

Population Status and Trends of Big Game and Greater Sage-Grouse Along the Colorado/Wyoming State Line



Photograph by John Ellenberger

Oil well and collector tanks on drill pad near Coalmont, Colorado (North Park)

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**Prepared for the
National Wildlife Federation**

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Executive Summary

The National Wildlife Federation retained Wildlife Management Consultants and Associates, LLC to compile and evaluate data for big game and Greater Sage-Grouse populations which occupy the areas along the Colorado and Wyoming state lines, generally between the Green River in the west and the Snowy and Medicine Bow ranges in the east and Interstate Highway 80 in the north and US Highway 40 in the south. Furthermore, we were requested to prepare a report of our evaluation of these data as it relates to the sensitivity or vulnerability of the above mentioned wildlife species to impacts due to energy development.

We obtained data from the Colorado Division of Wildlife (CDOW) and Wyoming Game and Fish Department (WG&F) for deer, elk, pronghorn antelope, moose and Greater Sage-Grouse for the above mentioned area. Data for big game were organized by data analysis units (DAUs) by CDOW and Herd Units by WG&F. Greater Sage-Grouse data were included in a series of 6 reports; Colorado Greater Sage-Grouse Statewide Conservation Plan, Wyoming Greater Sage-Grouse Conservation Plan, North Park (Colorado) Greater Sage-Grouse Conservation Plan, Northwest Colorado Greater Sage-Grouse Conservation Plan, South Central Wyoming Greater Sage-Grouse Conservation Plan and Southwest Wyoming Sage-Grouse Assessment and Plan.

The study area contains Data Analysis Units or Herd Units for 6 different mule deer herds, 7 elk herds, 9 pronghorn herds, 2 moose herds and 4 Greater Sage-Grouse conservation areas. While the report addresses 5 different species of wildlife, it is divided into 4 sections; one that addresses basic wildlife biology and 3 that address all 5 species of wildlife in 3 separate geographic sections of the study area. Section I addresses big game and Greater Sage-Grouse basic biology, ecology and management. Section II focuses on all 5 wildlife species in the general geographic areas of North Park, Colorado and the upper North Platte River valley of Wyoming. Section III discusses all 5 wildlife species in the area generally depicted by Routt and eastern Moffat Counties in Colorado and portions of western Carbon and eastern Sweetwater Counties south of Interstate Highway 80 in Wyoming. Section IV covers all 5 wildlife species in the area generally depicted by western Moffat County Colorado and central Sweetwater County Wyoming south of Interstate Highway 80 in Wyoming.

Data from the two wildlife agencies included population models, harvest estimates, hunter license numbers and hunter success rates for deer, elk, pronghorn and moose for all data analysis units or herd units. Population models were the source of information for population estimates, male to female ratios and young to female ratios. Excel spread sheets were created using the data from the models, harvest data, hunter license numbers and hunter success rates to produce the figures used for this report. The trendline function in Excel was used to determine long-term trends for the data portrayed in each of the figures.

Using models to portray performance of animal populations can be problematic especially if there aren't independent estimates of the parameters portrayed in the models. The wildlife agencies in Colorado and Wyoming both conduct periodic aerial surveys to provide independent estimates of male to female and young to female ratios for big game. However, with the exception of pronghorn in Wyoming, estimates of population size, independent from the estimates provided by the models, are uncommon. That being said, models are still considered as useful tools to portray long-term trends in population size when accurate estimates of harvest and age and sex ratios are used as input data.

Colorado Division of Wildlife and Wyoming Game and Fish use different models to portray big game wildlife populations. Colorado uses an Excel spread sheet model developed by Dr. Gary White, retired professor of wildlife management at Colorado State University. Wyoming uses POP-II developed by John Bartholow, owner of Fossil Creek Software. The issue of different models providing varying estimates of wildlife population performance is not a problem for this analysis. Evaluations of big game populations in this analysis did not make comparisons

between populations across state lines or between populations in the same state. The question being considered was how individual big populations were performing through time. For this type of analysis, both of the models provided adequate assessments.

Other issues that need to be discussed are changes in big game management philosophy such as changes in population objectives or changes in management prescriptions such as managing for high male to female ratios. An example of changing population objectives is the decision to reduce the elk population for Colorado DAU E-2 (Bear's Ears) from approximately 39,000 elk to 16,000 elk. The biggest impact to the hunting public as a result of this change was the dramatic decrease in antlerless elk hunting licenses. Concerning changes in management prescriptions, both Colorado and Wyoming have experienced major changes in mule deer management philosophy over the years. For example, in 1999, Colorado switched from unlimited over-the-counter licenses for antlered deer (general licenses) in most units to totally limited licenses for antlered deer (limited quota) on a statewide basis. Likewise, Wyoming has restricted licenses for antlered deer hunting in some units to address hunter crowding issues and the public demand for high male:female ratios in an attempt to produce more large antlered deer. In the South Rock Springs herd unit (424), Wyoming switched from general licenses to limited quota in 1986. In all the instances mentioned above, information is provided in the text of the document for the affected herd units to show that the changes in the populations are a result of conscious management decisions instead of changes due to environmental factors.

SECTION SUMMARY

Section II: North Park Colorado and Upper North Platte River Valley Wyoming

This section of the report focuses on big game wildlife and Greater Sage-Grouse in the general geographic area of North Park, Colorado and the upper North Platte River valley of Wyoming. This geographic area contains 2 deer herd units, 3 elk herd units, 4 pronghorn herd units and 2 moose herd units; Colorado deer DAU D-3 (North Park), Wyoming Deer Herd Unit 541 (Platte Valley), Colorado elk DAU E-3 (North Park), Wyoming Elk Herd Unit 425 (Sierra Madre), Wyoming Elk Herd Unit 533 (Snowy Range), Colorado Pronghorn DAU A-3 (North Park), Wyoming Pronghorn Herd Unit 528 (Elk Mountain), Wyoming Pronghorn Herd Unit 529 (Big Creek) and Wyoming Pronghorn Herd Unit 630 (Iron Springs), Colorado Moose DAU M-1 (North Park) and Wyoming Moose Herd Unit 545 (Snowy Range/Sierra Madre). This geographic area is also part of the area covered by the South Central Wyoming Sage-Grouse Conservation Plan and the North Park Greater Sage-Grouse Conservation Plan. Also, be aware that the geographic boundary of this section is irregular due to the fact that unit boundaries for all 5 wildlife species are not identical, e.g., the area covered by Wyoming Deer Herd Unit 541 (Platte Valley) is roughly the same as the area covered by the 3 pronghorn herd units in the valley and the area covered by the two elk herds discussed in this section cover a larger geographic area than the Platte Valley Deer Herd Unit. For more information on the individual DAUs or Herd Units included in this section refer to the detailed maps, unit descriptions and evaluations in the main body of the report.

MULE DEER

Mule deer populations in this section of the report include two herd units, Colorado DAU D-3 (North Park) and Wyoming Herd Unit 541 (Platte Valley).

Herd Unit 541 appears to be in good condition with the long-term trend for population increasing slightly and the long-term trend for hunter harvest remaining stable. The post-hunt population estimate for 2008 was 25,000 animals which is 25% above the long-term objective of 20,000 animals.

However, the North Park, Colorado deer herd (DAU D-3) is not in as good of condition with the long-term trend for population decreasing slightly. The post-hunt population estimate for 2008 was 5,100 animals which is 15% below the long term objective of 6,000 animals. The deer

population in DAU D-3 has fluctuated substantially over the years, ostensibly due to the impacts of severe winters on deer survival. As it is currently represented, this herd has declined from a maximum population of 9,229 animals in 1988 to a minimum population of 4,283 animals in 1997. Since the decline in the middle 1990s, the deer population has climbed back to an estimated 8,015 animals in 2004 but has since declined to approximately 5,100 animals.

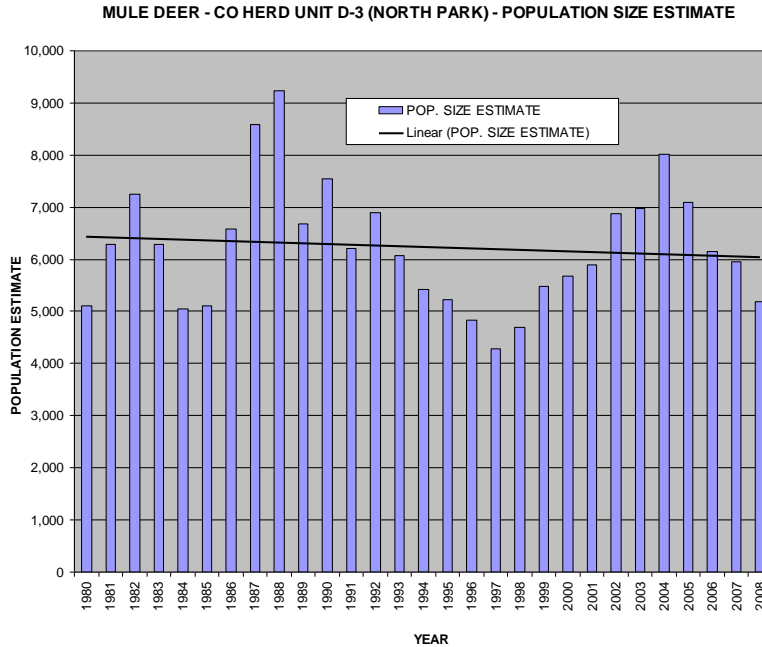


Fig. 1. Colorado Deer Herd DAU D-3 (North Park) Population Estimate

With this herd not performing as well as preferred by biologists, licenses have been reduced in number resulting in a substantial loss of hunting opportunity for sportsmen. The significant reduction in harvest beginning in 1995 is due to a change in hunting regulations in which deer hunting licenses for all seasons and methods of take were totally limited and only available via a drawing or lottery. While harvest improved in the early portion of the last decade, the population doesn't seem to be able to sustain that level of harvest and harvest has declined in the latter part of the decade. On the average, the unit now provides only 38% of the hunting opportunity that it did prior to management via limited licenses. However, hunter success rates are substantially higher than during the period of time when this herd unit had unlimited buck hunting.

