1987

Greater Yellowstone Ecosystem

U.S. House Committee on Insular Affairs

Follow this and additional works at: https://digitalcommons.usu.edu/govdocs

Part of the Ecology and Evolutionary Biology Commons

Recommended Citation

GREATER YELLOWSTONE ECOSYSTEM
AN ANALYSIS OF DATA SUBMITTED BY FEDERAL AND STATE AGENCIES
PREPARED BY THE CONGRESSIONAL RESEARCH SERVICE LIBRARY OF CONGRESS FOR THE SUBCOMMITTEE ON PUBLIC LANDS AND THE SUBCOMMITTEE ON NATIONAL PARKS AND RECREATION OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS U.S. HOUSE OF REPRESENTATIVES NINETY-NINTH CONGRESS SECOND SESSION

DECEMBER 1986

Printed for the use of the Committee on Interior and Insular Affairs

U.S. GOVERNMENT PRINTING OFFICE WASHINGTON 1986
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

WASHINGTON, D.C. 20515

November 22, 1996

MEMORANDUM

To: All Members of the Committee

From: Maurice E. Hill, Chairman

Subject: Status of Research

This is to inform the Members of the Committee on Interior and Insular Affairs of the progress of the research on the Greater Yellowstone Ecosystem which is being conducted by the Library of Congress. The research is being conducted by the Library of Congress upon the request of the Committee.

We are pleased to report that the research is progressing well and that the progress report is scheduled for release in the near future. The report will be made available to the Members of the Committee for their review.

Maurice E. Hill, Chairman

Committee on Interior and Insular Affairs

U.S. House of Representatives

Washington, D.C. 20515

December 3, 1996

Chairman Maurice E. Hill, Chairman

Committee on Interior and Insular Affairs

U.S. House of Representatives

Washington, D.C. 20515

Dear Mr. Chairman:

We are pleased to report that the research on the Greater Yellowstone Ecosystem is progressing well and that the progress report is scheduled for release in the near future. The report will be made available to the Members of the Committee for their review.

The research is being conducted by the Library of Congress upon the request of the Committee. We are pleased to report that the research is progressing well and that the progress report is scheduled for release in the near future. The report will be made available to the Members of the Committee for their review.

Maurice E. Hill, Chairman
SUMMARY AND OBSERVATIONS

Background:

When the Subcommittee on Public Lands and the Subcommittee on National Parks and Recreation announced an October 25, 1985 joint hearing on Federal land management practices on the so-called "Greater Yellowstone Ecosystem," a more or less routine handling of a complex issue was expected. However, as the rest of this publication will attest, the hearing was only the prelude to a larger effort to learn more about that important area.

The hearing was a long one. Thirty-eight witnesses, representing as many organizations and government entities, testified well into the evening. There was general agreement on the area's importance. Otherwise, testimony ran the full gamut. The diversity of views offered was matched by the varied land management policies and techniques of the Federal agencies which, proceeding under thin mantles of inter-agency cooperation, make thousands of separate decisions whose cumulative impacts really define the overall handling of the area.

It was the inability of the Subcommittees to focus the debate that led to the call for more information. With four Federal agencies, three States, and private owners all making land management decisions affecting seven national forests, two national parks, three wildlife refuges, wilderness and grazing areas, state, county and private lands, and, more, the lack of common data and consensus was understandable. Nevertheless, it was dismaying.

Reasoning that the conflicts inherent in managing the Greater Yellowstone area will simply grow more acute, and that many will still come back to the Congress for resolution, the Subcommittees sought to find out "what is known" about the area under discussion.

The first step was to define the "Ecosystem's" boundary. The Congressional Research Service (CRS) of the Library of Congress was asked to analyze all of the testimony, identify "areas of concern" to the witnesses and draw a boundary around those areas. The
map was duly completed, with the limits drawn whenever feasible along already existing administrative lines (e.g., country lines, National Forest District lines, etc.). The Subcommittees chose not to label it an "ecosystem" map because of the continuing evolution of the definition of that word. However, it was clear from the testimony that the boundary enclosed essentially a free-standing area of great size in which the movement, interdependence and interplay of biota resemble the classical definition of an ecosystem. Moreover, even opponents of the term had begun, for convenience sake, to refer to the "Greater Yellowstone Ecosystem." Thus the term (or simply "ecosystem") will be used throughout these introductory comments.

With the map in hand, the Subcommittees then prepared a thorough set of questions for the land managing agencies responsible for the area, principally the U.S. Forest Service, the National Park Service, the U.S. Fish and Wildlife Service, the Bureau of Land Management and the Fish and wildlife agencies of the States of Montana, Wyoming and Idaho, and other Federal agencies as well. They were asked to tell us "what is known" in areas ranging from visitor use and timber sales to locations of abandoned mines and grizzly bear kills. Knowing the amount of work this would entail for each agency, the Subcommittee stipulated that no new data should be compiled. Either the information existed and could be transmitted or a gap existed. In the latter case, the agency was asked to state that the data was unavailable.

Voluminous data and hundreds of maps arrived and were referred to the Congressional Research Service for independent analysis. The U.S. Geological Survey and the Forest Service were especially diligent in submitting quality data by the deadline and continuing to provide attentive cooperation as the analysis continued.

CRS staff performed professionally in transforming the often disjointed raw data into an intelligible form. There was an especially difficult task. As is pointed out in the Report, while Federal agencies created no new data for submission, the fact that so much existing data on that huge area had never before been compiled into a single document means that "new information," in a sense, is being offered. Likewise, the authors point out that the maps accompanying the report are unique in the information that they convey.

The Report does not purport to cover every item of information submitted by the agencies. In some cases, the data was too scarce or ambiguous to be analyzed. At the other extreme, the data on the qualifications of Federal personnel working in the area was so voluminous that CRS resources were not sufficient to computerize it. Submissions being public information, it may remain for enterprising graduate students to review the materials for potential dissertation topics. Information not used in the report remains available for future public and Congressional access (for Library of Congress accession, contact the Geography and Map Division for "Yellowstone Ecosystem, Resources and Management Inventory Maps: 8C4767, Y401 svnr "Y4").

In any event, the choice of what information to highlight and how to highlight it remains for the Congressional Research Service. The Report stands on its own. The following comments represent not reactions to the Report. Certain generic (and occasional specific) observations are suggested by the data amassed and they are offered in the following paragraphs.

Observations:

The first thing likely to strike the reader of the CRS Report is the unevenness of the cumulative data on the region, by quality and quantity. One realizes that each agency has its own special, set of needs as well as constraints when collecting information. But there is also a need to look at the "big picture," and that has proved exceedingly difficult to do. It is precisely the inability to do so that has permitted some of the major ecosystem problems to fester until today they seem nearly intractable. It is imperative that all persons working to resolve conflicts in that region agree, at the very least, on statistics and definitions so that, hopefully, they may agree ultimately on the solutions.
The complexity of the Greater Yellowstone Ecosystem is suggested by its sheer size. The map prepared by the Congressional Research Service indicates that it may contain up to 14 million acres. Clearly the centerpiece is Yellowstone National Park, also the center stone in the "crown jewels" of America's protected areas. This 2.2-million-acre preserve has excited the imagination not only of most Americans for over a century, but has been a drawing card for large numbers of foreigners as well. So important is its stature that it has been designated a World Biosphere Reserve by UNESCO and inscribed on the World Heritage List under the World Heritage Convention. It contains unsurpassed natural beauty, including waterfalls, lakes, mountains and the most spectacular geysers in the world. Yellowstone is also famous for its splendid diversity of wildlife—elk, deer, moose, bald eagles, trumpeter swans, trout and grizzly bear.

However, the focus of the joint hearing, and of the attached Report, rightfully has extended beyond the Park as well to the several million acres of surrounding territory. These areas contribute directly and indirectly to the health of natural systems in Yellowstone Park. They also possess their own unique values and have their own human and animal constituencies. More than 90 per cent of the lands surrounding Yellowstone are Federally owned and managed. As a measure of public concern over the non-Park lands, a majority of persons testifying at the hearing directed their remarks at these other parts of the Ecosystem.

The Greater Yellowstone Ecosystem contains most of the animal species which were present before the arrival of the first white visitors. The wolf is the only one of the original major vertebrates still missing from the area. Nevertheless, the populations of many animal species have been reduced by human activities in or near their habitats, and further reductions are likely. Of critical concern is protection of the water quality of streams and lakes of the area as well as the associated riparian areas. Cutthroat trout, being a food source for many species and an indicator of water quality, are an especially important linchpin in the system.

8

In the public's mind, grizzly bears are the most important indicator of the Ecosystem's health. These large animals, whose most heavily used habitat is often crucial to many other species, are particularly sensitive to human presence and are thus the first species displaced by development activities. Although expressly protected by Federal law, testimony at the hearing charged the agencies with lax enforcement. Deaths did continue, most of them seemingly clustered in discreet areas. The Report uses the term "black hole" in connection with the cluster areas. The term is not been designated a World Biosphere Reserve by UNESCO and inscribed on the World Heritage List under the World Heritage Convention. It contains unsurpassed natural beauty, including waterfalls, lakes, mountains and the most spectacular geysers in the world. Yellowstone is also famous for its splendid diversity of wildlife—elk, deer, moose, bald eagles, trumpeter swans, trout and grizzly bear.

However, the focus of the joint hearing, and of the attached Report, rightfully has extended beyond the Park as well to the several million acres of surrounding territory. These areas contribute directly and indirectly to the health of natural systems in Yellowstone Park. They also possess their own unique values and have their own human and animal constituencies. More than 90 per cent of the lands surrounding Yellowstone are Federally owned and managed. As a measure of public concern over the non-Park lands, a majority of persons testifying at the hearing directed their remarks at these other parts of the Ecosystem.

The Greater Yellowstone Ecosystem contains most of the animal species which were present before the arrival of the first white visitors. The wolf is the only one of the original major vertebrates still missing from the area. Nevertheless, the populations of many animal species have been reduced by human activities in or near their habitats, and further reductions are likely. Of critical concern is protection of the water quality of streams and lakes of the area as well as the associated riparian areas. Cutthroat trout, being a food source for many species and an indicator of water quality, are an especially important linchpin in the system.

In the public's mind, grizzly bears are the most important indicator of the Ecosystem's health. These large animals, whose most heavily used habitat is often crucial to many other species, are particularly sensitive to human presence and are thus the first species displaced by development activities. Although expressly protected by Federal law, testimony at the hearing charged the agencies with lax enforcement. Deaths did continue, most of them seemingly clustered in discreet areas. The Report uses the term "black hole" in connection with the cluster areas. The term is not been designated a World Biosphere Reserve by UNESCO and inscribed on the World Heritage List under the World Heritage Convention. It contains unsurpassed natural beauty, including waterfalls, lakes, mountains and the most spectacular geysers in the world. Yellowstone is also famous for its splendid diversity of wildlife—elk, deer, moose, bald eagles, trumpeter swans, trout and grizzly bear.

However, the focus of the joint hearing, and of the attached Report, rightfully has extended beyond the Park as well to the several million acres of surrounding territory. These areas contribute directly and indirectly to the health of natural systems in Yellowstone Park. They also possess their own unique values and have their own human and animal constituencies. More than 90 per cent of the lands surrounding Yellowstone are Federally owned and managed. As a measure of public concern over the non-Park lands, a majority of persons testifying at the hearing directed their remarks at these other parts of the Ecosystem.

The Greater Yellowstone Ecosystem contains most of the animal species which were present before the arrival of the first white visitors. The wolf is the only one of the original major vertebrates still missing from the area. Nevertheless, the populations of many animal species have been reduced by human activities in or near their habitats, and further reductions are likely. Of critical concern is protection of the water quality of streams and lakes of the area as well as the associated riparian areas. Cutthroat trout, being a food source for many species and an indicator of water quality, are an especially important linchpin in the system.

In the public's mind, grizzly bears are the most important indicator of the Ecosystem's health. These large animals, whose most heavily used habitat is often crucial to many other species, are particularly sensitive to human presence and are thus the first species displaced by development activities. Although expressly protected by Federal law, testimony at the hearing charged the agencies with lax enforcement. Deaths did continue, most of them seemingly clustered in discreet areas. The Report uses the term "black hole" in connection with the cluster areas. The term is not been designated a World Biosphere Reserve by UNESCO and inscribed on the World Heritage List under the World Heritage Convention. It contains unsurpassed natural beauty, including waterfalls, lakes, mountains and the most spectacular geysers in the world. Yellowstone is also famous for its splendid diversity of wildlife—elk, deer, moose, bald eagles, trumpeter swans, trout and grizzly bear.

However, the focus of the joint hearing, and of the attached Report, rightfully has extended beyond the Park as well to the several million acres of surrounding territory. These areas contribute directly and indirectly to the health of natural systems in Yellowstone Park. They also possess their own unique values and have their own human and animal constituencies. More than 90 per cent of the lands surrounding Yellowstone are Federally owned and managed. As a measure of public concern over the non-Park lands, a majority of persons testifying at the hearing directed their remarks at these other parts of the Ecosystem.

The Greater Yellowstone Ecosystem contains most of the animal species which were present before the arrival of the first white visitors. The wolf is the only one of the original major vertebrates still missing from the area. Nevertheless, the populations of many animal species have been reduced by human activities in or near their habitats, and further reductions are likely. Of critical concern is protection of the water quality of streams and lakes of the area as well as the associated riparian areas. Cutthroat trout, being a food source for many species and an indicator of water quality, are an especially important linchpin in the system.
virtually all conflict in the area. Logic suggests that some way be devised to determine the extent of impact in advance of administrative actions. For example, the most serious ecological impacts of development activities result from access roads. Roads frequently increase erosion and pollute the clear streams and lakes upon which many animal species depend. Of perhaps more importance, however, is the human presence which results from access roads. Yet road construction and access decisions are determined for each resource activity; there is no coordinated consideration of the effects of roads and access on the Ecosystem.

The problem of coordination extends to the existing "coordination committees" themselves. A review of the data is convincing that the committees are inadequate to provide a comprehensive, integrated overview of the Ecosystem. The Greater Yellowstone Coordinating Committee excludes several important agencies, such as the Bureau of Land Management, State wildlife agencies, and possibly one or more of the National Wildlife Refuges. Other committees focus on one animal species or issue, supporting a fragmented approach to coordination. In addition, there may be duplicative efforts because of the multiple committees on some issues.

Even where the expertise and commitment exist within a coordinating body, there is serious reason to believe that the data needed to support many decisions simply is not available. The Report reveals that data on activities in the Ecosystem, and on the effects of those activities, is incomplete and inconsistent among the Federal agencies. It is insufficient to evaluate management choices and hence to resolve conflicts in a lasting manner and on the basis of facts. Perhaps the most striking example of this concern the recording of grizzly bear kills. Two agencies submitted data which can only charitably be called "at variance." They differed in practically every category: number of kills, location, cause, etc. This is particularly disturbing in the case of the grizzly—a prominent creature in the Ecosystem, expressly protected by an Act of Congress, whose well-being is supposedly the highest priority of each Federal agency.

The quality of research. Only the Forest Service has a research branch which is independent of its land managers, and can therefore relatively easily conduct studies which last beyond limited personnel tenures. The structure of research efforts, as well as the scope, therefore affects the agencies' ability to generate good data that translates into good decision-making.

Although the jurisdictions of the various Federal agencies in the Greater Yellowstone Ecosystem are a matter of historical record, one is nevertheless struck, when perusing the Report, by how much the federal government's administrative boundaries can affect comprehensive, coordinated management. Regional boundaries fragment the area into three Forest Service Regions, two Fish and Wildlife Service Regions, and three Bureau of Land Management State Offices. Even within the regions, individual unit boundaries often have little relevance to the Ecosystem. Four of the Forest Service Ranger Districts include lands distinctly separated from those in the Ecosystem. In virtually all agency decision-making, the whole is subordinated to its fragments.

Recommendations:

The Report documents the most serious deficiency: an inadequate data base. Data varies from nonexistent to very good to inconsistent, and it varies from agency to agency within the same agency. Yet the agencies manage roughly the same type of terrain containing generally the same wildlife and subjected to similar human activities. If data underpinning management decisions vary, then the decisions made will vary despite the best intentions to achieve consistency.

The Report also documents inconsistencies in current attempts to achieve coordination. The subcommittees appreciate two recent coordination attempts taken as a result of the joint hearing. The Forest Service and National Park Service have agreed to improve contacts, and the Forest Service has assigned "lead agency" responsibility to a single National Forest in coordinating approaches to resource management in the Ecosystem. However, Report data can
lead one to question whether "more of the same" will adequately address the continuing problem of coordination.

The Report deserves thorough review by all parties interested in resolving conflicts in the Greater Yellowstone Ecosystem. Obviously, disagreements will continue, but hopefully they will take into account the data (or lack thereof) contained in the Report.

The observations set forth in these paragraphs represent "first impressions." They attempt to single out those deficiencies that reasonable people would agree must be overcome if a more rational, coordinated management scheme is to be devised.

In holding the hearing, the Subcommittees hoped to stimulate discussion on new approaches to old problems. Clearly, little can be said here that will move opposing forces to early agreement on such controversial topics as oil and gas leasing, below-cost timber sales, and so like. But suggestions can be made for improvements in data collection and management, on the coordination of multi-agency management efforts, and on certain of the more outstanding resource problems on which consensus is possible. In this spirit, the following suggestions are made:

Data Collection - The agencies basically need to gather management statistics in a more comprehensive and coordinated fashion. Department of Interior agencies especially need to begin collecting such information. When it is gathered, it needs to be in a form which can be shared and understood by other agencies. Likewise, the Forest Service should review its definitions to assure that they conform to common usage -- or can at least be easily translated into common usage.

One agency, presumably the Inter-agency Grizzly Bear Committee, should be specially charged with gathering the data on grizzly bear deaths and sold to make this a regular part of its agenda. The Fish and Wildlife Service is required by law to consult under Section 7 of the Endangered Species Act. That it does not have up-to-date and accurate statistics immediately available for use in these consultations is deplorable, to say the least.

Data Management - A central clearing house for Greater Yellowstone Ecosystem data would go far toward standardizing and making available data collected by the land managing agencies. It is therefore suggested that a non-land managing agency be given that responsibility. The U.S. Geological Survey is in the process of perfecting a digital cartography program that is ideally suited for this task. In this exciting program, data is computerized and plotted with great precision for retrieval in map form. The agency could receive information from all sources, feed it into a Geographic Information System, and make the data base available to all agencies, including city and local governments (who would be encouraged to submit data also). Federal agencies would be required to develop compatible data bases.

With the Geological Survey leading by providing both hardware and software, the main data base should include (in addition to standard geographic data on topography, roads, ground cover, ownership, etc.), at a minimum:

a. Geologic data on energy and mineral resources;

b. Energy and mineral leases and claims, mines, drill sites, etc., to the extent that they are known;

c. Past and future timber sales;

d. Recreation sites;

e. Visitor use patterns;

f. Existing and proposed water development projects;

g. Grazing allotments;
h. Maintenance levels of roads;

1. Grizzly bear death locations, and statistics on cause of deaths, with supplementary material in narrative form describing the deaths;

2. Eagle nests, whooping crane sites, trumpeter swan sites, ungulate calving grounds, migration corridors;

4. Impediments to animal movements;

1. Hunting and fishing concentrations;

m. Trails and trailheads; and

n. Historical and archeological sites.

Care would need to be taken to protect from public disclosure certain information, such as the location of critical bird nesting areas or archeological sites, if such disclosure could result in harm to fragile resources.

Research - Enlure the practice of the Forest Service by requiring agencies, particularly the National Park Service, to establish research arms that are separate from the land managers. It would also be useful, for example, to have the Fish and Wildlife Service do a comprehensive biological survey of the area; all species present, distributions, numbers and other data.

Coordination - The numerous, duplicative coordinating committees need to be coordinated themselves. Among the options that might be considered are the following:

1. Eliminate some or all of the current committees and replace them with a more comprehensive one.

2. Make the Greater Yellowstone Coordinating Committee responsible for:

a. assuring that all relevant

Federal, State, and local agencies (including water management agencies) are included in the coordinating committee;

b. assuring relevant participation in the various subcommittees set up to examine specific issues (bald eagle management, whooping crane recovery, peregrine falcon recovery, road access decisions, etc.);

c. coordinating research efforts of the various agencies and universities; and

d. assuring consistent data collection among the agencies involved in the Yellowstone area.

Boundaries - Consideration should be given to adjusting existing administrative boundaries, especially Ranger Districts, within the Ecosystem so that information collected in that administrative area would automatically feed into a central data base.

Human Activities - Human presence in the Ecosystem—in whatever form, be it in connection with resource development or with hunting and hiking—is ultimately associated with virtually all conflict there. While Congress is trying to resolve such controversial matters as oil and gas leasing, some effort should be made to address the overall issue of human access, with special attention paid to the timing of human presence. Since the bulk of the access is via road, this issue should be given top priority.

The carrying capacity of the Greater Yellowstone Ecosystem should be determined in a comprehensive manner, prior to decisions on resource management. Options might include:

1. A committee could coordinate current road planning activities, and recommend adjustments when conflict or duplication
might occur.

2. A comprehensive road management plan could be developed for the Ecosystem, with the plan including:
   a. road construction locations and standards,
   b. required road maintenance levels (including costs),
   c. road closure standards (location and timing), and
   d. road destruction for any roads slated for elimination.

3. A committee could establish zones within the Ecosystem which define not only the appropriate levels but the timing of human presence, taking into consideration the requirements of wildlife and other resources in the area.

Grizzly Bears - Two outstanding facts would lead the most impartial observer to conclude that the Federal grizzly bear management program in the Greater Yellowstone Ecosystem is flawed: deaths continue, and statistics on those deaths are suspect. Compliance with existing law requires improvement in both areas. Therefore, the following are advanced for consideration:

1. Scrap the Management Situation concept. Create instead "zones of density" of grizzly bear use and adjust human and grazing access accordingly.

2. Eliminate the so-called grizzly bear "black holes" by targeting enforcement in these areas and following with vigorous prosecution.

3. Conduct thorough forensic investigations of bear kills and include in statistics greater precision on cause of death.

Other Wildlife - More data should be acquired on non-game species in the Greater Yellowstone Ecosystem, and more attention should be given to fish -- "indicators" in the Ecosystem. Fish are a prime source of food for many other species and a good indicator of habitat for others (e.g., trumpeter swans). By extension, a similar increase of attention should be given to protection of all riparian habitat.

The foregoing recommendations do not necessarily require legislation. Much can, and should, be initiated by the agencies themselves. It is hoped that these suggestions can help all interested parties better understand the issues involved, and that future Congresses will not hesitate to take whatever further action--by way of oversight or legislation--that may be required to ensure that proper management policies, coordination and cooperation are achieved to protect the Greater Yellowstone Ecosystem.

JOHN F. SEIRERLING  
Chairman, Subcommittee  
Committee on Interior and Insular Affairs  
U.S. House of Representatives
YELLOWSTONE: ECO SYSTEM, RESOURCES, AND MANAGEMENT

Prepared at the Request of:
Hon. John P. Sabin, Chairman
Subcommittee on Public Lands

and
Hon. Bruce F. Vento, Chairman
Subcommittee on National Parks and Recreation

for the use of the
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

M. Lynne Corn
Analyst in Natural Resources Policy
Environment and Natural Resources Policy Division

and
Ross W. Gorte
Analyst in Natural Resources Policy
Environment and Natural Resources Policy Division

December 11, 1986
ABSTRACT

This report summarizes and evaluates information on the lands and resources in and around Yellowstone National Park. The information was provided by numerous federal and several state agencies in response to questions from the House Interior Subcommittees on Public Lands and on National Parks and Recreation. The report describes the Yellowstone ecosystem and its major resources, identifies the development activities in the area, and considers the effects of those activities on the ecosystem and its resources. The report also examines grizzly bear distribution and mortalities as an example of development's effects on an "indicator species," and evaluates the inter-agency coordination in managing the federal lands of the region. The report presents numerous findings, the most significant are:

1. Grizzly bears are useful indicators of the health of the Yellowstone ecosystem, and their populations trends provide useful information on the effects of land and resource management in the area.

2. The "Management Situations" concept for grizzly habitat management is not particularly effective for preventing grizzly bear deaths. There are seven concentrations of grizzly deaths: grizzly bear black holes—in and around Yellowstone National Park. Preservation of grizzly bears requires special attention to these areas, and to the causes of death in these areas.

3. The most significant impacts of human developments on the Yellowstone ecosystem result from the access required for virtually all development activities in the area. Access has two effects:
   a. Roads that provide most forms of access can seriously degrade water quality. Many species of animals (especially fish) require clean water, and the Yellowstone ecosystem depends on large volumes of clean water which are produced in the area.
   b. Human activities can disturb and displace many species of animals. Some species, such as grizzly bears, are particularly sensitive to human presence, but many of the other animals important to the ecosystem (e.g., elk and bald eagles, for example) can be, or have been, displaced by developments.

4. The existing information and coordination mechanisms are inadequate to provide the comprehensive coordinated management needed to maintain the balance in the Yellowstone ecosystem. Comprehensive data did not exist for any aspect of management or use of the ecosystem (including grizzly bear mortalities). Some coordinating committees appear duplicative, while for others, membership and focus is incomplete. Finally, the existing administrative boundaries and organizations tend to restrict, rather than assist, information gathering.
INTRODUCTION
1
DEFINING A YELLOWSTONE ECOSYSTEM
1
HEALTH OF THE GREATER YELLOWSTONE ECOSYSTEM
1
Request for Additional Information
1
Area for Which Information Was Provided
1
New Information
1
PURPOSE OF THIS REPORT
1
THE YELLOWSTONE ECOSYSTEM
9

PHYSICAL FEATURES
9
Geology
10
Hydrology
10
FOREST TYPES
11
Lodgepole Pine
15
Douglas-fir
15
Spruce/Fir
16
Aspen
17

ANIMALS
17
Grizzly Bears
19
Habitat
20
Population Levels
20
Recovery
21
Wolves
24
Bison
29
Elk
30
Bald Eagles
31
 Peregrine Falcons
31
Trumpeter Swans
31
Whooping Cranes
31
Fish/Salmonids
38

development activities
39

OVERVIEW OF IMPACTS
39
Employment
40
Payments to Counties
40

TIMBER HARVESTING
42
Federal Timber Management
43
Salvage Sales
44
Commercial Sales
45
Timber Sale Economics
46
Economic Effects
46
Effects on Other Resources
48
Effects on Water and Watersheds
48
Effects on Fish and Wildlife
49
Access
50
Habitat
51
Effects on Recreation
51
Access
52
Aesthetics
52
Effects on Range Management
53
Effects on Energy and Mineral Development
53
WATER DEVELOPMENTS
53
Federal Water Projects
54
Federal Energy Regulatory Commission
54
Bureau of Reclamation
54
Other Water Projects
54
Economic Effects
54
Effects on Other Resources
57
Water Impoundments
57
Hydroelectric Facilities
58
Stream Channel Projects
59
GRIZZLY BEARS
19
Habitat
20
Population Levels
20
Recovery
21
Wolves
24
Bison
29
Elk
30
Bald Eagles
31
Peregrine Falcons
31
Trumpeter Swans
31
Whooping Cranes
31
Fish/Salmonids
38

DEVELOPMENT ACTIVITIES
39
OVERVIEW OF IMPACTS
39
Employment
40
Payments to Counties
40

ENERGY AND MINERAL MANAGEMENT
68
Mineral Activities
68
Locatable Minerals
69
Coal
69
Phosphates
70
Oil and Gas
71
Geothermal Resources
73
Locatable Minerals
74
Energy Transmission Corridors
75
Economic Effects
75
Economic Effects
76
Mining and Non-Fuel Mineral Activities
77
Oil and Gas Activities
78
Seismic Testing
80
Exploratory Drilling
81
Oil and Gas Production
82
Geothermal Activities
82
Energy Transmission Corridors
82
RECREATION

Recreational Activities 83
Recreation Data Problems 86
Snowshoeing 88
Campgrounds, Picnic Areas, and Resorts 90
Hunting and Outfitters 90
Sport Fishing 90
Hiking, Backpacking, and Cross-Country Skiing 96

Economic Effects 95
Employment 97
Economic Value 97
Effects on Other Resources 101
Effects on Water Quality 101
Effects on Wildlife 107
Ski Developments 103
Fishing Bridge 106
Poaching 105
Hunters and Grizzlies 105
Non-Native Species 106
Effects on Other Resources 106
Fear and Protection 106

CULTURAL AND HISTORIC RESOURCES

Protection of the Resources 119
Effects on Other Resources 119

GRIZZLY BEAR MORTALITY CLUSTERS: A SITE-SPECIFIC ANALYSIS

Sources of Information 114
Grizzly Bear Mortality Clusters 119

MANAGEMENT IMPLICATIONS

Grizzly Mortality Data 130
Preventing Grizzly Bear Deaths 131

FEDERAL AGENCY COORDINATION AND INFORMATION

Interagency Coordination 137
Coordinating Committees 138
Species-Oriented Analysis 140
Cumulative Effects Analysis 141
Grizzly Bear Cumulative Effects Model 143
Information Management 144
Commodity Resource Data 144
Non-Commodity Resource Data 145
Agency Organizational Structure 147

SUMMARY OF FINDINGS

The Yellowstone Ecosystem 149
Development Activities 149
Grizzly Bear Mortality Clusters 150
Federal Agency Coordination and Information 151

APPENDIX I: QUESTIONS ASKED OF EACH AGENCY

U.S. Army Corps of Engineers 153
Environmental Protection Agency 153
Bonneville Power Administration 153
Federal Energy Regulatory Commission 154
Advisory Council on Historic Preservation 154
U.S. Fish and Wildlife Service 155
National Park Service 159
U.S. Geological Survey 172
Bureau of Indian Affairs 174
Bureau of Land Management 177
Bureau of Reclamation 177
Bureau of Mines 177
Office of Surface Mining 178
State Fish and Game Agencies 178

APPENDIX II: FOREST SERVICE PAYMENTS TO COUNTIES

Forest Service Payments to Other Counties 179
Felt Payments to Counties 181
<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Forest Service Economic Values for Dispersed Recreation</td>
<td>101</td>
</tr>
<tr>
<td>19</td>
<td>Number of Historic and Prehistoric in the National Forests of the OYER</td>
<td>111</td>
</tr>
<tr>
<td>20</td>
<td>Mortality Causes for Grizzly Bear Deaths in the Yellowstone Area from 1971-1985</td>
<td>117</td>
</tr>
<tr>
<td>21</td>
<td>ORBC Data on Grizzly Mortalities Near Gardiner, Montana</td>
<td>121</td>
</tr>
<tr>
<td>22</td>
<td>ORBC Data on Grizzly Mortalities, Bear Creek City, Montana</td>
<td>122</td>
</tr>
<tr>
<td>23</td>
<td>ORBC Data on Grizzly Mortalities, Bear Creek and Sunlight Creek, Shoshone National Forest, Wyoming</td>
<td>123</td>
</tr>
<tr>
<td>24</td>
<td>ORBC Data on Grizzly Mortalities Near the Thoroughfare Plains, Tetons Wilderness, Bridger-Teton National Forest, Wyoming</td>
<td>125</td>
</tr>
<tr>
<td>25</td>
<td>ORBC Data on Grizzly Mortalities Near Fishing Bridge, Yellowstone National Park, Wyoming</td>
<td>126</td>
</tr>
<tr>
<td>26</td>
<td>ORBC Data on Grizzly Mortalities Near Falls River and Conant Creek, Targhee National Forest, Idaho and Wyoming</td>
<td>127</td>
</tr>
<tr>
<td>27</td>
<td>ORBC Data on Grizzly Mortalities Near Mount Hayden, Montana, and Henry's Lake, Idaho</td>
<td>129</td>
</tr>
<tr>
<td>28</td>
<td>Coordinating Committees in the Yellowstone Area</td>
<td>139</td>
</tr>
<tr>
<td>29</td>
<td>Estimated Forest Service Payments to OYER Counties</td>
<td>180</td>
</tr>
</tbody>
</table>
INTRODUCTION

Yellowstone National Park, the world's first national park, was created by an Act of Congress in 1872, protecting more than two million acres of spectacular natural beauty, including geysers, waterfalls, lakes and mountains in what is now Montana, Idaho, and Wyoming. In the floor debate on the bill, Congressman Henry L. Dawes (R-Mass.) stated: "The headwaters of the Yellowstone River) is a region of the country seven thousand feet above the level of the sea, where there is frost every month of the year, containing the most sublime scenery in the United States except the Yosemite valley, and the most wonderful geysers ever found in the country."

The purpose of the bill is to preserve that country from depredations.

In the past century, development and human population have increased in nearby areas outside the Park. Ecologists have noted that the rare species found in the Park have ranges that extend beyond Park boundaries into these areas of increasing development and that most species depend on resources outside the Park for some part of their life cycle. Ecologists and physical scientists are investigating the hydrological connections between Yellowstone's unique geothermal features and watersheds in nearby forests.

Scientists have therefore come to recognize that preserving the many of the unique features of the Park is at least partly dependent on management of the surrounding lands. Many feel the Park is too small to protect its living and geological resources adequately and that management of lands around the Park should be integrated into the management of a larger "Greater Yellowstone Ecosystem."

DEFINING A YELLOWSTONE ECOSYSTEM

Yellowstone National Park is dominated by a high plateau, surrounded by still higher, mountains, which are in turn surrounded by lower plains with less rainfall. The animal and plant communities in the plateau and surrounding mountains have distributions that reach well outside Park boundaries. The Park and its surrounding mountains form perhaps the largest relatively undisturbed ecosystem in the contiguous United States.

