Final Report

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The Economic Impacts of Hunting, Fishing and Wildlife Watching in Colorado

Prepared for

Colorado Division of Wildlife

Prepared by

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Executive Summary

Background

In 1988, the Colorado Division of Wildlife (CDOW) selected BBC Research & Consulting (BBC) to build a model that estimated the economic effects of hunting and fishing in Colorado. The Division used and maintained this model, and provided periodic updates of economic effects as new information became available. State and local government officials and CDOW personnel regularly used the model's results to help them educate the public, consider policy choices and allocate resources.

CDOW personnel last updated the model in 1997. However, updating became increasingly difficult due to the lack of staff familiarity with the model's software, changes in Game Management Units, the addition of Broomfield County and the availability of new hunting, fishing and wildlife watching survey data. In 2003, the Policy and Regulations Section of CDOW contracted with BBC to assess the feasibility, options and benefits of updating CDOW's economic impact model and to develop a course of action for such an update. BBC began updating the model in late 2003 and completed the update in October 2004.

Objectives

CDOW specified several objectives for this update.

- Work with CDOW personnel to integrate the most recently available information and refine working assumptions;
- Provide statewide and individual county estimates of the economic effects of elk hunting, deer hunting, other big game hunting, small game hunting and fishing;
- Distinguish between resident and non-resident impacts;
- Provide a statewide estimate of the economic effects of wildlife watching, using a methodology similar to that for hunting; and
- Develop a model that CDOW personnel can easily update as new information becomes available.

Overview of Statewide Economic Impacts of Hunting and Fishing

Hunting and fishing is an important and sizable portion of Colorado's tourism economy. During 2002, the most recent year for which hunting and fishing data are available, there were about 10.1 million hunting and fishing activity days. An activity day consists of one hunter or angler spending at least part of one day hunting or fishing. Resident hunter and angler activity days were over two-thirds of the total.

Hunters and anglers spent an estimated $797 million on trip expenses and sporting equipment in Colorado during 2002. CDOW spent an additional $49 million on operations that support hunting and fishing.

Residents provided 58 percent of statewide hunting and fishing trip and equipment expenditures. Non-resident hunters and anglers also provided an important boost for local economies:

- Non-resident hunters and anglers spent more money per day, on average, than residents did. For example, non-resident big game hunters spent an estimated $300 per day, while resident big game hunters spent about $35.

- Non-resident hunters and anglers contributed $332 million, or 42 percent, of the statewide trip and equipment expenditures.

- Non-resident hunters and anglers brought money into the Colorado economy that would probably have gone to another state if not for Colorado's variety of hunting and fishing opportunities.

The total economic impact of the hunting and fishing industry is the sum of new dollars injected into the economy (trip expenses, sporting equipment purchases and CDOW expenditures that support hunting and fishing) and the secondary impact of the dollars that are re-spent within the economy. The secondary economic impact of hunting and fishing dollars during 2002 is estimated at $660 million, yielding a total estimated impact of just over $1.5 billion. This level of activity supports an estimated 20,000 full-time jobs in Colorado. These jobs are located across Colorado and are an important component of the economic base, particularly in certain rural counties.

Overview of Statewide Economic Impacts of Wildlife Watching Activities

Trip and equipment expenditure estimates for wildlife watching activities away from home rely on much of the same surveys and methodology as the hunting and fishing estimates. However, wildlife watching activities are often bundled with other activities. While the survey questions used to estimate wildlife watching expenditures do ask if wildlife watching was the "primary" reason for this expenditure, it is difficult to know what portion of these expenditures are solely attributable to wildlife watching. BBC therefore recommends that economic impact estimates for wildlife watching not be directly compared to those for hunting and fishing activities.

During 2001, the most recent year for which wildlife watching expenditure data are available, trip and equipment expenditures that are primarily for wildlife watching activities more than one mile from home are estimated at $562 million. The secondary economic impact of these expenditures is estimated at $378 million, yielding a total estimated economic impact of $940 million. This level of spending supports approximately 13,000 jobs in Colorado's economy.

Wildlife watching by residents amounts to two-thirds of the total economic impact, with the remaining one-third coming from non-residents. As with hunting and fishing, there were far fewer non-resident wildlife watching days. However, non-residents spent more money per day, on average, than residents engaged in watching Colorado's wildlife.

SECTION I.
Introduction

Background

In 1988, the Colorado Division of Wildlife (CDOW) selected BBC Research & Consulting (BBC) to build a model that estimated the economic effects of hunting and fishing in Colorado. The Division used and maintained this model and provided periodic updates of economic effects as new information became available. State and local government officials and CDOW personnel regularly used the model's results to help them educate the public, consider policy choices and allocate resources.

CDOW personnel last updated the model in 1997. However, updating became increasingly difficult due to the lack of staff familiarity with the model's software, changes in Game Management Units, the addition of Broomfield County and the availability of new hunting, fishing and wildlife watching survey data. In 2003, the Policy and Regulations Section of CDOW contracted with BBC to assess the feasibility and benefits of a more comprehensive update to CDOW's economic impact model and to develop a course of action for such an update. BBC began updating the model in late 2003 and completed the update in October 2004.

Objectives

CDOW specified several objectives for this update.

- Work with CDOW personnel to integrate the most recently available information and refine working assumptions;
- Provide statewide and individual county estimates of the economic effects of elk hunting, deer hunting, other big game hunting, small game hunting and fishing;
- Distinguish between resident and non-resident impacts;
- Provide a statewide estimate of the economic effects of wildlife watching, using a methodology similar to that for hunting; and
- Design and develop new software for the model to allow CDOW personnel to easily update the model as new information becomes available.

Process

BBC completed six tasks in order to update the model and develop revised software to facilitate CDOW use of the model and future updates. These tasks included:

- ***Project initiation*** — BBC met with CDOW staff at the beginning of this project to begin securing the data needed from CDOW and to select a user-interface for the model that would best meet CDOW's needs.

- ***Data collection*** — BBC obtained the most recent available data from CDOW, the U.S. Fish and Wildlife Service, the U.S. Bureau of the Census, the Colorado State Demographer's Office, and the IMPLAN Group, Inc.

- ***Core model implementation*** — BBC developed the analytical components of the model and reviewed the model's structure, key assumptions and preliminary outputs with CDOW staff.

