Land Ownership Adjustment

Most Forests and Parks have an ongoing program of land ownership adjustment. Objectives are to improve management efficiency by disposing of lands that are difficult to manage because of size, use, or location and by acquiring lands or easements beneficial to the management of Forests or Parks.

Existing Situation

Lands identified as desirable for acquisition by the Federal government are generally those within or adjacent to Forest or Park boundaries and those that would simplify administration and enhance public recreation opportunities, wildlife habitat, and wilderness.

Partial interest acquisitions—easements— allow the government to obtain certain rights such as public access, limitation to development, or management access. Ownership of such land remains in

Upper Mesa Falls on the Targhee National Forest was recently acquired by the government in exchange for summer home tracts and other facilities under special use permit.

private hands. The government uses easements to avoid outright acquisition.

Although the Federal Government does have the power of eminent domain, the common method for acquisition of lands or easements is through land exchange (trade) or a "willing buyer, willing seller" (purchase) basis. The amount of direct purchase activity has been constrained in recent years due to Federal budget considerations.

Planned Management

Land ownership adjustments are generally aimed at improving management efficiency. Generally, on National Forests, ownership adjustments are made through the exchange (trade) procedure. In some cases, critical lands may be purchased through the Land and Water Conservation Fund Act. National Forests have authority to exchange (acquire or dispose of) lands within Forest boundaries. Congressional approval is generally required for acquisition or disposal of lands outside existing boundaries. Congressional approval is required for any additions or deletions of lands associated with National Parks.

Map 16 shows that most Forests and Parks have identified areas where administration and management can be made more efficient through land ownership adjustments. Chart 10 displays acres in each category.

Coordination Opportunities

Land ownership adjustment opportunities include these:

- Provide a land ownership program that improves efficiency of administration and management
- Ensure that land ownership adjustments complement the goals of other units, adjacent private landowners, and state and local governments

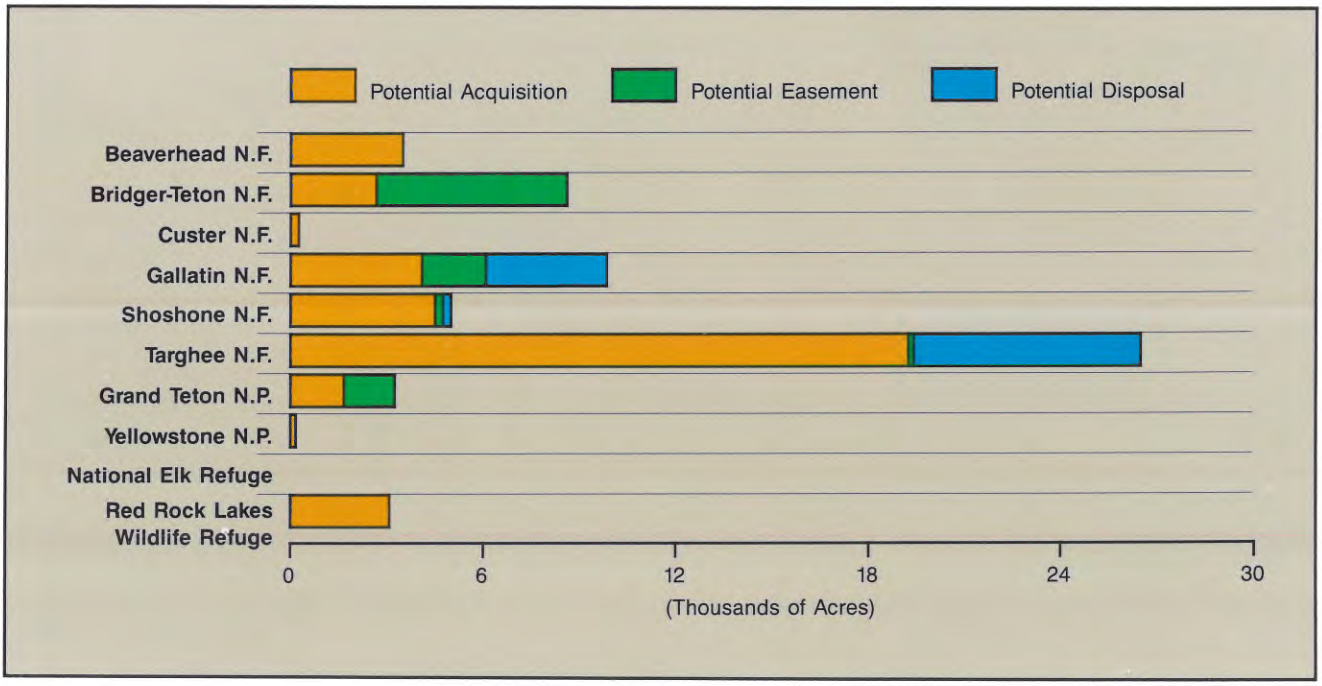
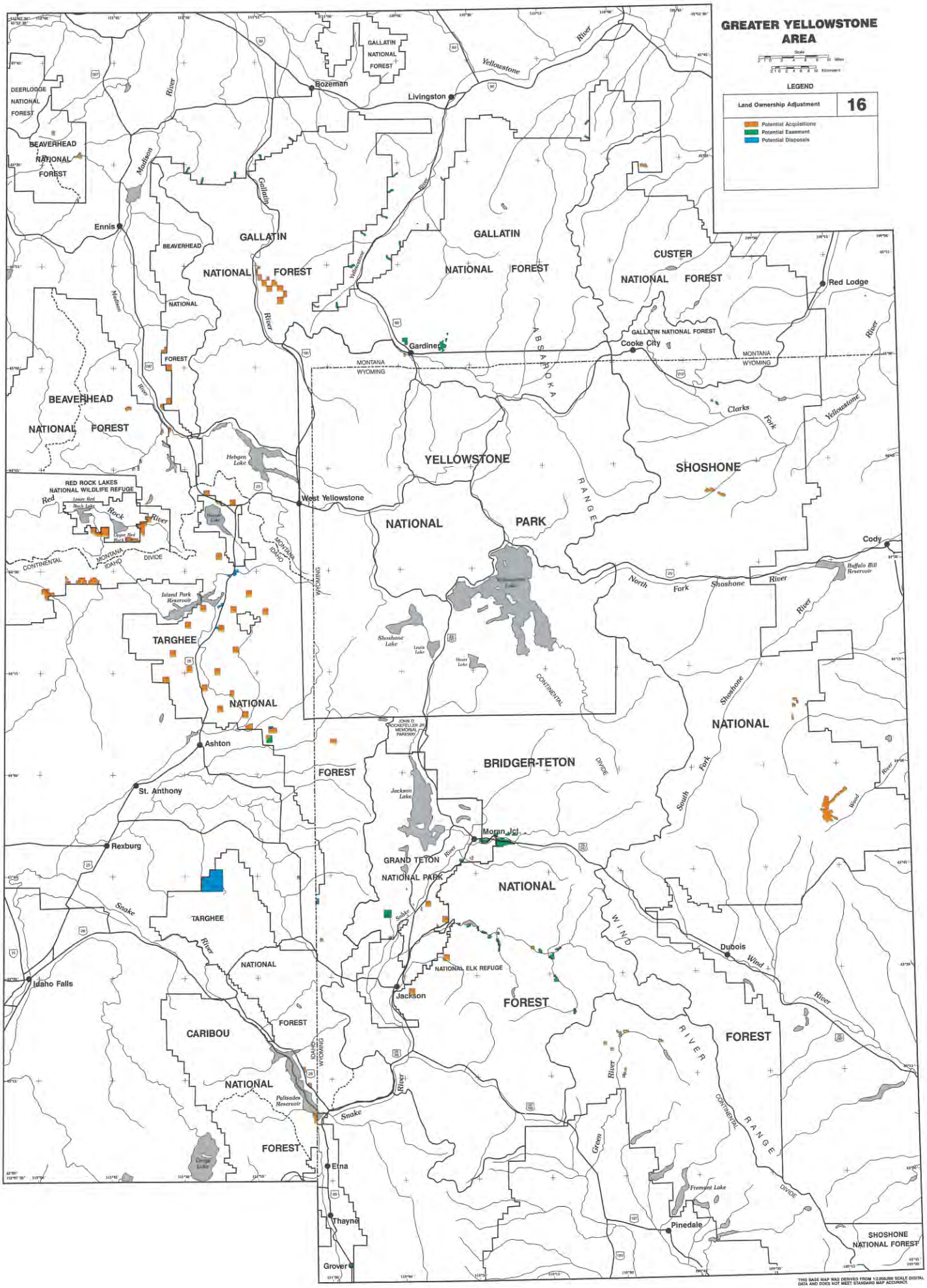


Chart 10. Potential land easements, acquisitions, and disposals.


GREATER YELLOWSTONE AREA
LEGEND
Land Ownership Adjustment
16
Potential Acquisitions
Potential Easement
Potential Disposals
DEERLODGE NATIONAL FOREST
BEAVERHEAD NATIONAL FOREST
GALLATIN NATIONAL FOREST
BRIDGER-TETON NATIONAL FOREST
TARGHEE NATIONAL FOREST
CARIBOU NATIONAL FOREST
CUSTER NATIONAL FOREST
SHOSHONE NATIONAL FOREST
YELLOWSTONE NATIONAL PARK
GRAND TETON NATIONAL PARK
RED ROCK LAKES NATIONAL WILDLIFE REFUGE
NATIONAL ELK REFUGE
JOHN D ROCKEFELLER JR MEMORIAL PARKWAY
Bozeman
Livingston
Ennis
Gardiner
Cooke City
Red Lodge
West Yellowstone
Cody
Ashton
St. Anthony
Rexburg
Idaho Falls
Jackson
Moran Jct.
Dubois
Pinedale
Etna
Thayne
Grover
MONTANA
WYOMING
IDAHO
CONTINENTAL DIVIDE
ABSAROKA RANGE
Yellowstone River
Madison River
Gallatin River
Snake River
Green River
Wind River
Clarks Fork
North Fork Shoshone River
South Fork Shoshone River
Hebgen Lake
Island Park Reservoir
Shoshone Lake
Lewis Lake
Heart Lake
Jackson Lake
Palisades Reservoir
Fremont Lake
Buffalo Bill Reservoir
Scale
Miles
Kilometers
THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA AND DOES NOT MEET STANDARD MAP ACCURACY.

Special Uses and Concessions

Special uses and concessions are located on both Forests and Parks. There are fewer within the Parks than in Forests, and those in the Parks tend to be oriented toward providing service to visitors. Some special uses in Forests provide services to visitors, others support private needs outside the Forest.

Existing Situation

"Special Use" is a term that describes the authorization of a specific activity facility, or concession by special use permit.

Some facilities—such as lodges, ski areas, and resorts—provide services to people visiting Forests. Others, such as electronic sites and water diversion facilities, support private uses outside the Forests.

About 2,650 permits exist in the Greater Yellowstone Area, with some 400 new applications received every year. Existing uses are located mainly near lakes, rivers, and the arterial road system. Outfitter camps are more dispersed.

Extent of Permitted Activities

In National Forests, the existing 1,150 recreational special use permits include winter sports sites, downhill ski areas, resorts, lodges, summer homes, outfitter and guide camps, organization sites such as scout camps, and numerous other recreational permits.

In addition to recreational uses, there are approximately 1,200 special use permits for other land uses. Ditches, canals, fences, power plants, powerlines, telephone lines, roads, electronic sites, and dams are examples.

In National Parks, concession activities are covered under concession contracts and concession permits, which are awarded after need is determined by the National Park Service and after competitive bidding.

Map 17 shows the location of some existing special uses and concessions. Chart 11 shows the number of existing special uses and the number of applications that are received each year.

Planned Management

In National Parks, no expansion of concession activities is contemplated. Approximately 100 applications for recreational or concession special use permits are received each year for National Forests. Current guidelines for long-term recreational special uses are these:

- Encourage private commercial recreational development on private land within and adjacent to National Forests and on suitable and available National Forest when public needs warrant.
- Manage recreational special use permits to assure 80 percent of designated capacity is available to the user public.
- Prohibit establishment of new recreational residence tracts.
- Manage potential recreation sites and potential ski area sites to assure availability and desirability. (Prior to development, a site-specific environmental analysis will be made.)
- Authorize expansion of existing facilities where a demonstrated need has been established and where there is no conflict with other resources.

The demand for nonrecreational special use permits in National Forests is increasing. For each new proposal

an environmental analysis will be made, with permits granted to applicants who comply with these guidelines:

- Use is consistent or compatible with purposes for which lands are managed or with other uses.
- The applicant is qualified.
- Proposed use is in the public interest.
- Private land is not available to accommodate the use.
- The applicant demonstrates technical and financial capacity.

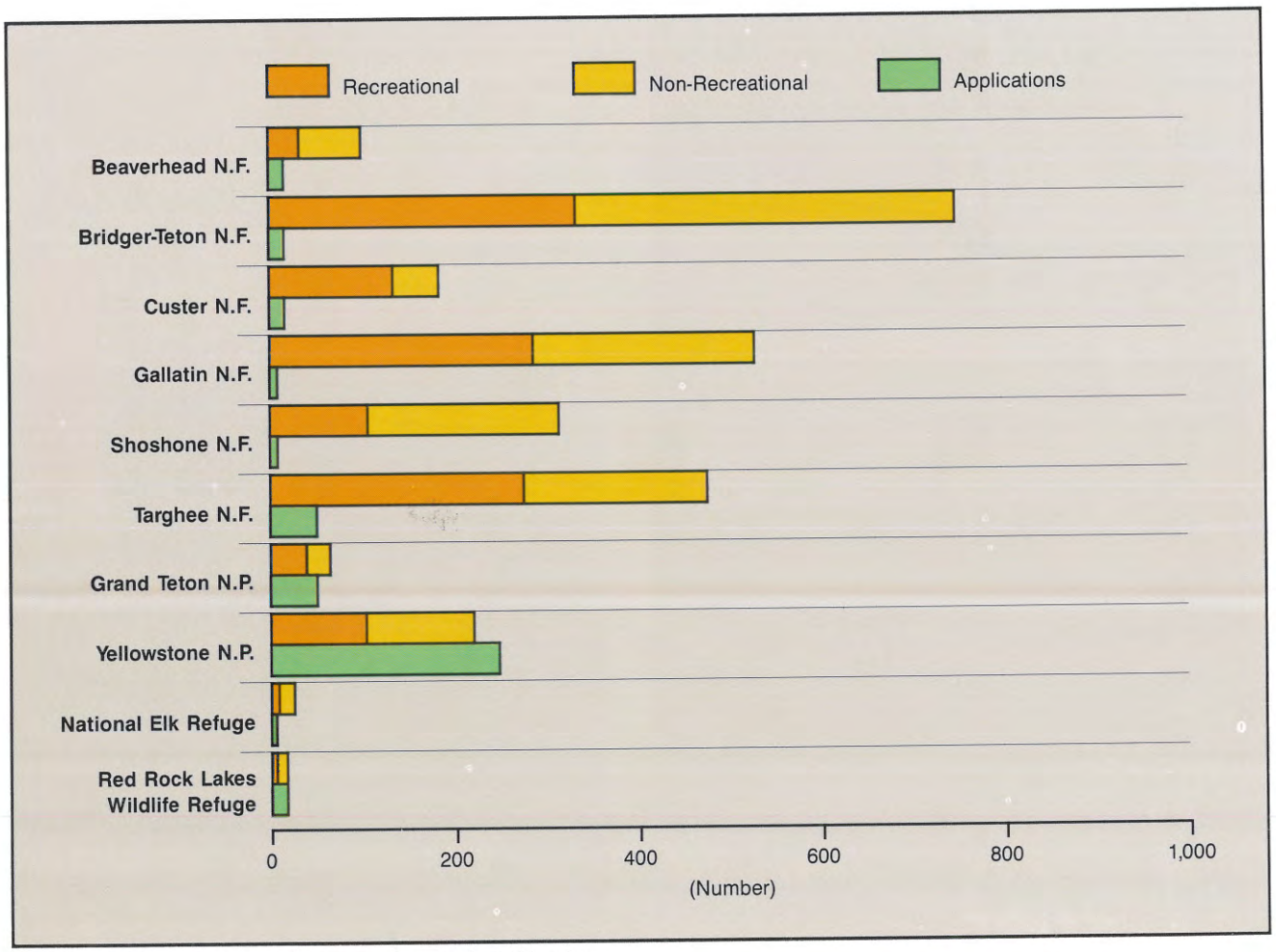


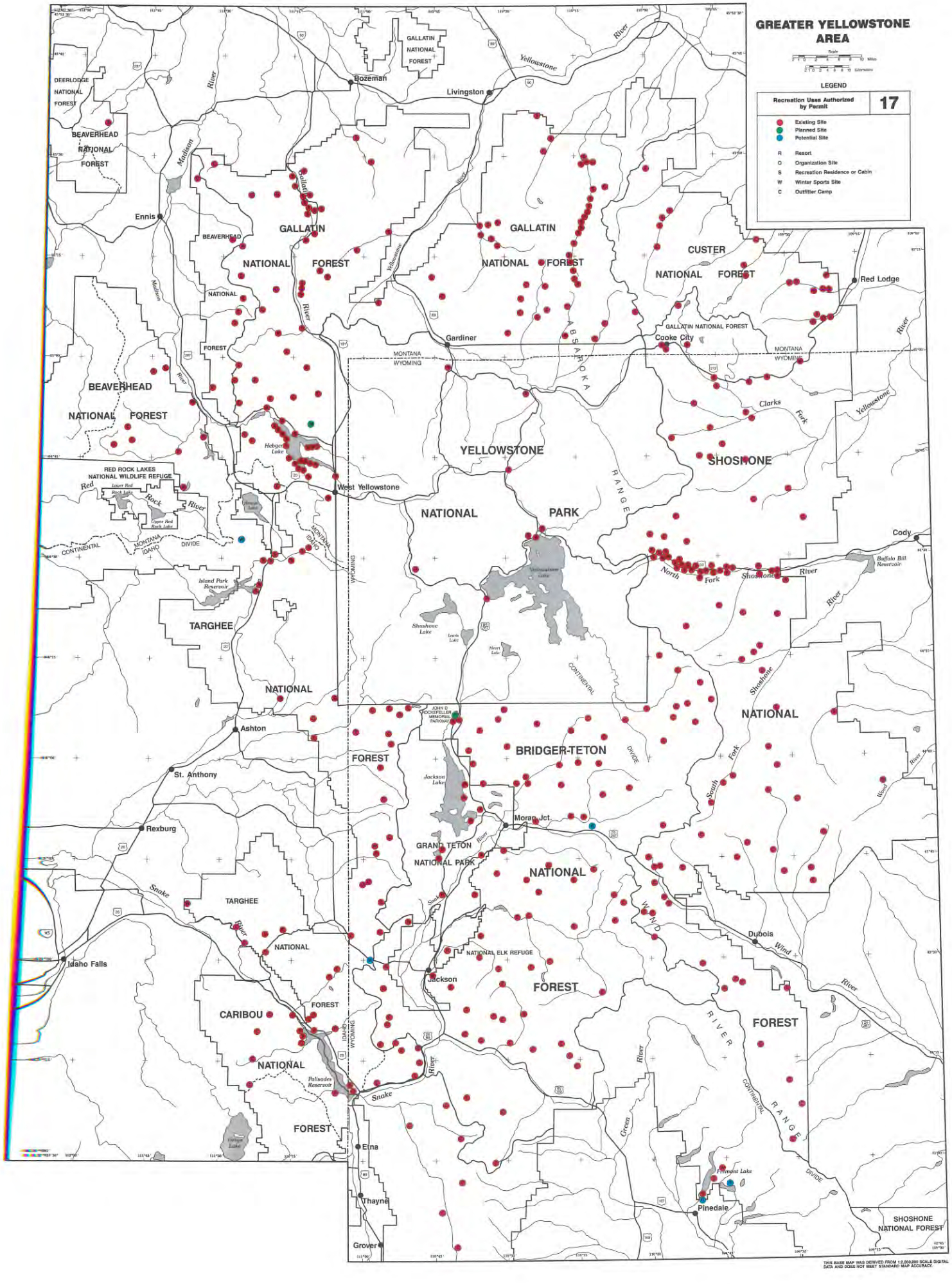
Chart 11. Existing special uses and annual applications.

Coordination Opportunities

Special uses include these coordination opportunities:

- Authorize special uses where needed to complement management programs of Forests and Parks.
- Ensure that the effects of special uses on other important resources within the Greater Yellowstone Area are acceptable.

Electronic site, Bridger Teton National Forest, outfitter camp, Shoshone National Forest, and summer homes, Targhee National Forest, are examples of some of the nearly 2,700 uses authorized by permit.


