Multiple-use of forest-range areas is a good example where the tree spacing allows growth of forage grasses in the understory. Land suitability or capability and apparent public need would have to enter into such dual-use decisions.

"....Harmonious and coordinated management of the various resources, each with the other...." Some resource uses complement each other or are neutral to the existence of each other, but in reality most of them seem to compete with each other in time and space. It is this aspect that makes many land-use decisions difficult to make. In such cases joint production of resources and values is possible only at the reduced or optimum level for both, rather than the maximum level for either one. This means that maximum production of one or both is to be deliberately sacrificed so that both competing resources or noneconomic values may be obtained from the overall planning unit area.

"....Without impairment of the productivity of the land...." Historically the Forest Service has advanced from a period of protection management to a period of use management. However, lessons of past abuse have not been forgotten as implied from the above words from the Multiple Use Law. It specifies that resource utilization shall not result in the permanent ruin of the land for other uses and it further implies that the land shall be managed for a sustained or perpetual yield of the resources and values.

"....With consideration being given to the relative values of the resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output...." This

is perhaps the most important and significant statement in the entire multiple-use doctrine. It clearly implies that the goal of the U. S. Forest Service is one of overall social values rather than one of economic gain. It clearly states that economic returns from management of the national forests cannot predominate over the nonmarketplace values also obtainable from a land area. An example is the fact that wilderness is considered a valid land-use in the multiple-use plan, although timber management would be too competitive to exist on the same area. Natural water production is complementary to wilderness values, although vegetative manipulations for increased water yields would be too competitive with wilderness values to be allowed on the area. Thus maximum water production is somewhat sacrificed to a lower "optimum level" which would enable management to preserve and maintain the area in wilderness. The harvest phase of timber management is sacrificed in order to preserve these wilderness values although timber management in the form of suitable insect, disease, or fire protection measures would continue to be carried out.

Multiple Use Planning Procedures in the Forest Service

The Multiple Use Law specifically states that the national forests are to be managed for outdoor recreation, range, timber, watershed, wildlife, and fish purposes according to the principles of multiple-use planning. The principles and concepts of multiple-use are clear even if the methods for coordinating the various resource uses are not. At the present time it appears that the multiple-use planner must do the best he can under policies and guidelines provided him by the Washington and Regional Offices of the Forest Service.

The Forest Service Manual (8) lists the following policies for the development of a multiple-use plan. Under the heading of criteria for selecting planning unit boundaries are three requirements:

1. General similarities in physical characteristics, resources, local economics, and public needs and desires that give rise to common management objectives and to multiple use opportunities for obtaining them.

2. Existence of situations relative to outside lands including population centers and existing or potential uses, that require special consideration in planning management for a large area of national forest lands.

3. Size sufficient to provide for flexibility in patterns of land development and use of resources.

In practice the Ranger District has been the most common overall planning unit, but exceptions such as the Little South Fork of the Cache la Poudre River basin do exist whereby a separate multiple-use plan would be helpful for management of the area and its resources and values.

Under basic data pertaining to the planning area:

1. Summaries of amounts and conditions of major resources, and their past, present, and projected future use.

2. Available information as to favorable or adverse inter-relationships in various resource uses.

3. Population and trends.

4. Programs and plans for development of private lands, or by other agencies, that relate to the planning units.

5. Amounts of public and private landownerships within national forest boundaries, and relationships of existing ownership patterns to multiple-use management.

6. Outstanding natural features having unique or special interest for the public.

7. Kinds, amounts, and standards of existing and planned transportation systems.

8. Other pertinent data.

This basic data, once collected and assembled, must be analyzed and evaluated:

1. Analyzing the basic data for a planning area consists of ascertaining what:
   (a) Resources, uses, and site suitability exist.
   (b) Kinds and amounts of public needs, both current and anticipated, which relate to these resources, uses, and suitabilities.

2. Evaluation consists of weighing all factors to arrive at judgements as to:
   (a) Relative values in terms of human welfare of the various resources and uses, area by area.
   (b) What combinations and patterns of uses will best meet public needs by giving desirable emphasis to various resources and making the land most productive.

3. Key factors to consider in making judgements as to desirable policies:
   (a) Compliance with applicable laws, regulations, and directives.
   (b) Compatibility of various resource and use developments, to each other, and to broad objectives for the area.
   (c) Site suitabilities for a particular use or combination of uses.
   (d) Maintenance or enhancement of land productivity.
   (e) Intangible as well as tangible factors.
   (f) Future and current public needs or desires for particular resources or areas.
   (g) Feasible opportunities to integrate orderly development of several resources and to place emphasis in accordance with specific objectives.
   (h) Professional knowledge, research findings, and experience, as it relates to a particular resource.
   (i) National programs and goals.
   (j) Public attitudes, local economy, and legislative climate.
   (k) Programs and activities of other agencies.

These statements are supplemented with the suggestion that "coordinating instructions" be included in the plan to enable it to be used as a working tool or as a basis for action such that it:

1. Places individual resources or uses in a perspective that accords with major multiple use objectives for the particular planning area or management zone.

2. Takes adequate account of interrelationships among the various resources and uses.

3. Integrates action programs toward achievement of the management direction established for each zone.

This list is further supplemented with a list of questions for the planner to ask himself in the development of his general coordinating instructions:

1. What actions will give the emphasis planned to particular resources and uses?

2. What is necessary to correlate use of one resource with protection and enhancement of the others?

3. What errors have been made in the past, and what guidance is needed to avoid duplicating them?

4. As written, are the instructions clear and specific, but with latitude for the administrator to work within them?

5. Are they generally positive, and couched in terms that recognize the information and education implications?

The above overall planning policies have been developed by the Washington Office of the Forest Service. Further guidelines are prepared by the planning staff of each Regional Office for their respective regions, and are issued to the National Forest Districts for the use of the multiple-use planner. They are in the form of a multiple-use plan made for a region or subregion as a whole.

In a general way they describe the resources of the region, the general management situations, assumptions as to the future of each resource or use, the management direction, the resource coordinating requirements, and they also delineate a group of broad management zones having similar management direction, resource production, and resource coordinating requirements. These management zones are the relatively homogeneous segments of the mostly

heterogeneous lands of the national forests. For example the Rocky Mountain Region of the U. S. Forest Service (9) defines eight such management zones:

> For planning purposes the Region is divided up into broad zones because of management situations requiring different management objectives.....Zones have been selected on the basis of broad similarities in management situations, complexities, opportunities, and objectives. The management zones of the Region include:
>
> 1. The "Crest Zone," generally limited to the alpine and sub-alpine zones, areas of very high water production and spectacular scenery.
>
> 2. The "Intermediate Zone," or general forest areas, making up the largest and most productive areas of the region.
>
> 3. The "Foothills Zone" includes the areas of rolling hills, and breaks, and generally along the base of the mountains where climatic factors limit the productivity and variety of resources and services.
>
> 4. The "Plains Zone" includes the "National Grassland" areas of the prairie and plains lands.
>
> 5. The "Sandhills Zone" is limited to the Bessey and Niobrara Divisions of the Nebraska National Forest, and is unique in concept and form.
>
> 6. The "Travel Influence Zone" comprises areas along designated roads and trails, and includes most of the accessable areas and provides for the most intensive occupancy and use.
>
> 7. The "Water Influence Zone" includes designated streams and bodies of water, together with areas of adjacent land where the presence of water is the most predominating influence.
>
> 8. The "Special Zone" includes areas classified by the Regional Forester, Chief, or Secretary, for special purposes, under specific regulations or legal authority.

In the Intermountain Region of the U. S. Forest Service, where conditions vary from that of the Rocky Mountain Region, Carlson (1) describes seven such zones:

1. Crest Zone.

2. Intermediate Zone.

3. Lower Zone. Typified by juniper-pinyon pine, mountain brush, sagebrush, and grass, these low-elevation areas do not produce much water.

4. Travel Influence Zone.

5. Water Influence Zone.

6. Other Management Zones. Because of the diversity of conditions between subregions, some have management zones that others do not have. For example, the Northwest Utah Subregion contains the Wasatch Front which is peculiar to this subregion. It is a zone characterized by steep, rough mountains and short, precipitous drainages which flow directly through the principal Utah cities at the west edge of the zone... ...

7. Special Zones. Designated lands, such as wilderness, primitive, geologic, archeologic, historic, and research areas, are delineated as special zones.....Some uses may be excluded such as roads in a wilderness area. Different management direction is given for each special zone, depending on the purpose for which it is classified.

The "Regional Guide For Multiple Use Planning" is actually an outline containing information, decisions, and policies towards resource use, present and projected public needs for resources and values, and the objectives for management of each resource. It forms the framework for the actual multiple-use plan to be made at the Ranger District level.

The Ranger District, as the basic planning unit, will include a number of the above management zones and each zone will be treated individually in the plan. The plan is in two parts: one dealing with the individual resources or uses on the area, and the other dealing with the land management zones occurring on the planning unit.

Multiple-Use Planning at the Ranger District Level and the Human Element

The policy statements made in the Forest Service Manual and the "Regional Guides" are very general in their content. It would appear that to make a detailed multiple-use plan there is required an individual who is in a position to have a comprehensive knowledge of the physical, ecologic, and socio-economic features of the planning unit and the surrounding area. These conditions are best found in the District Ranger whose staff is most familiar with the minute details and problems of management of the multiple resources and values found on specific areas of land. He is thus given the responsibility to plan for the orderly use and development of the resources and land area. The National Forest staff and the Regional Office staff advises the District Ranger in this task and provides multiple-use inspections of his District. In the main, multiple-use planning is an individual matter, however. Cliff (2), in his address to the Fifth World Forestry Congress, said:

> It is on the ranger districts where management decisions are eventually developed for each resource or activity and welded together in ranger district multiple use plans. These plans interpret and apply to specific areas of land or to specific management situations the management direction as provided in the regional guides which, in turn, are based upon regional and national objectives and coordination requirements.
>
> Successful multiple-use managers require considerable training. They must understand the multiple-use planning processes, especially the relationship of one plan to the other. They must be knowledgeable and conversant with the facts that go into the plans themselves. They must know the areas and resources in which they are working, the potentialities, the techniques that are involved in making the highest sustained yield, and they must have a good background in the demands that will be made of them..... As we

> are confronted with greater and greater demands on the national forests, training in multiple-use management will have to be accelerated and sharpened very much over what it has been in the past.