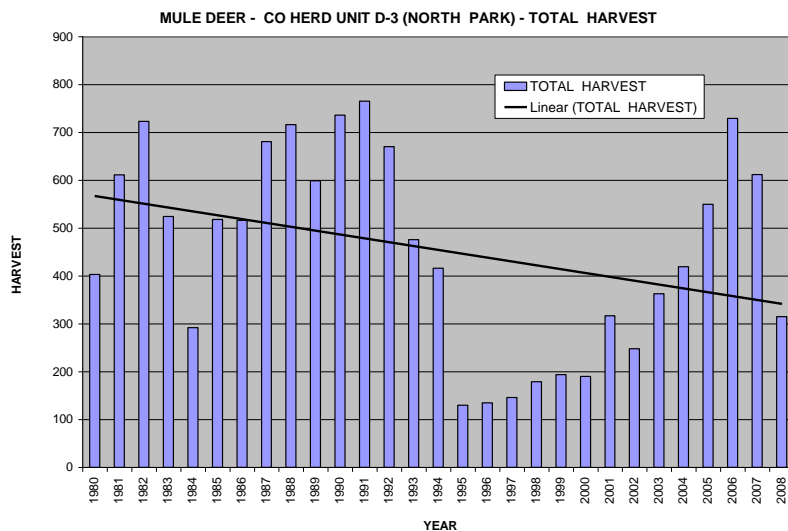


Fig. 2. Colorado Deer Herd DAU D-3 (North Park) Total Harvest

Another important feature of the deer herd in this section of the study area is a substantial interstate movement of deer from North Park, Colorado to the Platte Valley of Wyoming and back to Colorado. This movement or migration of animals occurs in mid-fall with deer moving out of the higher elevations in North Park in order to locate more suitable winter range in the Platte Valley. The migration of deer from Colorado to Wyoming is not confined to animals summering in North Park in close proximity to the Wyoming state line, but includes animals from the central and southern portions of the unit that make the annual trek to winter ranges in Wyoming. A radio telemetry study to determine timing and extent of animal movements between the states was conducted in the middle of the last decade. Based on this movement study and other information, CDOW personnel estimate that approximately 90% of the deer that summer in North Park move to winter ranges outside of the herd unit, leaving only 600 deer to winter in the DAU. It is also estimated, that of the 5,400 deer that leave the DAU to winter, approximately 75%, or 4,050 animals, are wintering in the Platte Valley herd unit in Wyoming.

ELK

Elk populations for this section include 3 herd units, Colorado DAU E-3 (North Park), Wyoming Herd Unit 425 (Sierra Madre) and Wyoming Herd Unit 533 (Snowy Range).

All 3 elk herds are performing similarly, showing increasing trends for population size and all being substantially over their individual long-term objectives for population size. Over the years of the analysis, as these elk populations have grown, so have hunter numbers and elk harvest.

PRONGHORN

Pronghorn populations for this section include 4 herd units, Colorado DAU A-3 (North Park), Wyoming Herd Unit 528 (Elk Mountain), Wyoming Herd Unit 529 (Big Creek) and Wyoming Herd Unit 630 (Iron Springs).

Pronghorn herd units 528 (Elk Mountain) and 529 (Big Creek) appear to be in good condition with long-term trends for population either slightly increasing or stable. The long-term trend for harvest for herd unit 528 is decreasing while the long-term trend for harvest for 529 is increasing slightly. Both herd units are substantially over their long-term population objectives.

However, Wyoming pronghorn herd unit 630 (Iron Springs) is not performing as well as the other 2 pronghorn herds in the Platte Valley. Pronghorn population size in Hunt Unit 630 fluctuated fairly dramatically during the 1980s but has stabilized in the 1990s and later. The post-hunt

population estimate for 2008 is 10,700 animals which is 11% below the long-term objective of 12,000 animals. The long-term trend for the population is stable or slightly decreasing.

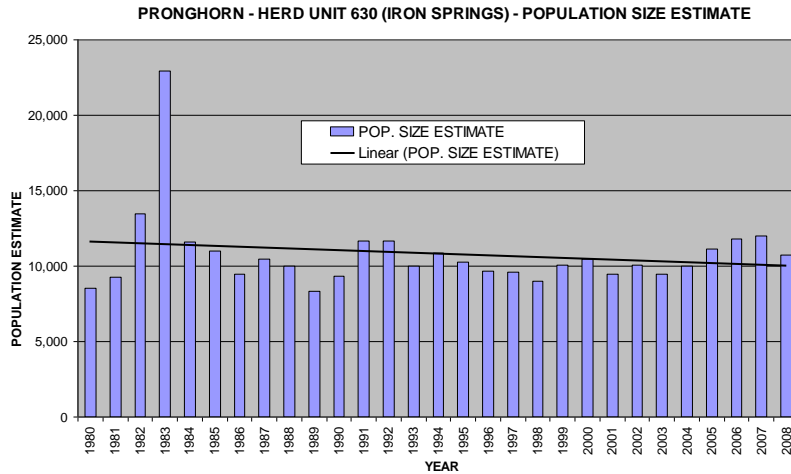


Fig. 3. Wyoming Pronghorn Herd Unit 630 (Iron Springs) Population Estimate

Total harvest for this unit has varied from a high of 3,407 animals in 1983 (just before a very severe winter), to 479 animals in 2001. The long-term trend for total harvest shows a strong decline. It appears that due to poor recruitment and/or survival, that in spite of the fact that the population has stayed fairly stable for the last two decades, the population is not able to support the amount of harvest it once sustained. Harvest over the last decade is less than 50% of the harvest that the unit supported in earlier years. As a result, hunter opportunity has been substantially decreased.

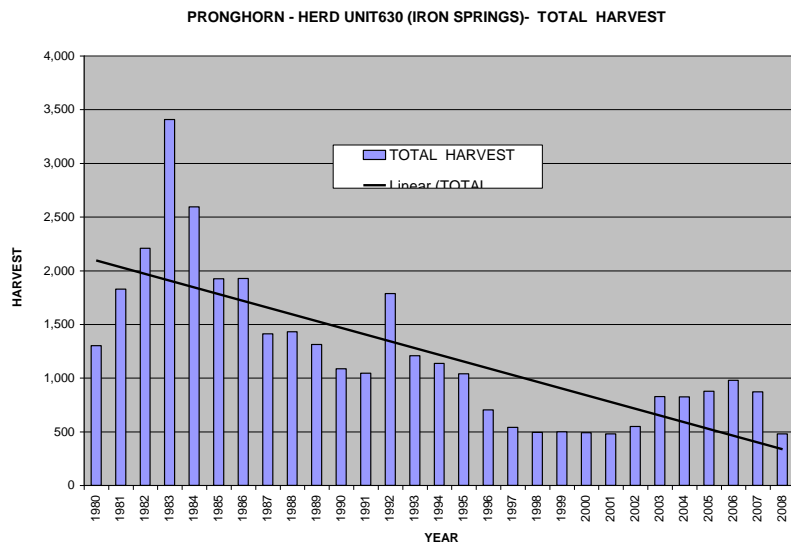


Fig. 4. Wyoming Pronghorn Herd Unit 630 (Iron Springs) Total Harvest

Colorado pronghorn herd DAU A-3 (North Park) is not doing as well as two of the three pronghorn herd units in the Platte Valley. The long-term trend for population size for DAU A-3 is decreasing. The 2008 post-hunt population estimate for the herd is 1,087 animals which are approximately 30% below the long-term objective for population size of 1,500-1,600 animals. The pronghorn population in DAU A-3 has fluctuated substantially over the years, apparently due to the impacts

of severe winters on survival as well as wholesale movements of animals out of the park, also likely caused by severe winter weather conditions. As it is currently represented, this herd has fluctuated from a maximum of 4,427 animals in 1988 to a low of 967 animals in 2009. In addition, the long-term trend for productivity for this pronghorn herd has decreased, indicating that it is not likely that this population will grow substantially in the near future.

