Bioeconomics
Executive Summary

Montana Department of Fish, Wildlife & Parks

BIOECONOMICS PROJECT
OBJECTIVES

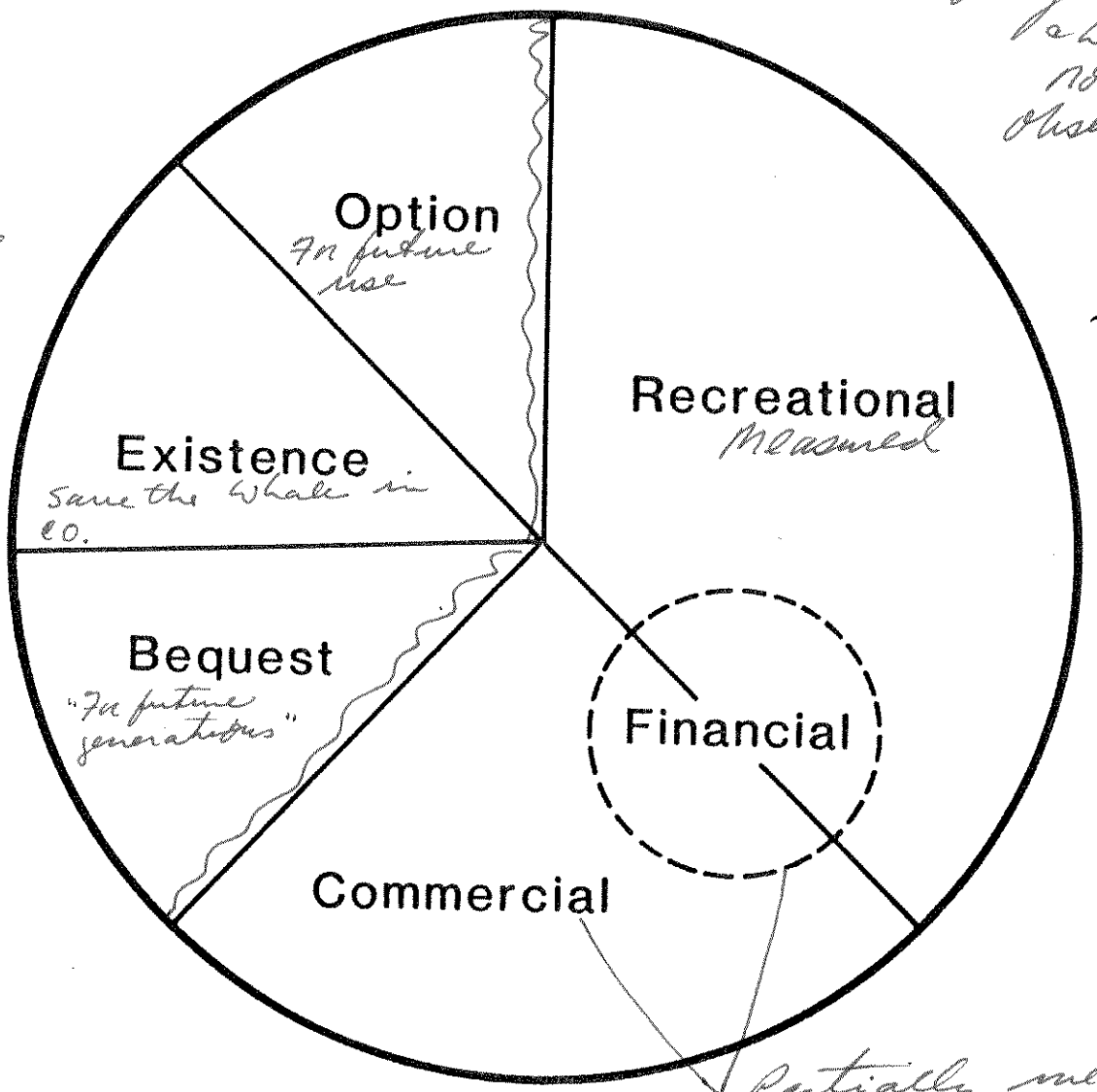
- Develop baseline economic values for:
    1. Stream and Lake Fishing
    2. Elk, Deer and Antelope Hunting

- Assess the preferences and attitudes of trout stream fishermen and elk hunters.
    1. Segment the users into groups to evaluate how they:
        A. View different management alternatives.
        B. How value and use might be affected by each segment.

Total Economic Value of Wildlife & Fisheries Resources

Usually measured
Total value
only value to fishers
& hunters -
not hiking,
observation, etc.