GREATER YELLOWSTONE AREA
LEGEND
Recreation Uses Authorized by Permit
17
Existing Site
Planned Site
Potential Site
R Resort
O Organization Site
S Recreation Residence or Cabin
W Winter Sports Site
C Outfitter Camp
DEERLODGE NATIONAL FOREST
BEAVERHEAD NATIONAL FOREST
GALLATIN NATIONAL FOREST
BRIDGER-TETON NATIONAL FOREST
TARGHEE NATIONAL FOREST
CARIBOU NATIONAL FOREST
CUSTER NATIONAL FOREST
SHOSHONE NATIONAL FOREST
YELLOWSTONE NATIONAL PARK
GRAND TETON NATIONAL PARK
RED ROCK LAKES NATIONAL WILDLIFE REFUGE
NATIONAL ELK REFUGE
Bozeman
Livingston
Ennis
Gardiner
West Yellowstone
Ashton
St. Anthony
Rexburg
Idaho Falls
Jackson
Moran Jct
Dubois
Cody
Red Lodge
Cooke City
Pinedale
Thayne
Etna
Grover
Island Park Reservoir
Palisades Reservoir
Fremont Lake
Buffalo Bill Reservoir
Yellowstone River
Madison River
Gallatin River
Snake River
Wind River
Green River
Clarks Fork
North Fork Shoshone River
South Fork Shoshone River
Absaroka Range
Continental Divide
MONTANA
WYOMING
IDAHO
THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA AND DOES NOT MEET STANDARD MAP ACCURACY.

Wilderness and Undeveloped Lands

Approximately 53 percent of the National Forests and National Park lands in the Greater Yellowstone Area are wilderness or have been recommended to Congress for wilderness designation. Currently, all of the nearly 4 million acres of wilderness in the Greater Yellowstone Area are within National Forests.

Only Congress, under the 1964 Wilderness Act, can designate an area as wilderness. According to the Act, wilderness is undeveloped and uninhabited Federal land retaining its primeval or primitive character.

Once Congress designates an area of a Forest or Park as wilderness, the area must be managed to protect its wilderness character. So under the Wilderness Act, people visiting this area would not encounter resource developments or motorized activities.

Existing Situation

Congressionally designated wilderness includes 32 percent of the land or 3,786,500 acres within the Greater Yellowstone Area.

Another 21 percent or 2,449,600 acres includes areas of recommended wilderness. Other areas, totalling 237,000 acres, are wilderness study areas.

Finally, research natural areas currently include 10,311 acres, with an additional 21,680 acres proposed for inclusion in this category. Research natural areas preserve a unique ecological community for study.

As Map 18 shows, major National Forest wilderness areas exist north, east, and south of Yellowstone and west of Grand Teton. The map also shows undeveloped areas, which have no roads or other major developments. Some of these undeveloped areas will remain undeveloped while others will be developed. Map 19 summarizes the nature of proposed changes.

Future congressional actions regarding wilderness are unknown, so Map 19 does not identify areas that Congress might eventually designate as wilderness. Chart 12 displays acres in the various categories.

Planned Management

Wilderness. Wilderness management will maintain the primeval or primitive characteristics of an area. Thus, activities such as road construction, timber harvest, and motorized use are generally prohibited. But activities such as camping, hiking, hunting, horseback riding, fishing, and livestock grazing are allowed in National Forests. Hunting and grazing are precluded in National Parks.

When an area is designated as wilderness, it is withdrawn from mineral entry, and no new leases or claims are allowed. However, valid prior claims and leases remain in force with the exception of National Parks where lands are withdrawn from mineral entry.

Recommended Wilderness. Areas recommended for wilderness designation are managed similarly to wilderness. However, some historical activities such as motorbike or snowmobile use may be allowed to continue, pending future congressional decisions. New mineral leases are generally not allowed although existing leases continue in effect in National Forests.

Wilderness Study Areas. Wilderness study areas in the Greater Yellowstone Area are now being evaluated to determine if they should be recommended for wilderness

designation. These studies may be a result of Forest or Park Service action (as in the case of the Centennial Mountains) or specific legislation (as in the case of the Palisades Wilderness Study Area).

These special study areas are managed like recommended wilderness areas, so many developmental activities are prohibited. However, Congress often has specified certain conditions in its establishment of wilderness study areas. For example, Congress allowed oil and gas leasing and exploration to continue when it set up Palisades Wilderness Study Area.

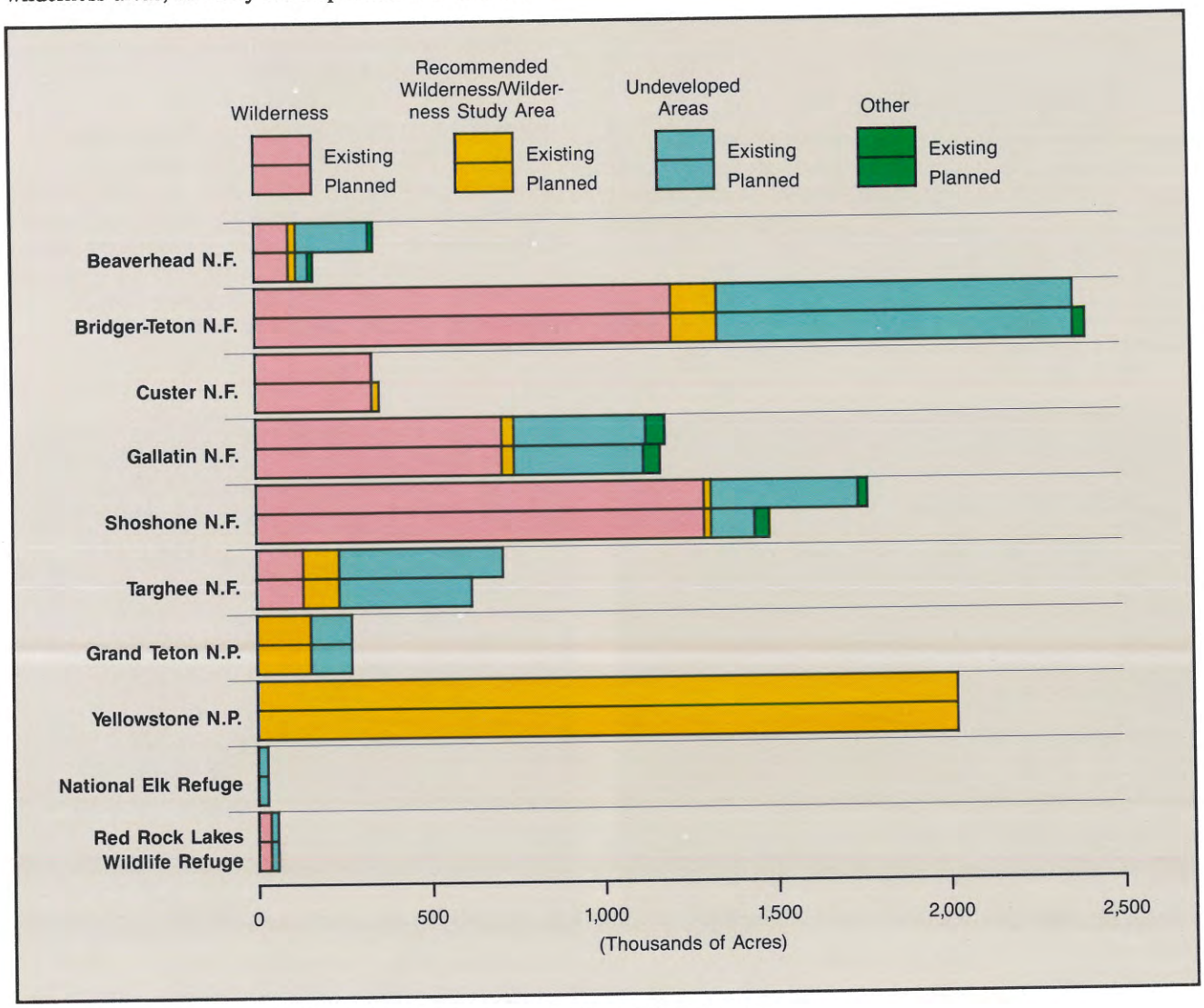


Chart 12. Wilderness and other undeveloped areas—existing and planned.

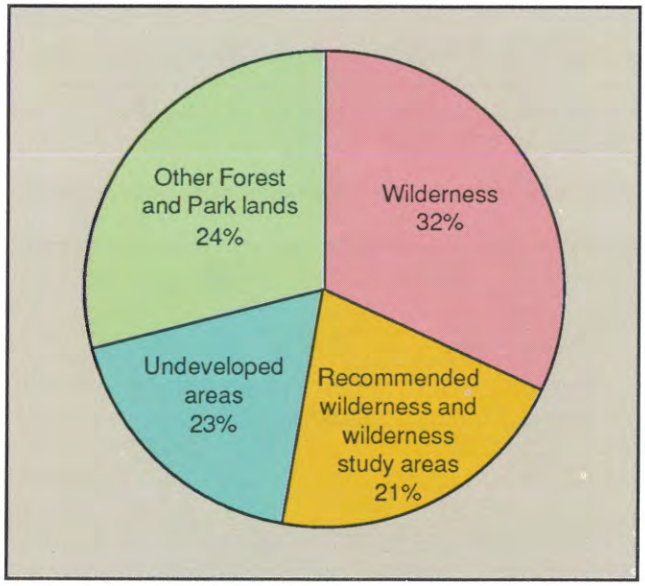


Chart 12.1. *Wilderness and other undeveloped areas.*

Wild and Scenic Rivers. Management of wild and scenic rivers varies, depending upon whether a river (or a part of river) is designated as wild, scenic, or merely recreational. Wild rivers are managed similarly to wilderness, so many developmental activities are prohibited or restricted. Scenic rivers have somewhat more development although their natural character is maintained. Recreational rivers have the fewest restrictions, with boat landings, fishing camps, and other developments commonly present.

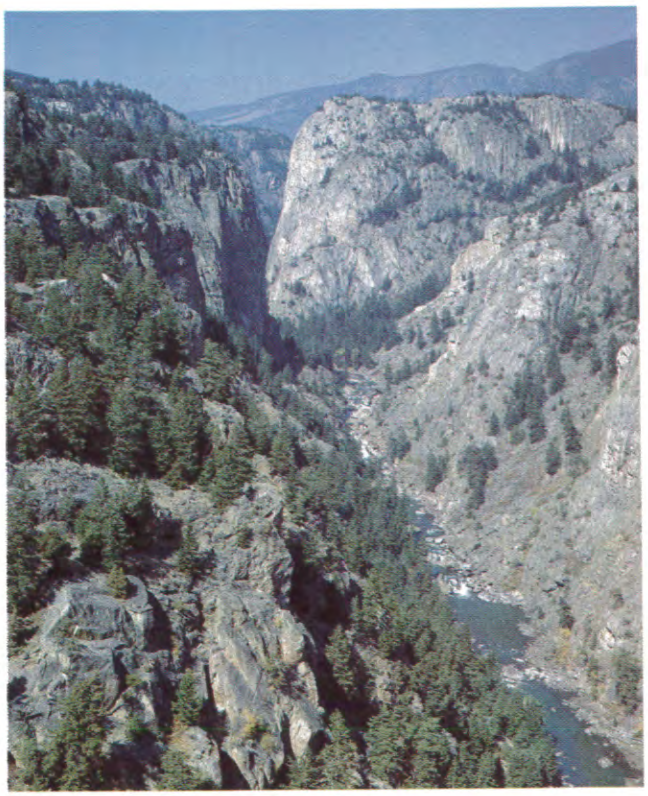
Undeveloped Areas. Current Forest management plans specify that 2,072,800 acres will remain undeveloped, at least for the next 10 to 15 years. At that time, Forests will review existing management plans and retain, amend, or prepare new ones. These future plans may permit more intensive development of some currently undeveloped areas, some may be recommended for wilderness designation, and others will remain undeveloped.

Absaroka-Beartooth wilderness, Custer and Gallatin National Forests.

Lionhead area in the background is recommended for wilderness designation in land management plans for the Targhee and Gallatin National Forests.

Coordination Opportunities

Many wilderness areas receive heavy use while others are merely adjacent to non-wilderness lands receiving heavy use. Such heavy use either in the wilderness or nearby areas can destroy what many people visit wilderness to experience—solitude.

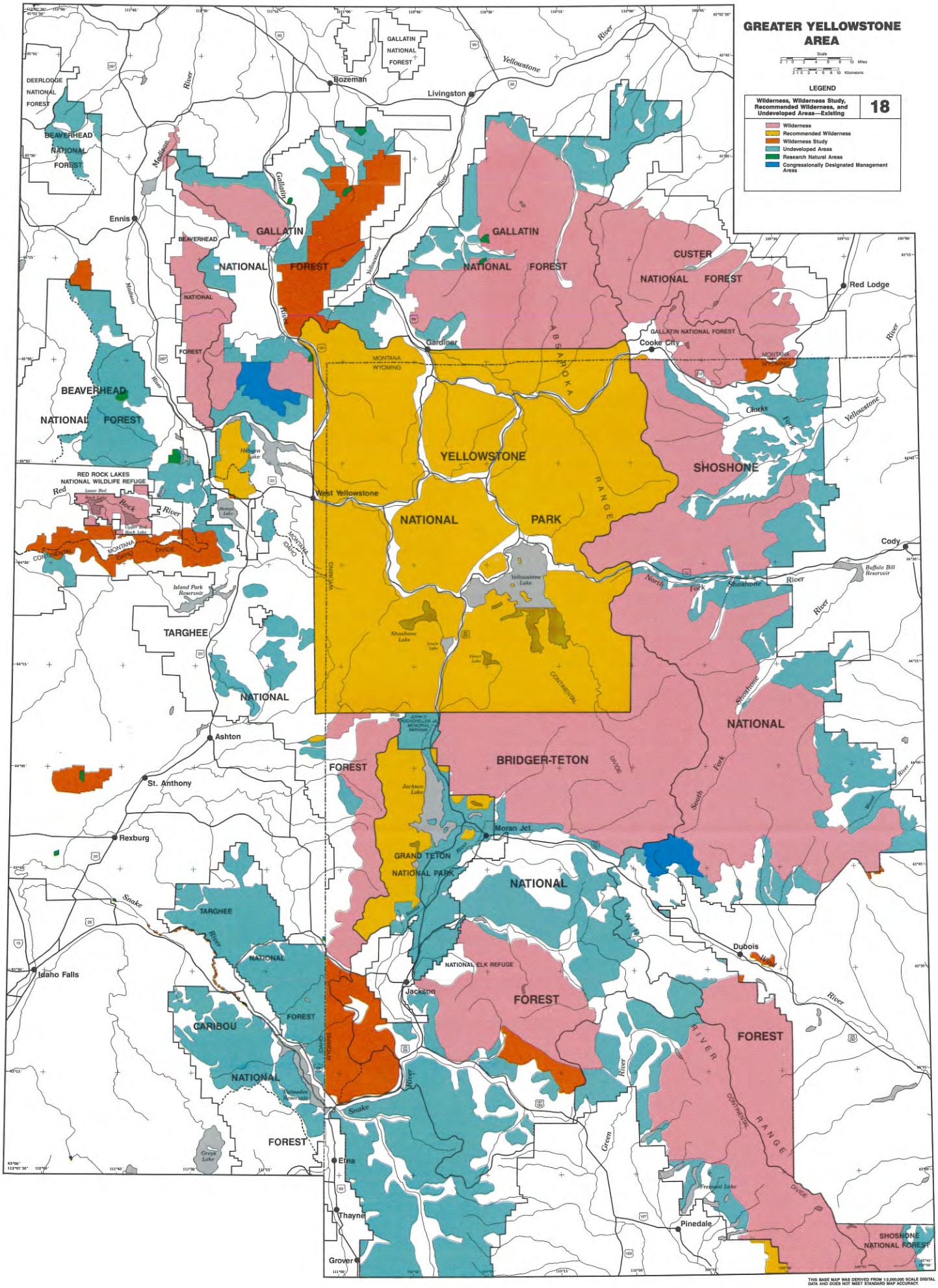


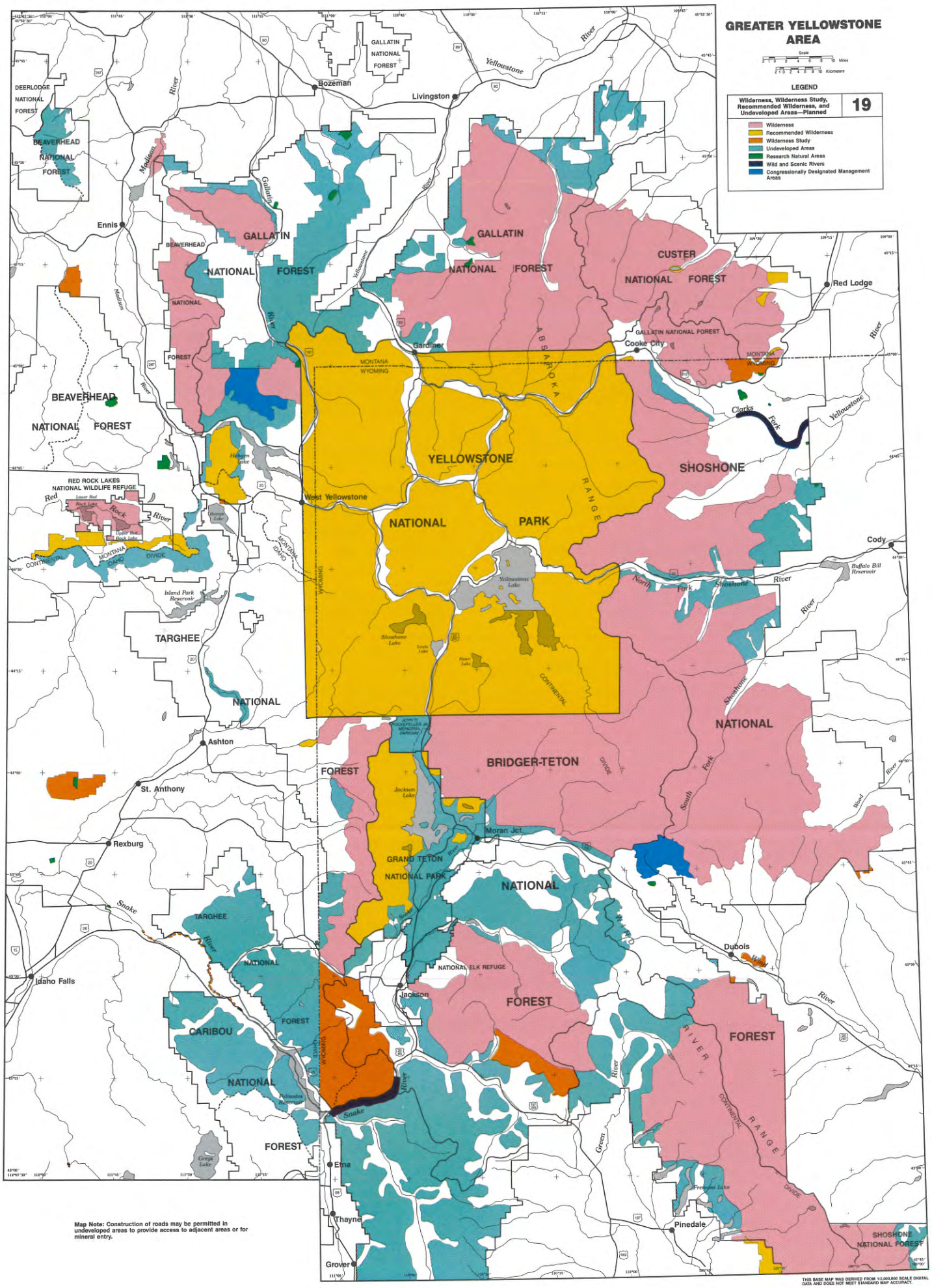
A portion of the Clarks Fork of the Yellowstone River, Shoshone National Forest, is proposed for inclusion in the National Wild and Scenic River System.

Managers of Forests and Parks in the Greater Yellowstone Area face these opportunities:

- To provide opportunities for a quality wilderness experience for an increasing number of wilderness users
- To ensure that visitor use does not adversely affect the wilderness resources
- To ensure that rules for visitors are reasonably consistent from one area to another

Many undeveloped areas, such as this one on Targhee National Forest, are not recommended for wilderness but will remain undeveloped according to management direction in land management plans.


GREATER YELLOWSTONE AREA
Scale
Miles
Kilometers
LEGEND
Wilderness, Wilderness Study, Recommended Wilderness, and Undeveloped Areas—Existing
18
Wilderness
Recommended Wilderness
Wilderness Study
Undeveloped Areas
Research Natural Areas
Congressionally Designated Management Areas
GALLATIN NATIONAL FOREST
DEERLODGE NATIONAL FOREST
BEAVERHEAD NATIONAL FOREST
CUSTER NATIONAL FOREST
BRIDGER-TETON NATIONAL FOREST
CARIBOU NATIONAL FOREST
TARGHEE NATIONAL FOREST
SHOSHONE NATIONAL FOREST
YELLOWSTONE NATIONAL PARK
GRAND TETON NATIONAL PARK
RED ROCK LAKES NATIONAL WILDLIFE REFUGE
NATIONAL ELK REFUGE
ABSAROKA RANGE
CONTINENTAL DIVIDE
Bozeman
Livingston
Ennis
Red Lodge
Cooke City
Gardiner
West Yellowstone
Cody
Ashton
St. Anthony
Rexburg
Idaho Falls
Moran Jct
Jackson
Dubois
Pinedale
Etna
Thayne
Grover
Yellowstone River
Madison River
Gallatin River
Snake River
Green River
Clarks Fork
North Fork Shoshone River
South Fork Shoshone River
Wind River
Buffalo Bill Reservoir
Island Park Reservoir
Jackson Lake
Yellowstone Lake
Shoshone Lake
Heart Lake
Grays Lake
Henrys Lake
Upper Red Rock Lake
Lower Red Rock Lake
Freemont Lake
MONTANA
WYOMING
IDAHO
THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA AND DOES NOT MEET STANDARD MAP ACCURACY.