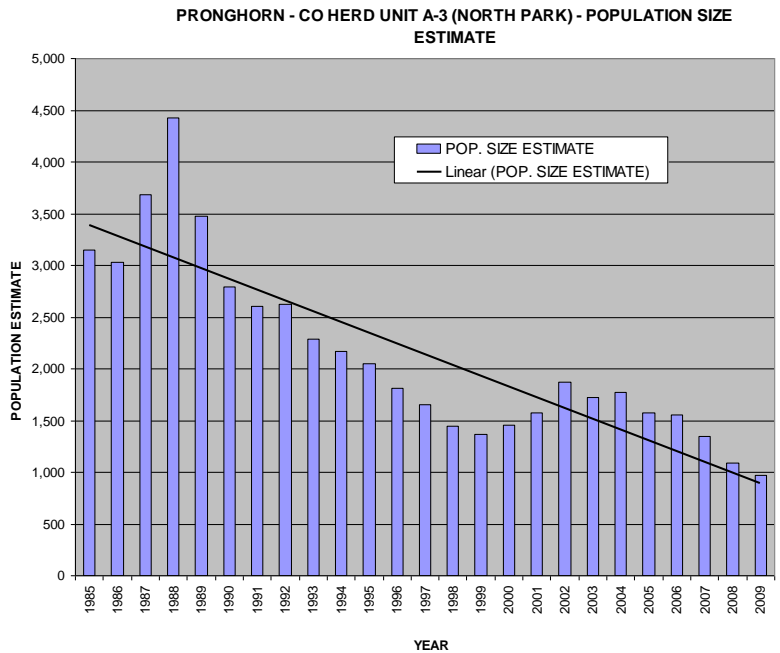


Fig. 5. Colorado Pronghorn DAU A-3 (North Park) Population Estimate

Due to the poor condition and performance of this pronghorn herd, license numbers have been reduced resulting in a decreasing long-term trend for harvest that is about 50% of the amount of harvest that occurred in this herd unit in previous years.

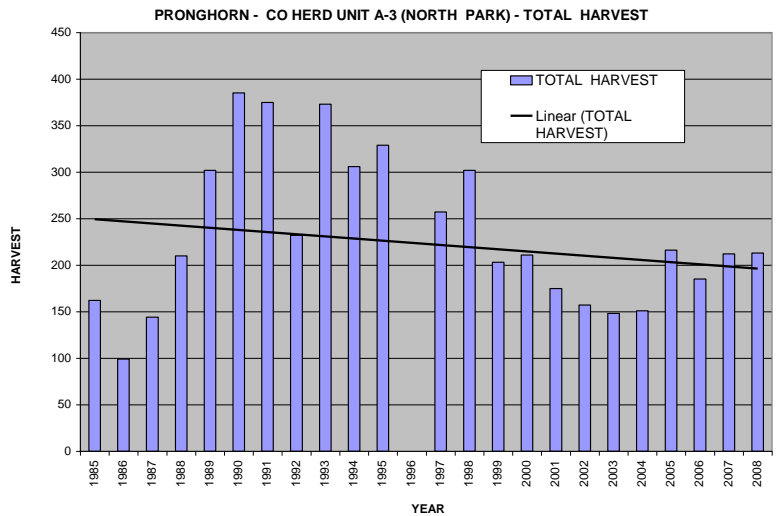


Fig. 6. Colorado Pronghorn DAU A-3 (North Park) Total Harvest

ENERGY DEVELOPMENT PROJECTS FOR SECTION II

Oil and Gas Drilling

Although no new major drilling projects are planned for this section, recently offered oil and gas drilling leases in the North Park, Colorado portion of the section are of concern. Winter range and migration corridors for deer and pronghorn are included in the areas recently offered for oil and gas drilling leases. While a number of these areas were removed from the leasing process, it is important that sportsmen and land managers be made aware of the importance of these habitats that were initially considered for drilling leases.

Wind Energy

The Chokecherry Wind Energy Project slated for development in the northwest corner of this section may likely have substantial impacts on deer and pronghorn. The area listed for development is mapped as winter/yearlong range for mule deer and pronghorn. As currently designed, the project calls for the installation of 675 2-MW wind turbines on 72,835 acres of public and private land, for a density of approximately 6 turbines per square mile. The turbines along with the associated infrastructure of roads, substations, and transmission lines will disturb habitat as well as potentially displace animals (Rowland et al. 2000, Sawyer 2006).

The Chokecherry Wind Energy Project is part of the combined Chokecherry and Sierra Madre Wind Energy Project that proposes building 1,000 2-MW wind turbines on a total of 98,447 acres. The Sierra Madre portion of the project is proposed to be built south and west of the Chokecherry Project in adjacent mule deer and pronghorn habitat. In addition to the construction of the wind turbines, approximately 500 miles of secondary roads will need to be constructed to facilitate construction and maintenance of turbines and ancillary structures. There is little empirical evidence documenting impacts of wind turbines on big game wildlife, but the authors question the wisdom of conducting a project of this scale on public land without additional information on potential impacts to wildlife.

Section III: Routt and Eastern Moffat Counties, Colorado and Western Carbon and Eastern Sweetwater Counties, Wyoming

This section of the report focuses on big game wildlife and Greater Sage-Grouse in the general geographic area of Routt and eastern Moffat counties, Colorado and western Carbon and eastern Sweetwater counties in Wyoming. This geographic area contains 2 deer herd units, 2 elk herd units and 3 pronghorn herd units; Colorado deer D-2 (Bear's Ears), Wyoming Deer Herd Unit 427 (Baggs), Colorado elk E-2 (Bear's Ears), Wyoming Elk Herd Unit 430 (Petition), Colorado pronghorn A-9 (Great Divide), Wyoming Pronghorn Herd Unit 414 (Bitter Creek) and Wyoming Pronghorn Herd Unit 438 (Baggs). This area is part of 2 sage-grouse conservation plans; the Northwest Colorado Greater Sage-Grouse Conservation Plan and the South Central Wyoming Sage-Grouse Conservation Plan. Be aware that the geographic boundary of this section is irregular due to the fact that herd unit boundaries for all 4 big game species are not identical, e.g., herd unit boundaries for elk herd units in the section may not match exactly with herd unit boundaries for deer and pronghorn. For more information on the individual DAUs or Herd Units included in this section refer to the detailed maps, unit descriptions and evaluations in the main body of the report.

MULE DEER

Mule deer populations for this section include two herd units, Colorado D-2 (Bear's Ears) and Wyoming Herd Unit 427 (Baggs).

Colorado D-2 (Bear's Ears) appears to be in good condition. The long-term trend for population is decreasing but this is due to a management decision to lower the long-term objective for the population. The new long-term population objective is 37,800 animals and the 2008 post-hunt population size is 36,200 animals. The long-term trend for harvest in this D-2 is stable to slightly decreasing. A major reason for this decline is the decision to begin using totally limited licenses in 1999 for all deer hunting in the state. Numbers of hunting licenses and harvest

declined in this DAU as well as nearly all herd units in the state as a result of this sweeping management decision.

The deer herd in Wyoming Herd Unit 427 (Baggs) does not seem to be performing as well as the Bear's Ears herd farther south in Colorado. Population size for this deer herd has fluctuated as the result of the effects of severe winter conditions on animal survival. As it is currently represented, this herd increased from a low of 10,412 animals in 1981 to a high of 25,800 animals in 1987. The long-term trend for the population is depicted as increasing, and the long-term population objective is 18,700 animals. The current population estimate, post-hunt 2008, is 16,800 animals.

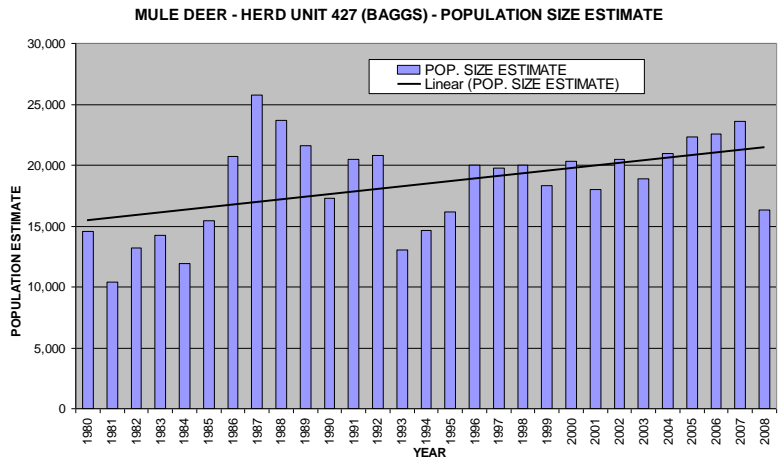


Fig. 7. Wyoming Deer Herd Unit 427 (Baggs) Population Estimate

Total harvest for this herd unit has varied from a high of 4,819 animals in 1980 to a low of 552 animals in 1985. Fluctuations in harvest for this deer herd are the third largest of any herd unit addressed in this report. In 4 different instances, total harvest decreased by 50% or more from the previous year, presumably due to the impacts of weather. These drops in harvest indicate that there were likely significant drops in survival, probably due to resource limitations on winter ranges. The long-term trend for harvest is also decreasing, indicating that this population isn't as productive, or survival rates aren't as high as they once were and the deer herd can't sustain the same levels of harvest that it has in the past. The long-term trend for young/100 females ratios is also decreasing, indicating general resource limitation problems exist with habitat in the herd unit. Large energy development projects looming in the future for this herd unit will likely mean additional loss of habitat or displacement of animals in a deer herd that appears to be struggling to maintain the status quo. If the proposed developments occur, managers will likely need to reduce the population in order for the remaining habitat to support the deer herd over the long term. Such a reduction would further reduce hunting opportunity in this herd unit.