Hall (3), an economist writing in the Journal of Natural Resources, has this to say concerning his study of multiple-use on the George Washington National Forest in Virginia:

> The key decisions are those which go into making the working block plans; therefore, the District Ranger is the key man in multiple use management.... It is common knowledge that one Ranger may be "recreation conscious" and view each plot of land as a possible camp site. Another might be fascinated by opportunity to improve wildlife habitat. Still another may be a "timber beast" and view all other activities as distractions from his main job of growing wood.
>
> Attitudes are important because most of the decisions involved in the day-to-day administration have such complex multiple use effects that a considerable degree of managerial discretion is unavoidable.... Any one variety of different land management programs could be selected, each capable of being justified on the basis of multiple use management.
>
> The wide range of choice leads forest managers to stress the subjective factors in multiple use management. One hears again and again that the vital element in land use decisions is "savvey," "good judgement" or "professional competence." This leads foresters to conclude that primary reliance must be placed on the judgement of the District Rangers and only very general rules can be established by higher authorities.
>
> The Forest Supervisor's role is also important. Particularly he must insure that his operating personnel are conscious of the various possibilities for multiple use of the forest. His chief weapon is inspections by himself and the specialists on his staff.... The Supervisor's assistants are experts in the various aspects of forest management, timber, water, etc.
>
> The conclusion is warranted that, in practice, multiple use at the operating level is not a rule that two foresters faced with the same objective situation will necessarily make the same land use decision. It is a subjective commitment to a "philosophy" that forest managers should take a "broad" view of the potentialities of the forest.

Discussion and Conclusion

That the human element can have a marked effect on successful multiple-use management is further supported by Wolf's article, previously cited, urging foresters to take the broad viewpoint in their land management planning and activities instead of favoring their own specialties or interests. Were timber the most predominant use of a planning unit or management zone, pure timber management plans might be in order around which other "minor" uses or resources might be planned. This might constitute multiple-use management on private timber company holdings. But legally, on the national forests, the other resources and uses would have equal priority, depending on site suitability and capability, for the overall public good, and timber management cannot have priority over the entire planning unit. In practice, however, if the human element tends to favor timber management over other uses or values, the multiple-use plans might tend to favor this resource, tending toward a dominant-use concept rather than one of equal priority of uses.

Under the provisions of the Multiple Use Act, it is clear that only the equal priorities doctrine of multiple-use management is legal for national forest management, stressing the social benefits of national forests over economic returns. The writer believes that those who wish to justify the existence of national forests solely on the basis of dollar returns to the U. S. Treasury, most of which comes from sale of high-value stumpage, do the Service an injustice by playing down the great social benefits which accrue from multiple-use of these public lands for the greatest benefit to the American people.

The public education programs of the Forest Service, which attempt to inform the public on what multiple-use is, are probably of limited value. The Forest Service, thus far, has been unable to inform all of the people that there is a difference between national parks and national forests, and that the man in the fire lookout is not the District Ranger. In the public image everybody with the Forest Service is a ranger. Over publicizing of multiple-use can cause more harm than good should the public tire of hearing the word.

Multiple-use policies of national forest management are not new, having evolved from management experience since the beginning of the Forest Service in 1905. Multiple-use plans are new, however, compared to individual resource management plans which the Forest Service has been preparing for many years. These individual resource plans are, in fact, approved at a higher level in the Forest Service hierarchy and tend, at the present time, to take precedence over any multiple-use plan. The simple truth is that the multiple-use plan is not the general overall management coordinating plan having teeth to prevent single use aspects of individual resource plans from dominating the management of a planning unit. It does not have the authority and status to serve as an overall master plan for resource management activities, although it might assume such a role with further refinement of multiple-use policy in national forest management.

The multiple-use plan is now useful mainly as a working tool and an education medium for Ranger District functions and orientation of employees to these functions. It can be used as a coordinating guide in the preparation of the individual resource plans because it points out specific instances where one resource use may conflict

with others. It is not an action plan as such, but is a guide for coordinating and harmonizing land-use over an entire planning unit. How useful and how effective the multiple-use plan is depends entirely upon the human element of management.

Chapter III

THE LITTLE SOUTH FORK OF THE CACHE LA POUDRE RIVER BASIN; ITS RESOURCES AND USES

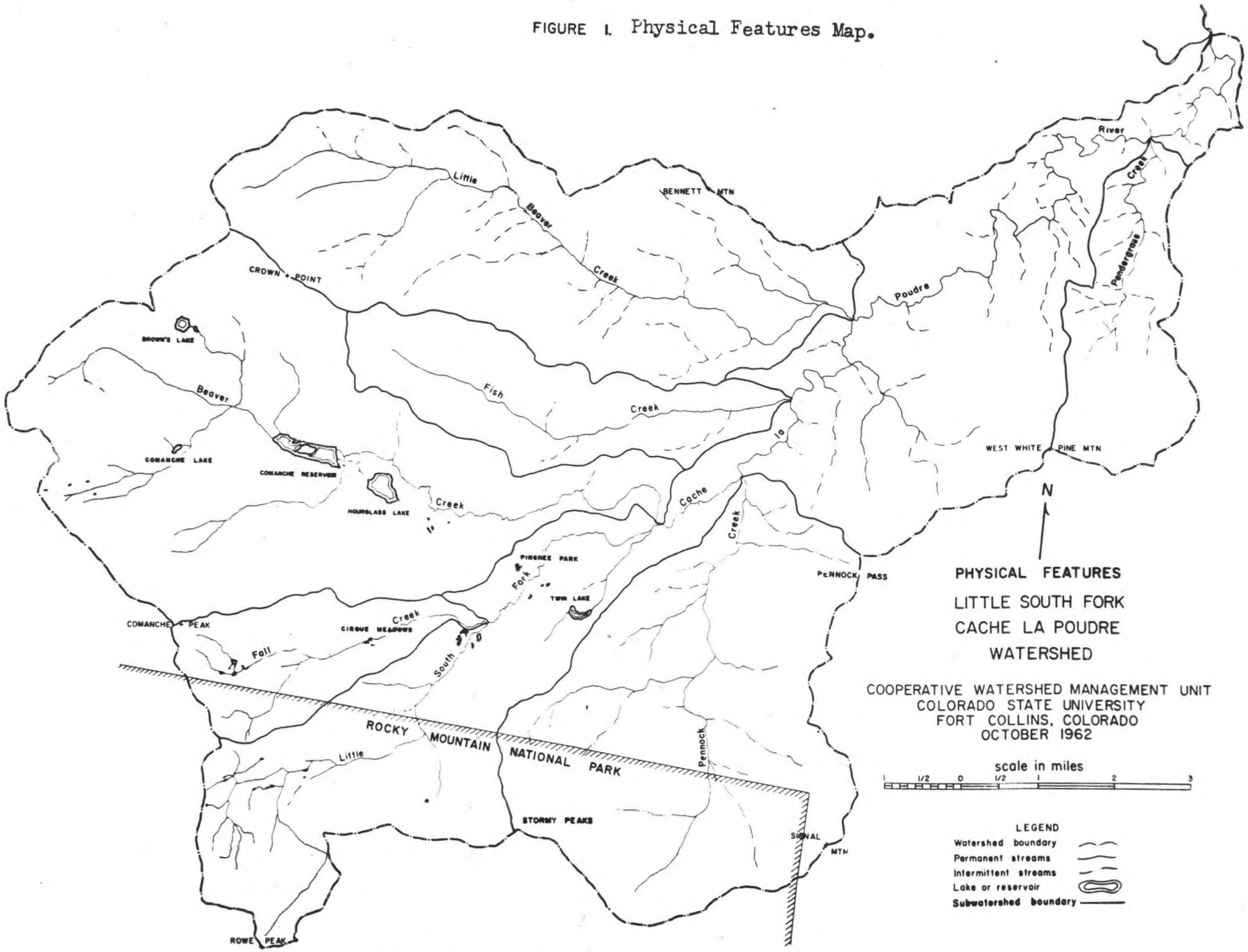
Multiple-use planning requires a good knowledge of the physical and cultural features that exist on a planning unit. Johnson, et al. (4) reports the various resources and uses of the Little South Fork watershed.

General Description of the Watershed

The 105 square mile basin of the Little South Fork of the Cache la Poudre River, in Larimer County, northern Colorado, is about 26 miles west of Fort Collins, and is in the Front Range of the Colorado Rockies. The stream is a major tributary of the Cache la Poudre River which flows easterly to the South Platte River. The "Little South" watershed is a diverse area of rugged mountains, alpine areas, glaciated cirques, forests, mountain meadows and parks, and mountain scenery.

