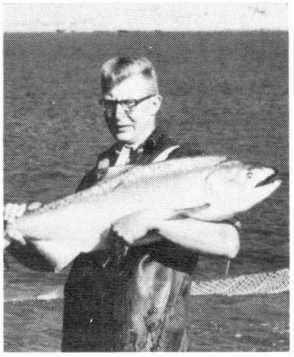
HOW TO DEMONSTRATE THE IMPORTANCE OF FISHERY RESOURCES TO INTERDISCIPLINARY PLANNING TEAMS

Fred H. Everest

ABSTRACT

U.S. Forest Service interdisciplinary teams are currently involved in extensive land use planning that results in allocation of unroaded Federal land for specific purposes. Fishery professionals can demonstrate the importance of the aquatic resource by providing resource managers with estimates of net economic values of fishery resources. The impact that fishery evaluation can exert on allocation of land is illustrated with a specific example from Oregon. In the example, the value of fish produced by the Mt. Butler/Dry Creek Planning Unit exceeded the value of other resources. Consequently, 45 percent of the unit was allocated for production of fish and recreation.

Interdisciplinary (ID) teams, present in the U.S. Forest Service for many years, have proliferated in both numbers and activity in this decade. With the emphasis on ID teams in the National Forest Management Act of 1976, this approach to management is sure to persist or even increase. The teams are assigned a variety of tasks but current emphasis concerns a coordinated land use planning effort that began in 1970 on 55.9 million acres of unroaded National Forest land.



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Planning teams span many disciplines and generally consist of two to six full-time members and four to nine part-time contributors. For example, in the Pacific Northwest Region (Oregon and Washington) 11 disciplines are represented on planning teams (Table 1). Specialists are chosen according to need and availability of personnel, but some weaknesses are apparent. For example, only 4 of 19 teams in the Region, which contains some of the most productive fisheries in the nation, utilize fishery specialists as part-time contributors and none enlist full-time fishery professionals. Forests without fishery professionals often seek consultative assistance from state fishery agencies or universities.

National Forest lands are receiving medium intensity planning that results in land allocation for specific uses based on capability of the land and local and national resource needs. Specific land allocations may emphasize use of selected resources, but all proposed activities must be accomplished within the concept of multiple use as defined by Federal laws and regulations.

Allocation of land is influenced by public needs and desires, the comparative importance (usually measured in economic terms) of goods and services that the land can produce, and the probable consequences to each resource resulting from specific allocations. Fishery resources are often not adequately represented in this process because of the difficulty in evaluating recreational fisheries. Since outdoor recreation in America has traditionally been an activity made available by the public sector, and sport fishing has traditionally been a free (or nearly free) right, market prices for sport fishing are largely absent, and where they do exist, they are not a true measure of the social value of angling recreation.

In the absence of market data, shadow prices have occasionally been used to estimate what the net value of recreational fishing would be if it was actually traded in the market place. Use of shadow prices, however, is not without controversy. Clawson (1976), in a critical review of the economics of National Forest management, states that shadow prices are often in dispute among economists and the figures generated by this approach might be somewhat imprecise, but he concludes that there is simply no alternative to making such estimates. If recreational activities, including sport fishing, are to be considered along with forest commodity outputs during the decision-making process, shadow prices for recreation goods and services must be supplied to the manager.

The purpose of this paper is to show how I have provided estimates of economic values of fisheries for anadromous salmonids, derived both from market values for commercial fisheries and shadow prices for sport fisheries, to planning team members and decision-makers that gained recognition of these resources. The Mt. Butler/Dry Creek Planning Unit in the Siskiyou National Forest of southwest Oregon is used as an example.

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ECONOMIC EVALUATION OF FISHERIES

Values of fisheries for anadromous salmonids produced by the Siskiyou National Forest and Mt. Butler/Dry Creek Planning Unit were estimated using the method described by Everest (1977). This procedure has been widely applied to fisheries

Table 1. Percentage of 19 National Forest land use planning teams in Oregon and Washington that utilize various disciplines.

