

Shoshone National Forest

Forest Plan Monitoring and Evaluation Report



Fiscal Year 2002

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Forest Plan Budget

Actual Costs of Applying Management Direction from the Forest Plan

This monitoring item is intended to help the Shoshone National Forest verify assumptions made in the Forest Plan relative to funding implementation of the projected mix of goods and services. It was designed to track the actual cost of implementing the Forest Plan and allows the Forest to keep track of trends in expenditures in any given resource area. The Forest Plan estimated the budget level necessary for implementation between 2001 and 2010 at an average annual expenditure of approximately \$12 million (2002 dollars).

Actual expenditures are reviewed annually and compared to Forest Plan projections. This has become a challenge given the many changes that have occurred in the budgeting process since the Forest Plan was published. Changes include combining or splitting of fund codes used to track dollars allocated to a particular resource program and modifications to the way expenditures are tracked. For example, the General Administration fund (NFGA), which represents the overhead cost of running the national forest, is no longer a separate fund code. It is now distributed throughout the other funds. Figure 1 compares projections made in the Forest Plan to actual costs for 2002 using the most current fund codes.

Evaluation

The total 2002 expenditures for the Shoshone National Forest represent approximately 71 percent of Forest Plan projections. The amount the Forest spent was less than initial projections. In late summer of 2002, the Forest Service was required to divert appropriated dollars to the fire suppression efforts across the country. This fire borrowing affected all national forests. The Shoshone alone gave back approximately \$1,138,000.

Although fluctuations in funding occur on an annual basis within particular resource areas, the overall trend in the last decade has been downward. The Forest's ability to implement Forest Plan management direction depends on the budget allocated by Congress. The mix of goods and services projected in the Forest Plan will be revisited and adjusted as the Forest Plan is revised. Barring unforeseen delays, Forest Plan revision is scheduled to begin in fiscal year 2004.

Figure 1. Comparison of fiscal year 2002 expenditures to Forest Plan full implementation budget (thousands of 2002 dollars).

Cost Center and Cost Center Components	Fund Codes	Fiscal Year 2002 Expenditures	Forest Plan	Percent of Forest Plan
Planning, Inventory and Monitoring				
Inventory/Monitoring	NFIM	666	1,057	63
Land Management Planning	NFPN	229	111	206
Recreation Mgmt				
Heritage, Recreation Wilderness	NFRW	1,206	1,570	77
Wildlife and Fish Management				
Wildland Habitat Mgmt, Anadromous Fish, Inland Fisheries, TE Adm	NFWF	639	1,103	58
Rangeland Management				
Range NFS	NFRG	229	585	39
Range Betterment	RBRB	11	91	12
Forest Products				
Timber Sales Mgmt	NFTM	707	550	128
Salvage Timber Sales	SSSS	6	124	5
Timber Cooperative Work	BDBD	1.5	26	6
Vegetation and Watershed Mgmt				
Vegetation Mgmt; Range Vegetation Mgmt; Soil and Water Improvements; Soil, Water, Air Ops.	NFVW	573	891	64
Physical Resources				
Minerals Mgmt	NFMG	61	248	25
Landownership Mgmt	NFLM	184	208	88
Land and Water Acquisition	LALW	15.6	35	45
Infrastructure Management				
Facilities Maintenance and Improvements	CMFC	961	496	194
Road Maintenance and Improvements	CMRD	716	1,051	68
Trails Maintenance and Improvements	CMTL	406	838	48
Law Enforcement				
Law Enforcement	NFLE	47	29	162
Wildland Fire Mgmt				
Hazardous Fuels Reduction	WFHF	405	389	104
Preparedness and Fire Use	WFPR	1,375	1,045	132
Cooperative Work	CWFS	67	91	74

Cost Center and Cost Center Components	Fund Codes	Fiscal Year 2002 Expenditures	Forest Plan	Percent of Forest Plan
General Administration				
General Administration	NFGA ¹	No longer a separate fund	1,492	
Grand Total		8,505	12,030	71

¹ General Administration dollars are no longer a separate fund, but are distributed throughout the other funds.

Recreation

The Shoshone National Forest's recreation program was challenged by several events in fiscal year 2002. A severe drought continued in the area. Providing adequate water in developed sites and crew quarters proved impossible in several locations. Several water systems were not operated during the year due to a history of poor tests or inadequate equipment. The drought across the west yielded a record fire year with one major wildfire on the Forest and some record acreages burning in neighboring Colorado. Demand for personnel with fire suppression skills during the height of the fire and recreation season made the 2002 season challenging. In addition, Congress and the administration determined that the fire suppression effort should be funded with existing appropriated dollars and required the national forests to contribute all possible funds to pay for suppression costs. In spite of these challenges, the Forest did see a substantial increase in developed site use, a solid year for the outfitting and resort industry, and continued slow growth in most recreation activities.

Priorities were:

- To continue deferred maintenance condition surveys for all facilities, and continue entering inventory and condition data into Infrastructure and Meaningful Measures databases
- To protect the health and safety of Forest visitors and prevent grizzly bear/human conflicts
- To protect the threatened grizzly bear by providing high levels of information, education, interpretation, monitoring, and compliance relative to the bear
- To keep all administrative sites and public recreation facilities safe, clean, and well maintained. The Forest continues to seek opportunities to reduce the cost of operation of developed sites and will continue to seek solutions to providing potable water at developed sites.
- To perform adequate levels of monitoring, clean up, and site rehabilitation in dispersed areas so that Forest visitors have a high quality experience
- To provide adequate levels of compliance/enforcement patrols to assure users and resources are protected, and user conflicts minimized
- To educate visitors on proper land ethics and multiple use, focusing on no-trace techniques and avoiding grizzly bear/human conflicts
- To work as partners with resorts and outfitters to provide public safety, land stewardship, and high quality value-added visitor services (including education and interpretation)

Monitoring was integrated into all aspects of fieldwork. The Forest will begin sampling for the National Visitor Use Monitoring surveys in fiscal year 2003. Preparation for that survey was a major focus for recreation and wilderness staff as the new fiscal year approached. An inventory of the recreation facilities' deferred maintenance backlog was continued and includes trails in addition to recreation facilities.

Off Road Vehicle Use of Designated Travelways

Off-highway vehicle (OHV) use, both nationally and on the Shoshone National Forest, is increasing at a noticeable rate. As use increases, the impact on Forest resources is becoming more apparent to managers and the public. The State of Wyoming began an innovative OHV sticker program in 2002, which parallels the Snowmobile Sticker program. There were some startup problems and the state will not produce a map of the OHV system until 2003.

Snowmobile use data is being collected with the assistance of the State of Wyoming. The Forest continues monitoring snowmobile use in concert with Greater Yellowstone Coordinating Committee requirements. Monitoring revealed that low snow depths continue to limit use of the Forest. As was the case in 2001, drought conditions shortened available seasons and reduced overall use. Data related to snowmobile monitoring has not yet been released by the state for 2002.

Evaluation

Clarks Forks Ranger District. The problems continue in a few areas, including the Morrison Jeep Trail, Fantan, and the Lily Lake Trails. Monitoring continues to indicate an overall increase in OHV use on the Clarks Fork Ranger District.

Greybull Ranger District. OHV use continues to increase.

Wapiti Ranger District. Forest personnel on the Wapiti Ranger District monitored OHV use through visual observation, photography, violation notices, and incident reports. OHV use on the Wapiti Ranger District is less problematic than other districts due to landform and wilderness location.

Washakie Ranger District. OHV use continues to increase. OHV travel off-road prompted a Forest Service and Bureau of Land Management closure order on off-road travel in the Pass Creek Fire area, which occurred in late summer.

Wind River District. OHV use continues to increase. Staffing shortages at the Wind River Ranger District prevented the usual level of monitoring, education, and enforcement in 2002.

Overall, increased emphasis and planning for OHV use is needed on the Forest. Use continues to expand into areas not previously impacted and resource impacts are becoming evident. Though the Forest does not receive the impacts experienced by some national forests and jurisdictions across the west, OHV use is increasing at a rate that will make management of the use a primary issue in future years. Continued cooperation with the State of Wyoming in establishing a state funded OHV program and trail system should yield measurable benefits to providing high quality OHV opportunities while reducing social and resource impacts of the use.

Dispersed Recreation Use and Experience and Dispersed Campsite Condition

In 2002, most dispersed sites on the north end of the Forest were monitored at least once during the season. Dispersed sites along roads were monitored more frequently than backcountry sites. On the south zone² of the Forest, monitoring of dispersed sites was diminished significantly due to personnel vacancies.

Evaluation

Dispersed campsite inventories in areas not previously inventoried were conducted in wilderness areas on the north zone. A new digital and laser based campsite mapping and monitoring system was used. Dispersed campsite issues remain, but are not increasing beyond those of past years. Primary focus of dispersed site management is in wilderness on the Forest.

Developed Site Use

Developed recreation site use is monitored largely through user fees and observations. More reliable use data is now available for sites where fees are collected. Focus on site fees, completion of the North Fork Shoshone Highway, and a general increase in regional travel contributed to an approximate increase in Developed Site Fee collections of 40%. While some of the increase is due to a modified fee structure, most is attributed to higher use by local and transient users. Vacationing close to home after the 9-11 event in 2001 is thought to have increased use along with the drought, which has diminished the quality of non-forest recreation settings in some areas in the State of Wyoming.

² The Shoshone National Forest is comprised of five ranger districts: Clarks Fork, Greybull, and Wapiti, known informally as the north zone; and Washakie and Wind River, known informally as the south zone.

Evaluation

In general, use of developed sites appears to be markedly increasing in the neighborhood of 20 to 30%. Closure of water systems in developed sites and restructuring of fees charged for developed sites make use levels more difficult to compare to previous years. Completion of the North Fork Highway construction also contributed to a major increase in use. The full service facilities at the Rex Hale Campground, opened for the first time in 2002, seemed to be very popular and sought after. Provision of similar facilities at the Wapiti Campground scheduled for reconstruction in 2003, should further improve the Forest's ability to serve this segment of the camping market.

Developed Site Condition

The US Forest Service operated all but one campground on the Shoshone National Forest in 2002. The Eagle Creek Campground reconstruction was completed on the north zone of the Forest; the campground was not opened for use this season. The Rex Hale Campground opened for the first year and was a major success. The RV sites and hookups proved to be popular with visitors. A concession continues to operate developed campgrounds on the Washakie Ranger District. One new Sweet Smelling Toilet (SST), accessible restroom was added to the system in 2002, and one below standard facility was replaced with SST technology.

A major effort to inventory deferred maintenance needs for facilities continues. Assessment of recreation facilities, as well as costs to bring facilities up to standard will continue.

Evaluation

Written public comments indicate that in general, the public feels campground facilities on the Forest are clean and well maintained. The primary problem noted by Forest personnel is the degradation of these facilities through daily wear and tear. Most of the picnic tables, hand pumps, fire rings, and toilets have been in place since the 1960s and need to be replaced. Despite the heavy use these sites receive, soil and vegetation condition is generally good.

All campground facilities in the North Fork corridor of the Wapiti Ranger District are planned for upgrading and retrofitting during the next decade. Rex Hale Campground was completed in 2001 and opened to the public in 2002. Eagle Creek Campground was reconstructed in 2002 and will be opened in 2003.

The campground facilities on the south zone of the Forest are in poorer condition than those on the north zone. The Louis Lake Campground on the Washakie Ranger District, for example, continues to receive heavy use with subsequent resource impacts to the campsites and surrounding area. Major rehabilitation and/or reconstruction are needed. The water system in the Sinks Canyon Campground requires constant maintenance. The Forest is evaluating the possibility of no longer providing water at many of its developed sites maintenance, testing, and compliance with water quality standards has become increasingly more difficult and expensive.

Trails

Summer/Fall Use Trails

Trail condition is monitored annually on the Shoshone National Forest. In 1999, the Forest Service began an inventory of assets; approximately 20 percent of the trails on the Forest are inventoried for deferred maintenance needs annually. At the end of fiscal year 2002, approximately 70 percent of the Forest's 1,388 miles of trail were inventoried. Data was entered into databases and documented in written records.

The Forest completed a trail inventory contract as an effort to increase the percentage of trail miles inventoried. Contractors used innovative Global Positioning System (GPS) based digital data and provided a wealth of accurate trail management information. The effort will continue in fiscal year 2003 if funding permits. The priority on the Forest pertaining to trails management continues to be deferred

maintenance condition surveys and keeping mainline trails safe and open to support commercially supported and non-commercial access to wilderness. Reconstruction of the Timber Creek Catwalk was a major safety improvement in this section of legendary hazardous trail. Replacement of the Cut Coulee Bridge was stalled by the need to contribute funding to fire suppression, but will be scheduled for 2003. A major thunderstorm event crossed the volcanic region of the Wapiti Ranger District and required significant trail crew work adjustment to reopen the Deer Creek, Ishawooa, and other affected trails.

The Forest Plan calls for maintenance of trails that provide a full range of recreation opportunities. It also states that design and maintenance of trails should be appropriate for the intended use. Throughout the Shoshone National Forest, a very wide range of recreation opportunities is available relative to the trail system and management objectives, ranging from challenging foot travel to motorized uses. Currently, the majority of trails on the Forest are constructed and maintained to be compatible with the intended use. The only exceptions are those trail segments outside wilderness that were not intended for motorized use. Due to the introduction of ATVs during the last decade and the tremendous increase in their popularity, many primitive trail segments not designed for motorized travel are being used in that fashion. Resource damage is occurring as a result. User and outfitter clearing of trails were emphasized in wilderness to allow the Forest to focus on heavy maintenance and reconstruction needs. This trend is expected to continue as outfitters and user groups such as the Back Country Horsemen are becoming more interested and active in light trail clearing projects.

Structures

All bridges are still serviceable and safe, but due to age, some may need replacement in the near future. Currently, two bridges with a high priority for replacement are the Cut Coulee Bridge and the Red Creek Bridge, both on the Wapiti Ranger District. The Cut Coulee Bridge is scheduled for replacement in 2003 and Red Creek will be demolished and replaced with a ford.

The Forest's south zone trail program has placed a greater emphasis on structures; therefore, puncheon sections are maintained to a higher degree than on the north zone. However, puncheons continue to be a major challenge to the goal of maintaining structures to standard in granitic areas of the Forest. Personnel shortages on the south zone diminished the level of project preparation, inventory, and trail maintenance accomplished.

The Forest was successful in reconstructing the Timber Creek Trail catwalk as part of a program to mitigate hazards. Planning was initiated for a similar project on the South Fork Trail.

Identification of deferred maintenance needs through inventory will help the Forest establish priorities for repair and reconstruction. The Whiskey Mountain Trail remains closed and the Forest is waiting for funding to relocate it. All other failures of trail tread or structures that could pose a major safety threat to the public were repaired during the 2002 field season.

The lack of adequate drainage structures Forest wide, in conjunction with minimal maintenance, has resulted in a less than satisfactory condition of existing drainage structures.

Evaluation

Meeting public expectations for acceptable levels of trail maintenance continues to be a problem for the Shoshone National Forest, given the extensive miles of trail in the system. However, there are many miles of trails at an acceptable standard. Analysis of deferred maintenance inventory data is helping the Forest prioritize trail safety problems and plan repairs as funds become available. The Forest continues to receive positive comments from users on the relatively good condition of its trails.

Use of motorized vehicles on trails, both where permitted and in many areas where restricted, is expanding rapidly, as observed by patrol personnel and on-the-ground impacts. Winter trail use by cross country skiers, snowshoe users, and other non-motorized uses continues to be minor but noticeable. One conflict with snow machine users was reported and mitigated by Wind River Ranger District employees.

Winter use monitoring on the Clarks Fork Ranger District indicates increasing snowmobile use. Most of the snowmobilers come from Montana and the upper Midwest states. The winter snowmobile program is relatively stable; major fluctuations in use are related to snow conditions. Snowmobile trail grooming, signs, warming huts, restrooms, and patrolling are provided through the State of Wyoming's sticker program. Snowmobiling continues to provide a significant commercial and non-commercial sport on the Forest. Investment in snow-based infrastructure and services on private land continues on the Washakie and Wind River Ranger Districts.

On the Washakie and Wind River Ranger Districts, evaluation of data collected from 25 infrared counters along snowmobile trails was completed by the State of Wyoming's Department of Commerce. Monitoring continued into its third year. Data from the counters is just now becoming available from this effort.

Wilderness snowmobile trespass has been reduced on the Forest because of patrols, well-publicized convictions of offenders, and increased signing of wilderness boundaries for winter recreation. A small percentage of snowmobilers continue to trespass.

The Shoshone National Forest is represented on an interagency team charged with evaluating winter visitor use in the Greater Yellowstone Area. The team was chartered by the Greater Yellowstone Coordinating Committee (GYCC) in response to greatly elevated levels of snowmobile use in Yellowstone National Park, and a number of other issues that are, or could potentially, affect the six national forests and two national parks represented. A formal monitoring program begun in 2001 will continue as funding is available.

Downhill Skiing Use

The Sleeping Giant Resort is the primary downhill ski area on the Shoshone National Forest. It is located on the Wapiti Ranger District and can accommodate approximately 1,000 skiers per day.

Figure 2. Sleeping Giant skier days for the last five years.

Season	December	January	February	March	April	Total
95/96	964	1,679	1,280	1,241		5,154
96/97	1,002	1,313	1,295	830	88	4,528
97/98	366	1,243	1,020	697	64	3,390
98/99	599	1,883	1,477	610		4,569
99/00	840	1,855	1,260	590		4,545

Evaluation

In fiscal year 2002, low snow conditions and a reduced level of management emphasis by the owner affected downhill skier use at the Sleeping Giant Resort. The owner did not report skier days in 2002.

The Red Lodge Race Camp on the Clarks Fork Ranger District did not operate in 2002, but the Gardner headwall and bar drift locations continue to be a major late spring attraction for snow play of a rather extreme character. The advent of snow boarding and similar new technologies has sustained use of this unique high elevation site.

The Forest Plan recommends reevaluation of ski area development when use exceeds managed capacity for three years. Current figures for use at the Sleeping Giant Resort demonstrate that use remains well below capacity at this time. The resort does provide a base for other winter recreation pursuits in the area such as cross country skiing and an alternative and overnight attraction for users of Pahaska Tepee snowmobile rentals.

Wilderness

Wilderness Campsite Condition

The Forest's inventory of wilderness campsite locations is essentially complete and available on a GIS map. The Forest began a campsite condition inventory using a GPS system. Approximately 50 sites were surveyed in 2002. A wilderness campsite condition rating has not yet been implemented on the Forest, but the new condition inventory process will allow careful comparison of changes in campsite condition in the future.

Wilderness rangers have identified problems related to food storage structures prompting a decision by the Forest to reduce the use of food storage boxes in wilderness and focus on new packable storage containers, food storage poles installed by the Forest, and technology being developed by National Outdoor Leadership School technicians. The Forest will work with the Bridger Teton National Forest and expand the Food Storage Order Forest wide in 2003. Efforts to expand the Order in 2002 proved to be highly controversial. Additional work will be done to rewrite the closure order and install infrastructure and signs in the affected areas to support Food Storage Order expansion.

Other Wilderness Monitoring

Wilderness Managed to Standard

Monitoring continues in the Forest's five wilderness areas. Based on current and previous monitoring efforts, the Forest estimates 1,378,440 acres meet national standards for wilderness managed to standard. The Forest wilderness program must achieve six of ten criteria to rate each wilderness as managed to standard. Completion of fire planning in 2002 for all Forest wilderness areas allowed the Forest to report that all acres were managed to standard.

Noxious Weeds

A vigorous noxious weed inventory, monitoring, and control program for wilderness began in fiscal year 2000 and continues. *See* item number six under Range section. The primary focus is in the South Fork of the Shoshone River drainage on Wapiti Ranger District and the Double Cabin area on the Wind River Ranger District. Primary species of concern include toadflax, houndstongue, and oxeye daisy. The noxious weed infestations are being mapped by skilled volunteer forces, trained wilderness rangers, and through agreements with county weed boards.

Wilderness Education

Wilderness rangers on patrol in wilderness areas made approximately 2,500 contacts. Education is focused on in-the-field contact with users because many are repeat visitors to the Forest. This approach has allowed the Forest to combine wilderness education with efforts to monitor wilderness, maintain trails, and enforce the law. The Forest continues to hire a field-trained wilderness ranger workforce for these purposes.

Evaluation

Wilderness areas on the Shoshone National Forest are in good condition, overall. A future challenge will involve successful implementation of wilderness fire plans. In addition, invasion by exotic weed species continues as a significant threat to wilderness ecosystems. The Forest is placing additional emphasis on weed-free feed programs and may need to devote additional resources to the noxious weed program.

Campsite inventory and visitor contact efforts have been very successful in achieving high levels of awareness among the Forest's wilderness users about *Leave No Trace* principles and grizzly bear behavior. Bear mortalities were high in 2000 and 2001, but showed a decrease in 2002 as education efforts and public awareness continued to pay off. The high level of one-to-one field contact by

wilderness rangers on the Forest continues to be the cornerstone of wilderness management for the Shoshone National Forest. In 2002, the Forest installed or replaced nearly 50 food and carcass hanging poles funded by a variety of sources. This effort will allow metal bear boxes flown into the wilderness over a decade ago to be gradually decommissioned and removed. Existing boxes are being turned over to outfitters with base camp facilities as the Forest makes better-built food storage poles available. The Forest has also begun a program with the National Outdoor Leadership School (NOLS) to devise acceptable food storage technology for areas that do not have sufficient tree cover necessary to practice food and carcass hanging. Initial results are encouraging and NOLS is proving to be a valuable partner in education and technology necessary to properly manage recreation use, wilderness, and wildlife.

Visuals

Adopted Visual Quality Objective (VQO)

Visual quality objectives (VQO) describe the acceptable degrees of alteration allowed in the natural landscape (Shoshone Forest Plan, FEIS, Volume I, page VII-35). This monitoring item was intended to ensure that projects meet these objectives or that corrective action, such as mitigation, is initiated when it appears a project will not meet them.

VQO are monitored at the project level and achieved through project implementation. If project level analysis indicates that an existing VQO, as identified in the Forest Plan, is not going to be met by the proposed action, two options are available. First, if through site specific analysis it is determined that the VQO is inappropriate for the project area it may be changed through a Forest Plan amendment. Second, if visual analysis indicates that the VQO is appropriate for the project area but is not being met (or is not going to be met), mitigation measures must be taken to meet the VQO in a minimum amount of time. Timeframes for meeting VQO vary between individual visual quality objectives.