An ecosystem is a "unit made up of all the living and nonliving components of a particular area that interact and exchange materials with each other. Given such a definition, the existence of a "Greater Yellowstone Ecosystem" is a scientific construct, rather than a legal designation, and is independent of any congressional action. Moreover, as this definition makes clear, it is possible to set only general limits to boundaries on any ecosystem, because animals move. It is implied impossible to draw a line through any area and then assert that one independent ecosystem lies on one side and another on the other side. A lack of agreement on boundaries should be expected from a scientific viewpoint. Even so, the concept is used to identify clusters of plant and animal, which appear together, and are generally different from those in surrounding areas. Observers may agree that some general area can be identified which includes the majority of the organisms in the ecosystem and its essential physical requirements. The ecosystem approach can then be useful as a management tool.

HEALTH OF THE GREATER YELLOWSTONE ECOSYSTEM

A number of conflicts have surfaced in the Yellowstone area. There have been charges that timber harvests damage grizzly bears. That oil and gas commercial drilling will damage Yellowstone's prairie, that grizzly bear populations are incompatible with heavy visitation use, and that the National Parks and National Forests are being managed in favor of animals to the detriment of people in the local economy. Animal populations are, in fact, affected by many types of activities, including timber harvesting, water development, grazing, energy and mineral development, and recreation. Conversely, these resources are affected by the requirements of wildlife, as well as many of the activities encountered in economic development of the other resources.

The House Interior Subcommittees on Public Lands and on National Parks and Recreation responded to public concerns about management of Yellowstone National Park and its forests by holding an oversight hearing on the Greater Yellowstone Ecosystem (GYS) on October 24.

1Act of March 1, 1872, ch. 24, 17 Stat. 32 16 U.S.C. Chapter 1 Subchapter V
2Dawes, Henry L. The Congressional Globe, v. 35, Feb. 27, 1872
1985. The purposes of the hearing were (1) to examine the meaning and significance of the Greater Yellowstone Ecosystem, its natural, cultural, and recreational resources, and their associated economic and environmental values; (2) to identify the various resource uses and the potential conflicts among them; and (3) to review the strengths and weaknesses of the State and Federal arrangements for managing the ecosystem and its resources.

Request for Additional Information

Lengthy testimony from federal agencies, organizations, and individuals went far toward meeting these purposes, but the subcommittees were left with numerous unanswered questions about resource management in the Greater Yellowstone Ecosystem. In order to evaluate the many issues raised at the October 1985 hearing, the Public Lands and National Parks Subcommittee, with the assistance of the Congress--\--Research Service (CRS), prepared follow-up questions for the federal and state agencies responsible for managing portions of the area. These questions were addressed to the agencies listed in Table 1, and Appendix 1 lists the questions asked of each agency regarding lands and their management in the COYR.

This list of agencies which provided information to the subcommittees is a nearly comprehensive compilation of federal agencies with activities in the Yellowstone area. The Minerals Management Service, which collects royalties from energy developments on Federal lands, is the only Federal agency identified in the course of this analysis which was not surveyed. Additional State agencies, local governments, and the Indian tribes could probably have supplemented the data provided to the subcommittees, but the agencies listed above represent the vast majority of those interested and involved in managing the Yellowstone ecosystem.

Area for Which Information Was Provided

Respondents had to have some geographical limits to reply, so CRS analysts were asked to prepare a map to assist the agencies in responding. The map's boundaries were chosen to include similar topography and climate zones as well as similar vegetation. For administrative convenience, legal boundaries (such as Ranger Districts, U.S. Forest Service, & National Park Service) were used. In addition to Federal land boundaries, the areas for which information was requested included a wide variety of ideas. State boundaries were used where they approximated natural boundaries. Every effort was made to include all areas discussed in any way at the subcommittees' hearing in October 1985. Map 1 shows the area for which information was asked. It will be referred to as the "Committee's Greater Yellowstone Map" or "GYR" in this report, and the region contained within the GYR will be called the GY Region or "GYR." The COYR is displayed in Map 1, which shows graphically topographic and other features of the area. Table 2 identifies the acreage managed by each of the major administrative units, while Figure 1 (p. 6) shows the administrative units for the various Federal land managing agencies in the COYR. The total land area of the COYR is about 14 million acres. Of this, the U.S. Forest Service is the largest landowner, with 10.7 million acres in seven National Forests. The National Park Service manages 1.3 million acres in Yellowstone National Park (NP), Grand Teton NP, and the John D. Rockefeller, Jr. Memorial Parkway connecting the two Parks. The U.S. Fish and Wildlife Service has three refuges in the COYR, with 7,100 acres, while the Bureau of Land Management (BLM) manages about 124,000 acres, primarily in the Madison River Valley and around Red Rock Lakes National
TABLE 2. Land Ownership in the GVR
(estimated)

<table>
<thead>
<tr>
<th>Landowner or Manager</th>
<th>Acreage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellowstone National Park</td>
<td>2,219,803</td>
</tr>
<tr>
<td>Grand Teton National Park</td>
<td>106,865</td>
</tr>
<tr>
<td>J. D. Rockefeller Parkway</td>
<td>22,772</td>
</tr>
<tr>
<td>National Park Service Subtotal</td>
<td>2,354,445</td>
</tr>
<tr>
<td>National Elk Refuge</td>
<td>24,147</td>
</tr>
<tr>
<td>Red Rock Lakes National Wildlife Refuge</td>
<td>32,467</td>
</tr>
<tr>
<td>Gates Lake National Wildlife Refuge</td>
<td>144,512</td>
</tr>
<tr>
<td>U. S. Fish and Wildlife Service Subtotal</td>
<td>72,867</td>
</tr>
<tr>
<td>Beaverhead National Forest</td>
<td>471,250 est.</td>
</tr>
<tr>
<td>Gallatin National Forest</td>
<td>1,510,100 est.</td>
</tr>
<tr>
<td>Custer National Forest</td>
<td>509,100 est.</td>
</tr>
<tr>
<td>Shoshone National Forest</td>
<td>2,471,039</td>
</tr>
<tr>
<td>Bridger Teton National Forest</td>
<td>3,400,110</td>
</tr>
<tr>
<td>Caribou National Forest</td>
<td>428,750 est.</td>
</tr>
<tr>
<td>Targhee National Forest</td>
<td>1,123,300 est.</td>
</tr>
<tr>
<td>U. S. Forest Service Subtotal</td>
<td>10,187,900 est.</td>
</tr>
<tr>
<td>Idaho BLM Lands</td>
<td>4,300 est.</td>
</tr>
<tr>
<td>Montana BLM Lands</td>
<td>76,500 est.</td>
</tr>
<tr>
<td>Wyoming BLM Lands</td>
<td>54,000 est.</td>
</tr>
<tr>
<td>BLM Subtotal</td>
<td>128,000 est.</td>
</tr>
<tr>
<td>Idaho State Lands</td>
<td>44,400 est.</td>
</tr>
<tr>
<td>Montana State Lands</td>
<td>13,250 est.</td>
</tr>
<tr>
<td>Wyoming State Lands</td>
<td>20,000 est.</td>
</tr>
<tr>
<td>State Land Subtotal</td>
<td>118,850 est.</td>
</tr>
<tr>
<td>Champion Timberlands</td>
<td>142,000 est.</td>
</tr>
<tr>
<td>Other Private Landowners</td>
<td>800,000 est.</td>
</tr>
<tr>
<td>Total Land in the GVR</td>
<td>14,000,000 est.</td>
</tr>
</tbody>
</table>

Wildlife Refuge (NWR). (BLM land ownership was estimated from maps provided by the Forest Service.) Thus, the Federal Government owns about 42% of the total land area. The States also own land in the GVR, with Idaho owning an estimated 10,000 acres and Montana owning about 10,000. The remaining one million acres are privately owned. The largest private landowner is Champion Timberlands, a forest products company. Champion owns about 142,000 acres in the Gallatin and Madison Ranges, northwest of Yellowstone NP.
New Information

As a general rule, the Federal agencies created no new data to respond to the Subcommittees' questions. Most of the data existed in files scattered among the various Federal agencies. In many instances, the information was not actively used in managing the area. This report, therefore, contains virtually no data which did not previously exist. However, the existing data on the Yellowstone ecosystem and on the development activities on various Federal lands in the Yellowstone area has never before been compiled into a single document. Thus, this report provides "new" information, in the sense that the data had not previously been compiled and readily available. In addition, the maps accompanying this report are the first spatially descriptive documents which identify most development activities and other important factors in examining the Yellowstone ecosystem. The significance of this report, therefore, is not in new data, but rather in the broad compilation of existing data -- beyond agency boundaries -- and the analysis of the interrelationships of these activities with the ecosystem.

PURPOSE OF THIS REPORT

The primary purpose of this report is to summarize and evaluate the additional information provided to the House Interior Subcommittees by the various agencies. Thus, this report can provide the basis for future congressional oversight on Federal activities affecting the Greater Yellowstone Ecosystem. The report also provides a comprehensive view of Federal land management in the area, and reveals opportunities for management adjustments that result from such a view. Similarly, such opportunities illustrate the value of a comprehensive view in examining land management for areas where the activities of one agency can affect the lands and resources of another agency. Thus, this approach may prove useful in examining resource conflicts in other units of the National Park System and other such lands.

This report is organized into several chapters. Chapter II describes the natural state of the Yellowstone ecosystem. Chapter III describes how various development processes and activities affect the natural system; the development activities discussed include timber harvesting, water developments, grazing, energy and mineral management, and recreation. Chapter IV describes several significant site-specific conflicts between grizzly bears, as indicators of the health of the ecosystem, and other uses. Finally, Chapter V discusses issues related to inter-agency coordination and management.
THE YELLOWSTONE ECOSYSTEM

This chapter describes the physical features of the GYER which help to distinguish it from surrounding lands. It is followed by a description of major vertebrate species which help define the ecosystem, and which have been the focus of special controversy. The important findings of this analysis are:

1. The Yellowstone ecosystem still contains the great majority of the species present in the past. With the first signs of the return of the whooping crane and the peregrine falcon, the wolf is the only large vertebrate originally present that is still completely missing from the GYER.

2. The populations of many animal species, such as bald eagles and trumpeter swans, have been affected by development activities on or near critical habitats.

3. Fish, especially cutthroat trout, are food sources for many species in the GYER, and play a critical role in the health of the ecosystem.

4. Grizzly bears are important as indicators of the health of the Yellowstone ecosystem, because:
   a. Areas of prime importance to grizzlies are also important to other species (the 2 eagles, trumpeter swans, elk, fish, etc.).
   b. Grizzlies are sensitive to human intrusions; and
   c. Grizzlies often die in human-bear encounters. These deaths are concentrated in certain areas.

5. Forest service and park service lands are currently divided into grizzly bear Management Situations, or zones. These Management Situations do not accurately reflect important grizzly habitat and use.

ECOSYSTEM FEATURES

The geology (elevation and landform) and hydrology of the Yellowstone area distinguish it from the surrounding countryside. These features help determine the plant and animal communities which can develop, and thus aid in defining the limits of an ecosystem.

The Yellowstone area is an identifiable land form, distinct from the surrounding area.** It is characterized by a high plateau composed of old lava flows (with an average elevation of 6000 feet), centered in Y-Lowstone National Park. The plateau is virtually surrounded by several high mountains ranges. (See Map 1.) Grand Teton Peak in Grand Teton NP is the highest mountain in the area, at 11,743 feet, but more than 40 peaks in and around Yellowstone NP exceed 10,000 feet. The area surrounding the GYER is dominated by lower elevation plains (under 6,000 feet in elevation) dotted with hills and low mountains. The area is, in effect, an island of mountains in the dry plains of the west.

The three principal geologic provinces from the formation of this ecological island: the Yellowstone volcanic plateau, the Overthrust Belt, and the Northern Rocky Mountain Province. Most of Yellowstone NP and the area southwest of the Park contain volcanic rocks, with calderas (volcanically formed basins) in the Park and near Island Park Reservoir: the geothermal resources of the Yellowstone Volcanic Plateau are related to the geologically recent volcanic activity. The Overthrust Belt, along the Idaho-Wyoming border, is characterized by many thrust faults running from northwest to southeast in the southern half of the GYER.** These thrust faults have created structural traps for hydrocarbons. The Northern Rocky Mountain Province, to the east and north of the volcanic plateau, is characterized by mountain ranges of volcanic or Precambrian rocks, separated by river valleys. These three geological provinces are distinct from the bedrock of the surrounding plains.

The high mountains and ranges extend across the Yellowstone area -- the Wind River Range to the southeast and the Salt River and Wyoming Ranges to the south. These ranges are geologically similar to the mountains surrounding the volcanic plateau of Yellowstone National Park. Some descriptions of the Greater Yellowstone Ecosystem exclude the southern parts of these ranges, but their geology distinguishes them from the surrounding plains and they historically had flora and fauna similar to those found in Yellowstone NP.

CSP-10

Geology

The Yellowstone area is an identifiable land form, distinct from the surrounding area.** It is characterized by a high plateau composed of old lava flows (with an average elevation of 6000 feet), centered in Y-Lowstone National Park. The plateau is virtually surrounded by several high mountains ranges. (See Map 1.) Grand Teton Peak in Grand Teton NP is the highest mountain in the area, at 11,743 feet, but more than 40 peaks in and around Yellowstone NP exceed 10,000 feet. The area surrounding the GYER is dominated by lower elevation plains (under 6,000 feet in elevation) dotted with hills and low mountains. The area is, in effect, an island of mountains in the dry plains of the west.

The three principal geologic provinces from the formation of this ecological island: the Yellowstone volcanic plateau, the Overthrust Belt, and the Northern Rocky Mountain Province. Most of Yellowstone NP and the area southwest of the Park contain volcanic rocks, with calderas (volcanically formed basins) in the Park and near Island Park Reservoir: the geothermal resources of the Yellowstone Volcanic Plateau are related to the geologically recent volcanic activity. The Overthrust Belt, along the Idaho-Wyoming border, is characterized by many thrust faults running from northwest to southeast in the southern half of the GYER.** These thrust faults have created structural traps for hydrocarbons. The Northern Rocky Mountain Province, to the east and north of the volcanic plateau, is characterized by mountain ranges of volcanic or Precambrian rocks, separated by river valleys. These three geological provinces are distinct from the bedrock of the surrounding plains.

The high mountains and ranges extend across the Yellowstone area -- the Wind River Range to the southeast and the Salt River and Wyoming Ranges to the south. These ranges are geologically similar to the mountains surrounding the volcanic plateau of Yellowstone National Park. Some descriptions of the Greater Yellowstone Ecosystem exclude the southern parts of these ranges, but their geology distinguishes them from the surrounding plains and they historically had flora and fauna similar to those found in Yellowstone NP.

Hydrology

The high plateau and mountains receive more than twice as much precipitation as the surrounding plains. Annual snowfall exceeds six feet (about six inches of precipitation) throughout most of the area.

---


---

** Geological Survey response to Subcommittees' questions. Map of geologic features.
while the plains generally receive less than three feet of snow (about three inches of precipitation). Precipitation in the GYVR, including snowfall, averages more than 12 inches per year, while the surrounding plains average less than 16 inches of precipitation annually. The greater precipitation in the GYVR allows for substantially different plant and animal communities than can develop in the surrounding plains.

The high elevations and precipitation levels in the GYVR mean that the area contains the headwaters for several rivers: the Snake River, the Green River (which flows through Flaming Gorge to the Colorado River), and numerous tributaries of the Missouri River (most notably, the Yellowstone River). Because of the numerous rivers originating in the GYVR, the National Weather Service maintains a network of hydrometeorological network (consisting of numerous rain and stream gauges and four measuring stations) in the area. This also implies that activities which alter the hydrology of the GYVR can have effects far beyond the boundaries of the area.

The most famous feature of Yellowstone is probably the geysers and hot springs. While other places also have geysers—notably Iceland and New Zealand—one cannot match the size, power, or number of geysers in Yellowstone National Park. The sources of groundwater for Yellowstone’s hydrothermal system is still under investigation. The U.S. Geological Survey has reported a similarity between the waters in the Yellowstone hydrothermal system and rainwater (collected in surface water and cold springs) in the Gallatin Mountains, suggesting that recharge for the Yellowstone hydrothermal system comes from the mountains to the north and northeast of the park.

Finally, Red Rock Lakes are an important hydrologic feature of the GYVR. These lakes are located about 30 miles west of Yelllowstone SE, near the Continental Divide. Although not in the central plateau or the surrounding mountains, their warm springs may be linked to Yellowstone’s hydrothermal system and the -tes are heavily used by the animal communities that help define the ecosystem.

FORESTS

The higher elevation and greater precipitation of the GYVR cause its vegetation to differ from the sagebrush and grasses of the surrounding plains. The GYVR is heavily forested, but there are numerous meadows and open creek bottoms, and sagebrush flats in the central plateau.

The extensive forests of the GYVR help define the ecosystem, but data on forests are generally available only for commercial timberlands and not on forests where timber harvesting is restricted. Commercial timberland (those lands which are available for harvesting and meet the minimum growth requirements) but with no allowance for such potentially limiting factors as soil stability or accessibility is harvested. All National Park lands, most National Wildlife Refuge lands, and all Federal wilderness areas are excluded from commercial timberland, because laws prohibit harvesting in these areas. Thus, harvesting is prohibited on nearly seven million acres, or 30 percent of the 26 million acres in the GYVR. These excluded lands are predominantly public lands.

Table 3 shows the 1.76 million acres of commercial timberland in the GYVR, as shown in Figure 2; p. 16: this is 7.5 percent of the National Forest land in the area. Wilderness and wilderness study areas (WSSA), where timber harvesting is prohibited, account for 4.4 million acres (42 percent) of the National Forest lands in the GYVR. The remaining 56 percent of National Forest land in the GYVR is excluded from commercial timberland for various, unspecified reasons and very little information exists on the vegetation of these areas.

The RM also manages commercial timberland in the GYVR, although the accurate location is not known. The commercial timberland is heavily forested in the Targhee National Forest (1977). This can be explained partly by the amount of wilderness, north, east, and south of the Yellowstone National Park (as shown in Map 8). But 77 percent of the lands in the Targhee National Forest have been identified as commercial timberland, while less than 20 percent of non-wilderness lands in the other National Forests in the GYVR are considered commercial timberland.

Lodgepole pine dominates the forested area, accounting for more than half of the commercial timberland in the GYVR, as shown in Table 4 and Figure 3. The other major timber types include Douglas-fir, Engelmann spruce/subalpine fir, and aspen. (See Effects of Other Resources under Timber Harvesting, p. 48, for a further description of the effects of timber harvesting on wildlife.)

10*Commercial timberland (as defined as forest land which is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. Note. Areas qualified as commercial timberland have the capability of producing in excess of 20 cubic feet per acre per year of industrial wood in natural stands. Currently, inaccessible and impermeable areas are included.)

### TABLE 3  Commercial Timberland by National Forest

<table>
<thead>
<tr>
<th>National Forest</th>
<th>Total</th>
<th>Wilderness &amp; VHA</th>
<th>Commercial Timberland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acreage</td>
<td>Acreage % of NF</td>
<td>Acreage</td>
</tr>
<tr>
<td>Beaverhead NF</td>
<td>414 5</td>
<td>108 4</td>
<td>26 4</td>
</tr>
<tr>
<td>Gallatin NF</td>
<td>1340 0</td>
<td>851 3</td>
<td>62 4</td>
</tr>
<tr>
<td>Custer NF</td>
<td>519 0</td>
<td>165 6</td>
<td>31 4</td>
</tr>
<tr>
<td>Shoshone NF</td>
<td>2439 0</td>
<td>1793 8</td>
<td>77 4</td>
</tr>
<tr>
<td>Bridger-Teton NF</td>
<td>3400 1</td>
<td>1396 2</td>
<td>41 4</td>
</tr>
<tr>
<td>Caribou NF</td>
<td>382 0</td>
<td>50 0</td>
<td>13 4</td>
</tr>
<tr>
<td>Targhee NF</td>
<td>1380 1</td>
<td>212 7</td>
<td>15 4a</td>
</tr>
<tr>
<td><strong>CUT</strong> Total</td>
<td>10700 7</td>
<td>1760 0</td>
<td>22 3a</td>
</tr>
</tbody>
</table>

### TABLE 4  Commercial Timberland by Forest Type

<table>
<thead>
<tr>
<th>Commercial Timberland</th>
<th>Lodgepole Douglas</th>
<th>Spruce</th>
<th>Pine</th>
<th>Fir</th>
<th>Fir</th>
<th>Aspen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commercial Forest</strong></td>
<td><strong>414 5</strong></td>
<td><strong>108 4</strong></td>
<td><strong>62 4</strong></td>
<td><strong>26 4</strong></td>
<td><strong>11 0a</strong></td>
<td><strong>0</strong></td>
</tr>
<tr>
<td><strong>Douglas</strong></td>
<td><strong>243 9</strong></td>
<td><strong>1793 8</strong></td>
<td><strong>41 4</strong></td>
<td><strong>231 9</strong></td>
<td><strong>6 3a</strong></td>
<td><strong>0</strong></td>
</tr>
<tr>
<td><strong>Spruce</strong></td>
<td><strong>165 6</strong></td>
<td><strong>1793 8</strong></td>
<td><strong>41 4</strong></td>
<td><strong>231 9</strong></td>
<td><strong>6 3a</strong></td>
<td><strong>0</strong></td>
</tr>
<tr>
<td><strong>Fir</strong></td>
<td><strong>42 0</strong></td>
<td><strong>1396 2</strong></td>
<td><strong>39 4</strong></td>
<td><strong>118 9</strong></td>
<td><strong>3 3a</strong></td>
<td><strong>0</strong></td>
</tr>
<tr>
<td><strong>Aspen</strong></td>
<td><strong>519 0</strong></td>
<td><strong>3400 1</strong></td>
<td><strong>199 9</strong></td>
<td><strong>212 7</strong></td>
<td><strong>15 4a</strong></td>
<td><strong>0</strong></td>
</tr>
<tr>
<td><strong>Beaverhead NF</strong></td>
<td><strong>464 5</strong></td>
<td><strong>1396 2</strong></td>
<td><strong>26 4</strong></td>
<td><strong>15 4a</strong></td>
<td><strong>11 0a</strong></td>
<td><strong>0</strong></td>
</tr>
<tr>
<td><strong>Caribou</strong></td>
<td><strong>382 0</strong></td>
<td><strong>17 3a</strong></td>
<td><strong>51 3a</strong></td>
<td><strong>118 9</strong></td>
<td><strong>3 3a</strong></td>
<td><strong>0</strong></td>
</tr>
<tr>
<td><strong>Targhee NF</strong></td>
<td><strong>1380 1</strong></td>
<td><strong>902 8</strong></td>
<td><strong>15 4a</strong></td>
<td><strong>902 8</strong></td>
<td><strong>65 3a</strong></td>
<td><strong>0</strong></td>
</tr>
<tr>
<td><strong>CUT</strong> Total</td>
<td><strong>10700 7</strong></td>
<td><strong>1761 2</strong></td>
<td><strong>22 3a</strong></td>
<td><strong>1761 2</strong></td>
<td><strong>17 3a</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>

---

**Figure 2. Commercial Timberland by National Forest**

- **Caribou NF**
- **Bridger-Teton NF**
- **Shoshone NF**
- **Custer NF**
- **Gallatin NF**
- **Targhee NF**

**Figure 3. Commercial Timberland by Timber Type**

- **Lodgepole Pine**
- **Douglas-fir**
- **Spruce/Fir**
- **Aspen**
Lodgepole Pine

The USFS contains the largest continuous expanse of lodgepole pine (Pinus contorta) in the United States. Lodgepole pine typically grows in extensive, evenly-aged stands interspersed with few other tree species. Because its life cycle is linked to insect-induced mortality and severe wildfires, which kill off other species in a wide area, the mountain pine beetle is a native insect throughout the western United States. It survives at low population levels until the lodgepole matures, then beetle populations expand rapidly, killing the mature trees. In the northeastern United States, beetle epidemics are typically restricted to stands of lodgepole larger than 1.4 inches in diameter (generally 140 or more years old). See Map 2 for locations of heavy insect infestations in the USFS. The trees killed by the beetles increase the available fuel, eventually contributing to devastating wildfires. However, through much of its range, lodgepole pine has adapted to wildfire by developing serotinous cones—the cones generally remain closed until the heat of a fire releases the seeds. Thus, the configurations can lead to regeneration of the lodgepole stands. Lodgepole pine can regenerate naturally without fire, because some seeds are released without the heat of a wildfire. The first-and-fire cycle causes a natural rotation (the age when trees die of natural causes) of about 150 years for lodgepole pine in the USFS.

More than a million acres of federal commercial timberland in the USFS contain lodgepole pine, accounting for 57 percent of the National Forest timberland in the USFS. Nearly half of this is in the Targhee NF, with the Gallatin and Bridger-Teton NFs accounting for substantial portions. Nearly two-thirds of the lodgepole pine stands exceed the standard harvest age on the National Forests (90 years), and 16 percent of the visible has trees over 160 years old. More than 15 percent of the lodgepole stands on the Bridger-Teton are over 150 years. Thus, many areas are approaching the natural rotation age for lodgepole pine, with increasing risks from insects and from wildfire.

Douglas-fir

The lodgepole pine stands are interspersed with stands of Douglas-fir (Pseudotsuga menziesii) and subalpine fir (Abies lasiocarpa), particularly at the lower elevations. Douglas-fir also typically grows in even-aged stands. Insects play a lesser role in Douglas-fir stands, although there are scattered heart-infestations of western spruce budworm and of Douglas-fir beetle, Douglas-fir has a longer natural rotation than lodgepole pine, generally exceeding 200 years in the USFS. Douglas-fir stands are also even-aged, because they are often affected by


Douglas-fir grows on more than a quarter of the commercial timberland in the USFS. The heaviest concentrations of Douglas-fir are generally west of Yellowstone National Park, on the Targhee and Gallatin NFs. Most of the Douglas-fir stands (64 percent) are older than the standard harvest age (120 years old) for the National Forests of the USFS. Nearly 70 percent of the Douglas-fir stands are between 120 and 140 years old, with only 14 percent exceeding 140 years of age. However, the Douglas-fir stands are fairly endangered from natural causes.

Some concerns have been expressed over regeneration of Douglas-fir. The species is common throughout the western United States, and Douglas-fir is typically replaced on sites where it has been harvested. However, the Idaho Department of Fish and Game asserted that Douglas-fir stands are being replaced by lodgepole pine or open fields in the USFS. 12

The USFS has been unsuccessful in regenerating Douglas-fir stands. Replanted plantings have failed with no planted trees surviving beyond five years. Consequently, most logged Douglas-fir sites are either devoid of trees or are being planted to or invaded by lodgepole pine. We feel that the current programs of Douglas-fir harvest on federal, state and private land will severely reduce the acreage of Douglas-fir in the USFS and private land will severely reduce the acreage of Douglas-fir in the USFS.

Douglas-fir stands would be harmful to many of the wildlife species in the area.

South and east of Yellowsone, particularly at higher elevations, the forests become dominated by Engelmann spruce (Picea engelmannii). Insects are even less of a problem for spruce/fir forests. Douglas-fir is more resistant to snow, which results in the natural rotation for spruce/fir stands of trees, which are more likely to be affected by the natural rotation for spruce/fir stands of trees. As a result, the natural rotation for spruce/fir stands of trees is 100 years (depending on the species), and spruce/fir forests often have a variety of ages throughout the stands.

12Idaho Department of Fish and Game response to Subcommittees' questions. p. 2
The spruce/fir forests occur on less than eight percent of the commercial timberland in the CGVR. This timber type is most common on the Bridger Teton and Shoshone Forests. Nearly 20 percent of the spruce/fir forests (all on the Shoshone SF) are sufficiently varied to be classified as uneven-aged forests. Most of the remainder (an additional 66 percent of the spruce/fir acreage) is more than 140 years of age, and thus approaching (albeit slowly) the natural rotation for the timber type.

ANIMALS

In addition to the conifers described above, aspen (Populus tremuloides) is scattered throughout the area, and accounts for significant timberland acreage in the Laramie and Gillette National Forests. Despite the substantial acreage of aspen timberland, aspen is not harvested commercially in the CGVR. A variety of diseases limit the life-span of aspen, and the natural rotation is only about 75 years in the CGVR.

The status and well-being of the animals of the Yellowstone area have been at the heart of many of the concerns about this area. The area's many jurisdictional boundaries do not limit the range of bears, fish, whooping cranes, elk, and other animals. Coordinating the management of these species requires not only exceptional cooperation among many responsible agencies, but also detailed knowledge of the animals' resource needs and movements. The animals' needs may be at odds with the legal mandates or preferred policies of the agencies, or their accommodation may require substantial modification of the normal means used to achieve the desired goals. Moreover, successfully coordinating management may be easier for some species than for others.

Not only is there a problem in preventing the extinction or local loss of species; there is an equally serious problem in preventing introduction of non-native species which may damage or destroy vital, delicate, symbiotic, inter-related systems. For example, one needs only look no further than Olympic National Park (ONP). At ONP, introduced mountain goats are destroying delicate alpine plant life which (due to long isolation from large grazing mammals) has never evolved -- or has lost -- adaptations that permit the species to survive. While deliberate introduction of non-native species by management professionals is now relatively rare, the "water Yellowstone Ecosystem" with its high visitation rates, is still vulnerable to accidental introductions, or deliberate introductions by irresponsible individuals. From gypsy moth -- to lack trout to mountain goats, the ecosystem's plants and animals are surrounded by potential invaders. An example of an invasion that was nearly successful will be discussed under Non-Native Species under Recreation (p. 107).

The ecology of each species in an ecosystem is tied to that of every other species in the ecosystem. Actions affecting one may have an unpredictable effect on many other species, as is seen easily in the reports of the introduction of house cats to remote islands or rabbits to Australia or of the loss of Atlantic salmon to the eastern United States. Species strongly dependent on one or a very few food items may be wiped out if that food disappears, but species dependent on a wide range of resources may be able to shift, at least for a time, to other resources.

When too many of these alternative resources are destroyed, the elic:tic species may also be lost. Many of the controversial species in the CGVR are critical in their food choices: grizzly bears, bald eagles, and peregrine falcons. In these cases, food shifting may temporarily correct losses of habitat quality but sometimes the replacement resources themselves become depleted. Other species (such as whooping cranes, trumpeter swans) may also take many foods, but only in a restricted habitat. Only preventing the loss of this habitat can ensure the preservation of these species.

Habitat fragmentation -- the separatio of usable habitat into disjoint units - can be a particularly acute problem for a wide-ranging species like the grizzly. Timber activities could inhibit grizzly access from Yellowstone Park to surrounding heavily used habitat. There may be travel corridors of forest cover and limited human intrusion linking areas heavily used by bears. These connecting links may therefore have an importance out of proportion to the number of bears in them at any given time. Breaks in these travel corridors could reduce or eliminate grizzly use of important habitat by removing the cover that allows free grizzly bear movement. At this point, not even is known about specific corridors or requirements of grizzly bears to identify methods of modifying timber management and other development activities to provide adequate cover.

Forest Service consideration of local fauna in land management planning relies on the concept of "indicator species." At each Forest, managers select one or more sensitive and readily identifiable animal species as indicator species because "their population changes are believed to indicate the effects of management activities." Indicators may be selected because their population changes are believed to indicate the health of major biological communities or on water quality. All species listed under Federal law are, by definition, to be treated as indicator species by the Forest Service. Once the Forest Service has chosen a species as an indicator, the agency must take various specific steps to consider the well-being of the species in management planning...

\[13\] 16 C.F.R. 219.19 (a)(1)

\[14\] 16 C.F.R. 219.19 (a)(1)
The grizzly bear, *Ursus arctos horribilis*, listed as a threatened species in the lower 48 states, is now found in all of the seven National Forests in the U.S. except in Alaska, and is an indicator for the other six. Because important grizzly habitat is frequently important habitat to other species as well, as shown below, its status as an indicator species is appropriate.

The grizzly bear and other species of mammals, birds, and fish which have been the focus of special controversy or attention are discussed below. Sometimes called “charismatic megafauna,” the discussion below is grouped taxonomically, beginning with grizzly bears ... by far the most controversial species in the GYR. In each case, the habits, range, and populations are discussed, with emphasis on how each species is or might be affected by human activities or management decisions.

**Grizzly Bears**

**Habits**

Grizzly bears (Ursus arctos horribilis) are the largest terrestrial carnivores in the contiguous United States, but their diet is more appropriately called omnivorous, since it includes a wide variety of plants. In the spring, bears typically feast on the carrion of elk, deer, and other animals which died and whose decomposition was slowed by the area's harsh winter. Small rodents, active in the remains of their winter tunnels, are caught by bears. Grizzlies will also attack elk and mule when these animals are still weak from winter's effects. An occasional grizzly might eat a salmon and bears congregate at streams in the spring to catch the spawning cutthroat trout. These various protein resources are particularly important for the female bear, which is born months before she leaves her hibernation. In the growing cub and weaning bear are also dependent on these foods. Later in the summer, bears shift to plant matter—such as edibles, clover, glacier lilies, tubers, berries, and

---

15This section covers grizzly bears, rather than black bears (Ursus americanus). Black bears are seen far more frequently than grizzlies in Yellowstone, although the black bear population is also declining. However, black bears are not endangered, are more tolerant of human developments, and rarely threaten human lives; thus, studies of their populations appear less critical to understanding the effects of activities on the ecosystem.


---


18Craighead, Track of the Grizzly. p. 106

---

controversial ever since a 1960s decision by the National Park Service to reduce the access of bears to open garbage pits. At the time, some authorities argued that the closure of garbage pits was desirable in order to discourage "not all concentrations of bears around these food sources, and to return the bears to a more natural diet. Critics charged that such a sudden withdrawal of an important food source would seriously damage an already precarious population, and that closure, while desirable, should be done much more gradually.

