COORDINATING LIVESTOCK AND TIMBER MANAGEMENT WITH THE GRIZZLY BEAR IN SITUATION 1 HABITAT, TARGHEE NATIONAL FOREST

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ABSTRACT: Adjustments were made in the timber and livestock management programs to accommodate the needs of the grizzly bear in Situation 1 habitat. Some of the major adjustments in the timber management program include reducing cutting unit size; using silvicultural prescriptions to benefit understory forage plants; increasing the size of leave strips; road closures; cover objectives that would not decline below 50 percent; and maintaining security areas of at least 5,000 acres. Some of the major adjustments in the livestock management program include closing four sheep allotments; converting one sheep allotment to a cattle allotment; full-time monitoring of all sheep allotments; restricting methods of handling bear predation problems; and removing sheep from an allotment in cases of conflict.

INTRODUCTION

One of the longest historical uses of the Targhee National Forest has been domestic livestock grazing; in some areas, grazing predated the creation of the National Forest. When the grizzly bear (Ursus arctos) was classified as a threatened species, historical grazing uses and public attitudes were in conflict with the immediate needs of the bear. Intensive timber management on the Targhee has been a more recent event, beginning mainly in the 1960's. Approximately half of the timber base on the Targhee is lodgepole pine (Pinus contorta), and about 90 percent of the pine was mature. The mountain pine beetle (Dendroctonus ponderosae) began killing large numbers of trees in the late 1960's and 1970's. The Forest subsequently began a salvage program, which in some cases was in conflict with the needs of the bear. This paper presents an overview of grizzly-livestock-timber coordination that has occurred on the Targhee National Forest since 1975, when the bear was officially listed as a threatened species under the Threatened and Endangered Species Act. It describes changes in livestock grazing and timber management, along with formal consultations that have occurred with the U.S. Department of the Interior, Fish and Wildlife Service.

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LOCATION

Grizzly bear Situation 1 habitat is located in two areas of the Targhee National Forest (fig. 1). One area lies in the northeast corner of the Forest and occupies 35,960 acres. This area includes the Henry's Lake Mountains north and east of Henry's Lake. The boundary follows the Continental Divide, which is also the Idaho-Montana state line. The area is characterized by high glaciated mountains rising to 10,000 ft elevation. Vegetation varies from heavy lodgepole pine and Douglas-fir (Pseudotsuga menziesii) timber stands in the lower elevations to subalpine and alpine vegetation in the middle and upper elevations. Perennial streams and springs occur throughout the area. Domestic livestock grazing has been the predominant resource use; timber harvest has been limited; and recreation use is considered light during the summer, with increasing use during the fall hunting season and high use during the winter snowmobile season.

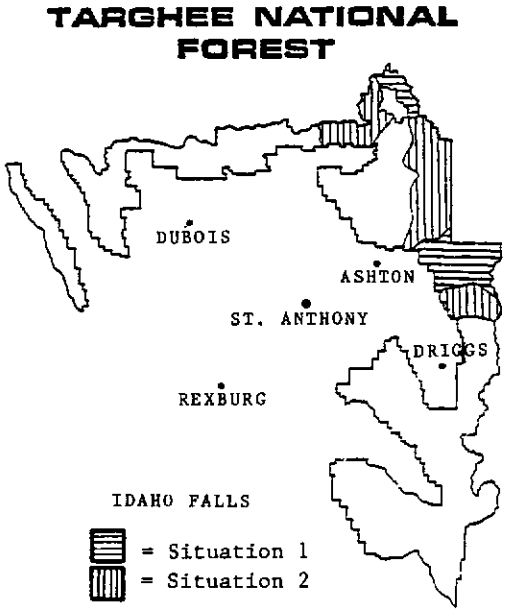

Figure 1.--Situation 1 and 2 grizzly bear habitat.

The second area lies along the southern boundary of Yellowstone National Park and occupies 138,140 acres. Elevations range from 5,600 ft on the western edge to 9,200 ft on the eastern side. The western portion of this area is

characterized by large lodgepole pine uplands and plateaus, dissected by gorgelike canyons. Shallow lakes and marshes are scattered throughout the area. The principal timber type is lodgepole pine; however, Douglas-fir grows along the canyon ridges and north facing canyon slopes. The lodgepole pine stands have undergone severe attack from the mountain pine beetle, and large areas have been salvaged. Cattle and sheep grazing occur within the area.