- ***Hunting and fishing results*** — BBC developed estimates of the economic impacts of hunting and fishing for the most recent available year (2002). We reviewed these results with CDOW senior staff and described them in a presentation to the Wildlife Commissioners.

- ***Wildlife watching results*** — BBC developed estimates of the economic impacts of wildlife watching in 2001, documented these results and reviewed them with CDOW senior staff and the Wildlife Commissioners.

- ***User interface and technical documentation*** — BBC built a user interface for the model to assist CDOW staff in performing future updates. Finally, BBC developed a technical memorandum describing model operation and assumptions.

Section II of this report provides an overview of the economic impact model.

Model Capabilities

The model provides estimates of the annual economic impacts of hunting and fishing activity for each county and statewide. Economic impacts are reported in terms of activity days, trip and equipment expenditures, total economic impacts (measured in terms of output/sales) and jobs.

Hunting impacts can be further broken down into impacts related to hunting several key species, including elk, deer, other big game and small game. Economic impacts are further divided into impacts resulting from resident hunting and fishing activity and impacts resulting from non-resident participants.

The model currently examines the 2002 hunting and fishing seasons. All economic impact results are reported in 2004 dollars.

Economic impacts associated with wildlife watching activities are available for residents and non-residents, but only at the statewide level. The model reports the economic impacts resulting from wildlife watching in 2001, the most recent year for which data are available.

Section III of this report describes statewide results and Section IV of this report describes county-level results. Section V of this report compares results of this updated model with the 1996 hunting and fishing estimates from the last update of the previous model.

SECTION II.
Model Overview

The updated economic impact model developed for CDOW combines the most recently available information from a variety of sources to generate estimates of the impacts of hunting, fishing and wildlife watching in Colorado. The model was also designed to assist CDOW users in conducting their own customized economic impact analyses. Through a series of menus, the user can specify the economic impact question and then select the types of results to be viewed.

This section of the report provides an overview of the model. More detailed technical information on how to use and update the model is provided in the user's guide, under separate cover.

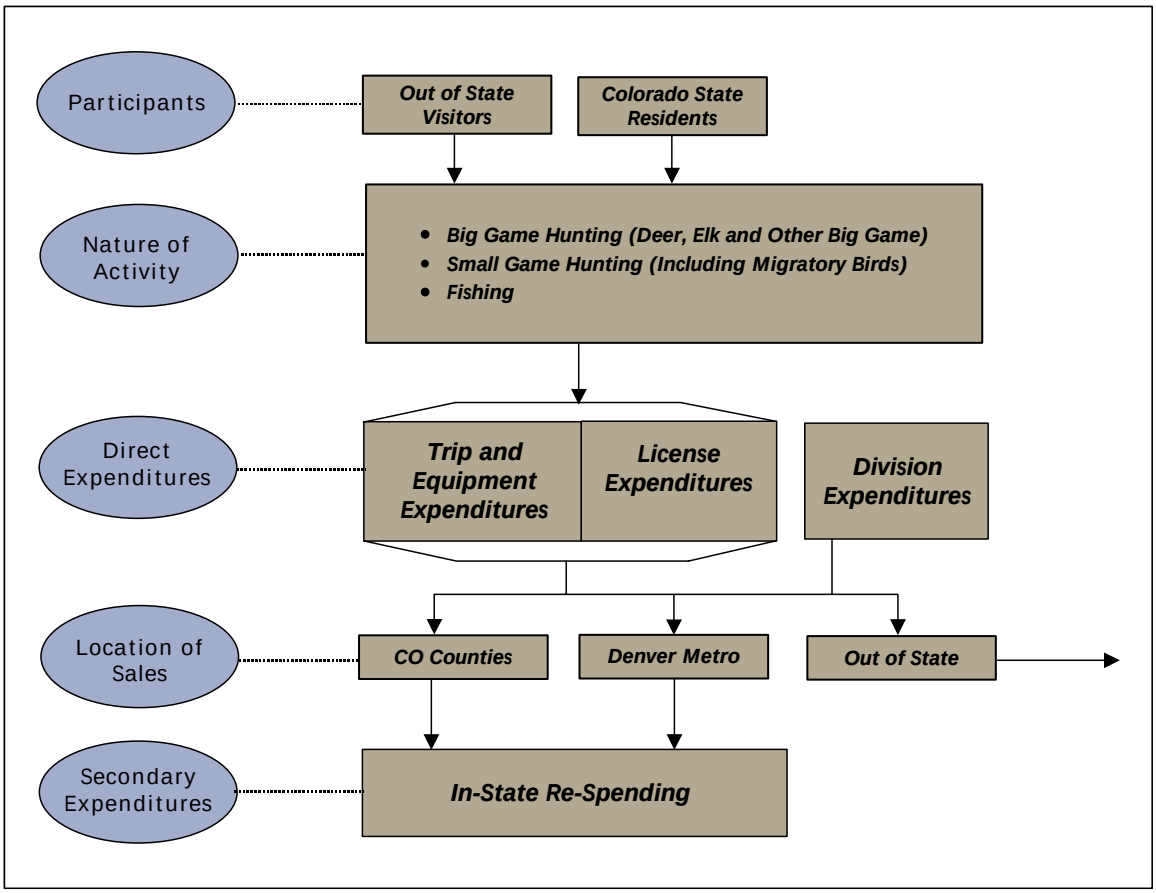
General model structure. The overall structure of the economic impact model is shown in Exhibit II-1. The model begins with information about resident and non-resident participants in Colorado. Estimates of equipment expenditures and per-visitor day direct expenditures for trip costs come from the U.S. Fish and Wildlife Service and U.S. Census Bureau of the Census "2001 National Survey of Fishing, Hunting, and Wildlife Associated Recreation." Estimates of the number of hunting and fishing participants, along with their destination, come from CDOW surveys and license sales.

The model then estimates direct expenditures, by type of visitor and activity, based on estimated expenditures per visitor day and per trip (specific to each type of activity and each type of visitor), combined with data on CDOW expenditures that support hunting and fishing activities. The location of sales depends on the type of expenditure, the locations where hunting and fishing activities take place and where equipment or trip support services are purchased.

Secondary expenditures, reflecting the re-spending of hunting and fishing dollars within Colorado, are estimated using the IMPLAN input-output model originally developed by the U.S. Forest Service. The model then combines the direct and secondary expenditures to produce total economic impact estimates and estimates of total employment related to hunting and fishing activities.