GREATER YELLOWSTONE AREA
Scale
Miles
Kilometers
LEGEND
Wilderness, Wilderness Study, Recommended Wilderness, and Undeveloped Areas—Planned
19
Wilderness
Recommended Wilderness
Wilderness Study
Undeveloped Areas
Research Natural Areas
Wild and Scenic Rivers
Congressionally Designated Management Areas
GALLATIN NATIONAL FOREST
DEERLODGE NATIONAL FOREST
BEAVERHEAD NATIONAL FOREST
CUSTER NATIONAL FOREST
YELLOWSTONE NATIONAL PARK
SHOSHONE NATIONAL FOREST
BRIDGER-TETON NATIONAL FOREST
TARGHEE NATIONAL FOREST
CARIBOU NATIONAL FOREST
GRAND TETON NATIONAL PARK
NATIONAL ELK REFUGE
RED ROCK LAKES NATIONAL WILDLIFE REFUGE
Bozeman
Livingston
Ennis
Red Lodge
Cooke City
Gardiner
West Yellowstone
Cody
Ashton
St. Anthony
Rexburg
Idaho Falls
Jackson
Moran Jct.
Dubois
Pinedale
Etna
Thayne
Grover
Yellowstone River
Madison River
Gallatin River
Snake River
Green River
Clarks Fork
North Fork Shoshone River
South Fork Shoshone River
Buffalo Bill Reservoir
Island Park Reservoir
Continental Divide
MONTANA
WYOMING
IDAHO
Map Note: Construction of roads may be permitted in undeveloped areas to provide access to adjacent areas or for mineral entry.
THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA AND DOES NOT MEET STANDARD MAP ACCURACY.

Rangelands and Grazing

Forty-four percent of the area is open to cattle or sheep grazing during part of the year. The remainder is either closed to all grazing or only open to recreational livestock—riding and pack stock associated with recreational use.

Existing Situation

Forage within the Greater Yellowstone Area is important for livestock operations in the surrounding area.

In National Forests, slightly more than one-half of the land is open to cattle and sheep grazing. Most areas in Forests are open to grazing by recreational livestock—riding and pack stock associated with recreational use.

National Parks, on the other hand, do not permit domestic livestock to graze, except on a small portion of Grand Teton where cattle grazing is allowed.

Planned Management

Thirty years of wiser grazing methods have improved range conditions significantly. The healthier land is largely due to two practices:

- Reductions in the number of domestic livestock grazing on National Forests from intense production efforts of World Wars I and II
- Using rest rotation or deferred rotation grazing systems to stimulate plant growth

These methods help plants regain vigor and produce seeds and seedlings. However, an unexpected increase in populations of large grazers, such as elk and bison, could impede range improvement.

More than 30,000 acres of range in poor condition will improve to fair or better condition during the next 15 years.

Chart 13 shows the existing and planned condition of domestic livestock range.

Forage for Livestock Grazing

Forage for livestock grazing is measured in animal unit months (AUMs)—enough feed to nourish one mature cow and calf for one month. The area produces 462,000 AUMs each year.

Despite its bounty of feed, the Greater Yellowstone Area is grazed well below capacity, mainly because the livestock market has been depressed. Most Forests have unused allotments for sheep grazing.

The Bridger-Teton and Targhee National Forests provide the most grazing land, with other Forests providing smaller amounts. All other units, except the National Elk Refuge, provide some grazing for domestic livestock.

Chart 14 and Map 20 show areas and the number of acres open and closed to domestic livestock grazing. Chart 15 shows AUMs provided by each Forest. Note that livestock do not graze on every acre of land open to grazing. Steep slopes and distance to water make some areas unavailable to domestic livestock.

Range Development

Land designated for cattle grazing has been developed in the following ways:

- Fences have been built to control stock movement
- Springs have been piped into troughs to keep livestock watered
- Seeps have been excavated to make small ponds
- Burning has been performed to improve and stimulate vegetation
- Spraying to eliminate undesirable plants was more common in the past but has been constrained in recent years

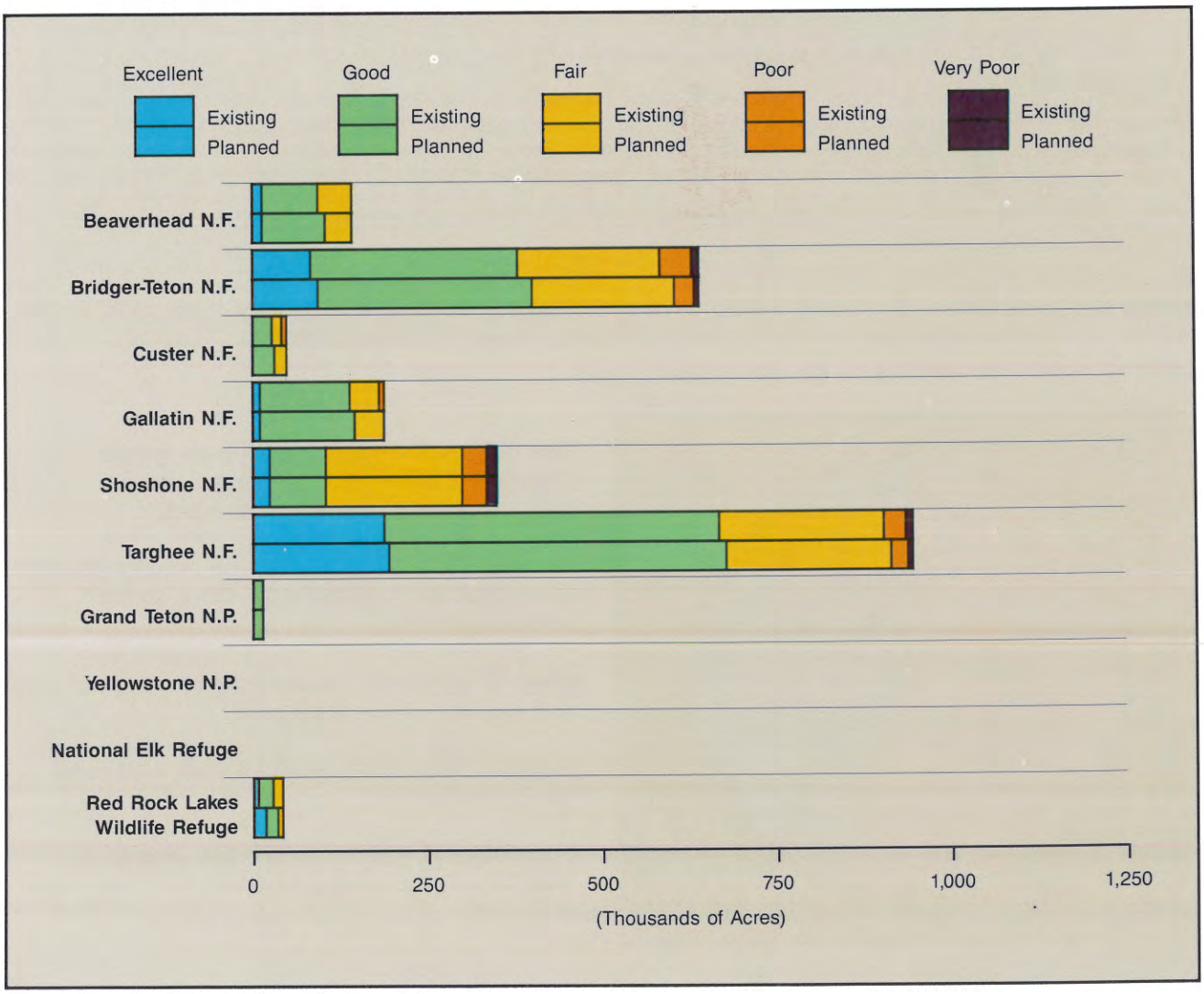


Chart 13. Condition of domestic livestock range.

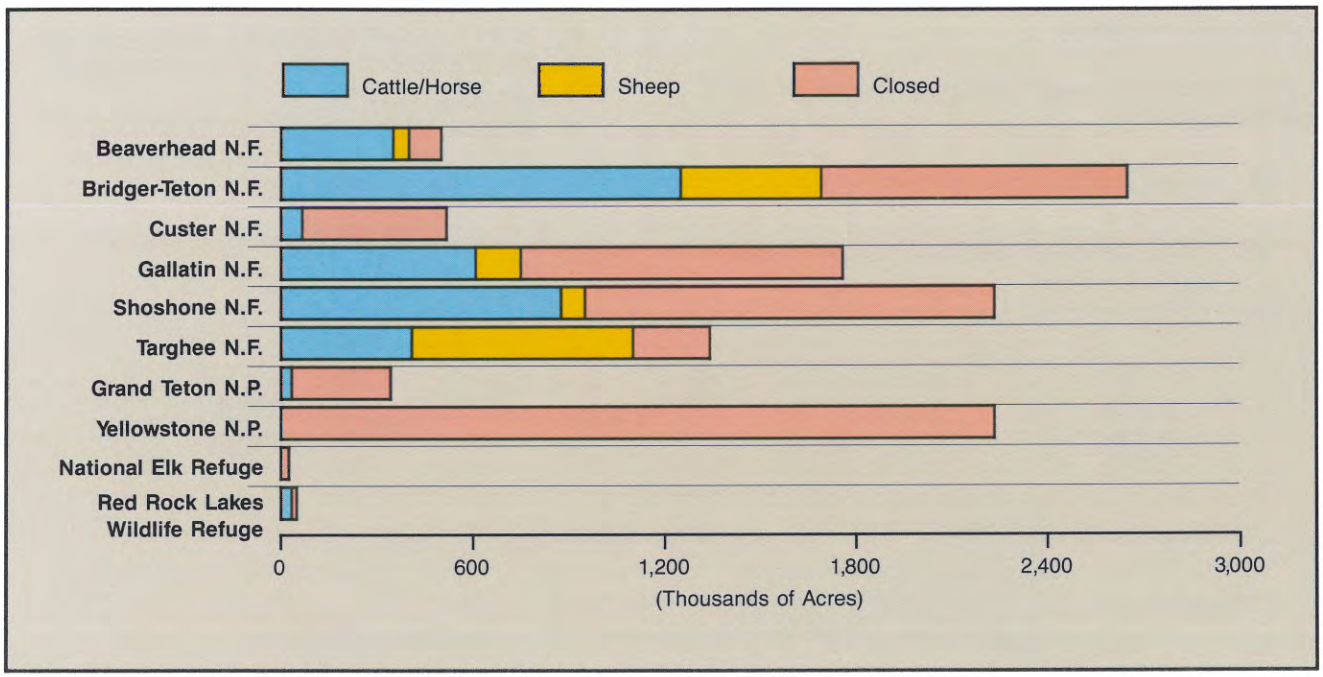


Chart 14. Acres open and closed to domestic livestock grazing.

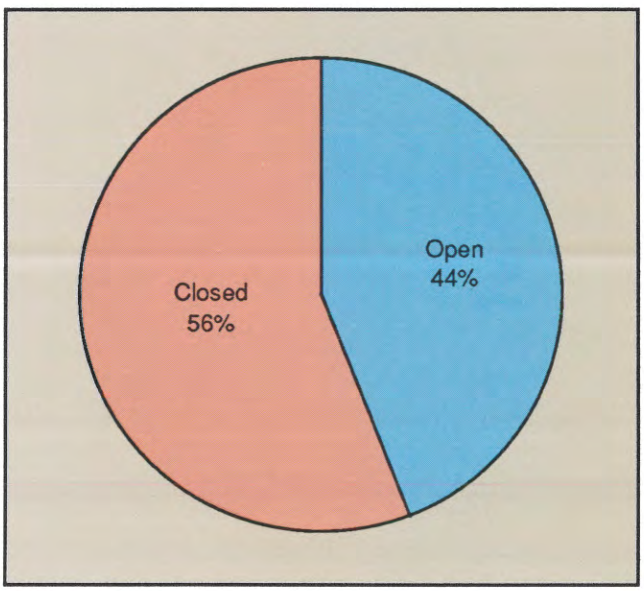


Chart 14.1. Acres open and closed to domestic livestock grazing.

Land designated for sheep grazing is not quite as developed. There are fewer fences and water sources, and vegetative improvements are not as feasible.

Improvements on sheep range include mainly suppression of sagebrush and conifers that are reinvading areas previously treated.

Charts 16 and 17 show structural and non-structural range improvements, present and planned.

Structural improvements include wells, fences, and spring developments.

Non-structural improvements include treating vegetation, such as burning sagebrush, to enhance forage production.

Coordination Opportunities

Because National Parks do not permit domestic grazing, the National Forests are faced with the following opportunities:

- Providing sufficient forage for cattle and sheep, as well as for wildlife that use the same range
- Ensuring that conflicts between grazing and other resources and activities are kept at an acceptable level

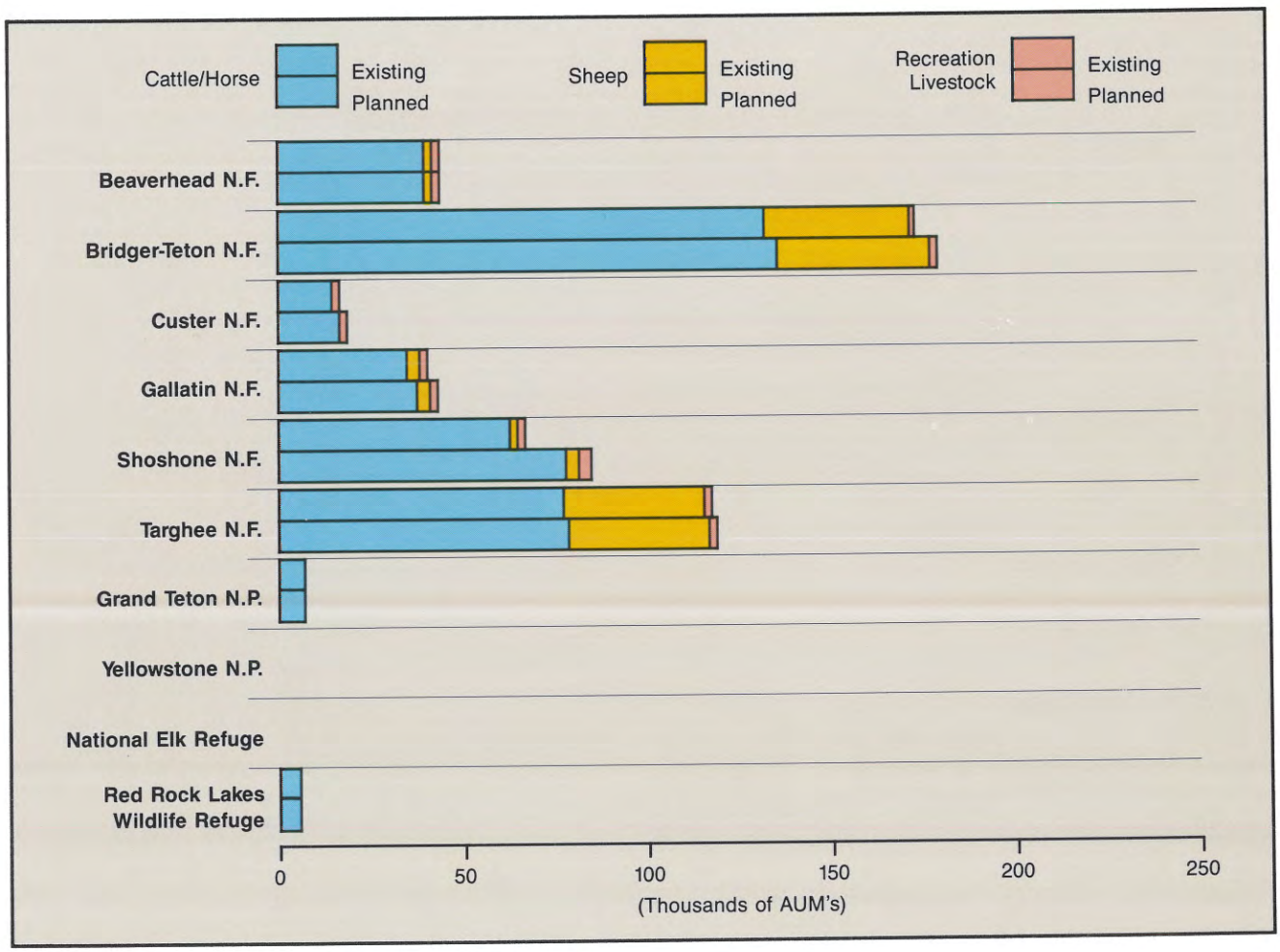


Chart 15. Amount of livestock grazing provided.

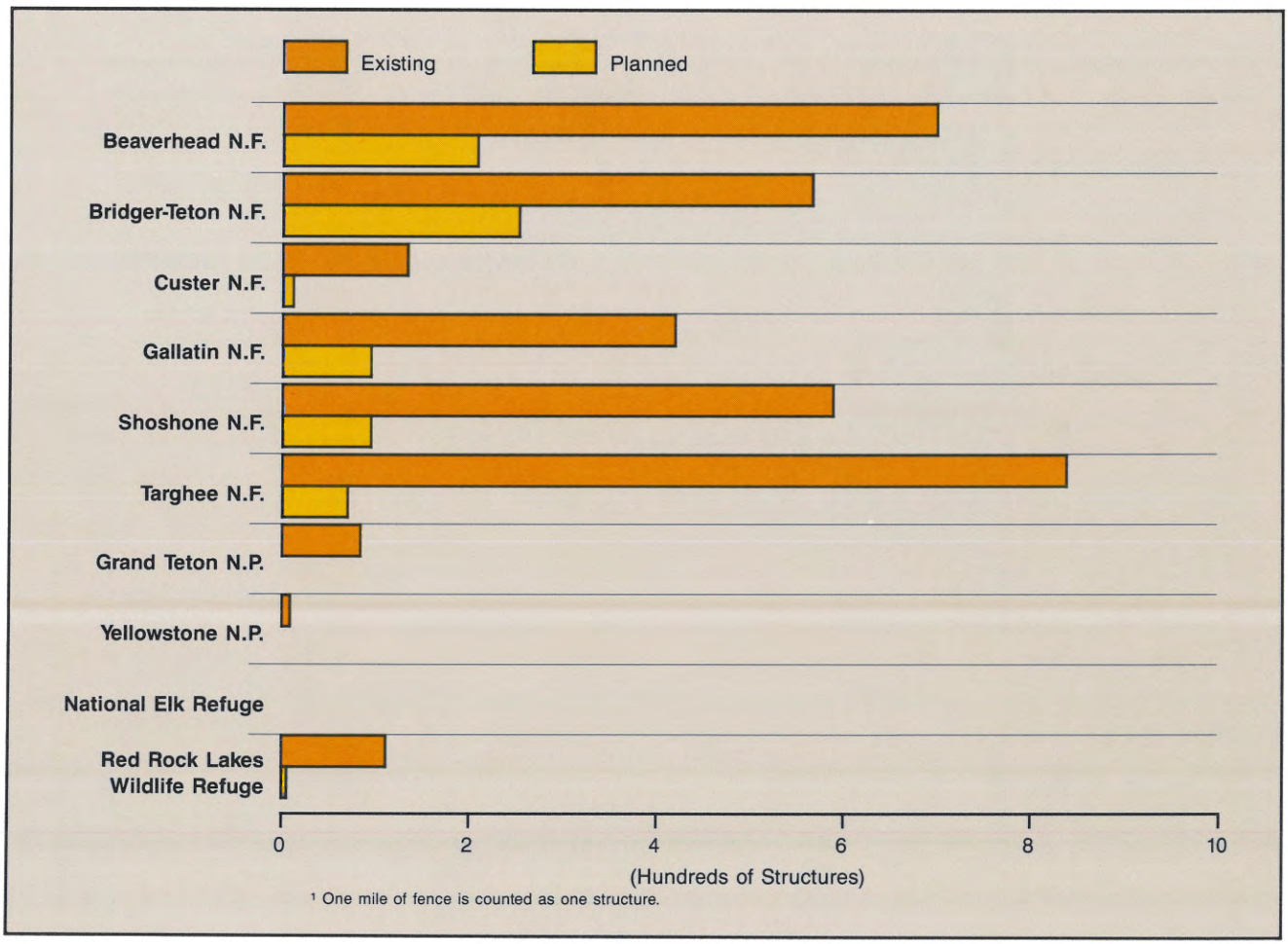


Chart 16. Structural range improvements—existing and planned.

