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Forest Service Handbook 2609.13 – Wildlife and Fisheries Program Management Handbook
Chapter 70 - Analysis of Economic Efficiency of Wildlife and Fisheries Projects

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Digest: Following is an explanation of the changes throughout the directive by section.

This amendment is a reissuance of FSH 2609.13 to conform the format and structure of the Handbook to the requirements of electronic directive issuance.

70: Establishes new direction for conducting economic efficiency analysis of Wildlife and Fisheries projects.

This Handbook is now available electronically in the National Information Center in the same format as the paper copy. Henceforth, amendments to this Handbook will be issued to Forest Service units electronically on a document basis.

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This chapter provides methodology and information necessary to integrate analyses of wildlife, fish, and threatened, endangered, and sensitive species projects with other resources so that decisionmakers have an understanding of impacts and tradeoffs needed to make informed decisions.

The direction in this chapter focuses on the economic efficiency component of economic analysis. See FSM 1972 for guidance on the use of economic impact analysis.

While the direction in this chapter is aimed at professionals at any level who are required to perform economic analysis of wildlife and fisheries projects, the primary audience is the professional biologist at the Forest and District level.

70.3 - Policy

1. Follow the procedures and guidance in this Handbook in conjunction with direction in FSM 1970 and FSH 1909.17, Economic and Social Analysis Handbook, when conducting economic efficiency analysis of wildlife, fisheries, and threatened, endangered and sensitive species projects.

2. Conduct all economic analysis of wildlife, fisheries, and threatened, endangered and sensitive species projects with consideration for other resource impacts; most projects will have joint products or opportunity costs in terms of other resources to consider in the analysis.

70.5 - Definition

In addition to the terms and definitions in FSM 1905,
FSH 1909.17 and FSM 2605, the following terms and definitions apply to the direction in this chapter:

Activity Day. Any part of a day spent in a given activity. For example, if someone hunted 2 hours one day and 3 hours another day, it would be recorded as 2 activity days of hunting. If someone hunted 2 hours in the morning and 3 hours in the evening of the same day, it would be considered 1 activity day of hunting.

Cost. The value of an input of land, labor, or capital that reflects the difficulty of activities.

Economic Analysis. The evaluation of projects and decision units using economic efficiency and/or economic impact analysis

Nonconsumptive Use. Activities such as photographing, observing, and studying fish or wildlife. (See also primary residential, primary nonresidential, secondary residential, and secondary nonresidential activities.)

Primary Nonresidential Use. Trips or outings of at least one mile from home for the primary purpose of observing, photographing, or studying wildlife. Trips to zoos, circuses, aquariums, and museums are not included.

Primary Residential Use. Activity within one mile of the home with a primary purpose that is wildlife related: (1) Closely observing or trying to identify birds or other wildlife; (2) photographing wildlife; (3) feeding birds or other wildlife on a regular basis; (4) maintaining natural areas of at least one-quarter acre for which benefit to wildlife is an important concern; (5) maintaining plantings (shrubs, agricultural crops, etc.) for which benefit to wildlife is an important concern; or (6) visiting public parks within one mile of home for the purpose of observing, photographing, or feeding wildlife.

Secondary Nonresidential Use. Seeing or hearing wildlife while on an outing that is taken for another purpose, such as camping, boating, or driving for pleasure. Not included are trips to other countries, trips of less than one mile from home, and trips for shopping or to go to work or school.

Secondary Residential Use. Seeing or hearing wildlife while pursuing other activities within one mile of home (for example, enjoying hearing songbirds while doing yard work).

Trade-off. The change in a benefit or cost produced by changing another benefit or cost.

Wildlife and Fish User Day (WFUD). Twelve visitor hours which may be aggregated continuously, intermittently or simultaneously by one or more persons and which represents participation in wildlife or fish-related recreational activity.

71 - Steps in Analysis

The purpose of economic analysis is to provide information useful and relevant to decisionmaking. Consequently, it is important to design the economic analysis to ensure that it covers information that will be helpful to the decisionmaker.

71.1 - Identifying the Decision Elements

To define the analysis required and the effort needed to accomplish it, answer the questions "who will make the decision; when will it be made; to what area does it apply (where); and what is the decision to be made" or alternatively, "what are the objectives to be accomplished" by the proposed project. Considering economic analysis in the context of the decisions to be made simplifies the task of deciding if an economic analysis is necessary or useful and what should be the scope of analysis.