Not measured



Partially measured via expenditures
Willingness & monetary opportunity cost

used by fed agencies - but numbers are questionable so good

ECONOMIC VALUATION
CONCEPTS AND TECHNIQUES

- 1. DEFINITION OF BENEFITS: ECONOMIC VALUE MEASURED AS WILLINGNESS TO PAY

- 2. MEASUREMENT TECHNIQUES
  - A. Travel Cost Method
  - B. Contingent Valuation Method

- Both the Definition of Benefits and the Measurement Techniques are Approved for Use by Federal Agencies.

Types of Recreation Economic Values

Forest Service: Fregplan R.P.A.

1. Value to recreationists and the nation
   a) Net willingness to pay: N.E.V. ≤ * what you would be willing to pay over and above actual expenditure

2. Value to local community
   a) Actual expenditure
   b) Convert to income and employment
   c) Transfer from one region to another

Implan (Input/Output model)

* Willing and ABLE to pay

Definitions of Economic Terms

Net Economic Value

Net Economic Value is the additional amount a hunter or fisherman would be willing to pay over and above what he/she actually pays.

- This value is a benefit to the user.

Expenditures

Actual out of pocket costs (i.e. transportation costs, lodging, food, guiding fees, etc) associated with a fishing or hunting trip.

- Expenditures are costs to the user.

USES OF NET ECONOMIC VALUES:

- 1. used by the federal government in benfit/cost analysis.

- 2. the basis of the Forest Services RPA values for forest planning.

- 3. the measure of value for all outputs in BLM's rangeland investment analysis.

-- NEV represents the economic value of fisheries or wildlife from an economic efficiency standpoint.

USES OF EXPENDITURE DATA:

- 1. Important from the standpoint of local economies.

- 2. Useful in determining the impact of hunting and fishing on local income and employment.

- 3. Used by the Forest Service in their Implan Model.

Regional Travel Cost Demand Method
(Multi Site Demand Equation)

$$Trips_{ij}/Pop_i = a - b_1 Dist_{ij} + b_2 Subs_{ij} + b_3 Quality_i + b_4 Income_i$$

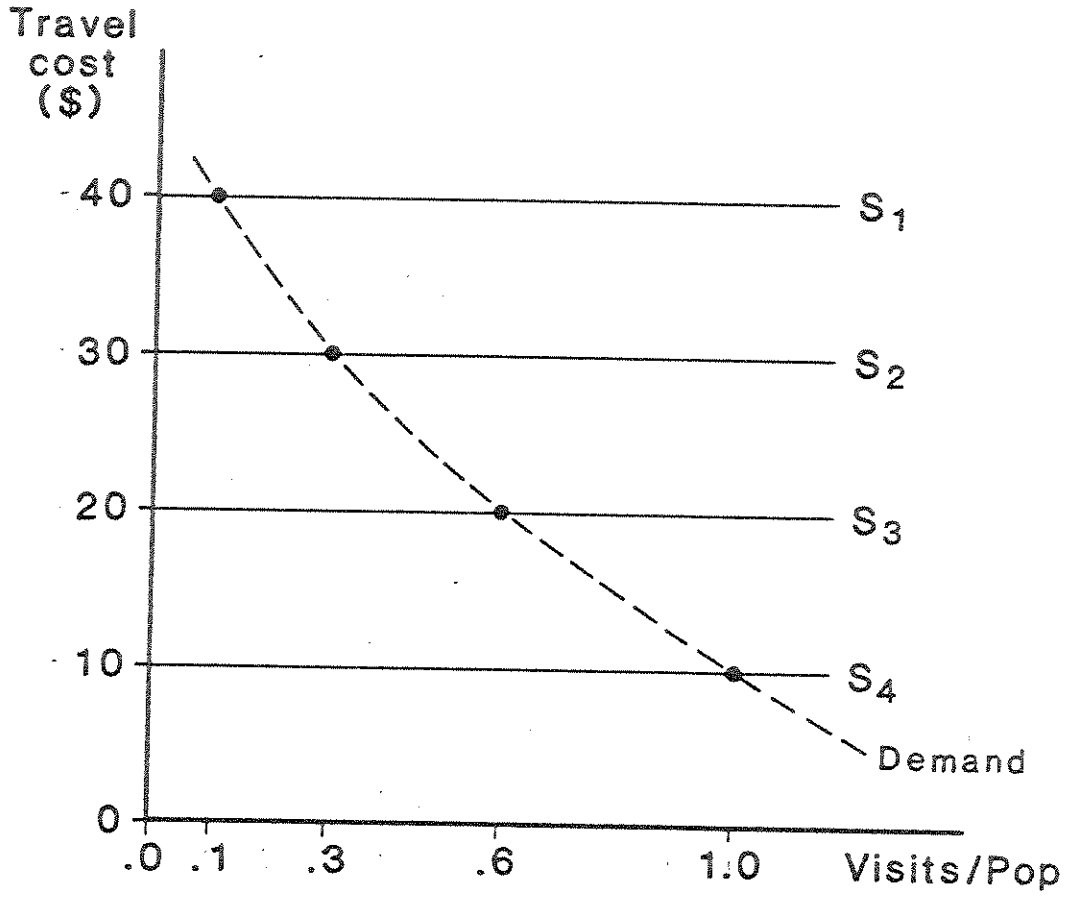
i = recreationist origin, i = 1, 2, 3, ... n