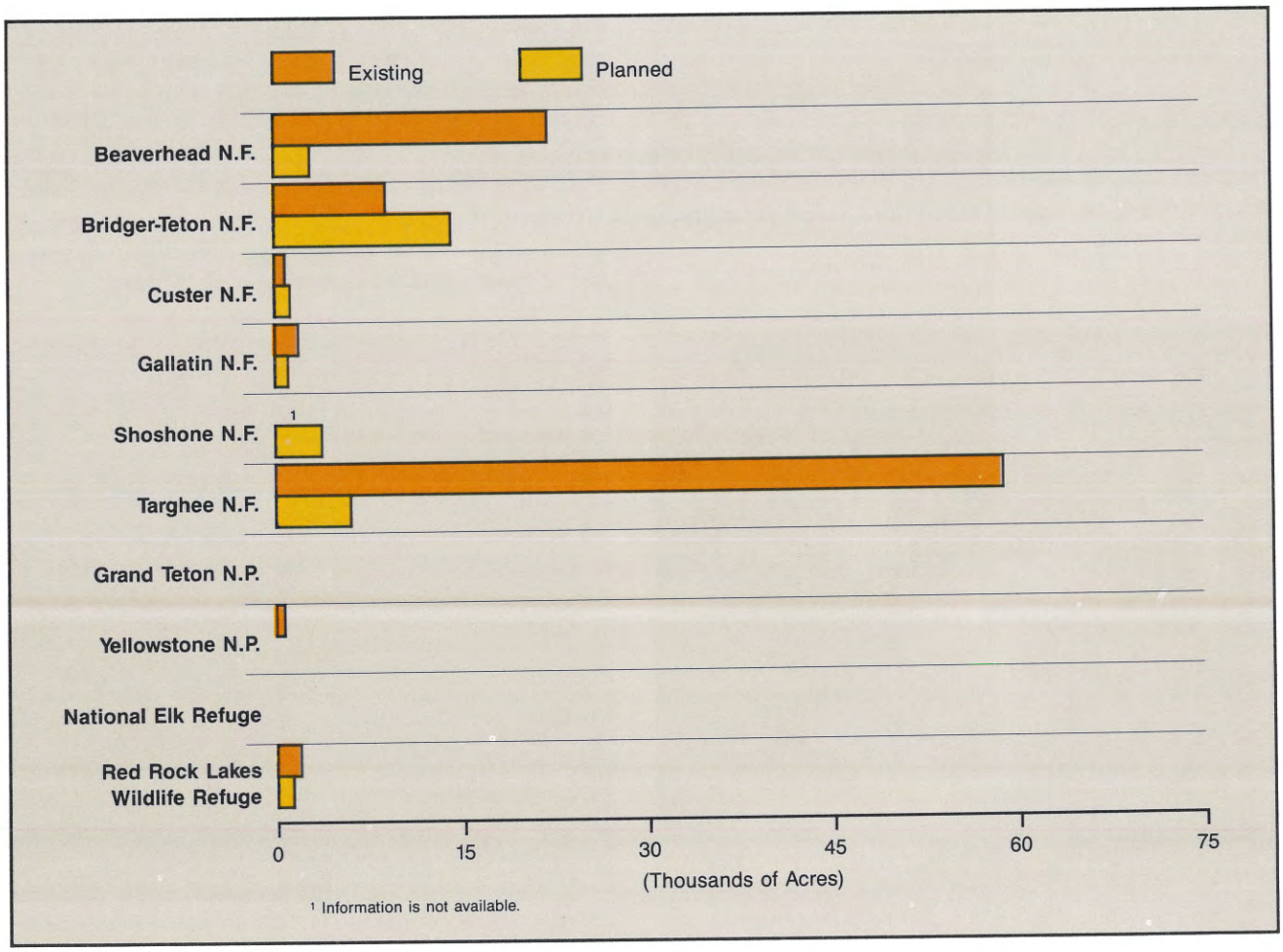
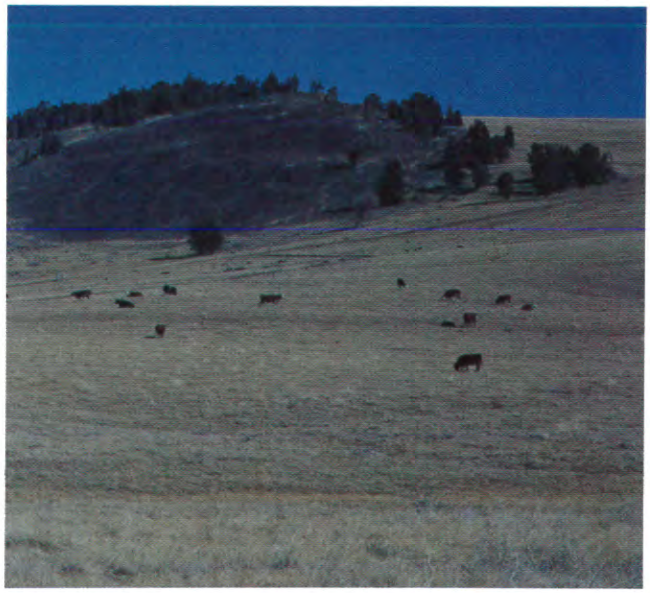


Chart 17. Non-structural range improvements—existing and planned.

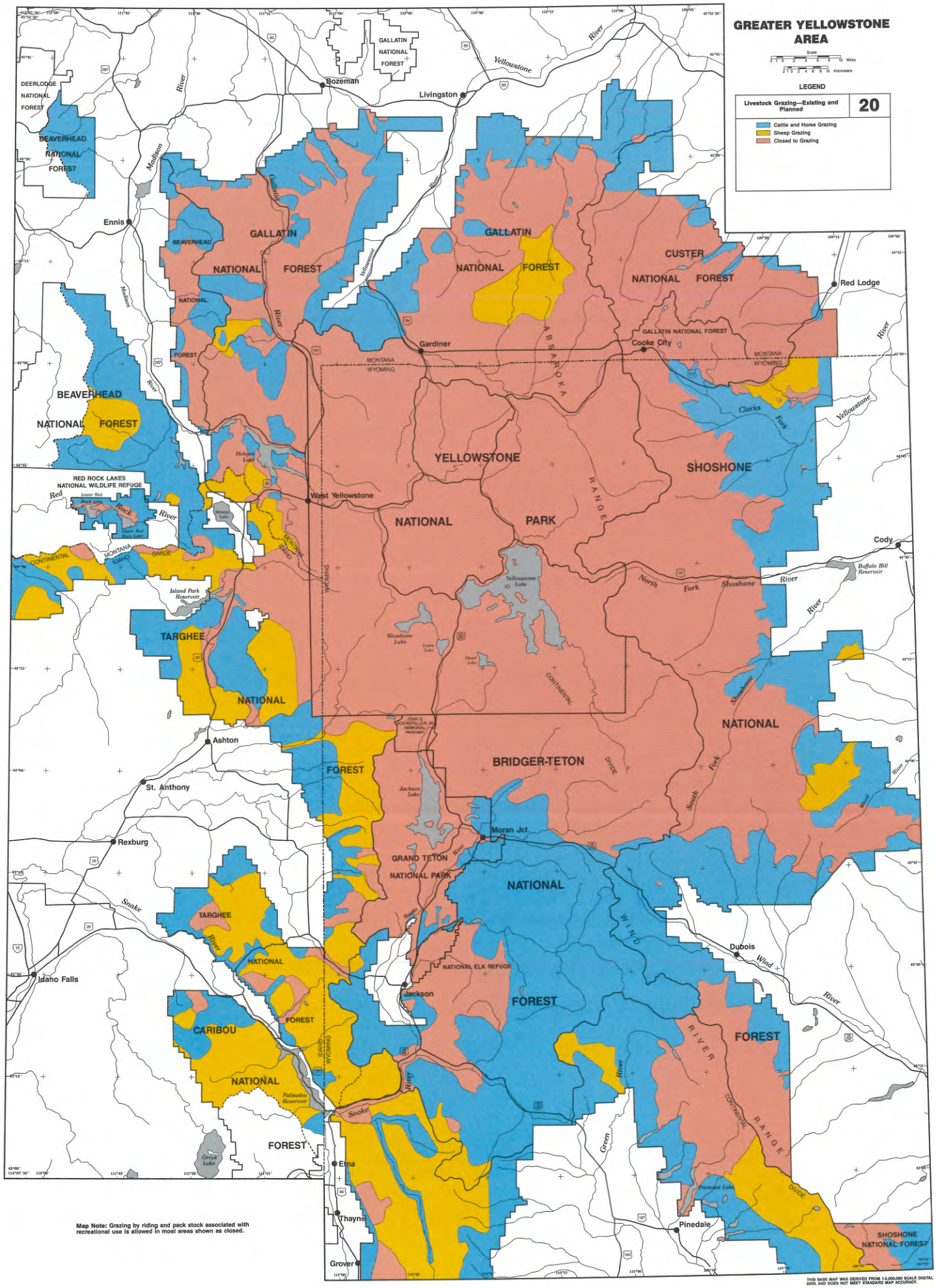
Cattle grazing on range in excellent condition, Beaverhead National Forest.



More than 30,000 areas of range in poor condition, such as this on the Beaverhead National Forest, will improve to fair or better condition during the next 15 years.

An overshot water wheel on the Beaverhead National Forest uses the power of falling water to pump water to higher elevation rangeland, allowing grazing by both domestic livestock and wildlife on otherwise waterless rangeland.

Burning sagebrush encourages the growth of plants better utilized by domestic livestock, Targhee National Forest.



Map Note: Grazing by riding and pack stock associated with recreational use is allowed in most areas shown as closed.

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Noxious and Exotic Weeds

Infestations of noxious and exotic weeds have increased significantly in recent years. Some species have doubled their acreage in the past ten years and are detrimental to native vegetation, domestic and wild animals.

Existing Situation

Most weed species are non-native or exotic plants that were introduced and have no natural enemies. Past control efforts have not kept pace with invasions.

Seeds from noxious weeds sometimes drift into water used for downstream irrigation, resulting in lost agriculture production and increased spraying costs to farmers.

Noxious and exotic weeds, such as this Musk Thistle, have been increasing in recent years.

Chart 18 shows acres of various weed species in the area for 1975 and 1985. Map 21 shows areas where infestations occur.

Planned Management

Given planned levels of control, the number of acres infested should continue to grow at about the same rate.

Coordination Opportunities

Parks and Forests face a single opportunity:

- Conducting an effective program for controlling the spread of noxious and exotic weeds.

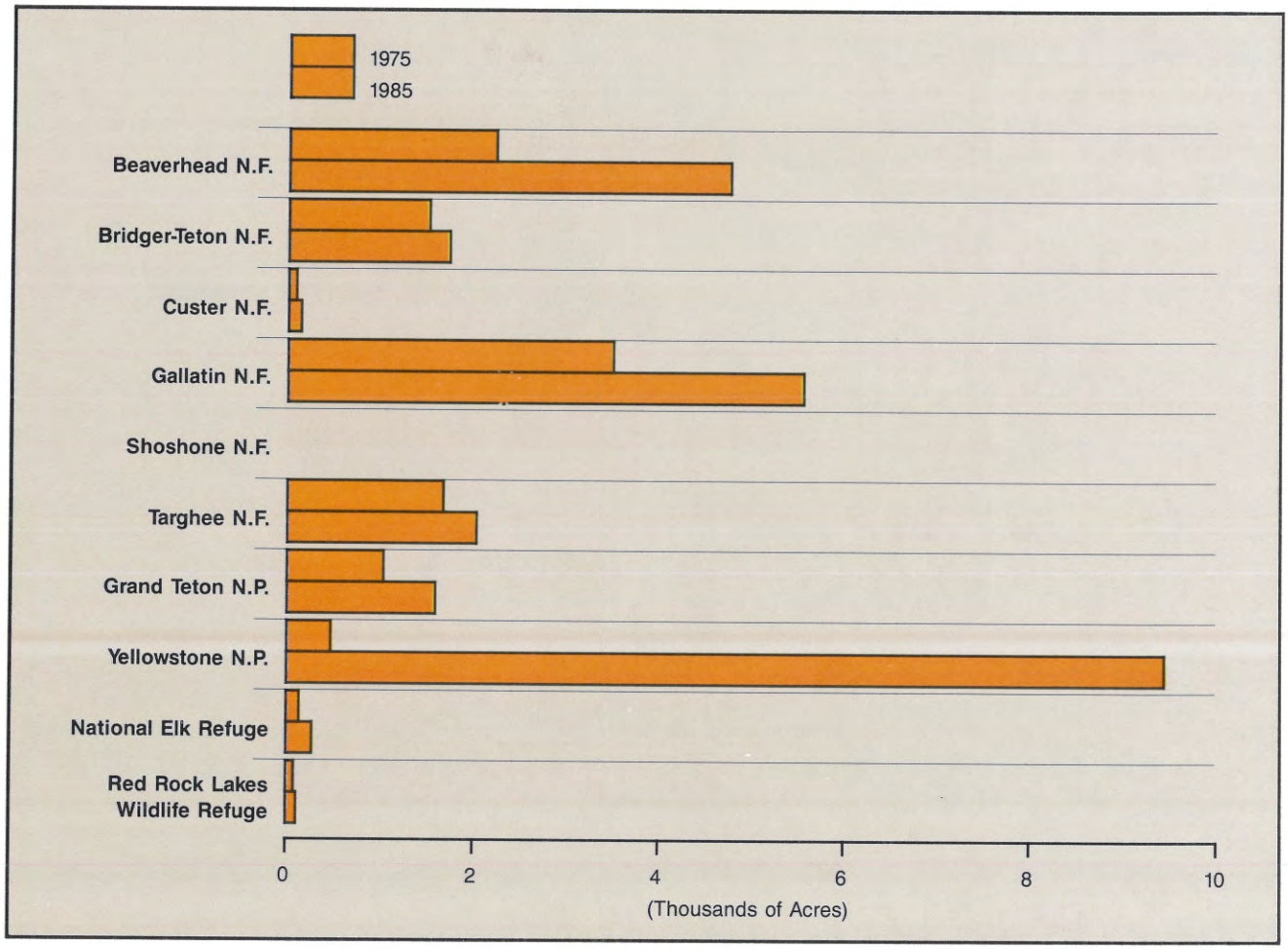
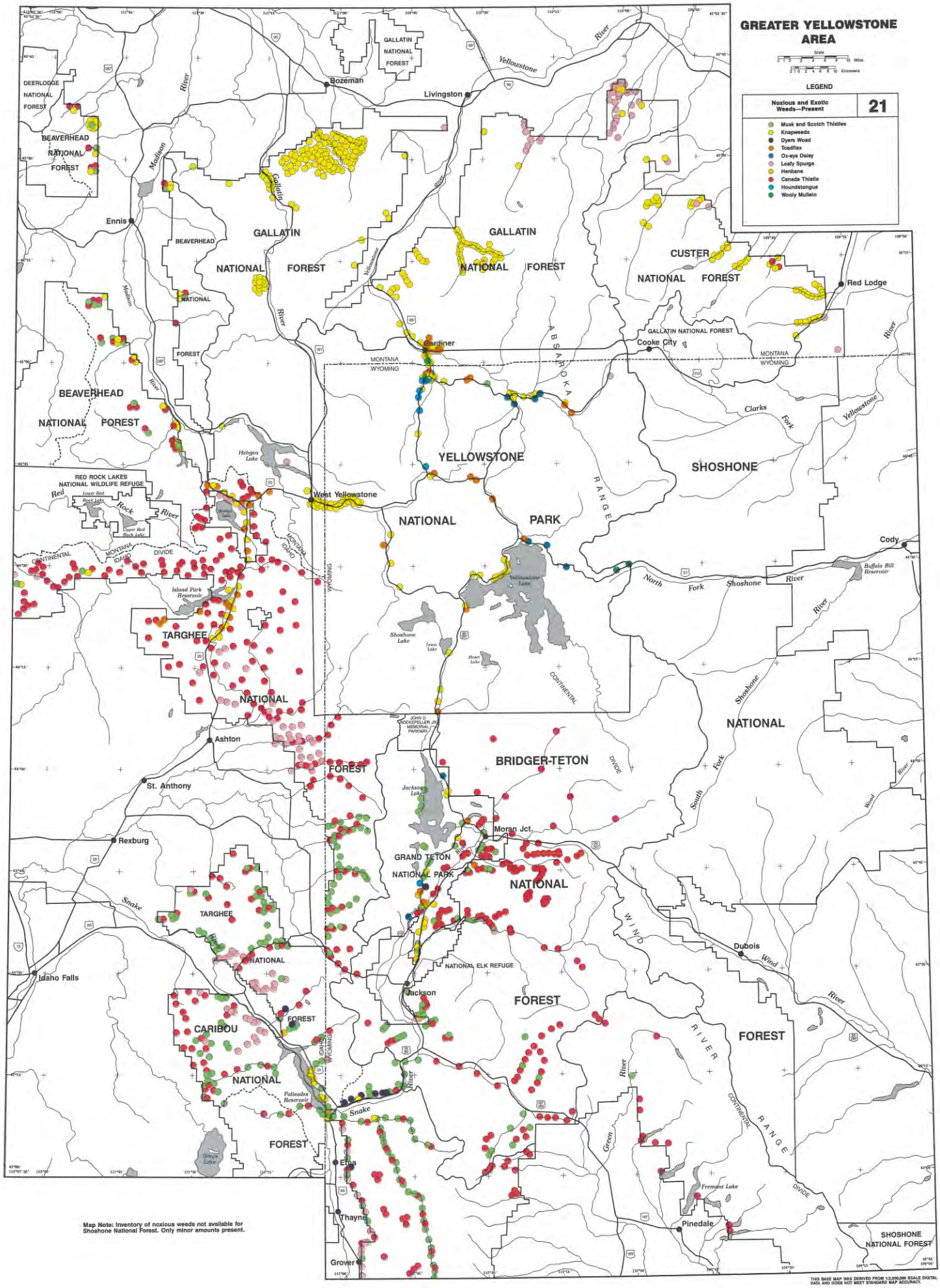


Chart 18. Acres of noxious and exotic weeds.


GREATER YELLOWSTONE AREA
LEGEND
Noxious and Exotic Weeds—Present
21
Musk and Scotch Thistles
Knapweeds
Dyers Woad
Toadflax
Ox-eye Daisy
Leafy Spurge
Henbane
Canada Thistle
Houndstongue
Wooly Mullein
Bozeman
Livingston
Ennis
Red Lodge
Cooke City
Gardiner
West Yellowstone
Cody
Ashton
St. Anthony
Rexburg
Idaho Falls
Moran Jct.
Jackson
Dubois
Pinedale
Etna
Thayne
Grover
Map Note: Inventory of noxious weeds not available for Shoshone National Forest. Only minor amounts present.
THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA, AND DOES NOT MEET STANDARD MAP ACCURACY.

Vegetation and Timber Management

Forested lands that make up the National Forest system are managed for multiple use including the long-term sustained yield of timber. Natural forces are allowed to function in forested lands that are part of the National Park system.

Timber harvesting is a source of economic development in the area and is also considered an important element in improving vegetation diversity, wildlife habitat, and to increase resistance of the forest to insects, disease, and wildfire. Nevertheless, only a small percentage (less than 3 percent) of total forested lands in the Greater Yellowstone Area has been modified by timber industry activities in the past 10 years. Planned harvesting in the next 10 to 15 years will increase this percentage only slightly.

Existing Situation

Vegetation is one of the most important and dominant features of the landscape in the Greater Yellowstone Area. It provides a wide range of benefits that include natural beauty, forage for wildlife and domestic animals, and opportunities for many forms of recreation including hiking, camping, and nature study.

Forested lands, with a diversity of vegetation species and ages, provide the greatest variety of habitat for wildlife and are generally more resistant to insect and disease epidemics than forests with uniform types and ages of vegetation. Vegetation diversity and related diversity of wildlife lends variety to visual quality and many recreation uses.

A substantial part of the vegetation management program on the National Forests is done through the commercial timber sales program. Experience has demonstrated that the sales program is an effective method of managing the forest vegetation to meet multiple use objectives. For example, vegetation can be treated to reduce natural fuels and susceptibility to fire, reduce the risk of or to suppress insects and diseases, increase and improve wildlife habitat, enhance visual quality, produce wood products, improve range condition, and increase water yield.

Land Classification

Sixty percent of the Greater Yellowstone Area is forested land and 38 percent is non-forested. The remaining two percent is water (see Chart 19). Land classification for each administrative unit is shown on Chart 20.

Vegetation Types

Major vegetation types within the Greater Yellowstone Area are shown on Map 22. Acres within each type are shown on Chart 21.