The wildlife watching component of the model follows a similar structure. However, due to data limitations, there is no county-level detail available for wildlife watching impacts. Economic effects of wildlife watching are only provided at a statewide level.

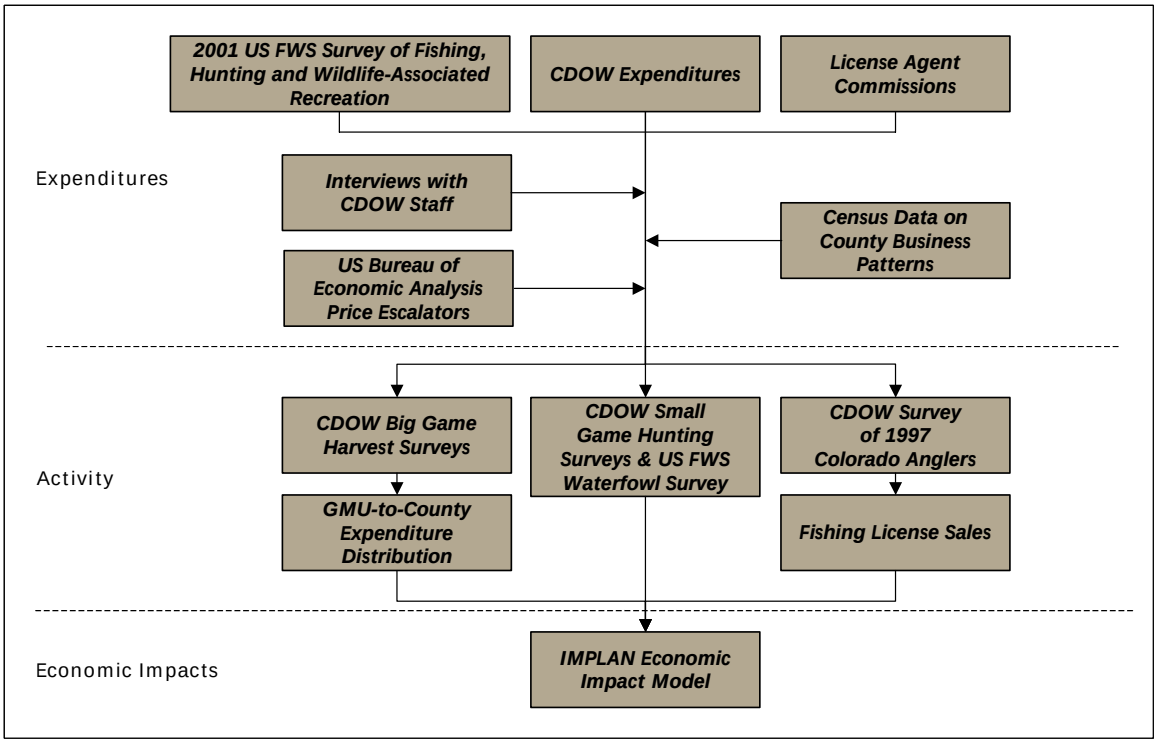
Exhibit II-1.
Overall Economic Impact Model Structure



Inputs to the model. Data for the model come from a variety of sources and are depicted in Exhibit II-2:

- CDOW provided data on hunting and fishing activity levels by location and species, direct CDOW expenditures and license agent commissions, and the geographic and economic relationship between Game Management Units and county boundaries;
- Colorado-specific information in the U.S. Fish and Wildlife Service and U.S. Census Bureau of the Census "2001 National Survey of Fishing, Hunting, and Wildlife Associated Recreation" provides estimates of hunting, fishing and wildlife watching expenditures in Colorado per visitor and per visitor day;
- Data from the U.S. Census County Business Patterns was used to apportion equipment expenditures based on the locations of retail outlets for hunting, fishing and wildlife watching equipment;
- Data from the U.S. Department of Commerce, Bureau of Economic Analysis was used to convert all dollar figures into their current (year 2004) value; and
- The IMPLAN economic impact model was used to estimate secondary economic impacts ("re-spending" effects) and total employment impacts.

Exhibit II-2.
Inputs to the Model



Model outputs. Apart from producing overall statewide estimates of the total economic impact of hunting, fishing and wildlife watching activities, the model is designed to be able to produce a variety of more specialized results users may need. As summarized in Exhibit II-3, the model can portray results at either the statewide level or the county level (except for wildlife watching impacts, which are only available statewide). The model can also generate impact results for more specific activities, such as elk hunting or small game hunting. A variety of economic measures are available from the model, including direct expenditures, total output and jobs.

Exhibit II-3.
Available Model Results

Source:
BBC Research & Consulting.

Geography

- ***County-level***
- ***State-level***

Residency

- ***Colorado***
- ***Non-resident***

Activity

- ***Elk hunting***
- ***Deer hunting***
- ***Other big game hunting***
- ***Small game hunting***
- ***Fishing***
- ***Wildlife watching***

Economic Impacts

- ***Direct expenditures***
- ***Secondary spending***
- ***Total impact (direct and secondary)***
- ***Jobs***
- ***Employee earnings***

Direct expenditure categories

- ***Trip expenses***
- ***Equipment purchases***
- ***CDOW expenditures***

SECTION III.
Statewide Results

Statewide Economic Impacts of Hunting and Fishing

Hunting and fishing is an important and sizable portion of Colorado's tourism economy.

Exhibit III-1 summarizes direct expenditures, total economic impacts and total jobs in Colorado related to hunting and fishing in 2002. Overall, economic impacts of fishing are somewhat greater than economic impacts of hunting, reflecting the fact that there were nearly eight times as many fishing activity days as hunting activity days in 2002. However, the economic impact of each hunting day is much larger than the economic impact of an individual fishing day. Among the major game species in Colorado, the economic impacts of elk hunting were by far the largest in 2002.