When the number of counted bears dropped following the closure, a few observers claimed that the drop was merely an artifact of the more difficult counting methods that were now required, rather than a real decline in the population. Most authorities now agree that a drop in population did occur. Moreover, the average age of females at the time of their first litter has risen from five to six years, the average litter size has decreased, and the weights of some bears have decreased, all changes which are consistent with food stress. The controversy may never be resolved to everyone's satisfaction, particularly since the Park Service removed radio collars and ear tags from a large number of bears at the time of the drop-followings. Since that time, many additional bears have been radio-collared and tagged, and aerial counts have been taken, and reports on the details of each sighting of a grizzly are made to managers. The population now shows a long term decline of 1.7 percent per year. 23

RCA

The number of reproductively active females generally defines the rate of growth that is possible for any population. In the case of grizzlies, whose females produce cubs only once every two or three years, "[A]dult females constitute the crucial component of the population, inasmuch as the difference between a 'recovering' population and one sliding towards extinction presently amounts to the loss of one or two adult females per year." 24 Since there were only 32 female bears of reproductive age were estimated to be in the population as of 1984. 25 The saving of even one adult female each year is roughly equivalent to [increasing] the litter size from the

23Knight and Eberhardt, Population Dynamics, p. 312.
24Knight and Eberhardt, Population Dynamics, p. 312-313.
25Knight and Eberhardt, Population Dynamics, p. 326-327.
28Knight and Eberhardt, Population Dynamics, p. 131.
29Picken, et al., Climate, Carrying Capacity, and the Yellowstone Grizzly Bear, p. 131.
30In astronomy, a "black hole" is a "hypothetical celestial body with small diameter and intense gravitational field..." among its characteristics is an intense attraction for matter, which, once the matter comes within the black hole's vicinity...-- unable to escape the area. [Source: Webster's New Collegiate Dictionary, Springfield, MA. G. and C. Merriam Co., 1975, p. 131.]
31S. Fish and Wildlife Service (FWS) response to Subcommittees' questions, p. 11.
TABLE 5. Mortality Causes for 112 Grizzly Bear Deaths in the Yellowstone Area from 1970-1985

<table>
<thead>
<tr>
<th>Mortality Cause</th>
<th>Number Recorded</th>
<th>% of Mortalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural</td>
<td>18</td>
<td>16.1</td>
</tr>
<tr>
<td>Management Control</td>
<td>14</td>
<td>16.0</td>
</tr>
<tr>
<td>Search/Management Accident</td>
<td>6</td>
<td>5.4</td>
</tr>
<tr>
<td>Self Kill</td>
<td>3</td>
<td>4.5</td>
</tr>
<tr>
<td>Illegal</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>Unknown</td>
<td>3</td>
<td>2.7</td>
</tr>
<tr>
<td>Total</td>
<td>112</td>
<td>100.0</td>
</tr>
</tbody>
</table>

In Table 5, "Management Control" refers to the deliberate killing or removal of bears from the ecosystem (Wyoming included removed bears since, from the standpoint of the recovery of the bear population, removed bears are equivalent to dead bears.) "Research/Management Accident" includes bears which might die during attempts to put collars or tags on them or which are killed when, say, being moved to a more remote area.

With rare exceptions, grizzly bears are now found only in Yellowstone National Park and its immediate surroundings. The areas used most heavily by the bears are shown in Figure 4. This map is based on the best data available since 1970, using observations by experienced individuals and airplane sightings. The authors made every attempt to avoid biases created by the presence of an observer, and to base the map on bear density alone.

In the mid-1970s the Fish and Wildlife Service proposed critical habitat for this population of bears under the requirements of the Endangered Species Act (16 U.S.C. 1533). The proposal was withdrawn, in favor of a system of "situations" or zones of management. The regulations designating these situations (designated as Management Situations 1 to 9 or MS-1 through MS-9) specify the level of consideration that will be given to the bears' requirements within those zones, with MS-1 being the most restrictive of activities that conflict with the bears' needs. (These Management Situations are described in Table 6, p. 25.) The Forest Supervisors and National Park Superintendents are charged with deciding the locations of the situation boundaries in their jurisdictions.


Cross-hatching indicates areas of highest use. Solid lines delineate areas where sightings are common, while the dashed lines indicate areas of occasional sightings. The outer rectangular dashed line is used as "bear range" by various agencies. Based on Knight and Eberhardt's Figure 1, provided by R. R. Knight.
TABLE 6  Grizzly Bear Management Situations

**MANAGEMENT SITUATION I**

**Population and habitat conditions.** The area contains grizzly population centers (a key to the survival of grizzlies where seasonal or short-range activity, under natural, free-ranging conditions is common) and habitat components needed for the survival and recovery of the species or a segment of its population. The probability is very great that major federal activities or programs may affect these direct or indirect relationships to the conservation and recovery of the grizzly.

**Management direction.** Grizzly habitat maintenance and improvement (improvement applies to Forest Service only), and grizzly human conflict minimization will receive the highest management priority. Management decisions will favor the needs of the grizzly bear when grizzly habitat and other land use values conflict. Land uses which can affect grizzlies and/or their habitat will be made compatible with grizzly needs or such uses will be disallowed or eliminated. Grizzly human conflicts will be resolved in favor of the grizzlies unless the bear involved is determined to be a nuisance. Nuisance bears may be controlled through either relocation or removal but only if such control would result in a net, natural free-ranging, grizzly population and all reasonable measures have been taken to protect the bear and/or its habitat (including area closures and/or activity curtailments).

---

**MANAGEMENT SITUATION II**

**Population and habitat conditions.** The area lacks distinct grizzly population centers; highly suitable habitat does not generally occur, although some grizzly habitat components exist and grizzlies may be present occasionally. By definition, management situation 2 areas are those considered unnecessary for species survival and recovery; although the status of such areas is subject to review and change according to management direction.

**Management direction.** The grizzly bear is an important but not the primary use on 1[1] the area. Habitat maintenance and improvement, and grizzly human conflict minimization may be, in some cases, important, but not the most important management considerations. Demonstration grizzly populations and/or grizzly habitat use will be accommodated in other land use activities if feasible, but not the extent of exclusion of other use needs. A feasible accommodation is one which is compatible with (does not make unattainable) the major goals and/or objectives of other uses. When grizzly population and/or grizzly habitat use and other land use needs are mutually exclusive, the other land use needs will prevail in management considerations. If grizzly population and/or habitat use represents demonstrated needs that are so great (necessary to the survival of the species or a segment of its population) that they should prevail in management considerations, the situation may be reclassified under Management Situation I. Nuisance grizzlies will be controlled.

---

**MANAGEMENT SITUATION III**

**Population and habitat conditions.** Grizzly presence is possible but infrequent in developments, such as campgrounds, resorts or other high human activity associated facilities; and human presence result in conditions which make grizzly presence uncomfortable for humans and/or grizzlies. There is a high probability that major Federal activities or programs may affect the species' survival and recovery.

**Management direction.** Grizzly habitat maintenance and improvement are not management considerations. Grizzly human conflict minimization is a high priority management consideration. Grizzly bear presence and factors contributing to their presence will be actively discouraged. Any grizzly involved in a grizzly-human conflict will be controlled. Any grizzly frequenting an area will be controlled.

---

**MANAGEMENT SITUATION IV**

**Population and habitat conditions.** Grizzlies do not occur, but habitat and human conditions make the area potentially suitable for grizzly occupancy, and the area is needed for the survival and recovery of the species. The probability is very great that major Federal activities and programs may affect the species' conservation and recovery.

**Management direction.** The grizzly activity resource potential on 1[11] the area is low. Grizzly habitat maintenance and improvement are important management considerations. Grizzly-human conflict minimization is not a management consideration. Human activity, and human conditions making the area suitable for grizzly occupancy, shall be degraded pending decisions regarding reestablishment of grizzlies.
Management Situation 1

Population and Habitat Conditions. Grizzly bears may not occur, or occur only rarely, in the area. Habitats may be unsuitable, unavailable, or suitable and available but unoccupied. The area lacks survival and recovery values for the species or subspecies. Major federal activities and programs probably will not affect species' persistence.

Feasible management actions for grizzly bears and their habitat in other resource-related decisions is not directed. Maintenance of grizzly habitat is an option. Any grizzly activity involved in a grizzly-human conflict will be controlled.

Few, if any, activities are prohibited on the strength of these regulations alone, but the regulations may require that certain activities be altered, modified, or restricted in various ways. In many cases, zone boundaries in National Forests coincide with, or are similar to, wilderness boundaries in the Shoshone, for example. The MS-II lines are identical to wilderness boundaries for considerable distances, even where these boundaries are straight lines.

The differences between the Situation map (Fig. 1) and Figure 4, can be important, especially if the Situation I, II, and III areas are misinterpreted as meaning areas of high, medium, and low bear use or density. These areas illustrate the problem. The area north of Yellowstone Park is considered by Knight and Eashard to be of the highest density of bear use. The entire area is essentially high. Is considered Situation II by the National Park Service a fact, which does not guarantee that Situation maps are not bear density maps. In fact, the bear densities and the number of bear deaths and removals that occurred in the area around Fishing Bridge would agree to extirpate the definition of "Population and Habitat Conditions."

For example, several timber sales have been proposed in MS-I areas in various National Forests. The "Effects on Fish and Wildlife under 'Timber Harvesting' for more details."

Livestock grazing occurs in MS-I areas, as well.

PSUC and Forest Service responses to Subcommittees' questions. Grizzly Bear Management Situation may overlays. Whether the differences are real, or simply errors by one or both agencies is not clear. The same pattern (e.g., one agency consistently drawing larger boundaries than the other) was evident.

Habitat conditions quoted under Situation II in Table 4. Similarly, the area north and east of Hebgen Lake is also "highest density" for bears, yet the Gallatin National Forest considers a substantial portion of the area to be only Situation II. The fate of the proposed ski Yellowstone development will be affected by this difference.

The Downhill Skiing under Recreation (p. 86) Finally, the mortality black hole noted above is in Situation II and II. (For an analysis of factors affecting each mortality concentration, see Grizzly Bear Mortality Clusters, p. 115.)

Wolves

Wolves (Canis lupus) form a special case in the analysis of the fauna of the CVR. In that they are not (as in Fig. 4) they were deliberately exterminated from the Yellowstone ecosystem in the early part of this century. In 1915, the Military Administration of Yellowstone called for the removal of wolves as a way of protecting prey species such as elk, deer, moose, and other herbivores. The Yellowstone passed into the civilian hands of the newly created National Park Service a few years later. The killing continued, and the wolf population was essentially wiped out in the next few decades. Although sporadic sightings of one or two wolves continued for many more years.

John Weaver, a biologist for the Forest Service, noting the huge populations of large ungulates12 in the Yellowstone area, stated, "To have a large population of ungulates without such a predator [wolves] in the system is unnatural." (You're missing a primary component of the whole system.)

The effect of predators on their prey populations is currently on of the more significant topics in theoretical population biology. In the wolf-ungulate interaction at Yellowstone, two extremes seem possible. First, killing by wolves could be added on top of current mortality, and total mortality of ungulates would increase, causing prey population growth to slow or drop. Second, at the other extreme, all prey taken by wolves might consist of animals so weakened that wolves merely hastened death from other causes by days or weeks. (Obviously, some intermediate between these extremes is also possible.) Thus, to the extent that wolves were merely taking animals which would have died soon of other factors, such as parasite or harsh weather, total mortality would also be unaffected. However, for example, leads the concern in suggesting that predators are unable to prevent large ungulates from being resource limited in a large number of

12An ungulate is any mammal having hooves. In the CVR, this includes such species as elk, deer, moose, pronghorn antelope, and mountain sheep.

13Note at: Return of the Native (by Christopher C. Cull) National Parks, v. 60, no. 7-8 (July/August 1966): 24.
ecosystems, particularly if the large ungulates are migratory and are also the most abundant of several alternative prey. Thre beurges and Cauchler have provided a recent summary of studies of wolves and their effects on prey populations. Of eighteen studies they reviewed, seven concluded wolves were the major limiting factor in the ungulate prey, five concluded that the wolves were not, and six concluded that weather, forage, and human hunting confounded the predator-prey relationship.

Historical evidence may be instructive. Using such archeological and historic evidence, Houston\(^2\) suggests that early wolf densities in the west were low in spite of large populations of ungulates. If so, the ungulate populations were more likely limited by the harsh winters than by predation. The extensive and historical recent scientific research on the ungulates of the USW makes it an important, even unique, testing ground for such theories if wolves are reintroduced. Scientists are waiting to test predation/prey theories in the cold light of real observations at Yellowstone.

**Bison**

There are about 1000 bison (Bison bison) in Yellowstone National Park.\(^3\) The majority of the population remains in Yellowstone National Park throughout the year, but roughly three to five percent of the animals use the areas adjacent to Yellowstone National Park during part of the year, particularly in winter. The principal conflict from this "leakage" of this slowly growing population is with livestock grazing, particularly because bison carry brucellosis, a disease which attacks cattle, sheep, goats, pigs, and certain other domestic animals. The disease can be abortion, stillbirths, birth of sick young, and infertility. Transmission occurs through contact with fetal membranes and fluids. However, since the bulk of the herd remains in the Park, conflicts regarding disease or other problems have been rare. The Animal and Plant Health Inspection Service (APHIS) of the U.S. Department of Agriculture notes that the only uncontrolled source of brucellosis in the area is from the herds of bison and elk centering in the Park.\(^4\) However, APHIS considers the risk to livestock to be minimal.


5APHIS response to Subcommittees' question. Cover letter.


\(^{5}\)Personal communication with Frank Singer, Wildlife Biologist, Yellowstone National Park. October 7, 1985.

Domestic herds in Wyoming and Montana are free of the disease and rates Idaho below 0.25 per cent. The leksy areas around Yellowstone National Park are along the northern border near Gardiner, on the western border in the Shoshone National Forest, and on the western border in the Targhee and Gallatin National Forests.

In the last year, controversy has developed over a sport hunts of the herd north of Yellowstone National Park near Gardiner, Montana. In 1984, unusually large numbers of bison left the Park during the winter. Local ranchers feared the spread of brucellosis, so the Montana Department of Fish, Wildlife, and Parks paid agents to kill 85 of the animals outside of the Park. The Nature Conservancy and the local group suspected the animals were not infected. Critics have charged that bison raised in Yellowstone National Park and out of state are not at all suitable for sport hunting, the animals "just stand there and die." The USFWS declined to object to the sport hunt, preferring the continuation of a system of professional marksmen and asking that the National Park Service do more to reduce the growing herd in the Park. In addition, the State's instructions to hunters note that improper handling of the carcasses or improper cooking of the meat can lead to transmission of brucellosis to humans; when it is called uncooked bison. Proposals of the hunt, including the Montana Wildlife Federation, support the increase in opportunities for hunters, and argue that it is more economical to have hunters pay the State to kill bison than to have the State pay sharpshooters to kill them.\(^6\)
slightly more likely than bison to spread brushtail during these migrations (if only because there are 15 times as many elk); it is not clear why the elk have been relatively untouched by the brushtail controversy.

During the fall migrations to the lowlands, sport hunters (in many of the jurisdictions around the National Parks, especially the National Forests) are the primary cause of elk mortality. But now that the ecosystem looks like the elk's previous major predators (wolves), bears have become second to humans as a major predator on the herd. However, the bears' kills are opportunistic, and occur chiefly in the spring. Bears, just emerging from hibernation, attack any weak and starving elk that have barely survived the winter. Bears may also attack elk foundering in deep snow or resting on the ground. Bears do not generally attack elk during the summer when other food sources are readily available, although they will readily feed on elk carcasses, should they find them at any time of year. 48

Critical areas for elk include the small traditional calving grounds in which females return each year to give birth, as well as low elevation wintering areas. Roads constitute barriers to migration in that elk initially hesitate to cross them. Even after elk become accustomed to a particular road, increased hunter access may present a threat to those elk that use it.

Bald Eagles
The CVCE is home to a substantial portion of the bald eagles (Haliaeetus leucocephalus) inhabiting the Rocky Mountain States. Bald eagles are endangered throughout the CVCE, although their populations have risen substantially since use of the pesticide DDT was cancelled in 1972. There are now 55 nesting pairs in the area, including 12 pairs which nest in Yellowstone National Park. The areas used most often by the birds are shown in Map 4. The local population growth of the last 15 years is largely attributed to only six pairs nesting along unusually rich rivers and streams south of Yellowstone National Park. 49

Fish constitute a major portion of the bald eagles' diet. In fact, the presence of open water in early spring within three miles of a nest site is a major distinguishing feature of bald eagle nest sites in the CVCE. 50 Prey species include trout and Utah suckers. Spring

48Personal communication with Robert Oakley, Wyoming Fish and Game Department, October 4, 1983.
50The CVCE Bald Eagle Working Team (made up of representatives from the three States, the three Forest Service regions, two Fish and Wildlife Service regions, one National Park Service region, and the Idaho State Director of the Bureau of Land Management) has divided the area into three population zones, the Yellowstone Unit, the Snake Unit, and the Continental Unit (See Figure 5). In the Yellowstone Unit, the team estimates that there are 55 nesting pairs, a fact indicating suitable habitat are natural wildfires and increased human use. Two bald eagle nests have been abandoned near Fishing Bridge and Giant Village on Yellowstone Lake due to human developments. Human impact is reduced.
by travel restrictions due to spring snow depth and by the late (July 15) opening of the fishing season on Yellowstone Lake.

Little winter food is available for eagles in the Yellowstone Unit and the majority of both adults and immatures leave the area during winter. Many of these birds move to the other two units, but some winter in the Pacific Northwest.\(^{48}\)

Productivity (fledged young per occupied nest) is significantly lower in the Yellowstone National Park Unit than in the other two. However, the differences in productivity between this and the other two populations are insufficient to account for the difference found during the period the young occupy the nest. The fact that the Yellowstone Unit population continues at current levels is due in part to immigration of eagles from the other two units, which are more productive areas.\(^{50}\)

The Snake River Unit, according to the Team, has ample prey of many species with opencutthroat trout being particularly important in the spring. This Unit experiences a net increase of adult eagles during winter. It should be noted that the Team's Snake River Unit extended well beyond the boundaries of the COU (compare Figure 1 and Figure 5), and the Team commented on the critical importance of the lower portion of the Snake (outside of the COU, apparently) to a variety of animals and plants. The Team noted that habitat change in the area, including associated degradation of the fisheries, had occurred as a result of regulation of the Snake River flow. Year-round recreational activity (rafting, fishing, boating, etc.) also disrupts the eagles' habitat along the Snake River.

The Continental Unit includes the upper portion of the Henry's Fork, Red Rock Lakes National Wildlife Refuge (ERLAN), Hebgen Lake, and the Madison River, all in the COU. The Henry's Fork and several of its tributaries remain open throughout the winter due to geothermally warmed water in the area. Disturbance by boaters, housing development, loss of trees due to insects, and timber management to control insect infestations are the chief disruptions of eagle habitat in the Idaho portion of this area. In the Montana portion of the Continental Unit, nesting areas are mainly in Douglas-fir habitat near large bodies of water. Sources of habitat loss in this area are housing development, intrusion by fishermen, recreation development, and timber management.
Falcon Reintroduction Proposal

Because of the risk of theft of peregrine eggs by illegal collectors, no data are presented in this report on locations of hatching sites.


Peregrine Falcon Reintroduction Proposal p. 3 The total calculated from Figure 2 of the Proposal in 149 birds, although the text claims 116 birds have been reintroduced. The discrepancy is not explained in the paper.

67-551 0 - 87 - 1

63

Peregrine Falcons

Peregrine falcons (Falco peregrinus) prey on domestic pigeons, ducks, herons, cranes, and many other birds. Occasionally, they will also take mammals and even insects. The species nests on cliffs and ledges, in the tops of trees, and the unoccupied nests of other species. Some nest sites are occupied for decades by succeeding pairs of falcons. 2

Peregrine falcons were once nearly extinct in the United States due to the effects of pesticides. As pesticide use declined, captive breeding programs were begun. With reintroduction of the captive-bred falcons into unoccupied but suitable habitat, the species has staged a remarkable comeback, though it is still endangered in most of its range. No breeding pairs of peregrine falcons were located in Idaho, Montana, or Wyoming in 1961-1963. 3

Peregrine falcon populations are now expanding in the CSWR, though it is still listed as endangered in all parts of the CSWR. A cooperative program of reintroduction sponsored by various federal agencies (including the National Park Service, the Forest Service, the Fish and Wildlife Service), the various States, and the Peregrine Fund (a private, non-profit organization) has been responsible for this improvement. By establishing young captive birds at "hacking sites" where they are artificially fed for a certain period, researchers hope to induce the falcons to return to the general area when they mature.

To date, 73 male and 74 female peregrines have been reintroduced under this program. Some of these birds have already successfully established nests, including the first known wild peregrine falcon nest in Montana in many years. Heinrich and his coworkers hope to establish 30 nesting pairs in Yellowstone National Park and its surroundings, with approximately 10 pairs in each State. They argue that the establishment of a self-sustaining population will require 50 birds (half males, half females) to be reintroduced each year through 1980. Recovery is also seen as one way the birds are successfully reintroduced do not survive long enough to reproduce, and some may leave the area. One breeding pair is established for every 39 falcons released. 4

At Red Rock Lakes, the use of lead shot by waterfowl hunters is now banned to reduce the risk to falcons (and eagles) of lead poisoning from feeding on injured birds. With the apparent progress on the reintroduction to the CSWR of this species and the whoping crane, the Greater Yellowstone Ecosystem now lacks only one large vertebrate -- the wolf -- that it was known to have in historic times.

Trumpeter Swans

Trumpeter swans (Cygnus buccinator) are not now listed as endangered. In 1932, the species was thought to be very depleted, and the population in the Yellowstone region was thought to consist only about 57 resident pairs. 5 They have recovered substantially since then, but the Yellowstone Ecosystem still represents crucial North American habitat for the species. 6 In addition to breeding birds, there is an even larger number of overwintering swans. Their winter feeding depends upon the geothermal activity throughout the area which prevents many streams from freezing over, since the snows fixed on submerged aquatic vegetation. (See Map 4, showing both components of the population.)

There are 300-400 resident birds breeding on small ponds in and around Yellowstone National Park. The Hebgen Lake area of the Gallatin National Forest, the Targhee National Forest near the southwest corner of Yellowstone National Park, as well as parts of the Bridger-Teton National Forest all contain substantial resident trumpeter swan populations. However, the major source of trumpeter swans in the area is Red Rock Lakes. Parts of this area have been closed to unauthorized entry to protect the swans. Also, lead shot and lead sinkers are banned at the refuge to prevent swans from ingesting them. Even so, the refuge officials noted "increasing reproductive difficulties" in recent years, which it attributed in part to cold, wet springs. The refuge has built and distributed floating nest platforms around the refuge. The design of the nests prevents the eggs from sinking in spring floods. 7 Data were not supplied on how frequently the nests are used.

Peregrine Falcon Reintroduction Proposal, p. 4


Personal communication with Ruth Gale, Biologist, Montana Cooperative Wildlife Research Unit, October 7, 1985

FWC response to Subcommittees' questions, p. 15
The larger component consists of overwintering birds, including about 95 percent of all the trumpeter swans breeding in Canada. The average number of wintering swans has grown from 15 in 1970-1978 to 1,400 in 1986. Overwintering swans rely not only on natural vegetation, but also on an artificial feeding program at Red Rock Lakes National Wildlife Refuge. Two small ponds at the east end of the Refuge provide winter habitat for up to 300 swans.

The Fish and Wildlife Service stated that the wintering areas are "really the critical factors" to the swans' success in the area. These wintering areas "need a combination of open water throughout the winter and a supply of submerged aquatic vegetation for feed to provide winter habitat. This habitat cannot be mitigated [11]. It is in critical supply and any disturbance to these wintering areas critically affects the wintering population."55

**Shooping Cranes**

The Grays Lake National Wildlife Refuge (16,000 acres) is the site of an experimental new flock of whooping cranes (Grus americana), an endangered species which was reduced to a total population of only 21 birds in the 1950s. Map 4 shows use areas for the experimental flock in 1981-1985. These large, long-lived birds pair for life, and feed and nest in marsh areas or along lakeshores. The Grays Lake experimental population represents an ambitious attempt to ensure the survival of the species in the event that a hurricane or other disaster should strike the one remaining natural flock. It is still too early to determine whether this experiment will be successful in establishing a second flock of whooping cranes.

The "whoppers" at Grays Lake are being raised by sandhill cranes acting as foster parents for whooping crane eggs that have been substiuted for their own. The sandhill cranes of the Grays Lake Refuge naturally use Yellowstone National Park and Red Butte National Wildlife Refuge, as well as other wetlands in the Greater Yellowstone Area. The Grays Lake program, which began in 1981, has followed the same course as the original flock. The first juvenile whopperas seen in Yellowstone National Park in the summer of 1985.[60] (See Map 4 for location of Park use.) With a current population of 30-35 whooping cranes in the Grays Lake Refuge.

---

55State of Wyoming response to Subcommittees’ questions.
57PSUS response to Subcommittees’ questions. p. 15
66Personal communication with Wendy Brown, Research Biologist, University of Idaho, October 7, 1985.

---

**Fish: Salmonids**

Salmonid fish (trout and whitefish) are at the heart of the ecosystem's attractiveness for many species, including humans. In the two National Parks, the main species sought are cutthroat, brown, rainbow, brook, and lake trout, as well as mountain whitefish. The Yellowstone cutthroat trout (Salmo clarki williamsi), a particularly important link in the ecosystem's food chains. This trout lives in all four National Parks, and each spring, adult fish move into the surrounding streams to spawn. Adult mortality during the spawning run is high, since cutthroat trout are an important source of food at this crucial spring period for many species of birds and mammals. Bears, just emerging from hibernation, are among the species' major predators. This timing of the spawning run is critical, since the spring period is when bear, especially females with young cubs, need protein. Certain rare or threatened species - such as bald eagles, nupoy, white pelicans, loons, and otters - are also heavily dependent on the cutthroat trout.

Many fish species spend most of their lives in lakes and return to fast-flowing streams to spawn. Some species prefer to spawn in very fast-moving water while others build their nests in pools and shallow riffles. Stream spawners scoop out a shallow depression in clean gravel, where the eggs are laid and fertilized. The eggs and very young fish remain in the nest, where the flowing water supplies oxygen necessary for them to survive. Eventually, they move downstream to lakes where they may spend several years before returning as adults to spawn. Initially, their food consists of small insects and other invertebrates, and later includes other fish.

The species which spawn in streams are dependent upon clear water with low sediment levels, cool temperatures, and high oxygen levels. Without these conditions, the eggs and young fish suffocate in the gravel nests. Activities which raise sedimentation or temperatures, or lower oxygen levels, could reduce or even destroy such fish populations.

67PSUS response to Subcommittees’ questions. p. 13-A
68PSUS response to Subcommittees’ questions. p. 13-A
DEVELOPMENT ACTIVITIES

This chapter addresses the economic consequences of various human development activities, as well as the interactions between those activities and the natural ecosystems and the possible conflicts among the activities. The activities examined include timber harvesting, water developments, grazing, energy and mineral development, and recreation. The following conclusions can be drawn about these activities from the information provided to the Subcommittees:

1. Recreation is the major economic activity on the federal lands in the Conr. followed by phosphate mining in the Caribou National Forest. In the National Forests, dispersed recreation (using primarily natural, scattered sites) accounts for more visitors, but has less impact on local jobs than developed recreation (using sites with Forest Service Improvements).

2. The most important ecological impact of development activities in the Conr is human access, frequently requiring building and use of roads. However, access, per se, is determined by independent decisions concerning each resource separately, rather than as an integrated issue which is broadly considered for cumulative effects on the ecosystem.

3. The existing data available to Federal land managers is incomplete and inadequate, especially for recreation activities and for units of the National Park System.

4. The economic values used by the Forest Service for some activities (particularly recreation) appear to be essentially arbitrary, and management choices may be influenced by economic comparisons that do not reflect the relative importance of the activities.

OVERVIEW OF ECONOMIC IMPACTS

Numerous human activities in and around the Conr can affect the ecosystem. Certain actions, especially at certain times or in specific locations, may radically alter the natural ecosystem, and perhaps even jeopardize the long-run ecological stability of the area. At the same time, many humans depend on those natural resources, and several commodities depend on the area for their economic well-being. The human activities in the Conr include: timber management, water developments, range management, energy and mineral development, recreation, and cultural and historic resource management. Before

Employment

More than 13,000 jobs are linked to the Federal lands in the Conr. More than a third of these jobs directly depend on activities in the Conr, while the remaining indirect and induced jobs are supported by the direct jobs. Tables 7a and 7b show the jobs created by activities in the National Forests in the Conr for various categories of activities. Similar information does not exist for other Federally managed lands.

The Forest Service estimates were derived from the agency's input-output model, EMFAR. However, each National Forest modifies the model to account for local differences in the various industries. Thus, direct jobs from one Forest may be somewhat different measures than from an adjacent Forest; the Bridger-Teton National Forest, for example, identified no jobs resulting from fishing, small game hunting, or other recreation, even though the Bridger-Teton accounted for more than half of the big game hunting and outfitter jobs in the Conr. Nonetheless, the aggregate data provide a basis for some comparisons.

A brief perusal of the tables leads to several observations:

- Details of jobs created by activities in the Conr are included with the discussions of the various activities.
- Energy and mineral development accounted for 42 percent of the jobs supported by the Conr National Forests. However, most of this (4,850 jobs) is employment in the phosphate industry and in the Caribou NF, the only other energy and mineral jobs were 80 oil and gas jobs in the Caribou and 418 indirect and induced jobs (but no direct jobs) from oil and gas activities in the Bridger-Teton Recreation. In its various forms, supported another 42 percent of the jobs, including more than 1,300 jobs from fishing and hunting, more than 1,200 jobs from downhill skiing, and more than 2,800 jobs from other forms of recreation.

Payments to Counties

The Forest Service returns 75 percent of gross receipts from each National Forest to the counties within which the Forest is located. The funds are distributed according to the proportion of a Forest's acreage in each county, rather than to the specific counties where the

6Direct jobs are generally those which occur on the Federal lands. Indirect jobs are local jobs in industries which supply inputs for the direct jobs (such as jobs in a local feed store selling fencing to a rancher who grazes cattle on Federal lands), while induced jobs are those which result because the direct employees spend their money in the local community.
### TABLE 7a. Direct Jobs From Activities in the CGTR National Forests
(* = less than 1 job; - = not reported)

<table>
<thead>
<tr>
<th></th>
<th>Sm. Game</th>
<th>Fishing</th>
<th>Hunting</th>
<th>Big Game</th>
<th>Hunting</th>
<th>Out-Fitters</th>
<th>Downhill Skiing</th>
<th>Other Recreation</th>
<th>Grazing</th>
<th>Timber</th>
<th>Energy &amp; Minerals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaverhead NF</td>
<td>5</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>27</td>
<td>164</td>
<td>443</td>
<td>9</td>
<td>54</td>
<td>-</td>
<td>51</td>
</tr>
<tr>
<td>Gallatin NF</td>
<td>65</td>
<td>9</td>
<td>71</td>
<td>27</td>
<td>164</td>
<td>443</td>
<td>9</td>
<td>54</td>
<td>-</td>
<td>183</td>
<td>-</td>
<td>845</td>
</tr>
<tr>
<td>Custer NF</td>
<td>19</td>
<td>2</td>
<td>14</td>
<td>5</td>
<td>123</td>
<td>19</td>
<td>1</td>
<td>43</td>
<td>13</td>
<td>13</td>
<td>-</td>
<td>1,220</td>
</tr>
<tr>
<td>Shoshone NF</td>
<td>37</td>
<td>-</td>
<td>141</td>
<td>61</td>
<td>-</td>
<td>610</td>
<td>91</td>
<td>54</td>
<td>-</td>
<td>55</td>
<td>-</td>
<td>709</td>
</tr>
<tr>
<td>Bridger-Teton NF</td>
<td>-</td>
<td>-</td>
<td>332</td>
<td>135</td>
<td>116</td>
<td>13</td>
<td>116</td>
<td>86</td>
<td>-</td>
<td>739</td>
<td>-</td>
<td>1,295</td>
</tr>
<tr>
<td>Caribou NF</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>43</td>
<td>13</td>
<td>13</td>
<td>1,220</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Targhee NF</td>
<td>20</td>
<td>2</td>
<td>38</td>
<td>21</td>
<td>306</td>
<td>13</td>
<td>28</td>
<td>13</td>
<td>285</td>
<td>-</td>
<td>1,220</td>
<td>1,374</td>
</tr>
<tr>
<td>Total CGTR</td>
<td>147</td>
<td>15</td>
<td>606</td>
<td>252</td>
<td>709</td>
<td>1,604</td>
<td>144</td>
<td>499</td>
<td>1,220</td>
<td>5,196</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### TABLE 7b. Indirect and Induced Jobs From the CGTR National Forests
(- = not reported)

<table>
<thead>
<tr>
<th></th>
<th>Sm. Game</th>
<th>Fishing</th>
<th>Hunting</th>
<th>Big Game</th>
<th>Hunting</th>
<th>Out-Fitters</th>
<th>Downhill Skiing</th>
<th>Other Recreation</th>
<th>Grazing</th>
<th>Timber</th>
<th>Energy &amp; Minerals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaverhead NF</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>20</td>
<td>29</td>
<td>11</td>
<td>-</td>
<td>71</td>
<td>-</td>
<td>658</td>
</tr>
<tr>
<td>Gallatin NF</td>
<td>34</td>
<td>7</td>
<td>52</td>
<td>19</td>
<td>316</td>
<td>316</td>
<td>14</td>
<td>103</td>
<td>-</td>
<td>1,494</td>
<td>-</td>
<td>1,494</td>
</tr>
<tr>
<td>Custer NF</td>
<td>10</td>
<td>1</td>
<td>10</td>
<td>3</td>
<td>83</td>
<td>13</td>
<td>3</td>
<td>11</td>
<td>-</td>
<td>341</td>
<td>-</td>
<td>341</td>
</tr>
<tr>
<td>Shoshone NF</td>
<td>7</td>
<td>-</td>
<td>39</td>
<td>21</td>
<td>-</td>
<td>205</td>
<td>13</td>
<td>56</td>
<td>-</td>
<td>341</td>
<td>-</td>
<td>341</td>
</tr>
<tr>
<td>Bridger-Teton NF</td>
<td>-</td>
<td>-</td>
<td>226</td>
<td>35</td>
<td>28</td>
<td>284</td>
<td>104</td>
<td>56</td>
<td>-</td>
<td>1,494</td>
<td>-</td>
<td>1,494</td>
</tr>
<tr>
<td>Caribou NF</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>0</td>
<td>41</td>
<td>76</td>
<td>19</td>
<td>3,660</td>
<td>3,800</td>
<td>-</td>
<td>1,284</td>
</tr>
<tr>
<td>Targhee NF</td>
<td>19</td>
<td>2</td>
<td>34</td>
<td>6</td>
<td>280</td>
<td>659</td>
<td>26</td>
<td>520</td>
<td>-</td>
<td>1,284</td>
<td>-</td>
<td>1,284</td>
</tr>
<tr>
<td>Total CGTR</td>
<td>73</td>
<td>12</td>
<td>370</td>
<td>87</td>
<td>503</td>
<td>1,255</td>
<td>682</td>
<td>814</td>
<td>4,478</td>
<td>8,274</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
receipts are generated. The Forest Service reports only total payments for the National Forests; therefore, county payments associated with the COVR must be estimated to allocate total payments for forests and counties with National Forest lands both inside and outside the COVR. The estimated Forest Service county payments associated with the COVR averaged about $80,000 annually from 1967 through 1985. (The detailed procedures used to estimate these payments is presented in Appendix III.) The estimated payments exceeded $900,000 in 1985, and may be more typical, since 1982 and 1983 were particularly poor revenue years for the Forest Service.