Major tree types are aspen, Douglas-fir, Engelmann spruce, lodgepole pine, and whitebark pine. Sub-alpine fir is also a major tree type; however, it is predominantly

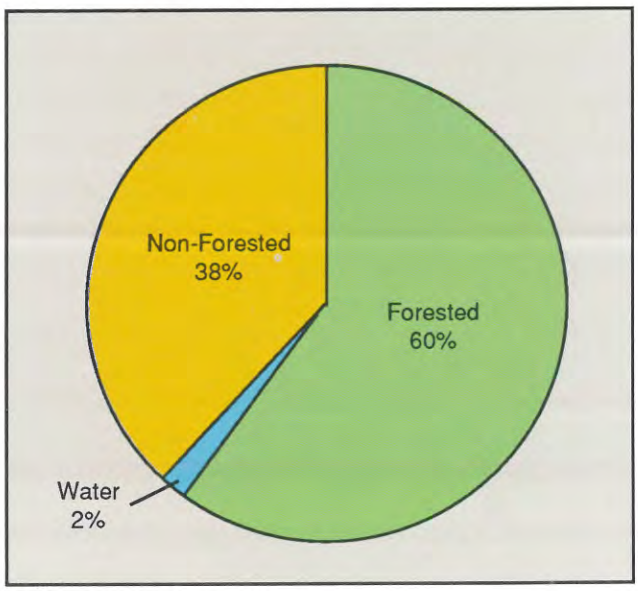
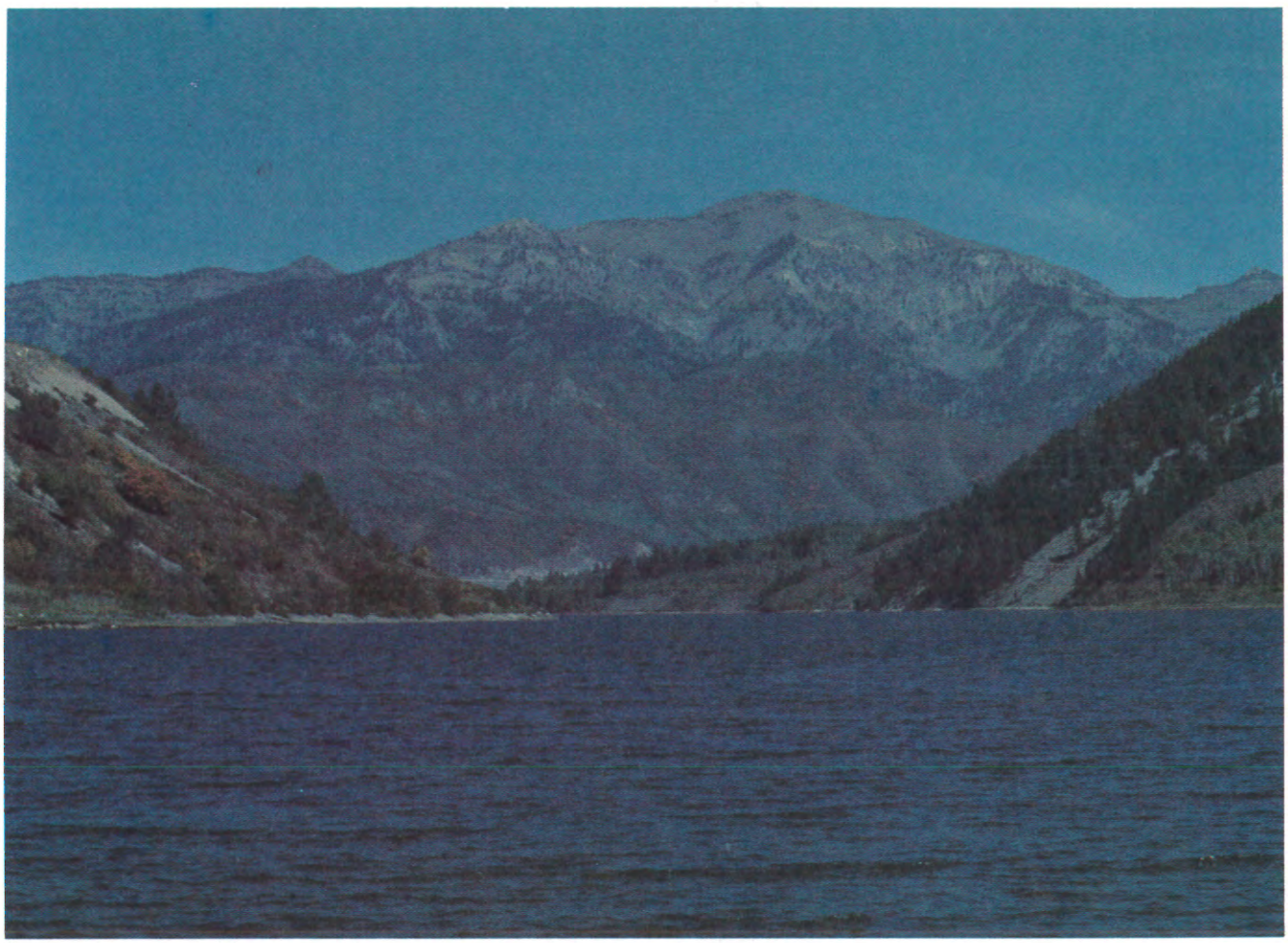


Chart 19. Land classification.

intermixed with the Douglas-fir and Engelmann spruce. Other tree species, including limber pine, are dispersed within lodgepole pine, Douglas-fir, and Engelmann spruce tree types.

Vegetation types shown on the maps are generally not pure but are interspersed with other species types and mixed species stands. The maps only show the major forest types.



The three land classes are illustrated in this photo at Palisades Reservoir, Targhee National Forest—water in the foreground, forested land on the mountain slopes, and non-forested shrub and brush fields at lower elevations and on barren slopes near the mountain peaks.

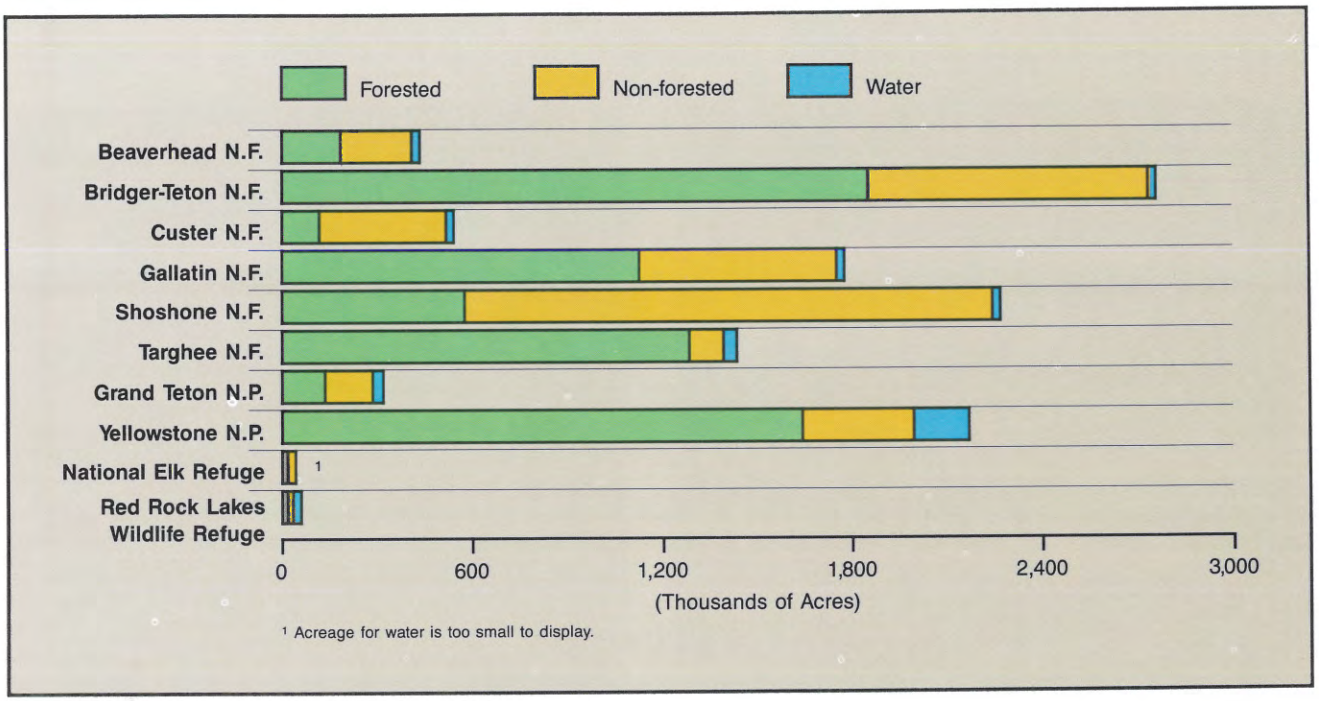


Chart 20. Land classification by unit.

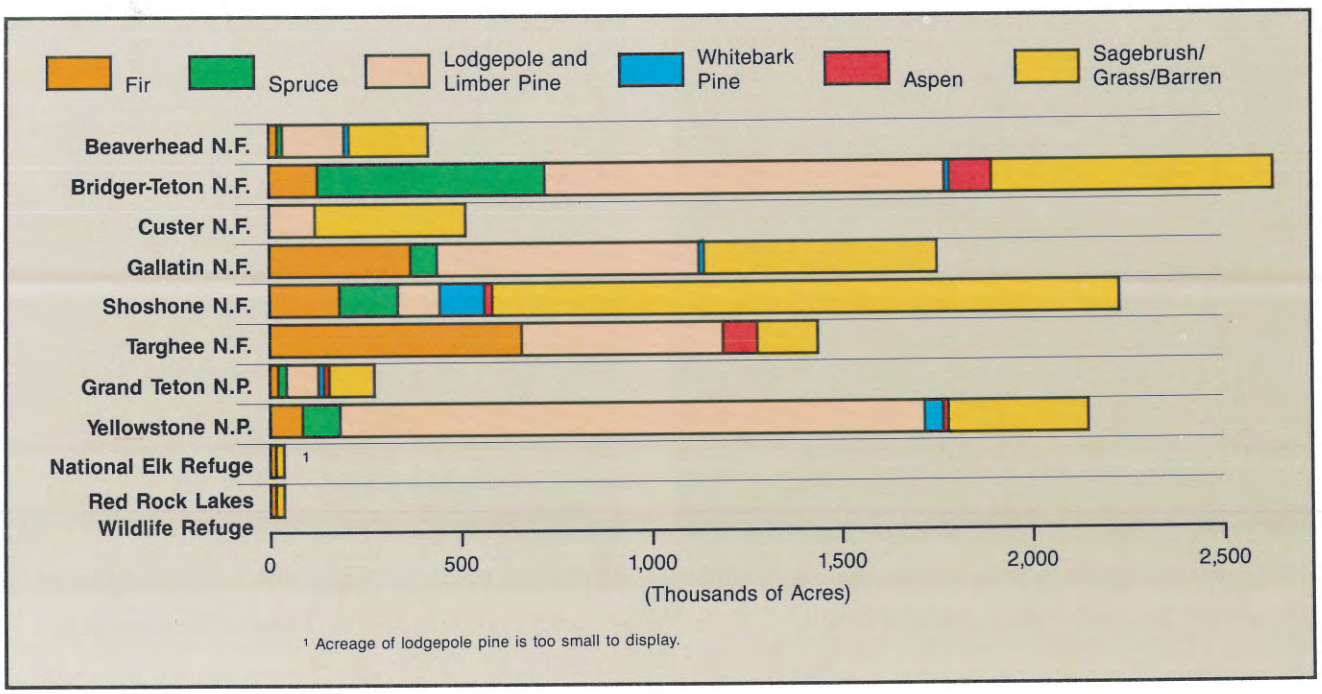


Chart 21. Vegetation classification.

Aspen tree type, Bridger-Teton National Forest.

Lodgepole pine tree type, Targhee National Forest.

Douglas-fir tree type, Gallatin National Forest.

Whitebark pine tree type, Yellowstone National Park.

Tree Age Classes

Major tree types—Douglas-fir, Englemann Spruce, aspen, lodgepole pine, and whitebark pine—are grouped into two age classes—young and old—as described in Table 2.

Old trees, particularly fir, spruce, and aspen, are important habitat for some species of wildlife. However, a diversity of age classes is also a desirable condition for maintaining good habitat for a variety of wildlife. Most trees in Forests are old and this condition will not change significantly during the next 10 to 15 years. Particularly on the Targhee National Forest, timber harvest in dead lodgepole pine will result in conversion of some stands from old trees to young trees. However, the vast majority—about 90 percent—will remain in their old, mature condition unless insects, disease, or fire intervenes, because they will not be harvested in the next 10 to 15 years.

Charts 22, 23, and 24 show existing and planned tree age class for aspen, spruce/fir, and pine for each unit.

Maps 23 and 24 show the location of existing and planned tree age classes.

As a result of timber harvest and subsequent reforestation some old lodgepole will be replaced by young trees, Targhee National Forest.

Age Class	Aspen	Douglas-fir/ Engelmann Spruce	Lodgepole Pine
Young	Less than 80 years old	Less than 120 years old	Less than 80 years old
Old	Greater than 80 years old	Greater than 120 years old	Greater than 80 years old

Table 2. Tree age classifications.

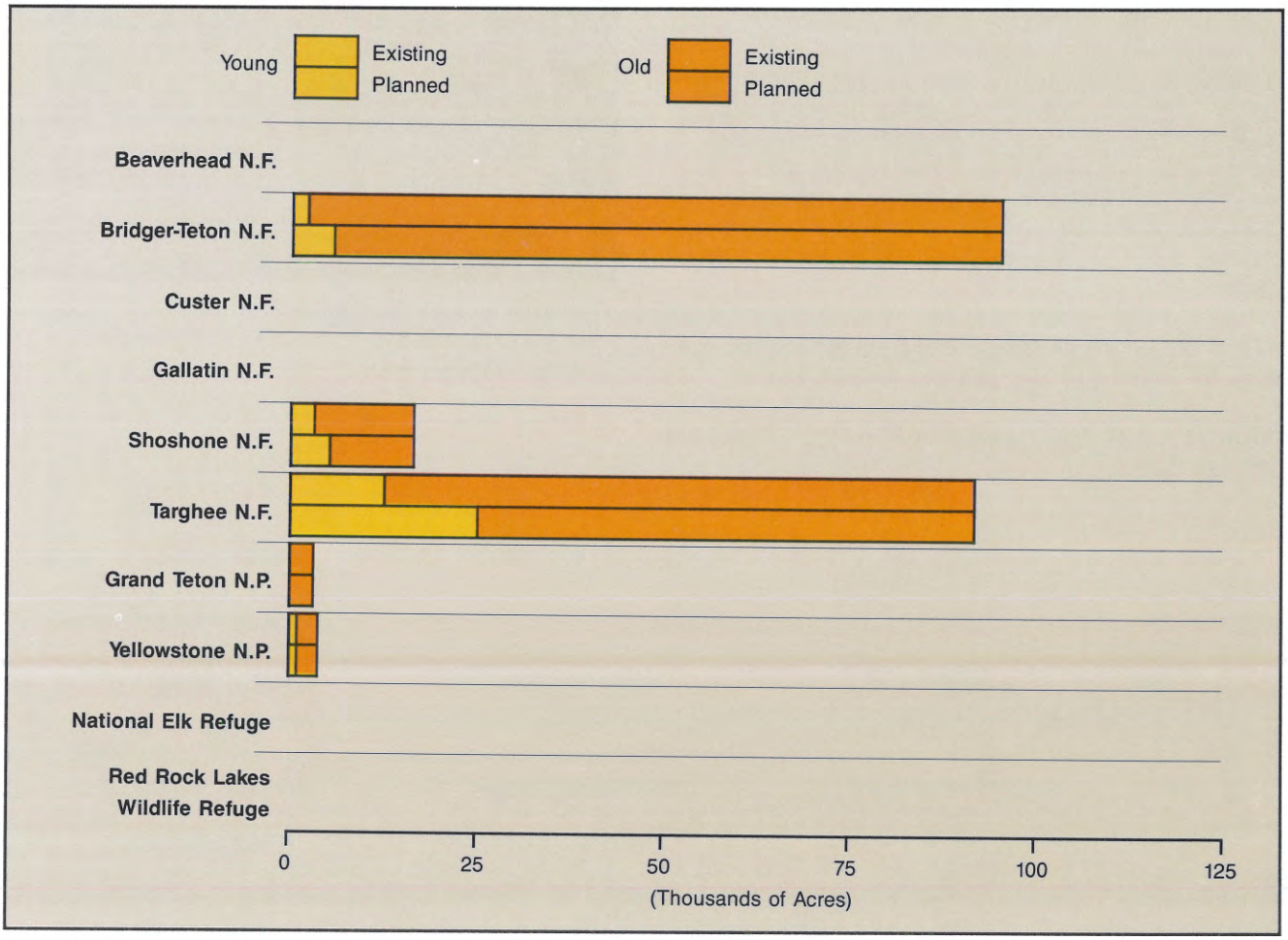


Chart 22. Tree age class—aspen.

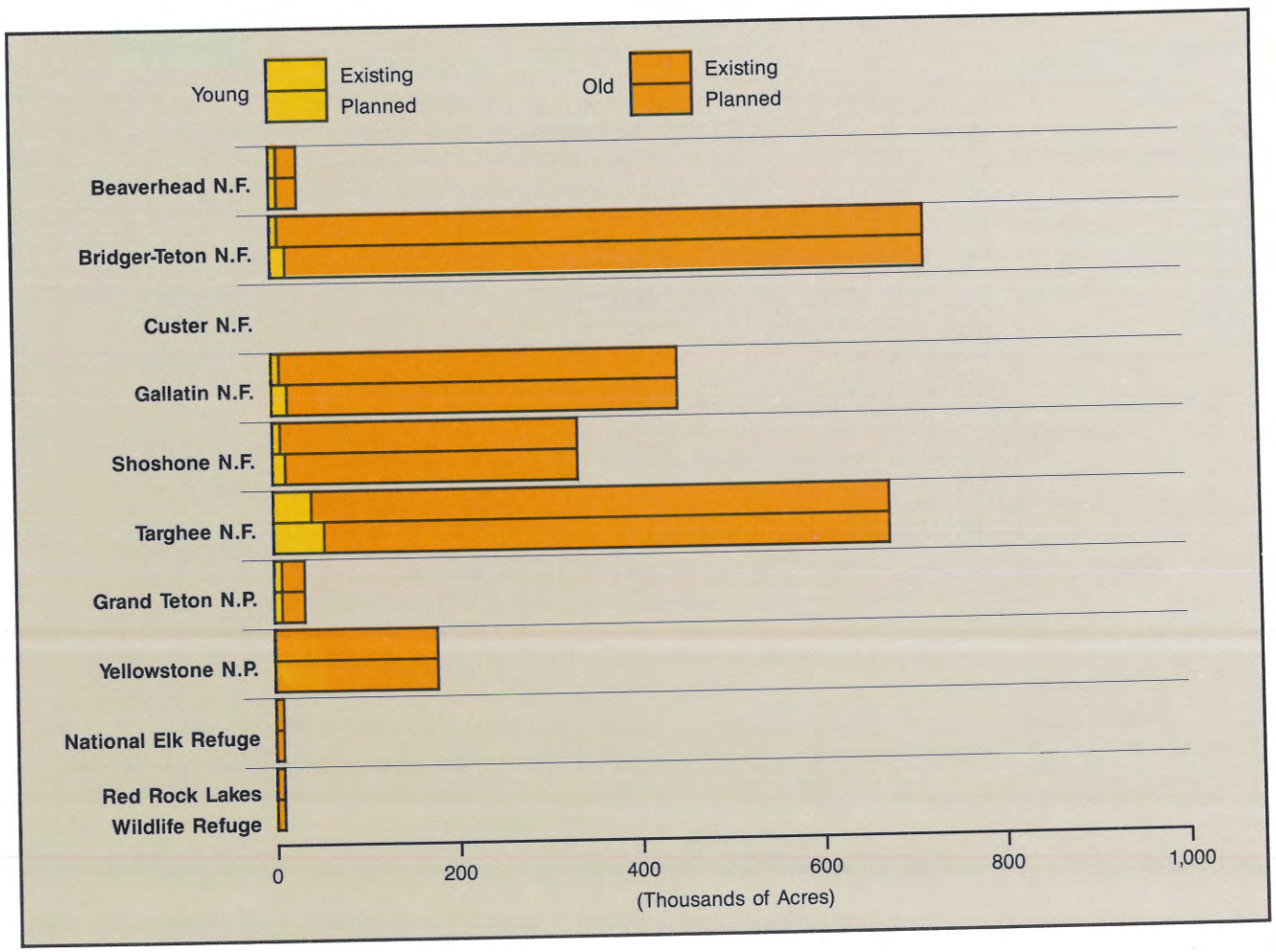


Chart 23. Tree age class—spruce/fir.