j = recreation site, j = 1, 2, 3, ... n

Subs = price of substitute sites

Quality = a demand shifter such as harvest

Dist = distance or travel cost (price)


Travel cost ($)
40
30
20
10
0
S_1
S_2
S_3
S_4
Demand
.0
.1
.3
.6
1.0
Visits/Pop

CVM process

Duffield

- Survey of individuals
- Confront respondent with hypothetical market
- Record respondent's hypothetical response to market change (e.g., "buy" or not buy at new price)

- Results used to:

  (1) Value changes in quality and/or quantity of recreation available

  (2) Value recreation currently available

THE NET ECONOMIC VALUE OF FISHING IN MONTANA

by

John Duffield, University of Montana
John Loomis, University of California, Davis
Rob Brooks, Montana Dept. of Fish, Wildlife and Parks

with Research Assistance Provided by

Joe Holliman, University of Montana
Joe Cooper, University of California, Davis

August, 1987

EXECUTIVE SUMMARY

The objective of this study was to estimate the net economic value (net willingness to pay) of stream and lake anglers in Montana. A regional Travel Cost Model (TCM) was used to statistically derive a demand equation from survey data collected from stream and lake anglers during the fall of 1985.

The regional TCM approach is recommended by the Water Resources Council (1979, 1983) and the U.S. Department of Interior (1986) as one of the two preferred techniques for estimating recreational benefits. In addition, a number of Federal agencies are required by the Water Resource Council and U.S. Department of Interior to use the concept of net economic value when evaluating Federal agency actions.

The TCM method uses the distance traveled as a measure of price and the number of trips taken from a given origin to a particular site as a measure of quality to trace out a demand curve for the recreation site. The resulting demand equation is used to calculate the additional amount anglers would be willing to pay, over and above their travel costs, to have the opportunity to fish at the site in question.

The state average net economic value for lake fishing is $89 per trip. For streams, the value is $113 per trip. This means an angler would be willing to pay $89 and $113 more per trip to have the opportunity to fish lakes or streams, respectively. On a per-day basis, the net economic value for lake fishing is $70 and $102 for stream fishing. Converting these values to a Forest

Service Recreation Visitor Day (RUD) yields a value of $280 for stream fishing and $342 for lake fishing. The annual aggregate value of Montana's stream and lake fishing is $122 million and $93 million, respectively. Net economic values are also derived on a site-specific basis.

Angler expenditure data collected in the same survey indicates a typical resident angler spent $48 per trip and a typical nonresident angler spent $360 per trip in Montana. Overall, a typical angler fishing in Montana spent $91.60 per trip.

The net economic values presented in this paper are the appropriate values to use in benefit/cost analysis or where economic efficiency decisions (i.e. forest or range planning) are being made. If the annual values of stream and lake fishing are put into net present value, they can be used in trade-off analysis with marketed resources such as timber, coal, or grazing. For example, the present value of the net willingness to pay values for stream fishing are conceptually comparable to stumpage prices.

NET ECONOMIC VALUE OF COLDWATER LAKE FISHING

NET WILLINGNESS TO PAY

Per Trip	$88.79
Per Angler Day	$69.61
Per 12 hour RVD/WFUD	$342.34

Table 17. Average angler expenditure per trip, Montana lakes (1985 dollars).

ITEM	MEAN ALL	RESIDENTS	NONRESIDENTS
TRANSPORTATION	26.85	19.09	68.40
LODGING FEES	12.36	8.69	31.97
FOOD-RESTAURANT	10.90	5.84	37.97
FOOD-STORES	31.82	22.40	82.22
TACKLE	5.13	3.72	12.65
GUIDE	.04	.05	.00
OTHER	4.81	2.75	15.84
TOTAL	91.90	62.54	249.05
ROUND TRIP DISTANCE (MILES)	241	167	640
SAMPLE SIZE	648	546	102

NET ECONOMIC VALUE OF STREAM FISHING

NET WILLINGNESS TO PAY

Per Trip	$117.65
Per Angler Day	$102.56
Per 12 Hour WFUD/RVD	$280.35

Table 16. Average angler expenditure per trip, Montana Stream (1985 dollars).

