

Section 3—Monitoring Results, Evaluation, and Recommendations

Monitoring Items—Summary Table

This section includes the results of each monitoring item and an interdisciplinary evaluation of those results. First, a summary table is provided of the above parameters. After the summary table, a more detailed discussion follows of the monitoring results and evaluation. Information included in this section is a compilation of site-specific monitoring conducted by the Districts, Supervisor's Office resource specialists, consulting firms, State agencies, etc. As discussed previously, the recommendations have been approved by the Forest Leadership Team.

Table 1: Summary of Monitoring Items from Chapter V of the Targhee Revised Forest Plan.

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
Air Quality	Long-Term Visual Range in Class I and II Airsheds (3)	Implementation	Weekly	Fire management group	0	The method in Chap V is not practical; attempted to install camera but could not find a location adequate. Have conducted lichen and lake sampling studies in Jed Smith. Also cooperated in the interagency Air Quality Assessment for the GYA.	Delete monitoring as shown; add lake and/or lichen sampling to Jed Smith and Winegar Hole Monitoring Plans. Shift responsibility to Forest Air Quality Specialist
Soils	Hydrologic Disturbance in Watersheds (2)	Implementation Validation	Annually	Soil scientist, watershed specialists, aquatic scientists	0	The 30% guideline for hydrologic disturbance is being adhered to except in one case where it was exceeded but no impacts expected. Cannot properly validate the threshold therefore should discontinue trying to monitor.	Delete monitoring item; retain guideline; make sure this it is considered in watershed analyses and project analyses. (Scale of analyses is dependent upon the project)

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
Soils	Woody Residue Needs for Soil and Wildlife (1)	Effectiveness Validation	Annually Before and after project analyses	Monitoring team of soils, vegetation, and wildlife ecology specialists	2019 post harvest ac. 3538 pre harvest ac.	About 85% of harvest and 100% of pre-harvest areas meet or exceed min. levels in RFP	Retain monitoring, allow qualitative data. Change guideline to eliminate it within road corridors.
Soils	Detrimental Soil Disturbance (2)	Implementation Effectiveness	Annually	Soil Scientist	100%	1997-99 sampling showed 60% of post-harvest areas exceeded 15% detrimentally disturbed soil. Equipment was used incorrectly, however. Subsequent monitoring shows that all units are meeting the guidance.	Retain monitoring but clarify that it applies before and after treatment, not during activities and all soil resource parameters should be monitored and evaluated together in future monitoring and evaluation reports.
Soils	Fine Organic Matter Retention (3)	Implementation Effectiveness	Annually	Soil Scientist	30%	Guideline is being met and appears valid. Mitigation is occurring where it was not being met.	Retain monitoring, but change to use ground cover transect measurements as the indicator, not the extent of ground cover.
Fish, Water, Riparian	Improvement of Water Quality Limited Streams (1)	Validation	Several times during summer	Hydrologist	100%	Monitoring has been done on four streams as required by CWA. Summertime temperature violations were recorded in six streams. Three of these have riparian improvement projects scheduled for 2004	Retain monitoring, continue to comply with CWA.
Fish, Water, Riparian	Application of Best Management Practices (3)	Implementation Effectiveness	Several times per year	Soil scientist, Fish biologist, Hydrologist	100%	Each year several timber sales are monitored, additional projects such as range have also been monitored. In general, BMPs were implemented as specified and appeared	Change this to Priority Group 1, change lead responsibility to Forest hydrologist.

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
						effective.	
Fish, Water, Riparian	Native Cutthroat Trout Habitat Features (1)	Validation	Survey one time	Fisheries biologist	Phase 1: All streams Phase 2: 65 miles	YCT distribution surveys have been done on all fish-bearing streams. 43 6 th code HUCs are YCT strongholds; 35 have depressed YCT pops, largely due to presence of non-native fish; YCT absent from 49 historic HUCs. Projects have been identified that could reduce the competition. AIZ standards appear to be adequately protecting habitat and shifting management emphasis.	Change monitoring: Do distribution surveys every 10 years; conduct physical habitat surveys on 10 stronghold streams by 2006; and delete Phase 3. Adopt Riparian Condition Indicators from Caribou RFP.
Vegetation	Timber Volume Removed from Unsuitable and Suitable-Unscheduled (U/S-U) Lands (1)	Implementation	Annually	Timber Contracting Officers	100%	Volume from unsuitable lands came from campgrounds and admin sites (390 mbf) and two BPA powerlines (800 mbf). This is well below 20 mmbf ceiling.	Retain monitoring.
Vegetation	Pest Increase in Managed Stands (1)	Effectiveness	Annually	Silviculturist	100%	Within managed stands on Forest, pest activity has declined but is on the rise in unmanaged stands. Nearing epidemic levels. S-Gs are effective except Rx 5.1.3	Change to measure pest increases in managed and unmanaged stands. Aerial pest detection surveys would be primary method.
Vegetation	Ute Ladies'-Tresses Populations (1)	Effectiveness Validation	Annually during flowering	Botanist	100%+ (Complete surveys of	Short term trend is up; long term is unknown. Monitoring has pointed out	Retain monitoring.

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
			season		the known pop'n were done instead of sampling)	some problem areas which were remedied. 1200 acres fenced from cows. S-Gs appear to be adequate to maintain population on South Fork Snake.	
Vegetation	Vegetation Structure, Composition, and Distribution of Sagebrush/Grassland Habitats (3)	Implementation	As needed	Rangeland Management Specialists	N/a	About 3400 acres were monitored. These were moved from unsatisfactory to satisfactory condition; acres were associated with vegetation management projects. There is no forestwide baseline to compare to. See Summary.	Change to use landsat imagery or other methods to measure changes in sagebrush canopy cover every 10 years. Change biodiversity guideline to match the canopy cover categories used in the Caribou RFP(2003)
Wildlife	Cavity Nesters (1)	Effectiveness Validation	Annually	Wildlife Biologists	0	Timber harvest typically reduces cavity nester habitat while natural mortality such as insects and disease increase it. Since 1997, approximately 2,590 acres have been harvested on the TNF. This amounts to 0.3 percent of the mature forested acres. Since 1997, natural mortality has affected over 25,000 new acres; creating at least 151,000 mature-tree snags.	Delete monitoring and delete all 8 species of cavity nesters as MIS. Track habitat changes by "Pest activity in managed and unmanaged stands" monitoring item and in the Insect and Disease program summaries and Fire and Vegetation management and included in standing dead tree habitat
Wildlife	Standing Dead Tree Habitat (1)	Effectiveness Validation	Before and after project analyses	Forest Wildlife Biologist	0	See "Cavity Nesters" item, above.	Delete monitoring item and replace with cavity nester recommendation above.

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
Wildlife	Grizzly Bear Population (1)	Effectiveness Validation	Annually	Interagency Grizzly Bear Study Team	100%	Distribution is expanding south along the Tetons and west along the Centennials. Since the RFP the Bechler-Teton has been occupied every year; Henry's Lake occ. 5 out of the past 6 years; and Plateau occ. 4 out of past 6 years. No bears have been killed as a result of livestock interactions on the TNF. Livestock are being moved to allotments outside the Recovery Area. All but 2 sheep allotments in the Recovery Area have been closed. With the decommissioning of about 383 miles of road, all BMUs are meeting road density standards.	Retain monitoring
Wildlife	Grizzly Bear Habitat Improvement (1)	Implementation Effectiveness	Annually	Forest Wildlife Biologist	100%	See "Grizzly Bear Population" Item, above.	Retain monitoring
Wildlife	Bald Eagle Nesting Population (1)	Effectiveness Validation	Annually	Forest Wildlife Biologist	100%	Since the RFP analysis, nesting territories in the GYA have increased from 42 to 54; three new territories are on the TNF for a total of 20 on Forest. Population continues to increase; productivity variable on TNF nest, partly due to elevation and associated weather.	Retain monitoring

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
Wildlife	Gray Wolf Population (1)	Effectiveness Validation	Annually	USFWS	100%	All recovery targets have been exceeded in the Yellowstone and Central Idaho Experimental Pop'n Area. There are no known wolf packs established on the TNF. There has been an increase in wolf sightings across the Forest. There have been confirmed livestock depredation adjacent to the TNF in Humphrey and Kilgore.	Retain monitoring
Wildlife	Peregrine Falcon Nesting Population (1)	Effectiveness Validation	Annually	Forest Wildlife Biologist	100%	Known peregrine nesting sites have increased from 6 in 1997 to a high of 10 in the year 2000. In 4 out of the past 5 years, the TNF nests have produced 10 or more young each year. Peregrines were removed from the USFWS list of Endangered and Threatened species in 2000.	Retain monitoring and retain as an MIS
Wildlife	Furbearer Population Trends (1)	Effectiveness Validation	Over half of the subsections per winter	Forest Wildlife Biologist	About 75%	19 survey units have been established. Bait and scent stations have been put out on all Districts. All species of furbearer and their prey are being found with expected frequency.	Retain monitoring, drop lynx, fisher, and wolverine as MIS.

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
Wildlife	Goshawk Population Trends (1)	Effectiveness Validation	Annually	Forest Wildlife Biologist	100% in 1998-99	About 55 goshawk territories have been found on the 50% of the Forest that has been inventoried. The number of young per successful territory has range from 0.6 in 1999 to 2.6 in 1998, for a ten year average of 2.0. Percent of occupancy between 1990-1994 averaged 77% compared with 39% occupancy between 1998-2002. Occupancy rates and nest success appear to be higher in territories with disturbance than undisturbed territories but this difference is likely not statistically significant.	Retain monitoring
Wildlife	Forest Owl Population (1)	Effectiveness Validation	Annually	Forest Wildlife Biologist	about 50%	Great gray owls have been found in all ecological subsections and appear to be the 2 nd most abundant forest owl on the TNF. Boreal owls have been found in 5 of 7 subsections; where found they are the most abundant. Flammulated owls have been documented in 3 of the 7 subsections.	Retain monitoring but drop all three owls as MIS.
Wildlife	Trumpeter Swan Nesting Population (1)	Effectiveness Validation	Annually	Forest Wildlife Biologist	100%	Current objectives are to have 10 breeding pairs on the Targhee. In 1997, 7 sites were occupied and in 2000 a high of 11 sites	Retain monitoring

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
						were occupied with 19 young produced.	
Wildlife	Spotted Frog Population (1)	Effectiveness Validation	Annually	Forest Wildlife Biologist	0	In 2002, Idaho State University re inventoried sites from the 1992-3 study. Mean species richness has increased in the past decade, although not statistically significantly.	Change monitoring to be surveys of amphibians every 10 years.
Wildlife	Common Loon Population (1)	Effectiveness Validation	Annually	Forest Wildlife Biologist	85%	Common loon nesting and reproduction has been documented at 7 locations on the TNF. Six of the sites have been monitored each year. Loons have been present every year in 2 of the lakes. Since 1997, young have been confirmed in 5 locations. A yearly average of 3.5 young have been confirmed on the TNF.	Retain monitoring.
Wildlife	Harlequin Duck Population (1)	Effectiveness Validation	Annually	Forest Wildlife Biologist	50%	In Big Elk Creek, where harlequin ducks have consistently been seen and surveyed, they continue to be observed and are reproducing. The S&G's are maintaining habitat for harlequin ducks.	Drop as an MIS and develop a consistent monitoring and reporting program for Idaho streams.
Wildlife	Elk Vulnerability and Elk Habitat Effectiveness (1)	Effectiveness Validation	Annually	Forest Wildlife Biologist	100%	Primary influence of Forest management on EV/EHE is roads. Administratively, all road densities have been met. Physically through decommissioning efforts, RFP densities have been	Change monitoring to review changes every 5 years instead of annually.

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
						met physically in 30 of 44 watersheds.	
Wildlife	Red Squirrel Population (1)	Effectiveness Validation	Annually	Forest Wildlife Biologist	50%	These have been monitored in conjunction with the furbearer track surveys. Red squirrels are found to be abundant and present in all subsections. They are the most common prey item.	Drop as an MIS, delete monitoring item as described. Continue to monitor furbearer transects and record this prey species.
Forest Users	User Satisfaction (2)	Implementation Effectiveness	Annually	Forest Public Affairs Officer	0	Anecdotal evidence suggests that the public is not happy with our decisions but is accepting with more involvement.	Change monitoring to use NVUM every 4 years.
Forest Operation	Budget (1)	Implementation Effectiveness	Every five years	Forest Budget and Finance Officer	100%	Forest funded far below expected levels. 51 positions (22 %) have been cut. Monitoring \$ is less than predicted needed for Priority Group 1 alone.	Replace detailed Monitoring Plan in Chapter V of the RFP with a Monitoring Guide consistent with the Caribou RFP.
Recreation	Seasonal Trail Use Impacts to Soil and Vegetation (2)	Implementation Effectiveness	Annually on 5-10% of system trail areas	Recreation and Engineering Staffs	536.3 miles surveyed 1999 to 2003 (40% of total summer trail mileage)	Several areas had moderate to significant effects to soils, veg and water. These are scheduled for maintenance or rehabilitation.	Condition surveys required by INFRA will serve same purpose as this monitoring item so delete specific RFP monitoring item and continue to monitor using the most current version of the national survey protocol.

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
Recreation	Recreation/Wildlife Conflicts (2)	Implementation Effectiveness	Winter: 10% of winter range Summer: Rx areas of big game range	District Rangers	1 winter range area two times 30% of 1 District two times ~~~~~ 13% winter 4% summer	Winter—3 Districts reported no signs of stress; 1 reported stress to moose, deer, elk in Fall Cr w/r. Summer—increased OHV use across TNF but no specific information on how pop'n are affected (would not seem to affect since elk, deer, moose seasons have been increased). Evidence is all anecdotal.	Delete monitoring and address in site specific analyses.
Recreation	Dispersed Campsite Soil Displacement (3)	Implementation Effectiveness	Annually in 10% of Rx 4.3 areas	Forest Recreation Staff	96 sites 96% of required	Most sites exceeded soil quality standards. 18 impacted sites have been rehabilitated in Fall Creek and Rainey Creek.	Change monitoring to look at extent of areas disturbed by dispersed camping and monitor change over time in critical watersheds.
Recreation	Jedediah Smith Wilderness LAC and Further Details (3)	Implementation Effectiveness	Annually	Teton Basin RD Forest Recreation Staff	All 6 of the indicators were monitored on over 20,000 (20%) acres in the Jedediah Smith Wilderness Area	Ind #1: areas within 1 mile of trailheads and in popular lake basins exceeded campsite density Ind #2: the majority of sites exceeded veg loss standard Ind #3: most of the area met standards for user-created trails Ind #4: area met standards for encounters/mile except w/in 1 mile of trailheads and on 3 trails Ind #5: entire Wilderness Area met standard for no complaints, 2 sheep allotments now closed Ind #6: 13 citations were issued for snowmobiles	Continue monitoring; clarify some of the definitions in the LAC's; change to Priority Group 1.

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
Roads & Trails Access	Authorized Use Levels (2)	Implementation	Annually	District Rangers	All Districts monitored 100%	Administrative use of roads did not “effectively open” those roads. The RFP S-G have been followed.	Retain monitoring
Roads & Trails Access	Road Closure Effectiveness (1)	Effectiveness	One or two Districts per year	Forest Law Enforcement Officer	0	There has been District-supplied information on effectiveness but the monitoring has not been conducted as directed in Chapter V of the RFP.	Change monitoring item to be more realistic and achievable given budget constraints.
Roads & Trails Access	Achievement of Road Density Standards (1)	Implementation	Annually	District Rangers Forest Engineer GIS Shop	100%	The Travel Plan is consistent with the RFP OROMTRD standards with a few exceptions which were addressed through an amendment. No increase in road density from RFP standards occurred in areas with grizzly bear habitat values. An increase was approved in two prescription areas with elk and deer habitat values. The RFP OROMTRD standards have been implemented administratively across the Forest but not always physically on the ground.	As part of the ongoing update of the forest transportation layer in GIS, a monitoring layer could be added to track the progress of actual closure efforts. Rely on district personnel for submitting closure implementation information the engineering/GIS to update the monitoring layer.
Range	Streambank Disturbance/Stubble Height/Channel Stability (1)	Validation	During the summer for 5 years 33 plots installed annually	Forest Range and Watershed Staffs	10 plots 10% of required	The Rangeland Monitoring Protocol established that the correlation plots would measure trampling, vegetation height and streambank stability. This validation monitoring is no	Delete monitoring item but continue to use an adaptive management approach to implement the appropriate annual livestock grazing. Use the Caribou Riparian

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
			for 3 years			longer necessary now due to additional research information.	Grazing Implementation Guide (GIG), along with the adaptive management approach.
Range	Riparian Forage Utilization w/in Key Areas (1)	Implementation	Annually on 30% of allotments	District Rangeland Mgt. Specialists	100+%	An average of 43% of the allotments were monitored using the Targhee Rangeland Monitoring Protocol. In these, 96% of the key areas were in compliance with the RFP riparian grazing standards.	Retain monitoring, report cattle and sheep separately.
Range	Upland Forage Utilization w/in Key Areas (3)	Implementation	Annually	District Rangeland Mgt. Specialists	100+%	An average of 43% of the allotments were monitored using the Targhee Rangeland Monitoring Protocol. In these, 93% of the key areas were in compliance with the RFP upland grazing standards.	Retain monitoring, report cattle and sheep separately.
Range	Riparian and Upland Long-Term Benchmarks (3)	Implementation	Every 5 years	District Rangeland Mgt. Specialists	N/a	Several upland and riparian transects have been installed or re-read. Apparent trend is upward or static.	Change to Priority Group 1
Timber	Changes to Land Suitability (1)	Validation	Annually	Project IDTs Forest Planning Shop	100%	No changes to land suitability.	Retain monitoring

Resource Area	Monitoring Item (Priority)	Type of Monitoring	Frequency	Responsibility	Amount or % Monitored	Results/Findings	Planned Action
Timber	Maximum Created Opening Size (3)	Implementation	In each decision document	IDT leader Deciding Officer	100%	No timber projects caused an exceedance of RFP max. opening size. S-Gs have been implemented but will severely limit ecosystem restoration projects and wildland fire use.	Delete monitoring and delete created opening limit guidelines in Rx 5.2.1, 5.2.2, and 5.4. Created openings should be based on project objectives and site specific issues. Definition of created opening should also be standardized throughout the RFP.
Timber	Security Cover Retention (3)	Implementation Effectiveness	In each decision document in BMU's	IDT leader Deciding Officer Wildlife Biologist	100%	Security areas have been met or exceeded in all timber sales. Some timber sales have retained much larger areas to provide further protection.	Retain monitoring; more clearly explain how to implement guidance.
Timber	Large Forested Block Retention (3)	Implementation	In each decision document	IDT Leaders Deciding Officer	100%	Large forested blocks were retained in each timber sale project. S-Gs are being followed.	Delete monitoring because it is a project level item.

Results and Evaluation

Air Quality

Long-Term Visual Range in Class I and Class II Airsheds

Requirements

According to Chapter V of the RFP, this monitoring item was designed to establish baseline data for wilderness Class I and Class II airsheds. Time-exposure cameras were to be established at fixed photopoints and aerosol particle evaluation conducted on days not meeting visual standards.

Results and Evaluation

From 1996 to 1998, the Teton Basin Ranger District worked to identify a suitable target for monitoring visibility in the Jedediah Smith Wilderness and Grand Teton National Park. After numerous field reviews, the group was unable to identify a target far enough away to monitor visibility in the Wilderness and Grand Teton National Park.

This effort demonstrates that photography is not a viable option for measuring visibility and air quality in the Jedediah Smith Wilderness. Forest personnel have conducted air quality monitoring using other methods. As a member of the Greater Yellowstone Area Clean Air Partnership (GYA CAP), the Forest participated in an Air Quality Assessment. The Forest has also initiated a partnership with Brigham Young University for lichen surveys, which serve as indicators of air quality.

In 2000, lake samples were collected and analyzed at eight lakes in the Jedediah Smith Wilderness. Two lakes have Acid Neutralizing Capacity (ANC) less than 50 microequivalents per liter (meq/l) and are considered sensitive to acid deposition. Additional sampling for these two lakes is scheduled for 2006.

In 2000, results were reported from the BYU lichen air quality biomonitoring study. Overall, the lack of bleached and necrotic lichen thalli, high species diversity, and the high number of sensitive indicator species per reference site indicate that the Jedediah Smith Wilderness is a clean air area. Concentrations of all critical pollutant elements are below background levels. BYU recommends a re-sample in 2005 and an increase in the number of reference sites from three to five. The Forest will re-sample as soon as funds are available to contract with BYU.

An Air Quality Monitoring Plan (AQMP) for the Jedediah Smith Wilderness has been developed. Forest fisheries crew will collect air quality samples from wilderness lakes and send them to the Rocky Mountain Research Station lab in Fort Collins for analysis. The Bridger-Teton NF will provide the training and forms to insure that all of the data required for the Natural Resource Information System (NRIS) is being collected. An AQMP for the Winegar Hole Wilderness will be drafted once preliminary results from lake samples are completed. Data was collected in 2004 by Forest employees and will be analyzed in 2005 and used to develop an AQMP for the Winegar Hole Wilderness.

Recommendations

The GYA CAP has not identified a need for additional air quality monitoring in the Jedediah Smith or Winegar Hole Wildernesses. Since there are so many monitoring sites in the Greater Yellowstone Area, no need has been identified for a visibility site on the Forest at this time. All fire projects require an air quality analysis which is one of the few Forest management activities that influence air quality. For these reasons, no need has been identified to continue this air quality monitoring item.

The Forest will propose to delete this RFP monitoring item for air quality and add to the Wilderness monitoring section and adopt the following strategy:

- Implement the Jedediah Smith Wilderness Air Quality Plan.
- Add an indicator for lake sampling in the Jedediah Smith Wilderness (see Wilderness monitoring).
- Add an indicator for the lichen biomonitoring in the Jedediah Smith Wilderness (see Wilderness monitoring).

Soils

Hydrologic Disturbance in Watersheds

Requirements

The Targhee RFP established a guideline for total hydrologic disturbance in watersheds. The guideline states that “not more than 30% of any of the principle watersheds and their subwatersheds should be in a hydrologically disturbed condition at any one time” (RFP pg. III-10). Research across the western United States indicates that, a detectable increase in water yield typically occurs if vegetation removal within a watershed exceeds 30 percent. The guideline was intended to identify those watersheds where overall watershed and stream channel stability could be degraded by the cumulative effects of activities within the watershed.

This particular monitoring item is designed to validate the 30 percent guideline level. According to the RFP, bank stability is compared to the level of hydrologic disturbance in five principle watersheds: 10, 11, 12, 13 and 25.

Results and Evaluation

As stated above, the purpose of this monitoring item is to flag watersheds where changes in flow regimes could be sufficient to initiate stream channel adjustments. While this concept is well-intended, the actual application of the monitoring cannot be effectively evaluated in watersheds 10, 11, 12 and 13. This is because watersheds 10, 11, 12 and 13 are in a geological area termed the “caldera.” This area is a collapsed volcanic structure, approximately 18 miles by 23 miles in diameter with a relatively flat relief. Due to the porous nature of the geologic material, water tends to infiltrate into the subsurface rather than flow over the surface within stream channels. The number of stream channels within the area is limited, with most valley bottoms consisting of dry swales rather than defined stream channels. Stream stability, however, has been measured in two streams in Watershed 25. See Table 7, below. Stability ratings have ranged from Fair to Excellent. Forest hydrologists could not determine if the “Fair” ratings are the result of “hydrologic disturbance”, “intangibles” or a combination of both.

Table 2: Stream channels stability in measured streams in Watershed 25—Camas Creek.

Stream Name	Stream Type	Year Investigated	Rating	
			Total Points	Rating
McGarry Canyon	Various	2002	46 to 97	Fair to Excellent
Goldmine Creek	B3 – A4	2002	54 – 94	Fair to Very Good

As part of the cumulative effects analysis for land-disturbing projects throughout the Forest, adherence with the 30 percent guideline is evaluated for each affected watershed at the 5th and 6th Hydrologic Unit Codes (HUC) scales. Though some timber sale and vegetation management projects have analyzed alternatives which would exceed the

30 percent guideline threshold, only one project selected an alternative that exceeded the threshold. This project was the Big Bend Ridge Vegetation Management Plan and Timber Sale which is located in the Island Park Caldera. Due to the nature of the topography, soils, and streams in the project area, the analysis determined that exceeding the threshold in one subwatershed would not impact water resources or stream channels.

Recommendations

This guideline was established to protect stream channels from increased stream flows resulting from vegetation alterations. However, due to the lack of channels within the watersheds, and in some cases, other impacts that are occurring in each of these watersheds, it is impossible to distinguish channel alterations that may be occurring from vegetation manipulation or from other activities such as livestock grazing, recreation, or other human- and natural-caused actions. Because the 30 percent disturbance figure cannot be properly validated, it is suggested that this monitoring parameter be discontinued. Stream bank stability, water quality and aquatic habitat can and will continue to be monitored through other mechanisms. The 30 percent figure should be retained in the Forest Plan to identify watersheds where the cumulative effects of activities within a watershed could have detrimental effects on overall watershed stability, stream channel stability, water quality and aquatic habitat. Effects to these particular parameters can be adequately assessed, addressed and monitored through the NEPA process for all land-disturbing projects.

Woody Residue Needs for Soil and Wildlife

Requirements

One goal of the RFP is to sustain long-term soil productivity by retaining fine organic matter and woody residue in activity areas. The RFP set minimum levels of woody residue that must remain on-site after activities are completed. This monitoring item is designed to measure pre- and post-activity levels of woody debris to determine if the guideline levels are being followed, and if the guideline is effective in helping to meet long-term productivity goals. An interdisciplinary team is to collect woody debris data prior to and following project analyses for each ecological subsection.

Results

Since different needs exist for soil quality and wildlife habitat, these items are monitored and evaluated separately. The RFP established a guideline for dead and down material for wildlife as follows: "On at least 60 percent of the forested acres of each analysis area, an average of 21 logs per acre should be left consisting of logs in decomposition classes 1, 2, and 3 where they exist (USFS 1979). Unmanaged stands, or stands where management did not include the removal or piling of down material, meet forest-wide guidelines for down woody material." The reasoning is that even though natural levels of down woody material vary over time and by habitat type (Targhee National Forest 1982), natural levels are considered adequate for soil quality, wildlife habitat and existing native species. In addition, Forest personnel are not going to inventory and manipulate the natural levels of down woody material in unmanaged stands.

Soils

Between 1997 and 1999, approximately 1,275 acres of harvested sites and over 1,500 acres of pre-harvest sites have been sampled. Approximately 40 percent of the pre-harvest sites with data have yet to be sampled post-harvest. Sample sites are located in the Centennial Mountains, Island Park, Big Hole Mountains, Caribou Range Mountains, and Teton Range Subsections. A variety of watersheds, ecological units, and habitat types have been sampled; however, the complete array of watersheds, subsections, and habitats where timber harvest has occurred have not been monitored.

The data from 80 to 90 percent of the pre-harvest units fall within, or exceed, the minimum amounts of down woody debris described in the RFP. Approximately 80 to 85 percent of the down woody data from harvested units also falls within the ranges found in the RFP. Preliminary results indicate that in a variety of pre-harvest conditions, actual amounts of down woody debris over three inches in diameter correlate well with amounts cited in literature and the RFP. The data set of post-harvest conditions indicates that the amount of down woody debris remaining after harvest is approximately equal to pre-harvest levels.

In 2000, about 460 acres of post-harvest monitoring was done. All sites monitored exceeded the minimum levels required by the RFP guidelines. In 2001, approximately 1,685 acres were monitored on sites that have yet to be harvested. In 2002, more than 355 acres were monitored pre-harvest, and 285 acres were

monitored post-harvest. The data from all of the pre-harvest units fall within, or exceeds, the minimum tons per acre required in the RFP. Data from harvested units show all units fall within the tons per acre required in the RFP. See also Detrimental Soil Disturbance and Fine Organic Matter monitoring items for monitoring done in 2003 and 2004.

Evaluation

Overall, the RFP direction for maintaining woody debris is being met. According to soil monitoring and validation research, this is insuring the maintenance of long-term soil productivity on management activity areas throughout the Forest. As shown in this section and the other soil monitoring items, monitoring results from 2000 to 2004 indicate that soil conservation practices, mitigation measures and Revised Forest Plan, and Regional Standard(s) and Guideline(s) have effectively limited detrimental changes in soil properties.

Wildlife

The Forest is divided into seven ecological subsections. Table 8 shows the percent of mature and late-successional forested acres that are also unmanaged (uncut) stands in 1991 and 1999 in each ecological subsection. This means these mature and late-successional forested acres are assumed to meet RFP standards for down, woody material, because they have not been altered. In four of the seven ecological subsections, over 90 percent of the mature and late successional timber is unmanaged. The two subsections with the highest amount of management (logging, etc.) are those that were salvage logged due to the bark beetle infestation in the 1970s and 1980s.

Table 3: Percent of mature and late-successional forested stands that are unmanaged.

Ecological Subsection	Percent of mature and late successional forest acres in unmanaged stands	
	1991	1999
Lemhi Section, Lemhi/Medicine Lodge	98.4	98.4
Medicine Lodge Section, Lemhi/Medicine Lodge	85.7	85.7
Centennial Mountains	79.2	78.6
Island Park	60.7	59.7
Madison-Pitchstone Plateaus	63.3	63.1
Teton Range	96.6	95.7
Big Hole Mountains	94.8	94.6
Caribou Mountains	98.5	98.3

The Forest completed monitoring in 1997, 1998 and 1999 for dead and down woody debris for wildlife in both natural stands and recently harvested stands. Only logs greater than or equal to seven inches and over twenty feet long are counted. Data from 28 transects in natural stands shows half the stands had less than 21 logs per acre and half had at least 21 logs per acre. The range in logs per acre was from four to fifty-seven, and the average number of logs per acre was twenty-two. In the 48 transects in recently harvested stands, about 62 percent had less than 21 logs per acre and 38 percent had at least 21 logs per acre. The range in logs per acre was from five to sixty-eight, and the average number of logs per acre was also twenty-two. These results show that both natural stands and recently harvested stands have a wide variability in dead and down woody material for wildlife. Despite the natural variability, the guideline is being met for for dead and down woody material for wildlife--60 percent of the forested acres as an unmanaged stand or with an average of 21 logs per acre.

The RFP also has a guideline that says when dead and down material is not present on at least 60 percent of the forested acres, an average of 42 logs per acre (≥ 7 inches in diameter and ≥ 20 feet long) should be left in all activity areas (harvest units). The RFP also provides for the use of smaller size logs to meet the dead and down woody material for wildlife when larger log sizes are not available. This guideline does not need to be implemented at this time, because adequate dead and down material is present on at least 60 percent of the forested acres. However, Forest managers were interested in whether the recently harvested stands would or would not achieve this guideline, if needed. From forty-eight transects in recently harvested stands, about 6 percent had at least 42 logs per acre (≥ 7 inches in diameter and ≥ 20 feet long) and

smaller logs (≥ 3 inches in diameter, with no length requirement) ranged from 108 to 667 per acre, averaging 399 per acre.

Evaluation

Dead and down material in a variety of decomposition classes is important to many wildlife species for a source of food, denning habitat, resting sites, and many other activities. The RFP guideline is to insure that at the forest-scale, the majority of the forested acres are unmanaged and will have natural levels of downed woody debris. Then, at the project-scale, enough large woody debris should be left after harvest to insure that wildlife needs are met.

The monitoring shows that the RFP guideline for 21 logs per acre in different decomposition classes is being met in both managed and unmanaged stands. The current insect epidemic has increased the number of standing dead trees (snags) dramatically on the Forest. Eventually these snags will fall over and become large woody debris. Thus, there will be an increase in the amount and size of large wood to replace what is currently on the ground as it decomposes. As discussed in the Insect and Disease program summary and the Cavity Nester monitoring item, the insect and disease outbreaks are generally attacking larger trees. This will insure that the larger diameter logs sizes will be more available than currently.

In the past seven years of implementing the RFP, less than 0.3 percent of the forested acres have been harvested. At the time of the RFP analysis, 79.6 percent of the forested acres were in mature and older age classes and determined to be unmanaged. Considering only the harvest since that time, 79.3 percent of the forested acres can now be considered unmanaged. This is well above the RFP guidance for at least 60 percent of the forested acres to be in unmanaged stands or managed stands with 21 logs per acre. The negligible amount of timber harvest will not affect overall wildlife habitat in general and woody debris, in particular.

Recommendations

The Forest will continue implementing and monitoring these guidelines to insure that long-term soil productivity is maintained and to provide wildlife habitat. Soil productivity should continue to be monitored separately from wildlife, because the data needed for each resource is different.

All of the soil resource parameters should be monitored and evaluated together in future monitoring and evaluation reports. This would show a more complete picture than evaluating the different soil parameters separately. See also Detrimental Soil Disturbance and Fine Organic Matter Retention monitoring items.

Where Applies- Change from Subsection, Watershed, Stand (-25 acres), Site, to Project Analysis Area.

Method- Change from sampling in project or analysis area by subsection by Watershed/Sub-Watershed, by Type, Elevation, and Soil Productivity Class (integrated resource inventory), to representative project or analysis area by habitat type,

Detrimental Soil Disturbance

Requirements

The purpose of monitoring soil quality characteristics is to determine whether soil conservation practices, mitigation measures and Revised Forest Plan (RFP), and Regional Standard(s) and Guideline(s) have effectively limited detrimental changes in soil properties and provided for long-term productivity of the soils; if not what changes can be made to ensure site productivity is sustained/maintained. It is not practical to monitor effectiveness on all projects. The goal is to collect information from representative projects that provide high quality data that can be extrapolated to future projects. The RFP directs Forest personnel to monitor detrimental disturbance annually on representative sites where various land treatments have occurred. Detrimentally disturbed soil is soil that has been displaced, compacted, puddled, or severely burned.

Results

In 1998 and 1999, Forest personnel monitored soil compaction using a cone penetrometer in timber harvest units to measure the extent of detrimental soil disturbance, specifically soil compaction (Hammann 1989). Conclusions

about detrimental disturbance could not be made because the cone penetrometer readings were not corrected for rock fragment content of the soil.

In 2000, management activities on the Ashton/Island Park and the Palisades Ranger Districts were monitored for detrimental soil disturbance.

- On the Ashton/Island Park Ranger District a dispersed camping site was monitored. Detrimental soil disturbance was below the Regional guideline of 15 percent, at 6 percent (Henry's Lake Dispersed Camping, Hamman 2000).
- On the Palisades Ranger District a prescribed fire was monitored. Severely burned soil was estimated at 20 percent of the activity area based on an ocular estimate; no measurements were taken (Pritchard/Garden Creek Fire, Hamman 2000). Transect measurements taken in 2003 of indicators for long-term soil productivity found sufficient fine organic matter, estimates of woody debris exceeded RFP guidelines and severely burned soil was less than 15 percent of the activity area (2003 Monitoring Report, Tepler 2003).

In 2001, a prescribed fire was monitored on the Dubois Ranger District. None of the activity area had severely burned soil (Meadow Creek Prescribed Burn, Hamman 2001). The Regional guideline of "No more than 15 percent of an activity area in detrimental disturbance," was met.

In 2002, eight livestock grazing allotments on the Palisades Ranger District were evaluated. None of them exceeded the Regional guideline for detrimental soil disturbance (Caribou Sheep Allotment Plan Revision, Tepler 2002). All met RFP guidelines for fine organic matter retention. Monitoring methods used for evaluation of detrimental soil disturbance are those described the Forest Service Handbook (FSH) 2509.18_r4_2002-1.

In 2003 management activities on the Dubois, Palisades and Teton Basin Ranger Districts were monitored for Woody Residue Needs for Soil, Detrimental Soil Disturbance and Fine Organic Matter Retention. Methods of evaluation for detrimental soil disturbance included the shovel penetration test, examination of soil structure change, and bulk density measurements, as described in the Forest Service Handbook (FSH) 2509.18_r4_2002-1.

- On the Dubois Ranger District, two timber sales and a road closure were monitored. The averaged detrimental soil disturbance in the activity areas for the two timber sales was 6 percent. The woody residue requirement for sustaining long-term soil productivity was exceeded on one sale and the other met the RFP guideline. Revised Forest Plan guideline for fine organic matter was met on both sales. Detrimental soil compaction for the road closure project was reduced to less than 15 percent by ripping the road prism. However, the RFP guidelines for fine organic matter and woody residue were not met. (Monitoring 2003, Tepler).
- On the Palisades Ranger District a sheep driveway, prescribed fire and timber sale were monitored. The sheep driveway had 4 percent detrimental soil disturbance, and met the RFP guideline for fine organic matter. The timber sale had 10 percent detrimental soil disturbance, also fine organic matter and woody residue were within the RFP guidelines. The prescribed fire had been monitored previously in 2000 (Pritchard/Garden Creek Fire, Hammon 2000) but no measurements were taken at that time to confirm detrimental disturbance amounts caused by severe burning. Measurements taken during this monitoring showed fine organic matter, woody residue and detrimental disturbance were within RFP and Regional guidelines.
- On the Teton Basin Ranger District projects on the Grand Targhee Ski area were monitored. Projects monitored included: Sacajewa ski run, snow making water line, Frisbee golf course, clearing for Run 6A ski lift terminal and over snow tree removal. Ground cover on the Sacajewa ski run averaged 68 percent, sufficient to prevent erosion and meet RFP guideline for fine organic matter. Contour-felled logs and water bars built on the ski run are working and no accelerated erosion was noted. The snow making water line was seeded and hay was spread, fine organic matter cover more than 50 percent of the area. No signs of any sinking or erosion of soil around water line trench were noted. The Frisbee golf course has soil compaction occurring on the trails from the tee-off area to the "hole". Currently, it has not reached detrimental soil conditions as described in FSH 2509.18. Clearing for ski Run 6A lift terminal has erosion mitigation in place; some sheet erosion is occurring but has not exceeded soil loss tolerance levels. Detrimental soil disturbance for the over-snow tree removal on the Sacajewa ski run was less than 1 percent of the activity area and RFP guidelines for fine organic matter were met.

Evaluation

Decommissioning of roads by scarifying is effective in reducing detrimental soil compaction to acceptable levels and returning soil to productivity. However, a requirement for woody residue, and/or fine organic matter on road closures should be included in project design methods. Organic matter enhances both the short-term effectiveness and greatly accelerates restoration of a road's hydrologic and ecological function (Effectiveness of Road Ripping in Restoring Infiltration Capacity of Forest Roads, Luce 1997).

Soil compaction monitoring results of timber sales showing the exceedence of the Regional guideline in 1998 and 1999 are due to incorrect interpretation of data. Results using soil cone penetrometers are especially affected by soil moisture and rock content. The data gathered had been adjusted for moisture but not for rock content. Calibrated cone penetrometer readings can provide a consistent high quantitative measurement in relatively rock free soils but should be calibrated where rocks are present in the soil. Monitoring results from 2000 to 2004 show that soil conservation practices, mitigation measures and Revised Forest Plan, and Regional Standard(s) and Guideline(s) have effectively limited detrimental changes in soil properties. Overall, the RFP direction is insuring the maintenance of long-term soil productivity on management activity areas throughout the Forest.

Recommendations

Continue monitoring for items outlined in RFP V7-10, for effectiveness in sustaining soil productivity, on representative activity areas using methods outlined in FSH 2509.18. If a soil cone penetrometer is used it should be calibrated and the data properly adjusted for moisture and rock content of the soil. All personnel collecting data using a cone penetrometer should be trained in the proper method of its use.

Soil disturbance should be assessed for all site-specific projects immediately following the completion of the project. During project implementation, however, detrimental soil guidelines may be exceeded as long as they are brought back to within the 15 percent guideline after the project is completed. The Forest will add this clarification to the RFP soil guidance. All of the soil resource parameters should be monitored and evaluated together in future monitoring and evaluation reports. This would show a more complete picture than evaluating the different soil parameters separately. See also Woody Residue Needs for Soil and Wildlife and Fine Organic Matter Retention monitoring items.

Fine Organic Matter Retention

Requirements

One of the goals for the soil resource is to sustain long-term soil productivity. The Targhee RFP includes several monitoring items to measure impacts on soil productivity. Those items include monitoring detrimental soil disturbance by observing structure soil for characteristics of compaction, soil core sampling for bulk density changes (an indicator of compaction), line transects and ocular estimates for ground cover, line transects for severely burned soil and woody debris.

The RFP includes a guideline that fine organic matter should be retained over at least 50 percent of the area within forested ecosystems. In non-forested ecosystems, 65 percent ground cover should be maintained. The Monitoring Plan recommends the soil scientist annually sample representative sites where various land treatments have occurred. Fine organic matter residue has been monitored in conjunction with the other soil monitoring items discussed in the previous two sections. The following is a summary of five soil parameters monitored in 2004: detrimental compaction, fine organic matter, severely burned soils, detrimental displacement and woody debris. These parameters were monitored on a variety of Forest management activities including timber sales, prescribed fire, summer residence home areas and livestock grazing allotments.

Results

This priority group 3 monitoring was not conducted in 1997 through 2000. In years 2000 and 2001 no data from recent post-management activity was collected. In 2002 data was collected from sites that had a variety of management activities. Fine organic matter data was collected during the recent watershed assessment for the Fall Creek Watershed in 2001. Most monitored sites were within the guideline. Small isolated areas, such as sheep bedgrounds, user created ATV routes, hill-climbs, and some dispersed recreation sites did not meet the guideline.

In 2003 and 2004, fine organic matter was monitored in conjunction with the other soil resource parameters. The information from that monitoring is summarized below.

Dubois Ranger District

Two timber sales with prescription fire to regenerate aspen and reduce fuels and one prescribed fire to create age diversity in sagebrush were monitored.

- Beacon Basin and Airways Basin timber sales were monitored for detrimental soil disturbance, fine organic matter and woody debris pre and post fire. Detrimental soil disturbance on all activity areas was less than 15% pre and post-fire meeting the regional guideline. Fine organic matter covered more than 50% of the area pre and post-fire meeting the RFP guideline. Woody debris was within the range to sustain soil productivity per the RFP guideline.
- Chicken Creek prescribed fire was monitored for detrimental soil disturbance, fine organic matter pre and post-fire. Detrimental soil disturbance on all activity areas was less than 15% pre and post-fire meeting the regional guideline. Fine organic matter covered more than 50% of the area pre and post-fire meeting the RFP guideline.

Table 4: Soil Resource Monitoring Results on Dubois Ranger District Projects, 2003-4.

Dubois Ranger District Soil Resource Monitoring							
Project Name	Type of Management	Monitoring Timing	Detrimental Soil Disturbance Parameter				Woody Debris (ton/ac)
			Detrimental Compaction	Fine Organic Matter	Severely Burned Soil	Detrimental Displacement	
Beacon Basin	Timber Sale and Prescribed fire	Pre-fire	None	85% ground cover	None	None	None recorded
		Post-harvest/fire	9%	87% ground cover	1%	1%	10.1
Airways Basin	Timber Sale and Prescribed fire	Pre-fire	None	72% ground cover	None	None	4.8
		Post-harvest/fire	None	75% ground cover	4%	10%	10.5
Chicken Creek	Prescribed fire	Pre-fire	None	77% ground cover	None	None	N/A
		Post-fire	None	60% ground cover	None	None	N/A

Ashton/Island Park Ranger District

Two summer home residence areas and a livestock grazing allotment were monitored. Big Springs and Buffalo River summer home areas and Squirrel Meadows cattle and horse grazing allotment were monitored for detrimental soil disturbance, fine organic matter and woody debris.

- Big Springs and Buffalo River had less than 15% detrimental soil disturbance, fine organic matter covered more than 50% of the areas, and woody debris was less than that needed to sustain soil productivity as per the RFP guideline.
- Squirrel Meadows grazing allotment had less than 15% detrimental soil disturbance, fine organic matter covered more than 50% of the areas. Woody debris is not a management activity associated with grazing so was not monitored.

Table 5: Soil Resource Monitoring Results on Ashton/Island Park Ranger District Projects, 2003-4.

Ashton/Island Park Ranger District Soil Resource Monitoring					
Project Name	Detrimental Soil Disturbance				Woody Debris
	Detrimental Compaction	Fine Organic Matter	Severely Burned Soil	Detrimental Displacement	
Big Springs Summer Home Residence Area	None	82% ground cover	None	None	0 tons/acre
Buffalo River Home Residence Area	None	92% ground cover	None	None	1 tons/acre
Squirrel Meadows Grazing Allotment	0.3% of the allotment	70 to 85% ground cover	None	None	N/A

Palisades Ranger District

Five summer home residence areas were monitored. Sheep Creek, Calamity, Palisades, Alpine, and Hoffman summer home areas were monitored for detrimental soil disturbance, fine organic matter and woody debris. All the areas had less than 15% detrimental soil disturbance, fine organic matter covered more than 50% of the areas, and woody debris was less than that needed to sustain soil productivity as per the RFP guideline.

Table 6: Soil Resource Monitoring Results on Palisades Ranger District Projects, 2003-4.

Palisades Park Ranger District Soil Resource Monitoring					
Project Name	Detrimental Soil Disturbance				Woody Debris
	Detrimental Compaction	Fine Organic Matter	Severely Burned Soil	Detrimental Displacement	
Sheep Summer Home Residence Area	None	90% ground cover	None	None	0 tons/acre
Calamity Summer Home Residence Area	None	95% ground cover	None	None	0 tons/acre
Palisades Summer Home Residence Area	None	93% ground cover	None	None	0 tons/acre
Alpine Summer Home Residence Area	None	90% ground cover	None	None	0 tons/acre
Hoffman Summer Home Residence Area	None	91% ground cover	None	None	0 tons/acre

Evaluation

Maintaining organic matter provides nutrients to the soil and reduces erosion potentials. Maintaining 65 percent ground cover is desired. The RFP assumptions are valid based on literature and actual measured results from erosion monitoring. This guideline is being met and is effective in insuring that Forest activities maintain soil productivity by providing nutrients and reducing soil erosion. Where the guideline is not met, the Forest Service assesses the need for rehabilitation work to restore productivity to the site, such as sheep driveways and dispersed recreation sites.

Increases in ground cover on Beacon and Airways Basin timber sales were not due to the timber sale. The measurements are averages and the small increase is within the range of the average. The lack of woody debris on the summer home residences is because of need to reduce fire fuels around the homes.

Overall, soil productivity is being sustained on a variety of Forest management activity areas.

Recommendations

The indicator should be changed to use ground cover transect measurements as the indicator, not the extent of ground cover. The Forest will propose changing this item to measure ground cover by taking transect plots prior to and following land treatments and management activities. If ground cover requirements are met for a site, soil quality should be maintained. Data could also come from the Nested Frequency plot data collected by range management personnel and measurements collected while collecting down woody residue data for site-specific projects.

The Forest should continue monitoring for items outlined in RFP V7-10, for effectiveness in sustaining soil productivity, on activity areas using methods outlined in FSH 2509.18-2. All of the soil resource parameters should be monitored and evaluated together, as shown here, in future monitoring and evaluation reports. This would show a more complete picture than evaluating the different soil parameters separately. See also Woody Residue Needs for Soil and Wildlife and Detrimental Soil Disturbance monitoring items.

Fisheries, Water, and Riparian Resources

Improvement of Water Quality Limited Streams

Requirements

This validation monitoring item was designed to answer whether streams can be removed from the State's list of Water Quality Limited Segments(WQLS). The Forest hydrologist is to measure the constituent(s) of concern on each WQLS and, if necessary, their tributaries and watersheds. This information would then be used to update the State's WQLS list. Streams should be surveyed several times each summer.

Results

The States of Idaho and Wyoming are required, under Section 303(d) of the Clean Water Act, to identify all streams within their boundaries that do not support designated beneficial uses. These streams are to be re-evaluated on a bi-annual basis. The State of Wyoming has not listed any streams on the Forest at the present time. However, the State of Idaho has listed several streams within and adjacent to the Forest. To date, assessments have been essentially completed, and TMDLs assigned for six subbasins within the Forest boundary. These are: Portneuf River and Blackfoot River (located within Caribou portion of the Forest), Bruneau River (Grasslands), Medicine Lodge, Palisades (includes Camp and Fall Creeks) and Teton (includes Moody, Fox and Spring Creeks) located within the Targhee portion of the Forest. Willow Creek (Caribou and Targhee portion), Beaver-Camas (Targhee portion) and Bear River (Caribou portion) are ongoing and have not been finalized at this time.

Implementation Plans have been completed for only a portion of the Palisades sub-basin and for the Portneuf and Blackfoot River subbasins. Palisades monitoring was conducted during 2000-2003. Monitoring will continue, and all monitoring data will be submitted to the State for evaluation and possible future de-listing. Bank stability assessments were conducted for Fritz Creek in 2001.

Table 7: Palisades Sub-basin WQL Streams

Stream Name	Boundaries	Pollutant	Monitoring Completed	Comments
Antelope Creek	State land boundary to S. Fk. Snake River	Sediment	None required by FS	Listed segment off-Forest. Bank disturbance and depth fines are TMDL monitoring items
Bear Creek	Headwaters to N. Fk. Bear Creek	Sediment	Bank condition, temperature monitored since 2000	Bank disturbance and depth fines are monitoring items
Camp Creek	Headwaters to Fall	Unknown	None required	

Stream Name	Boundaries	Pollutant	Monitoring Completed	Comments
	Creek			
Elk Creek	Headwaters to W. Fk. Elk Creek	Unknown	Bank condition monitored 2002	Recommended for Delisting
Fall Creek	Headwaters to S. Fk. Fall Creek	Temperature and Sediment	Temperature monitored 2001-2002	TMDLs not yet established. Deferred until 2006
Little Elk Creek	Headwaters to Palisades Reservoir	Unknown	None required	Recommended for delisting
N. Fork Indian Creek	Wyoming line to Indian Creek	Unknown	None required	Recommended for delisting
Sheep Creek	Headwaters to S. Fk. Snake River	Unknown	None required	Recommended for Delisting
Snake River	Palisades dam to HUC boundary	Flow Alteration	None Required	No TMDL established

Temperature has been monitored using continuous recording thermistors in Beaver, Brockman, Corral, Fall, Fox, Fritz, Moody, Pine, Sawmill, West Camas, Medicine Lodge and Webber Creeks in 2000 - 2003. Summertime violations in temperature were recorded in Beaver, Corral, Fall, North Fork Moody, South Fork Moody and North Fork Pine Creeks. Minor violations were observed in West Camas and Pine Creeks. This data has been submitted to Idaho Department of Environmental Quality for inclusion in their 303(d) assessments and development of TMDLs. In 2004, monitoring efforts were concentrated in the Portneuf and Blackfoot River Subbasins and no additional data were collected in the above streams.

In addition to the monitoring conducted specifically for WQLs and TMDLs, bank stability and riparian/stream channel condition was measured for 130 segments on thirty-seven streams between 2000 and 2002. Of these stream segments, 11 percent were rated as poor; 44 percent fair; 28 percent good; and 18 percent excellent. Not enough data exists to establish trends. In 2003 and 2004, 120 additional streams were surveyed in the Centennial Range (Ashton/Island Park District), Salt River drainage (Soda Springs District), Palisades Sub-basin and in the Bear River basin (Montpelier District). The majority of the stream segments ranged in the good to fair condition categories.

- In the Salt River drainage, about 10 percent were rated in the poor category and nearly 30 percent were rated in the very good to excellent category. The remainder were in the good to fair category.
- Within the Centennial Range, in the Sawtell Peak area, about 8% were in the poor category, 54% were in the fair to good category and 39% were in the very good to excellent category.
- Within the Palisades Subsection, 23% were in the poor category, 73% were in the fair to good category and 3% were in the very good to excellent category.
- Within the Bear River basin, 3% were in the poor category, 55% were in the fair to good category and 28% were in the very good to excellent category.

Evaluation and Recommendations

The State has established TMDLs on two streams within the Targhee portion of the Caribou-Targhee. Additional TMDLs have been established in the Portneuf and Blackfoot River Subbasins in the Caribou Forest. The remainder of the TMDLs are currently in the process of being established. TMDL Implementation Plans have been written for Beaver and Elk Creeks and Blackfoot and Portneuf Subbasins in the Caribou portion of the Forest. Not enough information has been collected to verify or refute State conclusions or to suggest the listing or de-listing of any specific stream segment. Monitoring of stream bank stability, water temperatures and other parameters that may be identified in upcoming TMDLs and Implementation Plans will continue as required by the Clean Water Act.

Application of Best Management Practices (BMPs)

Requirements

Monitoring compliance with BMPs is used to determine whether the BMPs are being applied on forest projects, primarily timber sales, and whether BMPs are adequate to maintain and improve water quality. Compliance findings are combined with the audits of timber sales required by an agreement with the State of Idaho through the Idaho Forest Practices Act (IFPA). BMP's are assessed for implementation and effectiveness. Implementation monitoring essentially asks: "Were BMP's implemented as stated in the NEPA document and in the Timber Sale Contract?" Effectiveness monitoring evaluates the overall effectiveness of any given BMP in controlling or maintaining water quality, aquatic and riparian attributes, and stream channel stability. "Has erosion been controlled and has sediment been delivered off-site to a stream course?" Even more importantly: "Have the designated beneficial uses of the water in affected stream courses been maintained?"

If a BMP is found to be ineffective or not as effective as desired or anticipated, then further evaluation is required to determine if the BMP was inadequate for a specific site condition, or if the BMP itself was inadequate over a large range of site conditions. If the latter situation occurred, then the practice would be brought to the review team, who, together, would examine the practice to determine if it needs to be modified or eliminated.

Results

BMP monitoring has been ongoing on the Caribou-Targhee since 1990. In the past 15 years, 24 timber sales have been reviewed on both the Caribou and Targhee portions of the Forest, far in excess of the "10 percent" mandated in the MOU with the State of Idaho. Evaluations are conducted by a multi-disciplinary team of Forest Personnel consisting of the Forest Hydrologist, Soil Scientist, Timber program Manager, Resources Staff Officer, District Ranger, Sale Administrator, Landscape Architect and Engineering. Not all disciplines attend each review, but most of the disciplines are represented each time. Also in attendance are personnel from the State of Idaho, including the Department of Lands, Department of Environmental Quality, Department of Fish and Game and Department of Water Resources. The timber purchaser also attends, when available, along with several interested individuals and organizations, such as the Greater Yellowstone Coalition. Findings are recorded on the State of Idaho's Best Management Practices Silvicultural Nonpoint Source Task Force Field Form. This form has changed somewhat over the years; however, the context of the form has remained constant. The form consists of a general project identification cover sheet, followed by an evaluation of each IFPA Rule and a summary evaluation of overall effectiveness.

Because BMP's used are the same on both zones of the Caribou-Targhee, this report uses information from BMP reviews on both zones. The following information is summarized from the 2005 BMP Summary Report prepared by the Forest Hydrologist. Table 13, below summarizes the results of timber sale reviews on the Caribou-Targhee from 1990 through 2004. For the purposes of this review:

- Good Implementation means – All NEPA listed BMPs and appropriate IFPA BMPs were implemented;
- Partial Implementation means – All NEPA and most IFPA BMPs were implemented;
- Fair Implementation means – One or more NEPA and/or IFPA BMPs were not implemented;
- Good Effectiveness means – No sediment in streams and no channel adjustments observed;
- Adequate Effectiveness means – some sediment observed, but no degradation of Beneficial Uses or aquatic habitat observed and no channel adjustments observed;
- Fair Effectiveness means – some sediment and minor degradation of Beneficial uses and/or aquatic habitat observed and no channel adjustments observed; and
- Poor Effectiveness means – Beneficial Uses and/or aquatic habitat degradation observed and/or channel adjustments occurring.

Table 8: Idaho Forest Practices Act, Best Management Practices Implementation and Effectiveness Monitoring, Caribou-Targhee NF, 1990-2004.

Timber Sale Name	Year Monitored	Zone of C-T	Implementation Findings	Effectiveness Findings
Nounan	1990	Caribou	Partial	Adequate (minor sediment observed in stream)
Brockman	1990	Caribou	Partial	Adequate (minor sediment observed in stream)
Overlook	1990	Caribou	Partial	Good
Diamond Flat	1991	Caribou	Good	Good
Diamond Flat	1992	Caribou	Good	Good
Alder Flat	1992	Caribou	Partial	Poor (road built next to channel)
Huckleberry Basin	1993	Caribou	Good	Good
Upper Fossil	1993	Caribou	Good	Good
Diamond Flat	1995	Caribou	Good	Good
North Pebble	1996	Caribou	Partial	Adequate (minor sediment delivered to stream)
Franklin Basin	1996	Caribou	Good	Good
M. Fork Bloomington Cr.	1997	Caribou	Fair	Fair (wind blow down across channel during sale)
Pebble Creek	1997	Caribou	Good	Good
Pole Canyon	1997	Caribou	Good	Good
St. Charles	1997	Caribou	Good	Good
Pole Canyon	1998	Caribou	Partial	Fair (sediment in ephemeral drainage)
Bloomington	1998	Caribou	Fair	Fair (wind blowdown across channel)
South Fork Timber Cr.	1998	Caribou	Partial	Fair (some sediment from road)
Coop	1998	Caribou	Good	Fair (heavy snowpack & wet weather)
Bloomington (Mariah)	1999	Caribou	Partial	Fair (wind blowdown across channel)
Mariah (Bloomington)	2000	Caribou	Good	Good (wind blowdown across channel)
Willow Creek	2000	Targhee	Good	Good
Campbell	2000	Caribou	Partial	Fair/Good (LWD inadequate; silt fence in disrepair)
Alpine	2001	Targhee	Fair	Adequate (no live water within sale)
Alpine	2002	Targhee	Fair	Adequate (no live water within sale)
Swan Flat	2002	Caribou	Good	Good
Beacon Basin	2003	Targhee	Good	Good
Miles Canyon	2003	Caribou	Good	Good (some minor road rutting)
Upper Dry Canyon	2004	Caribou	Good	Good (some wet road rutting – minor sediment in ephemeral channel)

Figure 1: Upper Dry Canyon T/S, Harvest Unit 4, harvested in 2003. Photo taken one year later shows excellent residual ground cover.



Of the 24 timber sales reviewed on the C-T between 1990 and 2004:

- 14 sales had *Good* implementation of Forest Plan standards and guidelines and appropriate BMPs and had *Good* effectiveness at protecting water resources. Of the four BMP reviews on Targhee zone timber sales, two had both *Good* implementation and *Good* effectiveness.
- 8 sales had *Partial* implementation of Forest Plan standards and guidelines and appropriate BMPs and *Good to Adequate* effectiveness at protecting water resources.
- 1 sale had *Fair* implementation of Forest Plan standards and guidelines and appropriate BMPs and *Fair to Adequate Effectiveness* at protecting water resources. Of the four BMP reviews on Targhee zone timber sales, two had *Fair* implementation and *Adequate* effectiveness. This was from two reviews done on the same timber sale.
- 1 sale had *Partial* implementation of Forest Plan standards and guidelines and appropriate BMPs and *Poor* effectiveness at protecting water resources. This was a sale reviewed on the Caribou zone in 1992.

Other projects monitored for implementation on the Targhee between 1997 and 1999 include: Bonneville Power Administration (BPA) powerline expansion from Swan Valley to Jackson; Camas Creek Timber Sale; Willow Creek Timber Sale; Grand Targhee Ski Resort; and Mill Creek Traverse. These inspections were qualitative “walk throughs” and were not adequately documented, however.

The State of Idaho also periodically conducts independent reviews of timber sale projects. The Camas Creek timber sale was inspected in 1998 by Ken Heffner, Idaho Department of Lands, Forest Practices Act Coordinator. This inspection found that all applicable BMPs were implemented correctly and appeared effective.

In 2004, an interdisciplinary team¹ performed a grazing review on the Bootjack Allotment located on the Ashton/Island Park Ranger District. The team evaluated the implementation and effectiveness of grazing direction, which include RFP standards and guidelines and regional soil and water conservation practices (FSH 2509.22).

¹ The team included the Ecosystems Branch Chief, District Ranger, Soils Scientist, Hydrologist, Rangeland Management Specialist, Wildlife Biologist, and Fisheries Biologist. A copy of the report is filed at: K:\em\Hydrology\Monitoring\BMP Reviews\grazing\bmp_review_bootjack_allotment2004.doc

Most of these “Best Management Practices (BMPs)” were implemented in a manner that meets or exceeds the objective of the practice and they provided for adequate protection of soil and water resources. See also Riparian and Upland Key Area Monitoring Items.

Evaluation

The reviews suggest that, when planned and administered properly, timber harvesting and associated roading have little observable effects to surface water quality. Detrimental effects can, and have been, reduced through the use of Best Management Practices and other mitigating actions. The intent of the Clean Water Act in protecting surface water quality has been satisfied through implementing the Idaho Forest Practices Act and other mitigating measures.

Some specific conclusions from the BMP reviews are:

- The greatest disturbance within the timber sale areas is from roads, skid trails and landings rather than the harvesting units themselves.
- Where BMPs are appropriately identified and applied, aquatic resources are adequately protected.
- Problems can and have occurred when BMPs are either not applied and prescribed or inadequately implemented.
- The BMP Review process is working well on the Caribou/Targhee National Forest and will be continued on an annual basis.

Recommendation

It is recommended that this monitoring item be continued per agreement with the State of Idaho and within the State of Wyoming as sales occur. Change this item to priority group 1 with the Forest hydrologist as the responsible person. Conduct “BMP” reviews of livestock grazing allotments also.

Native Cutthroat Trout Habitat Features

Requirements

The Targhee Forest Plan directs Forest personnel to monitor native cutthroat trout habitat features. This validation monitoring has demonstrated that the expected values for water temperature and width/depth ratio for a given Rosgen stream type represent good habitat conditions for native cutthroat trout at the watershed scale. It has also shown that those expected values or conditions are attainable.

According to the RFP, there are three phases to this monitoring item:

- Phase 1: Within all native trout watersheds, assess the population status of native cutthroat trout populations as to presence/absence, relative abundance, presence of other salmonid species, and level of hybridization.
- Phase 2: Where populations of native cutthroat trout exist, measure and record physical habitat features listed on page III-11 of the Forest Plan.
- Phase 3: Compare, at the watershed scale, the recorded values for water temperature and width/depth ratio to the values on the table on page III-11 of the Forest Plan.

Results

Phase 1

Phase 1, fish distribution surveys, have been underway on the Forest since 1997. The survey methodology was developed by Dan Delaney (past Forest Fisheries Biologist), Mark Gamblin (Past IDFG Regional Fish Manager), Jack Griffith (past ISU Fisheries Professor), and Rob Van Kirk (ISU Mathematics Professor). The survey was further refined by the Forest Fisheries Biologist. The 1997-1999 and 2000-2001 Targhee Forest Monitoring and Evaluation Reports provide details on the stream surveys completed for those years.

By the end of the 2003 field season, all of the fish-bearing streams had been surveyed at least once. This provides an excellent baseline database that includes fish distribution, population density, species presence/absence, degree of introgression of the Yellowstone cutthroat trout populations, channel stability indexes, water temperatures, and

general notes on aquatic and riparian habitat condition observations. A survey report was prepared for each stream surveyed.

Fish distribution has not been previously documented by any agency in many of the streams Forest personnel surveyed. These Forest surveys provide the Forest and its partners an insight into the location of native fish strongholds. In addition, the surveys provide specific information that is used in project-level planning, particularly where more in-depth physical habitat monitoring is required. Also, several restoration opportunities were identified during the surveys, such as fish passage projects and native fish population restoration projects. The Idaho Department of Fish and Game geneticist has all of the Forest's genetic samples, and their analysis has begun. The analysis was delayed until recently, because of their emphasis on Westslope cutthroat trout.

