

Wyoming Grizzly Bear Occupancy Management Guidelines

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1. Introduction/Background

Following completion of the final Wyoming Grizzly Bear Management Plan (Plan; Moody et al. 2002), the Wyoming Game and Fish Department (WGFD) agreed to further refine grizzly bear occupancy guidelines within the Plan. This commitment was the result of concerns expressed by some segments of the public, including at least one county commission, that management direction for grizzly bears in all the areas within the outer boundary described in the Plan needed to be more specific. These publics felt social tolerance for bear occupancy is low for the significant amounts of private property, as well as some of the other habitats, that occur within the outer boundary described in the Plan.

The Trophy Game Section compiled appropriate indicators of suitable grizzly bear habitat, including secure habitats, potential denning areas, current distribution, available grizzly bear food resources (whitebark pine), and potential core and corridor areas. Areas mapped in northwest Wyoming supporting these five indicators are considered to be biologically suitable habitat capable of supporting grizzly bears. Human uses, including livestock grazing, timber harvest, oil and gas development, areas of high road densities and recreational activities/developed sites create potential increases for human/grizzly bear conflicts increasing potential for bear mortalities. Areas supporting these human uses are considered socially unacceptable for grizzly bear occupancy. These areas were mapped and compared to the biologically suitable habitat base to determine those areas in northwest Wyoming most suited for grizzly occupancy.

The strategy recommended in this document for managing occupancy goals applies to northwest Wyoming outside Yellowstone National Park, Grand Teton National Park, and the Wind River Reservation. This proposal only refines management direction for the occupancy section of the Wyoming Grizzly Bear Management Plan. All of the remaining guidelines and criteria in the Wyoming Grizzly Bear Management Plan that address population and human-bear conflict management will remain the same. **It should also be noted that implementation of these guidelines will not occur until after grizzly bear delisting.**

The basis of this proposal is to identify those areas within the state's Grizzly Bear Data Analysis Unit (GBDAU) (Fig. 1) where the Department will manage for grizzly bear occupancy. The outer boundary of the GBDAU in this proposal is identical to the area identified for potential grizzly bear occupancy in the Wyoming Grizzly Bear Management Plan (Page 15, Fig. 12). It also identifies where grizzly bear dispersal and occupancy will be discouraged through a combination of regulated sport hunting and agency conflict resolution actions, including bear removals and relocations. The overall goal is to minimize human/grizzly bear conflicts throughout the GBDAU in combination with public outreach and continued education. Population estimation and mortality criteria that are delineated in the Conservation Strategy (CS) will be applied to the entire GBDAU. All females with cubs-of-the-year will be used to estimate population size and all human caused grizzly bear mortalities within the entire GBDAU will be applied to the allowable mortality threshold as per the CS. If a Federal Rule is developed that utilizes new techniques to estimate population size and/or set allowable mortality thresholds, they will be implemented by the Department.

Extensive efforts will be made to minimize and prevent human/bear conflicts. Increased grizzly occupancy within the GBDAU will only occur by natural dispersal. No bears will be relocated to facilitate occupancy expansion. When delisting occurs the overall population goal in Wyoming will have been met.. With delisting, the Inter Agency Grizzly Bear Study Team (IGBST), using the best available science, will reevaluate mortality thresholds and modify if needed to stabilize grizzly bear numbers in Wyoming. Consultation with members of the Yellowstone Grizzly Bear Coordinating Committee (YGCC) will continue to assure that the mortality threshold for the entire grizzly bear population within the Greater Yellowstone Area (GYA) is not exceeded.

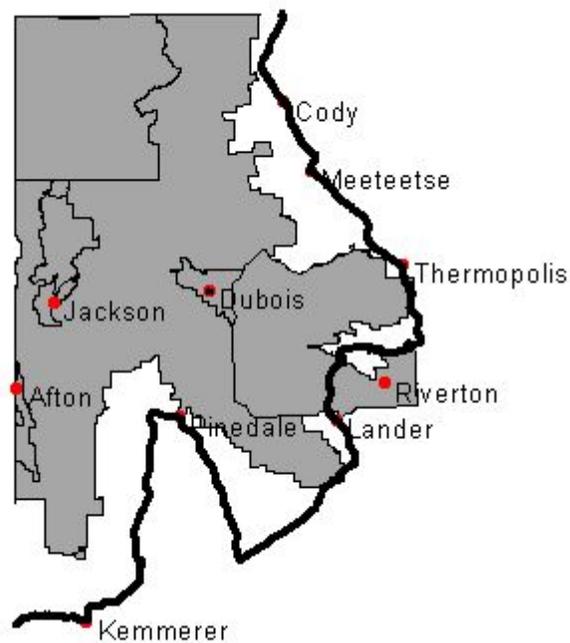


Figure 1. Grizzly Bear Data Analysis Unit (GBDAU) within Wyoming reported in the Wyoming Grizzly Bear Management Plan (Moody et al. 2002).

Once adopted by the Wyoming Game and Fish Commission, these grizzly bear occupancy management guidelines will be appended to the Wyoming Grizzly Bear Management Plan and the CS. The Department recognizes that this proposal is based on existing human uses that are present on public and private lands. Management guidelines may need to be modified in the future to address potential changes in biologically and socially acceptable habitats.

2. Goals of the Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area

- Manage the Yellowstone grizzly bear population in the entire GYA at or above 500 bears (CS, Page 26). This population threshold represents the lowest population level that must be maintained. In order to sustain this number of bears, numbers will have to be managed at a level above 500 to assure that the population never falls below 500. If the population is allowed to decrease below 500, relisting may occur.
- Maintain 16 of 18 Bear Management Units (BMU) within the Primary Conservation Area (PCA) occupied by females with young at least one year out of six, with no two adjacent BMUs unoccupied over any six year period (CS, Page 26).
- The running six-year average for total known and probable human caused mortality, as confirmed by the Interagency Grizzly Bear Study Team (IGBST), is not to exceed 4% of the total estimated population. Additionally, the six-year average for total known and probable human caused mortality for females is not to exceed 30% of the 4% mortality limit over the most recent six-year period. Once population and distribution goals have been met, the mortality standards will be reviewed and revised as necessary using the best information and science to maintain these population goals (CS, Page 26).
- Maintain seasonal habitats (secure areas), active grazing allotments, and developed sites at 1998 levels in the PCA. Phase out domestic sheep allotments where vacated on a voluntary basis within the PCA (CS, Page 39).
- Within the PCA, bears displaying food conditioning and/or habituation or depredating on livestock lawfully present on public lands may be either relocated or removed. However, no bear will be removed for any offense, other than unnatural aggression, without at least one relocation, unless representatives of affected agencies document the reason in writing. In addition, before any removal, except in cases of human safety, management authorities will consult by phone or in person to judge the adequacy of the reason for removal (CS, Page 58). Outside the PCA, management of conflicts will be governed by the nuisance management guidelines in the CS and Wyoming Grizzly Bear Management Plan (Moody et al. 2002).

3. Summary of Public Review Process for Grizzly Bears

A significant amount of public input has been obtained about grizzly bears and grizzly bear management in the last four years. The public has had the opportunity to comment on the Draft Conservation Strategy, the Draft Wyoming Grizzly Bear Management Plan, the Draft Forest Plan Amendments for Grizzly Bear Habitat Conservation for the GYA National Forests, and the Draft Grizzly Bear Occupancy Management Proposal Following Delisting as a Threatened Species.

Additionally, the Department conducted a phone survey of Wyoming residents in 2001 during the development of the Wyoming Grizzly Bear Management Plan. As would be expected, public attitudes towards grizzly bears vary widely regardless of where people reside. All of the above documents can be obtained through the appropriate agency.

4. Occupancy Management Analysis Process

The purpose of this proposal is to identify biologically and socially acceptable habitats, outside the PCA. Management direction within the PCA is clearly delineated in the CS. Phase one of this process identifies those portions of the GYA in Wyoming that could potentially support grizzly bears based strictly on their biological requirements. These areas delineate portions of the GYA considered biologically suitable grizzly bear habitat. The second phase identifies the type and location of human use factors that are associated with increased human/grizzly conflicts and bear mortalities. Areas supporting these human use factors essentially identify those portions of biologically suitable habitat that are socially unacceptable for grizzly bear occupancy. The remaining biologically suitable grizzly bear habitat, posing little opportunity for human/bear conflicts and potential grizzly bear mortality, represents a contiguous region of suitable habitat that is or may be occupied in the foreseeable future by grizzly bears via natural dispersal. The Wyoming Grizzly Bear Management Plan specifies that the Department will not relocate grizzly bears to areas where they do not occur to facilitate expansion of the population.

This analysis evaluates the potential for specific geographic regions to support grizzly bears based primarily on habitat suitability and the potential for human/bear conflicts and grizzly bear mortalities. Based on public opinion, as expressed in the various public review processes that have been completed over the last five years, there is no clear consensus concerning what biologically suitable habitats are socially acceptable for grizzly bear occupancy. This analysis is strictly science based to reduce the potential pitfalls of relying primarily on public opinion polls or input when developing various management plans.

