SHOSHONE NATIONAL FOREST

FOREST PLAN MONITORING REPORT FOR FISCAL YEAR 2005

NOVEMBER 2006

Prepared by the

Shoshone National Forest

Planning Staff

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Introduction

This report is the Shoshone National Forest's Forest Plan Monitoring and Evaluation Report for fiscal year 2005. The format for this report is different from those produced over the last few years. The Forest started its Forest Plan revision in 2005 and is beginning a transition to the new planning regulations in formatting this monitoring report. Under the new planning regulations, the annual monitoring report will only focus on those items that were monitored in any given fiscal year. In the past, our monitoring reports included information on all monitoring items whether they were funded in a particular year or not. This will lead to a more focused report that highlights each fiscal year's monitoring focus. Much of the other remaining information in past monitoring reports is now available in the Comprehensive Evaluation Report that is being prepared for plan revision. The latest copy of that report is available on our web page.

This report includes discussions for various resource areas. Each resource discussion includes a summary of trend data components that relate to Forest Plan direction and monitoring, including the latest information for fiscal year 2005. The trend discussions provide context for what has happened to the resource during Forest Plan implementation. In this version of the report, the presentation of the data is similar to past monitoring reports. Over the next couple of years, we will transition the presentation and format of this report to more closely follow what will be produced after the revision of the Forest Plan in 2008.

The assessment of what changes, if any, need to be made to the Forest Plan because of the monitoring information is not included in this report. The need for change assessments are currently ongoing as part of the revision process. That information is available on our Web site.

Water use

Activity and condition trends

Forest Plan goals have been met and management direction has been implemented.

Several new water right applications were reviewed to ensure the requested uses would not conflict with existing uses and rights, including instream flows quantified by the Big Horn adjudication. Potential conflicts were resolved as the application was processed through the State Engineer's Office or through special use permit clauses, once a right was granted.

Work relative to the filing of water right claims with the State Engineer's Office, per agreement under the Big Horn adjudication interlocutory decree, continued. Final location and volume information on instream flow quantification points were provided. Additionally, the Forest awarded a water rights investigation contract for detailed survey of non stock-related discreet water uses listed in the decree. Much of this information has been submitted to the State for review and approval. Any outstanding information will be provided to the State by early 2005. Closure on the decree should be reached shortly thereafter. Before issuance of the contract, the Forest and State agreed that due to court ordered time constraints, stock-related discreet water uses would be accepted as listed in the decree rather than field investigated via the contract, but they would be validated over time as staffing and funding permit.

During the water rights investigation, it became apparent that holders of special use permits that include water rights are lax in following State water law. There is a need to educate permittees on water law requirements and ensure permits are adequately administered and enforced.

Watersheds

Activity and condition trends

The science of wildland watershed management has evolved considerably since the Forest Plan was developed. The evolution of the science and the results of Plan monitoring are reflected in annual monitoring reports and certain amendments to the Plan, specifically the oil and gas leasing (USDA Forest Service 1996) and allowable sale quantity (USDA Forest Service 1994) amendments.

The oil and gas leasing and allowable sale quantity efforts incorporated a first generation watershed cumulative effects analysis screening process using best available information at that time. Model assumptions and weaknesses were identified as part of the process. Modeling results were presented in tabular form because spatial presentation opportunities were limited.

The modeling identified three categories: validated, unvalidated, and potential watersheds of concern. Watersheds of concern are those where impacts have reached a level of disturbance at which watershed condition and stream health are degraded beyond their abilities to recover in the short term. Validated watersheds of concern are those where field data and observation have verified this determination. Unvalidated watersheds of concern appear to have reached this level of concern but this has not been verified by field data and observation. Potential watersheds of concern appear to be approaching this level of concern but the impacts and conditions are not yet verified. This latter group is being monitored.

On the Clarks Fork Ranger District, there were ten validated, two unvalidated, and two potential watersheds of concern. On the Wapiti Ranger District, there were three validated, one unvalidated, and two potential watersheds of concern. On these two districts, the large Yellowstone fires of 1988 were a major impact leading to identification of these watersheds as areas of concern. On the Wind River Ranger District, two potential watersheds of concern were identified, mainly due to logging in the 1960s through early 1980s. This identification led to monitoring and inventory of watershed condition across the Forest and to implementation of watershed improvement projects in targeted areas. Examples since the last annual monitoring report include inventory of approximately 40 stream reaches, obliteration of approximately 50 miles of road in the Horse Creek watershed, and interdisciplinary best management practice reviews on several timber sales and commercial livestock grazing allotments. The best management practice reviews are providing valuable information on whether implementation is occurring and if so, its effectiveness. If implementation is not occurring, or is found to be ineffective, the review identifies the reasons. Overall, implementation is occurring and is effective in protecting soil and water resources. Concerns with proper riparian area management and proper road drainage have been identified, resulting in changes in allotment management and road design.

Through these inventory, monitoring, and improvement project efforts, there is a better understanding of overall watershed health across the Forest; the information should be very useful during Plan revision.

Figure 1. Best management practice reviews.

Year	Activity
1999	Bear Creek allotment
1999	Burroughs Creek Salvage Sale
2001	Lodgepole II Timber Sale
2001	Dick Creek allotment
2002	Rock Creek allotment
2002	Wood River/Kirwin allotments
2002	East Fork allotment
2002	Enos Creek allotment
2003	West Goose Timber Sale
2003	Union Pass allotment
2003	Wolf Creek I & II Sales/Unit 40 Fire
2004	Atlantic Creek Salvage
2004	Rattlesnake II Timber Sale
2004	Maxon Basin allotment
2004	Belknap allotment
2005	Fish Lake Creek allotment

In recent years, the Forest has completed four watershed assessments that used Ecosystem Analysis at the Watershed Scale (USDA Forest Service 1995) as a guide. These assessments resulted in comparisons of current watershed health against reference health. Where significant deviation was documented, management recommendations to improve health were identified.

Forest products

Activity and condition trends

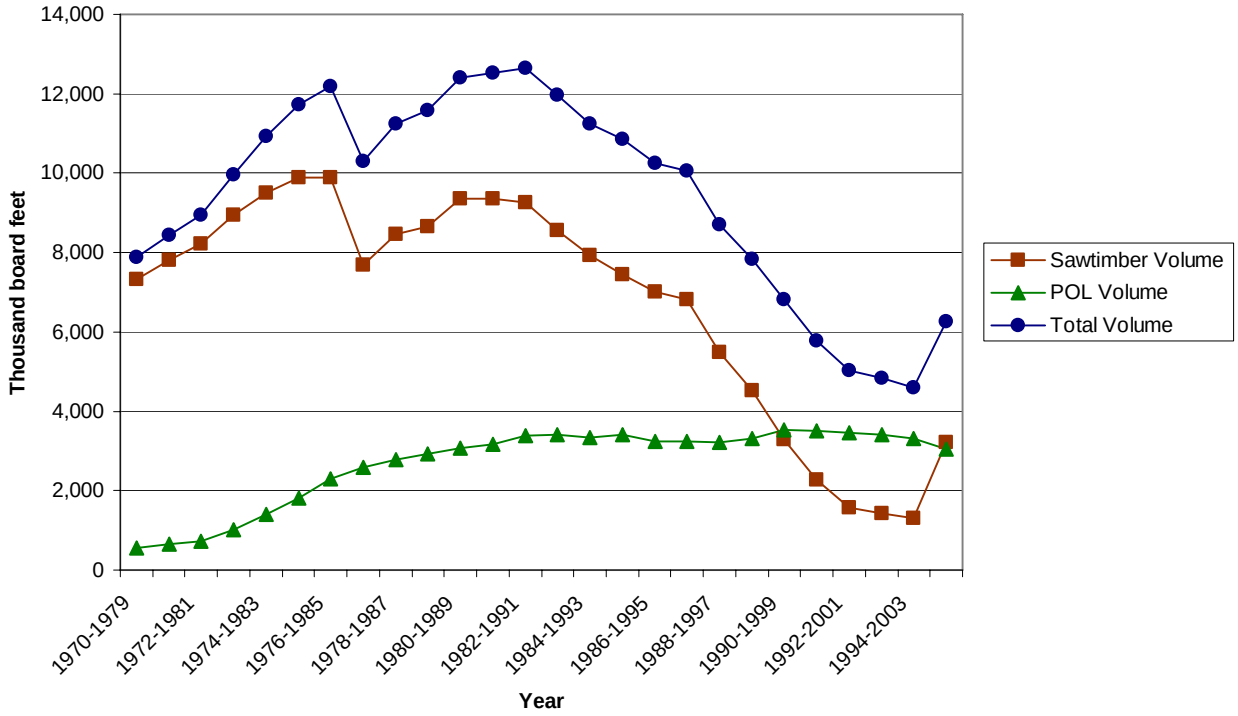
The 1986 Forest Plan set an average annual Allowable Sale Quantity (ASQ) volume of 11.2 million board feet. The Forest Plan set this amount as the maximum allowable harvest of timber from the suitable timber land base of approximately 86,000 acres. The 1986 decision indicated that all this volume would be sawtimber. The 1986 decision predicted an additional 1.2 million board feet of products other than logs[1] would be sold annually. This additional volume would not count toward the ASQ.

In the early 1990s, monitoring indicated that timber data and assumptions used in the Forest Plan analysis had overestimated the amount of timber the Forest could produce. This, combined with the 1988 fires that burned over 9,000 acres of suitable timber land, resulted in the need to amend the Forest Plan. The Forest Plan was amended in August 1994 (USDA Forest Service 1994) with a recalculated ASQ. The amendment changes the annual average volume to 4.5 million board feet. The amended amount includes 4.3 million board feet of sawtimber and 0.2 million board feet of products other than logs. The amendment also predicts an additional 3.0 million board feet of products other than logs would be sold annually. The amendment directs that all salvage volumes offered for sale would count toward ASQ. This decision was made to address events such as the 1988 wildfires.

Based on data shown in Figure 5, it is possible to look at some general trends on the Forest by certain periods.

[1] Products other than logs includes posts, poles, firewood, etc.

Figure 2. Average annual harvest for rolling ten-year periods.



Data from Figure 5 are displayed in Figure 2 using a rolling 10-year average to smooth out the year-to-year fluctuations that make it difficult to discern trends. Total average annual volume harvested has fallen steadily since 1990, until the increase in 2004. The graph also shows that products other than logs volume has remained relatively stable during that period. The majority of the decline has occurred in the form of reduced sawtimber harvest.

In comparing these data to the Forest Plan decisions, the volume of products other than logs sold since 1986 has averaged slightly over 3.0 million board feet per year. This amount is very close to the volume predicted in the 1994 Allowable Sale Quantity amendment of 3.0 million board feet, though it is above the 1.2 million board feet predicted in the 1986 Forest Plan decision.

Sawtimber volume sold has fluctuated greatly since 1986, as shown in Figure 3. The period from 1995 to 2004 was influenced by the large volume sold in 2004. Without the 2004 volume, the average for 1995 through 2003 would have been 1.2 million board feet.

The large fluctuations in total sawtimber volume are related to the offering of salvage sales in response to large disturbance events such as the 1988 wildfires and the recent insect epidemic.

Other than in the late 1980s, total sawtimber sold has been below the Forest Plan ASQ. As a point of clarification, volume that contributes to ASQ is harvested from suitable timber lands. Not all volume sold was from suitable lands. As a result, this discussion does not provide an exact accounting of ASQ harvested, but it does provide adequate information to assess the trends of ASQ harvest over the life of the Forest Plan.

Figure 3. Sawtimber volume sold, in million board feet.

Timber period	Average annual total sawtimber volume sold	Forest Plan average annual allowable sale quantity
1986 - 1990	11.2	11.0
1991 - 1994	3.4	11.0
1995 - 2004	3.2	4.5

Figure 4. Acres harvested in fiscal years 1984 through 2005.