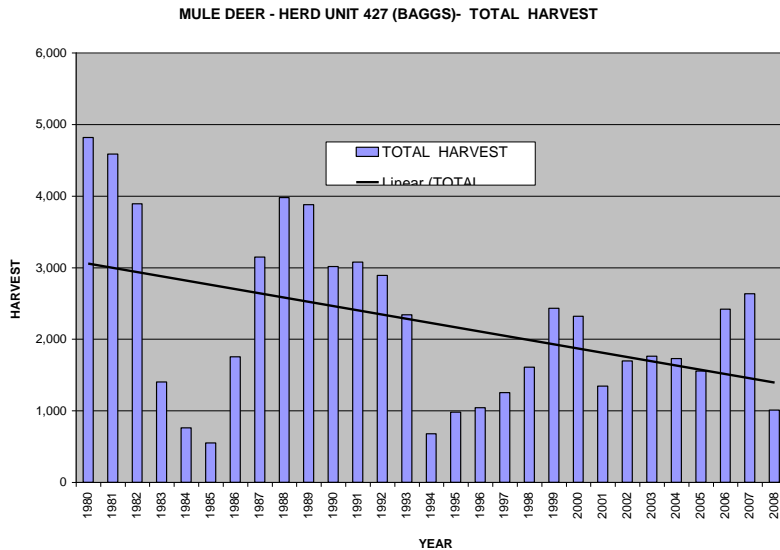


Fig. 8. Wyoming Deer Herd Unit 427 (Baggs) Total Harvest

ELK

The elk population for this section is comprised of 2 herd units, Colorado DAU E-2 (Bear's Ears) and Wyoming Herd Unit 430 (petition).

The elk population in DAU E-2 grew substantially in the late 1970s and 1980s. Starting in the late 1990s a concerted effort was made to reduce the elk herd to densities more in balance with social carrying capacity and available habitat. As it is currently represented this herd has been reduced from a high of 37,589 animals in 1999 to a low of 16,138 animals in 2008. This represents a 57% reduction in population size. As a result of this management action, the long-term trend for population size is decreasing. The new long-term population objective for the DAU is 15,000 to 18,000 animals.

Wyoming Herd Unit 430 (Petition) appears to be in good condition although it is a much smaller elk herd than the Bear's Ears herd adjacent to it in Colorado. The long-term population trend for this herd is stable or slightly increasing and long term trend for harvest is increasing. The post-hunt population estimate for 2008 was 300 animals and the elk population is at the long-term objective of 300 animals.

PRONGHORN

The pronghorn population for this section is comprised of 3 herd units, Colorado DAU A-9 (Great Divide), Pronghorn Hunt Unit 414 (Bitter Creek) and Pronghorn Hunt Unit (438) Baggs.

The pronghorn herd in DAU A-9 appears to be in fair condition with the long-term trend for population increasing. However, this increasing long-term trend is somewhat misleading due to the fact that the reason for the increase in population size is due the addition of new game management units with populations of animals that weren't previously hunted. The long-term trend for harvest is decreasing indicating possible problems with resource limitations that prevent the herd from supporting the level of harvest it sustained in the past.

The pronghorn population in Herd Unit 438 does not appear to be performing as well as the adjacent pronghorn herd to the south in Colorado. This pronghorn population has displayed substantial fluctuations, due to a variety of factors, with weather, including severe winters and drought, being the most significant factor. As it is currently represented, the population has increased from a low of 3,800 animals in 1997 to a high of 13,100 animals in 2005. The long-term trend for the population is stable to slightly increasing. The 2008 post-hunt estimate for

population size is 6,300 animals which is 30% below the long term population objective of 9,000 animals.

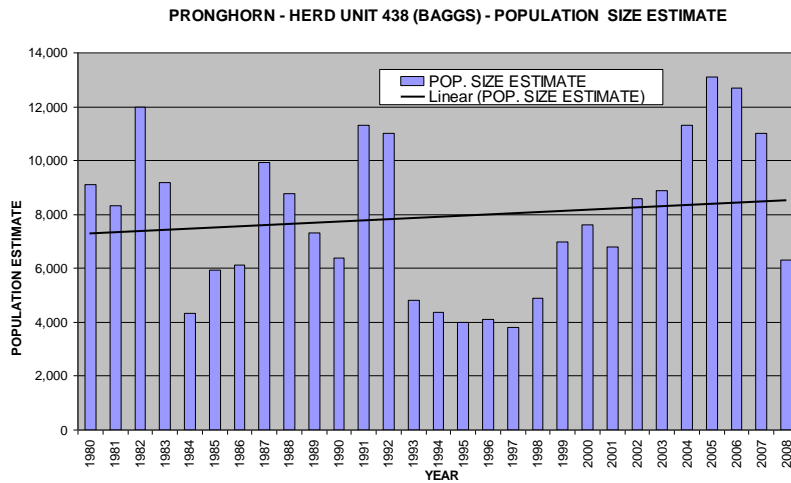


Fig. 9. Wyoming Pronghorn Herd Unit 438 (Baggs) Population Estimate

Total harvest for this herd unit has varied from a high of 2,905 animals in 1983 to a low of 175 animals in both 1997 and 1998. The long-term trend for harvest is decreasing. Total harvest has varied more in this herd unit than for any other big game herd analyzed for this report. These significant fluctuations in harvest demonstrate how weather can have dramatic impacts on big game populations. Loss of habitat due to development will likely exacerbate or aggravate the situation causing further declines in harvest and hunter opportunity.

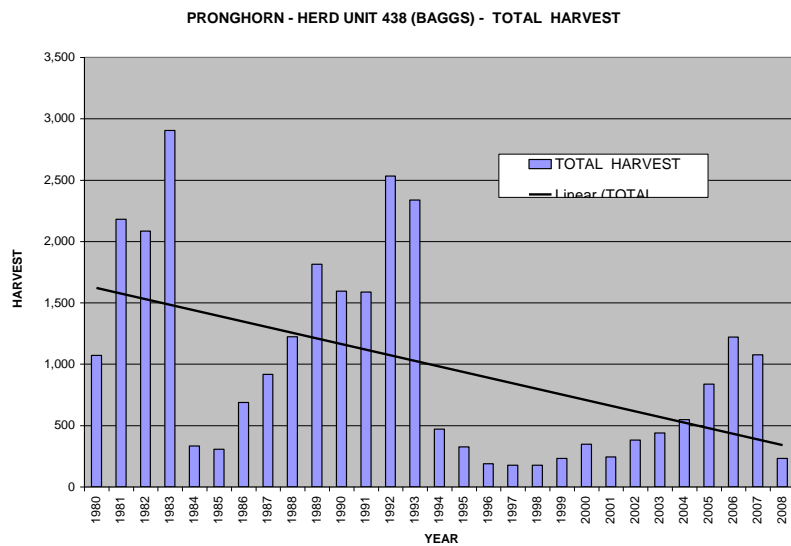


Fig. 10. Wyoming Pronghorn Herd Unit 438 (Baggs) Total Harvest

The pronghorn occupying the Bitter Creek Herd Unit are another herd that aren't performing as well as expected. The 2008 post-hunt population estimate for this herd is 9,300 animals. This is a significant decline from the previous year and is attributed to the severe winter of 2007-2008. The population estimate for this herd has varied from a low of 7,000 animals in 1981 to a high of 22,000 animals in 1992. The long term-trend for the population is increasing. The long-term

population objective for the herd is 25,000 animals, an objective that is unlikely to be obtained without a long period of mild winters and/or significant improvements in habitat.

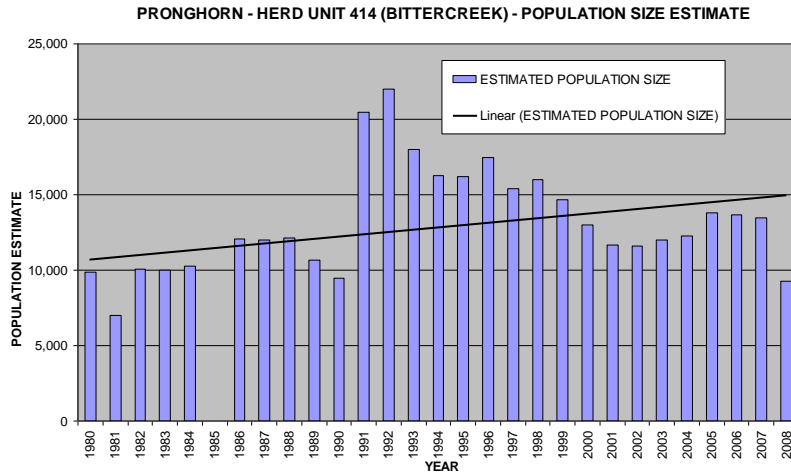


Fig. 11. Wyoming Pronghorn Herd Unit 414 (Bitter Creek) Population Estimate

Total harvest for this herd unit has varied from a high of 4,122 in 1992 to a low of 268 in 2008. The long-term trend for harvest is decreasing. Although the long-term trend for population size is increasing, this herd cannot support the harvest that it once sustained. This indicates that there are resource limitation issues existing for this herd that are affecting recruitment and/or survival. Any loss or degradation of habitat will likely aggravate the problem causing further declines in harvest and hunter opportunity.

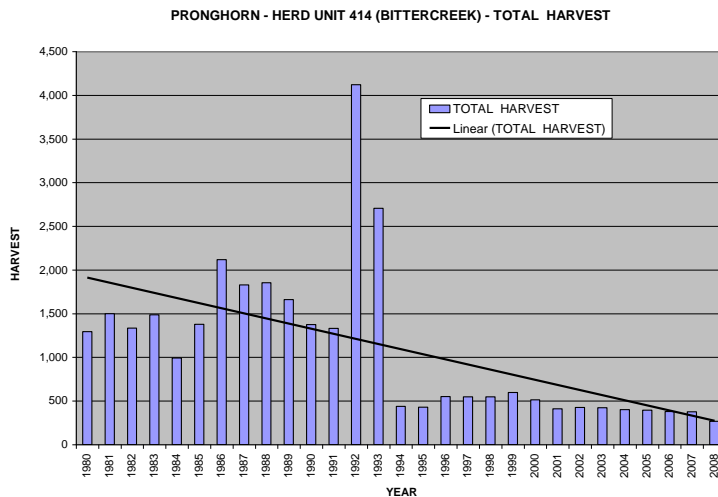


Fig. 12. Wyoming Pronghorn Herd Unit 414 (Bitter Creek) Total Harvest

ENERGY DEVELOPMENT PROJECTS FOR SECTION III

At this point in time, at least 3 major energy projects are active in this section, Desolation Flats, Continental Divide/Creston Natural Gas Development Project and the Atlantic Rim Project. This has fragmented large portions of big game migration corridors as well as crucial winter range (Sawyer 2007). In addition, numerous small projects are also impacting the area. The Sierra Madre portion of the Chokecherry and Sierra Madre Wind Energy Project is also planned for the area.

