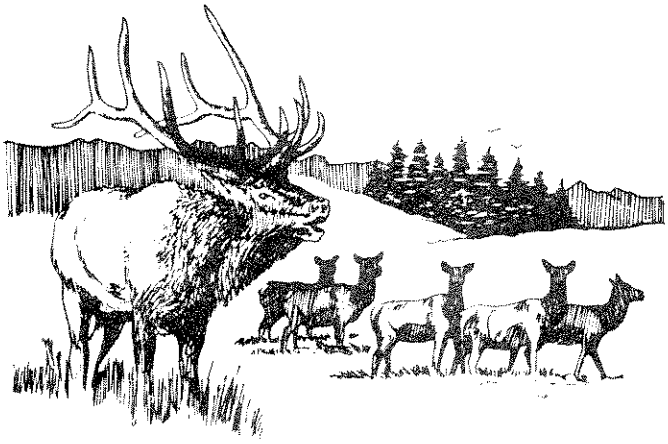
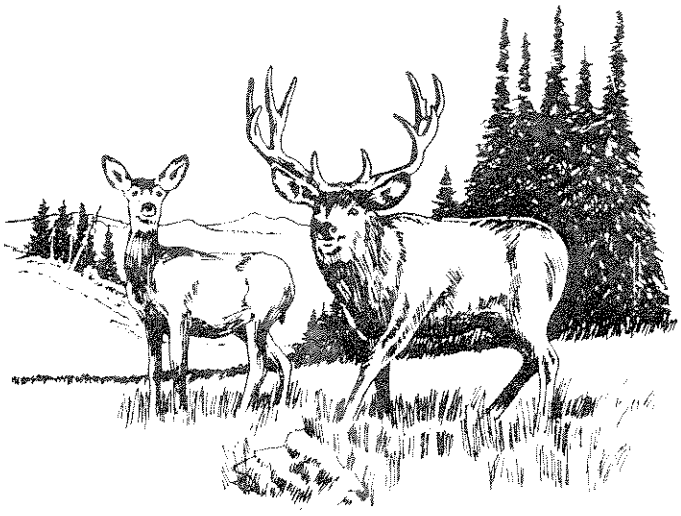
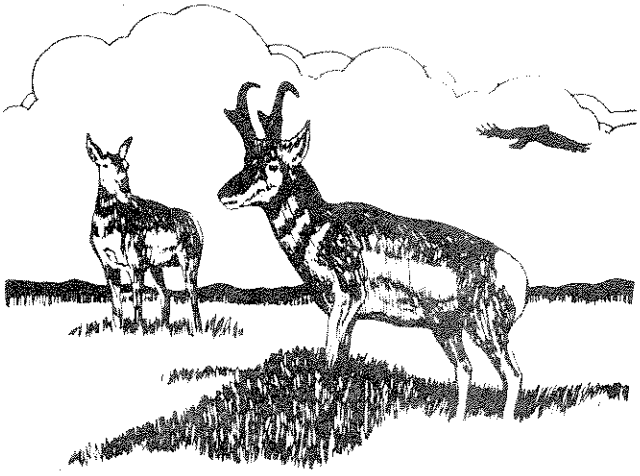
F-E-6

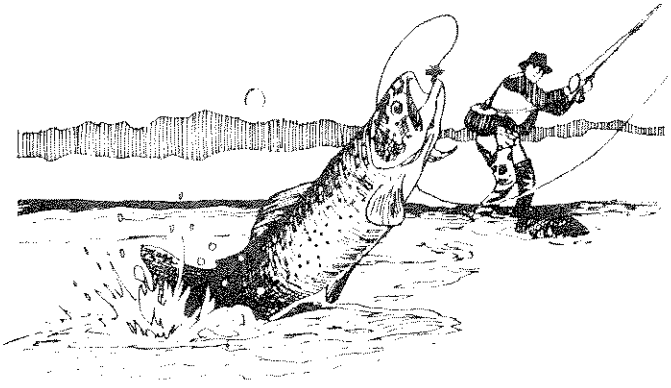
ref# 85212
Rep#

EXECUTIVE SUMMARIES









ON COMMON GROUND

The Economic Value of Hunting and Fishing in Montana

Montana Department of Fish, Wildlife & Parks

FISHING

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.

ELK HUNTING

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.

DEER HUNTING

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 $108 per trip. As mentioned above, this means hunters would be willing to pay $108 more per trip than they actually do to be able to hunt at a given site. 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 values presented here are limited to the direct use values associated with Montana deer hunting resources. Accordingly, these net economic values underestimate the total value associated with this resource, since indirect values (existence, bequest and option uses) have not been estimated.

ANTELOPE HUNTING

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 components for nonresidents.