Exhibit III-1.
Statewide Economic Impacts of Hunting and Fishing in 2002

Activity	*Direct Expenditures[1] ($ in thousands)*	*Total Impact[2] ($ in thousands)*	*Total[3] Jobs*
Elk Hunting	$ 191,500	$ 340,100	4,500
Deer Hunting	54,600	97,500	1,330
Other Big Game Hunting	6,600	12,000	180
Small Game Hunting	85,100	153,700	2,240
Fishing	458,700	820,000	10,950
CDOW Expenditures	48,800	91,200	1,010
Total	***$ 845,300***	***$ 1,514,500***	***20,210***

Note: Measured in 2004 dollars

1. Trip and equipment expenditures and CDOW expenditures in support of these activities.
2. Direct expenditures plus secondary spending by businesses and households (multiplier effects).
3. Includes job creation from direct and secondary expenditures.

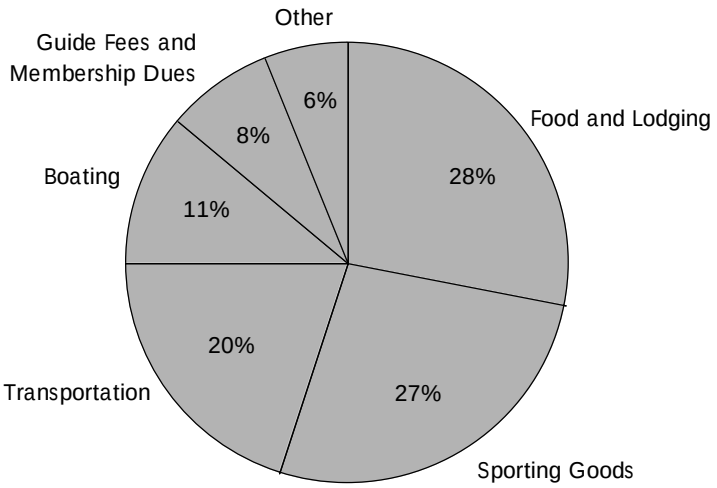
Source: BBC Research & Consulting, 2004.

Direct expenditures. Hunters and anglers spent an estimated $797 million on trip expenses[1] and sporting equipment[2] (direct expenditures) in Colorado during 2002. Expenditures by Colorado residents made up about 58 percent of this total, while non-resident expenditures were 42 percent. Expenditures per day were greater for non-residents than for Colorado residents. When combined with CDOW expenditures that directly support hunting and fishing activities[3], total direct expenditures are estimated to equal $845 million.

Exhibit III-2 shows how hunters and anglers spent their trip and equipment expenditures. Food, lodging and transportation, the primary trip expenditures, are almost half of total direct expenditures. Over one-quarter of direct expenditures went to purchases of sporting goods equipment.

Exhibit III-2.
Direct Expenditures by Expenditure Type

Source:
BBC Research & Consulting, 2004.



Secondary economic impacts. Businesses receive revenue from hunter and angler purchases and use a portion of this money to pay employees and purchase goods and services that support business operations. Thus, the hunter and angler expenditures re-circulate in the local economy — providing an economic impact beyond just the original expenditures. This additional re-spending impact is often termed a "multiplier" effect.

[1] Includes expenditures on the following goods and services: food, lodging, public transportation, private transportation, guide fees, public land access fees, private land access fees, equipment rental, boat fuel, other boating costs, and heating and cooking fuel.

[2] Includes some or all of the expenditures on the following items: guns and rifles, ammunition, other hunting equipment (including processing and taxidermy costs), fishing gear, camping equipment, binoculars, clothing, taxidermy, boats, trucks, campers, recreational vehicles, magazines and books, membership dues and contributions, film, bird food, and food for other wildlife.

[3] Includes the following CDOW budgetary object groups: contract personal services, other personal services, building purchase/improvements, land and water improvements, lease purchase land and water improvements, capital equipment, non-capitalized equipment, communications equipment, computers/technology, educational/training, equipment maintenance/repair, equipment rental, facility/property maintenance and repair, fish production, property rental, motor vehicle expenses, agent commission fees, postage and shipping, printing and reproduction, public relations, purchased services, supplies and materials, utilities, instate travel, employee moving expenses and uniform maintenance allowance.

Total economic impacts. The total economic impact of the hunting and fishing industry consists of both new dollars injected into the economy from hunter and angler trip expenses and sporting equipment purchases and the secondary impact as these dollars are re-spent within the economy. The secondary economic impact of hunting and fishing dollars during 2002 is estimated at $660 million. Adding this figure to the trip and equipment purchases, the total estimated impact is just over $1.5 billion.

Jobs. A portion of the direct expenditures of hunters and anglers and the subsequent re-spending of these revenues pay for wages and salaries that currently support an estimated 20,000 full-time jobs in Colorado. These jobs, located across Colorado, form an important component of the local economic base, particularly in certain rural counties.

Activity days. During 2002, the most recent year for which data are available, there were about 10.1 million hunting and fishing activity days. An activity day consists of one hunter or angler spending one day hunting or fishing. Resident hunter and angler activity days comprise more than two-thirds of the total hunting and fishing activity days in Colorado. Non-resident hunter and angler activity days were 30 percent of the total. Exhibit III-3 shows these results.

Exhibit III-3.
Hunting and Fishing Activity Days, 2002

Activity	*Resident Activity Days*	*Non-Resident Activity Days*	*Total Activity Days*
Big game hunting	931,000	490,000	1,421,000
Small game hunting	544,000	128,000	672,000
Fishing	5,630,000	2,424,000	8,054,000
Total	***7,105,000***	***3,042,000***	***10,147,000***

Source: BBC Research & Consulting, 2004.

Statewide Economic Impacts of Hunting and Fishing by Residents/Non-Residents

Resident and non-resident hunters and anglers provide an important boost for local economies and bring money into the Colorado economy that may well have been spent in another state if not for Colorado's unique outdoor experience.

Daily expenditures. Non-residents spend more money per day, on average, than residents. For example, non-resident big game hunters spend an estimated $300 per day, while resident big game hunters spend about $35. Exhibit III-4 shows additional information about average per day expenditures.

Exhibit III-4.
Average Expenditures per Hunter and Angler per Day, 2002

Note: Measured in 2004 dollars.

Source:
BBC Research & Consulting, 2004.

Activity	*Resident $ Per Day*	*Non-Resident $ Per Day*
Big game hunting	$35.10	$299.70
Small game hunting	$32.00	$156.60
Fishing	$17.80	$141.00

Trip and equipment expenditures. Non-residents contributed $332 million, or 42 percent, of the statewide trip and equipment expenditures (excluding direct CDOW expenditures). Exhibit III-5 shows additional detail for expenditures by place of residence.