Level of participation	Disciplines										
	Forestry	Wildlife biology	Soil science	Landscape architecture	Engineering	Hydrology	Range conservation	Archaeology-anthropology	Geology	Ecology	Fishery biology
full time	95	16	37	32	21	0	11	11	0	0	0
part time	37	84	58	68	58	58	37	32	37	32	21

produced by National Forests of the Pacific Coast States and is used in slightly modified form by the Oregon Department of Fish and Wildlife (1977) and the National Marine Fisheries Service (Tuttle et al. 1975). Economic values of fisheries for resident salmonids can be calculated using the procedure reported by Kunkel and Janik (1976).

Economic values generated by these procedures determine consumer surplus values (total net benefits at the zero price currently charged) that would be lost if a fishery was destroyed over a broad geographic area. Since potential losses resulting from forest management would be incremental rather than total, these procedures might overstate the actual value that could be lost as a result of management.

FISHERY ECONOMICS IN LAND USE PLANNING

The Mt. Butler/Dry Creek Planning Unit is located in the northwest corner of the Siskiyou National Forest and contains 8,944 hectares (ha) of incredibly rough, steep, and unstable terrain. Portions of two major coastal watersheds drain the unit, Elk River and Sixes River (Fig. 1). The area contains a variety of resources and is largely untouched by the activities of man.

Many streams that originate within or traverse through the Unit contain large populations of anadromous salmonids. More than 27,000 adults of four species—chinook salmon