Fiscal Year	Acres Harvested
1984	0
1985	248
1986	472
1987	272
1988	1,470
1989	548
1990	494
1991	499
1992	2,007
1993	709
1994	553
1995	33
1996	206
1997	51
1998	24
1999	85
2000	47
2001	69
2002	19
2003	323
2004	198
2005	828

Figure 5. Volume sold and harvested, by product, in thousand board feet. [2]

Fiscal year	Sawtimber sold	POL sold	Total		Sawtimber harvested	POL harvested	Total
1970	5,777	427	6,203		11,519	501	12,020
1971	3,735	348	4,083		11,569	388	11,957
1972[3]	--	--	1,177		--	--	3,678
1973	--	--	3,777		--	--	7,798
1974	--	--	3,335		--	--	6,121
1975	--	--	5,200		--	--	2,852
1976[4]	26,731	796	27,527		3,996	341	4,337
1977	7,723	1,370	9,093		5,557	998	6,555
1978	9,999	969	10,968		5,108	1,107	6,216
1979	6,784	635	7,419		17,187	351	17,538
1980	10,479	1,404	11,883		7,682	842	8,525
1981	7,911	1,213	9,123		10,653	1,574	12,227
1982	8,466	2,884	11,350		3,625	2,415	6,040
1983	9,107	4,174	13,281		5,366	1,749	7,115
1984	6,978	4,421	11,398		6,490	4,052	10,542
1985	4,720	5,103	9,823		11,575	4,345	15,920
1986	4,743	3,806	8,549		8,799	4,360	13,159
1987	15,410	3,262	18,672		14,639	4,824	19,463
1988	12,054	2,270	14,324		12,351	3,509	15,860
1989	13,620	2,106	15,726		5,982	2,109	8,091
1990	10,516	2,437	12,953		14,709	2,360	17,069
1991	7,104	3,292	10,395		10,055	2,489	12,544
1992	1,327	3,170	4,497		6,926	3,300	10,226
1993	2,730	3,441	6,172		4,222	2,975	7,197
1994	2,254	5,176	7,430		3,965	3,790	7,755
1995	284	3,420	3,705		1,141	3,796	4,936
1996	2,850	3,784	6,634		2,234	3,627	5,861
1997	2,241	2,970	5,211		1,732	3,975	5,707
1998	2,315	3,359	5,674		385	5,230	5,615
1999	1,158	4,250	5,408		1,289	4,092	5,380
2000	400	2,202	2,602		2,020	1,611	3,631
2001	112	2,923	3,035		1,068	2,895	3,962
2002	4	2,466	2,471		630	2,619	3,250
2003	1,410	2,458	3,868		1,044	2,591	3,635
2004	21,373	2,538	23,911		5,762	2,465	8,226
2005	4,369	2,596	6,965		11,939	2,731	14,670

[2] Numbers in this table were rounded up to the next whole number.
[3] Cut and sold data by product are not available for fiscal years 1972 through 1975 (totals only).
[4] Fiscal year 1976 data include the transition quarter.

Livestock grazing

Activity and condition trends

A number of changes in commercial livestock grazing activities have occurred on the Forest over the past 70 years and have accelerated in the past 10.

From a high point in the early 1900s, commercial sheep grazing has been in a steady decline on the Forest. The initial decline in sheep numbers was primarily due to adjustments to stocking rates that reflected a more sustained use of the range resource. The decline in sheep animal unit months continued through the 1970s and continued to decline in subsequent decades, though at a slower rate, reflecting declining demand and increased importation of wool and mutton from overseas. The last 10 years have seen the removal of all but one commercial sheep-grazing permit due to an increase in predator/livestock conflicts and concern over the potential for disease transmission from domestic sheep to bighorn sheep.

In contrast to commercial sheep use, the levels of permitted[5] cattle grazing and demand for allotments have changed little for many decades. The influence of cattle grazing on the rangeland resource has lessened considerably. Improved livestock management, consolidation with vacant sheep allotments, where applicable, and construction of off site water sources have led to improved conditions of both upland and riparian rangeland.

In the past five years, drought has resulted in a decrease in actual use animal unit months–a trend reflected in Figure 6. Permitted cattle use animal unit months are not affected by this.

[5] Permitted levels are set for a ten-year period in the allotment management plan. Authorized use levels are set annually in the permittees' operating instructions and may or may not be the same as the permitted use. The difference between permitted and authorized use constitutes non-use.

Figure 6. Authorized commercial livestock grazing use since 1986, 1,000 animal unit months (some numbers were rounded).

Year	Cattle/horse AUM	% Forest Plan	Sheep AUM	% Forest Plan	Total AUM	% Forest Plan
Forest Plan	78	100	25	100	103	100
1986	55	70	4	17	58*	56
1987	59	75	2	10	61	59
1988	56	72	2	11	59*	57
1989	58	74	2	11	60	58
1990	64	82	2	11	67*	64
1991	58	75	2	8	59*	57
1992	49	62	1	5	50	48
1993	56	71	1	7	57	56
1994	54	68	0	2	54	52
1995	57	72	0	1	57	55
1996	57	72	1	7	58	56
1997	54	69	2	8	56	54
1998	58	74	1	7	60*	58
1999	57	72	1	7	58	56
2000	57	72	1	7	58	56
2001	48	62	1	4	49	48
2002	37	47	0	2	37	36
2003	36	45	0	2	36	35
2004	45	58	1	2	45*	44
2005	44	56	0.5	2	44.5	43

*These numbers do not add up due to rounding.

Figure 7. Commercial livestock grazing use since 1986.

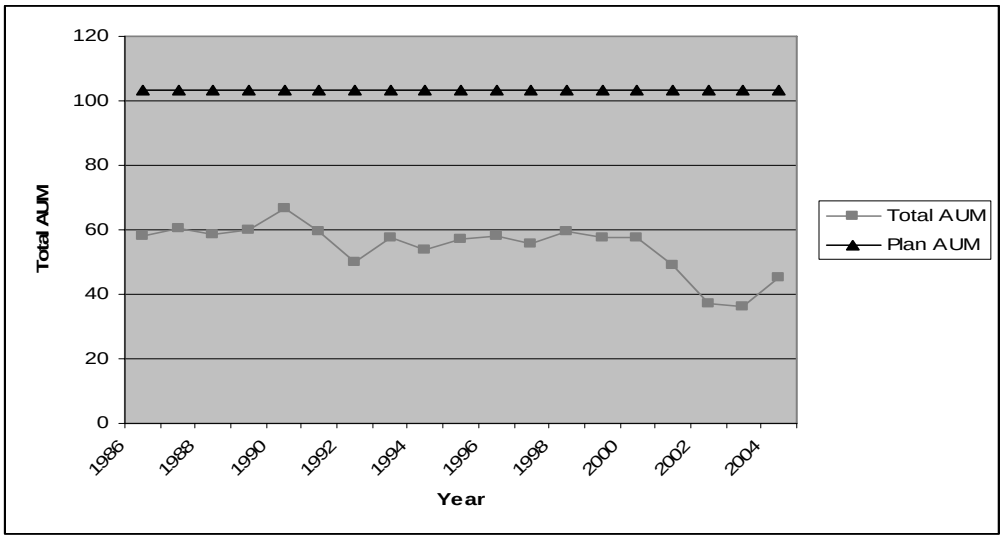
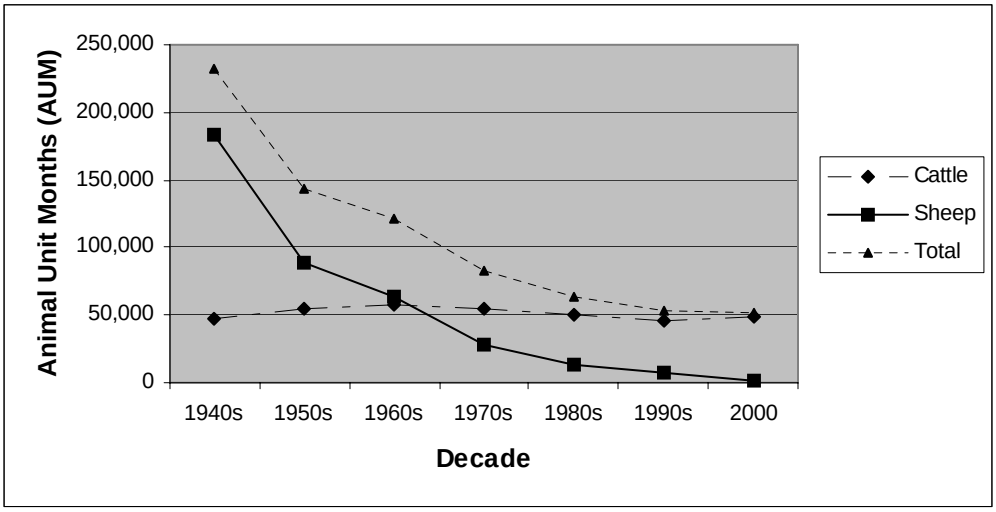


Figure 8. Historic commercial livestock use, by decade.



Special uses

Activity and condition trends

The Forest Service uses special use authorizations (permits) to allow private or other government entities to occupy, traverse, or use National Forest System lands. Special use authorizations fall into two broad categories: recreation special uses such as outfitter/guide authorizations, recreational cabins, and resorts; and non-recreation special uses such as roads, ditches, pipelines, communication sites, and utility lines.

A key aspect of special use permits is that they authorize use over a specified period (generally not to exceed 20 or 30 years, but with provisions for renewal). In many situations, the authorized use is for a shorter period, e.g., one season, one event, or the life of the project.

Through recreation special use authorizations, commercial and non-commercial partners provide a variety of opportunities for the public. Permitted activities and associated facilities on the Shoshone include developed campgrounds, ski areas, lodges, organization camps, and recreation residences. Many facilities, such as lodges and recreation residences, are privately owned facilities residing on National Forest System lands, while others, e.g., campgrounds, are government-owned but managed under a special use permit.

Group events, competitive events, recreation events, and outfitting and guiding services (commercial and non-commercial) are also authorized under recreation special use permits. Outfitting and guiding operations include trail rides, rafting, fishing, big game hunting, pack trips, snowmobiling, and sled dog tours. Outfitting occurs both in and outside designated wilderness.

Inquiries for new authorizations for traditional activities and activities not currently authorized on the Forest are common. In addition to inquiries for traditional horse-based outfitted uses, inquiries are very high for outfitted activities not currently authorized on the Forest, such as bicycle tours, guided nature tours, and ice climbing. Funding constraints have not allowed the completion of the required processes for new permits. The Forest's

top priority in funding recreation special use authorizations is the administration of existing uses, with an emphasis on those involving potential risks to human health and safety.

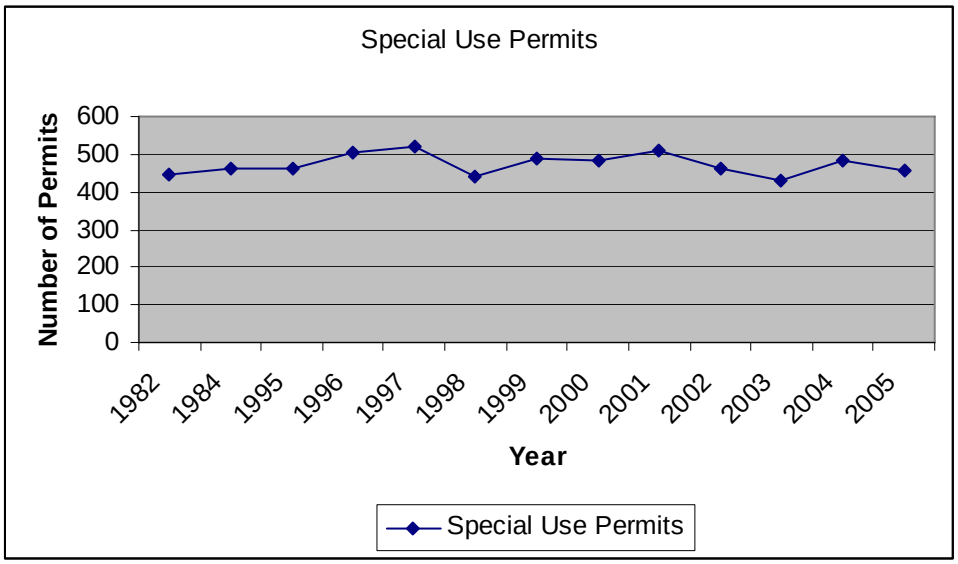
The number of many other recreation-based authorizations has also remained constant for several reasons. New authorizations for recreation residence authorizations have remained at pre-1986 levels because Forest Service policy precludes issuance of new authorizations for these uses. Due to limited capacity for potential expansion and the lack of demonstrated public need for expansion of these privately provided recreation services, the number of authorizations for organization camps, e.g., Boy Scouts camps, skiing, and resorts has largely remained constant.

Numbers of non-recreation uses have increased over the last 15 years. Most of the increases have been in water uses such as pipelines and ditches, and in the number of road use authorizations that provide access to private lands located within the Forest boundary. New requests for these types of uses are authorized if they are found to be consistent with current Forest Service policy, the Forest Plan, and if potential environmental impacts can be mitigated successfully.

Figure 9. Special use permit categories by year, 1982, 1984, and 1995 through 2005.