Methods

Five factors were considered to identify biologically suitable grizzly bear habitat within the GYA: (1) areas of secure grizzly bear habitat, based on criteria defined in the CS; (2) potential denning habitat; (3) occurrence of whitebark pine stands; (4) current distribution of grizzly bears; and (5) suitable core and corridor habitat analyses.

Secure habitat is essentially an index of road density, where areas >500 meters from a motorized access route or recurring helicopter flight path and ≥ 10 acres in size are defined as secure grizzly bear habitat (IGBC 1998). A portion of the northern half of the GYA and most of the Wind River Range, excluding the southern end, contain large, contiguous blocks of secure grizzly bear habitat, primarily due to National Parks and wilderness areas (Fig. 2). Roaded areas become more prominent through much of the Wyoming Range and the northern portion of the Wind River Range (i.e., the Union Pass and upper Green River areas). Adequate grizzly bear denning habitat occurs throughout most of the GYA, with the exception of upper elevations of the Wind River Range where rocky terrain may inhibit denning activity (Fig. 3; Podruzny et al. 2002).

Whitebark pine nuts are an important food source for grizzly bears (Mattson et al. 1991), and annual forage production is inversely related to levels of human-bear conflict activity (Gunther et al. 2004). Whitebark pine has a scattered distribution throughout most of the GYA and appears infrequent south of Jackson, but current analysis is incomplete for the Wyoming and Salt River Ranges where whitebark pine is known to occur more frequently than currently mapped (USGS, Fig. 4). As of 2000, grizzlies in Wyoming occupied much of the region north of Jackson, east to the Upper Green River Lakes, north towards Dubois, and west of Meeteetse and Cody. Dispersal has occurred southward into the northwest end of the Wind River Range and to the east into the Owl Creek Mountains and the northern portion of the Wind River Reservation (Fig. 5; Schwartz et al. 2002). Walker and Craighead (1997; American Wildlands Corridors of Life Project) delineated core and corridor habitat for 3 umbrella species (elk, cougar, and grizzly bear), which suggested that much of the GYA in Wyoming contained suitable core habitat, with regions north of Jackson, the upper Green River, and peripheral areas exhibiting varying levels of corridor habitat (Fig. 6). Merrill and Mattson (2003) evaluated grizzly bear habitat conditions relative to the remoteness from human activity (similar to WGFD approach) and developed a map of “biophysically suitable” grizzly bear habitat in the GYA (Fig. 7). These sources of information provide insight into areas that contain biologically suitable habitat that could sustain a grizzly bear population in the foreseeable future, but with no constraints on distribution due to socially unacceptable parameters.

Generally speaking, grizzly bear survival is positively related to remoteness from human activity (Merrill and Mattson 2003). This is largely due to human conflicts resulting in grizzlies being lethally removed from the population. Thus, the development of occupancy goals in Wyoming should not only consider habitat attributes necessary to sustain grizzlies, but must also include consideration of human activity where conflicts are likely to be high, increasing the potential for grizzly bear mortality.

Human/grizzly bear conflicts are defined as grizzly activity resulting in human injury, property damage, human food or garbage consumption, or livestock depredation (Fig. 8). While grizzly depredation on cattle is not uncommon and significant losses can occur, relatively few bears become habitual predators of cattle. Selective removal of offending individuals has been shown to be successful in resolving these conflicts (Anderson et al. 2002). Sheep allotments, however, pose a greater management challenge, due to the propensity for bears to kill sheep, often in large numbers, sometimes requiring lethal removal of the bear to resolve the problem (Mattson 1998, Boyce et al. 2001). Grizzly bear occupancy relative to sheep allotments must be considered. Within the GYA, there are livestock allotments throughout much of the National Forest System lands excluding some wilderness areas (Fig. 9). Most active sheep allotments currently occur in the Wyoming Range and the southern portion of the Wind River Range.

In addition to livestock allotments (Fig. 9) and roaded areas (Fig. 10), other types of human activity that may result in conflicts and/or habitat loss include oil and gas development and timber harvest. These activities increase open road densities and chances for increased contact between grizzly bears and people resulting in conflicts and potentially bear mortality. Most public-land oil and gas leases in the GYA are in the Wyoming Range, with isolated activity occurring north of Dubois and west of Meeteetse (Fig. 11). Areas designated as suitable for timber harvest by the U.S. Forest Service include much of the Wyoming Range, the upper Green

River area, and the southern end of the Wind River Range (Fig. 12). The geographic locations of these human activities were overlain on the biologically suitable habitat base to delineate those biologically suitable areas that are socially unacceptable for grizzly occupancy.

Results

Based on this analysis, it appears the biologically suitable and socially acceptable habitats in the Wyoming portion of the GYA, occur north of the Snake River Canyon and Hoback River, which includes a contiguous region bounding the Absaroka Range and that portion of the Wind River Range north of Boulder Creek. The results of the Department's analysis are comparable to similar analyses completed by American Wildlands (Fig. 6) and Merrill and Matson (Fig. 7).

The majority of the Wyoming and Salt River Ranges are not suited for grizzly bear occupancy due to a combination of several factors including the presence of numerous active sheep allotments (Fig. 9), high road densities (Fig. 10), high levels of potential oil and gas development (Fig. 11), potential for future timber harvest (Fig. 12), and the high number of recreational sites traditionally used by the public. The portion of the Wind River Range south of Boulder Creek is not considered suitable for grizzly bear occupancy due to a combination of several factors including the presence of active sheep allotments (Fig. 9), high densities of roads (Fig. 10), and high numbers of recreational sites traditionally used by the public. Additionally, all private lands and most of the lands managed by the Bureau of Land Management (BLM) outside the National Forests have high potential for human/grizzly bear conflicts and a source of grizzly bear mortality making them unsuitable for sustaining grizzly bears.

Based on current road densities, presence of domestic sheep and current levels of conflict with livestock, the upper Green River area on Forest could also be considered unsuitable for grizzly bear occupancy. However, important biological issues make the Upper Green River area very important in ensuring CS population and distribution objectives will be met long-term. The Upper Green River area is presently occupied by grizzly bears and is important contiguous habitat that links the bear population between the Gros Ventre/Upper Hoback area, Upper Wind River Range, and core bear habitat north of this area. Recognizing the significance of this area for bear movements is important, but this does not preclude managing for low bear densities, if needed, in this portion of the DAU, to minimize conflicts.

Distribution data of independent females with cubs-of-the-year relative to current, overall grizzly population estimates indicate that the current distribution identified in Figure 5 needs to be maintained to assure the minimum population threshold in the CS is maintained. The combination of the proposed geographic area and management strategies outlined in this plan should provide a sufficient amount of habitat in Wyoming to adequately support Wyoming's share of the tri-state Yellowstone population. Additionally, it also provides grizzly bear habitat that can compensate for potential reduction or loss of specific important food sources within the PCA.

Bears do not recognize jurisdictional boundaries. Some grizzly bears will move into areas considered socially unsuitable for grizzly bear occupancy. The Department cannot realistically implement a management program that is designed to immediately remove every grizzly bear

that moves outside of suitable habitat. Unless conflicts occur, the presence of these bears may go undetected for some time. If a bear is involved in a conflict, the Department will remove the offending individual.

5. Occupancy Management Strategy

Consultation with the USFWS has determined the existing outer boundary of the GBDAU must remain intact as it was identified in the 2002 Wyoming Grizzly Bear Management Plan and adopted by the USFWS as part of the CS. This does not mean that all of the area within the GBDAU must be occupied by grizzly bears. There are large blocks of public and private land outside of the PCA that are not suitable for grizzly bear occupancy. Grizzly bear dispersal and occupancy will be discouraged in these areas. There are other areas outside of the PCA where the potential for human-bear conflicts will require that grizzly bears be managed for low numbers depending on localized situations.

The outer boundary of the GBDAU in Wyoming encompasses most of the area within the Wyoming portion of the Greater Yellowstone Ecosystem. Specifically, it includes an area with an outer boundary beginning at the intersection of Wyoming Highway 120 and the Montana border; southerly along said highway through Cody and Meeteetse to U.S. Highway 20 in Thermopolis; southerly along said highway to Wyoming Highway 789 in Shoshoni; southwestly along said highway to Wyoming Highway 134; westerly along said highway to Wyoming Highway 132; southerly along said highway to U.S. Highway 287; southeasterly along said highway to Wyoming Highway 28 approximately eight miles south of Lander; southerly along said highway to U.S. Highway 191 in Farson; northerly along said highway through Pinedale to U.S. Highway 189; southerly along said highway to U.S. Highway 30 in Kemmerer; west along said highway to the Utah border (Figure 13).

The Department will not allow grizzly bears to reoccupy areas outside the GBDAU, including mountain ranges such as the Bighorns, Sierra Madres, Snowy Range, Laramie Range, and the Black Hills. These mountain ranges are relatively small compared to the Greater Yellowstone Ecosystem, and, as such, do not provide suitable habitats in sufficient quantities to permit grizzly bears to re-establish without unacceptable levels of conflict. All are spatially separated from the Greater Yellowstone Ecosystem by large expanses of high desert habitats that are not conducive to grizzly bear occupancy, and all present an extraordinarily high potential for conflicts. Grizzly bears that occur outside the GBDAU will be dealt with on an individual basis, utilizing the Department's full array of management practices. Any grizzly bears removed from this area outside the GBDAU, as identified in the Conservation Strategy, will not count against the mortality threshold.