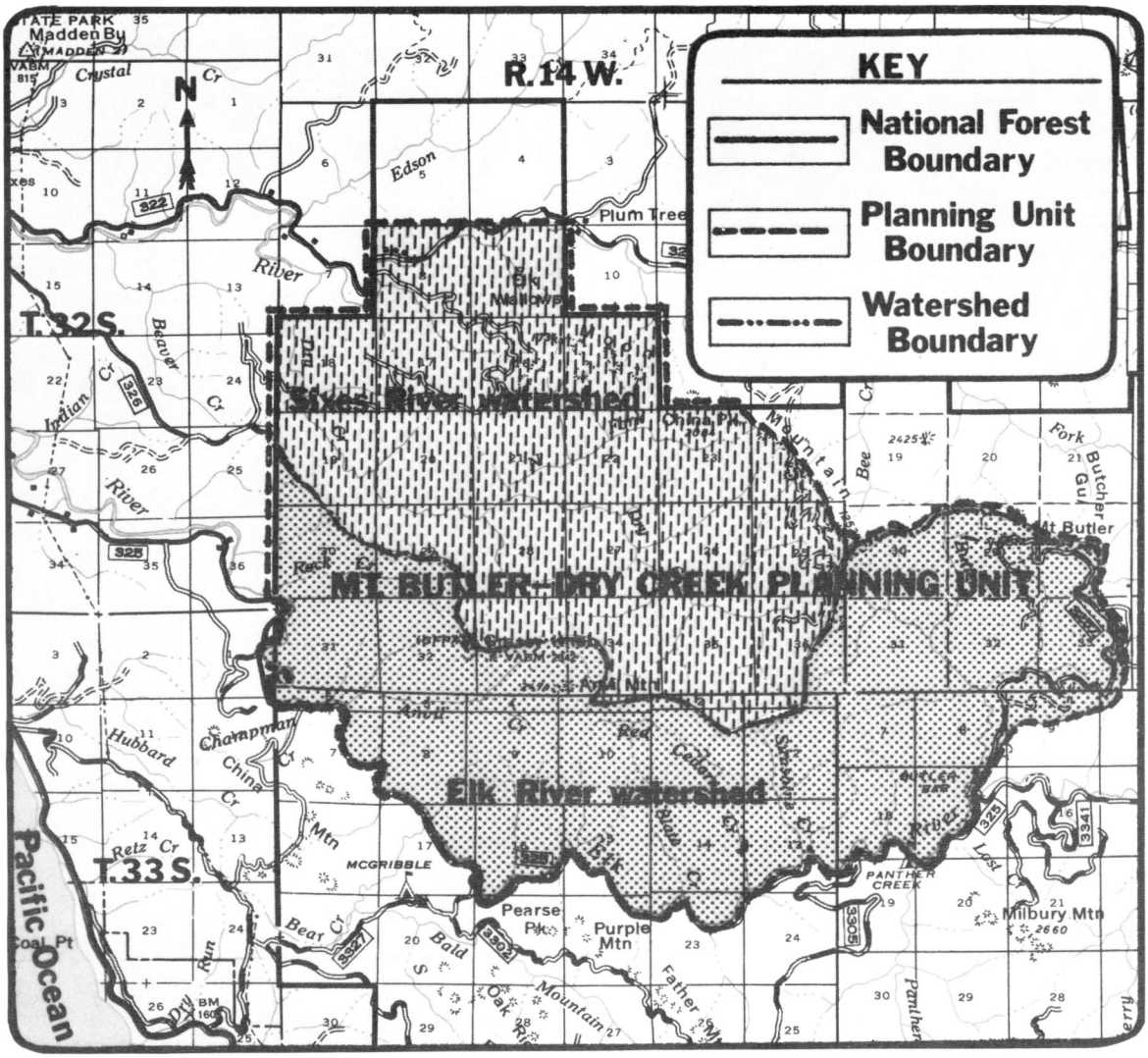

Figure 1. Watersheds of the Mt. Butler/Dry Creek Planning Unit, Siskiyou National Forest, Oregon.

Table 2. Estimated net annual fishery values of the Mt. Butler/Dry Creek Planning Unit, 1975.

River basin	Salmon		Steelhead	Cutthroat	Total
	Commercial	Sport			
Sixes	$ 65,500	$326,600	$54,500	$ 9,400	$ 456,000
Elk	108,500	536,600	43,100	5,400	693,600
Total	$174,000	$863,200	$97,600	$14,800	$1,149,600

(*Oncorhynchus tshawytscha* Walbaum), coho salmon (*O. kisutch* Walbaum), steelhead rainbow trout (*Salmo gairdneri* Richardson), and coastal cutthroat trout (*S. clarki* Richardson) —enter Elk and Sixes River on spawning migrations each year. Not all adults spawn within the Unit, but all are subject to land management activities that occur there.

Sport and commercial fisheries for anadromous salmonids produced in Elk and Sixes Rivers were valued at over $3.0 million in 1975. Sport fisheries included 35,000 man-days' effort with a harvest of about 25,000 fish and a net value of $3.3 million. The two rivers also provided an estimated 56,000 salmon, valued at $594,000, to commercial fisheries in 1975.

About $1.2 million of the fishery value in Elk and Sixes Rivers can be attributed to the Planning Unit (Table 2). Dry Creek in Sixes River watershed has the highest annual value for an individual stream, with fisheries valued at $456,000. The portion of Elk River within the Unit, including several tributaries and 21.7 km of the mainstream, produced fisheries valued at $694,000 annually.

The value of anadromous fisheries in Elk River is rising rapidly because of a large fishery enhancement program conducted by the Oregon Department of Fish and Wildlife. Elk River Hatchery, located on Elk River near the downstream boundary of the Unit, rears chinook salmon smolts for release in Elk River and other coastal streams. The value of the hatchery to Oregon fisheries was estimated at $402,000 in 1973 by the Oregon Department of Fish and Wildlife.

Water for the hatchery is drawn from Elk River, but temperatures in Elk River frequently become marginal for hatchery operations in summer. Temperatures in excess of 20°C are common in hatchery raceways, resulting in stress and sporadic mortality of young salmon. Future production at Elk River Hatchery is dependent on maintenance or enhancement of water quality in the river.

Timber is also a valuable resource in the Unit. Merchantable softwood volume exceeds 572 million board feet, which could sustain an annual yield of approximately 7.4 million board feet. Gross value of the potential annual yield of logs exceeds $1.6 million, with a net stumpage value of about

$0.3 million after subtracting costs associated with felling, yarding, and transporting timber to local processors.

Timber and fish are potential concurrent crops from most forested lands, but special care must be taken to protect fisheries when other resources are managed. It is well documented that production of timber and fish are not totally compatible activities on a given unit of land, but neither are they mutually exclusive (e.g., Lantz 1971). Under most circumstances, both timber and fish can be managed successfully in the same watershed if measures to protect water quality and fish habitat are carefully planned and implemented.

Concurrent production of timber and fish in the Mt. Butler/Dry Creek Planning Unit is particularly difficult because severe topographic relief, unstable slopes, and erosive soils result in lands highly susceptible to environmental damage. Conventional timber management activities (sidecast road construction, hi-lead yarding, slash burning) conducted on similar lands along the perimeter of the unit in the early 1960's seriously damaged habitat of anadromous salmonids, and totally curtailed production in one segment of a major tributary. Sedimentation in that stream was so severe that 15 years later the stream still flows subsurface through the sale area most months of the year. Recent timber management in the area has shown that aquatic habitat can be protected if the most technologically advanced practices for road construction and timber harvest are utilized.