71.2 - Determining the Level and Type of Analysis Needed

71.21 - Economic Analysis of Current Situation

First, consider and display the current situation and what will happen in terms of benefits and costs (economic consequences) if no action is taken. This evaluation establishes the benchmark against which all alternative decisions are compared. With the benchmark in place, the tradeoffs among alternative decisions or alternative projects to accomplish the objective can be considered and tradeoffs analyzed in terms of increased or decreased benefits and costs.

71.22 - Elements of Economic Efficiency Analysis

Identify the elements that can be analyzed to provide the decisionmaker with information on the economic consequences of a proposed wildlife and fisheries project. Consider such elements as:

1. Benefits and costs arising directly from implementation of the project. For example, if a prescribed burning project is intended to change a habitat type to favor certain species, begin an economic analysis by determining the costs associated with the prescribed burn. Assess also the immediate effects on animal populations both in the short term and the longer term. Assess estimates of effects on human use, both recreational and commercial, following estimates of animal populations. The recreational and commercial effects are the outputs which usually have prices available, (for example, Resources Planning Act (RPA) Prices, sec. 76.5). Use these prices to evaluate both short and longer term outputs which, along with cost data, comprise the data needed for calculations of present net values and benefit cost ratios.

The results from such a project analysis can be compared to similar information developed for the current "benchmark" situation to determine if there are project benefits that can be expressed in dollar terms.

2. Benefits and costs arising from timber support situations. Economic analysis is often done where joint benefits and costs are involved. An example of such a situation might be a choice between two configurations of a timber sale layout, one of a clearcut having a rectangular form and another clearcut having a less regular form but where edge effects are greater. The latter sale has less timber volume, is somewhat more costly but has substantially greater wildlife benefits. In situations such as this analysts need to (a) identify for each of the two alternatives costs of both alternative sale layouts, both timber and wildlife benefits for the short term and long term, and (b) use the present net value measure to compare these alternative timber sale layouts.

3. Benefits and costs associated with coordination projects. An example of a coordination measure is a passable fish culvert. With a conventional and less costly structure, while the objective of area access for fish accompanying a timber sale or grazing allotment is accomplished, fish migration and fish benefits are reduced or destroyed. With a more expensive passable culvert, the losses in fish values can be mitigated. In this example, the benefits of the more expensive culvert are actually non-losses of the fish resource. In this case, both costs and benefits of the alternative fish culverts should be identified and compared using the present net worth criterion.

72 - Scope and Design of Economic Efficiency Analysis

Use this direction to analyze individual projects and their selection using economic efficiency measures (FSM 1970.6). A project is the smallest unit upon which economic analysis is applied and is defined by geographic boundary, homogeneous management, and singleness of purpose. However, singleness of purpose does not mean that a project cannot have multiple outputs or joint products.

72.03 - Policy

For actions that result in the production of Wildlife and Fish User Days (WFUD's), pounds of commercial fish or fur pelts, use the economic analysis procedures outlined in this chapter to determine Present Net Value, a Benefit/Cost Ratio or some other measure of economic efficiency (FSH 1909.17, sec. 11.1, 11.2). For proposals to accomplish wildlife and fisheries objectives that would not result in WFUD's, commercial fish, or pelts, use the procedures for analyzing cost effectiveness in FSH 1909.17, Economic and Social Analysis Handbook, sec. 11.1. Therefore, the only efficiency analysis necessary to evaluate threatened, endangered, or sensitive species projects, is an evaluation of project costs and identification of the least cost project.

72.1 - Uses of Economic Efficiency Evaluations

Evaluate economic efficiency to assist decisionmakers in:

1. Evaluating and ranking alternatives (for example, projects) by present net value or other appropriate measures of economic efficiency: for example cost effectiveness.

2. Selecting the efficient combination of activities in an alternative (for example, a project).

3. Measuring tradeoffs among resource outputs and among types of programs.

4. Considering incremental unit costs and other measures of performance.

73 - Measures of Economic Efficiency

Present net value is the primary measure of economic efficiency to be used in comparing mutually exclusive alternatives for projects.