The timely completion of fish distribution surveys would not have been possible without the support of our partners, including U.S. Bureau of Reclamation, Jackson Hole One Fly, Idaho Department of Environmental Quality, Federation of Flyfishers, Trout Unlimited, Henrys Fork Foundation, and Idaho Department of Fish and Game.

Of the 127 6th code HUCs that were historically in the range of Yellowstone cutthroat trout on the Targhee portion the Forest, forty-three were identified as Yellowstone cutthroat trout strongholds. These stronghold populations are those streams in which all life histories that historically occurred in the watershed are still present, the numbers of fish are apparently stable or increasing, and more than fifty percent of the total salmonid community consists of native fish. Thirty-five of the 6th code HUCs were identified as having depressed Yellowstone cutthroat trout populations and forty-nine are areas where the species once occurred but are now absent. These numbers are subject to slight changes with the completion of the distribution surveys in the 2004 field season. The concentration of native trout stronghold populations occur in tributaries of the South Fork Snake River, with other pockets of stronghold populations distributed around the Forest.

Phase 2

Monitoring of Phase 2 has commenced using the R1/R4 physical habitat survey. This is a modified Hankin-Reeves type stream survey with protocol developed by Overton, et al (1997). This survey methodology incorporates the physical stream habitat parameters identified in the table on page III-11 of the Forest Plan at the watershed scale. The survey provides a good way to collect riparian and aquatic habitat data on a watershed scale that can be used to determine site- specific areas where more intensive monitoring should occur. This intensive and expensive survey effort began in 1999. To date, the streams surveyed on the Targhee portion of the Forest include:

- Ashton/Island Park Ranger District: Thurmon Creek (5 miles)
- Palisades Ranger District: Pine (22 miles), Rainey (15 miles), Burns (16 miles), and Fall (7 miles) Creeks

The survey data has been entered in an electronic database, and a report was prepared for each stream. The survey reports have been used in project support documents and fisheries population and habitat restoration project planning. When an adequate number of watersheds have been surveyed, survey data will provide meaningful comparisons of habitat parameters with those found in the table on page III-11 of the Forest Plan as required by Phase 3.

Phase 3

This phase requires the Forest to use the Phase 2 physical habitat survey data and compare it to the parameters in the table on page III-11 of the Forest Plan. This will determine if there is a correlation between those parameters (particularly width:depth ratio and temperature) and native trout strongholds. This phase has not been conducted.

Summary of Results

The data collected in Phases 1 and 2 are being used as a baseline. On most streams, since prior surveys were not conducted, trends analysis is difficult. However, comparisons with the historic distribution of Yellowstone cutthroat trout on the Forest can be made. Yellowstone cutthroat trout strongholds occur in approximately 34 percent of the historic Yellowstone cutthroat trout watersheds. Depressed populations occur in approximately 28 percent of the historic Yellowstone cutthroat trout watersheds. In approximately 39 percent of the watersheds where the species

historically occurred, they are now absent. Often, these populations were replaced by non-native species, most commonly brook trout stocked decades ago.

Yellowstone cutthroat trout occur in approximately 62 percent of their historic range on the Targhee portion of the Forest. May (1996) estimated Yellowstone cutthroat trout occupy 41 percent of historic riverine environments throughout their historic range. Approximately 63 percent of historic riverine habitats on National Forests across their range still support populations of Yellowstone cutthroat trout (May 1996). Thus, fish distribution monitoring on the Forest indicates estimated Yellowstone cutthroat trout distribution, per surface area, is more than the range-wide estimate and about the same as the distribution of Yellowstone cutthroat trout on Forests across its historic range.

Fish distribution surveys have been valuable for determining the quantity and location of Yellowstone cutthroat trout strongholds on the Forest and the distribution of other fish species, including non-native fish. The survey results indicate that more Yellowstone cutthroat trout stronghold streams exist on the Forest than previously expected.

Evaluation

The fisheries monitoring in the Targhee Forest Plan focuses on learning how certain stream and riparian habitat conditions, particularly channel width:depth ratio and stream temperature, affect fish habitat and populations. Forest fisheries biologists were uncertain about the validity of Forest Plan assumptions that a low width:depth ratio and stream temperature benefit native trout. Further literature research showed that several studies document the relationship between the parameters in the table on page III-11 of the Forest Plan and the wellness of aquatic habitat. The value of pool frequency to fish populations is documented in Beard and Carline (1991), Bozek and Rahel (1991), Kozel and Reighn (1993), and Angermeier and Schlosser (1989). The value of water temperature is documented in Beschta et al (1987), Kozel and Reighn (1993), and Platts and Martin (1979). The value of large instream wood is documented in Sedell, et al (1988). The value of stream bank stability is documented in Bustard and Narver (1975), Kozel and Reighn (1993), Platts (1990), and Keller and Burnham (1987). The value of lower stream bank angle is documented in Bustard and Narver (1975), Platts (1990), and Keller and Burnham (1987). The value of width:depth ratio is documented in Platts (1990), Keller and Burnham (1987), and Overton et al (1994).

One problem with the table of "Expected values for healthy native fish habitat conditions at the watershed scale" on page III-11 of the RFP is that it assumes that "one size fits all." That is, all stream banks should have at least 80 percent stability, or all streams should have at least twenty pieces of large instream wood per mile. It is more appropriate to provide expected values for these parameters based on a specific Rosgen channel type and local information, as shown in the Riparian Condition Indicators Interim Default Values table in Appendix B-1 of the Caribou Revised Forest Plan (2003).

As an example, Fall Creek on the Palisades Ranger District was surveyed for fish distribution in 1999 to determine if an isolated population of Yellowstone cutthroat trout was present above the falls. Instead, the survey found a population challenged by competition from an introduced non-native fish (brook trout) and habitat impacts from roads, recreation, and cattle grazing. This initial survey indicated the need for a physical habitat survey. In 2002, a R1/R4 survey was performed in upper Fall Creek. Bank stability was rated at 65 percent, far less than the "expected value" of 80 percent in the Revised Forest Plan. Although cattle grazing has decreased the stability of the stream banks (USDA Forest Service 2002), the stream banks are naturally unstable because of the channel type and a lack of streambank rock to armour it. A more appropriate stability guideline for this channel type would be 70 percent (USDA Forest Service, 2003). This situation was anticipated in the 1997 RFP which states that the values "are intended as a starting point and can be refined later, based on field analysis or literature review, to better reflect conditions that are attainable." The literature review described above and the field analysis both indicate that the expected values should be changed for Fall Creek and others with similar characteristics.

In addition, the table itself has been misapplied. The values in the table are "expected values" for native trout watersheds and not RFP guidelines or standards. The values are to be used when applying guidelines which reference native cutthroat trout stream habitat features (RFP, page III-11), not as standards that each stream must meet. The table has also been used at the project scale, and the information is not routinely expanded to give a watershed scale perspective. As described in the RFP, "individual habitat features will be measured at the stream reach scale [but] the criteria for meeting the expected values apply at the watershed scale."

Recommendations

The Forest will propose to replace the table on page III-11 of the RFP and associated guidance with the Riparian Condition Indicators table in Appendix B-1 of the 2003 Caribou Revised Forest Plan. How these parameters are to be applied will also be explained in more detail (e.g. minimum bank stability criteria).

Phase 1 of the fisheries monitoring is valuable baseline information that provides information on the location of fish populations, the frequency of native fish populations, and population densities. Additional monitoring is needed to assess trends in habitat conditions in a subset of identified native trout stronghold populations to determine if Forest Plan direction protects these streams and their associated riparian areas. The Forest will continue performing Phase 1 (fish distribution surveys) every 10 years to determine trends.

The Forest will propose to replace the current Phase 2 monitoring process with direction to perform a physical habitat survey (incorporating the Riparian Condition Indicator parameters) on at least ten Yellowstone cutthroat trout stronghold streams by 2006. Survey data will be used as a baseline for monitoring Forest Plan effectiveness. The type of monitoring would change from validation to effectiveness, and it would continue to be a priority 1 monitoring item.

Phase 3 monitoring would be discontinued.

Vegetation

Timber Volume Removed from Unsuitable and Suitable-Unscheduled Lands

Requirements

Each project level NEPA analysis is to be reviewed to see if any unsuitable and suitable, but unscheduled lands, are proposed for timber harvest. The RFP put a ceiling on timber removed from unsuitable and suitable-unscheduled lands of 20 million board feet per decade.

Results and Evaluation

This item has been monitored each year and the volumes are archived in the Periodical Timber Sale Accounting Report (PTSAR) computer database. Since 1997, 390 thousand board feet of timber (MBF) has been removed from unsuitable lands. These sales were in administrative sites and campgrounds. Timber harvest in suitable-unscheduled lands removed approximately 700 MBF. These two sales were for powerline maintenance on the two Bonneville Power Administration (BPA) lines in Fall Creek and Swan Valley-Teton. Between 2000 and 2002, approximately 276 thousand board feet (MBF) was removed from unsuitable lands. These projects were in campgrounds and special use areas. Approximately 80 MBF was removed from "suitable but unscheduled" lands. These projects involved timber removal for rights-of-way.

The standards and guidelines from the RFP for timber harvest planning are being followed. No proposals exceeded standards for the respective area. The RFP put a limit of 20 MMBF of timber that could be removed from unsuitable and suitable unscheduled lands during the initial decade. Seven years into implementation of the Revised Plan, the total volume removed from unsuitable and suitable-unscheduled lands is approximately 1.5 MMBF.

Evaluation and Recommendation

This activity has little relationship to the suitability determination in the RFP, since the harvest volume is small in comparison to the tolerance level. It should remain in the monitoring plan through the decade, primarily as a way to track volume that may be removed if disturbance activities (insects, disease, fire) or other events create a need to remove volume from these lands.

Pest Increase in Managed Stands

Requirements

By reviewing the annual pest activity survey maps, the Forest silviculturist can determine the effectiveness of vegetation management activities in reducing incidences of insects and diseases. Areas with recent timber management activities should be the priority for review. This monitoring is a requirement of the National Forest Management Act (NFMA).

Results and Evaluation

This monitoring has been done each year, using maps provided by the Forest Health Protection Group from Rocky Mtn. Research Station. Aerial detection surveys since 2000 show a steady increase in infestation of Douglas-fir bark beetle and Mountain pine beetle, particularly in the Centennial Mountains of the Dubois and Island Park Ranger Districts. An infestation of Western spruce budworm in the late nineties through 2003 has largely subsided. Approximately 15,000 acres were newly infested by Douglas-fir beetle and 10,500 acres by mountain pine beetle in 2004. Incidences of subalpine fir complex, a combination of insects, diseases and drought impacts is also increasing on nearly all Ranger Districts. These infestations have increased through 2004. Where Douglas-fir and mountain pine bark beetle outbreaks are most intense, stands are characterized by high mature tree densities, nearly pure Douglas-fir or lodgepole pine composition, and little or no recent disturbance through timber harvest or fire. Western spruce budworm, a leaf defoliating insect, weakens but seldom kills mature trees. However, larvae from overstory trees are dropping into the understory, completely defoliating and sometimes killing seedlings and saplings. Localized outbreaks of Douglas-fir bark beetle, mountain pine beetle and subalpine fir complex, often caused by a combination of insects and disease, are occurring in the Palisades, Bear Creek and Poker Peak Roadless areas of the Palisades Ranger District. Outbreaks of insects have been exacerbated by the drought. Areas of recent harvest activity show little increase in insect and disease activity due to a reduction of host tree density or a change to younger age classes.

Trees killed by insects become part of the Forest's standing and down, dead fuel component, adding to the fuel accumulation and, eventually, accumulation of organic matter on a given site. Most defoliated mature trees recover a few years after the infestation ends, although they may suffer growth loss and encourage attacks from bark beetles when weakened by defoliation.

The standards and guidelines for timber management appear to be effective in managing forest pests and salvaging timber value in the short term. Over the long term, Forest managers are concerned about harvest restrictions in some Prescription Areas where recent insect infestation impacts have been greatest, specifically 5.1.4 (Timber Management with Big Game Security Emphasis) and 5.3.5 (Grizzly Bear Habitat). The impacts of management restrictions from the Lynx Conservation Assessment and Strategy on precommercial thinning activity to reduce densities, insect loss risk, and fuels, particularly in urban interface zones in the Island Park area, are also of concern, however, additional analysis and recent re-mapping efforts by the Forest Service and Fish and Wildlife Service have resulted in greater potential opportunities to implement this activity in these areas. See Furbearer Population Monitoring Item, Additional Canada Lynx Information for details on this re-mapping effort. See also the Insect and Disease program summary and Cavity Nesters monitoring item for more information on insect activity in forested stands.

Recommendation

This item should be changed to measure pest increases in forested vegetation, both managed and unmanaged stands. Aerial pest detection surveys would be the primary method used.

Ute Ladies'-Tresses Populations

Requirements

This monitoring item is designed to assess the effectiveness of standards and guidelines for livestock grazing and other activities for protection of this threatened plant. Population trends are to be measured at least once a year

using a grid system or other transects in known population areas. Habitat changes should be mapped and human activities recorded.

Results

The Ute ladies'-tresses is a threatened orchid, which has been found to occur along the South Fork of the Snake River in Idaho, from Swan Valley downstream to its confluence with the Henry's Fork. The plant was found on the Targhee NF in 1996. Yearly population surveys along the South Fork of the Snake River have yielded more known occurrences. The Targhee RFP contains guidance for managing this population in the Plant Diversity and Livestock Grazing areas. This guidance is as follows:

Plant Species Diversity

Information on the presence of listed threatened, endangered or sensitive plant species will be included in all assessments for vegetation and/or ground disturbing management activities. Appropriate protection and mitigation measures will be applied to the management activities. (S)

Ute ladies'-tresses (*Spiranthes diluvialis*)

1. For known populations within livestock grazing allotments, provide appropriate protection, particularly during the flowering and seed-set periods (generally August and September). (S)
2. Allow no ground disturbance activities or changes in hydrology within occupied habitat without review by botanist and interdisciplinary team. (S)

Since 1997, Ute Ladies'-Tresses have been monitored at a higher level than prescribed in the RFP. A complete inventory and monitoring of all known populations along the South Fork of the Snake River has been done as part of a Challenge-Cost Share project with the Idaho Conservation Data Center and the Bureau of Land Management. These monitoring and inventory efforts found that in the short-term, the population trend is up, as indicated by population size and condition. The long term trend is unknown. The study documented the number of plants and acres for each of the occurrences; observed and potential threats from current and proposed activities; and current, proposed, and needed conservation actions. This information is available from the Conservation Data Center's home page at www.state.id.us/fishgame/cdchome.htm. In 2001, botanists installed at least one permanent habitat monitoring transect at each known occurrence on public land. This new monitoring should provide better documentation regarding changes in habitat conditions over the long-term.

Habitat Data and Current Species Population Information

Plant communities supporting Ute ladies'-tresses populations on the South Fork were primarily determined by vegetation sampling in 1998 and 1999. Many of the communities form a complex mosaic of small patch size. These communities are usually in the middle (transitional zone) of the moisture gradient from wet (e.g. seasonally to semi-permanently flooded river channel, backwater slough, or wet swale) to dry (e.g., intermittently flooded cottonwood/dry bar) and occur on low terraces, in swales, or on channel banks. These sites may or may not be directly connected to the floodplain or river systems.



Figure 2: Close-up of Ute ladies'-tresses plant in Gormer Canyon, 2004.

In 2003, a total of sixty individual plants were found on lands managed by the Forest Service. One occurrence (Warm Springs Bottoms) is on lands managed by the BLM but is within a Forest Service cattle allotment. A total of 502 plants were counted at this population site in 2003. In 2004 a total of 96 individual plants were found on Forest managed lands and 1560 at Warm Springs bottoms.

Each year since 1997 a complete count has been completed of all individual plants observed at all known occurrences on BLM and FS managed lands. Results are updated annually for each known occurrence of the plant and formally updated as a CDC element occurrence. Between 1997 and 2003, the Idaho Conservation Data Center has prepared a status report that formally documents the results.



Figure 26: Ute ladies'-tresses habitat along the South Fork of the Snake River. Photograph by Bob Mosely.

Between the years of 1997 and 2003, populations and habitat monitoring of all known occurrences on the South Fork on public lands has been conducted in cooperation with the CDC, BLM and the Forest. In 2001, monitoring was expanded to include an objective, systematic, and easily repeatable monitoring method for measuring annual changes and threats to Ute ladies'-tresses habitat. The monitoring methodology chosen uses an "index of habitat change" which measures changes in habitat quality and ecological processes rather than monitoring the plant specifically. The intent of the additional monitoring method was to formally measure changes in habitat and ecological processes, because the plant does not flower each year. As a result, annual population numbers do not necessarily measure trend for the species.

In the first five years after being discovered along the South Fork of the Snake River all areas considered to be the most likely suitable habitat for the species have been surveyed also. No populations have been found on the Forest that are not associated with the floodplain of the South Fork of the Snake River.

Evaluation

The Revised Forest Plan guidance insures that this monitoring is funded by having it clearly stated as Priority Group 1 monitoring. RFP guidance requires Forest botanists to assess the condition of each known occurrence on the Forest every year. By visiting each site each year, potential and known impacts have a low probability of becoming chronic, i.e. unauthorized livestock grazing, noxious weeds, and recreation use conflicts are managed on a yearly basis.

In response to monitoring data, the Forest has changed the timing of authorized grazing to insure protection of the plant during its flowering and seed-set period. For example, in the Moody, South Fork, and Burns Allotment Management Plans Revision decision, the Palisades District will exclude livestock from about 1,200 acres of cottonwood bottoms along the South Fork of the Snake River. In cooperation with the BLM, species-specific insects (biocontrol) have been released in areas of noxious weed infestations.

The species is currently under status review by the USFWS in response to a petition for the species to be delisted as a Threatened species under the Endangered Species Act. After completion of the status review there may be some changes in how Ute ladies'-tresses is managed; however even if the species is delisted, it is likely to remain a species of special concern along the South Fork of the Snake and protection measures will remain.

Current monitoring does not indicate that overall forest management activities are reducing the population. As described above, site-specific threats are managed on a case-by-case basis. The standards and guidelines have been effective. Through these intensive surveys RFP objectives have been met for the plant.

Recommendations

The Forest should continue to cooperatively monitor this plant in the areas of known occurrences. Recommended changes to the Monitoring Guide for Ute ladies'-tresses will likely occur after the status review is completed.

Vegetation Structure, Composition, and Distribution of Sagebrush/Grassland Habitats

Requirements

This monitoring item measures progression toward the desired mix of age classes in big sagebrush stands. Ocular estimation and/or line intercept transects are to be used to determine the canopy class distribution of sagebrush in watersheds and subwatersheds.

Results and Evaluation

Between 1997 and 1999, a total of 3,436 acres of sagebrush and mountain brush were inventoried. Over three thousand of the acres were associated with a site-specific vegetation management plan that proposed burning or spraying. Prior to 1999 sagebrush in these areas displayed a canopy cover class of greater than 30 percent. Average canopy cover in the burned areas is 10 percent (due to the mosaic), and the average live canopy cover in the sprayed area is 20 percent.

This monitoring item is not well-defined. Most of the Forest's rangeland vegetation condition information is more than 20 years old and was collected when sagebrush age-class structure and density was not a concern. To make this monitoring item more meaningful, baseline data on sagebrush structure, composition, and density should be gathered across Districts. The Dubois District inventoried much of its sagebrush/grassland in the mid-1990's; this effort found that the overwhelming majority of sagebrush acres were in the high density canopy cover classes (25+%). See also the section on "Habitat for Species Associated with Sagebrush/Grasslands", later in this report.

Recommendation

This information is necessary to track progress toward the goals described in the RFP for biological diversity and to provide for a diverse array of wildlife habitats. The Forest will propose to change this monitoring item. Remote-sensing technology or other methods will be used to measure the changes in canopy cover of sagebrush every ten years. This issue should be addressed specifically in watershed assessments. In addition, the Forest will propose changing the biodiversity guideline to match the canopy cover categories used in the Caribou RFP (2003) which is more reflective of wildlife needs and current science.

Wildlife

Cavity Nesters

Requirements

Population trends and habitat changes (snags per 100 acres) are to be monitored annually in the timber management prescription areas. This information is needed to evaluate the effectiveness of snag retention standards for timber harvest prescription areas.

Results

Population Monitoring

Population trend monitoring using point count surveys has not been implemented at this time. Forest biologists are currently evaluating whether these types of surveys can provide sufficient information to show population trends, particularly as it relates to associating any trend to habitat conditions. Hoffman (1997) reported results of surveys for three species of cavity nesters on the Targhee National Forest and adjacent Yellowstone National Park. Based on the following results, Forest managers are evaluating the time and expense needed to do population trend monitoring for cavity nesting species:

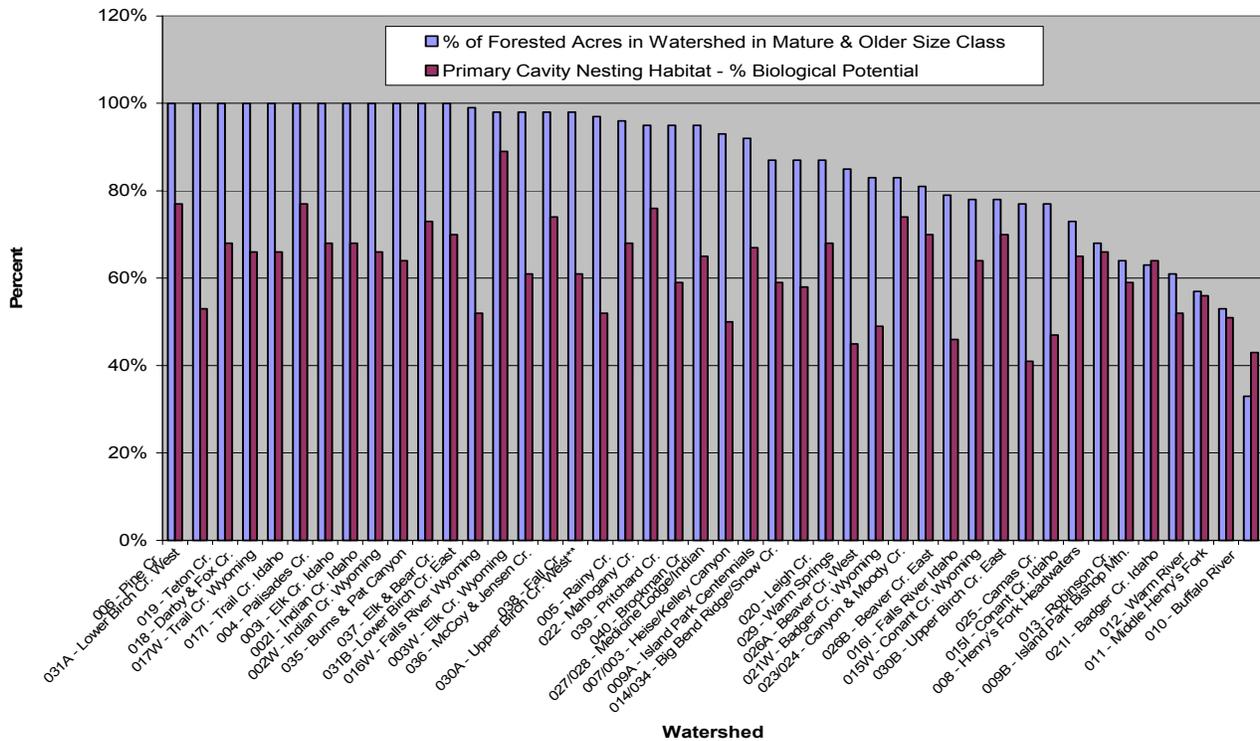
- Extensive surveys are needed in order to document the presence of even a few individuals.
- No study area had the same number of species and/or composition of cavity-nesting species present in successive years, even though no habitat changes had occurred.

- The effect of year was more influential in creating changes in species distributions among strata than were the main effects (habitat and/or species).

Habitat Changes

During the Forest Plan Revision, a detailed analysis on cavity nesting habitat capability (also referred to as biological potential) was completed using data from permanent forest inventory plots (Targhee National Forest 1997, Process Paper D). This analysis showed a Forest-wide average cavity nesting habitat capability of 0.61 as of 1991. The analysis also estimated how cavity nesting habitat capability would change over time with timber harvesting and natural tree mortality; this estimate indicated that over the life of the Plan, habitat capability would remain at 0.61. The following chart displays how woodpecker habitat, measured as percent biological potential, was distributed across principal watersheds at the time the RFP was adopted, prior to the insect outbreak. Even in watersheds with very high amounts of mature and older forests, the biological potential for woodpeckers varied as much as within watersheds with lower amounts of mature and older forests. As Figure 27 shows, biological potential varies with natural changes and, would not reach 100% biological potential for the entire watershed, even without timber harvest. Small areas within the watershed may reach 100% Biological Potential for short periods of time because it is a dynamic process. The first 12 Watersheds in figure 27 have had no timber harvest. Biological potential for all woodpeckers on the Forest ranged from 0.41 to 0.89. Biological potential for large woodpeckers ranged from 0.29 to 0.72.

Figure 27: Biological potential and percent of the forested acres in mature and older size classes, by watershed. This data was used in the RFP analysis.



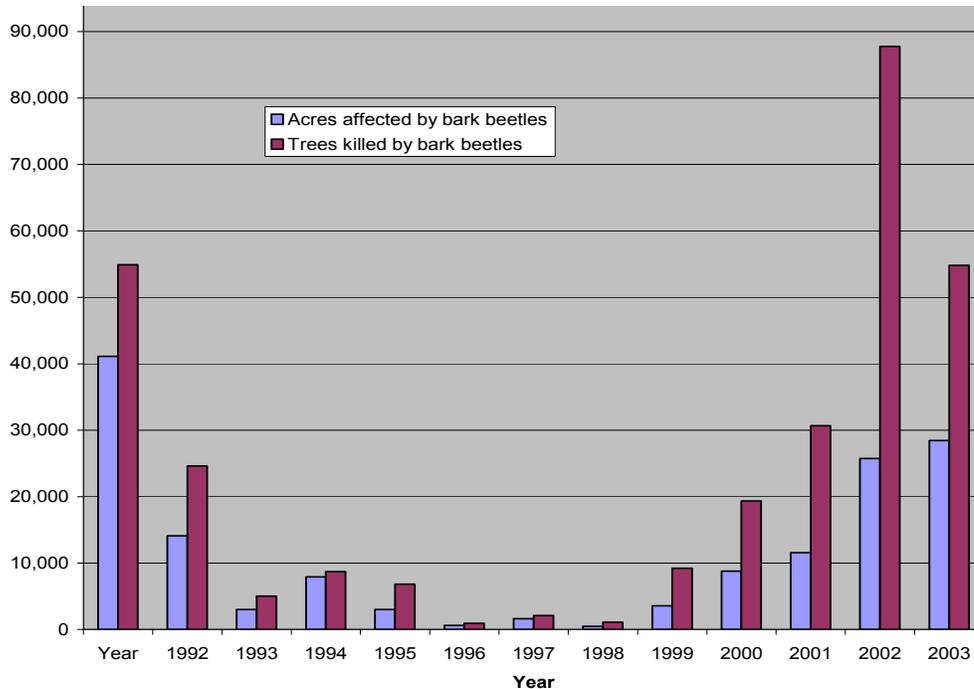
Since the forested vegetation data was collected for the RFP analysis in 1990 and 1991, changes have occurred in forested stands on the Targhee. The most significant change is an increase in insect-related tree mortality. Dayle Bennett and Ken Gibson, entomologists with the Forest Health Protection (FHP), stated that in the Centennial Mountains “the beetle-caused mortality has become extreme.” This has created more snags for cavity nesting species. Table 14 shows the number of **new trees** killed each year and the number of acres affected by new infestations of bark beetles in that year (USDA Forest Service, Annual Reports of Forest Insect and Disease Conditions, 1992-2004). From 1992-2004, about 305,000 mature trees were killed and thousands of acres were infested by bark beetles. Bark beetle mortality has been increasing steadily since 1999.

Table 9: Number of acres affected and number of trees killed by bark beetles each year from 1992-2004.

Year	Acres affected by bark beetles	Trees killed by bark beetles
1992	41,100	54,900
1993	14,100	24,600
1994	3,000	5,000
1995	7,900	8,700
1996	3,000	6,800
1997	600	900
1998	1,600	2,100
1999	450	1,100
2000	3,550	9,200
2001	8,789	19,327
2002	11,555	30,654
2003	25,749	87,760
2004	28,434	54,806
Total	N/a¹	305,847

1: A total for acres is not applicable because mappers may count the same acres in successive years if bark beetles are still present and causing add'l tree mortality on those acres.

Figure 28: Acres affected and trees killed each year by bark beetles from 1992-2004.



Timber harvest has had little impact on the cavity nesting habitat since the adoption of the RFP. Table 15 shows timber harvesting by different silvicultural methods that has occurred from 1992 through 2004². Clear cutting is usually associated with the greatest reduction in cavity nesting habitat capability, because even though some snags may be retained in clearcut areas, the complete removal of mature trees eliminates snag replacement opportunities. Other silvicultural methods that retain mature trees may reduce habitat capability, but not to the same extent as clear cutting. Table 15 shows 7,999 acres of timber (3,464 clearcut acres) were harvested from 1992 to 2004. This

² Figures are shown from 1992 since the RFP cavity nester analysis was based on vegetation data from 1990 and 1991. Thus, in order to show a true picture, we have included changes to forested vegetation from 1992 to present.

amounts to about 0.6 percent of the total forested acres and about 0.8 percent of the mature and older forested acres harvested in this 12 year period. Since the adoption of the RFP in 1997, only 2,656 acres of mature timber have been harvested. This is less than 0.2 percent of the forested acres and 0.3 percent of the mature forested acres on the Targhee.

Table 10: Acres of timber harvest from 1992-2004.

Year	Acres cut by Silvicultural Method							Total acres
	Clear Cut (CC)	Shelterwood (SW)	Seed Tree (ST)	Commercial Thin (CT)	Selection (ST)	Sanitation Salvage (SS)	Permanent Tree Removal (P)	
1992	1,019	697		35	130			1,881
1993	855			200				1,055
1994	860	155			40	46		1,101
1995	355				88	359		802
1996	262	53			63	112	14	504
1997						220		220
1998		45	45	328		72		490
1999		45		45	10			100
2000		20		20		100	1	141
2001	18	25		8		40	22	113
2002				742				742
2003	95			688				783
2004				21	46			67
Total	3,464	1,040	45	2,087	377	949	37	7999

Evaluation

As stated previously, the RFP analysis predicted that only 2.5 percent of the forested stands would be harvested and that this harvest would not change the average biological potential for woodpeckers across the Forest. Since the RFP was adopted, however, only approximately 0.2 percent of the forested acres have been harvested. In addition to the extremely low level of harvest, insect outbreaks are occurring across the Forest, creating more snags. According to pre-cruise data from the McGarry timber sale area, in 2001 there were more than 23 snags greater than 8 inches dbh inside of the planned harvest units. This is almost eight times the number of snags needed to meet the RFP minimum guideline of 40 percent biological potential in Timber Management Prescription Area 5.1.4. Biological potential continues to increase across the Forest.

Biological potential for large woodpeckers (those requiring snags ≥ 12 inches in diameter) was lower than for all woodpeckers at the time the RFP was adopted. This too has changed in the past decade. Since large mature and overmature Douglas-fir in densely stocked stands are most susceptible to attack by beetles, the insect outbreak is creating more large diameter snags. Forest Health Protection scientists found that in the Centennial Range, Douglas-fir bark beetles were concentrating their attacks in trees that were 18-20 inches diameter at breast height (dbh). They also found that there are at least 10-12 beetle-attacked trees associated with each of the new infestation pockets (Letter 7-16-2002 r.e. Bark beetle, Centennial Range, Island Park and Dubois Ranger Districts). According to "The Field Guide to Diseases and Insect Pests of Northern and Central Rocky Mountain Conifer" (USDA 2003), bark beetles seldom attack trees smaller than 12 inches dbh. Timber cruise data from the McGarry salvage area validates this assessment. In 2004, there were 13 unmerchantable snags per acre greater than 12 inches dbh in the harvest units. That means that even after the sale occurs, approximately 13 large snags per acre would remain. Even after harvest, the McGarry area would provide more than three times as many snags as needed for 100% biological potential for the four large woodpecker species. In unharvested stands across the Centennials, snag densities are expected to be even higher.

In some of the watersheds on the Targhee, however, the number of large snags is limited strictly by the vegetation type and natural disturbance regime. For instance, the lodgepole pine in the Island Park Caldera area becomes susceptible to mountain pine beetle at 8 inches dbh. The beetles kill the trees and they cannot reach larger diameters. This has no relationship to timber harvest or other forest management activities.

Bull et al. 1997 says that "providing 4 or more snags >10" dbh per acre may provide for locally viable populations". In Douglas-fir forests, 40 percent biological potential equates to 4.15 snags per acre (RFP III-15 to III-16). The management prescriptions on about three-quarters of the Forest require higher than 40 percent biological potential after timber harvest activities; do not allow timber harvest activities at all; or are non-forested where biological potential does not apply. Thus, the RFP requires much higher snag densities than Bull et al. (1997) suggests is necessary to maintain habitat for viable populations. And, as the data above shows, the actual snag densities on the Forest are much higher still. This indicates that the snag habitat (biological potential) and other timber direction in the plan is adequate to maintain habitat for viable populations of cavity nesting wildlife species.

Recommendation

The Forest will propose to delete all eight species of cavity nesters as MIS. Habitat changes will be tracked by the "Pest activity in managed and unmanaged stands" monitoring item and in the Insect and Disease program summaries and Fire and Vegetation management and included in standing dead tree habitat. Compliance with the RFP direction for biological potential will continue to be disclosed in site-specific project analyses.

Standing Dead Tree Habitat

Requirements

This effectiveness monitoring was designed to determine the degree to which wildlife requirements are being met by standing dead and replacement trees. Systematic sampling is to be done in project areas prior to and following analyses. The monitoring should include site, stand, and landscape conditions.

Results and Evaluation

This monitoring item duplicated the Cavity Nesters Monitoring item; it will be deleted and replaced with the item above.

Recommendation

This monitoring item will be deleted and replaced with the cavity nester recommendation above.

Grizzly Bear Population and Grizzly Bear Habitat Improvement

Requirements

Population trends and habitat changes are to be monitored annually in the Grizzly Bear Management Units (BMUs) and Subunits. The population trend information is primarily gathered by the Interagency Grizzly Bear Study Team and the U.S. Fish and Wildlife Service for the entire Yellowstone Recovery Area. Habitat monitoring is done by the Ranger Districts.

This habitat improvement item is designed to measure the improvement in quality of grizzly bear habitat on the Forest and to determine how much Forest habitat contributes to habitat quality in the entire Greater Yellowstone Area. The change in habitat quality will be measured using a variety of parameters, including road and trail access, vegetation manipulations, and human activities. From this updated information, Forest biologists would run the cumulative effects model on each of the five grizzly bear subunits.

Results and Evaluation

The grizzly bear population on the Forest is part of the Yellowstone Grizzly Bear Ecosystem (YGBE) as defined in the Grizzly Bear Recovery Plan (U. S. Fish and Wildlife Service 1993). This monitoring and evaluation displays information about population distribution and habitat on the Targhee NF and population trends and recovery progress for the grizzly bear population in the YGBE. These monitoring items have been combined in this report.

Grizzly Bear Distribution on the Targhee National Forest

Since 1960, Forest personnel have been recording reported sightings/observations of grizzly bears on the Forest. These sightings/observations can include actual sightings of bears, or tracks and other signs, such as scat and diggings. Forest personnel try to verify each sighting or provide a rating as to its reliability. Not all grizzly bear

sightings/observations are reported to the Forest Service, but careful record keeping over the years identifies the general distribution of grizzly bears on the Forest. Figure 30 shows the record of reported sightings/observations for the Forest. As displayed in Figure 30, the sightings for the 1990's and since 2000 are compared to all sightings from 1960 to 1989. Grizzly bear distribution on the Forest currently is very similar to the previous 30 years, the major difference being an extension in the 1990's down the Westslope of the Tetons. The sightings shown on Figure 30 in the Big Hole Mountains/Palisades area and the Caribou area of the Forest are not verified sightings; Forest biologists do not believe grizzly bears are present in those areas at this time.

Observation Flights by State Fish and Game Departments, the Interagency Grizzly Bear Study Team and Grand Teton National Park

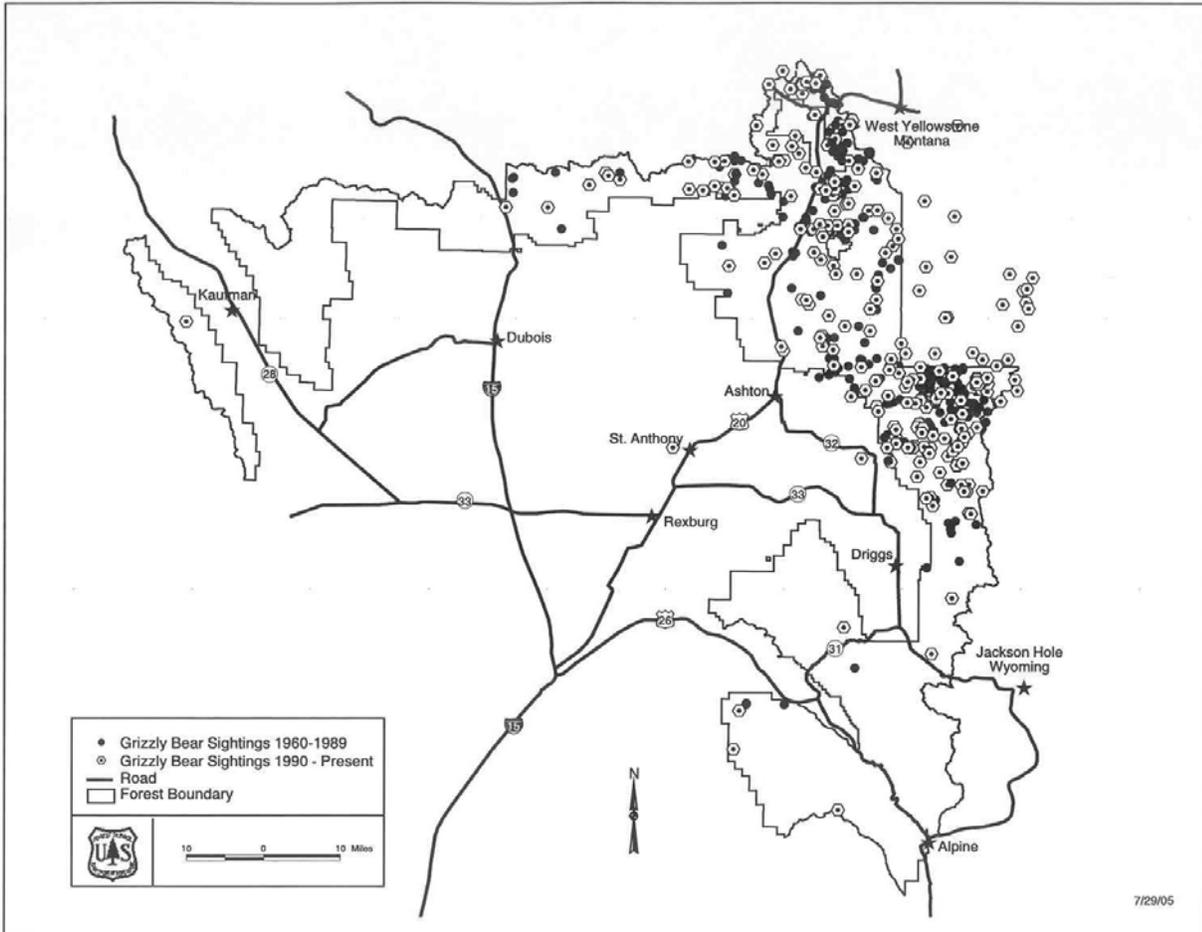
The Idaho Department of Fish and Game, Interagency Grizzly Bear Study Team, and Grand Teton National Park conduct observation flights to collect additional information on grizzly bears, such as distribution, females with cubs, and population trends. On the Forest, Idaho Department of Fish and Game conducts observation flights for the Plateau Bear Management Unit (BMU) and a 10-mile area outside of the Plateau and Henry's Lake BMUs. The Interagency Grizzly Bear Study Team conducts observation flights for the Henry's Lake BMU, and Grand Teton National Park does observation flights for the Bechler/Teton BMU. Results of the observation flights from the Idaho Department of Fish and Game are as follows:

Plateau BMU:	1996 – 1 bear
	1999 – 1 bear
Plateau BMU, Subunit 1:	2001 – 1 bear
	2003 – 1 bear
Plateau BMU, Subunit 2:	2002 – 1 bear (but this observation was not confirmed)
	2003 – 2 adults and 2 cubs-of-the-year
10-miles outside the BMU:	2002 – 1 bear

Figure 29: Two subadult grizzly bears in Squirrel Meadows, 2004. This parcel of land was acquired in the Grand Targhee-Squirrel Meadows Land Exchange.



Figure 30: Grizzly bear observations on the Caribou-Targhee Nat'l Forest, 1960 – present.



Female Grizzly Bears with Young

Monitoring the distribution of females with young (cub, yearling, or two-year old) by Bear Management Unit (BMU) is a recovery task identified in the Grizzly Bear Recovery Plan (USFWS 1993). Part of the recovery requirements state that within a 6-year span, sixteen of the eighteen BMUs must be occupied by a female with young, and no two adjacent BMUs may be unoccupied (USFWS 1993). This monitoring demonstrates the distribution of the reproductive cohort³ within the grizzly bear recovery area. It is used as a predictor of the future distribution of the population. Observations of females with young are to be confirmed by documented reports of the Interagency Grizzly Bear Study Team. Table 16 displays the BMUs occupied by verified female grizzly bears with young for the entire Yellowstone Grizzly Bear Recovery Area from 1992 to 2004. Since 1997, all eighteen of the BMUs have been occupied by a female with young within a 6-year span, thereby achieving this recovery requirement. On the Targhee, the Bechler/Teton BMU has had the highest occupancy rate for females with young (11 of 13 years), followed by the Henry's Lake and Plateau BMUs (7 of 13 years each).

³ Refers to a discrete reproductive group.

Table 11. BMU's Occupied by Verified Female Grizzly Bears with Young in the GYA. Shaded BMU's include portions of the Caribou-Targhee NF.

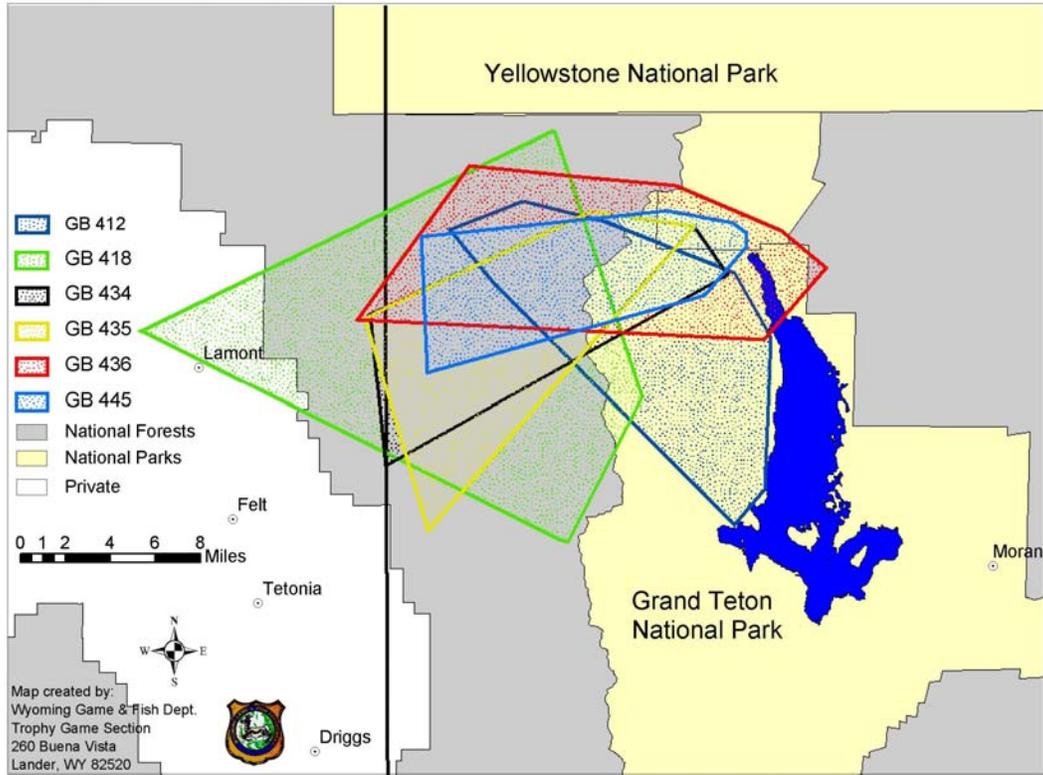
Greater Yellowstone Area Grizzly BMUs	Occupancy by Year													Years Occupied
	92	93	94	95	96	97	98	99	00	01	02	03	04	
Hilgard	x	x	x	x		X		x	x	x	x	x	x	11
Gallatin	x	x	x	x	x	X	x	x	x	x	x	x	x	13
Hellroaring/Bear		x				X		x	x	x	x	x		7
Boulder/Slough				x	x	X		x	x	x	x	x	x	9
Lamar	x	x	x	x	x	X	x	x	x	x	x	x	x	13
Crandall/Sunlight	x	x		x		X	x	x	x	x	x	x	x	11
Shoshone	x	x	x	x	x	X	x	x	x	x	x	x	x	13
Pelican/Clear	x	x	x	x	x	X	x	x	x	x	x	x	x	13
Washburn	x	x	x		x	X	x	x	x	x	x	x	x	12
Firehole/Hayden	x	x	x	x	x	X	x	x	x	x	x	x	x	13
Madison		x	x			X	x	x	x	x	x		x	9
Henry's Lake				x		X	x		x	x	x		x	7
Plateau			x					x	x	x	x	x	x	7
Two Ocean/Lake	x	x		x	x	X	x	x	x	x	x	x	x	12
Thorofare	x	x	x	x	x	X	x	x	x	x	x	x	x	13
South Absaroka	x	x	x	x	x	X	x	x	x	x	x	x	x	13
Buffalo/Spread Creek	x	x	x	x	x	X	x	x	x	x	x	x	x	13
Bechler/Teton	x	x			x	X	x	x	x	x	x	x	x	11
# of BMUs occupied each year	13	15	12	13	12	17	14	17	18	18	18	16	17	-
# of BMUs occupied at least once within a 6-year span	-	-	-	-	-	18	18	18	18	18	18	18	18	-

Source of data: Annual Reports of the Interagency Grizzly Bear Study Team (IGBST), 1997-2004 and IGBST data provided in 2005.

Cooperative Research with the Wyoming Game and Fish Department

In the summer of 2003, the Wyoming Game and Fish Department trapped for grizzly bears on the Ashton/Island Park RD and the Teton Basin RD to place radio-collars on the bears and learn more about movements and habitat use. A total of 7 grizzly bears were trapped: 2 adult males, 1 adult female, 2 yearling males, 1 yearling female, and 1 subadult male. Figure 31 displays the home ranges of 6 of these bears since they were trapped and radio-collared.

Figure 31: Home ranges of 6 grizzly bears trapped and radio-collared in 2003 (map provided by Dave Moody, Wyoming Game and Fish Department 2005).



Grizzly Bear Mortality

The Targhee has had the lowest incidence of human-caused grizzly bear mortality of any National Forest in the Greater Yellowstone Ecosystem since the bear was listed. Since 1982, there have been no grizzly bear mortalities associated with forest management activities (Targhee RFP, Process Paper D, 1997; Craighead et al. 1988; Annual Report of the Interagency Grizzly Bear Study Team, 2003 and 2004). A list of the human-caused mortalities is presented below. The five mortalities that occurred on the Forest during the past 22 years have all been associated with the fall hunting season.⁴

- 2003 and 2004 – no known mortalities⁵
- 2002 – sow and cub shot during fall hunting season in a roadless area near Sawtell, Henry’s Lake 1 BMU
- 1985 through 2001 – zero known mortalities
- 1984 – sow shot during fall hunting season by hunters in the Plateau 1 BMU
- 1984 – male bear carcass found during fall hunting season in the Henry’s Lake 1 BMU
- 1984 – sow died in trap in YNP after being caught on private land in Henry’s Lake 2 BMU to prevent sheep predation on private land²
- 1983 – zero known mortalities
- 1982 – sow shot during fall hunting season by a hunter in the Bechler/Teton BMU

Grizzly Bear/Domestic Sheep Incidents

⁴ In 1984 one sow died in a trap in Yellowstone National Park after being caught on private land in the Henry’s Lake BMU, Subunit 2 to prevent sheep predation on private land. This mortality is not included in the numbers since the bear was caught on private land for predating on sheep on private land and died in Yellowstone National Park.

⁵ In the fall of 2003, a subadult grizzly bear was trapped on private land in Teton Basin after getting into unnatural foods on private lands. This bear was transported to the Shoshone National Forest and denned there. In the spring of 2004, this bear was again using unnatural foods around human habitations and was killed. This mortality is not included in the numbers since the bear was caught on private land and was transported to another part of the ecosystem where it was killed.

Table 17 lists domestic sheep allotments within the BMUs on the Forest, shows their current status, and lists the years with documented grizzly bear/domestic sheep incidents for each allotment. During the 1990's, grizzly bear incidents occurred on three allotments. From 2000 to 2004, only one unverified grizzly bear incident has been reported. The two allotments with the highest number of grizzly bear incidents have been closed (Badger Twin and Green Mountain). In 2004, three allotments in the Henry's Lake 1 BMU were closed. There are now only two active domestic sheep allotments within the BMUs on the Forest (both within the Henry's Lake 1 BMU).

Table 12. Domestic Sheep Allotments within the Grizzly Bear Recovery Line on the Caribou-Targhee .

BMU	Allotment Name (FS#)	Status	Years with Grizzly Bear Incidents														
			90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
Henry's Lake 1	Carrot Canyon-Taylor Creek (218)	Closed ⁶															
Henry's Lake 1	Snyder Creek (228)	Closed ⁶															
Henry's Lake 1	Meyers Creek (225)	Active										X			X ⁵		
Henry's Lake 1	Icehouse-Willow Creek (223)	Active															
Henry's Lake 1	Blue Creek (217)	Vacant															
Henry's Lake 1	West Lake (230)	Closed ⁶															
Henry's Lake 1	Hotel Creek (222)	Vacant															
Henry's Lake 1	Sawtell Peak (227)	Vacant															
Henry's Lake 1	Coffee Pot (219)	Vacant															
Henry's Lake 2	Jesse Creek (224)	Closed															
Henry's Lake 2	Reas Pass (226)	Closed															
Henry's Lake 2	Dry Creek (220)	Closed															
Plateau 1 & 2	Black Mountain (308)	Closed															
Plateau 2	Partridge Creek (309)	Closed															
Plateau 2	Trail Canyon (310)	Closed															
Plateau 2	Fish Creek (311)	Closed															
Bechler/Teton	Badger Twin (518)	Closed ³	X ¹						X	X	X	2	2	2			
Bechler/Teton	Green Mtn.(534)	Closed ⁴			X				X	X	X	X	2				

¹:This incident actually occurred on the adjacent vacant Tepee Creek Allotment. In 1990, domestic sheep were grazing on the adjacent vacant Tepee Creek cattle allotment. One grizzly bear incident was reported.

² No domestic sheep grazing occurred in these years.

³ The Badger Twin Allotment was officially closed to grazing in December 2001.

⁴ The Green Mountain Allotment was officially closed to grazing in the spring of 2001.

⁵ On the Meyers Creek Allotment, there was an unverified claim that a grizzly bear killed one sheep in 2002.

⁶ Three allotments (Carrot Canyon-Taylor, Snyder Creek, and West Lake) were closed to grazing in February 2004.

As displayed in the table, only two incidents occurred prior to 1996. The increase in the number of grizzly bear incidents from 1996 to 1999 may be an indication of an increasing and expanding grizzly bear population, especially along the west slope of the Tetons (Schwartz et al. 2002). Outside of the grizzly bear recovery line, there have been two grizzly bear/sheep incidents. In 1999, a grizzly bear/sheep incident occurred about eight miles south of the Bechler/Teton BMU boundary on the Canyon Badlands allotment (Westslope of the Tetons). In 2000, a grizzly bear/sheep incident occurred about seven miles west of the Henry's Lake BMU, Subunit 1, on the Ching Creek allotment (Centennial Mountains). The location of these incidents may also be an indication of an increasing and expanding grizzly bear population (Schwartz et al. 2002).

No grizzly bears have been killed or injured in any of these incidents. At least three previously unknown females with cubs have been discovered as a result of these incidents. The allotment permittees and their herders have met all of their permit requirements. As required in the 1997 RFP, all of the active domestic sheep allotments within the Recovery Line are to be phased out on an opportunity basis. Forest managers are currently working on this phase out, and only two active sheep allotments remain within the Henry's Lake BMU, Subunit 1.

Grizzly Bear/Cattle Incidents

Table 18 lists the domestic cattle allotments within the BMUs on the Forest, shows their current status, and lists the years with documented grizzly bear/cattle incidents for each allotment. Eleven active cattle allotments occur within the BMUs on the Forest. Grizzly bear incidents occurred on two of these allotments, both of which are located on the westslope of the Tetons in the Bechler/Teton BMU. As displayed in the table, no incidents occurred prior to 1998. The 1998 and 2002 incidents involved grizzly bears eating dead cows. The cause of death could not be determined. The cattle could have died from other causes. The 1999 grizzly bear/cattle incident involved a radio collared adult male bear. During the time the bear was tracked, and prior to 1999, it had never been on the Forest. Prior to 1999, the bear had never been implicated in any cattle incidents, even though it had been around cattle. In 1999 the bear moved onto the Forest and was involved in at least two cattle deaths. No attempts were made to capture or move the bear. The livestock grazing permittees have met all of their permit requirements.

Table 13. Domestic Cattle Allotments within the Grizzly Bear Recovery Line on the Caribou-Targhee National Forest.

BMU	Allotment Name (FS#)	Status	Years with Grizzly Bear Incidents														
			90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
Henry's Lake 1	High Five (203)	Active															
Henry's Lake 1	Bootjack (201)	Active															
Henry's Lake 1	Meadowview (234)	Active															
Henry's Lake 1	Red Rock (233)	Active															
Henry's Lake 1	West Lake (206)	Active															
Henry's Lake 1	Meadow Creek (2614)	Active															
Henry's Lake 2	Garner Canyon (235)	Active															
Henry's Lake 2	Twin Creek (205)	Active															
Bechler/Teton	Fall River (302)	Active															
Bechler/Teton	Squirrel Meadows (303)	Active									X ¹	X			X ¹	2	
Bechler/Teton	Tepee Creek (509)	Active									X ¹						

¹ These incidents involved grizzly bears eating on dead cows, and the cause of death could not be determined. The cows could have died from other causes.

² In 2003 Forest Service personnel from the Ashton/Island Park RD checked one cow carcass on the Squirrel Meadows allotment; it was not killed by a bear, but a bear had fed on it. The cow carcass was removed after it was found.

In 1999, a grizzly bear/cattle incident occurred on State land near Reynolds Pass in the Henry's Lake BMU. In this incident a grizzly bear was found eating on cows that had died from grazing poisonous plants. No grizzly bears have been killed, injured, trapped or moved in any of these incidents.

In 2002, there was one grizzly bear/cattle incident on the west boundary of Plateau BMU (Subunit 2). Some cows from the Gerritt Meadows Allotment, which is west of the Plateau BMU, strayed off the allotment and into the Plateau BMU. Grizzly bears were discovered eating on a dead cow carcass (the cause of death could not be determined). The stray cows were returned to the allotment and the cow carcass was removed. No efforts were made to trap or move the grizzly bears.

Motorized Access Management within the BMU's

Motorized access management was the major management concern for grizzly bear habitat during the Forest Plan revision. The RFP established new motorized access standards for the portions of the BMUs that occur on the Targhee NF. In the 1999 Open Road and Open Motorized Trail Analysis EIS (Travel Plan 2) access standards did not change, but several changes were made regarding which roads would be open, restricted or decommissioned.

One of the objectives of the RFP is to achieve the motorized access standards within three years of signing of the Record of Decision. To meet this objective, Forest managers began decommissioning roads and improving access restrictions, such as gates on restricted roads in 1998. The work began in the Henry's Lake BMU, progressed through the Plateau BMU, and moved to the Bechler/Teton BMU later in the summer of 1998. Before the

Bechler/Teton BMU was finished, however, the Commissioners for Teton County, Idaho, issued new weight limitations on county roads. These restrictions prohibited Forest personnel from transporting equipment and completing the decommissioning in the Bechler/Teton BMU. A lawsuit was filed by a Forest user group, also preventing further decommissioning. In 1999, the Forest released the 1999 Travel Plan decision which was appealed by several individuals and groups. The Regional Forester upheld the appeals and required the Forest do additional NEPA analysis on the roads that were previously decommissioned and the methods of road closures used. The Forest completed the first of these analyses in 2003 (Henry's Lake Travel Plan Implementation EA). The second, Plateau Travel Plan Implementation EA, was completed in the spring of 2005. The third and final, Bechler/Teton Travel Plan Implementation EA, is scheduled for completion in the summer or fall of 2005.

In 1998, the Forest actually completed about 379 miles of decommissioning. According to the Forest's current and most accurate GIS layer, there were 414 miles of roads to be decommissioned. In 1998, the Forest completed 91 percent of the required decommissioning before operations were delayed as explained above. In the spring of 2001, after coordination with the Teton County Commissioners and USFWS, the Forest decommissioned three roads totalling 5 miles (Forest Service Roads (FSR) 662, 123, and 393) using less ground disturbing methods in the Bechler-Teton BMU. These were decommissioned by planting 4-inch dbh⁶ and 20 foot tall trees near the road junctions and deeply scarifying the road surface. According to the Forest's monitoring data, the decommissioning efforts on FSR 123 and 393 have been fully successful. On FSR #662, ATV's have been using the road and one of the planted trees was chopped down (personal communication, Dave Ovard, 2004).

To date, the Forest has decommissioned 384 miles of roads in the BMU's. This is 93 percent of the planned amount. The remaining 31 miles will be decommissioned as the site-specific analyses are completed. According to the appeal decision from the Regional Forester, the analysis must be completed on the previous decommissioning prior to doing any new decommissioning. There are more roads to decommission, however, in all BMU's the open road and open motorized trail route density (OROMTRD \leq 0.6) and total motorized access route density (TMARD \leq 1.0) requirements in the RFP and Biological Opinion are being met, even with the inclusion of private and state lands that are within the BMU boundary. The 2004 OROMTRD and TMARD for each BMU subunit are presented below.

- Henry's Lake BMU, Subunit 1 (excluding Management Situation 3 (MS 3) areas):
 - NF land only: OROMTRD = 0.47
 - NF land only: TMARD = 0.69
 - NF land + private & state land: OROMTRD = 0.55
 - NF land + private & state land: TMARD = 0.764

- Henry's Lake BMU, Subunit 2 (excluding MS 3 areas):
 - NF land only: OROMTRD = 0.44
 - NF land only: TMARD = 0.51
 - NF land + private & state land: OROMTRD = 0.51
 - NF land + private & state land: TMARD = 0.58

- Plateau BMU, Subunit 1 (excluding MS 3 areas):
 - NF land only: OROMTRD = 0.52
 - NF land only: TMARD = 0.93
 - NF land + private & state land: OROMTRD = 0.59
 - NF land + private & state land: TMARD = 0.98

- Plateau BMU, Subunit 2:
 - NF land only: OROMTRD = 0.53
 - NF land only: TMARD = 0.75
 - NF land + private & state land: OROMTRD = 0.57
 - NF land + private & state land: TMARD = 0.78

- Bechler/Teton BMU:
 - NF land only: OROMTRD = 0.52

⁶ Dbh: A way to measure trees: diameter at breast height.

- NF land only: TMARD = 0.81
- NF land + private & state land: OROMTRD = 0.52
- NF land + private & state land: TMARD = 0.81

Sanitation Accomplishments

For the grizzly bear recovery zone, the Forest has a food storage order requiring all food and other grizzly bear attractants to be properly stored so that bears cannot obtain access to them. This food storage order applies to all Caribou-Targhee lands within the recovery zone, except for the MS 3 area in Island Park. The MS 3 area in Island Park has a lot of private land with many summer homes and developments. It is not legally possible for the Forest Service to issue a food storage order for private land. The Forest is cooperating with the Idaho Department of Fish and Game and County Commissioners in an education program to inform the private land owners of how to live safely in grizzly bear country. In 2004, 500 visits were made to private land owners in Island Park to provide education to private land owners. This program is continuing in 2005.

All Forest Service campgrounds and some high use dispersed recreation sites within the grizzly bear recovery zone have bear resistant refuse containers or bear resistant food storage boxes installed for public use. Beginning in 2003 and continuing through 2005 the Ashton/Island Park RD has replaced some of the bear resistant refuse containers that have become worn and hard to use.

The Dubois RD, Ashton/Island Park RD, and Teton Basin RD have also installed bear resistant food storage boxes, meat hanging poles, and information and education signs both inside and outside the grizzly bear recovery zone to help prevent grizzly bear/human conflicts.

Evaluation

Status of the Grizzly Bear Population in the Greater Yellowstone Area

The Recovery Plan established three demographic (population) recovery targets that must be achieved for a recovered grizzly bear population, and defined a recovered grizzly bear population as one that could sustain a defined level of mortality and is well distributed throughout the PCA. The three demographic (population) recovery targets include:

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

At the end of 2004, the number of unduplicated females with COY over a six-year average both inside the PCA and within a 10-mile area immediately surrounding the PCA was 40, more than double the Recovery Plan target of 15 (Table 19). In fact, the Recovery Plan target for the number of unduplicated females with COY (15) has been exceeded since 1988 (Interagency Conservation Strategy Team 2003). In 2004, 46 unduplicated females with COY were documented inside the PCA and within a 10-mile area immediately surrounding the PCA (Figure 32). Unduplicated females with COY were also documented outside the PCA and the 10-mile area (Figure 32). At the end of 2004, the distribution of females with young, based on the most recent six years of observations in the ecosystem, was 18 out of 18 BMUs (Table 19). The previous Table 16 displays the BMUs occupied by verified female grizzly bears with young for the entire Yellowstone Grizzly Bear Recovery Area from 1992 to 2004. Since 1997, all eighteen of the BMUs have been occupied by a female with young within a 6-year span, thereby achieving

this recovery requirement. This criterion is important as it ensures that females occupy the majority of the PCA and that successful reproductive females are not concentrated in one portion of the ecosystem.

At the end of 2004, the minimum population estimate was 431 bears (Figure 33), the running six-year average of known and probable human-caused grizzly bear mortality was 13.3, and the running-six-year average of known and probable human-caused female grizzly bear mortality was 6.0 (Table 19). The total mortality is under the mortality threshold set in the Recovery Plan, but the female mortality exceeds the mortality threshold set in the Recovery Plan (Table 19). Beginning in 2000, the number of mortalities counted each year includes known and probable mortalities, but the mortality thresholds are set using only the minimum population estimate. The IGBST and USFWS are currently evaluating new population analysis tools to calculate a total population estimate and new information on mortality thresholds.

Table 14. The status of the Recovery Plan demographic (population) recovery parameters, 1999 through 2004¹.