Revegetation of the North Fork Highway Reconstruction Project

In fiscal year 2002, revegetation of the North Fork Highway Reconstruction project was field monitored for consistency with Forest Plan VQO. Construction was monitored June 3, 2002 by a team from the Forest Service, Wyoming Department of Transportation (WYDOT), Park County, and private consultants to ensure that the disturbed areas conform to the VQO of retention. In the upper elevation portion of the North Fork Shoshone River corridor, the team found the revegetation density was 80 to 90 percent while the lower portion ranged in coverage from 35 to 80 percent. For most of the disturbed areas throughout the North Fork, the revegetation work is blending and/or matching the adjacent vegetation's color, texture and distribution. Approximately 25 percent of vegetation planted failed due most likely to sun shock and possibly improper planting techniques. Aspen and Douglas-fir had some damage due to wildlife and other factors.

The VQO of partial retention appears to have been met except in limited areas. A few areas need to be replanted from rye grass (bright chrome green contrast) to fescue and blue wheatgrasses. Rye grass areas are planned for replanting with fescue and blue wheatgrasses. Most sage areas are revegetating and will meet the VQO of partial retention in three to five years. A few areas need to be planted with overstory species, which will take 10 to 20 years to meet partial retention. The WYDOT plans to overplant lodgepole seedlings in key areas for the next year or two. It is recommended that the Forest follow up with WYDOT concerning the above mitigation and that progress continue to be monitored.

Rex Hale Campground Post-Construction Evaluation

On June 5, 2002, a Forest Service team from the Shoshone National Forest accomplished a recreational and scenic analysis and field review of Rex Hale campground. Comments and concerns centered on the recognition that the historic setting, scenic context, and/or sense of place was somewhat compromised by the modern upgrade of the site. Since the Forest is in the process of upgrading the Wapiti campground, the team felt that the Forest could benefit from the post evaluation. The team produced recommendations to improve cost effectiveness, to maintain the historic sense of place, and to enhance and/or maintain the relatively primitive and rustic nature of the North Fork recreation facilities. Those recommendations have already been integrated into the construction documents for the Wapiti campground.

Forest Highways

Three important scenic Forest highways—Beartooth and Togwotee Highways and the Louis Lake Road—are in various stages of planning and reconstruction design. Scenic analysis has occurred through visual surveys and varying forms of field reconnaissance. For the most part the existing scenic condition meets the Forest Plan VQO with a few exceptions. Portions of the Louis Lake (Loop) Road are questionable in

meeting the Forest standard due to the significant amount of dead, dying, and decaying forest areas adjacent to the roadway.

Fiddlers Lake Timber Sale

The Fiddlers Lake Timber Sale was analyzed in 2002. Because much of the landscape was covered in snow, an office mapping review occurred and seasoned peer input was received. Portions of the sale area are in need of visual vegetative recovery. Specified visual recommendations were incorporated in the timber sale plans. Monitoring of scenic aspects is planned for the 2003 field season.

North Fork Fire Prevention Projects

For fuel reduction projects adjacent to historic lodges, recreational residences, and other recreational facilities, some field analysis has been performed. The treatment concepts are sound in terms of VQO and no significant scenic impact is anticipated except for minor areas of temporary disturbance. In most sites, long-term scenic variety and character will be enhanced.

Forest Antenna Towers

Antenna towers installed this year do not meet the Forest Plan VQO.

On all sites, placement was poor. The scenic character, the sense of place, and/or historic character of these administrative sites (Sunlight, Crandall, Timber Creek, Dickinson Park and Dead Indian) were significantly diminished. It is recommended that the Forest's landscape architect and archaeologist work with the responsible telecommunications personnel to reanalyze these sites for proper relocation and other mitigation to meet the intent of Forest Plan direction.

Evaluation

Forest wide, and in general, Forest Plan VQO are being met. Forest personnel work actively to implement the Forest Plan by forecasting and subsequent mitigation of visual impacts due to management activity. It appears substantial forest wide effort has been made to meet VQO.

From a long-term standpoint, scenic quality will most likely continue to degrade due to significant areas of dead and dying trees from historic fire suppression measures and subsequent pest infestations. Economic and practical circumstances preclude a significant trend reversal. Eventually, fire will renew the vegetation cycle. Considering the visual status of a post-fire landscape, no visual quality standards exist in the Forest Plan nor is there a common agreement among experts as to the public's perception of a burned landscape. Debate and controversy exist concerning methods of pre- and post-fire management practices relating to scenic integrity. This may be an issue to debate and attempt to resolve as Forest Plan revision proceeds.

Cultural

The role of the cultural resources program is to provide stewardship for the prehistoric and historic resources located on the Forest. The cultural resources program includes site protection, investigation, interpretation, and public education to enhance and protect irreplaceable assets.

A major component of the cultural resources program is to provide input into projects that occur on national forest lands. The process involves ensuring compliance with Section 106 of the National Historic Preservation Act.

Another part of the process is interdisciplinary participation on National Environmental Policy Act (NEPA) analysis for projects occurring on the Forest.

Compliance with Cultural Resource Regulations

The Forest continued to work through many issues of compliance with cultural resource regulations in 2002. In coordination with the State Historical Preservation Office (SHPO), a program was developed and implemented to help the Forest comply with cultural resource regulations. The following activities are aimed at compliance with Section 106 of the National Historic Preservation Act.

Approximately 3,587 acres of the Forest are currently under contract for survey for the prescribed fire program. Another 37,000 or so acres were surveyed under contract for the range permit reissuance effort. Twenty-five sites were recorded and evaluated as part of this effort.

Approximately 2,000 additional acres were inventoried for other miscellaneous projects such as wilderness trail maintenance, road decommissioning, campground reconstruction, and miscellaneous range improvement projects. Several additional contracts for survey work are scheduled for 2003 for range, prescribed fire, timber harvest, road decommissioning, and watershed enhancement projects.

Evaluation

The remedial plan that was developed jointly with the State Historic Preservation Office (SHPO) is being implemented

The Forest will continue to address the issues outlined in the plan and is working toward full compliance with cultural resource regulations in coordination with SHPO.

Annual meetings are occurring between the Forest Service and SHPO to review progress toward full compliance. The Forest Service Rocky Mountain Region is also working on a uniform protocol for all forests within the region to use when interacting with SHPO.

Protection of Properties Eligible for the National Register

In fiscal year 2002, 51 new sites were evaluated for National Register eligibility and two sites were interpreted for the public (signs were installed and information posted). One site, the Clay Butte Fire Lookout, is in the process of being nominated for the National Register. Site visits occurred and site condition was assessed at eight sites, listed below, that are listed or eligible to be listed on the National Register of Historic Places.

Figure 3. Cultural sites monitored in fiscal year 2002.

Site Name	National Register Eligibility	Status and Recommendation
Mummy Cave	Listed	New highway construction bypass site. Continue monitoring ³
Dead Indian Campsite	Listed	No change in condition observed.
Looking Bill	Concurred Eligible	No change in condition observed, use by dispersed campers.
Kirwin Town Site	Concurred Eligible	No change in condition observed. Stabilization work in progress. Continue to monitor.
Double Dee Ranch	Concurred Eligible	Management plan development in progress. Some stabilization work is needed. Continue to monitor.
Wapiti Ranger Station	National Landmark	Maintenance and upgrades occurring.
Black Water Firefighter Memorial	Listed	Stabilization work occurred and will be completed 2003. Continue to monitor.
Clay Butte	Nomination in Progress	Some work is needed to make the lookout usable for interpretation

¹ The north wall of the block excavation conducted at Mummy Cave in the early 1960s is experiencing rill erosion. The southern extent of the block excavation is pock marked from visitors gouging into the wall. No artifacts or features were observed at the site. The site should continue to be monitored to see if additional artifacts or features are being exposed by disturbances of the unexcavated portions of the rock shelter.

Evaluation

It is recommended that monitoring of eligible sites continues, to ensure no long-term degradation is occurring at listed sites (National Register of Historic Places) on the Forest. In addition, as more properties are nominated to the list, more emphasis needs to be placed on monitoring these sites.

Additional Monitoring Efforts

Per a Memorandum of Understanding (MOU) with the SHPO, the Forest agreed to perform visual examination of areas identified as having high potential for heritage resources and high probability of impacts associated with livestock grazing. A concerted effort was made to examine these areas to ensure that the terms of the MOU were being followed. This effort was very successful in that many areas were examined and inspected. The Forest will continue this effort.

Forest personnel gave four archeological presentations to organizations and schools. The Forest also conducted a structural stabilization project in cooperation with Wyoming SHPO and with the help of volunteers at the Kirwin historic site. This effort will continue into 2003. Stabilization work will also be performed on the Double Dee Ranch.

³ The north wall of the block excavation conducted at Mummy Cave in the early 1960s is experiencing rill erosion. The southern extent of the block excavation is pockmarked from visitors gouging into the wall. No artifacts or features were observed at the site. The site should continue to be monitored to see if additional artifacts or features are being exposed by disturbances of the unexcavated portions of the rock shelter.

In an effort to place more emphasis on cultural resource management, agreements are being developed and implemented with Northwest College, the Dubois Museum, the Buffalo Bill Historical Center, Colorado State University, and the Wyoming Heritage Project. These agreements will increase the personnel available to monitor and protect historic and prehistoric resources on the Shoshone National Forest. These efforts are yielding new information about cultural resources within the wilderness areas, which will help the Forest to better manage these resources.

Proposed, Threatened, Endangered, and Sensitive Species

Known Human-Caused Grizzly Mortalities

The 1993 *Grizzly Bear Recovery Plan (Recovery Plan)* established a number of parameters to be monitored for determining recovery within the Greater Yellowstone Area (GYA). Criteria for recovery include a limit on grizzly bear mortalities that applies to all jurisdictions within the GYA. Known and probable human-caused mortality is not to exceed four percent of the minimum population estimate calculated on a six-year running average. In addition, female mortality (six-year running average) is not to exceed 30 percent of the four percent. Mortalities tied to recovery objectives are counted in the grizzly bear recovery area (recovery area) and within 10 miles outside. Methods for estimating populations and calculating mortality limits are documented in the *Recovery Plan*. All grizzly bear recovery information is reported annually for the GYA in the Annual Report of the Interagency Grizzly Bear Study Team (IGBST). Annual reports are generally available by May of the following year and can be accessed under [bear links](http://www.fs.fed.us/r1/wildlife/igbc/) at the following web site <http://www.fs.fed.us/r1/wildlife/igbc/>. The Forest participates in gathering and compiling information presented in the IGBST annual report.

Fifteen known and probable grizzly bear mortalities were documented in the grizzly bear recovery area and the 10-mile perimeter within the GYA. Seven of these were females, with sex undetermined on two subadult bears removed to the grizzly discovery center. Four known human-caused mortalities (one female) occurred within the outer boundary of the Shoshone National Forest (Figure 4). Two of these, including the lone female, occurred on private inholdings in the Crandall Area on the Clarks Fork Ranger District. Two additional adult females died of unknown causes, with a possible mortality of an adult female wounded by a hunter. All mortalities were within the grizzly bear recovery area. A single natural mortality of a cub of unknown sex was documented. Specific locations and causes of these mortalities are documented and summarized for the Shoshone National Forest in the 2002 IGBST report.

Figure 4. Grizzly bear mortalities within the boundary of the Shoshone National Forest, 2002.

Location	Date	Sex	Age	Type	Cause
North Fork	4/2/2002	M	6	Known Human-caused	Management Removal Nuisance and property damage.
Papoose Creek	10/9/2002	M	Ad	Known Human-caused	Hunter self defense
Crandall (private)	9/10/2002	F	21	Known Human-caused	Management Removal Nuisance and property damage.
Crandall (private)	11/8/2002	M	7	Known Human-caused	Shot at private residence
Undisclosed	Fall 2002	F	10	Unknown Cause	Under Investigation
Sunlight Creek	Fall 2002	F	Ad	Unknown Cause	Unknown
Ishawooa Creek	11/6/2002	F	Ad	Possible Human-caused	Hunter wounded – no carcass
Sunlight Creek	9/21/2002	?	Cub	Natural	Specific cause unknown

Evaluation

Grizzly bear mortalities in the grizzly bear recovery area and within 10 miles in the GYA have ranged between 15 and 19 for the last three years. The six-year running average mortality thresholds identified in the *Recovery Plan* have not been exceeded for all bears or for females since 1997. Hunter-related mortalities, management removals related to bears obtaining human foods, property damage, or livestock depredation constitute the majority of the grizzly bear mortalities during the last three years in the GYA. The current level of mortality does not appear to be significantly limiting the expansion or growth of the

population. Hunter education is still a priority with the Forest. Information is posted at all trailheads and campgrounds, pamphlets are distributed, and hunter patrols contact many hunters in the field during the hunting season. The Forest also cooperates with the Wyoming Game and Fish Department (WGFD) in conducting “Living in Bear Country” workshops in several communities in western Wyoming. During 2002, numerous public contacts, new releases, radio and TV spots informed users of the importance of storing their food properly and recreating safely in bear country.

Compliance with Grizzly Guidelines

The two main components of the *Grizzly Guidelines (Interagency Grizzly Bear Guidelines)* are to maintain and improve habitat, and minimize the potential for or resolve grizzly bear/human conflicts. The 1998 Monitoring Report discussed the main elements of the Forest program designed to achieve the above objectives and how these have contributed to the remarkable progress toward grizzly bear recovery on this Forest. The reader is referred to that report for background information and perspective. Items monitored in 2002 relative to this element include biological evaluations prepared, conflict reports, and public education efforts.

All grizzly bear/human conflicts, confrontations, and management actions for the entire Yellowstone ecosystem have been published annually since 1993. Beginning in 1999, the conflict report has been incorporated into the IGBST’s annual report. In 2002 on the Shoshone, there were 51 documented grizzly bear/human conflicts, 11 livestock depredation incidents, 31 instances where bears obtained food rewards (19 that also resulted in property damage), and an additional 12 cases of property damage where bears did not obtain food rewards. Specifics on the number, location, cause, and suggested solutions for grizzly bear/human conflicts occurring on the Shoshone National Forest can be found in the 2002 IGBST report. See the section on grizzly bear mortality in this report for information on how to access IGBST reports.

Evaluation

Seventeen biological evaluations were completed in 2002 to determine the effects of proposed actions on grizzlies and their habitat on the Forest and to assist in the ultimate recovery and delisting of the species. Forest biologists and other personnel met regularly with biologists and personnel from other federal and state agencies with shared responsibilities for this species to review proposed actions and consider alternative courses of actions and associated consequences for the grizzly. As in previous years, grizzly bear clauses, as appropriate, were updated and included in special use permits, domestic livestock grazing permits, and contracts for other activities in grizzly bear habitat on the Forest.

Efforts to minimize or resolve grizzly bear/human conflicts were a high priority as always. Numerous public education outreach efforts were carried out in cooperation with other forests and agencies in the GYA. Some of these efforts included education and enforcement of the Food Storage Order requiring food attractants be kept unavailable to bears; dissemination of literature and personal contacts at Forest offices, trailheads, campgrounds, the Wapiti Information Center, and the Clay Butte Information Center; inspections of guest lodges and summer homes; safety presentations for organized groups; and participation in the “Living in Bear Country” workshops.

Grizzly Habitat Effectiveness

Habitat effectiveness is a measure of the degree to which an area of habitat is producing the desired results given its capability. In other words, to what degree is the capability of the habitat being impaired by humans and their activities? This parameter is considered with respect to individual project proposals as they are evaluated, as well as for the entire area of Shoshone National Forest grizzly bear habitat. Data from various monitoring efforts, as well as professional judgments, are used to assess overall habitat effectiveness for the entire Forest and for specific projects.

The 1998 Monitoring Report identified various parameters that were being monitored, in cooperation with the Yellowstone Ecosystem Subcommittee, to evaluate habitat effectiveness. The current version of the *Draft Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area*⁴ (*Conservation Strategy*) (November 2002) modified the specific habitat standards somewhat from those presented in the 1998 Monitoring Report. These same modified habitat standards will be incorporated into the *Recovery Plan*. The forests in the GYA have agreed in concept to a no net loss of habitat within the grizzly bear recovery area which these draft standards attempt to represent. Proposed activities are evaluated against these standards pending the finalization of habitat criteria in the *Recovery Plan* and the *Conservation Strategy*. The *Recovery Plan* is relevant while the bear is listed as a threatened species, whereas the *Conservation Strategy* will apply when the bear is delisted.

The habitat standards are based on a 1998 baseline of habitat conditions within each of the 40 Bear Management Subunits within the recovery area and summarized below. See the *Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area*⁵ for more information.

- The percent of secure habitat within each bear management subunit must be maintained at or above levels that existed in 1998. Temporary or permanent changes are allowed under certain conditions. Permanent changes require replacement of secure habitat of equal value and temporary changes are limited in size and number.
- The number and capacity of developed sites within each subunit will be maintained at or below the 1998 level with some exceptions for administrative or maintenance needs.
- Inside the recovery area, no new active commercial livestock grazing allotments will be created and there will be no increases in permitted sheep Animal Months (AMs) from the identified baseline. Existing sheep allotments will be monitored, evaluated, and phased out as the opportunity arises with a willing permittee.

In addition to the above standards, the percent of open and total motorized access route density, habitat effectiveness as identified in the Grizzly Bear Cumulative Effects Model, and habitat connectivity will be monitored by the Forest under the *Conservation Strategy* and the *Recovery Plan*.

Evaluation

All *Recovery Plan* population parameters for the ecosystem were exceeded in 2002. The habitats on the Forest contributed significantly to meeting these targets and to the overall goal of grizzly bear recovery. Mortality was below the threshold and there were a total of 52 unduplicated females with cubs-of-the-year (COY) sighted in the recovery area and the 10-mile perimeter. This equates to a six year running average of 38 females with COY and is well above the threshold of 15 females with COY identified in the *Recovery Plan*. Thirteen of those females with COY were initially sighted on the Shoshone National Forest and 19 used habitats on the Forest. Females with young have occupied all the Bear Management Units on the Forest for each of the last six years. The *Recovery Plan* requires that females with young must occupy 16 of 18 bear management units at least one year out of six. Information that is more specific can be found in the 2002 IGBST report.

A complete evaluation of secure habitat or motorized access density has not been completed ecosystem wide since the evaluation of the 1998 baseline pending the finalization of the habitat standards. However, effects on secure habitat have been evaluated for all proposed projects on the Forest to ensure compliance with the draft standard. No new roads have been built in the recovery area that would result in a decrease in secure habitat. Several roads have been closed or obliterated within the recovery area since 1998 that would result in a decrease in motorized access route density and an increase in secure habitat over the 1998 baseline. There have been no increases in site development that were not mitigated to ensure no detrimental impact to grizzly bears, and no new livestock allotments or increases in sheep AMs. A

⁴ The Conservation Strategy is available at <http://www.fs.fed.us/r1/wildlife/igbc>

continuation of the expansion of bears into new areas and apparent increases in population size and reproduction on the Forest also suggest relatively high habitat effectiveness in and out of the recovery area.

Wolf Population Status

Fourteen gray wolves were reintroduced into Yellowstone National Park in January 1995 from Alberta, Canada. The following year, 17 additional wolves from British Columbia were added to the reintroduced population. These animals and any other native wolves that might have remained in the Greater Yellowstone Area have been classified as a “non-essential experimental” population, as per provisions of the Endangered Species Act, which provides for additional management flexibility.

The U.S. Fish and Wildlife Service (FWS) and the National Park Service (NPS) monitor wolves with assistance from other agencies, groups, and individuals as circumstances allow. Shoshone National Forest personnel maintain contact with these agencies, and use other information sources as well, regarding the status, location, and activities of wolves on or near the Forest. Weekly reports from the FWS on the status of wolves in the Rocky Mountain area are posted on the FWS Region 6 Internet site www.r6.fws.gov/wolf/index.htm. The 2002 annual report can also be viewed at this site after about May 1, 2002.

Evaluation

In December 2002, 67 to 81 wolves (38 to 52 adults/yearlings) in eight different packs were present in Wyoming outside of Yellowstone National Park (YNP). Four of these packs (Beartooth, Sunlight, Absaroka, and Washakie) have been using areas primarily on the Shoshone National Forest since at least 2000. An additional pack (Greybull River) formed and began using the Greybull River of the Forest in 2001. Mollie’s Pack and the Yellowstone Delta Pack, whose home ranges are primarily in YNP, occasionally use areas in the upper North Fork and South Fork of the Shoshone River drainages on the Forest.

The Sunlight, Beartooth, Absaroka, Washakie, and Greybull packs had pups in 2002.

Two of these packs were documented killing livestock in 2002: Sunlight (at least four calves), and the Washakie (at least five calves). Attempts were made by the FWS to control wolves in the Sunlight and Washakie packs. Three wolves were removed from the Sunlight Pack and both the alpha male and female were trapped, fitted with new radio collars, and released on site. The Washakie Pack has a long history of livestock depredations. Three wolves in this pack were removed and one adult male wolf was captured, radio collared, and released on site.

For more information, *see* the 2002 Rocky Mountain Wolf Recovery Annual Report.

Nesting Peregrine Falcons

Although the peregrine was removed from the Endangered Species List in 1999, the Shoshone National Forest continues to cooperate with the WGFD to monitor this species on the Forest. In 2002, WGFD monitored the following items related to peregrines: number of nest sites, number of nesting pairs, nesting success, and production for the Shoshone National Forest (SNF) and surrounding area. Since its delisting, the State has kept a record of all nests and fledglings produced.

Evaluation

In and around the Forest, there were 19 active peregrine falcon nests in 2002. These nests produced 35 young. Of these, twelve nests were discovered on the Forest, which produced at least 26 fledglings, or 2.1 young per pair. People involved in monitoring nests believe there are more nesting peregrines than are found during the surveys. Surveyors are not always able to access the good nesting ledges, and when they check areas that have not been checked for a few years, they most often find nesting birds there.

The following graphs show the trend of occupied nests and fledglings produced on and near the Shoshone National Forest since 1999. Both of these measures show an upward trend for peregrines over the last 5 years. Recognizing that sometimes nests cannot be checked due to weather or other factors, these numbers could be higher. Peregrines appear to be doing well on and near the Forest and are increasing.

Figure 5. Number of occupied peregrine falcon nests on or near the Shoshone National Forest.