Three management approaches will be employed within the GBDAU, one for the PCA, another for suitable grizzly bear habitat outside the PCA and another approach for those areas outside the PCA unsuitable for grizzly bear occupancy. Collectively these three management approaches will be implemented to maintain a recovered grizzly bear population in Wyoming's portion of the GYA while minimizing human/grizzly bear conflicts through outreach and education, managing bear numbers through regulated grizzly bear hunts, and management of conflict bears.

In all situations when human/bear conflicts are resolved through bear relocation, the bear will be moved to or within 10 miles of the PCA.

Management strategies within the PCA will be designed to retain the number of grizzly bears the habitat will support. This does not equate to a hands off policy. Public take will be allowed outside of National Parks but generally at low levels compared to areas outside the PCA. Any such take would be within the management criteria outlined in the CS. Within the PCA, human-bear conflict management will be consistent with the guidelines established in the CS where males are managed on a case-by-case basis and females are afforded a higher level of protection. Human-bear conflict management outside the PCA will adhere to the criteria in the Wyoming Grizzly Bear Management Plan.

Grizzly bear occupancy will occur outside of the PCA, on most of the Forest Service and Park Service lands, north of the Snake River Canyon and Hoback River, which includes a contiguous region of public land bounding the Absaroka Range and that portion of the Wind River Range north of Boulder Creek. A combination of increased agency management actions including public education and outreach regarding ways that people can secure attractants and thereby minimize conflict potential, hunting, and/or bear removals due to conflicts with humans, will be utilized to address specific areas where grizzly/human conflicts occur. The Department is not proposing that all of this geographic area be managed for high bear numbers. Greater management flexibility will occur in this portion of the GBDAU as compared to areas within the PCA including increased hunting opportunity. In this area, grizzly bears will not be given a higher level of priority compared to other species or land uses. Efforts will be made to minimize bear/human conflicts through prevention and if human-bear conflicts occur, they will be addressed on a case-by-case basis. Mortality management in this area will account for the potential effects on that segment of the population whose home ranges overlap the PCA boundary.

The remainder of the GBDAU, primarily south of the Snake River Canyon and Hoback River, the portion of the Wind River Range south of Boulder Creek and all private and BLM lands adjacent to the National Forests with high potential for human/grizzly bear conflicts, will be managed to discourage grizzly bears from dispersing to, and occupying these areas due to the potential for human/bear conflicts and bear mortalities. In these areas, human caused mortality will consist primarily of hunter harvest and case-by-case conflict resolution as described in the Wyoming Grizzly Bear Management Plan (Moody et al. 2002). However, the Department acknowledges that total exclusion of grizzly bears in this area is probably not possible, as portions of this area provide biologically suitable habitat for bears and it is contiguous with occupied habitat.

Upon delisting, when the CS and associated state management plans are implemented, management objectives will be established to support the ecosystem wide population and distribution goals detailed in the CS, Wyoming Grizzly Bear Management Plan, and this document. Data collection and analysis to assess population trends and to estimate population size will be conducted annually as specified in the CS. Females with cubs-of-the-year at side will be used as an index of population size. Mortality thresholds will be managed as per the adaptive management approach stated in the Conservation Strategy.

When delisting occurs the overall population goal in Wyoming will have been met. With delisting, mortality thresholds will be adopted to allow Wyoming to stabilize their segment of the population, and management strategies will be adopted to achieve desired distribution within those areas considered suitable for grizzly bear occupancy. Mortality management and methods to allocate or direct mortality to areas where management objectives have been met will be coordinated with the other YGCC agencies and will be based on the best available science to ensure adherence to the CS population management objectives. . All forms of mortality will be monitored within the GBDAU as per the Conservation Strategy. While the allowable human caused mortality threshold for the Wyoming segment of this population will be determined through a coordinated management system, Wyoming will have the latitude to determine where to apply the mortality. The Department will have the ability to direct human caused mortality to the areas it deems appropriate. The only constraint will be that the Department cannot exceed the overall human caused mortality threshold for the state. Consultation with appropriate state and federal agencies will continue to assure that management objectives for Montana, Idaho and the National Parks are not compromised.

Annual mortality quotas for public hunting will be set to assure that the Wyoming portion of the total allowable human caused mortality threshold is not exceeded. All proposed hunting seasons and quotas will be established in a Commission approved grizzly bear hunting regulation through the normal hunting season development and public review process. Females with dependent young at side (cubs-of-the-year, yearlings, spring two year olds) will be protected from hunter harvest. To minimize management removals of bears, public outreach and education efforts to prevent and/or reduce bear human conflicts will continue in all areas within the GBDAU where grizzly bears occur.

6. Public Outreach, Reservation Coordination, and Habitat Management

The Department recognizes that adequate management of conflicts needs to address more than simply relocating or removing offending individuals. We will continue to emphasize public outreach, education, and assistance in conjunction with federal land use agencies in an effort to prevent and minimize human-bear conflicts in all portions of the ecosystem where grizzly bears exist. The CS and Wyoming Grizzly Bear Management Plan outline specific programs that will be used to achieve this objective to prevent and minimize bear-human conflicts.

This proposal does not address potential expansion and management within the boundaries of the Wind River Reservation (WRR). The Department has no management authority over wildlife on tribal lands within the WRR, but does maintain management authority for non-Indian private in holdings. Portions of the WRR are presently occupied by grizzly bears and the potential for expansion exists on the WRR. The Department, along with the Yellowstone Grizzly Coordinating Committee, will continue efforts to work with the Shoshone and Arapaho Tribes and include the WRR in the coordinated management program with compatible protocols for data collection and management so that mortality management, outreach, and human-bear conflict protocols will exist within the WRR and management of the Reservation grizzly bears is fully coordinated with the other agencies under the YGCC.

Habitat management is the responsibility of the federal land management agencies, primarily the U. S. Forest Service and the Bureau of Land Management. Habitat within the PCA will be managed according to the criteria established in the CS and the Forest Plans. Habitats outside the PCA will be managed according to amended Forest Service Plans. Existing guidelines in appropriate land management plans will continue. The Department’s Grizzly Bear Management Plan addresses those habitat components that are relevant to grizzly bears outside the PCA (Moody et al. 2002:19).

Fig. 2. Secure grizzly bear habitat within the Greater Yellowstone Area, Wyoming. Secure habitat is essentially an index of road density where areas >10 acres and >500m from active roads and recurring helicopter flight paths are defined as secure.