The Continental Divide-Creston Natural Gas Development Project involves the drilling of up to 9,000 additional wells in an area that currently has 2,200 wells. The proposed area for the project encompasses approximately 1.1 million acres of federal, state and private lands that includes portions of Sweetwater and Carbon Counties. A 15 year construction period with a 30 to 40 year life of project development and operational period is proposed (BLM 2006). A portion of the project area is north of Interstate Highway I-80 and outside of the boundary of the herd unit, but approximately 50% of the mapped project area lies south of I-80 and on both sides of Wyoming Highway 789.

The Atlantic Rim Project proposes drilling and developing up to 2,000 new wells in an area that currently has 200 wells. Approximately 1,800 wells would be drilled to develop coal bed natural gas with 200 wells being drilled to access conventional natural gas (BLM 2007). The proposed area for the project encompasses approximately 270,080 acres of federal, state and private land between I-80 and the Colorado state line and between Wyoming Highway 789 and the continental divide. The life of the project is expected to be 30 to 50 years (BLM 2007).

The Sierra Madre Wind Energy Project involves installing 325 2-MW wind turbines on 25,642 acres of federal, state and private land south of Rawlins, Wyoming in Carbon County. The project would also involve the installation or construction of access roads, underground electric gathering lines, an overhead electric transmission line and electric substations to interconnect the generated power to the electric grid (BLM 2009). The project area lies south of the overland trail, west of Wyoming State Highway 71 and east of Wyoming Highway 789.

All three projects impact important seasonal ranges for mule deer and pronghorn and to lesser extent for elk. In the case of the Atlantic Rim project, important migration corridors for mule deer are also impacted. These three large projects and numerous small projects are a prime example of the issue of cumulative impacts. How much development can occur in an area in the form of individual, independent projects before the area becomes ineffective as wildlife habitat?

Section IV: Western Moffat County, Colorado and Central Sweetwater County, Wyoming

This section of the report focuses on big game wildlife and Greater Sage-Grouse in the general geographic area of Western Moffat County, Colorado and Central Sweetwater County, Wyoming. This geographic area contains 2 deer herd units, 2 elk herd units and 2 pronghorn herd units; Colorado Deer DAU D-1 (Cold Springs), Wyoming Deer Herd Unit 424 (South Rock Springs), Colorado Elk DAU E-1 (Cold Springs), Wyoming Elk Herd Unit 424 (South Rock Springs), Colorado Pronghorn DAU A-11 (Vermillion Bluffs) and Wyoming Pronghorn Herd Unit 412 (South Rock Springs). This section is also included in a portion of the areas covered by the Northwest Colorado Greater Sage-Grouse Conservation Plan and the Southwest Wyoming Sage-Grouse Assessment and Plan. For more information on the individual DAUs or Herd Units included in this section refer to the detailed maps, unit descriptions and evaluations in the main body of the report.

MULE DEER

Mule deer populations in this section of the report include two herd units, Colorado DAU D-1 (Cold Springs) and Wyoming Herd Unit 424 (South Rock Springs).

Colorado Deer DAU D-1 (Cold Springs) is in very poor condition with the long-term trend for population decreasing substantially. The reason for the decline is unknown at this time. The 2008 post-hunt population estimate for this deer herd is 1,448 animals. As it is currently represented, this herd has declined from a maximum of 4,642 animals in 1990 to a minimum of 1,157 animals in 2004. The long-term population objective for the herd is 13,500 animals, an objective that is probably unrealistic and unreachable at this time without substantial habitat manipulation and/or other drastic management actions.

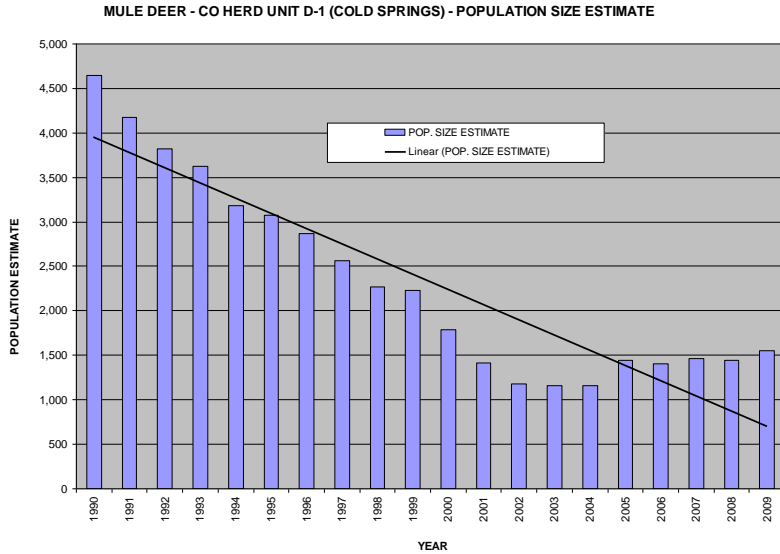


Fig. 13. Colorado Deer DAU D-1 (Cold Springs) Population Estimate

Total harvest for this DAU has ranged from a maximum of 839 animals in 1989 to a low of 48 animals in 2008. The long-term trend for harvest shows a dramatic decline. The 2008 harvest of 48 animals is approximately 6% of the maximum harvest for this deer herd. Needless to say, this has resulted in a significant decrease in deer hunting opportunity in this DAU. In addition, even with a 66% reduction in deer density, productivity continues to be on a downward trend almost guaranteeing that deer harvest will not recovery substantially anytime in the near future.

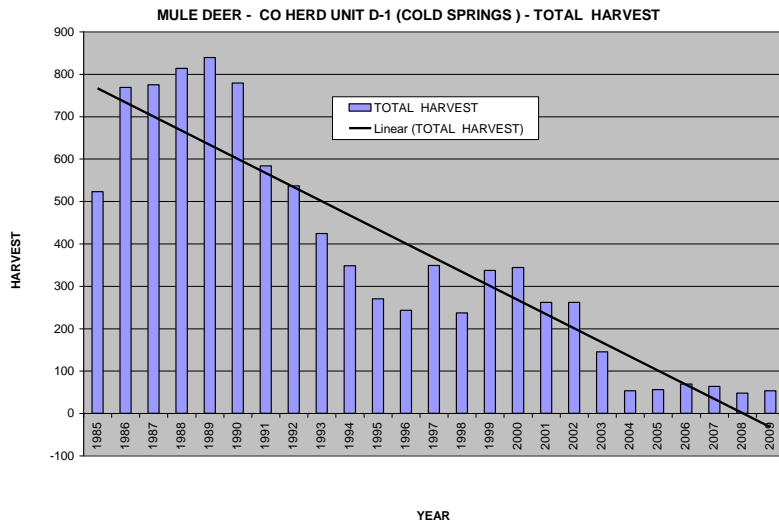


Fig. 14. Colorado Deer DAU D-1 (Cold Springs) Total Harvest

Wyoming Deer Herd Unit 424 (South Rock Springs) is performing better than the adjoining deer herd to the south in Colorado, but the long-term trend for this population is also declining. According to current models this population has varied from a high of 11,700 animals in 1986 to a low of 5,000 animals in 1995. The long-term objective for population size is 11,750 animals but the population remains below the objective at 7,100 animals despite conservative hunting season recommendations.

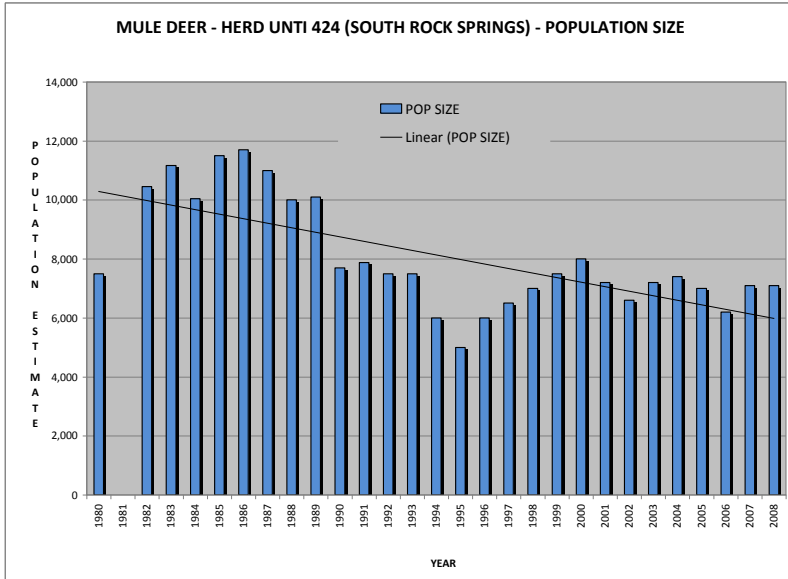


Fig. 15. Wyoming Deer Herd Unit 424 (South Rock Springs) Population Estimate

Total harvest for this unit has varied from a high of 1,204 animals in 1980 to a low of 128 animals in 1995. The long term trend for harvest is showing a strong decline. Total harvest for 2008 was 386 animals. Readers are reminded that since this herd unit became a limited entry area in 1990, license numbers have been reduced dramatically to reduce hunting pressure and harvest.