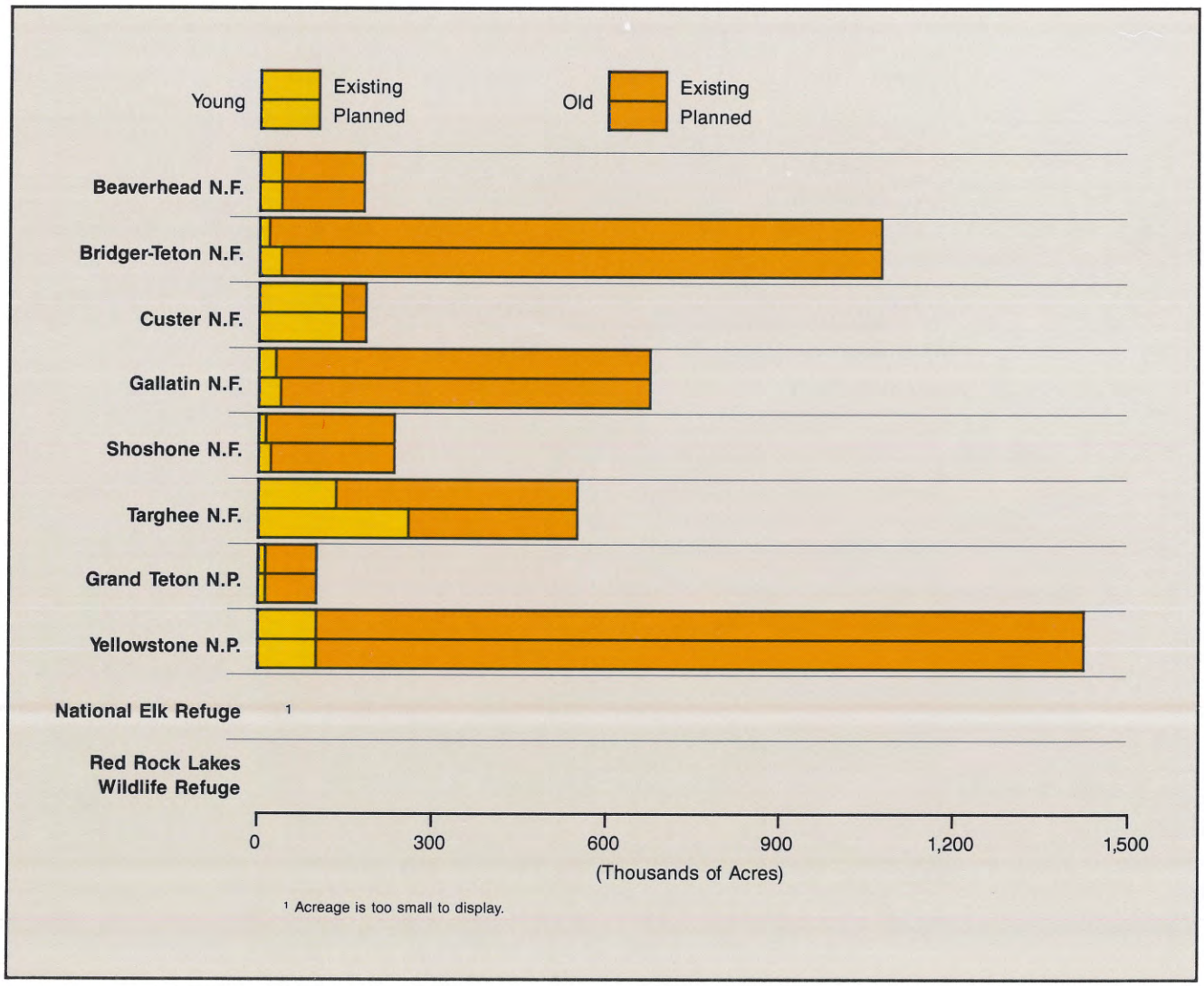


Chart 24. Tree age class—pine.

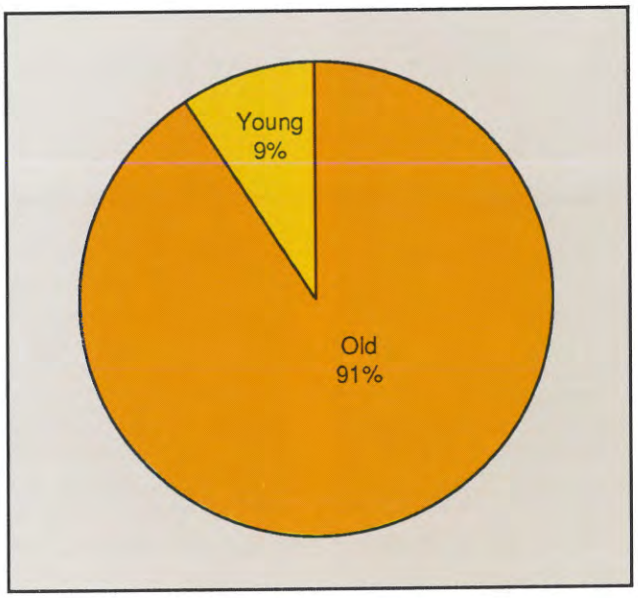


Chart 24.1 *Tree age class—all species.*

Old and young aspen trees, Targhee National Forest.

Old and young Douglas-fir trees, Gallatin National Forest.

Forest Insects

A major factor in the Greater Yellowstone Area's Forests is infestation by insects, most notably the mountain pine beetle and the western spruce budworm.

Under federal law, the Forest Service is responsible for providing insect and disease expertise and technical services to the Park Service and Bureau of Land Management. In the Greater Yellowstone Area, these services include annual insect detection flights, mapping and evaluation; hazard tree detection training for recreation areas; onsite evaluation of insect and disease conditions; identification of insects or pathogens; and other support activities.

Mountain Pine Beetle. The Greater Yellowstone Area has a long history of epidemic populations of mountain pine beetle. Recent significant epidemics in the late 1950s continued into the 1980s, killing millions of lodgepole pine trees. The old aged stands (over 90 years), large size (over 10 inches in tree diameter at breast-height), and extensive acres of same age and size classes contributed to the epidemic. All of the lodgepole pine timber types have been affected.

The mountain pine beetle is a natural part of lodgepole pine forests. As these trees mature, their growth slows and they become less resistant to attacks. The beetles bore into the bark and lay their eggs. After hatching, the larvae feed on the inner bark of the tree, eventually girdling the tree. Sap can no longer flow through this vital layer and the tree dies. The larvae then pupate, emerge as adults, and bore out of the host tree. They then fly to a nearby tree where they lay their eggs, and the cycle begins again.

Trees killed by the beetle generally stand for five years and then rapidly begin to fall to the ground, creating a buildup of fuel in the path of fires. In the absence of fire many lodgepole pine stands will evolve to a spruce/fir vegetative type. Fire or timber harvest can regenerate a new stand of lodgepole pine.

Past spraying efforts in the mid-1960s were ineffective and were subsequently discontinued. Management strategies

to control pine beetle are now designed to salvage dead and high risk (old) trees and to replace some of these stands with young trees. The result will be a greater variety of age classes that are less susceptible to beetle attacks. Aspen and other species are also stimulated by the lodgepole salvage and reforestation work.

Current and planned timber harvests of lodgepole pine types by National Forests are designed to significantly reduce the potential for future pine beetle epidemics by improving age and species diversity. Map 25 shows the extent of the present infestation. Map 26 illustrates expected future conditions.

Western Spruce Budworm. The western spruce budworm has been a persistent defoliator of the Douglas-fir, Engelmann spruce, and sub-alpine fir trees in the Greater Yellowstone Area.

Recent recorded epidemics of spruce budworm began in the late 1940s and have continued in cycles through the 1980s. The historical exclusion of wildfire has favored development of mixed age stands of Douglas-fir at elevations where western spruce budworm does well. The resulting unevenaged, layered vegetation, and recent good weather has provided an optimum environment for budworm development. Budworm larvae feed on cones and foliage of host trees. Cone crops become sparse to none with repeated years of feeding. Damage to foliage of the host trees ranges from needle loss, to top killing, to tree mortality in severe situations of repeated heavy defoliation. Mortality normally occurs in the smaller tree sizes, and top killing in larger trees.

Western spruce budworm activity is shown on Chart 25.

Methods available for management of the budworm include pesticides, biological agents, and cultural management. Pesticides and biological agents are designed to kill budworm in early stages of development, and results are immediate.

Controlling western spruce budworm, on the other hand, through cultural manipulation of forest stands is a long-term effort involving practices designed to reduce

Red trees are evidence of mountain pine beetle infestation, Targhee National Forest.

Repeated defoliation by western spruce budworm eventually causes mortality as is shown in these Douglas-fir trees, Gallatin National Forest.

susceptibility of stands and to increase factors detrimental to the insect's development. Practices include retaining or improving tree vigor, featuring non-host conifer species, and applying even-age (single canopy) management techniques. While treatment of a given stand may provide immediate protection for that stand, it will have little influence forestwide; however, over time enough stands can be treated to significantly reduce budworm activity. Treatment of budworm within the Greater Yellowstone Area has been very limited in scope, with no extensive programs being undertaken in recent years.

Planned Management

Suitability of Lands for Timber Production

Lands suited for timber production are the forested lands that are included when calculating long-term sustained yield in Forest plans. This does not mean timber harvests will occur on all suited lands in the next 10 to 15 years. In fact, only a small percentage will be affected. Areas not suited for timber production are these:

- National Parks
- National Forest wilderness
- Areas where timber production would cause irreversible damage to soil and/or watersheds
- Areas where reforestation will be uncertain
- Other areas designated in Forest plans because of economics or because the areas are not compatible with other Forest plan objectives

Timber harvests will not occur on lands designated as not suited except to protect other multiple-use values.

Chart 26 and Map 27 identify the suitability of lands for timber harvests in the various management units of the Greater Yellowstone Area.

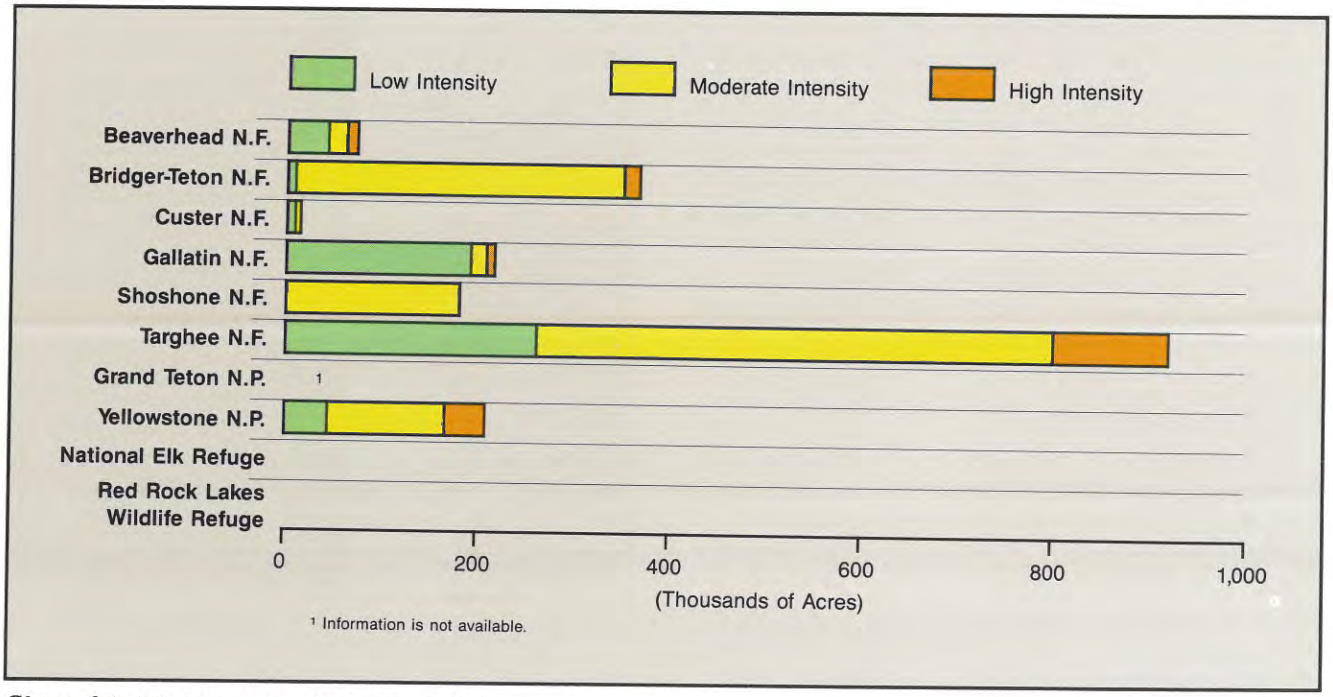


Chart 25. Western spruce budworm activity.

Areas Modified by Timber Harvest

Most past and planned timber harvest is related to salvaging and reforesting lodgepole pine stands killed by a mountain pine beetle epidemic that has been ongoing since the early 1950s. All Forests have timber sale programs of varying size. However, most timber harvesting in the past has been on the Targhee and Gallatin National Forests. The majority of future timber harvests will occur also on the Targhee. Map 27 displays acres modified by past timber harvests as well as acres that will be modified by harvests in the future. Map 28 shows where the timber harvests occurred from 1975 to 1985. Map 29 displays the same information and also shows where timber harvest is planned.

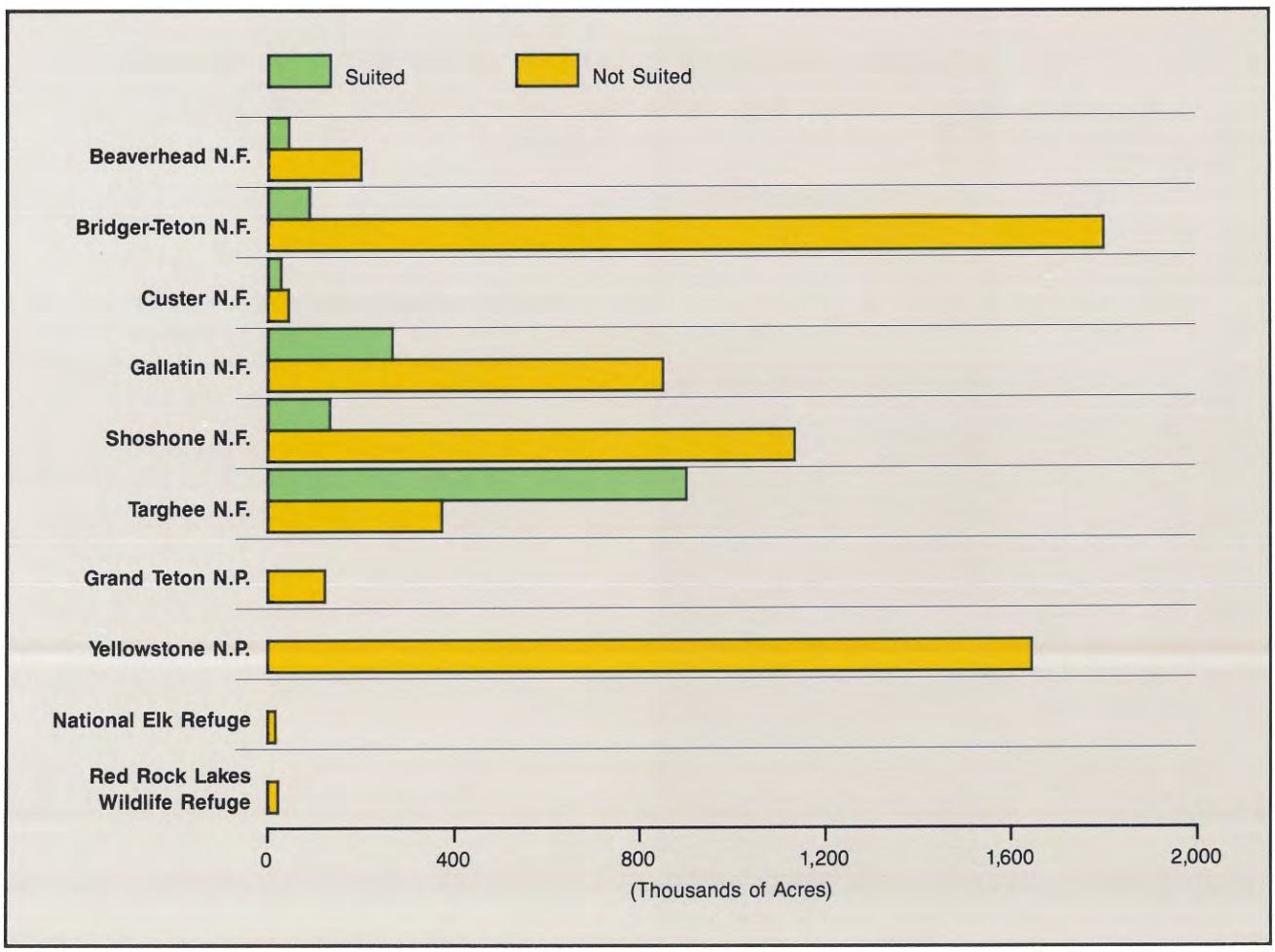


Chart 26. Suitability of lands for timber production.

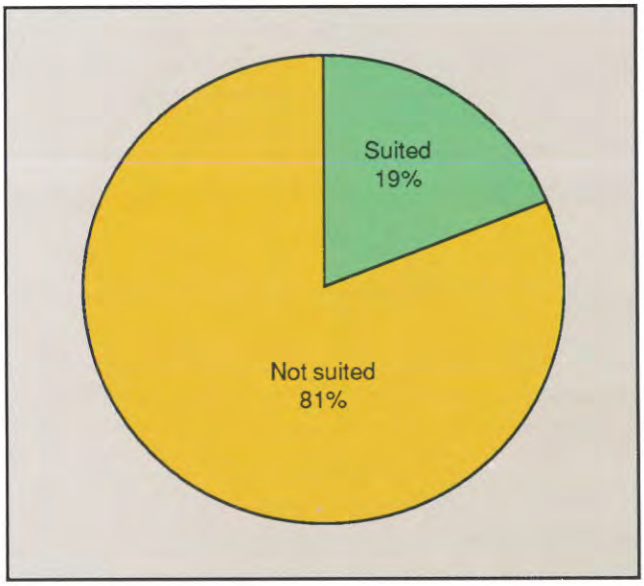


Chart 26.1. Suitability of lands for timber production.

Firewood gathering is important to the timber management program on the Targhee National Forest.

Coordination Opportunities

Vegetation is a dynamic, ever-changing feature of the Greater Yellowstone Area. In National Parks, natural forces (insects, disease, and fire) are allowed to function to the maximum extent possible. However, in National Forests, timber harvest, prescribed burning, and other management tools as well as natural forces are available for use to manage vegetation.

Timber harvests and the associated roads and other activities have the potential to affect, adversly or beneficially, other resources, especially wildlife and fish. Therefore, such activities are carefully planned and implemented.

Vegetation and the associated timber management provide these coordination opportunities:

- Ensure that production of timber, firewood, and other wood products and management programs minimize potential conflicts with other resources and activities on the same or adjacent units.
- Reduce fuel build up and enhance diversity of tree age classes by salvaging dead and dying lodgepole and promptly reforesting areas where harvest occurs.