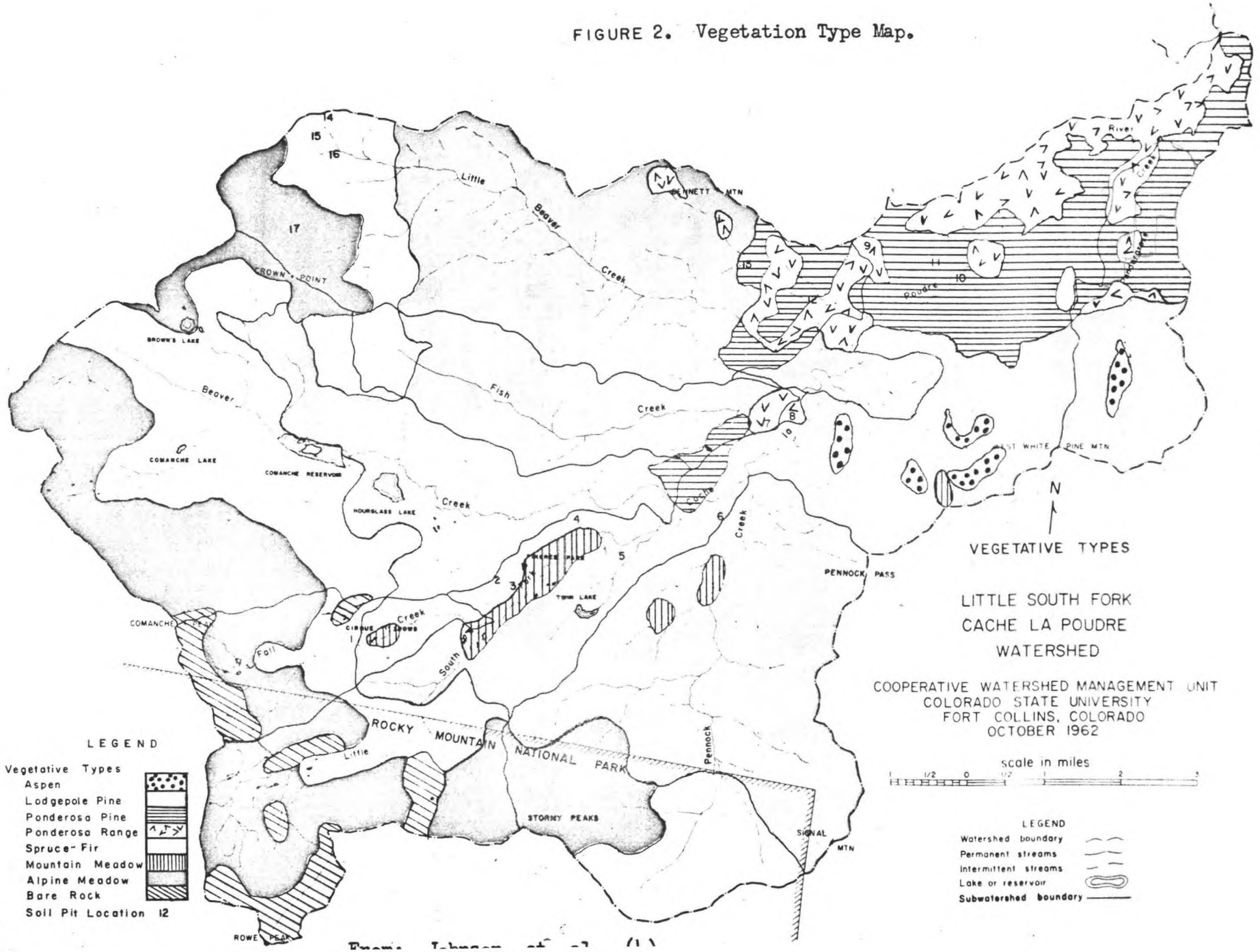
Elevations range from 6,550 feet at the mouth of the Little South canyon to 13,400 feet on Rowe Peak in Rocky Mountain National Park in the southern portion of the watershed. Eighty percent of this 67,155 acre watershed lies at elevations between 8,300 and 11,300 feet. Average slope is about 32 percent; eighty-eight percent of the area being between 10 and 70 percent slope.

FIGURE 1. Physical Features Map.



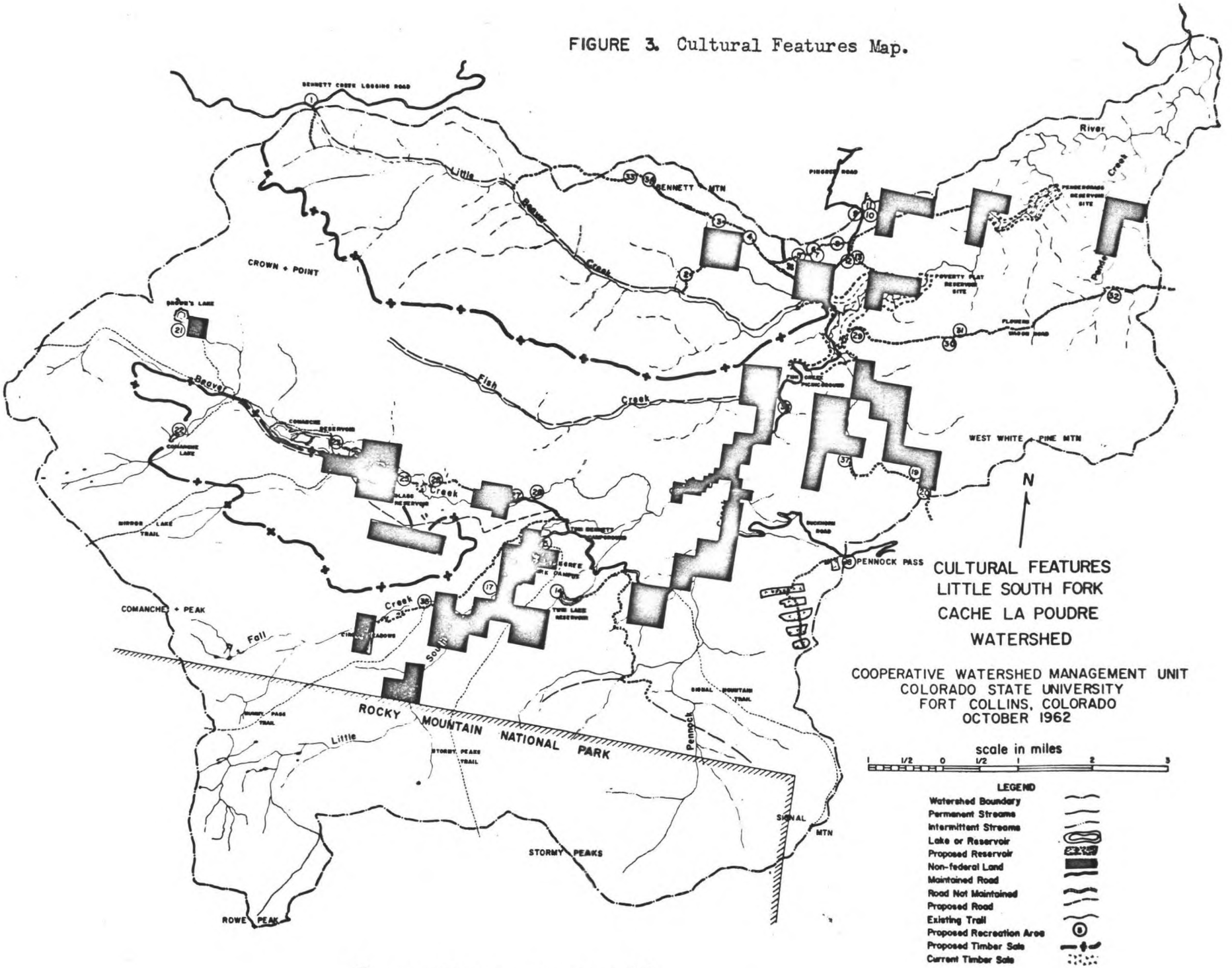
From: Johnson, et. al., (4)

FIGURE 2. Vegetation Type Map.



From: Johnson et al. (1)

FIGURE 3. Cultural Features Map.



From: Johnson, et al. (1)

Estimated mean annual precipitation is between 18 and 22 inches, with about one-third to one-half of this total in the form of snow. Temperature extremes recorded at Pingree Park in the watershed (elevation 9,018 feet), in 1962, ranged from -45 degrees F. to 83 degrees F. Ten percent or about 6,716 acres are estimated to be in the Alpine Zone. The remaining area is in forest and mountain meadow.

The main tributary streams, their length of channel, their watershed area, and the percent of the total area of the Little South watershed are as follows:

Little Beaver Creek including Jack's Gulch	12.2 miles	11,590 acres	17%
Fish Creek	5.6 miles	4,224 acres	6%
Beaver Creek	15.1 miles	14,253 acres	21%
Fall Creek	4.8 miles	2,758 acres	4%
Mainstem of the Little South Fork	20.2 miles	19,795 acres	30%
Pennock Creek	10.4 miles	11,232 acres	17%
Pendergrass Creek	7.0 miles	3,302 acres	5%
Total	73.3 miles	67,155 acres	100%

Prominent landforms along the southern rim from west to east and their elevations include:

Crown Point	11,636 feet
Comanche Peak in the Mummy Range	12,702 feet
Mummy Pass and Trail	11,250 feet
Pingree Park on the Little South Fork	9,018 feet
Rowe Peak	13,400 feet

Stormy Peaks	12,295 feet
Signal Mountain	11,261 feet
Pennock Pass and Buckhorn Road	9,143 feet
West White Pine Mountain	10,250 feet
Quigley Mountain	9,400 feet

Lakes and reservoirs, their size, and their elevations include:

Browns Lake Reservoir	20 acres	10,519 feet
Comanche Lake	7 acres	10,000 feet
Comanche Reservoir	64 acres	9,400 feet
Hourglass Reservoir	44 acres	9,380 feet
Twin Lakes Reservoir	19 acres	9,306 feet
About 50 small ponds	31 acres	
Total water surface	185 acres	

Road systems, using U. S. Forest Service route numbers, and approximate mileage of each are:

1631 Road; Little South Fork Road from northern watershed boundary to junction with Buckhorn Creek Road, 5.8 miles.

1631 Road; Buckhorn Creek Road from the Little South Fork to Pennock Pass, 2.5 miles.

1639 Road; Portion of Bennett Creek Logging Road in Upper Little Beaver Creek drainage, 2.3 miles.

1652 Road; Old Flowers Wagon Road from the Little South Fork to the eastern watershed boundary, 4.5 miles.

1638 Road; Jack's Gulch Road, 3.4 miles.

1646 Road; Pingree Park Road from Buckhorn Creek Road to Upper Fall Creek, 6.8 miles.

1645 Road; Hourglass Road from Pingree Park Road to Comanche Reservoir, 3.8 miles.

1647 Road; Pingree Park Ridge Road, 2.5 miles.

Pennock Creek Logging Road, 2.8 miles.

Twin Lakes Road, 0.8 mile.