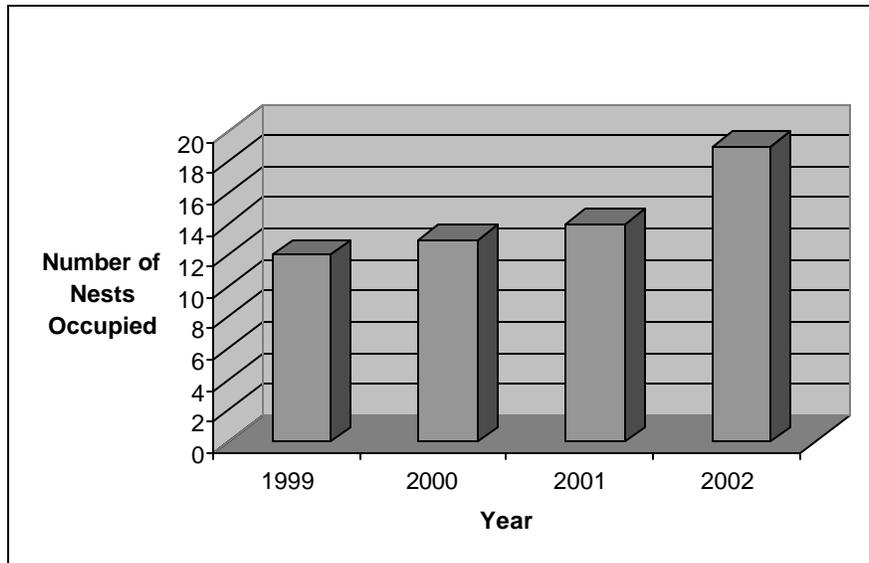
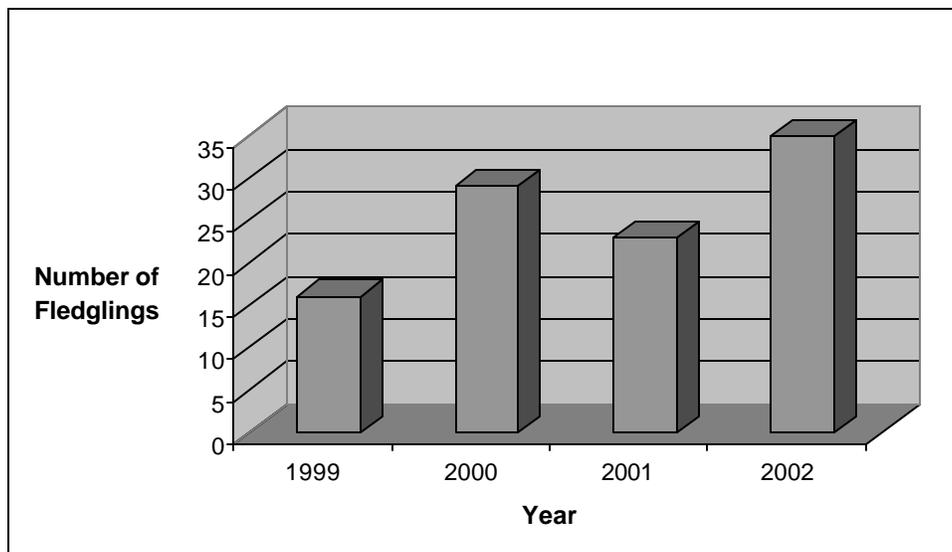


Figure 6. Number of peregrine falcon fledglings produced on and near the Shoshone National Forest.



Nesting Bald Eagles

The bald eagle remains on the list of threatened species, even though delisting has been proposed by the U.S. Fish and Wildlife Service. For the past two decades, there has been an ongoing cooperative recovery effort for bald eagles throughout the Greater Yellowstone Area, the State of Wyoming, and many other areas of the country. Nesting surveys on the Shoshone National Forest are conducted annually as part of Wyoming statewide surveys.

Evaluation

Although the number of bald eagles in Wyoming is stable, annual surveys conducted in 2002 did not detect any current nesting on the Forest, and none of the nests in close proximity to the Forest were successful. The habitat requirements for bald eagles—large open water and large trees for nesting and roosting—are not readily available on the Forest, which has predominately smaller, headwater streams. However, throughout the state of Wyoming and in the Greater Yellowstone Area the number of nesting pairs has increased dramatically in the past 20 years.

Lynx

The Forest completed its final portion of the National Lynx Protocol in 2002, meaning that both grids set up for the Forest have been sampled three times as the protocol described. The protocol involves putting out hair snare pads with attractant (such as catnip) at intervals along a grid to entice a cat to rub on the pad, leaving a hair sample. These samples are collected and sent in for DNA analysis. In 2002, the Beartooth survey (grid #33) was conducted for the third time. The results are not yet available.

Because the surveys in 2000 (obtained in 2001) detected lynx hairs in the Beartooth grid, the Forest focused on additional snow tracking surveys in the Beartooth area in the winter of 2001/2002. These surveys entail looking for lynx tracks using snowmobiles or skis. If tracks are found, they are followed in an attempt to locate a day bed with hair to sample for DNA analysis. These surveys were done in partnership with the Rocky Mountain Research Station in Missoula Montana, and were conducted January through March of 2002. Information on the miles of tracking is not yet available and will be reported in next year's annual report.

Evaluation

Although results of the 2002 hair samples are not available, the results of the snow tracking survey were negative. This means that even though hairs were previously detected in the Beartooth area, lynx do not appear to be occupying the area with any frequency, or tracks would probably have been discovered during the extensive snow tracking survey.

The 2001 results for grid #33 were received in 2002 due to the length of time it takes to receive DNA analysis results. There was no evidence of lynx presence detected from samples submitted. The Forest has not yet received 2002 DNA results.

Because evidence of lynx was found in the Beartooth area from the 1999 survey, further analysis of future projects in that area must be performed to determine what effects these projects may have on lynx and its habitat. The Beartooth highway project, for example, has been examined for potential lynx crossing areas and ways to preserve those areas when the highway is reconstructed. In addition, money is being allocated to snow tracking surveys in this area to look for further evidence of lynx.

Sensitive Plants

The botany-sensitive plant program on the Forest continues to have a low emphasis due to funding. Sensitive plant monitoring occurred mostly in conjunction with proposed projects.

Qualitative monitoring of round-leaf orchid populations occurred at the Swamp Lake Botanic Special Interest Area (SIA) on the Forest's north zone. Livestock use at the southern end of the SIA continues to be a problem due to trampling.

A contract was initiated in early fiscal year 2002 with Dr. Richard Scott, a botanist with Fremont County Weed and Pest, to complete a Forest wide plant list. To date 1,495 plants have confirmed identifications on the Shoshone National Forest. A research publication of this list will be pursued in fiscal year 2003.

It is recommended that the Forest increase its efforts to monitor sensitive plant species. The addition of new plants to the regional sensitive plant list will result in an increase to the workloads of Forest

personnel. Land management projects that may affect sensitive plants will require biological assessments. Funding for botanical work continues to be a concern. Monitoring of livestock disturbance within the Swamp Lake SIA will continue.

Wildlife and Fish

Winter Range Carrying Capacity

The Forest monitored winter range by conducting two winter range monitoring trips in the spring of 2002. A team consisting of range staff, wildlife and fisheries biologists, WGFD biologists, and hydrologists were involved in monitoring. This group rode over several miles through the Elks Fork of the North Fork of the Shoshone River and the Rock Creek grazing allotment in the South Fork of the Shoshone River watershed. The group monitored forage vigor, species diversity, amount of litter, and watershed condition. In addition, the Forest Service, cooperating with other agencies, continued to monitor winter range for the Whiskey Mountain bighorn sheep herd on the Wind River Ranger District. This has been ongoing for over 40 years. Forage condition was measured using vegetative clippings and by calculating pounds of forage produced per acre on several sampling transects both on and off the Forest. Figure 7 displays combined forage production for two transects on the Forest portion of Sheep Ridge, monitored during the life of the Forest Plan.

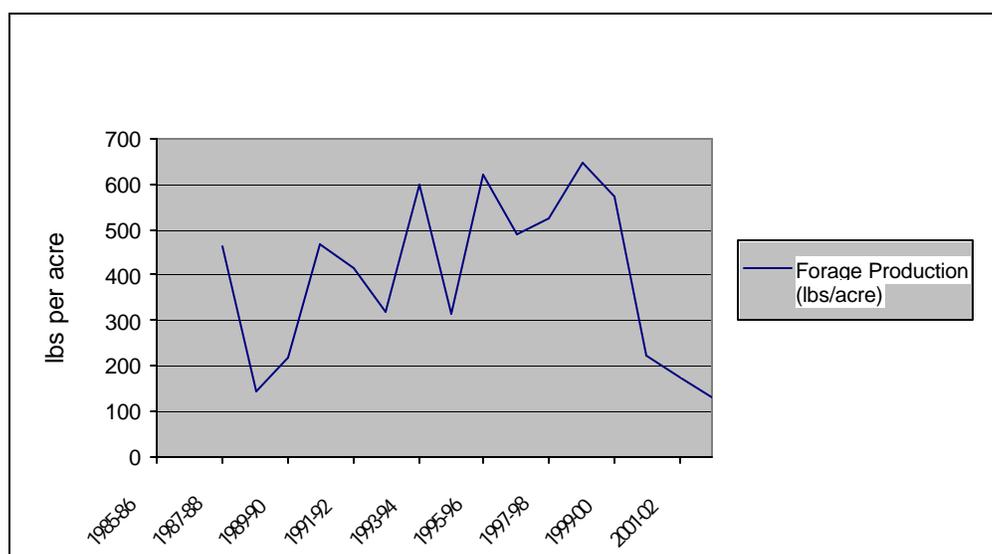
Evaluation

Cattle graze the Rock Creek allotment in the summer months and elk graze it in the winter months. Livestock numbers were reduced less than a decade ago and elk numbers are above objective (as of 2001), but lower than they were in the mid 1990s when they peaked. The area showed poor plant vigor and a lack of litter although there was high plant diversity. The area appears to be in better shape than it was several years ago when the last monitoring was done, but the upward trend is slow. Drought has certainly set back some of the riparian areas, which appear to be in worse shape than the upland areas, with considerable conifer encroachment and heavy browse of willow and aspen.

The Elks Fork area was also in less than ideal shape. Since cattle grazing has not been documented in the drainage for over 100 years, the grazing pressure observed is due to wildlife, particularly elk. Elk are also above objective levels. The plant vigor was poor and litter was low, but it also looked better than it did several years ago. Improvement noted is mostly likely linked to the fact that elk numbers are lower than they were several years ago.

The trend for winter range forage production on Sheep Ridge (which is winter range for the Whiskey Mountain bighorn sheep herd) is shown in Figure 7. Since the Forest Plan was published in 1986, forage production has fluctuated, although it has been somewhat stable until the last few years. This is largely due to the drought situation. If this data is reviewed in relation to the Whiskey Mountain herd trend in Figure 11, it is apparent that low forage production is not due to higher sheep numbers and overgrazing, since the population is continuing to decline. However, there may be some connection between the low sheep numbers and the low forage production.

Figure 7. Forage production trend on Sheep Ridge.



Wildlife and Fish Habitat Improvements

Wildlife Habitat Improvements

In 2002, approximately 1,500 acres of noxious weeds were treated on the Shoshone National Forest to increase native plant species and improve desired habitat conditions and diversity. Approximately 3,900 acres of sagebrush, conifers, or a mix of vegetation types were burned in several locations across the Forest. The goal was to set back plant succession and improve habitat for bighorn sheep, elk, grizzly bears, and other wildlife. Reduction of fuels, improvement of forage for domestic livestock, and movement toward long-term desired Forest conditions were other primary goals in some of these areas.

Evaluation

Limited monitoring of habitat improvements was accomplished this year due to funding and personnel shortages. Noxious weed treatments in winter ranges in the South Fork and Sunlight areas appear to be halting the spread of noxious weeds at this time. The result is that native vegetation is becoming available for ungulates using these winter ranges. Areas treated with prescribed fire across the Forest were set back to earlier successional stages, providing wildlife species greater habitat diversity.

Fish Habitat Improvements

The current Forest Plan has little specific direction related to the management of fisheries and their habitats. Much of it is outdated. Indirect inferences are made in other resource areas including watershed, riparian, wetlands, livestock grazing, and roads. The Forest is currently reviewing other forest plans, more recent forest planning direction, and Regional Office direction to develop a better link between the stream physical habitat, the biological habitat, and water quality. This issue will be addressed during Forest Plan revision.

Streams

Monitoring of fisheries mitigation associated with reconstruction of the North Fork Highway (Buffalo Bill Scenic Byway) continued in 2002. Random rock cover placement structures were installed during the early spring of 1999 in three areas of the North Fork Shoshone River: Laughing Pig, Horse Creek, Elk Fork Cliff, and on lower Elk Fork Creek. This was done as Phase II fisheries mitigation for highway encroachments on the North Fork River that impacted fisheries habitat.

The structures were installed according to recommended Forest specifications. It was determined that the structures were not functioning as intended in terms of providing additional scour pool habitat and resting areas for fish. As a result, a sub sample of the structures, including the one in the Laughing Pig area of the North Fork and Elks Fork Creek, were adjusted in the fall of 2000.

During the fall of fiscal years 2001 and 2002, the rock cluster adjustments were evaluated. The Forest fisheries crew determined that setting the top rocks of the clusters at or above bankfull created the desired fish habitat (scour holes, deep pools, resting habitat, and feeding lanes). As funding becomes available, a portion of the remaining clusters in the Elk Fork Cliff and Horse Creek areas of the North Fork will be adjusted similar to those at Laughing Pig to provide a diversity of fisheries habitat.

A j-hook structure was installed downstream of the Clearwater Bridge during late fall of 2001, using some of the large shot rocks left over from highway reconstruction. The purpose was to provide a large scour hole to increase this type of limited fish habitat in the area and to reduce bank erosion. Monitoring after runoff and bankfull flows indicated that the structure was functioning as intended in the fall of 2002.

The WGFD constructed the Horse Creek Fish Enhancement Project in 1993. *See* the 1995 Monitoring and Evaluation Report for more details on this project⁶. Monitoring the effectiveness of these structures continues. The structures below the Horse Creek campground have been effective in preventing further road erosion and in providing fish habitat. Overall, the project has been successful. Fish densities and biomass have increased significantly. In the upstream section, some structures constructed by WGFD have deteriorated and are not functioning as intended. WGFD and Forest fisheries biologists met in 2002 and decided to leave the existing structures alone. It would cost more money and additional resource damage than we felt it was worth to adjust and rebuild these types of structures.

Lakes

During the summer of 2002, a spring box system was installed in a cooperative effort with the Forest, Trout Unlimited volunteers, and the WGFD. The purpose was to increase the flow of water into Lower Dick Creek Lake. During low snow pack and drought years, this small one-acre lake does not have enough water to over winter fish. After installation, the Forest fisheries crew determined that the spring box system should provide enough water to keep the pond at full pool and over winter fish. The WGFD plans to stock the lake with Yellowstone cutthroat trout in fiscal year 2003. Monitoring of the lake level and fish population will continue to ensure that fish are able to over winter.

Evaluation

Overall, the trend for fisheries habitat is stable or improving due to road improvements that reduce sediment introduction, improved fish passage due to correction of road stream crossing problems, various fisheries habitat improvement projects, and better compliance of livestock use standards. As mentioned above, little direction exists in the Forest Plan for overall fisheries habitat improvements. However, on a site-specific basis, habitat improvements have been effective in accomplishing identified fish habitat improvement goals.

Riparian Condition

This section addresses riparian monitoring conducted by the Forest fisheries crew. *See* the Water Resources, Fisheries, Range, and Wildlife sections for additional riparian monitoring.

In fiscal years 2000 to 2002, the fisheries crew investigated the effects of past tie hacking activities on Warm Springs Creek upstream of the Warm Springs Canyon (Wind River Ranger District). The crew collected detailed channel and flood plain measurements.

⁶ Previous years' monitoring reports can be viewed or downloaded from <http://www.fs.fed.us/r2/shoshone/forestmgt/nepa/planinfo.htm>. Or, contact the Supervisor's Office at 307.527.6241 to request a report.

Burroughs Creek was monitored for work that began in 1999 to correct problems with fish passage, road erosion, and safety. The capacity of Burroughs Creek to handle high flows has more than doubled, allowing fish and other aquatic organisms greatly improved access to the upper stream reaches.

In the early spring of 2002, an undersized deteriorated culvert that was a partial barrier to upstream fish passage on a tributary to Rock Creek on the Washakie Ranger District was replaced with a larger culvert. The culvert was realigned with the profile of the stream.

The fisheries crew also participated in a Best Management Practices field trip to the Wood River and Kirwin allotments. *See* the Range Section for a discussion on findings.

Five riparian areas in unknown condition were surveyed and rated by the fisheries crew. They were determined to be in proper functioning condition.

Evaluation

The trend for riparian habitat is stable or improving due to better livestock compliance and administration, improved road drainage, stream improvement projects, and the creation of a diversity of vegetative seral stages in and around riparian areas.

Surveys confirm that the existing Warm Springs Creek channel has been straightened, incised, and widened. Very little large woody debris (minimum of four inches in diameter and five feet in length) remains in the stream. Other changes include a drop in the water table and the reduction of riparian vegetation compared to potential conditions for this stream type. Information gathered may be used to develop a stream restoration design. The project would be implemented as funding becomes available.

Monitoring continues on work on the Squaw Creek stream crossings in 1999. Fish are now able to access the entire Squaw Creek drainage. The creek experienced bankfull and above flows last spring resulting in changes to the stream channel such as narrowing, point bar development, and establishment of streamside vegetation. About one third of the conifers planted in the road way survived the current drought cycle. Follow-up monitoring will continue to determine how the stream adjusts and if any additional stream or plant restoration work is needed.

Fish and other aquatic organisms in Gas Creek and the tributary to Rock Creek now have unimpeded access to upper stream reaches. Additional grass seed needs to be planted along the banks of Gas Creek due to lower initial survival than anticipated. Mortality is likely due to drought conditions experienced the last few years.

Population and Habitat Trend of MIS

In 2002, Forest personnel prepared an evaluation of Management Indicator Species (MIS) designated by the Forest Plan (*Shoshone National Forest Management Indicator Species, Version 2.0*). The document contains a comparison of each MIS to the habitat it was chosen to represent by way of review of recent literature to see if the relationship remains appropriate. It also includes a review of literature and recent data to ascertain population trends.

Game Species

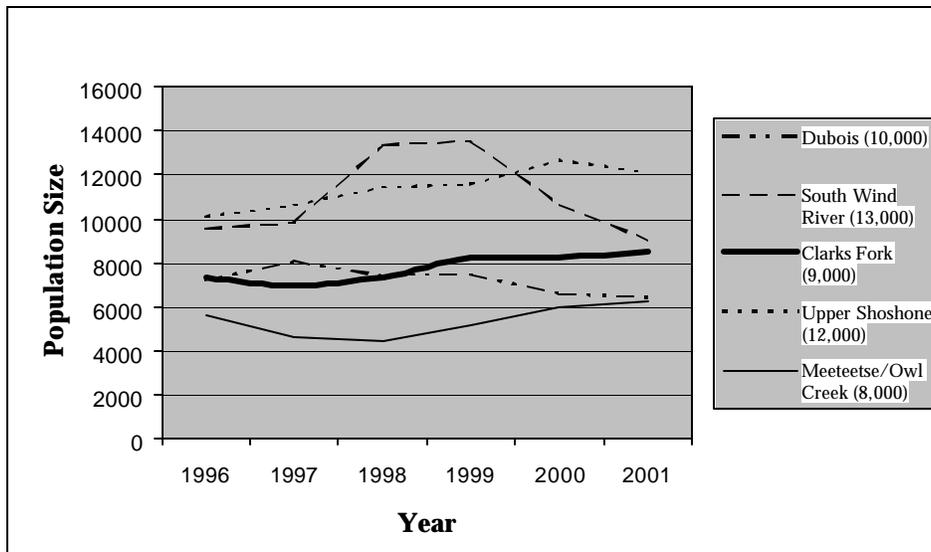
Five game species (mule deer, elk, bighorn sheep, moose, and mountain goats) are designated in the Forest Plan as MIS based on their economic importance and the level of public interest in them. Each year, the WGFD calculates and monitors population trends of all these species using visual counts, harvest data, and population modeling. Objectives are set for each separate herd unit based on the carrying capacity of the winter ranges, historic trends, land management agency input, and public input. WGFD manipulates hunting seasons and permits to adjust the trend of the herd toward the objective. For each species, the trends of the herd units that occur partially or wholly on the Shoshone National Forest are displayed graphically. In the legend, next to the herd unit name is the population objective set for that herd unit by WGFD. Population trends are shown using 2001 data. The 2002 data are not yet available.

Evaluation

Mule Deer

The Dubois and South Wind River herds appear to be decreasing slightly while the other herds are increasing. All herds except the Upper Shoshone are under objective. WGFD has restricted hunting seasons on these herds to allow them to grow toward the objective numbers. As the herds near the objective, restrictions are loosened to slow the growth trend. The biggest factor affecting these herds is the condition and availability of winter range.

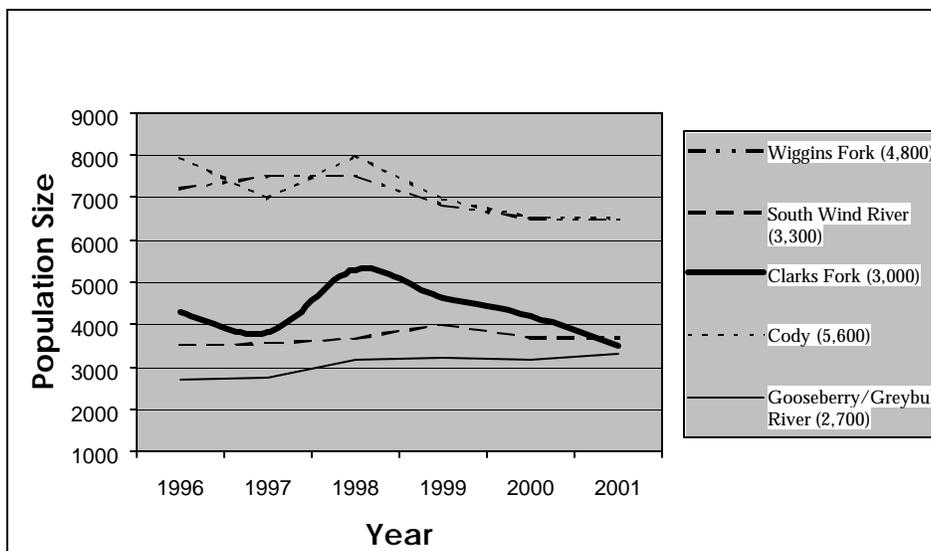
Figure 8. Mule deer herd unit population trends.



Elk

All elk herd units are currently over objective but most are in a decreasing trend. WGFD has encouraged additional harvest and this, as well as poor calf recruitment, has decreased the size of most herds.