While serving as a part-time member of the planning team, I contrasted an estimate of the net annual value of fish produced in the unit ($1.2 million) with net annual value of potential timber yield ($0.3 million) (even though these values might not be precisely comparable), and with the results of past management activities as a reference point, I then illustrated the potential consequences to fisheries resulting from timber harvesting with anything less than the most sophisticated techniques. These data were used by managers in arriving at a decision for allocation of unit lands.

Approximately 45% of the area has been allocated for protection of fish habitat, water quality, wildlife, and recreation. Fifty-three percent of the area, containing 66% of the potentially available softwood timber, will be used primarily for timber management (Fig. 2).

A Fisheries/Recreation Area totalling 931 ha was designated in the Dry Creek drainage, a major tributary to Sixes River, to maintain fish habitat and recreational resources. The mainstream and portions of major tributaries of Dry Creek were included. A similar area of 81 ha was designated to

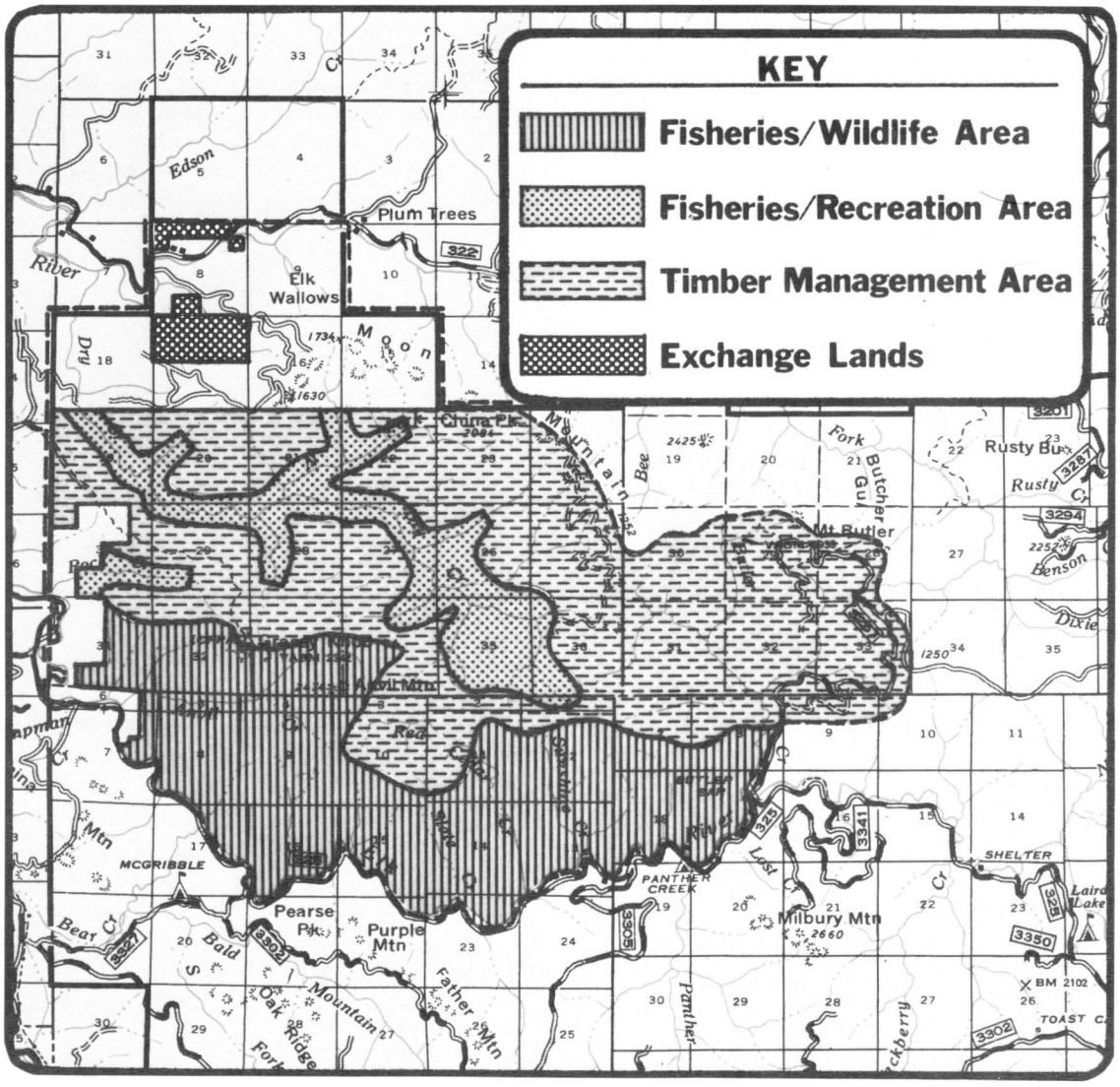

Figure 2. Allocation of National Forest land in the Mt. Butler/Dry Creek Planning Unit, Siskiyou National Forest, Oregon. Private lands are not shaded.

maintain fish habitat in Rock Creek, a major reproductive area for chinook salmon in the Elk River drainage. No timber will be harvested from these areas, which extend at least 200 m on each side of designated streams. A Fisheries/Wildlife Area containing 2,995 ha and varying in width from 1.6 to 3.2 km was established along 20.9 km of the north slope of Elk River.

The Fisheries/Recreation Area contains much of the area with the greatest potential for fish production. Development of this area will be limited to a 22.5 km trail system and a small number of minimum-impact primitive camps.

The Fisheries/Wildlife Area includes the least productive timber lands in the Unit, covers 33% of the acreage, but contains less than 18% of the potentially harvestable timber. The area, however, contains high watershed and fishery value and will remain roadless and free from timber management activities to maintain existing fishery and watershed resources.

Most of the remaining area in the Unit will be used primarily for timber management with a 64 km minimum impact ridgetop road network. About 362 million board feet of timber on 4,533 ha will be designated for timber harvest. An annual yield of 4.9 million board feet based on a 100-year rotation is expected. Most of the high-volume timber stands and best timber-site acreage are included in the area.