ITEM	MEAN ALL	RESIDENT	NONRESIDENT
TRANSPORTATION	31.64	13.05	166.51
LODGING FEES	14.66	1.13	112.81
FOOD-RESTAURANT	15.84	4.92	95.10
FOOD-STORES	19.68	11.31	80.39
TACKLE	8.23	2.72	48.23
GUIDE	3.47	2.20	12.66
OTHER	3.24	.82	20.77
TOTAL	96.74	36.15	536.47
ROUND TRIP DISTANCE (MILES)	289	119	1521
SAMPLE SIZE	611	537	74

Angler Preference Study
Final Economics Report

CONTINGENT VALUATION OF MONTANA TROUT FISHING

BY RIVER AND ANGLER SUBGROUP

John Duffield
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University of Montana

Stewart Allen
Department of Wildland Recreation
University of Idaho

With Research Assistance by
Joe Holliman
University of Montana

March 1988

EXECUTIVE SUMMARY

OBJECTIVES

The major objective of this study was to provide contingent valuation estimates of net economic values for trout fishing on nineteen Montana rivers. A secondary objective was to estimate the net value associated with changes in fishery quality. Specifically, angler net willingness to pay was estimated for improved chances to catch larger trout and improved chances to catch more trout. The general approach to both of these objectives was to estimate economic models of demand for recreation opportunities. A related third objective was to explore the issue of market definition, in this case the types of recreation experience. Fishing, or even more narrowly trout fishing on Montana rivers, is an activity with many different styles, settings, technologies and purposes. Because of this, the fishing experience varies considerably from one angler to the next. By defining different angler types, it is possible to show how net economic values vary across user groups.

This study is based on the Angler Preference Survey administered by the Montana Department of Fish, Wildlife and Parks in the summer and fall of 1986. A description and analysis of survey findings with respect to angler characteristics, preferences, behavior and attitudes is provided in a companion study by Allen

(1987). The latter includes a discussion of angler perception of river and fisheries management policies.

METHODS

Net economic values are defined here as net willingness to pay. The latter is the net difference between the maximum an individual would be willing to pay before foregoing the use of a resource or commodity and the amount they must actually pay. Many federal agencies are required by the U.S. Water Resource Council Principles and Guidelines to use the net willingness to pay concept to measure the economic value of both marketed and nonmarket goods.

The basic approach used to estimate net economic values was the contingent valuation method (CVM). This is one of two basic methods that are recommended by the Water Resources Council for valuing recreation. (The other is the travel cost model.) The CVM method uses survey techniques to ask people about the values they would place on nonmarket commodities if markets did exist. Two specific versions of the CVM method were employed: open-ended and dichotomous choice. In the open-ended CVM approach individuals were asked "What is the maximum increase in your actual trip cost you would have paid to fish the (name of river fished) instead of having to fish elsewhere_____(dollars)?" In the dichotomous choice approach, individuals were asked "...would

you still have made the trip if your share of expenses had been (dollar bid amount) more? ___yes ___no". In the latter, the bid amount was randomly varied from $1 to $500 and respondents indicated a yes or no response. Similar questions were developed to identify net economic values for doubled chances of catching large trout or more trout.

The analysis of the open-ended CVM is fairly simple; one merely calculates the mean of the dollar responses. One problem with this method is in interpreting extreme values: either zero response or very high values. Another problem is that respondents may find it a difficult question to answer. By contrast, the dichotomous choice question requires only a yes or no to a given dollar amount. The disadvantage of the dichotomous choice approach is that a fairly complex analysis is required in order to determine net willingness to pay. Basically, the data is used to estimate how the probability of a "yes" response varies with the bid amount and other explanatory variables such as income. The analysis reported below assumed a standard logistic probability distribution function; accordingly the specific dichotomous choice model estimated here is conventionally referred to as a logit model. The mean net willingness to pay is derived by integrating the logit function from zero to the upper limit of sample bids (in this case $500).

The basic method used to determine angler types was a cluster

analysis. The survey included a list of 17 possible reasons for fishing a specific river on the angler's most recent trip. The reasons include "to catch large trout", "to catch many trout", "to be with my family", "to experience solitude", etc. The respondent ranked the reasons on a four interval scale from "very important" to "not at all important". The cluster analysis is a multivariate statistical technique; here it was used to identify the most distinct subgroups of anglers based on their reasons for fishing.