Exhibit III-5.
Hunting and Fishing Trip and Equipment Expenditures by Residents and Non-Residents, 2002

Activity	*Resident ($ in thousands)*	*Non-Resident ($ in thousands)*	*Total ($ in thousands)*
Hunting	$156,800	$181,000	$337,800
Fishing	$307,800	$150,900	$458,700
Sub-Total	***$464,600***	***$331,900***	***$796,500***
CDOW Expenditures	N/A	N/A	$48,800
Total	***N/A***	***N/A***	***$845,300***

Note: Measured in 2004 dollars.
Source: BBC Research & Consulting, 2004.

Statewide Economic Impacts of Wildlife Watching Activities

Trip and equipment expenditure estimates for wildlife watching activities away from home rely on many of the same information sources as the hunting and fishing estimates. However, wildlife watching activities are often bundled with other activities, such as hiking and camping. Although the survey questions used to estimate wildlife watching expenditures ask if wildlife watching was the "primary" reason for this expenditure, it is difficult to know what portion of these expenditures are solely attributable to wildlife watching. Therefore, the results for wildlife watching are not directly comparable to those for hunting and fishing activities.

Results. Trip and equipment expenditures that are primarily for wildlife watching activities more than one mile from home are estimated at $562 million for calendar year 2001 (the most recent year available). The secondary economic impact of these expenditures is estimated at $378 million, yielding a total estimated impact of $940 million. Direct and secondary expenditures at this level would support approximately 13,000 jobs in Colorado.

Wildlife watching by Colorado residents made up about $632 million, or two-thirds of the total economic impact of wildlife watching in 2001. Non-residents watching wildlife in Colorado contributed an estimated $308 million to the Colorado economy. As with hunting and fishing, there were far fewer non-resident wildlife watching days. However, non-residents spent more money per day, on average, than residents engaged in watching Colorado's wildlife.

SECTION IV.
County-Level Results

The hunting and fishing portion of the model also estimates the economic effects of these activities for individual counties. In absolute terms, the largest impacts on business output and employment from hunting and fishing take place in the Colorado counties with the largest populations and economies. This occurs because a large portion of the equipment expenditures occur where hunters and anglers live. Consequently, urban areas can see large economic contributions from hunting and fishing, even though urban areas have little or no local hunting and fishing activity. Several counties in the Denver Metropolitan Area, as well as El Paso County and Larimer County, have more than 1,000 jobs supported by hunting and fishing.

In relative terms, hunting and fishing activity has a greater economic impact in some of Colorado's rural counties. Exhibit IV-1 shows the counties that are most dependent on hunting and fishing activity. In Jackson County, more than 17 percent of all local jobs are directly or indirectly supported by hunting and fishing activities.

Exhibit IV-1.
Colorado Counties with Largest Proportion
of Employment Related to Hunting and Fishing, 2002

County	*2002 Jobs from Hunting & Fishing*	*2002 Total Jobs in County*	*Percent of Total Jobs*
Jackson	200	1,154	17.3%
Rio Blanco	360	4,343	8.3%
San Juan	30	475	6.3%
Grand	560	10,370	5.4%
Mineral	40	742	5.4%
Hinsdale	30	632	4.7%
Gunnison	540	11,381	4.7%
Moffat	330	7,440	4.4%
Archuleta	280	6,405	4.4%
Chaffee	380	9,745	3.9%

Source: BBC Research & Consulting, 2004. Total county employment from U.S. Department of Commerce, Bureau of Economic Analysis.

Exhibit IV-2 shows direct expenditures (i.e., hunting and fishing trip and equipment expenditures and estimated CDOW expenditures) for each of Colorado's 64 counties. This exhibit also shows the estimated total economic impacts and the number of jobs sustained by these activities.

Exhibit IV-2.
Estimated Hunting and Fishing Economic Impacts by County, 2002

County	*Direct Expenditures[1] ($ in thousands)*	*Total Impact[2] ($ in thousands)*	*Jobs[3]*
Adams	$30,100	$54,200	670
Alamosa	$12,600	$22,300	280
Arapahoe	$46,100	$83,500	1,140
Archuleta	$12,400	$21,800	280
Baca	$700	$1,200	20
Bent	$2,300	$4,100	50
Boulder	$36,000	$65,300	920
Broomfield	$3,700	$6,800	90
Chaffee	$15,600	$27,600	380
Cheyenne	$400	$700	10
Clear Creek	$2,600	$4,600	60
Conejos	$1,000	$1,800	20
Costilla	$700	$1,200	20
Crowley	$600	$1,000	10
Custer	$2,100	$3,700	50
Delta	$14,600	$25,900	340
Denver	$69,100	$126,100	1,540
Dolores	$1,300	$2,300	30
Douglas	$21,400	$38,400	510
Eagle	$32,200	$57,800	820
El Paso	$47,100	$85,000	1,130
Elbert	$3,500	$6,300	70
Fremont	$8,100	$14,500	190
Garfield	$30,000	$53,100	690
Gilpin	$200	$400	10
Grand	$22,800	$40,400	560
Gunnison	$23,000	$40,600	540
Hinsdale	$1,100	$2,000	30
Huerfano	$3,000	$5,400	70
Jackson	$8,800	$15,400	200
Jefferson	$50,500	$91,000	1,270
Kiowa	$400	$800	10
Kit Carson	$2,500	$4,500	60
La Plata	$18,900	$33,700	450

Note: Measured in 2004 dollars.
1. Trip and equipment expenditures and CDOW expenditures in support of these activities.
2. Direct expenditures plus secondary spending by businesses and households (multiplier effects).
3. Includes job creation from direct and secondary expenditures.

Source: BBC Research & Consulting, 2004.