This second area includes the newly created Winegar Hole Wilderness adjacent to the southern boundary of Yellowstone National Park. Numerous ponds, seeps, meadows, shallow lakes, and streams are dispersed throughout the area. These aquatic and riparian habitats are surrounded by extensive stands of lodgepole pine, aspen (Populus tremuloides), Douglas-fir, and subalpine fir (Abies lasiocarpa). The dominant human use is for recreation.

The eastern portion of this second area is part of the newly created Jedediah Smith Wilderness. The area is characterized by high-elevation, glacially scoured ridges and basins perched above U-shaped canyons. Scattered patches of subalpine fir, spruce (Picea engelmannii), Douglas-fir, and whitebark pine (Pinus albicaulis) are interspersed through natural forb and grass meadows. The dominant human use is recreation and livestock grazing.

RECENT GRIZZLY BEAR USE

Forest personnel have annually compiled a list of grizzly bear sightings. Figure 2 summarizes the sightings from 1965 through 1984.

Documentation of grizzly bear-livestock-human interactions on the Targhee National Forest has been accomplished through several research studies and agency reports (Jorgensen and Allen 1975; Jorgensen 1979, 1983; Griffel 1981; Knight and Judd 1983; U.S. Department of Agriculture, Forest Service 1981-1984). These studies and reports document consistent human-bear-sheep interactions and incidents. These studies and reports have shown only an occasional interaction between cattle and grizzly bears, with no human-bear incidents occurring as a result of cattle grazing.

No studies have analyzed the effects of logging on grizzly bears on the Targhee National Forest. However, Interagency Grizzly Bear Study Team research has identified grizzly bear-habitat relationships in the Yellowstone area (Blanchard 1983). Interagency Guidelines have been developed for coordinating timber management with grizzly bear needs. (USDA, Forest Service 1979, 1982). Verified grizzly bear sightings have occurred in timber sale areas before, during, and following harvest activities. No verified human-bear incidents have been associated with logging.

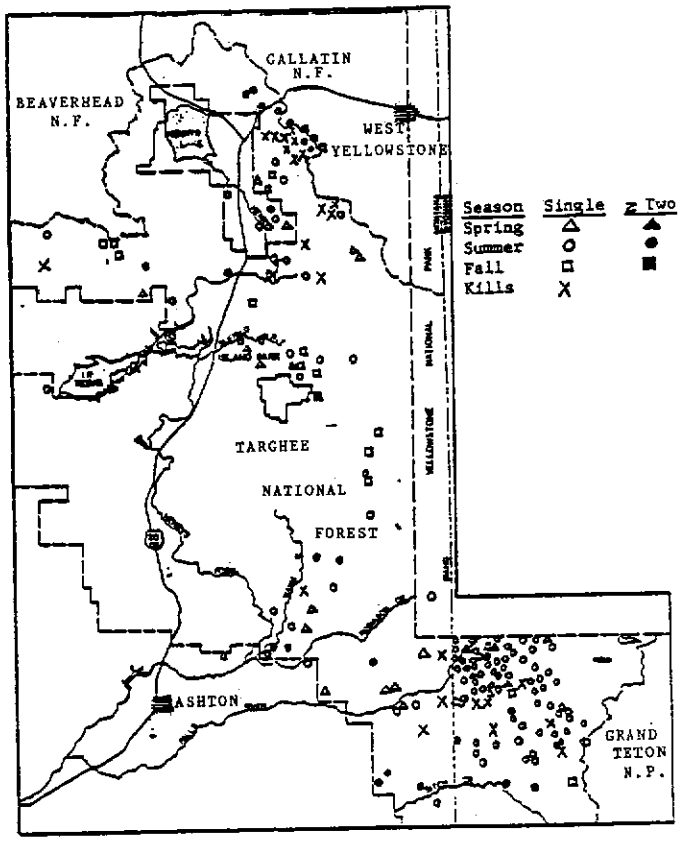

Figure 2.--Summary of grizzly bear observations on the Targhee National Forest, 1965-84.