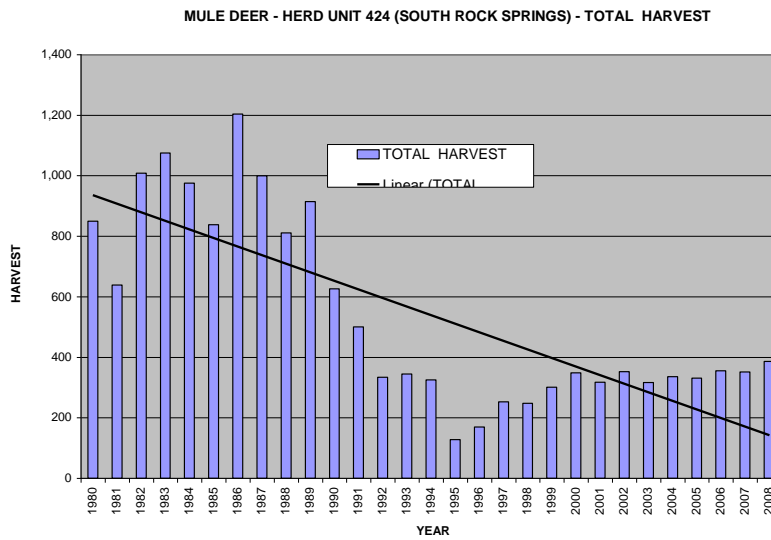


Fig. 16. Wyoming Deer Herd Unit 424 (South Rock Springs) Total Harvest

ELK

The elk population for this section consists of 2 herd units, Colorado DAU E-1 (Cold Springs) and Wyoming Herd Unit 424 (South Rock Springs).

Both herds are performing well, showing increasing long-term trends for population size. and both populations are over their respective long-term objectives for population size. Both herd units are above their respective long-term population objectives of 1,810 animals for Colorado and 1,000

animals for the Wyoming portion. The post-hunt population size for the Colorado DAU was 2,044 animals and the Wyoming herd unit was 1,580 animals. In addition both herds are showing increasing long-term trends for harvest. Hunting opportunity has grown through the years, primarily for antlerless animals, as the elk herd in this section has increased.

Wyoming Herd Unit 424 has been managed as a limited quota elk hunt area since the 1980s. While it is a limited quota unit it isn't considered as a trophy bull hunting area as the units to the south are being managed by Colorado and Utah. This inconsistency in management philosophy causes some problems as there is significant movement of animals across state lines in this area. Colorado and Utah are severely restricting hunter opportunity in their states in order to increase bull/cow ratios and provide hunters the opportunity to harvest an older age class bull. While Wyoming is managing this herd unit as a limited quota area, they are not restricting numbers of hunters as severely as Colorado and Utah. As a result, Wyoming hunters often have the opportunity to harvest a trophy class bull without having to wait an extended period of time to hunt in a quality or trophy unit.

PRONGHORN

Pronghorn populations for this section consist of 2 herd units, Colorado DAU A-11 (Vermillion Bluffs) and Pronghorn Hunt Unit 412 (South Rock Springs). There is significant movement of animals across the state line from Wyoming, especially in winter in this section. While interchange of animals occurs all along the state line, there appears to be a substantial corridor or conduit in the vicinity of Vermillion Creek and Shell Creek.

The pronghorn population in DAU A-11 has fluctuated substantially over the years. Some increases in population size have been attributed to immigration of animals from Wyoming during severe winters such as the winter of 1983-84. As is currently represented, population size for the unit has varied from a high of 2,766 animals in 1992 to a low of 919 animals in 2004. The long-term trend for population size is decreasing and the long-term objective for population size for this DAU is 3,200 animals. The 2008 population size was 1,205 animals.

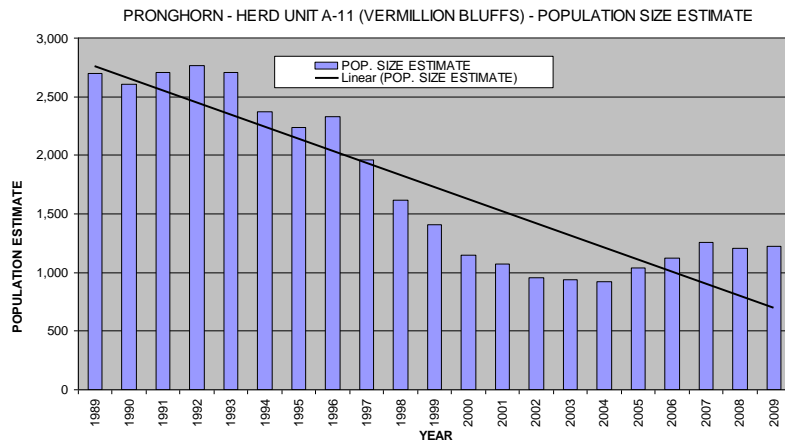


Fig. 17. Colorado Pronghorn DAU D-11 (Vermillion Bluffs) Population Estimate

Total harvest for this DAU has varied from a high of 714 animals in 1988 to a low of 47 animals in 2006. Long-term trend for harvest is decreasing. Total harvest in the DAU for 2008 was 60 animals, a 92% decrease from the high harvest of 1988. Needless to say, this dramatic decrease in harvest has seriously impacted hunter opportunity.

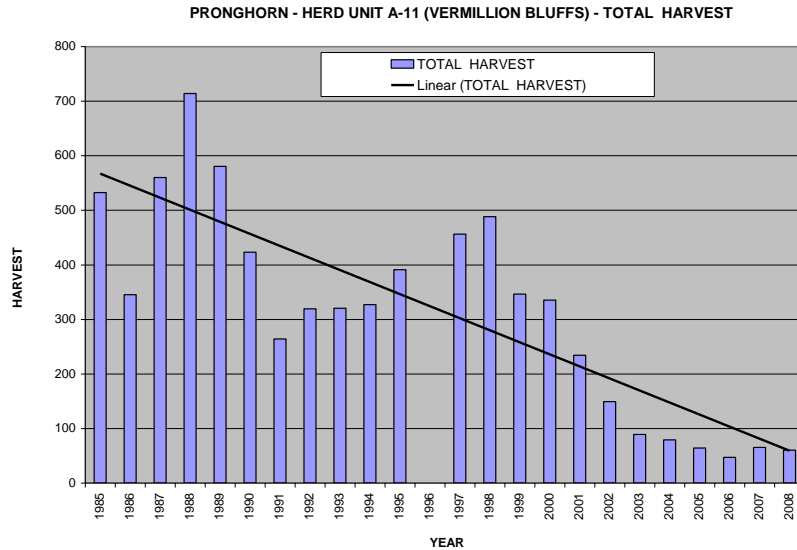


Fig. 18. Colorado Pronghorn DAU D-11 (Vermillion Bluffs) Total Harvest

The pronghorn population occupying Wyoming Herd Unit 412 is performing somewhat better than the pronghorn population across the state line to the south in Colorado. Population size for this herd unit has varied from a low of 2,600 animals in 1980 to a high of 6,000 animals in 2005. The long-term trend for this population is increasing and the long-term population objective is 6,000 animals. The population size for 2008 was 5,400 animals.

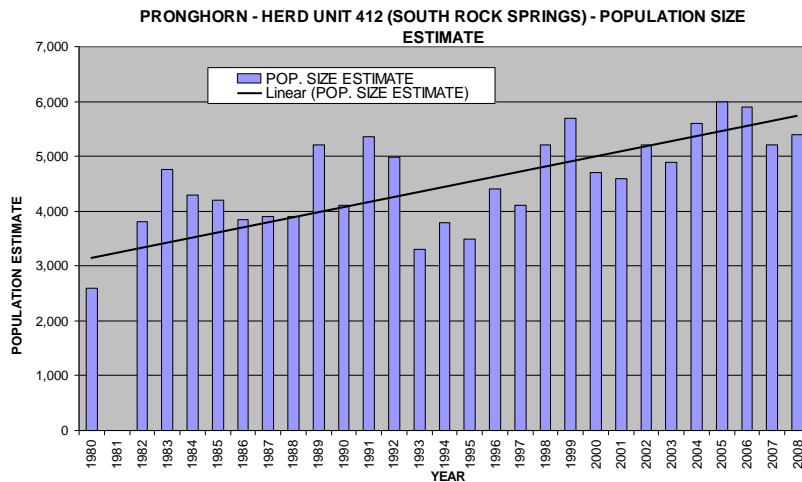


Fig. 19. Wyoming Pronghorn Herd Unit 412 (South Rock Springs) Population Estimate

Total harvest for this herd unit has varied from a high of 1,327 animals in 1990 to a low of 121 animals in 1995. The long-term trend for total harvest is decreasing. Total harvest for 2008 was 519 animals. While the decline in harvest is not as severe for this unit as the Colorado unit to the south, hunter opportunity has been impacted significantly.