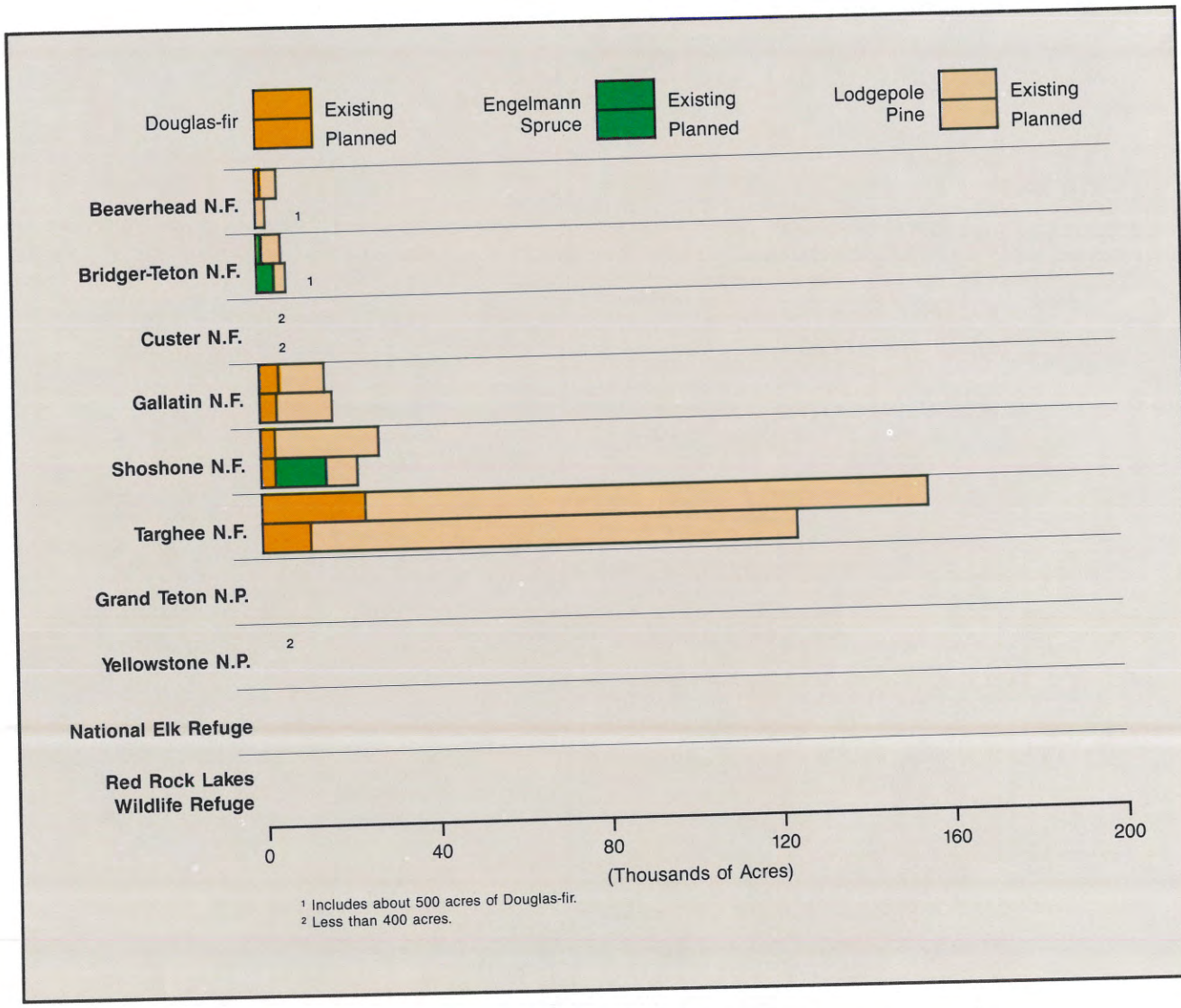
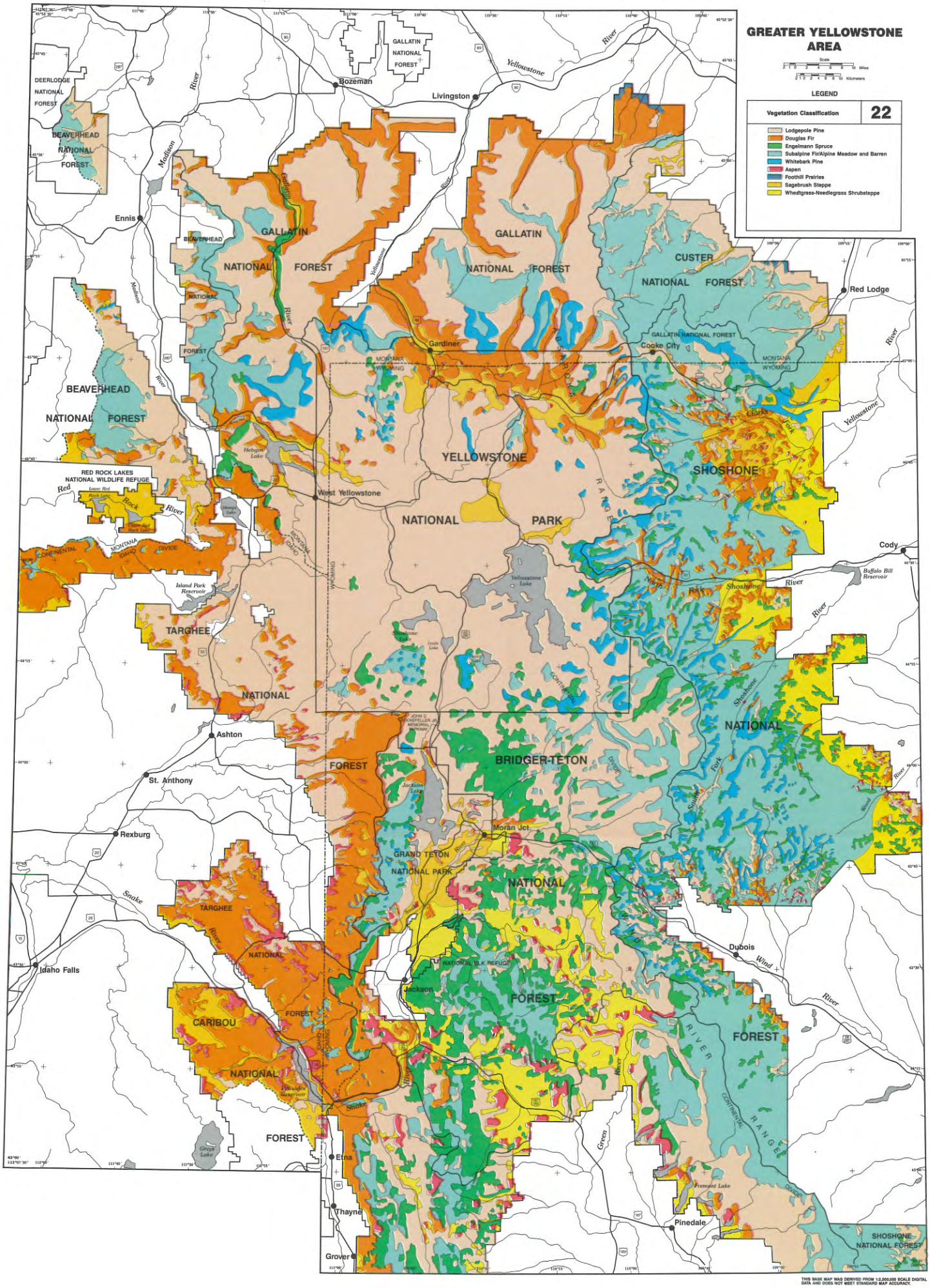
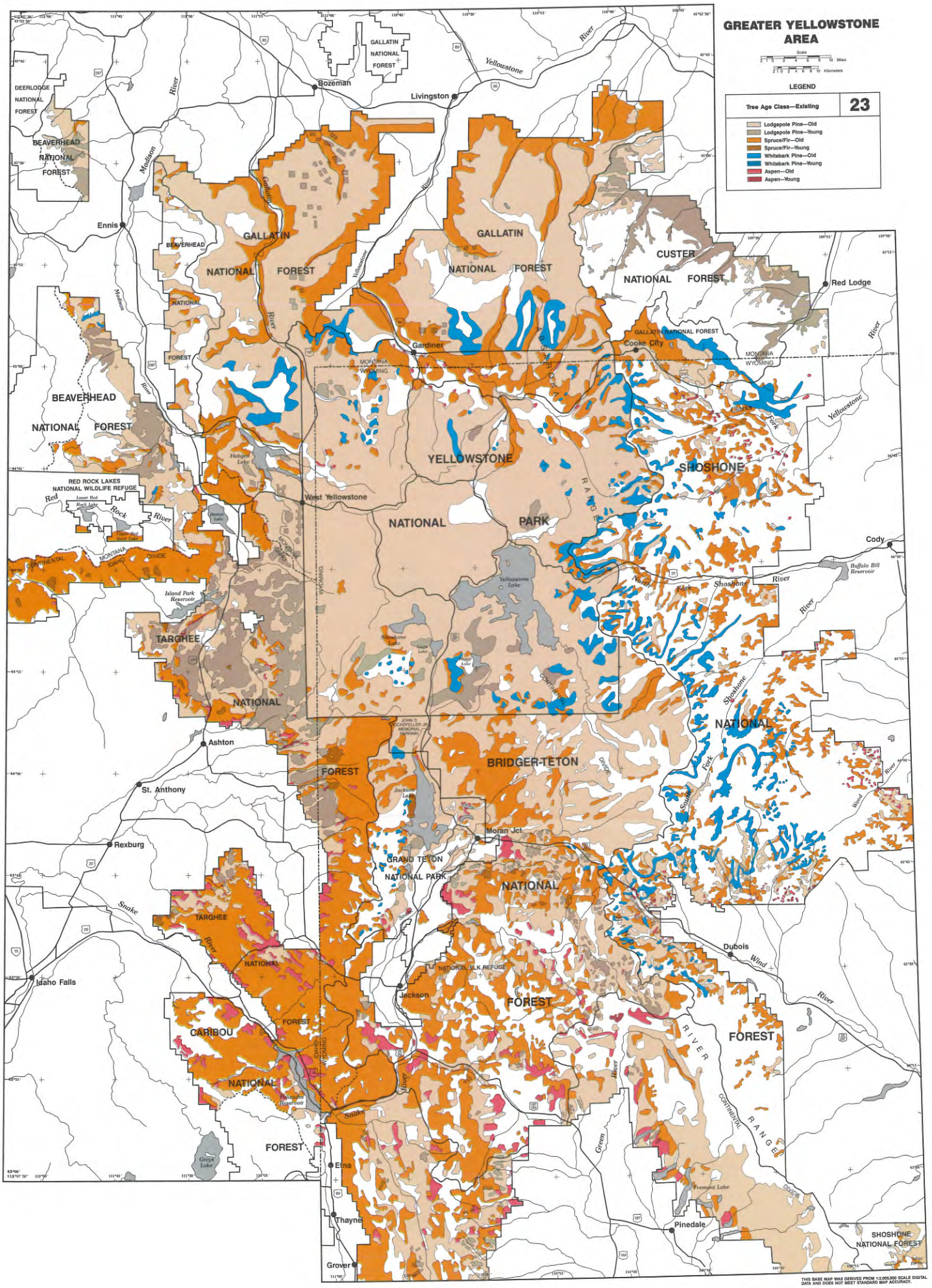
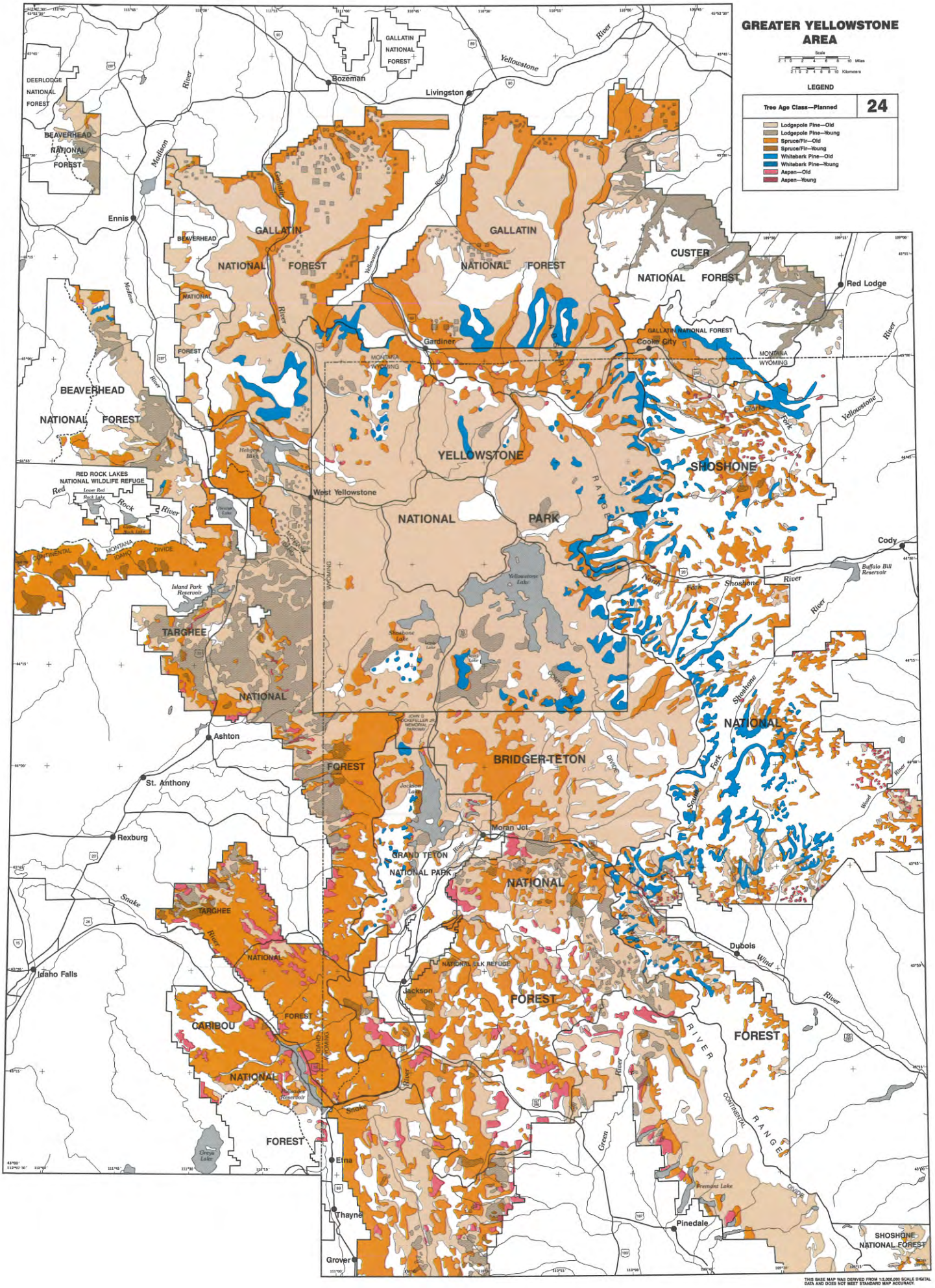
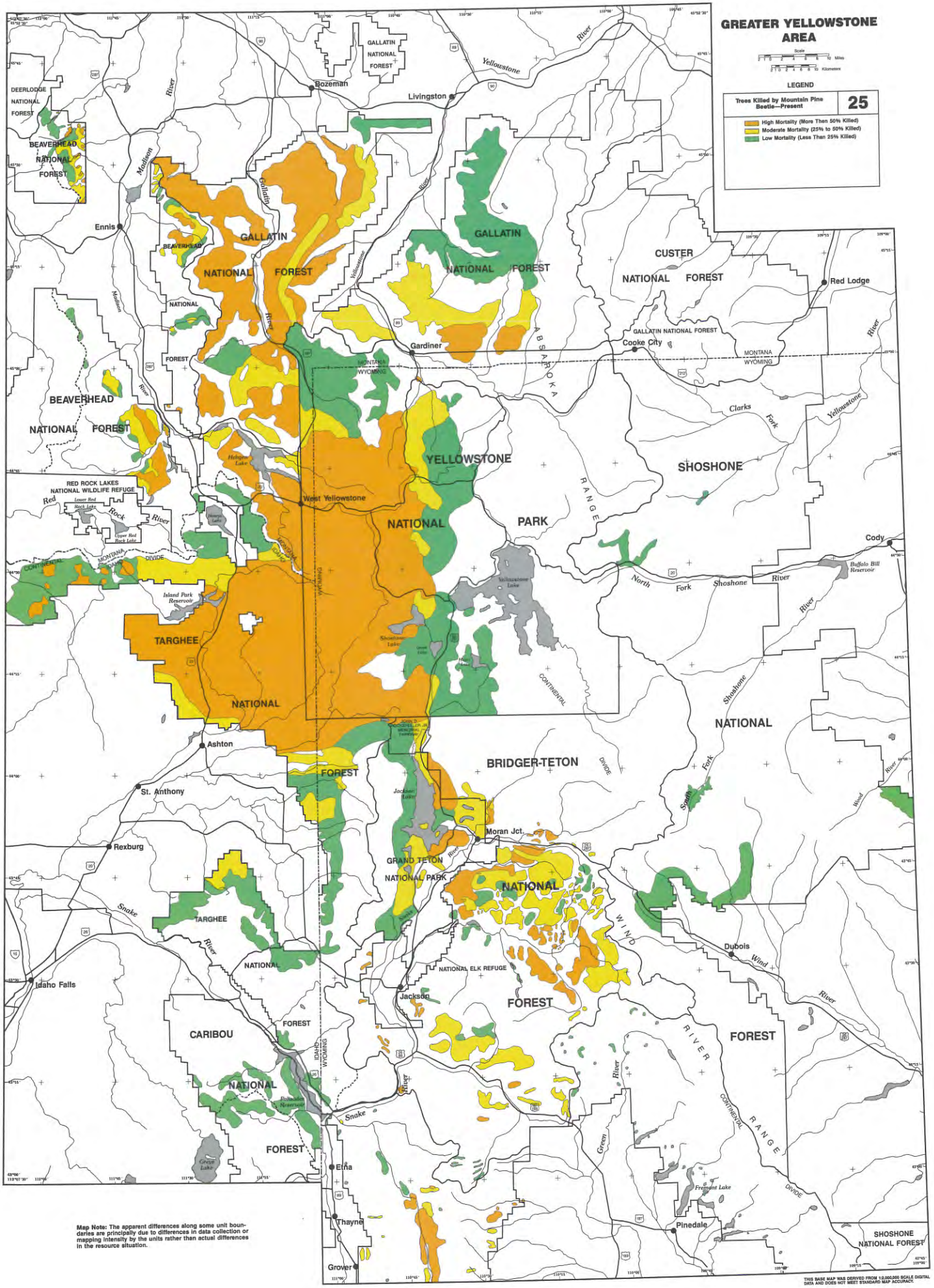


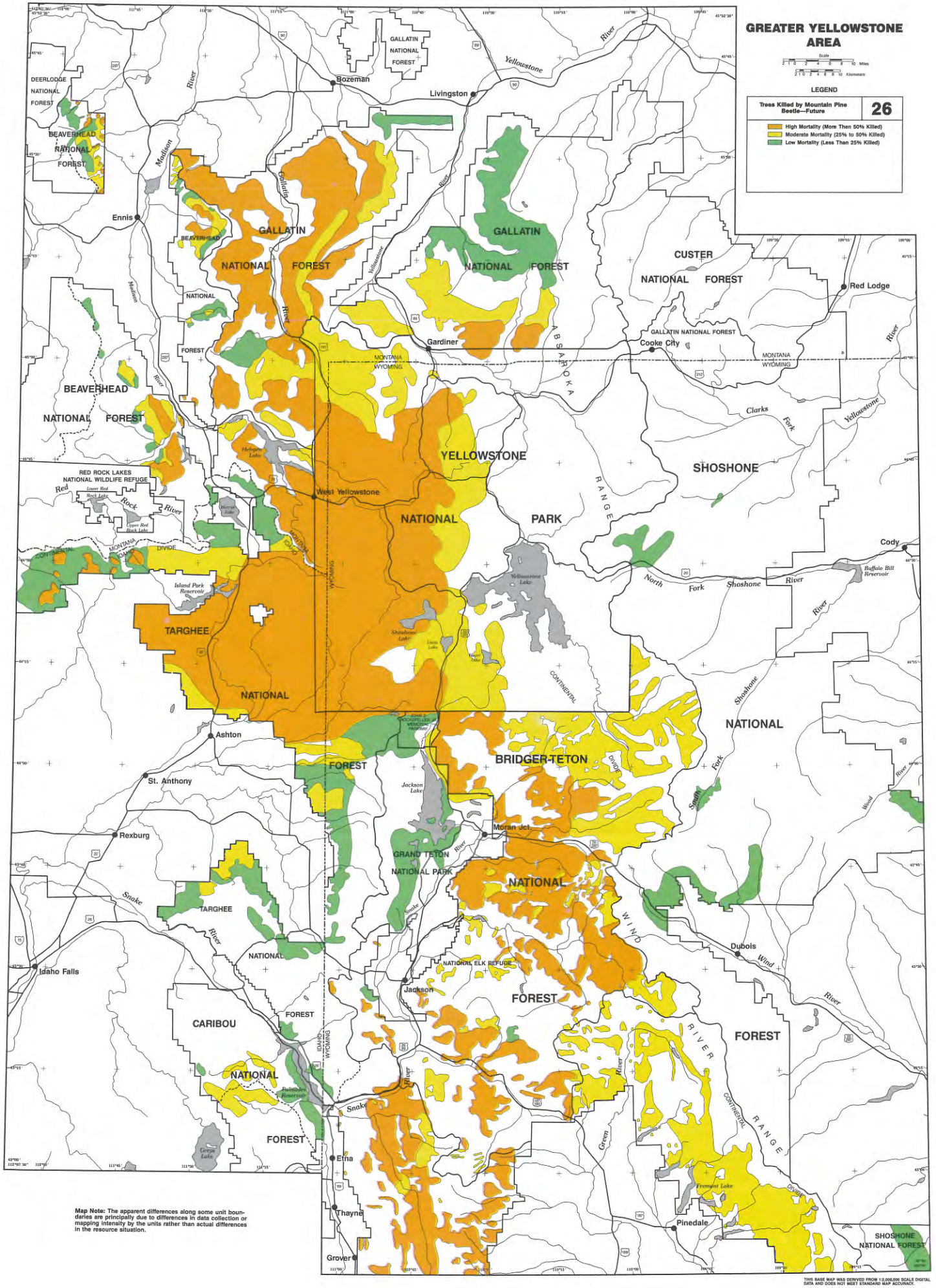
Chart 27. Areas modified by timber production—existing and planned.


GREATER YELLOWSTONE AREA
Scale
Miles
Kilometers
LEGEND
Vegetation Classification
22
Lodgepole Pine
Douglas Fir
Engelmann Spruce
Subalpine Fir/Alpine Meadow and Barren
Whitebark Pine
Aspen
Foothill Prairies
Sagebrush Steppe
Wheatgrass-Needlegrass Shrubsteppe
DEERLODGE NATIONAL FOREST
BEAVERHEAD NATIONAL FOREST
GALLATIN NATIONAL FOREST
CUSTER NATIONAL FOREST
YELLOWSTONE NATIONAL PARK
SHOSHONE NATIONAL FOREST
TARGHEE NATIONAL FOREST
CARIBOU NATIONAL FOREST
BRIDGER-TETON NATIONAL FOREST
GRAND TETON NATIONAL PARK
RED ROCK LAKES NATIONAL WILDLIFE REFUGE
NATIONAL ELK REFUGE
CONTINENTAL DIVIDE
Bozeman
Livingston
Ennis
Red Lodge
Gardiner
Cooke City
West Yellowstone
Cody
Ashton
St. Anthony
Rexburg
Idaho Falls
Moran Jct.
Jackson
Dubois
Etna
Thayne
Grover
Pinedale
Madison River
Gallatin River
Yellowstone River
Snake River
Green River
Wind River
Shoshone River
Clarks Fork
Hebgen Lake
Island Park Reservoir
Buffalo Bill Reservoir
Fremont Lake
Grays Lake
MONTANA
IDAHO
WYOMING
THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA AND DOES NOT MEET STANDARD MAP ACCURACY.