Mummy Pass Trail

Stormy Peaks Trail

Signal Mountain Trail

Landownership classes, size of each ownership, and percent of the total area follows:

Roosevelt National Forest	54,310 acres	81%
Rocky Mountain National Park	8,550 acres	13%
Cities of Fort Collins and Greeley	800 acres	1%
Colorado State Board of Agriculture (Colorado State University)	1,030 acres	2%
Private lands	2,465 acres	4%
Total	67,155 acres	100%

A list of landowners, size of holdings, and purpose of ownership includes:

Roosevelt National Forest, Ft. Collins, Colorado	54,310 acres	multiple-use management of public land
Rocky Mountain National Park, Estes Park, Colorado	8,550 acres	recreation management of public land
Cities of Fort Collins and Greeley	800 acres	reservoir sites (tentative)
Colorado State Board of Agriculture (governing body of Colorado State University, Ft. Collins)	1,030 acres	research, education, and service

William E. Morgan, Fort Collins, Colorado	777.5 acres	summer home, eventual sub-division, leases grazing
Ray Lambert Poudre Canyon, Colorado	480 acres	ranch business
Weepah Mfg. Company	240 acres	speculation
Hazel B. Koenig Fort Collins, Colorado	170 acres	summer cabins (original Koenig homestead)
Agnes Meridith	160 acres	leases grazing
Gladys Patterson	160 acres	leases grazing
Vern Steadman	160 acres	part of ranch business
Paradise Valley Enterprises, Inc.	160 acres	speculation, sale of summer home lots
Sky Ranch Lutheran Camp, American Lutheran Church	117.5 acres	education and recreation
Chambers Lake Company	40 acres	no purpose at the present time; could be exchanged with the Forest Service

Resources in the Little South Watershed

On driving through the basin one encounters one mountain meadow after another along the Little South Road, giving the impression that much of the area is in mountain meadow. In reality this is not true because the roads take advantage of the few meadows, most of which are concentrated in the valley of the Little South Fork, in order to traverse the basin. This further implies that there is relatively few area suitable to the grazing of livestock in the basin. Actual vegetation types, area covered, and percent of total area is as follows:

Alpine	11,200 acres	16.7%
Bare Rock	2,100 acres	3.1%
Reservoir or water surface	185 acres	0.3%
Spruce-fir	11,200 acres	16.7%
Lodgepole pine	31,650 acres	47.1%
Ponderosa pine	6,350 acres	9.5%
Pine-brush range	3,200 acres	4.8%
Mountain meadow	770 acres	1.1%
Aspen	500 acres	0.7%
Total	67,155 acres	100.0%

The ponderosa pine type is, of course, at the lower elevations in the watershed primarily in the steep and rugged areas in the northeast portion. There are some good sites for management of this timber tree but most of the area is too rough and rocky for operable harvesting or intensive management of the area.

Management for aspen is not feasible. The stands themselves are too few in size and number and they are more valuable for other things besides timber harvest in the overall multiple-use complex.

Large bare rock areas occur with the large areas of alpine turf. Nearly half of the alpine areas are within Rocky Mountain National Park and the remainder are on the Roosevelt National Forest.

Estimated timber volumes on Roosevelt National Forest lands in the Little South are:

Lodgepole pine	130 million board feet
Engelmann spruce and subalpine fir	115 million board feet
Ponderosa pine	30 million board feet

Limited volumes of Douglas-fir, blue spruce, white fir, limber pine, and aspen.

Large volumes of pole-sized timber, mostly lodgepole pine.

Most of the past timber management has been oriented toward protection and harvest. Very little intensive management has been undertaken. Lack of markets has prevented large-scale utilization of the huge lodgepole pine resource in the basin so that only a relatively few stagnated stands have been clearcut and regenerated for a more intensive type of management. Future timber sales in the basin will need to be coordinated with the research objectives in this area.

The forest-range and mountain meadows on Roosevelt National Forest lands are estimated to provide 900 animal-unit-months of forage or enough to support 360 head of cattle during the 2½ month summer season of use. Private lands support additional numbers of cattle. In general the lands occupied by dense stands of lodgepole pine or Engelmann spruce and subalpine fir do not provide significant grazing resources. The primary range types in the basin are as follows:

Alpine range	Primarily sheep use providing 665 AUM's of forage from July 11 to August 31 for 2000 head of sheep on the 11,200 acres of this range in the Roosevelt National Forest.
	Big game range for elk and sheep in both the national forest and Rocky Mountain National Park.
Forest-Range	Primarily the dry meadows or open stands of ponderosa pine in the lower portion of the watershed; provides summer grazing for cattle on both private lands and national forest lands.
	A yearlong big game range.

Mountain meadows	The wet meadows at higher elevations along the major stream courses; providing cattle grazing from the middle of June until late September or early October. Big game range for most of the year.

The basin provides sufficient forage for sizeable deer and elk herds. Elk will summer in the high country in Rocky Mountain National Park and migrate to the Little Beaver Creek country in the winter. Mule deer summer in the Lower Little South Fork watershed and travel out of the basin to winter on the south-facing slopes along the Cache la Poudre River.

The Roosevelt National Forest, adjacent to so many centers of population, is becoming more and more recreation oriented in line with increasing public needs and demands for outdoor recreation space and facilities. The National Forest Recreation Survey (10) appraises the basin for 42 possible recreation sites or developments. Potential for recreation development is always limited, never unlimited, yet the recreation resources of the basin are relatively undeveloped at the present time. Fish Creek Picnic Area and Tom Bennett Campground are the only two developments although Twin Lakes and Limber Pines Campgrounds are planned.

This northern area of Rocky Mountain National Park maintains a wilderness aspect and is accessable by the Signal Mountain, Stormy Peaks, and Mummy Pass Trails adding another valuable recreation resource to the basin. A wide range of recreational opportunity exists here: from summer homes on the private lands to wilderness camping along the southern rim.

Limited stream and lake fishing is also available. There is native cutthroat trout here along with plantings of rainbow, brook, and brown trout. Stocking has been done since the early 1900's.

Average water production for the years 1957 through 1961, measured at the gaging station on the main stem of the Little South Fork located seven miles above its mouth, was 50,375 acre-feet. This location represents runoff from 90.3 of the 105 square miles of the basin. At an average runoff figure of 10 inches for the entire basin, the yield from the entire 105 square-mile watershed is estimated to be about 56,000 acre feet per year.

Although the area has been prospected for gold and other minerals since the 1850's, little by way of mineralization has been found in the basin. Much of the upper watershed has been glaciated. The rock formations of the basin are believed to be that of the Idaho Springs Schist (quartz, biotite, schist) and the Silver Plume Granite (quartz, biotite, feldspar). Under present or anticipated future economic conditions mining of the known minerals in the basin is not feasible.

In summary, the chief value of the basin is for recreation, water yield, big game range, and production of lodgepole pine timber. The area lacks suitability as a major source of range forage or fisheries habitat. These resources are restricted by limited miles or stream channel suitable for fish, and lack of open areas for the production of livestock forage.

Historical Description

1858: Water from Cache la Poudre River diverted for irrigation at the present site of LaPorte, Colorado.

George

1868: John W. Pingree established a tie camp near the present Pingree Park.

1868: Buckhorn Creek Road built.

1869: Charles W. Pennock established a tie camp on the present Pennock Creek.

1875: Cattle grazed in Pingree Park by Currie and Kissock.

1879 1881: ~~Ben~~ Jacob Flowers built a wagon road from the head of Rist Canyon west across Stove Prairie, the head of Pendergrass Creek, the Little South Fork, up Beaver Creek, and continuing past Crown Point on its way to the mines in North Park.

1890: Large fire raged over the basin; resulted in much of the present stands of lodgepole pine.

1890: Hourglass Reservoir built for the City of Greeley; storage right adjudicated in 1898 with enlargement of rights in 1901.

1903: Brown Lake dam was built; washed out in 1906 and never rebuilt.

1903: Tom Gard homestead in Beaver Creek area.

1904: Storage rights at Twin Lakes adjudicated to City of Greeley.

1905: Area was added to the Medicine Bow Forest Reserve.

1906: First Twin Lakes Dam started by Charles Ramsey.

1910: Area was made part of the old Colorado National Forest.

1913: Mummy Pass Trail built by U. S. Government.

1913: Frank Koenig and Tom Bennett homesteaded in Pingree Park area.

1913: Twin Lakes Road into Pingree Park built by Charles Ramsey, Frank Koenig, and Tom Bennett.

1914: Under a special Act of Congress, passed in 1912, officials of Colorado A & M College selected 1600 acres of land in the area for use and support of the school, including the present Pingree Park Campus of Colorado State University.

1915: Forest Research and education started at Pingree Park.

1915: The high southern rim of the Little South Basin including the headwaters of Pennock Creek, the Little South Fork, and Fall Creek became a part of the newly established Rocky Mountain Park.

1923: Present Little South Fork Road was built into the watershed from the South Fork of the Cache la Poudre Canyon.

1923: Comanche Reservoir storage rights adjudicated; rights enlarged in 1925.

1924: Comanche reservoir built for the City of Greeley.

1932: Colorado National Forest renamed the Roosevelt National Forest.

1933: Little South Road improved with CCC labor.

1935: Road from Pingree Park up Fall Creek to Cirque Meadows built with WPA labor.

1940: West White Pine Lookout built by the Forest Service.

1951: U. S. Forest Service granted Colorado A & M College a special-use permit to use national forest areas surrounding Pingree Park as "forestry, range, recreation, and wildland experimental area and training ground for students."

1963: U. S. Forest Service granted Colorado State University permission to use Little South basin for watershed research and demonstration purposes.

Chapter IV

COOPERATIVE ACTIVITIES IN THE LITTLE SOUTH BASIN

The watershed of the Little South Fork of the Cache la Poudre River is the site of many and varied activities. Cooperation takes many forms, ranging from the weekend fisherman placing his trash in a roadside barrel, to research and development of improved land management techniques and the training of tomorrow's land managers. All of these activities form the overall multiple-use complex existing in the basin. A knowledge of the activities of the various agencies, federal, state, local, and private, is necessary for success of multiple-use administration.

Colorado State University

The Pingree Park Campus of Colorado State University provides training, living, and laboratory facilities for teachers and students giving them a first-hand knowledge of natural resources problems and management. Each summer nearly 80 forestry students come here for field training to fulfill part of the degree requirements in the College of Forestry and Range Management. A number of high school science teachers come to Pingree Park each summer for training in natural resources and conservation. A two-week summer science course for junior high school students is held each year. Opportunities also exist for college undergraduates and secondary school students to participate in the

research programs conducted in the basin by the staff and graduate students.

The Little South watershed fulfills the need for a demonstration area for both the general public and resource management people. Conservation groups, students, scouts, local business and civic leaders can obtain first-hand information on natural resources administration and management. It is a valuable common ground where professional workers in the fields of natural resources can come together for exchange of information, discussion of problems, and indeed for solutions and inspiration.

Research Activities Completed by CSU

(1) Watershed analysis of the Little South Fork of the Cache la Poudre River. Colorado State University, Watershed Management Unit. 1963.

(2) Effects of glaciation on hydrologic characteristics. M. S. thesis by Ed Hansen, Watershed Management Unit. A study of the Upper Little Beaver and Fall Creek areas.