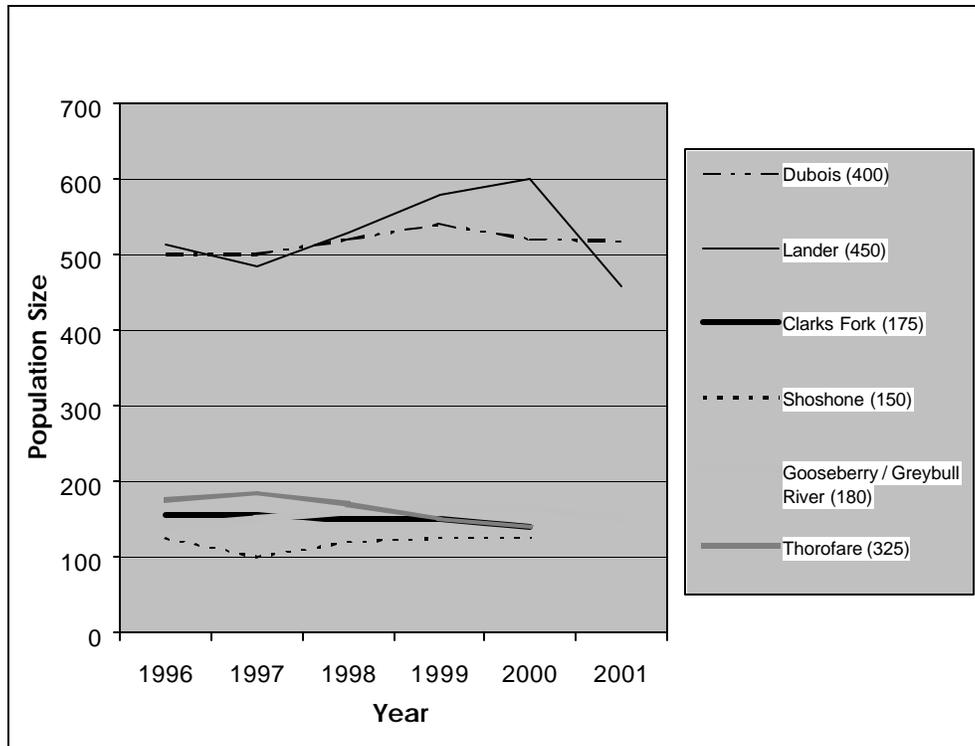
Figure 9. Elk herd unit population trends.



Moose

Moose on the Forest have been difficult to count therefore there is less confidence in output from modeling moose populations than there is for other species. Based on the best possible estimates given available data, most moose herds are under objective with the exception of those on the south end of the Forest (Dubois and Lander herds). Some of the low population levels on the north end are due to habitat loss from the 1988 fires. In the Thorofare area on the Forest's north end, moose herd harvests are restricted in order to reverse the decreasing trend. The last three years of drought have also affected available browse for this species.

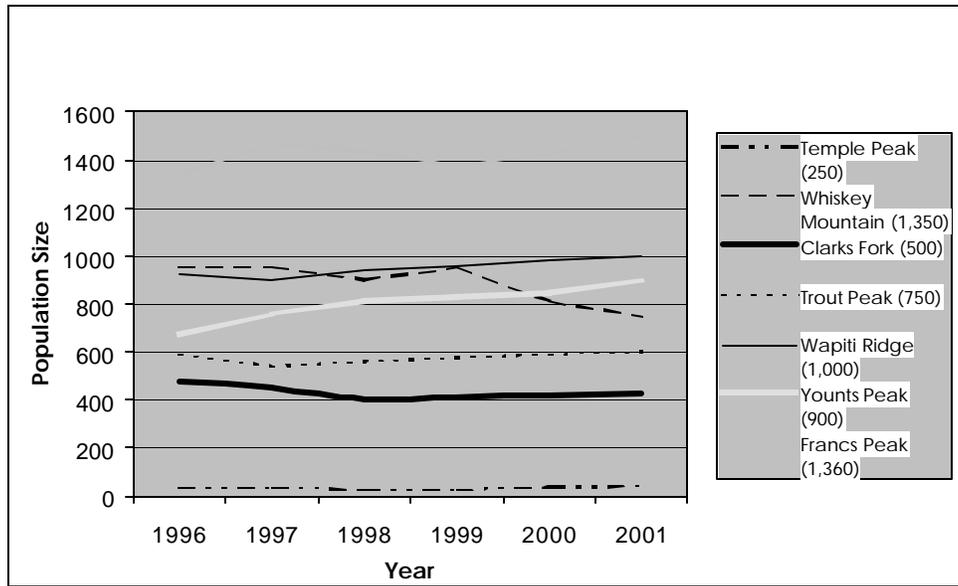
Figure 10. Moose herd unit population trends.



Bighorn Sheep

Most herds are under objective, some severely so. The herds on the north end of the Forest are increasing while the southern herds are either stable or in a decreasing trend. The Temple Peak and Whiskey Mountain herds on the south end of the Forest are still recovering from massive pneumonia die-offs in the early 1990s. The Foundation for North American Wild Sheep and the Forest Service are currently involved in studies to determine the causes of population declines. These studies are suggesting that the lack of certain essential minerals in the vegetation is causing health problems for the sheep, making them more susceptible to illness and predation. More study is needed to understand this situation and offer solutions.

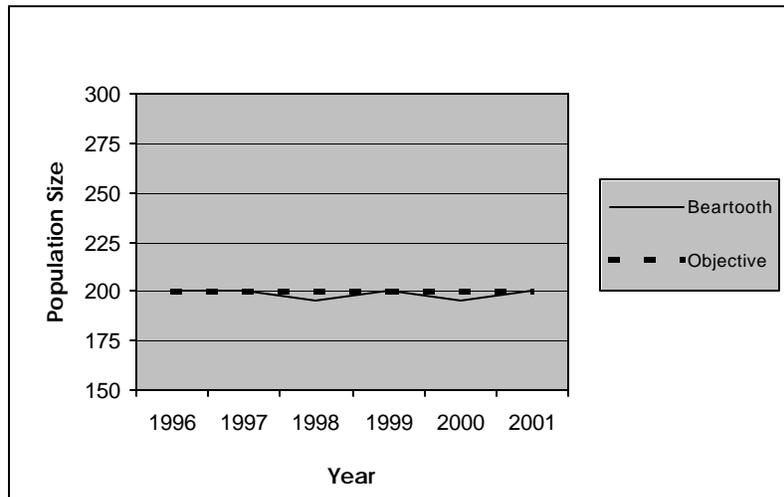
Figure 11. Bighorn sheep herd unit population trends.



Mountain Goats

The Beartooth herd is the only mountain goat herd on the Forest. It is only slightly under objective (by three percent) and is stable according to population models.

Figure 12. Mountain goat herd unit population trends.



Pine Marten

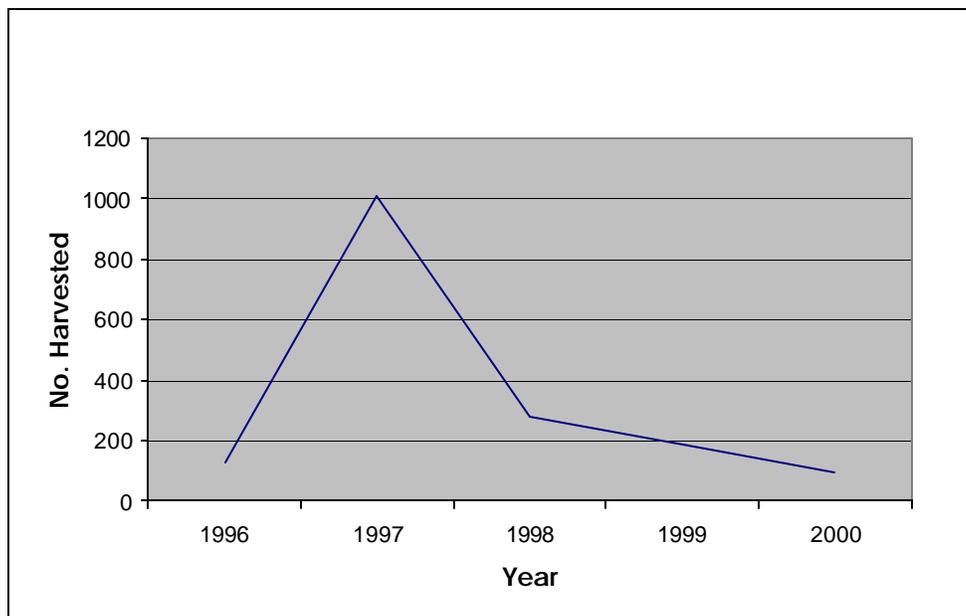
No specific monitoring was completed for this species although marten tracks were observed during lynx snowtracking in the Beartooth area on the north end of the Forest. Data on the number and location was not available at the time of this report. The information will be presented in the 2003 annual Monitoring and Evaluation Report. WGFD has collected harvest information for this species but 2000 was the last year that marten harvest was tracked. Casual observations by Forest Service personnel were also reported. Beginning in 2003, snowtracking on several snowmobile routes across the Forest will provide data on marten occurrences.

Evaluation

Marten are seen relatively often on the Forest considering their shy nature. They appear to be widely distributed wherever suitable habitat occurs. For this reason, they have been low on the state's priority list of species to monitor with limited monitoring dollars. In the winter of 1995/1996, 233 miles of snowtracking surveys were conducted across the Forest and marten were found at a rate of 0.7 marten per mile surveyed (reported in the 1996 annual Monitoring Report). In Welp's report (Welp et al 2000) the Shoshone is listed as having the highest quality habitat in the region and in the state.

Pine marten are legally trapped in Wyoming.

Figure 13. Marten harvest in Wyoming.



Data indicates that marten harvests peaked and then fell to approximately the level of harvest in 1996. A decrease in harvest is not necessarily due to a decrease in marten numbers but may be due to other factors such as fur prices and hunter/trapper effort. The MIS Evaluation concluded that the amount of suitable marten habitat on the Forest (mature coniferous forest) is abundant and in most areas of the Forest is increasing every year.

Northern Goshawk

Four transects were surveyed for goshawks on the Washakie Ranger District in June of 2002 using the Pat Kennedy protocol. No other monitoring data was collected, although an attempt was made on the north end of the Forest. However, surveys began too late in the season to be conclusive.

Evaluation

Goshawks were observed on two of the transects surveyed this year. Several other incidental goshawk sightings were reported by Forest Service employees working in the field and were recorded. The Forest Service concurs with the State of Wyoming that the species is widespread and fairly common on the Forest. WGFD has assigned this species a low priority for monitoring because of its widespread distribution, general abundance, and apparent adaptability.

Welp (Welp et al, 2000) reports that the Shoshone National Forest has the highest quality northern goshawk habitat in the region, and the largest most secure population in Wyoming. This is compared to other large populations in the state. As discussed relative to pine marten, mature coniferous forest is abundant on the Shoshone National Forest and the trend toward late successional habitat is occurring.

Brewer's Sparrow and Hairy Woodpecker

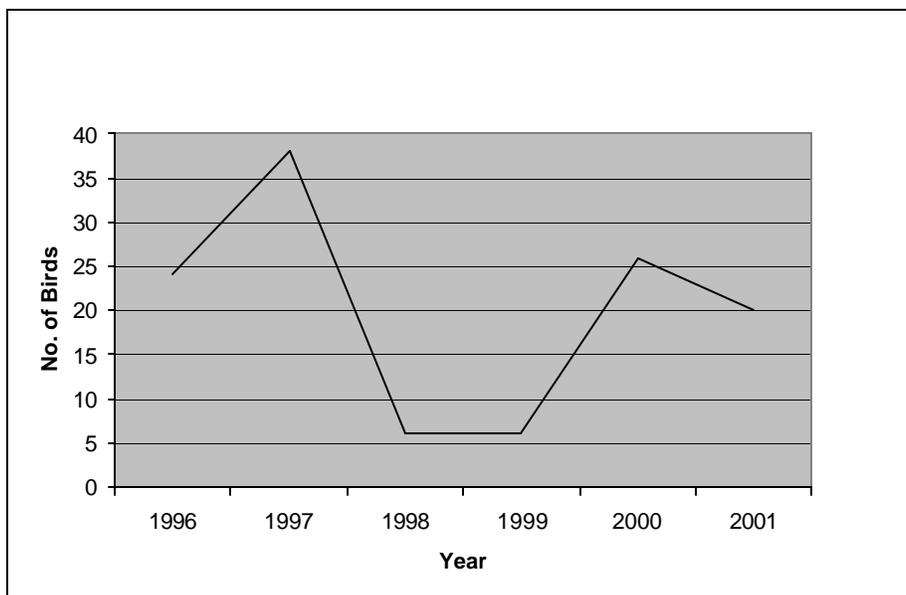
Three Breeding Bird Survey (BBS) routes have been established on the Forest. Additional bird monitoring began in 2002 as part of a statewide effort by the national forests in Wyoming to get better data on statewide trends of several species. Thirty transects were surveyed on the Shoshone National Forest, 10 in each of three habitat types: montane riparian, mid-elevation conifer, and grasslands. These transects will be surveyed each year for an indefinite amount of time.

Evaluation

Data collected in 2002 contains evidence of brewer's sparrow across the state in several transects. The estimated density of brewer's sparrow is 45 birds/km in the shrub-steppe types, 29 birds/km in grassland types, and 18 birds/km in juniper woodlands across the state. On the Shoshone National Forest in particular, the species occurred at a density of 32 birds/km in grassland habitats, and was detected on seven transects (Rocky Mountain Bird Observatory, unpublished data). BBS numbers through 2001 (most recent data available) are displayed in Figure 14.

A trend in this data is difficult to interpret due to a number of factors. BBS routes are surveyed by volunteers and are not always run consistently. Sometimes unfavorable weather prevents survey work. The sparrow is common locally, but the global trend, as well as trends in Wyoming, Colorado and Montana, is downward (BBS data).

Figure 14. Trend of Brewer's sparrow populations.



The hairy woodpecker was not detected by the statewide survey transects in 2002. It has been observed infrequently on the BBS routes on the Forest. One individual was detected in 1999 and 2000.

Data does not reveal any trend on the Forest though it does indicate that monitoring methods used do not appear to adequately sample this species. Nesting has been confirmed across the Forest, but declines have been reported (Natureserve 2001).

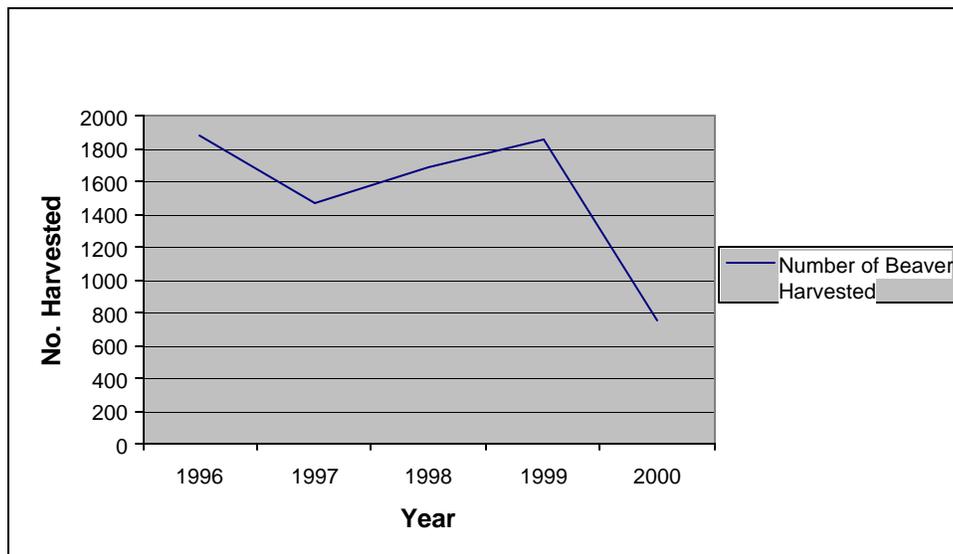
Beaver

WGFD has collected harvest data for beaver through 2000. No other monitoring information has been collected other than Forest employee observation. Additional information on beaver activity across the Forest will be collected in the summer of 2003.

Evaluation

Researchers from the University of Wyoming found several areas of beaver activity (reported in 2003 MIS evaluation and 1996 Monitoring and Evaluation Report), but no data on more recent activity is available. Researchers concluded that in general the Forest does not provide good beaver habitat because the riparian areas are too steep, valleys too narrow, substrates are of unstable volcanic origin, and deciduous food supplies are too limited. The global trend for beavers appears to be increasing.

Figure 15. Trend of beaver harvest in Wyoming.



Harvest numbers appear to be decreasing but factors such as fur prices and hunter/trapper effort are not factored in. A conclusion on the population trend cannot be directly drawn from harvest data.

Blue Grouse

WGFD collects harvest data for this species by state management area (MA). In addition, other information is collected such as number of days hunters spend and how many birds each hunter takes. Five management areas, or portions of them, occur on the Shoshone National Forest (MAs 8, 11, 12, 14, and 16).

Evaluation

Trends in blue grouse harvest between 1996 and 2001 are displayed in Figure 16 (most recent data).

Figure 16. Blue grouse harvest numbers by management area.

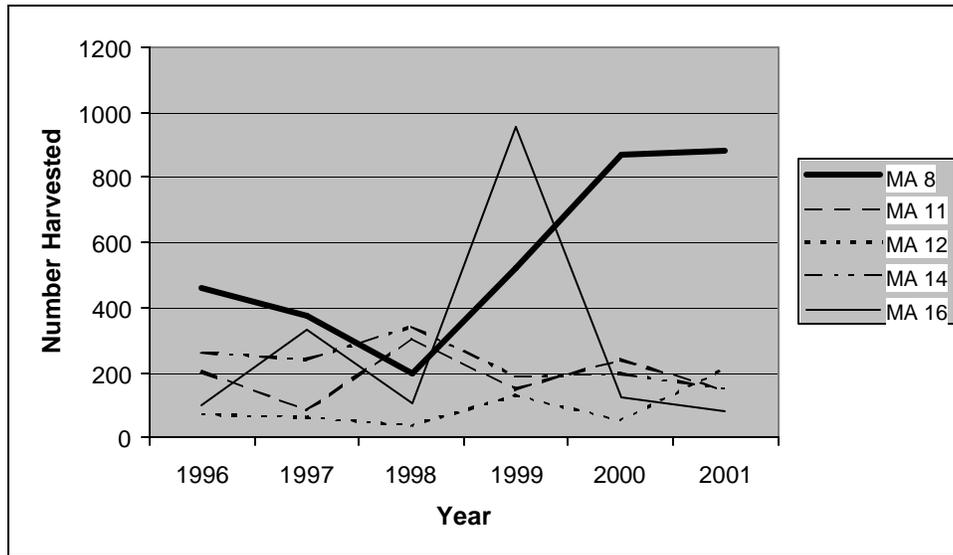
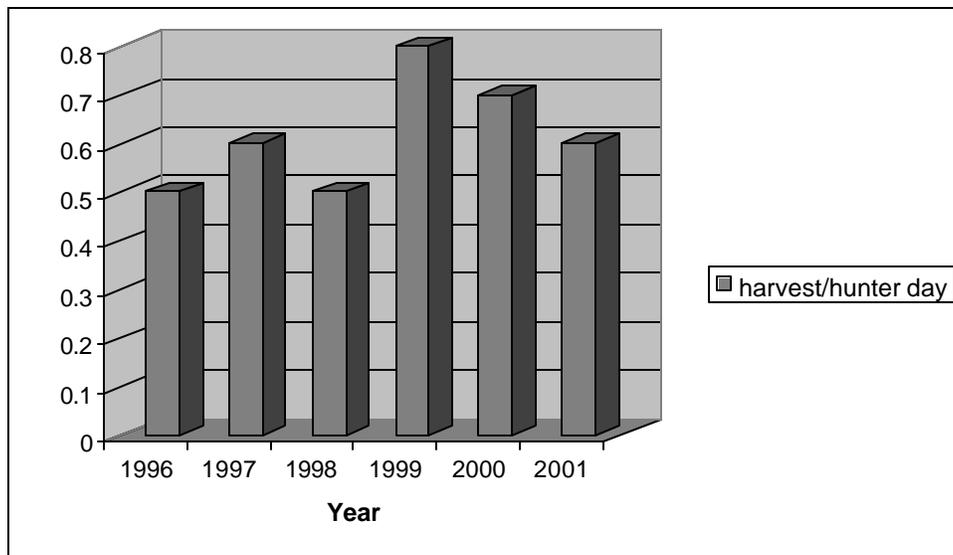


Figure 17. Index of blue grouse harvested in relation to hunter effort.



Harvest numbers for a few areas are quite variable from year to year and others appear to vary little. Some variation can partially be explained by differences in hunter efforts to harvest these birds. To account for hunter effort, an index, displayed in Figure 17, was developed that relates harvest to effort put forth by hunters. If few birds are taken relative to hunter effort (measured by hunter days), the index is low, indicating that birds are hard to find, and may be in low abundance. If several birds are taken with little hunter effort, the index is higher, indicating that birds are easier to find and perhaps more abundant on the landscape.

When combined for the five areas across the Forest, the index for blue grouse has a variable trend, but displays an upward trend over the last six years. This could indicate that birds are harder to find and therefore not as prevalent on the landscape. There are however, other factors at work, such as hunter skill, that have not been measured.

Blue grouse are commonly seen on the Forest by both Forest and WGFD personnel. There is ample available habitat on the Forest.

Ruffed Grouse

WGFD collects harvest data for ruffed grouse in the same manner described for blue grouse.

Evaluation

Figure 18 displays the harvest trend between 1996 and 2001 (most recent data). Figure 19 displays the index that takes into account effort put forth by hunters to harvest these birds.

Figure 18. Ruffed grouse harvest numbers by management area.

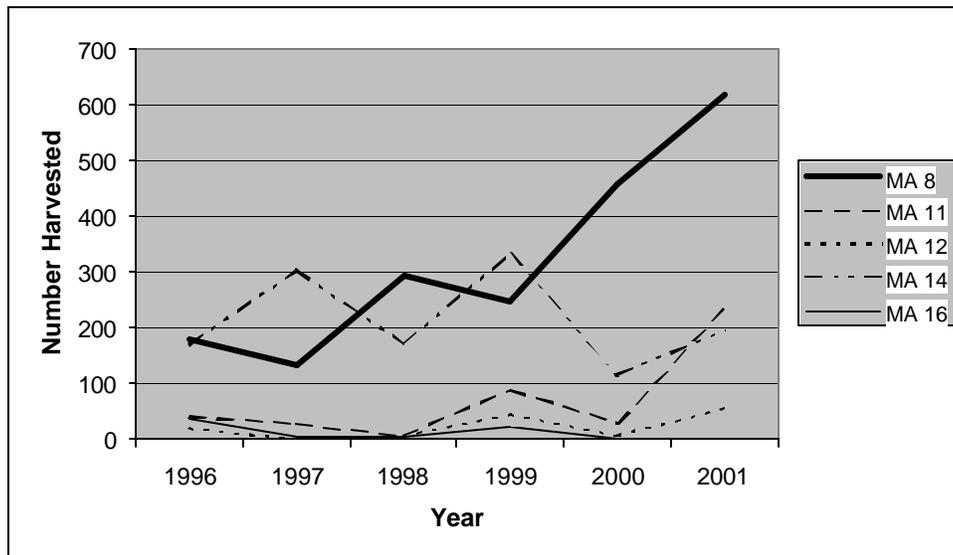
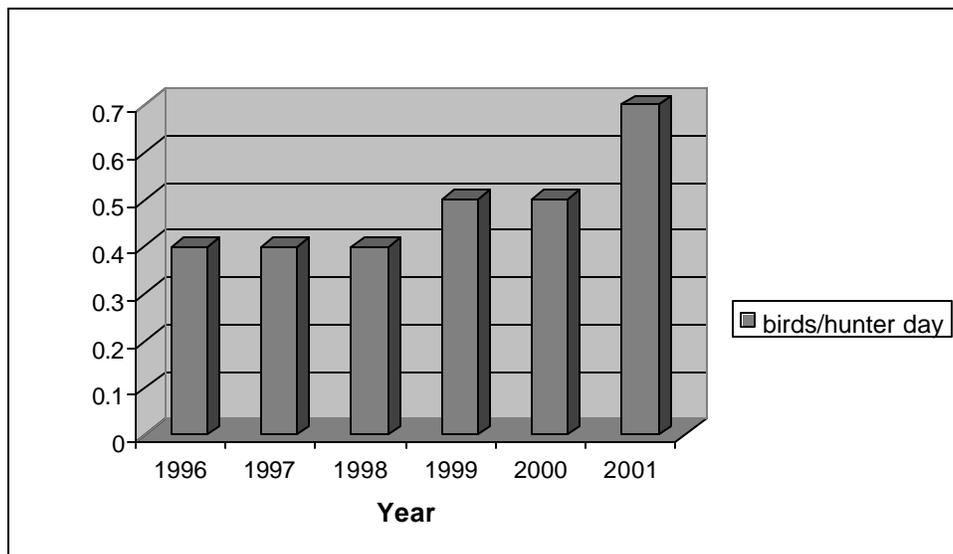


Figure 19. Index of ruffed grouse harvested in relation to hunter effort.