TIMBER MANAGEMENT--1975 to 1985

Intensive timber management on the Targhee began in the 1960's. Approximately half of the timber base on the Forest is lodgepole pine; a large percentage (80 to 90 percent) of the pine was in a mature timber class by the 1960's and 1970's. The mountain pine beetle began killing large numbers of trees in the late 1960's and 1970's. Early timber management techniques involved selection cutting to remove only the trees killed by the beetle. This type of cutting opened up many timber stands and created favorable conditions for understory shrubs and grasses but generally did not encourage regeneration of lodgepole pine. Clearcutting of stands followed by extensive mechanical soil scarification is the technique used now to regenerate stands.

Timber management was the first program to receive formal consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act. In 1978, a "no jeopardy opinion" was received with the timber management program, providing certain management actions were implemented in a "discreet manner." The following is a summary of the recommended management actions:

1. Miles of road in areas of grizzly use (Situation 1 habitat) should remain at or below the present (1978) number.

2. Heavy concentrations of dead trees resulting from the pine beetle epidemic could cause multi-thousand acre fires, which would be detrimental to the cover needs of the bear. Timber harvesting to break up this fuel loading was considered beneficial with the following recommendations:

a. Selection cuts should be used wherever and whenever possible and clearcuts should be minimized. Understory forage species, such as tall huckleberry (Vaccinium globulare), would be protected and possibly enhanced with selection type cutting.

b. When they are necessary, clearcuts should be irregularly shaped to increase ecotonal areas and should not exceed 100 meters across. Where clearcuts are used, soil scarification should be minimized by broadcast burning slash whenever possible; dozer piles should be kept small and placed in areas most severely impacted by machinery.

c. Uncut strips or cover strips should be left around clearcuts and around open grizzly feeding sites such as avalanche chutes, meadows, shrubfields, sidehill parks, and creek bottoms. To assure cover adequacy, cover strips, even in the form of dead standing or fallen trees should remain.

d. When possible, logging should be restricted to the winter months in areas having abundant bear foods (generally large mesic sites) to reduce soil scarification, which destroys rhizomatous plants and root crowns of some shrubs.

e. When more soil scarification is required for conifer regeneration than is obtained in the above slash disposal methods, scarification should be restricted to highly disturbed sites or to a strip configuration through the clearcuts.

The Targhee National Forest is often called the "pocket gopher capital of the world," and successful regeneration of cutting units often will not occur until intensive gopher control work is completed. The most commonly used technique for pocket gopher control is to use 0.5 percent strychnine-treated oats placed underground in burrows at a rate of 1/2 to 1 1/2 lb/acre the first year of treatment, and 1/4 to 1/10 lb/acre the second and third years.

With regard to this part of the timber management program, the 1978 formal consultation recommended that strychnine bait not be used to control pocket gophers in grizzly bear biological centers. The Environmental Protection Agency, however, had previously determined that underground use of strychnine bait did not significantly increase the risk to nontarget wildlife (Hegdal and Gatz 1976).

In 1979, the Forest Service reinitiated formal consultation with the Fish and Wildlife Service in order to address the potential hazards of this program for the grizzly bear. To adequately assess the potential hazards, biologists from the Denver Wildlife Research Center designed and conducted a study. At the conclusion of this research, a biological opinion was received that the use of strychnine grain bait underground is not likely to jeopardize the continued existence of the grizzly bear. In issuing this opinion, the following additional conservation measures were recommended:

1. An area should be reforested as soon after harvest as possible. Immediate reforestation reduces problems with pocket gophers and the amount of strychnine needed.

2. The feasibility of other control techniques such as vexar tubes or zinc phosphide should be explored. This research has subsequently been completed (Barnes and Evans 1982; Anthony and Barnes 1978).

3. Areas scheduled for treatment should be thoroughly surveyed for evidence of grizzly use such as tracks, diggings, or actual sightings. If grizzly use is noted, treatment plans should be delayed until the bears leave the area. If grizzly use becomes evident after baiting has commenced, treatment should be halted immediately.

4. Baiting procedures by contracted crews should be closely regulated and inspected by the Forest Service to ensure that the minimum amount of grain is deposited in each bait set and in each treatment site. Penalties should be assessed for too many sets and too much grain in each set. The Forest Service should consider developing a tool to administer a predetermined amount of baited grain per set when setting bait by hand.