Recovery Plan demographic (population) recover parameters	Recovery Plan target six-year average	Existing number six-year average
Maintain a minimum of 15 unduplicated females with COY over a six-year average both inside the PCA and within a 10-mile area immediately surrounding the PCA.	>15	40
Sixteen of 18 BMUs within the PCA must be occupied by females with young, including COY, yearlings, or two-year olds, as confirmed by the IGBST from a six-year sum of observations. No two adjacent BMUs may be unoccupied during the same six-year period.	>16	18
Human-caused mortality: The running six-year average of total known, human-caused mortality ² as confirmed by the IGBST is not to exceed 4% of the minimum population estimate ³ . The running-six-year average of known, human-caused female grizzly bear mortality ² is not to exceed 30% of the 4% total mortality limit over the most recent three-year period.	<17.2 <5.2	13.3 6.0

¹Data for this table came from information provided by the Interagency Grizzly Bear Study Team.

² Beginning in 2000, probable mortalities were included in the calculation of mortality thresholds, and COY orphaned as a result of human causes will be designated as probably mortalities (Interagency Conservation Strategy Team 2003).

³At the end of 2004, the minimum population estimate was 431 bears (Interagency Grizzly Bear Study Team).

Figure 32: Unduplicated Females with Cubs of the year in the Greater Yellowstone Area.

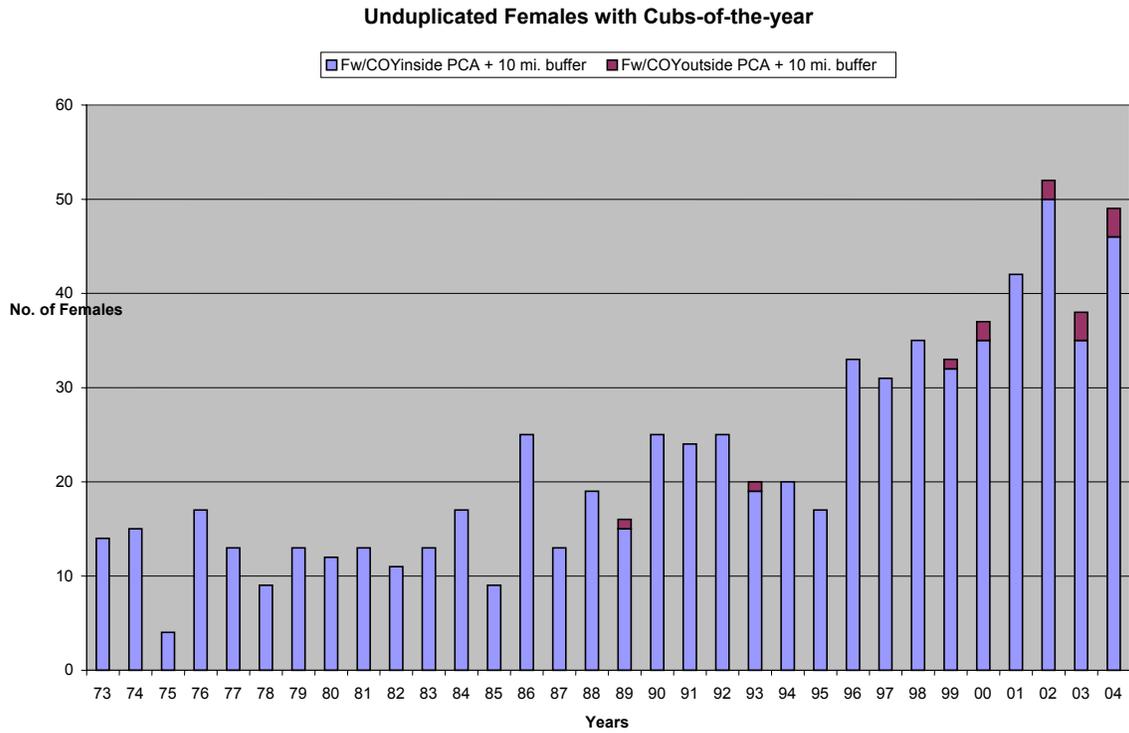
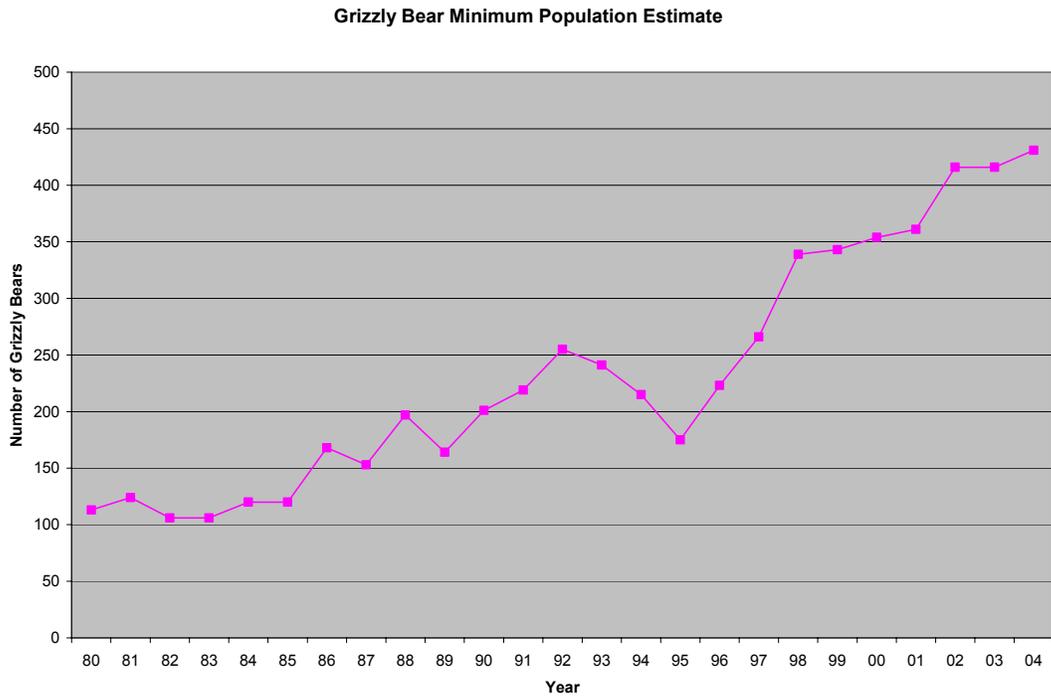


Figure 33: Grizzly Bear Minimum Population Estimate 1980-2004 (Interagency Grizzly Bear Study Team).



Grizzly bear population trends in the GYA have been researched extensively. The following provides a sequential summary of research over the last decade pertaining to grizzly bear population trends in the GYA.

- Eberhardt et al. (1994) reported: The trend of the Yellowstone grizzly bear (*Ursus arctos horribilis*) population was estimated using reproductive rates calculated from 22 individual females and survival rates from 400 female bear-years. The point estimate of the rate of increase was 4.6%, with 95% confidence limits of 0 and 9%. The major finding of the present study is that the Yellowstone grizzly bear population appears to be increasing. Adult survival is the most important determinant of the rate of increase of the population, with reproductive rate the next most important factor and subadult survival somewhat less important than reproductive rate.
- Knight et al. (1995) reported: Using annual totals of distinct family groups suggested an increasing trend. The slope of a log-linear regression ($R^2=0.41$) indicated a 3.9% annual increase. Confidence limits (95%) obtained by bootstrapping were 2 to 6%. These results compared favorably with those of Eberhardt et al. (1994).
- Eberhardt and Knight (1996) reported: The initial results of our study indicated a slow rate of decrease through 1980, roughly 2% per year (Knight and Eberhardt 1985). Current analyses (Eberhardt et al. 1994, Knight and Blanchard 1995; Knight et al. 1995) show a positive annual rate of change (roughly 2 to 5%). The turning point appeared to occur in the mid 1980s, when the policy of preventing adult female mortalities whenever feasible began to be widely observed. A high adult female survival rate is essential to maintain large mammal populations having low reproductive rates.
- Pease and Mattson (1999) reported: We concluded that, within the limits of uncertainty implied by the available data and our methods, of data analysis the size of the Yellowstone grizzly bear population changed little from 1975 to 1995. Our analysis used demographic data from 202 radio-telemetered bears followed between 1975 and 1992 and accounted for whitebark pine (*Pinus albicaulis*) crop failures during 1993 to 1995. We calculate the population growth rate = 1.00 from 1975 to 1983 (four mast and five nonmast years) and 1.02 from 1984 to 1995 (seven mast and five nonmast years). Overall, we find that population growth rate = 1.01 ± 0.04 (mean \pm 1 standard error) from 1975 to 1995.
- Boyce et al. (2001) reported: We provide a Monte Carlo technique, which confirms that the Yellowstone ecosystem grizzly bear population increased during the period 1986 to 1998.
- Boyce et al. (2001) updated earlier research (Boyce 1995) and reported: The trend in the adjusted number of adult females with COY corroborates other data indicating that the GYE bear population increased during 1983 through 1997. Recent data provide optimistic projections of the likelihood of persistence for grizzly bears in the GYE—a 99.2% probability that the GYE grizzly bear population will persist for 100 years. Extending to a 500-year period, we find that probability of persistence decreases to 96.1%. Hunters are the second greatest source of grizzly bear mortality in the GYE. Hunters shoot grizzly bears deliberately, in self-defense, or because they mistake grizzlies for black bears. Reducing hunter related mortalities could increase the probability of long-term persistence of grizzlies in the GYE. Count data, demographic analysis, and grizzly bear distribution all indicate that the GYE bear population increased during the past decade, probably because of cooperative efforts by state and federal agencies and the public to reduce conflicts between humans and bears. Managing to ensure capability of dispersal for bears among subpopulations through linkage zone management and/or by transplants can improve prospects for long-term viability of grizzly bear populations.
- Schwartz et al. (2002) reported: The Yellowstone grizzly bear has been expanding its range during the past two decades and now occupies historic habitats that had been vacant. We used kernel estimators to develop distribution maps of occupied habitats based on initial sighting of unduplicated females (n=300) with cubs-of-the-year, information from radiomarked bears (n=105), and locations of conflicts, confrontations, and mortalities (n=1,235). The current distribution (1990 to 2000) extends beyond the recovery zone identified in the Recovery Plan. Range expansion is particularly evident in the southern portion of the ecosystem in Wyoming. A comparison of our results from the 1990s to previously published distribution maps show an

approximate increase in occupied habitat of 48% and 34% from the 1970s and 1980s, respectively.

- Keating et al. (2002) reported: Previous approaches underestimate the total number of females with COY, thereby underestimating population size and sustainable mortality. Estimated numbers of females with COY in the Yellowstone population ranged from 20 animals in 1987 and 1989 to 60 in 2000. The total number of unique females with COY actually observed ranged from 13 in 1987 to 42 in 2001. The number of unique females with COY detected through random sightings alone ranged from 12 in 1987 to 39 in 2001.
- Mattson and Merrill (2002) reported: With respect to current conservation, grizzly bears survived from 1920 to 1970 most often where ranges at the beginning of this period were either larger than 20,000 km² or larger than 7,000 km² but with a ratio of perimeter to area of <2. Without reductions in human lethality after 1970, there would have been no chance that core grizzly bear range would be as extensive as it is now. Although grizzly bear range in the Yellowstone region is currently the most robust of any to potential future increases in human lethality, bears in this region are threatened by the loss of whitebark pine.
- Pyare et al. (2004) reported: Expansion in the southern end of the ecosystem was exponential and the area occupied by grizzly bears doubled approximately every 20 years. A complementary analysis of bear occurrence in Grand Teton National Park also suggests an unprecedented period of rapid expansion during the last 20 to 30 years. The grizzly bear population currently has reoccupied about 50% of the southern GYA. Based on assumptions of continued protection and ecological stasis, our model suggests total occupancy in 25 years.

In summary, current information indicates that this population of grizzly bears is growing at approximately 3 to 4% or more annually. In addition, the grizzly bear has increased its distribution in the GYA by almost 50% since the 1970s; this expansion is expected to continue. While there is some debate related to the actual level of population increase since the bear was listed in 1975, all of the current information (i.e. number of unduplicated females, distribution of reproducing females, distribution of bears, informal sightings by agency personnel, and areas where nuisance bears are being managed) indicates this population has increased in both numbers of bears and the geographic area they occupy (Interagency Conservation Strategy Team 2003).

Recommendation

The RFP standards and guidelines are contributing towards recovery of the grizzly bear in the Greater Yellowstone Ecosystem. When the Six Forest Habitat Amendment is completed, the RFP will be amended to incorporate the latest direction for management of grizzly bear habitat on the Caribou-Targhee.

Bald Eagle Nesting Population

Requirements

This monitoring was established to record the occupancy and productivity of the known bald eagle territories on the Forest and the relationship of this trend to habitat changes. Cooperative monitoring with Idaho Department of Fish and Game, Wyoming Game and Fish Dept, Bureau of Land Management, U.S. Fish and Wildlife Service, and private individuals would be conducted annually (as it has for over one decade). All known territories are to be monitored each year.

Results and Evaluation

The Targhee NF is within the Greater Yellowstone (GY) bald eagle management zone as outlined in the Pacific States Bald Eagle Recovery Plan. According to the Recovery Plan, the habitat management goal for the portion of the GY zone that includes the Targhee NF is to have twenty-three nesting territories. To measure progress toward this goal, cooperative bald eagle territory monitoring has been conducted every year since 1981. The recovery goal for this area was met in 1988. The population has continued to increase, and in 2004, approximately fifty-eight nesting territories had been documented in this area. In 2004 two new possible territories were found "Near Market Lake" and "Sugar City—South Fork Teton River" but no nest sites have been found nor have any territory numbers

been assigned. (Table 20 and Figure 34). Out of the fifty-eight nesting territories, thirty-two have some portion of the territory on the Targhee and twenty-one have their nest site on the Forest (Table 20 and Figure 34).

Table 21 and Figure 35 illustrate the nesting success for the past two decades, in terms of number of advanced young birds documented at each nesting territory. Nesting success has been highly variable between years. After a decline in the late 1990's, nest success has increased substantially since 2000. In 2003 and 2004, the highest number of advanced young from all territories combined was recorded. In those two years, the Greater Yellowstone nests produced 54 and 64 advanced young, respectively. Prior to that, the highest number of advanced young (48) from all territories combined occurred in 2001. Since 1990, over 40 advanced young have been produced from all nests in eleven out of the fifteen years.

Nesting success has been more variable from Targhee NF nests than from other nests. Targhee nests occur at higher elevations than the other nests. Monitoring reports have documented that nesting success is lower when cold wet springs occur, particularly in the higher elevations (Whitfield 1999). Also, several consecutive years of drought has affected water levels in lakes and reservoirs. The highest number of advanced young (23) from Targhee nests occurred in 1991. Nest success was second-highest in 2004, with 19 advanced young being recorded from Targhee nests. The third highest number of advanced young (18) from Targhee nests occurred in 1992, 1994, and 2001. In 1998 and 2002, Targhee nests produced only six advanced young. The 1998 Annual Productivity Report suggested a "connection to water levels at reservoirs," since the seven Palisades area nests produced only one fledgling, and no young were produced at the three known sites on Island Park Reservoir (Whitfield et al 1998). Water levels were also very low in 2002 due to several consecutive years of drought.

Even though nesting success has been variable, the net results indicate an increasing population. Because adult bald eagles are long-lived and have low mortality, the annual variability in nesting success is not a negative factor (Mark Orme, personal communication). At the present time, Forest biologists are unable to predict when the available bald eagle habitat will be fully occupied, resulting in no further increases in the bald eagle population.

The standards and guidelines in the RFP limit human disturbance around nesting zones and do not allow forest activities that could damage habitat. It is apparent from this data that bald eagle management direction on the Targhee has contributed to the recovery of the bald eagle. The number of territories in the Greater Yellowstone management zone and on the Forest continues to increase. Productivity has fluctuated over the past two decades, but the net result is still an increasing population. The critical factors in bald eagle production appear to be spring weather and water levels in the nesting season. The annual variability in bald eagle production also may be due, in part, to the saturation of available habitat by adult bald eagles as the overall nesting population continues to grow (Whitfield 1998). **Forest management activities are not impairing the viability of the bald eagle on or adjacent to the Targhee.**

Figure 34: Bald eagle nesting territories on the Targhee, 1981-2004.

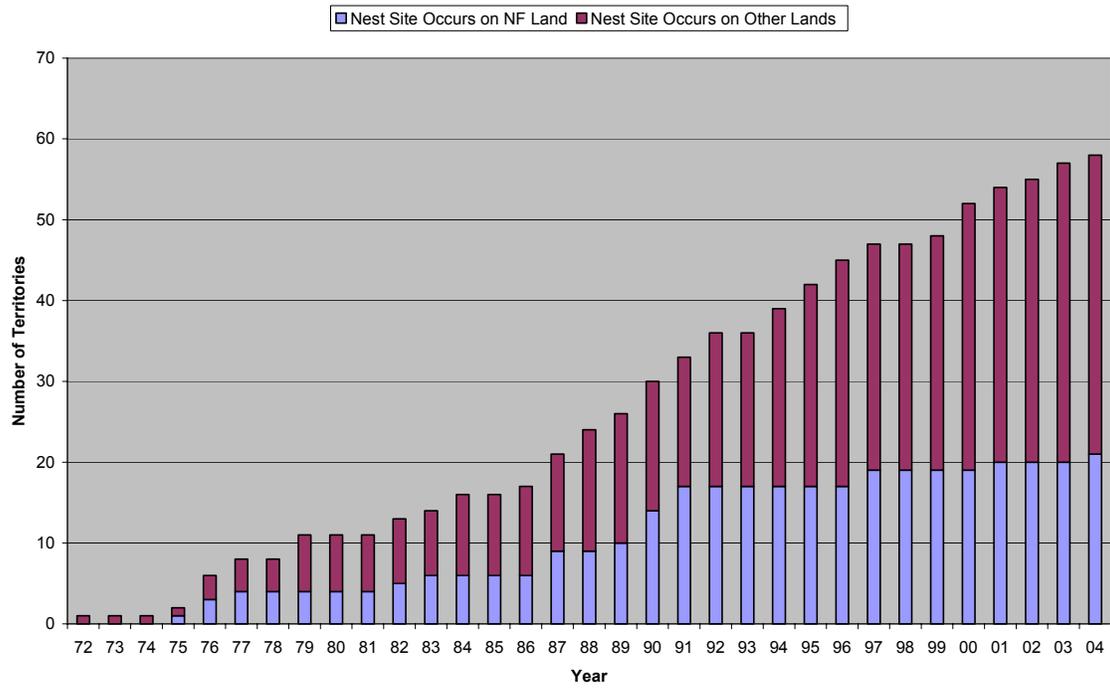


Table 15: Bald Eagle Breeding Territories on and adjacent to the Targhee National Forest.

Territory Name	Territory Number	Nest Site Occurs on Forest (Yes/No)	Some Portion of Territory Occurs on Forest (Yes/No)	Year First Recorded
UPPER HENRY'S FORK SNAKE RIVER				
Kerr Canyon	18-IC-01	No	No	1986
Pine Haven	18-IC-02	Yes	Yes	1983
Box Canyon	18-IC-03	Yes	Yes	1977
Coffee Pot	18-IC-04	Yes	Yes	1982
Bishop Lake	18-IC-05	Yes	Yes	1987
Sheridan	18-IC-06	No	Yes	1979
Lucky Dog	18-IC-07	Yes	Yes	1987
Henry's Lake	18-IC-08	No	Yes	1976
Staley Spring/Targhee Cr.	18-IC-09	Yes	Yes	1987
Hale Canyon	18-IC-10	No	No	1987
Moonshine	18-IC-11	Yes	Yes	1989
Last Chance	18-IC-12	Yes	Yes	1990
IP Bills	18-IC-13	Yes	Yes	1990
Flat Rock	18-IC-14	Yes	Yes	1990
Riverside	18-IC-15	Yes	Yes	1990
Snake R. Butte	18-IC-16	Yes	Yes	1991
Buffalo R.	18-IC-17	No	Yes	1994
Big Bend 1/	18-IC-18	No	Yes	1995
Upper Mesa Falls	18-IC-19	Yes	Yes	2001
Middle Reservoir	18-IC-20	Yes	Yes	2004
Sand Creek 8/				1991
SOUTH FORK SNAKE RIVER				
Palisades Cr.	18-IS-04	No	Yes	1988
Swan Valley	18-IS-05	No	Yes	1979
Conant Valley	18-IS-06	No	No	1972
Pine Cr.	18-IS-07	No	No	1977
Dry Canyon	18-IS-08	No	Yes	1982
Gormer Canyon	18-IS-09	No	Yes	1976
Wolverine	18-IS-10	??	Yes	1992
Antelope Cr. 2/	18-IS-11	No	Yes	1984
Cress Cr.	18-IS-12	No	No	1988
Menan Buttes	18-IS-20	No	No	1992
Five Ways	18-IS-24	No	No	1995
Clarks Hill	18-IS-25	No	No	1996
Ririe Reservoir	18-IS-26	No	No	1996
Annis Slough	18-IS-27	No	No	1996
Great Feeder Island	18-IS-31	No	No	2000
Dry Bed	18-IS-35	No	No	2000
Table Rock Canyon	18-IS-36	No	Yes	2002
Lowder Slough	18-IS-37	No	No	2003
LaBelle	18-IS-38	No	No	2003
Fisher Bottom 7/				2000
PALISADES RESERVOIR AREA				
Hoffman East/Trout Cr	18-IS-01	Yes	Yes	1975
Williams Cr. 3/	18-IS-02	Yes	Yes	1976
Van Point 3/	18-IS-03	Yes	Yes	1976
Edwards Cr.	18-IS-17	Yes	Yes	1991
King Cr.	18-IS-18	Yes	Yes	1991
Hoffman West/McCoy Cr 5/	18-IS-28	Yes	Yes	1997
Van Point South 6/	18-IS-29	Yes	Yes	1997

Territory Name	Territory Number	Nest Site Occurs on Forest (Yes/No)	Some Portion of Territory Occurs on Forest (Yes/No)	Year First Recorded
MAIN SNAKE RIVER				
Confluence	18-IS-13	No	No	1979
Market Lake	18-IS-22	No	No	1994
Near Market Lake 9/				2004
LOWER HENRY'S FORK SNAKE RIVER				
Cartier Slough	18-IS-14	No	No	1987
St. Anthony	18-IS-15	No	No	1984
Singleton Pond	18-IS-16	No	No	1989
Lower Fall River	18-IS-19	No	No	1992
Fun Farm Bridge	18-IS-34	No	No	2001
TETON RIVER				
Upper Teton River 4/	18-IS-21	No	No	1994
Hog Hollow	18-IS-23	No	No	1995
Spring Hollow	18-IS-30	No	No	1999
Upper Teton-Trail Cr.	18-IS-32	No	No	2000
Teton River-Danford	18-IS-33	No	No	2000
Sugar City-S.F. Teton River 9/				2004

Source of Data: Bureau of Land Management Bald Eagle Database, Idaho Falls, ID; Idaho Bald Eagle Research Project/Greater Yellowstone Ecosystem-Annual Production Summaries 1992 through 2004; Idaho Bald Eagle Nesting Report, Idaho Fish and Game 1999.

1/ This territory may be an alternate nest site for the Moonshine territory. Monitoring in future years will be necessary to see if this is the case.

2/ This territory was called Wolf Flats from 1984 to 1987; it has been called Antelope Creek from 1988 to the present.

3/ In BLM bald eagle data records prior to 1992, territory 18-IS-02 is called Van Point and Territory 18-IS-03 is called Williams Creek. From 1992 to the present, reports show the names and numbers as listed in this table.

4/ Some reports may refer to this territory as Three Forks.

5/ Hoffman West is now identified as a separate territory.

6/ Van Point South may be an alternate nest site for the Edwards Creek territory. Monitoring in future years will be necessary to see if this is the case.

7/ From 2000 to 2003, the Fisher Bottom nest was not considered a unique territory, was not given an official territory number, and was never occupied. In the spring of 2004, the nest was occupied and active, but by mid-May the eagles left the nest in what appears to be a failed nest attempt.

8/ Sand Creek: One bald eagle was reported near the Sand Creek ponds in the Sand Creek Wildlife Management Area in 1991. This area has never been assigned a territory number and no nest site has been found. It was considered occupied in 2004, but again no nest site was found.

9/ Possible new bald eagle territories found in 2004 include 'Near Market Lake' and 'Sugar City-S.F. Teton River'. No territory numbers have been assigned, and no nest sites have been found.

Table 16: Bald Eagle Nesting Success, 1981-2004. Key to table: '-' years prior to the first recording of the nest territory; '**' data was not collected or was insufficient to provide information; 'U' the nesting territory was unoccupied by eagles that year. Shaded lines are territories where the nest stand is on the TNF.

Territory Name	Territory #	Number of Advanced Young Each Year 1/																							
		81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
UPPER HENRY'S FORK SNAKE RIVER																									
Kerr Canyon	18-IC-01	-	-	-	-	-	1	*	2	1	1	1	2	2	2	2	1	1	1	1	1	2	0	1	
Pine Haven	18-IC-02	-	-	1	3	0	1	3	2	1	0	2	0	0	0	1	0	1	2	1	2	0	0	0	
Box Canyon	18-IC-03	2	0	0	2	*	2	1	3	1	2	0	1	1	1	0	0	0	2	0	1	0	1	0	
Coffee Pot	18-IC-04	-	0	*	0	*	0	1	1	0	0	2	2	0	0	1	0	0	0	1	0	0	0	0	
Bishop Lake	18-IC-05	-	-	-	-	-	-	0	2	2	2	2	0	1	0	0	1	3	0	0	0	1	0	0	
Sheridan	18-IC-06	*	*	*	*	*	*	2	2	0	1	2	2	1	2	0	0	0	1	0	0	0	0	2	
Lucky Dog	18-IC-07	-	-	-	-	-	-	2	0	3	2	1	2	0	2	0	0	0	0	0	0	0	0	0	
Henry's Lake	18-IC-08	2	2	2	2	1	2	2	0	1	2	3	1	0	0	U	U	0	1	1	2	1	1	1	
Staley Spring/Targhee Cr.	18-IC-09	-	-	-	-	-	-	1	2	2	2	2	0	1	2	1	1	2	1	0	0	0	0	0	
Hale Canyon	18-IC-10	-	-	-	-	-	-	3	*	2	2	2	2	1	1	1	2	2	1	0	1	1	1	0	
Moonshine	18-IC-11	-	-	-	-	-	-	-	-	1	*	2	1	0	0	U	1	0	0	*	1	0	0	0	
Last Chance	18-IC-12	-	-	-	-	-	-	-	-	-	2	1	2	0	2	2	2	2	1	0	0	*	0	1	
IP Bills	18-IC-13	-	-	-	-	-	-	-	-	-	2	2	1	1	0	0	1	0	0	0	1	1	0	2	
Flat Rock	18-IC-14	-	-	-	-	-	-	-	-	-	3	1	1	0	1	2	2	0	1	0	1	2	2	0	
Riverside	18-IC-15	-	-	-	-	-	-	-	-	-	0	0	U	U	2	1	2	1	1	2	1	2	1	2	
Snake R. Butte	18-IC-16	-	-	-	-	-	-	-	-	-	-	0	1	0	1	1	1	0	U	0	2	2	0	0	
Buffalo R.	18-IC-17	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	U	U	U	U	U	U	0	0	
Big Bend 2/	18-IC-18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	2	0	0	0	0	0	1	
Upper Mesa Falls	18-IC-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0	0	
Middle Reservoir	18-IC-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
Sand Creek 9/	??																							*	
SOUTH FORK SNAKE RIVER																									
Palisades Cr.	18-IS-04	-	-	-	-	-	-	-	3	3	2	1	3	2	2	2	0	0	2	0	2	0	2	1	
Swan Valley	18-IS-05	*	2	2	1	0	1	2	1	0	1	0	0	0	1	2	1	0	0	0	2	2	2	1	
Conant Valley	18-IS-06	2	2	1	3	2	0	3	3	2	2	1	1	2	2	3	2	2	1	2	0	2	*	2	
Pine Cr.	18-IS-07	2	0	2	2	2	1	0	2	1	2	2	2	1	0	0	0	1	0	2	2	1	0	2	
Dry Canyon	18-IS-08	-	0	2	0	1	2	2	2	0	2	0	2	1	2	2	1	0	1	1	2	2	0	2	
Gormer Canyon	18-IS-09	2	0	2	*	1	0	2	0	3	3	3	3	1	2	2	2	3	0	0	0	1	0	0	
Wolverine	18-IS-10	-	-	-	-	-	-	-	-	-	-	-	0	2	1	1	1	2	1	1	2	2	1	1	
Antelope Cr. 3/	18-IS-11	-	-	-	0	*	2	2	0	1	2	1	0	2	1	1	0	1	1	2	1	1	0	1	

Territory Name	Territory #	Number of Advanced Young Each Year 1/																							
		81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
Cress Cr.	18-IS-12	-	-	-	-	-	-	-	2	1	2	2	2	0	2	3	2	2	2	0	1	*	1	0	1
Menan Buttes	18-IS-20	-	-	-	-	-	-	-	-	-	-	-	1	2	1	2	0	1	2	1	2	2	2	2	3
Five Ways	18-IS-24	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	2	2	2	2	1	2	2	3
Clarks Hill	18-IS-25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	0	2	2	2	2	2	
Ririe Reservoir	18-IS-26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	0	*	0	2	1	0	0	
Annis Slough	18-IS-27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	1	1	2	1	2	1	
Great Feeder Island	18-IS-31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	2	2	2	
Dry Bed	18-IS-35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	*	2	2	0	
Table Rock Canyon	18-IS-36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	
Lowder Slough	18-IS-37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	
LaBelle	18-IS-38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	
Fisher Bottom (first found in 2000) 8/	18-IS-??	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	U	U	U	0	
PALISADES RESERVOIR AREA																									
Hoffman East/Trout Creek	18-IS-01	2	3	0	*	0	2	3	2	0	*	2	2	1	2	0	2	1	0	0	0	0	2	0	1
Williams Cr. 4/	18-IS-02	*	1	2	1	0	1	2	1	1	1	1	0	0	1	0	2	0	0	2	2	2	0	1	2
Van Point 4/	18-IS-03	2	0	1	2	2	2	2	2	1	0	2	2	0	2	0	0	1	1	1	2	2	1	1	2
Edwards Cr.	18-IS-17	-	-	-	-	-	-	-	-	-	-	2	2	0	0	0	0	U	0	0	U	U	0	0	2
King Cr.	18-IS-18	-	-	-	-	-	-	-	-	-	-	1	1	0	2	U	0	U	0	2	2	1	0	0	0
Hoffman West/McCoy Creek 6/	18-IS-28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	U	U	U	U	U	2	1
Van Point South 7/	18-IS-29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	U	2	2	0	0	0	1
MAIN SNAKE RIVER																									
Confluence	18-IS-13	2	1	2	0	2	1	3	2	1	1	1	0	0	1	0	0	0	2	0	0	*	2	1	1
Market Lake	18-IS-22	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	*	1	1	*	2	1	1
Near Market Lake 10/																									*
LOWER HENRY'S FORK SNAKE RIVER																									
Cartier Slough	18-IS-14	-	-	-	-	-	-	0	2	1	1	1	1	1	1	0	0	*	1	1	0	*	*	1	1
St. Anthony	18-IS-15	-	-	-	*	0	0	3	3	3	0	1	2	1	2	1	2	2	1	0	1	*	0	2	2
Singleton Pond	18-IS-16	-	-	-	-	-	-	-	-	1	2	2	1	0	1	2	2	1	1	0	1	2	1	1	2
Lower Fall River	18-IS-19	-	-	-	-	-	-	-	-	-	-	-	0	0	U	*	0	2	1	0	0	U	1	1	1
Fun Farm Bridge	18-IS-34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	2	3
TETON RIVER																									
Upper Teton River 5/	18-IS-21	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	2	3	0	2	1	2	2	2	2
Hog Hollow	18-IS-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	2	1	0	0	2	2	0	0
Spring Hollow	18-IS-30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	0	1	1	1	1
Upper Teton-Trail Cr.	18-IS-32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	0	1	1

Territory Name	Territory #	Number of Advanced Young Each Year 1/																							
		81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
Teton River-Danford	18-IS-33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	U	0	U	0
Sugar City-S.F. Teton River 10/																								*	
TOTALS																									
Total Advanced Young From Other Nests		10	7	13	8	9	10	24	24	21	26	23	25	19	25	30	26	33	26	18	29	30	34	44	45
Total Advanced Young From Targhee Nests		6	4	4	8	2	8	15	15	12	16	23	18	5	18	7	17	13	6	13	16	18	6	10	19
Total Advanced Young		16	11	17	16	11	18	39	39	33	42	46	43	24	43	37	43	46	32	31	45	48	40	54	64
# of Territories w/ nest sites on other lands		7	8	8	10	10	11	12	15	16	16	16	19	19	22	25	28	28	28	29	33	34	35	37	37
# of Territories w/ nest sites on Targhee		4	5	6	6	6	6	9	9	10	14	17	17	17	17	17	19	19	19	19	20	20	20	21	
Total # of Territories		11	13	14	16	16	17	21	24	26	30	33	36	36	39	42	45	47	47	48	52	54	55	57	58
Territories Occupied &/or Active on other lands													19	19	21	24	26	27	27	28	32	30	35	36	34
Territories Occupied &/or Active on Targhee													16	16	17	15	17	17	16	18	17	18	19	20	21
Total Occupied &/or Active Territories													35	35	38	39	43	44	43	46	49	48	54	56	55

Source of Data: Bureau of Land Management Bald Eagle Database, Idaho Falls, ID; Idaho Bald Eagle Research Project/Greater Yellowstone Ecosystem-Annual Production Summaries 1992 through 2004; Idaho Bald Eagle Nesting Report, Idaho Fish and Game 1999.

1/ See Key to Table in Caption description.

2/ Big Bend may be an alternate nest site for the Moonshine territory. Monitoring in future year will be necessary to see if this is the case.

3/ This territory was called Wolf Flats from 1984 to 1987; it has been called Antelope Creek from 1988 to the present.

4/ In BLM bald eagle data records prior to 1992, territory 18-IS-02 is called Van Point and Territory 18-IS-03 is called Williams Creek. From 1992 to the present, reports show the names and numbers as listed in this table.

5/ Some reports may refer to this territory as Three Forks.

6/ Hoffman West is now identified as a separate territory.

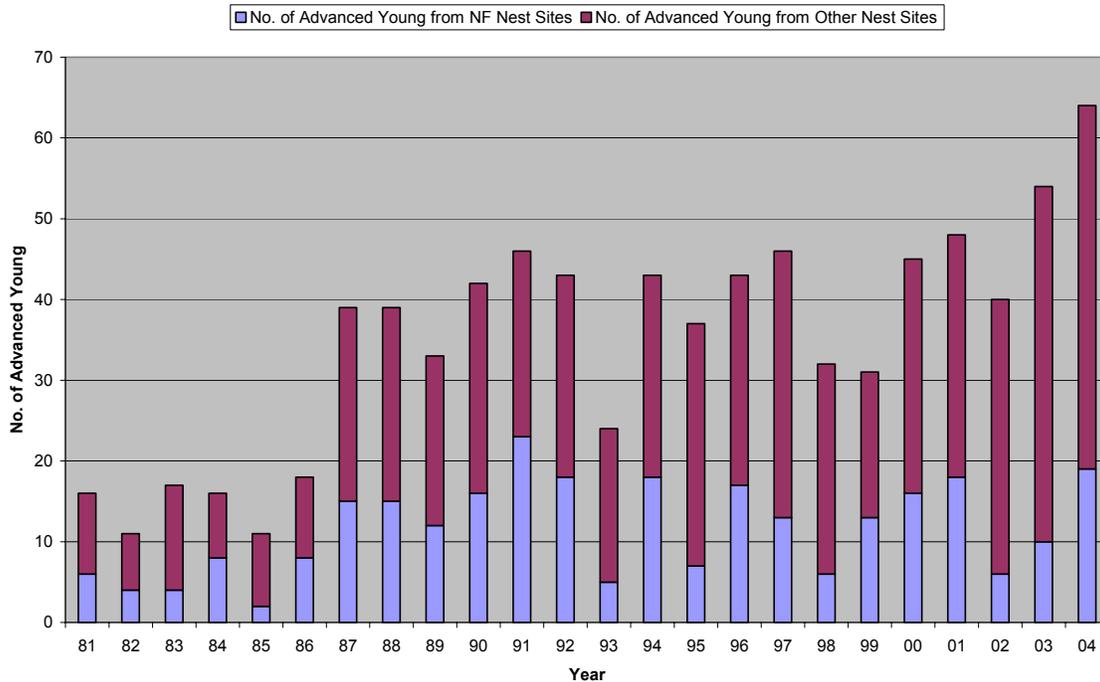
7/ Van Point South may be an alternate nest site for the Edwards Creek territory. Monitoring in future years will be necessary to see if this is the case.

8/ From 2000 through 2003, the Fisher Bottom nest was not considered a unique territory, was not given an official territory number, and was never occupied. In the spring of 2004, the nest was occupied and active.

9/ Sand Creek: One bald eagle was reported near the Sand Creek ponds in the Sand Creek Wildlife Management Area in 1991. This area has never been assigned a territory number and no nest site has been found. It was considered occupied in 2004, but again no nest site was found.

10/ Possible new bald eagle territories found in 2004 include 'Near Market Lake' and 'Sugar City-S.F. Teton River. No territory numbers have been assigned, and no nest sites have been found.

Figure 35: Bald Eagle Productivity. Number of advanced young from Targhee nests and other nests, 1981-2004.



Recommendation

Continue monitoring bald eagle productivity and forest management activities around nest territories.

Gray Wolf Population

Requirements

In cooperation with the US Fish and Wildlife Service and wolf monitoring teams, all verified wolf sightings and reports of wolf pack activity are to be recorded and investigated. This information is to be used to measure wolf population trends and the impacts of habitat management on that trend. Where packs are established, activities would be monitored to insure they are in compliance with RFP standards and guidelines.

Results and Evaluation

The portion of the Forest that is east of Interstate 15 is within the Yellowstone Nonessential Experimental Population Area (sometimes referred to as the Yellowstone Wolf Recovery Area). At the end of 2004, there were 40 identified wolf packs (Map 3), 30 breeding pairs (Table 22), and a minimum fall wolf population of 324 wolves (Table 23) in this area. As displayed in Map 3, only one established wolf pack was using the Forest. This was Pack #49 (the Bechler Wolf Pack) which was using the Southwestern (SW) portion of Yellowstone National Park and the adjacent portion of the Forest. There were also reports of individual wolves from Pack #54 (the Biscuit Basin Wolf Pack) traveling to portions of the Forest on the Ashton/Island Park Ranger District.

The portion of the Forest that is west of Interstate 15 is within the Central Idaho Nonessential Experimental Population Area (sometimes referred to as the Central Idaho Wolf Recovery Area). At the end of 2004, there were 50 identified wolf packs (Map 4), 30 breeding pairs (Table 22), and a minimum fall wolf population of 452 wolves (Table 23) in this area. As displayed in Map 4, no wolf packs from the Central Idaho area were using the Forest. The nearest wolf pack was Pack #39 (the Grassy Top Pack) that was north of the Forest in Montana.

Table 17. Number of Gray Wolf Breeding Pairs in the Yellowstone Nonessential Experimental Population Area and the Central Idaho Nonessential Experimental Population Area (U. S. Fish and Wildlife Service et al. 2005).

Area	Year									
	95	96	97	98	99	00	01	02	03	04
Yellowstone Area	2	4	9	6	8	14	13	23	21	30
Central Idaho Area	0	3	6	10	10	10	14	14	26	30

Table 18: Minimum Fall Gray Wolf Population in the Yellowstone Nonessential Experimental Population Area and the Central Idaho Nonessential Experimental Population Area (U. S. Fish and Wildlife Service et al. 2005).

Area	Year									
	95	96	97	98	99	00	01	02	03	04
Yellowstone Area	21	40	86	112	118	177	218	271	301	324
Central Idaho Area	14	42	71	114	156	196	261	284	368	452

Since wolves were reintroduced into the Yellowstone area and Central Idaho area in 1995, the Forest has received numerous reports of individual wolves and groups of wolves (2 to 4 animals in a group) occurring on the Forest. Map 5 displays these sightings.

There has been no verified wolf predation on domestic livestock on the Forest. There have been no wolves killed on the Forest as a result of Forest management activities, and no wolves have been trapped and moved off of the Forest. Wolf predation has occurred on private lands adjacent to the Forest, and one wolf was legally shot and killed on private land when it was preying on new born calves.

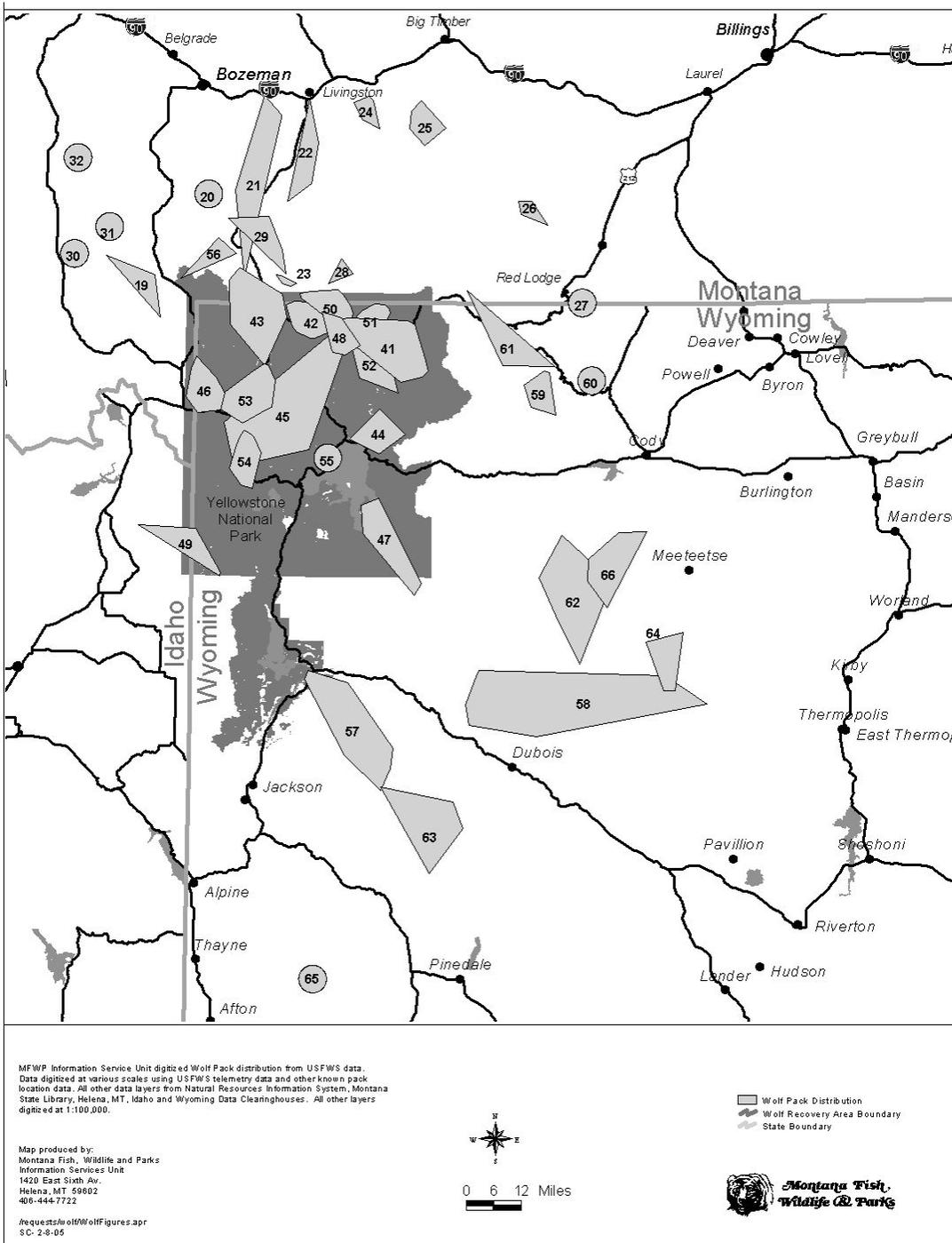
In February 2005, one injured female wolf was euthanized by personnel from the Idaho Department of Fish and Game when it was found injured and unable to take care of itself. Evidence from the area where this female wolf was found indicated that it may have been injured by a moose. Previous C-T Forest Plan Monitoring and Evaluation Reports documented wolf packs that visited the Forest but did not stay, and other sightings of wolves, which are not repeated here.

The reintroduction of wolves into the Greater Yellowstone Area and the Central Idaho Area has been very successful. Figures 36 and 37 show the trends in the number of breeding pairs and the minimum fall wolf population from 1995 to the end of 2004 (data is from U. S. Fish and Wildlife Service, et al. 2005).

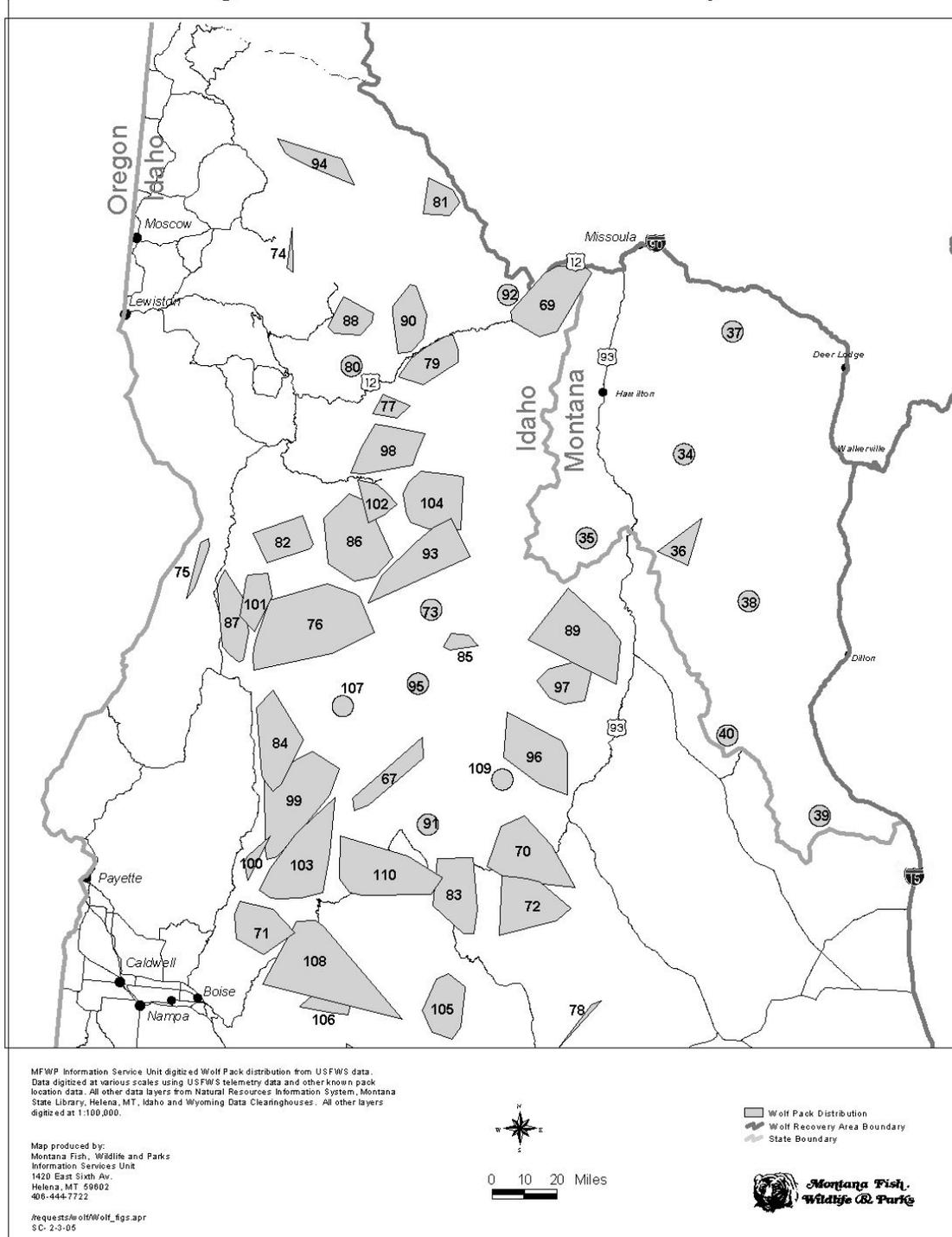
Recommendation

Continue cooperative monitoring and investigation of reports of wolf sightings and wolf pack activity.

Map 1: Wolf Packs in the Greater Yellowstone Wolf Recovery Area at the end of 2004 (U. S. Fish and Wildlife Service, et al. 2005).



Map 2: Wolf Packs in the Central Idaho Wolf Recovery Area at the end of 2004 (map is from U. S. Fish and Wildlife Service, et al. 2005).



Map 3: Wolf sightings on the Targhee portion of the Caribou-Targhee National Forest 1981 through 2005.

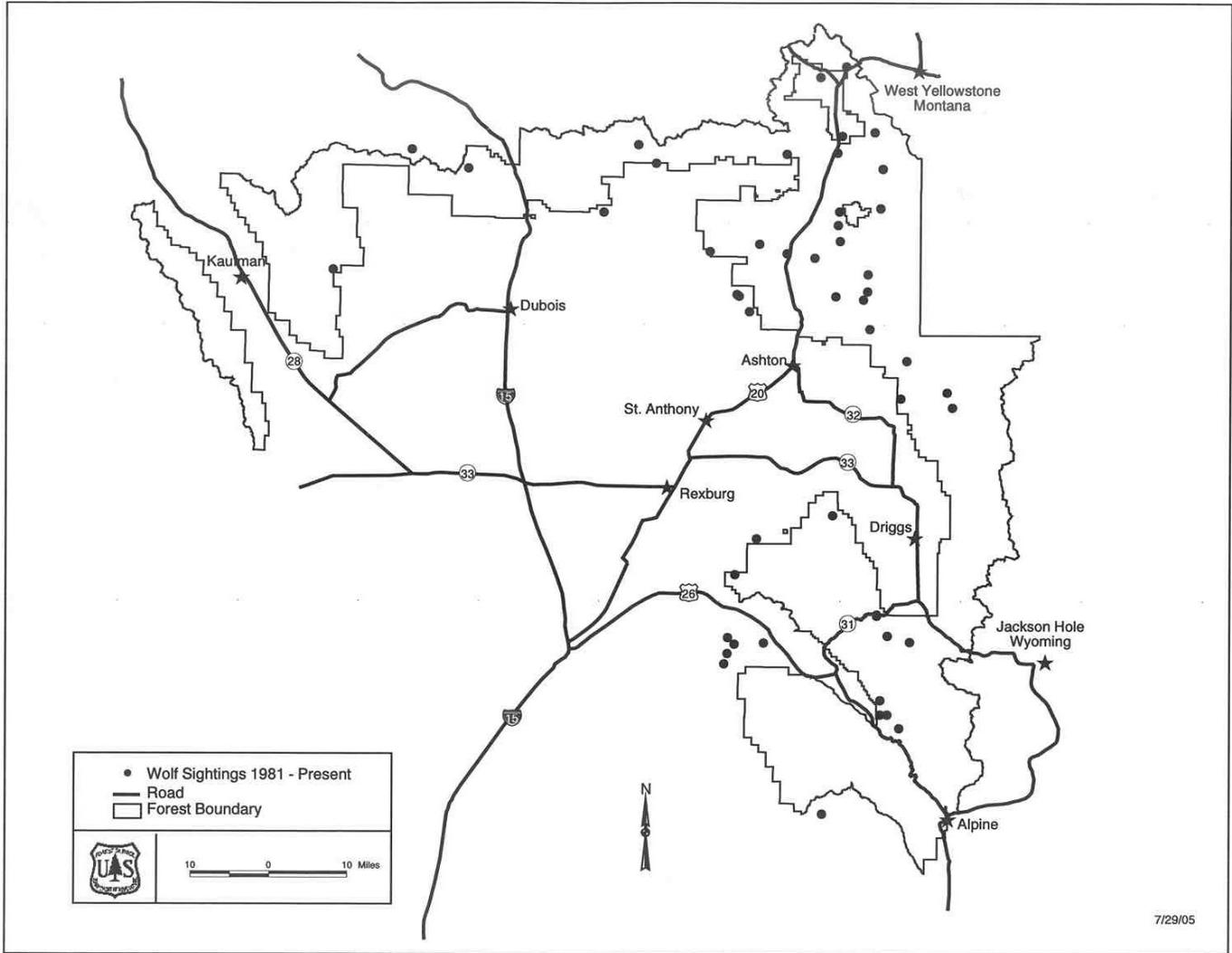


Figure 36: Trend in the number of gray wolf breeding pairs in the Greater Yellowstone Area and the Central Idaho Area.

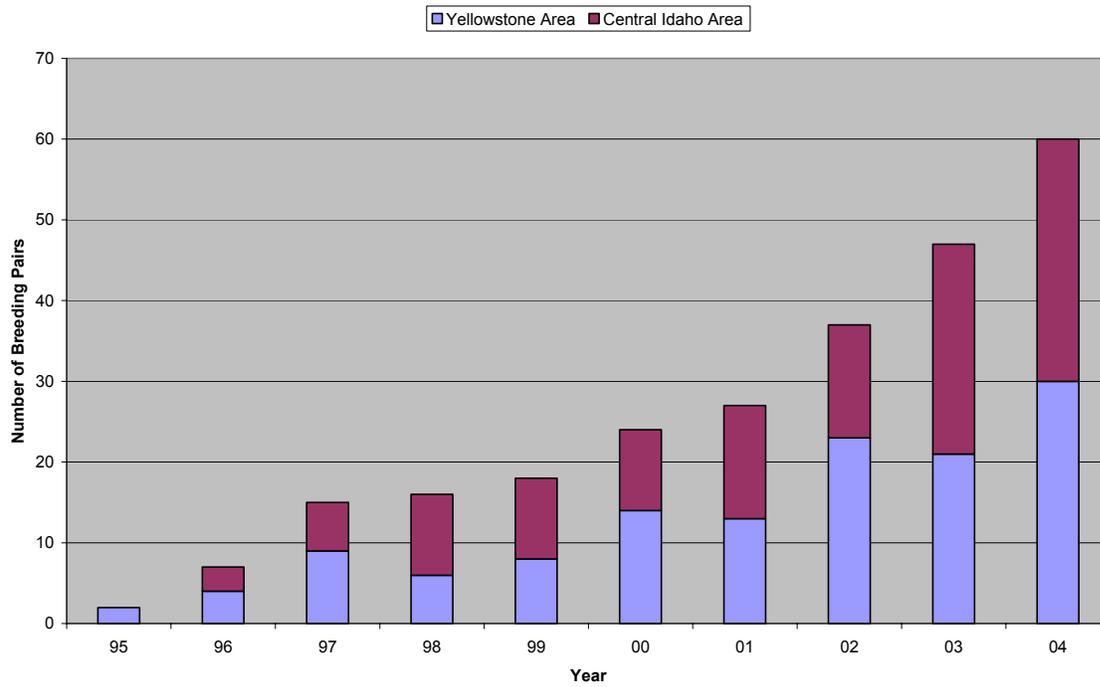
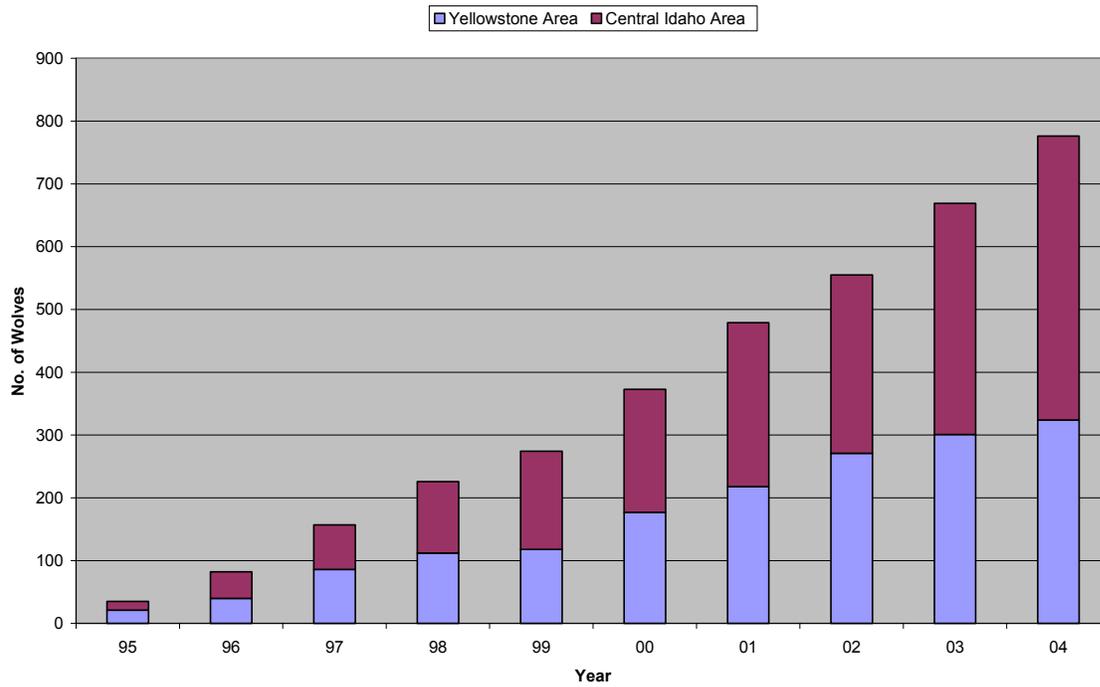


Figure 37: Trend in the minimum fall gray wolf population in the Greater Yellowstone Area and the Central Idaho Area.



Peregrine Falcon Nesting Population

Requirements

Cooperative monitoring of the occupancy and productivity of known peregrine falcon nest sites and territories is to be done to determine its relationship with habitat changes. This is to be conducted annually, as it has been for over ten years.

Results

Peregrine falcons are distributed throughout North America and are increasing steadily after a drastic decline in the 1950's and 1960's due to the pesticide DDT. In 1977, a recovery plan for the peregrine was developed. One of the reclassification objectives was to have a minimum of seventeen breeding pairs in Idaho, producing an average of 1.25 young each year. In 2004, twenty-six occupied territories were documented in Idaho, producing an average of 1.6 young per occupied territory and 2.3 young per successful territory (Sallebanks 2004; Johnston et al. 2003). In the spring of 2000, the peregrine falcon was removed from the Endangered Species List. In 2004, the number of occupied territories, number of young per occupied territory, and number of young per successful territory were the highest recorded in the state of Idaho since 1985.

During the 1980's Forest employees cooperated with the Peregrine Fund and the Idaho Department of Fish and Game to reintroduce peregrines. In 1985, the first re-establishing pair of peregrines in Idaho was discovered at the release site in Targhee Creek on the Targhee National Forest. This eyrie in Targhee Creek was occupied by a pair of peregrine falcons from 1985 through 1987; but from 1988 to the present, no pairs have been documented at the site. However, the number of occupied territories on and adjacent to the Forest has grown from one to a high of ten in 2000 and 2003. Table 24 shows the occupancy and productivity of the known peregrine territories on and adjacent to the Forest from 1985 to 2004. As shown in Table 24, each year occupancy in some territories is unknown, because surveys were not done or surveys were incomplete. Therefore, occupancy and productivity could be higher than reported in the table.

Evaluation

While the number of occupied territories has generally increased over the past eighteen years, the number of young produced has been more variable. Productivity peaked in 1993 with seventeen young produced; since that time productivity has ranged between six and eleven young produced per year. This variable productivity is likely due to the spring weather conditions. According to the analysis for the RFP, human-caused disturbance or habitat alterations close to an active peregrine nest are the greatest potential hazard currently. RFP standards and guidelines were developed to minimize this potential. Peregrines have successfully fledged young in the known territories since the revision of the Forest Plan; this success leads Forest biologists to assume Forest Plan standards and guidelines are adequately protecting the eyries. Furthermore, forest management activities have not prevented an increase in the number of occupied territories on the Forest.

Recommendation

The Forest will retain this monitoring item and retain the peregrine falcon as a Management Indicator Species (MIS).

Table 19: Known peregrine territories that are within and immediately adjacent to the Targhee, 1985-2004.

Key to table: **N** territory unoccupied; **Y#** territory occupied by a pair and the number indicates the young fledged; **Y/?** indicates unknown productivity; **U** indicates unknown (in most cases because surveys were not done); **-** indicates that the territory was not known to exist during those years.

Territory	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04
Targhee Cr.	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	U	U	U	U	U	U	U
Sawtell	N	N	N	Y/0	Y/0	Y/0	N	N	N	U	U	N	U	U	Y/0	Y/0	U	U	U	U
Alpine	N	N	N	U	Y/0	Y/3	Y/2	Y/4	Y/2	Y/3	Y/3	Y/3	Y/3	Y/4	Y/3	Y/3	Y/1	Y/0	Y/0	Y/0
Henry's Fork	N	N	N	N	U	Y/3	Y/0	Y/2	Y/4	Y/U	Y/0	Y/0	Y/1	Y/1	Y/3	Y/0	Y/1	Y/0	Y/0	Y/0
Henry's Lake (adj to Targhee)	N	N	N	N	N	Y/2	Y/3	Y/2	Y/3	Y/2	Y/0	Y/0	Y/0	Y/0	Y/0	Y/2	Y/2	Y/3	Y/2	Y/3
South Fk.	N	N	N	N	N	Y/0	Y/2	Y/0	Y/0	Y/0	Y/2	Y/0	Y/U	Y/0	Y/0	Y/0	Y/2	Y/0	Y/?	Y/1
Sheep Cr.	N	N	N	N	N	N	Y/0	Y/4	Y/4	Y/4	Y/0	Y/0	N	Y/0	Y/0	Y/2	Y/1	Y/1	Y/2	Y/2
Swan Valley	N	N	N	U	U	U	U	U	Y/4	Y/U	Y/0	Y/0	Y/3	Y/4	Y/0	Y/4	Y/3	Y/3	Y/1	Y/0
Palisades (adj to Targhee)	U	U	U	U	N	U	N	N	U	U	U	U	U	N	Y/0	Y/0	U	U	N	N
Teton Canyon ¹	U	U	U	U	Y/2	N	N	N	N	N	Y/3	Y/3	Y/0	Y/2	Y/U	Y/0	Y/1	Y/3	Y/3	Y/1
Pine Creek/Conant Valley (adj to Targhee) ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y/0	N	U	Y/0	U
Upper Mesa Falls ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y/4	Y/3
Split Creek ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y/2	Y/2
Total Occupied Territories	1	1	1	1	3	5	5	5	6	6	7	7	6	7	9	10	7	7	10	9
Total Young Produced	U	U	U	0	2	8	7	12	17	9	8	6	7	11	6	11	11	10	14	12

Sources: Levine et al. 1990, 1991, 1995, 1996, 1997, 1998, 1999, 2001; Johnston et al. 2002, 2003; Susan Patla, WY Game and Fish Dept. 1995-2004; Sallebanks 2003, 2004; Targhee National Forest 1997.

¹: The north side of the canyon was not surveyed until 1995; peregrines could have been using this area previously. In the years when no occupancy was noted, only the south side of Teton Canyon was surveyed; peregrines could have been present on the north side of the canyon.

²: Pine Creek territory was first reported in 2000; Upper Mesa Falls and Split Creek territories were first reported in 2003.