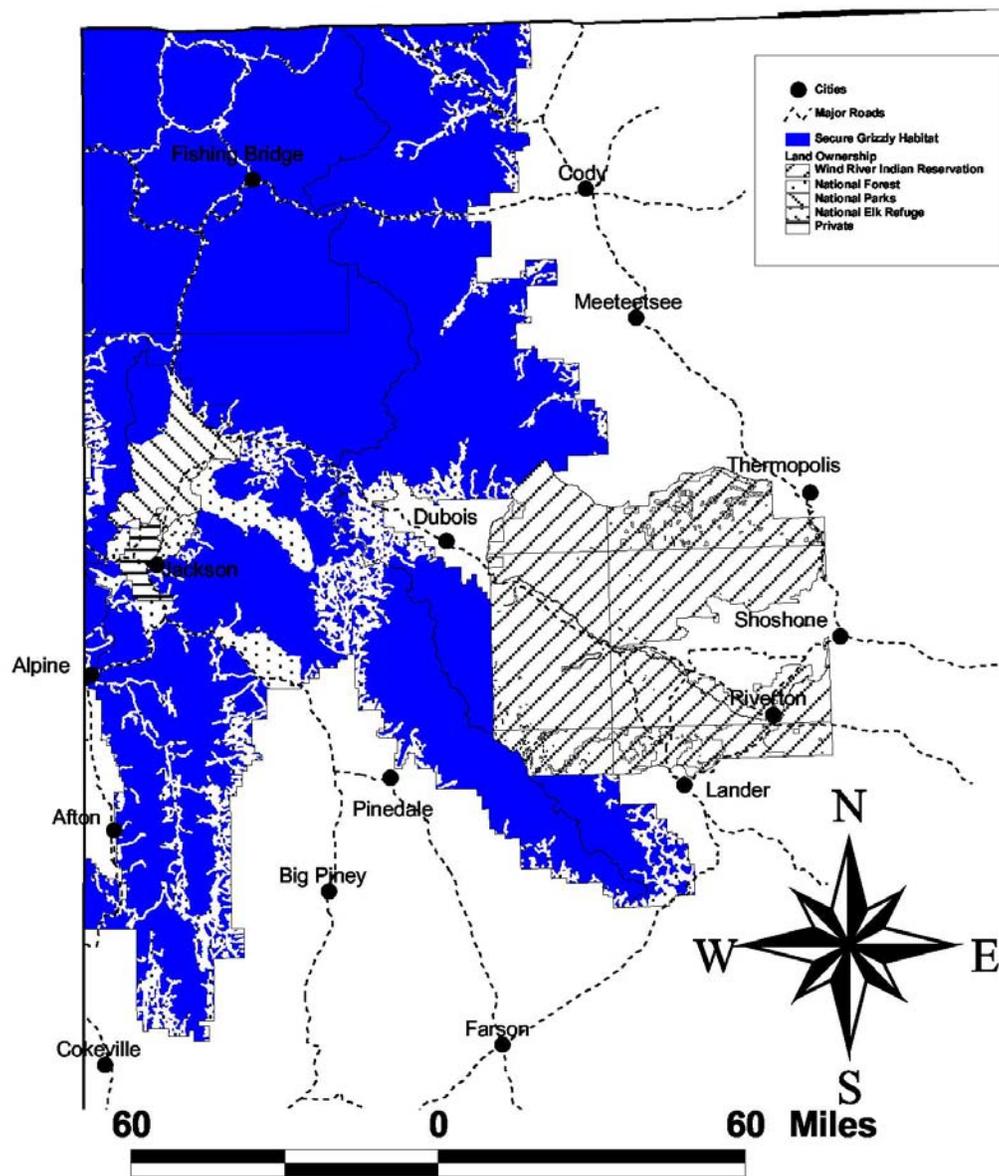


Fig. 3. Potential grizzly bear denning habitat in the Greater Yellowstone Area, Wyoming (Podruzny et al. 2002).

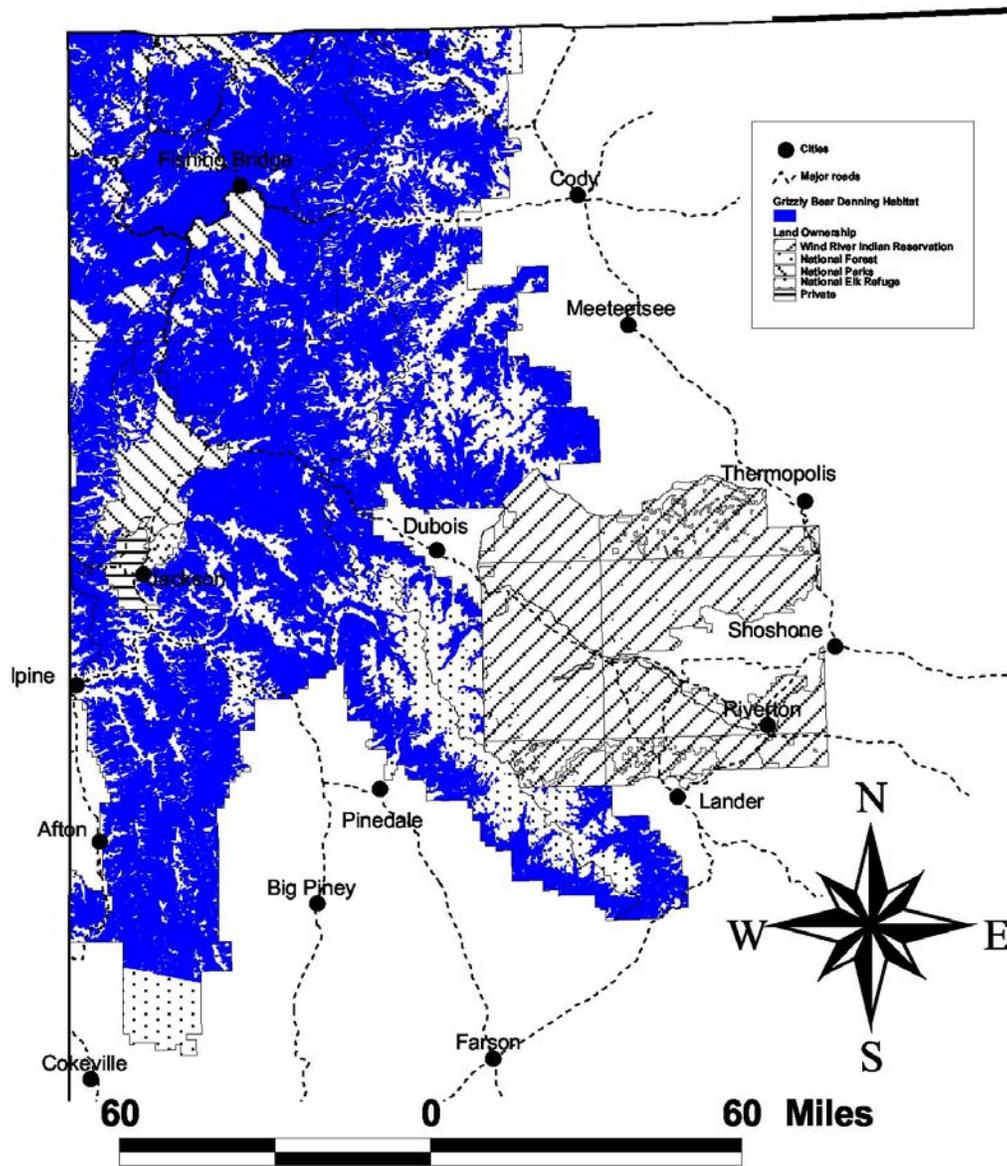


Fig. 4. Estimated distribution of whitebark pine stands in the Greater Yellowstone Area of Wyoming (regions in purple; USGS Northern Rocky Mtn. Science Center). Analyses are incomplete through most of the Wyoming and Salt Ranges.

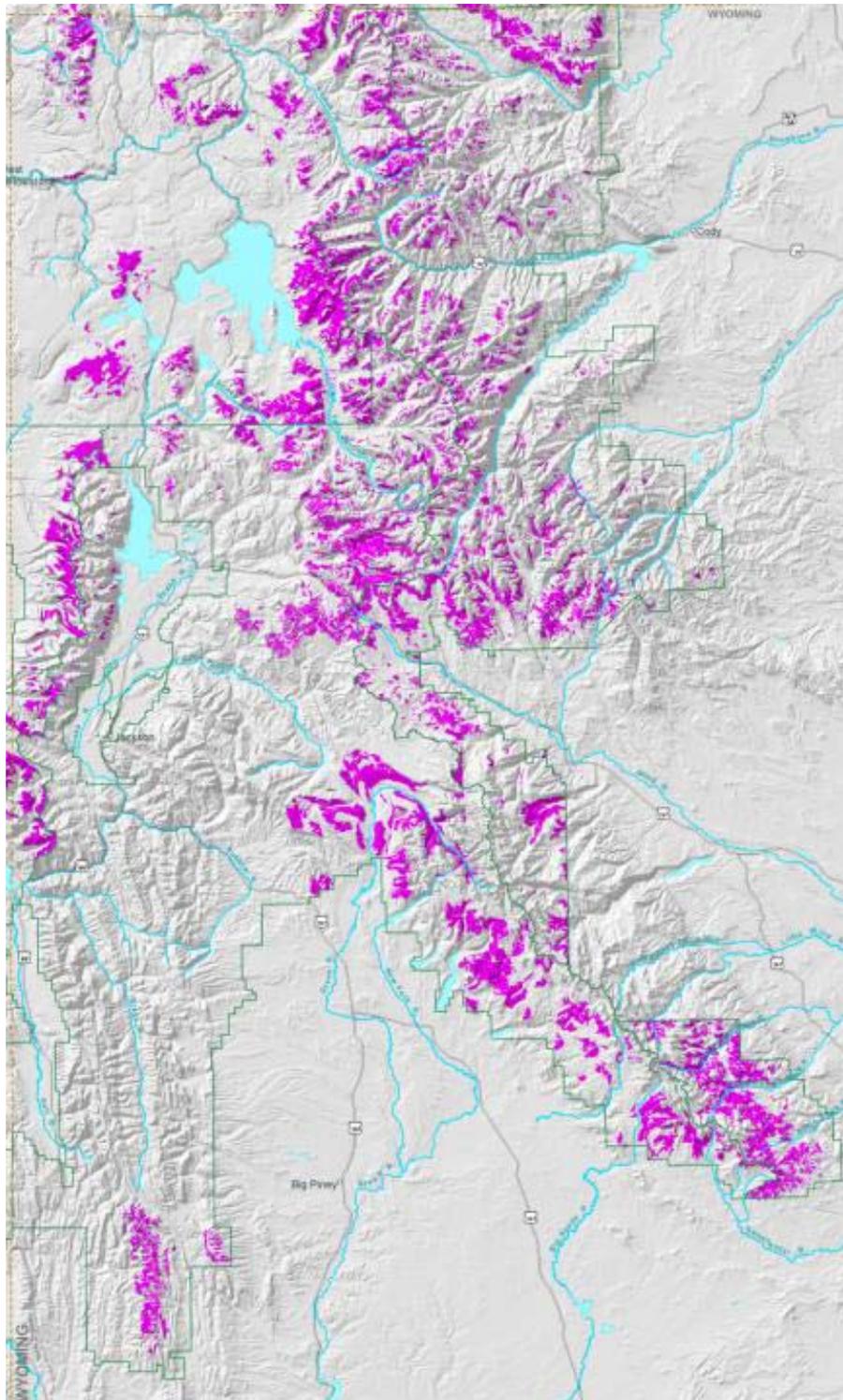


Fig. 5. Occupied grizzly bear habitat in the Greater Yellowstone area of Wyoming through 2000 (Schwartz et al. 2002).