The final environmental impact statement for the Unit also requires use of sophisticated logging systems to protect fish habitat and water quality on lands managed for timber production. Uphill felling will be used extensively to protect streams and soils and better utilize timber resources. Unstable and erosive soils in the Unit will require yarding systems capable of suspending logs above the ground to reduce potential sediment transport to streams. Skyline and helicopter systems currently operating on the Forest have demonstrated this capability.

THE BROAD PERSPECTIVE

Fishery values on the Mt. Butler/Dry Creek Planning Unit, as estimated by the procedures of Everest (1977), exceeded estimates of the value of other resources, and the land allocation decision by resource managers reflects this knowledge. But the outcome might have been different if no attempt had been made to quantify fishery values. Past performances of public and private agencies across the nation provide numerous examples where large and productive fisheries whose values had not been quantified were relegated to a subordinate position under pressures to develop or exploit commodity resources. Some of the blame for these apparent errors in judgment must be assumed by fishery managers and resource economists who have failed to provide economic data to decision-makers.

When fisheries are less valuable than competing resources, decision-makers can use the knowledge of fishery values as a basis for protecting fish habitat. On the public land this often means a slightly increased, but usually cost-effective, investment in management activities to maintain fish production. Even where fishery-commodity conflicts occur on private land, a modest investment of private dollars to protect the value of public fisheries would, in most cases, produce net benefits to society.

The result of fishery evaluation has been felt in the area of resource decision-making on the Siskiyou National Forest, but this is only one local example. On a broader scale, definition of net economic values of fisheries in Oregon (Brown et al. 1964, 1972), Washington (Mathews and Brown 1970), and Idaho (Gordon et al. 1973) have established sport fishing as a major economic resource of the West, one to be reckoned with when resource conflicts occur. In the southeastern states an economic survey of hunting and fishing recreation (Georgia State University 1974) has documented substantial values for marine and freshwater angling that have been used effectively in and out of court to resolve resource conflicts. None of these studies, however, has done a wholly adequate job of assessing net values. Nevertheless, I urge fishery management agencies and biologists across the nation to press forward with economic evaluations of the resources they manage and support research that will provide improved procedures for evaluating sport fisheries. Many decisions on resource allocation and utilization are currently made on the basis of economics. Consequently, it is the responsibility of fishery managers to provide economic data to planners, developers, and resource decision-makers.

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