In general, present net value is the appropriate measure of economic efficiency, rather than benefit-cost ratio or rates-of-return, when comparing mutually exclusive alternatives (projects) for managing resources in long-run analysis periods.

Exceptions to the use of present net values are discussed in FSM 1971.2 and FSH 1909.17, Economic and Social Analysis Handbook, sec.11.2.

74 - Identifying Inputs, Outputs, and Production Processes

Clearly identify significant inputs and outputs of production processes (FSH 1909.17, Economic and Social Analysis Handbook, ch.12) in economic efficiency evaluations. Inputs are the amounts of land, labor, and capital required. Outputs are amounts of goods and services expected to be produced. Present a description of how inputs are transformed into outputs in a format appropriate for each evaluation. Then use efficiency measures to indicate the economic feasibility of an action: express inputs as costs, translate outputs into benefits, and represent the production processes by a production function, that is, the transposing of inputs into outputs, or in economic terms, costs into benefits.

In analysis of economic efficiency of wildlife and fish projects, the production process can be described as follows:

1. Activities or activity types are the inputs and have units of work and costs attached.

2. Habitat modification or maintenance is the immediate result of doing an activity or activities.

3. Habitat capability is an intermediate product resulting from habitat modification or maintenance due to the activities (inputs).

4. The supply or availability of Wildlife and Fish User Days is changed as a result of new habitat capability. When this supply is used or consumed, benefits result. Wildlife and Fish User Days are the output and have benefits attached.

5. This flow from input to output takes time and is represented by benefits over the life of the project.

74.1 - Level of Detail

Evaluations should present quantitative schedules of input and output flows expected over time, or refer to such schedules in associated documents. A schedule of outputs for six years is shown in section 77.22.

74.2 - Inputs

Use the standards for inputs in FSH 1907.17, (Economic and Social Analysis Handbook, sec. 12.4).

74.3 - Outputs

Use the standards for outputs in FSH 1909.17 (Economic and Social Analysis Handbook, sec. 12.5).

74.31 - Wildlife and Fish Output Measures

Outputs occur in two stages as a result of wildlife and fish projects.

1. The first stage is an intermediate phase where, as a result of a project, changes occur to habitat capability and then subsequently to animal populations.

2. The second stage represents the results of the project in terms of end products such as recreational use, numbers of pelts and pounds of fish harvested. It is these second stage outputs that are valued as benefits in efficiency analyses such as present net value and benefit-cost analysis.

These second stage outputs for recreational use are measured in terms of Wildlife and Fish User Days. At the National level three broad categories are used: Hunting, Fishing, and Nonconsumptive Use. For project level use, however, these categories can be subdivided into more specific uses, such as big game, small game, warmwater fish, coldwater fish, and the like.

74.4 - Time Dimension

(FSH 1909.17, Economic and Social Analysis Handbook, sec. 12.3). In the production process, there is a lapse of time between spending or committing inputs and receiving outputs. In addition, there is an expected life or duration that outputs will flow from the project. Economic analyses must recognize that a quantity of outputs (hence benefits) captured sooner has more economic value than an equivalent amount captured later because of the potential for immediate investment and effects of inflation. These concepts lead to discounting future benefits, and are more fully covered in chapter 77.

74.41 - When to Record Outputs

When planning and analyzing, report the project outputs in the years they begin. For example, if a stream improvement project to increase recreational anadromous fishery use does not increase recreational use until the fourth year after the improvement, then the fourth year will be the first occasion to record an output (hence benefit).

74.42 - Effective Life of Projects

Since the effects of investment generally will not last indefinitely, claim outputs only over the project's effective life. These time periods will vary because of climate, soils, and other natural or manmade events. For purposes of illustration, exhibit 01 shows years of effectiveness for a variety of projects. Though taken from an actual situation, this exhibit is not meant to establish a standard.