Harvest numbers for most areas have varied over the years and harvest is increasing in all areas. As with the blue grouse, harvest numbers are not the whole picture, and an index is needed to account for hunter effort. When combined for the five areas across the Forest, this index for ruffed grouse trends mostly upward, which could indicate that the birds are getting easier to find when hunting, indicating that there may be more birds on the landscape. This species is commonly seen on the Forest by both Forest and WGFD personnel, and there is ample available habitat on the Forest.

Fish

In the existing Forest Plan, game trout were selected as the management indicator species for aquatic habitat, many of which are introduced. Native Yellowstone cutthroat trout (YSC) have been reduced to a fraction of their historic range for several reasons, including introduction of non-native fish species, habitat modification, and habitat degradation. As a result, they are listed as a Rocky Mountain Region sensitive fish species. Additionally, some non-native stream species, primarily brook trout, can tolerate very poor stream habitat conditions yet still maintain viable populations. Brook trout have established viable populations throughout the Forest. Introduced fish species are not good indicators of habitat condition. This issue will be addressed during Forest Plan revision.

Various YSC populations were monitored on the Shoshone National Forest in fiscal year 2002. Work continues in conjunction with the WGFD to complete detailed mapping of YSC historic, current, and potential range; barriers to fish passage; and the presence of other fish species. The Forest is also involved in an ongoing YSC range-wide effort to determine current distribution and historic range, and to assess risks to population viability. Information obtained will be very useful in a variety of forums including Forest Plan revision, development of a Yellowstone cutthroat trout conservation strategy, identification of monitoring needs, and for overall management.

Evaluation

The Greybull and Wood River drainages (Greybull Ranger District) contain one of the last strongholds of YSC on the Forest. Field research and sampling conducted in cooperation with the WGFD continued in fiscal year 2002 in these drainages both on and off the Forest. As mentioned in last year's report, suitable year round fish habitat is limited in these drainages even though they contain substantial miles of streams. Recording thermographs were placed in various streams to monitor stream temperatures and help determine if these streams are capable of supporting viable YSC populations naturally.

Venus and Anderson Creeks (both tributaries to the Greybull River located in the Washakie Wilderness) were sampled in 2002 for signs of natural reproduction. The WGFD would like to reduce wilderness stocking of flowing waters, especially if natural reproduction is taking place. A diverse age class structure, including young-of-the-year fish, was found in Venus Creek. Only the most recently stocked YSC were found in Anderson Creek. The WGFD plans additional studies to determine why fish are apparently naturally reproducing in one stream and not the other.

The WGFD hired a fisheries biologist in 2002 to sample and explore the possibilities of expanding the range of YSC in the Wood and Greybull River drainages. Numerous unknown fish barriers were discovered and mapped. Dick Creek and Deer Creek on the Wood River were electrofished, surveyed, and analyzed from mouth to headwaters to determine the feasibility of future work. Dick Creek is being considered for brook trout removal and restocking of pure YSC.

Spawning traps were placed in Deer Creek in the fall of 2002 in an attempt to stop brook trout from moving up the drainage and to check for YSC young-of-the-year moving downstream to the Wood River to over winter. Very few fall spawning brook trout were found moving upstream to spawn. Numerous YSC, including young-of-the-year, were caught moving downstream from September through October, probably due to low flows.

Overall, available MIS fish habitat is currently stable or improving primarily due to road improvements that reduce sediment introduction, improved fish passage due to correction of road stream crossing problems, various fisheries habitat improvement projects, better compliance of permittees with livestock use standards, and a greater diversity of vegetative habitat including younger vegetative seral stages. The MIS fish populations generally respond accordingly to improved habitat conditions.

Rangeland Management

Commercial Livestock Grazing

An Animal Unit Month (AUM) is the unit of measure used to report and compare the amount of commercial livestock grazing that takes place on the national forest. An AUM is the equivalent to the amount of dry forage consumed by an 800-pound non-lactating cow in one month (approximately 840 lbs. or 28 lbs per day). Recreation visitor livestock and permitted outfitter/guide pack and saddle stock are not included in this category.

Table III-1 in the Forest Plan contains a list of management practices and the proposed outputs for those practices (see Chapter III, pages III-13 to III-14 for range projections). For commercial livestock grazing, the Forest Plan predicted an average annual output of 78 thousand cattle and horse AUM and 25.4 thousand sheep AUM for a total of 103.4 thousand AUM per year between 1985 and 2000. During this period several allotments have been closed to commercial livestock grazing; as sheep allotments became vacant they were not restocked, resulting in the current permitted grazing of 63.7 thousand cattle and horse AUM and 1.1 thousand sheep AUM for a total of 64.8 thousand AUM.

Figure 20. Authorized commercial livestock grazing use (1,000 AUM).

Reporting Year	Cattle/Horse AUM	% of Forest Plan	Sheep AUM	% of Forest Plan	Total AUM	% of Forest Plan
Forest Plan	78.0	100	25.4	100	103.4	100
1986	54.6	70	3.5	17	58.1	56
1987	58.6	75	2.0	10	60.6	59
1988	56.4	72	2.3	11	58.7	57
1989	57.9	74	2.3	11	60.2	58
1990	64.3	82	2.3	11	66.6	64
1991	57.7	75	1.6	8	59.3	57
1992	49.1	62	0.9	5	50.0	48
1993	56.0	71	1.4	7	57.4	56
1994	53.6	68	0.4	2	54.0	52
1995	56.8	72	0.2	1	57.0	55
1996	56.8	72	1.3	7	58.1	56
1997	54.2	69	1.6	8	55.8	54
1998	58.2	74	1.4	7	59.6	58
1999	56.5	72	1.3	7	57.8	56
2000	56.5	72	1.3	7	57.8	56
2001	48.2	62	1.0	4	49.2	48
2002	36.7	47	0.4	2	37.0	36

Figure 21. Cattle and horse grazing use.

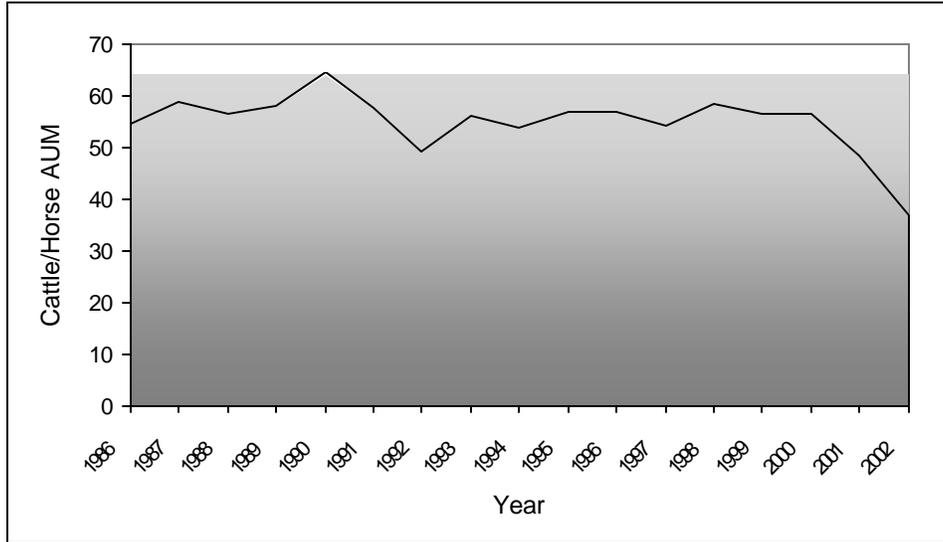
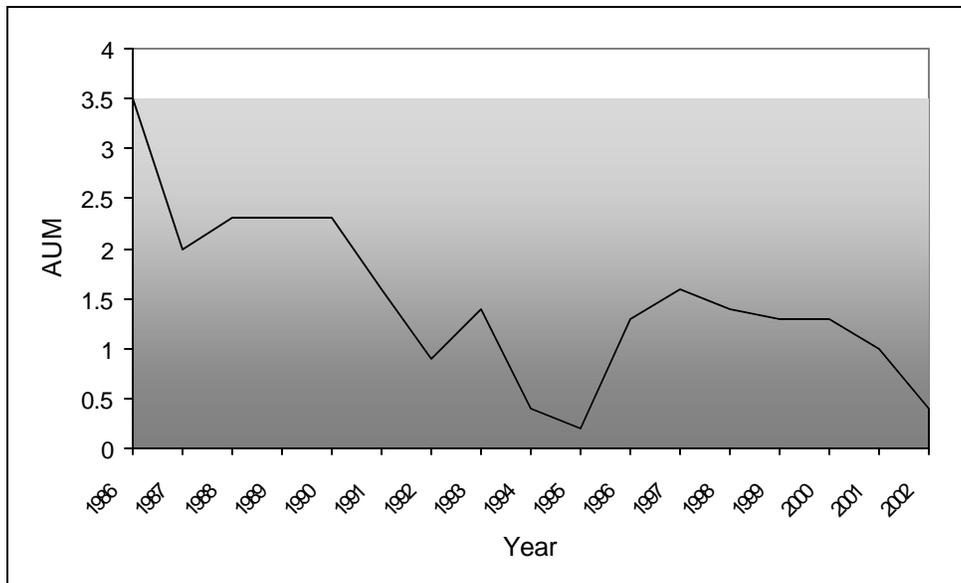


Figure 22. Sheep grazing use.



Evaluation

The difference between the authorized use figures and the permitted use figures is accounted for as non-use. Non-use, or partial non-use, of an allotment may occur for one of two reasons: non-use for personal convenience, or non-use for resource protection. Non-use for personal convenience indicates that grazing use was offered but the permittee declined to use it. Non-use for resource protection is normally associated with non-use due to a prescribed fire or wildfire or during a period of severe drought.

Permitted grazing use by commercial livestock has never reached the levels the Forest Plan projected to be available. Presently, cattle grazing use is approximately 80 percent and sheep grazing use is approximately 4 percent of Forest Plan projected levels. In response to a fourth year of severe drought, numerous allotments were in non-use or partial non-use status resulting in considerably lower actual

grazing than what was permitted. In addition to the reduced numbers of livestock, grazing seasons were shortened significantly.

While demand for cattle grazing allotments has remained high, sheep allotments have been vacant due to a lack of interest resulting from a depressed market, predation problems, and conflicts with wildlife. As a result, the Forest issued a recent decision based on an environmental analysis stating that due to the potential for disease transmission between bighorn sheep and domestic sheep, no permits would be issued for domestic sheep grazing on the vacant sheep allotments located on the Clarks Fork and Greybull Ranger Districts.

Vegetation Utilization

Vegetation utilization and resource impact from both livestock and wildlife is measured by various methods, including visual estimates, height/weight measurements, stream bank impact transects, and clipping and weighing. A combination of these methods was used in the 2002 field season to monitor livestock and wildlife utilization on 45 allotments. This represents 70 percent of the 65 allotments upon which commercial livestock were actually grazed. Most of the allotments on the Shoshone National Forest are managed under a modified deferred-rotation grazing system. Under this system, grazing is delayed (not scheduled) on a given area or unit of the allotment during the active growing season to allow plant reproduction, recovery, and establishment of new plants.

The Forest has an ongoing range utilization, condition, and trend-monitoring program performed by the permittees. This data collection process was established in 1998 with assistance from the University of Wyoming and the Wyoming Agricultural Extension Service. There are currently 28 permittees collecting some type of monitoring data on 33 allotments.

In addition to Forest Service and permittee monitoring, there were two cooperative monitoring projects taking place on six allotments on the Shoshone in 2002. Both Montana State University and the University of Wyoming are in the final year of an intensive study to determine the level of use, competition for forage, and influence between cattle and elk. In gathering data for the study, this group has collected utilization data by clipping plots in both grazed and ungrazed (caged) areas to determine how much forage utilization has occurred and which ungulate grazed the forage from the timing of the clipping.

On the south end of the Forest, the Teton Science School again collected livestock utilization data on the Dunoir Allotment as a part of their curriculum in environmental studies

Evaluation

Annual utilization data collected in 2002 revealed that despite a fourth year of severe drought conditions forage utilization by commercial livestock generally did not exceed acceptable standards. This is primarily the result of intensive administrative activity that resulted in livestock being removed from the Forest considerably earlier than the permitted off-date because allowable utilization levels had been reached. Significantly lower livestock numbers on many allotments also contributed to the lower level of forage utilization.

Range Condition and Trend

Range analysis field exams are conducted according to processes described in the Region 2 (Forest Service Rocky Mountain Region) *Rangeland Analysis and Management Training Guide*. Methods utilized throughout the 2002 field season were photo points, photo transects, cover by life form transects, and general observations made during allotment inspections.

Evaluation

Analysis of the data, reports, and photographs collected was difficult due to continued drought conditions. In most cases, reduced vigor and plant growth was indicative of drought-related stress, not of grazing pressure. Where plant composition was determined, the data displayed a static or positive trend toward the desired condition. Rangeland that was currently in desired condition showed the least change and those changes were due to natural succession. Forest wide, with a few exceptions, range vegetative conditions are either at or moving toward the desired conditions as outlined in the Forest Plan and/or associated Allotment Management Plan.

Allotment Management Plans and Annual Operating Instructions

The Rangeland Management Interdisciplinary Team is nearing completion of analysis for ten livestock grazing allotments. As soon as concurrence is received from the Wyoming State Historical Preservation Office for the cultural survey reports submitted, a final environmental assessment and decision document will be issued for ten livestock grazing allotments. Depending on the decisions reached an Allotment Management Plan (AMP) will be developed that implements management practices to achieve the desired conditions outlined in the selected alternative. In addition, a decision notice was recently issued that documents a determination not to issue grazing permits for ten sheep grazing allotments.

Annual Operating Instructions are developed by the district rangeland management specialists and reviewed with each permittee. These instructions are used to outline numerous details specific to that year's management of the allotment. In cases where an up-to-date Allotment Management Plan is not in place, the annual instructions will cover those directions. Typically these instructions include: the annual livestock management strategy, range improvement construction plans (if any), treatment of invasive plant species, designation of monitoring sites, the level of desired utilization, or any other pertinent management needs to implement Forest Plan standards and guides.

Evaluation

Upon completion of the NEPA requirements for the allotments listed above, the Forest will be back on track to meet the schedule outlined in the Rescissions Act (Public Law 104-19). In 2003, rangeland analysis, condition, and trend data as well as cultural surveys will begin on the remaining allotments on the Rescission Act schedule.

Forage Development (Range Readiness)

Sufficient plant development, before grazing, helps ensure the long-term health and vigor of the rangeland resource. Rangeland plant readiness is checked to verify adequate forage development before livestock use.

Evaluation

No range readiness data were collected this year due to severe drought conditions. In times of drought, snowmelt occurs earlier than normal, resulting in early and rapid plant development. Because of the conservative on-dates for livestock grazing, range readiness was not a concern this year.

Noxious Weeds

There are four aspects to the noxious weed control program. They are prevention/education, detection/inventory, control (biological, chemical, and mechanical), and restoration. In fiscal year 2002, the Shoshone National Forest was involved in all four areas.

Education efforts continued and expanded from last year's efforts. Presentations were made to schools, backcountry users, and county fair audiences; newspaper articles were published.

The Dubois-Crowheart Weed Management Area (WMA) was initiated in fiscal year 2001 with the primary goal of fostering community weed awareness. In fiscal year 2002, a MOU and management plan were written and signed for this WMA. Initial steps were made to create the Sunlight / Crandall Weed Management Area. A talk was given to the Sunlight landowners association to assess interest and build support.

The Forest continued to inventory noxious weeds and undesirable plants in 2002. Data collection focused on the Clarks Fork, Wind River, and Greybull Ranger Districts. Data was entered into a Forest GIS database and will be shared with other forests and county weed and pest organizations in the Greater Yellowstone Area. Over 2,200 separate noxious weed locations have been identified in the last three years. A major infestation of oxeye daisy was found in the Double Cabin area of the Wind River Ranger District.

Forest personnel, contractors, and county weed and pest districts treated approximately 1,500 acres of National Forest System land infested with noxious weeds. Treatments included the use of chemical, mechanical, and biological control agents. Areas of spotted knapweed, houndstongue, and yellow toadflax on the Clarks Fork and Wapiti Ranger Districts were monitored and treated throughout the fiscal year 2002 growing season. Repeated treatments were made to eliminate new seedlings and prevent seed dispersal.

Last year's fall treatment of toadflax along the South Fork of the Shoshone River was monitored in the early summer for effectiveness. It was determined that the herbicide Plateau was very effective in treating toadflax. Some problems were noted due to application difficulty in rough terrain. Helicopter treatment alternatives were not considered due to the lack of personnel to complete an environmental impact statement. BASF research scientists continue to monitor herbicide effectiveness in toadflax control plots on adjacent private lands.

Josh Shorb of Park County Weed and Pest and Dr. Richard Hansen of APHIS monitored biocontrol efforts on Dalmatian toadflax. It was determined that *Mecinus janthinus*, a stem-boring weevil, successfully overwintered again and was inflicting heavy damage to toadflax at the release sites. These sites may achieve a density where collections may be possible for release to other areas in fiscal year 2003.

Washakie Wilderness toadflax herbicide treatments areas were revisited in fiscal year 2002. Dramatic reductions in toadflax were observed. Wilderness trailheads were also monitored for invasive plants. Problem areas continue to be at Pahaska, Fishhawk, Double Cabin, and Dead Indian trailheads. A large population of oxeye daisy was located along the Wiggins Fork of the Wind River. This population was mapped and a treatment plan is being written.

Once an area is treated, restoration of the area to pre-infestation conditions, or better, needs to be considered. Native vegetation recovery is being monitored on the Cabin Creek Fire sites that received herbicide treatments. Some temporary stunting of native grass seed heads observed in fiscal year 2001 were not apparent in 2002. A very positive byproduct of the use of Plateau was the reduction of cheat grass, which is also an invasive species.

The prevention/education program continues to grow with positive results. The development of weed management areas in critical watersheds has continued. The South Fork, Dubois-Crowheart, and Sunlight-Crandall WMAs are essential for weed control on public lands. The Wapiti WMA needs to be formed to address weed issues along the North Fork of the Shoshone River.

The detection and inventory programs should be continued on an annual basis. Information developed by the program is essential for the Shoshone National Forest to establish baseline data to monitor new population increases or decreases in existing infestations, and as a way to measure the success of weed control treatments. Drought creates growth conditions where weeds out-compete native vegetation. Many of the new weed locations found in fiscal year 2002 could be attributed to drought. Financing detection and mapping programs may become a problem if grant applications are not successful in fiscal year 2003.

Control activities need to be expanded in fiscal year 2003. Emphasis species include Dalmatian toadflax, spotted and diffuse knapweed, and houndstongue. Repeated treatments of these species need to occur during the growing season to eliminate new seedlings and prevent seed dispersal. Additional releases and monitoring of the biocontrol insect *Mecinus janthinus* are planned for fiscal year 2003. Aerial application for Dalmatian toadflax is still warranted. An environmental impact statement needs to be written to update the Forest wide environmental assessment for weed control.

Restoration of weed-infested areas should be given more emphasis in fiscal year 2003. The establishment of non-native competitive grasses in road right-of-way treatment areas needs attention. Monitoring of native plant-herbicide relationships should also continue in fiscal year 2003.

The Forest invasive species problem continues to grow as knowledge about distribution increases. However, the level of infestation is still relatively low (with the exception of the South Fork of the Shoshone River and the Wiggins Fork of the Wind River drainages) when compared to other parts of the Greater Yellowstone Area. Future aggressive treatment programs and constant monitoring are essential in containing and eliminating invasive species. Unfortunately, this program area will be in a growth cycle for years to come.

Grants received for the weed program in fiscal year 2002 provided the Forest with the ability to accomplish needed work. Without grants, the Forest invasive species program would be unable to stay abreast of the noxious weeds problem. Accordingly, budgets will need to increase or a vigorous grant-writing program continued in fiscal year 2003 if the Forest is to keep up with the invasive species problem.

Timber

Allowable Sale Quantity

The Allowable Sale Quantity (ASQ) is the maximum volume of timber that may be sold from the suitable timber base during the planning period specified in the Forest Plan. The quantity is normally expressed as the average annual allowable sale quantity. The intent of this monitoring item is to facilitate tracking of how close the Forest is to meeting the ASQ during any given year, and to ensure that it is not exceeded in any given decade.

The current ASQ is 45 million board feet (MMBF) per decade or an average annual of 4.5 MMBF.

The Shoshone National Forest sold 0.010 MMBF or 10,000 board feet of green (live) timber in fiscal year 2002. The Forest sold 2.5 MMBF of salvage volume, consisting of small salvage sales, fuel wood, and other product sales (post and pole, commercial fuel wood, house logs, etc.). *See* the chart in this section of the report, which portrays the amount of sawtimber sold on the forest from 1994 to present.

In fiscal year 2002, the Forest conducted a formal interdisciplinary review of the Enos Creek Timber Sale, which focused on compliance with the requirements of the Clean Water Act, Wyoming Non-point Source Management Plan, Silviculture Best Management Practices, and the Watershed Conservation Practices Handbook. *See* the Water section of this Monitoring Report for the results of this formal review.

Insects, wildfires, and other disaster agents are currently at epidemic levels. The initial effect of an insect epidemic is a reduced fire hazard because of the inability of the timber stand to carry a crown fire due to a loss of needles. Within 10 years, however, tremendous fuel loadings could occur that could create intense fires, possibly causing damage to soil and affecting watershed function.