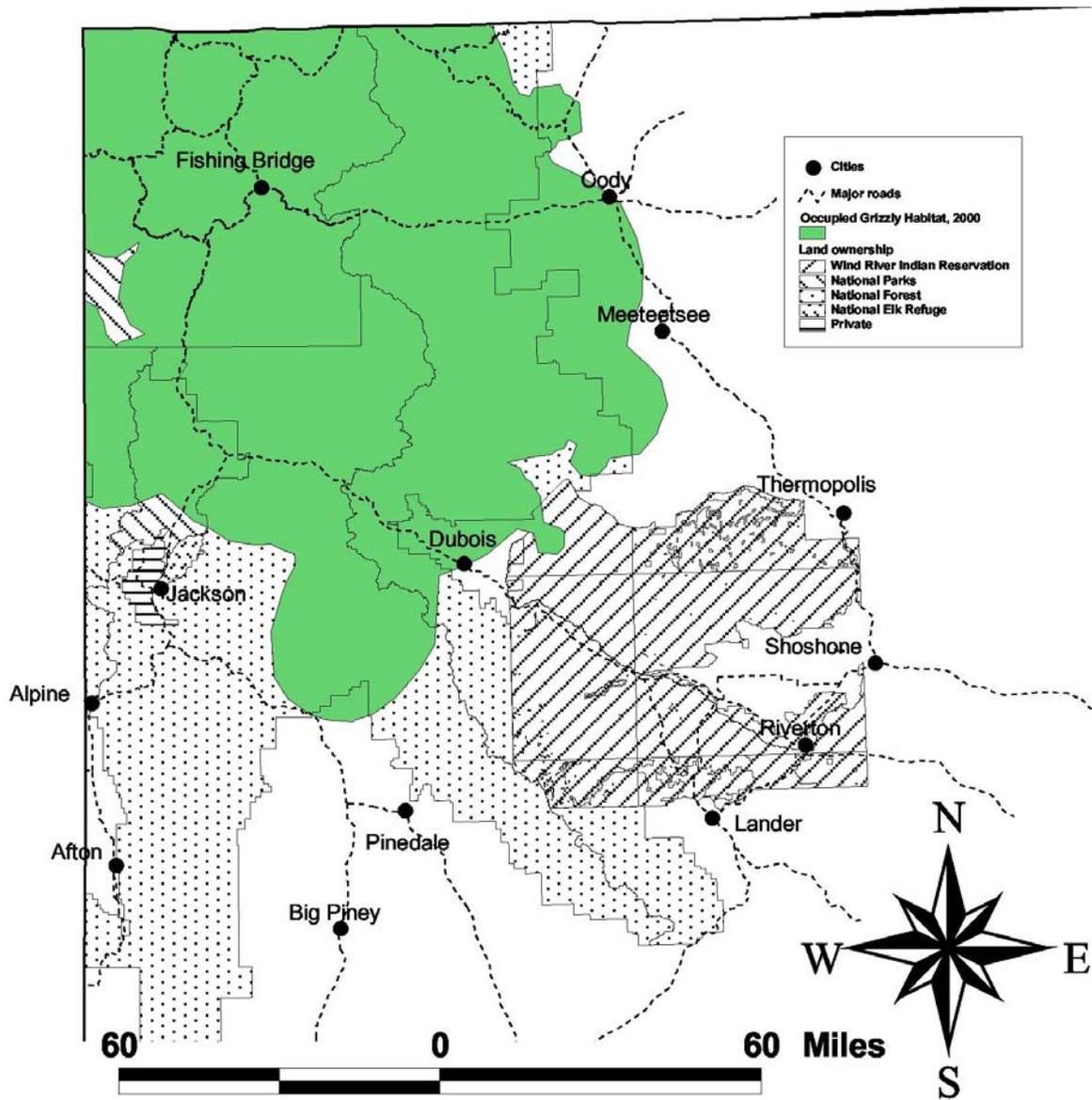


Fig. 6. Habitat suitability map for Greater Yellowstone Area of Wyoming illustrating core habitat with high, medium, and low quality corridor habitat (Walker and Graighead 1997; American Wildlands Corridors of Life Project).

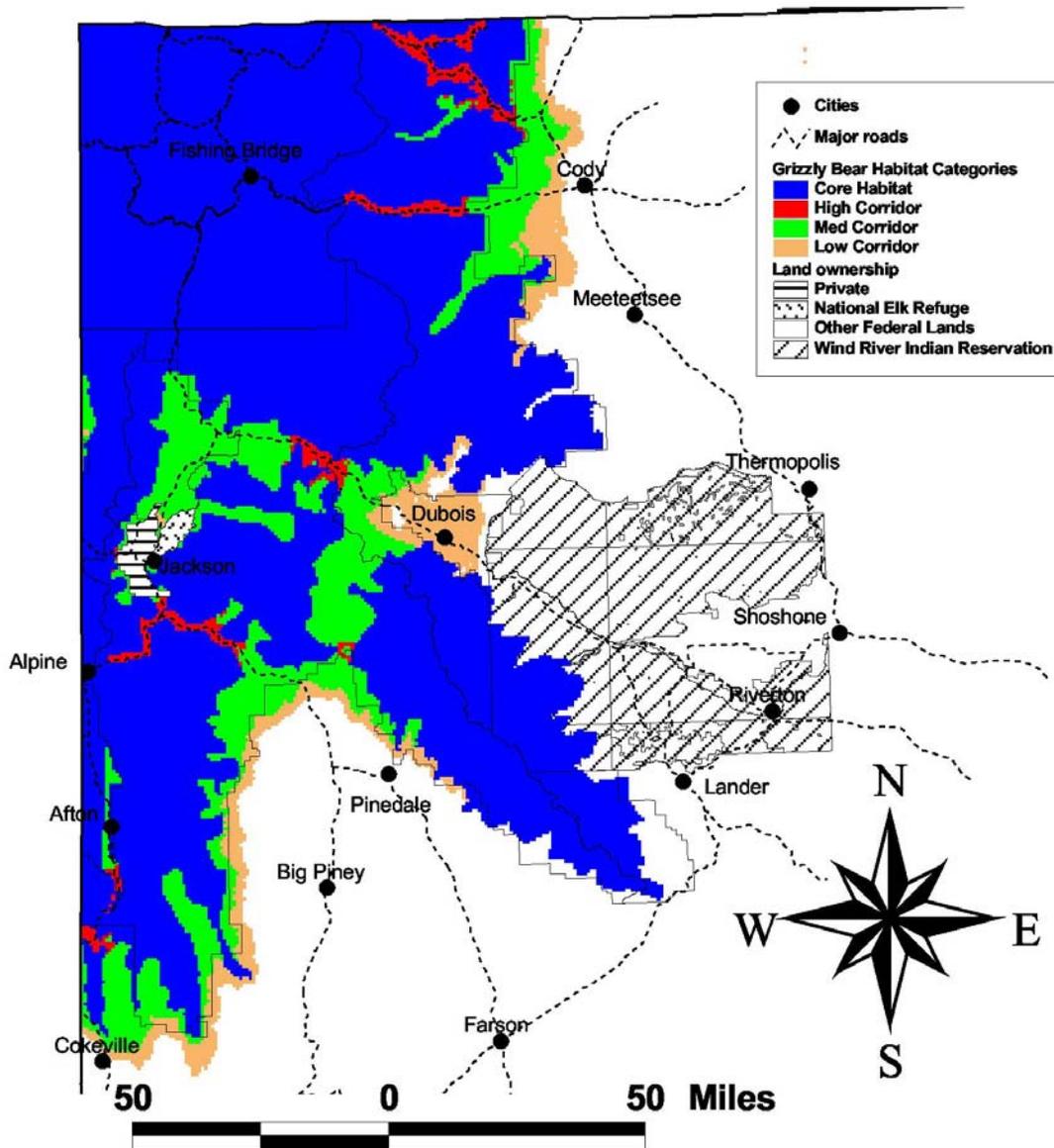


Fig. 7. Core and transition grizzly bear habitat in the Greater Yellowstone Area of Wyoming based on habitat productivity and remoteness from human activity (Merrill and Mattson 2003).