Special use type	1982	1984	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Organization camp	3	3	3	3	3	3	3	3	3	3	3	3	3
Resort	17	17	17	19	19	18	18	18	19	18	18	18	18
Skiing	3	3	4	4	4	4	4	4	4	4	4	4	4
Recreation residence	100	100	100	100	100	95	100	100	100	100	100	100	100
Outfitter/guide	110	118	118	132	135	100	147	134	127	121	91	126	97
Minerals	--	4	11	19	28	40	24	17	16	18	18	--	--
Road use authorizations	--	12	34	34	33	38	37	37	35	35	40	40	38
Research	--	1	--	--	15	17	16	13	19	5	6	8	7
Utilities/communications	--	67	38	38	37	46	46	48	46	42	47	47	47
Water use	--	78	79	82	79	74	75	74	93	84	89	90	90
Miscellaneous	--	65	--	76	70	8	21	35	48	30	16	45	54
Forest total	448	461	460	507	523	443	491	483	510	460	432	481	458

Figure 10. Special use permits by year, 1982, 1984, and 1995 through 2005.



Land ownership

Activity and condition trends

Landownership adjustment

Land ownership adjustment through purchase and exchange is an important tool for meeting the goal of improving the efficiency of land management and meeting resource management objectives.

The landownership pattern on the Shoshone National Forest is highly consolidated, with few inholdings of private land within the Forest boundary. Acquisition projects in the last fifteen years have further improved this pattern with the acquisition of a large number of inholdings on the Greybull Ranger District.

Acquisition of other inholdings is desired, but limited by other Forest priorities, the willingness of sellers, and the ability to obtain funding for acquisition of high priority parcels.

Figure 11. Shoshone National Forest acreage for 1986, 1991, and 2005.

Year	Acres
1986	2,433,125
1991	2,432,990
2005	2,437,218

Figure 12. Acres of land disposed.

Year	Transaction	Acres
1986	Wyoming Game and Fish	161
1988	Goodyear	3
1989	Julien	1
1991	Stuart	3
1991	B4 Ranch	1
1996	South Fork exchange	157
1997	Les Terry	<1
1998	TE Ranch exchange	55
	Total	382

Figure 13. Acres of land acquired.

Year	Transaction	Acres
1986	Wyoming Game and Fish	160
1991	Deer Creek trailhead	1
1992	Kirwin	3,843
1996	South Fork exchange	103
1998	TE Ranch exchange	365
2002	Dunrud	589
	Total	4,530

Access and travel management

Activity and condition trends

The following set of definitions is intended to help the reader better understand this section.

Transportation definitions

Forest road. A forest road is one that is wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources.

Unauthorized road. An unauthorized road is a road that is not a forest road or a temporary road and is not included in the forest transportation atlas.

Temporary road. A temporary road is a road authorized by contract, permit, lease, other written authorization, or emergency operation, not intended to be part of the forest transportation system and not necessary for long-term resource management.

Functional class. A road may be classified as one of three categories.

- Arterial roads provide service to large land areas and connect with other arterials or public highways.
- Collector roads serve smaller land areas than arterials and connect arterials to local roads or terminal facilities.
- Local roads are *s*ingle purpose roads that connect terminal facilities with collectors or arterials.

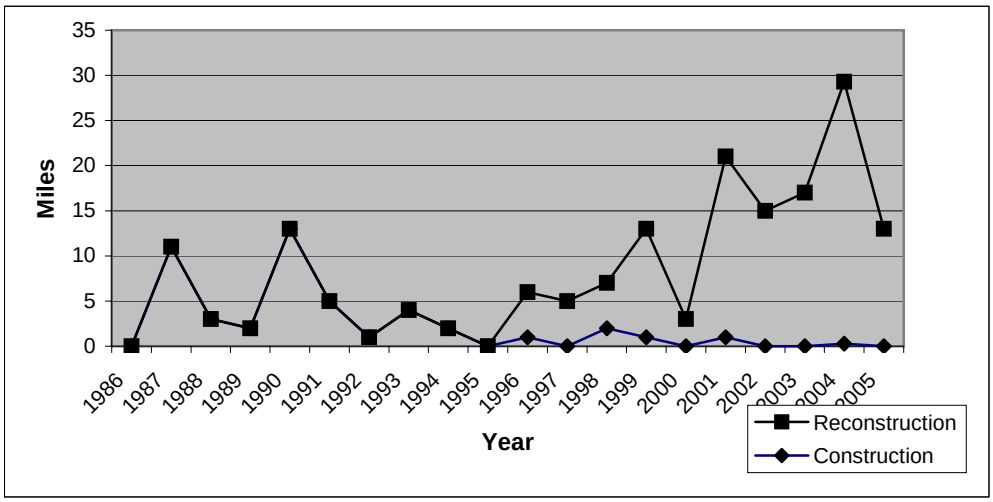
Maintenance level is the level of service provided by, and maintenance required for, a specific road.

- Level 1 is assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed one year. Basic custodial maintenance is performed.
- Level 2 is assigned to roads open for use by high-clearance vehicles. Traffic is normally minor.
- Level 3 is assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Level 3 roads are generally low speed, single lane, with spot surfacing.
- Level 4 is assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most are double lane and aggregate surfaced.
- Level 5 is assigned to roads that provide a high degree of user comfort and convenience. Normally level 5 roads are double lane, paved facilities.

Since 1986, new road construction has remained at a fairly consistent level, under four miles per year. Vegetative treatment activities generate the primary need for new road construction. Existing roads were decommissioned to balance the miles of new roads, or the newly constructed roads were closed to highway vehicles upon completion of the activity for which they were constructed. Most of the new roads constructed on the Forest are local roads.

In the same period, levels of reconstruction have fluctuated. Reconstruction is directly related to activities such as timber sales and the capital investment and deferred maintenance programs. Vegetation management programs have experienced an increase in funding recently, which accounts for the majority of miles of road reconstruction. The majority of reconstruction work has been on local and collector type roads.

Figure 14. Annual miles of forest road constructed/reconstructed, 1996 through 2005.

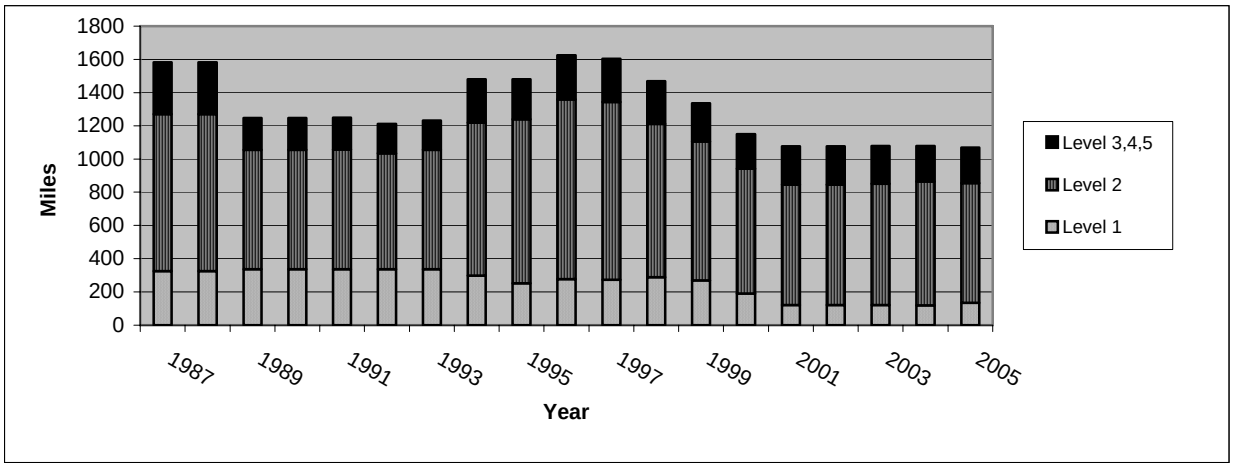


The overall miles of forest roads have declined since 1987, although the ratio of miles in each maintenance level has remained fairly consistent. A peak in the mid-1990s of total road miles was likely due to active inventorying of two-track roads existing at the time and a lack of guidance on how to categorize this new set of routes, e.g., forest road versus unauthorized road.

Annual road maintenance activities continue to be performed, with roads in maintenance levels 3, 4 and 5 receiving the majority of funding due to their use as primary routes and

access ways to Forest facilities and uses. The majority of roads on the Forest are within the maintenance level 2 classification.

Figure 15. Total miles of forest road, by maintenance level, 1987 through 2005.



In 2002, Forest personnel completed a Forestwide roads analysis designed to evaluate the Forest's road system. The objective of the roads analysis process was to provide decision makers with critical information that they may use to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions. The results of the analysis include:

- The existing roads designed for passenger cars (maintenance levels 3, 4 and 5) are adequate for access to and within the Forest, although there are areas where increased public access is a goal.
- Adequate funding for maintaining this basic subset of roads is lacking.
- There are environmental issues involving roads that include wildlife, watershed, and soil resources largely due to the age of the roads system and the maintenance backlog.
- Though there may be needs for additional access for resource management, it is not expected that those additions will be to the main (maintenance level 3, 4 and 5) road system.

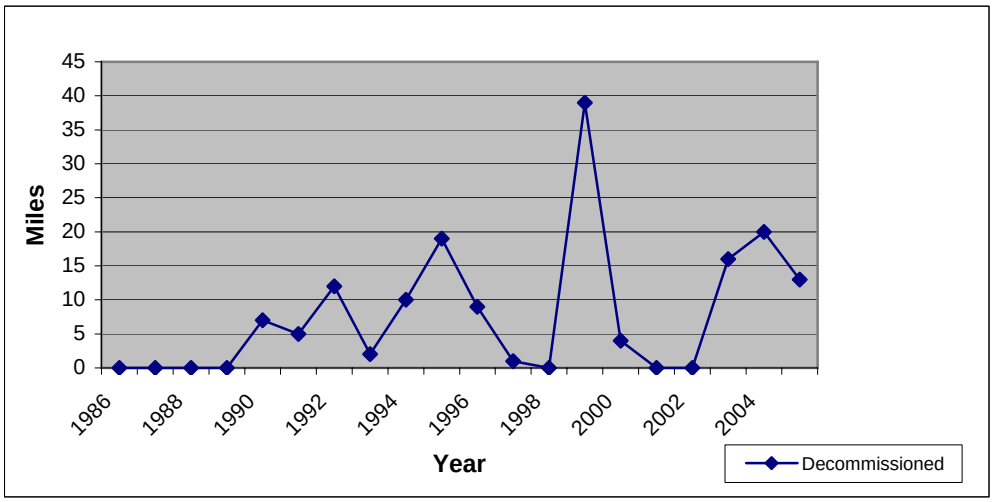
An emphasis on decommissioning roads not needed for resource management, administrative use, or public access and roads causing resource damage in the 1990s resulted in fairly consistent achievement of goals during that decade. Decommissioning strategies range from complete removal of the template and corridor from the landscape, which is essentially obliteration, to constructing closure devices to eliminating use by highway vehicles and restoring the template to natural drainage patterns and vegetation. Decommissioning occurred on both forest and unauthorized roads and will continue as needed to eliminate resource damage and remove routes not needed for access for the short or long term.

The purpose of the Forest's strategy of not increasing net miles of roads is to mitigate cumulative impacts, which were a significant issue in the oil and gas leasing analysis (1992) and the ASQ analysis (1994). Implementation of the strategy requires that the number of miles of new construction not exceed the number of miles of road decommissioned Forest-wide. For each running five-year period beginning October 1, 1994, the cumulative number of new miles of forest road constructed should not exceed the cumulative number of miles

of road decommissioned. Therefore, as new construction is planned, decommissioning of other roads is planned and implemented. Additionally, any temporary roads constructed or utilized for vegetative treatment activities must be closed upon completion of the activity.

Since the no net gain of roads policy was adopted in 1994 (USDA Forest Service 1994), a total of seven miles of new roads were built, and 105 miles of road were decommissioned, totaling 98 more miles of road decommissioned than constructed. The five-year average of roads constructed for the period ending in fiscal year 2004 is 0.2 miles. The five-year average of roads decommissioned for the same period is 5.4 miles. The trend since the 1994 Forest Plan amendment is illustrated in Figure 16. Though the total number of roads increased in the middle to late 1990s, a decrease followed. The inventory has been stable for the last several years.

Figure 16. Annual miles of road decommissioned, 1986 through 2005.



Wildlife

Activity and condition trends

Wildlife habitat on the Shoshone National Forest is likely the one of the most intact and unaltered in the lower 48 states. Due to the abundance of wilderness and roadless areas, most connectivity corridors for wildlife have not been impacted by management activities. As with most of the western United States, there has been an expansion of development along the Forest boundary; this is currently impacting wintering wildlife. Currently, most winter range is only minimally impacted by exotic species or loss of forage. Approximately 90 percent or more of the watersheds of the Shoshone National Forest provide ample security for all species of wildlife. Riparian areas constitute approximately 1 percent of the Forest, yet provide some form of habitat for a majority of wildlife species. Grazing impacts from early in the 20th century altered some of these riparian areas and empirical information suggests the beaver population has declined (State of Wyoming 2004).