Furbearer Distribution and Population Trend Information

Requirements

Winter track survey routes in each ecological subsection are to be established and at least half read each year to measure population trends of pine marten, fisher, and wolverine. Because wolverine and fisher have natural limited distribution and low population densities on the Forest, additional monitoring methods are used such as recording sightings, and cooperating with studies. Results of the additional monitoring methods are also reported here.

Winter track survey routes also provide information on a few other species, such as weasels, coyotes and fox, red squirrels, snowshoe hares, bobcats, mountain lions (cougars), mink and river otter, cottontail rabbits, and forest grouse. Information on these species is ancillary information gathered with the winter track survey routes, and we provide a brief summary of that information here.

Many of these species are associated with forested habitats, especially mature, late seral and old growth forest habitats. Changes in mature, late seral and old growth forest habitats are documented in other areas of the monitoring report, such as the insect and disease, fire, vegetation, and timber management sections. Habitat for species associated with late seral forests is also discussed in that section.

Results and Evaluation

A total of 19 winter track survey routes have been established in six of the seven ecological subsections on the Forest. The one ecological subsection without winter track survey routes is the Lemhi/Medicine Lodge Subsection. This subsection has limited winter access and it is not possible to consistently run winter track routes. The number of tracks observed each time a route is run is divided by the length of the transect (number of miles) and the hours since the last snow fall to create a standardized "track index". Data from the established survey routes is presented below, along with other information pertaining to each species.

Pine Marten

Pine marten (or marten) are a MIS for the Forest. Marten are associated with conifer forest habitat. Marten tracks have been documented on 18 out of 19 winter track survey routes, indicating that they are well distributed through 6 ecological subsections (Table 25). The only winter track route where no marten have been documented is the Fall Creek/June Creek route in the Caribou Mountain Range ecological subsection. The Fall Creek/June Creek route has very little conifer habitat, and marten are not expected in this area.

There are two routes where marten have been only documented one time; these are the McCoy-Trout-McNeal Route (in the Caribou Range Mtns Subsection) and the Alpine Summer Home/4-H Camp Route (in the Big Hole Mtns Subsection) (Table 25).

There are 12 winter track survey routes that have been run for two or more years. Regression analysis was done for each of these routes to assess trends and test for statistical significance in the trends. Results of this analysis are presented in Table 25. Seven routes showed an upward trend, and 5 routes showed a downward trend. Only one of the trends was statistically significant, and this was an upward trend on the Huckleberry Ridge Route.

Most of these routes include areas of past timber harvesting, and four of the routes occur in areas where the lodgepole pine timber harvest salvage program occurred from the 1970's to the early 1990's. The track data shows that marten distributions have not changed due to past timber harvesting.

It is not possible for populations to always show upward trends, because they are going to reach carrying capacity of the habitat, or there are numerous natural events that can cause downward trends such as weather, competition with other species, natural fluctuations in food abundance, and predation. For marten, there is also a trapping season that affects populations. Therefore, both upward and downward trends will occur over time. Overall, the marten track data indicates a well distributed marten population that is stable.

Table 20. Summary of Pine Marten Data from the Winter Snow Tracking Routes.

Ecological Subsection	Route Name	Years When Data Was Collected	Total # of Times Route was Run	Pine Marten Documented on the Route (Yes/No)	Trend ¹	Statistically Significant ¹ (Yes/No)
Centennial Mtns.	D51-Pete Cr.-RC1	1996, 1997, 1999	9	Yes	Up	No
Centennial Mtns.	D51-West Camas-RC2	1996, 1997, 1999, 2001	9	Yes	Down	No
Island Park	D52-Chick Cr. Flat-IP3	2000, 2002	3	Yes	Up	No
Centennial Mtns.	D52-Dry Creek-RC3	1997	3	Yes	NA ²	--
Centennial Mtns.	D52-Kick Creek-RC4	1997, 2000, 2002	6	Yes	Down	No
Island Park	D52-Huckleberry Ridge-RA1	1996, 1997, 2002, 2004	4	Yes	Up	Yes
Madison-Pitchstone Plateau	D52-Wyoming Creek-RA2	1996, 1997, 2004	3	Yes	Down	No
Madison-Pitchstone Plateau	D52-Long-haul Road-NA1	1997, 2000	3	Yes	Up	No
Madison-Pitchstone Plateau	D52-Snow Creek Butte-NA2	1997, 2000	3	Yes	Up	No
Island Park	D52-Warm River Butte-RA3	1997	2	Yes	NA ²	--
Island Park	D52-Marysville Hill	1999	2	Yes	NA ²	--
Caribou Range Mtns.	D54-Fall/June Cr.	2000, 2001, 2002, 2004	5	No	NA ²	--
Caribou Range Mtns.	D54-McCoy, Trout, McNeal	1999, 2000, 2002, 2003	6	Yes (only 1 time)	NA ²	--
Caribou Range Mtns.	D54-Calamity (Palisades Dam)	1999, 2000, 2001, 2002, 2003,	6	Yes	Up	No
Big Hole Mtns.	D54-Windy Ridge/Moody	2003, 2004	3	Yes	Down	No
Big Hole Mtns.	D54-Alpine Summer Home/4H Camp	2003, 2004	3	Yes (only 1 time)	NA ²	--
Teton Range	D56-S. Leigh/Kiln Cr.-TB4	2000, 2001	3	Yes	Down	No
Teton Range	D56-Badger Springs-TB3	2000, 2001, 2003	4	Yes	Up	No
Big Hole Mtns.	D56-Relay Ridge Route	2003	2	Yes	NA ²	--

¹For trend analysis, we used the regression analysis program in Microsoft Excel. For tests of statistical significance, we used a 95% confidence level.

² 'NA' means not applicable, and means that trend analysis was not done for four routes with only 1 year of data, the one route with no pine marten, and the 2 routes with pine marten only documented one time.

Additional Canada Lynx Information

Summary of Canada Lynx Occurrences, Snowshoe Hare Studies, and Subalpine Fir Habitat Information for the Caribou-Targhee National Forest and Adjacent Bureau of Land Management Lands.

The following information provides a detailed summary of Canada lynx, snowshoe hare, and subalpine fir habitat information for the Caribou-Targhee National Forest and adjacent Bureau of Land Management lands. This information was compiled to support the agencies' recommended changes to the 2001 Lynx Analysis Unit (LAU) map.

Documented Occurrences from the Lynx Science Team Publication (Ruggiero et al 1999)

Canada lynx have historically been very rare within and adjacent to the Targhee portion of the Caribou-Targhee National Forest, as well as the BLM administered lands. For the time period covering 1842 to 1998, there have only been 32 documented lynx occurrences within the Targhee Forest boundary, and four documented lynx occurrences on or adjacent to BLM lands in Southeast Idaho (Table 26 and Map 6) (Ruggiero et al. 1999). Of these, 78% occurred in two ecological subsections: Centennial Mountains (61% of the occurrences) and Teton Range (17% of the occurrences).

Table 21: Canada lynx occurrences within and adjacent to the Targhee boundary from 1842-1998..

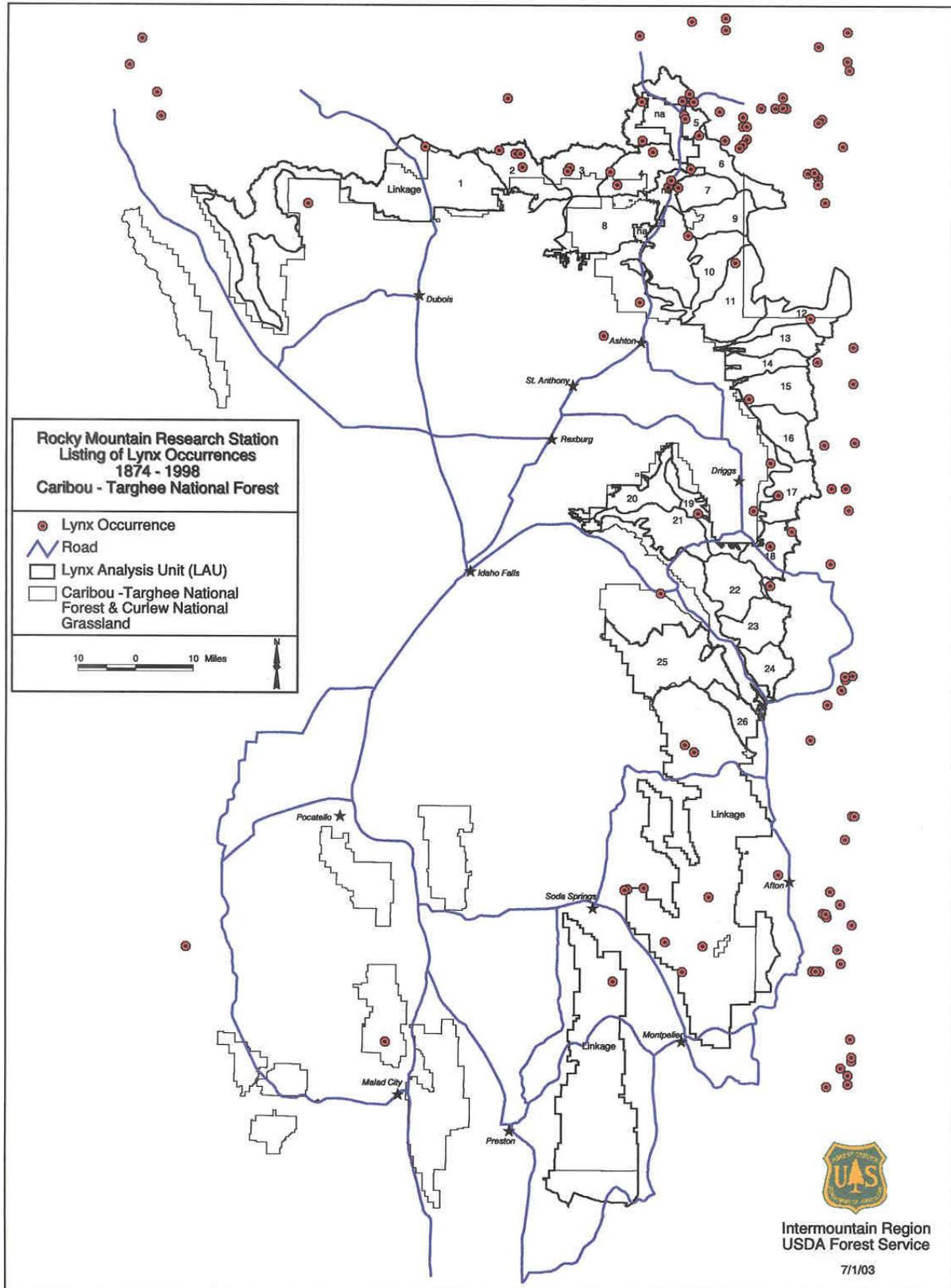
Ecological Subsection	# of documented lynx occurrences w/in Targhee boundary	# of documented lynx occurrences on or adjacent to BLM lands in SE Idaho
Lemhi/Medicine Lodge	0	1
Centennial Mountains	21 ¹	1
Island Park	2	1
Madison-Pitchstone Plateaus	2	0
Teton Range	5 ²	1
Big Hole Mountains	1 ³	0
Caribou Range Mountains	1	0

¹ Four of these occurrences are near the boundary with the Island Park Subsection; there were also additional occurrences north and east of the Forest boundary in Montana.

² There were also additional occurrences east of the Forest boundary in Wyoming.

³ There was 1 additional occurrence outside of the Forest boundary in Wyoming.

Map 4: Rocky Mountain Research Station listing of lynx occurrences, 1874-1998.



National Lynx Detection Survey, 1999-2003

Beginning in 1999 and continuing through 2003, the Forest participated in a national lynx detection survey, using the national lynx detection survey protocol (McKelvey et al. 1999). Four areas of the Targhee and one area of the Caribou were surveyed as displayed in Table 27 and Map 7. Only one Canada lynx hair was detected on the Forest during the surveys, and this was on the Westslope of the Tetons in 2003 (Table 27).

Table 22: Canada lynx survey results using the national lynx detection survey protocol.

Location of Survey	National Survey #	Forest Survey #	Years of Survey	Results (# of lynx hair-pad hits)
Centennial Mountains	#21	Targhee #1	1999, 2000, 2001	0
Plateau (area west of YNP boundary)	#32	Targhee #2	1999, 2000, 2001	0
Westslope of the Tetons	#79	Targhee #3	2001, 2002, 2003	1 ¹
Big Hole Mountains	#80	Targhee #4	2001, 2002, 2003	0
Webster/Preuss Mtns.	#65	Caribou #1	2000, 2001, 2002	0

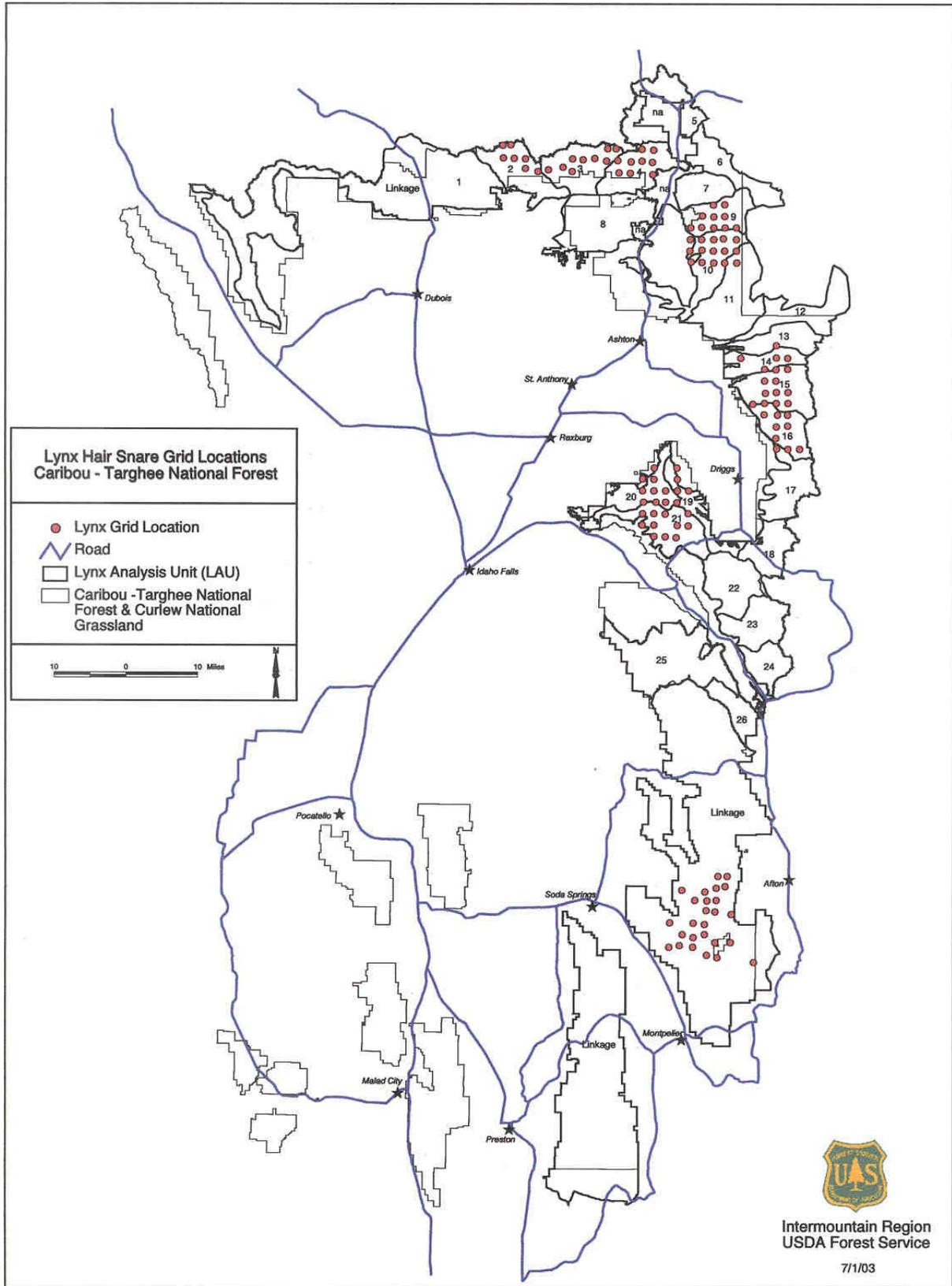
¹ One lynx hair was found on one hair-snare pad in 2003.

Winter Snow Tracking Routes and Surveys, 1996-2004

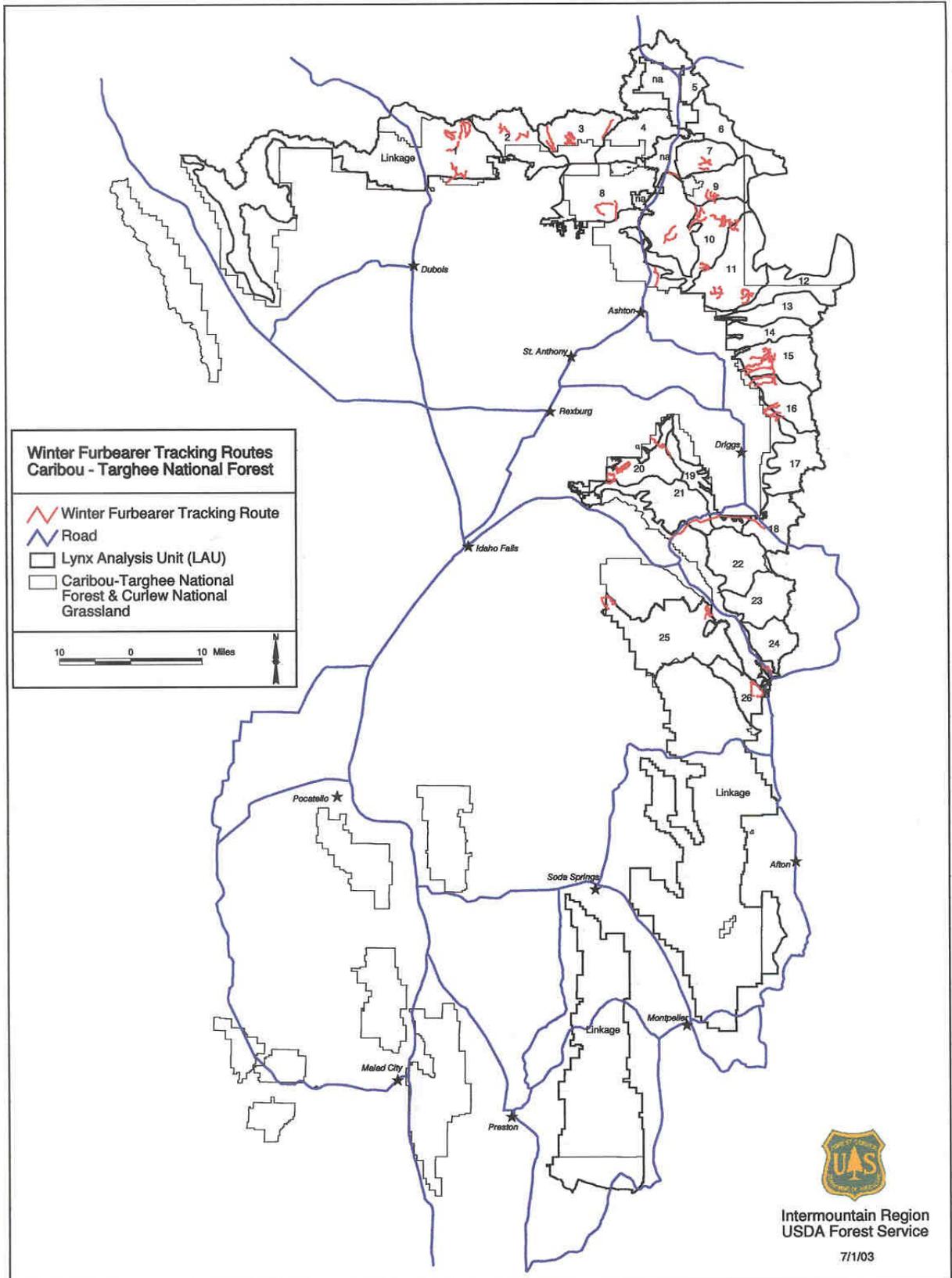
The Forest has also conducted winter snow tracking routes to help document the presence and distribution of lynx and other furbearers. The location of these snow tracking routes is displayed in Map 8. Possible lynx tracks have been recorded only three times when doing these winter snow tracking routes, as follows:

- In January 1996, one set of either lynx or mountain lion tracks was observed on the Dry Creek route in the Centennial Mountains. A positive determination could not be made.
- In January 1997, two possible lynx tracks were observed on the Snow Creek Butte route in the Island Park area. The tracks looked fuzzy with no distinct pad or claw marks.
- In February 1997, three possible lynx tracks were observed on the Kick Creek route in the Centennial Mountains.

Map 5: Lynx hair-snare grid location map.



Map 6: Location of winter furbearer snow-tracking routes.



Other Lynx Sightings, 1998-Present

Forest personnel record reports of other possible lynx sightings when they receive them. Table 28 provides a list of those reports.

Table 23: Other lynx sightings, 1998-present.

Year	Ecological Subsection	Location	Type of Observation	Reliability 1/	Source	Additional Comments
1998 (Jan.)	Centennial Mtns.	Targhee Pass T16N R44E S29	tracks	R	Targhee NF	lynx tracks reported by Forest employees
1998 (winter)	Lemhi/Medicine Lodge	5 miles south of Scott/Mahogany Canyon areas	sighting	C	Targhee NF	Wildlife Service's trapper reported sighting to Dubois Ranger District personnel.
1999 (Jan. 27-30)	Big Hole Mtns.	T3N R44E Sec.22 and 15. Sheep Driveway in N. Pine Creek and Corral Canyon	sighting and tracks	C	Targhee NF	A Forest employee saw the lynx on Jan. 27. Employee returned with Mike Whitfield to the area on Jan. 29 and 30 and observed and measured tracks, and followed tracks for some distance.
1999	Teton Range	Cold Spring Road	tracks	unk	Dick Steiger (Alta 4-H Club)	This was a second or third hand report to the Forest Wildlife Biologist. Details about track size, tracking conditions, etc. were not available.
2000 (May 25)	Big Hole Mtns.	T5N R44E Sec. 18 SW1/4 (south side of road and south side of creek)	Sighting	P	Geologist, C-T NF	Observed what he thought was a lynx from about 25 yards away; lynx jumped up on a log, light buff color, no spots, couldn't see ear tufts but lighting was dark, long back legs, large hind feet, thought he saw a black tip on tail. (A lynx hair snare pad was placed at this location after this sighting was reported; no hair was collected.)
2000 Spring	Teton Range	T44N R117W Sec. 28 (near timberline up towards Table Mtn in Teton Canyon)	tracks	unk	Cross-country skier	A cross-country skier reported seeing lynx tracks. No measurements were provided.
2000 Spring	Teton Range	Jackpine Loop Area	Tracks	unk	Targhee NF, Teton Basin RD	Two Forest employees observed melted-out cat tracks in a clearcut; by size of tracks could have been cougar or lynx.

1/ C = confirmed; P = probable; U = unreliable; R = reliable, unk = unknown.

During August of 2000 and 2001, a radio-collared male Canada lynx was located for a short period of time each year on the Forest. This male lynx was originally trapped and radio-collared in the Wyoming Mountain Range near Big Piney, Wyoming. During the summer months, he would leave the Wyoming Range and make a long trek, which included the Island Park and eastern Centennial portions of the Targhee.

Snowshoe Hare Studies

Since snowshoe hares are the principle diet of lynx, especially for successful reproduction, the Forest has funded two studies to obtain information about snowshoe hare distribution, abundance and habitat use. These studies were done by personnel from the USDA Forest Service Rocky Mountain Research Station, in Missoula, Montana. The following is a summary of these two studies.

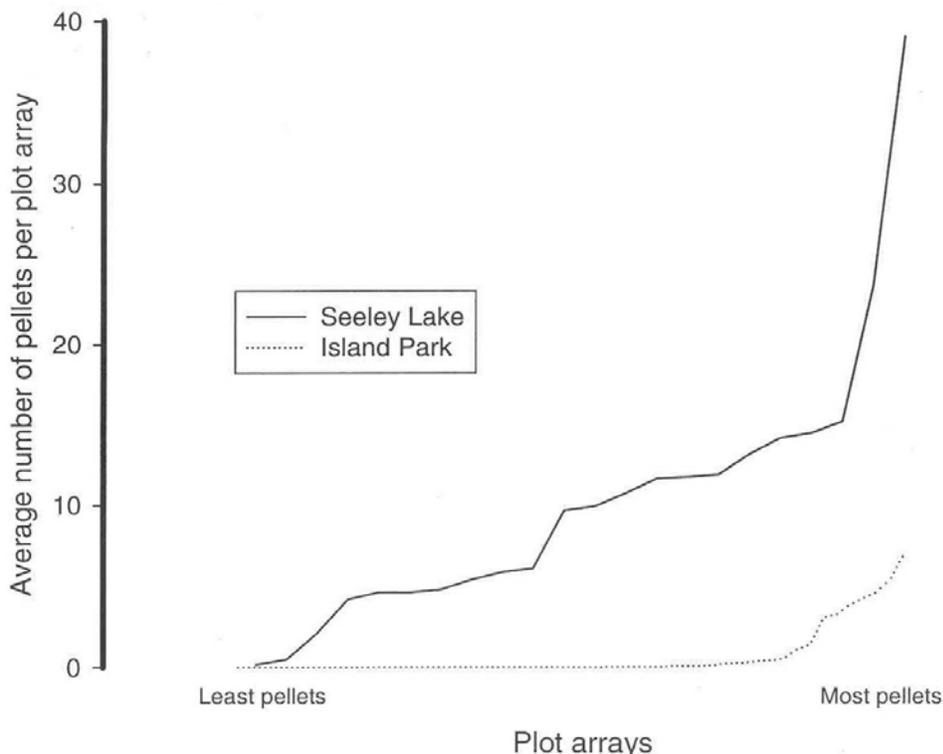
Field work for the first study was done in 2000, with the final report dated June 5, 2001. The report was titled: "An analysis of snowshoe hare (*Lepus americanus*) numbers in Island Park based on pellet sampling and capture/recapture trapping" (McKelvey and McDaniel 2001). Findings from this study were:

- "Winter snow tracking suggests that hares occur at extremely low densities throughout much of Island Park. However, these densities are too low to be reliably measured. Higher concentrations of hares can exist either on the Plateau or in the bottom of the Caldera in areas where lodgepole pine are young and reasonably dense. We found no evidence of high hare densities in any stands older than saplings. Within

the young, unthinned stands, pellet data suggested that denser stands had more pellets, and by inference, more hares.”

- “In general, very few pellets were found in areas either thinned traditionally, or thinned traditionally but with small, unthinned patches left. We believe, based on winter track observations, and the lack of new pellets located during visits in May 2001, that pellets found on 2 of the thinned areas were related to populations of hares in previous years and not to current populations. We therefore found no evidence to suggest that hares were maintained in traditionally thinned stands.”
- “In Island Park, hares occur in reasonably high concentrations (we caught 11 different hares on one grid) when stand conditions are exactly right: lodgepole pine tall enough to have about $\frac{1}{2}$ to $\frac{3}{4}$ of their canopy above the snow, and stem densities > 4000 stems/ha. Additionally, within these stands, more hares were caught in stands with larger quantities of forbs, grass, and horizontal cover $< 0.5\text{m}$; more pellets were found in stands with higher quantities of forbs. These correlations with grass/forb vegetation suggest that a somewhat clumped distribution (allowing patches of light and therefore more vegetation on the forest floor), and/or more mesic sites that allow both high stem densities and foliage on the forest floor may be optimal. We located stands having these conditions with high concentrations of pellets both on the Plateau and within the Caldera. The highest concentration of stands with these characteristics (young dense lodgepole pine and abundant pellets) was in the area around Stamp Meadows, and that area may have some local edaphic or weather conditions that make this area more conducive to producing hares.”
- “However, based on our observations, we believe that these stand conditions will be difficult to reliably achieve and maintain. In many areas post fire or post clearcut regeneration does not achieve these densities. Additionally, this stand condition is ephemeral on any given site. The unthinned young stands where we found pellets were composed of trees between 15-25 years old with tree heights between 3-10m. Based on our sampling and additional observations, we do not believe that the stands in which we found the most pellets and caught the most hares will be productive 10-15 years in the future. We found no evidence of hare concentrations in older stands, regardless of forest type. We therefore believe that while some stands in Island Park can produce hares at densities similar to those observed in the Seeley Lake area (an area known to support lynx), these stands will remain scattered, and will only constitute a small proportion of the landscape.” Figure 38 compares snowshoe hare data for Seeley Lake and Island Park.

Figure 38: Comparison of snowshoe hare pellets between Seeley Lake, MT and Island Park, ID study areas.



Field work for the second study was done in 2003 and 2004, with the final report dated November 29, 2004. The report was titled: “*Micro-scale Habitat Use of Snowshoe Hares in Eastern Idaho, Including a Comparison Between Telemetry and Pellet Counts*” (McDaniel et al. 2004). The study was designed to evaluate habitat use of snowshoe hares in young lodgepole (*Pinus contorta*) stands using telemetry. The telemetry system was a sensor array designed to obtain hare use at a micro-scale (telemetry error < 0.5 m) on a 24-hour basis throughout the year. Macro- and micro-habitat use patterns were evaluated across seasons, and between daily activity periods. At each sensor researchers measured stem density, horizontal and vertical cover, herbaceous cover and seasonal pellet deposition. Findings from this study were:

- “All vegetation parameters were strongly associated with patterns of hare use. Snowshoe hares selected characteristics of the vegetation that related to dense cover during all seasons, selected open habitat in the summer during the active period of the day, and selected areas with high forb cover during the summer and autumn. Relationships between hare use and pellet deposition were poor. Although pellet and hare densities may be related at larger spatial scales, our data indicate that using pellet densities to determine fine-scale habitat use patterns is questionable.”
- “In general, sapling patches with high density cover are important for hares in the Island Park area. Hares avoided sapling densities < 7.95k saplings / ha during the winter, thus sapling densities within this range probably do not provide adequate cover. In Utah, Wolfe et al. (1982) proposed optical density < 40% above snow level precluded any appreciable winter use of snowshoe hares. Our observations (2 m between observer and cover board) are not directly comparable to their measurements (15 m between observer and cover board), but we also found that hares in Island Park avoided areas where horizontal cover was low during the winter. Our estimates of minimum stem density and horizontal cover also agree with minimum estimates for hare habitat in Maine (Litvattis et al. 1985b). In addition, we believe that hare habitat must also include at least some areas where saplings are at densities >23.1 k stems/ ha because hares selected

these areas during all seasons. In our study, sapling densities > 23.1 k stems / ha occurred in 25% of the young stand and 14% of the older stand.”

- “A mixture of sapling densities should provide various conditions to support both higher quantities and a wider range of herbaceous species during summer and autumn. During the winter, especially in older sapling stands, a mixture of various sapling densities would provide trees that self-prune at different ages, providing green needles on lower branches and within reach of snowshoe hares as the stand matures. Our study sites probably had the highest densities of snowshoe hares in the immediate forest area (McKelvey and McDaniel 2001), but we cannot assume that they were in any way optimal hare habitat.”
- “Because hares moved between sapling stands and other forest types on a seasonal basis relative to snow levels, close proximity of favorable forest types that include dense (or at least marginal) understory conditions are important. Forest types favorable to snowshoe hares could be a mixture of young and old sapling stands, or mature forest stands secondary in importance to hares. Several studies (Dolbeer and Clark 1975, Wolfe et al. 1982, Griffin 2004) in the southern Rocky Mountain region have related high hare use to mature stands with dense understory. In our study, snowshoe hares used mature forest stands that had marginal understory cover, probably because mature stands with high understory cover are limited on the forest. Predation risk is high in these stands (Griffin 2004); but apparently cover was sufficient that use was not precluded. Most hares moved to secondary habitats < 3 km from sapling stand, although at least one hare moved 5 km. Most secondary habitats should be located close to sapling stands to reduce effects of predation as predation risk increases with movement distance.”

Interagency Lynx Coordination Meeting, 2003

On July 8-10, 2003, an interagency lynx coordination meeting was held in Island Park, Idaho, to discuss lynx habitat mapping (the 2001 LAU map), lynx information, and snowshoe hare information for the Caribou-Targhee NF and adjacent BLM lands. This meeting was arranged by the U. S. Fish and Wildlife Service, and included members of the interagency “Lynx Biology Team.” Personnel from the following agencies participated in the meeting: U. S. Fish and Wildlife Service, Forest Service, Bureau of Land Management, Idaho Department of Fish Game, Yellowstone National Park, Rocky Mountain Research Station, University of Montana, and a representative from Senator Larry Craig’s Office. Recommendations specific to the Targhee that were developed as a result of this meeting include:

- The Forest should review the vegetation classifications on the Island Park Ranger District in the mapped lynx habitat with particular emphasis on the dry, persistent lodgepole pine stands. It appeared that some of these sites were not subalpine fir climax and should be re-typed. The presence of rhyolite soils (well drained soils) as well as slope and aspect should be primary factors in determining Potential Vegetation Types (PVT) in these upper elevation areas even though they could have snow levels of 6-12 feet in winter. The Targhee did fund this reclassification; the results are discussed in the next section.
- When it becomes available, utilize a model and field sampling protocol developed by Drs. Kevin McKelvey, Karen Hodges and others to evaluate lodgepole pine stands in mapped lynx habitat in regard to their ability to produce snowshoe hares. This would provide a quantitative method to distinguish stands that would never develop conditions suitable for snowshoe hare production from stands that will provide snowshoe hare habitat. This technique should allow evaluation of stand potential at 9-12 years of age regarding snowshoe hare production and thereby provide a process to identify stands that will not produce snowshoe hares. Stands that have the potential to develop snowshoe hare habitat in the future would not be precommercially thinned until crowns have lifted, whereas stands that would not provide habitat for snowshoe hares would become available for silvicultural treatment. Due to the ongoing research on the Island Park Ranger District, it appears there is sufficient research data currently available to develop a process and analysis structure to make these decisions. Monitoring of these stands, if this model and field sampling protocol are developed and used, would then become part of the CTNF forest plan monitoring system. The Targhee did fund this model development and the results are discussed in the next section.

Vegetation Classification and Potential for Snowshoe Hare Modelling

To accomplish the Lynx Biology Team recommendations described above, Dr. Kevin McKelvey and Greg McDaniel developed a field sampling methodology to obtain information on the presence of subalpine fir in the Centennial Mountains and the Plateau areas of the Forest. BLM and FS crews completed the field work following the

methodology in the fall of 2003. The data from the field work was used to develop two logistic models of subalpine fir presence (one model for the Centennial Mountains, and one model for the Plateau area) (McDaniel and McKelvey 2004). The following provides a summary of the field data and logistic models (from McDaniel and McKelvey 2004):

- “The forests around Island Park, Idaho, exist at the arid limit of the subalpine fir habitat series. For this reason, subtle changes in aspect, elevation, and soil condition will determine the series. Further, much of the forest is young due to timber harvest and fire. For these reasons, the application of using diagnostic understory species (that may not be present until secondary succession) or relying on field biologists’ best judgment to type areas based on inadequate statistical evidence of the relationship of habitat types and local site characteristics is likely to be unreliable. Much of the area could be improperly typed because so much of the area is young and therefore typed based on these rules. To produce more reliable stand classifications in this area we built topographic models relating topography (elevation, slope and aspect) to the presence of subalpine fir in older stands, then used these relationships to estimate the extent of subalpine fir within 2 study areas near Island Park, Idaho. The 2 study areas were the south side of the Centennial Mountains and the east rim of the caldera at Island Park. The presence of subalpine fir was strongly related to topographic variables in both areas and a directional gradient to the east was strongly associated with the occurrence of subalpine fir in the Centennial Mountains. **Based on these methodologies, estimated occurrence of subalpine fir habitat type on the east rim of the caldera was considerably (>30%) less than previously mapped.**”
- “Habitat typing follows time-independent procedures, although a suggested disturbance-free period needed for a habitat type to be identified from the understory is 60-80 yr in the West (Cook 1996). These times can be extended if very large fires remove subalpine fir as a seed source across broad areas. However, this was not the case in the 2 study areas. Of the older plots, 42% on the East Plateau and 62% in the Centennial Mountains contained subalpine fir. While more metaphysical discussions concerning the long-term climax species across the area may persist, those areas in which plots conservatively aged at >80 years contained no subalpine fir were strongly associated with topographic variables, not age. **There is little evidence, given current climate to indicate that subalpine fir can grow in these sites, and even less evidence of a successional trajectory leading to subalpine fir dominance.**”
- “Continuous areas of subalpine fir were not evident across the East Plateau and at lower elevations in the Centennial Mountains. In these areas, the forests appear to exist at the edge between subalpine fir and other forest types. At this edge, even sites with similar topographic characteristics can lead to different potential climax species (Cook 1996, McCune and Allen 1985) due to other factors such as ground litter, soil moisture and nutrient levels. Most subalpine fir habitat types on the East Plateau are the subalpine fir / grouse whortleberry (*Vaccinium scoparium*) sere which is a dry type for this region (Bowerman et al. 1999). Due to the generally dry forest types in this area, likely, at best, dense forest cover for snowshoe hares would occur only in small patches discontinuously throughout the area. This disjunct nature of snowshoe hare habitat is not uncommon in the more semi-arid regions of the central Rocky Mountains (Wolfe 1982, Howell 1923). **In the locations of this study and the forest throughout the caldera we previously found that snowshoe hare abundance was low compared to areas in more continuous habitat (McKelvey and McDaniel 2001).**”
- “The lynx conservation strategy (Ruediger et al. 2000) has provided what biologists suggest as a minimal standard of at least 10 mi² of subalpine fir habitat type within a Lynx Analysis Unit (approximate size of a female lynx home range in the southern extent of the lynx distribution). Lynx habitat is present on the Targhee Forest, but to a less extent than was previously estimated. Within our sample of plots from older forests, subalpine fir only occurred on about 42% of the plots. Within 3 ecological units (Bowerman et al. 1999) that cover most of the East Plateau area (approximately 90% of the area), previous typing estimated subalpine fir habitat types covered 75% or more of the land area.”
- “The Centennial Mountains had an almost uniform distribution of plots across its range of probability values, and on the East Plateau, all possible estimated probabilities were well represented by plot data (> 29 plots / 10 % interval width for 20-70 % probabilities on the East Plateau; > 30 plots / 10% interval width for 10-100 % probabilities in the Centennial Mountains). Therefore, within the study areas the models should be applicable to the range of available topographic features and therefore can be used to infer the likelihood of subalpine fir in areas where stand age precludes direct measurement. However, moving beyond the directly sampled areas would be exposing the model to topographic conditions not sampled, or only poorly sampled. Under these circumstances, model performance is likely unreliable.”

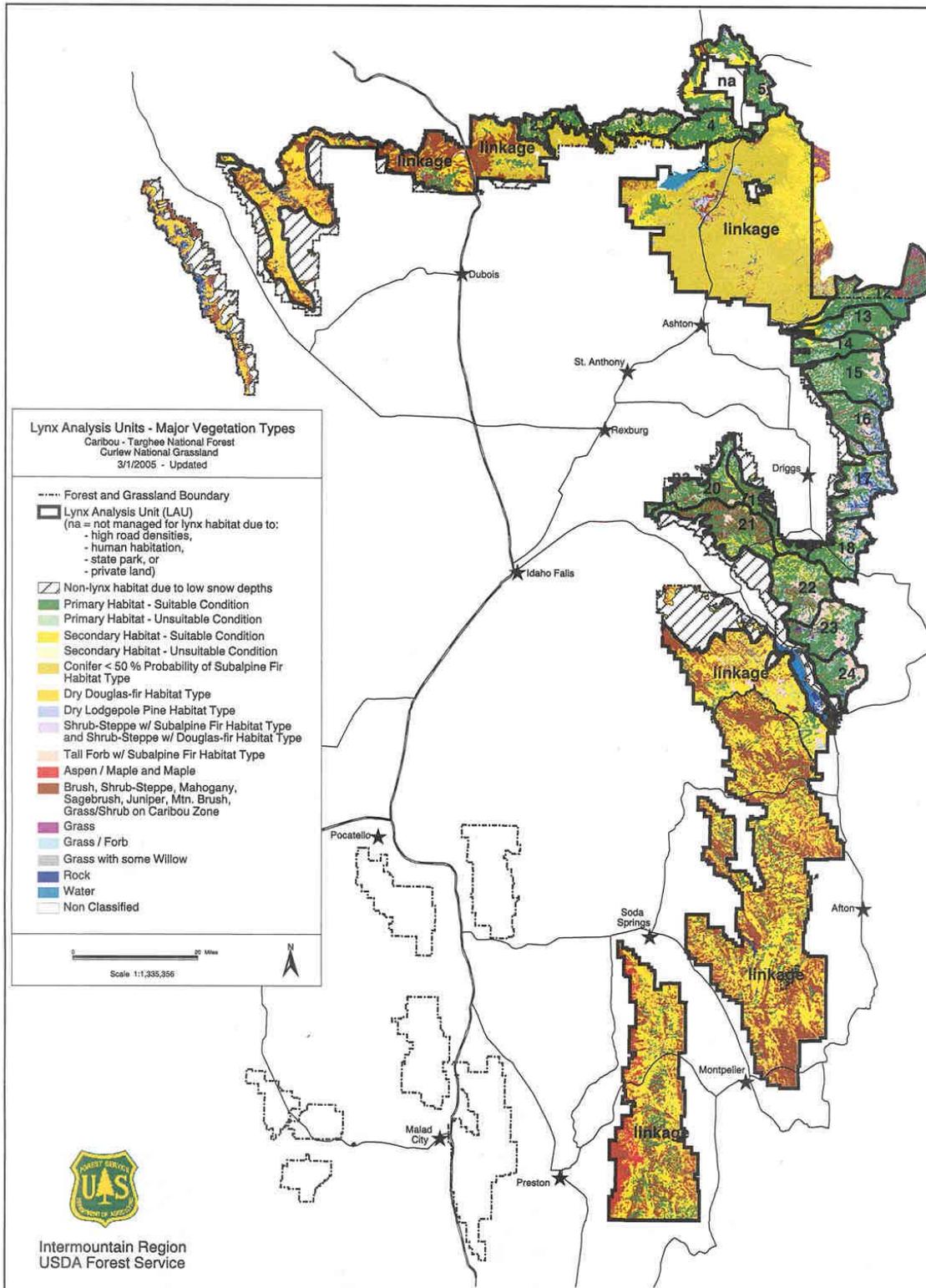
In December of 2004, Greg McDaniel was hired by the Caribou-Targhee NF to run the logistic regression models for subalpine fir presence on the Centennial Mountain area, the Plateau area, and the Bishop Mountain area of the Forest, and to provide maps of those areas showing the results of the models. Greg McDaniel was also asked to provide recommendations to the Forest Service and BLM for changing the 2001 LAU map based on the outcomes of the logistic regression models and maps. McDaniel completed a report "*Mapping the Probability of Subalpine Fir Habitat Type on the Caribou-Targhee National Forest and Bureau of Land Management*" in December of 2004.

McDaniel and McKelvey (2004) surveyed and modeled the probability of subalpine fir habitat type on portions of the National Forest land and BLM land. They produced a map for the Forest which classified areas based on their likelihood of being subalpine fir climax types. Areas having greater than seventy percent occurrence of subalpine fir habitat type were delineated as primary lynx habitat. This was based on local wildlife and forest biologists' opinion that this classification provided a high probability of mature forest with a sufficiently dense understory of vegetation for lynx and snowshoe hares. Dense cover in the understory is specified in the Canada Lynx Conservation Assessment and Strategy (2000) as lynx habitat and this type of forest structure is well documented within the Rocky Mountains as snowshoe hare habitat (Wolfe et al. 1982, Griffins 2004, Dolbeer and Clark 1975). Secondary lynx habitat was classified as areas that contained greater than 50 percent occurrence of subalpine fir habitat.

Based on this modeling and other lynx surveys and data, the Caribou-Targhee National Forest and the Bureau of Land Management made recommendations to the U.S. Fish and Wildlife Service to change the LAU maps. Some of these changes include: see Map 9

- Drop a portion of lynx habitat in LAU 1 (Signal Peak area) because it is isolated and contains less than 10 sq. miles in primary habitat.
- Drop LAU's along the west side of YNP (LAU's 6, 7, 9, 10, and 11) because of lack of primary lynx habitat. This would also be consistent with YNP mapping.
- Drop LAU 8 because it is isolated and contains less than 8 sq. miles of primary habitat.
- Drop all BLM lands because they do not contain any primary lynx habitat are a considerable distance away from primary lynx habitat on National Forest land.
- Drop LAUs 25 and 26 since they only have about 6 square miles of primary lynx habitat in each LAU. The lack of existing subalpine fir forest after many decades of fire suppression indicates that the majority of the forested acres in this area will not develop into subalpine fir forest with the climate and natural disturbance regimes that exist in this area.

Map 7: Map showing Lynx Analysis Units (LAU's) agreed to by BLM, Forest Service, and U.S. Fish and Wildlife Service in 2005.



Additional Wolverine Information

Wolverines have only been documented on four winter track survey routes as follows:

- 1996 on the Pete Creek Route in the Centennial Mtns Subsection
- 1996 on the West Camas Route in the Centennial Mtns Subsection
- 2000 on the Kick Creek Route in the Centennial Mtns Subsection
- 2001 on the Leigh/Kiln Creek Route in the Teton Range Subsection

Since the early 1960's, the Forest has recorded locations of wolverine sightings. These sightings provide a good overview of the distribution of wolverines on the Forest. Sighting data shows that wolverines occupy the Lemhi/Medicine Lodge Ecological Subsection, the Centennial Mountain Ecological Subsection and the Teton Range Ecological Subsection. The highest number of locations has occurred in the Centennial Mountain Ecological Subsection and the Teton Range Ecological Subsection (Targhee National Forest-Process Paper D 1997, Caribou-Targhee National Forest 2000). See Map 10 for wolverine observations.

Monitoring at Grand Targhee Ski and Summer Resort on the Westslope of the Tetons documented wolverine tracks beginning in January 1997. A bait and camera station was placed in South Leigh Creek, yielding pictures and collection of some scat; DNA analysis on the scat determined the animal to be a female wolverine. A cooperative project was started in 1998 with the Alta 4-H club, Grand Targhee Resort, Jeff Copeland, Wyoming Game and Fish Department, and the Teton Basin Ranger District to try to capture and place radio transmitters on wolverines. In April 1998, an adult female wolverine was captured and implanted with a radio transmitter. In March 1999 an adult male wolverine was captured and implanted with a radio transmitter. In April 1999 a young female was captured and implanted with a radio transmitter. Mountain Air Research, Inc. has been providing locations on these animals. These animals have been located in Grand Teton National Park as well as the Targhee National Forest (Caribou-Targhee National Forest 2000).

Beginning in the winter of 1998-1999 and concluding in the winter of 1999-2000, the Forest cooperated in a wolverine project to accomplish two objectives:

1. Identify areas of predicted suitable wolverine denning habitat using GIS modeling analysis which uses denning habitat characteristics identified in scientific literature.
2. Conduct aerial surveys in and adjacent to the predicted suitable wolverine denning habitat to document the presence of wolverines.

From this wolverine project, a total of 25,228 hectares of predicted suitable wolverine denning habitat were mapped within or adjacent to 8 areas of the Forest, which includes 4 ecological subsections of the Forest (Table 29) (Heinemeyer and Copeland 1999; Heinemeyer et al 2001). Aerial surveys documented wolverine tracks in 4 of the 8 areas (Table 29). As noted in Table 29, 50% of the predicted suitable wolverine denning habitat was surveyed. Therefore, the project probably underestimates wolverine presence.

Table 24: Predicted Wolverine Denning Habitat and Wolverine Tracks Documented in Aerial Surveys, 1999 and 2000.

Area of Forest	Ecological Subsection	Predicted Denning Habitat from GIS Analysis (hectares)	Percent of Denning Habitat Aerially Surveyed	Wolverine Tracks Documented in Aerial Surveys 1999 & 2000
Lemhi Range	Lemhi/Medicine Lodge	5,583 ²	42%	No tracks documented
Italian Peaks	Lemhi/Medicine Lodge	6,198 ¹	43%	Tracks documented at 1 location adjacent to the Forest in Montana
West Centennials	Centennial Mountains	1,104 ¹	42%	No tracks documented
East Centennials	Centennial Mountains	1,171 ¹	96%	Tracks documented at 14 locations on the Forest & 7 locations adjacent to the Forest in Montana
Targhee Creek	Centennial Mountains	2,174 ¹	81%	Tracks documented at 11 locations on the Forest & 12 locations adjacent to the Forest in Montana
Teton Range	Teton Range	3,239 ³	38%	Tracks documented at 8 locations on the Forest

Big Hole	Big Hole/Palisades	133	50%	No tracks documented
Palisades	Big Hole/Palisades	5,626 ⁴	52%	No tracks documented
Totals	----	25,228	50% (weighted average)	----

¹ Some of these hectares are not on the Forest; they are located north of the Forest in Montana

² Some of these hectares are not on the Forest; they are located west of the Forest on the Salmon-Challis National Forest.

³ Some of these hectares are not on the Forest; they are located east of the Forest in Grand Teton National Park and the Bridger-Teton National Forest.

⁴ Some of these hectares are not on the Forest; they are located east of the Forest in the area administered by the Bridger-Teton National Forest.

Beginning in 2000 and continuing to the present time, the Forest has been cooperating with the Wildlife Conservation Society on a wolverine research project that includes two study areas in the Greater Yellowstone Area, which are the Teton and Madison Study areas. The Teton Study area includes the Westslope of the Teton Mountain Range and the Big Hole/Palisades areas of the Caribou-Targhee NF, and adjacent areas in Yellowstone NP, Grand Teton NP, Bridger-Teton NF, and other lands in Wyoming. The Madison Study area includes the Henry's Lake Mountains and the Centennial Mountains of the Caribou-Targhee NF, and adjacent areas on the Beaverhead-Deerlodge NF, BLM land, and other lands in Montana. This project is still in progress, but some of the preliminary findings from progress reports and one publication are summarized below (Inman et al. 2003; Wildlife Conservation Society Greater Yellowstone Field Update 2004; Inman et al. 2004; Inman et al. 2005):

- A total of 26 wolverines have been captured between the two study areas, including 15 females and 11 males.
- Both adults and subadults have been captured, and successful reproduction has been documented.
- As part of this study, 2 of the 6 reproductive wolverine den sites ever documented in the lower 48 states have been found. One of those den sites was on the Caribou-Targhee NF.
- Eleven of the 26 captured wolverines have been documented using portions of the Caribou-Targhee NF.
- Mean home range size of adult females was 645 km² (range = 191 – 1,831 km²).
- Mean home range size of adult males was 1,204 km² (range = 713 – 2,116 km²).
- Mean home range size of subadult females was 679 km² (range = 135 – 2,048 km²).
- Mean home range size of subadult males was 3,911 km² (range = 975 – 10,526 km²).
- Home range sizes of adult females and subadult females are not statistically different, whereas home range sizes of adult males and subadult males are statistically different.
- This project documented extensive movements by one male wolverine between February 2001 (11 months of age) and December 2003 (46 months of age) (Figure 39) (Inman et al. 2004). From 26 March to 13 April 2002 (about 25 months of age), this male wolverine moved from Grand Teton National Park, Wyoming, to the Portneuf Range east of Pocatello, Idaho, and returned to the Teton Range, covering a minimum distance of 412 km in 19 days. Soon after this, from 18-24 April 2002, this wolverine moved north to Mount Washburn in the northern portion of Yellowstone National Park and back to the Teton Range, covering a minimum distance of 226 km over 7 days. As shown in Figure 39, this male wolverine also made distant movements to the Gros Ventre, Wind River, and Salt River Ranges of Wyoming and the Centennial Range along the Idaho – Montana border. He was legally harvested by a trapper in the Montana portion of the Centennial Range on 11 January 2004 at 47 months of age. This male wolverine had a home range estimate of 37,637 km².
- A total of 9 wolverines have died during the study; 4 from natural causes (2 by predation, 1 by an avalanche, and 1 unknown cause) and 5 from human causes (4 from trapping and 1 road kill).

Map 8: Map of wolverine observations on the Targhee National Forest

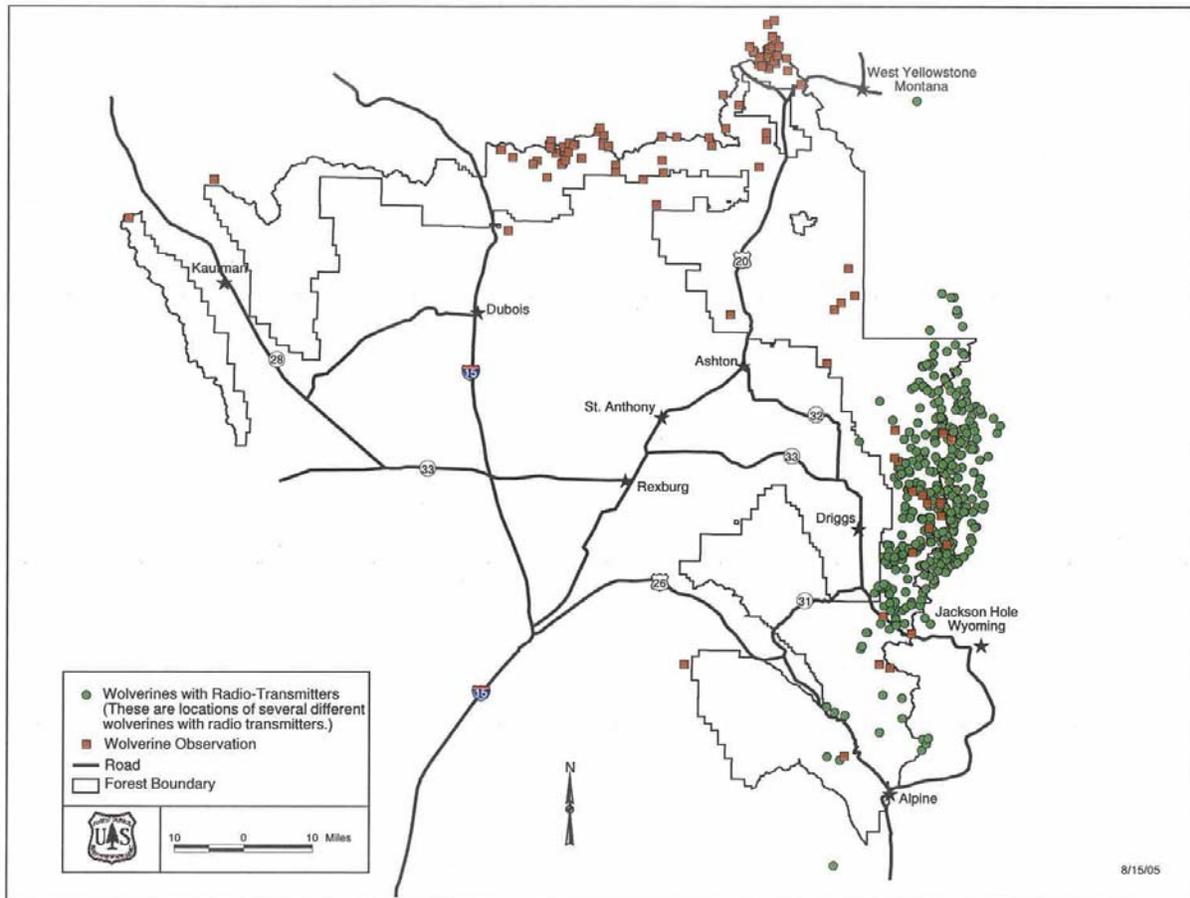


Figure 39: Locations of male wolverine, M304, captured in the Teton Range of Wyoming over a 34 month period.

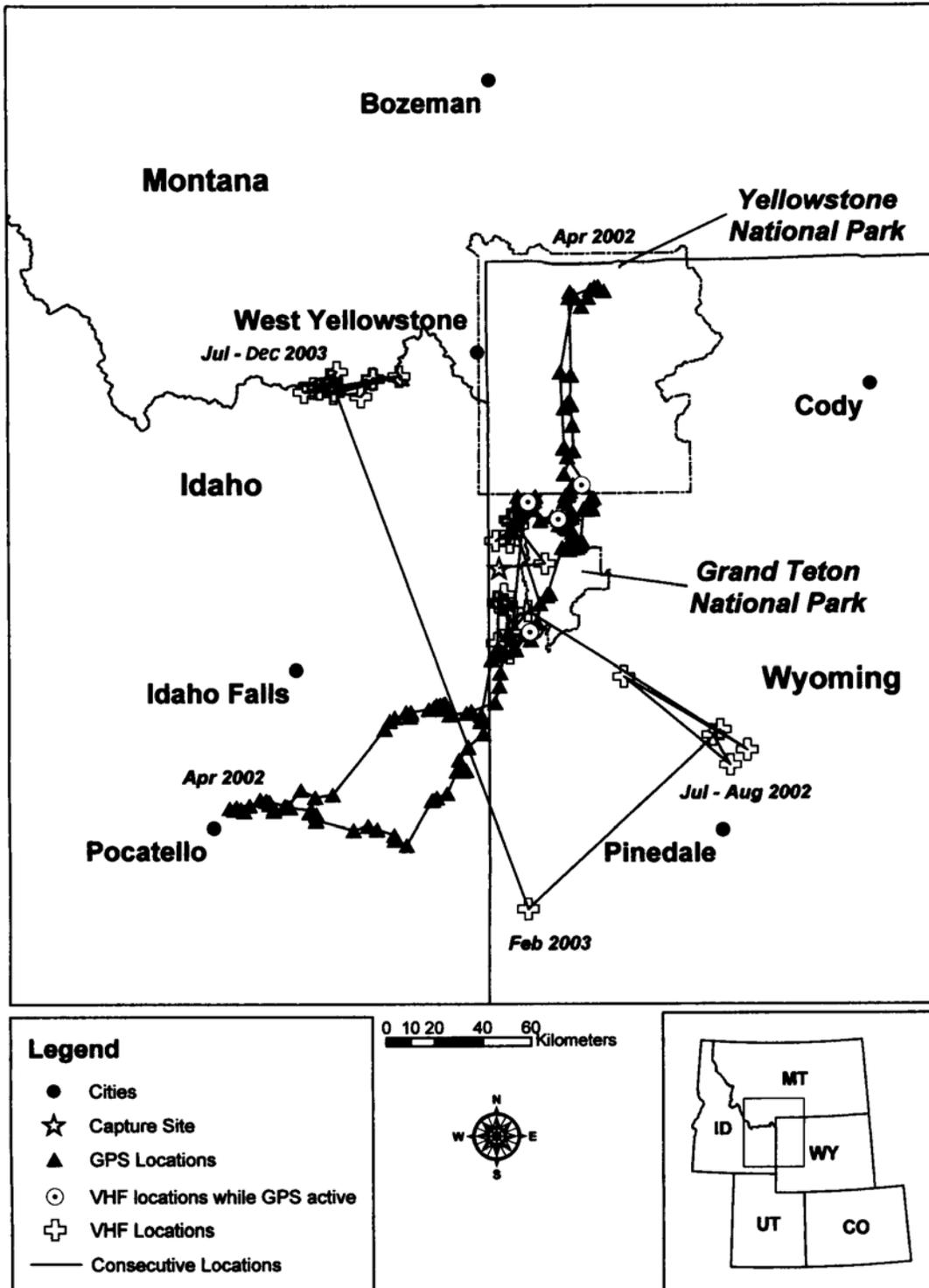


Figure 1. Locations of a male wolverine, M304, captured in the Teton Range of western Wyoming and made over a 34 mo period while the wolverine was 11–46 mo of age, 23 February 2001–19 December 2003.



Figure 40: Ashton/Island Park Ranger District wildlife biologist Bryan Aber with wolverine trapped in 2003.

Figure 41: Wolverine F105 prior to release from trap, 2003.



Additional Fisher Information

Sightings and Distribution

Fisher have only been documented twice on the winter track survey routes as follows:

- 1996 on the Pete Creek Route in the Centennial Mtns Subsection (recorded as possible tracks)
- 1997 on the Warm River Butte Route in the Island Park Subsection (recorded as possible tracks)

On Oct. 15, 2004, Forest Biologist Mark Orme observed a fisher crossing road # 266 (NE1/4 of Section 25, T7N, R45E) on the Westslope of the Tetons, Teton Range Subsection. This is in Principal Watershed #021I that has 61% of the forested acres in mature and older size classes, and 39% of the forested acres that have had timber harvest. This is in the same subsection where fisher tracks were documented in 1995(see below).

Other fisher observations that we have records of include:

- 1978 – Warm River Butte – 1 fisher was trapped (Island Park Subsection)
- 1995 – Near N. and S. Leigh Creeks – fisher tracks were observed by Dr. Steve Minta (Teton Range Subsection)
- 1996 – Porcupine Lake (T9N R45E Sec. 32) – tracks observed (Island Park Subsection)
- 1996 – North Fork Deep Creek (T12NR32E Sec. 34/35) – possible tracks.(Lemhi/Medicine Lodge Subsection)
- 1998 – Mesa Falls Byway (T10N R43E Sec. 13) – fisher ran across highway (Island Park Subsection)

Other records documenting fisher either on the Forest or adjacent to the Forest indicate that fisher have always been very rare (USDA Forest Service 1994; Targhee National Forest-Process Paper D 1997). Because of the overlap in track size with pine marten (a very common animal on the Targhee) the unverified sightings and possible tracks should be used with caution.

Habitat Information

Information on fisher habitat use and distribution is limited. According to Ruggerio et al. (1994), "fishers prefer late-seral forests (especially for resting and denning) and occur most frequently where these forests include the fewest large nonforested openings. Avoidance of open areas may restrict the movements of fishers between patches of habitat and reduce colonization of unoccupied but suitable habitat. Large physical structures such as live trees, snags and downed logs are the most frequent fisher rest sites, and these structures occur most commonly in late-seral forests." This research recommends that "until it is understood how these structures are used and can be managed outside their natural ecological context, the maintenance of late-successional forests will be important for the conservation of fishers." Thus, the RFP direction to maintain 10-20 percent of each watershed in late seral and/or old growth is important to maintaining fisher habitat (RFP Wildlife Analysis, Process Paper D pages 216-227).

As part of the analysis for the Interior Columbia River Assessment, Witmer et al. (1998) conducted a literature review on forest carnivore conservation and management. In this document, they identified four issues of concern to fisher conservation and management and key environmental correlates for each of those issues. The following discussion shows how the guidance in the RFP addresses those issues and environmental correlates.

Issue 1: Conservation of late successional forest at low to mid elevations. Key environmental correlates:

- Coniferous forest: > 20 percent of unit mature forest and > 40 percent additional heterogeneous aged forest;
- Coarse woody debris: medium to high fuel loadings and large logs.

At the time of the RFP analysis, timber harvesting or fire in the past 40 years had occurred on only 20.4 percent of the forested acres, leaving 79.6 percent of the forested acres that had not been harvested or burned (Process Paper D, page 211). Analysis of the 412 permanent forest inventory plots (FIA plots) showed the following:

- 8.7% of the plots meet all old growth characteristics.
- 1.7% of the plots meet live tree old growth characteristics.
- 21.6% of the plots have at least 1 live tree per acre meeting old growth characteristics.
- 45.1% of the plots have large live trees that meet the minimum dbh requirements for old growth.
- This came to a total of 77.1 percent of the 412 forest inventory plots that had some components of old growth forest habitat. These plots are distributed throughout the Forest.