(3) A description of some ecological relationships of a mountain watershed. M. S. thesis by Hans Keller. Watershed Management Unit. A study of the Upper Little Beaver area.

(4) Aquatic insects and stream debris in the Little South Poudre at Pingree Park. By Dr. Ed Reed, CSU Department of Zoology.

(5) Phenology of Colorado alpine plants. CSU Department of Botany. A study of the False Mummy Pass area.

Research Activities Currently Underway by CSU

(1) Studies of summer precipitation distribution, range plant phenology, and phenology and cambial response in lodgepole pine.

(2) Summer storm patterns and cloud formations. M. S. Thesis. CSU Watershed Management Unit.

(3) Alpine ecology. CSU Department of Botany.

(4) Distribution, abundance, and growth of fishes of the Little South Poudre watershed. Colorado Cooperative Fisheries Unit.

(5) Ecological study of the Poudre deer herd. Colorado Department of Game, Fish, and Parks.

(6) Assimilate capacity, stocking, and spacing of juvenile lodgepole pine. CSU Department of Forest Management.

(7) Survival and growth of planted ponderosa and lodgepole pine seedlings in relation to environment. CSU Department of Forest Management.

(8) Effect of physical environment on small mammal activity. CSU Department of Forest Recreation and Wildlife Conservation.

(9) Small mammal populations in relation to vegetative type, beaver distribution and populations in the Upper Little South, effects of clipping bitterbrush at different intensities, and fish populations in the Upper Little South. CSU Department of Forest Recreation and Wildlife Conservation.

(10) Effects of removing a brook trout population from Cirque Lake. Colorado Cooperative Fisheries Unit, CSU Department of Forest Recreation and Wildlife Conservation, Colorado Department of Game, Fish, and Parks, and the U. S. Forest Service cooperating.

(11) Hourglass stream gauge. Installed by the Roosevelt National Forest and serviced by the CSU Watershed Management Unit.

(12) Four stream gages installed and serviced by the U. S. Geological Survey in cooperation with Colorado State Water Board.

(13) Two weather data stations, and three snow survey courses. Serviced by CSU Cooperative Watershed Management Unit.

(14) Impact of land use on water quality. CSU Watershed Management Unit.

(15) Dye technique of measuring water yields. CSU Watershed Management Unit.

(16) Secondary school students research participation program.

(17) Site Productivity in the Montane Zone. CSU Departments of Forest Management and Range Management.

Proposed Research by CSU

(1) Geology of the Little South Poudre watershed.

(2) Snow accumulation, redistribution, and ablation.

(3) Hydrologic soil depth measurements by seismographic measurements.

(4) Comparison of mountain meadow and alpine climate.

(5) Hydrologic characteristics of a high elevation watershed.

(6) Application of snow surface additives to suppress evaporation and accelerate melt.

Cooperative Agreement Between Colorado State University and the U. S. Forest Service

During March of 1963 a cooperative agreement (11) was made to use the Little South Basin as a watershed research and demonstration area:

> Research on study plots and a few small watersheds has demonstrated that water yield conditions may be changed by management of the vegetation.... More data and information are needed about water yield and its relation to precipitation, the various cover types, the various soil types, and vegetative manipulation. Pilot study projects are needed to test available data and information under variable conditions.
>
> The Little South Fork of the Cache la Poudre River watershed within the Roosevelt National Forest offers opportunity for such a pilot study.

Several of the provisions relate directly to multiple-use management requirements in national forest management:

> The Forest Service will review and discuss with the University, prior to activation, resource management, development, or experimental programs. These will include timber sales, timber stand improvement, erosion control, campground construction, road construction, etc. that might be of interest or have a direct relation to the University's work within this area.
>
> The Forest Service will practice those forms of land and resource management on the Little South Fork drainage that will, as fully as practicable, benefit the Forest Service and the University's mutual interest in the conducting of basic experiments, demonstrations, and inventories in the field of watershed management.

> The University will erect no signs or structures, perform no construction, or in any way manipulate the vegetative or soil resources on National Forest lands without first securing the concurrence of the Forest Supervisor.
>
> The University will review and discuss, prior to activation, all surveys, studies, or experiments that might be of particular interest or significance, or that might have a direct relationship to Forest Service activities within the area.
>
> The University recognizes the Forest Service as the Federal agency responsible for determining the proper use of National Forest land in the interest of coordination with other uses and values.

Under this cooperative agreement the headwaters of the Little South, which is mostly within Rocky Mountain National Park, and Fall Creek, would serve as control watersheds, and the other subwatersheds as treatment areas. Tentative plans call for Hourglass Creek, a tributary of Beaver Creek, to be used to investigate the effects of the present timber cutting practices in the spruce-fir type and alpine type.

The preceding list of research activities in the basin make it appear that the area is more of a multiple-use demonstration area rather than solely for watershed research and demonstration purposes.

Other Cooperative Activities in the Little South Basin

Besides Colorado State University there are many other organizations and agencies that cooperate with the Forest Service in various activities in the basin.

The Colorado Department of Game, Fish, and Parks manages wildlife and fish populations, regulates hunters and fishermen, plants fish in the streams, and conducts research. Fish for stocking are brought in from the Department's fish hatchery near Fort Collins. The

U. S. Fish and Wildlife Service also cooperates in fish and wildlife activities.

The City of Greeley, Colorado owns a number of water rights in the basin but does not use the water for municipal supplies. They trade this water to irrigation ditch companies for water from the Colorado-Big Thompson Project. The City of Greeley, with the City of Fort Collins, has bought up tracts of formerly private land along the lower portion of the Little South Poudre basin as reservoir sites. Tentative plans, in cooperation with the Bureau of Reclamation, call for construction of two reservoirs on the Little South called Pendergrass and Poverty Flats. If and when these projects will be undertaken is not yet known, although they were included in Bureau of Reclamation plans prepared in 1957. The Greeley Water Department has an employee in the basin and maintains a cabin for his use on their property near Little Beaver Creek and the Little South Poudre Road.

As stated before, the U. S. Geological Survey operates stream gaging stations in the basin. Another division has recently re-surveyed the basin for a new topographic map. The published map will be available to the public as well as Federal Government agencies. The Soil Conservation Service cooperates in snow surveys. The Rocky Mountain Forest and Range Experiment Station of Fort Collins, Colorado, another division of the U. S. Forest Service, cooperated in the 1958 Forest Survey of the Roosevelt National Forest and a new timber management plan which includes the timber resources of the basin.

Three ranchers graze cattle in the basin. Lambert owns land in the basin, leases grazing on private lands, and holds U. S. Forest Service cattle allotments in the basin. Steadman also owns land in

the basin and leases grazing from private landowners, but holds Forest Service allotments outside the basin. Both live in the Poudre Canyon area. The third rancher, Spencer, leases forage on Colorado State Board of Agriculture lands in the basin, owns land in the Buckhorn Creek area outside the basin, and has several allotments in the Buckhorn area just over Pennock Pass. He is an absentee owner, listing his address as Dallas, Texas. Munroe and Brackenberry graze sheep in the high country of the Little South basin.

Logging interests that might be involved in timber harvest and access road construction in the Little South watershed include Eastside Lumber Company, Spaulding Lumber Company, and Ray Lambert of the Fort Collins area, and Hurley, or Kitchen of Loveland, Colorado.

A few of the private landowners, particularly William E. Morgan of Fort Collins, provide the Forest Service with a valuable service by accommodating the local demand for summer home sites in the basin. The Forest Service, in turn, provides fire control service and maintains the roads of the area.

Politics of Multiple-Use Management in the Little South Basin

Following is a list of power groups which could have some interest and influence in resource management and allocation in the Little South Poudre watershed:

Producers of wood products. (unorganized)

Producers of livestock and their local, state, and national organization. (Larimer County Stockgrowers, Colorado Cattlemen's Association, and Colorado Woolgrowers Association)

Roosevelt National Forest Grazing Advisory Board

Landowners. (unorganized)

Larimer County Board of County Commissioners.

Fort Collins City Council, Chamber of Commerce, and civic leaders.

Local recreation users, hunters and fishermen (loosely organized locally), national conservation groups, and the Colorado Department of Game, Fish and Parks.

Cities of Fort Collins and Greeley (municipal water.)

Downstream irrigation users, users associations, and the Bureau of Reclamation.

U. S. Forest Service and Rocky Mountain National Park.

Roosevelt National Forest Advisory Council

American Lutheran Church (Sky Ranch Lutheran Camp).

Colorado State University

All of these interests will have varying weights of influence in the basin. The Forest Service and Rocky Mountain National Park, on their respective lands, are the most dominant influences having the legal right to administer and manage the resources, multiple-use in one case, and outdoor recreation in the other. Both are legally devoted to serving the overall public interest.

Municipal water supplies have some dominance under state water laws over other water users. But use of water for irrigation <u>is</u> the local economy and in terms of money and power could carry the most weight in attempting to influence land-use decisions away from other uses and towards maximum water yields. For example, the ultimate power struggle might be one where it is proposed to pave large areas of the Little South Basin for the maximum in water yields. No trees, grass, nor picnic benches, just pavement and water catchments. This proposal for a single use might seem far-fetched, but it is not an

impractical idea where moneyed interests want the water resource only.

No large controversies over use in the Little South have yet developed. They could develop as certain resources become scarce. Utilization properly coordinated under multiple-use concepts of management, should tend to minimize conflicts in resource allocations in the Little South Basin. For this reason, future water developments and impoundments in the basin should be multi-purpose in design, serving a wider segment of the public.

Chapter V

CONTRIBUTION TOWARD A MULTIPLE-USE PLAN IN THE LITTLE SOUTH FORK WATERSHED

Resource Use and Management

Soils

Soils in the basin are varied and complex. A soil survey has been started in the Hourglass drainage, but a complete survey of the basin soils is needed before multiple-use management can be modified to consider soil types. Such an inventory is essential to multiple-use management. Management without such an inventory must be based on the "good judgement" of the forester and depends on his ability to recognize soil and site conditions which could affect his handling of various resources on the area.

The alpine soils, according to Retzer's (6) classification, consists of Alpine Turf, Alpine Meadow, and Alpine Bog types--well drained, poorly drained, and undrained. Most of these soils are the Alpine Turf type having well developed horizons and varying from 14 to 32 inches in depth.