The low level of vegetation treatment that was accomplished this year and in past years is of concern to management and to some members of the public. Many of the stands of timber on the Forest are in declining health and are approaching late successional stages. These stands of timber are most susceptible to insect and disease attacks and to the risk of wildfire. Insect and disease activity is increasing on a Forest wide basis to epidemic levels and is anticipated to continue at an elevated rate until these infected stands age class and species diversity is reestablished on the Forest.

Tree mortality is increasing substantially and can be viewed from any travelway on the Forest. Loss of coverage of some tree species, such as aspen and narrow leaf cottonwood, is occurring due to the invasion of conifer species through succession and lack of disturbance. These issues need to be addressed in project level analysis and in the revision of the Forest Plan.

Figure 23. Volume sold and harvested⁷.

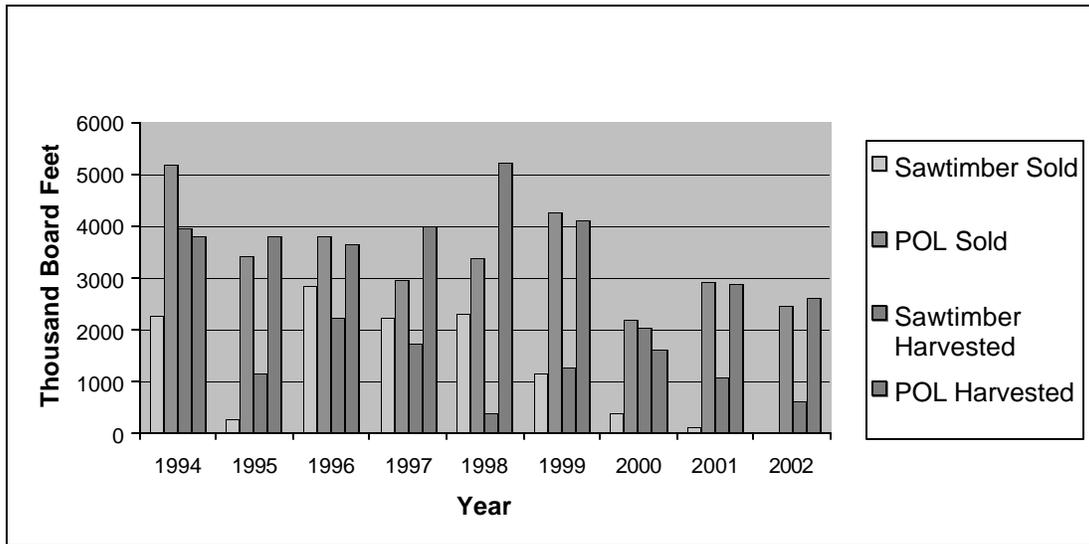


Figure 24. Sawtimber and POL sold and harvested (MBF), fiscal years 1994 through 2002.

Fiscal Year	Sawtimber Sold (MBF)	POL Sold (MBF)	Sawtimber Harvested (MBF)	POL Harvested (MBF)
1994	2,254	5,176	3,965	3,790
1995	284	3,420	1,141	3,796
1996	2,850	3,784	2,234	3,627
1997	2,241	2,970	1,732	3,975
1998	2,315	3,359	385	5,230
1999	1,158	4,250	1,289	4,092
2000	400	2,202	2,020	1,611
2001	112	2,923	1,068	2,895
2002	4	2,466	630	2,619

Reforestation Monitoring

This topic will be broken into two sections: reforestation monitoring from clearcuts, and reforestation monitoring from other types of regeneration harvest or from plantations resulting from natural disturbances. In both instances, however, reforestation monitoring is conducted in the same manner: first, third, and fifth year regeneration surveys are performed on natural regeneration and on planted stock. Plantations are normally monitored through stake-row surveys. Monitoring protocols are outlined in Chapter 2.7 of the Silvicultural Practices Handbook 2409.17. Minimum stocking levels to be achieved are found on Forest Plan pages III 66-68. When stands meet or exceed minimum stocking standards, the stand is certified as fully stocked. If the stand is not regenerating naturally or plantation survival is poor, additional reforestation recommendations will be made by the fifth year survey.

⁷ POL (products other than logs) consists of posts, poles, fuelwood, and miscellaneous convertible products. Source: Timber Cut and Sold on National Forests under Sales and Land Exchanges, Fiscal Years 1994 - 2002. Volume Sold and Harvested by Product, Shoshone National Forest.

Reforestation and Reforestation Monitoring

The Forest completed 131 acres of whitebark pine planting on non-suited lands in fiscal year 2002. Planting occurred along the Loop Road on the Washakie Ranger District, in the old Geyser Creek Burn on the Wind River Ranger District, and in portions of the Clover Mist Fire on the Clarks Fork Ranger District.

The Forest completed approximately 2,460 acres of regeneration surveys in fiscal year 2002. Approximately 2,070 acres of these were first, third, or fifth year plantation survival surveys and the remaining 390 acres were first, third, or fifth year surveys on natural regeneration. These acreages include totals for both clearcuts and other types of regeneration harvest.

The majority of plantation survival surveys were conducted on the Clarks Fork Ranger District in the Clover Mist Fire area. The remainder of the plantation or growth and survival surveys were scattered throughout the Wind River and Washakie Ranger Districts.

Approximately 942 acres of planted sites were certified as fully stocked and 132 acres of natural regeneration were certified as fully stocked (these acreages again include both clearcut and non-clearcut regeneration harvest). Some of the certified sites include the 1988 Unit 40 Fire that was planted to lodgepole in the early 1990s. Several of the Lodgepole Creek/Wolverine Creek planting units are also certified. Third and fifth year plantation survival/growth and survival surveys are ongoing on the uncertified sites. These surveys will identify any additional reforestation measures that are needed for uncertified sites.

Evaluation

Survival percentages showed a wide range of variation, depending on species planted or evaluated, and microsite conditions at individual planting sites. Some of the third year plantation survival surveys, particularly for lodgepole pine, showed dramatic declines in survival from first year surveys due to the extended drought. However, while resurveyed stake rows showed lowered survival rates, the presence of natural regeneration (of varying species) increased in most cases. Many of the planted stands that were certified in 2002 contained a high percentage of naturally regenerated seedlings that contributed to full stocking. Many other lodgepole plantings, however, have survived well and many were certified as fully stocked.

Whitebark pine survival on non-suited acres also varied greatly. Upland sites at higher elevations with low grass/forb competition survived better than lowland sites where ungulate grazing, browsing, or trampling diminished survival. This occurred in the Squaw Creek, Trail Creek, and East Fork Painter Gulch units on the north zone of the Forest.

The greatest factor in lowered survival on whitebark units planted in fiscal year 2002 was the late arrival of the seedlings, low soil moistures, and the competition with other national forests for the same planting contractor. The nursery releases whitebark pine stock for summer-fall planting, beginning around the middle of June. In normal or above average moisture years on whitebark pine sites, this timeframe would be soon after snow melt when available soil moisture is high and soil temperatures are appropriate. However, due to the extended drought and below normal snow pack, snow melt occurred by the middle of May on most of the planting sites. This resulted in droughty soils with higher soil temperatures than what is optimum for whitebark pine seedlings. It is recommended that fall planting be used for whitebark pine.

Restocking of Clearcuts

NFMA requires that where trees are harvested for timber production (suited timber lands) "the cuttings shall be made in such a way as to assure that the technology and knowledge exists to adequately restock the lands within five years after final harvest." For clearcuts that means five years after the clearcut occurs (36 CFR 219.27 sec. (c)(3)). This monitoring item was intended to ensure that clearcuts are restocked by the fifth year.

Figure 25. Status of clearcuts on the Shoshone National Forest, Wind River Ranger District.

Year Cut	Sale Name	Planted?	Year Planted	Certified?	Year Certified	Comments
1992	Union Pass Blowdown	No		Yes	2001	
1992	Trapper Creek	Yes	2000	No		Certification pending walk-through with additional naturals.
1992	Wildcat Blowdown	No		Yes	2001	
1998	Charlie Creek	Yes	2000	No		Certification pending walk-through with additional naturals.
1999	Pelham Lake	No		Yes	2002	
2000	Sheridan Creek Oil Well Pad	Yes	2000	Yes	2002	

In addition to Figure 25, approximately seven acres of patch cuts in units under ten acres in size were under contract on the Washakie Ranger District in fiscal year 2002. These treatments are being made along the Loop Road to enhance site distance on the road, to improve visual quality by providing background views of mountain vistas, and to provide fuel breaks.

Evaluation

Third year plantation survival surveys were completed on Charlie and Trapper Creeks in fiscal year 2002. The survival rate on planted trees in stake rows dropped dramatically from the first year due to the extended drought. However, many naturally regenerated seedlings have established themselves in the area since the initial survey. These naturals were not accounted for on the stake row surveys. It is anticipated that these sites will be fully stocked when the fifth year survey is completed.

The Wildcat Blowdown was scheduled for spot planting or fill-in planting in fiscal year 2001. This did not occur because a regeneration survey was completed in calendar year 2002 which indicated the site met Forest Plan stocking requirements and was certified. Additional field reconnaissance will be conducted in fiscal year 2003 to determine if additional reforestation efforts are needed in the Trapper Creek units.

Of the 47 acres of clearcuts discussed in the fiscal year 2001 Monitoring and Evaluation Report on the Washakie Ranger District, 32 acres have been certified as fully stocked in fiscal year 2002. Third and fifth year regeneration surveys are ongoing on the remaining 15 acres of clearcuts.

Monitoring through on-the-ground surveys indicates that the majority of the clearcuts that were made before 1976 fully meet the criteria to be certified as fully stocked. The majority of clearcuts on the Shoshone National Forest occurred before the passage of the National Forest Management Act in 1976. Although regeneration surveys are not required for those acres clearcut before 1976, the Forest has spent considerable time in past years visiting, evaluating, and surveying those acres in order to update records and evaluate past silvicultural treatments.

Timber Stand Improvements

Timber stand improvement (TSI) is any vegetation management activity that improves the composition, condition, or growth of a stand of trees. This monitoring item requires that acres of TSI not vary more than 25 percent from what is planned annually. The Forest Plan projected 121 acres per year of TSI for the period between 1991 and 2001 (Shoshone National Forest Land and Resource Management Plan, Table III-1, page III-14).

Figure 26. Acres of TSI accomplished and acres projected by the Forest Plan, 1991 through 2002.

Year	Acres Treated	% of Forest Plan
Forest Plan	121	100
1991	40	33
1992	407	336
1993	0	0
1994	140	115
1995	250	206
1996	117	97
1997	455	376
1998	937	774
1999	882	728
2000	0	0
2001	0	0
2002	239	198
Average	267	220

During the past 12 years, emphasis for TSI activities has been placed in cutover areas to enhance new stand growth by reducing competition on desirable species and to promote individual tree growth. The majority of this work has been achieved using TSI contracts that are inspected by Forest personnel. Forest personnel have also completed TSI treatment under the guidance of a forester. Contract inspectors and foresters, using daily diaries and inspection reports, monitored accomplishments for the period shown above.

Areas were not contracted in fiscal years 2000 and 2001 due to the listing of the Canada lynx as a threatened species. The Forest identified Lynx Analysis Units (LAU) and potential lynx habitat in fiscal year 2001. Precommercial thinning in LAUs is allowed only when stands no longer provide snowshoe hare habitat.⁸ Approximately 4,000 acres with TSI needs have been identified in LAUs.

Beginning in 2001, areas outside of LAUs were evaluated for TSI needs and requests submitted for TSI dollars and a TSI target in out years. In fiscal year 2002, approximately 153 acres of lodgepole pine stands were precommercially thinned in the South Pass area on the Washakie Ranger District outside of LAUs where previous stand improvement work (removal of mistletoe-infected overstory trees) had occurred. An additional 86 acres of lodgepole pine stands were also weeded to remove mistletoe-infected stems in the South Pass and Limestone areas on the Washakie Ranger District and in the Lava Mountain area on the Wind River Ranger District.

Evaluation

Between 1991 and 2002, the Forest accomplished approximately 220 percent of what the Forest Plan projected for acres of TSI. Some of the TSI contracts span multiple years, therefore acreage accomplishments will vary from year to year, with accomplishments exceeding planned acreage targets in some years.

One major reason the Forest Plan TSI estimates were exceeded on the Shoshone National Forest relates to the fact that clearcuts from the 1960s have grown in and are now overstocked. For example, on the southern part of the Forest, there are at least 4,000 acres of old cutover areas on suited base timberlands from the 1960s. Some of these stands are in need of thinning to lessen competition, promote growth, add to age class diversity, and protect these stands from insect and disease infestations.

⁸Self-pruning processes have eliminated snowshoe hare cover and forage availability during winter conditions with average snow pack.

TSI work on the Forest is anticipated to decline, at least temporarily, due to federal listing of the lynx and implementation of the *Canada Lynx Conservation Assessment and Strategy* (Ruediger et al. 2000). There is concern that timber stand improvement work on the Forest has been eliminated in the LAUs, which cover the majority of the Forest. If timber stands in need of TSI are not treated, growth of these stands will be stagnated in the long run, will be more susceptible to disease infestations of dwarf mistletoe and commandra blister rust, and will provide habitat for epidemic outbreaks of insects such as the mountain beetle, ips, sawflies, etc.

Growth Response

Growth response to vegetation management is monitored through stand exam surveys. Data collected by stand surveys is used in growth and yield models to predict annual and long-term growth patterns and potential. Monitoring of growth response tells the manager whether vegetation responds to treatments and silvicultural prescriptions as predicted.

Approximately 2,016 acres of intensive stand exam were contracted in fiscal year 2002 with the newly developed Common Stand Exam protocols. An additional 5,256 acres of fuels surveys were included with this contract. Both types of survey were conducted on the North Fork of the Shoshone River in support of vegetation management being planned or occurring there (*see* Forest Health discussion below). Due to funds being reallocated for fire suppression efforts in 2002, a reduction in the amount of acres surveyed and a delay awarding the contract occurred. The contract was not awarded until September 2002. The result of the award going out this late in the field season was that only 50% of the contract was completed in fiscal year 2002. The contract is anticipated to resume in the spring or early summer of fiscal year 2003, after the snow melts.

Evaluation

Data gathered in past years indicates that growth response in planted stands surveyed on the north zone of the Forest is meeting the expected growth potential. Stands clearcut in the 1960s on the south zone of the Forest that were surveyed for growth response after treatment are at least meeting, if not exceeding, the expected growth potential. There is evidence that residual stands adjacent to those treated in the 1960s are heavily infected with dwarf mistletoe and commandra rust. Treatment of the adjacent stands and thinning of the new stands is critical to maintaining maximum growth potential and to reduce infection by mistletoe and commandra rust. Stands left untreated and densely stocked are more susceptible to infections from dwarf mistletoe, commandra rust, other diseases, and insect attacks. Potential for stand replacing fires is also a concern due to the age of the forest and the buildup of dead and down fuels (*see* Forest Health discussion below).

Size of Clearcuts

Clearcuts greater than 40 acres in size require the Regional Forester's approval. Clearcuts are rare on the Shoshone National Forest. Those that have occurred (*see* Reforestation and Reforestation Monitoring discussion) since 1989 have not exceeded the 40-acre limit.

Lands Not Suited for Timber Production

Lands not included in the suited timber base may not be managed for wood fiber as the primary product but may be managed for other resource objectives. In some situations, wood fiber is a byproduct of resource management activity, such as when openings are created for wildlife in a forested area. The Forest Plan contains standards and guidelines that specify what types of activities are permissible outside the suited timber base. They are reviewed before activity occurs. This monitoring item was intended to guarantee that lands outside the suited timber base are managed for the appropriate resource objectives.

In fiscal year 2002, a vegetative management project was completed on the Wapiti Ranger District along the North Fork corridor (Buffalo Bill Scenic Byway) on non-suited timbered lands. The project was designed to remove timber from the old Eagle Creek Campground, in preparation for its reconstruction. Removing trees before the campground project began reduced the reconstruction cost. Hazard trees were also removed from the site. Remaining woody material was made available to the public for fuel wood collection. Work was accomplished in support of the recreation program on the Forest through a timber sale contract. Three campground upgrades have occurred in the North Fork corridor using timber sale contracts to support other resource programs and objectives (Newton Creek, Three Mile, and most recently Eagle Creek). These projects saved the Forest an estimated \$80,000 in campground reconstruction costs.

Planting of whitebark pine was completed in fiscal year 2002 on non-suited lands. Planting is accomplishing two objectives: 1) providing a food source for the grizzly bear, and 2) reestablishing whitebark pine that is blister rust resistant in areas where this species was destroyed by the wildfires of 1988, and in areas where white pine blister rust has caused heavy mortality on this tree species.

Evaluation

The vegetation management projects mentioned above involve removal of timber from non-suited lands for reasons other than commercial timber production. Individuals, communities, and businesses neighboring the Forest utilize material such as fuel wood (commercial and personal use), posts and poles, house logs, and sawtimber.

Removal of products such as fuel wood from the Forest is authorized by obtaining permits or through contracts.

Forest Health

Forest health is monitored annually by the Forest Health Management Service Centers through aerial survey pest detection flights and through Lindgren funnel traps baited with aggregation pheromones. Traps were placed to monitor Douglas-fir beetle, spruce beetle, and western balsam bark beetle where beetles exist, have been epidemic, or where potential for epidemic exists. Areas monitored in this manner include the North Fork of the Shoshone River, Sunlight Basin, and the Clarks Fork River on the north zone of the Forest, and the Dunoir and Moccasin Basin areas on the Wind River Ranger District. Specific methodology can be obtained from Forest Health Management Service Center personnel in Rapid City, SD. Refer to Schaupp, et al 2002, or use the link <http://www.fs.fed.us/r2/fhm/> for additional information.

Evaluation

Occurrence and Trends in 2002

Forest health is declining rapidly across the Shoshone National Forest. The 2002 aerial survey conducted by the Forest Health Management Service Center shows that insect and disease agents have reached epidemic conditions on a large scale throughout the Forest. The agents causing the greatest damage are epidemic levels of spruce beetle and Douglas-fir beetle. Agents that are endemic but have potential to become epidemic are mountain pine beetle, subalpine fir complex, and whitebark/limber pine complex. In addition, large areas of lodgepole pine are heavily infected with dwarf mistletoe and commandra blister rust.

Extended drought conditions have exacerbated occurrences of insect and disease outbreaks as the majority of the Forest is generally in an old-aged and overstocked condition, which reduces a tree's ability to resist insects and diseases. These outbreaks can be expected to worsen and endemic populations are anticipated to become epidemic unless weather conditions change (e.g., extended cold period in winter, cool wet summers) to cause a die-off in the insect and disease populations.

A spruce beetle epidemic started in the Washakie Wilderness a few years ago and has spread rapidly to epidemic proportions, with the greatest spread and mortality occurring between 2001 and 2002, where entire hillsides (e.g., Carter Mountain) turned brown.

Currently, its greatest extent is throughout the Wapiti Ranger District on the North and South Forks of the Shoshone River.

Douglas-fir beetle has continued to be a serious problem on the north zone of the Forest ever since the fires of 1988 on the Shoshone National Forest and in Yellowstone Park. In a recent report produced by Schaupp, et al (2002) the authors state

In 1988, extensive wildfires occurred in Yellowstone National Park and the Shoshone National Forest. Populations of Douglas-fir beetle increased in fire-scorched trees caused by the wildfires. Subsequent generations of the beetles moved from these injured trees to undamaged trees in neighboring stands on the Shoshone National Forest Wyoming. This outbreak has moved from the Clarks Fork/Sunlight Basin area and now affects almost all of the entire drainage west of Cody along the North Fork of the Shoshone River. Beetle populations have erupted in the past few years within the large expanse of susceptible forest, killing many tens of thousands of Douglas-firs. Mortality evident in 2002 from beetle attacks in 2001 was far more extensive and intense than at any time since the current outbreak began. Brood sampling indicates another year of strong increase in the Douglas-fir beetle population. Because the current outbreak will continue to expand and intensify, continued high levels of mortality can be expected along the North Fork.

The report and cover letter state that the use of anti-aggregation pheromones and sanitation harvesting are the recommended control measures for control in small stand areas such as campgrounds.

Douglas-fir beetle seems to be endemic over the rest of the Forest. However, the aerial detection flight conducted in 2002 indicates several small patches of Douglas-fir beetle radiating out from the existing epidemic and occurring independently in Douglas-fir stands across the Forest. There is a very strong



Figure 27. Lundgren funnel trap site set up to monitor western balsam bark beetles on the Wind River Ranger District.

possibility that the Douglas-fir beetle will expand and cover a much larger portion of the Forest before the epidemic subsides.

A mountain pine beetle epidemic has been occurring over the last few years in whitebark pine on the southeastern end of Yellowstone National Park, the western side of the Washakie Wilderness on the Wapiti Ranger District of the Shoshone National Forest, and on the Bridger-Teton National Forest west of Togwotee Pass. This epidemic has spread onto the northern and western portions of the Wind River Ranger District in the last few years and is infesting stands of whitebark pine. As with the other bark beetles, the epidemic is projected to get much worse, due to the old age of the stands and the overstocking of trees on the infected sites. Epidemics of insects are expected to continue until the majority of the older trees succumb to the insect attacks

While mountain pine beetle seems to be endemic in lodgepole pine across the Forest, a few small epicenters of infestation can be found along the Wind River and in the Double Cabin area on the Wind River Ranger District. Isolated hits were also found in several places on the Wind River Ranger District. Mountain pine beetle in lodgepole also has potential to increase over the next few years to epidemic levels. While less susceptible to mountain pine beetle than whitebark, the epidemic in the whitebark could spill over into lodgepole stands quite readily if beetle populations are high enough.

Both whitebark and limber pine are being impacted by a complex of mountain pine beetle, white pine blister rust, and/or dwarf mistletoe on all districts of the Forest. Contrary to the mountain pine beetle epidemic in whitebark, limber pine seems to be more susceptible to dwarf mistletoe and white pine blister rust than whitebark. The areas of heaviest mortality in whitebark from these agents are in the Washakie Wilderness on the Wapiti Ranger District, and in limber pine on Dead Indian Hill, on the Clarks Fork Ranger District. Heavy infection of limber pine by white pine blister rust is also present in certain portions of the Washakie Ranger District such as the Middle Fork of the Popo Agie in Sinks Canyon, in Canyon Creek, and in the Limestone Mountain area. The heaviest infestations of white pine blister rust in whitebark appear to be in the Republic Mountain area on the Clarks Fork Ranger District and in the Togwotee Pass area on the Wind River Ranger District.



Subalpine fir is declining on the Forest. This decline is poorly understood, but it is thought that a combination of western balsam bark beetle and diseases such as *Armillaria* root rot play a role in tree death (USFS 1994-2001). While this complex is present across the Forest, it is approaching epidemic conditions in the Dunoir area on the Wind River Ranger District.