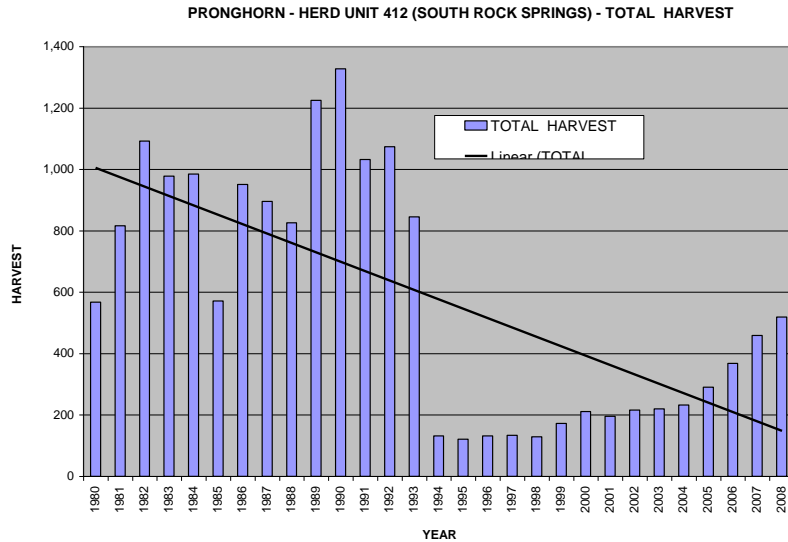


Fig. 20. Wyoming Pronghorn Herd Unit 412 (South Rock Springs) Total Harvest

ENERGY DEVELOPMENT PROJECTS FOR SECTION IV

At this point in time there is 1 major energy development in the section that has the potential to threaten big game wildlife, Greater Sage-Grouse and their habitat. The Hiawatha Regional Energy Development Project involves further development of natural gas fields in the Vermillion Basin area in Sweetwater County, WY and the East and West Hiawatha/Sugarloaf Fields in Moffat County, CO (BLM 2006).

The project involves approximately 157,361 acres of mixed federal, state and private lands in the above mentioned areas. The project includes drilling and developing up to 4,208 wells with 40-acre downhole well spacing per section. It is estimated that $\frac{2}{3}$ (2,805) of the potential wells could be located within the Wyoming portion of the project area and the remaining $\frac{1}{3}$ (1,403) could be located in the Colorado portion of the project area (BLM 2006). According to the EIS, 16.84% of the total project area would receive some form of surface area disturbance and 5.13% of the area would receive long term disturbance for the 20 to 30 year construction life and 30 year operational life of the project (BLM 2006).

SPECIES SUMMARY

Mule Deer

Five of the 6 deer herds we examined were below their long term population objectives. In addition, 3 were more than 10% below their long term population objective and had decreasing population trends (Table 1). Two more herds were below their population objective but had increasing population trends. Only 1 of the herds examined was at or above its long term population objective and had an increasing population trend. Only 2 of 6 deer populations evaluated would be considered healthy, robust deer populations with good recruitment and survival. Based on past experience, virtually all 6 herds are located in environments where they are vulnerable to severe winters and/or drought. Also, deer herds with decreasing long-term trends for population size and productivity are especially vulnerable in situations where there is the potential for habitat loss and/or degradation. Two of the 6 deer herds evaluated for this report are in this category. Also, trends for harvest and numbers of hunters were decreasing in 5 of the 6 deer herds with only 1 herd showing a stable trend for harvest and hunter numbers. We are concerned that additional direct and indirect impact of energy development, when added to the current situation for mule deer, will have a negative impact on many of the deer populations in the study area.

Table 1. Summary of 2008 deer population data and data trends

Herd Unit or DAU	Population Objective	Population Estimate	Population Trend	Young/100 Females	Young/100 Female Trend	2008 Harvest	Harvest Trend	Hunter Trend
D-1	13,500	1,448	Decrease	71.9	Decrease	48	Decrease	Decrease
D-2	37,800	36,022	Decrease	75	Decrease	3,689	Decrease	Decrease
D-3	6,000	5,000	Decrease	70	Stable	315	Decrease	Decrease
424	11,750	7,100	Decrease	59	Increase	386	Decrease	Decrease
427	18,700	16,800	Increase	45	Decrease	1,010	Decrease	Decrease
541	20,000	25,000	Increase	52	Decrease	1,261	Stable	Stable

Elk

The situation for elk seems to be almost exactly opposite of what is occurring for mule deer. Of the 7 elk herds we evaluated, all are at or above their current long term population objective. Five are at or above objective with an increasing population trend. One herd is at objective with a stable population trend, and 1 herd is at objective but with a declining population trend. Trends for harvest are increasing for all 7 herds and trends for numbers of hunters are increasing for 6 of the herds and stable for 1. For a variety of reasons, elk don't seem as vulnerable as mule deer to severe winters and habitat issues. However, there is significant concern that energy development may displace elk populations, causing increased game damage problems on private lands. Such issues will likely result in demands for further reduction in long term population objectives for elk. If long-term population objectives for elk are reduced, it will eventually result in further decreases in harvest and hunter opportunity.

Table 2. Summary of 2008 elk population data and data trends

Herd Unit or DAU	Population Objective	Population Estimate	Population Trend	Young/100 Females	Young/100 Female Trend	2008 Harvest	Harvest Trend	Hunter Trend
E-1	1,810	2,044	Increase	49.9	Decrease	445	Increase	Increase
E-2	16,500	17,673	Decrease	68.8	Increase	4,243	Increase	Increase
E-3	4,500	11,540	Increase	52.9	Stable	1,141	Increase	Increase
424	1,000	1,580	Increase	46	Decrease	537	Increase	Increase
425	4,200	8,100	Increase	35	Decrease	1,405	Increase	Increase
430	300	300	Stable	NA	Decrease	41	Increase	Increase
533	6,000	8,400	Increase	46	Increase	1,536	Increase	Stable

Pronghorn

We analyzed information for 9 pronghorn herds for this evaluation. The situation for pronghorn seems to be very similar to what was observed for mule deer. Seven of 9 of the herds were below their long term population objectives, the other 2 were at or above objective. Of the 9 herds, 4 were below population objective but had an increasing population trend. Three were below objective and had a declining population trend. Of the 2 herds that were above their long term population objectives, one had an increasing population trend and 1 had a stable population trend. Long term trends for harvest were decreasing in 7 of the 9 herds and increasing for 2. Long term trends for hunter numbers shows 6 decreasing, 2 increasing and 1 stable. As with mule deer, the pronghorn herds with decreasing trends for productivity along with negative

trajectories for population growth seem to be very vulnerable. Not only do they struggle with the normal problems of drought and severe winters, but loss or degradation of habitat due to energy development places an additional burden on these herds.

Table 3. Summary of 2008 pronghorn data and data trends

Herd Unit or DAU	Population Objective	Population Estimate	Population Trend	Young/100 Females	Young/100 Female Trend	2008 Harvest	Harvest Trend	Hunter Trend
A-3	1,600	1,087	Decrease	34.7	Decrease	213	Decrease	Increase
A-9	15,800	12,351	Increase	54.3	Increase	2,656	Increase	Increase
A-11	3,200	1,205	Decrease	52.4	Decrease	60	Decrease	Decrease
412	6,000	5,400	Increase	53	Decrease	519	Decrease	Decrease
414	25,000	9,300	Increase	47	Decrease	268	Decrease	Decrease
438	9,000	6,300	Increase	38	Decrease	231	Decrease	Decrease
528	5,000	9,000	Increase	39	Decrease	842	Decrease	Decrease
529	600	760	Stable	45	Decrease	126	Increase	Stable
630	12,000	10,700	Decrease	49	Decrease	480	Decrease	Decrease

Moose

Although there are 2 moose herds in the study area, only 1 had enough reliable data to allow us to conduct a thorough analysis. The North Park moose herd is at its long term population objective with an increasing population trend. In addition trends for harvest and hunters are also increasing.

Table 4. Summary of 2008 moose data and data trends

Herd Unit or DAU	Population Objective	Population Estimate	Population Trend	Young/100 Females	Young/100 Female Trend	2008 Harvest	Harvest Trend	Hunter Trend
M-1	500	493	Stable	51.1	Decrease	94	Increase	Increase

Greater Sage-Grouse

As with big game, Greater Sage-Grouse are affected by a multitude of natural factors as well as anthropogenic factors. From the information we analyzed it appears that sage-grouse populations in all of the study area have been declining throughout the 20th century and the first decade of this century. It is our concern that habitat destruction and degradation caused by energy development in sage-grouse habitat will be an additional factor that will further suppress sage-grouse populations.

The most reliable long term data sets that can be used to evaluate Greater Sage-Grouse populations appear to be long term trends for hunter harvest data and lek count data (total number of leks counted and total number of birds counted on all leks).

Of the 4 conservation plans reviewed in this report (North Park Greater Sage-Grouse Conservation Plan, Northwest Colorado Greater Sage-Grouse Conservation Plan, South West Wyoming Sage-Grouse Conservation Assessment and Plan and South Central Wyoming Sage-Grouse Conservation Plan), all 4 showed dramatic declines in long term trends for hunter harvest.