If the allowable sale quantity (ASQ) had been met each year, only 2.5 percent of the forested acres would have been harvested. This would have meant that all ecological subsections would have 58.6-95.3 percent of their forested acres in old growth or late successional or mature conditions without any timber harvesting occurring on them (Process Paper D, page 211, Alt. 3M). All principal watersheds on the Forest would have 33-100 percent of the forested acres in old growth or late successional or mature conditions without any timber harvesting occurring on them (Process Paper D, page 214, Alt. 3M). As described elsewhere in this report, timber harvest has been much less than predicted in the RFP analysis. In the past seven years, only 0.2 percent of the total forested acres and 0.3 percent of the mature and older forested acres have been harvested. Thus, the amount of mature and late successional forest on the Targhee is much more than recommended by Witmer et al. (1998).

Coarse woody debris is addressed by management direction for dead and down material for wildlife (RFP page III-15). The Forest also has a photo series for quantifying forest residues. As shown in the Woody Debris for Soils and Wildlife monitoring item, these requirements have been met in harvested stands. Because of the insect epidemic, large woody debris is expected to increase in the next decades.

Issue 2: Maintenance of links between populations. Key environmental correlates:

- Nonforested habitat and highway location and density

The RFP does not increase nonforested habitat nor does it change highway location or density. Approximately 800 miles of motorized routes were closed in order to meet the route densities in the RFP.

Issue 3: Maintenance of riparian corridors for use by individuals and populations. Key environmental correlates:

- Riparian corridors on 1st, 2nd and 3rd order streams

The RFP has an Aquatic Influence Zone management prescription 2.8.3 which is applied to all streams on the Forest outside of designated wilderness areas (it is not needed in designated wilderness areas) (RFP pages III-106-112). This prescription applies to the aquatic influence zone associated with lakes, reservoirs, ponds, perennial and intermittent streams and wetlands.

Issue 4: Trapping pressure and human disturbance. Key environmental correlates:

- Road density $\leq 1.6\text{km}/2.6\text{ km}^2$ ($\leq 1\text{ mi}/\text{sq mi}$)
- Trapping (allowable fisher harvest by area and recent harvest data by area)

The RFP established standards for open roads and open motorized trails across the Forest (referred to as OROMTRD in the RFP). Note that the RFP included motorized trails, while the key environmental correlate is for road density only. In the RFP, 31 out of 44 watersheds (70%) have an OROMTRD of $<1\text{ mi}/\text{sq mi}$ (Process Paper D, page 81 Alternative 3M). Since motorized trails are included in this figure, the actual road densities are less than this.

Trapping is outside of the jurisdiction of the Forest Service. The States of Idaho and Wyoming do not have a trapping season for fisher. Fisher can occasionally be caught in traps set for other forest furbearer species such as marten.

Evaluation

The monitoring data show that fisher are very rare, but are still present on the Forest and are distributed in the same subsections as shown by historical records. No actual trend information is available because the species is so rare and hard to detect.

The Targhee has had two sightings in one watershed located on the Teton Basin Ranger District in 1995 and 2004. In that watershed where the fisher sighting occurred in 2004 (#021I), 61 percent of the forested acres are in mature and older size classes, and 39 percent of the forested acres have had timber harvest. If fisher persist in this area then timber harvest affecting only 0.2 percent of the mature forest over the entire forest should not impact fisher distribution at all. At the time of the RFP analysis, 79.6 percent of the forested acres were in mature, late seral, or old growth. Since the RFP was adopted in 1997, less than 0.3 percent of the forested acres have been harvested. The RFP standards and guidelines and conditions on the Targhee are meeting or exceeding the current recommendations for fisher habitat. The RFP standards and guidelines are adequate to maintain habitat for viable populations.

Weasels

Two species of weasels occur on the Forest, the short-tailed weasel and the long-tailed weasel. These two species are not MIS species or sensitive species for the Forest. Information on these two species is ancillary information gathered with the winter track survey routes, and we are providing a brief summary of that information here. It is very difficult to distinguish between tracks of these two species; therefore track information is recorded as weasel.

Weasels are associated with a wide variety of habitats. Weasel tracks have been documented on 19 out of 19 winter track survey routes, indicating that they are well distributed through 6 ecological subsections (Table 30).

There are 15 winter track survey routes that have been run for two or more years. Regression analysis was done for each of these routes to assess trends and test for statistical significance in the trends. Results of this analysis are presented in Table 30. Eight routes showed an upward trend, and 7 routes showed a downward trend. None of the trends were statistically significant.

It is not possible for populations to always show upward trends, because they are going to reach carrying capacity of the habitat, or there are numerous natural events that can cause downward trends such as weather, competition with other species, natural fluctuations in food abundance, and predation. For weasels, there is also a trapping season that effects populations. Therefore, both upward and downward trends will occur over time. Overall, the weasel track data indicates a well distributed weasel population that is stable.

Table 25: Summary of Weasel Data from the Winter Snow Tracking Routes.

Ecological Subsection	Route Name	Years When Data Was Collected	Total # of Times Route was Run	Weasel Documented on the Route (Yes/No)	Trend ¹	Statistically Significant ¹ (Yes/No)
Centennial Mtns.	D51-Pete Cr.-RC1	1996, 1997, 1999	9	Yes	Down	No
Centennial Mtns.	D51-West Camas-RC2	1996, 1997, 1999, 2001	9	Yes	Down	No
Island Park	D52-Chick Cr. Flat-IP3	2000, 2002	3	Yes	Down	No
Centennial Mtns.	D52-Dry Creek-RC3	1997	3	Yes	NA ²	--
Centennial Mtns.	D52-Kick Creek-RC4	1997, 2000, 2002	6	Yes	Down	No
Island Park	D52-Huckleberry Ridge-RA1	1996, 1997, 2002, 2004	4	Yes	Up	No
Madison-Pitchstone Plateau	D52-Wyoming Creek-RA2	1996, 1997, 2004	3	Yes	Up	No
Madison-Pitchstone Plateau	D52-Long-haul Road-NA1	1997, 2000	3	Yes	Up	No
Madison-Pitchstone Plateau	D52-Snow Creek Butte-NA2	1997, 2000	3	Yes	Up	No
Island Park	D52-Warm River Butte-RA3	1997	2	Yes	NA ²	--
Island Park	D52-Marysville Hill	1999	2	Yes	NA ²	--
Caribou Range Mtns.	D54-Fall/June Cr.	2000, 2001, 2002, 2004	5	Yes	Up	NO
Caribou Range Mtns.	D54-McCoy, Trout, McNeal	1999, 2000, 2002, 2003	6	Yes	Down	No
Caribou Range Mtns.	D54-Calamity (Palisades Dam)	1999, 2000, 2001, 2002, 2003,	6	Yes	Down	No
Big Hole Mtns.	D54-Windy Ridge/Moody	2003, 2004	3	Yes	Down	No
Big Hole Mtns.	D54-Alpine Summer Home/4H Camp	2003, 2004	3	Yes	Up	No
Teton Range	D56-S. Leigh/Kiln Cr.-TB4	2000, 2001	3	Yes	Up	No
Teton Range	D56-Badger Springs-TB3	2000, 2001, 2003	4	Yes	Up	No
Big Hole Mtns.	D56-Relay Ridge Route	2003	2	Yes	NA ²	--

¹For trend analysis, we used the regression analysis program in Microsoft Excel. For tests of statistical significance, we used a 95% confidence level.

² 'NA' means not applicable, and means that trend analysis was not done for four routes with only 1 year of data.

Coyote and Fox

These two species are not MIS species or sensitive species for the Forest. Information on these two species is ancillary information gathered with the winter track survey routes, and we are providing a brief summary of that information here. It is often difficult to distinguish between coyote tracks and fox tracks; therefore track information is combined for these species.

Coyotes and fox are associated with a wide variety of habitats. Coyote and fox are present in all ecological subsections of the Forest. Coyote and fox tracks have been documented on 18 out of 19 winter track survey routes (Table 31). The only winter track route where no tracks have been documented is the Snow Creek Butte route.

There are 13 winter track survey routes that have been run for two or more years with coyote and fox data (Table 31). Regression analysis was done for each of these routes to assess trends and test for statistical significance in the trends. Results of this analysis are presented in Table 31. Seven routes showed a downward trend, and 6 routes showed an upward trend. None of the trends were statistically significant.

It is not possible for populations to always show upward trends, because they are going to reach carrying capacity of the habitat, or there are numerous natural events that can cause downward trends such as weather, competition with other species, natural fluctuations in food abundance, and predation. For coyote and fox, there are hunting, trapping and predator control activities that effect populations. Therefore, both upward and downward trends will occur over time. Overall, the track data indicates a well distributed coyote and fox population that is stable.

Table 26. Summary of Coyote and Fox Data from the Winter Snow Tracking Routes.

Ecological Subsection	Route Name	Years When Data Was Collected	Total # of Times Route was Run	Coyote or Fox Documented on the Route (Yes/No)	Trend ¹	Statistically Significant ¹ (Yes/No)
Centennial Mtns.	D51-Pete Cr.-RC1	1996, 1997, 1999	9	Yes	Down	No
Centennial Mtns.	D51-West Camas-RC2	1996, 1997, 1999, 2001	9	Yes	Down	No
Island Park	D52-Chick Cr. Flat-IP3	2000, 2002	3	Yes	Up	No
Centennial Mtns.	D52-Dry Creek-RC3	1997	3	Yes	NA ²	--
Centennial Mtns.	D52-Kick Creek-RC4	1997, 2000, 2002	6	Yes	Down	No
Island Park	D52-Huckleberry Ridge-RA1	1996, 1997, 2002, 2004	4	Yes	Up	No
Madison-Pitchstone Plateau	D52-Wyoming Creek-RA2	1996, 1997, 2004	3	Yes	Up	No
Madison-Pitchstone Plateau	D52-Long-haul Road-NA1	1997, 2000	3	Yes (only 1 time)	NA ²	--
Madison-Pitchstone Plateau	D52-Snow Creek Butte-NA2	1997, 2000	3	No	NA ²	--
Island Park	D52-Warm River Butte-RA3	1997	2	Yes	NA ²	--
Island Park	D52-Marysville Hill	1999	2	Yes	NA ²	--
Caribou Range Mtns.	D54-Fall/June Cr.	2000, 2001, 2002, 2004	5	Yes	Up	No
Caribou Range Mtns.	D54-McCoy, Trout, McNeal	1999, 2000, 2002, 2003	6	Yes	Down	No
Caribou Range Mtns.	D54-Calamity (Palisades Dam)	1999, 2000, 2001, 2002, 2003,	6	Yes	Down	No
Big Hole Mtns.	D54-Windy Ridge/Moody	2003, 2004	3	Yes	Up	No
Big Hole Mtns.	D54-Alpine Summer Home/4H Camp	2003, 2004	3	Yes	Down	No
Teton Range	D56-S. Leigh/Kiln Cr.-TB4	2000, 2001	3	Yes	Up	No
Teton Range	D56-Badger Springs-TB3	2000, 2001, 2003	4	Yes	Down	No
Big Hole Mtns.	D56-Relay Ridge Route	2003	2	Yes	NA ²	--

¹For trend analysis, we used the regression analysis program in Microsoft Excel. For tests of statistical significance, we used a 95% confidence level.

²'NA' means not applicable, and means that trend analysis was not done for four routes with only 1 year of data, the one route with no coyote or fox tracks, and the 1 route with coyote or fox only documented one time.

Red Squirrel

Red squirrels are a MIS for the Forest. Red squirrels are associated with conifer forest habitat that are of cone bearing age. Red squirrel tracks have been documented on 19 out of 19 winter track survey routes, indicating that they are well distributed through 6 ecological subsections (Table 32). The Fall/June Creek survey route had few red squirrel tracks compared to the other survey routes, because this route has very little conifer habitat.

There are 15 winter track survey routes that have been run for two or more years. Regression analysis was done for each of these routes to assess trends and test for statistical significance in the trends. Results of this analysis are presented in Table 32. Seven routes showed an upward trend, and 8 routes showed a downward trend. Only one of the trends was statistically significant, and this was an upward trend on the Wyoming Creek Route.

Most of these routes include areas of past timber harvesting, and four of the routes occur in areas where the lodgepole pine timber harvest salvage program occurred from the 1970's to the early 1990's. The track data shows that red squirrel distributions have not changed due to past timber harvesting.

It is not possible for populations to always show upward trends, because they are going to reach carrying capacity of the habitat, or there are numerous natural events that can cause downward trends such as weather, competition with other species, natural fluctuations in food abundance, and predation. Therefore, both upward and downward trends will occur over time. Overall, the track data indicates a well distributed red squirrel population that is stable.

Table 27. Summary of Red Squirrel Data from the Winter Snow Tracking Routes.

Ecological Subsection	Route Name	Years When Data Was Collected	Total # of Times Route was Run	Red Squirrel Documented on the Route (Yes/No)	Trend ¹	Statistically Significant ¹ (Yes/No)
Centennial Mtns.	D51-Pete Cr.-RC1	1996, 1997, 1999	9	Yes	Down	No
Centennial Mtns.	D51-West Camas-RC2	1996, 1997, 1999, 2001	9	Yes	Down	No
Island Park	D52-Chick Cr. Flat-IP3	2000, 2002	3	Yes	Up	No
Centennial Mtns.	D52-Dry Creek-RC3	1997	3	Yes	NA ²	--
Centennial Mtns.	D52-Kick Creek-RC4	1997, 2000, 2002	6	Yes	Down	No
Island Park	D52-Huckleberry Ridge-RA1	1996, 1997, 2002, 2004	4	Yes	Up	No
Madison-Pitchstone Plateau	D52-Wyoming Creek-RA2	1996, 1997, 2004	3	Yes	Up	Yes
Madison-Pitchstone Plateau	D52-Long-haul Road-NA1	1997, 2000	3	Yes	Up	No
Madison-Pitchstone Plateau	D52-Snow Creek Butte-NA2	1997, 2000	3	Yes	Down	No
Island Park	D52-Warm River Butte-RA3	1997	2	Yes	NA ²	--
Island Park	D52-Marysville Hill	1999	2	Yes	NA ²	--
Caribou Range Mtns.	D54-Fall/June Cr.	2000, 2001, 2002, 2004	5	Yes	Down	No
Caribou Range Mtns.	D54-McCoy, Trout, McNeal	1999, 2000, 2002, 2003	6	Yes	Down	No
Caribou Range Mtns.	D54-Calamity (Palisades Dam)	1999, 2000, 2001, 2002, 2003,	6	Yes	Up	No
Big Hole Mtns.	D54-Windy Ridge/Moody	2003, 2004	3	Yes	Down	No
Big Hole Mtns.	D54-Alpine Summer Home/4H Camp	2003, 2004	3	Yes	Up	No
Teton Range	D56-S. Leigh/Kiln Cr.-TB4	2000, 2001	3	Yes	Down	No
Teton Range	D56-Badger Springs-TB3	2000, 2001, 2003	4	Yes	Up	No
Big Hole Mtns.	D56-Relay Ridge Route	2003	2	Yes	NA ²	--

¹For trend analysis, we used the regression analysis program in Microsoft Excel. For tests of statistical significance, we used a 95% confidence level.

² 'NA' means not applicable, and means that trend analysis was not done for four routes with only 1 year of data.

Snowshoe Hare

Snowshoe hares are not a MIS species or sensitive species for the Forest. Information on this species is ancillary information gathered with the winter track survey routes, and we are providing a brief summary of that information here. Snowshoe hare tracks have been documented on 17 out of 19 winter track survey routes, indicating that they are well distributed through 6 ecological subsections (Table 33). The two survey routes with no snowshoe hare tracks were the Huckleberry Ridge route and the Leigh/Kiln Creek route. Also, five routes had snowshoe hares documented only one time.

There are 9 winter track survey routes that have had regression analysis done to assess trends and test for statistical significance in the trends (Table 33). Four routes showed an upward trend, and 5 routes showed a downward trend. Only one of the trends was statistically significant, and this was a downward trend on the Badger Springs Route.

Most of these routes include areas of past timber harvesting, and four of the routes occur in areas where the lodgepole pine timber harvest salvage program occurred from the 1970's to the early 1990's. The track data shows that snowshoe hare distributions have not changed due to past timber harvesting.

It is not possible for populations to always show upward trends, because they are going to reach carrying capacity of the habitat, or there are numerous natural events that can cause downward trends such as weather, competition with other species, natural fluctuations in food abundance, and predation. Snowshoe hare populations in the lower 48 states do not show the large cyclic patterns that occur in Canada and Alaska, but small cyclic patterns may occur in some areas. Therefore, both upward and downward trends will occur over time. Overall, the snowshoe hare track data indicates well distributed populations that are stable.

Table 28. Summary of Snowshoe Hare Data from the Winter Snow Tracking Routes.

Ecological Subsection	Route Name	Years When Data Was Collected	Total # of Times Route was Run	Snowshoe Hare Documented on the Route (Yes/No)	Trend ¹	Statistically Significant ¹ (Yes/No)
Centennial Mtns.	D51-Pete Cr.-RC1	1996, 1997, 1999	9	Yes	Down	No
Centennial Mtns.	D51-West Camas-RC2	1996, 1997, 1999, 2001	9	Yes	Down	No
Island Park	D52-Chick Cr. Flat-IP3	2000, 2002	3	Yes	Up	No
Centennial Mtns.	D52-Dry Creek-RC3	1997	3	Yes	NA ²	--
Centennial Mtns.	D52-Kick Creek-RC4	1997, 2000, 2002	6	Yes	Up	No
Island Park	D52-Huckleberry Ridge-RA1	1996, 1997, 2002, 2004	4	No	NA ²	--
Madison-Pitchstone Plateau	D52-Wyoming Creek-RA2	1996, 1997, 2004	3	Yes (only 1 time)	NA ²	--
Madison-Pitchstone Plateau	D52-Long-haul Road-NA1	1997, 2000	3	Yes	Up	No
Madison-Pitchstone Plateau	D52-Snow Creek Butte-NA2	1997, 2000	3	Yes (only 1 time)	NA ²	--
Island Park	D52-Warm River Butte-RA3	1997	2	Yes	NA ²	--
Island Park	D52-Marysville Hill	1999	2	Yes (only 1 time)	NA ²	--
Caribou Range Mtns.	D54-Fall/June Cr.	2000, 2001, 2002, 2004	5	Yes (only 1 time)	NA ²	--
Caribou Range Mtns.	D54-McCoy, Trout, McNeal	1999, 2000, 2002, 2003	6	Yes	Up	No
Caribou Range Mtns.	D54-Calamity (Palisades Dam)	1999, 2000, 2001, 2002, 2003,	6	Yes	Down	No
Big Hole Mtns.	D54-Windy Ridge/Moody	2003, 2004	3	Yes	Down	No
Big Hole Mtns.	D54-Alpine Summer Home/4H Camp	2003, 2004	3	Yes (only 1 time)	NA ²	--
Teton Range	D56-S. Leigh/Kiln Cr.-TB4	2000, 2001	3	No	NA ²	--
Teton Range	D56-Badger Springs-TB3	2000, 2001, 2003	4	Yes	Down	Yes
Big Hole Mtns.	D56-Relay Ridge Route	2003	2	Yes	NA ²	--

¹For trend analysis, we used the regression analysis program in Microsoft Excel. For tests of statistical significance, we used a 95% confidence level.

²'NA' means not applicable, and means that trend analysis was not done for four routes with only 1 year of data, the 2 routes with no snowshoe hares, and the 5 routes with snowshoe hares only documented one time. This includes one overlap.

Bobcat and Mountain Lion

Bobcats and mountain lions (cougars) are not MIS species or sensitive species for the Forest. Information on these two species is ancillary information gathered with the winter track survey routes, and we are providing a brief summary of that information here.

Bobcat tracks have been documented on 6 out of 19 winter track survey routes in 4 ecological subsections (Table 34). This information suggests that bobcats are not widely distributed during the winter season in the areas of the Forest where the winter track survey routes are located. Bobcats are usually associated with habitats that have lower snow depths during the winter, and this would occur at lower elevations below the Forest boundary.

Table 29. Summary of Bobcat Tracks Documented on Winter Track Survey Routes.

Ecological Subsection	Winter Track Route Name	Year	Number of Tracks
Island Park	Warm River Butte	1997	1
Teton Range	Leigh Creek/Kiln Creek	2000	1
		2001	1
Teton Range	Badger Springs	2000	7
		2001	1
Big Hole Mountains	Windy Ridge/Moody	2004	1
Big Hole Mountains	Alpine Summer Home/4H Camp	2003	1
		2004	1
Caribou Range Mountains	McCoy, Trout, McNeal	1999	1
		2000	2
		2002	1

Mountain lion tracks have not been documented when doing the 19 winter track survey routes. This information suggests that mountain lions are not widely distributed during the winter season in the areas of the Forest where the winter track survey routes are located. Mountain lions prey on big game animals, primarily deer and elk. These prey species migrate to lower elevations during the winter season, and are not present in the areas where winter track survey routes are located.

Mink and River Otter

Mink and river otter are not MIS species or sensitive species for the Forest. Information on these two species is ancillary information gathered with the winter track survey routes, and we are providing a brief summary of that information here.

Mink tracks have not been documented when doing the 19 winter track survey routes. Mink habitat is associated with rivers, streams and wetland areas. Since the winter track survey routes are located in upland habitats, we do not expect to find mink tracks or sign when running the routes.

River otter tracks have only been documented one time on one winter survey route. This occurred in 2000 on the Long-haul Road survey route in the Madison-Pitchstone Plateau Ecological Subsection. River otter are usually associated with rivers and large streams, but will occasionally leave these areas and take treks into upland habitat, sometimes to cross from one drainage into another drainage. The Long-haul Road survey route is in upland habitat, and the river otter tracks that were observed one time is documentation of a rare occasional event. The winter track survey routes are not located along rivers and large streams, so we do not expect to find their tracks when running the routes.

Cottontail Rabbit and Forest Grouse (Ruffed Grouse and Blue Grouse)

Cottontail rabbit and forest grouse are not MIS species or sensitive species for the Forest. Information on these species is ancillary information gathered with the winter track survey routes, and we are providing a brief summary of that information here.

Cottontail rabbits have been documented on 4 of the 19 winter track survey routes in 2 ecological subsections (Table 35).

Table 30. Summary of Cottontail Rabbit Tracks Documented on Winter Track Survey Routes.

Ecological Subsection	Winter Track Route Name	Year	Number of Tracks
Big Hole Mountains	Windy Ridge/Moody	2003	53
		2004	89
Big Hole Mountains	Alpine Summer Home/4H Camp	2003	1
Caribou Range Mountains	Fall/June Creek	2000	1
		2001	4
		2002	6
		2004	4
Caribou Range Mountains	Calamity (Palisades Dam)	2002	1

Forest grouse include the ruffed grouse and blue grouse. Because it is not possible to differentiate between these two species from sign in the snow, they are combined together as forest grouse. Forest grouse have been documented on 17 out of 19 winter track survey routes, including 6 ecological subsections. The two routes where they have not been documented are the Long-haul Road route and the Leigh/Kiln Creek route. On the routes where they have been documented, they are not found each time the route is run. Because they fly and roost in trees, they can be present along a route and not be documented from tracks or sign in the snow. From the winter track survey routes, it is not possible to evaluate any trends. The data shows that forest grouse are well distributed throughout the forested habitats on the Forest.

Recommendation

For Furbearers the Forest would retain monitoring, and drop lynx, fisher, and wolverine as MIS. The Forest would continue to run winter track survey routes and continue to cooperate in special studies as in the past.

Goshawk Population Trends

Requirements

To measure the population trend and its relationship to habitat changes, a minimum of fifteen goshawk nesting territories are to be surveyed each year. Surveys record adult occupancy, productivity, human activities and habitat parameters. This data is to be analyzed to determine if RFP standards and guidelines are effectively protecting the northern goshawk.

Results

Variable information on goshawk territories extends back to 1980. From 1980 to 1988, the Forest did not have a specific goshawk monitoring program; during these years, goshawk territories were found incidentally when doing fieldwork for timber sales and other management activities. From 1989 through 1996, a goshawk monitoring program was initiated, which included annual checking of many of the known territories and systematic searches for new territories. This effort greatly expanded Forest biologists' knowledge of goshawk territories on the Forest. In 1997, no goshawk monitoring was conducted on the Forest. Beginning in 1998, a random sampling of known goshawk territories was conducted that followed the goshawk monitoring protocol established in the 1997 Revised Forest Plan. Table 36 provides a summary of all of the information gathered on goshawk territories from 1990 to 2004. Goshawk monitoring data from 1980-1989 is not displayed here since the methods used were different than currently used. See the 1997-1999 C-T Forest Plan Monitoring and Evaluation Report for that data.

It is not possible to use data from all years (1980 to 2004) to analyze population trends, because survey methods were not consistent and comparable every year. The best comparison of occupied and active territories can be made for the years of 1990-1994 and 1998-2004, because consistent and comparable survey methods were used during these years. Table 37 provides a summary of goshawk monitoring data collected for those years. Some of the key findings from Table 37 are:

- Percent of territories occupied ranged from 94 percent in 1991 to 31 percent in 2004, with a twelve-year average of 52 percent. Percent occupancy of goshawk territories peaked during the years 1990-92 and then declined in subsequent years. Percent occupancy between 1990-1994 averaged 7 percent compared to an average occupancy rate of 34 percent between 1998-2004.
- The percent of occupied territories that successfully raised young ranged from 100 percent in 1998 and 2004 to 33 percent in 1999, with a twelve-year average of 73 percent. For the years 1990-1994, the average percent of occupied territories that successfully raised young was 73 percent compared to 72 percent for the years 1998-2004.

- The number of young per occupied territory ranged from 0.6 in 1999 to 2.1 in 1998, with a twelve-year average of 1.4. For the years 1990-1994, the average number of young per occupied territory was 1.5, compared to 1.4 for the years 1998-2004.
- The number of young per successful territory ranged from 1.3 in 2003 to 2.6 in 1994, with a twelve-year average of 2.0. For the years 1990-1994, the average number of young per successful territory was 2.1, compared to 1.9 for the years 1998-2004.

Goshawk territories that have been monitored for the years 1990-1994 and 1998-2004 were separated into two groups: 1) undisturbed territories that have not had any timber harvesting activity within the territory; and 2) territories which have had timber harvesting activity within the territory sometime in the past. Occupied and successful goshawk nesting have been documented in both undisturbed territories and in territories with timber harvest activity. Table 38 displays monitoring data for the undisturbed territories, and Table 39 displays monitoring data for the territories with timber harvesting. Some key findings from Tables 38 and 39 are:

- Percent occupancy of territories in the 1990-1994 period was 75 percent and 77 percent for the undisturbed territories and territories with timber harvesting, respectively. The highest percent occupancy occurred in the territories with timber harvesting in 1990, 1991, and 1992. Both groups of territories had declines in percent occupancy during the 1998-2004 period, with 44 percent and 24 percent for the undisturbed territories and territories with timber harvesting, respectively. The lowest percent occupancy occurred in the undisturbed territories in 2004 (11%). The second lowest percent occupancy occurred in territories with timber harvesting in 2000, 2003, and 2004 (13%).
- The percent of occupied territories that successfully raised young in the 1990-1994 period was 59 percent and 83 percent for the undisturbed territories and territories with timber harvesting, respectively. The percent of occupied territories that successfully raised young in the 1998-2004 period was 68 percent and 80 percent for the undisturbed territories and territories with timber harvesting, respectively.
- The number of young per occupied territory in the 1990-1994 period was 1.2 and 1.7 for the undisturbed territories and territories with timber harvesting, respectively. The number of young per occupied territory in the 1998-2004 period was 1.4 and 1.3 for the undisturbed territories and territories with timber harvesting, respectively.
- The number of young per successful territory in the 1990-1994 period was 2.0 and 2.1 for the undisturbed territories and territories with timber harvesting, respectively. The number of young per successful territory in the 1998-2004 period was 1.8 and 1.6 for the undisturbed territories and territories with timber harvesting, respectively.

While doing goshawk monitoring in 2001, the opportunity arose to radio-tag three birds. The results of the radio-tagging are as follows:

- Two adult females were radio-tagged from territories D2-03 and D5-04, and one adult male was radio-tagged from territory D1-08 (Patla 2002).
- Both adult females appeared to shift the center of their activity by late August/early September away from nesting territories (Patla 2002).
- The female from D2-03 moved over 23 miles away from her nest area, close to the border of Yellowstone National Park by the end of August. She was relocated within the park near the Firehole River until her transmitter went on mortality mode by mid-October. Her carcass was retrieved in early March under 6 feet of snow under a lodgepole pine tree set on top of a small open knoll surrounded by mature forest. Only the transmitter was found along with a few breast feathers. The Teflon harness had been chewed through by mammals. Given the time of year and location, predation was the likely cause of death (Patla 2002).
- The female from D5-04 moved 11 miles north of her nest area by early September when aerial tracking began. She was relocated consistently in the Jackpine Loop area of the Teton Basin District until January, when she moved back closer (2.8 miles north) of the nest site. The next location obtained for her was a mortality signal in February, 7.8 miles from her nest site. Her carcass was retrieved from under 4 feet of snow near the headwaters of Jackpine Creek in February. The body was intact but her head and wing were torn off and found next to the carcass. Talon marks could be seen on the tarsus. The female may have been preyed upon by another raptor, likely a great horned owl or golden eagle (Patla 2002).
- At the two territories where the adult females from the previous year had been lost, pairs were observed during the courtship period in April 2002 using the same nest stands occupied the previous year. One site produced young in 2002 (D5-04), but no nest was found subsequently at the other territory (D2-03). These results suggest surplus females exist within this population, and also that males rather than females select nest sites (Patla 2003).
- The adult male from D1-08 was relocated closer to his nest site compared to the female adults during the late summer and fall. The five locations obtained between late August and the end of October, ranged in distance from the nest site

from 0.5 to 4.5 miles. In January the male had moved over 30 miles to the Big Bend Ridge area northwest of Ashton Reservoir (Patla 2002). At the adult male territory (D1-08) in the spring of 2002, no radio signal was picked up in April or May. A new nest was found during the fledgling period at this territory but this nest was over 600 meters away from the nest used in 2001. A visual was not obtained on the male goshawk at this site, so we could not determine if radio failure occurred or if a new male had taken over this territory (Patla 2003).

Some additional findings from the goshawk monitoring include:

- Only about 50 percent of the Targhee has been inventoried for goshawk territories. About 55 territories have been documented in that half of the Forest.
- No goshawk territory has been active every year.
- Most goshawk territories have alternative nest sites which makes monitoring more difficult.
- Goshawks have been present on territories that have not been counted as occupied territories according to the monitoring protocol. This means that more goshawks are present within the Forest. Because it is hard to find alternate nest sites, some territories may be occupied that have not been counted as occupied.
- Other raptor species that use goshawk nest sites for nesting include great gray owl, long-eared owl, and red-tailed hawk (at only one territory). Sometimes goshawk territories are active when these raptors are present and nesting, and sometimes they are not (Patla 2001, 2002, 2003).
- Other raptor species documented within goshawk territories include: sharp-shinned hawk, Cooper's hawk, American kestrel, great horned owl, short-eared owl, boreal owl, northern saw-whet owl, and northern pygmy owl (Patla 2003).

Reasons for the decline in occupancy from highs in the early 1990's are unknown. Declines in the occupancy of raptor territories most likely reflect changes in prey abundance and availability and an associated increase in goshawk mortality due to starvation and/or increased competition by other diurnal or nocturnal raptors (Patla 2003). In the more northern regions, goshawk populations follow a cyclical pattern where snowshoe hare is the main prey item for the goshawk (Patla 2003). Due to a greater variety of prey species in the more southern extent of its range, it has been assumed that goshawk populations south of the boreal forest would not fluctuate as greatly compared to populations in the north (Patla 2003). Little information exists on population cycles of goshawk prey species in the western United States, however. It is difficult to determine why numbers of nesting pairs may have declined since the early 1990's. Drought conditions, or perhaps habitat changes due to other factors on summer and/or winter use areas, may be affecting prey populations (Patla 2003).

Another factor that has not been discussed with regard to the high occupancy rate that occurred in the early 1990s is the 1988 fires that burned over one million acres on National Forest and National Park lands. These fires would have displaced many adult goshawks from their traditional territories. These goshawks may have occupied adjacent suitable habitat, making occupancy rates in adjacent areas such as the Targhee, high for several years following the fires. Like many other factors that could be affecting goshawk occupancy rates, it will not be possible to determine if this was a factor contributing to the high occupancy rates in the early 1990's (Mark Orme, personal communication).

The decrease in goshawk occupancy since the early 1990s could be a result from causes other than prey cycles also. Weather patterns also appear to greatly influence goshawk nest success in the northern Rockies and Europe (Patla 1997 and 2000). The year of highest productivity on the Forest, 1992, was a warm, dry spring (Patla 1997). Wet weather during the incubation and nestling period could affect nest success by increasing energy demands on the incubating female and newly hatched young, and decreasing availability and/or abundance of prey for the foraging male. Changes in predation rates and parasitism might also result from poor weather conditions.

Patla (2000) describes the difficulty of monitoring goshawk territories. Goshawk pairs that attempt to lay eggs but have a failure, leave the nest area early in the breeding season. Estimating occupancy status of territories where eggs were not laid may require regular visits to the nest area three weeks prior to and one week after egg laying. Since between 50 and 71 percent of territorial pairs move to alternate nests each year, searching for pairs outside of known nest areas is required in the nestling and fledgling periods and results in the largest investment of time for the monitoring program. Searches within a 1,500-meter radius of known nest trees are needed to locate 90-95 percent of alternate nests.

Evaluation

In 1996, The Wildlife Society did a technical review of the northern goshawks and forest management in the southwestern United States. That technical review was used in development of the Targhee RFP standards and guidelines for goshawk. In 2003-2004 The Wildlife Society did another technical review called "The Status of Northern Goshawks in the Western United States" (TWS, 2004). This recent technical review by The Wildlife Society supports management direction in the 1997 Revised

Forest Plan, and the analysis used to develop that management direction. The following are some quotes from this most recent review. All emphasis is added by Forest.

- “Northern goshawks in western North American {sic} breed in forested habitats, and in most places, goshawks select nest areas that are typically composed of late-successional forests. Goshawks often place their nests in the larger or largest trees in a stand, and stands in which nests are placed tend to be older than nearby stands in at least some landscapes. Beyond the immediate area surrounding the nest, late-successional forest stands do not appear to compose a higher proportion of the landscape than what is generally available, and the preponderance of these stands decreases as the scale of the landscape increases. During the breeding season, goshawks forage in late-successional forests, but at least in some landscapes, also use other habitats for foraging. Although data on foraging locations and habitat use outside of the breeding season are few compared to habitat data in the vicinity of nest sites, it appears that in many landscapes goshawks use older forests throughout the year. Goshawks use a range of habitats and prey on species that use a range of habitats, but use late-successional forests in almost all landscapes where they have been studied. However, **goshawks exhibit considerable versatility in habitat use, and prey on a variety of species that inhabit both early- and late-successional forests. At present, assessing the status of goshawks based solely on the distribution of late-successional forests is not appropriate based on the current understanding of goshawk-habitat relationships, although goshawks clearly use and often select for late-successional forests.**”
- Concerning a status review conducted by the USFWS in 1998: “The USFWS used data from recent survey and monitoring efforts suggesting that goshawks have generally been located where intensive survey and monitoring efforts have been implemented, and that goshawks remain widely distributed throughout their historic range. **The USFWS also reviewed existing habitat data and concluded that there was no evidence that habitat was currently limiting goshawk populations, and that habitat was unlikely to limit the population in the foreseeable future.** The petition for listing suggested that goshawks in the western U. S. are dependent upon large, unbroken tracts of late-successional forest, but the USFWS concluded that there was little or no support for this assertion.”
- “For example, Reynolds and Joy (1998) found that in some years up to 83% of goshawk pairs on the Kaibab Plateau in northern Arizona did not lay eggs, and that alternative nests within a breeding area were up to 4.0 km apart. Fifty-five to seventy-five percent of egg-laying pairs moved to alternative nests between years (Reynolds and Joy 1998), highlighting the importance of standardized protocols for assessing occupancy. **High annual variability in reproduction appears to be characteristic of all goshawk populations studied to date and is associated with annual variation in weather and prey** (Kostrzewa and Kostrzewa 1990, Keane 1999, Doyle and Smith 2001).”
- “Contraction of historic breeding and/or wintering ranges could suggest a decline in population size (Kennedy 1997), but **no historic or current evidence is available to suggest either a range contraction or expansion in the western U.S.**”
- “Goshawks forage in late-successional forests that have relatively dense canopies (Widen 1989, Austin 1993, Bright-Smith and Mannan 1994, Hargis et al. 1994, Iverson et al. 1996, Beier and Drennan 1997), but also capture prey in a variety of vegetative cover, including open sagebrush (*Artemisia* spp.) (Younk and Bechard 1994, Patla 1997). In the western U.S., most diet studies report that prey associated with late-successional forests are important (Reynolds and Meslow 1984, Kennedy 1991, Reynolds et al. 1992, Keane 1999, Maurer 2000, Lewis 2001), **although species associated with other habitats are also used** (e.g., Reynolds et al. 1992, Boal and Mannan 1994, Doyle and Smith 1994, Younk and Bechard 1994, Patla 1997, Watson et al. 1998).”
- “**If detailed prescriptions are developed (e.g., Reynolds et al. 1992), they need to be viewed as long-term experiments in an adaptive-management context, and they will need to be modified for different landscapes and vegetation types because of variation in the importance of different prey species among bioregions.**”
- “There is general agreement among biologists that habitat that supports breeding by goshawks can be discussed in terms of 3 nested spatial scales: a nest stand (and alternative nest stands; 10-12 ha), within a post-fledging area (PFA; 120-240 ha), and within a foraging area (1,500-2,100 ha) (Reynolds et al. 1992).”
- “Northern goshawks have broad geographic and elevational distributions in North America and can be found in many different forest types and forest stand conditions (Squires and Reynolds 1997). Goshawks have relatively large home ranges, are able to move great distances, especially during times of low prey abundance, and use a wide variety of prey species across the range of landscapes in which they occur. Goshawks tend to nest in forest stands

with specific structural characteristics – generally stands with large trees and moderate to high canopy closure that is high relative to the range of available canopy closure. Goshawks forage in a variety of habitats, ranging from mature forests to open habitats adjacent to forested habitats. During the breeding season, late-successional forests appear to be used predominantly for foraging, although some of the prey taken by goshawks use young forests and open habitats.”

- “There is general agreement among biologists that goshawk breeding habitat can be discussed in terms of 3 nested spatial scales: a nest stand (and stands containing alternative nests), within a PFA, and within a foraging area. At the nest-stand scale, late-successional forest characteristics are often important determinants of where goshawks locate their nests. The preponderance of late-successional forest in the landscape decreases as the scale increases (e.g., as one moves from nest stand to PFA to foraging area), and **existing data from telemetry and observational studies suggest that goshawks use late-successional forests within their home ranges for foraging, but use prey associated with both early- and late-successional forests, and in some cases open habitats. Thus, goshawks appear to be associated with late-successional forests for nesting and foraging, but clearly also use, and use prey associated with, other habitats.** Goshawk breeding habitat has been studied much more intensively than non-breeding habitat. In some landscapes, goshawks appear to remain near breeding areas throughout the year, although there is considerable annual variation and variation between sexes in non-breeding habitat use. In at least some landscapes, goshawks forage in late-successional forest habitats throughout the year. Conversely, some goshawks use landscapes during the non-breeding season (e.g., pinyon-juniper and open sagebrush basins) that are quite different from landscapes use during the breeding season. In general, there appears to be a wider range of habitats used during the non-breeding season than during the breeding season.”

Even though occupancy rates have declined from high levels in the early 1990's, radio-tagging results discussed above indicate surplus females exist within this population (Patla 2003). Also, as discussed above, goshawks have been present on territories that have not been counted as occupied territories according to the monitoring protocol. This means that more goshawks are present within the Forest. Because it is hard to find alternate nest sites, some territories may be occupied that have not been counted as occupied. Other monitoring across the west indicates that goshawk elsewhere have experienced a decline in occupancy. For instance, according to Dr. Richard Reynolds, the Rocky Mountain Research Station has also recorded low productivity in the past several years, with 7 percent and 42 percent of the 121 pairs studied laying eggs in 2003 and 2004, respectively. This is much lower than their highest year recorded in 1982 when 87 percent of the studied pairs laid eggs (Reynolds pers. comm., 2005).

As shown previously, goshawk occupancy has declined dramatically since the early 1990's in **both** undisturbed territories and territories with timber harvesting. Since the RFP was signed in 1997, however, occupancy has not changed appreciably in either undisturbed territories and territories with timber harvesting. From 1998-2004, the number of young produced per occupied territory has averaged 1.4 in undisturbed territories and 1.3 in territories with timber harvesting. During the life of the RFP, the number of young produced per successful territory has average 1.8 in undisturbed territories and 1.6 in territories with timber harvesting. These differences are not statistically significant. This indicates that the RFP standards and guidelines have not had any effect on the decline in goshawk occupancy. In addition, there has been very little timber harvest since the RFP was adopted in 1997. Only 0.2 percent of the forested acres, and 0.3 percent of the mature forested acres have been harvested in the past eight years. With such a small amount of timber harvest, it would be very difficult to draw any conclusions regarding the impacts of timber harvest on goshawk. As described above, wet, cold spring weather or drought are more likely causes of the decline than the minor amount of timber harvest that has been done recently.

Recommendations

Based on this information, the Forest has determined that the standards and guidelines in the RFP are adequate to maintain habitat for viable populations of northern goshawk and is sufficient to provide well distributed habitat for reproductive individuals. The Forest will continue monitoring and retain northern goshawk as an MIS.

Table 31: Summary of Data Collected for Known Goshawk Territories on the Targhee National Forest from 1990-2004.

(Key to Table: A = active goshawk territory-nest found; A* = active goshawk territory- no nest found; O = occupied goshawk territory but not active-adults defending nest early in season; F = nest failed-no fledglings documented; N = alternate nest found; G = adult goshawk sighted/heard but territory not occupied or active; B = defensive adult goshawk or fledglings seen in area; a number (1, 2, 3, 4) = number of fledglings documented; GG = great gray owl; a = one mile search around known nests-no goshawks found; b = 0.5 mile search around known nests-no goshawks found; c = nest stands checked-no goshawks found; a blank space means no surveys of any kind were conducted for that year) (light shading = undisturbed territories being monitored following Forest Plan protocol; dark shading = territories with timber harvesting being monitored following Forest Plan protocol)

Number	General Location	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
D01-01	Divide Cr.	A*														
D01-02	Fritz Cr.	A*/N/2	A/3	A/2	b	c	c									
D01-03	S. Fork Deep Cr.	c	c	A/3	c	c	c									
D01-04	Three Mile Cr.	A/2	A/F	c	A/1	A/3	b	b				a		a		
D01-05	E. Rattlesnake	c	c	c	c	c										
D01-06	Sheep Cr./Chicken Cr.	A/3	A/2	A/4/GG	A/F/GG	A/3/GG	A/F	A*		A/3/GG		GG/a	a	GG/a		
D01-07	Pete Cr. TS Unit 9			b	a/G											
D01-08a/b	Miner's Cr.	N/c	a	A/2	A/2	A/3	a	A/3		GG/a	a	A/2	A/3/GG	A/2/GG	A/1	G
D01-09	Alex Draw	GG/c	c	c/GG	a/GG	c/GG	b				GG/a	a				
D01-10	E. Steel Cr.	c/GG	A/2/GG	A/F	a/GG	A/2/GG	A/F	b		GG/a				GG/a		
D01-11	Kay Cr.	A/2	A/2	A/2/GG	a/GG	c	c				a	GG/a				a
D01-12	Saw Cr.		A*/N	b	A/1	b	A/2	A/F			GG/a	A/3/GG		a		
D01-13	Disaster Cr.				A/2/GG	b	A/F	b/GG		A/2	GG/a	A/2			A*	a
D02-01	Walking Fish TS	b/GG	c	A/2/GG	b	b	b	b				a				a
D02-02	Taylor-Carrot	c/GG	c/GG	A/2/GG	A/2	b/GG	b	b/GG							a	
D02-03	Dry Canyon/Ice House TS	A/3	O	a	c	b	c			a		a	A/2	O/GG	A/2/GG	A/2
D02-04	Staley Springs	A/3	c	A/1	O/b	A/2	a	A/F		GG/a			O		a/GG	a
D02-05	N. Fork TS		A/1	A/1	G/a	b	c	b		a			O		A/1	A/2
D02-06	Elk Springs TS			A/2	a	c	c	b		a	a			GG/a	GG/a	
D02-07	Chick Cr. TS			A/2	a	c	c	b								
D03-01	Polebridge	A/1	c	A/F	G/a	b	b	b		a	a	GG/a		G/a	a	
D03-02	N. Antelope Flat Road		c	a	c											
D03-03	Comp. 105/Road 724		c	b	c											
D03-04	Eccles Road Unit 104-10		c	a	c	b										
D03-05	Anderson Mill TS		b													
D03-06	Fall River Ridge	c	c	c	c	b									a	a
D03-07	MA 12 TS Unit 326-11		c	c	c	b										a
D03-08	Porcupine						A*				A/F/GG			O	GG/a	a
D03-09	Hatchery Butte						A	b		GG/a	A/F		A/1/GG	A/1/GG		
D03-10	Hale Canyon							G								
D04-01	Argument Ridge TS	c	A/F	A/2	G/b	a	A/2	b					G/a			a
D04-02	Rocky Canyon	A	A	A	A									a		a

Number	General Location	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
D04-03	Water Canyon (burned 1987)			c												
D04-04	Long Gulch	c	A/2	A/2	A/2	c	A/2	G		A/3/GG			a			
D04-05	Marlow Cr.		A/F	c	c	c		c								
D04-06	Farnes Mtn. TS		A	c			A			A/2	A/2/GG	GG/a	GG/a			
D04-07	Van Point		A													a
D04-08	Squaw Cr.										A/2					a
D05-01	Dry Cr. TS Unit 22/24/9		b	a	b											
D05-02	Dry Cr. II Unit 20		c	c	b											
D05-03	Pole Canyon		A*/2/GG	A/3/GG	A/1/GG	c/GG	A/1	b/GG		GG/a			GG/a/G		a	
D05-04	Bustle Cr.	A*	c	b	a	a				a	a		A/3	A/2	A/1	
D05-05	Grandview TS	b	b	c	c	c										
D05-06	Canyon Cr. TS Unit 245/20	b														
D05-07	Canyon Cr. TS Unit 247/12	A/2	A/2/GG	A/3/GG	GG/a	c	a	b		a	a	A/2	a			G
D05-08	Kirkham Hollow TS Unit 246/17															
D05-09	Gooseneck TS	A/2	A/2	A/3	A/1	A/3	A/F	b				GG/a	a		a	
D05-10	Horseshoe Canyon		A/1	A/1	A/1	A/2	A/3	A/3		A/1			G/a	G/a	a	G
D05-11	Dry Hollow			A/4	A/3	A/3	A/3	G		a	A	GG/a				
D05-12	Dude Cr.					A		G		A/2	A/F/GG		a		a	
D05-13	Rammell Hollow					A					A	O/GG		GG/a	a	
D05-14	Milk Cr.					A					A/F	GG/G/a	GG/a	G/a		
D05-15	Dry Ridge									A/2	A/1			GG/a		a
Adj. To Forest	Grandview Point							A/2								
Adj. To Forest	Copeland's							A/3								

References for the data in this table include: Patla 1990, 1991, 1992, 1993, 1996, 1997, 1999, 2000, 2001, 2002, 2003, 2004; Patla and Trost 1995a, 1997; and Trec, Inc. 2005. The Forest has goshawk monitoring data from 1980-1989 but it is not displayed here since the methods used were different than currently used. See 1997-1999 C-T Forest Plan Monitoring and Evaluation Report for those figures.

Table 32: Goshawk Monitoring Summary, 1990-1994 and 1998-2004.

Monitoring Parameter	1990	1991	1992	1993	1994	1998	1999	2000	2001	2002	2003	2004	12-year average	1990-94 average	1998-2004 average
No. of Territories Monitored (At survey levels a and b only ¹)	11	16	22	22	24	19	18	16	16	16	16	17	N/A	N/A	N/A
No. of Territories Occupied	10	15	20	13	12	7	9	6	6	5	5	2	N/A	N/A	N/A
Percent Occupied	91%	94%	91%	59%	50%	37%	50%	38%	38%	31%	31%	12%	52%	77%	34%
No. Successful Territories (fledglings were documented)	8	9	16	10	8	7	3	4	4	3	4	2	N/A	N/A	N/A
Percent Successful (percent of number occupied)	80%	60%	80%	77%	67%	100%	33%	67%	67%	60%	80%	100%	73%	73%	72%
No. of Young Produced (either fledged or advanced nestling state)	18	16	32	16	21	15	5	9	9	5	5	4	N/A	N/A	N/A
No. of Young/Occupied Territory	1.8	1.1	1.6	1.2	1.8	2.1	0.6	1.5	1.5	1.0	1.0	2.0	1.4	1.5	1.4
No. of Young/Successful Territory	2.3	1.8	2.0	1.6	2.6	2.1	1.7	2.3	2.3	1.7	1.3	2.0	2.0	2.1	1.9
No. of territories with goshawks seen or heard but not counted as occupied	--	--	--	4	--	--	--	1	3	3	0	3	N/A	N/A	N/A

¹ Survey level a = one mile search around known nests; survey level b = 0.5 mile search around known nests.

Table 33: Goshawk Monitoring at Undisturbed Territories

Monitoring Parameter	1990	1991	1992	1993	1994	1998	1999	2000	2001	2002	2003	2004	12-year average	1990-94 average	'98-'04 average
No. of Territories Monitored ¹	5	6	10	10	13	9	8	8	8	8	8	9	-	-	-
No. of Territories Occupied	4	5	8	8	7	4	4	5	4	3	4	1	-	-	-
Percent Occupied	80%	83%	80%	80%	54%	44%	50%	63%	50%	38%	50%	11%	57%	75%	44%
No. Successful Territories (fledglings were documented)	2	2	6	6	4	4	0	3	3	2	3	1	-	-	-
Percent Successful (percent of number occupied)	50%	40%	75%	75%	57%	100%	0%	60%	75%	67%	75%	100%	65%	59%	68%
No. of Young Produced (fledged or advanced nestling state)	6	3	8	11	10	8	0	7	8	4	4	2	-	-	-
No. of Young/Occupied Territory	1.5	0.6	1.0	1.4	1.4	2.0	0.0	1.4	2.0	1.3	1.0	2.0	1.3	1.2	1.4
No. of Young/Successful Territory	3.0	1.5	1.3	1.8	2.5	2.0	0.0	2.3	2.7	2.0	1.3	2.0	1.9	2.0	1.8
No. of territories with goshawks seen or heard but not counted as occupied	--	--	--	--	---	--	--	1	1	2	0	2	-	-	-

¹ Survey level a = one mile search around known nests; survey level b = 0.5 mile search around known nests.

Table 34: Goshawk Monitoring at Territories with Timber Harvesting

Monitoring Parameter	1990	1991	1992	1993	1994	1998	1999	2000	2001	2002	2003	2004	12-year average	1990-94 average	'98-'04 average
No. of Territories Monitored ¹	6	10	12	12	11	10	10	8	8	8	8	8	-	-	-
No. of Territories Occupied	6	10	12	5	5	3	5	1	2	2	1	1	-	-	-
Percent Occupied	100%	100%	100%	42%	45%	30%	50%	13%	25%	25%	13%	13%	46%	77%	24%
No. Successful Territories (fledglings were documented)	6	7	10	4	4	3	3	1	1	1	1	1	-	-	-
Percent Successful (percent of number occupied)	100%	70%	83%	80%	80%	100%	60%	100%	50%	50%	100%	100%	81%	83%	80%
No. of Young Produced (fledged or advanced nestling state)	12	13	24	5	11	7	5	2	1	1	1	2	-	-	-
No. of Young/Occupied Territory	2.0	1.3	2.0	1.0	2.2	2.3	1.0	2.0	0.5	0.5	1.0	2.0	1.5	1.7	1.3
No. of Young/Successful Territory	2.0	1.9	2.4	1.3	2.8	2.3	1.7	2.0	1.0	1.0	1.0	2.0	1.8	2.1	1.6
No. of territories with goshawks seen or heard but not counted as occupied	--	--	--	4	--	--	--	--	2	1	0	1	-	-	-

¹ Survey level a = one mile search around known nests; survey level b = 0.5 mile search around known nests.

Forest Owl Population

Requirements

To measure population trends of boreal, great gray, and flammulated owls, a minimum of ten miles of winter calling transects is to be set up in each ecological subsection. Standard survey methods have been used by Forest employees for several years. Habitat changes in the vicinity of the calling transects will be recorded and relationships between the two analyzed.

Results and Evaluation

Forest owls have been monitored in conjunction with timber sales and other projects since the late 1980's. From 1991 to 1996, flammulated owls were observed or heard at five sites on the Targhee NF. Boreal owl observations began in 1987 and by 1992, only three had been found, all of which were in the Centennial Mountain Subsection. Between 1992 and 1996, additional surveys were conducted, and boreals were found in four other subsections: Island Park, Madison-Pitchstone Plateau, Teton Range, and the Big Hole Mountains. When the analysis was done for the RFP, great gray owls had been documented in each subsection on the Forest.

1994-1996 Study of Great Gray Owls

From 1994-1996, the Forest cooperated in a study of great gray owls on National Forest land and nearby private land in the Teton Valley area (Whitfield and Gaffney 1996). That study documented that great gray owls were not found in severely altered habitats with little intact forest, but nesting pair numbers appear to have increased in areas where 17 to 50 percent of formerly continuous forest has been clearcut. They found that over the broader landscape, great gray owls in the study area had demonstrated considerable adaptability to habitat alteration. However, the data indicated that removal of over 50 percent of forest cover may eliminate great gray production in traditional nesting areas.

Average clutch and brood sizes were comparable to other populations, whereas juvenile mortality in the first 60 days post fledging may have exceeded 60 percent. Although the data suggested a relatively high juvenile owl mortality rate for the pre-independence period, the probability of survival detected was biased by inability to track many juveniles. Some of the more severely altered habitats may have become ecological traps for breeding great gray owls, areas with abundant prey but insufficient security cover to ensure that sufficient numbers of juveniles survive. Juvenile mortality, however, is of far less concern than adult mortality for relatively long-lived species such as great gray owls, but could limit population sustainability if too extreme.

Forest Owl Monitoring Transects

Since the RFP was adopted, forest owl (great gray owl, boreal owl, and flammulated owl) monitoring transects have been established in all seven ecological subsections on the Forest. The results of this monitoring is shown in Tables 40, 41, and 42. A summary of the data for each species from the monitoring transects follows the tabular data.



Figure 42: Great gray owllet.

Table 35: Boreal Owl – late winter/early spring transect route results, 1997-2004. An “-” indicates that the transect was not read that year.

Ecological Subsection	Transect Name	1997		1998		1999		2000		2001		2002		2003		2004	
		Times Read	# Owls														
Centennial Mountains	Cottonwood Loop	0	-	0	-	1	4	0	-	0	-	0	-	0	-	0	-
	Stoddard-VaNoy Ski	2	2	1	1	1	0	1	0	1	1	1	1	2	0	1	0
	Threemile-Corral-Rattlesnake	2	0	0	-	0	-	0	-	0	-	1	2	1	1	1	1
	E. Sawtell	0	-	3	0	2	2	3	2	1	1	1	3	1	1	1	1
	Willow Creek	0	-	3	7	4	5	3	2	1	2	1	5	1	2	1	2
Madison-Pitchstone Plateau	Lower Black Canyon	0	-	2	2	3	2	3	2	2	1	2	2	1	1	1	6
	Upper Black Canyon	0	-	2	0	2	2	2	2	1	1	0	-	2	1	0	-
Island Park	Green Canyon	0	-	3	1	3	2	3	2	2	3	0	-	1	0	2	1
	Chick Creek Flat	0	-	3	2	3	1	3	3	2	0	1	0	1	0	1	1
	Marysville Hill	0	-	0	-	1	0	0	-	1	0	0	-	0	-	1	0
	Black Springs	0	-	0	-	0	-	1	0	1	1	0	-	2	1	1	1
Big Hole Mountains	Moody Swamp	0	-	0	-	0	-	0	-	0	-	0	-	1	1	1	1
	Horseshoe	0	-	3	1	4	1	3	0	3	1	0	-	1	0	0	-
Teton Range	Dry Ridge	0	-	2	2	4	7	3	1	2	1	0	-	0	-	0	-
	Bustle Creek	0	-	0	-	3	2	3	0	1	0	1	0	0	-	0	-

Table 36: Great Gray Owl – late winter/early spring transect route results, 1997-2004. An “-” indicates that the transect was not read that year.

Ecological Subsection	Transect Name	1997		1998		1999		2000		2001		2002		2003		2004	
		Times Read	# Owls														
Lemhi Medicine Lodge	S. Fork Fritz Cr	0	-	0	-	2	0	0	-	0	-	0	-	0	-	0	-
	Italian Canyon	0	-	0	-	2	1	0	-	0	-	0	-	0	-	0	-
Centennial Mountains	Cottonwood Loop	0	-	0	-	1	3	0	-	0	-	0	-	0	-	0	-
	Stoddard-VaNoy Ski	2	2	1	1	1	1	1	0	1	0	1	0	2	0	1	0
	Threemile-Corral-Rattlesnake	2	0	0	-	0	-	0	-	0	-	1	0	1	0	1	0
	E. Sawtell	0	-	3	0	2	0	3	1	1	0	1	0	1	0	1	1
	Willow Creek	0	-	3	1	4	0	3	0	1	1	1	0	1	1	1	0
Madison-Pitchstone Plateau	Lower Black Canyon	0	-	2	3	3	1	3	0	2	3	2	2	1	0	1	0
	Upper Black Canyon	0	-	2	0	2	0	2	0	1	0	0	-	2	3	0	-

Ecological Subsection	Transect Name	1997		1998		1999		2000		2001		2002		2003		2004	
		Times Read	# Owls														
Island Park	Green Canyon	0	-	3	0	3	0	3	0	2	0	0	-	1	0	2	1
	Chick Creek Flat	0	-	3	4	3	1	3	0	2	0	1	0	1	0	1	0
	Marysville Hill	0	-	0	-	1	0	0	-	1	2	0	-	0	-	1	3
	Black Springs	0	-	0	-	0	-	1	0	1	0	0	-	2	3	1	0
Big Hole Mountains	Moody Swamp	0	-	0	-	0	-	0	-	0	-	0	-	1	0	1	0
	Horseshoe	0	-	3	0	4	2	3	0	3	0	0	-	1	1	0	-
Teton Range	Dry Ridge	0	-	2	2	4	2	3	0	2	0	0	-	0	-	0	-
	Bustle Creek	0	-	0	-	3	0	3	1	1	0	1	0	0	-	0	-
Caribou Mountains	Echo/Papoose	0	-	2	0	0	-	0	-	0	-	0	-	0	-	0	-
	Hoffman	0	-	0	-	0	-	0	-	0	-	1	0	2	0	2	0

Table 37: Flammulated Owl – Late spring/early summer transect route results, 1997-2004. An “-” indicates that the transect was not read that year.

Ecological Subsection	Transect Name	1998		1999		2000		2001		2002		2003		2004	
		Times Read	# Owls												
Island Park	Marysville Hill	1	0	2	1	3	1	0	-	0	-	0	-	0	-
Big Hole Palisades	Kelly-Table Rock	0	-	0	-	1	1	1	1	2	1	4	4	7	8
	Flemming Cr	0	-	0	-	0	-	1	2	1	3	2	0	1	0
	Limekiln Rd 218	0	-	2	2	0	-	0	-	0	-	0	-	0	-
	Alpine-Long Spr	2	2	2	2	0	-	1	1	4	5	1	0	1	1
	Swan Vally-Sheep-Sawmill	1	0	1	1	0	-	1	0	1	3	1	3	1	0
	Black-Burns	0	-	1	0	0	-	0	-	0	-	0	-	0	-
	Lower Rainey	0	-	1	1	0	-	1	0	0	-	1	0	1	0
	Upper Rainey	0	-	1	0	0	-	0	-	0	-	0	-	0	-
	Upper Farnes	0	-	1	0	0	-	0	-	0	-	0	-	0	-
	Mike Spencer	0	-	0	-	0	-	1	1	1	4	2	0	1	0
	Horseshoe-Packsaddle	0	-	1	0	0	-	0	-	0	-	0	-	0	-
Caribou Mountains	Echo/Papoose	3	13	0	-	0	-	0	-	0	-	0	-	0	-
	Hoffman-McCoy	0	-	0	-	0	-	1	0	2	0	1	0	1	0
	Calamity	0	-	0	-	0	-	1	0	4	1	1	0	1	1
	Long Gulch-Little Box	0	0	6	7	0	-	1	0	2	1	1	0	1	1
	Fall Cr-Rash Can	1	0	0	-	0	-	0	-	0	-	0	-	0	-
	Hawthorne Hollow	1	0	1	0	0	-	0	-	0	-	0	-	0	-
	Pritchard Creek	2	1	0	-	0	-	0	-	0	-	0	-	0	-
Cold Spr-Hawley	1	0	0	-	0	-	0	-	0	-	0	-	0	-	

Great Gray Owls

- Great gray owls have been documented in all seven ecological subsections of the Forest, which is the widest distribution of the three forest owl species.
- 19 monitoring routes have been run at the proper times (late February through April) for great gray owls. Great Gray owls have been found on 13 of these routes (68% of the routes).
- 15 monitoring routes have been run more than one year, with great gray owls being documented on 11 of the routes (73%). On these routes, great gray owls have not been documented every year, but after a year or two of absence, they will again be documented on the routes. The only exception to this is the Stoddard-VanNoy route, where great gray owls were documented from 1997 through 1999, but from 2000 to the present time no great gray owls have been documented on this route.
- 4 monitoring routes have been run only one year, with great gray owls being documented on 2 of the routes (50%). This is a lower percentage than the routes that have been run more than one year, and shows that routes need to be run more than one year to document presence of great gray owls.
- Great gray owls have large territories, and it is possible to miss an owl on one or two surveys because it may be in another area of its territory. On the routes where two or more surveys have been done in a single year, the data shows that owls can be missed on one or more surveys, but are found on another survey during the same year. This illustrates that each route should have at least 3 surveys done each year to more accurately document the presence of great gray owls.
- Great gray owls are occasionally documented on monitoring routes run in May and June for flammulated owls. This has occurred on three routes in the Big Hole-Palisades Subsection (Kelly-Table Rock route, Alpine-Long Springs route, and Upper Farnes Mtn. route), and two routes in the Caribou Mountains Subsection (Long Gulch-Little Box route and Echo-Papoose-Squaw route).
- The monitoring data shows that great gray owls continue to be distributed in all ecological subsections, and they are persistent on all monitoring routes, with the exception of the Stoddard-VanNoy route. The monitoring data indicates a stable population.

Figure 43: Great gray owlets in a broken-off snag on the Targhee National Forest.