Following these two formal consultations with the Fish and Wildlife Service, the Targhee National Forest in 1980 began to develop the Forest Land Management Plan. For the purpose of simplicity, the discussion of how timber management and the needs of grizzly bear were coordinated in the Targhee Forest Plan is confined to the Situation 1 habitat area south of Yellowstone National Park (fig. 1). This management area contains extensive stands of lodgepole pine, most of which are dead or dying and will be lost to commercial use if not salvaged within the next 15 years. In addition to the obvious loss of products if salvage operations were not undertaken, future productivity is jeopardized as the untreated and dying stands naturally regenerate at a much slower rate than treated stands. In addition, untreated stands become infested with mistletoe from the residual overstory.

A first step in the coordination of timber with grizzly bear needs was to inventory the timber resource and to determine exactly how much was available. The inventory identified 50,000 acres of mature lodgepole pine on slopes less than 40 percent that could conceivably be harvested while maintaining acceptable soil and water conditions. In this management area, as in several others, the planning team did not consider salvage of lodgepole during the first decade (1981-1990) in areas where advanced logging systems would be required, because massive amounts of dead material were available for salvage in more economically and environmentally suitable areas.

It was estimated that the 50,000 acres of mature lodgepole would yield 350 million board feet; however, because most of the lodgepole was dead and had been for some time, salvage would only be possible during the next 15 years. In planning terms, this level of activity is designated as the maximum unconstrained timber benchmark (fig. 3).

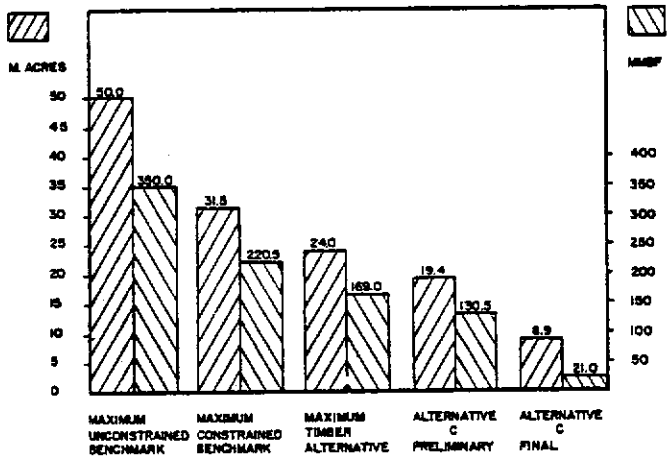

Figure 3.--Acres and volume of lodgepole pine timber management benchmarks and alternatives in Situation 1 habitat south of Yellowstone National Park.

Obviously, it was not possible or desirable to cover the entire management area within 15 years. The interdisciplinary team evaluated the minimum needs of other resources such as recreation, range, wildlife, and watershed and concluded that to maintain basic minimum levels of other resource use, the total area and volumes that could be realized during the first decade were 31,500 acres and 220.5 million board feet. This level of activity is designated as the maximum constrained timber benchmark (fig. 3).

Up to this point, the emphasis was on developing baseline data from which alternatives could be developed. These alternatives projected timber outputs ranging from 12,351 to 24,027 acres, and 83.2 to 169.0 million board feet. Alternative C, the preferred alternative, called for treatment of 19,370 acres with a projected volume of 130.5 million board feet (fig. 3).

During a subsequent period of "ground truthing" by ranger district personnel, it became evident that the projections for timber outputs were too high and that they could not be achieved if the needs of the grizzly bear were to be met. Several factors contributed to this perception:

1. The initial reductions for wildlife were based on general wildlife considerations and did not consider the special needs of the grizzly bear.

2. Although there was still a considerable amount of mature lodgepole cover within the area, quality of cover was poor because of limited dispersion.

3. There had been fairly extensive harvest of "dead only" areas, leaving stands of mature lodgepole that contained low volumes and provided limited cover.

4. The level of existing activity had not been carefully balanced against projected future activity and the needs of the bear.

To correct these deficiencies, district personnel stratified the management area by portraying grizzly habitat components and showing precisely where past timber activities had occurred and where future activities were projected.