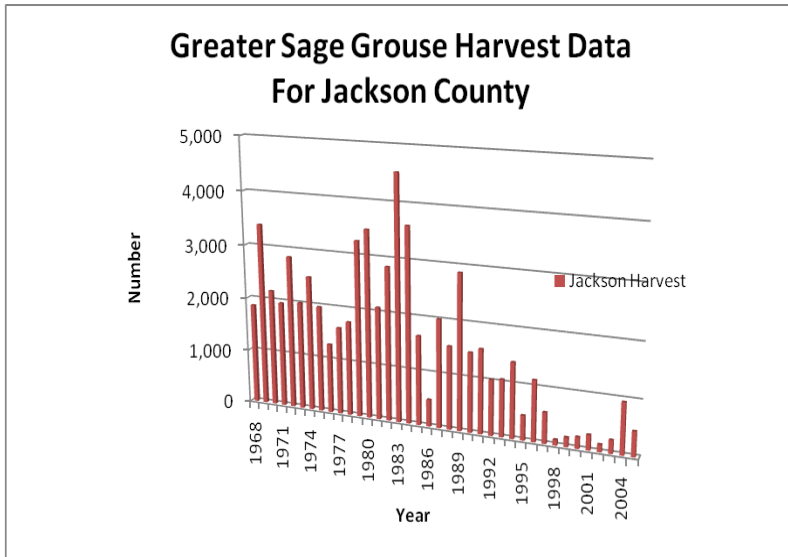


Fig. 21. Greater Sage-Grouse harvest for Jackson County (North Park) form 1968 – 2005.

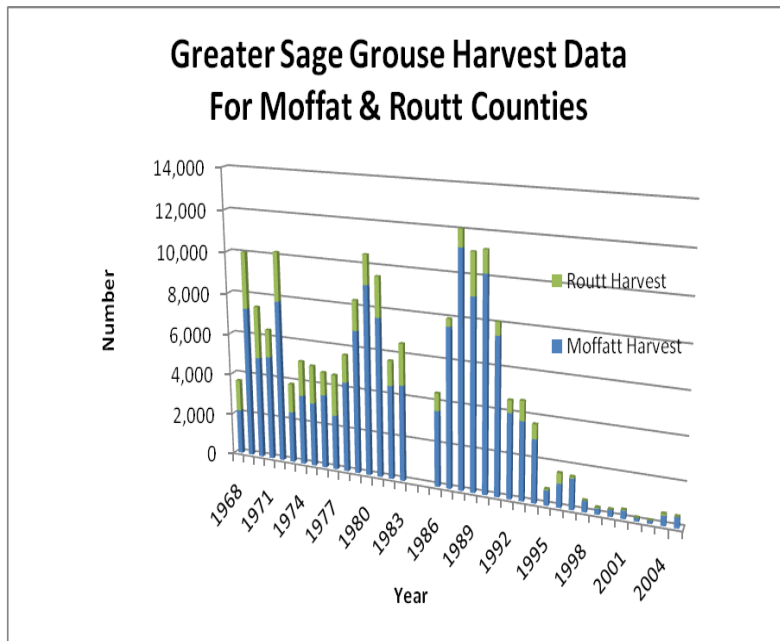


Fig. 22. Greater Sage-Grouse Harvest for Moffat and Routt Counties (1968-2005).

Sage-Grouse Harvest Data from SWSGCA 1982-2005

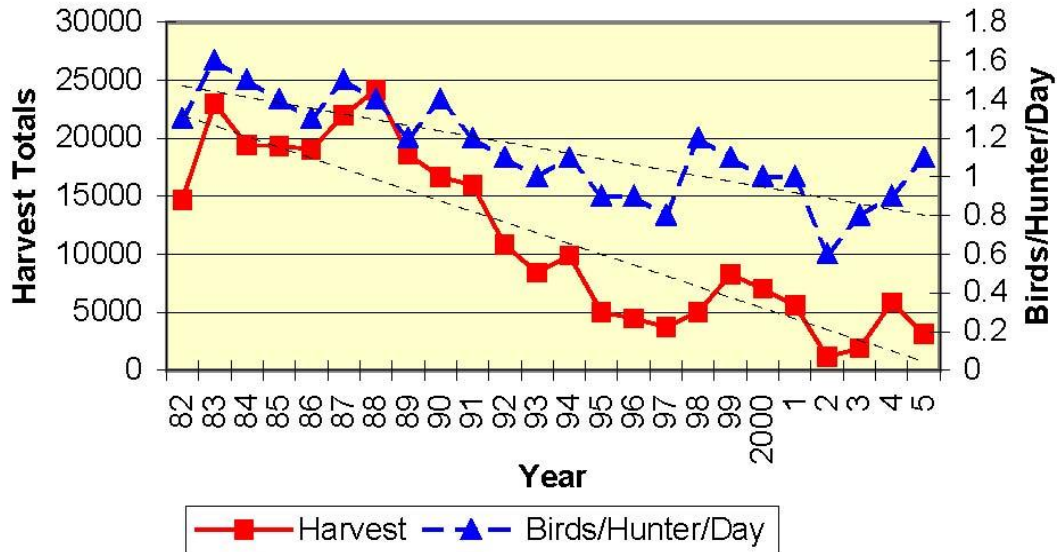


Fig. 23. Greater Sage-Grouse Harvest for Southwest Wyoming (1982-2005)

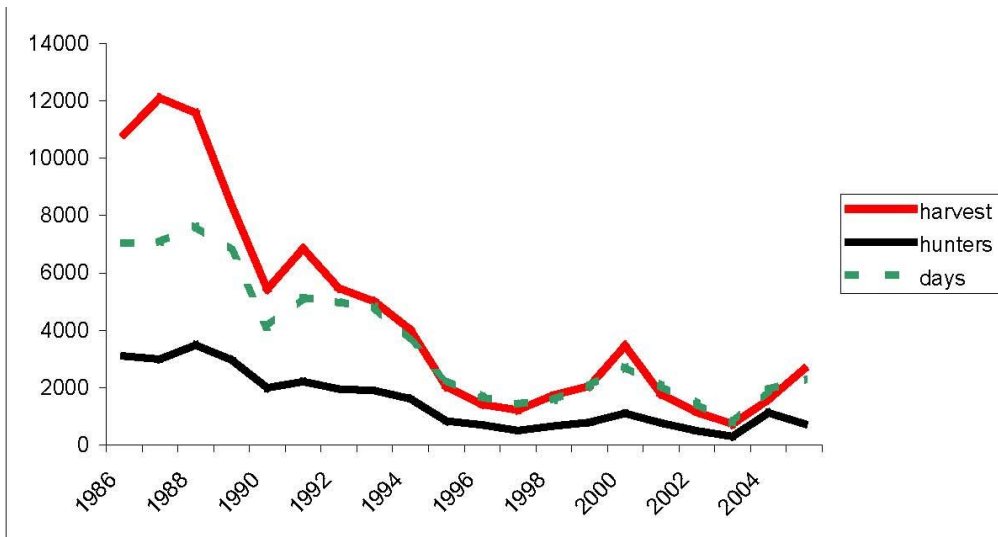


Fig. 24. Greater Sage-Grouse Harvest for South-Central Wyoming (1986-2006).

Long-term trends for lek count data for all 4 plans were either stable or increasing slightly from 1996 to present. However, there is a caveat for long term trends for lek count data. It appears that the more effort that is expended in conducting lek counts, that more leks and birds are

detected as a result of the renewed interest and effort to collect reliable data about sage-grouse populations. The apparent increase in numbers of birds and active leks observed may be a more accurate indicator of survey intensity instead of an actual increase in numbers of birds.

CONCLUSIONS

Wildlife managers have known for years that a variety of factors are responsible for the condition of big game populations throughout the west as well as the area addressed in this report. Severe winters, extended drought, loss of habitat to development and noxious weed invasion are just a few of the factors that can have detrimental impacts on big game populations. Elk populations seem to be in good condition but this analysis has shown that mule deer and pronghorn populations covered in this report seem to be extremely vulnerable to these environmental factors. Only 2 of the 6 deer population and 5 of the 9 pronghorn populations would be considered healthy, robust populations with good recruitment and survival. With this vulnerability to current environmental conditions clearly demonstrated, further loss and fragmentation of habitat due to current and impending energy development in the area is very likely to cause additional declines in big game populations, or make it very difficult for these populations to recover to anywhere near the numbers that occurred in the past.

Although the current recession has slowed industrial development in Colorado and Wyoming for the past 2 years, approved energy exploration and development projects are being constructed at a rapid pace throughout portions of both states covered in the report and they impact large parcels of public and private land. Furthermore, additional energy development projects are being proposed for the same area. Unless measures are taken to reduce or mitigate the effects of energy development (drilling activities [development of well pads, pipelines, roads and other infrastructure], development of wind power, power line construction, etc.) it is the opinion of many in the field of wildlife management that there will be significant negative impacts to native wildlife and their habitats. As a result of the impact of current and planned energy development, big game wildlife and Greater Sage-Grouse in the above mentioned areas will likely have difficulty maintaining current population levels. Hunting and watchable wildlife opportunities for sportsmen and other outdoor enthusiasts will likely decline as wildlife populations struggle to survive and adapt in the face of direct and indirect loss of habitat due to energy development.

ACKNOWLEDGEMENTS

Dr. Steve Torbit, National Wildlife Federation (NWF), was the impetus for the project and provided ideas and support. Dwayne Meadows, Wyoming Wildlife Federation, also provided information and shared his excellent background knowledge of the North Platte River Valley of southern Wyoming. This study was made possible because of the generous support of the George B. Storer Foundation. Data used in this analysis came from Colorado Division of Wildlife (CDOW) and Wyoming Game and Fish Department (WG&F). We would also like to take this opportunity to thank Rebecca Schilowsky of WGF and Mary Lloyd, Darby Finley and Jeff Yost of CDOW for responding to our frequent requests for information.

The data used in this report has been collected by many unnamed CDOW and WG&F personnel over the years. We greatly appreciate their dedication, diligence and professionalism in collecting, transcribing and filing the information. Without their efforts this report would have not been possible.