Exhibit IV-2 (Continued).
Estimated Hunting and Fishing Economic Impacts by County, 2002

County	*Direct Expenditures[1] ($ in thousands)*	*Total Impact[2] ($ in thousands)*	*Jobs[3]*
Lake	$4,100	$7,300	100
Larimer	$61,200	$109,600	1,470
Las Animas	$4,100	$7,300	100
Lincoln	$1,500	$2,700	30
Logan	$4,800	$8,500	120
Mesa	$32,600	$58,100	750
Mineral	$1,500	$2,600	40
Moffat	$14,500	$25,500	330
Montezuma	$8,600	$15,200	200
Montrose	$13,400	$23,600	310
Morgan	$5,900	$10,500	130
Otero	$4,300	$7,500	100
Ouray	$2,400	$4,300	60
Park	$6,800	$11,900	170
Phillips	$900	$1,600	20
Pitkin	$13,000	$23,600	340
Prowers	$3,400	$6,100	80
Pueblo	$30,000	$53,400	710
Rio Blanco	$16,300	$28,400	360
Rio Grande	$4,600	$8,200	110
Routt	$23,600	$41,900	560
Saguache	$2,400	$4,400	50
San Juan	$1,300	$2,300	30
San Miguel	$7,200	$12,900	180
Sedgwick	$800	$1,400	20
Summit	$22,800	$41,500	620
Teller	$4,000	$7,100	100
Washington	$700	$1,200	20
Weld	$21,200	$38,300	500
Yuma	$2,200	$3,900	50
Total[4]	***$845,300***	***$1,514,500***	***20,210***

Note: Measured in 2004 dollars.
1. Trip and equipment expenditures and CDOW expenditures in support of these activities.
2. Direct expenditures plus secondary spending by businesses and households (multiplier effects).
3. Includes job creation from direct and secondary expenditures.
4. Values may not sum to totals due to rounding.

Source: BBC Research & Consulting.

Exhibit IV-3 provides additional detail regarding the county-level economic impacts of hunting and fishing. In this exhibit, total economic impacts are shown in five categories: resident and non-resident hunting impacts, resident and non-resident fishing impacts, and impacts from expenditures by CDOW.

Exhibit IV-3.
Economic Impacts by County, Activity and Residence, 2002

	Direct Expenditures[1]					
	Hunting ($ in thousands)		Fishing ($ in thousands)		CDOW[2]	Total Impact[3]
County	Resident	Non-Resident	Resident	Non-Resident	($ in thousands)	($ in thousands)
Adams	$6,360	$4,350	$34,090	$9,300	$140	$54,240
Alamosa	$3,150	$7,510	$7,160	$3,620	$860	$22,300
Arapahoe	$20,440	$9,810	$38,890	$14,200	$180	$83,520
Archuleta	$2,630	$14,790	$2,540	$1,400	$460	$21,820
Baca	$350	$350	$230	$150	$120	$1,200
Bent	$240	$170	$1,410	$1,330	$920	$4,070
Boulder	$17,350	$5,550	$31,330	$10,950	$110	$65,290
Broomfield	$1,780	$970	$2,690	$1,270	$70	$6,780
Chaffee	$4,370	$4,250	$10,030	$7,770	$1,200	$27,620
Cheyenne	$170	$220	$110	$60	$130	$690
Clear Creek	$790	$520	$1,810	$1,420	$80	$4,620
Conejos	$420	$160	$560	$270	$410	$1,820
Costilla	$160	$360	$190	$100	$390	$1,200
Crowley	$150	$100	$360	$290	$120	$1,020
Custer	$460	$940	$1,020	$920	$400	$3,740
Delta	$3,910	$9,730	$8,400	$3,520	$340	$25,900
Denver	$17,790	$14,190	$42,130	$16,700	$35,280	$126,090
Dolores	$250	$1,740	$130	$70	$80	$2,270
Douglas	$6,560	$2,120	$22,160	$7,490	$100	$38,430
Eagle	$16,800	$14,150	$18,230	$8,520	$140	$57,840
El Paso	$16,750	$10,930	$36,690	$17,810	$2,870	$85,050
Elbert	$540	$410	$3,890	$430	$990	$6,260
Fremont	$1,870	$1,480	$7,050	$2,860	$1,180	$14,440
Garfield	$7,210	$20,780	$14,120	$7,580	$3,390	$53,080
Gilpin	$230	$100	$30	$10	$70	$440
Grand	$8,200	$9,860	$12,720	$8,920	$730	$40,430
Gunnison	$5,880	$14,610	$10,390	$8,140	$1,580	$40,600
Hinsdale	$510	$300	$600	$200	$370	$1,980
Huerfano	$690	$1,290	$1,420	$1,220	$810	$5,430
Jackson	$1,600	$5,990	$3,510	$3,260	$1,090	$15,450
Jefferson	$19,780	$8,200	$42,980	$19,880	$180	$91,020
Kiowa	$150	$110	$220	$190	$120	$790
Kit Carson	$680	$1,070	$990	$810	$930	$4,480
La Plata	$7,140	$11,760	$8,510	$4,970	$1,300	$33,680
Lake	$1,470	$1,020	$2,800	$1,950	$80	$7,320
Larimer	$18,760	$9,380	$48,020	$26,740	$6,700	$109,600
Las Animas	$1,050	$2,400	$1,900	$1,460	$460	$7,270
Lincoln	$370	$410	$570	$410	$980	$2,740
Logan	$2,430	$1,070	$2,680	$1,870	$480	$8,530

Note: Measured in 2004 dollars.
1. Trip and equipment expenditures.
2. CDOW expenditures in support of hunting and fishing.
3. Direct expenditures plus secondary spending by businesses and households (multiplier effects).

Source: BBC Research & Consulting.

Exhibit IV-3 (continued).
Economic Impacts by County, Activity and Residence, 2002