74.42 - Exhibit 01

Example: Sample Average Effective Life of Projects

Activity Type	Years Effective
Seeding and Planting--Grass and Forbs	6-10
Seeding and Planting--Shrubs	5-50
Seeding and Planting--Trees	10-75
Release, Thinning, Pruning	10-20
Openings, Edge Treatment	10
Spawning, Bed Improvement	5-10
Stream Barrier Removal	10-15
Fish Population Control	5-10
Aquatic Plant Control	1-5
Fish Habitat Fertilization	1-5
Pothole Development	10
Nest Structures, Den Development	5-10
Water Developments	10-20
Wildlife Cover Development	5-15
Management Fencing Construction	20
Marsh Development	20
Greentree Reservoir Construction	7
Fish Cover Development	15-20
Channel Stabilization Construction	10-20
Spawning Facility Construction	10-20
Fishway and Fish Screen Construction	30
Lake Construction	40
Plant Physical Protection	20

75 - Analyzing Cost

Consider all economic costs in project planning. These include: budget costs (Federal government outlays for inputs of labor, services, supplies, and equipment under the principal categories of administrative costs, operating costs, and investment costs) and other costs such as those incurred by users in extracting outputs or in engaging in on-site uses, for example, travel costs to a hunting or fishing site, boat fuel and labor costs in commercial fishing. Include only those costs in the production process up to the point of evaluation or which influence the values of outputs as economic costs, for example, costs of harvesting commercial fish to dockside.

75.1 - Classification

(FSH 1909.17, sec. 13.2). Consider and classify all costs for inclusion or exclusion from project analysis. Exclude fixed costs, for example, overhead or general administration costs which will occur regardless of the project(s) unless it can be shown that these costs do vary with the size of project. Include variable costs associated with project(s) inputs and opportunity costs of outputs foregone because of the project(s).

75.11 - Wildlife and Fish Classification

The rationale behind cost classification is to identify what is relevant for inclusion in economic analysis. Include, only those costs which vary due to undertaking a project in the analysis. These costs are called variable costs.

Wildlife and fish costs are classified or take the form of:

(1) Investments in resource management.

(2) Operational costs.

(3) Variable general administration.

All of these fall under the classification of variable costs.

For economic evaluations, include costs of inputs purchased by parties other than the Forest Service, for example, challenge cost share partners. These costs contribute to the production of benefits and are necessary to determine if a project is economically efficient.

Exhibits 01 and 02 are examples of wildlife and fisheries management activities with a classification of costs. The exhibits show examples of variable costs that should be used in an economic analysis and examples of fixed costs which occur regardless of whether or not a project is undertaken and should not be included in an analysis.

75.11 - Exhibit 01

Examples of Fixed Costs for Wildlife and Fish Projects*

Type of Activity	Classification
Surveys, Planning, Prescriptions Monitoring and Administration	Fixed Cost-Administration
Studies	Fixed Cost-long range planning
Surveys, Inventory and Planning	Fixed Cost-long range planning
Monitoring	Fixed cost-protection
Formal and Informal Consultations	Fixed Cost-ownership requirement
Cooperation with Other Agencies and Comprehensive Plans	Fixed Cost-ownership requirement and long term planning

* Fixed costs typically encompass a number of projects.

For specific projects what may be considered fixed for a large number of projects may become variable for one.

75.11 - Exhibit 02

Examples of Variable Costs for Wildlife and Fish Projects

Type of Activity	Classification
Surveys, Planning, Prescriptions Monitoring and Administration	Mostly Fixed Cost
Prescriptions	Variable Cost-operational, planning and management
Recovery efforts and conservation for Threatened, Endangered, and Sensitive Species	Variable cost-resource management
Non-structural habitat improvement	Variable cost-resource management
All activity types	Variable cost-resource management
Structural Habitat Improvement	Variable cost-resource management
All Activity Types	Variable cost resource management
Structural Habitat Maintenance	Variable cost

75.2 - Sources of Cost Data

Perform and update cost studies at appropriate intervals between planning cycles. Use historical costs for activities and activity types when available. One source of historical cost data is from the Program Accounting and Management Attainment Reporting System (PAMARS).

Appropriate cost studies include:

1. Site-specific cost studies. These include statistical analysis of project costs using sample data, construction cost estimation, and cost estimation by technical experts.

2. Cost trend analyses and projections. Trends for real cost changes of inputs possibly requiring market analysis.

3. Maintenance cost studies. Future maintenance and replacement need to be estimated to know costs that will be incurred to keep capital assets in service.