In many circumstances, changes in Forest Service county payments would not affect total federal payments to a county because of the Payments in Lieu of Taxes Act (PILT). Under this Act, the RLH generally pays counties $0.75 per acre for most types of federal land (including National Forests). However, PILT payments are exactly offset by Forest Service county payments. PILT payments cannot fall below a minimum of $0.10 per acre, but will be reduced from the standard $0.75 per acre by Forest Service payments. Forest Service payments from the COVR National Forests are low enough (the highest payments were $0.23 per acre from the Taghee NF in 1984) that changes are fully offset by corresponding changes in PILT payments to COVR counties. Thus, it seems likely that the COVR counties with National Forest land would be unaffected by any changes in Forest Service county payments.

**Timber Harvesting**

The following section describes the federal timber sale program, the jobs which result, and the effects of timber harvesting on other resources. The major findings are:

1. Timber access roads are the most significant impact on the ecosystem, by affecting water quality and increasing human activities (both the timber harvesting and other Forest visitors who use the roads).

2. Insect infestations of the timber are a major reason for harvesting in the COVR, and account for many, but not all of the below-cost timber sales.

3. The seasonal timing of timber activities is important in assuring their impact on animals, but timing is typically ignored in determining the conditions for timber sales.

4. Cover - dense stands of timber - is important for many animals, especially grizzly bears, and activities that reduce timber stand density (such as thinning) can be harmful.

**Federal Timber Management**

Both the Forest Service and the RLH sell timber from their lands in the COVR. Table 8 shows that more than 130 million board feet are harvested annually, with 99 percent of the total coming from the National Forests. More than half of the total is harvested from the Taghee NF, where timber sales revenue accounts for 72 percent of the timber harvest. Overall, 60 percent of the timber harvested from the Federal lands in the COVR is from salvage sales.

| Table 8: Average Timber Harvest from Federal Lands in the COVR (in million board feet annually) |
|---|---|---|---|
| Lodgepole | Fir | Other | Average COVR |
| Green - Douglas - Spray | Dead | Annual | n/a |
| Swanhead NF | 2.91 | 1.02 | 0.74 | 3.67 | 5.80 | 4.64 |
| Gallatin NF | 0.25 | 1.19 | 0.28 | 1.68 | 19.64 | 16.04 |
| Coeur NF | 0.20 | 0.47 | 0.17 | 0.77 | 0.70 | 0.47 |
| Shoshone NF | 6.17 | 0.11 | 0.04 | 6.32 | 10.36 | 7.94 |
| Bridger-Teton NF | 3.6 | 0.11 | 0.04 | 3.75 | 10.15 | 7.24 |
| Caribou NF | 2.03 | 2.41 | 0.36 | 5.80 | 3.65 | 3.65 |
| Taghee NF | n/a | 1.26 | 0.08 | 1.34 | 49.46 | 52.34 |
| RLH - Montana | 0.01 | 0.01 | n/a | 0.01 | 0.01 | 0.01 |
| RLH - Idaho | 0.01 | 0.01 | n/a | 0.01 | 0.01 | 0.01 |
| RLH - Wyoming | 0.01 | 0.01 | n/a | 0.01 | 0.01 | 0.01 |
| COVR Total | 38.40 | 9.74 | 4.39 | 39.53 | 132.74 |

**Salvage Sales**

The majority of the timber harvested in the COVR is salvage of lodgepole pine infested with mountain pine beetles. These native insects have evolved a boom-and-bust cycle with lodgepole pine. The beetle populations reach ecological proportions in aspen groves, killing the majority of the trees in the stand, wildfire then sweeps through the stand, opening the lodgepole's sporocrypt to release the seeds and thereby regenerate the stand. Salvage timber harvesters attempt to mimic this natural cycle, by clearingcutting the trees while the wood is still usable, and regenerating the stand artificially. However, artificial regeneration is not always successful, and the roads and other human activities associated with timber harvesting have greater effects on water quality and animal populations than does the natural cycle.

Dead lodgepole or lodgepole salvage sales accounted for 60 percent of the timber sale program from the National Forests in the COVR from 1961 through 1985. Salvage sales are heavily concentrated.
in the Targhee NF, because of heavy insect infestations at the southeast corner of Yellowstone National Park. Map 1 identifies areas of intensive insect infestation (primarily, although not exclusively) in mountain pine beetles, as well as the areas harvested in the recent past and proposed for harvesting in the near future.

Timber harvesting is the only means currently used to control the beetles. Forestry research suggests that beetle problems can be controlled through (1) a discontinuous pattern of timber stands, (2) reduced average stand size and age, and (3) reduced-tail gentleman. Salvage operations are generally not effective unless the harvest is within the first two years after the initial outbreak. Fire may control beetle infestations, but only intense fires ... which would kill the trees - kill the beetles. Finally, insecticides can be used, but it is difficult to reach the beetles under the tree bark, and the high cost and environmental effects of pesticides limit their usefulness.

The ability to control beetles through timber harvesting is limited. A long time is required to convert the extensive even-aged stands of mature lodgepole to younger, more vigorous, beetle-resistant stands. This conversion is further hampered by the poor economics of salvage operations. Salvage sales averaged gross returns of less than $10 per thousand board feet (MBF) from FYB through FYB, which is substantially less than the Forest Service's direct cost to prepare and administer the sales. In addition, the lodgepole pine stands in the National Parks and in the wilderness areas are exempt from harvesting, and thus beetle populations can maintain themselves in these protected areas. Still, assuming insect control is desirable, the salvage sale program may be the least-cost means of controlling beetle epidemics and the subsequent devastating fires.

Commercial Sales

Non-salvage timber sales account for 40 percent of the Federal timber cut in the COYR. Lodgepole pine dominates, accounting for 73 percent of the non-salvage volume harvested annually. Although lodgepole accounts for only 15 percent of the commercial timberland in the COYR, lodgepole pine accounted for more than 90 percent of the timber harvested from the Bridger-Teton, Shoshone, and Coeur National Forests; though it was less than two-thirds of the harvested volume from the Gallatin and Bearhead. Douglas fir accounts for much of the rest of the COYR timber harvest, including more than 90 percent of the non-salvage timber harvested from the Targhee NF and nearly three-quarters of BLM timber harvested from the COYR in Montana.

TABLE 9. Average Value of Timber Harvested from Federal Lands in the COVR
(In dollars per thousand board feet)

<table>
<thead>
<tr>
<th>Region</th>
<th>Lodgepole</th>
<th>Douglas-fir</th>
<th>Spruce/</th>
<th>Dead/</th>
<th>Salvage</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaverhead NF</td>
<td>$13.49</td>
<td>$28.26</td>
<td>$11.41</td>
<td>$4.35</td>
<td>$13.47</td>
<td></td>
</tr>
<tr>
<td>Gallatin NF</td>
<td>$18.75</td>
<td>$17.26</td>
<td>$14.71</td>
<td>$1.00</td>
<td>$22.56</td>
<td></td>
</tr>
<tr>
<td>Custer NF</td>
<td>$8.82</td>
<td>20.00</td>
<td>n/a</td>
<td>n/a</td>
<td>8.81</td>
<td></td>
</tr>
<tr>
<td>Shoshone NF</td>
<td>$14.82</td>
<td>7.11</td>
<td>2.05</td>
<td>11.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridger-Teton NF</td>
<td>$21.83</td>
<td>19.66</td>
<td>18.95</td>
<td>n/a</td>
<td>24.37</td>
<td></td>
</tr>
<tr>
<td>Caribou NF</td>
<td>$22.94</td>
<td>24.28</td>
<td>28.10</td>
<td>n/a</td>
<td>24.14</td>
<td></td>
</tr>
<tr>
<td>Targhee NF</td>
<td>n/a</td>
<td>2.44</td>
<td>1.00</td>
<td>9.42</td>
<td>9.36</td>
<td></td>
</tr>
<tr>
<td>BLM - Idaho</td>
<td>$10.62</td>
<td>$18.66</td>
<td>n/a</td>
<td>n/a</td>
<td>$10.86</td>
<td></td>
</tr>
<tr>
<td>BLM - Montana</td>
<td>9.40</td>
<td>11.93</td>
<td>$10.90</td>
<td>n/a</td>
<td>11.25</td>
<td></td>
</tr>
<tr>
<td>BLM - Wyoming</td>
<td>12.55</td>
<td>12.55</td>
<td>n/a</td>
<td>n/a</td>
<td>12.55</td>
<td></td>
</tr>
<tr>
<td>COVR Total</td>
<td>$21.55</td>
<td>$20.26</td>
<td>$16.28</td>
<td>$8.61</td>
<td>$21.10</td>
<td></td>
</tr>
</tbody>
</table>

Gross receipts for FY83 through FY85 were $8.05 million, but this includes purchaser used credits of $2.23 million. Deposits for the three years to the Timber Salvage Fund totaled $1.01 million. K-V Fund deposits were estimated to be $3.38 million, this includes $2.34 million from the Gallatin, Custer, Shoshone, and Targhee NF, and an estimated $1.0 million from the Beaverhead, Bridger-Teton, and Caribou. 66 Finally, the Forest Service has paid the counties an estimated $1.75 million because of timber harvests in the COVR. Thus, while $5.81 million was received from timber sales, $6.66 million was deposited in special timber funds or returned to the counties; the Forest Service used $0.85 million (nearly $300,000 annually) more than was received.

Timber sales also require expenditures by the Federal Government, from FY83 through FY85, the Federal Forests in the COVR spent $8.96 million on timber sale preparation, administration, and support ($22.71 per MFB sold), and used $1.38 million from the K-V Fund ($6.05 per MFB sold). 67 This $11.14 million expended substantially exceeds the $5.81 million in cash receipts from timber sales during these years.

66 The latter 3 forests did not distinguish K-V Fund deposits from other receipts. Their K-V Fund deposits have been estimated at the average ratio of deposits to receipts for the other 4 Forests; K-V Fund deposits equal .354 of gross receipts for the Gallatin, Custer, Shoshone, and Targhee Forests.

67 It is sheer coincidence that the K-V Funds used by the Forests equal the K-V Fund deposits for the 4 Forests reporting their deposits.

TABLE 10. Timber Sale Receipts and Dispositions, FY83-FY85 Total

<table>
<thead>
<tr>
<th>Receipts</th>
<th>Dispositions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross receipts reported</td>
<td>$293.41 million</td>
</tr>
<tr>
<td>Less: Purchaser used credit</td>
<td>$6.41 million</td>
</tr>
<tr>
<td>Cash receipts</td>
<td>$287.00 million</td>
</tr>
<tr>
<td>Disbursements of cash:</td>
<td></td>
</tr>
<tr>
<td>Timber Salvage Fund deposits</td>
<td>$1.01 million</td>
</tr>
<tr>
<td>K-V Fund deposits - actual (4 Forests)</td>
<td>2.38 million</td>
</tr>
<tr>
<td>K-V Fund deposits - estimated (3 Forests)</td>
<td>1.5 million</td>
</tr>
<tr>
<td>Estimated payments to counties from timber sales</td>
<td>1.05 million</td>
</tr>
<tr>
<td>Total dispos.</td>
<td>$6.66 million</td>
</tr>
<tr>
<td>Cash receipts net of dispos.</td>
<td>$280.35 million</td>
</tr>
</tbody>
</table>

Three years, if payments to counties are included, the cash "loss" is even greater. The comparison of costs and cash dispositions with timber sale receipts is an important issue, because many groups have stated that lands where costs exceed receipts should be identified as not suited for timber production in the ongoing Forest Service land and resource management planning.

ECONOMIC EFFECTS

The Forest Service reported that 499 direct jobs were created by timber harvesting in the COVR, and another 411 were created indirectly or were induced by timber harvesting, as shown in Table 7. These estimates were derived from the agency's input-output model. However, depending on how each National Forest modified the model, direct jobs might be limited to jobs in timber harvesting on one Forest while another Forest might include and report jobs in milling and even in timber distribution.

More than 50 sawmills receive federal timber from the COVR. Of these, only four mills have more than 100 employees (in St. Anthony, Idaho; Afton, Wyoming, and Livingston and Belgrade, Montana). While another 16 have between 10 and 100 employees. (Map 2 shows the locations of 17 of these sawmills, the mills in Idaho Falls, ID; Dillon, MT; and Evanton, WY, are beyond the borders of Map 2). In total, the sawmills receiving federal timber from the COVR employ 1,051 people. Not all of these employees can be attributed to the COVR, because numerous mills (especially in Montana) get some timber from outside the COVR, for example. The two large mills in Montana get only a third of their timber from the COVR.

Employment derived from timber harvesting in the COVR can also be estimated from the timber harvest levels. In 1978, seven people were employed in the forest industry for each million board feet of timber harvested.
harvested in Idaho. An average of 113 million board feet have been harvested annually from the Federal lands in the CVBR. This suggests that about 930 employees are supported by timber harvesting in the CVBR, assuming that sawmill labor intensity has not changed much since 1974. This figure roughly concurs with the employment in sawmills receiving CVBR timber.

In 1970, the timber industry accounted for less than 10 percent of the employment in the counties around CVBR. Data from the Forest Service input-output model indicated that timber harvesting created 11.6 percent of the direct jobs resulting from activities on the National Forests, although 79.2 percent of the indirect and induced jobs resulted from timber harvesting. Thus, CVBR timber harvesting is an important source of employment, exceeding the jobs created by all other National Forest commodity outputs combined, except phosphate mining on the Caribou NF. However, recreation activities in the CVBR create substantially more direct, indirect, and induced jobs than all commodity outputs combined. (See Table 7, p. 41, and Economic Effects under Recreation, p. 95.)

Effects on Other Resources

Effects on Water and Watersheds

Timber harvesting can alter water flows and watershed values, and the runoff from the CVBR is important for several major rivers. Forests have long been recognized as valuable for protecting watersheds, largely by regulating water run-off and preventing erosion. Snow accumulation is greater in forests than in surrounding forested areas (because of wind-blow snowdrifts and lower evapo-transpiration rates), and the openings increase melt rates and peak runoff. Thus, timber harvesting generally increases spring flows and flood potential while decreasing summer streamflow.

A more important watershed concern may be the potential water pollution from increased erosion following timber harvesting. Erosion from harvested sites is of some concern, but it is widely recognized that the erosion from roads associated with timber harvesting is

69Ball, Estimating Timber Employment. p. 3

generally far more damaging to water quality. A Forest Service research report on lodgepole pine management for the control of mountain pine beetles stated:72

The primary watershed concern with epidemics thus appears to be the potential for lowering water quality through sedimentation from roads constructed to salvage timber.

Increased sedimentation can be a particular problem for downstream users who depend on clean water, as well as for fish and wildlife.

Effects on Fish and Wildlife

The road construction which nearly always accompanies timber harvesting can be beneficial or harmful to fish and wildlife populations, depending on the road locations and use. Roads can have both direct impacts, by increasing erosion and creating open corridors through the forest, and indirect impacts, by increasing the numbers of people present in the area. The roads and the access they provide can affect fish and wildlife populations in various, interspersed ways.

The Idaho Department of Fish and Game stated that additional roads would make big game (particularly elk) more vulnerable, and that this would require the Department to shorten the hunting season or to reduce the number of hunters or the elk harvest in some other way.73 However, from the agencies' responses provided to the Subcommittee, it is impossible to determine whether similar damage is occurring in other parts of the CVBR or for other species, and whether the benefits of increased access may be greater than the damage.

Increased access is harmful to grizzly bears, because most bears at-14 human contact are not possible. Since access is necessary for timber harvesting, timber cutting restricts bear habitat and can alter bear behavior. A greater reliance on temporary timber roads (roads which are permanently closed to travel after timber removal is completed) can reduce the long-term impact of road construction.

The timing of the timber cutting and removal can influence the impact of roads on grizzlies. Access can be timed so as to avoid prime bear use areas when the bears are there, such as den sites.
during winter or stands near clover meadows when the clover is blooming. This level of control on timber harvest timing requires greater knowledge and understanding of grizzly habits, but is rarely used in current timber harvesting contracts. However, such measures might allow timber harvesting over a greater area with minor impacts on grizzly bears. Greater control is probably most important in areas with substantial grizzly bear use (as identified in Figure 4, p. 75). Several sales have been proposed in areas with heavy grizzly bear use, including two sales in the Gallatin National Forest (south of West Yellowstone and west of Cooke City) and one in the Teton area (on Sunlight Creek and along the Clark’s Fork of the Yellowstone River).

Control over the timing of access could also probably reduce the effects of timber harvesting on birds, particularly bald eagles and peregrine falcons. Avoiding the disturbance caused by timber activities during the nesting season would likely enhance the reproductive success for these endangered birds, with minimal impacts on timber harvesting, providing that the next trees are left standing. Again, current timber harvesting contracts do not typically include such timing restrictions for wildlife protection.

Habitat. In addition to the effects of increased access, the cutting of trees can directly affect fish and wildlife habitats. Fish can be affected by stream sedimentation—particularly from roads constructed for timber removal—and by the loss of shade which can raise stream temperatures above tolerable levels. The effects of timber harvesting on fish habitat can be minimized by protecting riparian areas and with careful road engineering to minimize sedimentation.

Protecting fish habitat in the GYWR is critical, since fish are important food sources for other animals, such as grizzlies and bald eagles. In addition, the wetlands and riparian areas that are important for fish are also favored habitats for bald eagles, trumpeter swans, whooping cranes, and moose. Thus, the importance of protecting these areas goes beyond the direct benefits to sport anglers.

Timber harvesting can improve the abundance and the distribution of forage for elk, deer, and grizzly bears. The preferred trees are large snags (dead, bare trees), particularly near favored fishing areas. Leaking, or even creating, snags could be beneficial for these species. Harvesting can typically occur quite close to next trees without affecting the birds, as long as nesting seasons are avoided.

Species of low commercial value can provide pine nuts for grizzlies. However, any benefits to big game from increases in forage after timber harvesting are limited to the number, because snow accumulations in clearcut restricted winter forage availability. Light and Butbridge noted that:

Forage in clearcut openings during winter is usually unavailable to big game due to deep, crusty snow. On elk and deer winter range where winds do not influence snow depth, clearcutting in response to beetle epidemics generally results in loss of cover and no gains in available forage.

Thus, timber harvesting can benefit wildlife species where summer forage is a limiting factor, however, it usually impacts winter habitat. For example, is the limiting factor, timber harvesting in the GYWR will likely yield no benefits for the species.

Cover is recognized as a significant component of habitat. Timber harvesting generally reduces the amount of cover, while intermediate stand treatments, such as thinning, often reduce the cover density. The Forest Service has considered 40 percent of an area remaining in cover to be optimal for summer elk habitat, but the Idaho Department of Fish and Game has stated that 50 percent should be considered a minimum, rather than an optimal. Cover is particularly important around elk calving grounds, such areas, which tend to be used in successive seasons, could be protected with little impact on the timber harvest by avoiding harvests near calving grounds.

For grizzly bears, cover is important for daybed resting sites, particularly near forage areas. The lack of dense cover around potential foraging sites, whether natural meadows or feeding areas enhanced by human actions, may limit foraging activities of the bears. Dense cover can be maintained by avoiding timber activities around foraging sites.

Fishing and next trees are important for bald eagles and peregrine falcons. The preferred trees are large snags (dead, bare trees), particularly near favored fishing areas. Leaking, or even creating, snags could be beneficial for these species. Harvesting can probably occur quite close to next trees without affecting the birds, as long as nesting seasons are avoided.

\(^{74}\) Ibid. p. 39

\(^{75}\) Idaho Department of Fish and Game. Letter to John B. Burns, Targhee National Forest Supervisor, March 15, 1982. p. 3
Effects on Recreation

Aesthetic. New roads can be beneficial for some types of recreation activities and harmful for others, depending on the road locations and use. Additional roads generally increase access, and are typically beneficial for activities which occur along roads (picnicking, fishing, hunting, some sightseeing, etc.). On the other hand, increased access may involve an area for recreation associated with roadless areas, such as backpacking. It is difficult to determine whether the benefits for some users of increased access from additional road construction exceed the harm to other recreationists who prefer fewer roads.

Aesthetics. A timber harvest site is not particularly beautiful, but extensive stands of dead or dying lodgepole pine, such as an area with a mountain pine beetle epidemic, may not be any better from an aesthetic viewpoint. Timber salvage operations can improve aesthetics, if the dead trees are replaced by healthy ones. However, harvesting can also aggravate the aesthetic problems. Forest Service research reports that 12

From a visual perspective, the more rapidly the dead lodgepole pine is replaced with healthy vegetation, the better; however, if cutting methods selected for natural regeneration or to minimize losses from mountain pine beetle are visually more undesirable than the effect of standing and fallen dead timber, the visual discontinuity of the landscape will have been aggravated or even magnified instead of lessened.

The current Forest Service visual management objectives and criteria may be sufficient to adequately protect the exceptional aesthetic of the GW, particularly if the most restrictive criteria are applied to the travel corridors bringing tourists into Yellowstone and Grand Teton National Parks. However, if second homes on the private lands scattered along the lower elevations remain on timberline, the interests of the homeowners could conflict with timber harvesting. If the homeowners, resort owners, and permittees organize into an effective interest group, the Forest Service could have difficulty.....continuing current timber harvesting programs.


Effects on Range Management

Timber harvesting can be beneficial for range management. Dense, mature timber stands produce little forage, but clearcutting can yield significant quantities of forage for several years. The forage produced by timber harvesting is beneficial for grazing, because livestock are more tolerant of human presence and cover is less important for livestock than for wildlife, and because the National Forests are grazed primarily during the summer, when the areas are clear of snow. At times, timber harvesting can conflict with range management, when both activities occur on the same or adjacent sites simultaneously. However, some control of the timing of harvesting and of livestock use can minimize such conflicts.

Effects on Energy and Mineral Development

Timber harvesting has little impact on energy and mineral development. The road construction often associated with timber harvesting could be beneficial for energy and mineral exploration and development by providing access to previously roadless areas, particularly since the Forest Service would then bear the costs of road development and maintenance. However, timber harvesting can at times conflict with energy and mineral activities, when both activities occur on the same or adjacent sites simultaneously. Some control of the timing of harvesting and of exploration and development of energy or minerals can minimize such conflicts.

Water Developments

This section describes the water development proposals in the GW, and describes the effects of these types of projects on other resources. The conclusions about water developments are:

1. There are many federal agencies (at least ten) involved in various types and aspects of water developments, with little coordination among them.

2. Water projects can eliminate riparian areas, which are critical habitats for many animals, and harm cutthroat trout populations, on which several other animals depend.

Federal Water Projects

Water management in the GW (as well as elsewhere) is a complicated issue. States generally have jurisdiction over water rights, although certain federal laws reserve some water rights in particular locations.
areas to the Federal Government. Two federal agencies -- the Bureau of Reclamation (Bureau) and the Army Corps of Engineers -- construct most Federal water projects, although the Federal Energy Regulatory Commission (FERC) regulates hydropower developments and the Environmental Protection Agency and/or the Army Corps of Engineers review proposals for water projects on Federal lands. In addition, the federal land managing agencies -- principally the Forest Service, National Park Service, and Fish and Wildlife Service -- are responsible for maintaining adequate water quality in the lakes and rivers flowing through their lands. This anomalous of Federal agencies makes for complex water management arrangements in the GVR.

Federal Energy Regulatory Commission

There are numerous proposed and licensed water projects throughout the GVR (Map 5). FERC has issued permits for four projects north and northwest of Yellowstone Park, in the Gallatin and Beartooth Forests, one exception (for a project of less than five megawatts) has also been applied for in this area. There are four FERC projects on private lands in Paradise Valley along the Yellowstone River north of the Park. A permit has been requested for a hydropower facility at the Island Park Dam, west of Yellowstone. 

The other four projects are south of Yellowstone. One is a permit for a hydropower feasibility study for the Jackson Lake Dam in Grand Tetons National Park. While a preliminary permit does require an additional permit for a hydroelectric facility on private land between the National Elk Refuge and the Bridger-Teton National Forest. The other two permits are for Forest land, on Geyser River in the Bridger-Teton and on Fall Creek in the Caribou, near Swan Valley (below Pahsades Dam).

15Bureau of Reclamation response to Subcommittees' questions.
16FERC response to Subcommittees' questions (by map).

Bureau of Reclamation

Most of the Federal water projects in the GVR have been constructed by the Bureau of Reclamation (Bureau). Bureau is currently considering upgrading the hydropower generating capacity of Palisades Dam by rewind existing generators and using some of the water presently being spilled.15 This change would not require any additional permits, and the power generated would be marketed by the Homerville Power Administration. Bureau did not provide any information about the potential effects of this upgrade on the reservoir or on the Snake River below the dam.

Bureau also identified two proposed future developments in the GVR. 16 One, on the Madison River in Montana, includes developments that would irrigate 12,400 acres with water diverted from the river. The other plan is to develop the power potential of the Clarks Fork of the Yellowstone River, in the National Forest, with three dams and reservoirs on the main stream and one on Sunlight Creek. This plan was presented to Congress in 1974,15 but the project has never been authorized or funded. Sunlight Creek is one of the areas identified as a concentration of grizzly bear deaths. (See Grizzly Bear Mortality Clusters, below.)

Other Water Projects

A number of water projects (which do not require FERC permits or licenses) are pending in Wyoming. The Wind River Indian Tribes and the State of Wyoming are discussing enlarging two reservoirs on the Wind River Reservation: Raft Lake and Bull Lake.16 However, the extent of the tribes' reserved water rights in Fremont County must be settled before either project can be undertaken.

The Army Corps of Engineers has limited activity within the GVR. Among other things, the Corps occasionally modifies stream channels to control possible flooding. In some areas, this includes "channelization", whereby artificial stream channels are constructed to direct

14Bureau of Reclamation response to Subcommittees' questions.
15Bureau of Reclamation response to Subcommittees' questions.
17Bull Lake is not in the GVR, but it adjoins the area and its watershed is entirely within the GVR.
the flow of water, but no channelization has occurred or been proposed for the CIV. The Corps also have leves to contain streamlines in limited areas. In the late 1940s, the Corps built levees along about 11 miles of the Snake River between Grand Teton Park and the Bridge-

ton National Forest, to protect the valley from flooding. The Corps is responsible for annual inspections and emergency repairs on these

flood control levees. 8

There are numerous, small water projects on the National Forests, mostly wells, springs or irrigation diversions, the number of such projects ranges from 14 on the Caribou NF to 42 on the Tanghee, although not all Forests reported the number of water projects in the CIV. The only reported water development proposal in the National Forests is the construction of the Fremont Lake Dam on the Bridger-

Teton NF near Pinedale. 8

Dams and hydroelectric projects are not the only water developments in the CIV. The U.S. Geological Survey has studied the effects of wastewat wet effluent discharge in the two National Parks, including

three effluent sites in Grand Teton and four sewage lagoons in

Yellowstone (at Fishing Bridge, Madison Junction, Old Faithful, and

Grant Village), the latter study, conducted cooperatively with the

National Park Service, included continued monitoring of the effects of

effluent discharges on the lakes and streams of the area. 9

Economic Effects

Direct jobs resulting from Federal water developments in the CIV were not identified by any of the agencies responding to the Subcom-
nittee's questions. It seems likely that federal water developments

provide few permanent jobs, compared with the other activities

occurring on Federal lands in the CIV, because of the relatively

small size of the existing projects and the few proposals for new

developments.

The water diverted by federal water developments is primarily

used to irrigate the dry plains surrounding the Yellowstone ecosystem. Water is essential for the ranchers and farmers in the vicinity,

although no information was provided concerning the degree of local

dependence on federal water projects. However, the CIV contains the

headwaters of several streams and rivers of significance both locally

and throughout the West, except from irrigation water are low, and

8 Army Corps of Engineers response to Subcommittees' questions.

9Forest Service response to Subcommittees' questions.

9National Forest Service response to Subcommittees' questions.

9SGS response to Subcommittees' questions. pp. 81-83.

are generally substantially below the Federal costs for building

reservoirs.

Flood control is another economic benefit from many Federal water

projects. Water developments allow some control over the quantity and
timing of streamflow, and thus the project managers can often reduce
the likelihood of devastating floods. However, it is difficult to
estimate the economic benefits of preventing rare but devastating
events, and no current estimates were made by the agencies for the
developments in the CIV. In addition, the agencies did not identify

those projects which have significant flood control benefits.

Finally, the FERC-authorized projects in the CIV generate

electricity. Some of the electricity is probably used locally, although the distribution of power from these developments was not

reported by FERC or the other Federal agencies. The Baker stated that electricity from the upgrade of the hydroelectric facilities at

Palisades Dam would be sold in the Pacific Northwest through the

Bonneville Power Administration. 9

Effects on Other Resources

It is difficult to assess the effects of water developments on

other resources and users, because of the substantial variation among

the projects. Some projects, such as major reservoirs with hydro-

electric facilities, may affect many uses over a wide area, while

others, such as spring development, may have only minor effects. To

facilitate this discussion, three distinct (although related) aspects

of water developments are examined separately: water improvements

(lakes and reservoirs); hydroelectric facilities and associated power
delivery systems; and stream channel projects.

Water Improvements

Dams, which convert free-flowing streams into reservoirs, can

cause significant alterations to resources and uses of an area. Fish

dependent on streams may be replaced by other species which prefer

lakes; the habitat of wildlife which depend on stream-living fish

such as grizzly bears and bald eagles, will in turn be lost through

floods. Dams also impede fish migration into upstream reaches, and

thus the effects may exceed the loss of stream habitat. Similarly,

recreation activities will be changed, with lake (and boat) based

fishing replacing such activities as stream fishing and river rafting.

In addition, some recreation facilities, such as campgrounds and

9Frederick, Ferreth D. Water Supplies. In Current Issues in
for the Future, 1982 pp. 243-244.

9Baker response to Subcommittees' questions.
plains areas might be flooded by the reservoir. Finally, commercial activities would be affected on the lands inundated by the reservoir.

There are no new reservoirs imminent for the GWF. (The Bitterroot plans for the Clarkes Fork have not been authorized). However, several proposals might increase the height of existing dams, thus expanding their reservoirs. A comprehensive list of proposed increases to existing dams is not available. The most important immediate effect of expanding a reservoir is the loss of land and its riparian vegetation along the shore. Many animal species of the Yellowstone ecosystem depend on their riparian areas, including bald eagles, trumpeter swans, whooping cranes, as well as moose and grizzly bears. Recovery of the riparian areas may require a decade or more, depending on the stability of the new shoreline. In extreme cases, where shore erosion is severe, riparian vegetation might never be reestablished. Without specific information on proposed dam enlargements, however, the possible effects cannot be examined in detail.

Another possible impact of reservoir expansion is the loss of upstream areas for fish spawning. Several important fish species of the lakes and reservoirs of the GYF, such as cutthroat trout, spawn in the streams above the lakes. Some dam enlargements would inundate spawning streams; for example, the PWS estimated that raising the Middle Creek Dam on Bull Lake Creek in the Gallatin National Forest by 15 feet would eliminate half of the cutthroat trout spawning habitat and more than three-quarters of grizzly spawning habitat. The natural spawning runs are important to grizzly bears and bald eagles in addition to providing sport fishing without cost to the Government.

Control of water flow through the dam can be managed to minimize the loss of stream habitat. BLM stated that their activities directly benefit wildlife in the streams below Island Park and Palisades Dams. Increased releases from Island Park Reservoir provide more open water for trumpeter swans wintering along Henry's Fork of the Snake River, while releases from Palisades Reservoir are increased during goose nesting season to ensure that nests will be high enough to be protected from summer irrigation flood waters.

Hydroelectric Facilities

Hydropower facilities generally have little direct impact on animals or on other resources except for increased hydroelectric projects may increase human traffic in travel corridors to and from the site and in the areas around the dam.


93Bitterroot responses to Subcommittees’ questions.
Conditions conducive to cottonwood regeneration have been eliminated by preventing the flooding and scouring action of the river in adjacent floodplains.