GREATER YELLOWSTONE AREA
Scale
0 2 4 6 8 10 Miles
0 2 4 6 8 10 Kilometers
LEGEND
Tree Age Class—Existing
23
Lodgepole Pine—Old
Lodgepole Pine—Young
Spruce/Fir—Old
Spruce/Fir—Young
Whitebark Pine—Old
Whitebark Pine—Young
Aspen—Old
Aspen—Young
GALLATIN NATIONAL FOREST
DEERLODGE NATIONAL FOREST
BEAVERHEAD NATIONAL FOREST
CUSTER NATIONAL FOREST
SHOSHONE NATIONAL FOREST
YELLOWSTONE NATIONAL PARK
TARGHEE NATIONAL FOREST
CARIBOU NATIONAL FOREST
BRIDGER-TETON NATIONAL FOREST
GRAND TETON NATIONAL PARK
RED ROCK LAKES NATIONAL WILDLIFE REFUGE
NATIONAL ELK REFUGE
Bozeman
Livingston
Ennis
Red Lodge
Cooke City
Gardiner
West Yellowstone
Cody
Ashton
St. Anthony
Rexburg
Idaho Falls
Jackson
Moran Jct.
Dubois
Pinedale
Etna
Thayne
Grover
MONTANA
WYOMING
IDAHO
Yellowstone River
Madison River
Gallatin River
Snake River
Wind River
Green River
Shoshone River
Buffalo Bill Reservoir
Island Park Reservoir
Palisades Reservoir
Jackson Lake
Yellowstone Lake
Hebgen Lake
Grays Lake
Fremont Lake
CONTINENTAL DIVIDE
RANGE
THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA AND DOES NOT MEET STANDARD MAP ACCURACY.


GREATER YELLOWSTONE AREA
Scale
0 2 4 6 8 10 Miles
0 2 4 6 8 10 Kilometers
LEGEND
Tree Age Class—Planned
24
Lodgepole Pine—Old
Lodgepole Pine—Young
Spruce/Fir—Old
Spruce/Fir—Young
Whitebark Pine—Old
Whitebark Pine—Young
Aspen—Old
Aspen—Young
YELLOWSTONE NATIONAL PARK
GALLATIN NATIONAL FOREST
BEAVERHEAD NATIONAL FOREST
CUSTER NATIONAL FOREST
SHOSHONE NATIONAL FOREST
TARGHEE NATIONAL FOREST
CARIBOU NATIONAL FOREST
BRIDGER-TETON NATIONAL FOREST
GRAND TETON NATIONAL PARK
RED ROCK LAKES NATIONAL WILDLIFE REFUGE
NATIONAL ELK REFUGE
DEERLODGE NATIONAL FOREST
Bozeman
Livingston
Ennis
Red Lodge
Gardiner
Cooke City
West Yellowstone
Cody
Ashton
St. Anthony
Rexburg
Idaho Falls
Moran Jct.
Jackson
Dubois
Etna
Thayne
Grover
Pinedale
Madison River
Gallatin River
Yellowstone River
Snake River
Green River
Wind River
Shoshone River
Buffalo Bill Reservoir
Island Park Reservoir
Jackson Lake
Yellowstone Lake
Shoshone Lake
Lewis Lake
Henrys Lake
Hebgen Lake
Grays Lake
Fremont Lake
MONTANA
WYOMING
IDAHO
CONTINENTAL DIVIDE
YELLOWSTONE RANGE
SOUTH FORK
NORTH FORK
CONTINENTAL RANGE
JOHN D ROCKEFELLER JR MEMORIAL PARKWAY
THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA AND DOES NOT MEET STANDARD MAP ACCURACY.


GREATER YELLOWSTONE AREA
Scale
0 2 4 6 8 10 Miles
0 2 4 6 8 10 Kilometers
LEGEND
Trees Killed by Mountain Pine Beetle—Present
25
High Mortality (More Then 50% Killed)
Moderate Mortality (25% to 50% Killed)
Low Mortality (Less Than 25% Killed)
Map Note: The apparent differences along some unit boundaries are principally due to differences in data collection or mapping intensity by the units rather than actual differences in the resource situation.
THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA AND DOES NOT MEET STANDARD MAP ACCURACY.
Bozeman
Livingston
Ennis
Gardiner
Cooke City
Red Lodge
Cody
West Yellowstone
Ashton
St. Anthony
Rexburg
Idaho Falls
Moran Jct.
Jackson
Dubois
Pinedale
Thayne
Grover
Etna
GALLATIN NATIONAL FOREST
BEAVERHEAD NATIONAL FOREST
DEERLODGE NATIONAL FOREST
CUSTER NATIONAL FOREST
YELLOWSTONE NATIONAL PARK
SHOSHONE NATIONAL FOREST
TARGHEE NATIONAL FOREST
CARIBOU NATIONAL FOREST
BRIDGER-TETON NATIONAL FOREST
GRAND TETON NATIONAL PARK
NATIONAL ELK REFUGE
RED ROCK LAKES NATIONAL WILDLIFE REFUGE
ABSAROKA RANGE
CONTINENTAL DIVIDE
WIND RIVER RANGE
MONTANA
WYOMING
IDAHO
Yellowstone River
Madison River
Gallatin River
Snake River
Green River
Clarks Fork
North Fork Shoshone River
South Fork Wind River
Hebgen Lake
Island Park Reservoir
Yellowstone Lake
Jackson Lake
Palisades Reservoir
Fremont Lake
Buffalo Bill Reservoir



Map Note: The apparent differences along some unit boundaries are principally due to differences in data collection or mapping intensity by the units rather than actual differences in the resource situation.

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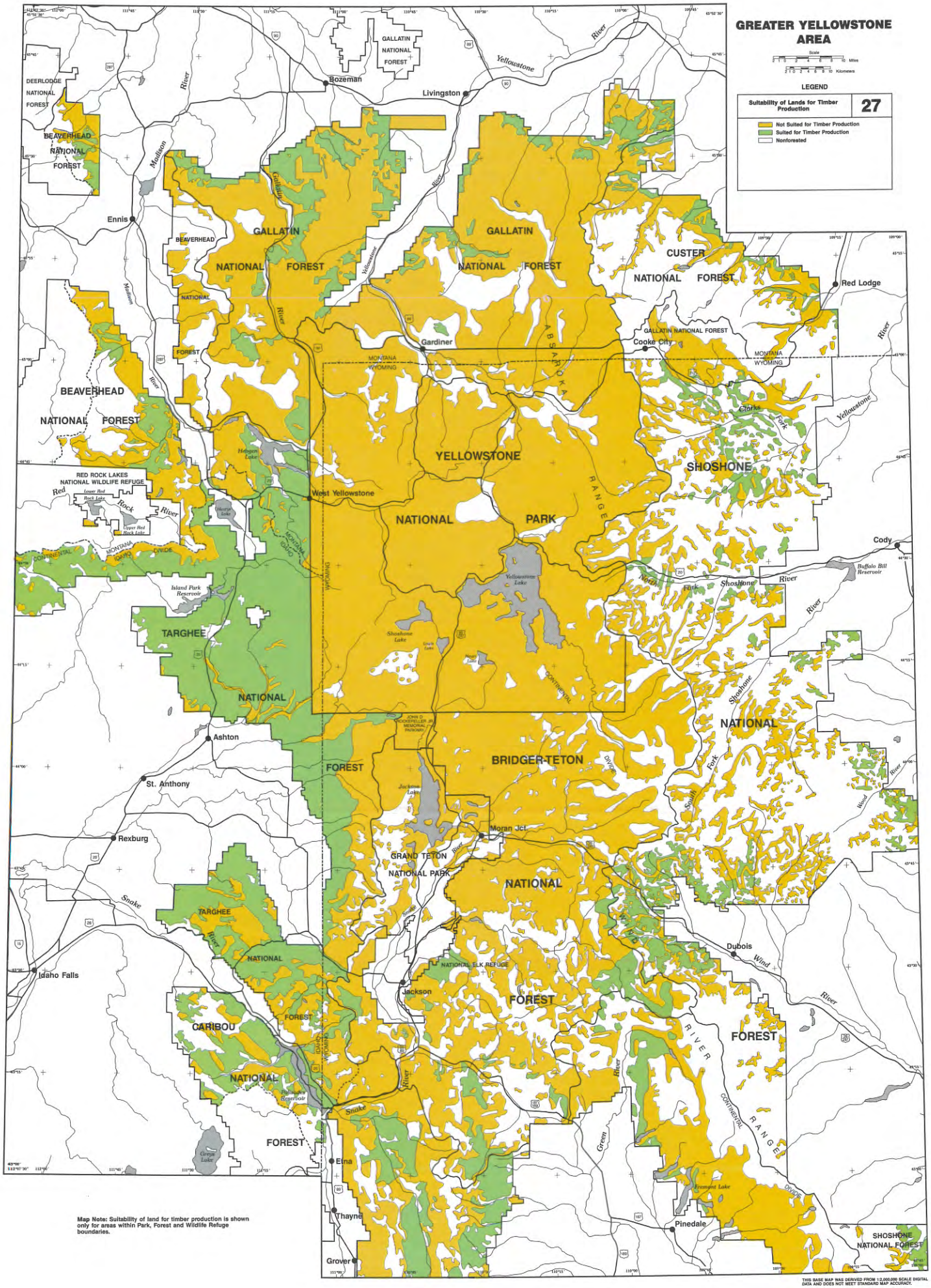
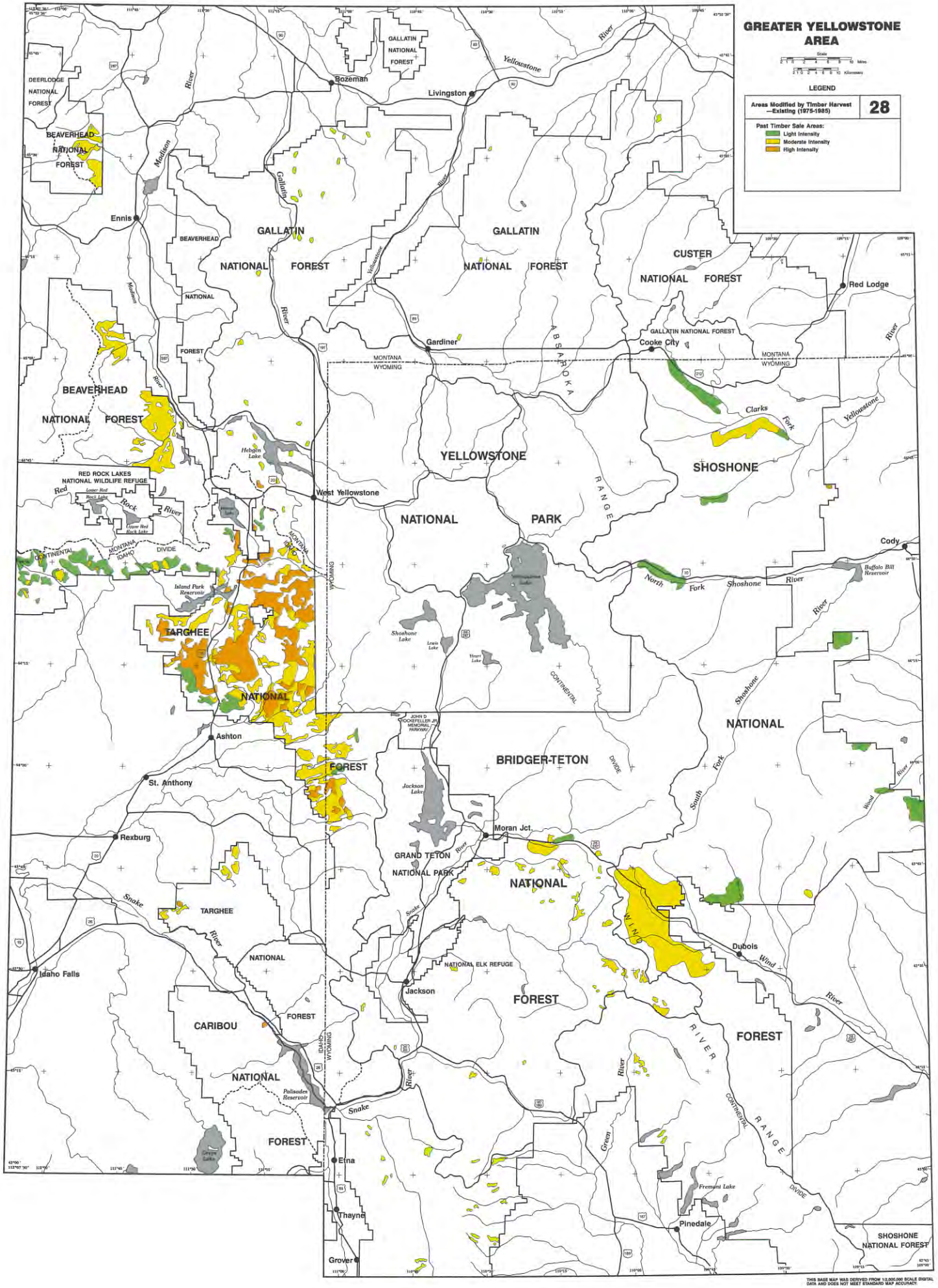
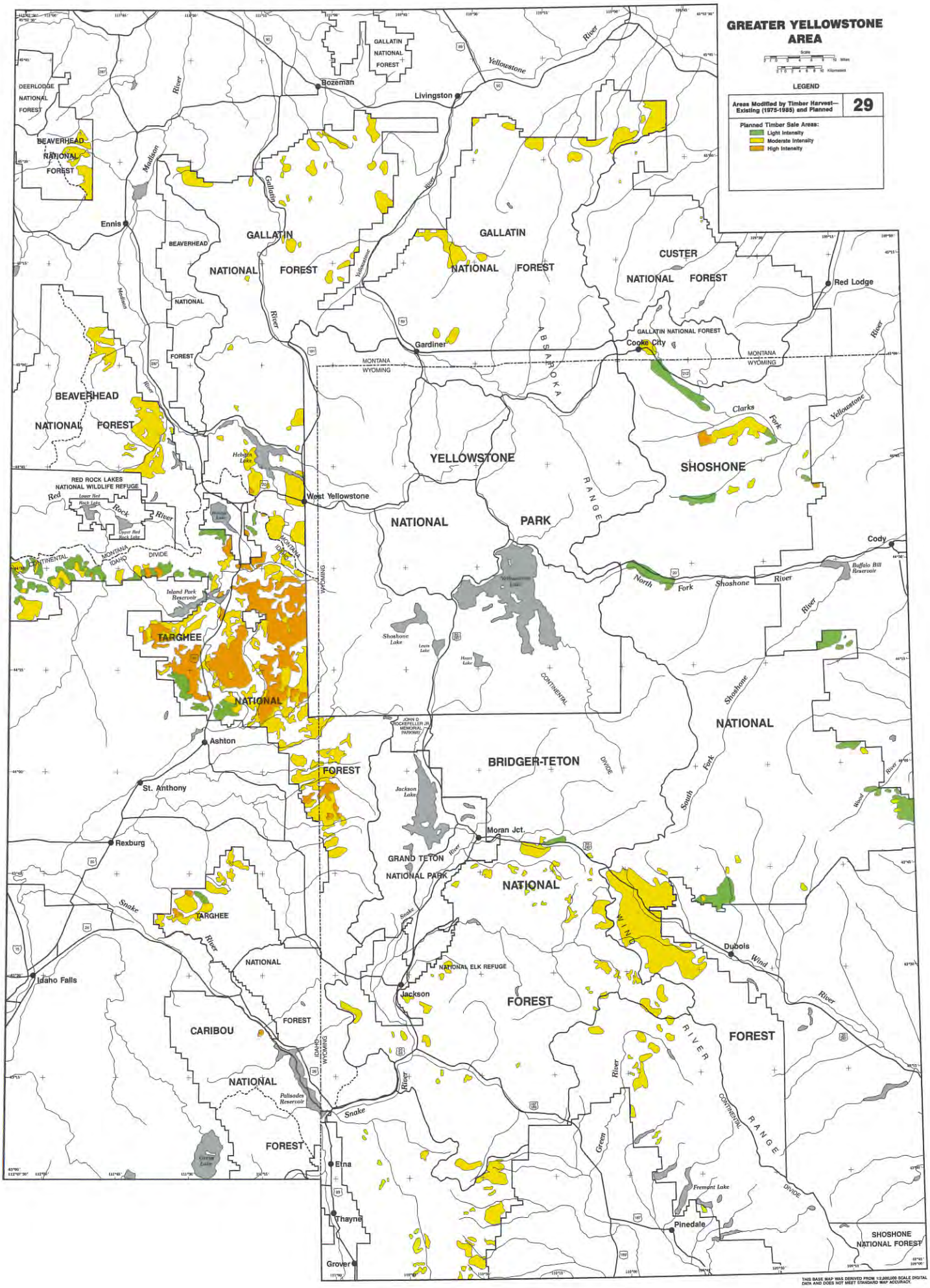


Map Note: Suitability of land for timber production is shown only for areas within Park, Forest and Wildlife Refuge boundaries.

THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA AND DOES NOT MEET STANDARD MAP ACCURACY.


GREATER YELLOWSTONE AREA
LEGEND
Areas Modified by Timber Harvest —Existing (1975-1985)
28
Past Timber Sale Areas:
Light Intensity
Moderate Intensity
High Intensity
DEERLODGE NATIONAL FOREST
BEAVERHEAD NATIONAL FOREST
GALLATIN NATIONAL FOREST
Bozeman
Livingston
Ennis
Madison River
Gallatin River
Yellowstone River
BEAVERHEAD NATIONAL FOREST
GALLATIN NATIONAL FOREST
CUSTER NATIONAL FOREST
Red Lodge
Gardiner
Cooke City
MONTANA WYOMING
ABSAROKA RANGE
Clarks Fork Yellowstone River
YELLOWSTONE NATIONAL PARK
SHOSHONE NATIONAL FOREST
RED ROCK LAKES NATIONAL WILDLIFE REFUGE
Red Rock River
Lower Red Rock Lake
Upper Red Rock Lake
Hebgen Lake
West Yellowstone
Cody
Buffalo Bill Reservoir
North Fork Shoshone River
CONTINENTAL DIVIDE
MONTANA IDAHO
Island Park Reservoir
TARGHEE NATIONAL FOREST
Shoshone Lake
Lewis Lake
Heart Lake
Ashton
St. Anthony
Rexburg
BRIDGER-TETON NATIONAL FOREST
JOHN D ROCKEFELLER JR MEMORIAL PARKWAY
Jackson Lake
Moran Jct.
GRAND TETON NATIONAL PARK
Snake River
Idaho Falls
TARGHEE NATIONAL FOREST
CARIBOU NATIONAL FOREST
Palisades Reservoir
IDAHO WYOMING
NATIONAL ELK REFUGE
Jackson
Dubois
Wind River
WIND RIVER CONTINENTAL DIVIDE RANGE
Green River
Fremont Lake
Pinedale
SHOSHONE NATIONAL FOREST
Etna
Thayne
Grover
THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA AND DOES NOT MEET STANDARD MAP ACCURACY


GREATER YELLOWSTONE AREA
Scale
LEGEND
Areas Modified by Timber Harvest—Existing (1975-1985) and Planned
29
Planned Timber Sale Areas:
Light Intensity
Moderate Intensity
High Intensity
DEERLODGE NATIONAL FOREST
BEAVERHEAD NATIONAL FOREST
GALLATIN NATIONAL FOREST
CUSTER NATIONAL FOREST
YELLOWSTONE NATIONAL PARK
TARGHEE NATIONAL FOREST
CARIBOU NATIONAL FOREST
BRIDGER-TETON NATIONAL FOREST
SHOSHONE NATIONAL FOREST
GRAND TETON NATIONAL PARK
NATIONAL ELK REFUGE
RED ROCK LAKES NATIONAL WILDLIFE REFUGE
Bozeman
Livingston
Ennis
Gardiner
Cooke City
Red Lodge
West Yellowstone
Ashton
St. Anthony
Rexburg
Idaho Falls
Jackson
Moran Jct.
Dubois
Cody
Pinedale
Etna
Thayne
Grover
MONTANA
WYOMING
IDAHO
Madison River
Gallatin River
Yellowstone River
Snake River
Green River
Wind River
Clarks Fork
North Fork Shoshone River
South Fork Shoshone River
Buffalo Bill Reservoir
Island Park Reservoir
Palisades Reservoir
Jackson Lake
Fremont Lake
Shoshone Lake
Heart Lake
Yellowstone Lake
Hebgen Lake
Lower Red Rock Lake
Upper Red Rock Lake
CONTINENTAL DIVIDE
ABSAROKA RANGE
CONTINENTAL DIVIDE
WIND RIVER RANGE
JOHN D ROCKEFELLER JR MEMORIAL PARKWAY
THIS BASE MAP WAS DERIVED FROM 1:2,000,000 SCALE DIGITAL DATA AND DOES NOT MEET STANDARD MAP ACCURACY.