Figure 28. An example of negative net growth in a 300-year old lodgepole pine stand heavily infected with dwarf mistletoe and commandra blister rust on the Washakie Ranger District.

On the south zone of the Forest widespread infection of lodgepole pine by both commandra blister rust and dwarf mistletoe continues to severely affect the growth of stands. Stand exam surveys and routine field observations indicate that the reproductive potential of lodgepole pine may be at risk in many stands due to the proliferation of these diseases. Commandra rust kills the seed/cone producing portion of the tree, while dwarf mistletoe reduces vigor and the tree's ability to produce cones and eventually results in premature death. The fact that the majority of lodgepole pine have non-serotinous cones, or cones that open annually to release seed, compounds the problem since the tree is not able to store seed in the previous year's cones. Forested stands on the north zone of the Forest also have commandra blister rust and dwarf mistletoe infestations, although not to the extent found on the south zone.

Lastly, a minor outbreak of lodgepole pine needle miners is occurring on the Washakie Ranger District on Timber Top Mountain and on Wolf Point. Periodic outbreaks of these miners occur when trees are overstocked or in drought stress. Trees generally recover after defoliation by this insect, but given the drought conditions, it is difficult to predict how extensive and long lasting it will be. A portion of the outbreak on Wolf Point was burned in the Pass Creek Fire in August and September of 2002.

Implications of Forest Health Conditions

Many stands comprised predominantly of Douglas-fir, Englemann spruce, limber/whitebark pine, and lodgepole pine are showing negative net growth rates which means mortality is exceeding growth. As a result, accumulation of fuel from dead and dying trees has put these stands at a higher risk of wildfire. The insect and disease situation combined with the generally older age structure of the Forest may result in large disturbances, such as wildfires comparable to the 1988 fires or larger. Evidence of the fuel build up was readily seen in the summer of 2002 during the Pass Creek Fire on the Washakie Ranger District and the South Fork Fire on the Wind River Indian Reservation. Historically, large-scale stand replacing fires followed large scale insect epidemics, which start the tree regenerative process.

The prevailing westerly winds characteristic of the majority of the Forest mean that the fire footprint, or pattern that a fire moves on the landscape, is from west to east. Invariably, fires starting on the Shoshone National Forest have the potential to move past the Forest boundary to the east onto other ownerships. This could ultimately threaten developments, communities, structures, lodges, subdivisions, or other improvements on adjacent lands. In addition, heavily used recreation corridors are being affected, such as the North Fork of the Shoshone River corridor and its campgrounds, scenic quality, and developments.

Vegetative Management Strategies to Address Forest Health Needs

Forest health conditions have changed dramatically since the original Forest Plan was written. Forested stands are older and the effects of prolonged infection are more evident in the form of increased net mortality. The loss of forested stands has the potential to affect all resources, from recreation to wildlife. This situation needs to be addressed during Forest Plan revision. A range of vegetative treatments including timber harvest and prescribed fire should be included as options in Forest Plan revision.

Before Forest Plan revision, other strategies are being developed or implemented to address forest health needs. Late in fiscal year 2002 and into fiscal year 2003, an effort began to combine national policies, such as the Forest Health Initiative and the National Fire Plan, into coordinated project level planning. Interdisciplinary teams are providing input for areas in need of some sort of treatment using objectives such as reduction of hazardous fuels adjacent to structures, reduction of the incidence of insects or diseases, or wildlife habitat improvement. This effort is consistent with the national strategies. Collaborative planning efforts can accomplish vegetative treatments where they are most needed. The process will focus resource specialists' time and energy into high priority Forest projects. Areas that were to have assessments performed under the Ecosystem Analysis at the Watershed Scale, which uses fifth level hydrologic unit code watersheds as boundaries, will be reprioritized. These assessments will provide the framework from which to choose specific projects that are consistent with the national strategies.

In the interim, collaborative planning processes have already begun and are being implemented on the ground with lodge, resort, and summer homeowners in the North Fork Shoshone River drainage. Several fuels reduction and vegetation management projects are being planned or are in the implementation phase because of these collaborative processes. Douglas-fir stands in the North Fork Shoshone River drainage, specifically in the Newton Creek, Eagle Creek, and Clearwater Campgrounds, as well as a number of resort/lodge and summer home areas, were protected last summer through the use of anti-aggregation pheromones that repel Douglas-fir bark beetles.

The Carter Mountain area is included in an assessment being conducted in conjunction with the Forest Service Rocky Mountain Regional Office to address the Englemann spruce bark beetle epidemic. Scoping will begin in 2003 to address vegetative management options in that area. Other collaborative projects proposed to begin in fiscal year 2003 include the Homestead Park, Freak Mountain, and Horse Creek projects on the south zone of the Forest.

Water

Effects of Specific Resource Management Practices on Waters of the U.S.

Monitoring of water resources occurred on timber sales, livestock grazing allotments, and burn areas.

Evaluation

Five interdisciplinary Best Management Practice (BMP) reviews were conducted: four on commercial livestock grazing allotments (Dick Creek, Wood River/Kirwin, Rock Creek, and East Fork) and one on a timber sale (Enos Creek). Detailed documentation of each review is available at appropriate district offices and at the Forest Supervisor's Office.

The grazing reviews indicate best management practices are, in general, being implemented and are effective in protecting soil and water resources, and that watershed health on these allotments is on an upward trend relative to historical conditions. Nonetheless, some concerns remain, particularly relative to use in riparian areas. Some of the riparian conditions encountered are a function of the current drought. In recognition of this, the Interdisciplinary Team believes future allotment management plans might benefit from the inclusion of a drought response plan. Forest range staff are pursuing potential implementation of such a plan.

The timber sale review also indicated that best management practices are, in general, being implemented and are effective in protecting soil and water resources. Minor concerns were identified relative to staying current with road maintenance, ensuring roads are adequately closed out, and timely rehabilitation of burn pile areas. Ideas on how to correct these concerns were discussed and implementation of them will be pursued.

All the reviews indicated a need to revisit certain Forest Plan standards and guidelines during the upcoming plan revision. This need has been identified in past annual monitoring reports as well.

A Burned Area Emergency Rehabilitation (BAER) assessment was conducted on the Pass Creek Fire. Treatment recommendations include control of motorized use through area closure to protect soil and water resources, and monitoring of noxious weed spread. An area closure was put in place immediately after the fire was controlled. Noxious weed monitoring will occur in fiscal year 2003. If the monitoring indicates the fire exacerbated weed spread, a request for funding to control the weeds will be submitted to the Forest Service Rocky Mountain Regional Office.

The Forest continued its five-year agreement with the United States Geological Survey, as part of the National Fire Plan, to monitor effects of the 2000 Crow Creek Fire on stream flow, sediment transport, and water quality. Data reduction, analysis, and interpretation will not occur until the data collection phase is complete, which will occur after five years.

The Natural Resource Information System (NRIS) water module was loaded on the Forest's computer system in fiscal year 2002. This module contains legacy stream health data and will be used from now on to store information on stream health, watershed improvement projects, and water rights.

Water Uses

New water right applications are reviewed to ensure the requested use will not conflict with existing uses and rights, including instream flow needs quantified by the Big Horn adjudication. Potential conflicts are resolved either as the application is processed through the State Engineer's Office or through special use permit clauses once a right is granted.

Evaluation

The Forest acquired new water rights as shown in Figure 29.

Figure 29. Water rights acquired in 2002.

Name	Permit Number
Wapiti R.S. & C.G. Well	U.W. 143373
Lower Dick Creek Lake Pipeline	S.W. 32660

Several water transmission lines were field reviewed to determine if bypass flows are needed before Ditch Bill permits are re-issued. The results of the field review are being shared with the lands staff.

Work relative to the filing of water rights claims with the State Engineer's Office, per agreement under the Big Horn adjudication, continued. A pilot project for field investigation of water rights on two quadrangles was conducted via a contract. Results of the pilot project are being shared with the State Engineer's Office with hopes all filings can be completed by fiscal year 2004.

Minerals

Compliance with Terms of Operating Plans and Consistency with the Forest Plan

Leasable Minerals

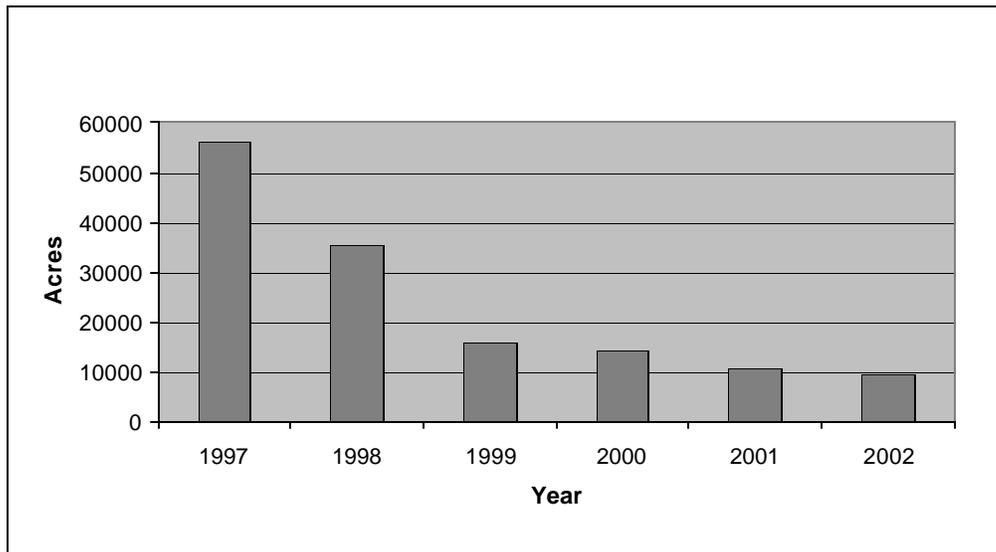
One Application for Permit to Drill (APD) was received in 1999, the Scott Well #2 exploratory well. Environmental analysis for this proposal was ongoing in fiscal year 2002.

Evaluation

There were approximately 9,517 acres under lease on the Shoshone National Forest at the end of fiscal year 2002. This represents an estimated one percent of the acres made available for lease (954,300) by the Oil and Gas EIS, Record of Decision.

Monitoring of reclamation efforts on the Lava Mountain well pad continued in fiscal year 2002. In fiscal year 1999 the area was seeded with native grasses and planted with five-foot lodgepole pine transplants at a 40 ft by 40 ft spacing with moderate success. The leaseholder, in coordination with the Forest, performed additional work in the area in fiscal year 2000. Work included planting additional trees on the site as required by the revised reclamation plan, and additional work on closure of an old road in the area. This work will complete the requirements on site, as long as the regeneration of trees is successful. First year regeneration survival was at or near 90%. The site was monitored in fiscal year 2002 and it was determined that all reclamation requirements have been met.

Figure 30. Mineral acres leased from 1997 through 2002.



Lands

Land Exchange Offers

Land exchange is a voluntary exchange of land by mutual agreement between the Forest Service and private landowners. This important land adjustment tool can provide great public benefits when used to acquire identified acquisition parcels that cannot be acquired through the land purchase program.

The Forest Plan objective for land exchange is plus or minus 50% of the planning period target. In 2002, the Shoshone National Forest did not have a land exchange target, and no land exchanges were initiated.

Evaluation

Because the Forest has very few private land inholdings, the opportunities to complete land exchange are limited. The Forest has identified parcels that would be beneficial to acquire, and the types of parcels that would be considered for disposal. The highest priority parcels for acquisition are not currently available, as the present landowners of most of these parcels are not willing sellers at this time. One land exchange proposal received in 2002 is currently under evaluation. If an identified parcel of land that is important wildlife habitat can be obtained through the proposed exchange, the project will be pursued.

Right-of-Way Acquisition

The Forest Plan identified a need to acquire approximately 278 miles of rights-of-way to secure access via road and trails on the Shoshone. The Forest Plan also predicted that demand by the general public for access to Forest lands would increase due to increased levels of recreational use and demands for timber harvest and other commodity uses.

In support of this demand, the proposed right-of-way acquisition in the Forest Plan was three cases per year from 1985 through 1990, and two cases per year from 1991 through 2000. Projected right-of-way acquisition beyond 2000 was two cases per year.

Evaluation

In recent years, most rights-of-way acquisitions on the Forest have been the result of land adjustment projects. In 2002, the purchase of a 59-acre parcel of land on the upper Wood River drainage resulted in the acquisition of rights-of-way on Forest trail # 814, which provides access over Bear Creek Pass, and Forest trail #816 which goes over East Fork Pass.



Figure 31. Acquisition parcel in T45N, R105W, Section 21.

Landline Location

The Forest Plan identified an estimated 1,250 miles of needed property boundary location on the Shoshone National Forest. The importance of landline location increases with increased development adjacent to the Forest boundary.

The plan objective for landline location is plus or minus 50% of the planning period target. In 2002, the Forest target for landline location was 10 miles, and at least 10 miles of landline location was completed.

Evaluation

Landline projects on the Forest in 2002 included one project northwest of Dubois on the Wind River Ranger District, one project adjacent to the Chief Joseph Scenic Byway on the Clarks Fork Ranger District, and one on North Fork Shoshone River drainage on the Wapiti Ranger District.

Landline location work resulted in the discovery of two situations of occupancy trespass.



Figure 32. Landline location project completed in 2002 on the North Fork, T50N, R105W, Section 9.

Occupancy Trespass

Encroachments on the Shoshone National Forest are discovered primarily through the completion of landline work, which is part of the Boundary Management program. Documentation of trespass situations discovered is completed and when the responsible party is known, written notice of trespass is sent.

In 2002, landline work on the Clarks Fork Ranger District resulted in the discovery of a small cabin that is partially located on national forest lands. Initial contact with the landowner has occurred. Official notification and resolution of the situation will begin once the survey plat is available to the Forest. On the Wapiti Ranger District, landline work identified a parcel of approximately 35 acres of National Forest land that is fenced into the adjacent landowner's property.

Evaluation

Resolution of the encroachment on the Clarks Fork Ranger District may be feasible under the Small Tracts Act Sale authority. This authority provides for sales of up to 10 acres of National Forest System lands if the landowner can demonstrate that the original encroacher relied upon a claim or color of title in his or her occupancy of National Forest System lands. Because official notification of the trespass has not yet been completed, it is unknown at this time whether the Small Tracts Act criteria will be met in this situation. On the North Fork trespass situation, the district ranger is working with the landowner to resolve the trespass.

Special Use Authorizations

Special uses are defined as all uses of National Forest System lands, improvements and resources, except those provided for under the timber, grazing, or minerals programs.

The Forest Plan predicted an increase in the demand for special uses at approximately 5% per year. When the plan was written in 1986, there were approximately 350 special use authorizations in place on the Forest.

Figure 33. Land use authorizations in place on the Shoshone National Forest in fiscal year 2002.

Type of Special Use	North Zone	South Zone	Forest Total
Organization Camp	1	2	3
Resort	14	4	18
Skiing	4	0	4
Recreation Residence	71	29	100
Outfitter Guide–Priority	44	39	83
Institutional Outfitting	3	35	38
Minerals	3	15	18
Road Easements/Permits	22	13	35
Research	3	2	5
Utilities/Communication	18	24	42
Water Use	68	16	84
Miscellaneous	23	7	30
Forest Total	274	186	460

Evaluation

The summary of existing special use authorizations shows that while the number of special use authorizations on the Forest has increased since the Forest Plan was implemented, the actual increase in authorizations has been less than what was projected by the Forest Plan. Although demand for new special uses remains very high, the number of new authorizations actually approved has been relatively low over the past several years. This is primarily due to an emphasis on ensuring that new uses are consistent with and compatible with the purposes for which the lands are managed.

Figure 34 summarizes permits by use type in five different years since 1995. Data for 1998, 1999, and 2000 is not available. Permit numbers increased from 460 total permits on the Forest in 1995, to a peak of 523 permits in 1997. In 2002, the total number of permits in effect at the end of the year was 460. The decrease in number at the end of 2002 is partially due to a backlog of expired permits that need to be reissued. The decrease in permit numbers also reflects the elimination of several special use pasture permits, which were not renewed upon expiration. Special uses policies provide for the elimination of these uses, except in cases where it can be demonstrated that the use in question reflects the highest use of the land occupied by the use. Other factors for smaller permit numbers includes a decrease in the number of short-term permits such as research permits, film permits, and construction area permits.

Figure 34. Special use permits.

Special Use Type	1995	1996	1997	2001	2002
Organization Camp	3	3	3	3	3
Resort	17	19	19	19	18
Skiing	4	4	4	4	4
Recreation Residence	100	100	100	100	100
Outfitter/Guide	118	132	135	127	121
Minerals		19	28	16	18
Road Use Authorizations	34	34	33	35	35
Research			15	19	5
Utilities/communications	38	38	37	46	42
Water Use	79	82	79	93	84
Miscellaneous	67	76	70	48	30
Forest Total	460	507	523	510	460

The number of authorizations processed on an annual basis is dependent upon the availability of funding to complete the environmental analysis process. Regulations that would provide for the collection of a processing fee have been proposed but not finalized. Until these regulations are finalized, the number of authorizations processed each year will be limited by the amount of appropriated funding for the special uses program that can be devoted to the processing of new applications.

The Forest's emphasis on special uses administration is focused on administration of existing uses. Proper collection of fees due for special use authorizations, transfers of permits upon change of ownership, and resolution of permit non-compliance issues are the emphasis items.

Field inspection of permit uses is focused on health and safety issues, with first priority given to ensuring compliance with the bear Food Storage Order and monitoring of public service uses. Field inspection of items other than those involving health and safety occurs primarily in conjunction with ongoing field work of other program specialists. Any permit non-compliance issues, which are discovered in this manner, are resolved through administrative permit actions.



Figure 35. Special use recreation residence cabin located on Ranger Creek, west of Dickinson Park Guard Station, Washakie Ranger District.

Soil

Soil Erosion

Monitoring of soil erosion occurred on timber sales, livestock grazing allotments, prescribed burns, and special use permit areas.

Evaluation

Please reference the Water section of this report for a discussion on evaluation of soil erosion monitoring that occurred in fiscal 2002.

Soil and Water Improvement (Improved Watershed Conditions)

Implementation of the watershed improvement five-year action plan continued during fiscal year 2002.

Evaluation

Field inventory, project design, and environmental analyses were initiated or accomplished on several projects as outlined in the action plan. Additionally, implementation of the Tiehack Bank Stabilization project was accomplished; implementation of two other planned projects was not. The Forest planned to award and implement contracts for the Long Park gully control and Horse Creek Road decommissioning projects. However, funding for the contracts for these two projects was diverted to fire suppression efforts. Current plans are to contract implementation in fiscal year 2003.

A final monitoring report for the Wapiti Ranger Station bank stabilization project was provided to the Army Corps of Engineers per conditions of the 404 permit issued for the project. The Corps accepted the report as complete.

Soil Survey

Work on a soil resource inventory that began in 1988 and covers the Clarks Fork, Wapiti, Greybull, and Wind River Ranger Districts continued on a limited basis as funds and personnel were available. This work, which involves population of the NASIS database, is being done in cooperation with the Natural Resource Conservation Service (NRCS) and their national soil survey program.

A survey of soils on the Washakie Ranger District was conducted in the late 1960s and early 1970s as part of the Fremont County (Lander area) soil survey. This survey was published in 1981. This older survey was scheduled for remapping early in the present inventory, but over time, funding was shifted into other regional priorities. The Forest plans to modify the Forest portion of the old survey as part of its Integrated Resource Inventory (IRI). This work will be accomplished in the future as funds are available.

Evaluation

As discussed in previous reports, the field work portion of the soil resource inventory is complete except for the Lander area. Map and NASIS database development will continue in 2003. Field work on the Lander portion will occur, as funding is available. Once accomplished, the final step in the inventory will be NASIS database and map certification by the NRCS.

Roads

Budget levels for fiscal year 2002 continued below Forest Plan projections but received a boost from supplemental funding through the Capital Investment (CIP) and 10% fund programs (TRTR). However, a number of proposed projects were not implemented due to the need to fund suppression of the many large fires experienced during the summer of 2002. Funds were borrowed from other programs to pay for fire suppression, which affected projects that were planned for award in the fourth quarter. Supplemental funds were tied directly to specific projects, including Eagle Creek Campground reconstruction (CIP) and Dick Creek road aggregate placement (TRTR).

Nationally, emphasis continued to be placed on road deferred maintenance condition surveys. Two Maintenance Level (ML) 2 roads were randomly selected for condition surveys. Approximately 50% of ML 3, 4, and 5 roads were resurveyed (initially completed in fiscal years 1999 and 2000) to ensure deferred maintenance data was updated and conformed to the current standard data collection program. All condition survey data was input into the INFRA database. Additionally, INFRA was updated as needed to ensure completeness of basic road data. Coordination with the Forest's GIS (spatial data) group continued, to review and attempt to validate spatial data linked to the INFRA data.

Bridges on National Forest System Roads (NFSR) received technical inspections as scheduled. Data was updated in INFRA to document information received through the inspection and survey operations.

The Roads Analysis Process (RAP) was utilized during project planning and watershed assessment processes to document resource issues associated with roads and to develop recommendations for future road management.

ML 3, 4, and 5 roads (for passenger cars) were maintained to similar standards and to the same degree as in previous years. Maintenance of the lower standard roads, ML 1 and 2 (for high clearance vehicles), was not particularly emphasized due to lack of funding and to emphasize maintaining the higher standard roads.

Planning coordination continued on the Beartooth Highway and Togwotee Highway reconstruction projects proposed by the Federal Highway Administration (FHWA) and the Wyoming Department of Transportation (WYDOT), respectively. Design coordination was begun on the Louis Lake road reconstruction project, proposed by the FHWA.

Road Construction/Reconstruction (Arterial, Collector, Local)

The Capital Investment Program (CIP) and 10% Fund program (TRTR) positively contributed to road reconstruction activities in fiscal year 2002, resulting in improvements to and a reduction in the deferred maintenance backlog on 7.3 miles of collector roads and 7.4 miles of local roads. Reconstruction activities on these two types of roads were implemented through the Dick Creek roads project and the Eagle Creek Campground project. Additionally, the Union Pass bridge replacement was completed in fiscal year 2002. No other road reconstruction was accomplished. No new roads were constructed.

Projected average annual road reconstruction/construction activities and outputs for fiscal years 2001 to 2010 are shown in Table III-1 of the Forest Plan, and are paraphrased below.

Road reconstruction	3.5 miles collector	4.0 miles local
Road construction	1.1 miles collector	3.4 miles local

Evaluation

Accomplishments in fiscal year 2002 represent a significant increase in the average annual collector and local road reconstruction miles projected in the Forest Plan. This increase was due to the availability of Regional CIP and TRTR funds for these specific projects in the given year. Although funding was realized in fiscal year 2002 to implement these reconstruction projects, there remains a sufficient backlog of road maintenance on the Forest, a progressive plan to improve recreation sites, and a significant lack of

continuous funding such that reconstruction accomplishments of this magnitude and cost are sporadic. A much more aggressive funding program is necessary in order to significantly improve road conditions of arterial, collector, and local roads on the Forest.