Even more damaging to bald eagles, in the Team's opinion, was the increased housing development following levee construction.

GRAZING

This section describes grazing on federal rangelands in the GVR, the jobs which result, and the effects of grazing on other resources in the area. There are several major findings:

1. Grazing on federal rangelands in the GVR supports little direct employment, although there are secondary effects (indirect and induced jobs).

2. Grazing requires federal cash expenditures substantially greater than the resulting revenues.

3. Livestock can damage riparian (stream- and lake-side) areas, which are critical habitats for many animal species.

4. Sheep grazing in areas with moderate or higher grizzly bear densities may result in unnecessary conflicts between humans and bears.

Range Management.

Commercial grazing is allowed in the National Forests, on BLM lands, and in some National Wildlife Refuges (including Red Rocks Lake NWR in the GVR). The GVR contains more than 746,000 acres where commercial grazing is allowed, as shown in Table 11. Under the regulations of the administering agency (BLM, BLM, or AIN), ranchers obtain grazing permits, which authorize them to graze a specified number of animals during a specified period, in a specified area (known as an allotment). The permittee pays a grazing fee for the permitted amount of use, based on an animal unit month (the amount of forage a cow and calf consume in one month is called an animal unit month, or AUM). The permits must be renewed annually, and the Forest Service has the authority to alter or revoke a permit. Changes in grazing use are governed by the Forest Service policy generally favors continuing permits to maintain the status quo.

The regulations of the administering agency (BLM, BLM, or AIN) differ substantially; this discussion only describes Forest Service grazing permits, since they account for 95 percent of the grazing use on federal lands in the GVR.

Commercial grazing is authorized in some National Parks, although none in the GVR. The National Park Service Organic Act of 1916 authorized commercial grazing in the National Park System, as long as grazing did not conflict with recreation in the Parks. However, during the debate, several Members of Congress expressed concern that commercial grazing in Yellowstone would destroy its value as a wildlife sanctuary. Thus, a provision prohibiting commercial grazing in Yellowstone National Park was included in the 1916 Act. Today, commercial grazing is prohibited in most National Parks and Monuments (including all Park System lands in the GVR), although it is authorized in at least 20 of the 377 units of the National Park System.

TABLE 11 Grazing on Federal Lands in the GVR During 1985

<table>
<thead>
<tr>
<th></th>
<th>Permitted Actual</th>
<th>Permitted Actual Livestock</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cattle Grazing</td>
<td>Sheep Grazing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Area</td>
<td>Use</td>
<td>Use</td>
<td>Area</td>
<td>Use</td>
</tr>
<tr>
<td>----</td>
<td>------</td>
<td>----</td>
<td>----</td>
<td>------</td>
<td>----</td>
</tr>
<tr>
<td>Bearhead</td>
<td>120.3</td>
<td>35.9</td>
<td>38.8</td>
<td>29.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Gallatin</td>
<td>102.6</td>
<td>29.5</td>
<td>26.7</td>
<td>9.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Coaster</td>
<td>59.5</td>
<td>8.3</td>
<td>7.8</td>
<td>2.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Shoshone</td>
<td>250.3</td>
<td>73.4</td>
<td>62.2</td>
<td>17.8</td>
<td>0.6</td>
</tr>
<tr>
<td>Bov.-Teton</td>
<td>561.8</td>
<td>195.7</td>
<td>171.5</td>
<td>123.1</td>
<td>2.5</td>
</tr>
<tr>
<td>Caribou</td>
<td>115.0</td>
<td>19.4</td>
<td>14.9</td>
<td>14.9</td>
<td>1.5</td>
</tr>
<tr>
<td>Targhee</td>
<td>590.6</td>
<td>57.1</td>
<td>53.7</td>
<td>27.8</td>
<td>11.7</td>
</tr>
<tr>
<td>Idaho BLM</td>
<td>175.5</td>
<td>40.0</td>
<td>1.3</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Montana BLM</td>
<td>26.3</td>
<td>7.7</td>
<td>7.2</td>
<td>5.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Wyoming BLM</td>
<td>26.2</td>
<td>4.0</td>
<td>4.9</td>
<td>9.4</td>
<td>1.9</td>
</tr>
<tr>
<td>Red Rock</td>
<td>162.6</td>
<td>5.5</td>
<td>5.5</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Lakes BLM</td>
<td>1,632.9</td>
<td>434.7</td>
<td>405.4</td>
<td>989.9</td>
<td>37.2</td>
</tr>
</tbody>
</table>

Cattle Grazing

Cattle grazing is permitted on more than 1,636,000 acres (about 12 percent) of federal land in the GVR; this is more than 65 percent of the Federal grazing lands, as shown in Table 11, with sheep grazing on the other 35 percent of Federal grazing lands. More than a third of the cattle grazing allotment acreage is in the Bridger-Teton National Forest, although all the National Forests in the GVR contain one or more cattle allotments. For much of the GVR, about 95 percent of the grazing use is on private lands, including all of the National Wildlife Refuges and National Parks in the GVR.
three acres are required to support a cow and calf for one month, although conditions vary—more than seven acres are needed per AUM in the Targhee NF. Nearly 400,000 AUMs of cattle were grazed on the CBY National Forests in the 1983 grazing season.22 With nearly another 20,000 AUMs on BLM lands and 5,900 AUMs in Red Rock Lakes NWR, the actual use was about 92 percent of the permitted level in the CBY, varying from 88 percent on the Bridger-Teton NF to 101 percent on the Targhee.

Cattle are grazers, eating primarily grass when it is available, thus, cattle compete directly with wildlife which graze—principally elk and bison in the CBY. Cattle are typically turned loose, and allowed to roam freely throughout the allotment. The permittees are responsible for maintaining the fences and other improvements, and for transporting the cattle to and from the allotment, but permittees do not continually supervise their cattle.

One might expect that the relatively low level of protection would lead to substantial losses of cattle to predators or poisonous plants. Forest Service data on livestock losses do not distinguish cattle losses from sheep losses. However, the statistical's significant correlation between livestock losses and cattle and sheep, grazing indicates that fewer than one percent of cattle grazing on the CBY are lost annually, while about five percent of sheep are lost. Thus, there appears to be little cause for concern over potential cattle losses in the CBY.

Sheep Grazing

Sheep (and goat) grazing is permitted on nearly 1.0 million acres of federal rangelands, nearly 90 percent of the Federal grazing land in the CBY. The sheep allotments are concentrated to the south and west of Yellowstone National Park, on the Bridger-Teton, Targhee, and Caribou National Forests, as shown in Table 11. For most of the CBY, about five acres are required to support a ewe and lamb for one month.23 More than 1,900 AUMs were grazed in CBY National Forests in the 1983 grazing season, with another 2,500 AUMs of sheep on BLM lands in the CBY. The actual use was only 87 percent of the permitted level; use was at 80 percent of the permitted level on the Bridger-Teton NF, but only at 41 percent on the Targhee.

9Grazing seasons in the National Forests are generally during the summer months, although the seasons vary substantially among the Forests.

10Sheep require less forage than cattle. I ewe with lambs equal 1 AUM. However, sheep allotments in the CBY contain much less forage than the cattle allotments, and thus about 25 acres are required per sheep AUM.

Sheep are browsers, eating predominantly herbs and shrubs; they compete directly with wildlife browsers, such as deer and moose. Sheep can be a serious problem in competition for forage, because they browse close to the ground, leaving little food available for other animals. Nearly continual movement is necessary to prevent sheep from overgrazing an area, and thus sheep are typically accompanied by herders, rather than turned loose in the allotment. This greater protection should lead to lower losses of sheep to predators, poisonous plants, and other factors. However, the correlation of livestock losses with cattle and sheep use indicates that about five percent of the sheep are lost annually. Half of all livestock losses in the past five years are due to predators; the primary predators are probably coyotes, but some live-traps (less than one percent of predator losses) have been lost to grizzlies.

Range Management Economics

The grazing fee for nearly all Federal rangelands was $1.35 per AUM in 1983. Using this fee, receipts from grazing on the Federal lands of the CBY in 1983 were calculated to be $580,000. However, not all grazing receipts are available for the U.S. Treasury. As noted earlier, the Forest Service returns 25 percent of its gross receipts to the counties where the National Forests are located (calculated to be $136,100); the BLM generally returns 12.5 percent of its gross grazing receipts to the counties (calculated to be $3,200). In addition, half of grazing receipts from each agency are deposited in a Range Retirement Fund (calculated to be $185,000), which are subsequently appropriated to each agency for rangeland improvements. Thus, only about $195,700 from 1983 grazing receipts was available to cover Forest Service and BLM range management costs.

It seems likely that the range management c-ats exceed the net grazing receipts from the CBY, Forest Service grazing receipts nationwide in 1983 were $9.0 million (comparing to BLM appropriations for range management of $28.2 million).24 Similarly, gross BLM grazing receipts nationwide in 1983 were [$16.8 million], while appropriated for range management were $28.0 million.25 Thus, gross grazing receipts accounted for a third of range improvements nationally in 1983. Because grazing fees are the same on nearly all


Federal lands, it is probable that the Forest Service and BLM net grazing receipts (after payments to counties and range improvement deposits) are substantially less than range management costs in the GVR.

The Forest Service identified grazing fees on private lands near the National Forests in the GVR. The private land grazing fees ranged from $7 per AUM near the Hebgen Lake District of the Gallatin NF to $11.50 on the adjoining Bozeman District, the grazing fees on private lands averaged about $10 per AUM. The federal grazing fee of $1.15 per AUM is more than 80 percent below the reported private grazing fees in the GVR. Private fees would be expected to be higher than fees for federal rangelands, because of such factors as permit conditions (both physical and financial) and differences in operating costs, but competitive prices for leases of federal lands in those few places where they once were are only 15 percent below comparable private grazing fees. Thus, grazing on federal lands accrues for fees which are substantially below the private market value of the grazing, and which do not cover the range management costs of the agencies.

Economic effects

The Forest Service reported that 184 direct jobs were created by livestock grazing in the National Forests of the GVR. Only 1.4 percent of the total number of all types of jobs created directly by grazing activities in the GVR National Forests. In addition, another 184 jobs were created indirectly or were induced by livestock grazing. These estimates were derived from the agency's input-output model; however, each Forest modifies the model to its own circumstances, and thus the "jobs created" estimates may not use the same basis on all Forests, and may not be very comparable to other industries.

As noted above, the Forest Service returns 25 percent of its gross receipts to the counties where the National Forests are located. For grazing, this is calculated to be $134,100 for FY86 (based on 1985 receipts), less than 15 percent of the total 1985 Forest Service payments to those counties. BLM payments to counties for FY86 from grazing were calculated to be only $3,200.

103Forest Service responses to Subcommittees' question 10.
105Forest Service responses to Subcommittees' question 1.
Certain livestock management practices can protect water quality and riparian areas from the possible damages by grazing. The location of fences, salt, and watering sites generally determine the distribution of livestock. Fences can be built to keep livestock out of riparian areas, although such an approach is quite expensive. Water impoundments scattered throughout an allotment can reduce pressures on streamside riparian zones and other wetlands. Similarly, certain grazing systems (such as deferred rotation and rest rotation) can protect important areas from grazing during critical periods. However, such practices would likely increase costs, particularly for the permittee, and would probably require more activities on the allotments by both the agencies and the permittees.

Effects on Fish and Wildlife

Degraded water quality from livestock grazing can reduce fish populations. Sediment in streams can impede oxygen exchange in the gravel where cutthroat trout eggs develop, and thus reduce spawning success. Lower fish populations would reduce the value of fishing for recreation and could harm other animals dependent on cutthroat trout, such as grizzly bears and bald eagles.

Livestock also compete directly with many animal species. As noted earlier, cattle graze primarily on grass when it is available, and thus compete with elk and bison for forage; sheep are browsers, eating predominately shrubs and herbaceous plants rather than grass, and thus compete with deer for forage. Allotment use is generally allocated in such a way as to allow sufficient forage for existing wildlife populations, but some rangelands are already considered overgrazed and increased elk and deer populations could exacerbate such conflicts. Another potential problem is that the COYR elk and bison carry brucellosis, a disease which can lead to spontaneous abortions in cattle. Domestic herds in Montana and Wyoming are currently free of the disease, while those in Idaho are nearly free of brucellosis. However, cattle grazing near elk or bison calving grounds could contract the disease.

The most serious conflict between grazing and elk is created by fencing, which may prevent elk from migrating summer and wintering grounds. Some fences have been designed to allow passage of wildlife.


113 Hall, Management Practices and Options. p. 4-5.

particular moose and elk; while restraining livestock, but two
years ago, in the Jefferson River valley north of the Park, were
bom to restrict wildlife use of private lands and have prevented the
forested the wolves' elk herds (125,000) annually from reaching a
substantial portion of their winter range. Foxes can cause severe
wildlife losses if they prevent the animals from reaching suitable
winter habitat.

Predators can conflict with livestock grazing, and particularly
with sheep grazing. Half of the livestock deaths in the COG
National Forests between 1911 and 1931 were due to predators. Of this
only 10% were deaths due to grizzlies. 

Grizzlies have been attributed to grizzlies, including 14 on the Gallatin NF.

This is likely that other predators are probably complex and
perhaps golden eagles are the primary livestock predators in the
Gallatin National Forest.

115

Grizzlies can also be killed in a result of their conflict with
livestock. The number of bears killed illegally by ranchers is not
known, but more than half of all grizzly deaths since 1911 have been
illegal kills that probably include some by ranchers. The conflict is
particularly acute with sheep. The 1911 protection for grizzlies
probably increased the gape. The contact between sheep and
grizzly bears. This might be done by eliminating selected sheep
allowing an entire herd to squeeze across used by grizzlies or by
shifting certain allotments to cattle grazing. The Targhee
National Forest, for example, has chosen to not renew sheep grazing
permits that are worked.

FUTURE AND FEDERAL POLICY

Energy and mineral developments are scattered throughout the
COG. Mining, primarily for gold, but including many other metals, is
particularly concentrated in the north and east of Yellowstone Park.
There is some interest in coal in the southern reaches of the COG.
Phosphate mining, primarily in the Caribou National Forest, supports
a substantial industry in Idaho. Oil and gas activities are predomi-
nant.

116

Gallatin National Forest response to Subcommittee's question 11

117

Forest Service response to Subcommittee's question 11

118


Foreman, Mark L. and Robert G. Williams. Coordinating Livestock and Timber Management with the Grizzly bear. 2002

Energy and mineral activities are largely confined to the Bridger-Teton NF, although most of the available National Forest lands have been leased. There are many geothermal leases west of Yellowstone, but no geothermal developments have begun.

The BLM is responsible for energy and mineral activities on all
federal lands. In the National Forests, the Forest Service controls the
surface access and impacts, and can recommend actions related to
leases and claims, but the BLM has the ultimate authority. Energy and
mineral activities are allowed in some National Parks (generally under
the laws establishing those Parks), but not in Yellowstone or Grand
Teton National Parks. The similarity, energy access development occurs in some
wildlife refuges, but none has occurred in Red Rock Lakes NWR, Grays
Lake NWR, or the National Elk Refuge.

This section presents information on the energy and mineral
activities in the COG, the resulting economic effects, and the
impacts on other resources. The contributions are these-

1. phosphate mining in the Caribou National Forest supports more
   jobs than any other single activity on the federal lands in the
   COG, and nearly equals the total jobs associated with recreation
   in the COG National Forests.

2. The major impacts of energy and mineral activities on the
   ecosystems are
   a. The potential water pollution; and
   b. The human access created to explore for and develop the
      resources

3. There is little opportunity for environmental review of energy
   and mineral leases, exploration, or development by interested
   groups, and limited federal control over exploration and develop-
   ment once leases are issued and claims are filed.

4. Geothermal development appears, at this time, to represent
   little threat to the hydrothermal resources of Yellowstone
   National Park.

MINERAL ACTIVITIES

Energy and mineral development can affect other resources
Openings in the surface, for example, can cause changes in surface and
groundwater quality. The most significant impact is probably the
access which accompanies mineral exploration and development, as
noted under timber harvesting. Increased access can harm water quality and
animal populations. This may be a more critical issue for energy and
minerals, because the land management agencies have less administra-
tive control over these activities, and thus less effective control
over the associated access.

In general, there are two approaches by which mineral resources
from federal lands can be acquired: leases and claims. Leases are
Park Reservoir. There was some production in this area in the 1950s, some of the phosphate leases have not expired, and two processing plants were proposed there in 1977, although neither was built. 129

Oil and Gas. Oil and gas exploration, including seismic testing and exploratory drilling, and field development can have numerous impacts on other resources. Water quality can be affected by the required roads and by the waste which accompanies drilling. Animals and humans can be displaced from drilling sites and disturbed by the noise and by the explorations of seismic testing. Thus, the location of oil and gas activities and the procedures under which they occur govern the possible effects of oil and gas exploration and development. Several areas within the GVR have high hydrocarbon potential, including the eastern edges of the Shoshone National Forest, the Wyoming and Salt River ranges, the Snake River Valley in Idaho, and the Henry's Lake area. 130 Most oil and gas drilling in the GVR has occurred in the Bridger-Teton NF. (No information was provided on drilling in the Shoshone NF by either the Forest Service or the BLM. 131) The Caribou NF has seven abandoned wells, while the Tarhee has one abandoned, one active, and one proposed well (all in Idaho, west of Jackson, Wyoming); there are no reported oil and gas drilling in the Montana National Forests in the GVR. (See Map 6 for well locations.) There are currently 18 producing wells, 9 other active drilling sites, and 18 abandoned wells in the Bridger-Teton NF. Most of these (including 13 producing wells) are concentrated in the Big Piney Range District, south of South Piney Creek and near McDougal Gap, but they reach as far north as Blackrock Creek, near Grand Teton National Park. In addition, 13 new wells have been proposed for drilling in the Bridger-Teton; the proposals are similarly concentrated in the Big Piney District, but two are proposed for the south side of the Gros Ventre Range and one near the ridgeline southeast of Mount Leidy.

The BLM is responsible for oil and gas leasing on all Federal lands, under an interdepartmental agreement, the Forest Service reviews lease applications on the National Forests, and BLM generally follows the Forest Service recommendations. For the GVR, the BLM

129CS response to Subcommittees' questions. Phosphate Map.
130BJS response to Subcommittees' questions. p. 20
131CS response to Subcommittees' questions. Oil and Gas Map Overlay
132Forest Service response to Subcommittees' questions. Oil and Gas Map Overlay. Forest Service data concur with BLM response to Subcommittees' questions, but BLM only provided data for Idaho (Enclosure 6).

reported 189 existing leases in Idaho, with 17 additional applications pending, and 6,400 leases in Wyoming, with 40 pending applications due to various appeals or reviews. 133 BLM did not provide data on the number of oil and gas leases and pending applications in Montana, but the Forest Service reported 185 leases in the Gallatin NF and 141 leases (including some lease applications) in the Beaverhead NF. 134

Map 6 shows the Federal lands in the GVR which have been leased for oil and gas, or for which leasing applications have been filed. New leases are prohibited in Congressionally designated wilderness and wilderness study areas, although valid existing leases can be developed under regulations intended to preserve the wilderness character of these areas. Of the 116 lease applications, 61 leases or a majority have been leased, including lands with little potential for oil and gas discovery. For example, there are leases for oil and gas exploration in portions of the Beaverhead and Gallatin Forests where the 135 Geological Survey reports on known potential for oil and gas gas. One group, critical of Federal oil and gas leasing activities in the Yellowstone area, has estimated that 83 percent of available lands have been leased, while the Forest Service has recommended no leasing for less than 4 percent of available lands. 136

The procedures used for oil and gas leasing and development have been criticized as not providing adequate opportunity for environmental review by interested public groups. 137 While the mere granting of a lease has no direct, immediate impacts on other resources, the exploration typically associated with active leases can have profound effects on water quality, animal populations, and recreationists. The Forest Service stated that National Forest plans currently being

133CS response to Subcommittees' questions. p. 17, 20
134Gallatin and Beaverhead NF responses to Subcommittees' question 13.
135CS response to Subcommittees' questions. Oil & Gas Overlay
137There have been numerous complaints about oil and gas leasing on Federal lands, but an analysis of the system is beyond the scope of this report. For more information, see U.S. General Accounting Office. Issues Surrounding Continuation of the Noncompetitive Oil and Gas Lottery System: Report to the Chairman, Committee on Interior and Insular Affairs, House of Representatives, Washington, April 4, 1985. GAO/RCED-85-88. 44 p.
Geothermal Resources. Geothermal energy development typically includes using steam or hot water to produce electricity. Such production is typically very noisy at the site, and generates hot wastewater with numerous minerals that can pollute streams. The only known electrical grade geothermal resources in the COW are those in Yellowstone National Park, which cannot be developed. Several low temperature hydrothermal systems (warm springs), which could be used for heat although not for commercial power generation, exist in the COW, including one near the town of Emida, Montana, and two in the Bridge-Teton National Forest, east of the J D Rockefeller Parkway and in the Gros Ventre Range.138

There are two known geothermal resources areas (GRAs) in the COW. The Yellowstone GRA, outside the western boundary of the Park, was established by the U.S. Geological Survey because of the available geologic data and thermal evidence.139 However, this area was withdrawn from leasing in 1981 by BLM to protect the nearby hydrothermal features of Yellowstone National Park; it was feared that geothermal development could disrupt the underground water pressure which causes the geysers inside the Park.

The Island Park GRA, further south and west, was established because of the numerous, overlapping lease applications. According to the Geological Survey, the geophysical data do not indicate a hot water resource in that area, and the warmest reported spring temperature is below 127°F (53°C).140 There are no geothermal leases in the Island Park GRA, but there are 31 lease applications.141 Lease application approvals have been postponed because of possible hydrologic connections between Yellowstone Park and the Island Park area. However, the Geological Survey has reported no thermal or chemical evidence for the flow of thermal waters between Yellowstone and Island Park.142

138GFFS response to Subcommittees’ questions p. 14
139GFFS response to Subcommittees’ questions p. 15
140GFFS response to Subcommittees’ questions p. 15
141GFFS response to Subcommittees’ questions p. 17
142BLM response to Subcommittees’ questions p. 15
143GFFS response to Subcommittees’ questions. Minerals Overlays

Locatable Minerals

The principal effects of hardrock mining on other resources are the impacts of the access for prospecting, mining, and ore removal and the degradation of water quality from the access roads, the opened mineralized surfaces (above and below ground), and the treatment of waste products. Hardrock minerals, and mining claims, are scattered through much of the COW. The areas with high mineral potential include the Absaroka Range, north and east of Yellowstone National Park, and the Gros Ventre, Wyoming, Salt River, and Caribou Ranges south of the Park. The principal minerals sought are gold and silver, but numerous other minerals have been mined in the area, including chromium, copper, iron, lead, molybdenum, nickel, platinum group metals, tungsten, and zinc.

There has been extensive prospecting and mining for metals in the COW, particularly in the Gallatin and Custer National Forests, the Cooke City area, Gardiner-Jardine area, east boulder Plateau, and the area around the south end of the road along the Boulder River all have high mineral potential for many of the metals listed above and numerous producing mines. Lincoln Mountain and Fagelton Peak on the Gallatin NF and Sunlight Creek on the Shoshone NF have also seen recent activity. Several of these areas (Cooke City, Gardiner, and Sunlight Creek) have been identified as areas of grizzly mortality concentrations (see Grizzly Bear Mortality clusters, p. 115). In addition, there has been significant placer mining activity in the Gravelly Range in the Beaverhead NF; placer prospecting has occurred throughout the Gros Ventre River valley, but no mines have been cited there. Map 5 shows the locations of the active and abandoned mines and prospecting sites in the COW.

In addition to metal mining, non-metallic minerals are mined in the COW. Talc is mined in the Beaverhead NF, and travertine (a building stone) is mined in the Gallatin NF, near Gardiner. Asbestos has been mined from the Gallatin NF (west of Belton Lake), and rock salt from the Caribou NF, but neither of these mines is currently active.

The process for granting development rights to locatable minerals on Federal lands differs substantially from the leasing of locatable minerals. The 1872 Mining Law allows for free exploration of most Federal lands. A prospector can stake a mining claim (a physical location) for a mineral deposit, which is recorded with the BLM. To hold a claim, the claimant must perform a minimal amount of some form of

143GFFS response to Subcommittees’ questions. Minerals Overlays
development activity each year. The Forest Service requires an operating plan for proposals entailing significant surface disturbance. Claims can be patented, transferring ownership from the Federal Government to the claimant, but a patent is not needed to extract and sell the mineral. The Federal Government collects a fee for recording the claim ($1), for filing for a patent ($3), and for transferring title to the land generally $2.50 or $3 per acre, depending on the type of claim), but collects no royalties or other payments from locatable mineral extraction on Federal lands.

Some Federal lands, such as National Parks, have been withdrawn from mineral exploration. New mineral claims are prohibited in wilderness areas, but valid existing claims can still be developed and patented under existing regulations. Otherwise, the Federal Government has little authority to regulate mineral exploration. The BLM stated that, other than withdrawing Federal lands, they have no authority to regulate mining. The Bureau of Land Management does not have the authority to deny a mining claim. The location and working of mining claims is a non-discretionary action on land that is open to mineral entry.

Energy Transmission Corridors

The Bonneville Power Administration (BPA) has examined several possible corridors for transmitting coal-generated electricity from eastern Montana and Wyoming to the Pacific Northwest. Some of the corridors examined passed through the CCFB, including through various wilderness areas and even through the edge of Yellowstone National Park. (See Map 1.) Phase I of the Pacific Northwest long range east-west energy corridor study, completed in 1977, identified corridor segments with adequate topography, geologic stability, and seasonal access. All corridors were considered feasible, and Phase I did not try to evaluate alternative routes. The energy situation has changed dramatically since Phase I was completed, but Phase II of the corridor study is still considered a long-range possibility. More...

144BPA response to Subcommittees' questions. p. 72


Phosphate mining in the Caribou National Forest appears to be a significant source of jobs in the CCFB, providing nearly as much employment as all forms of recreation combined. The Forest Service estimated that phosphate mining in the CCFB supported 1,200 direct jobs and 3,600 indirect and induced jobs. The BLM also estimated the employment from phosphate mining for the same areas in the same year, but the estimates were 50 percent above the Forest Service estimates (1,800 direct jobs and 5,400 indirect and induced jobs). The difference between these estimates illustrates the difficulty in determining the employment effects of activities on Federal lands. The Forest Service estimated that 20 direct and 60 indirect and induced jobs are supported by oil and gas activities in the Caribou NF; this compares with the BLM estimate of 22 direct and 90 indirect and induced jobs from oil and gas activities on Federal lands in the CCFB in Idaho. The Bridger-Teton NF reported 818 indirect and induced jobs from oil and gas activities, but no direct jobs. This is difficult to understand, since indirect jobs are those supplying direct jobs, while indirect jobs are those resulting from economic...
activity generated by direct jobs. Some direct employment likely is associated with oil and gas activities in the Bridger-Teton, since there are 10 producing wells and 9 active drilling sites in the forest.

The Forest Service provided no information on jobs resulting from hardrock mining in the National Forests, although there are numerous producing mines in the COY. The BLM identified 10 jobs (total) from locatable mineral activity on their lands in Montana.

Effects on Other Resources

Among the principal effects of energy and mineral development are those resulting from the necessary access and the human activities that occur on the sites. Improper road construction can degrade water quality, this can reduce fish populations, and subsequently harm populations of wildlife dependent on fish, such as gizzly bears and bald eagles. The activities themselves can also displace wildlife, partly as for grizzlies which avoid human contact. Thus, unless the location and use of roads is controlled, access has the potential to damage water quality and fish and wildlife populations. (For a fuller discussion, see Access under Timber Harvesting, p. 49.)

Mining and Non-Fuel Mineral Activities

Activities associated with mining claims can affect the other resources of an area. Maintaining a claim requires at least $100 worth of development annually, this is a relatively small amount, and does not necessarily have to occur on the claim proper. In many cases, no work will be done as long as there is no challenge to the claim. Nonetheless, it means that the claimant is entitled to access to the site, and human activities may occur on the site. However, the actual effects are likely to be quite limited...in both time and space...until a mine is developed.

There are three basic ways to extract non-fuel minerals: placer mining, underground mining, and surface mining. Placer mining involves the use of running water to concentrate minerals from gravels deposited by past or present streams. The most significant effect of such or other forms of hydraulic mining is that they can introduce sediment loads into clear-flowing streams if improperly operated. Some sediment results from erosion of cleared areas and access roads, but much of it is mobilized during washing gravel to extract the metal (usually gold). Increased sedimentation can harm fisheries by reducing spawning success and eliminating spawning areas...

The effects of underground mining can be more limited. In some cases, there may be subsidence of the surface above the workings. But the most significant impacts are likely to result from the associated surface facilities, such as the mill, the waste rock, and the tailings pond, although these can be located away from the mine site. For example, the proposed platinum group metal (PGM) mine in the Uinta National Forest near Nye, Montana, would require 150 acres in the forest for the small proposal, but less than 2 acres for the larger proposal because the tailings pond would be six miles northeast in a private land, outside the COY and served by a short pipeline. The surface activities would displace wildlife and other development activities in the area, including most recreation, in addition to introducing substantial traffic.

Mines, both underground and on the surface, can harm water quality directly in addition to sedimentation from access roads. Mine openings facilitate movement of air and water into the subsurface mineralized zones, and often promote release of toxic metal ions and the formation of acids through the dissolving of corrosive minerals. This can substantially degrade water quality and damage fish and wildlife populations. If precautions are not taken. In addition, mine tailings contain potentially hazardous compounds which can further degrade both surface waters and groundwater. However, many types of mining...such as those under consideration for the Still water Complex in the Uinta National Forest...have water quality performance standards which generally prohibit the discharge of water used in processing. In these cases, mining might have only limited effects on the surface or groundwater of the COY.

Surface mines (strip and open pit mines), even more than underground mines, may displace wildlife and recreation activities from a significant area. Surface mining can raise a lot of dust, which...

14 National Park Service, Gates of the Arctic, p. 44-45.
16Surface Mining of Non-Coal Minerals, p. 58.
18Highg, Environmental Issues, p. 24-27.
degrades air quality.\(^1\) However, the most conspicuous effect of surface mines is the substantial and relatively widespread change in the land surface.\(^2\) Surface mines without subsequent reclamation create scars on the land which degrade the aesthetic quality of scenic vistas. In any case, the unavoidable alteration of the surface, in addition to the disturbance generated by mining while it is in progress, are probably the most important effects of non-fuel activities on other resources.

**Oil and Gas Activities**

Exploiting and drilling for oil and gas can affect other resources, and the various stages in the process can have different effects. The following discussion focuses on the three major types of activities which can affect other resources: seismic testing, exploratory drilling and well production.

Oil and gas leasing is perhaps the most controversial activity on the federal lands in the U.S. One group has asserted that 83 percent of the area available for leasing has been leased. The BLM reported more than 170 existing or pending leases in Idaho, and 6,400 existing or pending leases in Wyoming.\(^3\) While the Forest Service reported more than 125 existing or pending leases in Montana.\(^4\) The Bridger, Teton, Caribou, and Targhee Forests identified a total of 19 producing oil and gas wells and 30 more drilling applications, while 40 wells have been abandoned.\(^5\)

The mere granting of a lease may not have any immediate direct effect on other resources. However, the seismic testing and exploratory drilling typically associated with active leases can have substantial impacts. Seismic activity is usually associated with those leases under consideration for active development, and such exploration may eventually occur on 30-lands open to leasing. Under BLM and Forest Service regulations, a company may conduct seismic


\(^3\) ELF's response to Subcommittees' questions, p. 17, 20

\(^4\) Callahan and Beavers td SF response to Subcommittees' question 14

\(^5\) Forest Service responses to Subcommittees' questions. Oil and Gas Map Overlays for Bridger-Teton, Caribou, and Targhee Forests

---

107

**CBL-79**

---

108

**CBL-80**

tests in anticipation of leasing favorable tracts in an area, they need not have a lease in the area. Finally, leases normally provide a guarantee that drilling can be pursued somewhere within the company's lease holdings. However, the Federal Government has the right to deny applications to drill on specific sites within a lease.

**Seismic Testing.** Geologists probe rock formations with the potential for being oil and gas reservoirs by examining recordings of shock waves sent through the earth. In some places, mechanical "chopping" devices (trucks with large weights) can be used to send the shock waves, but the relatively roadless nature of the GYR strongly suggests that explosives would be used.\(^1\) Explosives are typically arranged in parallel rows, and detonated simultaneously. Each explosion does some damage, although such effects are localized and the areas generally revegetate naturally in a year or two. However, the lines can still often be seen from a distance, possibly disrupting scenic views. In addition, the wires and debris which are left behind can entangle and even kill animals. Finally, the trails created for the seismic testing can increase human traffic in the area, and may be the most significant and long-term effect of seismic testing.

The most significant tentative impacts of seismic testing while it is in progress result from associated human activity and the noise and congestion of the blasts. Many of the lines of explosives are laid in roadless backcountry, with crews sometimes flown in by helicopter, such activities bring many people into areas previously accessible only on foot or horseback, and thus can disturb wildlife which has adapted to a near-absence of human populations. Wildlife species which are relatively intolerant of human activity, such as getters bears, will likely be disturbed, and one group asserted that elk and bald eagles have been affected by seismic testing.\(^2\) The noise and combustion of explosives can disturb recreationists as well as wildlife. The blasts can allegedly be heard for a dozen miles,\(^3\) and such evidence of human presence can degrade the outdoor experience for backcountry users and other who want to "get away from it all." To date, there is little research to fully assess the effects of seismic exploration—while it is in progress or subsequently—on wildlife populations or on recreation.