In addition, the management area was further stratified into "bear subunits" (fig. 4). This stratification allowed planners to better

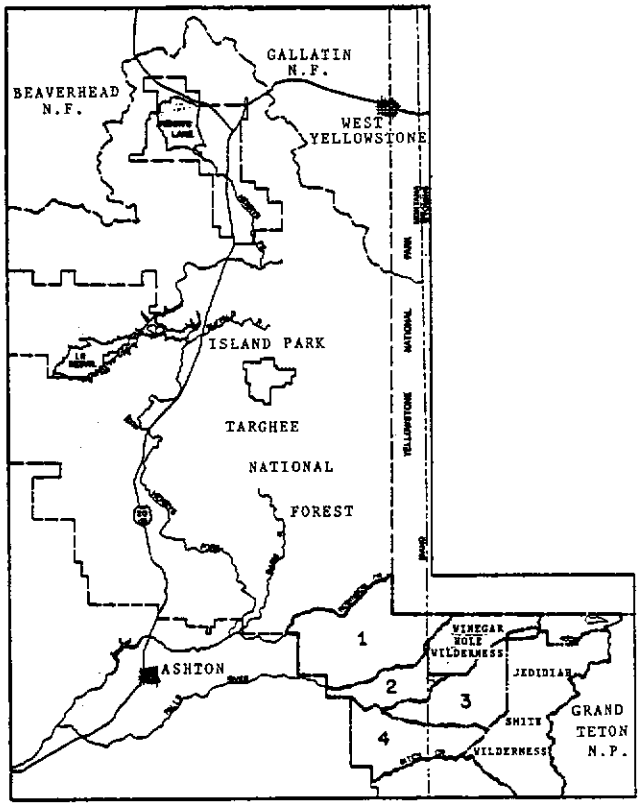

Figure 4.--Situation 1 habitat south of Yellowstone National Park, subdivided into four bear management subunits.

distribute activities and to designate areas where development would not occur until activities in other subunits were concluded.

Specific output levels and cultural practices for timber harvest as well as levels of cover that would be maintained were identified and carried forward as management direction in the Land Management Plan as follows:

1. Harvest timber and other products, reforest cutover areas, and accomplish timber stand improvement and silvicultural examination during the first decade as shown in table 1.

2. The following cultural practices apply to lodgepole pine stands:

Area	Maximum size clearcut	Minimum average width of leave strip
	Acres	Feet
Elk summer concentration areas	40	1/ 600
Elk calving areas	40	1/ 600
Elk/deer winter range	40	1/ 600
Situation 1 grizzly bear habitat	2/ 40	1/ 800

3. Concentrate all timber management activities within the shortest time period and smallest possible area.

4. Maintain security areas of at least 5,000 acres within subunits 1, 2, 3, and 4 for duration of high level of human activity.

5. Manage Situation 1 subunits to provide the following levels of cover:

Subunit	Acres	Conifer cover 3/ 1981	Conifer cover 3/ 1990	Aspen	Unproductive forest
1	32,400	60	66		
2	8,960	65	65		
3	18,080	74	74		
4	19,900	60	65		
Total	79,340	65	66	7	1

1Leave strips having a percentage of dead trees high enough to prevent their serving as cover may be harvested before adjacent clearcuts provide cover, if contiguous cutting units have been planted or naturally regenerated. Natural regeneration will be considered accomplished after the third year inspection reveals natural regeneration meets stocking level standards.

2Each sale area, and the individual stands within, will be evaluated for key grizzly habitat components for final unit size determination. Clearcut size may exceed 40 acres (up to 100) if cutting unit configuration is such that distance to cover does not exceed 300 ft over 80 percent of the unit.

3Does not include aspen or unproductive forest.

The result was that lodgepole pine harvest was reduced to 8,925 acres with a projected volume of 21.0 million board feet (fig. 3).

Although this level of timber harvest will treat considerably fewer acres of decadent lodgepole than necessary to properly manage timber stands from a purely timber silvicultural standpoint, this strategy is considered necessary to adequately provide for the needs of the grizzly bear.

LIVESTOCK GRAZING--1975 to 1985

Perhaps the oldest resource use occurring on the Targhee National Forest is domestic livestock grazing. Many of the permits for grazing allotments date to the time when the Forest was officially established. Livestock permittees on National Forest lands legally have a contract with the government. Grazing privileges are guaranteed to the livestock permittee as long as the permittee is willing to abide by the conditions of the permit. Permits cannot be cancelled unless violations of the permit requirements occur. In 1975, when the grizzly bear was officially classified as a threatened species, 11 sheep allotments and four cattle allotments were permitted and in use in the areas that were eventually to become Situation 1 grizzly bear habitat (table 2; fig. 5).