There were no timber sales requiring road construction or reconstruction in fiscal year 2002. Although there is generally some roadwork associated with timber sales on an annual basis, the amount of roadwork associated with timber sales is typically minimal.

Fire borrowing reduced funding available to implement additional small reconstruction projects.

Roads Closed (System Miles Closed by Project Activities)

No system roads were closed in fiscal year 2002 after completion of timber sale or other activities.

Evaluation

Table III-1 in the Forest Plan estimates 99 miles of roads would be closed throughout the 2001 to 2010 decade. The previous effort to correctly classify Forest roads will continue, as will evaluation of these roads for potential decommissioning. There were no documented decision needs or opportunities to annually close system roads within timber sale projects, as only one timber sale closed in fiscal year 2002. No other projects warranted annual closures. However, seasonal closures were implemented as scheduled.

Roads Obliterated (Road Miles Obliterated by Project Activities)

No roads were obliterated (decommissioned) in FY02. Environmental documentation was completed for implementation of decommissioning roads within the Horse Creek watershed and plans were made to accomplish this and additional unclassified road decommissioning. However, the project was not awarded prior to the fourth quarter so the funds for decommissioning these identified classified and unclassified roads were diverted to help pay for fire suppression on other forests.

Evaluation

The Forest Plan (Amendment 94-001) projects an average annual of 4.5 miles of road decommissioning. However, no classified (system) or unclassified (non-system) road miles were decommissioned this year, because the planned funds had to be returned to fund the 2002 fire suppression effort. Significant progress was made toward furthering future decommissioning efforts on the Forest via the decision document implementing some of the recommendations made in the Horse Creek Watershed Assessment and the completion of the Upper/Middle North Fork Shoshone River Watershed Assessment. Decisions documenting watershed assessment and RAP recommendations and project level analysis should create opportunities for future road decommissioning provided there remains emphasis and funding to accomplish them.

The Forest policy of no net increase in road miles will continue.

Level 1 Road Maintenance (Miles of Level 1 Maintenance Accomplished)

Maintenance was accomplished on approximately 25% of Maintenance Level 1 roads (annual closures) through activities such as employee field verifications, real property inventories, reviewing correct classification of roads, and using roads for resource activities. Comments provided by the public on issues related to effective closures are very useful to road managers as they provide feedback on what is working and what needs attention. No condition surveys were required on ML 1 roads.

Evaluation

Priority was given to Maintenance Level 3, 4, and 5 roads, which are maintained for passenger car use, where public health and safety and user comfort are significant concerns. Current budgets do not allow for maintenance of all Forest roads annually. Since priority is given to higher standard roads, less is spent on Level 1 roads.

Proper classification efforts must continue. Maintenance accomplishment met the Forest's adopted policy of completing 25% of Level 1 road maintenance annually. Although no actual surface maintenance was accomplished, observations and reviews of proper classification helped to accomplish the Forest Plan goal for maintenance.

It is expected that property verification requirements will continue, which will help to ensure proper road classification. Additional deferred maintenance condition surveys, as required, will assist in that regard. Effectiveness of closures was noted as a future monitoring emphasis.

Trends

The CIP and TRTR programs introduce sporadic additional funds for road construction and reconstruction, as prioritized and scheduled by the Forest Service Rocky Mountain Regional Office, but the appropriated budget has remained fairly consistent, if not dipping slightly. It is expected that the programs mentioned above, plus the Deferred Maintenance program (CMII), will continue to offer funding opportunities for occasional improvement and repair of Forest roads, reducing the deferred maintenance backlog and providing for improved user safety and watershed condition. It is also anticipated that the appropriated budget will remain constant or even decrease, which will neither help to reduce maintenance backlog nor improve road conditions on the Forest. Heavy maintenance and improvement of local, collector, and arterial roads will continue to be emphasized, although budgets will be hard pressed to keep up with the need.

Divergent opinions concerning roaded access will continue to create challenges in decisions on travel and resources management. Comments received range from "don't reduce roaded access" to "there are too many roads." The Forest must facilitate public participation in order to capture valuable input. Watershed assessments, RAP documentation, and project level decisions will be heavily utilized to recommend and implement the most efficient, necessary, and cost effective transportation system.

Across the Forest, road conditions are deteriorating. Current funding levels are barely adequate to provide annual surface maintenance on passenger car roads, including replacement of drainage structures and maintenance of bridges, signs, and other structures. On-the-ground maintenance of ML 1 and 2 roads is minimal. Without adequate funding to maintain and improve existing roads, the Forest road system will provide less service to the public and there will be increased resource concerns and potentially more seasonal and/or annual closures.

It is expected that improvements to deteriorating recreation facilities will be emphasized in order to meet the expectations and standards of today's traveling and vacationing public. This will most likely require road reconstruction. There will be tremendous competition for the limited CIP funding available regionally.

INFRA and GIS will need to be continuously updated and edited in order to maintain good current information. Annual deferred maintenance survey requirements, verification of road inventories, and reporting will continue to be emphasized.

Partners, such as local county road agencies and large private or commercial interests, will continue to be utilized to accomplish road maintenance activities. Road construction and reconstruction will continue to be contracted.

The timber sale program will continue to utilize, maintain, construct, and reconstruct Forest roads as needed to manage and protect resources.

The Forest policy of no net increase in roads will continue to guide transportation decisions and emphasize reconstruction over construction.

Road analyses will continue to be conducted at the project and watershed scales and will be used to provide guidance and recommendations to district rangers regarding future transportation system management decisions.

The TRTR program was implemented after the 1986 Forest Plan. The funds are used to improve such things as watershed condition and user health and safety directly related to transportation facilities. It is anticipated that, as long as the program remains in existence, funds will be available for implementing projects within the criteria, which allow expenditure of funds in the program.

Annual watershed assessments, required by the Forest Service, will help to sustain decommissioning goals on the Forest and will lead to continued environmental analyses in order to implement decommissioning. It is anticipated that there will be emphasis on enforcement and maintenance of seasonal and annual road closures, protection of resources, maintenance of structures and facilities related to public health and safety, visitor information, and providing appropriate levels of access.

Protection

Fuels Treatment Target

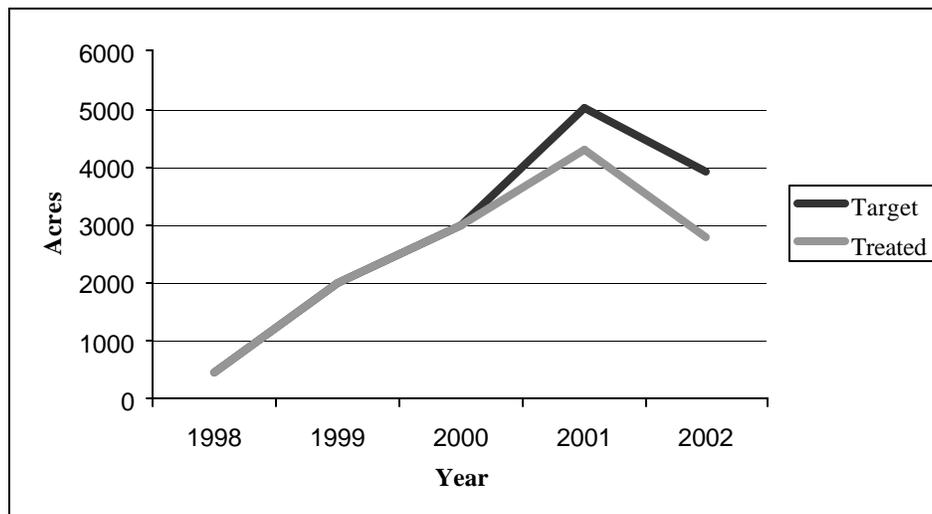
The fuels treatment program on the Shoshone National Forest involves reduction of both natural fuels and management activity-generated fuels. Natural fuel reduction focuses on vegetation exceeding natural volumes based on the assumption of natural disturbances and agreed-to thresholds. Activity fuel reduction focuses on human activities which generate wood debris such as logging, tree thinning, and road right-of-way clearing. Forest Plan standards and guidelines for activity-generated fuel provide direction to reduce or treat fuels so the potential fire line intensity will not exceed 400 BTU/sec/ft (four ft flame length) during 90 percent of the normal fire season. There is also direction to isolate continuous fuel concentrations or provide additional protection. The measurement frequency for natural and activity fuel treatment is the annual planned target +/- 25 percent.

Evaluation

The 2002 natural fuel treatment target was 3,912 acres; the natural fuel planning target was 8,000 acres. The Forest accomplished 2,900 acres (74 percent of the treatment target) and 100 percent of the planning target. All treatments satisfied Forest Plan standard and guidelines. Additionally, specific project goals and resource objectives, such as fuels reduction, preparing for fire use, and wildland/urban interface protection, were evaluated for each fuel reduction project. Using the same measurement frequency, all goals and objectives for fuels treatment projects were satisfied.

The hazardous fuels program has experienced a general increase over the past five years. National and regional focus on forest ecosystem health and wildland fire threat associated with hazardous fuels is causing the program to expand. The program increase is well within Forest Plan direction.

Figure 36. Hazardous fuels target and treatment accomplished.



Fire Management Effectiveness Index

The fire management effectiveness index is a tool that measures the relative effectiveness of fire protection by comparing funds expended on staffing suppression resources with resources lost. The analysis determines the Most Efficient Level (MEL) of suppression capabilities. MEL is based upon cost of preparedness and suppression plus the net change in value of the resources. The current model used is the National Fire Management Analysis System-Interagency Initial Attack Analysis (NFMAS-IIAA). This analysis is

completed every five years and is based on data collected the previous 10 years. Historically, the fire program has been funded at levels significantly less than MEL. The 1999 NFMAS analysis defined MEL on the Shoshone National Forest as:

- Five hand crews—one per district (three firefighters/five days per week, two firefighters/two days per week)
- Three Type 6 engines—one each at Crandall, Wapiti, and Dubois (three firefighters/six days per week, two firefighters/one day per week per engine)

Evaluation

In 2002, Congress directed and funded the Forest to implement at 95% of MEL (\$1,195,000). The decision was made on the Shoshone National Forest to modify the implementation of MEL to account for long travel distances between engines and to increase capability to implement fuels program targets. The modification is as follows:

- Three hand crews (Cody, Crandall, Dubois)
- Five engines (Wapiti, Sunlight, Timber Creek, Dubois, and Lander)

The Forest accomplished the task of staffing at 95% of MEL by reducing engines and hand crews from three persons per resource seven days a week to two persons per resource seven days a week. The number of engines and hand crews remained the same as in FY 2002 but with less firefighting capability.

Recommendations for Revision/Amendment

A review of the Forest Plan is suggested to ensure that appropriate levels of soil, water, and air protection are being afforded related to fuels treatment and use of prescribed fire. It is recommended that this review occur as part of Forest Plan revision.

As discussed in previous monitoring reports, terminology needs to be consistent with current policy (e.g., the Federal Wildland Fire Management Policy & Program Review (1995), and the Wildland and Prescribed Fire Management Policy (1988)).

The ability to utilize Wildland Fire Use for Resource Benefit (Wildland Fire Use) outside wilderness should be analyzed in an amendment or at revision. Concurrent with this analysis, the constraint in the standards and guidelines of 1,000 and 2,000 (Little Popo Agie and Fitzpatrick Wildernesses) acres on Wildland Fire Use inside wilderness should be analyzed. The value of natural fire ecology on all lands should be paramount in all land management decisions.

Effects of Other Resources on Air Quality and Air Quality Related Values

Precipitation samples and weighing rain gauge charts were collected every Tuesday at the National Atmospheric Deposition (NADP) site near South Pass City, Wyoming. Some sample analysis (e.g., pH and conductivity tests) was performed in the Lander office laboratory. Consistent with NADP sampling protocol, samples were then sent to the Central Analytical Laboratory in Illinois for further chemical analyses. Data has been collected at this site since 1985 and is available at the NADP web site (<http://nadp.sws.uiuc.edu>).

Air quality related values (AQRVs) were monitored at two lakes in Class I and Class II wilderness areas: Ross Lake in the Fitzpatrick Wilderness and Lower Saddlebag Lake in the Popo Agie Wilderness. Monitoring is being conducted to assess the effects of acid deposition on water quality. Water samples, as well as zooplankton and macroinvertebrate samples, were collected at both lakes. Each lake is sampled three times between early summer and late fall.

The Bridger-Teton National Forest also collects bulk deposition (precipitation) samples at Hobbs and Black Joe Lakes in the Wind River Mountains. These data have been collected since 1986. Data from bulk deposition sampling is displayed in annual summary reports submitted to the Wyoming Department of Environmental Quality (DEQ).

The National Outdoor Leadership School (NOLS) did not perform additional AQRV wilderness lake sampling for the Forest Service in the Wind River Mountains this year.

In January 2000, an IMPROVE (Interagency Monitoring of Protected Visual Environments) station was installed at Dead Indian Pass (NOAB1), financed by the State of Wyoming. This station includes aerosol monitors and a nephelometer. Aerosol filters are changed weekly and sent to the University of California at Davis for analysis. Data are then quality assured by the National Park Service and made available to the public. IMPROVE program staff have developed a web site to share collected information with federal and state agencies and to provide information to the public. The URL for this site is <http://vista.cira.colostate.edu/improve/>. Data for January 2000 thru May 2002 are available on the web site.

The Forest Service continues to review NEPA work being conducted by the BLM for proposed large-scale oil and gas developments in southwest Wyoming, developments that may have a direct impact on Class I areas in the Wind River Mountains. This includes monitoring impacts from two large projects, the Continental Divide/Greater Wamsutter II natural gas development, and the Pinedale Anticline oil and gas development, which were authorized for development in 2000. The Forest Service was a cooperating agency during the completion of the air quality analysis for the Pinedale Anticline project.

The Forest Service is also involved with the Greater Yellowstone Area Clean Air Partnership (GYA-CAP), established to identify and address key issues relating to air quality in the Greater Yellowstone Area. The partnership allows for an exchange of information and improved dialog between state and federal agencies working in the GYA.

Evaluation

The South Pass NADP site is funded primarily by SF Phosphates as part of their Wyoming DEQ Prevention of Significant Deterioration (PSD) permit. Summaries and trend analysis for this and other NADP sites are available on the Internet at <http://nadp.sws.uiuc.edu>.

DEQ and other agencies continually analyze these data. cursory analysis of the South Pass NADP data shows a slight trend toward increasing levels of NO₃ and inorganic nitrogen in recent years. The Southwest Wyoming Technical Air Forum (SWWYTAF) has incorporated NADP data into the CALPUFF model, which is used to model and track emissions and acid deposition across southwestern Wyoming. The Forest will continue monitoring this important site.

Figure 37. Annual NO₃ concentrations, 1985 through 2001 (site WY97 South Pass City).

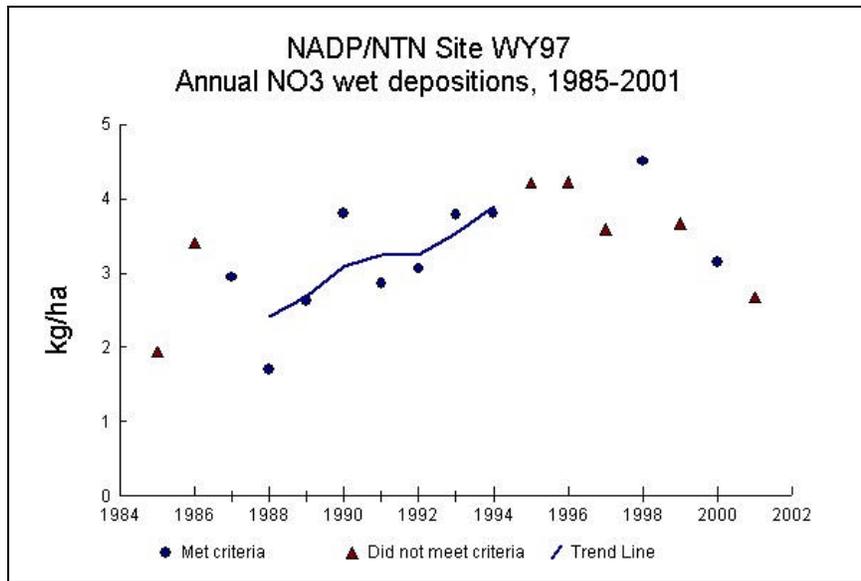
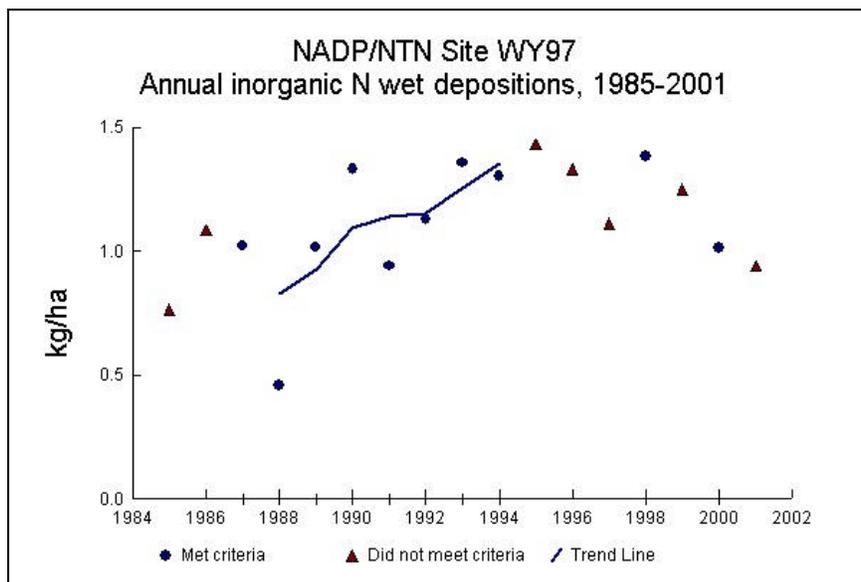


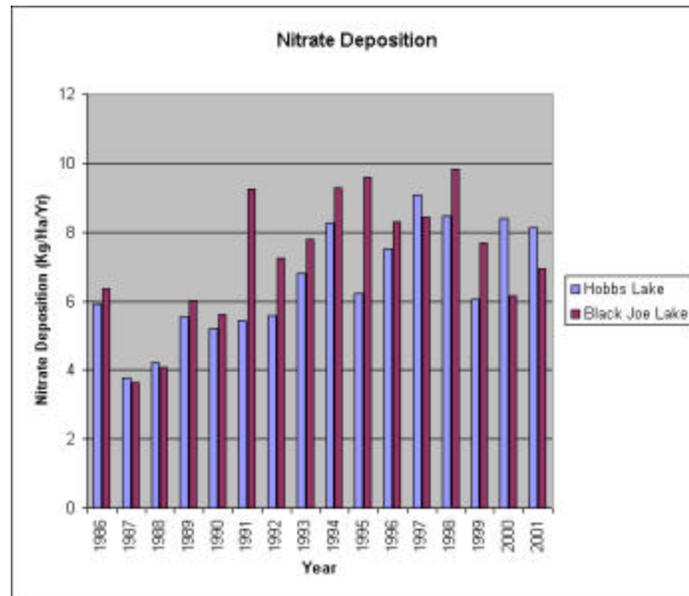
Figure 38. Annual inorganic N depositions, 1985 through 2001 (site WY97 South Pass City).



Based on current data, there does not appear to be a trend in the chemical composition of the lakes being sampled. However, because these lakes are sensitive and susceptible to change from acid deposition, the Forest will continue to monitor both lakes. Continued monitoring of these lakes will allow development of a database sufficient to conduct quality statistical analysis where general trends indicate increased nitrate, sulfate, and phosphate concentrations as well as increased acidification. A need to monitor additional sensitive lakes in future years may be necessary as additional data from the existing lakes is collected and analyzed.

Data from the Bridger-Teton bulk deposition sampling indicates a general trend of increasing total nitrate deposition (in kg/ha/yr).

Figure 39. Nitrate deposition data from the Bridger-Teton National Forest.



Bridger-Teton National Forest personnel are entering new AQRV lake monitoring data from the Shoshone National Forest into the Natural Resource Information System (NRIS) air module. Data entry is ongoing as data is collected. Version 1.1 of this corporate database was installed on the Shoshone in 2002, and v1.2 should be released for installation in the spring of 2003. Version 1.2 will include sub-modules, which incorporate lichen data. This will also provide a tool for tracking comments to the proponent's application for a Prevention of Significant Deterioration (PSD) permit, and responses and actions taken in NEPA analysis and review. This information will eventually be available on an Internet site once resources are available. These data are evaluated by personnel at the National Biological Survey at Colorado State University in Fort Collins, Colorado.

An IMPROVE site at Dead Indian Pass was installed in January 2000. Baseline data for the site will be collected for three years, at which time additional monitoring will help detect changes in air quality and visibility. The data for January 2000 through May 2002 is available on the IMPROVE web site.

Air quality monitoring is ongoing at the Continental Divide/Greater Wamsutter II natural gas development located between Rock Springs and Rawlins, Wyoming. The development of 1,065 wells and associated ancillary facilities was authorized by the BLM in 2000. Air quality modeling suggests no impact would occur from this project alone. However, the cumulative impact of this project and other development which is either occurring or will occur in the reasonably foreseeable future could potentially impact visibility in the Rawah and Savage Run Class I wilderness areas one to two days per year at the 0.5 deciview level.

The Pinedale Anticline oil and gas development is located on the west side of the Wind River Mountains near Pinedale, Wyoming. The development of 700 wells over the next ten to fifteen years was authorized by the BLM in 2000. Air quality modeling, conducted to assess the effects of this development on adjacent Class I and Class II wilderness areas, suggests no impacts would occur from this project alone. However, modeling suggests the cumulative effects of this project, coupled with existing emissions and potential emissions from reasonably foreseeable future projects, could potentially impact the adjacent wilderness areas. For the scenario with the highest development and emission rates, modeling indicates visibility impairment could occur from 11 to 15 days per year at the 0.5 deciview level, affecting the Bridger and Fitzpatrick Class I wilderness areas, the Wind River Indian Reservation Roadless Area, and the Popo Agie Class II wilderness area.

Proponents of the Pinedale Anticline project (Ultra Petroleum) financed the installation of low NO_x burners at the Naughton power plant near Kemmerer, Wyoming and reduced their permitted levels of NO_x emissions by 1,000 tons per year. Model runs showing this reduction in emissions convinced the Forest Service that this

off-site mitigation is sufficient to offset the modeled impacts from the proposed project. The Forest Service is actively involved with the BLM, Wyoming DEQ, and local citizens to monitor impacts from this project. Monitoring is done to confirm that the impacts from this project are within the range described in the NEPA documents. These monitoring efforts will continue in the future.