DATA

The data for this analysis was based on a sample of resident and nonresident license holders. A total of 2672 questionnaires were mailed in the summer and fall of 1986. A total of 2171 completed questionnaires were received or a response rate of 81 percent. This is a very high response rate for a mail survey and indicates that trout anglers have a keen interest in Montana fisheries.

RESULTS

The cluster analysis is reported in detail in Allen (1987). The cluster analysis showed that the most clearly defined subgroupings were with four angler types. The groups included two generalist types, an occasional angler group and a specialist group. Members of the specialist groups are twice as likely to

be fly fishermen compared to the other three groups (60 percent versus 30 percent) and have higher income levels. Occasional fishermen are twice as likely to catch no fish as the other groups and fish one-third as much. The two generalist types differ mainly in that one is more oriented toward the outdoors and solitude while the other is more oriented toward the fishing itself.

Logit functions were estimated for each cluster (angler group) and separately for each river. In general the probability of a "yes" response was found to be significantly correlated to the standard economic demand variables (price (bid), income, quantity (number of trips and days fished per trip), measures of taste and preference (reasons for fishing, how much the angler prefers fishing to other activities, etc.) and measures of angler success (number of trout caught). In addition, the sign of the estimated coefficients were generally consistent with the economic theory of demand. For example, the higher the income level of the respondent, the more likely a "yes" response to a given bid level. The high significance level of the estimated parameters, the large number of significant variables and the theoretical consistency of the signs indicate the logit model provides a good specification for the dichotomous choice responses. In general, the river specific sample sizes were around 100 to 150 respondents. However, functions could not be estimated on several rivers due to limited samples.

The estimated net economic values varied dramatically across cluster group for the logit analysis. As one might expect, mean value per trip increases the more specialized and committed to the sport the angler is. For example, with respect to mean values for the current trip, the occasional user has a net value per trip of only $7.56, while the generalist groups are at $91.03 and $117.07 and the specialist group has a value of $170.28.

The open-ended CVM responses also show large differences across clusters. However, the open-ended CVM analysis was not particularly successful in that 40 to 45 percent of all respondents indicated a zero willingness to pay. It was found that many individuals who said they would pay "zero" on the open-ended CVM in fact responded "yes" when faced with a specific amount in the logit portion of the survey. One possible interpretation is that the open-ended CVM has not successfully elicited responses for a large subsample of survey respondents. This may be in part because of the difficulty of answering the open-ended question. Because of these problems, not much credibility can be placed on the open-ended estimates.

The logit estimates also varied considerably across rivers, from $58 per trip on the Bitterroot to $228 on the Madison. The mean net economic value per trip averaged across 17 rivers is $117. A limitation of the analysis is that on several rivers, the highest

bid asked (generally $500) was not sufficiently high to identify the point where the probability of a "yes" response is driven down to near zero. This was especially a problem on the Big Hole, Beaverhead and Gallatin, where a high proportion of respondents were willing to pay even the highest bid asked. This problem was compounded in several cases by the limited sample size.

Logit values were also calculated for angler net willingness to pay for changes in fishery quality. One finding was that anglers were willing to pay significantly more for doubled chances of catching large trout on 60 percent of the sample rivers. By contrast, anglers were willing to pay significantly more for doubled catch on only around 15 percent of the rivers.

In order to validate the logit estimates, they were compared to results of a travel cost model of Montana stream fishing (Duffield, Brooks, and Loomis, 1987). The data base for the latter study was derived from a 1985 survey of Montana anglers. The travel cost model uses observations of travel distance (and costs) as a measure of price and actual observed recreation trips as a measure of quantity to statistically trace out a demand equation. The travel cost model estimate of net economic value per trip (for the same set of 17 rivers used in the logit analysis) is $122 based on angler reported travel costs. This is almost identical to the logit mean estimate of $127. There is

also considerable agreement on site specific values in the two separate studies. The Pearson product-moment correlation coefficient for the sample of 17 rivers is .73; this indicates that the logit and travel cost model values for these sites are highly and positively correlated. Similarly, a relatively high value for the nonparametric Spearman's correlation coefficient (.73) indicates that the two methods tend to provide a consistent ranking of sites according to net value per trip.

It would appear that the consistency of site level results provide a measure of validation for both the travel cost model and the logit CVM results. The similarity of estimates is remarkable given the very different methods and the separate data bases employed.