So far have been collected identifying the extent of seismic testing in the GYR. As noted earlier, leasing is not a prerequisite


160 Sierra Club, Yellowstone Under Siege. p. 9

161 Sierra Club, Yellowstone Under Siege. p. 9
for seismic exploration on federal lands. Rather, the testing can be used to determine whether and where to lease. Each test provides proprietary information to the tester. Thus, several seismic tests by competing enterprises could occur in the same area over a period of time. Reducing the degree of sequential seismic work, perhaps by providing for an exchange of seismic data on some basis following a period of exclusive use, could limit the environmental damages of seismic exploration.

Exploratory Drilling. Seismic tests can only indicate favorable structures and formations. Drilling is needed to confirm the existence of oil and gas. For federal lands, a lease applies only if the lessee can drill to a depth sufficient to find oil or gas. This can be costly in itself since production is highly automated. However, drilling only on leases leased specifically for exploratory drilling (such as “spud log” leases) reduces the size of the impact and the number of sites. Drilling can also reduce streamflow during critical periods for fish and wildlife.

Exploratory drilling displaces wildlife and other development activities (i.e., harvesting, grazing, recreation, etc.) from a relatively small area. As with underground mining, however, impacts on wildlife are likely to be cumulative and irreversible. The size of the impact is not necessarily related to the size of the wellhead area; however, the size of the site is critical.

Seismic testing may have only temporary effects, if sufficient oil or gas is found. Dry wells are generally capped, and the sites are often restored naturally in a few years. However, access to the sites may continue to be used by others, by loggers of sick hunters, for example. Thus, the access provided for exploration drilling could have effects which last long after drilling has ceased.

Oil and Gas Production. The effects of producing wells are similar to those of exploratory wells; the differences are in the time and extent of the effects. A single, unsuccessful exploratory well is a transient event lasting only a few months to a year. The development of a field can be anything from the original single exploratory well on a small discovery to dozens of wells across hundreds of acres. Development may last several years and the drilling sites are typically larger than for exploratory wells. Traffic will be substantial while the wells are drilled and outfitted with the necessary equipment and storage facilities. Borehole diameter gathering pipelines (up to an inch in diameter) may be laid down to collect and move the oil and gas from various adjacent leases to a central processing site. Once fully developed, the human presence will diminish, since production is highly automated. However, inspection, maintenance, and other activities will continue to be conducted on the sites sporadically through the life of the field, which may be measured in decades. There are currently 19 producing wells in the CVB, with most (13) concentrated in the Big Pines Ranger District of the Bridger-Teton National Forest.

Geothermal Activities.

To date, the only geothermal activity in the CVB is the leasing of some federal lands, mostly near Island Park Reservoir. As with oil and gas leases, a geothermal leaseholding might not have direct impacts on other resources. The effects result from activities (such as drilling) which may occur because of the lease. In addition to the potential damage caused by increased human access, geothermal energy production drilling could alter water supplies. Hot water releases from a geothermal operation could increase the temperatures, which could harm trout populations and thus the wildlife and recreation associated with these fish species. The hot brines contain dissolved minerals and are thus corrosive; their ultimate disposal presents a problem which has yet to be solved. The drilling could also alter underground hydrothermal systems, such as the geysers in Yellowstone National Park, but the U.S. Geological Survey reported that a link between Island Park Reservoir Geothermal Resource Area and Yellowstone is unlikely. Finally, the energy must be used on the site, so the construction and operation of a power plant or other facility requiring heat is involved.

Energy Transmission Corridors.

Powerlines, moving energy in, out, or across the CVB, can affect wildlife and recreation. As noted under Water Developments, energy corridors can encourage access to previously unavailable areas, particularly for all-terrain vehicles. Of particular concern are the major east-west corridors considered by Bonneville Power Administration
nation; these corridors would include a 100-foot wide right-of-way, carrying up to three Ultra High Frequency lines. The straight clearings typical of such corridors are not particularly attractive, and could detract from recreation values in the area. In addition, an extended opening of this size could serve as a barrier to wildlife movement, especially for wildlife species which prefer cover for traveling. Thus, major energy transmission corridors could harm wildlife populations by altering migration patterns.

RECREATION

This section provides general information on recreation use and imputed economic values of recreation, as developed by the Forest Service to use in evaluating tradesoffs in land management planning. More specific information is then provided on use, resulting economic activity, and other effects for downhill skiing, campgrounds, picnic areas, and resorts, hunting and outfitters; sport fishing; and hiking, backpacking, and cross-country skiing. These are several major findings.

1. Recreation supports more employment than any other activity in the National Forests, and except for phosphate mining in the Caribou National Forest, is responsible for two-thirds of the jobs resulting from all activities in the National Forests.

2. More recreation is dispersed throughout the area than occurs at developed sites, although the imputed economic values for developed recreation are generally higher. The dispersed recreation occurs along roads primarily built for other uses (timber harvesting, etc.). This human intrusion into the farthest reaches of the COVR is probably the most significant impact of recreation on the ecosystem.

3. The economic value of recreation used by the Forest Service for evaluating management alternatives appears to be only distantly related to the local economic benefits, and inconsistent among adjoining Ranger Districts. These inconsistent values may result in incoherent comparisons between recreation and other resources.

4. The data on levels and locations of various recreation activities are incomplete and inconsistent among agencies. National Park Service data particularly were lacking, but other agencies provided data which were incomplete over time and organized in categories which limit their utility in making management decisions. There was virtually no data on recreation use by locations for the Park Service and the Fish and Wildlife Service.

Recreational Activities

Recreational activities include a diverse group of actions by people visiting the Parks and Forests for enjoyment. In Yellowstone National Park, visitation has increased spectacularly over the years from 5,518 visitors at the Park in 1873 to 2,491,000 in 1984. Grand Teton National Park reported 2.14 million visitors in 1984, with a significant overlap of visitors to the two Parks. Forest Service data showed more than 5.1 million visits to the COVR National Forests in 1984, many of these visitors also visited Yellowstone NP. In sum, there may have been as many as 10 million visits to the Federal lands in the COVR in 1984.

Some activities require intensively developed sites, while other activities can occur with no supporting facilities. The Forest Service divides recreation into two basic categories: dispersed and developed. Developed recreation sites result from management intent and involve money in site modification - i.e., facility installation. Some activities, such as downhill skiing, occur only at developed sites. On the other hand, some kinds of fishing, for example, might be considered developed while other kinds would be dispersed. The classification would depend on ancillary facilities such as docks, toilets, etc.

Figure A graphically shows the number of Recreation Visitor Days (RVD) spent in 1984 in developed and dispersed recreation in the COVR National Forests, by Ranger Districts. In three Districts, 144the COY Bald Eagle Working Team, A Bald Eagle Management Plan for the Greater Yellowstone Ecosystem, Wyoming Game and Fish Dept., Nov 1983, p. 20.

145Grand Teton National Park Superintendent Jack E. Stark’s response to subcommittees’ question.


147Recreation Visitor Day is defined as “Recreational use of National Forest sites, or areas of land or water, which aggregates 12 visitor-hours for 1 hour, or any equivalent combination of continuous or intermittent recreation use by individuals or groups.” Source: Forest Service RIM Handbook, p. 84.

148Data provided by the Forest Service Office in Washington, DC, for entire Ranger Districts. Districts with disjoint parts outside of the COVR are included in the figures, and that totals may oversate COVR recreation in the Gallatin NF and the Custer NF.
Figure 6. Recreation Visitor Days (RVDs) by Ranger District in FY84

- Teton Basin (TNF)
- Palisades (TNF)
- Ashton (TNF)
- Island Park (TNF)
- Soda Springs (CA)
- Pinedale (BTNF)
- Buffalo (BTNF)
- Jackson (BTNF)
- Greys River (BTNF)
- Big Piney (BTNF)
- Kemmerer (BTNF)
- Wind River (SNF)
- Wapiti (SNF)
- Lander (SNF)
- Greybull (SNF)
- Clarks Fork (SNF)
- Beartooth (CUNF)
- Hebgen Lake (GNF)
- Bozeman (GNF)
- Gardiner (GNF)
- Livingston (GNF)
- Big Timber (GNF)
- Madison (BNF)

Ranger District

RVDs (x1000)

Developed
Dispersed
developed recreation exceeded dispersed recreation by a small margin, but overall, dispersed recreation accounted for two-thirds of the recreation in the CVNR National Forests in 1984.

The Forest Service provided data on recreation use by several types of activities. As shown in Table 11, camping and picnicking are the most common activities. Hunting and fishing account for nearly one million Bye, while certain kinds of dispersed recreation — hiking, dispersed tent camping, and cross-country (K-C) skiing — are also popular. Finally, there are several ski resorts in the CVNR National Forests.

Recreation Data Problems

The only recreation data collected annually for all units of the National Park System concern overnight visitors and entrance statistics. Data on types of overnight stays were provided to the Subcommittees, but no data were available on other types of activities, such as hiking and fishing. Recreation data are only marginally better for the National Park Service's sister agency, the Fish and Wildlife Service. The FWS reported some data on hunting and fishing, but apparently collects information on few other categories of recreational activities.

Ironically, recreation data are far more extensive and available for the Forest Service than for the National's premier recreation agency, the National Park Service. However, the Forest Service data, while more extensive and computerized, present their own problems of interpretation. The chief problem is that the Service's definitions of activities do not fit an intuitive concept of what such terms should include—a Service-wide problem that is not unique to the CVNR (see especially "Camping" and "Hiking", below). In addition, reported numbers are often the local managers' best guess of actual levels of activity, rather than the result of surveys or samples. Not knowing the weakness of gaps in the Forest Service's raw data, some comparisons can be made, but usually not between agencies.

Downhill Skiing

There are nine operating downhill ski resorts in the CVNR, and three more in various stages of planning. (See Map 7 for locations.) The nine operating areas are:

1. The Lodge Mountain-Grizzly Peak in the Bearth Ranch Subdistrict of the Custer National Forest. According to the Forest Service, the area is not known to have financial problems, and in fact has made "significant capital investments" over the last 10 years.

2. The Big Sky in the South Bozeman District of the Gallatin National Forest. The Forest Service noted that the area has returned approximately $28 million on an initial 1970 investment of $7 million...
by the developer. One day lift tickets cost $22 for the 1986-87 season.

(3) Red Lodge Ski Camp in the Clark's Fork District of the Shoshone National Forest. This is a very small facility, with no more than 200 Recreation Visitors Days annually from 1976-1986. According to the Shoshone National Forest, the facility "showed a loss in 1982, but operated profitably in 1983-84."

(4) Sleeping Giant in the Wapiti District of the Shoshone National Forest. This area is also fairly small. The USFS says the area "has failed to show a profit in the last three years (1982-84), and visitor days are declining."

(5) White Pine in the Francis Lake 4Distriél of the Bridger-Teton National Forest. Use at this area is "on a slight downward trend," according to the Forest Service.

(6) Snow King Mountain in the Gros Ventre District of the Bridger-Teton National Forest. Use at this area is "on a slight upward trend."

(7) Jackson Hole also in the Gros Ventre District. Use at this area "has increased only slightly in recent years and may be stabilizing." One day lift tickets cost $26 for the 1986-87 season.

(8) Kelly Canyon in the Palisades District of the Targhee National Forest. The Targhee calls the area "economically sound." But another Targhee ski area did not renew its permit in 1986 because of marginal economics.

(9) Grand Targhee in the Teton Basin District of the Targhee National Forest. The Targhee response says that the area is "economically sound."

In addition to the nine operating areas, there are three areas at various stages of planning or development. The most controversial of these is Ski Yellowstone in the Hebgen Lake District of the Gallatin National Forest. (See discussion below under Effects on Other Resources.) Two additional ski areas, in the Targhee National Forest, are proposed, one near Sawmill Peak south of Henry's Lake, and another near Teton Pass.

Campgrounds, Picnic Areas, and Resorts

Map 7 shows the location of all campgrounds and picnic areas, resorts, ranches, and lodges in the GYNF, and Table 14 shows the number of campgrounds and picnic areas within each jurisdiction. These facilities are generally clustered along the roads leading up the valleys of the National Forests and along the network of roads through the National Parks and Wildlife Refuges. They are also, as might be expected, areas with high levels of other recreation activi-
Hunting and Outfitters

The Forest Service divides hunting into four categories: big game, small game, upland birds, and waterfowl. Big game hunting predominates in the CWR, and for this analysis, all four subcategories have been added together. Figure 7 shows the distribution of hunting pressure in the Federal administrative units of the CWR where hunting is allowed. The Bridger-Teton, Gallatin, Targhee, and Shoshone National Forests accounted for 88 percent of all Hunting Recreation Visitor Days in the National Forests of the CWR in 1975. Interestingly, the National Elk Refuge (NER) actually has the lowest hunting activity of the nine jurisdictions. This refuge is, however, the destination for much of the huge migration of elk travelling from Yellowstone National Park south through the Bridger-Teton. Providing winter habitat, the Refuge makes possible the high levels of hunting activity in the Bridger-Teton.

It is difficult to assess fully the hunting activity in the CWR because of gaps in the data. The most striking of these gaps is at the Caribou National Forest, which stated "Hunting RVD data for 1976 thru [1981] 1984 were not kept on the Forest, but probably can be acquired from the archives in Washington, D.C." Another anomaly occurs on the Beaverhead, which reported identical statistics for all four subcategories of hunting for 1979, 1980, and 1981. These statistics were identical not only for the Madison District as a whole, but also within each of the subdistricts.

Sport Fishing

Map 7 shows the areas of the CWR judged by Federal land managers to have especially heavy fishing use relative to other areas in the same jurisdiction. The areas indicated on the map are not the same as the areas of the best fishing, but rather the areas of the best fishing, based on the judgments of the area’s various managers. Several areas, both in and out of the two Parks, offer outstanding recreational fisheries, in the view of some observers. The most heavily used areas are listed in Table 16, on p. 92.

\(^{16}\)Caribou National Forest response to Subcommittees’ question 17

\(^{17}\)Bright, Mark. Representing the Montana Council of Trout Unlimited. Greater Yellowstone Ecosystem Oversight Hearing. P. 549-551
TABLE 16  Heavily Used Fishing Areas Within the COYR Federal Lands

<table>
<thead>
<tr>
<th>Area</th>
<th>Heavily Used Fishing Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaverhead NF</td>
<td>Madison River (a certain tributaries)</td>
</tr>
<tr>
<td>Gallatin NF</td>
<td>Hebgen Lake, Gallatin River, Yellowstone River</td>
</tr>
<tr>
<td>Custer NF</td>
<td>Tributaries of the Yellowstone River flowing northeast</td>
</tr>
<tr>
<td>Shoshone NF</td>
<td>Clark's Fork of the Yellowstone River, the North Fork of the Shoshone River, and the Wind River</td>
</tr>
<tr>
<td>Bridger-Teton NF</td>
<td>Several artificial impoundments in the Wind River Range; Snake River</td>
</tr>
<tr>
<td>Caribou NF</td>
<td>Only a few scattered areas</td>
</tr>
<tr>
<td>Targhee NF</td>
<td>Henry's Fork, the Palisades Reservoir (on the Snake River); Inland Park Reservoir; and Henry's Lake</td>
</tr>
<tr>
<td>Yellowstone NF</td>
<td>Yellowstone Lake, Yellowstone River; Madison River; Firehole River; and Gibson River</td>
</tr>
<tr>
<td>Grand Teton NF</td>
<td>Jackson Lake; Snake River</td>
</tr>
<tr>
<td>Rockefeller Parkway</td>
<td></td>
</tr>
<tr>
<td>National Elk Refuge</td>
<td></td>
</tr>
<tr>
<td>Guns Lake NWR</td>
<td>No response</td>
</tr>
</tbody>
</table>

Figure 8 shows the number of fishing Recreation Visitor Days on those parts of the National Forests in the GOYR. (The Targhee did not report data for 1976-77.) In the GOYR in 1985, RDVs for fishing were highest in the Gallatin National Forest and lowest in the Beaverhead. Use of the two most heavily fished areas, the Gallatin and the Bridger-Teton, appears to have declined over the last decade.

Fishing RDVs at Red Rock Lakes National Wildlife Refuge and the National Elk Refuge were extremely low, with a peak of 1371 RDVs for Red Rock Lakes in 1977 and of 964 RDVs for the National Elk Refuge in 1985. Fishing at these two refuges was less than one per cent of all of the fishing RDVs in the GOYR. No data were provided for Guns Lake National Wildlife Refuge. Consequently, data for the Wildlife Refuges were not included in Figure 6. There are no data for fishing RDVs at any of the three National Park System units, although managers did indicate the areas they thought were most heavily fished.
Figure 8. Fishing Recreation Visitor Days in the National Forests of the CGYR, FY76-FY85
Hiking, Backpacking, and Cross-Country Skiing

Analysis of the impact of hiking and backpacking is difficult for two reasons. First, the National Park Service and the Fish and Wildlife Service collect very few data on the subject. Second, while the Forest Service collects more voluminous data, the material is difficult to use because of unconventional definitions of these subjects. "Camping," for example, is divided into four categories: "Camping-General Day," "Camping-Auto," "Camping-Tailor" and "Camping-Test." According to the Forest Service, any and all of these activities may take place in a developed campground. Only the first and last can occur along a trail remote from any road. The definition of tent camping also makes it clear that activities of backpackers while on the trail or away from their tents should not be included in that activity code.

Moreover, the definition of "hiking and walking" is also unusual. "Foot travel (including jogging) for pleasure or exercise includes sightseeing while traveling and rest or leisure stops that are not significant enough to report as specific activities." So other category of recreation is any closer to those activities usually considered hiking or backpacking here defined as walking, away from a road, across country or on a trail, while typically carrying a pack that contains food and other supplies for a trip of several hours to one or more days.

As a result, it is impossible to estimate the amount of hiking and backpacking for any area of the CONR based on data available to the subcommittees. It appears that information is not collected on hiking and backpacking by any agency active in the CONR. The Forest Service category of "camping" (i.e., all four categories used by the Forest Service) and "hiking" should not be considered surrogate for backpacking. Nor do... presumably... include backpacking as an unknowable percentage of their total values.

One can only... correlate on the level of hiking activity in the three National Park System units... and the three National Wildlife Refuges. Hundreds of miles of trails cross these six areas, and use is probably intense near roads in the summer. Some areas are periodically closed to hikers because of grizzly bear activity or the presence of whooping cranes, nesting trumpeter swans, and other wildlife management concerns. The effects of these closures on hikers are unknown, since no basic data are available on levels of hiking under normal circumstances. However, data are available... (see Figure 9) for "backcountry overnight stays" for the National Park System, which seems to be the best available surrogate for backpacking activity. However, these figures may include individuals whose main activity during the day is fishing, riding, or other activities.

[17] Forest Service RM Handbook, p. 95
Hiking, Backpacking, and Cross-Country Skiing

Analysis of the impact of hiking and backpacking is difficult for two reasons: First, the National Park Service and the Fish and Wildlife Service collect very few data on the subject. Second, while the Forest Service collects more voluminous data, the material is difficult to use because of unconventional definitions of these subjects. "Camping," for example, is divided into four categories: "Camping-General Day," "Camping-Auto," "Camping-Tailor" and "Camping-Test." According to the Forest Service, any and all of these activities may take place in a developed campground. Only the first and last can occur along a trail, remote from any road. The definition of tent camping also makes clear that activities of backpackers while on the trail or away from their tents should not be included in that activity code.

Moreover, the definition of "Hiking and Walking" is also unusual. "Foot travel (including jogging) for pleasure or access. Includes sightseeing while traveling and rest or leisure stops that are not significant enough to report as specific activities." So other categories of recreation are any closer to those activities usually considered hiking or backpacking, here defined as walking, away from a road, across country or on a trail, while typically carrying a pack that contains food and other supplies for a trip of several hours to one or more days.

As a result, it is impossible to estimate the amount of hiking and backpacking for any area of the COY based on data available to the Subcommittee. It appears that information is not collected on hiking and backpacking by any agency active in the COY. The Forest Service categories of "camping" (i.e., all four categories used by the Forest Service) and "hiking" should not be considered surrogates for backpacking, but do - presumably - include backpacking as an unknown percentage of their total values.

One can only speculate on the level of hiking activity in the three National Park System units and the three National Wildlife Refuges. Hundreds of miles of trails cross these six areas, and use is probably intense near roads on the summer. Some areas are generally closed to hikers because of grizzly bear activity or the presence of whooping cranes, nesting trumpeter swans, and other wildlife management concerns. The effects of these closures on hikers are unknown, since no basic data are available on levels of hiking under normal circumstances. However, data are available (see Figure 9) for "backcountry overnight stays" for the National Park System, which seems to be the best available surrogate for backpacking activity. However, these figures may include individuals whose main activity during the day is fishing, riding or other activities.

17Forest Service RM Handbook, p. 95

Cross-Country Skiing (or "XC skiing") is divided into two subcategories: skiing on "set" or "groomed" tracks prepared by snow machines, and skiing on trails or open country without such grooming. The former class is popular especially with those interested in high speed performance and competition, but cannot occur in very steep or wilderness areas, since snowmobiles would be physically or legally unable to groom trails in such places. This type of cross-country skiing is often provided at downhill ski resorts, and cross-country skiers of unusual ability may even use down hill slopes. Cross-country skiing on ungroomed tracks is typically popular with those interested in wilderness or wilderness-like environments. Less experienced skiers may find that old roads and easy trails offer a suitable challenge and, in winter's silence, still provide the solitude they seek.

Forest Service recreation statistics do not distinguish between these two types of cross-country skiing.

Figure 9 shows Recreation Visitor Days for hiking, dispersed tent camping, and cross-country skiing in FY8 in the Ranger Districts of the National Forests and for "backcountry overnight stays" in the three National Park System units. (This measure appears to be equivalent to the Forest Service's dispersed tent camping Forest Service data were not available by Subdistricts, so levels shown in the graph are for entire Districts, even if a part of the District is in the COY.) Surprisingly perhaps, these recreation activities are not overwhelmingly concentrated in those Ranger Districts adjacent to the National Parks. For example, the Princedale Ranger District, by far the leader in FY8 for these types of recreation, is as far from Yellowstone National Park as any other District in the Bridger-Teton. At least two Ranger Districts (Floods, is in the Bridger-Teton and Beartooth in the Crazy) had levels of dispersed tent camping that even exceeded the "backcountry overnight stays" of the two National Parks. At the same time, Nohgen Lake, a District adjacent to Yellowstone National Park, and which ranks very high in fishing pressure, is only intermediate for these forms of recreation.

Economic Effects

Employment

In the National Forests, visitors make very substantial expenditures for recreation, producing large numbers of jobs. These jobs may be directly created by the forest number of reported direct jobs in six of the National Forests in the COY (7,7 percent of direct jobs). However, data are available (see Figure 9) for "backcountry overnight stays" for the National Park System. Which seems to be the best available surrogate for backpacking activity. However, these figures may include individuals whose main activity during the day is fishing, riding or other activities.

Table 7 (p. 41) shows direct and indirect jobs in the National Forests resulting from various recreation activities. Hunting.
Figure 9. Tent Camping (Dispersed), Hiking, and Cross-Country Skiing in the Ranger Districts and Park System Units of the CGYA in FY84
fishing, and skiing create many jobs, but other recreation activities (lodging, resort ranches, riding, camping, bird-watching, snowmobiling, etc.), which are only reported in the aggregate, are consistently among the largest generators of jobs, comprising over 40 percent of all reported direct jobs for most of these National Forests.

As shown in Table 7 (p. 41), estimated direct jobs from the existing ski areas range up to 106 on the Targhee. (The Shoshone National Forest does not keep separate records of downhill skiing jobs, since the numbers are so small.) The Shoshone accounts for less than two percent of GtVH downhill skiing Recreation Visitor Days in 1964.] There were 109.5 direct jobs in the GtVH due to downhill skiing -- a higher total than any other single industry in the GtVH except phosphate mining. Indirect plus induced jobs added another 611 jobs in the GtVH.

Big game hunting, with or without outfitters, plays a major role in the creation of jobs in several areas, particularly the Bridger-Teton National Forest and the northern part of the Shoshone National Forest. In contrast, small game hunting produces a total of only 24.8 direct jobs and 11.8 indirect or induced jobs in the entire GtVH.

Fishing activity can be locally important to the economy (see Table 7; p. 41), particularly in the Teton Lake Ranger District of the Gallatin National Forest and in the east-flowing streams of the Shoshone National Forest. (See Figure 8.) There are 47 direct jobs related to fishing in the National Forests of the GtVH, and an additional 73 indirect and induced jobs.

Table 7 (p. 41) shows that "Other Recreation" generates a very high number of direct, indirect, and induced jobs in the GtVH. Together, the resorts, campgrounds, and recreation cabin users contribute more to the over-11 job market in the area than any other single industry which depends directly on Federal lands in the GtVH.

Economic Value

Where available, values are given for economic values of recreational activities. "Economic value" -- (or "benefit value") as used by the Forest Service - is not a measure of local or regional economic impact. The Forest Service defines this term as a value "to quantify the results of a proposed activity, project or program expressed in monetary or nonmonetary terms." While this definition is not illuminating, in essence it means that the Forest Service attempts to estimate how much each participant values a particular experience. There are a number of methods, chiefly involving surveys of participants, that can be used to estimate such values. These methods might

### TABLE 17: Forest Service Economic Values for Recreational Activities

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Game</td>
<td>20.00</td>
<td>20.00</td>
<td>20.00</td>
<td>20.00</td>
<td>20.00</td>
<td>20.00</td>
<td>20.00</td>
<td>20.00</td>
</tr>
<tr>
<td>Deer</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Fishing</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Hiking</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Picnicking</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
</tbody>
</table>

1. The Gallatin NF did not report year of data for hunting or E-C skiing.

2. The Caribou NF reported 1981 data for fishing.

3. The Targhee NF reported 1978 data for downhill skiing and 1981 data for hunting and fishing.

4. The Shoshone NF supplied a range of values for camping and picnicking, since "Values used in Forest Planning were not broken down distinctly into the listed categories." The values in the table are the low limit: the upper limit is $113.84 per day for both categories.

There is economic data available for the National Park Service or the Fish and Wildlife Service on these subjects. For example, agencies charge fees for camping at their developed facilities, although there may not be a fee charged outside of the park's boundaries. The law (16 U.S.C. 440, 442) requires certain minimum facilities for the agencies to charge fees. Tent or trailer spaces, drinking water, access roads, refuse containers, toilet facilities, fire facilities, visitor protection, and personal collection of the fees by an agent of the agency. The campground may have sufficient space for a few hundred campers.

Table 17 shows the imputed economic values of four categories of hunting RDU's. In contrast, the Upper National Forest cited a study by the Montana Extension Service which estimated expenditures of $1,800 per harvested elk, which would be equivalent to a value far higher than the values shown in the table, unless the average elk hunter is spending roughly 60 days to harvest one elk (a good illustration of the difference between local expenditures and economic values). For fishing RDU's, the Gallatin National Forest cited two studies. In Montana on expenditures by non-resident fishermen, Trout Unlimited reported an average expenditure of $272 per fishing trip by non-residents, and the Madison River (thermal) Study reported $78 per day for non-residents. As with hunting, these reported expenditures differ substantially from the imputed economic values reported by the Forest Service.

There are no data for the economic value of hunting or fishing for recreation visitors on the three National Wildlife Refuges. The Red Rock Lakes and the National Elk Refuge indicated that they do not collect such information. Grays Lake did not respond to the Subcommittees' inquiries.

There are small differences in the imputed economic values reported for summer and winter dispersed recreation. Winter dispersed recreation is rated slightly higher than summer dispersed recreation on some National Forests. These values are shown in Table 18. The reason for the enormous difference between the Bridger-Teton value and the other Forests' values for dispersed recreation is not clear, but may be due to Bridger-Teton's inclusion of such activities as birdwatching and nature photography as dispersed recreation, which other Forests did not include.


174 Gallatin National Forest response to Subcommittees' question 16.
TABLE 16. Forest Service Economic Values for Dispersed Recreation
(in dollars per AUM; n/r = not reported)

<table>
<thead>
<tr>
<th>Date of</th>
<th>Winter</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimate</td>
<td>Use</td>
<td>n/r</td>
</tr>
<tr>
<td>Beaverhead NF</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Gallatin NF</td>
<td>7.00</td>
<td>6.00</td>
</tr>
<tr>
<td>Ouster NF</td>
<td>1982</td>
<td>1982</td>
</tr>
<tr>
<td>Shoshone NF</td>
<td>1982</td>
<td>1982</td>
</tr>
<tr>
<td>Bridger-Teton NF</td>
<td>1982</td>
<td>40.10</td>
</tr>
<tr>
<td>Caribou NF</td>
<td>1978</td>
<td>3.00</td>
</tr>
<tr>
<td>Targhee NF</td>
<td>3.00</td>
<td>3.00</td>
</tr>
</tbody>
</table>

1 The Shoshone NF supplied a range of values, since "values used in Forest Planning were not broken down distinctly into the listed categories." The value in the table is the lower limit: the upper limit was $13.84 per AUM for both winter and summer dispersed recreation.

2 The Bridger-Teton NF, in its estimate of the economic value of other dispersed recreation in winter and summer, gave the values for "non-consumptive wildlife" use. This category, therefore, includes such activities as bird-watching, nature photography and study, etc.

Effects on Other Resources

Effects on Water Quality

One serious consequence of heavy backcountry use is contamination of water supplies with human and pack animal wastes. (This is an occasional problem at campgrounds, as well.) Of particular concern is human and pack animal fecal contamination, which can spread the parasite Giardia lamblia, and various bacterial contaminants. Contamination by pack animals may also occur. Giardia is a waterborne gastrointestinal disease that is rarely fatal, instead leaving many of its victims in temporary but acute misery. Protection is achieved either by boiling water, or by chemical treatment, with one expert recommending both.175

As many as 10 percent of the U.S. population may be carriers of giardiasis.176 So it is reasonable to predict that contamination levels in the GUY are likely to increase as the number of visitors increases. However, very few studies have been done on the scope of this problem, so current risks in the GUY cannot be assessed.

any young for several years. The effects of these platforms will be monitored for the next several years.\textsuperscript{185}

\textbf{Ski Developments.} Due to the mere presence of people, a ski facility may displace animals from critical winter habitat or reduce the suitability of an area for foraging, cover, or travel. Access roads to a facility may increase hunter access, fishing pressure, or numbers of visitors outside of the ski season. The roads could also harm water quality and degrade fisheries habitat. (See Access under Timb. Harvesting, p. 49, for further discussion.) The condominium development usually required to make destination resorts profitable can have even wider effects due to increased human activity in the area, both winter and summer. For species such as grizzlies that avoid human contact, the area can be effectively closed to their use. Even less sensitive species, such as elk, can be excluded. An existing ski development -- Big Sky in Montana -- disrupts a Yellowstone National Park elk herd which passes through the area during its migration. However, a park biologist judged the current effects as minor. If the size of the development does not increase.\textsuperscript{185}

The proposed Ski Yellowstone area -- the most controversial ski development in the GWRS. It is about 10 miles northwest of West Yellowstone on the north and east sides of Mount Helgen, and would occupy approximately 1,300 acres of private land and 1,700 acres of National Forest land. It falls within grizzly Management Situation I (See Map 3 and Map 7.) However, it is near a grizzly bear "black hole" and ranks as "Highest Density" in bear use. (See Map 3 and Figure 4, p. 24.) Ski Yellowstone would also occupy an area currently used as an elk foraging ground and would overlap moose winter range and calving grounds.\textsuperscript{185}

Ski Yellowstone's developers initially applied for a permit in 1971. A series of appeals have since been filed by opponents, and the developers have submitted additional materials in support of their application. A permit for development was issued by Gallatin National Forest in August 1982. This special use permit does not allow development until a final master plan, construction plans, and financial capability are approved. The Gallatin has asked for additional information regarding Phase I of the development, and does not plan to allow any development to proceed until a Cumulative Effects Analysis of grizzly habitat is complete. The Gallatin in reply

\textsuperscript{185}Yellowstone National Park Superintendent Bob Barbee's response to Subcommittee's question 4.

\textsuperscript{186}Personal communication with Frank Singer, Wildlife Biologist, Yellowstone National Park, Oct 7, 1985.


\textbf{Fish and Wildlife Service.} The Fish and Wildlife Service said that if the area is reclassified to grizzly Management Situation I, "then alteration of development plans may be necessary.\textsuperscript{188} Certain environmental groups have announced plans to sue the Forest Service and the Fish and Wildlife Service concerning the permit. Ski Yellowstone has bought over 1,100 acres of private land (which has appreciated in value due to the proposed development), and has spent approximately $75,000 on a one mile road across private land, as well as about $100,000 in planning costs, according to the Forest Service.\textsuperscript{188} Planning costs and facilitation costs would not be recoverable if the development does not proceed. The two proposed ski areas on the Targhee have received little attention. The Sawtooth Development -- based on an "economic exchange" for grizzly bears, while the area near Teton Pass is not considered part of grizzly range. (Compare Map 1 and Figure 4, p. 34.) Among the comments on the Targhee draft forest plan, no one supported any of the potential future ski area proposals. However, the Targhee stated its intention to manage the areas so as not to preclude future ski development.\textsuperscript{185}

\textbf{Fishing Bridge.} A major controversy also surrounds Fishing Bridge Campground and Visitor Center in Yellowstone National Park. Fishing Bridge is the site of highly developed facilities on the north shore of Yellowstone Lake where the Yellowstone River drains from the Lake. As its name suggests, Fishing Bridge is a favored fishing site, for both humans and grizzly bears. More grizzlies have been removed from this area, either by death or to zones for control actions than from any other site in the GWRS. (See Map 1.) Largely because of concern for the grizzlies, the National Park Service decided in 1974 to close the 71-year-old facility and move the center of human activity to Grant Village, south of West Thumb, where grizzlies are less common. (See Figure 4, p. 34.) As Grant Village expanded, Fishing Bridge was to be closed.