Boreal Owls

- Boreal owls have been documented in five out of the seven ecological subsections of the Forest. They have not been documented in the Lemhi/Medicine Lodge and Caribou Subsections.
- There are 15 monitoring routes that have been run at the proper times (late February through April) in the five ecological subsections with boreal owls. Boreal owls have been found on 14 of these routes (93% of the routes). The only route without boreal owls is the Marysville Hill route.
- 14 monitoring routes have been run more than one year. On these 14 routes, boreal owls have not been documented every year, but after a year or two of absence, they will again be documented on the routes.
- Boreal owls have large territories, and it is possible to miss an owl on one or two surveys because it may be in another area of its territory. On the routes where two or more surveys have been done in a single year, the data shows that owls can be missed on one or more surveys, but are found on another survey during the same year. This illustrates that each route should have at least 3 surveys done each year to more accurately document the presence of boreal owls.
- Boreal owls are occasionally documented on survey routes run in May and June for flammulated owls. This has occurred on two routes in the Big Hole-Palisades Subsection (Kelly-Table Rock route, and Upper Rainey route), and one route in the Centennial Mountains Subsection (Willow Creek route).
- The monitoring data shows that boreal owls continue to be distributed in five ecological subsections, and they are persistent on all monitoring routes. The monitoring data indicates a stable population.

Flammulated Owls

- Flammulated owls have been documented in just three of the seven ecological subsections of the Forest, which is the smallest distribution of the three forest owl species. Those three subsections are the Island Park, Big Hole/Palisades, and Caribou subsections. (Note: Flammulated owls were documented one time on Lightning Peak in the Teton Range Subsection, and one time in Black Canyon in the Madison-Pitchstone Subsection. Because these are one time occurrences we do not consider these subsections occupied by flammulated owls.)
- Flammulated owls are migratory and do not return to this area until late in the spring. There are 20 monitoring routes that have been run at the proper times (May, June and early July) in the three ecological subsections with flammulated owls. Flammulated owls have been found on 12 of these routes (60% of the routes).
- 11 monitoring routes have been run more than one year, with flammulated owls being documented on 9 of the routes (82%). On these routes, flammulated owls have not been documented every year, but after a year or two of absence, they will again be documented on the routes.
- 9 monitoring routes have been run only one year, with flammulated owls being documented on 3 of the routes (33%). This is a lower percentage than the routes that have been run more than one year, and shows that routes need to be run more than one year to document presence of flammulated owls.
- Flammulated owls have much smaller territories than boreal owls and great gray owls, but the data shows that it is still possible to miss an owl on one or two surveys. On the routes where two or more surveys have been done in a single year, the data shows that owls can be missed on one or more surveys, but are found on another survey during the same year. This illustrates that each route should have at least 3 surveys done each year to more accurately document the presence of boreal owls.
- The monitoring data shows that flammulated owls continue to be distributed in three ecological subsections, and they are persistent on all monitoring routes. The monitoring data indicates a stable population.

Other Owls

A few other owl species were also documented when monitoring for the forest owl species. These species include the great horned owl, saw-whet owl, pygmy owl, and long-eared owl. It should be noted that the owl monitoring transects are run in locations and at times when it is best for the forest owl species, which is not particularly the best places and times for these other owl species. The saw-whet and great horned owl appear to be widely distributed across the forest, as they occurred in all ecological subsections except the Lemhi/Medicine Lodge subsection. The pygmy owl was found in three subsections (Centennial, Teton Range, and Big Hole/Palisades Subsections). The long-eared owl was found in the Caribou Subsection.

Recommendations

Delete all three owls as MIS because the practical monitoring method which is (winter and spring owl calling) does not yield adequate information on populations. Keep all three owls as monitoring items which would provide information on distribution and relative changes in abundance.

Trumpeter Swan Nesting Population

Requirements

Occupancy of suitable nesting habitat and productivity of swan pairs found is to be recorded annually in trumpeter swan nesting habitat. Highest priority would be given to the ponds and lakes identified in the RFP standards and guidelines. This item would determine if the standards and guidelines are adequate to protect this management indicator. The ponds and lakes identified in the RFP are: Boundary Pond, Swan Lake, Lily Pond, Hatchery Butte, Railroad Pond, Mesa Marsh, Bear Lake, Upper Goose Lake, Long Meadows, Thompson Hole, Twin Lakes, Chain Lakes, Widge Lake, Rock Lake, Indian Lake, Putney Meadows, and Unnamed Pond.

Results

Trumpeter swans on the Targhee NF are part of the Rocky Mountain Population (RMP) of trumpeter swans, comprised of non-migratory Tri-state flocks (Idaho, Montana, and Wyoming) and migratory Canadian flocks. For this report, monitoring data collected on nesting pairs within the Targhee NF will be presented first, followed by habitat work and habitat studies that have been accomplished on the Forest. Monitoring data collected by other agencies for segments of the tri-state flock will then be presented, followed by information for the migratory Canadian flocks and a brief summary of population management actions. Finally, the evaluation and recommendations are summarized.

Nesting Pairs and Cygnet Production within the Targhee

Monitoring records for the Targhee NF span a 23-year period from 1982 to 2004 (Table 43). The survey protocol involves two to three visits to the site each year. An early spring check determines the presence of a pair; after that checks are made to document nest incubation and cygnet production. During this 23-year time period, a total of 35 lakes and ponds have had at least one pair of swans for at least one or more years (Table 43). Five sites have shown the highest occupancy by pairs: Swan Lake, Mesa Marsh, Bear Lake, Thompson Hole, and Indian Lake. In recent years, the Railroad Pond and Upper Goose Lake have shown high occupancy by pairs also. The number of sites occupied by trumpeter swan pairs over the 23-year period is shown in Figure 44. Between 1982 and 2004, pairs have occupied an average of 11 sites each year. The highest occupancy occurred in 1989 when pairs were documented at 17 sites. The years with the lowest pair occupancy occurred in 1982 and 1997 when pairs were located at only 7 sites. The data suggest an increasing trend from 1982 to 1989, and a decreasing trend from 1989 to 2004.

Between 1982 and 2004, only seventeen sites have produced cygnets (Table 43). Just seven of the sites account for 81 percent of the total cygnets produced over the 23-year period. These are Boundary Pond, Swan Lake at Highway 20, Hatchery Butte, Railroad Pond, Mesa Marsh, Bear Lake, and Thompson Hole. Two of the sites, Swan Lake at Highway 20 and Thompson Hole, account for 37 percent of the total cygnets produced. In 2002, 2003, and 2004, Indian Lake was the most productive site on the Targhee, producing a total of eleven young in those three years. The number of cygnets produced over the 23-year period is shown in Figure 45. The highest cygnet production occurred in 2000 when 19 cygnets were recorded. The lowest cygnet production occurred in 1993 and 2002 when only 3 cygnets were documented. Since the RFP was signed in 1997, an average of nine cygnets have been produced each year.

Cygnet production is not correlated with the number of sites occupied by pairs, because as stated above, just seven sites account for 85 percent of the cygnet production. Cygnet production does appear to fluctuate with precipitation levels; this is likely due to water level fluctuations on the ponds. In "wet" years some sites have higher productivity and in drought years, other sites have higher productivity. Indian Lake is one that seems to produce more young during drought years, as is demonstrated by its high productivity from 2002-2004.

Current objectives for the minimum breeding pairs of trumpeter swans in the Tri-state region are to have ten pairs on the Targhee portion of the Caribou-Targhee NF (Maj and Shea 1996). Forest biologists determined that to reach this number, more sites would need to be managed for nesting swans. The Revised Forest Plan designated seventeen sites which would receive swan management emphasis. These seventeen sites are part of the total monitoring effort on the Targhee.

Table 38: Summer trumpeter swan nesting activity from 1982 to 2004 (P= lake occupied by pair of swans but no nesting was recorded; p/= lake was occupied by a pair, nesting was documented, and the # is the number of young observed; a "-" indicates no recorded swan use on the lake); N=nonbreeders.

General notes: In 1995, nonbreeders were observed at Swan Lake (Sec. 12, T9N, R45E) and Rock Creek Lake. In 1996, a nonbreeder was observed at SW 1/4, Sec. 32, T12N, R45E. In 1997, 3 adults were seen at Lower Goose, 1 adult was seen at Putney Meadows, 1 adult was seen at Boundary Pond. In 1998, 1 adult was seen at Boundary Pond, 1 adult was seen at Chain Lakes.

Data are from Targhee National Forest records and 1982-1999; and U.S. Fish and Wildlife Service September Survey Data (in 1999 Sept. survey data was by Ruth Shea).

Location	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
Boundary Pond	-	-	-	P	-	P/4	-	P/4	P	P/3	P/1	-	P/2	-	-	-	-	P/0	-	-	-	-	-
Pond at Sec. 32	-	-	-	-	-	-	-	P	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-
Eccles Marsh ¹	P	P	-	-	-	-	-	P	-	P	-	-	-	-	-	-	-	-	-	-	-	P/0	-
Gerrit NE Pond	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P/3	-	-	-	-	-	-
Swan Lake @ Hwy 20	P/3	P	P/0	P/2	P/3	P/0	-	P/1	P/4	P/4	P/5	P/3	P/0	P/4	P/6	-	P/0	P/2	P/3	-	P/0	P/0	-
Lily Pond	-	P	P	P	-	P	P/3	P	P	-	-	-	P	-	-	-	-	-	-	-	-	N	-
Hatchery Butte	-	P/5	P/0	P/3	-	-	-	-	-	-	-	-	-	P/5	P	-	P/0	P/0	P/0	-	-	-	-
Railroad Pond	P/0	-	P/1	P/3	P/0	-	-	-	-	-	P	P	P/2	P/0	P	P/5	P/5	P/0	P/4	P	P	P/0	P/0
Beaver Pond	-	-	-	-	-	-	-	P	P	P	P	-	P	P	-	P/0	P/0	-	-	-	-	-	-
Mesa Marsh	-	P/0	-	P/2	P/3	P/1	P/0	-	P/2	P	P/4	P	P/4	P	P/3	P/0	P/2	P/2	P/0	P/3	P/0	P/3	P/0
Beaver Lake	-	-	P	-	P	P	P	P	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bear Lake	P/2	P/0	P/0	P/1	P/1	P/2	P/1	P/1	P	P/0	P/0	P	-	P/1	P/0	P/1	P/3	P	P/3	P/0	P/0	P	P/0
Swan Lake II	-	-	-	-	-	-	-	-	-	-	-	P	P	-	-	-	-	-	-	-	-	N	-
Steele Lake ³	-	-	-	-	-	-	-	-	P	-	-	P	-	-	-	-	-	-	-	-	-	-	-
Upper Goose Lake	-	-	-	-	-	-	-	P	P	P/0	-	-	-	-	-	-	P/0	P/0	P/0	P/3	P/0	P/0	P/3
Lower Goose Lake	-	-	-	-	-	P	P	-	-	-	-	-	P	-	P	-	-	-	-	-	-	-	-
Long Meadows	-	P	-	P/0	-	P/0	P/0	P/0	P	-	-	-	-	-	P/0	-	-	-	-	-	-	-	-
Thompson Hole	P/0	P/2	P/4	P/0	P/1	P/1	P/4	P/1	P/5	P/0	P/1	-	P/4	P/2	P/2	-	P/0	P/5	P/4	P/0	P	P/0	P
Twin Lakes	-	P	P	P/1	-	P	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tule Lake	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Porcupine Lake	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ponds at Sec. 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chain Lakes	-	P	-	P	P	P/0	P/0	-	-	P	P	-	P	P/1	P	P/0	-	P	P/0	P	P	-	P
Putney Meadows	-	-	-	-	-	-	-	P	-	-	-	P	P/0	P/1	-	-	-	-	-	-	-	-	-
Last Chance Pond	-	-	-	-	-	-	-	-	-	P	-	P	P	-	-	-	-	-	-	P/3	-	P	P
Tom's Creek	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-
Warm R. Meadows ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P/1	-	-	P/2	P/0	-	-	-
Pond at Sec. 21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Widgit Lake	P/0	-	P/0	-	-	-	-	P/0	P/0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rock Lake	-	-	-	-	-	-	P/0	-	P	-	P	-	-	-	-	-	-	-	-	-	-	-	-
Junco Lake	-	-	-	-	-	-	-	P	P	-	P	-	-	-	-	-	-	-	-	-	-	-	-
Fish Lake	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indian Lake ³	P/0	P/0	P	P/0	P	P/0	P/1	P/0	P/0	P/0	P	P/0	P/0	P/2	P/0	P/0	P/0	-	-	-	P/3	P/3	P/5
Bergman Reservoir	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-
East Bergman Marsh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P/1	P/3	P/0	-	-	-
Pond at Sec. 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ernest Lake	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Squirrel Meadows	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-
Pond E. of Squirrel M.	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-
Ponds at Sec. 14/15	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Porter Pond	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Palisades	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	P	-	-	-
Total Sites w/ Pair	7	11	10	12	8	12	11	17	15	12	13	9	15	10	10	7	10	10	11	10	8	9 ⁴	8
Total Young Observed	5	7	5	12	8	8	9	7	11	7	11	3	12	16	11	7	13	10	19	9	3	6	8

^{1/} Eccles Marsh and Beaver Pond generally have swans present for various lengths of time during the summer, but use is not of sufficient duration to designate these areas as being occupied by a pair.

^{2/} Warm River Meadows has not been consistently surveyed; notes prior to 1997 indicated occasional use by nonbreeders; 1997 is the only documented breeding pair.

^{3/} Partly in Idaho and partly in Wyoming.

^{4/} In 2003 there was one more site with a pair of swans recorded in Wyoming but FS is not sure of the location.

Map 9: Historic and active trumpeter swan nest sites on the Caribou-Targhee National Forest.

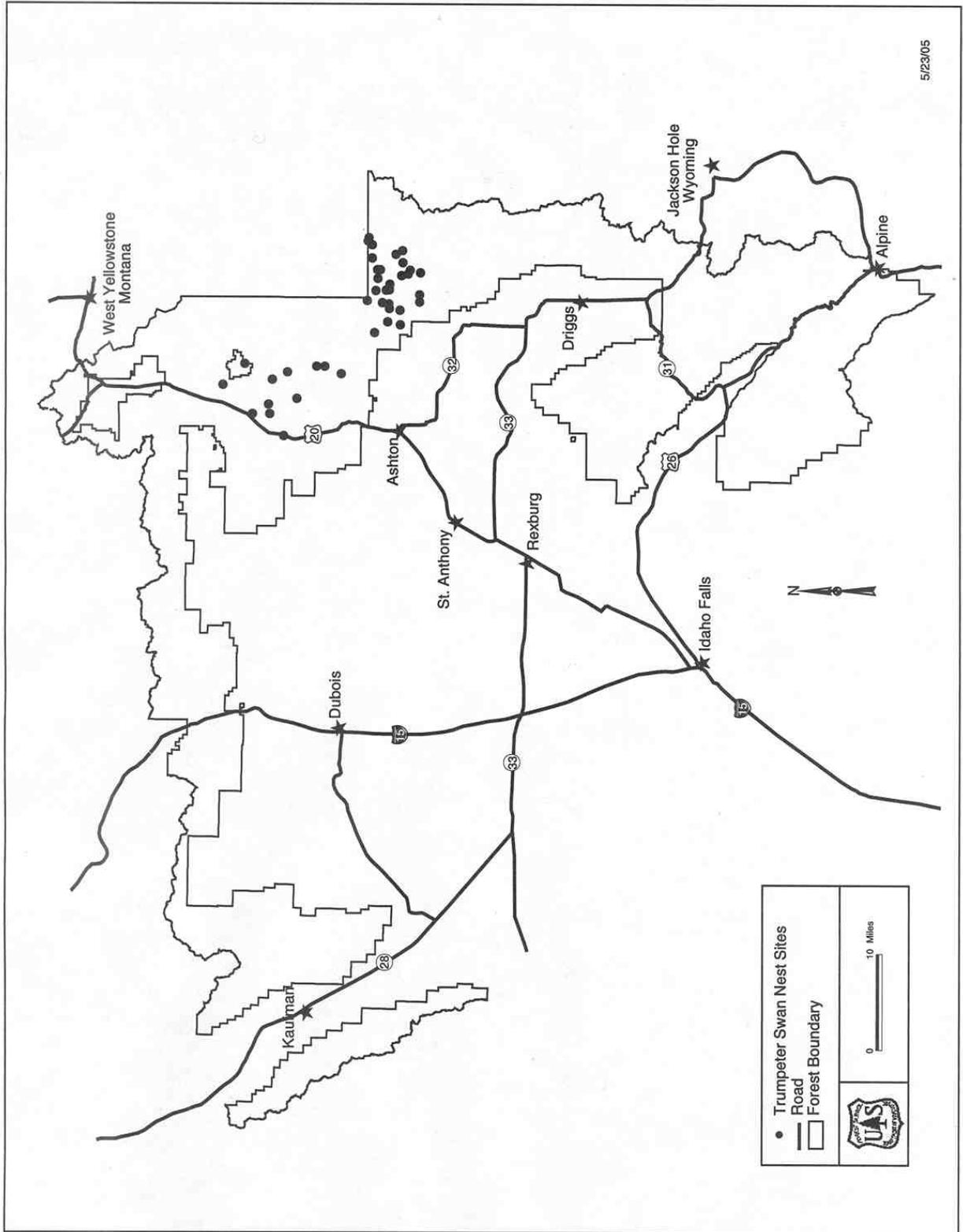


Figure 44: Number of nesting sites occupied by trumpeter swan pairs on the Targhee from 1982-2004.

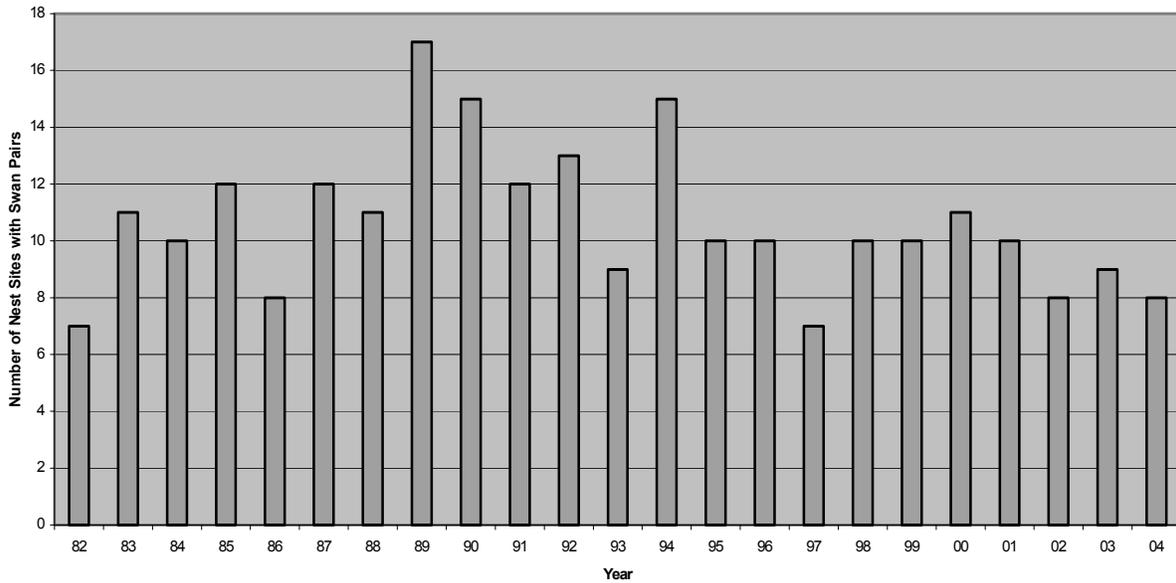
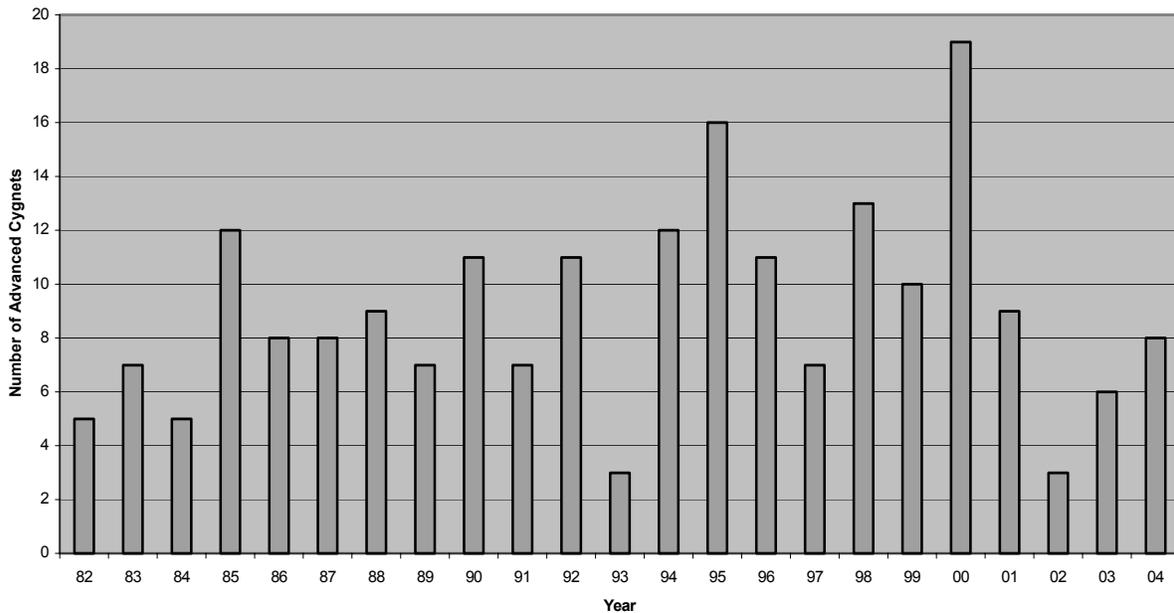


Figure 45: Advanced cygnet production from Targhee nest sites, by year, from 1982-2004.



Habitat Work within the Targhee

The Targhee has completed several habitat projects in an effort to maintain suitable habitat for nesting trumpeter swans. Following is a brief summary of the habitat work that has been accomplished:

- Thompson Hole typically dried out as the summer wore on and swans would walk their cygnets to Steele Lake. In 1979, a dike was constructed to keep the Hole from going dry and nest islands were also built. As shown above, Thompson Hole has been one of the most productive nesting sites on the Forest.

- At Ernest Lake, a fence was built in 1980 to keep livestock from the lake shore. This project has not increased swan use at the lake.
- In the 1980's, roads were closed to Long Meadows and Chain Lakes to reduce human disturbance. Swans continue to use Chain Lakes, but the last pair to be documented at Long Meadows was in 1996.
- In 1984, nest sites at Railroad Pond were elevated to keep them from being flooded by high water. Swan pairs have consistently used Railroad Pond from the 1990's through present. As stated above, Railroad Pond is one of the top seven sites for cygnet production.
- In 1984, water levels were raised at Bear Lake to provide more water through the nesting season. Nest sites were also raised to accommodate the higher water levels. As stated above, Bear Lake is one of the top seven sites for cygnet production although no cygnets have been recorded since 2000.
- In the early 1980's, the dike at Mesa Marsh was raised to provide more water through the nesting season. As stated above, Mesa Marsh is one of the top seven sites for cygnet production.
- In the 1980's, roads were closed to Swan Lake II and Lily Pond to reduce human disturbance. This work has not increased swan use at these sites. The last pairs to be documented at either site occurred in 1994 although nonbreeders were documented at both sites in 2003.
- Swan Lake at Highway 20 was dredged in 1988 and 1992 to increase water depths. This site has had the highest cygnet production of all sites on the Forest.
- In 2001 a water control structure was installed at Swan Lake at Highway 20 with the help of the Idaho Transportation Department. This structure will help hold water in the lake for longer periods of time. Nest islands were also raised at the lake to accommodate the higher water levels. The water structure has not been fully functional, because a series of continuing drought years has failed to put enough water into the lake, and the lake has been dry by middle summer. This may be the reason that no cygnets were produced at this site from 2001-2004.
- In 2001 a new dike and water control structure were built at Mesa Marsh. The water control structure will allow some water level management designed to increase vegetative diversity and forage production for swans and other waterfowl.
- In 2001, nest islands were built at Ernest Lake. A nesting pair of swans has not been documented at Ernest Lake in over two decades. A series of continuing drought years has failed to put enough water into the lake, and the lake has been dry by middle summer.
- In 2002, a water control structure was installed at Beaver Pond. The water control structure will allow some water level management designed to increase vegetative diversity and forage production for swans and other waterfowl. The last year Beaver Pond was occupied by a nesting pair of swans was 1998.
- In 2005, in cooperation with the Trumpeter Swan Society, using North American Wetland Conservation Act funds, the Forest plans to implement some of the "Wetland Management Guidelines" described in Henry (2004). This habitat study is described later in this report.

Habitat Studies within the Targhee NF

Forest employees have participated in three completed studies and one on-going study. A brief summary of each follows.

Trumpeter swan habitat was studied on the Targhee National Forest in 1980 and 1981 (Maj 1983). Comparative analysis of habitat variables were performed on presently used, historically used, and non-used lakes in an effort to define nesting and brood rearing habitat. Key results of the study were:

- Average clutch size of 4.4 eggs, and hatching success of 84 percent.
- Analysis of egg composition, dimensional measurements, the time of cygnet mortality and the consistently poor production over many years on particular lakes indicate that mortality may be site-specific.
- Present and historically used lakes had significantly greater shoreline irregularity than non-used lakes.
- Although the abundance of emergent or submergent vegetation was not significantly different between the three lake groups; however, significantly more total vegetation was found in presently used lakes.

- The greatest species diversity in vegetation and invertebrates was found in presently and historically used lakes.
- Results of the study indicate that swans are utilizing eutrophying⁷ lakes on the Targhee for nesting, while the non-used lakes are more oligotrophic⁸.

In the early 1990's, a study was done to evaluate trumpeter swan incubation behavior using measures of habitat quality (Henson and Cooper 1993). This study compared incubation behavior and habitat quality in Alaska with the Tri-state region of Idaho, Wyoming, and Montana. The study found that Alaska female swans remained on nests incubating eggs for longer periods of time (referred to as a high incubation constancy), and had shorter feeding periods, than the Tri-state female swans. The study concluded that the Tri-state region is relatively poor swan habitat, because it lacks the food resources necessary to allow female swans to maintain a high incubation constancy in an area with a short and harsh breeding season (Henson and Cooper 1993).

Trumpeter swan food habits have been studied in the Greater Yellowstone Ecosystem (Squires and Anderson 1995). The primary food in summer was *Potamogeton* foliage which accounted for 48.2 percent of the summer diet. Nesting trumpeter swans significantly prefer *Potamogeton* spp. when it was available at feeding sites within their territories. *Chara* spp. was eaten in proportion to its availability, and swans avoided eating *Ceratophyllum demersum* and *Myriophyllum exalbescens*.

Beginning in 2002 and continuing to 2004, the Forest was involved in a cooperative study to learn more about the ecology and dynamics of montane wetlands and trumpeter swan nesting habitat. Montane wetlands in the Caribou-Targhee National Forest (CTNF) serve as important breeding habitat for the tri-state population of trumpeter swans. Protecting this population and assuring recruitment of swans requires an understanding of wetland dynamics and well-conceived habitat management strategies. The Forest helped fund this study which was conducted by Adonia Henry as part of her Master's program at the University of Missouri at Columbia. Cooperators included: Gaylord Laboratory, University of Missouri-Columbia; Idaho Department of Fish & Game; U.S. Fish and Wildlife Service, Office of Migratory Birds; Henry's Fork Watershed Council; Bureau of Reclamation; Ducks Unlimited; The Trumpeter Swan Society; Eastern Idaho Resource Advisory Committee; and the Caribou-Targhee National Forest. The specific study objectives were to:

- Assess historical changes in extent and pattern of wetland vegetation communities in relationship to land-use changes and hydrological alterations.
- Assess factors that affect vegetation communities and abiotic conditions on selected wetlands.
- Assess factors that affect vegetation communities and abiotic conditions following a fall/over winter drawdown.
- Compare composition, structure, and production of wetland vegetation during pre and post drawdown periods and quantify associated changes in abiotic conditions.
- Describe habitat use of trumpeter swans and other waterbirds during pre and post drawdown periods.

Henry's Masters Thesis, "Habitat Characteristics and Community Ecology of Waterbirds on Three Wetland Types at the Caribou-Targhee National Forest, Idaho and Wyoming" includes management recommendations. Hydrologic and habitat characteristics, along with information on aquatic and emergent vegetation, trumpeter swan use, and soils, were used to identify water-management practices which could increase native plant diversity and overall habitat quality. The study includes site-specific recommendations for specific nesting sites as well as general wetland management guidelines. In 2005, the Forest will be implementing some of those wetland management guidelines at Thompson Hole and Unnamed Pond.

Monitoring Data Collected by Other Agencies

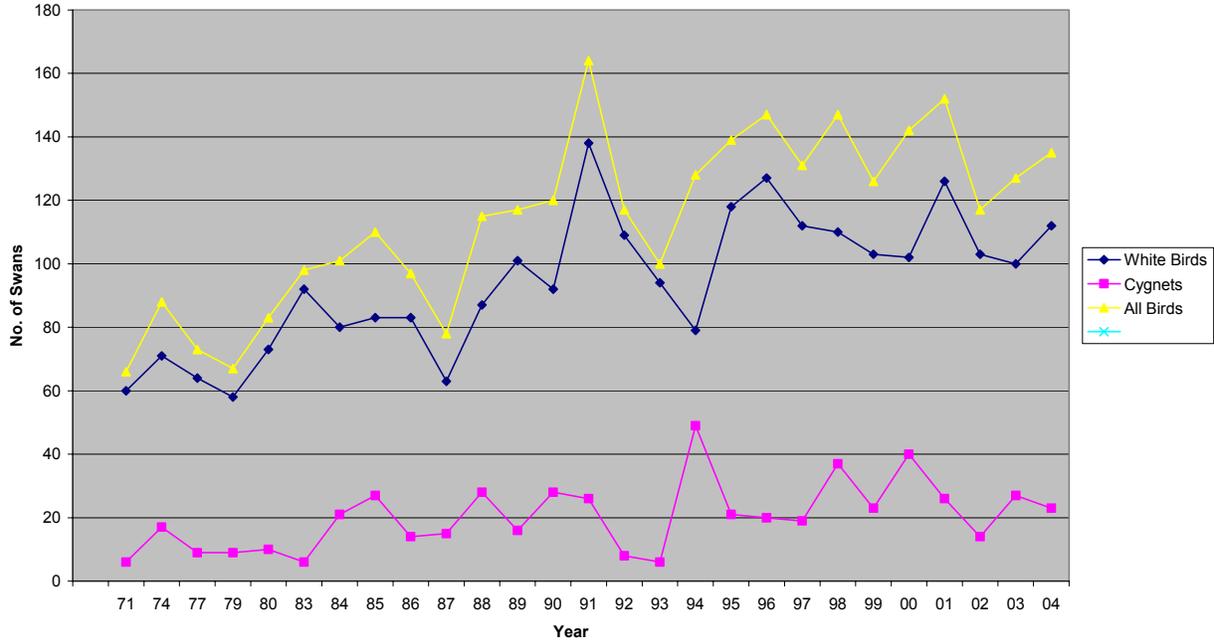
The U. S. Fish and Wildlife Service (USFWS) has conducted September aerial surveys of trumpeter swans in the Tri-state area for many years. Data from these September surveys has been compiled in "USFWS Fall Trumpeter Swan Survey Reports" that are archived at the Red Rock Lakes National Wildlife Refuge. The U. S. Geological Survey (USGS) has compiled all of the data from these fall surveys and has made this data available at the following web site: <http://www.nrin.nbio.gov/swan/census/index.html>. The following is a summary of this survey data:

⁷ Increasing nutrient enrichment in aquatic systems, such that the productivity of the system is no longer limited by the availability of nutrients. This is a natural process but may be accelerated by human activities.

⁸ Describes a body of water in which productivity is low and nutrients are limiting to algal growth. These water bodies are unusually clear.

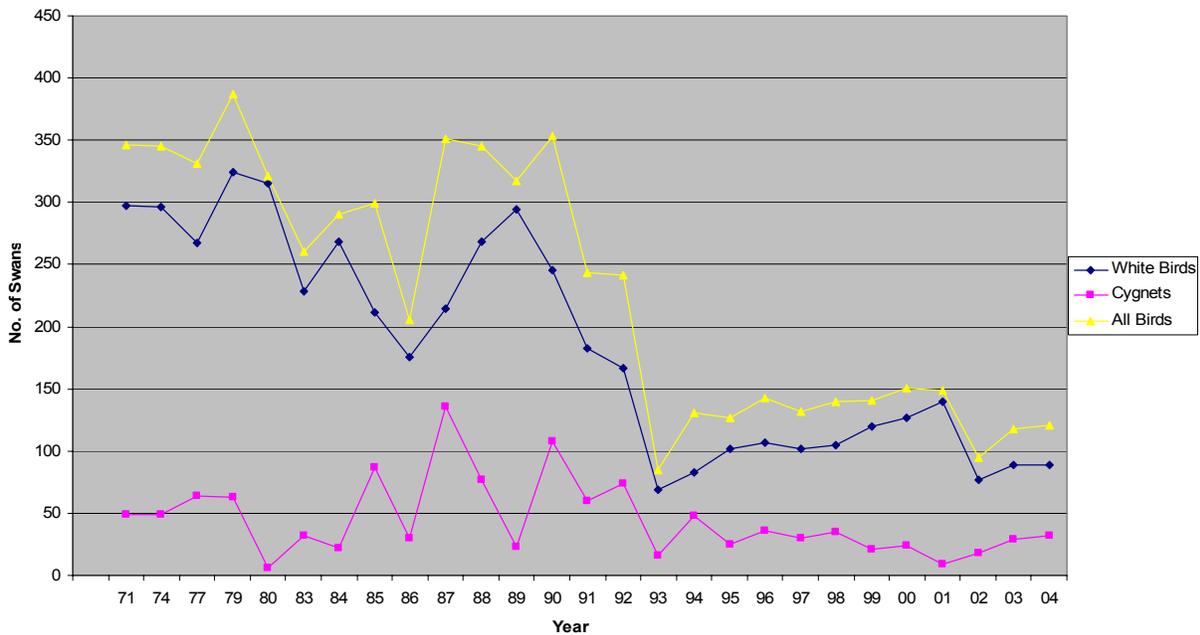
- The fall survey data for Idaho indicates a general increasing trend in the total number of trumpeter swans from 1971 to 2004 (Figure 46). The highest count for Idaho occurred in 1991, with the second highest count in 2001. The lowest count occurred in 1971.

Figure 46: Trumpeter swans in Idaho from USFWS September surveys, 1971-2004.



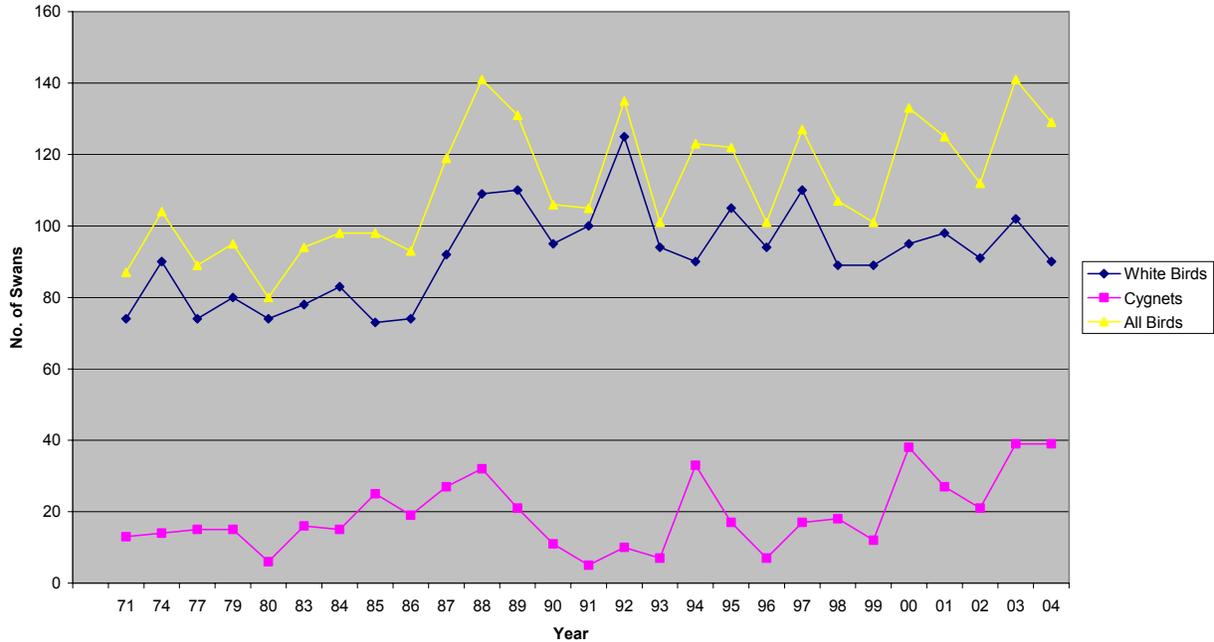
- The fall survey data for Montana indicates a decreasing trend in the total number of trumpeter swans from 1971 to 2004 (Figure 47). The highest count for Montana occurred in 1979, with the lowest count in 1993. The data shows a sharp decline in the number of swans between 1990 and 1993.

Figure 47: Trumpeter swans in Montana from USFWS September surveys, 1971-2004.



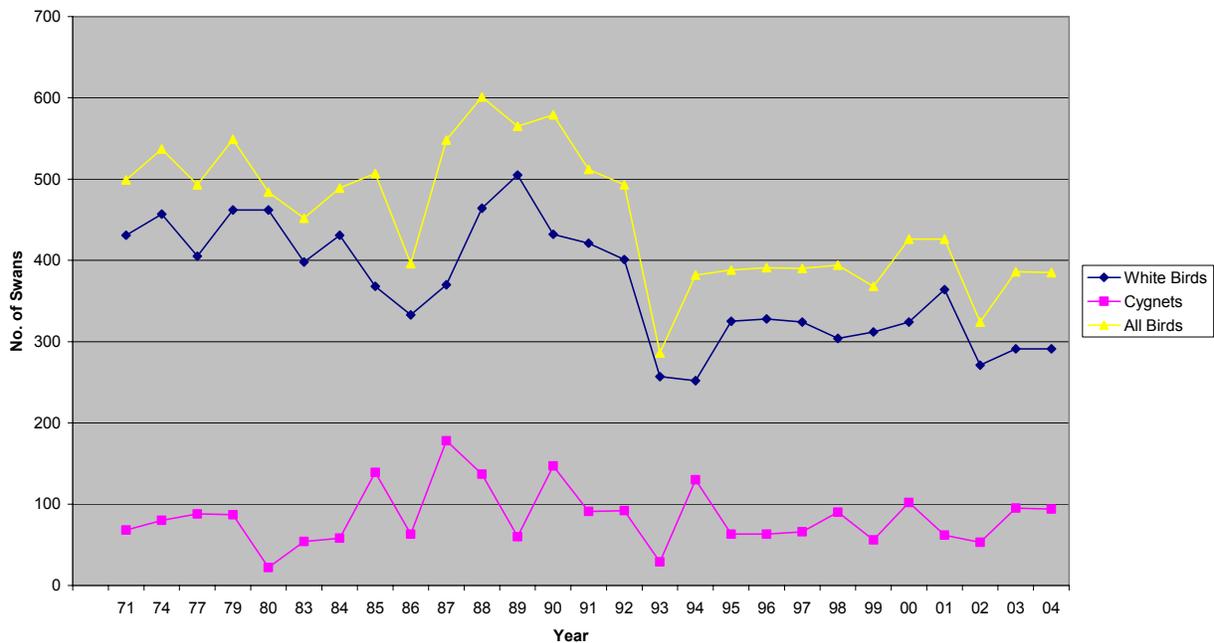
- The fall survey data for Wyoming indicates a increasing trend in the total number of trumpeter swans from 1971 to 2004 (Figure 48). The highest count for Wyoming occurred in 1988, and the lowest count occurred in 1980.

Figure 48: Trumpeter swans in Wyoming from USFWS September surveys, 1971-2004.



- Combining the fall survey data for all three States indicates a decreasing trend for the Tri-state population of trumpeter swans (Figure 49). The decline that has occurred in Montana is greater than the increases that have occurred in Idaho and Wyoming. The highest count for all three States occurred in 1988, and the lowest count occurred in 1993.

Figure 49: Trumpeter swans in the Tri-State Area from USFWS September surveys, 1971-2004.



Wright et al. (2001), conducted a study called “Bayesian Time-Series Analysis of Segments of the Rocky Mountain Trumpeter Swan (*Cygnus buccinator*) Population” (http://nrin.nbio.gov/swan/metadata/time_series_metadata.html). This time-series analysis spans from 1931 to 2000. Results of their analysis are summarized as follows:

- The Yellowstone National Park segment of white birds is *declining* at an annual rate of 3.5 percent ($\pm 2.2\%$, $p=0.90$). Outside of Yellowstone, Wyoming white bird numbers are estimated to be *increasing* at an annual rate of 1.5 percent ($\pm 3.3\%$, $p=0.90$).
- In the Centennial Valley in southwest Montana, the white bird population is *increasing* at an annual rate of 5.2 percent ($\pm 7.9\%$, $p=0.90$), with considerable uncertainty.
- The Targhee segment of white birds is *declining* at an annual rate of 3.9 percent ($\pm 3.2\%$, $p=0.90$), while outside of the Targhee, Idaho white birds are *increasing* at an annual rate of 8.7 percent ($\pm 7.1\%$, $p=0.90$).

Migratory Canadian Flocks

Trumpeter swans that nest in Canada migrate to the Greater Yellowstone Area (GYA) to spend the winter. From 1932 to the 1970’s, the Canadian flocks grew from about 100 birds to 200 birds, while the resident Tri-state flocks grew from about 100 birds to 450-650 birds (Maj and Shea 1996). However, during the 1970’s the Canadian flocks started to grow, reaching about 2,200 birds by 1994 and increasing to almost 5,000 birds by 2004 (Maj and Shea 1996; U. S. Fish and Wildlife Service 2004).

The growth in the number of wintering Canadian birds is displayed in Figures 50 and 51.

- Figure 50 is the total number of wintering trumpeter swans counted in the USFWS winter surveys; it is a combination of Canadian birds and Tri-state birds (U. S. Fish and Wildlife Service 2003). The total number of wintering birds increased from about 600 in 1972 to a high of over 5,000 birds in 2005.
- Figure 51 displays how the Canadian flocks have increased since the early 1970’s while the resident Tri-state flocks have declined. The data in Figure 51 was computed by subtracting the USFWS September survey data of resident Tri-State birds from the USFWS winter survey data to obtain the number of Canadian birds. Since the resident Tri-state birds do not migrate out of the Tri-state area, the September survey data represents the number that would be wintering in the area.

Figure 50: Trumpeter swans in the Tri-state area from USFWS Winter Surveys 1972-2005..

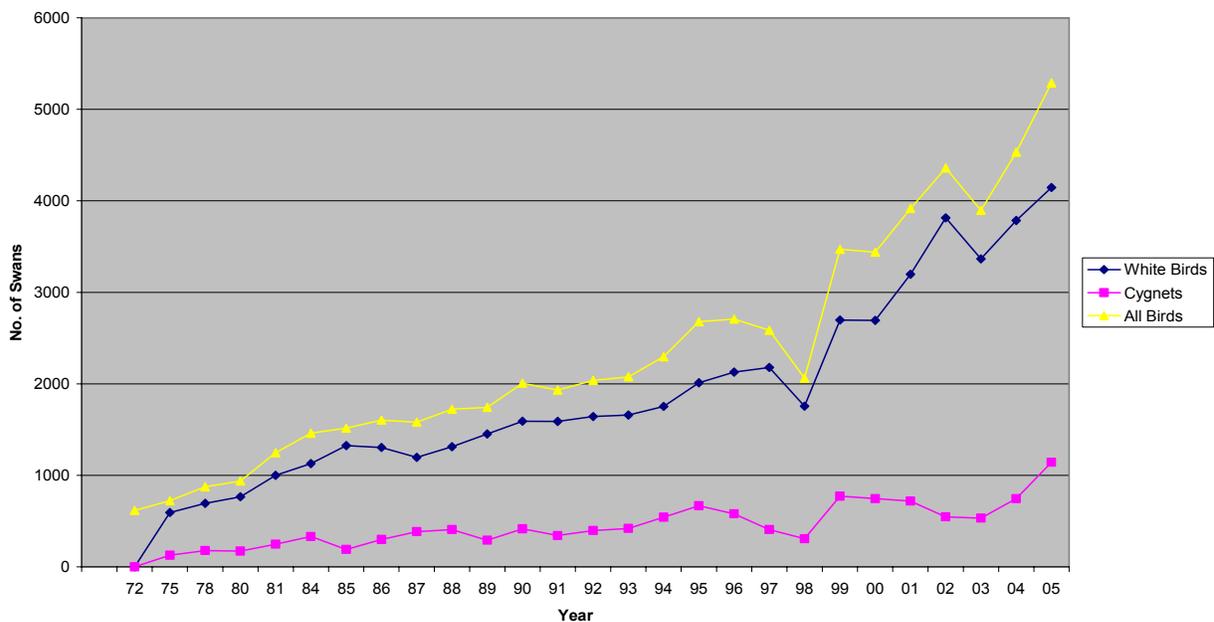
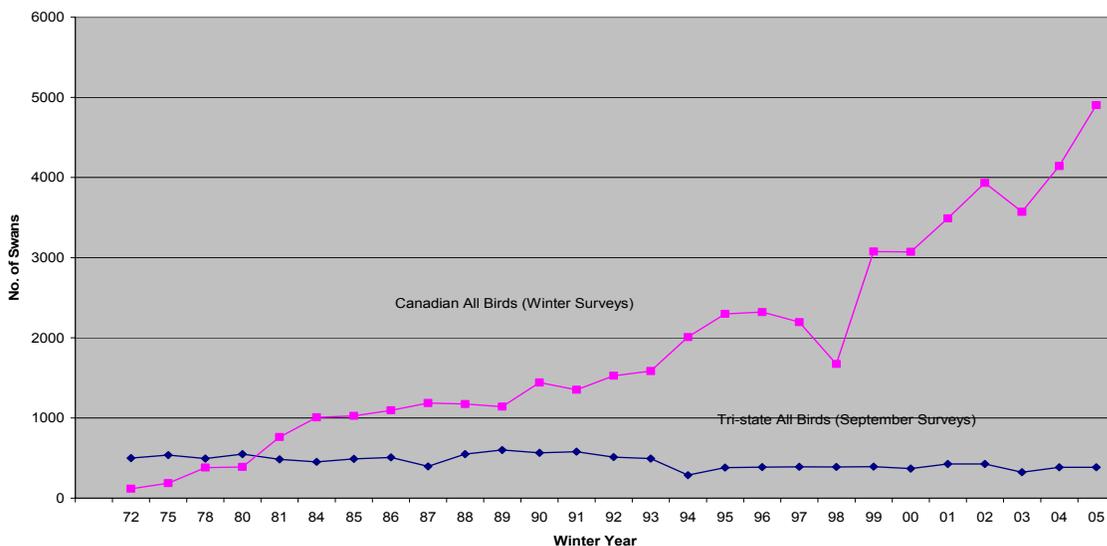


Figure 51: Comparison of resident Tri-State swans and migratory Canadian swans, 1972-2005.



Population Management - 1990's to Present

As the total number of wintering trumpeter swans increased, as shown in Figure 50, historical wintering areas, such as Harriman State Park on the Henry's Fork of the Snake River, began to be over utilized by wintering swans. In the 1990's, State Fish and Game agencies and the U. S. Fish and Wildlife Service initiated management actions to distribute swans to other wintering areas. These management actions include trapping and relocation of adults and cygnets; hazing to try and get swans to fly to other wintering sites; cessation of supplemental feeding; changing water regimes; and lowered water levels in several wintering ponds (Bouffard 2000). The trapping and relocation included moving swans to other areas in Wyoming and Idaho, Utah, Nevada and Oregon. These management actions resulted in a reduction in wintering swans during the mid-to-late 1990's, as shown in Figures 50 and 51. However, relocated birds had a high mortality rate, and efforts to get adult swans to permanently use new wintering areas were mostly unsuccessful. Also, it was not possible to distinguish between Canadian swans and the resident Tri-state swans during the trapping and relocation efforts, resulting in reductions of the resident Tri-state populations due to these efforts. In late 1990's and into the twenty-first century, the amount of wintering swans has increased dramatically, from 2,063 in 1998 to an all-time high of 5,290 swans in 2004 (Figure 50). Canadian swans have increased dramatically while the Tri-State population has remained at very low levels (Figure 51).

Beginning in 2001, trapping and relocation efforts were changed so that only cygnets were trapped, with half of the trapped cygnets being relocated to more southern areas in Idaho, and half of the trapped cygnets being released at the trapping site (Idaho Department of Fish and Game 2002 and 2003). This effort was designed to test two things: try and get cygnets to begin using new wintering areas, and try to see if there was a difference in mortality rates between those that were moved versus those that were released at the trap site. Also, hazing work was stopped in 2002. Preliminary observations indicate that more swans are now being observed in more southerly areas in SE Idaho, such as along the South Fork of the Snake River, and down to Bear Lake National Wildlife Refuge. While it appears swans are expanding their range to other areas, the trapping and moving efforts appear to have taken a toll on resident swan populations. These management efforts are necessary to prevent over-use of the limited habitat but may be causing mortality or relocation of some resident swans.

Evaluation

While trumpeter swan occupancy and cygnet production has been decreasing, there is no evidence that forest management activities caused this decline. Three primary factors in the trumpeter swan decline are likely:

- reduced availability and quality of wintering habitat due to over-utilization by migrating Canadian birds;
- prolonged drought affecting water levels in nesting sites;
- and mortality or removal due to other management efforts such as hazing and relocation.

Recommendations

Continue to implement cooperative projects to improve nesting and wintering habitat. Continue to monitor trumpeter swan occupancy and production on the Targhee.

Spotted Frog Population (and other Amphibians)

Requirements

The Targhee NF and Idaho State University inventoried much of the Forest's riparian and wetland areas for the occurrence of spotted frogs (and other amphibians) in 1992 and 1993 (Clark and Peterson 1994). According to the RFP, each year a random sampling of the areas inventoried in 1992 and 1993 is to be done to document changes in occupancy and habitat conditions. The random sampling is to be done at a minimum of fifteen sites. This information would be used to determine population trend and the adequacy of Rx 2.8.3 and the standards and guidelines for Fisheries, Water, and Riparian Resources.

Results and Evaluation

The annual random sampling as stated in the RFP has not been done. However, Dr. Charles Peterson at Idaho State University approached the Forest in 2002 and suggested that the University and the Forest cooperatively fund a study to reinventory the sites that were inventoried in 1992 and 1993. This would give the Forest a ten-year view of changes in spotted frog and other amphibian populations. The Forest agreed to cooperate with Dr. Peterson, and the reinventory was accomplished in 2002. The following is a summary of the findings from this effort (Jochimsen et al. 2003). This monitoring will be repeated every ten years.

The goal of this study was to answer the following question: *Are amphibian populations declining on the Caribou-Targhee National Forest?* The approach used to address this question was to resurvey seventy-seven sites that were surveyed for amphibians in 1992 and 1993 by Clark and Peterson (1994). Specific objectives were to:

- measure temporal (among year) and geographic (among forest district) variation in site occupancy (% of sites at which each amphibian species was detected);
- measure temporal (among year) and geographic (among forest district) variation in species richness (number of species per site); and
- examine spatial shifts in the sites occupied by each species.

Environmental Measurements

Monthly air temperatures (Figure 52) and precipitation (Figure 53) varied among the 1992, 1993 and 2002 average years. The weather of 1993 was relatively cool and wet, whereas 1992 and 2002 were relatively warm and dry. Temperature and precipitation can directly affect pond permanence and amphibian breeding success. If a site dries up before amphibian eggs or larvae have the opportunity to metamorphose, breeding will not be successful. A total of eight sites were dry upon the second survey visit and breeding was observed during the first visit to 6 of these sites in 2002 (Figure 54).

Yearly Variation in Amphibian Site Occupancy

Table 44 provides a summary of the amphibian observations for the 1992, 1993, and 2002 surveys. Some variation was noted in observed occurrence of amphibians in the TNF between 1992, 1993, and 2002. Tiger Salamanders and Western Toads had higher site occupancies in 2002. Columbia Spotted Frogs had greater site occupancy in 1992 than in 1993 and 2002. However, the only significant yearly difference in occupancy was between Boreal Chorus Frogs observed in 1992 and 1993 (Fisher's exact test, $p=0.001$). All of the Fisher's exact test results are included in Table 49.

Species were not necessarily observed at the same site all three years (Table 45, Figures 59 through 62). In fact, with the exception of Columbia Spotted Frogs, the majority of species' observations were made at sites that only had that species for one or two years. Of the Western Toad and Tiger Salamander sites in 2002, about half of the sites had those species observed only for that year. The same was true for Boreal Chorus Frogs in 1993.

Relatively few of the sites surveyed across the Forest had evidence of amphibian breeding (Table 3A-B). A site is classified as a breeding site only if eggs or larvae are observed. In 2002, Columbia Spotted Frogs bred at 26 percent of all sites, which was the highest breeding percentage of any year or species. In 1993, Boreal Chorus Frogs bred at only 1 percent of all sites, which was the lowest breeding percentage of any year or species. The Ashton Ranger District had the highest percentage of amphibian breeding sites in 2002 (57%) of any year and district.

These results indicate that while amphibian populations are certainly not in stasis at the sites surveyed, there is no evidence for a general increase or decline of amphibian species in the area.

These results also suggest that weather variables, such as temperature and precipitation, may not be a reliable predictor for amphibian occurrence. The years 1992 and 2002 were characterized as being relatively warm and dry, whereas 1993 was a relatively cool, wet year (Fig. 1-2) generally offering better conditions for amphibians. However, it is interesting to note greater numbers of Tiger Salamanders and Western Toads were present in 2002. While these differences did not produce statistically significant results, they provide evidence against using weather only as a predictive variable. Several factors likely influenced detection in subsequent years, with temperature and precipitation being two of them. Time of year is another factor that might have affected the results in this survey. Some of the 2002 surveys were done later in the year than the 1992-1993 surveys and, in some cases, detected amphibians that had not previously been detected.

Geographic Variation in Amphibian Occurrence

Finally, the study looked at how the occurrence of amphibians has changed across years for each ranger district (Figure 4). With the exception of Teton Basin, species occurrence was relatively constant across districts and years. Due to the small sample sizes per district, the study did not statistically test for differences between years and districts. To examine the geographic variation at a finer scale, the study looked at how species occurrence has changed within each district between the 1992, 1993 and 2002 field seasons (Figures 56 through 58). The most interesting result is the lack of detection of Western Toads and Boreal Chorus Frogs and an apparent decline of Columbia Spotted Frogs in Teton Basin in 2002. Columbia Spotted frogs also seemed to show a slight decline in Island Park in 2002, but Tiger Salamanders were observed for the first time, and toad sites increased in that district. Tiger Salamanders were also detected for the first time in 2002 in the Dubois District, and a small increase was noted in Columbia Spotted Frog occurrence. Finally, Western Toads were observed in the Ashton District for the first time.

Resurveys of Historic Localities

Some of the sites surveyed in 2002 also had historical observations for Columbia Spotted Frogs, Western Toads, and Northern Leopard Frogs (*Rana pipiens*). Of the sites surveyed in 2002, Columbia Spotted Frogs occurred at eight of fourteen historic sites and Western Toads were detected at two of their six historic sites. Northern Leopard Frogs were not observed at any of the 77 surveyed sites on the Caribou-Targhee National Forest. This species was not detected in the earlier surveys conducted in 1992 and 1993. Therefore, the 2002 survey provides further evidence that this species is possibly extinct within the section of its former range within forest boundaries.

Species Richness

Mean species richness was 0.74, 0.87, and 0.90 for 1992, 1993, and 2002, respectively. This information reveals a slight increase in mean species richness among survey years. The study also examined the temporal and geographic variation in overall species richness. Temporally, a decrease was noted in the number of sites where only one amphibian species was detected and a slight increase in sites where no amphibians were detected in 2002 (Table 46). However, an 8 percent increase was noted in the number of sites where three different amphibian species were detected.

Exploring the geographic variation of species richness allowed study participants to examine how species richness has changed on a finer scale. The overall species richness at survey sites within the Forest's districts was variable across years (Figures 63 through 67). In Ashton, Dubois, and Island Park, a general increase in 3-species sites was noted and a decrease in 1-species sites in 2002 as compared to 1992 and 1993. It is interesting to note that these new 3-species sites were generally in the northern part of the district. However, the opposite was true for Teton Basin. There were no 3-species sites in this District, and the percentage of sites with no species observed increased in 2002.

Table 44 is a summary of amphibian observations for the 1992, 1993, and 2002 surveys of the Caribou-Targhee National Forest. The number of sites where Tiger Salamanders (*Ambystoma tigrinum*), Western Toads (*Bufo boreas*), Boreal Chorus Frogs (*Pseudacris maculata*), and Columbia Spotted Frogs (*Rana luteiventris*) were detected and sites where no species were observed are included, followed by their relative percent listed in parentheses. The last column indicates the number of sites where a species was observed at least once during any survey, and the number of sites where no species were detected in any year. Only data from the 77 sites common to all surveys are included.

Table 39: Summary of amphibian observations for the 1992, 1993, and 2002 surveys of the Caribou-Targhee NF.

	1992	1993	2002	1992, 1993, or 2002
No species observed	34 (44%)	31 (40%)	38 (49%)	18 (23%)
Tiger Salamander	8 (10%)	8 (10%)	15 (19%)	19 (25%)
Western Toad	7 (9%)	6 (8%)	10 (13%)	15 (19%)
Boreal Chorus Frog	8 (10%)	25 (32%)	16 (21%)	30 (39%)
Columbia Spotted Frog	34 (44%)	28 (36%)	28 (36%)	41 (53%)

Table 40: Detailed summary of amphibian observations for the 1992, 1993, and 2002 surveys of the Caribou-Targhee NF. It displays the number of sites where species were observed in: one year only, any two years the surveys were conducted, or all three years of the survey. Only surveys from the 77 sites which were surveyed in all three years are included.

	1992 only	1993 only	2002 only	1992 and 1993	1992 and 2002	1993 and 2002	All three years
No species observed	4	4	7	5	8	5	18
Tiger Salamander	1	2	7	1	3	2	3
Western Toad	1	2	6	2	2	0	2
Boreal Chorus Frog	1	11	4	2	0	7	5
Columbia Spotted Frog	6	1	5	6	2	1	20

Table 41: Temporal variation of species richness at 77 common survey sites on the Caribou - Targhee National Forest. Total number of sites with corresponding level of species richness (number of different species present at survey site) by survey year, with relative percent in parentheses.

Species Richness	1992	1993	2002
0	34 (44%)	31 (40%)	38 (49%)
1	32 (42%)	30 (39%)	18 (23%)
2	8 (10%)	12 (16%)	12 (16%)
3	3 (4%)	3 (4%)	9 (12%)
4	0	1 (1%)	0

Table 42: Number of detected amphibian breeding sites for each species by survey year on the Caribou - Targhee National Forest. Only data from the 77 sites common to all surveys are included, with the relative percent included in parentheses.

Species	1992	1993	2002
Tiger Salamander	7 (9%)	6 (8%)	14 (18%)
Western Toad	2 (3%)	4 (5%)	4 (5%)
Boreal Chorus Frog	2 (3%)	1 (1%)	14 (18%)
Columbia Spotted Frog	14 (18%)	17 (22%)	20 (26%)

Table 43: Number of detected amphibian breeding sites for each ranger district by survey year on the Forest (N = number of sites in that district). Numbers in parentheses indicate the relative percent of amphibian breeding sites for each corresponding ranger district. Only data from the 77 sites common to all surveys are included.

Ranger District	1992	1993	2002
Ashton	7 (30%)	6 (26%)	13 (57%)

N = 23			
Dubois N = 11	3 (27%)	5 (45%)	6 (55%)
Island Park N = 17	5 (29%)	6 (35%)	8 (47%)
Palisades N = 20	1 (1%)	0	1 (1%)
Teton Basin N = 6	3 (50%)	3 (50%)	3 (50%)

Table 44: Results of Fisher's exact test comparisons of species occurrence between years.

Species	Year comparison	P-value
Tiger Salamander	1992 - 1993	1.000
	1992 - 2002	0.174
	1993 - 2002	0.174
Western Toad	1992 - 1993	1.000
	1992 - 2002	0.608
	1993 - 2002	0.429
Boreal Chorus Frog	1992 - 1993	0.001
	1992 - 2002	0.119
	1993 - 2002	0.144
Columbia Spotted Frog	1992 - 1993	0.411
	1992 - 2002	0.411
	1993 - 2002	1.000

Figure 52: Monthly mean temperatures measured in 1992, 1993, and 2002 for eastern Idaho (Source: NOAA Climatological Records for Idaho 1992, 1993, and 2002).

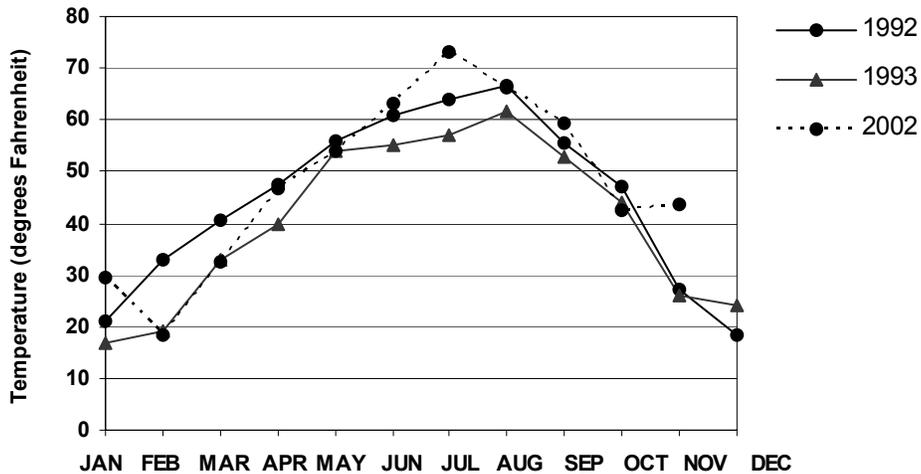


Figure 53: Monthly total rainfall measured for eastern Idaho in 1992, 1993, and 2002 (Source: NOAA Climatological Records for Idaho 1992, 1993, and 2002).

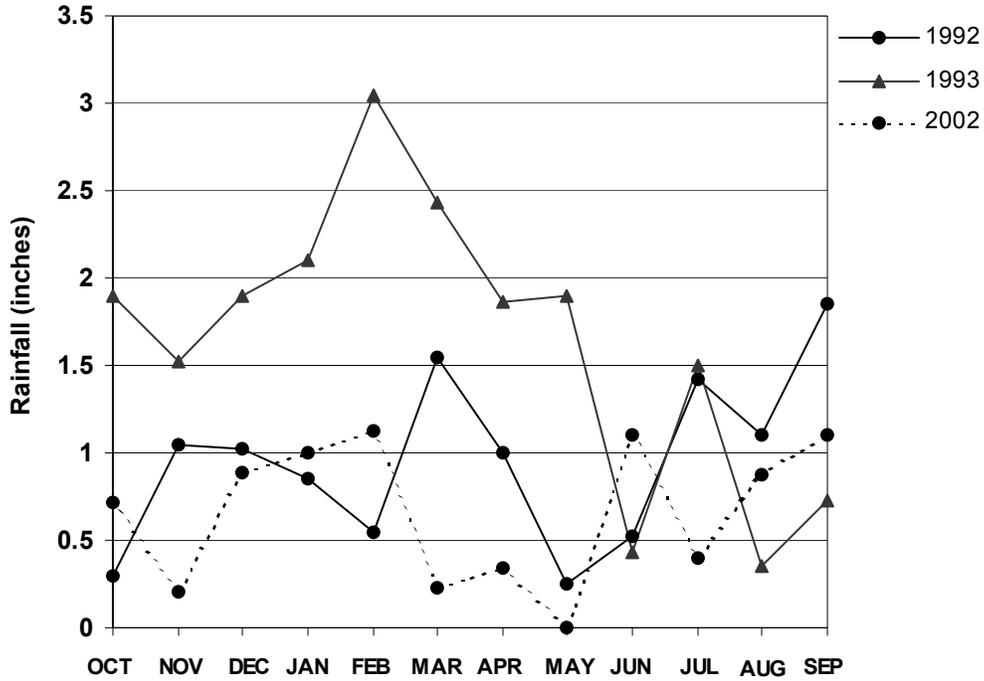


Figure 54: Pond permanence. Site classification is based on both visits. For example, if no amphibians are found at a site during the first visit and evidence of breeding is found on the second visit, the site is classified as breeding.