The Alpine Zone itself is characterized by these shallow soils, extensive rock fields, talus slopes, steep-walled cirques from glaciation, steep slopes, and a harsh, physical environment (12). Because of this environment disturbance of the native vegetation is slow to recover. Since this soil is quite erodible, maintenance of

the vegetative cover must be a primary consideration in management of the alpine.

Soils in the lower, forested areas are quite varied, having been modified by glaciation and other transport, rock type, topography, vegetation, and climate. In general they are of low fertility, low organic content, moderate to high internal drainage, moderate to high infiltration capacity, and low to moderate erosive qualities. There is evidence of past erosion in the forested zone, particularly on the more erosive soils in the lower part of the basin. Most of these areas have recovered.

It is assumed that increased use and demands for the resources in the basin will require that detailed soils information be obtained. Presently only limited areas of the basin--those subject to some immediate intensive use such as research--can be surveyed for soil characteristics. As this additional soils information becomes available management and resource use can be more adequately based.

Water

The Little South Fork contributes a significant amount of the overall streamflow of the Cache la Poudre River now used primarily for irrigation and some municipal use. With water shortages and proposed water developments within and adjacent to the basin it can be expected that closer attention will be given toward increasing the water yield from the basin without adversely affecting the water quality. A research project in the basin has been initiated to keep continuous records of water quality in relation to land management practices such as that of logging, occupancy, or roadbuilding.

Plans of the Cities of Fort Collins and Greeley, and the Bureau of Reclamation for the development of water storage and flow regulation facilities within and adjacent to the basin are only tentative. Despite this uncertainty it can only be assumed that such facilities will be constructed sometime in the future in order to fully utilize the flow of water from the Cache la Poudre watersheds. Construction of water impoundments will have a marked effect upon the resource use patterns existing in the Little South and that water yield and water quality management would become increasingly important.

Recreation

Because of the basin's proximity to rapidly growing centers of population and the tentative plans to impound water in or near the basin, increased use of the area for recreation is almost certain. Use of the Little South for resource production must also consider the recreational potential and demand. As the demand becomes more and more evident additional camp and picnic facilities will need to be developed.

Private lands in the basin can be expected to satisfy the demand for summer homes. Although the Forest Service has little or no control on the use of these lands, other than through goodwill and cooperation, they are of considerable value to the national forest management pattern by taking this recreation pressure and concentrated use off the national forest land.

Continued cooperation and goodwill with landowners, as long as the public interest is protected, does constitute a means of "light" control of private land developments through the landowner's good opinion and respect for the Forest Service people and the national

forest land. Such an attitude on the part of private landowners is essential to multiple-use management in the Little South basin.

That portion of Rocky Mountain National Park in the basin, while not under the jurisdiction of the U. S. Forest Service, cannot be separated from that agency's recreation resource in the Little South watershed. The area is essentially a wilderness area and adds materially to the range of recreational opportunity of the area.

Possible recreation opportunities include auto travel and sightseeing, jeep travel and sightseeing, picnicking and camping, fishing and hunting, wilderness travel and living, hiking, summer home living, winter sports, and winter crosscountry snoeshoeing or skiing. Thus, the basin contains a wide range of recreational activities, from smooth to rough, accommodating many preferences.

One of these for example, jeep travel and sightseeing, is rarely considered in national forest recreation management programs. More and more people throughout the country are buying four-wheel-drive vehicles in order to enjoy the back country. The backroads of the Little South basin, mostly logging access or pioneer roads, could be kept open for this use and hunting, but would still need to be drained and seeded to grass. Additional road signs are also needed and interpretive services such as historical signs would add materially to the recreational resource. These resources in the Little South basin are of very high quality and should be given equal priority to the other multiple resources of the area.

Timber

Although inventories of timber volume have been made in the

Little South basin for the purpose of formulating management plans, little is known of the timber site qualities. Present systems of management depend on the forester's judgement or skill to recognize a good timber site or a poor site. Unfortunately some people see timber production on every site, good or poor.

Of the site conditions in the Little South drainage it can be said that site conditions vary, some sites now containing timber are not suitable for intensive commercial production of wood products, other sites are extremely well suited to commercial timber production, but some of these well suited sites because of their location or situation are far more valuable for recreation and other uses in the overall multiple-use complex.

Although lodgepole pine is the most abundant timber species on the area its management has been neglected because this small-sized species lacks markets for its utilization. The potential of this species for fiber production is too great not to plan ahead for its intensive utilization and management now. For this reason an inventory of timber site qualities is every bit as important to resource management as a soil survey would be. A practical multiple-use plan must be specific but without such information the plan is often too general to be an effective coordinating device. One has to have information as to which are areas suited to timber management and which are areas of no timber management. The site study in the Montane Zone, currently underway by Colorado State University, should provide some of this information in the Little South watershed.

Range

Most of the mountain meadows and open parks, of which there are comparatively few in the Little South basin, were taken up in homesteads and used for the grazing of domestic livestock. The lands now in national forest ownership support little livestock use or potential for improvement because of lack of forage grasses, dense stands of timber, and steep topography. Looking at the entire complex of ownerships in the basin, however, grazing of livestock cannot be de-emphasized in multiple-use management in the Little South because the summer range resources that do exist here are needed for the economic success of a year round livestock business. While the area in the basin that is usable for grazing is small, that which is available tends to complete a necessary segment of a much larger range area outside the basin in the plains and foothills where summer range is scarce and droughty.

Most of the private landowners in the basin are not in the ranching business but they do lease their meadowlands to cattle ranchers for the extra income that it provides. Some lands of the Colorado State Board of Agriculture and those of the Cities of Greeley and Fort Collins are also leased for grazing use by ranchers. All of these lands appear to be in fairly good condition. But, on alpine sheep ranges, where the harsh environment inhibits quick recovery of the vegetation cover, past use appears to have deteriorated this vegetation cover. Use may well need to be modified to protect the vegetation and soil of this high water producing area.

The conclusion reached is that range use, although small in

total numbers of stock grazed, is an important land use and deserves equal weight in land use decisions.

Wildlife and Fish

Big game management cannot be separated from the range management needs in the Little South watershed. Mule deer and elk are forage and browse users like domestic livestock and leave their impact on the forage resources. They, too, must be considered in terms of carrying capacity of the land.

Big game, unlike domestic stock, are also closely tied in with the recreational potential of the area and, in the case of the Little South Fork of the Poudre, they are one of the major attractions to the area. Deer and elk do not, however, comprise the entire wildlife management effort on the area. Habitat for mountain sheep, black bear, snowshoe rabbit, beaver, squirrel, wild turkey, ptarmigan, grouse, and other species must also be considered.

Fishing is a major summer recreation use on the area. To maintain this resource the fish habitat--streams and lakes--must be protected from land use practices that allow considerable quantities of silt to enter water courses, and from stream changes that would reduce fish production.

Geology and Minerals

No mining or processing of rock for aggregate or other purposes has yet been feasible in this basin. With changing technology or improvement of local roads this situation could change. The multiple-use plan, each time it is revised, will have to consider any possible changes in this situation. Present and potential recreation sites and

the administrative site containing West White Pine Lookout have already been withdrawn from mineral entry.

The National Forest Recreation Survey (10) lists 5,053 acres at the headwaters of Fall Creek and the Little South Fork as a potential Geologic Area "being a good example of glaciation during the Wisconsin Era." This area would also include Mirror Lake which is just outside the watershed.

Transportation

Roads and trails are an important aspect of use and management of a land area. However, their presence does cause some problems and in a wilderness environment, such as the northern portions of Rocky Mountain National Park, the building of roads would effectively destroy the valued type of recreation which this area can offer. On the other extreme, the building of superhighways tends to destroy the quality of the sightseeing resource, although the design of any main highway should have the safety of the traveler in mind.

The main Little South Poudre Road, the Buckhorn Creek Road, and possibly the road past Sky Ranch to Hourglass and Comanche Reservoirs might be the only ones normally used by the auto tourist for sightseeing. Conceivably some of these roads might be realigned and even paved at some future date as travel use becomes more intense and money becomes available for road improvements. It would greatly help to maintain other resource values if the alignment and standards for these main roads was decided once and for all so that the general area is not littered with old road scars and the roadside vegetation has a chance to heal over the damage.

Other access roads in the drainage, having only limited value to auto travel, are of great value to the owner of a vehicle suited for back country travel, hunter or fisherman access, and to national forest administrative activities. Future logging activity is expected to pay for the access roads that recreationists and forest officers will use.

Access roads often create as many problems as they solve. Unless carefully engineered, drained, and kept away from stream channels they will invariably introduce large amounts of silt into the water course, lowering water quality, damaging aquatic habitat, reducing water storage capacity and depth of ponds and reservoirs, and lowering the quality of the streamside recreational resource.

Access to national forest lands beyond the private land is often blocked to the public by the private landowner. In most cases, however, certain actions by the public precipitated this discord. Better accessability is thought to increase the danger of man-caused fires but it also enables a fire crew to arrive in time to keep fires small and put them out more quickly.

Land Occupancy and Special Use

Private lands in the basin are expected to fill the demand for summer home occupancy needs in the basin. In this capacity they are an aid to national forest management but they will also cause some problems for management of the adjacent national forest lands. Eventually, with development, demand for power and telephone rights-of-ways will increase. Keeping these facilities away from roadside and streamside zones will be a problem in this mountainous and rocky

area. Increased occupancy and travel might dictate road right-of-way relocations. A modified timber harvest system might be necessary where timber sales are adjacent to heavily developed summer home or other recreational areas.

With future developments in the area and more use is made of its resources more and more demands for special single uses will be made for public lands which by law are to be managed for multiple-uses. Each application deserves careful consideration of its need to serve the local public, the overall public interest, and national forest management objectives.

Research, Education, and Demonstration Use

These activities are centered at the Pingree Park Campus of Colorado State University which contains living, classroom and laboratory facilities. By their very nature they will involve use of national forest lands in the Little South basin. Use of the area is covered by cooperative agreements that are coordinated with multiple-use of the basin. The area has also been set up as a watershed management study and demonstration area, also under cooperative agreements, but watershed management cannot constitute the sole research use of the area; a wide range of natural resources research is carried out on the area.