Wildlife population data for management indicator species

Grizzly bear

The grizzly bear was listed as a threatened species under the Endangered Species Act in 1975. The Grizzly Bear Recovery Plan (Recovery Plan) (USDI Fish and Wildlife Service

1982 and 1993), first approved in 1982 and revised in 1993, defined a recovered grizzly bear population as one that could sustain a defined level of mortality and is well distributed throughout the recovery zone. The Recovery Plan outlined a monitoring scheme that employed three demographic sub-goals to measure and monitor recovery of the Yellowstone grizzly bear population. They include:

- Maintain a minimum of 15 unduplicated females with cubs-of-the-year over a six-year average both inside the recovery zone and within a 10-mile area immediately surrounding the recovery zone (14,497 square miles).
- Sixteen of 18 bear management units within the recovery zone must be occupied by females with young, including cubs-of-the-year, yearlings, or two-year olds, from a six-year sum of observations. No two adjacent bear management units may be unoccupied during the same six-year period. This is equivalent to verified evidence of at least one female grizzly bear with young at least once in each bear management unit over a six-year period.
- The running six-year average for total known, human-caused mortality is not to exceed 4 percent of the minimum population estimate. The running six-year average annual known, human-caused female grizzly bear mortality is not to exceed 30 percent of the 4 percent total mortality limit over the most recent three-year period. These mortality limits cannot be exceeded in any two consecutive years. Beginning in 2000, probable mortalities were included in the calculation of mortality thresholds; cubs-of-the-year orphaned because of human causes were designated as probable mortalities.

The Interagency Grizzly Bear Study Team monitors these recovery parameters in cooperation with the Forest Service. The general trend in the grizzly bear population within the Greater Yellowstone Ecosystem has been upward since the species came under the protection of the Endangered Species Act. Current population estimates are two to three times greater than when the bear was listed in 1975. Bears have continued to expand into new areas both within and outside of the original recovery zone, with the greatest expansion south on the Bridger-Teton National Forest and east on the Shoshone National Forest. All recovery targets, except female mortality, have been met since 1998. All 18 bear management units in the Greater Yellowstone Area have been occupied at least five times in the last six years by females with young.

Habitat management and management of grizzly bear/human and grizzly bear/livestock conflicts have been directed by the Interagency Grizzly Bear Guidelines (Guidelines) (USDA Forest Service 1991) that were incorporated into the Forest Plan. Adherence to the Guidelines has been instrumental in achieving the demographic recovery of the grizzly bear in the Greater Yellowstone Area and on the Shoshone National Forest. The Shoshone has made a concerted effort to educate users about proper behavior in bear country. A special order requiring that all attractants be kept unavailable to bears has been in place on most of the Forest since 1990. The order has been expanded several times to include occupied grizzly bear habitat. Grizzly bear/human conflicts and associated bear mortality still occur, vary by year, and are correlated with the availability of natural food sources. In years where these food sources are low, grizzly bear/human conflicts increase. Often these conflicts result in relocation or even death of the bear. High levels of grizzly bear mortality from 1994 through1996 were associated with poor food years for bears. Recent increases in mortality are a result of several factors, including poor food years, bears expanding into marginal habitats, and more bears in the public/private land interface.

The Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area (Conservation Strategy) (Interagency Conservation Strategy Team 2003) was completed in 2003 and is the document that will guide management and monitoring of the Yellowstone

grizzly population upon delisting. This document describes a Primary Conservation Area where stipulations to protect grizzlies would be applied. The Primary Conservation Area is the same as the original recovery zone and much of this occurs on the Shoshone (1,230,000 acres). Forest plan amendments for the six Greater Yellowstone Area national forests will incorporate the Conservation Strategy into existing forest plans. This amendment will improve the consistency of habitat management for the grizzly bear across the ecosystem. In November 2005, the U.S. Fish and Wildlife Service published the proposed rule in the Federal Register to delist the Yellowstone grizzly bears (USDI Fish and Wildlife Service 2005). The final rule to delist the Yellowstone grizzly bear population is expected in the summer of 2007.

Figure 17. Six-year average of unduplicated female grizzly bears, 1978 through 2005.

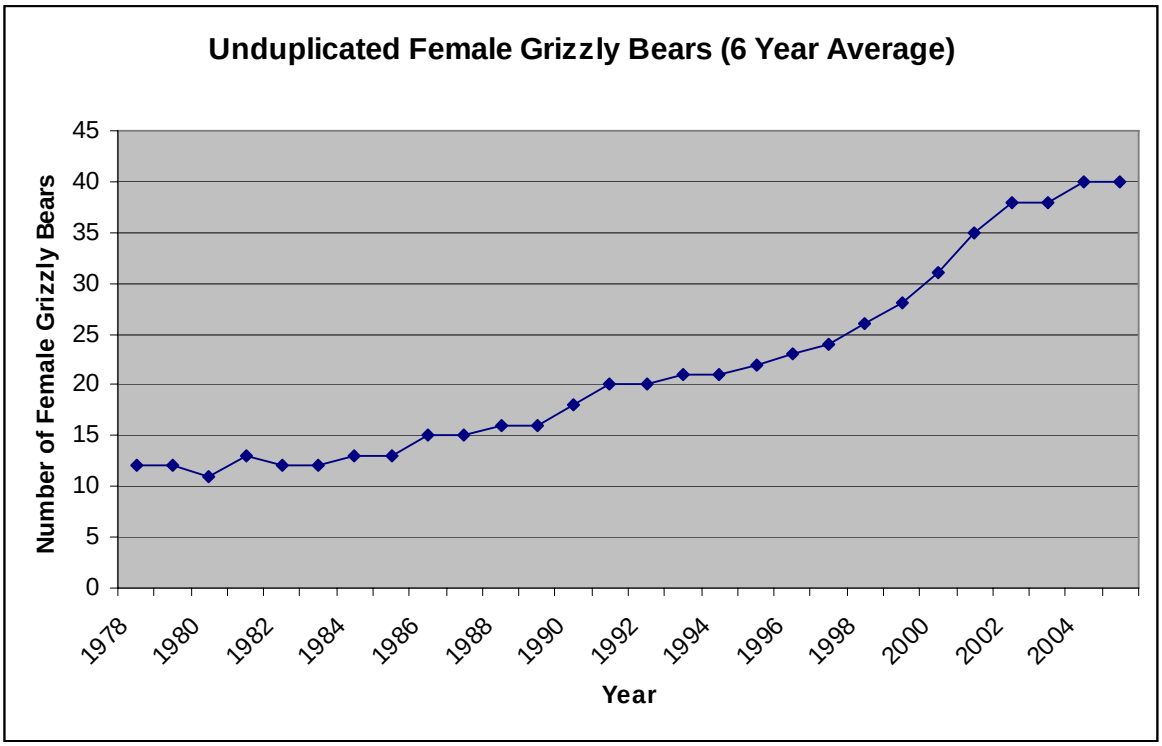


Figure 18. Female grizzly bears with cubs-of-the-year, known human-caused female mortalities, and all grizzly bear mortalities in the GYA, 1973 through 2005.

Year	Females with cubs-of-the-year[6]		Female mortalities[7]			All bear mortalities[8]		
	Annual	Six-year average	Annual	Six-year average	30% of total mortality	Annual	Six-year average	4% of minimum population
1973	14	--	6	--	--	14	--	--
1974	15	--	6	--	--	15	--	--
1975	4	--	1	--	--	3	--	--
1976	17	--	1	--	--	6	--	--
1977	13	--	5	--	--	14	--	--
1978	9	12	1	3.3	1.4	7	10.2	4.5
1979	13	12	1	2.5	1.2	7	9.2	3.9
1980	12	11	3	2.0	1.4	6	7.7	4.5
1981	13	13	2	2.2	1.5	10	8.8	4.8
1982	11	12	5	2.8	1.2	14	10.2	4.1
1983	13	12	3	2.5	1.2	6	8.5	4.1
1984	17	13	3	2.8	1.5	9	8.8	4.8
1985	9	13	4	3.3	1.5	5	8.5	4.8
1986	25	15	4	3.5	2.0	5	9.0	6.6
1987	13	15	2	3.5	1.8	3	7.8	6.0
1988	19	16	2	3.0	2.3	5	6.3	7.7
1989	15	16	0	2.5	2.0	2	5.7	6.7
1990	25	18	6	3.0	2.5	9	5.7	8.2
1991	24	20	0	2.3	2.6	0	4.7	8.8
1992	25	20	1	1.8	3.1	4	3.8	10.2
1993	19	21	2	1.8	2.9	3	3.8	9.6
1994	20	21	3	2.0	2.6	10	4.7	8.6
1995	17	22	7	3.2	2.1	17	7.2	7.0
1996	33	23	4	2.8	2.7	10	7.3	8.9
1997	31	24	3	3.3	3.2	7	8.5	10.7
1998	35	26	1	3.3	4.1	1	8.0	13.6
1999	32	28	1	3.2	4.1	5	8.3	13.7
2000	35	31	5[9]	3.5	4.2	16	9.3	14.2
2001	42	35	8	3.7	4.3	17	9.3	14.5
2002	50	38	7	4.2	5.0	10	10.7	16.6
2003	35	38	6	4.7	5.0	11	11.2	16.6
2004	46	40	9	6.0	5.2	17	13.3	17.2
2005	29	40	2	6.2	4.3	7	13.7	14.5

[6] Data are from Schwartz and Haroldson 2006.
[7] Data for 1973 through 1992 are from Knight et al. 1997. Data for 1993 are from Schwartz and Haroldson 2004. Data for 1994 through 2005 are from Schwartz and Haroldson 2006.
[8] Data for 1973 through 1992 are from Knight et al. 1997. Data for 1993 are from Schwartz and Haroldson 2004. Data for 1994 through 2005 are from Schwartz and Haroldson 2006.
[9] Beginning in 2000, mortalities include both known and probable human-caused mortalities.

Gray wolf

Fourteen gray wolves from Alberta, Canada were reintroduced into Yellowstone National Park in January 1995. The following year, 17 additional wolves from British Columbia were brought to the reintroduced population. These animals and any other native wolves that might have remained in the GYA have been classified as a “non-essential experimental” population, as per provisions of the Endangered Species Act. The U.S. Fish and Wildlife Service and National Park Service monitor wolves with assistance from other agencies, groups, and individuals.

Wolves first made brief visits to the Shoshone National Forest in 1995. Numerous sightings occurred on the Forest in 1996 and one of the original packs, the Soda Butte Pack, included part of the northeast corner of the Clarks Fork Ranger District in its home range. In late 1996, the Washakie Pack formed, denned, and produced five pups in the Six Mile drainage on the Shoshone National Forest. This was the first pack to den outside Yellowstone National Park in Wyoming. The Sunlight pair began using the Shoshone National Forest in the spring of 1998 in the Trail Creek and East Painter Creek area on the Clarks Fork District but did not produce pups until 1999. By 2000, there were four packs (Beartooth, Absaroka, Sunlight, and Washakie) using areas primarily on the Shoshone National Forest. Another pack (Greybull River) formed in 2001. All but the Greybull River pack were known to have pups in 2001. The Sunlight, Beartooth, Absaroka, Washakie, and Greybull packs all had pups in 2002 and 2003. An additional pack of four wolves, the Dubois Pack, appears to be using areas primarily on the Forest and did not produce pups in 2003. At the end of 2003 there were six known packs using areas mostly on the Shoshone for a total of 36 wolves. Several other packs include part of the Shoshone National Forest in their home ranges.

As of 2005, nine wolf packs’ home ranges were on the Shoshone (the Washakie, East Fork, Beartooth, Sunlight, Absaroka, South Fork, Wood River, Greybull River, and Carter Mountain packs).

The total gray wolf population in Wyoming decreased approximately 7 percent from 272 wolves in 2004 to 252 wolves in 2005. The number of wolves in Yellowstone National Park decreased approximately 31 percent from 171 wolves in 2004 to 188 wolves in 2005. However, the number of wolves in Wyoming outside of Yellowstone National Park increased approximately 33 percent from 101 wolves in 2004 to 134 wolves in 2005. Most of the increase in wolf numbers in 2005 on the Shoshone are from updated information on pack distribution within the Forest and high pup survival rates.

Figure 19. Gray wolf population in the GYA, 1999 through 2005.