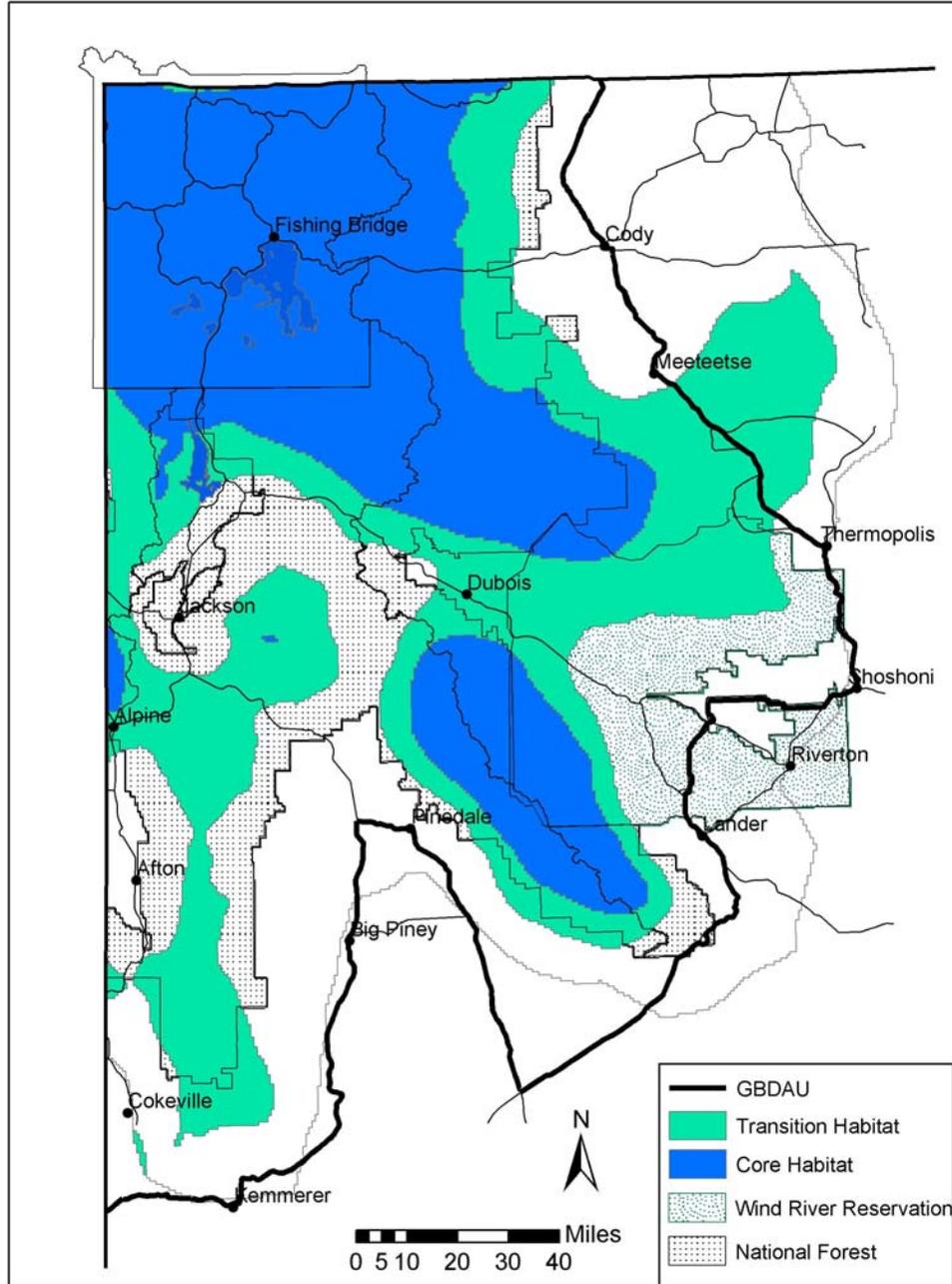


Fig. 8. Location and type of grizzly bear conflicts in the Greater Yellowstone Area of Wyoming, 1992-2003.

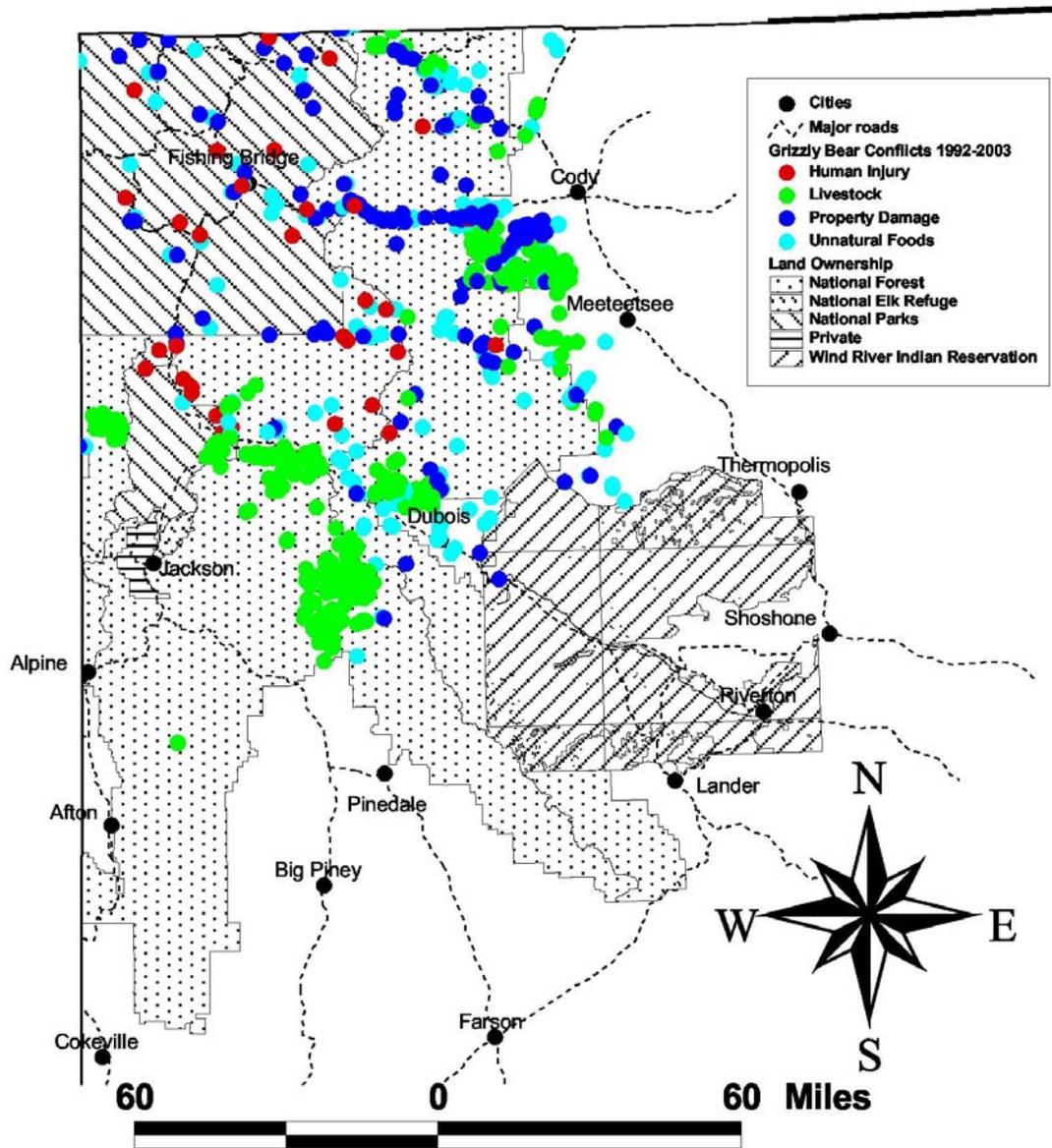


Fig. 9. Active and vacant livestock allotments (by class) in the Greater Yellowstone Area, Wyoming.