Zone Management

The Little South Fork of the Cache la Poudre River basin, in light of watershed management study and demonstration objectives, constitutes a Special Zone for multiple-use planning within the overall planning unit which is the Poudre District of the Roosevelt National

Forest. Within the Special Zone there are four specific multiple-use management units: Crest Zone, Intermediate Zone, Water Influence Zone, and Travel Influence Zone.

The Crest Zone includes the open alpine areas and the subalpine spruce and fir forests of the Little South basin and is generally above 10,000 feet. The remainder of the watershed is in the Intermediate Zone which is the forested area most of which is capable of commercial timber production. Throughout these zones are the Travel Influence and Water Influence Zones.

The Travel Influence Zone refers to a strip 250 feet wide on each side of a road commonly used by the traveler, sightseer, and recreation user. Its purpose is to preserve the foreground scenic areas. The strip is often much wider where camp and other roadside recreation facilities have been developed. The main Little South Road to Pingree Park, the Buckhorn Road to Pennock Pass, and possibly the road past Tom Bennett Campground to Sky Ranch Lutheran Camp, Hourglass Reservoir and Comanche Reservoir should be provided with this designation.

The Water Influence Zone refers to a strip of sufficient width to provide a natural atmosphere along the shoreline of all bodies of water which support fish, in order that soil, water, and recreation resources are protected. The main Little South, Little Beaver, Beaver, Fish, Fall, Pennock, and Pendergrass Creeks should receive this designation. The various lakes and reservoirs such as Comanche, Hourglass (Hourglass Creek also), Browns, Twin Lakes, and others should also be included.

Specific Management Problems and Conflicts

If multiple-use planning is to help orient the attitudes and activities of Forest Service district personnel, perhaps the plan should include a discussion of specific management problems and conflicts which presently exist on the planning unit or are expected to appear in the future. Following are eight such conflicts which can be seen in the Little South.

Alpine Grazing

The soil and vegetation resources in the vicinity of Crown Point of the Little South watershed have received damage as a result of the grazing of domestic sheep. The main problem is that sheep grazing has reduced the other values of the alpine in that a basic tenet of the multiple-use doctrine is "that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land."

The area is most valued for the production of water. Recreation use of some areas of the alpine is increasing and such use may not be compatible with the presence of sheep, nor does grazing damage to the land contribute to the natural surroundings demanded by the type of recreationist who is inclined to prefer the alpine. Big game animals must also be provided for in this area. The erosive qualities of alpine soils and slowness of recovery of damaged vegetative cover are the chief limiting factors to use of the alpine ranges.

Little is known either of alpine grazing or of rehabilitation. Studies need to be made on the influence of alpine grazing on water

yield, condition and trend of alpine ranges, and methods and feasibility of rehabilitating the range and restoring the vegetative cover.

In regard to the damage around Crown Point, several questions need answered. Does the use of exclosures indicate that present sheep use is still contributing to the damage or that complete or partial removal of the two bands of sheep will enable a satisfactory rate of recovery? What would be the impact of complete or partial removal on the economic operation of the sheep owner? What part has the knowledge and skill of the herder had in causing the on-site damage? Another issue is whether returns from grazing minus the negative value of the damage is compatible with the value of the alpine for watershed, recreation and normal wildlife use?

There are a number of possible alternative solutions. One might be to simply live with the situation, but this is not a good solution as it is against the basic tenets of the Multiple-Use Law. Possibly the best solution might be to erect study exclosures of a type which the herder cannot open up for his sheep, which will allow study of the effects of present sheep use and nonuse on vegetation recovery, and then base the decision on this evidence. Another approach is to discuss the problem with the sheep owner out on the allotment and to mutually agree to reduced numbers or nonuse for a time, or if the damage is thought to be the result of poor herding the owner can then discuss the problem with his herder. The remaining alternative is to autocratically terminate sheep grazing in the alpine, but hopefully at a time when the action won't "stir up too big a fuss."

Action on an autocratic basis too often invites resentment and political action in return. Local and national groups of the

National Woolgrowers Association are concerned when an irate member complains of an allotment termination.

A counterbalance is possible if the Forest Service is able to convince its Grazing Advisory Council, made up of local ranchers, of needed action after a firsthand inspection of the damaged area. Recreation users might bring about some pressure for action if enough of them have significantly strong feelings for this particular segment of the alpine.

Pressures to bear on the problem from a watershed management standpoint would have to come from the Forest Service watershed staff organization. For the first time the Roosevelt National Forest has employed a trained watershed manager to handle watershed damage and water management problems and programs. Water quality research undertaken by Colorado State University should provide information on the impact of this land use on the water resource.

An indirect source of pressure could come from water users at some future date when water resources become so critical that political pressure is used to push the Forest Service into emphasis on water management. With such an overall pressure on water management programs, the Forest Service would also focus attention on watershed problems other than water yield--damage to the soils of alpine watersheds being one such problem. Studies are needed before the effect of excessive alpine grazing on the water resource can be assessed.

Eventually, pressures from recreation users and water interests could make sheep grazing of the alpine even more incompatible with other values. However, if it were possible to graze limited numbers lightly with the best of herding, with gradual rehabilitation of the

vegetative resource, then grazing of alpine ranges should not interfere with other uses and values in the Little South basin.

Cross-Country Travel

Cross-country travel can be a problem in the Little South on any of the open areas wherever a vehicle can gain access, where soils are erosive, where the grade is steep, where the soil is wet, and where use of the same wheel ruts is continued year after year. A good example of such use in the Little South is that of the alpine route used for access to Browns Lake in the headwaters area of Beaver Creek. There are many such wheel ruts in the rolling, open, and grassy alpine ridges above Browns Lake indicating that fishermen are not the only group involved in cross-country travel. Sometimes both Forest Service people and stockmen drive cross-country, where possible, for easier access to some area. The original ruts may well have been started by the workmen who built Browns Lake dam in 1903, which washed out in 1906, scouring out a portion of Upper Beaver Creek.

Nonetheless, the demand for access to this lake is very evident and a problem of erosion does exist. Without a properly designed road, a stretch of "cross-country road" which becomes washed too much to allow travel makes it necessary for a driver to use an alternative bypass route. In time the bypass route becomes washed out and needs a bypass, thus widening the damaged area.

Some recreation users might prefer that access to the lake remain limited and the area kept natural. Judging from the many wheel ruts seen on aerial photos of the area, the hand of man has already been felt in this area. To some it is still a wilderness even though

a wilderness doesn't exist. Considering the nearness of the alpine wilderness of Rocky Mountain National Park to the south and the Rawah Wild Area to the north, the supply of this class of recreational opportunity is not critical. Two other remote lakes, Mirror and Lost Lakes, are nearby. Those people who use the old road for access to the lake may well demand that it be left open for use.

One possible solution of the immediate problem is to block the road and place signs to keep wheeled vehicles and the public out. Perhaps a better solution, more compatible with public service objectives of national forest management implied in the multiple-use doctrine, would be to use recreation funds to construct a properly designed road, preferably over the original ruts. It should be built into the timber below the open area and terminated before the steep area above the lake is encountered, blocking further vehicle entry, and constructing a trail down to the lake. A camping area with minimal facilities could be constructed at some suitable site at the end of the road and beginning of the trail. If at all feasible or practical, some sanitation facilities should be placed at the lower end of the trail.

A complete solution to the problem of cross-country travel will probably never be realized. It is impossible to get everyone to conform to rules and regulations, although most people will obey the rules of back country travel if they are both informed of them and the reasons for having them. The problem can be reduced considerably through good public relations and information. A roadside sign, with generous turnout space, giving historical or other interesting information as a public service, can also be used to briefly and courteously state a few regulations. For example, a sign where the

old Flowers Wagon Road crosses the Little South Road would be appropriate, and perhaps one on the Buckhorn Road at Pennock Pass.

More autocratic regulations plainly get the message across but without the public cooperation and goodwill necessary in achieving good multiple-use management and public service. Bluntly locking a gate or closing a road to an area that has some attraction to the public may cause more harm than if the damaged area remains open. In some areas of the country, owners of four-wheel-drive vehicles have organized into clubs which function to protest closures of public land to wheeled vehicles. Sometime in the future, one of these clubs may be formed in the Fort Collins area.

Private Property Along Streams

Most of the private lands in the Little South basin are along the stream courses, a situation which creates certain problems in multiple-use management.

One such problem is that of fishermen who are restricted to national forest streamside areas, and who tend to have ruffled feelings toward the "no fishing" regulations of which the landowners have the right to impose and which, in some cases, are necessary for the protection of their property. The problem is not one of restricted fisherman access, but one of respect for property rights. This also comes into sharp focus whenever the Forest Service locates camp and picnic facilities immediately adjacent to private land.

A landownership map of the basin shows most of the entire length of the Little South Fork on national forest land, lands of the Cities of Fort Collins and Greeley, and Colorado State Board of

Agriculture land. Unfortunately, that portion of the stream which is closed by private lands is the part most accessable to the main Little South Road. The use of signs stating "National Forest Land, Fishermen Welcome" seems to offer the best solution. Perhaps it might be good to go one step further and protect the landowners rights by putting on the reverse of these signs the statement "Entering Private Land, Public Use Not Permitted."

A potentially serious problem of stream pollution could arise from activities or developments on private land, particularly in regard to the design and location of sanitation facilities. This could also become a problem on Forest Service camp and picnic grounds. The Forest Service has little or no control over activities on private lands other than through a cooperative attitude of the owner.

The present landowners in the Little South are outstanding in that they are generally willing to discuss and work with the Forest Service to solve problems. This is an attitude that can only be developed through judicious respect for his rights and by common courtesy on the part of Forest Service people.

If this loose control is not sufficiently effective to prevent future stream contamination or siltation of the stream, then nothing short of declaring the pollution a public nuisance and taking it to court will solve the immediate problem. In this case future relations may prove troublesome. With further development of the water resources of the Poudre River for downstream municipal use excessive contamination of the Little South Fork could become a serious problem such that the water-using agency would ask the Forest Service to help correct it, or would intercede for the Forest Service to correct the problem and

obtain better water quality. To do this would require development of methods to trace down sources of contaminants and evaluate their impact on the water quality.

Roads Built Near Streams

The rough, steep, rocky topography of the Little South basin seems to dictate that most main access roads follow the path of least resistance up through the meadows and right next to the streams. These roads achieve needed access for better and more intensive multiple-use management, but their presence or design can also create problems in multiple-use management.