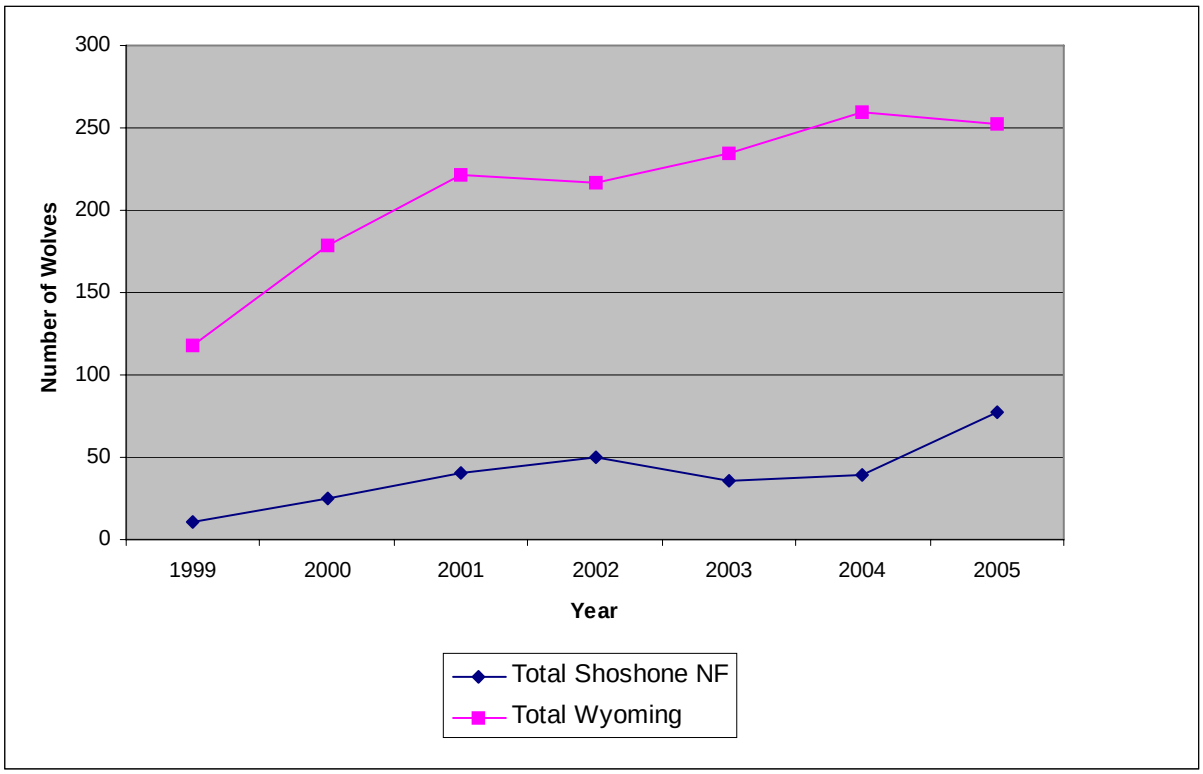


Figure 20. Wolf population in the GYA, 1999 through 2005. [10]

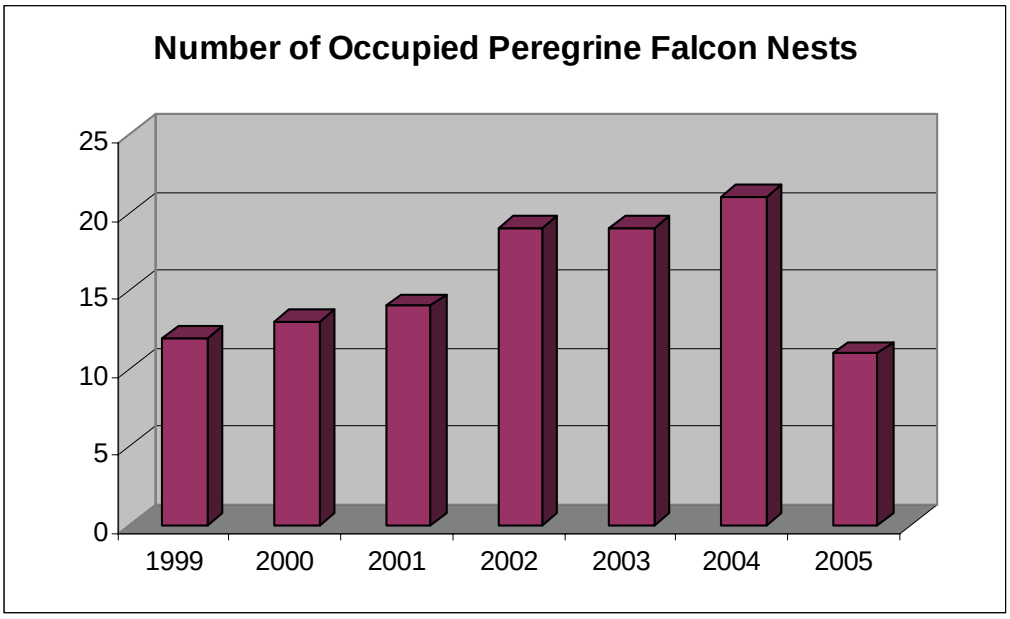
	1999	2000	2001	2002	2003	2004	2005
Total Shoshone National Forest	11	25	40	50	36	39	77
Total Wyoming	118	178	221	217	234	260	252

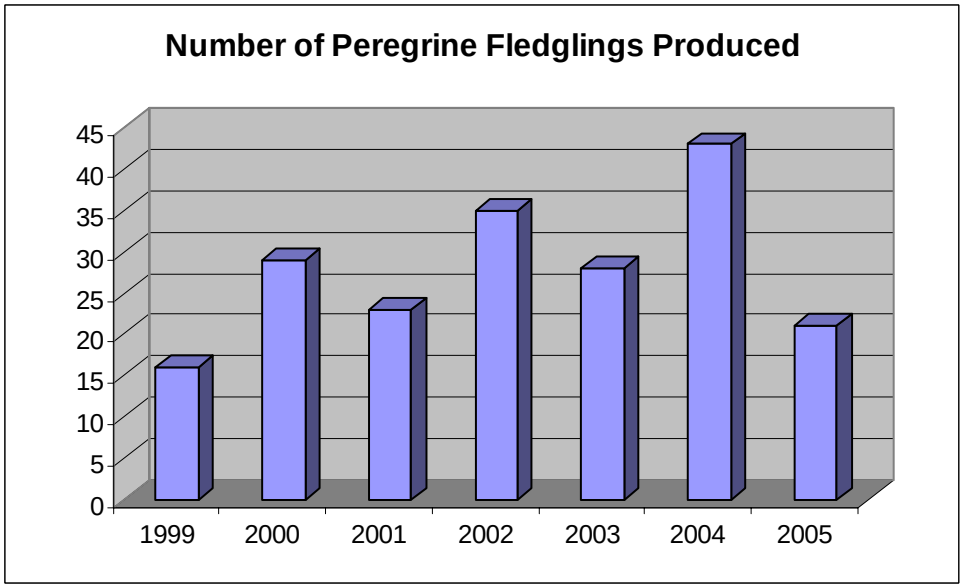
Peregrine falcon

In 1999, the peregrine falcon was removed from protection under the Endangered Species Act. The Shoshone National Forest participated heavily in the activities that led to delisting. Over 131 peregrines were successfully released on the Forest or in adjacent areas between 1987 and 1995. The Wyoming Game and Fish Department monitors nest sites in cooperation with the Forest Service. Figure 21 shows the number of nests and fledglings produced over the last several years. Both measures show an upward trend for peregrines. Biologists monitoring peregrine falcons believe these nests represent only a portion of the birds nesting in the area of the Forest because whenever new areas of suitable habitat are checked, they quite often find new nesting pairs. In 2005, the Wyoming Game and Fish Department began surveying fewer nest sites, which accounts for the lower number of occupied nests in the 2005 data.

[10] Data were obtained at http://westerngraywolf.fws.gov/annualreports.hrm

Figure 21. Number of occupied peregrine falcon nests, and number of peregrine fledglings produced, 1999 through 2005.





Brewer's sparrow

Breeding bird data from 1980 through 2003 for the central Rockies indicate a positive trend of 1.4 percent per year. Data for the Shoshone National Forest from the Monitoring Wyoming Birds project indicate Brewer's sparrow populations are stable throughout thet state. From 2002 to 2004, the population on the Shoshone showed a stable to increasing population. Monitoring data for 2005 show a large decrease in the population on the Shoshone, but statewide, the population appears to be stable. Grassland and shrub habitats are plentiful on the Forest, although the recent drought has reduced quality somewhat.

Figure 22. Densities of Brewer's sparrows (birds/km) in various habitats.

Year	Shoshone National Forest montane grasslands	Wyoming statewide grasslands
2002	53	71
2003	45	134
2004	67	262
2005	19	246

Hairy woodpecker

The hairy woodpecker was not recorded on the Monitoring Wyoming's Birds transects, which is not surprising as woodpeckers are not as vocal as songbirds. Breeding Bird Survey data for the central Rockies from 1980 to 2003 show a somewhat stable to slightly downward trend of -0.7 percent per year. Forest Service and other field researchers on the Forest observed several woodpeckers in different project areas in the summers of 2003 and 2004, indicating that hairy woodpeckers do occur, though they are uncommon on the Forest. In the last five years, habitat conditions on the Forest for hairy woodpeckers have improved as densities of snags have increased due to the insect and disease outbreak on the Forest.

Goshawk

The Breeding Bird Survey data for goshawk suggest a decreasing trend in the central Rockies for the last seven to eight years (1996 through 2003). Data for the same region from 1980 through 2003 indicate a stable to slightly positive trend of 0.4 percent per year. Data collected on the Shoshone National Forest indicate the species is present but uncommon. Goshawk nests have been difficult to locate. Two active nests were found in 1989 and two nests were discovered in 1994. Surveys of these old nesting areas and surrounding habitat were conducted in 2002 and 2003 and no nests were discovered. In 2004, in partnership with the Wyoming Natural Diversity Database, surveys were performed again in areas where earlier nests had been found, and two nests were discovered. Monitoring efforts later in the summer of 2004 failed to confirm whether these nests produced young. Surveys in 2005 confirmed three active nests. No fledgling counts were conducted in 2005.

Big game

The Wyoming Department of Game and Fish sets herd unit objectives for big game species based on habitat conditions, public opinion, and cooperating agency input. Post-season population estimates were generated from the most recent (and considered most reliable) Wyoming Department of Game and Fish population simulation model for each herd unit. Not all species/herd units have population models; thus, not all species/herd units have population estimates. Due to modeling revisions, use of standardized modeling parameters, and refined data collection/analysis, current estimates may or may not agree with previously published population estimates, e.g., Annual Job Completion Reports. Beyond the earliest year for which population estimates are made, or if no estimates were available, a narrative discussion addresses population trends, as perceived by Wyoming Department of Game and Fish managers, with particular comments directed at the segment(s) of each herd unit that spend part or all of the year on the Shoshone National Forest.

Elk

The most reliable population estimates for the Gooseberry elk herd date back to 1995. Prior to 1995, this population increased slightly until about 1999, when it peaked at about 4,200 elk. This upward trend was likely the result of improved forage quality and quantity due to increased moisture, as well as both prescribed and natural fires that have occurred on much of this herd's winter range. In recent years, the population has shown a declining trend toward objective due to increased hunter harvest and drought conditions.

Following a comprehensive telemetry project that revealed significant interchange between the Carter Mountain and North Fork Shoshone River elk herd units, the two herds were combined in 1993 to create the Cody elk herd unit. The objective for the Cody herd unit is the combined total of the two herds. The current simulation model produces reliable estimates through 1997. Although no figures are given for 1986 through 1996, the general trend was a population near or slightly above the objective in 1986 that grew prolifically following the 1988 fires to approach perhaps 10,000 elk by 1993. Since 1993, elk numbers have gradually declined to where they are once again near objective.

The current simulation model produces reliable estimates since 1997 for the Clarks Fork elk herd unit. Although no figures are given for 1986 through 1996, the general trend was a population above the objective in 1986 that grew following the 1988 fires to approach perhaps 6,300 elk by 1993. Since 1993, elk numbers have gradually declined to where they are once again near objective.

For several years, personnel have used winter trend counts to estimate the population of the Wiggins Fork elk herd unit. Trend counts are conducted on three sub-segments within the herd unit including East Fork, Dunoir/Spring Mountain, and South Dubois. These sub-segments represent groups of elk that follow three distinct movement/migration patterns detailed in the Wiggins Fork Elk Movement Study. As part of an objective change in 2002, the Wyoming Department of Game and Fish committed to maintain 6,000 to 7,000 wintering elk in the area. The total includes 2,400 to 2,800 elk in the East Fork segment, 2,300 to 2,700 elk in the Dunoir/Spring Mountain segment, and 1,300 to 1,500 elk in the South Dubois segment. The actual number of elk counted in each herd segment is divided by a sightability factor to calculate the low and high population estimates.

The population in the Wiggins Fork herd unit has declined since 1997. Counts performed in 2002 produced numbers so much lower than the previous years that they were considered unreasonable and the trend counts were deemed invalid. The winter of 2002/2003 was extremely mild with little snow cover. It is likely more elk wintered off traditional winter ranges where the counts were conducted. In 2003, personnel observed 4,418 elk and believe the trend count was more reliable. The elk population is currently at the lower end of the objective range set in 2002. Given recent recruitment trends in the herd, the population will likely continue to decline in the near future.