The net economic values presented in this paper are the appropriate values to use in benefit/cost analysis or where economic efficiency decisions (i.e., forest planning) are being made. The values per trip can be converted to net present values that can be used in trade-off analysis with marketed resources, such as timber, coal or grazing. The net economic values presented here are limited to the direct use values associated with Montana stream fishing resources. Accordingly, these net economic values are an underestimate of the total value associated with this resource, since indirect values (existence, bequest and option uses) have not been estimated.

MONTANA BIOECONOMICS STUDY

RESULTS OF THE ANGLER PREFERENCE SURVEY

DRAFT

Prepared for

Montana Department of Fish, Wildlife and Parks

By

Stewart Allen, Ph.D.

October 15, 1987

INTRODUCTION

This draft report summarizes the results of the Angler Preference survey conducted in summer and fall, 1986. It is a companion paper to the economic findings reported by Duffield (1987). The Angler Preference Study had four main goals:

1. To clearly specify the products (trout fishing opportunities) for which economic values are being estimated;

2. To fine-tune the economic estimates of recreational value by identifying subgroups of trout anglers and calculating estimates separately for each group;

3. To learn more about the people who fish for trout on 19 Montana rivers and streams, including where they're from, why they're fishing that particular river, and what they consider to be comparable places to fish. This information can serve as baseline data for future studies;

4. To learn about anglers' perceptions of possible recreational conflicts or management problems and to measure their attitudes toward potential river and fisheries management programs. Fisheries managers can use this information to review existing management policies.

THE NET ECONOMIC VALUE OF ELK HUNTING IN MONTANA

John Duffield
University of Montana

with Research Assistance Provided by
Joe Holliman, University of Montana

February 1988

Report to Montana Department of
Fish, Wildlife and Parks

EXECUTIVE SUMMARY

The objective of this study was to estimate the net economic value (net willingness to pay) of elk hunters in Montana for the 1985 hunting season. A regional travel cost model (TCM) was used to statistically estimate an elk hunting demand equation from survey data.

The regional TCM approach is recommended by the U.S. Water Resources Council as one of the two preferred techniques for estimating recreational benefits. In addition, a number of federal agencies are required by the Water Resource Council Principles and Guidelines to use the concept of net economic value when evaluating federal agency actions.

The TCM method uses the distance traveled as a measure of price and the number of trips taken from a given origin to a particular site as a measure of quantity. The resulting demand equation is used to calculate the additional amount hunters would be willing to pay, over and above their travel costs, to have the opportunity to hunt at the site in question.

The survey data utilized by this study is based on a telephone survey of licensed hunters undertaken by Montana Department of Fish, Wildlife and Parks (DFWP) in January and February of 1986.

Hunters were asked sites visited, species hunted, travel distance, travel expenditures and hunter demographics such as age, income and years hunted. A total of 696 telephone interviews were completed with elk hunters. The 129 elk hunting districts defined in the DFWP hunting regulations were aggregated into 22 specific hunting sites for purposes of this study.

The conversion of distance traveled to a dollar value (travel cost) is accomplished by multiplying travel distance by the reported cost of 42.2 cents per mile. The latter includes both variable out of pocket expenditures per mile and the opportunity cost of travel time. The variable cost of travel of 34.6 cents per mile was derived from regression analysis of hunter reported trip expenditures. The opportunity cost of travel time was based on one-third of the hunter sample hourly wage rate (following Water Resource Council guidelines).

In 1985 there was a 17,000 quota on non-resident Montana combination hunting licenses. This creates a special problem for the TCM method in that a random sample of license holders does not reflect the actual total demand by out of state hunters. A model was developed to predict the number of nonresident elk permits that could have been sold in 1985 in the absence of the quota. Time series data including permits sold and price for 1970 to 1978 (years prior to an effective quota constraint) were utilized. The estimated model predicts that in 1985

approximately 30,000 non-resident licenses could have been sold at then current price of $300.

The TCM demand curve was estimated both on the random sample of licensed hunters and on a corrected sample (including the higher proportion of nonresident hunters that would be observed in the absence of a license quota). The estimated models provided a good fit to the data, with hunting trips per capita a function of distance (travel cost), years hunted and success rates for bull elk at the site hunted. Because the model overpredicts total trips, benefit estimates were based on actual trips taken.

For the random sample of licensed hunters, the state average net economic value for elk hunting is $185 per trip. This means a hunter would be willing to pay $185 more per trip (on average) to have the opportunity to elk hunt a given area. On a per day basis (based on an average of 2.8 days per trip), the net economic value for elk hunting is $66. Utilizing the sample average of 6.3 hours of hunting per day, the U.S. Forest Service 12 hour recreational visitor day (RVD) for Montana elk hunting is $125.