County	Direct Expenditures[1] Hunting ($ in thousands) Resident	Hunting ($ in thousands) Non-Resident	Fishing ($ in thousands) Resident	Fishing ($ in thousands) Non-Resident	CDOW[2] ($ in thousands)	Total Impact[3] ($ in thousands)
Mesa	$10,260	$16,660	$20,430	$8,150	$2,580	$58,080
Mineral	$790	$570	$790	$240	$250	$2,640
Moffat	$3,790	$16,780	$2,500	$1,360	$1,080	$25,510
Montezuma	$2,480	$7,050	$3,350	$1,840	$450	$15,170
Montrose	$3,400	$10,500	$4,830	$3,880	$1,040	$23,650
Morgan	$1,640	$1,880	$2,260	$2,820	$1,900	$10,500
Otero	$1,220	$1,550	$2,600	$2,050	$120	$7,540
Ouray	$880	$1,060	$1,280	$760	$300	$4,280
Park	$1,960	$1,290	$4,660	$3,950	$80	$11,940
Phillips	$430	$240	$270	$180	$470	$1,590
Pitkin	$8,360	$3,570	$8,600	$2,540	$580	$23,650
Prowers	$1,220	$750	$2,050	$1,610	$450	$6,080
Pueblo	$5,710	$3,790	$26,400	$15,980	$1,520	$53,400
Rio Blanco	$3,240	$22,070	$1,230	$920	$990	$28,450
Rio Grande	$1,240	$2,780	$1,760	$1,310	$1,090	$8,180
Routt	$8,760	$17,450	$9,080	$5,440	$1,120	$41,850
Saguache	$700	$1,470	$240	$140	$1,800	$4,350
San Juan	$370	$1,160	$320	$110	$360	$2,320
San Miguel	$4,050	$4,030	$3,660	$860	$310	$12,910
Sedgwick	$570	$200	$120	$70	$470	$1,430
Summit	$14,880	$3,750	$16,880	$5,370	$630	$41,510
Teller	$1,600	$730	$2,860	$1,870	$80	$7,140
Washington	$290	$180	$160	$90	$470	$1,190
Weld	$7,960	$3,830	$14,200	$5,720	$6,620	$38,330
Yuma	$1,010	$600	$920	$750	$650	$3,930
Total[4]	***$286,180***	***$317,080***	***$553,990***	***$266,030***	***$91,190***	***$1,514,500***

Note: Measured in 2004 dollars.
1. Trip and equipment expenditures.
2. CDOW expenditures in support of hunting and fishing.
3. Direct expenditures plus secondary spending by businesses and households (multiplier effects).
4. Values may not sum to totals due to rounding.

Source: BBC Research & Consulting.

Exhibit IV-4 provides detailed estimates of direct and secondary expenditures associated with hunting and fishing activities by county.

Exhibit IV-4.
Expenditures by County and Activity, 2002

County	Population[1] (2003)	Direct Expenditures							Secondary Expenditures ($ in thousands)	Total Impact[2] ($ in thousands)	Percent of Total
		Deer Hunting ($ in thousands)	Elk Hunting ($ in thousands)	Other Big Game Hunting ($ in thousands)	Small Game Hunting ($ in thousands)	Fishing ($ in thousands)	CDOW ($ in thousands)	Total Direct Expenditures[2] ($ in thousands)			
Adams	380,273	$ 840	$ 2,710	$ 120	$ 2,200	$ 24,180	$ 70	$ 30,100	$ 24,100	$ 54,200	3.6 %
Alamosa	15,126	350	4,820	40	860	6,080	460	12,600	9,700	22,300	1.5
Arapahoe	516,060	2,600	7,570	520	5,900	29,430	100	46,100	37,400	83,500	5.5
Archuleta	11,313	1,660	7,730	50	550	2,210	250	12,400	9,400	21,800	1.4
Baca	4,223	80	50	30	240	210	60	700	500	1,200	0.1
Bent	5,613	70	50	20	90	1,560	490	2,300	1,800	4,100	0.3
Boulder	278,231	1,990	5,460	400	4,660	23,470	60	36,000	29,300	65,300	4.3
Broomfield	42,169	240	730	40	500	2,190	40	3,700	3,100	6,800	0.4
Chaffee	16,841	730	3,140	90	870	10,090	640	15,600	12,000	27,600	1.8
Cheyenne	2,052	60	50	30	90	90	70	400	300	700	0.0
Clear Creek	9,538	140	410	30	150	1,820	40	2,600	2,000	4,600	0.3
Conejos	8,403	40	110	10	160	460	220	1,000	800	1,800	0.1
Costilla	3,563	30	230	--	30	160	210	700	500	1,200	0.1
Crowley	5,449	10	40	10	70	370	60	600	400	1,000	0.1
Custer	3,784	170	450	20	150	1,100	220	2,100	1,600	3,700	0.2
Delta	29,409	1,220	5,390	70	1,080	6,690	180	14,600	11,300	25,900	1.7
Denver	557,478	2,770	9,210	410	5,250	32,610	18,880	69,100	57,000	126,100	8.3
Dolores	1,825	230	850	--	50	110	40	1,300	1,000	2,300	0.2
Douglas	223,471	750	1,970	150	1,880	16,600	50	21,400	17,000	38,400	2.5
Eagle	46,020	2,820	10,180	370	3,910	14,900	80	32,200	25,600	57,800	3.8
El Paso	550,478	2,370	7,360	440	5,080	30,340	1,560	47,100	37,900	85,000	5.6
Elbert	22,254	130	170	40	190	2,400	540	3,500	2,800	6,300	0.4
Fremont	47,556	450	870	40	510	5,560	620	8,100	6,400	14,500	1.0
Garfield	47,611	3,410	10,880	110	1,540	12,220	1,840	30,000	23,100	53,100	3.5
Gilpin	4,845	60	120	--	--	20	40	200	200	400	0.0
Grand	13,173	1,530	7,040	140	1,460	12,230	390	22,800	17,600	40,400	2.7
Gunnison	14,046	760	9,480	100	1,320	10,500	840	23,000	17,600	40,600	2.7
Hinsdale	759	50	250	10	130	440	190	1,100	900	2,000	0.1
Huerfano	7,827	220	800	40	60	1,500	430	3,000	2,400	5,400	0.4
Jackson	1,507	160	3,750	50	390	3,860	580	8,800	6,600	15,400	1.0
Jefferson	528,563	2,390	7,190	450	5,280	35,060	90	50,500	40,500	91,000	6.0
Kiowa	1,444	30	30	20	70	230	60	400	400	800	0.1
Kit Carson	7,911	130	110	20	750	1,020	500	2,500	2,000	4,500	0.3
La Plata	46,229	2,080	6,420	170	1,990	7,520	690	18,900	14,800	33,700	2.2
Lake	7,731	240	810	40	300	2,680	40	4,100	3,200	7,300	0.5
Larimer	266,610	2,680	7,260	370	5,260	42,090	3,590	61,200	48,400	109,600	7.2
Las Animas	15,499	300	760	100	820	1,900	250	4,100	3,200	7,300	0.5

Note: Measured in 2004 dollars.
-- denotes less than $5,000 in expenditures.
(1) Estimate, U.S. Census Bureau.
(2) Values may not sum to total due to rounding.

Source: BBC Research & Consulting, 2004 and U.S. Census Bureau, 2004.