Sheep grazing generally occurs from the first part of July until the first part of September (approximately a 72 day grazing period). A sheepherder stays with the sheep full time while they are on the Forest.

Cattle grazing generally begins around the first part of July but continues longer into the fall, generally to the first part of October (approximately a 92 day grazing period). Cattle allotments are fenced into various pastures. Unlike sheepherders, cattlemen are generally not continually with their livestock. Occasional fence mending, herding, and movement of the cattle between pastures is required.

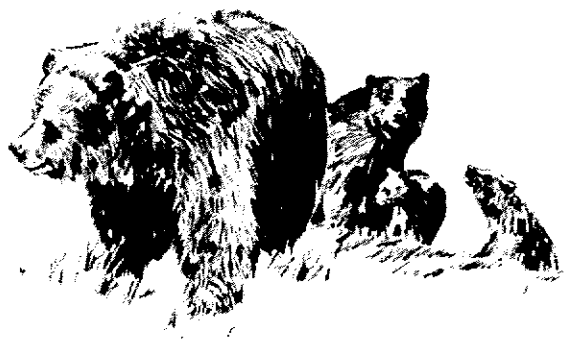

Table 1. Timber management outputs for the first decade (1981-90) in management area 12

Timber type	Acres planned for harvest	Estimated outputs MBF's 1	Acres to be reforested			Acres timber stand improvement
			Backlog	Current cutover (sawtimber)	Current cutover (firewood and other products)	
Douglas-fir	561	2,000	-	-	-	
Lodgepole	3,225	16,000	425	3,200	-	602
Firewood and other products	5,700	5,000	-	-	5,700	

[1]Includes approximately 4,550 acres and 10 million board feet (not a part of target) that may not be available depending on future application of grizzly bear guidelines to on-the-ground conditions.

Table 2. Summary of permitted livestock grazing in situation 1 grizzly bear habitat, 1975

	Allotment name	Type	Permitted grazing use	In Use
1.	Targhee Mountain	Sheep	1,200-ewe band	Yes
2.	East Targhee	Sheep	1,000-ewe band	Yes
3.	Dry Creek	Sheep	850-ewe band	Yes
4.	Jesse Creek	Sheep	850-ewe band	Yes
5.	Reas Pass	Sheep	1,000-ewe band	Yes
6.	Garner Canyon	Cattle	26 AUM's 1	Yes
7.	Twin Creek	Cattle	198 AUM's	Yes
8.	Rock Creek	Sheep	700-ewe band	Yes
9.	Fall River Ridge	Cattle	2,420 AUM's	Yes
10.	Squirrel Meadows	Cattle	4,699 AUM's	Yes
11.	Dog Creek	Sheep	1,000-ewe band	Yes
12.	Squirrel Meadows	Sheep	1,000-ewe band	Yes
13.	South Boone	Sheep	1,000-ewe band	Yes
14.	Grizzly Creek	Sheep	1,000-ewe band	Yes
15.	Middle Bitch Creek	Sheep	1,000-ewe band	Yes

Total: 11 sheep allotments in-use: 10,600 ewes
4 cattle allotments in-use: 7,343 AUM's

[1]Animal unit months.

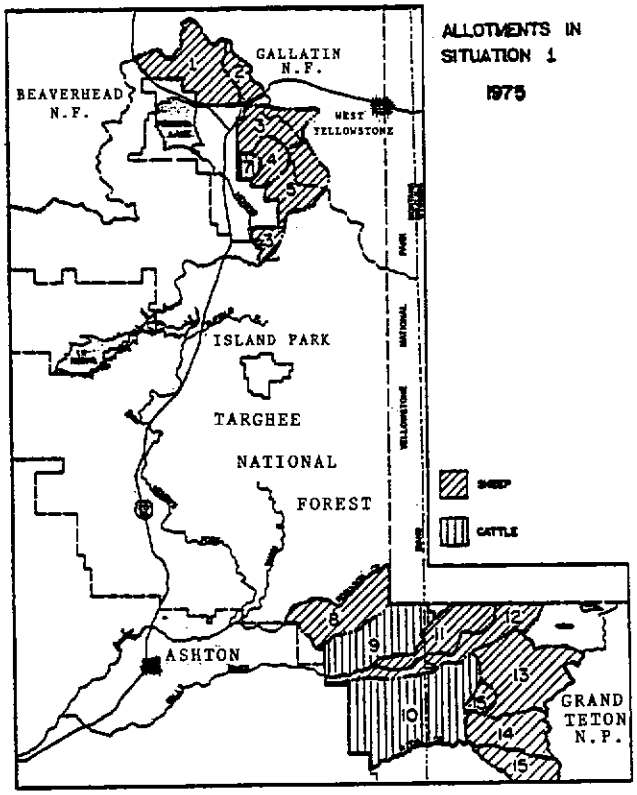

Figure 5.--Livestock allotments in use in Situation 1 habitat in 1975 (numbers refer to allotments listed in table 2; allotment number 6 is not shown).