However, citizens, particularly those in Cody, Wyoming, became concerned that moving the facility would divert traffic and business from the Park's east entrance through Cody -- to its other entrances. In addition, the Advisory Council on Historic Preservation, a Federal agency, was not consulted on the move, and was concerned about the status of the National Historic District at Fishing Bridge. The Wyoming State Historic Preservation Office shared

\textsuperscript{188}Gallatin National Forest response to Subcommittees' question 4.

\textsuperscript{189}Gallatin National Forest response to Subcommittees' question 20.

these concerns. As a result of such issues, Fishing Bridge has not been closed.

The area is currently operating under Interim Guidelines. Since 1977, camping at Fishing Bridge has been restricted to "hard-side" vehicles (recreation vehicles, trucks, station wagons, etc.), to reduce the risk of bears to other species from human-bear encounters. Additional restrictions contained in the Interim guidelines include closure of some portions of the campground where grizzly use has been especially high, intense patrolling of the area for garbage collection, and unattended food items left within reach of bears; reducing the number of National Park Service employees using cabin night patrols of campgrounds; and training of National Park Service personnel in bear safety. A final Environmental Impact Statement on the closure and relocation is expected in May 1987 with a final decision following in June.

**Poaching:** The Beaverhead and the Gallatin National Forests identified poaching as a "management problem" in the COY. The Gallatin staff said poaching of elk, big horn sheep, moose, deer, and black bear populations in Gallatin Canyon. The sources asserted that about 17 grizzlies have been poached in the COY in the last five years. Poaching is particularly damaging for grizzlies, due to the species' low population base.

**Bull Runs and Grizzlies:** There may be a direct conflict between hunters and grizzlies. Hunter camps may attract grizzlies because of the presence of carcasses. In the COY, grizzlies can be found in the area around the Thoroughfare Plateau in the Teton Wilderness. It is the most controversial, since a great deal of elk hunting occurs there in the fall. The very high density of hunter camps, outfitters, and other recreational facilities -- combined with the presence of many well-armed individuals and the lack of carcasses -- can lead to conflict at grizzlies to other areas. The Thoroughfare Plateau has been the scene of many bear deaths over the last 10 years. (See Map 2.)

There are stringent regulations in the National Forests of the COY for the storage of game meat, fish, and human and animal food.

---


187) Gallatin National Forest response to Subcommittees' question 17

refute this observation. Loggers may also be reluctant to enter
an area during a hunting season for similar reasons.

A Yellowstone National Park document sounds the following
warning: "The hazards of a bear encounter is low, but very real. If
you cannot accept the possibility of an encounter, then hike else-
where." 192 Martinka193 has shown that, at Glacier National Park,
human-grizzly confrontations and grizzly bear removals are strongly
related with visitation rates. He argues that traditional manage-
ment of confrontations has "stressed the aggressive treatment of
problem bears," rather than "visitor management, as an independent
variable. [holding] the key to reducing future confrontations and bear
removals in the park environment." Since reductions in the total
number of visitors are unlikely or even impossible, he emphasizes
control of visitor distribution. Among his listed options are the
following:

1. Relocation of trails and campsites.
2. Restriction of human activity in an area to times or seasons
   when grizzlies are unlikely to be present, and
3. Use of computer models with detailed information on visitor
   travel patterns, campsites, and bear contacts.

These options are obviously not mutually exclusive. Moreover, the
last option could consider far more variables than those cited by
Martinka as predictors of grizzly bear confrontations. It is clear,
however, that unless data bases are improved beyond those made
available for this study, the computer modeling option at Yellowstone
National Park is highly improbable at this time due to lack of even
raw data on recreation use, rainfall, bear sightings, and bear
movements, among other important factors. (See also the following
chapter on grizzly bear mortalities.)

192 Personal communication with Donald B. K. English, Outdoor
Recreation Planner, Southeast Forest Experiment Station, U.S. Forest
Service, October 21, 1986.

193 S. Department of the Interior, National Park Service
Beyond road's end: A backcountry user's guide to Yellowstone National
Park, 1981 p. 17

194 Martinka, C. J. Rationale and Options for Management in
Grizzly Bear Sanctuaries. "Transactions of the 47th North
American Wildlife and Natural Resources Conference." Washington,
CULTURAL AND HISTORIC RESOURCES

Although this report is primarily focused on the natural resources of the Yellowstone ecosystem, the cultural and historic resources of the area can also affect and be affected by human development activities. This chapter provides a description of what was reported to the Subcommittees about the historic and cultural resources in the GNP. The major finding is that there is little information about the locations and importance of the cultural and historic resources in the area.

INFORMATION ON THE RESOURCES

Prehistoric and historic sites occur throughout the GNP. Prehistoric sites are areas with relics which predate written history, such as burial grounds, caves, petroglyphs (rock art), paleontological sites, and bone beds of bison and antelope. Historic sites include more recent sites that still have importance for understanding the area's history, such as structures associated with past mining activity and Native American Indian settlements. Parts of the area are also used by Native Americans for cultural and religious purposes.

Yellowstone National Park contains numerous cultural and historic sites. There are two historic districts (Fishing Bridge and Old Faithful), five individual structures, and one archaeological site listed on the National Register of Historic Places for Yellowstone National Park, and three historic structures listed for Grand Teton National Park. There has also been a cultural site inventory for Yellowstone, which identified 279 cultural sites in the Park; of these, 272 sites are in Wyoming and 7 are in Montana, with none in Idaho. However, the inventory noted that more than 90 percent of the Park lacked a systematic survey of cultural resources, and it was "not

197 Personal communication with National Register Office, Cultural Resources Division, National Park Service, U.S. Department of the Interior, December 5, 1986.
195 Cultural Site Inventory of Yellowstone National Park, p. 9.
possible to predict the extent of archaeological resources within Yellowstone National Park. 198

The National Forests in the GYF also contain numerous historic and prehistoric sites. Table 19 shows the number of sites identified by each National Forest, with data disaggregated by Ranger District where provided in such detail. Of those nearly 1,000 sites, nine are listed on the National Register of Historic Places, including two on the Beaverhead National Forest, four on the Shoshone National Forest, and three on the Bridger-Teton National Forest. In addition, the administrative sites of the Tongue and Caribou Forests and the Oregon and Lander Trail segments that cross the Caribou are eligible for listing on the National Register. 200

Despite this listing of historic sites in the National Forests, the information on such sites is far from comprehensive. The State Historic Preservation Office for all three States described the incomplete records on cultural sites in the National Forests. The Idaho State Historical Society stated that “a majority of prehistoric sites on the Caribou National Forest have yet to be located since little cultural resource survey has occurred there.”201 Further, “historic resources, in fact, appear to be the best-kept secret of the Forest Service. Unlike other issues which are discussed and debated, the issue of historic resources is virtually ignored.”202 Finally, the Wyoming State Archives, Museums, and Historical Department stated that “most of the area delineated by the GYF for Wyoming has never been surveyed for cultural resources.”203 Thus, the existing information on cultural and historic resources in the National Forests is not complete.

198Cultural Site Inventory of Yellowstone National Park, p. 4
199Personal communication with National Register Office, Cultural Resources Division, National Park Service, U.S. Department of the Interior, December 5, 1986.
203Wyoming State Archives, Museums and Historical Department, State Historic Preservation Office, response to Subcommittees’ questions. Cover letter

<table>
<thead>
<tr>
<th>NATIONAL FOREST</th>
<th>Ranger District</th>
<th>Number of Historic Sites</th>
<th>Number of Prehistoric Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEAVERHEAD NF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gravelly Subd.</td>
<td></td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Madison Subd.</td>
<td></td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Tobacco Root Subd.</td>
<td></td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>GALLATIN NF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total of 300 “cultural sites”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CUSTER NF</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Bearth th Subd.</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>SHOHOKE NF</td>
<td></td>
<td>23</td>
<td>17</td>
</tr>
<tr>
<td>Clarke Fork RD</td>
<td></td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>Waghiit RD</td>
<td></td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Green River RD</td>
<td></td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>Lander RD</td>
<td></td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>BRIDGER-TETON NF</td>
<td></td>
<td>13</td>
<td>145</td>
</tr>
<tr>
<td>CARIBOU NF</td>
<td></td>
<td>64</td>
<td>0</td>
</tr>
<tr>
<td>TARSEEY NF</td>
<td></td>
<td>83</td>
<td>157</td>
</tr>
<tr>
<td>Island Park RD</td>
<td></td>
<td>20</td>
<td>32</td>
</tr>
<tr>
<td>Ashton RD</td>
<td></td>
<td>23</td>
<td>60</td>
</tr>
<tr>
<td>Teton Basin RD</td>
<td></td>
<td>20</td>
<td>33</td>
</tr>
<tr>
<td>Pallisades RD</td>
<td></td>
<td>20</td>
<td>37</td>
</tr>
</tbody>
</table>

Despite this listing of historic sites in the National Forests, the information on such sites is far from comprehensive. The State Historic Preservation Office for all three States described the incomplete records on cultural sites in the National Forests. The Idaho State Historical Society stated that “a majority of prehistoric sites on the Caribou National Forest have yet to be located since little cultural resource survey has occurred there.” Further, “historic resources, in fact, appear to be the best-kept secret of the Forest Service. Unlike other issues which are discussed and debated, the issue of historic resources is virtually ignored.” Finally,

the Wyoming State Archives, Museums, and Historical Department stated that "most of the area delineated [by the CVR] for Wyoming has never been surveyed for cultural resources." Thus, the existing information on cultural and historic resources in the National Forests is not complete.

PROTECTION OF THE RESOURCES

Federal agencies are responsible for preserving historic properties which they own or control. The National Historic Preservation Act directs the agencies to consult with the Secretary of the Interior and with State historic preservation officers in locating historic sites and recommending qualified sites for the National Register.

There has been some coordination among the Federal agencies for preserving historic sites in the CVR. The Advisory Council on Historic Preservation (AHP) reported 61 cases of consultation since 1972, principally with the National Park Service and the Forest Service, although they noted that their records may be incomplete for the older cases. One case of particular note is the Fishing Bridge Historic District in Yellowstone National Park. Beginning in 1972, the National Park Service has considered removing the buildings and returning the area to its natural state, because of the numerous confrontations between humans and grizzly bears. The Wyoming State Historic Preservation Office asserted that the area would qualify for the National Register of Historic Places, and the AHP became involved in the disposed building demolition in 1980. The National Park Service program to close Fishing Bridge was halted in 1983, but the agency has begun a new planning effort to reconsider closing the area.

The Council also felt that they were not consulted in all relevant Federal projects, particularly in the National Forests, specifically 220


206Wyoming State Archives, Museums and Historical Department, State Historic Preservation Office, response to Subcommittee's questions. Cover letter

207Advisory Council on Historic Preservation response to Subcommittee's questions. p. 9

208Advisory Council on Historic Preservation response to Subcommittee's questions. p. 4

209Advisory Council on Historic Preservation response to Subcommittee's questions. p. 8


211Advisory Council on Historic Preservation response to Subcommittee's questions. p. 8

212Advisory Council on Historic Preservation response to Subcommittee's questions. p. 9


214Advisory Council on Historic Preservation response to Subcommittee's questions. p. 9

Given the extent of timber sales, recreational developments, road construction and improvements, and other usual forest service activities, it would appear that many undertakings are occurring without offering the Council an opportunity to comment under the provisions of the National Historic Preservation Act.

The Forest Service is developing integrated land and resource management plans for the National Forests, but surveys of cultural and historic resources are generally only conducted on specific sites for each proposed project, all and gas leases, for example, include a stipulation requiring a survey for paleontological resources. Initially, the Advisory Council on Historic Preservation concurred with the Forest Service that the Forest plans would have no effect on historic properties, and had certified a Programmatic Memorandum of Agreement allowing plan development without comments from the Council. However, the State Historic Preservation Offices have recognized that the Forest plans may provide for activities without adequately considering historic resources, the Montana Historical Society, for example, stated that 211

... we strongly question whether the Forest Service can undertake "a systematic program of cultural resource inventory, evaluation and preservation aimed at the enhancement and protection of significant cultural resource values" in the absence of a full-time cultural resource staff specialist. Indeed, seven years [sic] work by seasonally employed staff has apparently not provided sufficient information on cultural resources to contribute to the planning alternatives of the draft [forest plan].

The Advisory Council has since recognized that the Forest plans may allow activities without adequate cultural and historic resource protection, and is therefore currently negotiating a new agreement with the Forest Service. 212

211Advisory Council on Historic Preservation response to Subcommittee's questions. p. 9


213Advisory Council on Historic Preservation response to Subcommittee's questions. p. 9
Cultural and historic resources, in and of themselves, have little effect on the ecosystem. They can, however, affect development activities by restricting activities in some areas. There are several ways in which protecting historic and cultural resources may alter human activities. The most common impact is stopping activities in certain areas; for example, the Bureau of Indian Affairs noted that operations which uncover archaeological sites in the Wind River Indian Reservation are halted, with undamaged sites left in place, while damaged sites are removed.213

Cultural and historic sites may also need to be protected from natural processes. Normal weathering and natural catastrophes can damage these sites. For example, the Forest Service has developed a policy of not suppressing some wildfires, under prescribed conditions, to restore some of the natural ecological processes; however, an internal Wyoming State Historic Preservation Office memorandum suggested that this policy could damage historic resources, and fire management plans should be modified to protect these sites.214

Finally, the designation of an historic site could increase the attraction of the area, possibly increasing the need to protect the site. In addition, increased recreation visits can influence land and resource management decisions, in much the same manner as other types and sites for recreational activities. Thus, protecting and designating cultural and historic sites could affect other resource uses (see Effects on Other Resources under Recreation, p. 101.)

213 Bureau of Indian Affairs response to Subcommittees’ question 2
214 Quoting State Archives, Museums and Historical Department, State Historic Preservation Office, response to Subcommittees’ questions Enclosure: Memorandum from Richard Bryant, Compliance Archaeologist, to Mark Jarger, Chief, April 24, 1984

Forest Service consideration of local fauna in land management planning relies on the concept of “indicator species.” The rationale for this concept is that, by assessing the well-being of the indicator species’ population, the health of its ecosystem will be protected. Thus, measuring the condition of the indicator species in the Coyote server as a surrogate for the much more difficult measurement of the condition of the whole ecosystem. The grizzly is a particularly appropriate indicator species for the Yellowstone ecosystem for several reasons: (1) its important habitats are also important to many other species; (2) grizzlies are sensitive to human infusions, and (3) grizzlies often die in human-bear encounters.

Maintaining adequate populations of this grizzly bear depends on at least two major factors: the rate at which new bears are born, and the rate at which bears die. Both of these rates are, of course, affected by a host of other variables. Human actions affect the “birth” rate indirectly, by modifying—or not modifying—grizzly habitat; in a manner that is difficult to measure, and which makes it difficult to identify which bears will benefit. (See Chapter III Development Activities for a discussion of these effects.) In contrast, bear mortalities caused by humans leaves individual bears as victims. As noted earlier, the loss of adult female bears is particularly critical, since the loss of one or two adult females per year to this population constitutes the difference between a declining and a stable or expanding population. In other words, if the average loss of adult females from the ecosystem can be reduced by only one or two per year, the population will likely recover, though perhaps slowly if not. It will become extinct.

The following discussion analyzes current information regarding indicator species, and its mortalities. The discussion considers particularly the clusters of mortalities and the locations and causes of deaths within these clusters. There exist several important conclusions:

1. Data on grizzly mortalities are of unusually poor quality, and inconsistencies among agency records are abundant. No single collection point exists, and agencies gather different kinds of information about deaths.

2. While no single, over-riding cause exists for the bears’ population decline, the data reveal patterns in the causes of bear deaths at some mortality clusters. These causes may be preventable.
1. The Situation Management concept currently used by the agencies is not a useful management tool for preventing deaths of grizzly bears.

SOURCE OF INFORMATION

Several federal and State agencies were questioned on locations of grizzly bear mortalities occurring between 1974 and 1986. The Fish and Wildlife Service, which has the responsibility of enforcing the Endangered Species Act, did not have any locality data for deaths before 1983, and the data provided for 1983-1986 was not sufficient to map locations; the agency replied that it did not maintain such specific information.

The data from the State of Wyoming and from the Interagency Grizzly Bear Committee (IGBC) were sufficiently clear and thorough to permit analysis. Wyoming provided a map showing the entire IGBC, with the location and year of each mortality, and a table showing the numbers of deaths due to various causes. The IGBC provided a table with information about each dead bear, a site (usually by township, range, and section), and some brief description of cause of death. Some inconsistencies should be expected when comparing hand-drawn maps with legal site descriptions. However, the extent of the discrepancies in this case is surprisingly large and reflects serious problems in the reporting techniques, especially since this information was the best available from the various sources. Moreover, these two sources rarely agreed with other, less comprehensive sources. Examples of discrepancies include:

1. Deaths identified as occurring at a certain creek or mountain in a given township, range, and section, when no such features occurred in that section (and, in one case, was found in an entirely different location).
2. Deaths listed by one agency miles from any possible match with data supplied by other agencies.

218Fish and Wildlife Service response to Subcommittees' questions p. 11.

214State of Wyoming response to Subcommittees' questions. Map of Grizzly Mortalities, and p. 3 of Terrestrial resources section. There was no information on how the data were obtained, but the memo implies that the State keeps its own records on grizzly deaths.

219Memorandum from Glen Coutter, Manager, Threatened and Endangered Program, U.S. Forest Service, Ogden, Utah, to Interagency Grizzly Bear Committee, June 19, 1986. A draft of IGBC request. The data were collected from internal IGBC documents and through telephone calls to unspecified sources.

TABLE 20: Mortality Causes for Grizzly Bear Deaths in the Yellowstone Area from 1973-1985

<table>
<thead>
<tr>
<th>Mortality Cause</th>
<th>State of Wyoming Number Recorded</th>
<th>IGBC Number Recorded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Control</td>
<td>18 (3%)</td>
<td>22 (3%)</td>
</tr>
<tr>
<td>Research/Management Accident</td>
<td>4 (4%)</td>
<td>5 (5%)</td>
</tr>
<tr>
<td>Road Kill</td>
<td>2 (2%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Self Defense/Property Protection</td>
<td>2 (2%)</td>
<td>6 (6%)</td>
</tr>
<tr>
<td>Illegal</td>
<td>60 (64%)</td>
<td>21 (33%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>0 (0%)</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>63</td>
</tr>
</tbody>
</table>

218"Management Control" refers to the deliberate killing or removal of bears from the ecosystem. "Research/Management Accident" includes bears which die during attempts to put collars or tags on them or which are accidentally killed when, for example, being moved to a more remote area.
The IGBC memo makes it clear that the data were compiled hurriedly and thus, some mistakes should be expected. The IGBC memo's author recognizes the incompleteness and the discrepancies of various agencies' records, and advocates preparation of a fuller, more nearly complete list. The truly surprising finding is that such information was not already accessible to the IGBC -- which is charged with coordinating the recovery of this population -- before Congressional inquiries began.

There was considerable difficulty in reconciling the site-specific information from the State of Wyoming with that of the IGBC. For example, the State of Wyoming reported at least seven deaths near the Thoroughfare Plateau in the Teton Wilderness of the Bridger-Teton National Forest which were apparently unknown to the IGBC. A death reported by the State of Wyoming near Baldy Mountain in the Palisades Ranger District of the Targhee NF was not reported by the Targhee.

The methods used in this analysis may even underestimate the differences: a match between Wyoming and IGBC reports was assumed if the deaths were in the same general area (within about five miles) and in the same year; larger deviations were considered matches, if other factors, such as location on a certain stream, were the same. However, there were still considerable discrepancies. Thus, the number of matches listed in the discussion below is probably a maximum -- and the number of reported bear deaths therefore a minimum -- unless one of the reports includes more deaths that there actually were. Using the standards just described, there were seven areas within the CGVR that appeared to have clusters of mortalities. (See Figure 10.)

Policy makers are also handicapped by lack of data on reasons for "management control" deaths, which accounted for 19 percent of the grizzly mortalities reported by Wyoming and 35 percent of those reported by the IGBC. A manager wishing to reduce human/grizzly conflict is left with little useful data upon which to base management decisions if the reason for the management control is omitted from the record. Management decisions might be quite different if, for example, the cause of past management controls was the habituation of bears to human handouts or animal carcasses by outfitters, rather than the presence of confirmed sheep-killers. However, from the standpoint of the grizzly population, it is irrelevant how a bear was removed from the ecosystem: by death (shooting or drug overdose) or alive (removal to a zoo or to British Columbia), and such information may be less important to managers.

In short, the best available data on grizzly mortalities are incomplete, contradictory, and do not provide sufficient information for informed decisions. Moreover, the tenure of managers in the Forest Service, Park Service, or Fish and Wildlife Service may be quite short. Thus, relying primarily on memory and personal familiarity with an area is insufficient for assuring recovery of the grizzly population.
FIGURE 10. Seven Grizzly Bear Mortality Clusters in the GYMR
Mortality Clusters Based on Data from State of Wyoming response to
Subcommittees’ Questions (including Wyoming Map of Grizzly Mortality
areas), and on Maps from Glen Contreras, Manager, Threatened and
Endangered Program, U.S. Forest Service, Ogden, Utah. In Interagency
Grizzly Bear Committee, June 19, 1986 Prepared at IGBC request. 4 p. (Unnumbered internal document.)

Grizzly Bear Mortality Clusters

Despite the weaknesses and discrepancies in the data, grizzly
mortalities over the last 10 years show concentrations in seven areas
in the GYMR. These areas are therefore sites where activities by
humans are having demonstrated effects on the natural environment.
The following discussion describes the bear deaths, and briefly discusses
known activities which might affect the likelihood of grizzly reco-
very. Failure to discuss a particular development activity means
that no major conflict between that activity and grizzly survival was
known by the Subcommittees to occur. There may be development
conflicts of which the Subcommittees are unaware.

Gardiner, Montana

Three deaths were reported in this area by both the State of
Wyoming and the IGBC, and four additional deaths were reported by the
IGBC. Most of these deaths are in the zone classified as grizzly bear
Management Situation II, but one is outside the situation areas
altogether. This last death, in 1982, area of “common sightings,”
while the others were in either high or highest density use. (See
Figure 1, p. 7.)

Of the seven IGBC reported deaths, one was a 1982 management
control near Crystal Creek Mountain, with no reason given. Two
others, in 1983, were also management controls (again with no reason
given), at the Gardiner town dump. Two deaths (in 1977 and in 1979)
were management controls taken because of cattle predation. (These
were the only two management controls listed in the IGBC memo for
which a reason was clearly stated.) In 1981, a grizzly hunter was
attacked and killed a bear in self-defense. Finally, a 1981 death was
an illegal kill in which the bear was shot and left on a road.

The area downstream from Gardiner, along the Yellowstone River,
provides important habitat for both bald eagles and trumpeter swans.
It is also heavily used for sport fishing. The entire area is
important winter range for the northern Yellowstone elk herd.

There are some heavy insect infestations of trees near Gardiner,
suggesting possible future Forest Service timber sales to control the
outbreak. Most of the infestations are at least five miles from past
mortalities, but one is near the 1982 site of a management control.

FIGURE 10. Seven Grizzly Bear Mortality Clusters in the GYMR. Mortality Clusters Based on Data from State of Wyoming response to Subcommittees’ Questions (including Wyoming Map of Grizzly Mortalities), and on Maps from Glen Contreras, Manager, Threatened and Endangered Program, U.S. Forest Service, Ogden, Utah. In Interagency Grizzly Bear Committee, June 19, 1986 Prepared at IGBC request. 4 p. (Unnumbered internal document.)

As shown in the map, there is a concentration of mortalities near the
Gardiner town dump. Three deaths in 1981 are classified as “common
sightings,” while the others were in either high or highest density use.
(See Figure 1, p. 7.)

Of the seven IGBC reported deaths, one was a 1982 management
control near Crystal Creek Mountain, with no reason given. Two
others, in 1983, were also management controls (again with no reason
given), at the Gardiner town dump. Two deaths (in 1977 and in 1979)
were management controls taken because of cattle predation. (These
were the only two management controls listed in the IGBC memo for
which a reason was clearly stated.) In 1981, a grizzly hunter was
attacked and killed a bear in self-defense. Finally, a 1981 death was
an illegal kill in which the bear was shot and left on a road.

The area downstream from Gardiner, along the Yellowstone River,
provides important habitat for both bald eagles and trumpeter swans.
It is also heavily used for sport fishing. The entire area is
important winter range for the northern Yellowstone elk herd.

There are some heavy insect infestations of trees near Gardiner,
suggesting possible future Forest Service timber sales to control the
outbreak. Most of the infestations are at least five miles from past
mortalities, but one is near the 1982 site of a management control.

The Gallatin National Forest is planning a logging operation very
close to, if not on, this site. There is an oil and gas lease at
Sheep Mountain, about eight miles from the nearest grizzly mortality,
and another lease near Steamboat Mountain, roughly four miles from
the 1982 mortality. However, there are no wells at either site. There
has been extensive mining and prospecting in the area around Gardiner
and the nearby town of Jardine.
TABLE 21. IGBC Data on Grizzly Mortalities Near Gardiner, Montana
(* = judged to be a match with data provided by State of Wyoming.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Sex</th>
<th>Age</th>
<th>Remarks/Collar Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/22/83</td>
<td>T95, R14, Sec 16 (Town Dump)</td>
<td>M*</td>
<td>1</td>
<td>m, c, control</td>
</tr>
<tr>
<td>5/22/83</td>
<td>T95, R14, Sec 16 (Town Dump)</td>
<td>F*</td>
<td>12</td>
<td>Mgmt control</td>
</tr>
<tr>
<td>7/29/82</td>
<td>T75, R14, Sec 27 (Reported as T65, but site on Miner Creek requires 775)</td>
<td>F</td>
<td>2</td>
<td>Mgmt control</td>
</tr>
<tr>
<td>10/16/81</td>
<td>T95, R14, Sec 5 (Parker)</td>
<td>F*</td>
<td>22</td>
<td>Illegal, shot</td>
</tr>
<tr>
<td>9/13/81</td>
<td>T95, R14, Sec 31 (Parker)</td>
<td>F</td>
<td>8</td>
<td>Self-defense house</td>
</tr>
<tr>
<td>10/19/79</td>
<td>T95, R14, Sec 20 (Parker)</td>
<td>M</td>
<td>7</td>
<td>Mgmt control: cattle</td>
</tr>
<tr>
<td>9/20/77</td>
<td>T95, R14, Sec 21 (Parker)</td>
<td>M</td>
<td>11</td>
<td>Mgmt control: cat, 4</td>
</tr>
</tbody>
</table>

With no further information on the reasons for the three unexplained management controls or the illegal shooting, it is difficult to generalize about the human/bear conflicts around Gardiner.

Cook City, Montana

There have been eight grizzly deaths in the Cook City area in the last 11 years. Seven deaths were reported by the State of Wyoming and six by the IGBC, with an apparent agreement on five of these deaths. Some of the deaths in this area occurred in Situation I and others in Situation II. The area is classified partly as highest density use and partly as common sightings. (See Figure 4, p. 24.)

The IGBC provided records for a total of six of these eight deaths. Three of these were management controls, with no reason given. Three were illegal, with corpses found in 1976, 1978, and 1981. Two of these were left at the town dump, and one was found on a moose carcass. (Whether the moose had been attacked and killed by the bear or whether the moose was a hunter’s kill was not stated.) Two of these kills occurred in September, and for the third the date was unknown.

The Gallatin National Forest plans timber sales in an area that has been the site of several bear deaths, and is near the site of

TABLE 22. IGBC Data on Grizzly Mortalities Near Cooke City, Montana
(* = judged to be a match with data provided by State of Wyoming. 7 = information not known or not provided by IGBC memo.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Sex</th>
<th>Age</th>
<th>Remarks/Collar Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/26/83</td>
<td>Silver Gate</td>
<td>F</td>
<td>4</td>
<td>Mgmt control: 67</td>
</tr>
<tr>
<td>7/1/82</td>
<td>T95, R14, Sec 25</td>
<td>F*</td>
<td>15</td>
<td>Mgmt control</td>
</tr>
<tr>
<td>7/1/82</td>
<td>T95, R14, Sec 25</td>
<td>M*</td>
<td>14</td>
<td>Mgmt control</td>
</tr>
<tr>
<td>9/9/81</td>
<td>T95, R15, Sec 18</td>
<td>M*</td>
<td>5</td>
<td>Illegal, shot on moose carcass</td>
</tr>
<tr>
<td>7/7/81</td>
<td>T95, R15, Sec 31</td>
<td>M*</td>
<td>3</td>
<td>Illegal, shot, left at dump</td>
</tr>
<tr>
<td>9/21/76</td>
<td>T95, R14, Sec 23</td>
<td>M</td>
<td>4</td>
<td>Illegal, shot at dump</td>
</tr>
</tbody>
</table>

(2 additional deaths reported by State of Wyoming in this area)

With no further information on the reason for the three unexplained management controls, it is difficult to generalize about the human/bear conflicts around Cook City, but it seems that illegal kills may be an important problem in this area.

Crandall Creek/Sunlight Creek, Shoshone National Forest, Wyoming

There appear to have been nine grizzly deaths in the Crandall Creek/Sunlight Creek area of the Shoshone National Forest over the last 13 years, according to the State of Wyoming, but only two were reported by the IGBC. Most occurred in Situation I, although a few were in Situation II. The area is ranked as high or highest density use. (See Figure 4, p. 24.)

In 1982, a bear was shot illegally, while a 1984 kill is still under investigation. Wyoming reported three deaths around Sunlight Creek plus 14 deaths in the Crandall Creek area for 1982, but the IGBC memo notes that there may be some duplicate counting (without

21b. 5. Geological Survey response to Subcommitte's questions Maps of mines and metallic resources.
The Teton Wilderness is only one of many regions where grizzly bears have been reported killed to protect wildlife. "If the ICBC is correct," the Wyoming map contains a substantial number of duplications, this area might be less important overall grizzly mortality. The 1982 death listed in the table below, plus another to the south, were the only ones reported by the ICBC in the Shoshone National Forest from 1982. In contrast, the Shoshone National Forest listed (without giving location) four deaths in 1982 from poaching and one from unknown causes. Given this particularly conflicting situation, it is difficult to generalize about the human/bear conflict in this area, but it is possible that illegal kills are a problem in this area.

Table 73. ICBC Data on Grizzly Mortalities Near Crandall Creek and Sunlight Creek, Shoshone National Forest, Wyoming

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Sex</th>
<th>Age</th>
<th>Remarks</th>
<th>Collar Number</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/1/84</td>
<td>TISH. R1084, Sec 10</td>
<td>*</td>
<td>Sub</td>
<td>Unknown, collar 108</td>
<td>adult</td>
<td>1750</td>
</tr>
<tr>
<td>6/1/82</td>
<td>TISH. R1084, Sec 34</td>
<td>4</td>
<td>Male</td>
<td>Illegal, shot</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Additional deaths reported by State of Wyoming, ICBC suggests some duplicate counts)

220 Shoshone National Forest response to Subcommittees' question 26
222 Shoshone National Forest response to Subcommittees' question 26

**Thermofare Plateau, Teton Wilderness, Wyoming**

There appear to have been 12 deaths in the Thermofare Plateau area in the last 10 years. Eleven deaths were reported by the State of Wyoming, while four of these were also reported by the ICBC. The entire area is situation I, and Knight and Rutherford classify it as high or highest density use. (See Figure 4, p. 24.)

Even with the limited ICBC data available, there is a pattern of shoting deaths: all four of the ICBC reported deaths are related to illegal shootings. Indeed, this pattern is supported by three additional grizzly shootings in area to the southeast of the plateau, farther along the elk migration route toward the National Elk Refuge. All three of these grizzly deaths are also illegal and hunter-related, according to the ICBC.

The Thermofare Plateau experiences intense hunting pressure on the elk migrating from their summer range in Yellowstone National Park to their winter range in and near the National Elk Refuge. The upper Yellowstone River flows through this area, and the fish resources of the River and the surrounding lakes provide food for bald eagles. The area is an important nesting area for bald eagles as well as trumpeter swans. Forest Service managers rated both Thermofare Creek and this part of the Yellowstone River as heavily used by sport anglers. 223

Of the seven grizzly bear mortality clusters described in this report, this one shows perhaps the clearest pattern of mortality causes: all of the mortalities are related to firearms, hunters, or outfitters. There have already been complaints about illegal elk service enforcement of regulations concerning outfitters and hunters in this area (see Effects on Other Resources under Recreation, p. 101), and such efforts need strengthening, if they have not been improved as yet.

**Fishing Bridge, Yellowstone National Park, Wyoming**

There appear to have been 10 deaths in the area around Fishing Bridge in the last 10 years. Nine were reported by the State of Wyoming, and five by the ICBC, with apparent agreement on four of these deaths. In this area, the Park Service has created some situation II islands in an area that is otherwise Situation I. With the scale of maps available, it is impossible to determine whether the deaths occurred in Situation I or II. Indeed, the very small size of these Situation II areas is not meaningful in terms of grizzly movements. Rather, they reflect the decision of National Park Service management that the human/bear conflict be given priority over the high concentration of grizzly use. (See Figure 4, p. 24.)
TABLE 24: ICBC Data on Grizzly Mortalities Near the Thoroughfare Plateau, Teton Wilderness, Bridger-Teton National Forest, Wyoming
(= judged to be a match with data provided by State of Wyoming; 
7 = information not known or not provided by ICBC memo.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Sex Age</th>
<th>Remarks/Collar Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/7/85</td>
<td>TBNR, 8109, Sec. 8</td>
<td>F+ 7</td>
<td>Illegal, shot</td>
</tr>
<tr>
<td>11/3/81</td>
<td>TBNR, 8110, Sec. 16</td>
<td>M+ 3</td>
<td>Illegal, at outfitters camp</td>
</tr>
<tr>
<td></td>
<td>Hawks East, Camp Bur.</td>
<td></td>
<td>(reported as 8108, but should be 8110)</td>
</tr>
<tr>
<td>9/16/80</td>
<td>Schmitz Camp, Pass Creek</td>
<td>M+ 13</td>
<td>Illegal, mistaken identity</td>
</tr>
<tr>
<td>9/24/77</td>
<td>Phelps Pass</td>
<td>F+ 16</td>
<td>Illegal, at hunter's camp</td>
</tr>
</tbody>
</table>

(7 additional deaths reported by Wyoming)

The ICBC reported all five deaths as management control actions (or similar terms), without elaboration. Although some explanations for these actions can be ruled out by the setting (e.g., conflicts with grazing and hunters), it is not possible to draw specific conclusions about the cause (or need for) management control from this record.