Exhibit IV-4. (continued)
Expenditures by County and Activity, 2002

County	Population[1] (2003)	Direct Expenditures: Deer Hunting ($ in thousands)	Elk Hunting ($ in thousands)	Other Big Game Hunting ($ in thousands)	Small Game Hunting ($ in thousands)	Fishing ($ in thousands)	CDOW ($ in thousands)	Total Direct Expenditures[2] ($ in thousands)	Secondary Expenditures ($ in thousands)	Total Impact[2] ($ in thousands)	Percent of Total
Lincoln	5,881	$ 80	$ 100	$ 60	$ 200	$ 550	$ 530	$ 1,500	$ 1,200	$ 2,700	0.2 %
Logan	20,928	190	240	40	1,500	2,570	260	4,800	3,700	8,500	0.6
Mesa	124,676	2,780	8,010	240	4,190	15,980	1,410	32,600	25,500	58,100	3.8
Mineral	881	90	470	20	190	570	130	1,500	1,100	2,600	0.2
Moffat	13,527	2,420	7,950	120	1,310	2,160	570	14,500	11,000	25,500	1.7
Montezuma	24,335	1,150	3,460	40	760	2,900	240	8,600	6,600	15,200	1.0
Montrose	35,984	1,270	4,310	50	2,330	4,930	550	13,400	10,200	23,600	1.6
Morgan	27,922	190	500	20	1,280	2,880	1,020	5,900	4,600	10,500	0.7
Otero	19,754	150	250	30	1,150	2,620	70	4,300	3,200	7,500	0.5
Ouray	4,021	180	680	20	200	1,140	160	2,400	1,900	4,300	0.3
Park	16,465	380	1,130	40	270	4,890	40	6,800	5,100	11,900	0.8
Phillips	4,511	50	50	--	280	240	250	900	700	1,600	0.1
Pitkin	15,002	1,140	3,120	210	2,110	6,140	310	13,000	10,600	23,600	1.6
Prowers	14,164	110	200	20	770	2,070	240	3,400	2,700	6,100	0.4
Pueblo	148,751	800	2,130	130	2,190	23,910	810	30,000	23,400	53,400	3.5
Rio Blanco	5,938	3,450	10,730	50	300	1,210	530	16,300	12,100	28,400	1.9
Rio Grande	12,346	150	1,680	20	430	1,720	580	4,600	3,600	8,200	0.5
Routt	20,788	2,320	10,540	170	1,810	8,140	600	23,600	18,300	41,900	2.8
Saguache	6,708	80	1,030	--	130	210	960	2,400	2,000	4,400	0.3
San Juan	572	110	690	10	70	240	190	1,300	1,000	2,300	0.2
San Miguel	7,154	840	2,610	100	960	2,480	160	7,200	5,700	12,900	0.9
Sedgwick	2,683	80	20	--	330	100	250	800	600	1,400	0.1
Summit	25,143	1,570	4,500	370	3,750	12,310	330	22,800	18,700	41,500	2.7
Teller	21,786	280	640	30	340	2,660	40	4,000	3,100	7,100	0.5
Washington	4,813	40	40	10	180	140	250	700	500	1,200	0.1
Weld	211,272	760	1,920	250	3,580	11,090	3,550	21,200	17,100	38,300	2.5
Yuma	9,799	110	80	10	710	940	350	2,200	1,700	3,900	0.3
Total[2]	**4,550,688**	**$ 54,600**	**$ 191,500**	**$ 6,600**	**$ 85,100**	**$ 458,700**	**$ 48,800**	**$ 845,300**	**$ 668,700**	**$ 1,514,500**	**100 %**

Note: Measured in 2004 dollars.
-- denotes less than $5,000 in expenditures.
(1) Estimate, U.S. Census Bureau.
(2) Values may not sum to total due to rounding.

Source: BBC Research & Consulting, 2004 and U.S. Census Bureau, 2004.

SECTION V.
Comparison of 2002 and 1996 Impacts

When updating an economic impact model, it is informative to compare the new results of the new model and most recent information with prior economic impact estimates. As noted in Section I, CDOW last updated the economic impact model in 1997, using 1996 information.

Exhibit V-1 compares the direct expenditures and total economic impact for the 2002 hunting and fishing season with the 1996 season.

Exhibit V-1.
Comparison of Hunting and Fishing Expenditures and Impacts, 1996 and 2002

	Direct Expenditures[1] ($ in thousands)		*Total Economic Impact[2] ($ in thousands)*	
Activity	***1996***	***2002***	***1996[3]***	***2002***
Big game hunting	$ 285,000	$ 252,700	N/A	$ 449,600
Small game hunting	64,600	85,100	N/A	153,700
Fishing	471,600	458,700	N/A	820,000
CDOW expenditures	77,200	48,800	N/A	91,200
Total	***$ 898,400***	***$ 845,300***	***$ 1,976,500***	***$ 1,514,500***

Note: Measured in 2004 dollars

1. Trip and equipment expenditures and CDOW expenditures in support of these activities.
2. Direct expenditures plus secondary spending by businesses and households (multiplier effects).
3. Total economic impacts by activity are not available in the 1996 report.

Source: William Devenney (Westat Consultants), 1997 and BBC Research & Consulting, 2004.

There are two reasons why the estimated economic statewide economic impacts of hunting and fishing in Colorado were lower for the 2002 season than for the 1996 season:

- A number of conditions led to 2002 being a rather poor year for hunting and fishing in Colorado.

- Certain changes in the model result in more conservative, but also more defensible estimates.

2002 conditions. Fires, drought and poor economic conditions reduced direct expenditures on hunting and fishing activities in 2002. The U.S. Fish and Wildlife Service and Census Bureau's "2001 National Survey of Fishing, Hunting and Wildlife Associated Recreation – Colorado" showed a 10 percent decline in hunting and fishing trip expenditures between 1996 and 2001 for Colorado (equipment expenditures declined by more). Additionally, fishing license sales declined more than 10 percent from 2001 to 2002, according to CDOW records.

Changes in the model. Slight methodological differences between the models also contribute to the decline in direct expenditures. When the original model was constructed in 1988, BBC used the then "best practice" to estimate the secondary economic impacts of sporting activities. However, the state-of-the-art has significantly changed since 1988, with resulting estimates now being more conservative.

These model changes preclude a direct comparison of the economic impact estimates between 1996 and 2002.