The annual aggregate value of Montana's elk hunting areas is $38 million. This is calculated by multiplying the value per day times the DFWP elk hunting pressure estimate for 1985 of 572,000 hunter days.

The study includes an analysis of the sensitivity of benefit estimates to methodological choices. For example, use of predicted trips in the benefit calculation (rather than actual observed trips) results in net economic values about 65 percent higher than those summarized above. Interestingly, correcting the sample to reflect the full non-resident demand had little effect on net economic values (5 to 8 percent higher than those summarized above).

Study results are also compared to estimates for three other recent elk hunting studies in the Northern Rockies. The most similar study (a TCM model for Idaho) estimated values that are approximately one-half as high as those derived here for Montana.

A secondary objective of this study was to provide data on hunter expenditures. Average expenditure for a Montana elk hunting trip in 1985 was $285. There was a large difference between average resident expenditures ($81) and nonresident expenditures ($1399). Over half of resident expenditures was on transportation, with most of the remainder being for food purchased in stores. Fifty percent of nonresident expenditures were for guiding fees with the remainder evenly split between transportation expenses and food and lodging expenses. It is interesting to note that nonresident trips average 2900 roundtrip miles while residents travel an average of 194 miles. Total estimated expenditure for

Montana elk hunting in 1985 is $58 million.

The net economic values presented in this paper are the appropriate values to use in benefit/cost analysis or where economic efficiency decisions (i.e., forest or range planning) are being made. If the annual values of elk hunting are put into net present value, they can be used in trade-off analysis with marketed resources, such as timber, coal or grazing. The net economic values presented here are limited to the direct use values associated with Montana elk hunting resources. Accordingly, these net economic values are an underestimate of the total value associated with this resource, since indirect values (existence, bequest and option uses) have not been estimated.

THE NET ECONOMIC VALUE OF DEER HUNTING IN MONTANA

by

Rob Brooks

Montana Department of Fish, Wildlife and Parks

February, 1988

EXECUTIVE SUMMARY

The objective of this study was to estimate the net economic value (net willingness to pay) for deer hunting in Montana. A regional Travel Cost Model (TCM) was used to statistically derive a demand equation from survey data collected from hunters during the spring of 1986.

The regional TCM approach is recommended by the Water Resources Council (1979, 1983) as one of the two preferred techniques for estimating recreational benefits. In addition, a number of Federal agencies are required by the Water Resource Council Principles and Guidelines (1983) to use the concept of net economic value when evaluating Federal agency actions.

The TCM method uses the distance traveled as a measure of price and the number of trips taken from a given origin to a particular site as a measure of quantity. The resulting "demand equation" is used to calculate the additional amount deer hunters would be willing to pay, over and above their travel costs, to have the opportunity to hunt at the site being investigated.

The conversion of distance traveled to a dollar value is accomplished by multiplying travel distance by a cost per mile figure. Two cost per mile values were calculated and used in this study. The cost per mile figure calculated from the angler survey (i.e., reported cost basis) more closely represents the actual cost associated with recreational vehicles used during hunting season and the driving conditions during that time. The

net economic values, estimated using the reported cost basis, reflect the value of deer hunting in Montana.

The state average net economic value for deer hunting is $10 per trip. As mentioned above, this means hunters would be willing to pay $10 more per trip than they actually do to be able to hunt at a given site. The net economic value across sites varies considerably, due, in part, to a large number of factors, both actual and perceived. The net willingness to pay per hunter day is $55. Converting this value to a Forest Service WFUD (Wildlife-fish User Day) yields $102. These benefit estimates are based on a double log regression model, using the actual number of trips from the sample.

Expenditure data from the survey shows that, in 1985, resident deer hunters spent $55 per trip or $31 per day. Nonresidents, in contrast, spent $542 per trip or $86 per day.

The net economic values presented in this paper are the appropriate values to use in benefit/cost analysis or economic efficiency decisions (i.e., forest or range planning). If the annual values of stream and lake fishing are converted into net present value, they can be used in trade-off analysis with marketed resources, such as timber, coal or grazing.

THE NET ECONOMIC VALUE OF ANTELOPE HUNTING IN MONTANA

Dr. John Loomis, Assistant Professor
Division of Environmental Studies
Department of Agricultural Economics

and

Joseph Cooper, Graduate Research Assistant
Department of Agricultural Economics

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EXECUTIVE SUMMARY

The net willingness to pay of antelope hunters in Montana was estimated using a multi-site regional Travel Cost Method (TCM). Data for the Travel Cost Method came from 1985 survey of Montana antelope hunters.

In a departure from the usual TCM, which estimates the average value per trip, the average value per antelope hunting permit is estimated instead. The TCM demand curve indicates that antelope hunting applications are positively related to success rate and income and negatively related to travel distance.