Although some conflicts between grizzlies and cattle have occurred, the major problems have been between sheep and bears.

Table 3 shows the number of grizzly bears estimated to have been killed since 1960. To place the data in table 3 in proper perspective, two factors must be considered:

1. Until August 1975, when the grizzly was declared a threatened species, a grizzly bear preying on sheep was treated the same as any other predator. Thus kills before 1975 were legal.

2. Of the eight kills estimated to have occurred since 1975, only two were actually verified.

Table 3.--Targhee National Forest estimated grizzly bear mortality associated with Situation 1 allotments[1]

Years	Sheep Allotments	
	Two Top/Reas Pass	Squirrel Meadows/Boone
1960	2	
1965	1	
1966	1	
1967	1	
1968	1	
1969	2	
1970	5 (6)	2
1971	1	2
1972	2	1
1973	1	2
1974-75	2	1
1976-79		7
1980-84	0	0

[1]1960-1979 estimates by John Weaver based upon grizzly bear mortality report by Carole Jorgensen (1979); 1980-1984 compiled by authors.

In 1981, the Forest completed a biological evaluation of "Man--Grizzly Bear Conflicts Related to Sheep Grazing in Essential (Situation 1) Grizzly Bear Habitat." This document was the result of 5 years of research and subsequent alterations in the management and alignment of domestic sheep allotments. It was submitted to the Fish and Wildlife Service for formal consultation and received a no jeopardy opinion. Key provisions of the biological evaluation and resulting no jeopardy opinion are as follows:

1. The number of sheep allotments was reduced from 11 to seven. This reduction allowed the Forest and permittees to avoid historic high conflict areas; it also allowed more room to move sheep should a conflict or potential conflict occur.

2. Several allotment boundaries were changed to avoid areas of historic conflict.

3. Permittees would not use traps, snares, or poison to control black bear predation. Free-ranging black bears would not be taken except under State hunting regulations. Predator control for bears would only be done by Federal trappers.

4. Should a conflict occur or appear imminent between sheep and a grizzly bear, the sheep will be moved or, if necessary, removed from the allotment until the conflict is resolved.

5. The Forest Service would provide a full-time monitor during the sheep grazing season.

6. The permittees would cooperate in the monitoring program by reporting locations of sheep kills or other incidents related to grizzly bear conflicts.

7. Any action taken by the permittees or their agents that violated the Endangered Species Act would be grounds for canceling the permit.

8. Camps would be maintained as directed to reduce chances of attracting bears.

9. The allotment annual plan of use would designate areas to be grazed and their season of use.

In 1983, the Forest proposed and evaluated the conversion of one sheep allotment (Rock Creek) to a cattle allotment. The Forest Service consulted informally about the conversion with the Fish and Wildlife Service, which favored the proposal. The number of sheep allotments within Situation 1 habitat was subsequently further reduced to six.

The Draft Targhee Land Management Plan presently permits six domestic sheep allotments and five cattle allotments within Situation 1 habitat. This is in agreement with the previous formal consultations with the Fish and Wildlife Service.

In 1983, a radio collared female grizzly bear (known as No. 38) and her two yearling cubs found sheep grazing on the Two Top allotment. A detailed accounting of this incident has been prepared by the Forest Service (1983). When No. 38 and her two cubs began using private land and Situation 3 habitat, they were trapped and relocated into Yellowstone National Park.

Radio tracking in the fall by the Interagency Grizzly Bear Study Team indicated that they returned to their normal denning area. Using the best biological data possible, it was determined that the sow and cubs would probably return to the Two Top allotment. The Forest Service, therefore, directed the permittee to use a different allotment during the 1984 grazing season. The permittee voluntarily agreed to graze a different allotment again in 1985.