75.3 - Adjustments for Constant Dollar Values for a Base Year

Use real dollar values for a specific base year for costs and benefits in analyses. Use Gross National Product (GNP) price deflators as index numbers for the base year and any other year of interest in calculation of real dollar values. The Land Management Planning (LMP) Staff or Regional/Forest Economist is the source of this information.

For adjusting values to a base year real dollar value, the general formula is:

$$\text{Real Dollar Value} = \frac{\text{Base Year Index Value}}{\text{Index Value for Year Converted}} \times \text{Dollar Value in Year Converted}$$

(See the example in sec. 77.24 and FSH 1909.17, Economic and Social Analysis Handbook, sec. 13.5.)

76 - Assessing Markets and Developing Output Values

Market assessments are a part of the Resource Planning Act (RPA) planning processes. Regional planning efforts should assess the interregional markets for each major output that has substantial differences in market structure or prices within the region. Normally, market assessments are not necessary for individual projects (see FSM 1971.5 and FSH 1909.17, Economic and Social Analysis Handbook, ch. 14).

76.1 - Purposes

1. To furnish a basis for determining values.

2. To help set planning objectives and constraints.

3. To help delineate appropriate areas for estimating economic impacts.

76.2 - Components of a Market Assessment

For general direction on components of a market assessment see FSM 1971.51 and FSH 1909.17, Economic and Social Analysis Handbook, sec. 14.2.

At a minimum an assessment should include:

1. Description of outputs.

2. Description of pricing process.

3. Analysis and projection of demand.

4. Description of supplies from non-Forest Service sources.

76.21 - Market Assessments as Substitutes for RPA Assessments

To substitute an assessment of demand and value for the Resource Planning Act (RPA) market assessment, demonstrate that the determinants of demand are different than the RPA assumptions or represent a change in value, not quantity demanded, by evidence that the product produced is different than the product valued by the RPA assessment. For a Regional or local assessment to be meaningful, demonstrate deviation from RPA's assumptions of income, consumer preferences, population trends or some other determinant.

Demand in economic terms is a statement of buyer's intentions with respect to the acquisition of a product. State demand as quantities demanded at each price for some specific time period.

Important determinants of individual demand are: (1) consumer's tastes and preferences, (2) consumer's income, (3) price of related goods (both complementary goods and substitute goods), and expectations of future incomes and prices. Market demand is determined by the above and the number of consumers in the market.

76.3 - Wildlife and Fish Outputs to be Valued

See FSM 1971.52 and FSH 1909.17, Economic and Social Analysis Handbook, sec. 14.1 for general direction on the selection of outputs to be valued.

At the national level, RPA Program and RIM System data collection efforts use 3 wildlife and fish recreational output categories:

Hunting User Days
Fishing User Days
Nonconsumptive User Days

At the Regional and forest levels, however, more specific output categories can be used in economic analysis if authorized by the Regional Forester or Forest supervisor. Examples of these are:

Big Game User Days
Small Game User Days
Nonconsumptive User Days (Primary Nonresidential)
Waterfowl User Days
Upland Game User Days
Anadromous Fish User Days
Anadromous Fish Commercial Harvest
Resident Cold Water Fish User Days
Furbearer Harvest
Resident Warmwater User Days

76.31 - Estimating Values of Current and Future Outputs

Projects involving the protection or restoration of threatened, endangered, and sensitive species are generally not valued for outputs produced (FSH 1909.17, Economic and Social Analysis Handbook, sec. 14.1). An exception to this could be cases where the projects result in an increase in nonconsumptive user days.

76.31a - Exclusions from Measure of Value

Do not include the following items in the measure of value:

1. The impact on the economy resulting from production processes. This is impact analysis (FSM 1972).

2. The participation costs of a recreation activity. This is part of expenditure analysis.

3. The value of the uniqueness of a species.

76.31b - Exclusions from Measures of Value at the Project Planning Level

1. Any option, existence or bequest values.

2. Nonconsumptive use that is secondary or residential.

76.4 - Demand Estimates for Wildlife and Fish

Estimates of demand in an economic sense are not practical for recreation related wildlife and fish. This is because insufficient market data exist to estimate current demand functions and current and future demand determinants are unknown. Since demand and price schedules are unknown, point estimates are used in the Forest Planning process. The Forest Plan, therefore, is often the best source of point estimates. These point estimates of demand can be developed by projecting historical data using Forest and Rangeland Renewable Resources Planning Act (RPA) trend assumptions. The following two sections show a procedure for projecting both animal numbers and recreation use.