Population numbers starting in 1996 for the South Wind River elk herd unit are from the POP-II model (a population simulation model) revised in 2003. Estimates for 1986 through1995 are from prior Annual Job Completion Reports. Herd numbers rose significantly in the mid-1990s, most likely due to mild winters and now are down to very near objective. As the population rose above objective, more liberal hunting regulations were introduced and were effective at reducing this herd to near objective numbers.

Figure 23. Elk population estimates. Herd unit objectives are shown in parentheses.

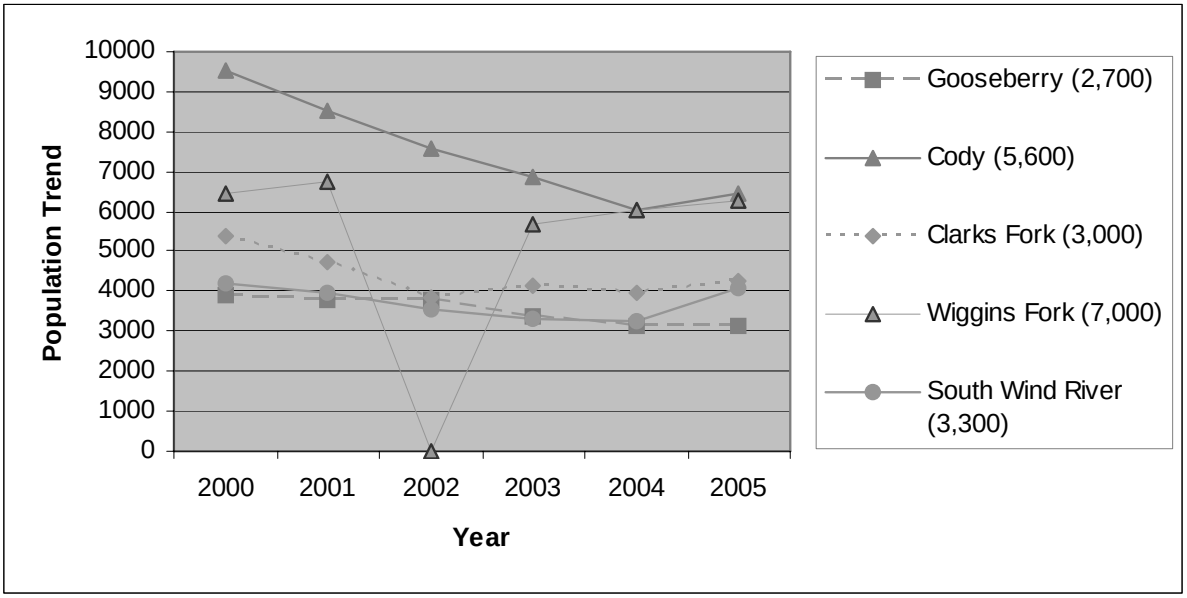
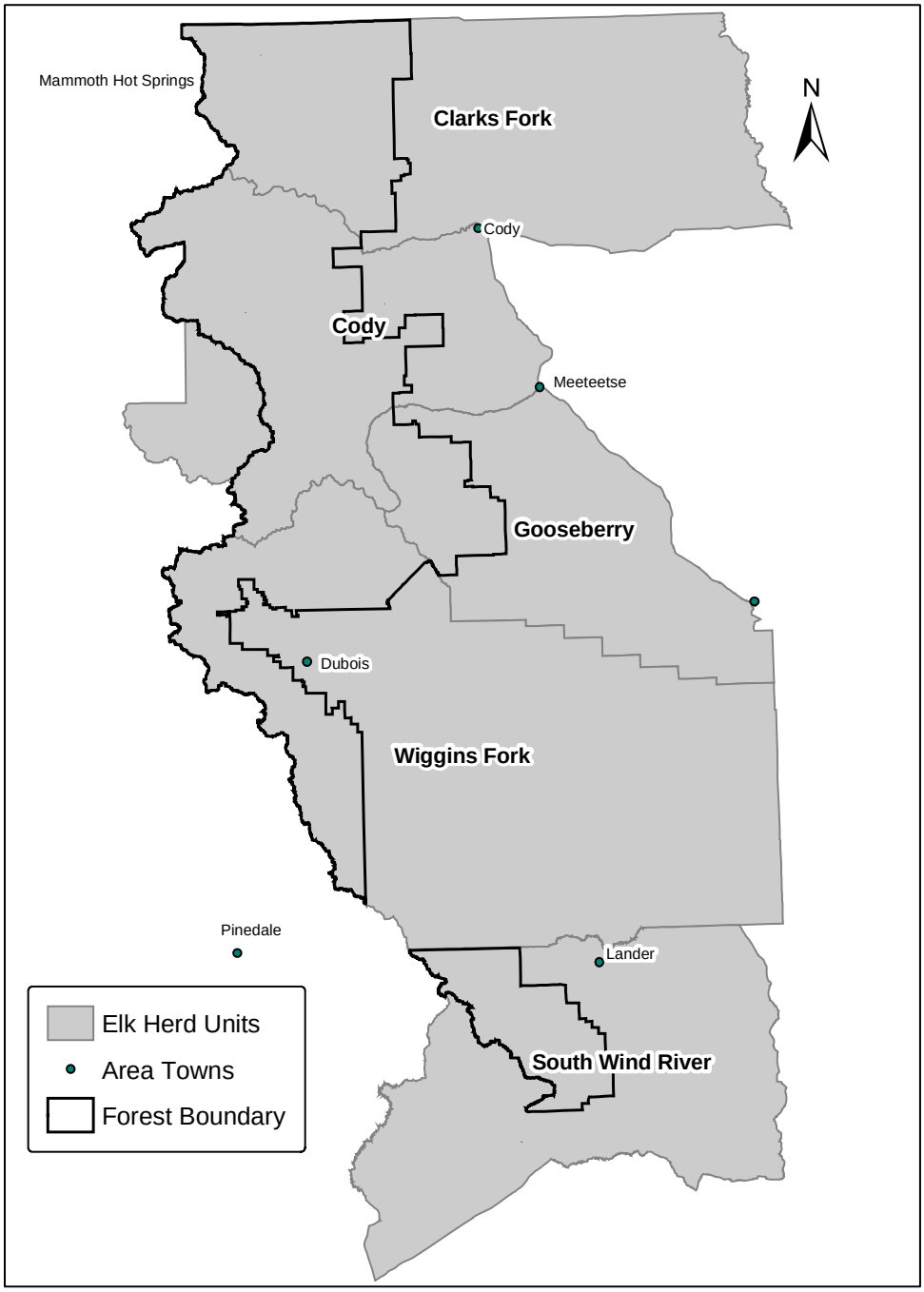


Figure 24. Elk herd units.



Mule deer

The most reliable population estimates for the Owl Creek/Meeteetse deer herd date back to 1995. Based on population estimates prior to 1995, it appears this deer herd increased slightly until about 1999, when the population began to stabilize. Drought conditions have somewhat persisted since 2000, which has impacted fawn recruitment and probably prevented this herd from meeting its population objective.

The current simulation model produces reliable estimates through 1990 for the Upper Shoshone mule deer herd unit. The Upper Shoshone deer herd is trending upward and is meeting herd population objectives.

The current simulation model produces reliable estimates through 1990 for the Clarks Fork mule deer herd unit. Although no figures are given for 1986 through 1990, the general trend was a population below the objective of 9,000 deer. Although this herd has been managed very conservatively, the population trend is somewhat downward. This trend is potentially due to the effects of drought and increased wolf predation in the area.

The population of the Dubois mule deer herd remains below the herd objective despite recent gains in population. The increase in 2005 reflects high fawn recruitment in the spring. This increase was probably due to a wet year, which provided ample forage for fawns.

The South Wind River mule deer herd was fairly stable from 2005 to 2003. The herd has increased in population for the last two years (2004 and 2005), but remains below the herd objective.

Figure 25. Mule deer population estimates. Herd unit objectives are shown in parentheses.

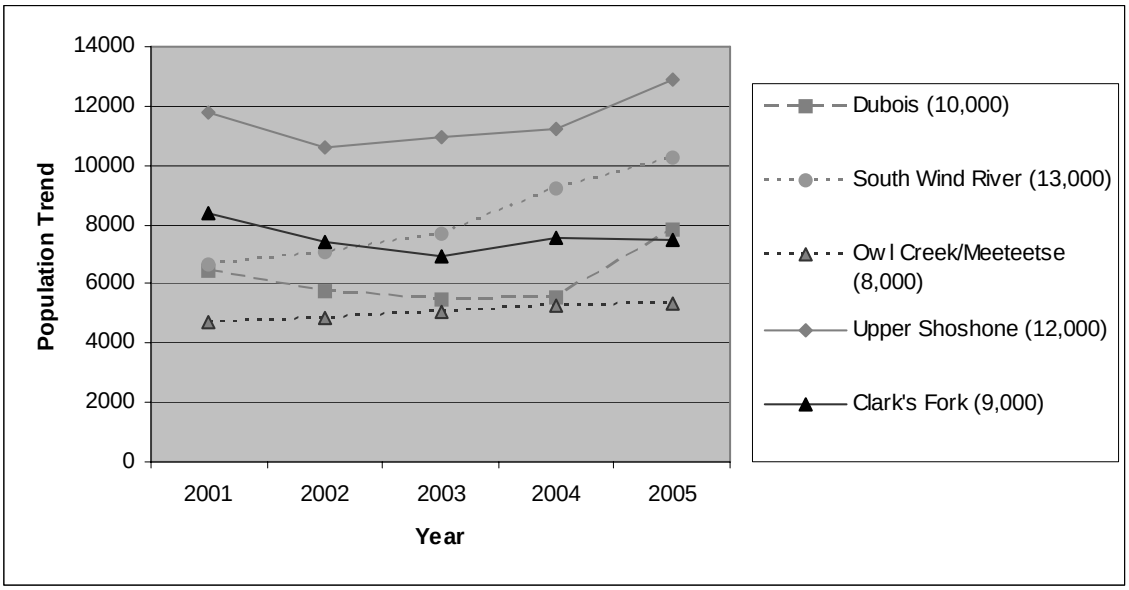
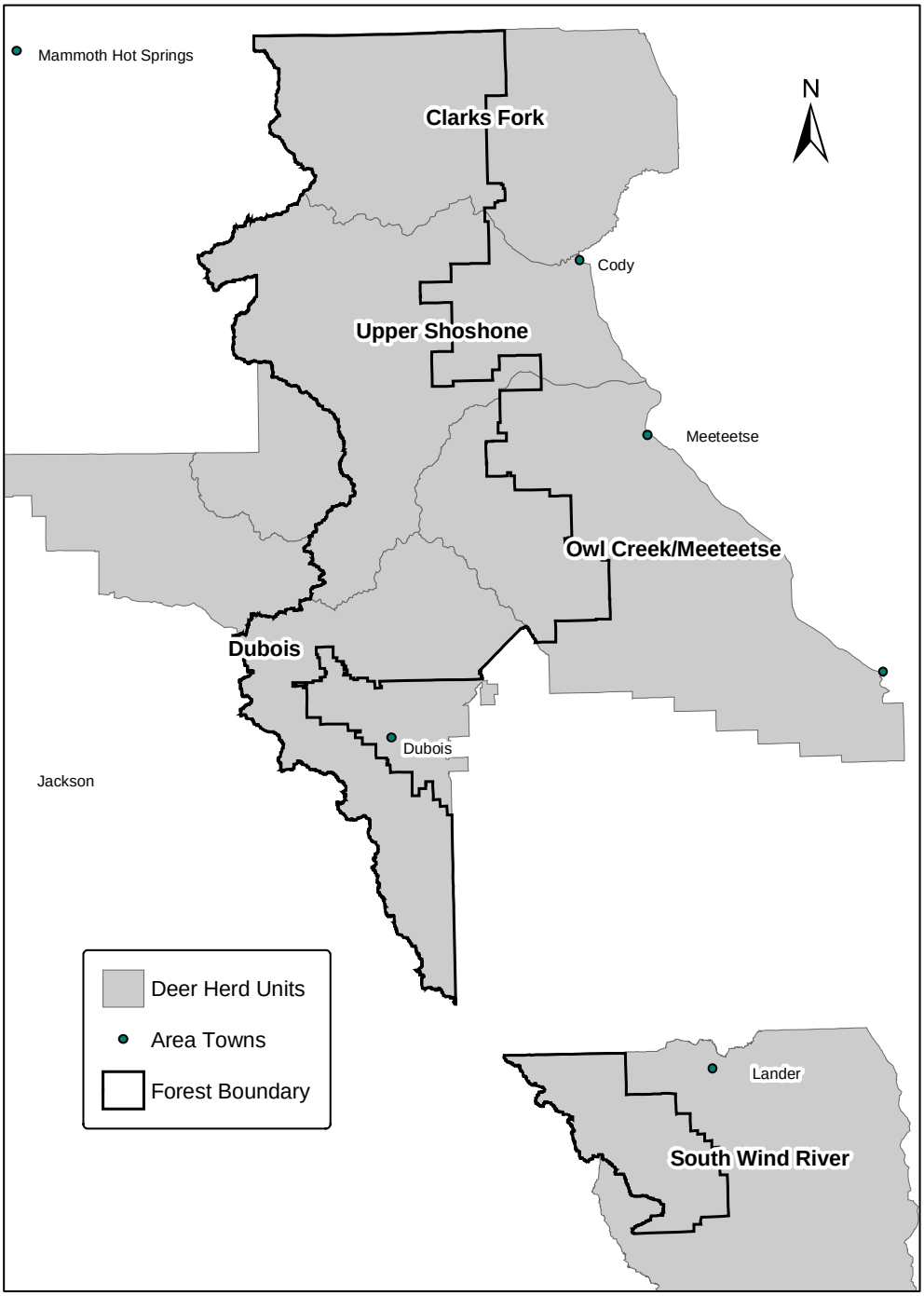


Figure 26. Mule deer herd units.