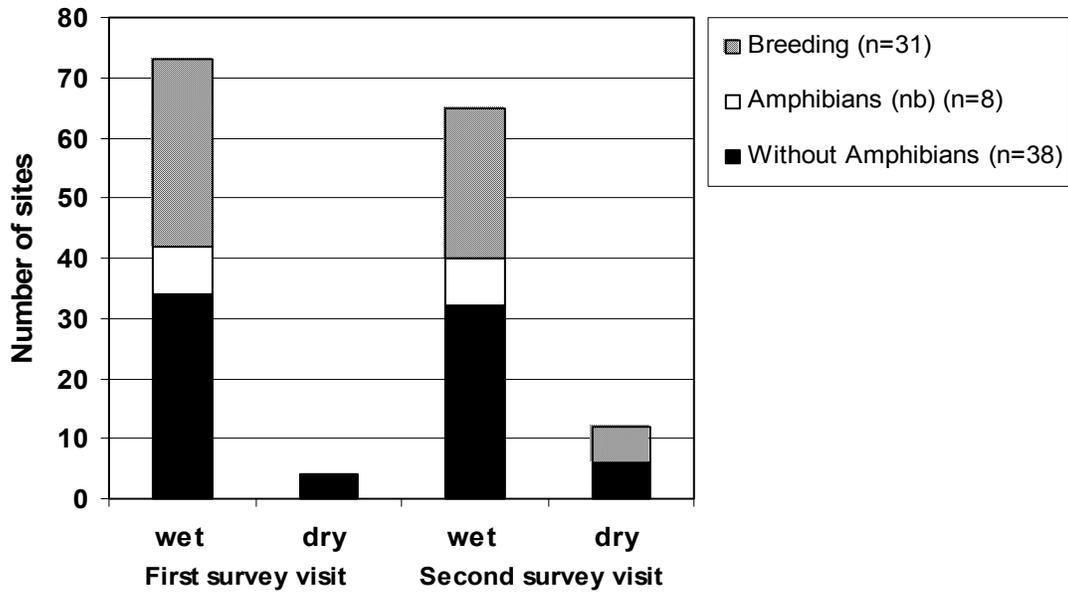


Figure 55: Total percentage of sites where amphibians were detected among districts and years for the Targhee - Caribou National Forest.

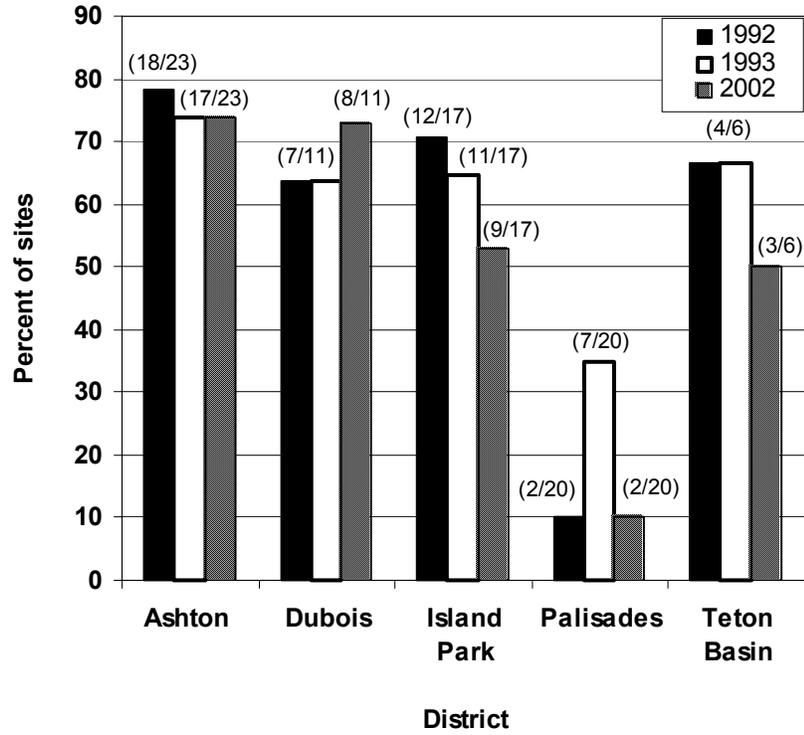


Figure 56: Number of sites occupied by amphibian species across districts in the Caribou - Targhee National Forest in 1992. AMTI = Tiger Salamander; BUBO = Western Toad; PSMA = Boreal Chorus Frog; RALU = Columbia Spotted Frog.

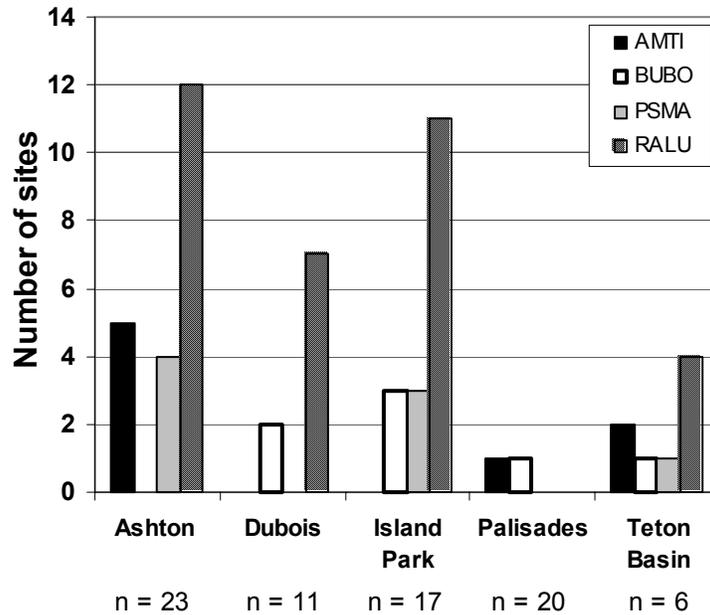


Figure 57: Percentage of sites occupied by amphibian species across districts in the Caribou - Targhee National Forest in 1993. AMTI = Tiger Salamander; BUBO = Western Toad; PSMA = Boreal Chorus Frog; RALU = Columbia Spotted Frog.

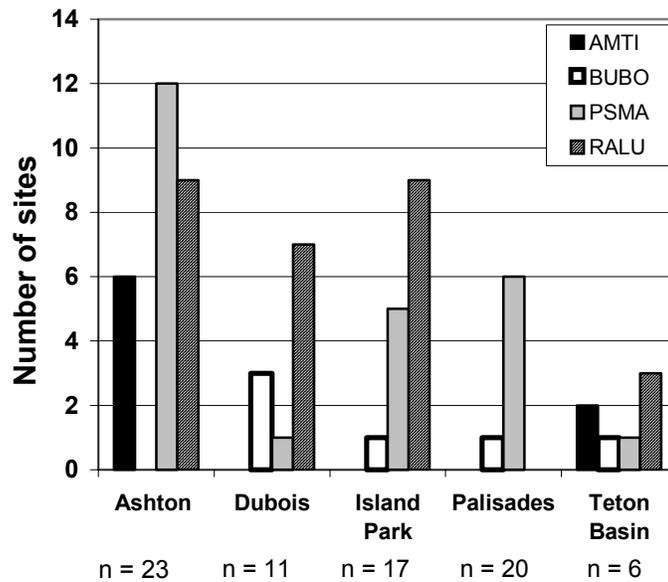


Figure 58: Percentage of sites occupied by amphibian species across districts in the Caribou - Targhee National Forest in 2002. AMTI = Tiger Salamander; BUBO = Western Toad; PSMA = Boreal Chorus Frog; RALU = Columbia Spotted Frog.

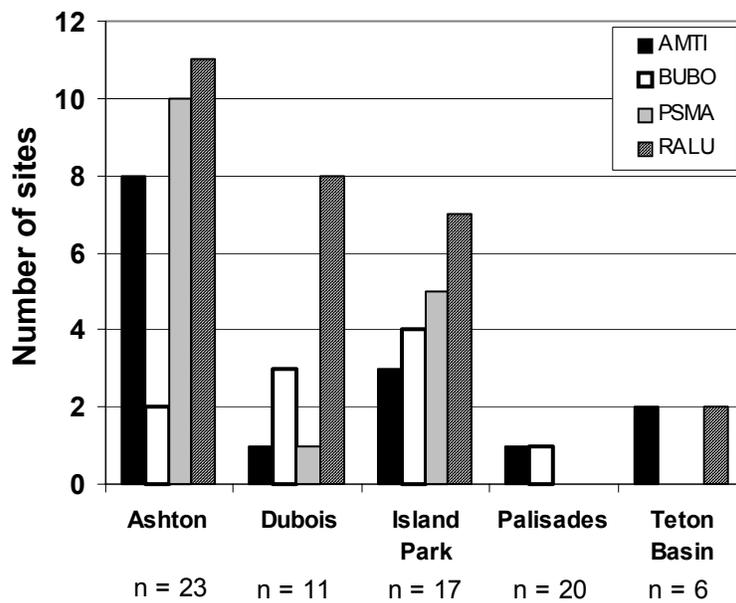
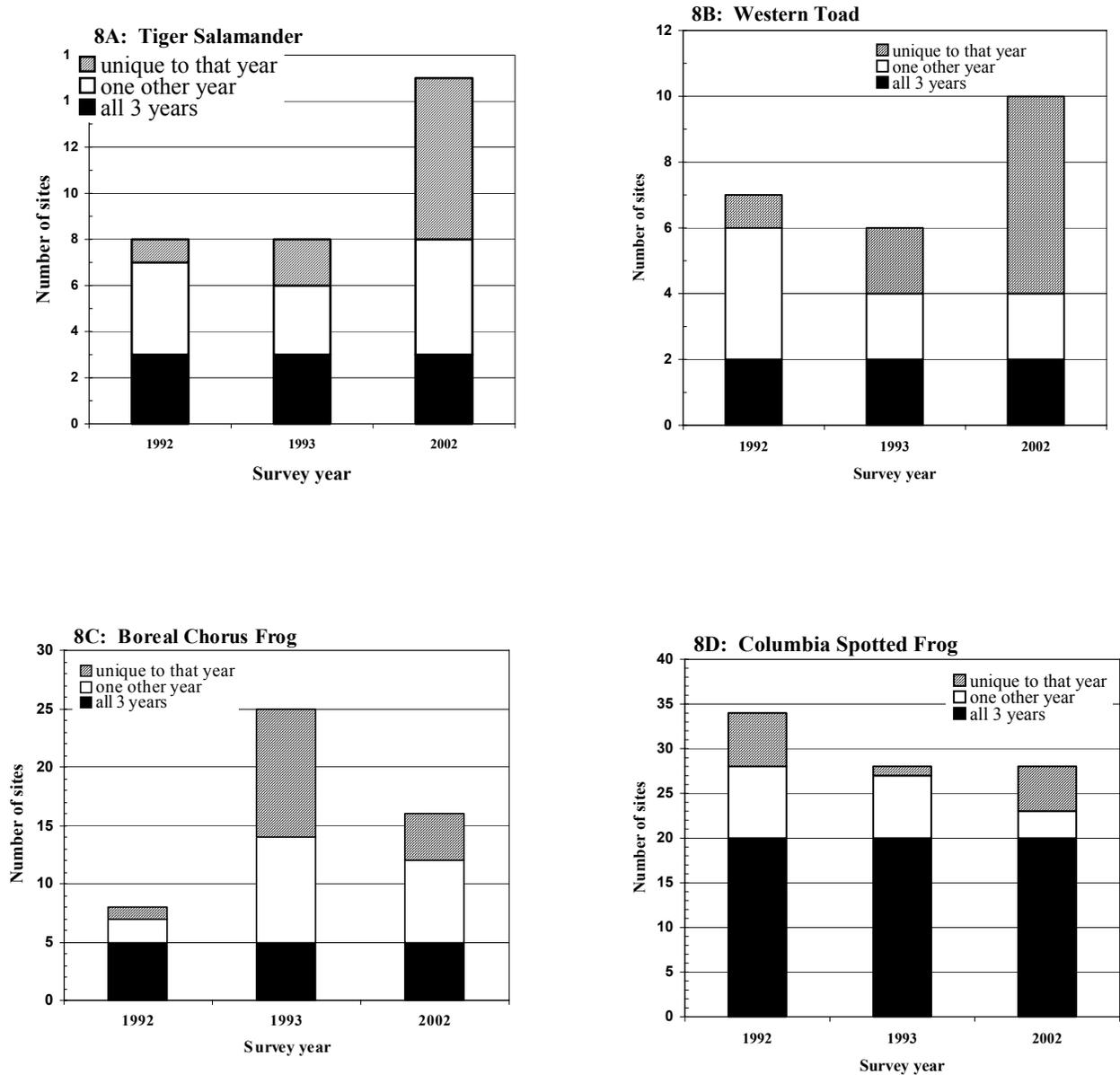


Figure 59, Figure 60, Figure 61, Figure 62: (Figures 8a-d) Shifting changes of sites occupied by amphibian species on the Forest across survey years. The black shaded region of each stacked bar represents the numbers of sites that the given species was observed in all three years the surveys were conducted (1992, 1993 and 2002). The white region of each stacked bar represents the numbers of sites where the given species was observed in any two of the survey years. The cross-hatched region of each stacked bar represents the numbers of sites that the given species was observed in that year only.



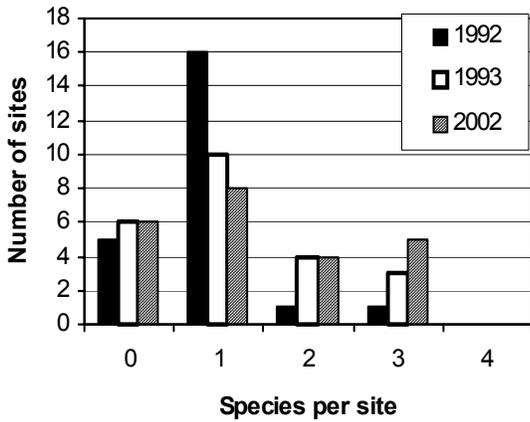


Figure 9a. Ashton (N=23 sites)

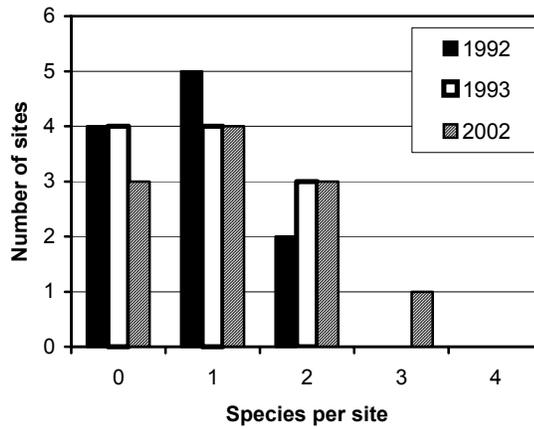


Figure 9b. Dubois (N= 11 sites)

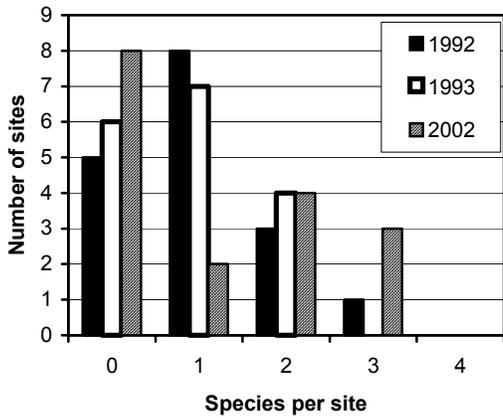


Figure 9c. Island Park (N=17 sites)

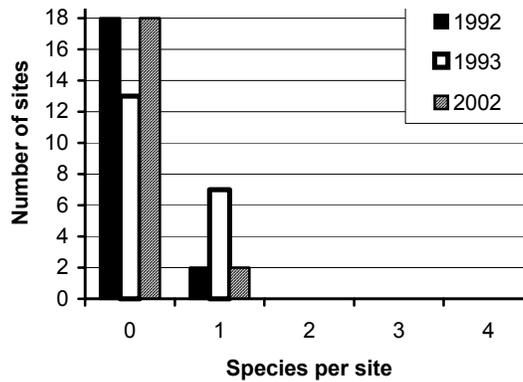


Figure 9d. Palisades (N=20 sites)

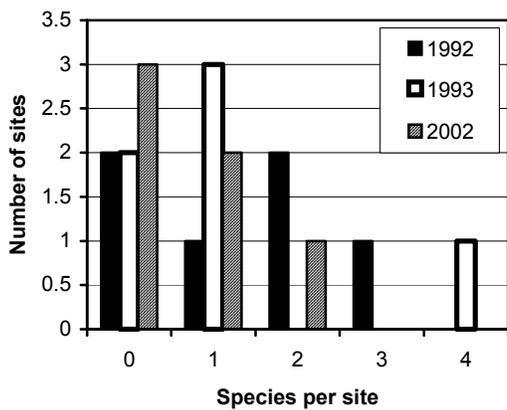


Figure 9e. Teton Basin (N= 6 sites)

Figure 63, Figure 64, Figure 65, Figure 66, Figure 67 (Figures 9a-9e): Comparison of species richness according to District and across years.

Summary

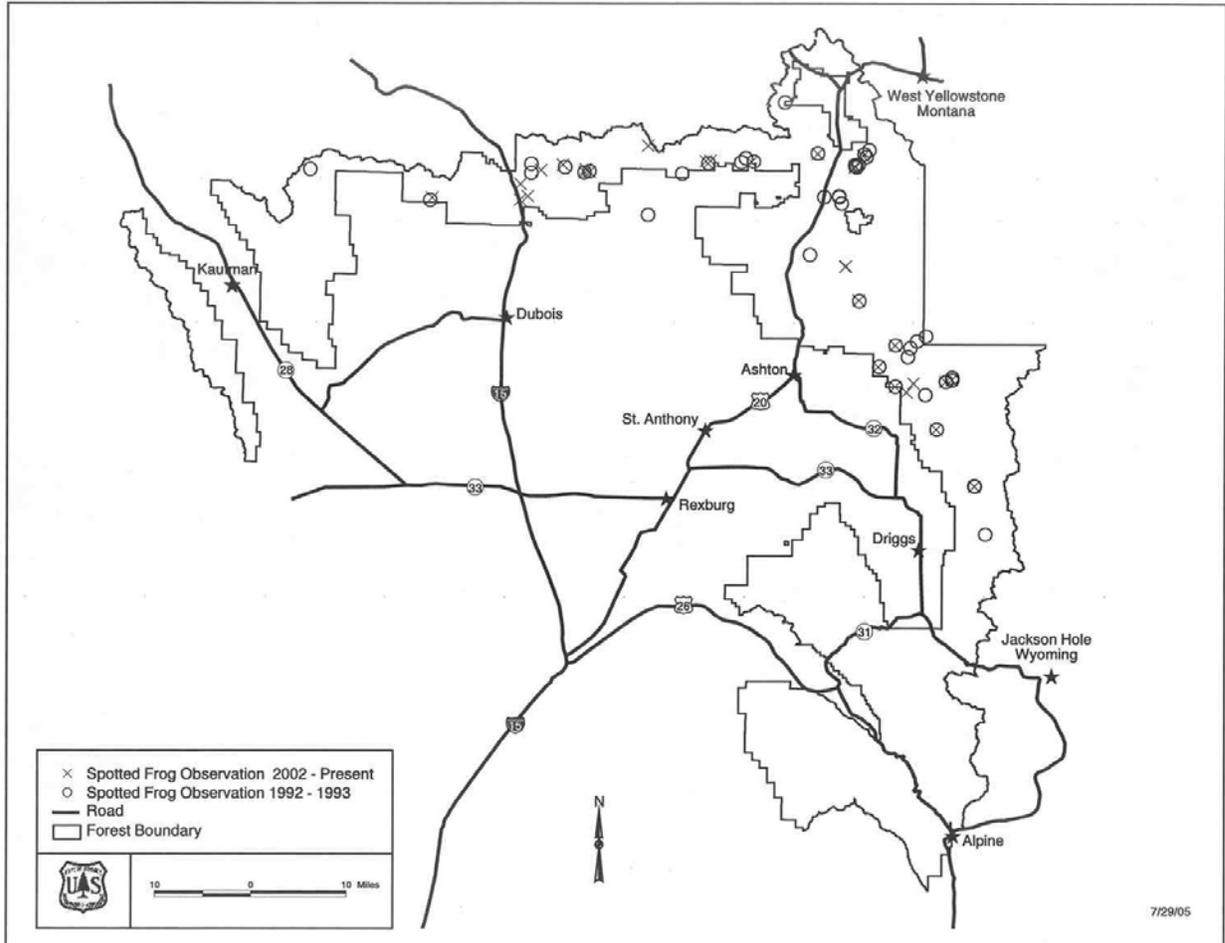
- The study found no statistically significant differences in site occupancies between 1992 and 2002 or 1993 and 2002.
- Tiger Salamanders and Western Toads were actually found at more sites in 2002 than in the 1990's.
- Boreal Chorus Frog site occupancy was highest in 1993 and lowest in 1992.
- Columbia Spotted Frog site occupancy was highest in 1992 and the same in 1993 and 2002.
- As in 1992 and 1993, the study found no Northern Leopard Frogs in 2002, which further suggests that this species may no longer occur on the Targhee National Forest.
- Site occupancy did not appear to be correlated with weather conditions (1992 and 2002 were relatively warm, dry years in comparison to 1993).
- Site occupancy showed relatively little variation across districts and years, with the exception of Teton Basin where there were fewer sites with Western Toads and Boreal Chorus Frogs in 2002 than in the 1990s.
- Although site occupancies did not change much over time, shifts in which specific sites were occupied were common. This result highlights the need to monitor across a variety of occupied and unoccupied sites so increases as well as decreases can be detected. If only previously occupied sites had been monitored, the study may have concluded that declines had occurred.
- No amphibian species were detected at the majority of sites in any given year.
- Mean species richness increased from 1992 to 1993 to 2002, although the differences were not statistically significant.

The study did not find any statistically significant differences in occupancy between the 1992 and 1993 surveys which were before the adoption of the RFP and the 2002 surveys which were after the RFP. Columbian spotted frog occupancy did not change from 1993 to 2002. This indicates that the RFP standards and guidelines and Aquatic Influence Zone management prescription direction is adequate to maintain habitat for spotted frogs.

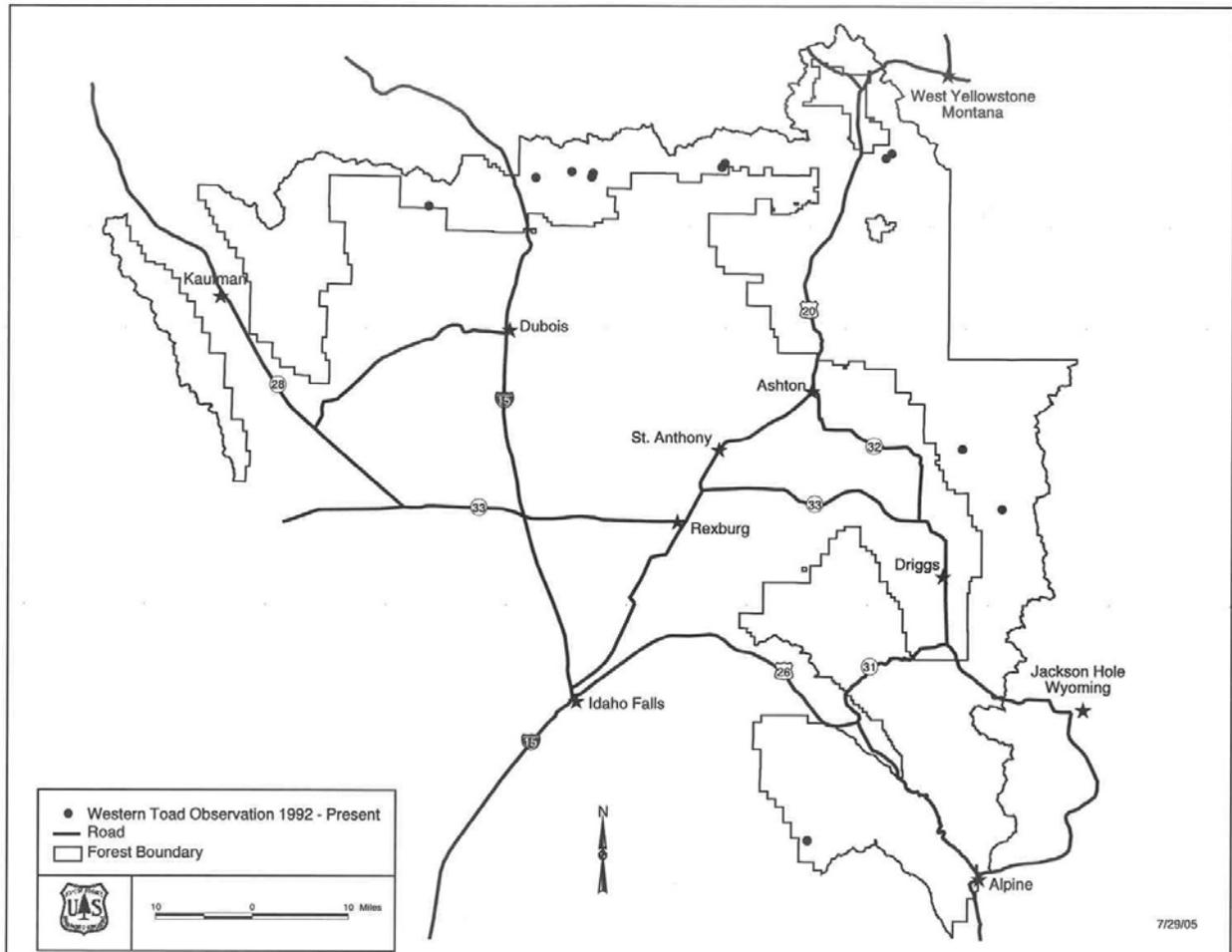
Recommendations

For future amphibian monitoring on the Targhee National Forest, Forest biologists recommend resurveying at least once per decade in cooperation with the Herpetology Dept. at Idaho State University or another qualified cooperator.

Map 10: Comparison of spotted frog observations in 1992 and 1993 with those recorded in 2003.



Map 11: Western toad observations on the Targhee from 1992 to present.



Common Loon Population

Requirements

Occupancy and habitat conditions in suitable loon nesting and brood-rearing habitat is to be monitored annually at the sites identified in Process Paper D. Personnel from the Wyoming Game and Fish Dept. have done this monitoring. This monitoring would measure populations of common loons and its relationship to habitat changes on the Targhee.

Results and Evaluation

Common loon nesting and reproduction have been documented at six lakes and one reservoir within the Targhee National Forest from 1987 to 2002 (Table 50). Loons have been present every year at Indian Lake and Loon Lake, while the other sites have had one or more years when no loons have been present. For the years 2000 through 2002, six sites have had loons present every year, and one site has had loons present four out of the five years.

Six sites have been consistently monitored for the presence of adult loons over the sixteen-year period (Table 50). The number of adult loons at the six sites has ranged between 4 and 12 (Figure 68). The overall trend for adult birds is stable within the range of four to twelve.

Indian Lake has produced the most birds (21 young) over the eighteen-year monitoring record, followed by Loon Lake (19 young), Moose Lake (12 young), Junco Lake (6 young), Bergman Reservoir (5 young), and Thompson Hole (1 young; but survey records are only complete for 1 year). Fish Lake has not produced any young. The year with the highest number of young produced was 1988 (10 young), and no young were produced in 1991.

Thompson Hole is surveyed every year for trumpeter swans, but surveys for swans may miss loons, unless a specific effort is made to look for loons. As indicated in the table, loons have only been documented one year at Thompson Hole. A need exists to specifically survey for loons at Thompson Hole.

Two of the sites (Bergman Reservoir and Indian Lake) have water rights associated with them, and water levels can be drawn down, especially in dry years. The drawdowns probably affect loon use at Bergman Reservoir more than at Indian Lake.

From 1997 through 1999, no documented loon use has occurred at Junco Lake, and concern has been expressed that changed habitat conditions or human use at the lake may be adversely affecting loon use (Caribou-Targhee National Forest 2000). Monitoring from 2000 through 2004 has documented that loons were present on the lake for the past five years, and successful reproduction was documented in 2000 (Table 50).

Common loons have been observed at other lakes and reservoirs within or adjacent to the Forest as follows: Palisades Reservoir, Island Park Reservoir, Grassy Lake Reservoir, Henry's Lake and Lake of the Woods. A previous monitoring report (Caribou-Targhee National Forest 2000) stated the Forest had no record of nesting or reproduction occurring at these sites. Previous monitoring reports noted that reservoirs have significant drawdowns during the summer months, and likely do not provide suitable breeding habitat for loons (Atkinson 1991; Caribou-Targhee National Forest 2000). However, in July 2003, Forest personnel received a report of a common loon with juvenile plumage at Island Park Reservoir, suggesting that successful reproduction may have occurred at that reservoir (email on file at Caribou-Targhee National Forest).

In summary, no changes have been detected in loon distribution on the Forest. The lakes that have historically provided habitat for nesting pairs of loons continue to provide suitable habitat. This indicates that the RFP direction is adequate to maintain habitat for viable populations and the protections in the RFP provide well distributed habitat for reproductive loons.

Recommendations:

Continue the monitoring with the Wyoming Game and Fish Dept.

Figure 68: Number of adult common loons at six sites.

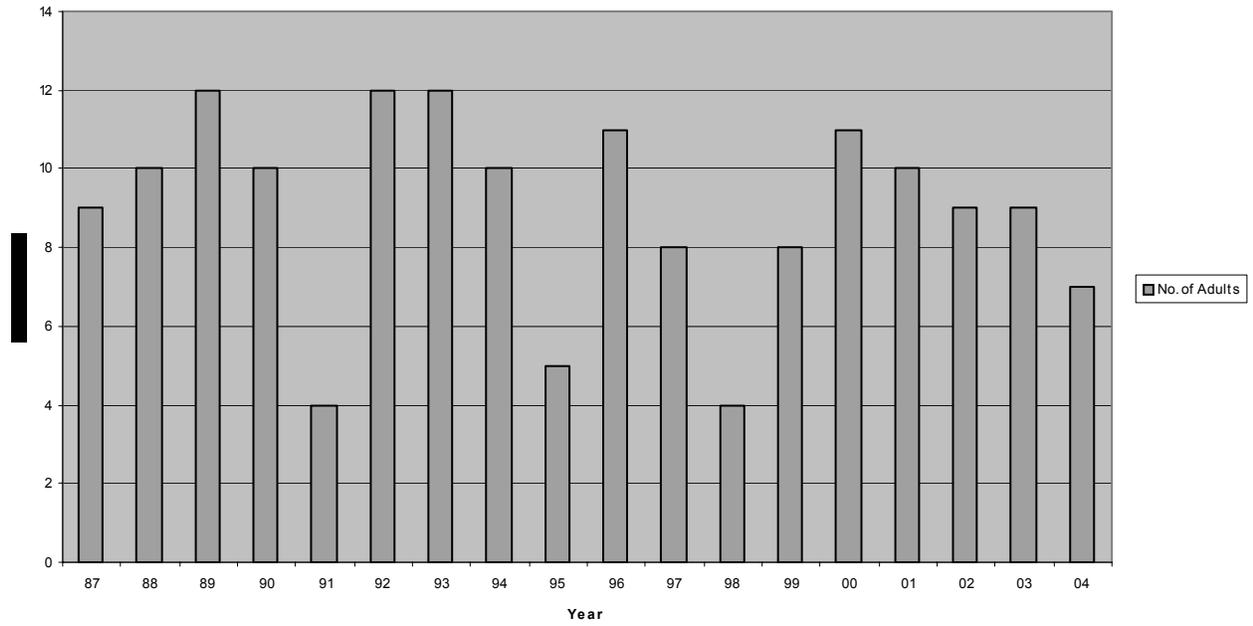


Table 45: Summary of common loon nesting (June) and productivity (July) surveys from 1987- 2004.
Key to Table: “-“ indicates that young were not observed during the survey; however, due to the secretive nature of loons, young may have been present but hidden from view; NS = not surveyed; and “?” indicates that a June nesting status survey was conducted only but these lakes were not surveyed in July so productivity was unknown.

	Bergman Res.	Fish Lake	Indian Lake	Junco Lake	Loon Lake	Moose Lake	Thompson Hole ³	Total Young Per year
Year	Adults/Young	Adults/Young	Adults/Young	Adults/Young	Adults/Young	Adults/Young	Adults/Young	
1987	2/1	0/0	2/2	1/1	2/1	2/2	NS	7
1988	2/2	0/0	2/1	2/2	2/2	2/2	2/1	10
1989	2/-	NS	4/1	2/1	2/2	2/-	NS	4
1990	2/-	NS	2/2	2/1	2/1	2/2	NS	6
1991	NS	NS	1/0 ¹	NS	2/0	1 ¹ /0	NS	0
1992	2/-	2/-	2/1? ²	2/-	2/?	2/?	NS	1
1993	2/?	1/?	3/-	2/-	2/1	2/?	NS	1
1994	2/-	2/-	2/2	0/0	2/1	2/1	NS	4
1995	2/-	0/0	2/-	0/0	1/2	0/0	NS	2
1996	1/-	2/-	2/1	2/-	2/2	2/-	NS	3
1997	1/2	1/-	2/2	0/0	2/2	2/1	NS	7
1998	0/0	0/0	½	0/0	1/-	2/1	NS	3
1999	0/0	2/-	2/2	0/0	2/-	2/-	NS	2
2000	1/0	2/-	2/2	2/1	2/1	2/-	NS	4
2001	0/0	2/- ⁴	2/1	2/-	2/1	2/1	NS	3
2002	1/0 ⁵	1/0	2/1	2/-	2/1	1/-	NS	2
2003	1/0	1/0	2/1	1/-	2/0	2/2	NS	3
2004	1+/-	1+/-	1+/-	1+/-	2/2	1+/-	NS	2
Total Young per Lake	5	0	21	6	19	12	1	-

Sources of data for the table: Andrea Cerovski, Wyoming Game and Fish Department common loon survey reports from 1987-2004; Targhee National Forest 1997; Caribou-Targhee National Forest 2000; Atkinson 1991.

¹ Records indicate that loons were observed, but the number of loons was not recorded; we have shown ‘1’ in the table, but the number could have been higher.

² A nest with 1 egg was observed; it is unknown if the egg hatched and the young loon survived.

³ Thompson Hole is surveyed every year for trumpeter swans, but surveys for swans may miss loons unless there is specific effort to look for loons. As indicated in the table, loons have only been documented one year at Thompson Hole.

⁴ Most likely the same pair that had recently flown from Loon Lake toward Fish Lake.

⁵ Most likely one of the adults from the Indian Lake pair.

Harlequin Duck Population

Requirements

Occupancy and productivity of harlequin ducks is to be monitored annually at nesting and brood-rearing sites identified in the RFP’s Process Paper D. This monitoring data would be used to determine if the standards and guidelines for Rx 2.8.3 and Fisheries, Water, and Riparian Resources are adequate to maintain populations.

Results

At this time, harlequin ducks have been documented on only four streams on the Targhee National Forest: Big Elk Creek and McCoy Creek (on the Palisades Ranger District), and Teton Creek and Darby Creek on the Teton Basin Ranger District. The following table summarizes years when monitoring was accomplished, and the documented observations on each stream.

Table 46: Summary of harlequin duck surveys from 1989 through 2005.

Year	Number of Adults and Young Observed (adults/young)			
	Big Elk Creek	McCoy Creek	Teton Creek	Darby Creek
1989	1 pair; 1 drake	Observed, # unk	---	---
1990	2 pairs; 1 drake	None observed	1 pair; 1 drake	1 pair; 1 drake; 1 lone young
1991	1 pair	None observed	1 hen, 2 young	None observed
1992	---	---	---	---
1993	None observed	None observed	---	---
1994	None observed	None observed	---	---
1995	1 pair; 2 drake, 1 hen	---	None observed	Harlequin egg shells found
1996	3 pairs	---	None observed	None observed
1997	1 pair	---	---	None observed
1998	2 hens	None observed	---	---
1999	---	---	---	---
2000	None observed	n/a	---	---
2001	n/a	n/a	---	---
2002	n/a	n/a	---	---
2003	n/a	None observed	---	---
2004	2 pairs	None observed	---	---

KEY: "—" No survey conducted; "n/a" information not available at the time of the report
 (Sources for the above information: Idaho Department of Fish and Game, Idaho Conservation Data Center; Atkinson 1991; Atkinson and Atkinson 1990; Cassirer and Groves 1990 and 1991; Whitfield and Maj 1996; Bud Alford 1991-2004)

Evaluation

Monitoring records illustrate that harlequin ducks are secretive and difficult to observe. Several times in Big Elk Creek, harlequins were not observed by the monitoring crew but were later observed and reported by other reputable people. Therefore, negative results from monitoring may not mean that harlequins are not present. Also, there are very few times when broods or young have been observed. Monitoring has not been consistently accomplished on three of the streams.

Other streams which have been surveyed for the presence of harlequin ducks, but no harlequin ducks have ever been found or reported include:

- Teton Basin Ranger District: Fox Creek, Bitch Creek, Badger Creek, Moose Creek, S. Leigh Creek
- Palisades Ranger District: Pine Creek
- Ashton/Island Park Ranger District: Robinson Creek, Targhee Creek

In Big Elk Creek, where harlequin ducks have consistently been seen and surveyed, they continue to be observed and are reproducing. The standards and guidelines in Management Prescription 2.8.3 appear to be adequate to maintain habitat for harlequin ducks.

Recommendation

The Forest should drop as an MIS and develop a consistent monitoring and reporting program for the streams in Table 51 and the streams listed above.

Elk Vulnerability and Elk Habitat Effectiveness

Requirements

To measure the effectiveness of RFP standards and guidelines and validate assumptions, the population trend and habitat changes for elk will be monitored annually. Population trend would be determined from the annual percent bull elk mortality as gathered by the State Fish and Game Departments. Habitat changes would be tracked by monitoring road and trail access, cross-country motorized travel, and cover analysis.

Results

The primary factor over which the Forest Service has control in elk vulnerability (EV) and elk habitat effectiveness (EHE) is motorized access (Targhee National Forest 1997, Process Paper D). This monitoring report for EV and EHE will focus on the progress the Forest has made in achieving the new motorized access density standards that were established in the 1997 Revised Forest Plan (RFP) and the 1999 Open Road and Open Motorized Trail Analysis (Motorized Road and Trail Travel Plan).

The Forest was appealed on motorized access decisions following the 1997 RFP and 1999 Travel Plan FEIS. Those appeals have resulted in the following on-the-ground situation:

- The decision on motorized cross-country travel in the 1997 RFP has been upheld. Work has progressed at getting adequate on-the-ground signing in place. New travel plan maps, which display motorized cross-country travel restrictions, were printed and distributed to the public in fall of 2000. Violations of the cross-country travel restrictions are occurring, but the Forest has not quantified these violations. For several years, the Forest has cooperated annually with Idaho Fish and Game to patrol high-use areas during the fall hunting seasons. See Monitoring Items Road Closure Effectiveness and Achievement of Road Density sections for more information on efforts the Forest is conducting to insure effective closures.
- Forest decisions have been upheld on which roads and trails will be open to motorized use and which ones will not be open for motorized use. Forest employees have been working to sign all of the roads and trails. The following signing has been accomplished (reported by District Rangers):
 - ☑ *On the Dubois Ranger District, 95% of the roads and 75% of the trails have been signed. Approximately 25% of the signs have been vandalized, especially in Birch Creek, but the District has been replacing these vandalized signs.*
 - ☑ *The Island Park Ranger District, 100% of the roads and 100% of the trails have been signed. Some vandalism has occurred, but there is no estimate of the percent vandalized.*
 - ☑ *On the Ashton Ranger District, 100% of the roads and 100% of the trails have been signed. Some vandalism has occurred, but there is no estimate of the percent vandalized.*
 - ☑ *On the Palisades Ranger District, 80% of the roads and none of the trails have been signed. Some vandalism has occurred, but there is no estimate of the percent vandalized.*
 - ☑ *On the Teton Basin Ranger District, 100% of the roads and 30% of the trails have been signed. Approximately 50% of the road signs have been vandalized.*
- The Forest began decommissioning roads identified in the 1997 RFP in 1998. The decommissioning work began in the grizzly bear management units (BMU's), the highest priority identified in the 1997 RFP. Decommissioning work has been completed in the Henry's Lake BMU (Watersheds 008, 009A, and part of 010) and the Plateau BMU (Watersheds 012, 013, and part of 010). The Forest began decommissioning roads in the Bechler/Teton BMU, but appeals by various user groups, litigation and actions by Teton County Idaho Commissioners stopped the decommissioning work. To resolve these issues, the Forest was

directed to complete site-specific analysis of the effects of the decommissioning methods before any ground disturbing activity can occur. The previous decommissioning work accomplished in the Henry's Lake BMU and the Plateau BMU has been re-evaluated for site-specific effects.

For EV and EHE, motorized access is measured by the density of open roads and open motorized trails and motorized cross-country travel within defined watersheds (Targhee National Forest 1997, Process Paper D). Table 52 lists the watersheds on the Forest and displays the motorized access density prior to the RFP; the density that the Forest is trying to achieve as a result of the RFP and 1999 FEIS Travel Plan; and the density at the end of 1999 and in 2005. Motorized access density standards have been achieved in 30 of 44 watersheds on the Targhee. In the 14 watersheds where access density standards have not been met, progress has been made primarily through cross-country travel restrictions. Twelve of those watersheds are exceeding motorized access density standards by only 0.01 to 0.03 miles per square mile. This difference may be attributed to more accurate mapping of the roads and trails. Full achievement of the motorized access standards will not occur until the following actions are accomplished:

- Improving gates on some restricted roads to make them effective;
- Additional site-specific analysis has been accomplished so that all of the decommissioning work can be completed;
- Education and law enforcement can reduce the amount of vandalism and motorized violations that are occurring.

Evaluation and Recommendation

The route density standards have been effective in improving elk habitat effectiveness and reducing bull elk mortality during hunting seasons by restricting hunter access. The Forest should continue site-specific analysis of road decommissioning so that standards can be achieved on the remainder of the Forest watersheds. Change monitoring to review changes every 5 years instead of annually.

Table 47: Motorized Access Density, Elk Habitat Effectiveness, and Elk Vulnerability changes in Watersheds on the Targhee National Forest.

Watershed #	Watershed Name	Motorized Access Density (mi/mi ²)				Elk Habitat Effectiveness (higher EHE means more secure habitat)				Elk Vulnerability ⁹ (estimated % bull elk mortality)			
		Prior to 1997	To Acheive Standards in 1997 RFP & 1999 Travel Plan	In 1999	In 2004	Prior to 1997	EHE predicted for Alt. 3M	In 1999	In 2004	Prior to 1997	EV predicted for Alt. 3M	In 1999	In 2005
002 I	Indian Cr. ID	2.06	1.21	1.54	1.21	0.53	0.53	0.53	0.55	46	38	38	33
003 I	Elk Cr. ID	0.71	0.48	0.68	0.48	0.62	0.63	0.62	0.68	27	26	26	24
004 I	Palisades Cr. ID	0.41	0.24	0.35	0.23	0.70	0.72	0.70	0.73	23	22	22	21
005	Rainey Cr.	0.96	0.6	0.86	0.59	0.57	0.70	0.59	0.66	30	23	28	25
006	Pine Cr.	2.36	0.85	1.24	0.81	0.52	0.59	0.52	0.59	51	28	34	28
007/03 3	Heise/Kelly Canyon	2.15	1.25	1.37	1.26	0.50	0.51	0.50	0.51	47	34	36	34
008	Henry's Fork Headwaters	2.56	1.15	1.15	1.15	0.57	0.60	0.62	0.62	62	42	40	40
009 A	Island Park (Centennials)	0.70	0.63	0.63	0.63	0.70	0.72	0.72	0.72	34	33	33	33
009 B	Island Park (Bishop Mtn.)	3.18	2.55	2.67	2.40	0.55	0.59	0.57	0.60	92	88	90	88
010	Buffalo River	7.07	2.43	2.43	2.56	0.52	0.57	0.58	0.57	97	62	60	62
011	Middle Henry's Fork	5.90	2.62	2.73	2.61	0.55	0.59	0.58	0.59	95	72	74	72
012	Warm River	6.75	1.04	1.04	1.04	0.59	0.69	0.71	0.71	94	31	30	30
013	Robinson Cr.	2.04	0.83	0.83	0.85	0.65	0.70	0.69	0.68	46	28	28	28
014/03 4	Big Bend Ridge/Snow Cr.	0.80	0.73	0.80	0.62	0.67	0.73	0.67	0.73	63	60	63	60
015 I	Conant Cr. ID	2.24	0.81	1.04	0.81	0.60	0.71	0.61	0.68	58	34	39	35
016 I	Fall River ID	1.77	0.7	1.02	0.70	0.60	0.70	0.59	0.69	50	33	38	34
017 I	Trail Cr. ID	1.38	0.77	1.28	0.78	0.57	0.65	0.56	0.66	36	28	34	27
021 I	Badger Cr. ID	3.04	0.82	1.24	0.82	0.56	0.66	0.58	0.66	69	36	42	36
022	Mahogany Cr.	2.53	1.35	1.56	1.48	0.53	0.53	0.53	0.53	53	35	38	36
023/02 4	Canyon/Moody Cr.	3.51	1.53	2.15	1.56	0.47	0.53	0.49	0.52	71	42	51	42
025	Camas Cr.	1.81	0.85	1.22	0.88	0.55	0.66	0.56	0.64	51	35	41	36
026 A	Beaver Cr. (West)	2.99	1.55	2.05	1.57	0.46	0.50	0.47	0.50	62	41	48	40
026 B	Beaver Cr. (East)	4.55	1.75	2.56	1.73	0.46	0.56	0.45	0.51	85	46	62	49
027/02 8	Medicine Lodge/Indian Cr.	2.90	0.89	1.05	0.82	0.49	0.55	0.49	0.55	61	29	32	29
029	Warm Springs	3.76	1.02	1.18	1.02	0.47	0.56	0.48	0.52	73	30	34	32

⁹ In order to show effects of Forest Service management actions, specifically changes in motorized access densities, the same formula that was used in the wildlife analysis for the 1997 RFP was used for EV calculations of subsequent years.

Watershed #	Watershed Name	Motorized Access Density (mi/mi ²)				Elk Habitat Effectiveness (higher EHE means more secure habitat)				Elk Vulnerability ^a (estimated % bull elk mortality)			
		Prior to 1997	To Acheive Standards in 1997 RFP & 1999 Travel Plan	In 1999	In 2004	Prior to 1997	EHE predicted for Alt. 3M	In 1999	In 2004	Prior to 1997	EV predicted for Alt. 3M	In 1999	In 2005
030 A	Upper Birch Cr. (West)	2.58	0.78	1.02	0.77	0.55	0.60	0.55	0.61	44	21	23	20
030 B	Upper Birch Cr. (East)	2.01	1.52	1.80	1.52	0.54	0.64	0.56	0.63	36	29	33	29
031 A	Lower Birch Cr. (West)	1.82	0.47	0.49	0.47	0.63	0.62	0.63	0.63	33	18	17	17
031 B	Lower Birch Cr. (East)	2.63	1.16	1.82	1.18	0.49	0.60	0.48	0.57	45	23	33	25
036	McCoy/Jensen Cr.	2.43	0.9	1.18	0.92	0.56	0.61	0.56	0.62	70	48	51	47
037	Elk/Bear Cr.	1.77	0.83	0.94	0.83	0.56	0.60	0.56	0.59	61	45	48	46
038	Fall Cr.	2.90	1.37	1.36	1.38	0.49	0.50	0.50	0.50	76	55	54	54
039	Pritchard Cr.	2.47	1.28	1.33	1.27	0.50	0.50	0.50	0.50	70	53	53	52
040	Brockman Cr.	3.65	1.05	1.35	1.05	0.50	0.52	0.50	0.54	83	49	52	48
016 W	Fall River WY	0.77	0.41	0.58	0.41	0.74	0.80	0.74	0.79	23	19	21	19
015 W	Conant Cr. WY	1.12	0.59	0.89	0.60	0.65	0.74	0.66	0.74	27	21	24	21
021 W	Badger Cr. WY	0.73	0.34	0.59	0.34	0.70	0.77	0.71	0.78	22	19	21	18
020 W	Leigh Cr. WY	1.03	0.51	0.75	0.51	0.63	0.69	0.63	0.69	26	20	23	20
019 W	Teton Cr. WY	1.25	0.76	0.98	0.76	0.63	0.66	0.63	0.69	29	24	25	23
018 W	Darby/Fox Cr. WY	0.98	0.76	0.80	0.76	0.67	0.67	0.67	0.68	25	23	23	23
017 W	Trail Cr. WY	0.51	0.23	0.45	0.24	0.71	0.76	0.70	0.76	21	18	20	18
004 W	Palisades Cr. WY	0.41	0.24	0.35	0.23	0.70	0.72	0.70	0.73	25	23	24	21
003 W	Elk Cr. WY	0.29	0.12	0.29	0.11	0.72	0.78	0.73	0.78	23	21	23	21
002 W	Indian Cr. WY	1.77	1.12	1.73	1.14	0.50	0.53	0.50	0.57	44	38	43	34

Red Squirrel Population

Requirements

Red squirrels "middens" (their cache of seeds and nuts) have been determined to be important to grizzly bears as an alternative food source. This monitoring item was set up to monitor densities of active red squirrel middens in grizzly bear BMUs and subunits.

Results and Evaluation

The RFP monitoring was designed to validate the assumption of the RFP analysis that suitable red squirrel habitat would be maintained with the standards and guidelines in the RFP. In 1996 a protocol was developed to monitor this item in the grizzly bear BMUs. Monitoring described in the protocol has not been conducted. Instead, red squirrels are monitored in conjunction with the furbearer transects and are the most common prey species recorded.

Red squirrel habitat requirements were discussed in the wildlife analysis for the RFP (Process Paper D pages 249-253). Red squirrels are present in all conifer stands with cone bearing trees. During the late 1960s and 1970s, extensive areas of mature lodgepole forests were attacked by the mountain pine beetle, and a high percentage of the mature trees died. The reduction of cone crops undoubtedly resulted in lower habitat quality for red squirrels in these types of stands. The wildlife analysis for the RFP predicted that red squirrel habitat would change by six-tenths of one percent (0.6%) due to timber harvesting allowed by the RFP. As stated in numerous other sections, only three-tenths of one percent (0.3%) of the mature forested acres have been harvested since 1997. Seventy percent of that harvest has been commercial thinning. This is a practice that takes smaller trees so that the remaining trees will grow larger, faster. Commercial thinning or "thinning-from-below" generally does not change the stand characteristics enough to change the seral stage and therefore would not reduce red squirrel habitat measurably. As stands age, the amount of mature forested acres on the Targhee will continue to increase.

The ongoing insect outbreak may have impact on red squirrel habitat in the pockets of concentrated insect or disease-related mortality. Red squirrels are almost solely dependent on cones from mature trees for sustenance. If all of the trees in a squirrel's home range are killed by insects or disease, it would be displaced to other stands. This may be occurring in areas such as Big Table Mountain in the Centennials where virtually all of the whitebark pine trees are dead. Since over 80 percent of the forested acres on the Targhee are mature, however, there is ample habitat for the red squirrels to move to. The RFP standards and guidelines are providing habitat to maintain viable, sustainable populations of red squirrels.

According to the monitoring data, red squirrels continue to be found in every ecological subsection on the Forest, and in every principal watershed on the Forest. They are the most abundant prey species recorded on winter furbearer track survey units and were found on 17 out of 18 of the winter track survey units. The one unit where they were not found does not have any conifer forest. See the Furbearer monitoring item section for more information on red squirrel tracking. See the Insect and Disease program summary and Cavity Nester monitoring item for more information on insect activity.

Recommendation

The Forest will propose to delete the red squirrel as an MIS and to delete this monitoring item as described. Furbearer transects will continue to record prey species such as the red squirrel.

Forest Users

User Satisfaction

Requirements

Forest User mailing lists are to be used to conduct annual, random sample surveys of user satisfaction. Forest employee records of user comments would also be used to measure user opinions. This monitoring item was designed to measure forest customer satisfaction with the direction, progress, and administration of the Revision.

Results and Evaluation

The monitoring described in the RFP has not been done. The Forest has had extensive contact with the public in its implementation of the RFP. Comment cards received generally indicate high satisfaction with information provided to recreating publics and generally high satisfaction with the experiences at developed campgrounds. Trail maintenance has been a concern in some areas.

When the RFP was first adopted, the major concern revolved around access management and completion of the Travel Plan was a high priority and key to determining user satisfaction. The Forest completed an Environmental Impact Statement that incorporated extensive public involvement. Approximately 1,100 appeals were received after the first Travel Plan decision was made. Just over fifty people or organizations appealed the second Travel Plan decision, however. Appellants were on both sides of the issues, both for and against travel restrictions. This anecdotal evidence suggests that much of the general public is not pleased with the decision to reduce motorized road and trail density and to decommission roads in the grizzly bear management units (BMU). The concern seems to be diminishing over time as people become adjusted to the changes. For instance, in 2004 the Forest decided to close the Big Bend Ridge area to cross-country motorized travel. This was done as part of the Big Bend Ridge Vegetation Management Project and Timber Sale EIS. No appeals were received on the decision to close the area to cross-country motorized travel.

As with the Travel Plan, administrative appeals of other site-specific National Environmental Policy Act (NEPA) decisions can be used to gauge how the Forest is meeting some user groups' expectations. Over the past eight years, some trends have emerged. Overall, the number of appeals the Forest is receiving has gone down but the appeals are much more voluminous. Projects with a commercial timber harvest component are almost always appealed. In the past few years, the projects that are appealed have become much more likely to be litigated. Most of the appeals filed are from environmental groups or multiple environmental groups. Appeals tend to focus on the perception that the Targhee RFP standards and guidelines are not adequate to protect wildlife and fisheries resources. In the past couple of years, soils has emerged as a common appeal issue. The Forest has been very successful in getting projects through the administrative appeals process. This is mainly due to the high quality of the analysis and voluminous amount of field data to support the conclusions and decisions.

In addition to information from site-specific project comments, the Forest has also used the 2001 National Visitor Use Monitoring (NVUM) project as an avenue to better understand the use of, importance of, and satisfaction with Forest recreation opportunities. This monitoring is done nationally, using the methodology and analysis developed by the Southeast Experiment Station of the Forest Service. The NVUM institutes standardized definitions to measure visitor use and satisfaction. The Caribou-Targhee National Forest participated in the NVUM project from January 1 through December 31, 2000. According to the study, over two million national forest visits were recorded in 2000. This total only includes visitors whose destination was the Caribou-Targhee; passers-by are not included. According to the study, the top five recreation activities of forest visitors are viewing scenery, viewing wildlife, snowmobiling, general relaxation and hunting. The top five primary activities (the reason picked for their current recreation visit) were snowmobiling, hunting, fishing, OHV travel and viewing nature. The facilities and specially designated areas most used by surveyed visitors included forest roads (36% of visitors), hiking, biking or horseback trails (23% of visitors), motorized developed trails (15% of visitors), and developed campgrounds (15% of visitors). Of the 2.2 million visits, over 21,273 visits were to experience Wilderness Areas. The majority of visitors to the Caribou-Targhee were males (78%) between the ages of 21 and 50 (64%). The average visit lasted about 27 hours, and 22 percent of the visitors stayed overnight on the Forest.

Visitors were asked to rate their overall satisfaction with specific resource and facility conditions. Ratings were predominantly good and very good, particularly for developed day use sites. The resources that visitors were least satisfied with were the condition of forest roads and trails, lack of adequate signage, and the availability of information on recreation, especially in the "general forest areas." In addition, most of the specific comments received identified the need for more signs, better maps, more information on the forest, improved road conditions, and more trail maintenance (NVUM, Caribou-Targhee, August 2001). Based on this survey, the Forest should put more resources toward road and trail maintenance and providing recreation information to visitors. The Forest is again participating in the NVUM project from October 1, 2004 through September 30, 2005.

Based on the 2001 NVUM, the Forest should put more resources toward road and trail maintenance and providing recreation information to visitors. This information will be used by the Forest Leadership Team when developing priorities for management each year. Information from the 2005 NVUM should be used to determine progress in meeting user satisfaction. However shifting funds will likely result in decreased visitor satisfaction in other areas of recreation management.

Recommendation

This item required a survey to evaluate how the Forest was meeting the needs of users. This survey would be costly and very time consuming. The Forest will propose to replace the RFP method with using the National Visitor Use Monitoring Report which is conducted every four years. While this survey is primarily targeted at recreation, it also asks visitors about visuals, quality of the experience, etc. Other data collection, such as comment cards, responses to project proposals, etc., could be used to gauge the satisfaction of forest users. This would be identical to the monitoring required in the Caribou RFP completed in 2003.

Forest Operation

Budget

Requirements

Every five years the Forest Budget and Finance Officer is to compare the actual annual budget to the projected budgets from the Revision. This is required by 36 CFR 219.12(K)(3).

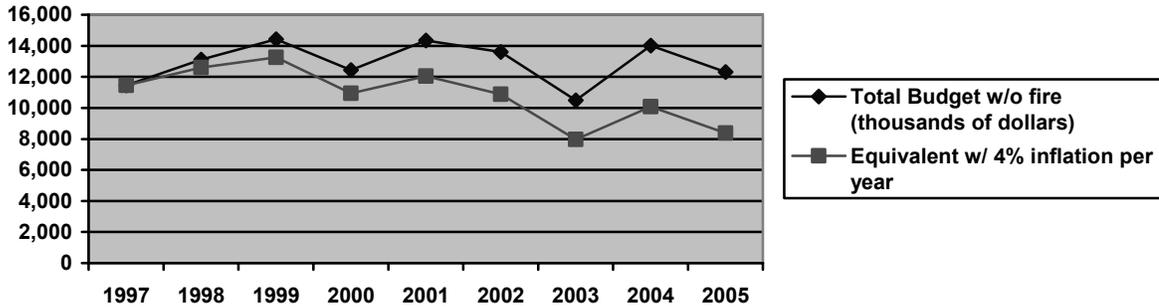
Results

Since the revision of the Targhee RFP in 1997, many administrative changes have occurred on the Forest. In 1998, the Caribou and Targhee began consolidation efforts by co-managing different management programs. By 2000, the Forests were officially combined into one unit. The consolidation makes tracking Forest budgets very difficult, because the budgets were also combined. Overall, the Forest budget is much less than anticipated, not even keeping up with the rate of inflation. In 2005, the total forest budget, without fire costs, was only about one million dollars more than allocated in 1997, eight years earlier. In 2003, the total forest budget was about 10 percent less than in 1997. Table 53 shows the combined budget and personnel for the Caribou-Targhee from 1997 through 2005. Since 1997 the Forest has undergone reorganization and consolidation in an effort to reduce fixed costs and allocate more money for on-the-ground projects. The Forest has reduced 62 permanent positions (measured as full time equivalents (FTEs)) since the revision was signed in 1997. This is a 27 percent reduction in the permanent workforce on the Caribou-Targhee NF. With the current budget allocations, however, the Forest still struggles to pay its fixed costs. Figure 69 shows the total budget without fire compared to a fixed inflation rate (4 percent was used). When inflation is factored in, the Forest's budget has been reduced by over one quarter since 1997. The Forest is continuing efforts to reduce fixed costs and free up more money to be used in projects on the ground.

Table 48: Budget comparison for Caribou-Targhee NF, fiscal years 1997-2005. All costs in actual dollars, not adjusted for inflation rates.

	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total budget w/o fire costs	11,442,800	13,115,800	14,416,700	12,441,000	14,342,800	13,610,400	10,486,000	14,006,918	12,312,920
Grand Total w/ fire costs ¹⁰	13,431,300	15,416,200	16,568,100	15,265,700	19,011,200	17,984,600	13,743,000	19,046,375	17,708,408
Full-time Equivalent positions	227	194	203	203	190	186	176	166	165

Figure 69: Caribou-Targhee National Forest budget compared to a fixed inflation rate from 1997 through 2005. Figures shown in thousands of dollars.



In Chapter V of the RFP, the Forest estimated that its monitoring program would cost over \$500,000 per year. This cost did not include compilation, printing, and distribution of the annual or five-year monitoring and evaluation reports. Monitoring was predicted to cost approximately \$341,000 for Priority Group 1; \$82,000 for Group 2; and \$90,000 for Group 3. In 2001-2005, the Caribou-Targhee was allocated about \$300,000 for Forest Plan monitoring on the Targhee, Caribou, and Curlew administrative units¹¹. This is less than the predicted cost of Priority Group 1 monitoring on the Targhee zone alone. It is approximately 60 percent of the budget necessary for completing just the Priority 1 monitoring for the 1997 Targhee RFP, 2003 Caribou RFP and 2002 Curlew National Grassland Plan. Budgets are expected to continue to be reduced.

Despite the dramatic budget shortfall, the Forest has accomplished the vast majority of objectives ahead of schedule. See Section 2 of this document for those accomplishments. The Forest has also conducted monitoring anticipated at the time of the RFP. In addition to Priority Group 1 monitoring, the Forest has monitored items in Priority Groups 2 and 3. The RFP did not envision monitoring of those items unless additional funding was received. The Forest has also done additional monitoring such as the Canada lynx research and surveys and rare plant surveys which are not part of the RFP monitoring plan. The Forest has been able to accomplish this, in large part, due to cooperative agreements with other groups and agencies. See Table 1, Accomplishment of Objectives—Summary Table and Table 6, Summary of Monitoring Items in this Report for more information.

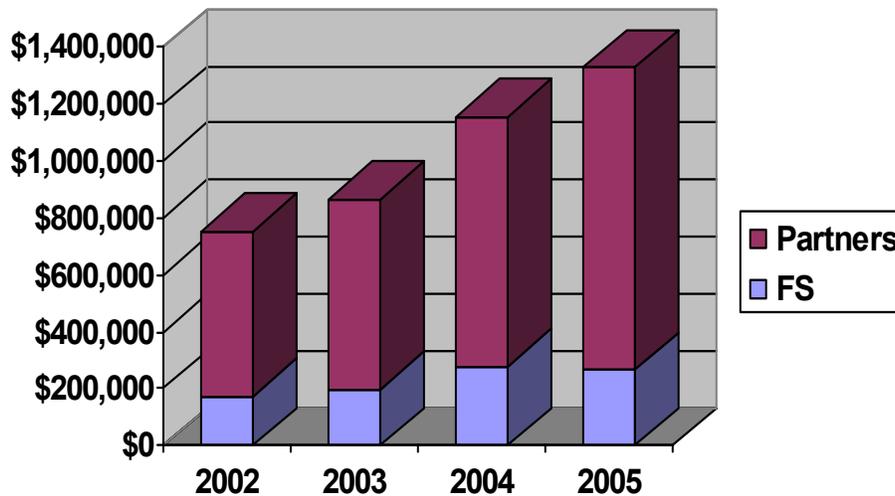
¹⁰ The increase in money the Forest received for fire suppression and fire hazard reductions beginning in 2000 is a reflection of Congressional emphasis following adoption of the National Fire Plan and is also dependent on the severity of the fire season.