76.41 - Estimating Animal Numbers

Sources of data on animal numbers include reports of individual states, habitat capability models, and the RPA Assessment. Exhibit 01 displays indexed future projections of game populations for various years by species and Regions as they appear in the RPA document. In using the Assessment document, exercise judgement in applying these regional data to project level situations.

As an example of how this RPA data might be used, multiply estimated current population numbers by the RPA index number for the appropriate year, species, and Region to arrive at a future estimate of animal numbers.

Using data from exhibit 01 assume that the population data on a management area shows that the population is 16,150 Deer. The RPA Index for the Rocky Mountain Region is 114 in 1995 using 1985 as a base year with an index value of 100. Interpolating the index numbers between 1985 and 1995, the index number for 1990 would result in the index number of 107. The increase in the index between 1990 and 1995 is 1.14/1.07 = 1.065 or 6.5%. Therefore, 16,150 x 1.14/1.07 = 17,206 which are the projected animal numbers for this area in 1995.

76.41 - Exhibit 01

Indexed projections in big game populations by region (Base = 1985 = 100), with number of states contributing to regional mean shown in parentheses.

Region Species	1995	2040
North		
Wild Turkey	153 (8)	214 (7)
White-Tailed Deer	102 (9)	97 (7)
Black Bear	109 (5)	107 (5)
South		
Wild Turkey	128 (7)	122 (5)
White-Tailed Deer	114 (9)	111 (8)
Black Bear	133 (4)	150 (3)
Rocky Mountain		
Wild Turkey	203 (5)	208 (5)
Deer	114 (11)	115 (10)
El	125 (8)	144 (7)
Pronghorn	101 (10)	115 (9)
Black Bear	06 (5)	105 (5)
Pacific Coast		
Wild Turkey	198 (2)	198 (2)
Deer	99 (3)	100 (4)
Elk	110 (1)	107 (2)
Pronghorn	100 (1)	100 (2)
Black Bear	120 (1)	110 (2)

76.42 - Estimating Future Recreation Use

Future recreational use estimates can be derived using indexes in Tables 35 and 36 on pages 66 and 67 of the 1989-2040 RPA Assessment Report. Basic use data are available from the Recreation Information Management (RIM) System and may be available from state and local sources.

For example, using the indexes and data from RIM to represent the mid-1980's, project future big game hunting use in the Eastern Region (R-9, Eastern Region, is shown as North Region in Table 36);

Years	Mid-1980	1990	2000	2010	2040
RPA Index	100	106	112	117	131
RIM use or projection in RVD or WFUDs	1,225,000	1,298,500	1,372,000	1,433,250	1,604,750

76.5 - Price Estimates and Measures for Wildlife and Fish Recreational Use

Wildlife and Fisheries prices have been developed for two of the three accounting stances used for resource output pricing in the 1990 Resources Planning Act (RPA) Program and in FSH 1909.17, Economic and Social Analysis Handbook, sec.14.51. These accounting stances are identified as Market Clearing and Willingness-to-Pay (in RPA Willingness-to-Pay is referred to as Market Clearing + Consumer Surplus). A third accounting stance, receipts, does not generally apply to wildlife and fisheries resources on National Forests.

Prices for hunting, fishing, and nonconsumptive use are shown in Exhibits 01, 02, and 03. These are taken from the Recommended 1990 RPA Program document. All prices are presented in first quarter 1989 constant dollars. In addition Exhibit 4 shows prices for more detailed categories of hunting and fishing, that is, big game hunting, coldwater fishing, and so forth. These are taken from an RPA publication Resource Pricing and Valuation Procedures for the Recommended 1990 RPA Program. Prices are presented in terms of activity days and wildlife and fish user days (WFUDs).

An activity day price represents the average price associated with the average amount of time people spend during a 24-hour period pursuing a particular activity. The duration of an activity day varies depending on the activity. The primary

advantage of an activity day value is that it represents an average of the time people actually spend in an activity. Its disadvantage comes in comparing the value of different activities of varying durations.