Moose

Moose populations have traditionally been managed using relatively small, single hunt area herd units, consisting of the Crandall, Sunlight, North Fork Shoshone River (North Fork), South Fork Shoshone River (South Fork), Greybull/Gooseberry, and Thorofare moose herd units. Population objectives for these herd units were 100 for Crandall, 75 for Sunlight, 75 for the North Fork, 75 for the South Fork, 85 for the Greybull/Gooseberry, and 325 for the Thorofare. Moose data in these areas are extremely difficult to collect, and therefore attempts at estimating population size have always been tenuous. Harvest data (hunter success, hunter effort) are the only pieces of information with which to assess population status. Due to perceived declines in moose numbers and the need to reduce hunting pressure, the Crandall and Sunlight herd units were combined in 1992 to create the Clarks Fork moose herd unit. The objective of 175 was derived from the previously established objectives of the combined Crandall and Sunlight herd units.

For similar reasons, the North Fork and the South Fork herd units were combined in 1999 to create the Shoshone herd unit. The objective of 150 was a result of the combined objectives of the North Fork and South Fork Shoshone herd units. Again, for similar reasons as those stated above and to simplify Annual Job Completion Report record keeping, the Clarks Fork, Shoshone, Greybull/Gooseberry, and the Thorofare herd units were combined in 2004 to create the Absaroka moose herd unit. The new objective derived from the combination of all previous herd units is 830 moose. Examination of moose harvest information indicates that moose numbers in the Thorofare have been steadily declining since the mid-1970s. Moose numbers in the North Fork/South Fork and Sunlight and Crandall areas remained relatively stable until the mid- to late 1990s, at which time numbers declined. Moose numbers in the Greybull/Gooseberry herd unit continue to be stable. Recently collected movement information has shown connectivity between the Buffalo Valley area of the Jackson herd unit and the Thorofare. Therefore, it is likely the Thorofare herd unit will be included in the Jackson herd unit in the near future. It is probably safe to say that from 1986 through 2003, moose numbers in all areas (except the Greybull/Gooseberry herd unit) have declined from near objective levels to a point substantially below objective. The most likely factors for the decline are prolonged drought, reduction of habitat from 1988 fires, and increased predation.

The population estimates for the Dubois moose herd unit are not considered reliable. The estimates are based on small classification samples most years. For some years, there are no empirical data on the population due to a lack of flight money for classifications. Anecdotal information suggests this moose population declined in the late 1990s and early 2000s. Several individuals of this herd were found dead in 2000 of unknown causes and it is possible a disease came through the population, which may account for the decline. Other potential factors are drought conditions and increased levels of predation.

Figure 27. Dubois moose herd unit population estimates, 1986 through 2005. The objective for this herd is 400 moose.

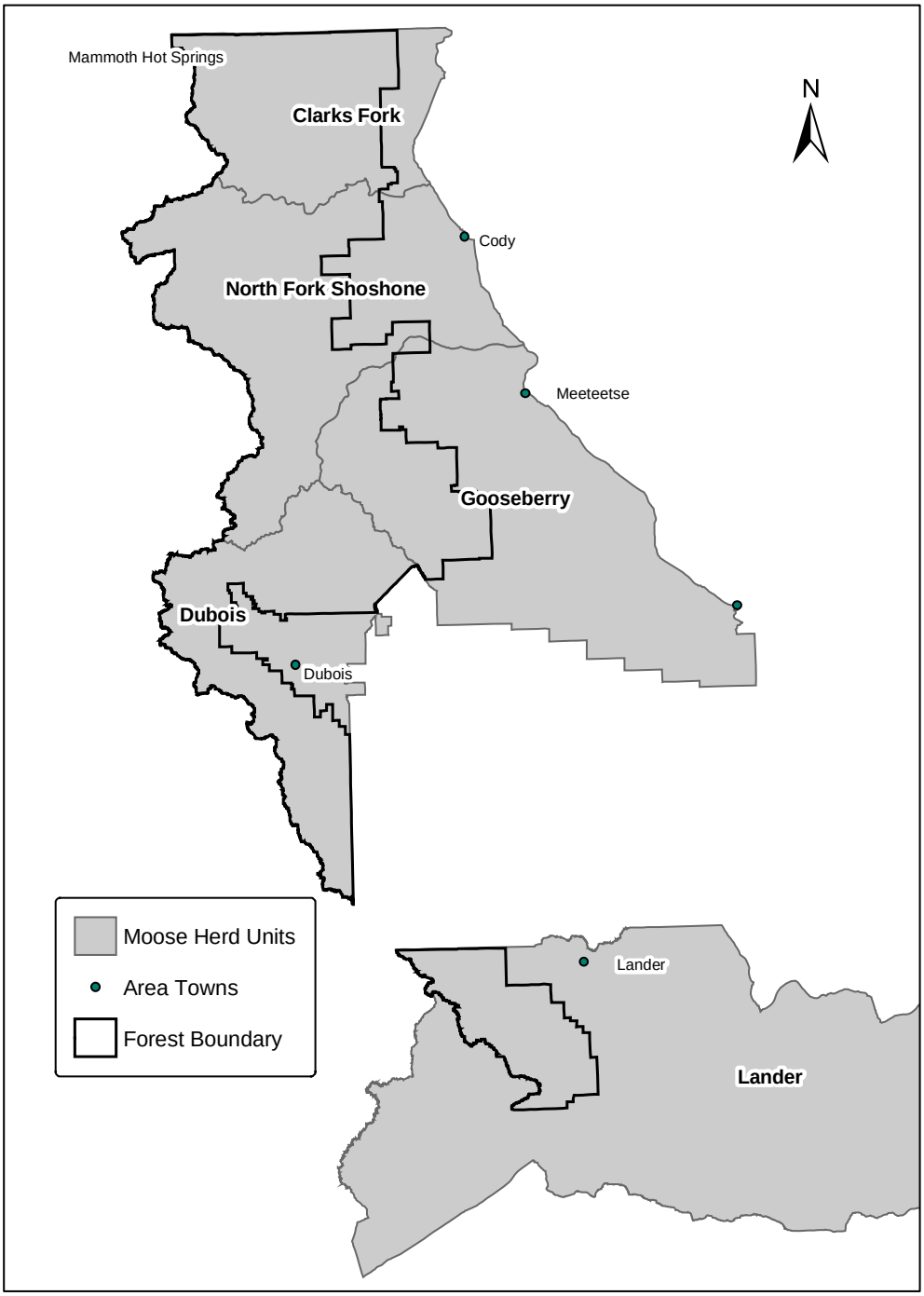
1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
625	654	699	715	686	672	697	663	674	649
1996	1997	1998	1999	2000	2002	2002	2003	2004	2005
583	538	547	565	557	558	585	557	400	400

Lander moose herd unit population numbers from 1995 are from the POP-II model revised in 2003. This herd has trended somewhat downward perhaps due to the effects of drought conditions on willow and other deciduous vegetation food sources. Harvest of females will be reduced in hopes of reversing this downward trend.

Figure 28. Lander moose herd unit population estimates, 1986 through 2005. The objective for this herd is 450 moose.

1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
371	381	388	364	363	359	338	407	395	520
1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
499	475	475	477	451	421	410	393	417	315

Figure 29. Moose herd units.



Bighorn sheep

A reliable population simulation model does not exist for the Clarks Fork herd unit. This herd is thought to have been near the objective of 500 sheep from 1986 through the mid-1990s. Particularly severe late winter snowstorms in 1995 and 1996 caused significant mortality in the northern portion of this herd unit. Since then, numbers have been steadily increasing, but are not thought to have reached the objective as of 2003.

A reliable population simulation model was recently developed for the Trout Peak bighorn sheep herd unit. Estimates place this herd substantially below the objective of 750 sheep. Only in the early 1990s was this herd thought to be near the population objective. Following the early 1990s, this herd is felt to have fluctuated below objective levels. Data collection in this herd unit has been sporadic; therefore, population dynamics in this herd are poorly understood.

A reliable population simulation model was recently developed for the Wapiti Ridge bighorn sheep herd unit. Estimates place this herd essentially at the objective of 1,000 sheep. Previous impressions of sheep numbers from 1986 through 1998 indicate this herd has been relatively stable near the objective.

Good population data have been collected from the Younts Peak bighorn sheep herd since 1991, when the herd appeared somewhat stable. From 1986 through1990, sheep numbers dropped from 1,000 to 900 sheep to a point near where they are estimated to have been in 1991.

The most reliable population estimates for the Francs Peak bighorn sheep herd unit date to 1996. Based on hunter harvest statistics and annual herd classification counts dating to the mid-1980s, it appears this population has remained relatively stable. Since 2001, lamb production has declined somewhat, which has caused a slight downward trend in the population in recent years.

The absolute value of these estimates is in all likelihood an underestimate of the Whiskey Mountain sheep population. The estimates provide an accurate trend of what has occurred in the population. Since a disease outbreak in the early 1990s, this population has declined substantially. The population is currently well below objective.

No population model has been available for the Temple Peak bighorn sheep herd since 1995. Numbers up to 1995 are from prior Annual Job Completion Reports. Numbers for 1999 through 2003 are from the 2003 Annual Job Completion Reports. The population trend appears to be stable over the last several years.

Figure 30. Bighorn sheep population estimates. Herd unit objectives are shown in parentheses.