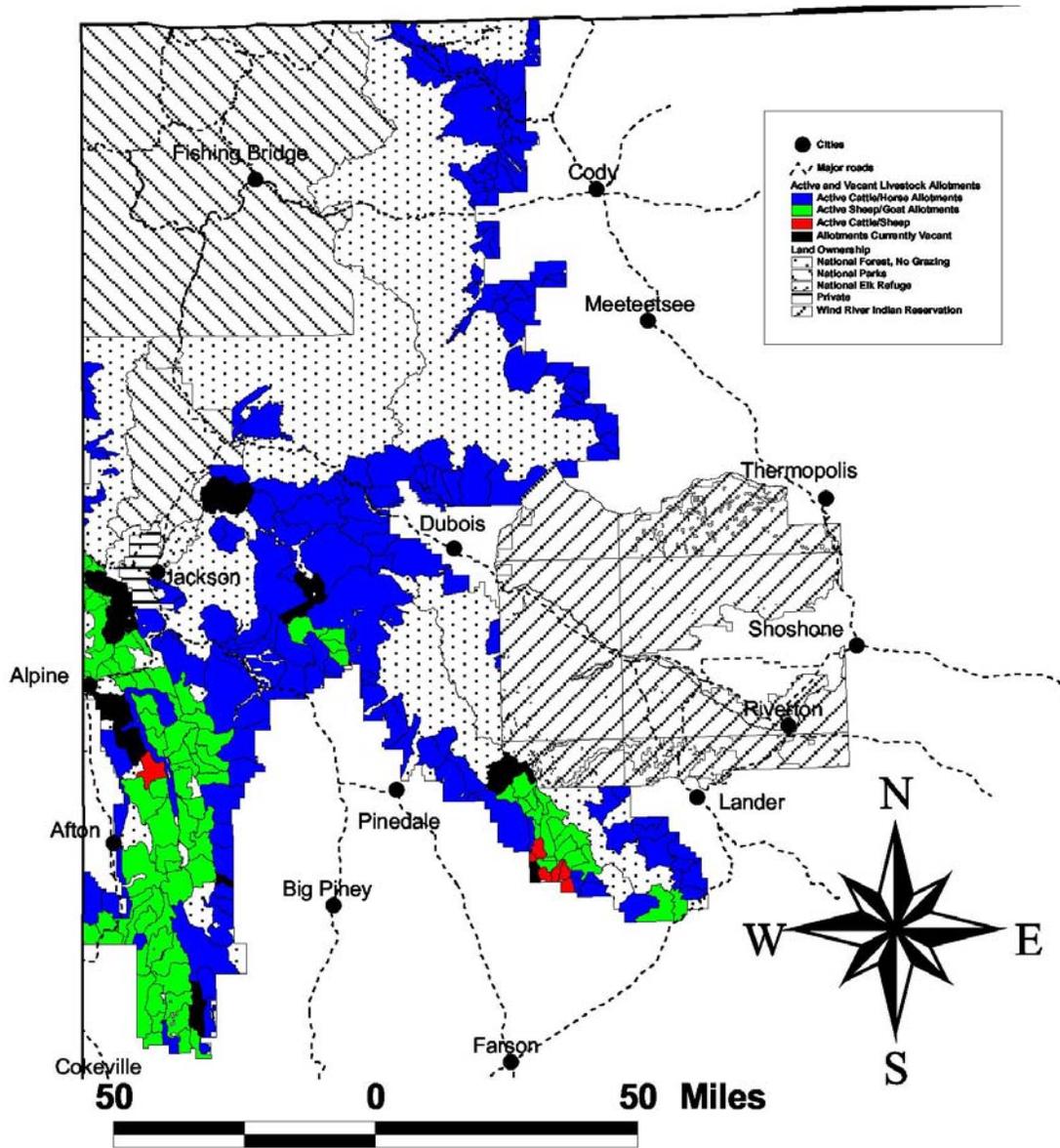


Figure 10. Open and gated motorized access routes in the Greater Yellowstone Area, Wyoming.

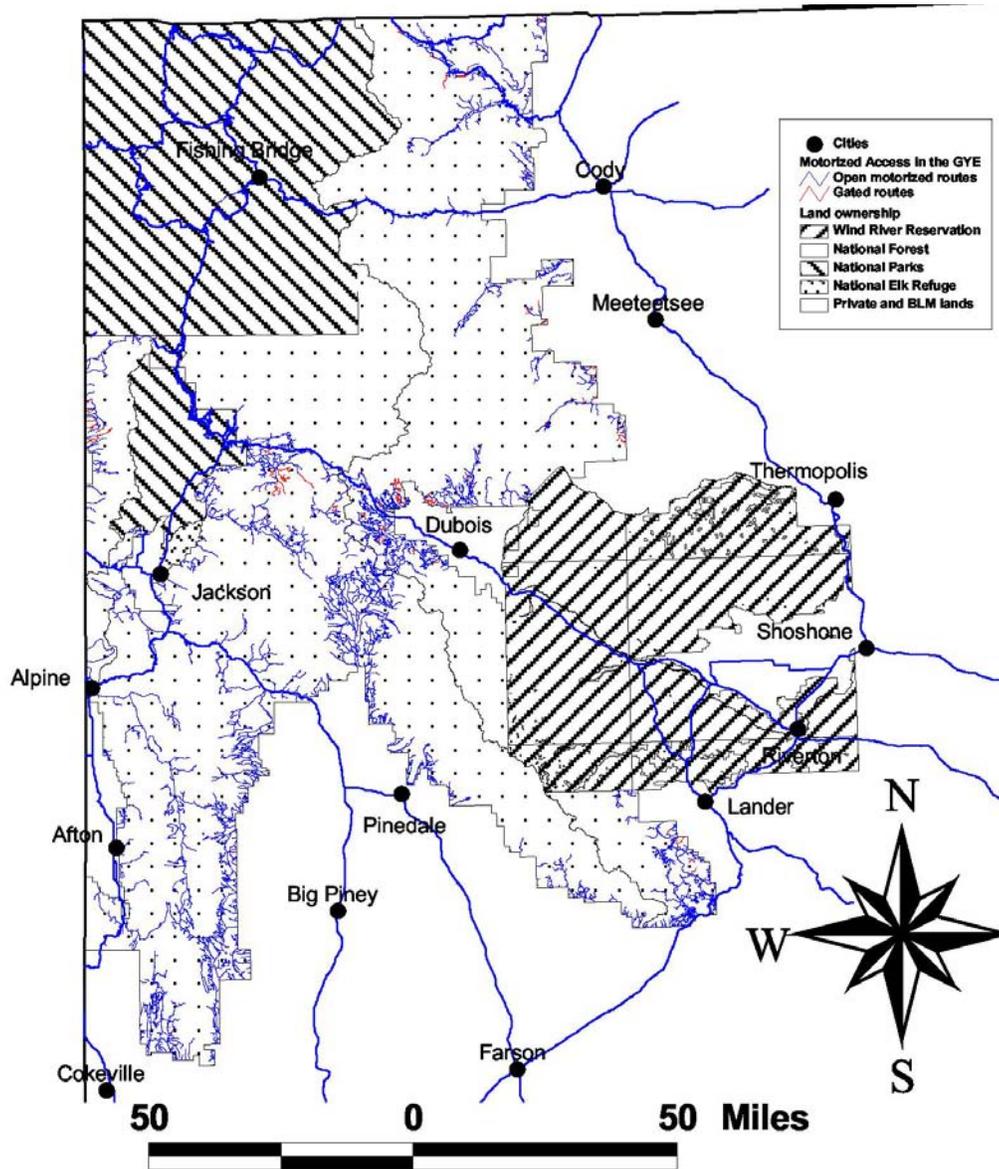


Fig. 11. Active and suspended public land oil and gas leases in the Greater Yellowstone Area, Wyoming.

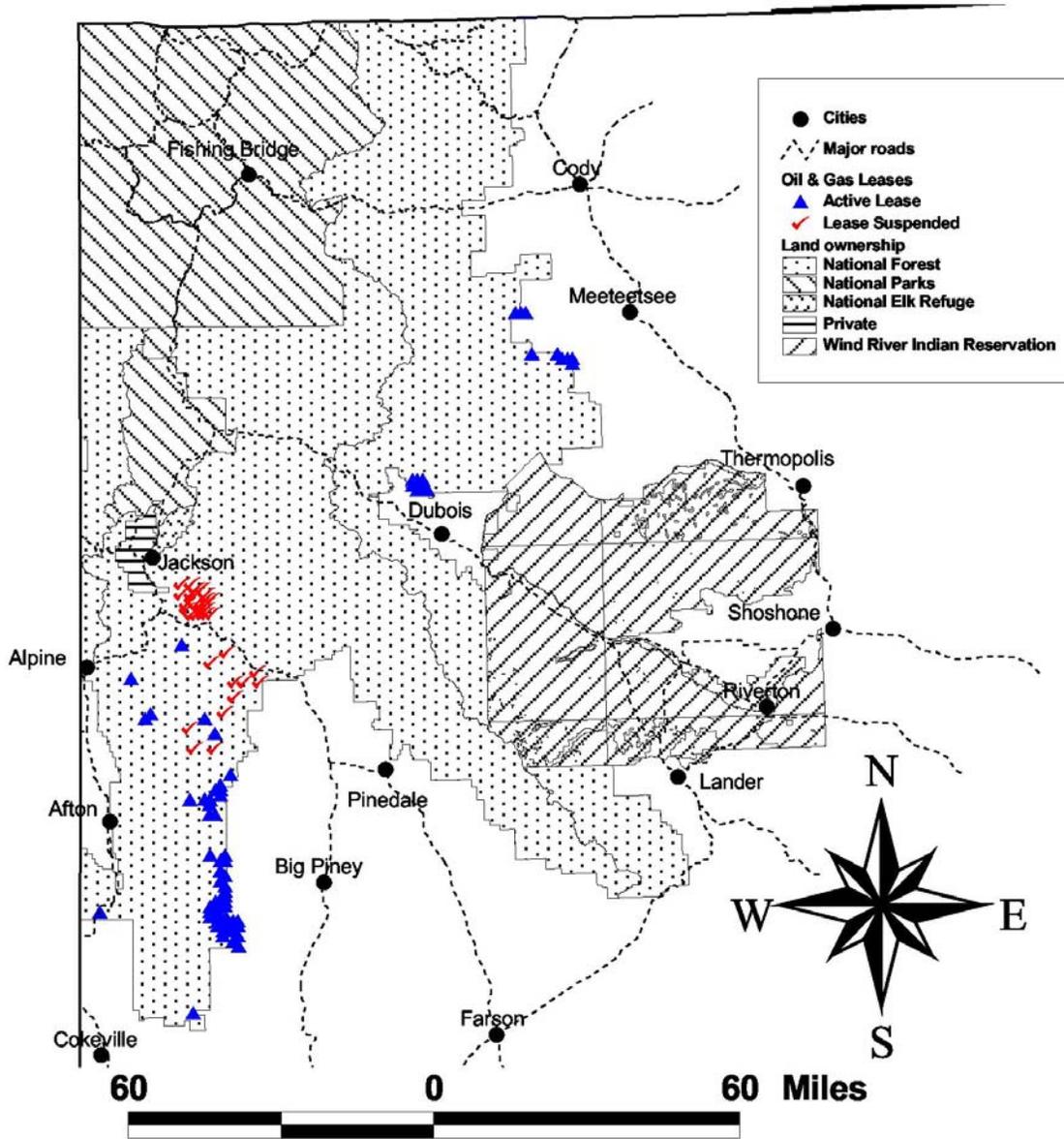


Fig. 12. Areas of timber suitable for future harvest (US Forest Service) in the Greater Yellowstone Area, Wyoming.