Economic conditions have not been favorable for many sheep ranchers in recent years; some have gone out of business, at least temporarily. As a result, two additional sheep allotments have been vacant in Situation 1 habitat. Table 4 and figure 6 summarize livestock grazing in Situation 1 habitat for 1984 and 1985. Compared to the level of grazing in 1975, the number of sheep allotments in use has declined by 73 percent and the number of sheep being grazed by 72 percent. The amount of cattle grazing has remained the same.

Depending primarily on the economics of sheep ranching the vacant allotments in Situation 1 habitat may be permanently closed, or suitable portions may be considered for conversion to cattle allotments. Direction in the Forest Plan specifies that permits for grazing sheep in Situation 1 grizzly bear habitat that are waived back to the government will not be reissued.

Full-time monitoring is occurring on all sheep allotments still in use within Situation 1 habitat.

At the present time, grizzly bears on the Targhee National Forest have fewer opportunities for conflicts with sheep than at any time since the Forest officially came into being.

Drafts of the Targhee's final plan and final environmental impact statement were submitted to the Fish and Wildlife Service for formal consultation. It was the opinion of the Fish and Wildlife Service that "implementation of the Proposed Targhee National Forest Plan ... is not likely to jeopardize the continued existence of the ... grizzly bear."

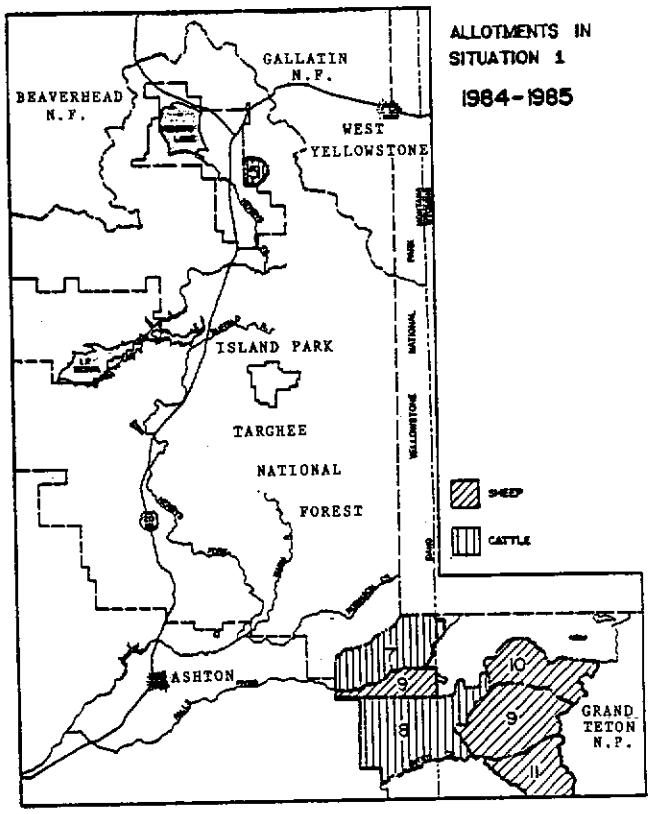

Figure 6.--Livestock allotments in use in Situation 1 habitat in 1984 and 1985 (numbers refer to allotments listed in table 4; allotment number 4 is not shown).

Table 4.--Summary of permitted livestock grazing in Situation 1 grizzly bear habitat, 1984 and 1985

	Allotment name	Type	Permitted grazing use	In use
1.	Targhee Mountain	Sheep	1,200-ewe band	No
2.	East Targhee	Sheep	1,000-ewe band	No
3.	Two Top	Sheep	1,200-ewe band	No
4.	Garner Canyon	Cattle	26 AUM's [1]	Yes
5.	Twin Creek	Cattle	198 AUM's	Yes
6.	Rock Creek	Cattle		No
7.	Fall River Ridge	Cattle	2,420 AUM's	Yes
8.	Squirrel Meadows	Cattle	4,699 AUM's	Yes
9.	Squirrel Meadows	Sheep	1,000-ewe band	Yes
10.	South Boone	Sheep	1,000-ewe band	Yes
11.	Middle Bitch	Sheep	1,000-ewe band	Yes

Total: 3 sheep allotments in-use: 3,000 ewes
4 cattle allotments in-use: 7,343 AUM's

[1] Animal unit months.

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