The problem is one of stream siltation which reduces water quality, destroys aquatic habitat, fills ponds and pools, discolors the water, and greatly reduces the recreation value of a stream. Frequent recreation users of the area and local landowners cannot be expected to tolerate such conditions. New roads built for timber access are usually the worst offenders. In one case along the Little South Road the entire stream channel was relocated to a steeper gradient so that roadbuilding costs would be less or construction easier. In many cases some roads could be located on side-slopes having deep soils rather than next to the stream, leaving the streamside zone in a natural condition which is required by a high quality recreation resource and by multiple-use guidelines.

A good example is the proposed logging plans for Fish Creek and Little Beaver Creek which calls for the use of streamside zones for location of the main access roads. In a rainstorm or during spring snowmelt a nonporous, packed dirt road can accumulate large amounts of

silt-laden runoff water. If the road is near a stream, most of the sediment will move into that stream. The situation is further aggravated by grader operations which tend to dump more loose dirt over the road fill preventing vegetation establishment on the bare earth fill.

Should a road be built at the lowest possible cost or should the road be built to protect other multiple values of a land area? The only solution to this problem requires that many people work together and that all of them are aware of the need and value of protecting streamside zones for recreation and water quality. These people include the timber sale planner, the forest engineer and his crew, the logger or roadbuilder and his crew, and those who are charged with the constant inspection and followup on plans, specifications, layout, and operations.

Lack of awareness or disinterest for the preservation of other values by any member of this team results in the destruction or reduction of another resource value. Proper location, minimum of surface disturbance away from the roadbed, proper drainage engineering and workmanship, and successful seeding of disturbed areas and roadbed surfaces are all essential for the maintenance of multiple-use values in the Little South basin.

Conflict of Recreation Use Versus Monetary Returns from Resource Extraction to the Economy of Local Communities

Under multiple-use doctrine recreation cannot prevail over other uses on a large planning unit such as the Little South basin, nor can other uses having direct monetary value to the local community prevail over the recreation resource. Of course, recreation does add somewhat

to a local economy in the form of retail business but the result of a man's recreation activities cannot be measured in terms of money in a storekeeper's receipts, but only in the value which the man places on his own activities and participation.

Which is more important: the economic existence of a community or a place where families and individuals can come to camp or fish? The question cannot be directly answered because we are talking of two different values; one is measured in monetary terms and the other in "units of appreciation." We could say that man has several hierarchies or levels of wants and needs. The first is to have the monetary means or security of being able to provide food, clothing, and shelter for himself and his family. The next higher level is to be able to enjoy his leisure time in some pleasant change doing only what he wants to do.

The basin of the Little South Fork of the Cache la Poudre River is able, through multiple-use management, to satisfy both levels of mans needs. Water, timber, range forage, even recreation expenditures, contribute to the economy of communities like Fort Collins and Greeley--water can almost be said to be the economy of this area. The supply of recreation opportunities and wildlife or fish helps to fulfill the other need.

Conflicts arise when user groups--water users, hunters, timber operators, fishermen, ranchers, or recreation users do not or will not consider the value of a land area to satisfy a multitude of needs. Application of the multiple-use principle helps to solve this problem and tends to take pressure off of national forest administration by dictating that these lands will be managed for multiple-use of all

resources and values "each with the other....in the combination that will best meet the needs of the American people."

Conflict of Using the Little South Basin for Research, Education, and Demonstration Versus Other Resource Uses and Values

As stated before, the national forest lands in the Little South area are under cooperative agreement with Colorado State University for research, education, and demonstration purposes, but that these uses can never constitute sole use of the watershed because others have an interest in and a right to use the watershed.

For this reason, people associated with Colorado State University must closely coordinate their activities with the U. S. Forest Service. These people must also be able to recognize the value and need for multiple-use management in the Little South and respect the rights of the public and private landowners here. Failure to realize this may well result in conflict and resentment with the result that pressures are brought to bear on the Forest Service from various other resource users. Research, education, and demonstration do constitute a valid use under multiple-use management. These must be harmonized and coordinated with the complex of other uses and values. An example of this was the need to calibrate the Little Beaver Creek watershed prior to logging in order to study the effect of land use on water yield and quality. The planned timber sale was rescheduled for a future date after the watershed is calibrated. Another sale on another area was set up to accommodate the loggers needs.

Forest Service management places much emphasis on research tested methods and knowledge for land management. Use of the area

by Colorado State University for research in natural resources will contribute materially to this store of information. It has obvious value to better multiple-use management.

Problem of Subalpine Timber Cutting and Management for Water Yield

Use of small clearcuts in the harvest of Engelmann spruce and subalpine fir timber species is of value in water yield management and is compatible in multiple-use. One problem, however, is in sporadic or no regeneration of spruce in the clearcut areas of the subalpine. Success of plantings has been poor.

To the trained forester, forest management consists of much more than a harvest of trees. It is his moral obligation to society to see that a stand is regenerated in the logged over area. Just living with this situation, comforted only by the benefit to water yield, does not fulfill the objectives of multiple-use management. The objective should be both timber and water, and to a certain extent scenic values for recreation, both now and in the future.

Another problem might be reduced economics to the logger in making small clearcuts rather than one large clearcut because of less volume of cut per acre in relation to cost of obtaining access. Road-building costs, for example, are higher because more miles of road must be built in order to obtain the timber. Involved in this problem is the question of whether the positive value of increased water yield is worth the reduced value of timber stumpage? If it is worthwhile, then some sort of subsidy would have to be worked out for the logger, depending on what is considered a fair and reasonable profit for his operations.

Problem of Clearcuts for Timber Harvest and Water Yield Versus Preservation of Scenic Values

The traveling public prefers the natural beauty of a mature forest of trees, whereas the trained forester may see only a decadent, diseased stand of mature trees. He sees far more beauty in a vigorous, healthy stand of young trees. The public is not used to seeing forest management being practiced on the ground. There is a considerable time-lag between the reduction of an old stand and an easily noticed reproduction of a new stand, an abruptness which is hard for the public to get used to.

A compromise is reached in the providing of a Travel Influence Zone on each side of roads commonly used by the public. Should part of the route be on a sidehill which commands a wide view of the managed forest, the clearcut areas will most certainly stand out. A good example of this can be found just outside the Little South watershed along the Buckhorn Road below Pennock Pass. There is a huge 160 acre clearcut on lands belonging to the Colorado State Land Board which has reduced or eliminated scenic values along this part of the road. There are smaller clearcuts on adjacent national forest land which do not appear as such a gash or spectacle, hence, they too represent a compromise with scenic resource values of the area.

Chapter VI

SUMMARY AND CONCLUSIONS

This report has attempted to evaluate multiple-use management of national forest lands as it relates to resources in the Little South Fork of the Cache la Poudre River watershed. Analysis of the legal definition of multiple-use was made, followed by a discussion of how multiple-use planning is carried out in the U. S. Forest Service.

Next, the physical and cultural resources of the Little South basin were discussed and the activities of cooperators also working in the basin were reported. Chapter V, entitled "A Contribution to a Multiple-Use Plan in the Little South Fork Watershed," attempted to mesh the existing resources and potentials with present and predicted future needs in relation to Forest Service management and Cooperator's activities, mentioning specific problems existing on the watershed or predicted to appear in the future, and suggesting alternative solutions. Unlike the standard U. S. Forest Service multiple-use plan, this report has listed the agencies and individuals that are involved in the management of the area and what they are doing, and it discusses specific problems that may result from attempts to manage the area for multiple-use.

There are several conclusions which can be derived from this report. One is the role that individual interpretation plays in making decisions for multiple-use management. How good a multiple-use manager

the individual is depends on his ability to take the broad viewpoint toward natural resources management, rather than favoring only his own specialty or his own personal wants. Perhaps the forester or resource manager should be trained in the broad field of natural resources instead of a more narrow field like timber management, if he is to have employment with a public agency.

The forester or resource manager is often confronted with a lack of information about the resources. In the Little South, for example, surveys or studies of site and soil qualities are needed along with research into the interactions of various resource uses with each other. Because of the lack of resource information, most multiple-use plans have been very general in content. The resource manager must also have insight into the political implications of management situations and direction if he is to successfully practice multiple-use management.

Resources and values obtainable from national forest lands cannot be directly compared or evaluated. Some are measurable in monetary terms but many are not; there is no common unit to evaluate resource use and demand. Lacking a means of evaluating public demand, the multiple-use plans have been uncertain as to the direction which multiple-use management should take. Therefore, multiple-use is not a perfect system of land management; it does have drawbacks and conflicts of use as seen in this report on the Little South. But it is the best system of management yet devised for the national forests because it directs management to serve the entire American public and to supply a wide range of resources and values.

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ABSTRACT

The objective of this report was to evaluate multiple-use management of national forest lands and resources in the Little South Fork of the Cache la Poudre River watershed. The area is typical of the Front Range of the Colorado Rockies, representing a wide variety of ecologic conditions ranging from Upper Sonoran to Alpine Zones. The watershed is used as a research, education, and demonstration area under cooperative agreements between the U. S. Forest Service and Colorado State University.

Both the legal definition of multiple-use and the multiple-use planning procedures of the U. S. Forest Service are analyzed. Soil, water, recreation, timber, range, wildlife, fish, and mineral resources, representative of the Crest, Intermediate, Travel Influence, and Water Influence multiple-use planning zones are discussed along with the activities of agencies, landowners, and interest groups involved with management and use of the watershed. Eight multiple-use problems are discussed, including: alpine grazing, cross-country travel, private property, roads, local economies, use of the area for research versus other uses, clearcutting and regeneration of subalpine timber stands, and clearcutting of timber stands for water yield versus scenic values, and a number of alternative solutions are suggested.

Conclusions reached are that the watershed cannot be used solely for research, education, and demonstration purposes without

consideration of other uses made of the land and resources. The area is most valued for its recreation, water, wildlife, and timber resources.

In order for multiple-use to work, a planner must accept the multiple-use doctrine and must consider the broad viewpoint of natural resources management. To do this he should have a good overall knowledge of natural resources and of the social and political implications of resource management. Because of the lack of detailed land and resource information he must rely on good judgement in making multiple-use decisions.

Another result of this lack of information is the present tendency of multiple-use plans to be very general in content and uncertain as to management direction, but this does not lessen the value of multiple-use planning as a means to coordinate and guide management of multiple resources.