A WFUD price is the price for 12 hours of a given activity. A WFUD can represent an aggregation of more that one trip or a trip can include more than one WFUD. The primary advantage of a WFUD is in comparing different activities because each activity is aggregated into a standard 12-hour time period. However, the disadvantage of the WFUD comes from the fact that people do not typically spend recreational time in 12-hour units. This tends to give the appearance of artificially high values if the reasons behind this measure are not understood.

76.5 - Exhibit 01

1990 RPA Hunting Prices by Forest Service Region
in 1989 Constant Dollars

	Market Clearing Prices		Willingness to Pay Price	
Region	Per Activity Day	Per WFUD	Per Activity Day	Per WFUD
1	22.42	48.05	40.77	87.36
2	28.50	51.83	51.83	94.22
3	20.09	38.28	36.53	69.59
4	21.96	39.93	39.93	72.59
5	19.63	33.16	35.68	60.30
6	21.49	35.33	39.08	64.24
8	16.35	33.27	29.74	60.48
9	21.02	45.05	38.22	81.91
10	28.41	54.98	51.64	99.96

76.5 - Exhibit 02

1990 RPA Fishing Prices by Forest Service Region
in 1989 Constant Dollars

	Market Clearing Prices		Willingness to Pay Price	
Region	Per Activity Day	Per WFUD	Per Activity Day	Per WFUD
1	19.05	67.58	34.64	122.88
2	21.51	54.91	37.69	99.84
3	24.09	73.96	43.81	134.47
4	19.05	53.23	34.64	96.78
5	22.98	63.31	41.77	115.12
6	27.45	76.76	49.92	139.57
8	24.09	65.56	43.81	119.19
9	25.21	76.20	45.84	138.55
10	18.48	36.96	33.60	67.19

76.5 - Exhibit 03

1990 RPA Nonconsumptive Use Prices by Forest Service Regions
in 1989 Constant Dollars

	Market Clearing Prices		Willingness to Pay Price	
Region	Per Activity Day	Per WFUD	Per Activity Day	Per WFUD
1	13.72	42.21	24.93	76.74
2	14.74	46.16	27.25	83.93
3	11.92	29.09	21.66	52.89
4	17.64	54.35	32.09	98.83
5	19.51	72.66	35.54	132.11
6	14.34	38.79	26.06	70.52
8	12.48	39.26	22.70	71.39
9	10.84	43.60	19.65	79.27
10	5.86	16.73	10.65	30.42

76.5 - Exhibit 04

1990 RPA Hunting and Fishing Prices by Category
(1989 dollars)

BIG GAME

	Market Clearing		Market Clear + CS	
Region	Activity Day	WFUD	Activity Day	WFUD
1	24	47	42	85
2	30	52	55	94
3	23	37	41	68
4	24	39	42	72
5	23	34	41	61
6	23	35	41	63
8	18	33	34	59
9	28	50	51	91
10	28	55	52	100

SMALL GAME

1	10	29	17	53
2	12	37	22	68
3	10	31	18	57
4	11	30	20	54
5	10	31	18	56
6	10	31	17	56
8	13	34	24	62
9	12	34	22	61
10	10	27	17	49

UPLAND GAME

1	18	50	34	90
2	13	39	24	72
3	12	38	22	69
4	15	41	27	74
5	14	50	26	90
6	18	51	34	93
8	12	30	22	54
9	14	39	26	72
10	18	51	34	93

76.5 - Exhibit 04--Continued

WATERFOWL

	Market Clearing		Market Clear + CS	
Region	Activity Day	WFUD	Activity Day	WFUD
1	18	57	34	105
2	18	57	34	105
3	17	61	33	110
4	17	69	31	126
5	17	41	31	76
6	18	49	34	89
8	18	53	34	98
9	18	48	34	87
10	18	52	34	94

COLDWATER FISHING

1	19	57	35	104
2	21	59	38	106
3	25	77	46	141
4	19	53	35	96
5	23	63	42	115
6	27	77	50	140
8	15	40	27	74
9	28	85	51	154
10	18	37	34	67

WARMWATER FISHING

1	14	43	26	78
2	15	44	28	80
3	16	50	29	90
4	14	40	26	73
5	22	60	39	107
6	14	40	26	73
8	27	75	50	137
9	24	72	43	130
10	18	37	34	67