¹¹ Data on the actual Budget Line Item (BLI) amounts for the years 1997 through 2000 is no longer available due to changes in the computer budget systems.

Evaluation

In order to “do more with less”, the Forest has leveraged federally appropriated funds to gain the assistance of partners in forest monitoring and completion of projects on the ground. These partnerships, sometimes referred to as challenge cost share (CCS) projects combine forest service resources with contributions from partners to achieve a goal. CCS projects for forest plan monitoring are prioritized and the federally appropriated funds are taken “off the top” of the forest budget each year. The CCS projects include matching funds or “in kind” contributions from private organizations, individuals, or agencies interested in assisting with this important monitoring. This program is an efficient way to obtain professional, objective monitoring data in a timely manner. In 2005, the Forest leveraged \$75,000 in federal funds to accomplish approximately \$400,000 worth of monitoring and inventory. This is almost a 6 to 1 return on federal dollars. The Forest has cooperated with many agencies and organizations to accomplish projects such as trail construction, campground improvements, fisheries improvements, etc. Figure 70, below shows federal and partner contributions over the past four years. As the graph shows, as partner contributions have increased, so has the amount of money the Forest Service has put into building partnerships. In 2005, the partnerships generated five dollars for every one dollar of federally appropriated funds put into the fund. This is an amazing return on taxpayer dollars. Some of the organizations or individuals participating in the monitoring effort include: Bureau of Land Management, U.S. Fish and Wildlife Service, Idaho State University, BYU-Idaho, Conservation Data Center - Idaho Fish and Game, Idaho Fish and Game, Trumpeter Swan Society, Northern Rockies Conservation Cooperative, Ducks Unlimited, Henry's Fork Foundation, Idaho Resource Advisory Council, Bureau of Reclamation, Gaylord Lab, TREC, Rocky Mountain Research Station, and the Wildlife Conservation Society (including 32 partners). Many of these same groups along with many others have assisted the Forest in completing actual projects on the ground, as well. For many years, the Forest has partnered with Idaho Parks and Recreation Department to improve trails and other recreational facilities on the Targhee. These people and organizations have made a valuable difference in forest management on many fronts. Without their cooperation and efforts the Forest would not be so successful in accomplishing the monitoring or managing our natural resources.

Figure 70: Forest Service dollars and matching Partnership contributions for projects and monitoring on the Caribou-Targhee NF, 2002-2005.



At the National level, the Forest Service has made many administrative changes designed to improve the overall efficiency of the Forest Service’s administrative operations. The Business Operations Transformations Project (BOTP) is an agency-wide, organizational efficiency improvement initiative that will span multiple years. Currently, the BOTP is focusing on three areas: financial management, information resources and technology management, and human resources. The project is centralizing and reorganizing these three major departments in the Forest Service. In 2004, the Forest Service implemented a new, more efficient Information Solutions Organization (ISO) to handle communications and technology across the agency. In 2005, the Albuquerque Service Center (ASC), the central financial management center for the Forest Service opened. In 2006, Human Resources will also be reorganized and centralized. These cost-saving measures have had and will continue to have impacts on the

organization at the Forest level. On the Caribou-Targhee, several employees moved, retired, or transferred when their jobs were abolished or relocated. Many tasks and duties have been shifted to other personnel, and employees are responsible for doing more of their own administrative tasks such as computer troubleshooting, typing and filing, benefits management, expense authorizations, etc. This trend is expected to continue for the next several years.

Recommendation

In the past three years, the Forest has completed many projects that have been in progress for a number of years. This has enabled forest managers to focus more on projects which integrate RFP goals and national emphases. In 2002 the Forest developed a budget process to help develop a more focused "program of work". Each year, the Forest Leadership Team determines the types of projects that the Forest will concentrate on. Using these criteria for emphasis, the resource program managers prioritize projects and tasks across all units. When the budget allocation is received, the priority list is used to determine which projects are funded. In the past three years, the forest has emphasized aspen restoration, wildland urban interface fuels reduction, watershed and fish restoration, road decommissioning and allotment management plan update projects. Forest plan monitoring and evaluation continues to be a high priority for the Forest. Using this process, the Forest has been able to achieve many RFP objectives and move towards the goals and desired future conditions in the face of declining budgets. The recommendation is to continue implementing the Forest Budget Process and developing partnerships to accomplish the Forest Program of Work.

RFP Monitoring

The Forest will propose to delete several monitoring items that are not necessary to measure progress toward objectives or adherence to RFP standards and guidelines. In addition, Forest managers will continue to foster partnerships to accomplish the monitoring with fewer permanent employees and less money. Implementation and use of the corporate database will make recording and reporting monitoring information more efficient, once the Natural Resource Information System (NRIS) database and core digital layers of spatial data are fully populated and functional.

The Forest will also propose to replace the detailed Monitoring Plan in Chapter V of the RFP with a more flexible, less constrained Plan. The detailed information, such as protocols, indicators or thresholds, and numbers of transects to monitor, will be converted into a Monitoring Guide. The Monitoring Plan in Chapter V of the RFP will identify the parameters to be monitored along with monitoring frequency, but it will not include the details of how the monitoring will be accomplished. Thus, the monitoring protocols can be updated and adapted to be most effective and efficient without amending the RFP. This proposal is in line with the monitoring plans in both the Caribou RFP and Curlew Grassland Plan. Thus, all three zones of the Caribou-Targhee will have consistent monitoring plans and guides. The Forest will propose this monitoring amendment.

Recreation

Seasonal Trail Use Impacts to Soil and Vegetation

Requirements

This monitoring item is designed to measure compliance with the soil quality standards and impacts to on- and off-trail soils from hiking, horses, and OHV use. Visual observations and photo documentation of trail conditions are to be conducted on 5-10 percent of the system trail areas and adjacent off-trail areas. The 60 to 120 miles should be done in these priority areas: Big Hole Mountains, Madison-Pitchstone Plateaus, Caribou Range Mountains, and Lemhi-Medicine Lodge ecological subsections.

Results and Evaluation

Monitoring as set up in the RFP began in 1999. There are approximately 1,322 miles of trail available for motorized and nonmotorized summer use. Trail conditions are monitored through an information collecting process called "condition surveys" or observing trail conditions at a lesser standard. Condition surveys include information about all aspects of a trail; such as tread condition, trail width, sign locations, water crossings, clearing limitations, erosion problems, reconstruction needs, etc. and is collected, usually, using a GPS and data dictionary. A condition survey provides the most detailed level of trail monitoring that is done. Condition surveys were first completed in 1999 although collection methods were unrefined and information was sometimes unusable. Since 1999, better collection, recording methods and equipment are being used.

Monitoring at a lesser standard consists of observing trail conditions while being on a trail to complete other trail work or for other reasons and recording the information in written format for future use. This monitoring method meets the requirements of the RPP. The Dubois Ranger District has completed monitoring at a lesser standard than condition surveys on 330 miles of trail between 1999 and 2004. Trails on the Dubois District have been monitored at least once during the last five years. See Table 54 below, for information on the trails monitored by each District.

Overall, the Targhee has completed condition surveys on 73 percent of trail miles. Forest plan monitoring required that 5-10 percent of trail miles be surveyed each year. After seven years of implementing the RFP, the Targhee should have surveyed 35-70 percent of the trail miles. Since 73 percent has been surveyed, the Forest has exceeded this standard. Combining condition surveys and the less-intensive monitoring protocol described above, the Targhee has monitored 98 percent of the summer trail miles on the Forest.

Table 49: Trail mileage by type and miles of trails monitored for each District on the Targhee zone.

	Dubois	Teton Basin	Ashton/IP	Palisades	Totals
Summer Trail Miles (as reported by districts)	220.1	316	215	571	1322
Groomed or Tracked Ski Trail Miles	3	13	28	13	54
Groomed Snowmobile Trail Miles	0	37	328	130	495
Trail Condition Surveys Completed					
2004	64	113	57	200	434
2003	16.6	55.6	6.5	214	292.7
2002	5.0	31.0	72.0	67.0	175
2001	11.5	6.0	0	0	17.5
2000	12.3	11.5	0	0	23.8
1999	27.3	0	0	0	27.3
Total Miles of Condition Surveys Completed					970.3

Several areas were found where trail use was having moderate to significant negative effects on soil, vegetation and water. Each of these areas exceeded the 15 percent detrimentally disturbed soil quality standard within the immediate area of the trail but not within the context of the drainage or watershed. Photo documentation of trail conditions and problem areas has been gathered. While some areas did exceed soil quality standards and negatively affect AIZs, this was not an overwhelming problem within the drainage or watershed and can be remedied with current staffing and budget levels. These areas will receive priority consideration for trail maintenance or reconstruction.

Those trail areas that are not meeting soil standards or exhibit obvious erosion problems are being scheduled for corrective action or have already been rehabilitated by use of the Idaho Parks and Recreation trail cat and trail rangers, trail maintenance contracts, Forest Service trail crews and through volunteers participating in programs such as the "Adopt a Trail" program. As a result of efforts to correct problem areas identified through our condition surveys, the Forest is providing safer trails, mitigating resource concerns and meeting RFP trail standards and guidelines. Increased law enforcement, signing, and education are helping to reduce resource damages on trails and lessen impact to areas.

Current monitoring requirements have enabled trail managers to identify those problem areas where use is impacting the soil resource; develop and implement mitigation measures; and insure compliance with RFP soil quality standards and guidelines.

Recommendation

The trail condition surveys that are required nationally will be used to measure on-trail disturbances. Thus, the Forest will propose to delete this specific RFP monitoring item and continue to monitor trail conditions using the most current version of the national survey protocol.

Recreation/Wildlife Conflicts

Requirements

Violations of closures, observed wildlife disturbances, and diminishing wildlife populations with signs of stress are to be used to measure conflicts between all forms of recreation and wildlife. According to the RFP, ten percent of the winter range should be monitored weekly for three or four months in the winter. In the summer, big game security and summer range prescription areas should also be monitored weekly for three or four months, especially in early summer.

Results and Evaluation

In 1997 through 1999, this item was monitored on the Palisades Ranger District in the Fall Creek winter range and the Kelly-Moody area off the South Fork of the Snake River. Approximately 20 percent of the winter range and 10 percent of the summer monitoring has been completed as described in the RFP. Other Districts have recorded less formal field observations that conclude the same thing—recreation use is increasing, but making any correlation with wildlife disturbances is difficult. See the Recreation program summary for more information on the Winter Recreation Survey results. See the Access monitoring items for more information on how the Forest is meeting RFP route density standards and travel plan enforcement efforts.

In the Fall Creek winter range on the Palisades District, snowmobiles have been observed violating the closures. This places stress on the moose, deer, and elk wintering in the area, but how or if that stress affects the population is not known. In 2003, the Idaho Fish and Game extended the mountain lion hunting season through the end of March with no quota on females. The Fall Creek winter range has a high concentration of lions but hunters cannot use the area because it is currently in management prescription 2.7(a) Elk and Deer Winter Range which does not allow any non-motorized or motorized cross-country travel from December 15 to April 15. This has created a conflict with Idaho Fish and Game's desire to reduce predators in the winter range. Idaho Fish and Game has indicated that they are less concerned with human disturbance in the winter range than with predation on wintering deer. The area along the Snake River from Heise to Little Baldy Mountain is also in management prescription 2.7(a) Elk and Deer Winter Range which does not allow any non-motorized or motorized cross-country travel. There are no designated routes for winter travel along the corridor which, in effect, makes this area closed to all human entry during the winter. In an effort to reduce non-native trout populations along the South Fork of the Snake, Idaho Fish and Game now allows fishing along this section of the river year-round. The Forest's management prescriptions and travel plan, however, restrict access to the river for anglers in the winter. This has created conflicts.

The north zone of the Targhee (Dubois, Island Park, and Ashton) did not conduct formal monitoring, but anecdotal evidence shows no signs of overall population stress. This seems to be substantiated by the increase in available permits and length of hunting seasons for elk and moose in the area.

Recommendation

This item, as written, is very subjective and time-consuming. As described above, very little monitoring has been done as described in the RFP. The monitoring is limited to anecdotal evidence of recreation impacts to the resources but no scientific tie has been made to wildlife populations. Most of the wildlife monitoring evaluates recreation impacts, where applicable. This is also indirectly addressed during project level NEPA and watershed analyses. Also, other agencies are monitoring this at a more site-specific level (harlequin duck, peregrine falcon, grizzly bear, etc.). For these reasons, this item should be deleted.

Dispersed Campsite Soil Displacement

Requirements

This monitoring item is designed to measure compliance with the soil quality standards in heavily used dispersed campsites. Annually, 10 percent of the 100 Management Prescription 4.3 areas are to be measured; the Caribou Mountains and Lemhi-Medicine Lodge Subsections are top priority for monitoring.

Results and Evaluation

Dispersed campsite monitoring has been conducted on all Districts of the Forest since 1998. A total of 108 sites have been monitored, as listed below. Some of these sites have been monitored in multiple years but no trend information is available at this time.

- Dubois—23 sites
- Ashton/Island Park—15 sites
- Palisades—51 sites
- Teton Basin—19 sites

In 2002, the Palisades District mitigated impacts to resources in six sites in Rainey Creek and one site in Fall Creek. Most of the dispersed recreation sites exceed 15 percent detrimentally disturbed soils, if the survey area is limited to the site itself. That is, a campsite and the access to that campsite will almost always be compacted; compaction being one condition of detrimentally disturbed soils.

Evaluation

This item was originally intended to look at impacts to riparian areas from non-livestock uses. The monitoring item, as written, does not answer monitoring questions and has been interpreted incorrectly. The Forest should prioritize areas for evaluation (RFP identified Caribou Mtns and Lemhi/Medicine Lodge Subsections) and determine a method to measure impacts from dispersed recreation in these priority areas at a larger scale. It is more important to monitor the extent and change in the extent of impacts than it is to validate impacts are occurring. To answer the question of whether dispersed recreation is impacting aquatic influence zones to unacceptable levels, a new set of parameters should be evaluated including the following:

- The size and extent of dispersed sites within a drainage or watershed
- Change in number, size, extent over time (trend) within the drainage or watershed
- Where the sites are located in relation to water quality limited streams and how much of the watershed is being affected. That is, how close the area is to the threshold of having 15 percent of the drainage or watershed impacted by dispersed sites.

Recommendation

The Forest recommends rewording this item and adding new monitoring parameters to answer the above questions. Methods will be described in the Monitoring Guide.

Jedediah Smith Wilderness LAC and Further Details [includes the Winegar Hole]

Requirements

This item is the consolidation of all of the monitoring described in the Jedediah Smith Wilderness Monitoring Plan (WMP). The annual evaluation is designed to measure the overall impacts from recreation use on the wilderness character. The WMP identifies six indicators to measure wilderness use impacts:

- 1) Number of occupied campsites visible from a site.
- 2) Condition of individual campsites.
- 3) Condition of user-created routes and trail segments.
- 4) Number of encounters per mile with other parties along a use-created route or trail.
- 5) Number of substantiated complaints about outfitters and grazing permittees from the public and other permittees.
- 6) Number of violations of regulations by type.

Results

According to the 1997-99 M&E Report, Wilderness monitoring occurred on approximately 663 acres in South Leigh Lakes Basin. The standard was exceeded for Indicator 1 (campsite density) at one campsite and for Indicator 2 (area of bare ground) at all sites. Standards were met for Indicators 3, 4, 5 and 6. The report identified an effectiveness problem with Indicator 2. During 2000-2002, a monitoring protocol was finalized and additional monitoring was completed on approximately 20,000 acres in the Jedediah Smith Wilderness. Forest Service employees, permitted outfitters, and the Resort Naturalist at Grand Targhee recorded the number of parties encountered while traveling in the Wilderness. Initial analysis of the data reveals the following:

During 2000-2004, a monitoring protocol was finalized and additional monitoring was completed on approximately 80,000 acres in the Jedediah Smith Wilderness. The baseline monitoring for both the Jedediah Smith and Winegar Hole Wildernesses is expected to be completed in 2005. Forest Service employees, permitted outfitters, and the Resort Naturalist at Grand Targhee recorded the number of parties encountered while traveling in the Wilderness. Initial analysis of the data reveals the following:

Indicator 1 – Campsite Density: Many campsites are dispersed along system trails and are within standard. Clusters of campsites that exceed the standard are located within one mile of the trailheads and in the popular lake basins. Many of these sites are located too close to water and violate the Greater Yellowstone Area Wilderness Special Order (GYCC-5 8-18-95). Of the areas inventoried, Alaska Basin has the most sites that exceed the campsite density standard.

Indicator 2 – Bare Ground: The standards, as written, on the table on page V-36 of the RFP do not provide enough detail but appear to correspond to Frissell Classes as defined on page G-17 of the RFP. Of the sites that have been inventoried, the majority exceed the standards as currently written on page V-36. This was true at camps within management prescription areas 1.1.6, 1.1.7 and 1.1.8.

Indicator 3 – User-created Routes and Trails: The standard, as written, does not differentiate between a user-created route or system trail. During 2003-2004, more trails and user-created routes have been inventoried using a GPS unit with data dictionary. More trail data will be collected in 2005 and the results analyzed during the winter of 2005-2006.

Indicator 4 – Number of encounters per mile with other parties: The standard, as written, is unclear. First, it does not specify if the standard is for each mile hiked or to be averaged over a day's journey. It is difficult to monitor the number of encounters per mile without wearing a pedometer or pushing a measuring wheel.

However, assuming an average hiking speed of two miles per hour, the number of parties encountered did not exceed the standard when averaged over the entire length of the trip for the majority of samples taken. The standards are occasionally exceeded within the first mile of trail from the trailhead, as allowed in the RFP. Use levels are approaching and occasionally exceeding the Limit of Acceptable Change on the Table Mountain Trail, the southern section of the Teton Crest Trail (including Alaska Basin), the South Teton Trail and the Darby Wind Cave Trail.

Indicator 5 – Number of substantial complaints about outfitters and grazing permittees from the public and other permittees: Few complaints have been received. All sheep allotments have been vacated during the reporting period and cattle grazing in the wilderness is limited to the Green Mountain watershed. The standards are being met.

Indicator 6 – Number of violation of regulations by type: Illegal snowmobile use in the Jedediah Smith Wilderness has been documented using aerial surveys and snowmobile patrols. The standards are being exceeded in all Prescription Areas from November through May each year. Eighteen violation notices were issued in 2002-2004.

Violations of the following regulations are also evident but rarely documented or acted upon due to the lack of funding for wilderness rangers:

- ATVs in the Spring Creek, Pinnacle, Baldy Knoll, Dry Ridge and Badger Creek areas.
- Campfires in Alaska Basin and Sunset Lakes

- Groups exceeding the 20-person limit, particularly on the Darby, South Teton and North Teton Trails.
- Bicycles on Teton Canyon, Coal Creek, South Leigh, North Leigh and Moose Creek Trail.
- Shortcutting switchbacks, particularly on the Darby, Table Mountain and North Leigh Trails.
- Evidence of chainsaw use on the Teton Crest Trail south of Bitch Creek (2002).
- Use of rock drills to place fixed anchors for caving and climbing.
- Camping within 200 feet of lakes and 100 feet of streams throughout the area.
- Improper disposal of human waste and garbage.
- Improper storage of food and other attractants in the Bear Management Area.

Evaluation

From 2000-2004, Forest managers have taken corrective actions to bring wilderness conditions within the limits of acceptable change identified in the Targhee RFP. These are detailed below:

Indicators 1, 2 and 3: Approximately 65 percent of the Jedediah Smith Wilderness and 10 percent of the Winegar Hole Wilderness has been inventoried. The Forest emphasis has been on finalizing the monitoring protocol and collecting baseline information, rather than taking corrective actions. The focus, to date, has been on the Prescription 1.1.8 high use areas, Prescription 1.1.7 trail corridors and portions of Prescription 1.1.6 where use is known or likely to occur. Analysis of the baseline information is planned for the winter of 2005-2006 and will be used to finalize the Recreation Capacity Analysis and to develop a visitor use management and rehabilitation strategy to bring conditions within standard.

Indicator 4: More outfitters are assisting with the collection of encounter data each year. More data are needed to make the random samples statistically valid. Analysis of the data is planned for the winter of 2005-2006.

Indicators 5: The Forest Service addresses performance problems with outfitters or grazing permittees administratively through meetings, letters and/or permit action. Very few complaints from the public have been received during the past five years. Sheep have been removed from all sheep allotments, further reducing conflicts between recreationists and grazing permittees.

Indicator 6: The Forest has worked to reduce violations through improved signing, handouts and website information. During 2002 -2004, two full-time volunteers worked at the Teton Canyon Trailhead providing information on the regulations, resulting in 7,000 individual contacts during July and August of 2002. "Leave No Trace" messages were emphasized with special attention on hiking and camping in bear country. The volunteers also provided "Leave No Trace" programs at the Treasure Mountain Boy Scout Camp. Two full-time volunteers continued the program in 2005

In 2002-2004, Forest managers have emphasized Travel Plan enforcement and the closure of the Wilderness to snowmobiles. Improved boundary signing and 6 to ten winter patrols each winter resulted in the issuance of eighteen violation notices and prevented an unknown number of illegal entries.

Recommendations

At this time, the Forest does not have enough information to propose whole-scale changes to the Limits of Acceptable Change (LACs) or the monitoring. This would likely occur in the next five-year evaluation. Several changes to the indicators are recommended, however. In the future, the title of this monitoring item should be changed to Wilderness LACs since monitoring includes the Winegar Hole Wilderness.

Indicators 1, 2, 3: The RFP estimates a cost from \$15,000 to 20,000 annually and states that these indicators should be monitored annually. The cost estimate is low and the frequency of monitoring the entire area unrealistic. Now that the baseline is established, a sample of sites will be revisited and monitored every 3-5 years.

Indicator 2: The standards, as written, are unrealistic and lack specificity. Currently, the presence of a single fire ring without any other disturbance exceeds the standard, as stated, for the pristine Prescription 1.1.6 areas. Similarly, sites in Prescription areas 1.1.7 and 1.1.8 that can legally accommodate up to twenty people and twenty-five stock animals at one time would exceed the current standard in only one night of use. The recommendation is to change the table to use the exact wording in the Frissell Condition Class definitions shown on page 17 of the RFP Glossary.

Indicator 3: The standard is for user-created routes *and* system trails, but the standards lack clarity and do not make sense for both routes and trails. It is unknown if the standards represent an average or maximum value. The Forest will recommend the following changes to the definitions:

- Rx -1.1.6, 1.1.7 and 1.1.8: *User-created routes* resemble a game trail no wider than 12 inches. Drainage structures may be installed only to effectively close the trail and allow for rehabilitation. Brushing and clearing are prohibited. Routes are not to be shown on Forest Service Maps or recommended for use by the public.
- Rx-1.1.7: *System trails* reconstructed and maintained to 18" tread width and no wider than 24" with brush, rock and organic matter present. All trail and bridge improvements must be applied to address critical resource concerns rather than visitor convenience and safety.
- Rx-1.1.8: *System trails* reconstructed and maintained to 24" tread width and no wider than 42". Trail and bridge improvements may address visitor convenience and safety issues but first priority will go to resource concerns.

Indicator 4: The "per-mile" standard is difficult to monitor without wearing a pedometer or pushing a wheel. The Forest recommends changing the standard to read: "Number of encounters *per hour* with other parties along a user-created (non-system) route or trail." The values would change to an equivalent average travel speed of two miles per hour and could be averaged over the length of the trip.

Indicator 6: The Forest should clarify that the standard is for each calendar year for regulations authorized by the Forest Supervisor under a special order. In addition, the Forest should monitor violations of the regulations that directly enforce the 1964 Wilderness Act including: possessing or using a motor vehicle, motorized equipment or mechanized transport in the Wilderness, including chainsaws, snowmobiles, bicycles, ATVs and aircraft.

In addition, the following changes are recommended for monitoring in the Jedediah Smith and Winegar Hole Wildernesses:

- Wildlife 1 and 2: Delete
- Cultural Resources: Delete "annually." The Forest's heritage resource inventory efforts should focus in areas where management activities are occurring.
- Add Air Quality monitoring of lichens and/or lake samples using the methods detailed in the Monitoring Guide.

Roads and Trails Access

Authorized Use Level

Requirements

The District Rangers approve authorized use, and at the end of the year, evaluate if that use effectively opened any closed roads. This monitoring is designed to measure the amount of authorized motorized use on roads and trails and determine if this administratively authorized use is effectively opening those closed routes. In Prescription Areas with elk and deer habitat values (5.1.4, 5.4, and 2.7) and grizzly bear habitat values (5.3.5, 2.6.1, 2.6.2, and 2.6.5) the number of motorized trips into closure areas or roads/trails would be recorded annually.

Results and Evaluation

All of the Districts have monitored authorized use on closed roads or into closed areas during the 1997 to 2002 period, to some degree. This use did not effectively open any nonmotorized road or trail.

- The Dubois District reported no roads were opened that are closed on the District for public access or any other reasons.
- In past years, Ashton/Island Park District personnel opened several roads which were designated as closed roads and gated. When a closed road was opened, another road was closed with equal road miles in the general area to maintain road density. Only one road was open for a long period of time for firewood gathering; the other roads were for administrative use and for the administration of a mining claim special use permit. In 2004, no closed roads were opened for public access, administrative use, or any other reason.
- In past years, the Palisades District has opened several roads for firewood gathering that were closed. In 2004, no closed roads were opened for public access, administrative use, or any other reason.
- Teton Basin District opened some closed roads, and in turn, closed some open roads to maintain OROMTRD in the area. Approximately nineteen roads have been opened and reclosed over the past five years for such reasons as, gopher control, tree planting, and fire. In 2004, no closed roads were opened for public access, administrative use, or any other reason.

Table 50: Roads opened for administrative use on Districts, 2000 through 2004.

District	Road Number	Amt of Time Open	Reason for Opening
Ashton/Island Park	702	2 months	Firewood gathering
	164	4 days	Timber Sale Prep.
	472	2 days	Regeneration Survey
	046	3 days	Vegetation Burning
	046	1-2 days/week	Mining Claim
Palisades	251	est. 2 months	Firewood gathering
	256	est. 2 months	Firewood gathering
	220	est. 2 months	Firewood gathering
Teton Basin	951	est. 2 months	Firewood gathering
	665	est. 2 months	Firewood gathering

Recommendation

Continue to measure the amount of authorized motorized use on roads and trails and determine if this use is effectively opening the route.

Road Closure Effectiveness

Requirements

The RFP set up a stratified sampling approach for monitoring the effectiveness of road and trail closures. Visual checks of closure areas and closed roads would be conducted three times during the snow-free season on one or two Districts per year.

Results and Evaluation

The monitoring described in the RFP has not been conducted due to the time-consuming monitoring method. The Forest did install a mounted camera activated by motion sensors on one road but it was stolen shortly after being placed. Other methods have been used to monitor the effectiveness of road and trail closures. On all Districts random visual checks of closure areas and closed roads have been done during the snow-free season on roads. Forest law enforcement personnel regularly patrol the Forest for travel plan compliance. Since the Forest only has three full-time enforcement officers to cover 1.8 million acres, this patrol is limited to priority areas. One of the priorities for enforcement activities is the grizzly bear management units (BMUs).

To date, the Forest has decommissioned about 384 miles of roads in the BMU's, this is 93 percent of the planned amount. The remaining 31 miles will be decommissioned as the site-specific analyses are completed. While there are more roads to decommission, in all BMU's the open road and open motorized trail route density (OROMTRD) and total motorized access route density (TMARD) requirements in the RFP are being met even with the inclusion of private and state lands that are within the BMU boundary. Outside of the BMU's, an additional 108 miles have been decommissioned elsewhere on the Forest.

During analysis for the Henry's Lake Travel Plan Implementation EA, forest personnel found that decommissioned roads in the BMU's are effectively closed to full size vehicles; however ATVs and motorcycles are driving around the road barriers. Some areas are not experiencing any motorized access due to the decommissioning. In areas outside of the BMU's, where roads were decommissioned, closure effectiveness is variable and largely dependent on terrain, location of the closures, and methods used. The travel plan implementation analyses address these roads at the site-specific level.

In response to a Notice of Intent to Sue regarding grizzly bear management, the Forest conducted a road by road review of closure effectiveness in Subunit 2 of the Plateau BMU. Out of the 113.5 miles of road that were decommissioned in Plateau BMU-Subunit 2, the Forest Service review documented only 11 miles of road where the decommissioning was found to be ineffective. The Forest will do additional work to more effectively close these roads. This amount of ineffective closure is dramatically less than what has been alleged by some Forest critics. It is important, also, to recognize that travel on these and other closed routes is illegal. The Forest Travel Plan meets the RFP open route density standards administratively and continuing decommissioning efforts will assist in meeting the standards physically. Across the Forest we continue to annually replace gates, reinforce earthen berms, scatter forest debris on the routes, replace signs and conduct law enforcement patrols to make closures effective.

For the past five years the Targhee has conducted a very intensive Travel Plan compliance effort during the Fall hunting seasons. This began with the Palisades Ranger District, Idaho Fish and Game, and Madison and Bonneville Counties and has since been expanded to other areas of the Forest. The District identifies areas where a Forest Service employee and Idaho Department of Fish and Game personnel or County Deputy go together to enforce Forest, State, and/or County regulations. This includes an airplane which is used at a specific time during the hunting season. If they observe people in violation of the Travel Plan the airplane crew relays information to ground personnel. During the first year of this intense effort, numerous violations were written, but over the years the number of violations has gone down and compliance has gone up. The Forest has received very positive feed back from the public on these efforts, and we are seeing benefit from our efforts with our partners.

For many years, the Districts have organized road patrol efforts during the hunting season. In general, most District personnel are enlisted to help enforce the Travel Plan at key times such as holidays or opening day of the different hunting seasons. This has been a priority for funding each year. For instance, over Memorial Day weekend 2004 on the Ashton/Island Park District, five permanent employees were out on road patrol. During this effort they distributed about 100 travel plan maps to Forest users and issued several tickets for road closure violations. The predominant violations were for OHV's (mostly four-wheelers) traveling cross-country. This is typical for the remainder of the Forest as well.

Forest managers continue to wrestle with the question of how to make road and trail closures more effective. Suggestions have been developed and are being considered in the site-specific analyses of travel plan implementation. They include:

- Install more effective gate closures.
- Start monitoring motorized use early in the year, from Memorial Day weekend through the fall hunting season. Additional Law Enforcement help is needed during the summer months, weekends, and holidays.
- Continue working with the Fish and Game and other agencies in using aerial surveys during fall hunting seasons. Engage other user groups to help with enforcement of closures.
- Enforcement during summer months should be centered around summer home areas and popular dispersed recreation areas.

- Create more ATV routes through the Forest which would give users a backcountry experience. ATV sales and registrations have increased over the past several years. Between 1996 and 2001 ATV registration in Idaho has increased 42 percent, from 14,735 to 35,807 vehicles. Many ATV users want to ride some place other than on graveled roads, which are traveled by automobiles, as well.

Recommendation

The RFP method and frequency for monitoring is not practical, nor is it within Forest budgets. The Forest should develop a new method for measuring and tracking closure effectiveness, starting at the watershed level. Several methods would be used, in a rough random sampling approach. Random visual checks of access points to closed road systems and information from incidental employee observations would be used to determine closure effectiveness. Those patrols would use a myriad of methods to check for closure effectiveness, including horse, foot, vehicle, ATV or aerial methods, depending on the closure and terrain. The monitoring would be performed during the spring/summer/fall seasons, to incorporate at least one or more holiday weekend and the fall hunting season. To accomplish this, and more, monitoring the Forest should continue to develop partnerships with state fish and game agencies, U.S. Fish and Wildlife Service, and forest user groups.

In addition, each District should begin using the "Road Patrol log books" developed by the Ashton/Island Park Ranger District (or some similar form). These books are put in Forest Service vehicles and when personnel check a closure (gate, berm, sign, or other closure) they document the status of that closure. The documentation also describes the action taken so personnel can follow up with any corrective actions taken or needed. This will provide additional written documentation of both enforcement efforts and compliance percentage.

Achievement of Road Density

Requirements

This implementation monitoring was developed to measure the achievement of Total Motorized Access Route Density (TMARD) and Open Road and Open Motorized Trail Route Density (OROMTRD) for each prescription area. The RFP directed us to use GIS and the moving-window technology to measure our progress.

Results and Evaluation

The 1999 Travel Plan decision approved a network of open roads and trails that was consistent with the OROMTRD standards in the RFP, with a few exceptions. The Travel Plan EIS amended the RFP OROMTRD standards in nine prescription areas across the Forest. See Table S-2 in the 1999 FEIS for the Open Road and Motorized Trail Analysis for a listing of these prescription areas. No increase in road density from RFP standards occurred in areas with grizzly bear habitat values. An increase was approved in tow prescription areas with elk and deer habitat values. The network of open roads and trails approved in the Travel Plan has many prescription areas below the RFP density standards, but these were not noted. The RFP OROMTRD standards have been implemented administratively across the entire Forest. See Table 52 in the EV/EHE monitoring section of this report for the current OROMTRD for each watershed on the Forest.

To date, the Forest has decommissioned about 384 miles of roads in the BMU's, this is 93 percent of the planned amount. The remaining 31 miles will be decommissioned as the site-specific analyses are completed. While there are more roads to decommission, in all BMU's the open road and open motorized trail route density (OROMTRD) and total motorized access route density (TMARD) requirements in the RFP are being met even with the inclusion of private and state lands that are within the BMU boundary. Elsewhere on the Forest, standards for road density have been met administratively but not always effectively, overtime these closures will be more effective through enforcement and education. An additional 108 miles have been decommissioned outside of the BMU's. As stated previously, the Forest has completed analyzing the environmental impacts of decommissioning more miles but this has been delayed by an appeal and lawsuit¹².

¹² Last year the Anderson Mill Timber Sale was appealed by environmental groups. As a result, the decision was remanded back to the Forest for further documentation of effects. 22.5 miles of decommissioning associated with that decision will not be completed until a new analysis and decision is conducted. At press time the Forest has been sued by environmental groups to prevent implementation of the Big Bend Ridge

In the grizzly bear BMUs, various methods of decommissioning were used to render the road closures effective. These actions were contested in court and the Forest must reevaluate the methods used. Cross-country motorized travel continues to be an increasing problem in some areas, despite the closures in the RFP. The number of user-created roads and trails has increased, even in the six years since the closures have been instituted. As described previously, however, enforcement and education efforts have accelerated on the Forest, producing results with the majority of users. See the previous section for information on road closure effectiveness.

Recommendation

OROMTRD standards have been met administratively across the Forest. These standards may not have been achieved physically on the ground, especially outside areas of the BMU's. As part of the ongoing update of the forest transportation layer in GIS, a monitoring layer could be added to track the progress of actual closure efforts. This would rely on district personnel submitting closure implementation information to engineering/GIS to update the monitoring layer. Any new user created routes could also be added and tracked if warranted.

It should be noted that as the Forest updates the travel layer using digital orthoquads to more accurately locate roads and motorized trails, there will be adjustments to prescription areas boundaries and to miles of roads and trails. This will cause adjustments to miles open roads and trails as well as adjustments to prescription areas (acres or square miles) that will affect OROMTRD calculations.

Range

Streambank Disturbance/Stubble Height/Channel Stability

Requirements

This monitoring item was developed to determine if a streambank disturbance standard was needed or if the stubble height standards were adequate to maintain channel stability. One hundred plots are to be established and read across the Forest for five years, mainly in areas with vegetation dependent channel stability. The watershed staff is then to measure channel stability at each correlation plot site. A matrix is to be developed by the soil scientist to determine if there is a correlation between stubble height, streambank disturbance, and channel stability in different ecological types.

Results and Evaluation

The Targhee Range Monitoring Protocol established a site selection process and procedures for measuring streambank disturbance and stubble height. Priority was given to stream channel types that are more dependent on vegetation for stability. The protocol also established an implementation schedule: a total of 33 plots are to be established every year for three years.

Due to funding shortfalls, the Forest Leadership Team determined that on-the-ground allotment administration would be done prior to validation monitoring. To date, only ten correlation plots have been established. Only the stubble height and streambank trampling information was gathered in these plots; the channel stability and correlation matrix "legs" of the monitoring item have not been done. None of the transect data sheets have been compiled and evaluated.

Since the development and adoption of the RFP, there has been much additional research regarding how livestock utilization at different levels affects stream channel stability and overall function. The interaction between livestock use and stream conditions is very complex and dependent upon physical factors such as channel substrate, predominant vegetation, flow regimes, gradient, etc. Research indicates that a stubble height standard alone may not protect stream conditions in all cases. For instance, some streams are held together by rock, in those stream types, vegetation along the "hydric greenline" is not necessary to maintain bank stability. On other streams,

Vegetation Management and McGarry Salvage projects. This has delayed implementation of the 32.7 miles of decommissioning associated with these projects since 2004.

vegetation is the most critical factor in maintaining channel stability. The Forest does not have the resources to test this research finding on the Targhee.

During the Caribou Forest Plan revision, Forest range and hydrology personnel developed a guide for using multiple parameters to regulate livestock grazing based on stream characteristics and condition and timing of use. This Caribou Riparian Grazing Implementation Guide (GIG) allows flexibility in managing livestock grazing while keying in on the most limiting factor for improving or maintaining stream conditions.

Recommendation

The Forest will propose to delete this monitoring item and use an adaptive management approach to implement the appropriate annual livestock grazing indicators. The Forest will propose to use the Caribou Riparian Grazing Implementation Guide (GIG), along with an adaptive management approach, to determine appropriate livestock utilization standards during site-specific analysis.

Riparian Forage Utilization Within Key Areas

Requirements

To monitor compliance with RFP riparian use standards, the RFP recommended tracking several items: stubble height of key species in the hydric greenline (HGL) and aquatic influence zone (AIZ); percent browse utilization in the riparian area; and soil disturbance levels in the AIZ. These parameters were to be measured at least once a year in priority allotments, with additional readings, if time allowed. One third of all allotments on each District are to be monitored yearly, approximately five days per allotment.

Results

The range, watershed, and fisheries personnel developed the Targhee Rangeland Monitoring Protocol (Version 3, 6/98) to provide a consistent method of monitoring. This protocol details the process to use when selecting key areas; method to use for measuring utilization; and forms for use in key area monitoring. This protocol was approved by the Regional Office for official use. In December of 1998, a Permittee Monitoring Guide was also developed, and training was provided on the Dubois District for all District permittees and interested members of the public.

According to the RFP, all priority allotments should be monitored annually, throughout the grazing season. Priority allotments are generally those which have resource problems, uncooperative permittees, recent management changes, or are located in ecologically or politically sensitive areas. Four of the five Districts monitored all of their priority allotments each year; other allotments were monitored as time allowed. Although the RFP directed that one third of the allotments be monitored each year, the Forest average was 43 percent of the allotments monitored each year, see Table 56, below. An average of 112 Key Areas were established and/or read each year in riparian areas. These key areas measured stubble height remaining along the HGL or the AIZ. See Table 57. Corrective action was taken, in most cases, when use levels exceeded the standards.

The Districts have selected key areas in different ways. The Rangeland Monitoring Protocol includes criteria to use when selecting a key area and explains the concept. In general, selection of the community type, location, and size of the key area is left to the professional judgment of the rangeland manager. When time is a limiting factor for the manager, key areas are usually a small site, representative of the rest of the unit. If the rangeland manager has an adequate amount of time, the key area is generally much larger. In some cases the key area will be an entire grazing unit or stream reach. In the latter case, several transects may be averaged to quantify use in the whole area, or one site is used for a pace transect. This use of the key area concept allows flexibility and helps focus resources where they are needed the most.

Figure 71: Residual vegetation along the hydric greenline (HGL) on the Fall Creek cattle allotment at the end of the grazing period, Palisades Ranger District, 2004.



This monitoring demonstrates that most of the livestock grazing on the Forest is within the riparian standards set in the RFP. Riparian grazing standards in the RFP are separated into different areas and vegetation type. A minimum of four inches of stubble should remain on the hydric greenline (HGL) and three inches in the adjacent aquatic influence zone (AIZ). Use on woody browse (willows) should not exceed 30 percent of the annual leader growth. According to the RFP, livestock should be moved when any one of these levels is exceeded. This insures that the trigger will be the limiting resource, not the most resistant. In general, stubble height/utilization standards on the herbaceous vegetation in the AIZ are met first, followed by the HGL, and lastly, woody browse. This is highly dependent upon the vegetation type, structure, and distribution, as well as season of use and class of livestock. Riparian key area monitoring includes all three of the standards; therefore, District rangeland managers are moving livestock when the most limiting standard is reached. From the data gathered, it appears that the standards and guidelines for grazing in the AIZ's are effective at maintaining or improving riparian resource conditions. See Table 57 for riparian key area monitoring and results.

Table 51: Forest-wide range monitoring conducted and compliance with RFP standards and guidelines by allotment.

NUMBER OF GRAZING ALLOTMENTS...	1997	1998	1999	2000	2001	2002	2003	2004	AVERAGE
Open to grazing	145	145	145	145	144	143	142	138	n/a
Monitored	68	59	54	63	59	68	81	79	66
% of allotments monitored	47%	41%	37%	43%	41%	48%	57%	57%	46%
Verified in compliance	65	59	53	61	54	63	75	71	63
Estimated in compliance and not monitored	77	86	91	82	85	75	61	59	77
% of total allotments in compliance (assuming all non-monitored are in compliance since problem allotments should ALL be monitored)	98%	97%	99%	98%	97%	97%	96%	94%	98%
% of monitored allotments in	96%	92%	98%	95%	92%	93%	93%	90%	94%

NUMBER OF GRAZING ALLOTMENTS...	1997	1998	1999	2000	2001	2002	2003	2004	AVERAGE
compliance									
Verified allotments NOT in compliance	3	5	1	3	5	5	6	8	n/a
Allotments w/ corrective action taken	0	5	3	3	5	5	6	8	n/a

Table 52: Total number of riparian key areas monitored forest-wide.

Key Areas	1997	1998	1999	2000	2001	2002	2003	2004	AVERAGE
# monitored	113	102	85	119	105	125	120	129	112
# in compliance	113	95	80	116	100	120	114	121	n/a
# NOT in compliance	0	7	5	3	5	5	6	8	n/a
% in compliance w/ RFP Standards	100%	93%	94%	97%	95%	96%	95%	94%	96%

Evaluation

As shown above, an average of 96 percent of monitored riparian key areas were meeting the RFP standards. This indicates a high level of compliance with the RFP. The minimum stubble height/utilization standards, identified in the RFP for herbaceous vegetation along the HGL and in the AIZ for livestock grazing, are reliable indicators. After six years of monitoring, trends are emerging from the information gathered.

- Monitoring data indicates that stubble height standards on the key herbaceous vegetation in the AIZ and along the HGL are met **before** allowable utilization is reached on willows or other key browse species in the riparian area.
- Monitoring data indicates that stubble height standards for the key herbaceous vegetation are met in the AIZ **before** allowable stubble height is reached along the HGL.

According to research, implementing these grazing forage utilization and stubble height levels should maintain or improve riparian conditions where livestock grazing has been identified as being the primary cause of less than satisfactory riparian conditions. Without forest-wide stream condition and trend data, however, this cannot be validated. In areas where stream channel condition data is available, the data indicate that conditions are generally improving. Rangeland managers continue to work with grazing permittees to improve conditions on a site-specific basis.

In 2004, an interdisciplinary team¹³ performed a grazing review on the Bootjack Allotment located on the Ashton/Island Park Ranger District. The team evaluated the implementation and effectiveness of grazing direction, which include RFP standards and guidelines and regional soil and water conservation practices (FSH 2509.22). Most of these “Best Management Practices (BMPs)” were implemented in a manner that meets or exceeds the objective of the practice and they provided for adequate protection of soil and water resources. The team noted that range improvements (e.g. fencing of the Poison Knoll unit and the need for a full time rider) should be implemented to further improve range conditions. The team discussed the challenge of range management in view of the heavy recreational use of the area (dispersed camping, motorized recreation, and motorized use of closed roads). Overall, the team agreed that current management has produced improvements in conditions. This review demonstrated that the RFP guidance and other standard conservation practices are maintaining or improving desired vegetation conditions.

¹³ The team included the Ecosystems Branch Chief, District Ranger, Soils Scientist, Hydrologist, Rangeland Management Specialist, Wildlife Biologist, and Fisheries Biologist. A copy of the report is filed at: K:\em\Hydrology\Monitoring\BMP Reviews\grazing\bmp_review_bootjack_allotment2004.doc

Figure 72: Riparian area on the Snake River Cattle allotment at the end of the grazing period, Palisades Ranger District, 2004.



Recommendations

Because cattle and sheep utilize riparian areas differently, the results for both classes of livestock should be reported separately. The Forest should continue to provide training to Forest Service personnel and livestock grazing permittees about key area selection, key species, annual monitoring, and riparian resources. In addition, it is likely that more on-the-ground monitoring is occurring than this report identifies. Since monitoring is not reported if it is not documented, this documentation should be emphasized as an integral part of permit administration. One way the rangeland managers are addressing this need is to use an electronic form for documenting range inspections. In addition, the INFRA database information can be used to report acres of allotments monitored to standard in future years.

Monitoring demonstrates that AIZ direction is properly implemented. Effectiveness monitoring should continue in order to validate whether the existing direction is indeed maintaining/moving toward desired conditions. In areas where RFP utilization standards do not appear to be protecting stream channel characteristics and meeting/moving towards RFP desired conditions, standards should be adjusted through the interdisciplinary adaptive management process. The most current version of the Caribou Riparian Grazing Implementation Guide could be used as a tool to determine appropriate indicators for grazing use.

Upland Forage Utilization Within Key Areas

Requirements

Upland forage utilization in key areas is to be measured, especially in areas where upland forage is limiting. This would primarily be in sheep grazing allotments. These upland use parameters, including percent forage utilization and soil disturbance, are to be measured on one third of the allotments per District, approximately two days per allotment.

Results and Evaluation

The range, watershed, and fisheries personnel developed the Targhee Rangeland Monitoring Protocol (Version 3, 6/98) to provide a consistent method of monitoring. This protocol details the process to use when selecting key areas; method to use for measuring utilization; and forms for use in key area monitoring. This protocol was approved for official use by the Intermountain Regional Office. In 1998, a Permittee Monitoring Guide was also developed, and training was provided on the Dubois District for all District permittees and interested members of the public.

According to the RFP, all priority allotments should be monitored annually throughout the grazing season. The Monitoring Plan states that about one-third of the allotments on each District should be monitored. Priority allotments are generally those which have resource problems, uncooperative permittees, recent management changes, are located in ecologically or politically sensitive areas, etc. Four of the five Districts monitored all of their priority allotments each year; other allotments were monitored as time allowed. Although the RFP directed that one third of the allotments be monitored each year, the Forest average was 46 percent of the allotments monitored each year (see Table 56, previously). An average of 101 Upland Key Areas were established and/or read each year; over 90 percent of these Upland Key Areas were in compliance with the RFP grazing standards for herbaceous and/or soil disturbance. Corrective action was taken, in most cases, when use levels exceeded the standards. Table 58 shows the number of key areas monitored Forestwide.

Table 53: Upland key areas monitored forest-wide.

Key Areas	1997	1998	1999	2000	2001	2002	2003	2004	AVERAGE
# monitored	135	112	90	53	57	61	143	157	101
# in compliance	118	109	84	51	52	56	137	149	n/a
# NOT in compliance	17	3	6	2	5	5	6	8	n/a
% in compliance w/ RFP Standards	87%	97%	93%	96%	91%	92%	96%	95%	94%

Monitoring results demonstrate that most of the livestock grazing on the Forest is within the upland use standards set in the RFP. It is difficult to interpret this data, however, since different parameters are measured for different classes of livestock. Soil disturbance is used to measure sheep use, and upland forage use estimates are used for cattle. This data is contradictory to expected results, because a higher percentage of upland key areas were above RFP standards than those for riparian use. Key areas are not in compliance with RFP standards, particularly in sheep allotments with overuse on some of the ridges and in several small cattle allotments on the Teton Basin Ranger District.

As discussed in the monitoring item above, in 2004, an interdisciplinary team¹⁴ performed a grazing review on the Bootjack Allotment located on the Ashton/Island Park Ranger District. The team evaluated the implementation and effectiveness of grazing direction, which include RFP standards and guidelines and regional soil and water conservation practices (FSH 2509.22). Most of these "Best Management Practices (BMPs)" were implemented in a manner that meets or exceeds the objective of the practice and they provided for adequate protection of soil and water resources. Overall, the team agreed that current management has produced improvements in conditions. This review demonstrated that the RFP guidance and other standard conservation practices are maintaining or improving desired vegetation conditions.

Recommendations

In the future, cattle and sheep should be reported separately, just as they are recorded separately using the Rangeland Monitoring Protocol. This item should be changed to Priority Group 1. Whenever possible, key areas should be located in the same or similar area as long-term trend monitoring sites. This would allow Forest managers to make a clearer tie between utilization levels and actual vegetation and stream channel conditions. In addition, the INFRA database information can be used to report acres of allotments monitored to standard in future years.

Riparian and Upland Long-Term Trend in Benchmarks

Requirements

This monitoring item was developed to measure achievement of the range objectives to improve riparian and upland vegetation conditions. According to the RFP, there should be at least one benchmark in each dominant ecological type within an area of interest. Chapter V of the RFP estimated that 105 benchmarks would be established and surveyed every five years.

¹⁴ The team included the Ecosystems Branch Chief, District Ranger, Soils Scientist, Hydrologist, Rangeland Management Specialist, Wildlife Biologist, and Fisheries Biologist. A copy of the report is filed at: K:\em\Hydrology\Monitoring\BMP Reviews\grazing\bmp_review_bootjack_allotment2004.doc

Results

Historic Long-term Trend Studies

The Forest has installed and read long-term trend transects on range allotments for the past five decades. These transects record many plant and soil characteristics which are used to determine condition and trend. Unfortunately, range analysis techniques have changed over the decades and the data from Site Analysis and Parker Three-Step transects read in the 1950's-1970's cannot be directly compared with the Nested Frequency transects used currently. Rangeland management specialists are working on a "cross-walk" which can be used to make indirect comparisons between data gathered using different techniques. For this reason, nested frequency transects are being installed in the same locations, where possible, as the old transects. The historic range analysis data is located in the District range analysis files.

Long-term Trend Studies since 1997

The range, watershed, and fisheries personnel developed the Targhee Rangeland Monitoring Protocol (Version 3, 6/98) to provide a consistent method of monitoring. This protocol details the process to use when selecting benchmark areas; methods to use monitor long term trend; and guidance documents for the various survey methods. Recommended surveys for riparian benchmarks include Cross Sections, Greenline Plots, Photo Points, Rosgen Stream Channel Classification, Stream Channel Stability, and Woody Species Utilization and Regeneration. Recommended methods for upland benchmarks include Density/Shrub Form Class, Line Intercept Transects, Nested Frequency Plots, and Photo Points.

This is a Priority Group 3 item and little funding has been available to do this monitoring. Despite the lack of funding, a total of 35 long-term trend transects have been installed and read on the Dubois Ranger District since the adoption of the RFP. This is approximately one-third of the monitoring objective for the entire Forest.

The following information is a summary of long-term trend data collected for the Porcupine East range analysis project. Actual data sheets and site evaluations are located in the Dubois Ranger District range files.

Riparian Vegetation Studies

Two long-term trend riparian "Cross Sections" were installed on the Dubois Ranger District and/or read between 1997 and 1999. Since these transects were new, no information on long-term trend across the Forest can be extrapolated. In 2000, two riparian "Greenline" transects were read in the Pete Creek drainage in the Centennial Mountains. These two transects were re-read in 2003 and the results are shown in the table below.

A number of the riparian areas along major drainages within the Dubois District portion of Centennial Mountain range were assessed during a field review in June and July of 2003. The following summary (Table 59) shows the results of the field review. The method of study was the "greenline" method outlined in the United States Department of Agriculture, Forest Service General Technical Report RMRS-GTR-47.

Table 54: Vegetation seral status, and stability ratings on representative reaches of major drainages located in the Porcupine East Grazing Analysis area.

Drainage	Vegetative Seral Status	*Actual Vegetative Trend	Greenline Stability Rating
East Threemile Creek	52.4 (Mid Seral)	Stable	6.7 (Moderate)
West Rattlesnake Creek	77.5 (Late Seral)	---	6.3 (Moderate)
Bear Gulch	70.6 (Late Seral)	---	6.6 (Moderate)
Little Creek	68.0 (Late Seral)	---	7.1 (Good)
West Camas Creek	78.3 (Late Seral)	Stable	8.3 (Good)
Alex Draw Creek	72.7 (Late Seral)	Up	7.5 (Moderate)**
Corral Creek	65.1 (Late Seral)	---	5.7 (Moderate)
McGarry Canyon	49.5 (Mid Seral)	---	5.1 (Moderate)
Steel Creek	101.6 (PNC)	---	8.0 (Good)
Stump Creek	100.8 (PNC)	---	8.9 (Good)
Upper Pete Creek	79.2 (Late Seral)	Up	7.9 (Good)
Lower Pete Creek	79.1 (Late Seral)	Stable	8.3 (Good)

Cottonwood Creek	56.8 (Mid Seral)	---	7.1 (Good)
Moose Creek	59.5 (Mid Seral)	---	6.0 (Moderate)

*Vegetative trend on these riparian areas is only indicated on stream reaches where a previous greenline study existed providing a baseline to compare present vegetation to.

**Alex Draw Creek stability rated out 7.47 which rates "good" based strictly on the stability index. However, the system is in an upward trend and although desired species are present, they are relatively young plants which are not supporting the very erosive soils as well as they will after a few more years of maturity. Based on professional judgment, this stream is "moderately" stable.

Upland Vegetation Studies

Nested frequency studies were installed and read on eight sites across the project analysis area during the 2003 field season. Species found present in these study locations were compared with the species list indicated for the potential natural community (PNC) of each site's respective Ecological Unit (Targhee National Forest EUI pg. 501-613). The number of matching species is indicated; species present on the site but not on the EUI's list for PNC are listed (Table 60). Major species associated with each Ecological Unit were present on every site.

Table 55: Current vegetation on nested frequency sites within the Porcupine East Grazing Analysis area compared to species at PNC of each respective Ecological Unit.

Allotment	Study Site	Number of Species Matching the PNC list	Species Present on Study Site, but Not on PNC list
Alex Draw-Threemile C&H	Threemile unit 1	34	None
Ching Creek S&G	Scalp Creek	37	<i>Koeleria</i> , <i>Lomatium</i> , <i>Phlox</i> , Tarweed, Mustard, <i>Calochortus</i> , Canada thistle, <i>Clematis</i> , Vetch (all in trace amounts except Tarweed)
Cottonwood-E. Camas S&G	Spruce unit	25	<i>Danthonia</i> , <i>Lomatium</i> , Tarweed, Mustard, <i>Rumex</i> , <i>Hordium</i> , Iris, <i>Aconitum</i> (all in trace amounts)
Pete-Stump S&G	Pete Cr. Nested	41	<i>Calamagrostis</i> , Annuals (all in trace amounts)
Table Mountain S&G	Table Mountain	28	Vetch, <i>Hackelia</i> , Mustard, <i>Crepis</i> , Annuals (all in trace amounts)
West Camas C&H	Alex Draw	40	<i>Osmorhiza</i> , Annuals, <i>Valerian</i> , Tarweed, (all in trace amounts)
	Pass Creek	41	Tarweed, Canada thistle, Annuals (all in trace amounts)
	McGarry Flat	26	<i>Periderida</i> sp., <i>Clematis</i> sp. (both present in trace amounts)

The dominant presence of desirable species within their respective Ecological Units indicates long periods of stability (Table 60). However, undesirable vegetation is present in a small percentage of areas, such as sheep bedgrounds, and trailing areas that were heavily used in the past. Mule's-ear, tarweed, and some less desirable annuals are the main species that have invaded these past heavily used areas. The upland studies in Table 60 indicate the presence of some of these less desirable species in varying amounts. Excessive disturbance from any action will often cause an increase in less desirable species and a decrease in the more favorable species. For example, excessive grazing by cattle will often lead to a decrease of highly favorable species such as Idaho fescue and timothy (*Phleum pretense*) and an increase in less desirable species such as Kentucky bluegrass (*Poa pratensis*), and prairie junegrass (*Koeleria cristata*). Excessive grazing by sheep can lead to a decrease in favorable species such as sweetanise (*Osmorhiza occidentalis*) and wild carrot (*Ligusticum filicinum*) and an increase in less desirable species such as western coneflower (*Rudbeckia occidentalis*) or goldenrod (*Solidago occidentalis*).

Table 56: Other Long Term Vegetation Studies installed and read on the Forest from 1997-2004.

District	Allotment	Unit	Year	Accomplishment
Dubois	Crystal Gulch C&H	North	2004	Install Nested Frequency over Site Analysis
Dubois	Slate Basin C&H	Slate Basin	2004	Install Nested Frequency over Site Analysis

Dubois	Nicholia-Chandler S&G	Nicholia	2004	Install Nested Frequency over Site Analysis
Dubois	Nicholia-Chandler S&G	Chandler	2004	Install Nested Frequency over Site Analysis
Dubois	Kelly Canyon S&G	Gallagher	2004	Install Nested Frequency over Site Analysis
Dubois	Snakey Canyon S&G	Left Fork Snakey	2004	Install Nested Frequency over Site Analysis
Dubois	Middle Creek C&H	Broad Hollow	2004	Riparian Greenline re-read
Teton Basin	Darby Creek C&H	Sweet Hollow	2000	Install Nested Frequency
Teton Basin	Darby Creek C&H	Darby Creek	2000	Install Nested Frequency

The data from these studies has not been analyzed at the time of this report.

Other long-term trend monitoring

In 2001 and 2002, several transects were established and read to track vegetation changes in a prescribed burn area. Nested frequency transects were also established in areas on the Dubois District where allotment management plans are being revised. Several of the transects were installed to measure differences in vegetation frequency for pre-burn and post-burn of mountain big sagebrush communities in the Meadow Creek drainage on the Dubois Ranger District applying light fall burning, heavy fall burning, and light spring burning. The brush and litter components decreased as a result of the burn, while fire tolerant forbs and grasses increased in frequency. It is noteworthy that the heavy fall burn resulted in an increase in bluebunch wheatgrass (*Agropyron spicatum*) the following year, while the spring burn resulted in a decrease in that species. Idaho fescue (*Festuca idahoensis*) and Needle-and-Thread grass (*Stipa comata*) responded much more favorably to lighter burns than to the heavy fall burn.

Evaluation

While wholesale extrapolation of data from one District to the entire Forest is not appropriate, two important conclusions regarding the RFP livestock utilization standards can be drawn from this information.

- Riparian vegetation is predominantly in late seral and Potential Natural Community (PNC) seral status. Where actual vegetative trend could be determined, trend is upward or stable. Livestock and wildlife utilization is generally the most influential factor on riparian vegetation condition. The data above indicates that livestock utilization standards in the RFP are maintaining or enhancing riparian vegetation conditions.
- The dominant presence of desirable upland species in the nested frequency transects indicates long periods of stability. This indicates that livestock utilization standards have been adequate to sustain desirable upland species across the landscape.

Recommendations

Long-term trend data is essential to demonstrate that Forest management activities are maintaining sustainable conditions on a site-specific basis. The recommendation is to change this to Priority Group 1 and emphasize collection of long-term data. The highest priority should be on re-reading and evaluating transects established in the past two decades. New transects should be located in the same location as historic transects, where possible, to facilitate actual trend comparisons. New transects should also be located in an area where specific livestock utilization data has been collected. This will enable the Forest to make direct comparisons between utilization levels and plant community trends.

Timber

Changes to Land Suitability

Requirements

This monitoring item was developed to validate the suitability assessment made in the RFP. Project-level analyses are to be reviewed yearly to determine if the analysis confirms or disagrees with the tentative suitability determinations. A significant change would trigger a review of the Allowable Sale Quantity (ASQ).

Results and Evaluation

This item was monitored each year. No changes were made to the tentative land suitability assessment in the RFP between 1997 and 2004. NEPA documents were reviewed for sales sold during FY 2000-2004: Beacon Basin, Airways, Pleasant Valley, McGarry Salvage, Hale Canyon and Alpine Fuels. None of these projects proposed changes to the tentatively suitable land assessment in the RFP.

Maximum Created Opening Size

Requirements

This monitoring item was developed to measure compliance with the RFP prescription area standards for created openings. Each decision document allowing vegetation management in Prescription Areas 5.2.1, 5.2.2, 2.1.2, 5.3.5, 2.6.1(a), and 5.4 would be reviewed. If the review shows a trend towards exceeding the guidelines to implement ecologically-based projects, those guidelines will be reviewed.

Results and Evaluation

Only three of the above-listed Prescription Areas have specific maximum created opening size standards (5.2.1, 5.2.2, and 5.4) in the RFP. All vegetation management projects have been reviewed for compliance with these RFP standards. No timber sale projects exceeded the created opening standards, and no RFP amendments were made within the above-listed Prescription Areas, between 1997 and 2004. Less than 700 acres have been harvested in these six prescription areas during this seven-year timeframe, with less than 10 percent of this harvest establishing created openings. However, if the harvest program were increased, adherence to this standard could lead to undesirable fragmentation of habitats and create an unnatural, and possibly undesirable, visual effects.

In landscape level projects, such as aspen restoration or wildland fire use, created opening size limits do not match with historical patch sizes or project objectives. Such small opening sizes also can create wildlife and livestock grazing conflicts, because the animals will concentrate in the open area. In addition, the glossary includes wildland and prescribed fire in the definition of created opening. This inclusion would limit the Forest's ability to use prescribed and wildland fire use to accomplish the prescription goals. Since the definition in the RFP is based on silvicultural techniques instead of existing vegetative conditions, there is variability in application of these guidelines as well. Lastly, two of the Prescriptions identified in the monitoring item—Rx 2.6.1(a) and 5.3.5—do not have specific created opening guidelines in their direction package.

Recommendation

The Forest will propose deleting this monitoring item and deleting the created opening limit guidelines in Prescriptions 5.2.1, 5.2.2, and 5.4. Instead of a Forest Plan acreage limit, created opening sizes should be based on project objectives and site-specific issues. The definitions of a created opening should also be standardized throughout the RFP.

Security Cover Retention

Requirements

This item is designed to measure compliance with the grizzly bear security cover RFP standard. Vegetation management project proposals in prescription areas 5.3.5 and 2.6.1(a) are to be reviewed.

Results and Evaluation

Each timber sale NEPA document affecting BMUs was reviewed. All of the projects in the BMUs met the RFP standard for security cover retention. The standard appears to be effective in obtaining grizzly bear management goals outlined in the RFP.

Large Forested Block Retention

Requirements

This item was designed to monitor compliance with the RFP prescription area standard to retain 250 acre forested blocks in Rx areas 5.1.4(c) and 5.4(a-c). Each timber sale analysis document is to be reviewed for compliance.

Results and Evaluation

This item was addressed in each timber sale document. All projects were in compliance with the standard.

Recommendation

Delete monitoring because it is addressed at the project level.