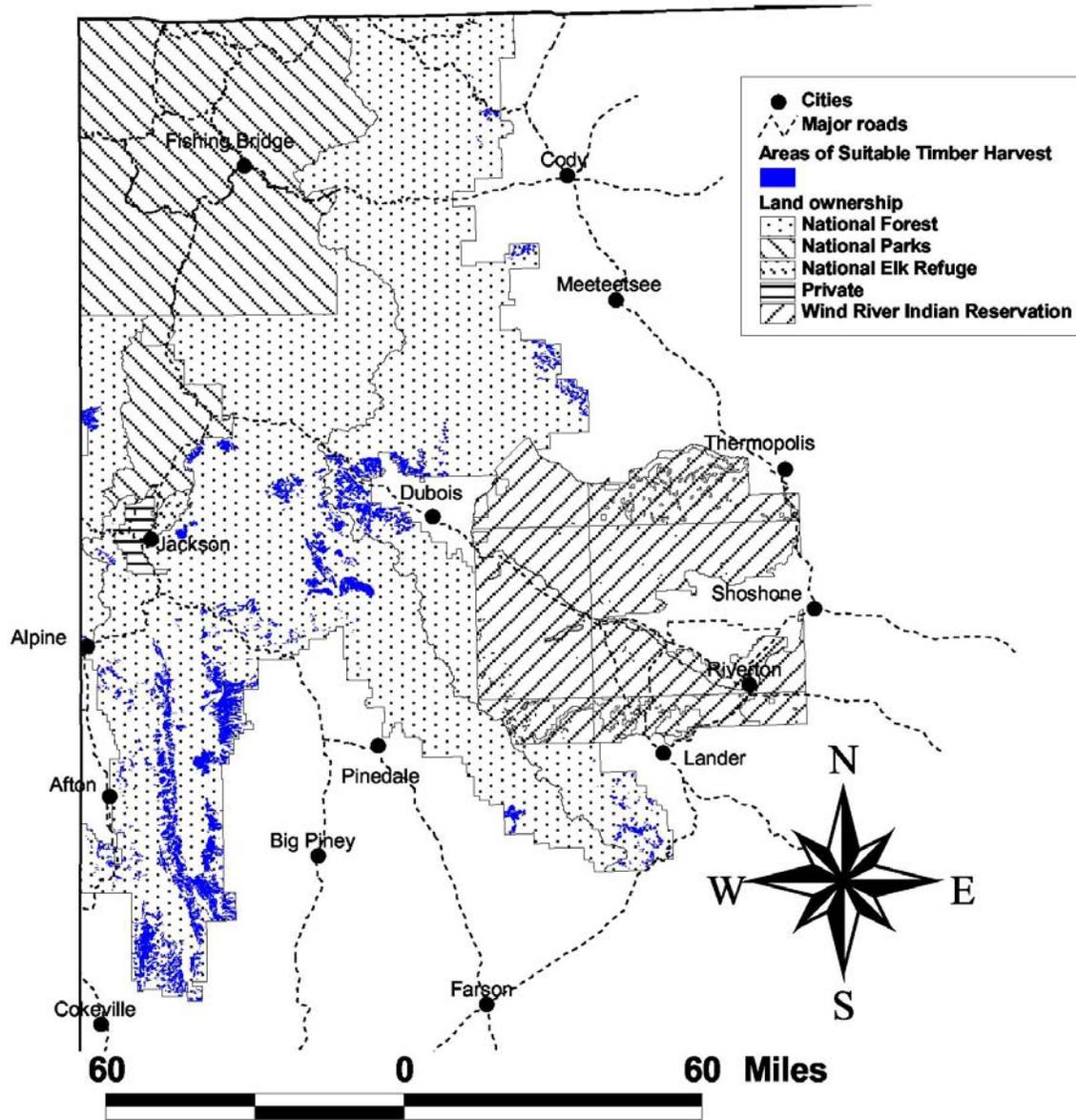
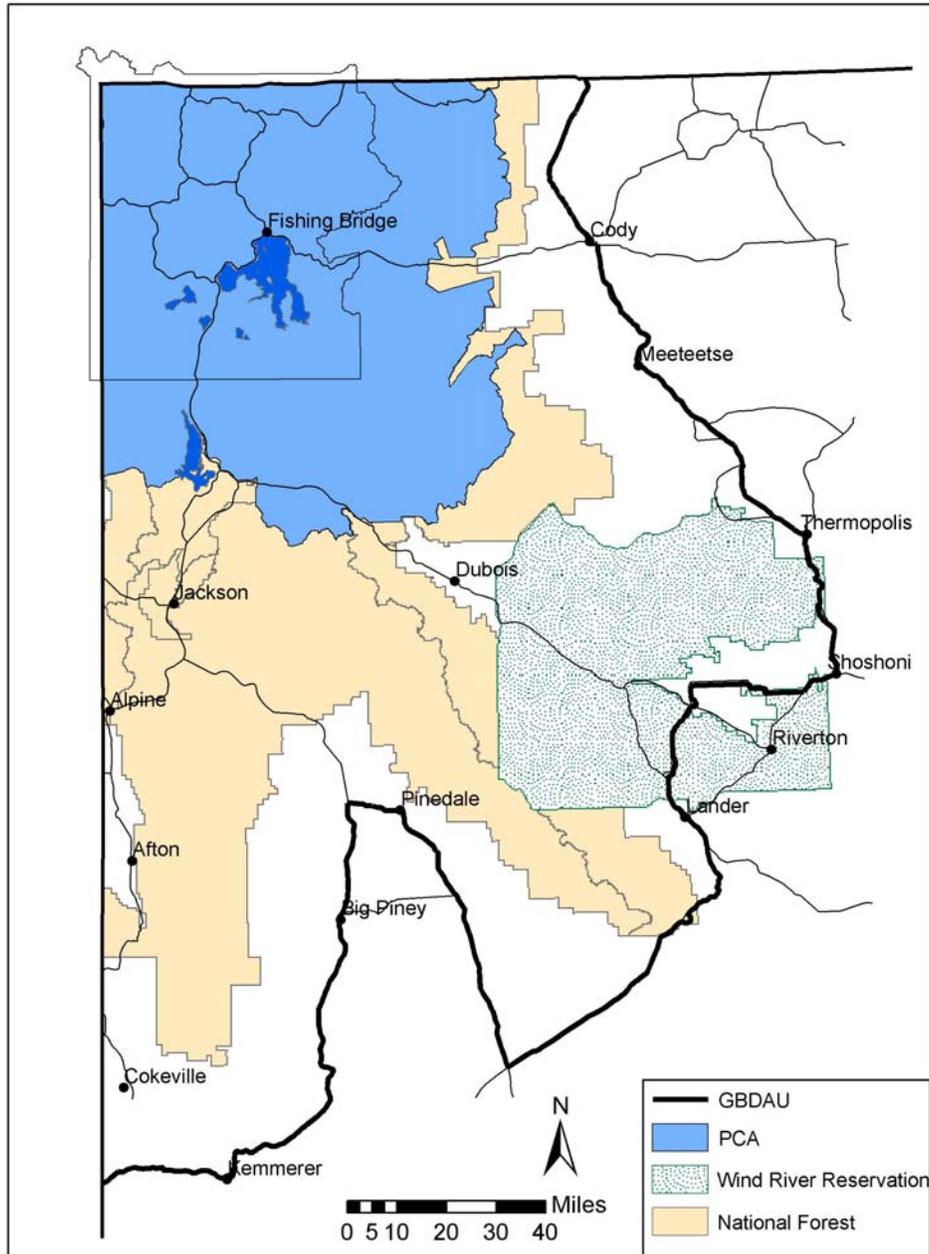


Fig. 13. Primary Conservation Area (PCA) and Grizzly Bear Data Analysis Unit (GBDAU) within the Greater Yellowstone Area of Wyoming.



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