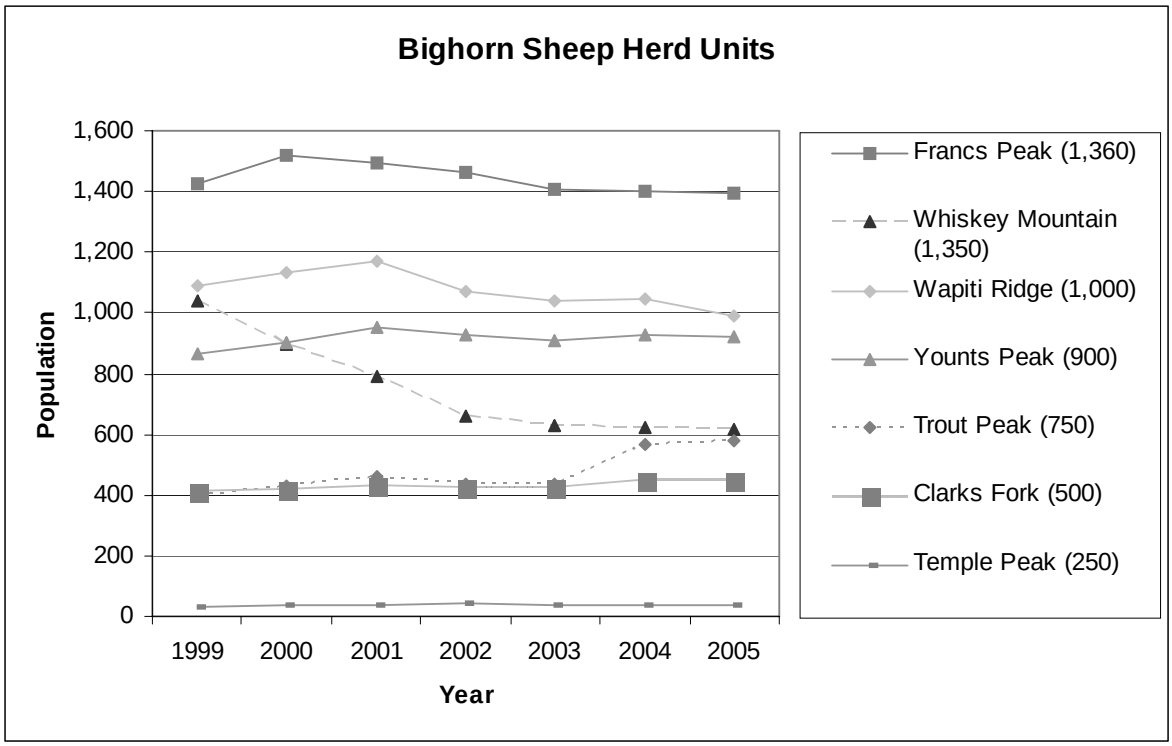
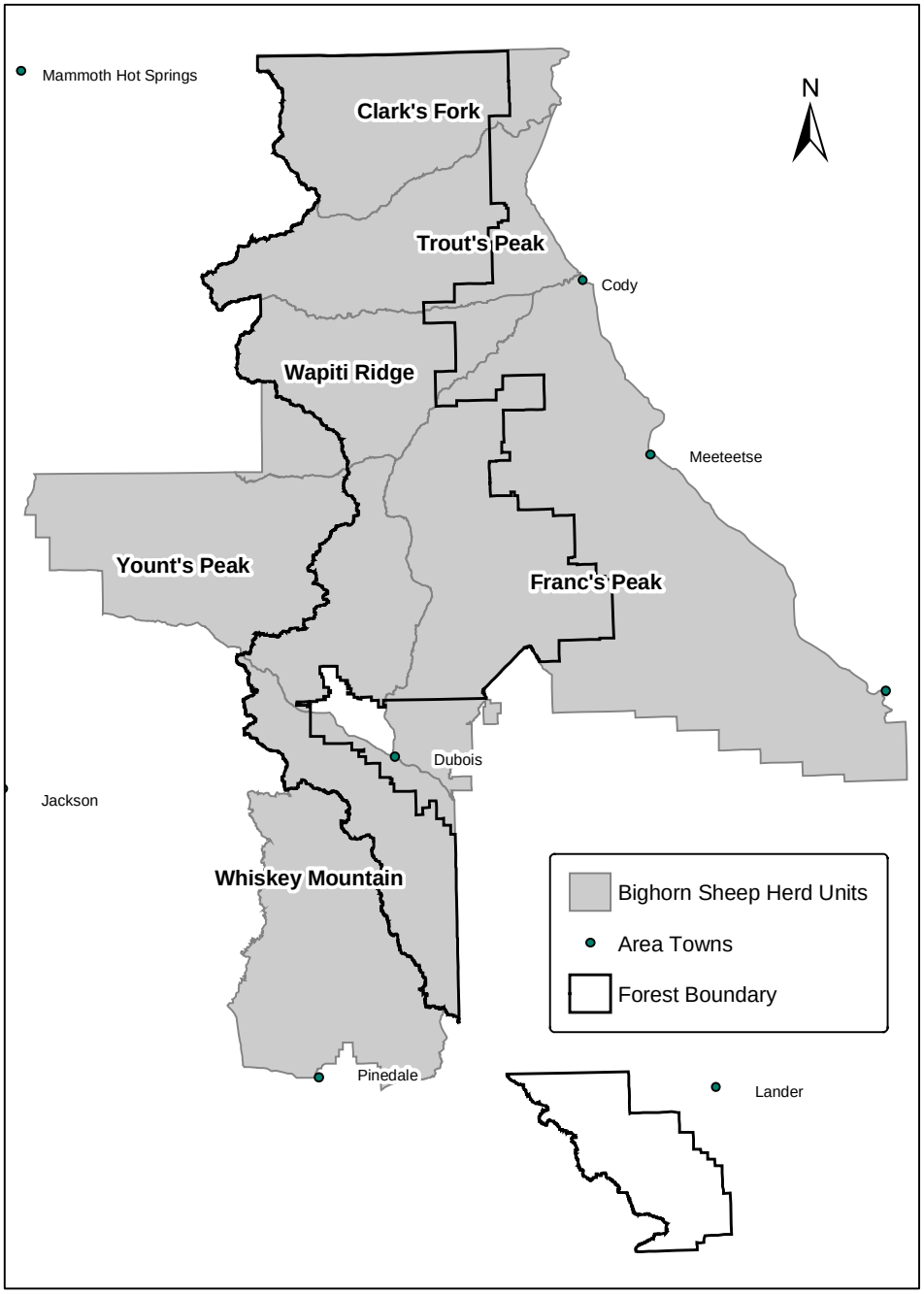


Figure 31. Bighorn sheep herd units (Temple Peak herd unit map is pending).



Mountain goats

The Beartooth herd is the only mountain goat herd on the Forest. Population estimates indicate the herd is at the objective level of 200 animals. It has been stable at this level for many years.

Figure 32. Mountain goat population estimates.

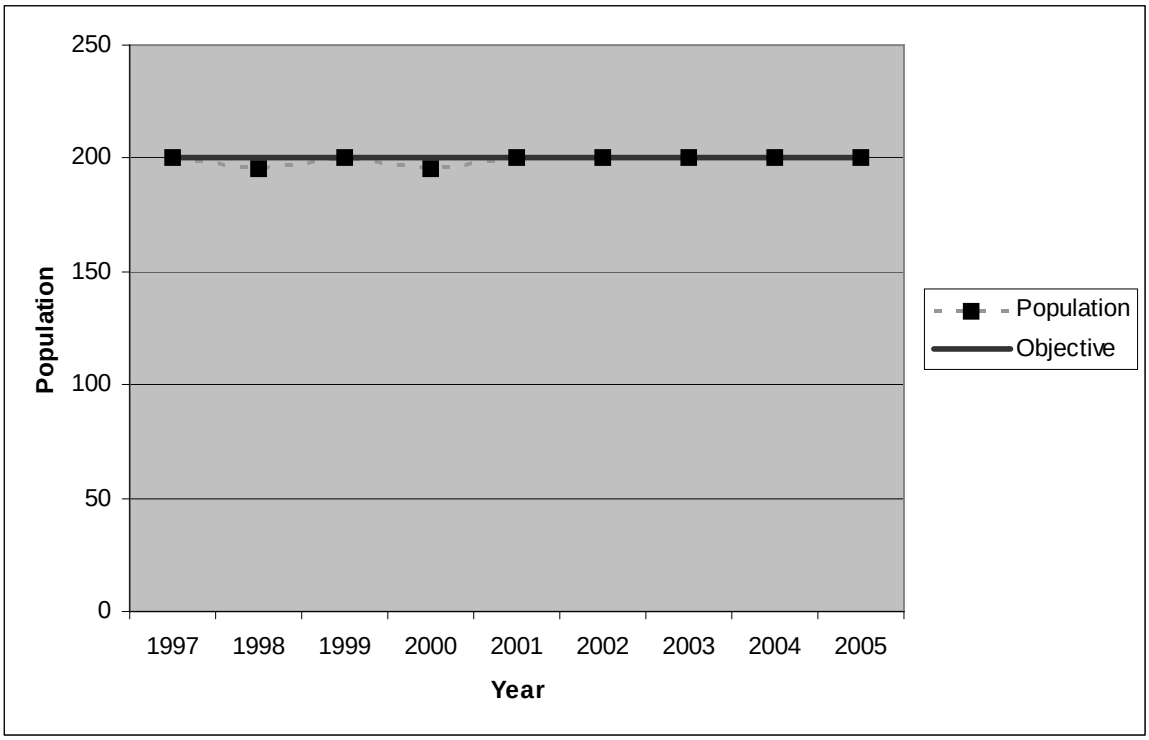
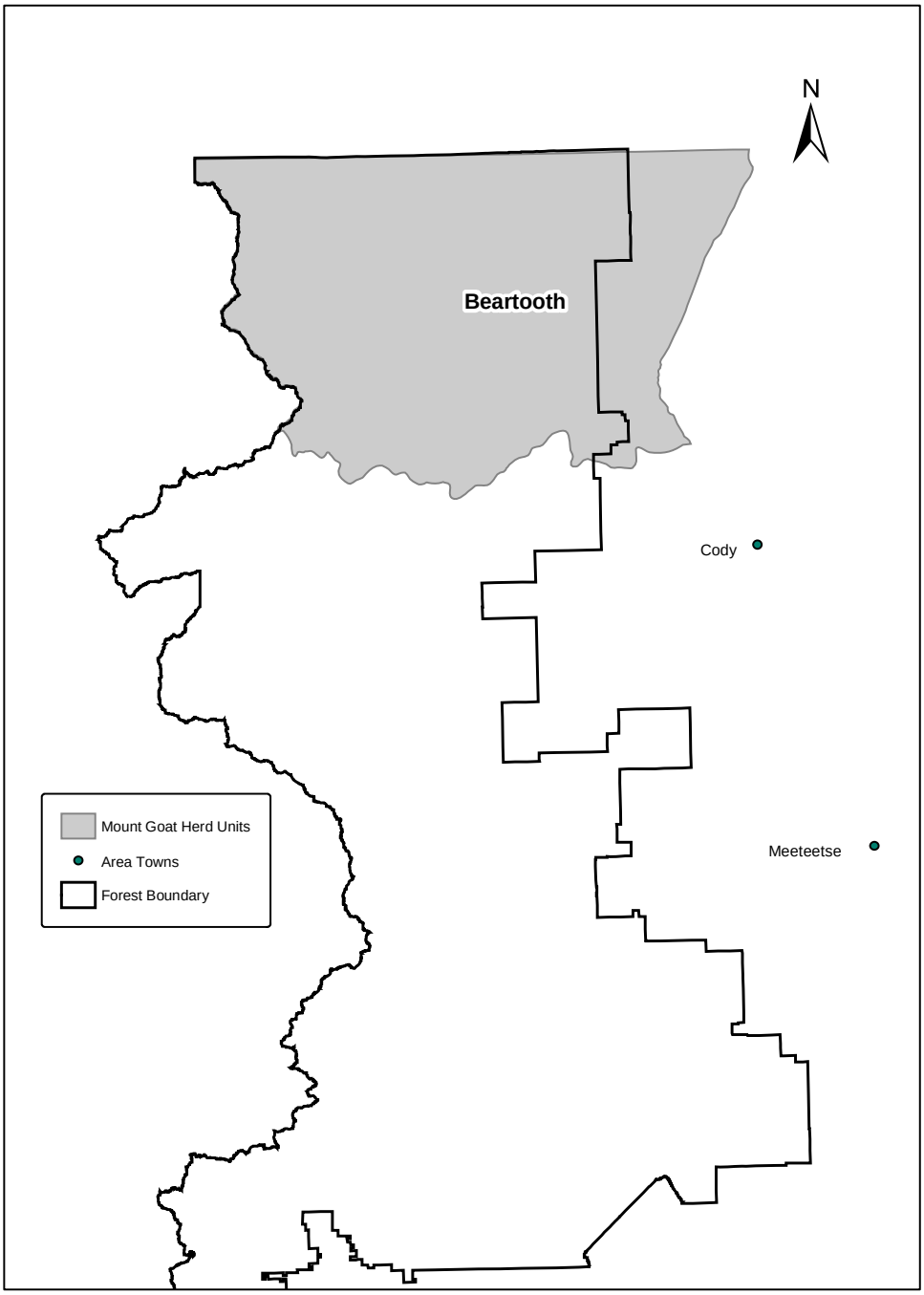


Figure 33. Mountain goat herd unit location.



Bird survey program

Birds are excellent indicators of environmental quality and change. They are one of the most highly visible and valued components of our native wildlife. Monitoring birds provides data needed not only to manage bird populations effectively, but also to understand the effects of human activities on ecosystems and to gauge their sustainability. Because bird communities reflect a broad array of ecosystem conditions, monitoring bird communities at the habitat level offers a cost-effective means for monitoring biological integrity at a variety of scales.

In 2005, the Shoshone National Forest concluded its fourth year of bird surveys with the Rocky Mountain Bird Observatory. The survey is designed to provide statistically rigorous, long-term trend data for populations for most diurnal, regularly breeding bird species in Wyoming. In 2005, the Rocky Mountain Bird Observatory conducted 365 point counts along 25 transects in three different habitat types of the Shoshone. The three habitat types surveyed on the Forest include mid-elevation conifer, montane grassland, and montane riparian.

A total of 2,016 individual birds of 83 species were detected. Seventeen species were detected in sufficient numbers to estimate density in at least one habitat, and some of those species were detected in sufficient numbers to estimate density in multiple habitats.

Of the three Shoshone habitats surveyed in 2005, the average species richness was greatest in montane riparian, and least in montane grassland[11].

[11] Rocky Mountain Bird Observatory information is available at http://www.rmbo.org/default.html

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