For Montana antelope hunting, the state's average value was $143 per permit. This means a hunter would be willing to pay, on average, $143 more per permit so as to have the opportunity to hunt the specific antelope unit they applied for. The net willingness to pay per hunter day is $62. The value per U.S.F.S. 12 hour Recreation Visitor Day is $135. The net economic value of antelope hunting under the existing lottery is $6 million dollars annually. Net economic values for per permit for hunting antelope in Region 3 is $133 per permit, $112 per permit in Region 4, $139 per permit in Region 5, $162 per permit in Region 6 and $170.30 in Region 7.

Expenditures of Montana antelope hunters average $114 per trip. This represents spending of $49.63 per hunter day or $108 per 12 hour Recreation Visitor Day. Transportation represented the major cost item for residents, but hunting fees represented the largest component for nonresidents.

MONTANA BIOECONOMICS STUDY

RESULTS OF THE HUNTER PREFERENCE SURVEY

DRAFT

Prepared for

Montana Department of Fish, Wildlife and Parks

By

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March 15, 1988

INTRODUCTION

The main goal of the Montana Bioeconomics Study was to estimate the economic value of elk hunting trips in Montana using travel cost and contingent valuation methods. This draft report summarizes the results of the Hunter Preference survey conducted during fall, 1986. It is a companion paper to the economic findings reported by Loomis (1987). The Hunter Preference Study had three objectives:

1. To clearly specify the products (elk hunting opportunities) for which economic values were estimated;

2. To learn more about elk hunters in Montana, such as where they were from, why they were hunting, what type of experiences they had on their most recent trip, and how they viewed existing and potential hunting management actions;

3. To identify subgroups of elk hunters, or hunter "types" who obtain similar benefits from elk hunting and should have similar perceptions of the trip's economic value.

This has been called the Hunter Preference Survey, but we really studied a full range of hunters' attitudes, beliefs, intentions, and behaviors. The next section reviews some of the applicable literature on hunting.

Montana Department of Fish, Wildlife & Parks

BIOECONOMICS PROJECT

Executive Briefing

Montana Student Union Building (SUB) Ballroom B

April 5, 1988

1:00-1:20	Overview and Study Objectives	Pat Graham/ Arnold Olsen
1:20-1:30	Study Methods and Definitions	John Loomis
1:30-1:50	Lake Angler Baseline (Net Value and Expenditures)	John Loomis
1:50-2:10	Stream Angler Baseline (Net Value and Expenditures)	John Duffield
2:10-2:30	Stream Angler Preference Economics	John Duffield
2:30-2:45	Questions and Answers	
2:45-3:00	Break	
3:00-3:30	Hunter Baseline Economics Deer, Antelope and Elk (Net Value and Expenditures)	Rob Brooks
3:30-3:50	Elk Hunter Preference Economics	John Loomis
3:50-4:30	Panel Discussion	
4:30-5:00	Questions and Closing Remarks	Graham/Olsen

start 1pm - Rob + Pam

BLM Forest Service invited

Montana Department of Fish, Wildlife & Parks

BIOECONOMICS PROJECT

Technical Presentation

Montana State University

Student Union Building (SUB) Ballroom B

April 6, 1988

8:00-8:30	Overview and Study Objectives Use in fisheries and wildlife management Uses in land management planning	Pat Graham Arnold Olson
8:30-9:00	Study Methods and Definitions Net WTP and Expenditures	John Loomis
9:00-9:15	Coffee Break	
9:15-10:00	Stream Angler Preference	Stewart Allen
10:00-10:15	Contingent Valuation Method	John Duffield
10:15-11:00	Stream Angler Preference Economics using Contingent Valuation	John Duffield
11:00-11:15	Break	
11:15-11:30	Travel Cost Method	John Loomis
11:30-11:45	Lake Angler Baseline Economics (Net WTP and Expenditures)	John Loomis
11:45-12:15	Stream Angler Baseline Economics (Unique and Trib. Waters) (Net WTP and Expenditures)	John Duffield
12:15-1:15	Lunch (On your own)	
1:15-1:45	Elk Hunter Preference	Stewart Allen

1:45-2:30	Elk Hunter Preference Economics	John Loomis
2:30-2:45	Break	
2:45-3:45	Hunter Baseline Economics (Elk, Deer, Antelope) (Net WTP and Expenditures)	Rob Brooks
3:45-4:00	Break	
4:00-4:30	Application of methods to Gallatin National Forest	John Loomis
4:30-5:00	Closing Remarks (Publications, etc.)	Graham/Olson