The area in and around Fishimor Bridge provides food and nesting sites for both hawks and trumpeter swans. Visiting cranes from the Grays Lake experimental flock (the first whapping cranes in the Park in decades) were seen in this area in 1985. As the main Fishing Bridge suggests, Yellowstone Lake and the Yellowstone River both experience very intense fishing pressure.

Recreational development is highly concentrated around Fishing Bridge, including numerous campites, picnic areas, boat docks, two amphitheaters, two stores, two restaurants, a laundromat and a theater, one post office, one gas station, and a ranger station. At Fishing Bridge itself, camping is allowed only in hard-sided vehicles (trailer, recreational vehicles, station wagons, etc.) because of the danger from bears. It seems likely that the bear deaths are related to the heavy tourism pressure in the area, but whether the conflicts were at fishing sites, the campgrounds, etc., is not clear. That three of the five management controls occurred during the heavy August visitor season tends to support this hypothesis.
Orme and Williams reported seven grizzly deaths in this area between 1976 and 1986 that were estimated to be associated with sheep grazing allotments. It is impossible to determine how many of the deaths occurred near the town of Yellowstone National Park and provides many essential services to visitors. The problem of protecting grizzly populations is more complex than at Fishing Bridge, because so much of the land in the area is privately owned. In addition, the proposed use of Yellowstone project lies in this area and one mortality (the 1976 car accident) lies inside the boundaries of the development. This same area has already been leased for possible oil and gas development.

There are widespread insect infestations of timber in the northern half of the area. Again, it appears that the Targhee and the Gallatin National Forests have plans to log on or near the sites of as many as eight of the 12 deaths in this area. Three of the sale planning areas lie directly between the Site 1 habitat in Yellowstone National Park and the distant island of Site 1 habitat less than 10 miles to the west. Parts of the proposed sale areas are classified as heavily grizzly use by Knight and Sherard. Logging or any other human intrusion could effectively isolate this island of suitable habitat from the mainland of Site 1 habitat. Finally, the increased human presence, if it occurs at times or seasons when bears are active, will expose bears to greater risks of fatal confrontations. Depending on the silvicultural system used, habitat fragmentation could be temporary. However, substantial clearings and sustained human traffic could permanently eliminate grizzlies from this habitat.


TABLE 26: ICBC Data on Grizzly Mortalities Near Falls River and Conant Creek, Targhee National Forest, Idaho and Wyoming

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Sex</th>
<th>Age</th>
<th>Remarks/Caller Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/11/82</td>
<td>Teton, RilIEW, Sec. 17</td>
<td>F+</td>
<td>15</td>
<td>Self-defense hunter</td>
</tr>
<tr>
<td>8/20/79</td>
<td>Hoblly Peak</td>
<td>M+</td>
<td>12</td>
<td>Suspected illegal kill</td>
</tr>
<tr>
<td>7/17/78</td>
<td>Indian Lake,</td>
<td>M+</td>
<td>2</td>
<td>Suspected illegal kill</td>
</tr>
<tr>
<td></td>
<td>Squirrel Meadows</td>
<td></td>
<td></td>
<td>#30</td>
</tr>
<tr>
<td>8/21/76</td>
<td>Teton, RilIEW, (Sec. 287)</td>
<td>F+</td>
<td>7</td>
<td>Possible drug overdose</td>
</tr>
</tbody>
</table>

(6 additional deaths reported by Wyoming)

Mount Helena, Montana, to Henry's Lake, Idaho

Four of the deaths reported by the ICBC were explained as due to management controls, with no further elaboration given, and three more deaths were management accidents, without explanation of whether the agency intended the bear to another site in the GNP or whether the intent was to remove the bears from the ecosystem (i.e., "kill" them, with respect to the ecosystem anyway). Of the remainder, two were due to a car accident, and two were shot. These last two were shot at a private "Nea... perhaps a resort or residence -- presumably (by inference) to defend human lives or property.

This area is important to bald eagles, trumpeter swans, and some of the young whooping cranes from the Gray Lake National Wildife Refuge experimental flock. The fishing pressure is among the most intense in the entire GNP, and focuses mainly on Yellowstone Lake and the Madison River in Montana, and Henry's Lake and Henry's Fork of the Snake River in Idaho.

As mentioned earlier, the town of the fishing bridge is a major point of interest in the area and one mortality (the 1976 car accident) lies inside the boundaries of the development. This same area has already been leased for possible oil and gas development.

There are widespread insect infestations of timber in the northern half of the area. Again, it appears that the Targhee and the Gallatin National Forests have plans to log on or near the sites of as many as eight of the 12 deaths in this area. Three of the sale planning areas lie directly between the Site 1 habitat in Yellowstone National Park and the distant island of Site 1 habitat less than 10 miles to the west. Parts of the proposed sale areas are classified as heavily grizzly use by Knight and Sherard. Logging or any other human intrusion could effectively isolate this island of suitable habitat from the mainland of Site 1 habitat. Finally, the increased human presence, if it occurs at times or seasons when bears are active, will expose bears to greater risks of fatal confrontations. Depending on the silvicultural system used, habitat fragmentation could be temporary. However, substantial clearings and sustained human traffic could permanently eliminate grizzlies from this habitat.

22 If these two are counted as self defense or property protection, then only one is rather than three reported by the ICBC due to self defense/proper protection is unaccounted for in the site specific data.
Geothermal leases cover the southern portion of this area, including the site of two 1977 shooting deaths. There are also oil and gas leases in much of the Henry's Lake/Mount Nehegan mortality cluster, including the sites of eight grizzly deaths, the site of a ninth is nearby. These oil and gas leases are nearly all in the northern portion of the mortality cluster, on the Gallatin National Forest, with roughly a third of the acreage in Situation 1 habitat and the rest in Situation 2. Most of the leased area is ranked as high or highest density use by Knight and Eberhardt. While there are currently no producing wells in the area, energy development, in combination with the proposed timber sales could result in the area

Z 37. IGBC Data on Grizzly Mortalities Near Mount Nehegan, Montana, and Henry's Lake, Idaho

(† = judged to be a match with data provided by State of Wyoming.

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Sex</th>
<th>Age</th>
<th>Remarks/Collar Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/24/73</td>
<td>West Yellowstone</td>
<td>M</td>
<td>12</td>
<td>Mgmt. control, #70</td>
</tr>
<tr>
<td>9/14/73</td>
<td>West Yellowstone</td>
<td>M</td>
<td>1</td>
<td>Mgmt. accident</td>
</tr>
<tr>
<td>10/3/73</td>
<td>Jesse Creek, Henry's Lake Flat</td>
<td>F</td>
<td>13</td>
<td>Mgmt. accident, #38</td>
</tr>
<tr>
<td>11/8/73</td>
<td>T12S, R3E, Sec 16</td>
<td>F+</td>
<td>6</td>
<td>Mgmt. control</td>
</tr>
<tr>
<td>8/24/73</td>
<td>T13S, R3E, Sec 34</td>
<td>F+</td>
<td>12</td>
<td>Mgmt. control</td>
</tr>
<tr>
<td>6/28/73</td>
<td>Rainbow Pt. Camp</td>
<td>M</td>
<td>1</td>
<td>Mgmt. control</td>
</tr>
<tr>
<td>11/8/73</td>
<td>T12S, R3E, Sec 16</td>
<td>M</td>
<td>4</td>
<td>Car accident</td>
</tr>
<tr>
<td>7/7/77</td>
<td>Nehegan Lake</td>
<td>F</td>
<td>5</td>
<td>Car accident</td>
</tr>
<tr>
<td>7/7/77</td>
<td>Horse Butte</td>
<td>M</td>
<td>1</td>
<td>Mgmt. Control</td>
</tr>
<tr>
<td>9/15/77</td>
<td>T12S, R3E, Sec 20</td>
<td>F+</td>
<td>5</td>
<td>Shot at private &quot;Res.&quot;</td>
</tr>
<tr>
<td>9/15/77</td>
<td>Island Park</td>
<td>M</td>
<td>2</td>
<td>Shot at private &quot;Res.&quot;</td>
</tr>
</tbody>
</table>

(3 additional deaths reported by Wyoming)
death, and should not be subject to opinions on the relevance of the bear's actions.

The emphasis for management control actions (including non-fatal action) should become part of the record of grizzly bear management in the GVR. Such information is far more important to understanding the cause of the death than is a precise description of the method used to dispatch a bear. Non-fatal actions which remove a bear from the GVR (to a zoo or to Canada, for example), as they are equivalent to a mortality, for the ecosystem. Finally, non-fatal action where a bear is moved within the GVR are also important because they indicate problem areas and problem bears, both of which may require additional management attention in the future.

The overriding problem with grizzly mortality data is that no agency or group appears to be responsible for maintaining the records. Discrepancies are thus likely to continue. This lack of basic data seriously hampers efforts to increase grizzly bear populations and to reduce human-bear confrontations. The accuracy and comprehensiveness of grizzly mortality data would be greatly enhanced by designating a lead agency responsible for maintaining records of past and all future bear deaths, and for resolving as many discrepancies among existing records as possible.

Preventing Grizzly Bear Deaths

New human intrusions into an area around a mortality cluster are particularly important, and each federal agency having management responsibility should evaluate management decisions allowing new entries carefully. Where the existing data show a reasonably clear pattern, as they already seem to around the Thoroughfare Plateau and the Falls Creek/Conant Creek area, special efforts to reduce the cause of the conflicts can reduce grizzly mortalities. In the Falls Creek/Conant Creek area, current policy has already begun to reduce the likely human/bear confrontations over grazing; these efforts could be continued or even accelerated. On the other hand, there have recently been complaints about poor enforcement of regulations protecting hunters and grizzlies from each other at the Thoroughfare Plateau.

The data for Gardiner, Cooke City, and Crandall Creek/Sunlight Creek are too vague to suggest definite action. Better data... including new information on the past deaths... is needed to identify causes and suggest appropriate control actions. The data on bear deaths around Fishing Bridge are almost useless for making management recommendations. If a pattern emerges from the data of the management controls are studied, specific steps should be taken to address those problems. In the ongoing debate concerning Fishing Bridge and whether it should be closed, bear mortality data should be part of the debate.
FEDERAL AGENCY COORDINATION AND INFORMATION

Numerous federal agencies are active in the NCR, including the Forest Service, the National Park Service, the Fish and Wildlife Service, the Bureau of Land Management, the Bureau of Reclamation, the Army Corps of Engineers, the Geological Survey, the National Oceanic and Atmospheric Administration, and more. Coordination is especially important in such an area, so as to avoid duplicative and contradictory programs. This section describes the major legal requirements for inter-agency coordination. Identifies and examines the numerous coordinating groups which have been formed, and discusses the information "systems" of the four major federal agencies in the NCR that are used to facilitate management and coordination. There are two major findings:

1. The existing coordinating committees are not comprehensive in either agency membership or approach. There is little likelihood of coordinated management of Federal lands in the yellowstone ecosystem under the existing structure.

2. The existing information is inadequate to analyze the site-specific impacts of proposed actions or to resolve management conflicts. The Forest Service organizational structure is better designed for providing ecosystem-wide data than the structure of the other Federal agencies.

LEGAL REQUIREMENTS

Several laws require Federal agencies to consult with one another in planning their activities. The National Environmental Policy Act provides for coordination in assessing environmental effects of major Federal actions. The law governing multiple-use management planning for the NPS and the Forest Service have more explicit direction on inter-agency cooperation. The Endangered Species Act authorizes the Fish and Wildlife Service to restrict, modify, and even prevent Federal actions which would jeopardize the continued existence of rare species. Finally, the National Historic Preservation Act requires Federal agencies to consult with the Advisory Council on Historic Preservation for cultural and historic sites potentially affected by Federal projects. These four laws provide major direction on inter-agency coordination in Federal land management. Although other laws require coordination on specific issues or in specific circumstances

National Environmental Policy Act

The National Environmental Policy Act of 1969 (NEPA) requires all Federal agencies to prepare environmental impact statements for proposed legislation and other major Federal actions significantly affecting the quality of the human environment. "In preparing such documents, agencies are required to coordinate with other Federal agencies and with State and local governments." Section 102(2)(C) directs that:

The responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved.

A Federal agency undertaking a project which requires an environmental statement must, therefore, consult with other Federal agencies which have expertise on the possible impacts. For example, the Fish and Wildlife Service is consulted when the Forest Service prepares an environmental statement on proposed oil and gas drilling in a National Forest.

Federal Land Policy and Management Act

The Federal Land Policy and Management Act of 1976 (FLPMA) requires BLM to coordinate with other government agencies (Federal, State, and local) in developing land use plans. Section 202(c)(19) specifically requires the Secretary of the Interior to coordinate the land use inventory, planning, and management activities of or for such lands with the land use planning and management programs of other Federal departments and agencies and of the States and local governments within which such lands are located.

In addition, section 202(f) directs that:

The Secretary shall allow an opportunity for public involvement and by regulation shall establish procedures to give Federal, State, and local governments and the public adequate notice and opportunity to comment upon


and participate in the formulation of plans and
programs relating to the management of the public lands.

Resouces Planning Act/National Forest Management Act

The Forest Service is similarly specifically required to coordi-

nate with other government agencies and in planning for activities in the

national forests. The Forest and Rangeland Renewable Resources

Planning Act of 1974 (RPA), as amended by the National Forest Manage-

ment Act of 1976 (NFMA), provides detailed guidance for National

Forest planning. Section 6(a) requires National Forest plans to be

coordinated with the planning processes of other government agencies,

while Section 8 requires procedures for agency comment on Forest Service

standards, decision criteria, and management guidelines. Specifically, section 6(a) directs that

the Secretary of Agriculture shall develop

management plans for units of the National Forest System, coordinated with the land and

resource management planning processes of State

and local governments and other Federal agen-

cies.

Section 6(a) requires

the Secretary, by regulation, shall

establish procedures to join the Federal,

State, and local governments and the public

adequate notice and an opportunity to comment

upon the formulation of standards, criteria and

guidelines applicable to forest service pro-

grams.

Endangered Species Act

The Endangered Species Act of 1973 (ESA), as amended, gener-

ally directs Federal agencies to ensure that their actions do not

jeopardize the continued existence of any species, or result in the

destruction of adverse modification of critical

habitat proposed to be designated for such

species.

The U.S. Fish and Wildlife Service, which is responsible for identi-

fying terrestrial and freshwater species which are threatened or

deteriorated and for designating critical habitats for those species, is

the agency which is consulted when a rare species is jeopardized by

Federal activities in the US.

National Historic Preservation Act

The National Historic Preservation Act, as amended, requires

Federal agencies to consider the effects of their projects on cultural

and historic sites on the Federal lands. Section 110 includes several

specific requirements:

(a)(1) The heads of all Federal agencies

shall assume responsibility for the preservation

of historic properties which are owned or

controlled by such agency.

Each agency shall undertake, consistent with

the mission of the agency, to carry out this section

and to the advice of the Secretary of the Interior,

in cooperation with the State historic preservation

officer for the State involved, each Federal agency

shall establish a program to locate, inventory, and

nominate to the State, all properties under the agency’s

ownership or control by the agency, that appear

to qualify for inclusion on the National Register

(2) The heads of the responsible

Federal agency shall, to the maximum extent

feasible, undertake such planning and actions as

may be necessary to minimize harm to a National

Historic Landmark, and shall afford the

Advisory Council on Historic Preservation a

reasonable opportunity to comment on the

undertaking.


Section 104 of the Act also directs the agencies to consider the effects of their actions on historic sites included in or eligible for the National Register, and to obtain comments from the Advisory Council on Historical Preservation on such actions.

INTER-AGENCY COORDINATION

The several federal agencies with activities in the CVR have various coordination mechanisms in place. The most obvious example is the comments provided by the National Parks and the Wildlife Refuges to the various National Forests on the Forest plans being prepared under PPA and SPMA. Since these plans will guide National Forest management on all forests (including those on the CVR) for the next decade or more (up to 15 years), the comments and suggestions of other agencies can influence the management of the Yellowstone ecosystem.

On the other hand, forest planning is highly decentralized, with only general direction provided by the Washington Office staff of the Forest Service. More direction is provided by the Regional Offices but the CVR includes National Forests from three Forest Service Regions (the Beaverhead, Gallatin, and Custer in Region I; the Shoshone in Region 2; and the Bridger-Teton, Caribou, and Targhee in Region 3). While there are informal meetings between neighboring National Forests, there is no provision for formal coordination of Forest plans and activities in adjoining areas. Thus, coordination of forest service activities in the CVR is not organized to assure consistent actions and efforts. In addition, some agencies feel that they have had inadequate opportunities for reviewing forest service activities, the Advisory Council on Historic Preservation, for example, stated that many activities occur without an adequate opportunity for the Council to comment on the proposed actions 210.

Finally, there is no analysis of the cumulative effects of activities, such as timber harvesting and oil and gas drilling, on the various federal lands and resources in the CVR (such as water quality and wildlife habitats). For example, timber sales in Montana proposed by the Gallatin National Forest south of West Yellowstone may restrict grizzly bears’ access to habitat (in the Targhee NF west of the proposed sales). Similarly, sheep grazing on BLM and private lands in the watersheds above Red Rock Lakes National Wildlife Refuge has caused “severe siltation” of Red Rock Creek. 211 Only a comprehensive review of activities in the CVR can assure that the activities in one area do not have undesirable and unintended consequences in another.

---

211 Forest Service response to Subcommittees’ question 26.
the Yellowstone National Park. The Bridger-Teton NF reportedly has the only respondent to identify other participants. Thus, group membership shown in Table 28 might not be complete, with important members not identified.

Species-Oriented Approach

The general approach to coordinated management adopted by the federal land agencies in the GISW focuses on measures for individual animal species. Such individualized efforts fit within the Forest Service's "indicator species" approach to conserving species diversity in the National Forests (see the discussion of Indicator Species under Grizzly Bears in Chapter 13). The Greater Yellowstone Ecosystem) That none of the grizzly bear mortality clusters are also important habitats for other animals, such as fishing grounds for bald eagles or migration routes for elk, tends to support the validity of this approach. However, no one species is a perfect indicator of the needs of another species, even if the two species have similar habitat requirements. Measures to protect a species, or to mitigate the effects of activities on one species, may be insufficient or too late to protect other species.

A more telling problem of the species-oriented approach is that it is likely to reduce the coordinated, comprehensive approach to National Forest management. Protection or mitigation measures for wildlife are likely to be viewed as constraints on activities because they may well impact on proposed developments. For example, grizzly use of the north side of Mount Wash might force restrictions on, or even the cancellation of, the proposed ski resort. Yet the species-oriented approach to analyzing impacts, and thus documenting the extent to which impacts could serve to emphasize fragile or critical habitats and would likely concentrate more intensive development in areas which are less important to animals and water quality.

The effectiveness of the species-oriented approach is also limited, because most of the federal land agencies and others who are not represented in the GISW appear to exist for several of the animal species. There are possibly three groups with overlapping membership and areas (both geographic and subjective) for bald eagles, trumpeter swans, and peregrine falcons. While these several committees may address differing aspects of the problems, there could be unnecessary duplication in their efforts. A comprehensive coordinated approach, with subcommittees formed as needed, as is used for grizzly bears, could provide more complete coverage with less potential duplication.

23Forest Service responses to Subcommittees' question 28.
Cumulative Effects Analysis

Coordination among Federal agencies in the COV (and elsewhere) is important because the effects of various activities may be inescapable when each is considered alone, but the effects of all activities on the same or adjacent sites, when taken together, could be significant. The Federal agencies are currently developing a model for assessing the cumulative effects on grizzly bears of human activities on the lands of the various agencies. This model may prove a useful tool for examining such impacts, but the model focuses only on grizzly bears. Grizzlies are an "indicator species" for most of the COV National Forests, but as discussed above, they are imperfect indicators of the health of the Yellowstone ecosystem. Thus, while a cumulative effects model for grizzlies is a useful first step, it is not sufficient for evaluating the cumulative effects of human activities on the Yellowstone ecosystem.

The Grizzly Bear Cumulative Effects Model

The Forest Service, Yellowstone NP, and the Interagency Grizzly Bear Study Team are developing a "Cumulative Effects Assessment" intended to assess the effects of human activity on bear habitat, distribution, and mortality. A quantitative model (the Cumulative Effects Model) is being developed to assess these effects. The model contains three submodels, each considering several contributing variables. The model is being designed to clarify choices for managers and predict the effects on the bear population under various alternative management practices and decisions.

The validity of the Cumulative Effects Model, like any other model, depends substantially on the accuracy of its assumptions. Such a model could prove extremely useful but, as described by Weaver et al., it appears to perpetuate some of the same false assumptions that have marred past efforts at grizzly management. Indeed, other observers have already suggested the need for stringent peer review of the model's assumptions. The model includes several assumptions which have contrary evidence in the literature.

1. Assumption: Situation I habitat is high quality habitat while Situation II habitat is lower in quality. However, grizzly use, as shown in Figure 5 (p. 24), does not follow the situation maps; in fact, some Situation II areas, such as Fishing Bridge, include highest use grizzly areas. Rather, it appears that Situation II delineates areas with substantial conflict between bears and humans.

2. Assumption: Habitat type and cover type accurately predict the food and cover value of an area to grizzlies. Reid and Germain document two examples where habitat quality evaluations suggested that the areas were unimportant to bears, while independent ground surveys showed tracks, scent feeding sites, day beds and other tangible evidence of use.

3. Assumption: The distribution of mortalities "does not represent a trend in time that would significantly alter the mortality indices." H. D. Pierson et al., reported that mortality rates were additive to climatic conditions, with increased likelihood of mortality during dry years. Thought reduces the availability of natural foods, and thus the bears range farther and come into more contact (and conflict) with humans.

There are several additional assumptions for which there is not directly contrary evidence, but which effect important facts of bear ecology, or severely limit the usefulness of the model. Such assumptions include:


4. **Assumption:** The value of a given area of habitat is related to the length of use by the bears. However, bears are probably more food-stressed at certain seasons or in certain years. The assumption ignores the possibility that a habitat might provide food briefly but at a critical time, such as in the early spring before the snows have left, when only a limited variety of foods is available. In some extent, this assumption may be countered by the weight the model gives to the presence of protein-rich foods.

5. **Assumption:** Where there is little human presence, food availability can be accurately described, and grizzly bear habitat in contributions to habitat quality. The authors cite a paper in press to justify the assumption regarding denning sites. But the assumption about cover is not explained. However, cover can provide not only resting sites, but may itself provide food (e.g., squirrel caches), resist from heat, and opportunities to hide young cubs. In dry years, when some foods are less available, and bears are more prone to wandering, cover may be particularly important.

6. **Assumption:** Habitat fragmentation... distinct areas of high quality... is not significant habitat fragmentation is ignored in the model. However, grizzly bears avoid areas with human presence. Distinct habitat areas may be unusable if they are separated by areas with human activities which prevent the bears from traversing the intervening ground.

7. **Assumption:** The Interagency Grizzly Bear Study Team, data on bear locations accurately represent grizzly use in the area. This assumption may be true, but there are substantial inconsistencies between ISGC mortality data and mortality data from the Wyoming Game and Fish Department, and these two in turn disagree with several other sources. Relying on a single source for this information may be unnecessarily risky, when other sources are also available.

8. **Assumption:** Legally killed bears or mortalities associated with research activities can be ignored. This may limit the predictive ability of the model, since a substantial number of mortalities. 29 percent of the human-related deaths reported by Wyoming Game and Fish and 40 percent of those reported by the ISGC would be excluded. Further, the model...
and Caribou Forests and all three BLM State Offices did not distinguish permitted use level from actual use.

The attention paid to commodity activities by the Forest Service and BLM tends to limit the focus of these agencies on information on non-commodity resources. For example, there is substantial knowledge about the vegetation on commercial timberland, but there is little information about vegetation on other lands, such as wilderness areas. For the GVR, vegetation data was provided for the 1.76 million acres of commercial timberland in the National forests, but this is only 17.3 percent of the 10.07 million acres of National Forest land in the GVR. Similarly, the non-commodity focus of the National Park Service limits information gathering concerning potential commodity resources in Yellowstone and Grand Teton National Parks. The Park Service maintains limited data on timber in these Parks. Thus, for the GVR as a whole, there is virtually no information on vegetation on 8.31 million acres of National Forests, on the 2.35 million acres of National Park land, or on the other Federal, State, or private lands in the area. However, it is important to know how much area is covered by what species of plants, and how much of the total area is open and how much is timbered, in understanding the importance of commercial timberland for the various animals which use timbered habitats, and in analyzing the impacts of timber harvesting on the animals of the GVR.

Non-Commodity Resource Data

The federal agency data on non-commodity resources, such as recreation, wildlife, and cultural resources is much less complete and more difficult to compare than the data for the commodity resources. Cultural resources, for example, appear to be identified only when a site is uncovered through project planning or on the ground activity. The National Park Service, the Federal agency most clearly charged with providing recreation facilities, maintains comprehensive data only on the number of people entering the Parks and on the number staying overnight. There is no long term program of information collection on the types of recreation (fishing, backpacking, tent camping, etc.), or its extent or location. It is difficult to manage recreation or understand its impacts on wildlife populations and habitats without such knowledge.

The Forest Service has much more recreation data, but there are consistency problems. Some forests have not maintained their data over time; the Caribou NF, for example, maintained no hunting data for years prior to 1985. In addition, the artificial categories used for aggregating the data limit their usefulness. For example, there is not a category for backpacking, backpacking is included in "hiking and biking" which also includes jogging and sightseeing while traveling. Forest Service data are also not very site-specific, unless the

250 Caribou National Forest response to subcommittees’ question 17.

site is developed. Data are generally available for each Ranger District, but the Pineywood District of the Bridger-Teton NF, for example, extends more than 60 miles from northwest to southeast. It is also difficult to obtain information on the activities in the subdistricts of the National Forests. These subdistricts may be separated by a considerable distance from the rest of the Ranger District, the Tobacco Root Subdistrict of the Beartooth National Forest’s Madison District, for example, is 10 miles from the Madison subdistrict and 15 miles from the Gravelly Subdistrict, and separated from these other subdistricts by rivers valleys of private, State, and BLM lands.

A very serious information problem is revealed by the inconsistent data available on grizzly bear mortality. As discussed above (see Grizzly Bear Mortalities), the Wyoming Game and Fish Department reported 112 grizzly deaths between 1975 and 1985, including 18 natural deaths and 94 man-caused deaths.251 The Interagency Grizzly Bear Committee reported only 63 man-caused deaths for the same period, while the Fish and Wildlife Service reported 74 man-caused deaths and 7 natural deaths in the period. In addition, when these data sets were compared, at least 17 of the deaths reported by the IGBC could not be matched with deaths reported by Wyoming, and the FWS-reported deaths through 1992 contained too little information to match deaths with other sources. A further problem is illustrated by a 1984 grizzly death on an island in Yellowstone Lake. The FWS reported the death of a female cub due to malnutrition on Frank Island in June; the IGBC also reported the death of a female cub on Frank Island, but on July 9 and from a possible drug reaction. These could be two reports of the same death, but they could be different cubs with the IGBC and the FWS unsure of the other death.

Agency Organizational Structure

The manner in which the various federal agencies are organized may contribute to the data problems. The Forest Service is generally organized along functional lines, and thus the timber staff have data on timberlands while the recreation staff have recreation data. The multiple-use direction of the agency tends to support such functional responsibilities. The National Park Service and Fish and Wildlife Service, on the other hand, have more focused objectives. Organizing these agencies by resource is probably inappropriate, but a broader mission for maintaining data on all resources could contribute to the existing knowledge about ecosystems.

Another organizational difference is in research. The Forest Service has a separate branch which conducts research and which funds cooperative research with various universities. The Forest Service conducts research on many aspects of land management, including fire and insects, economics, timber management and harvesting, watershed,
wildlife, recreation, and more. Research by the Park Service is within the purview of each Park Superintendent; there is no independent research organization for the National Park Service. Thus, studies tend to be limited by the tenure of the Superintendents. A separately funded research organization, with explicit direction for research in the National Parks, could improve the information on recreation, vegetation, and animals in the Parks by allowing more comprehensive and longer-term studies.
SUMMARY OF FINDINGS

This report examined the lands and resources in and around Yellowstone National Park. Numerous Federal and some State agencies provided information to the House Interior Subcommittees on Public Lands and on National Parks and Recreation. The report summarized and evaluated that information. These are the findings of the report.

THE YELLOWSTONE ECOSYSTEM

1. With the recent return of peregrine falcons and whooping cranes, the wolf is the only major vertebrate lacking from the ecosystem as it was in 1872, when Yellowstone National Park was established. However, the populations of many animals have been reduced by human activities in the area, and further effects on their populations appear likely.

2. Grizzly bears are an important indicator of the health of the Yellowstone ecosystem, because: (a) their heavy use areas correspond with important habitats for many other animals; (b) grizzlies are more sensitive to human disturbance than most other species in the area; and (c) grizzlies often die in human-bear encounters. Therefore, grizzly population trends are likely to be leading indicators of the effects of human activities on the ecosystem.

3. The "Management Situation" zones used for considering grizzly bear requirement is inadequate to assure the continued survival of the Yellowstone grizzlies, because it accurately portrays neither important habitat areas nor areas used by grizzlies.

DEVELOPMENT ACTIVITIES

1. Recreation is the most important economic activity occurring on Federal lands in the Committee's Greater Yellowstone Region (GYSR). Excluding the substantial phosphate mining in the Caribou National Forest, recreation creates nearly two-thirds of the direct jobs supported by the GYSR National Forests.

2. The most significant effects of development activities on the ecosystem result from access. Roads can degrade water quality, and many animal species depend on clean water. In addition, human activities can disturb many animal species, particularly grizzly bears. Despite these effects, road construction and access decisions are determined for each resource specialty, rather than as an inte-

grated issue which is broadly examined for its effects on the ecosystem.

3. The economic values used by the Forest Service for some activities (especially recreation) appear to be unrelated to the economic importance of the activities. Since these values are used in assessing management choices, the resulting comparisons may improperly reflect the importance of the various resources.

4. Data on activities and locations are incomplete and inconsistent, hampering coordinated management efforts for the area. Data are particularly poor for non-commodity resources, but even commodity data is not aggregated in a manner which facilitates a comprehensive analysis. Similarly, the categories used, particularly for recreation, are not especially useful for examining the activities which are important.

5. Many of the commodity resource programs in the GYSR National Forests (timber harvesting, water developments, grazing, and energy and mineral development -- are of minor importance. The jobs in these industries (except phosphate mining) are few, compared to recreation-related jobs. The payments to counties resulting from these activities are unimportant, because changes in receipt-sharing are fully offset by changes in farmland in lieu of taxes.

6. Both location of development activities and timing of human presence are important in evaluating impacts of the activities on the ecosystem. Greater consideration of when activities occur can reduce developmental damages to the ecosystem.

GRIZZLY BEAR MORTALITY CLUSTERS

1. The existing data on grizzly bear mortalities is incomplete and inconsistent, even though such information is important for determining effective management practices.

2. Despite the poor data quality, seven areas with concentrations of grizzly bear deaths -- grizzly bear mortality clusters -- have been identified, and the likely causes can be determined for some of these clusters. Focused management actions can reduce mortalities in these areas, and could substantially improve the probable survival of the Yellowstone grizzlies.

3. The "Management Situation" concept used for grizzly bears is not particularly useful for preventing grizzly bear deaths. Many of the grizzly mortality clusters are outside Situation I areas, which have the highest level of grizzly protection.
The existing coordinating committees are not comprehensive in either membership or approach, and therefore are inadequate for providing complete, coordinated management of the Yellowstone ecosystem. In addition, there are multiple committees focusing on a single animal species, suggesting duplication and fragmented efforts.

2. Data on the ecosystem and on development activities are inadequate to evaluate management choices. The existing data are incomplete and inconsistent among the Federal agencies in the area.

3. Existing administrative boundaries and organizations hamper comprehensive, coordinated understanding and management of the ecosystem. Regional boundaries fragment the area, and individual units include disjunct lands, with little regard for the ecology of the area.

4. Only Forest Service research is independent of land managers, whose relatively brief tenure limits the long-term scope of research. Thus, the research efforts of other agencies are generally insufficient to provide the understanding needed for comprehensive land and resource management of the Yellowstone ecosystem. Long-term research, from economics to vertebrate biology, is hindered or even prevented by the lack of a separate research branch outside the land management structure.
The Subcommittees on Public Lands and on National Parks and Recreation attempted to question every federal agency active in the CVP about their major activities, in land management, data collection, and any other responsibility which might affect the ecosystem in retrospect. It is clear that at least one significant agency was omitted - the Minerals Management Service in the Department of the Interior. This agency is responsible for the royalty collections for energy and mineral resources for energy and mineral resources on public and acquired lands, on Indian reservations, and on the Outer Continental shelf.

In addition, the three State governments were questioned about their activities of the State fish and wildlife agencies in the area. Replies from both State and Federal agencies were voluminous. Most agencies included one or more maps in their replies, and many had a series of attachments to expand on their answers.

Each agency received a preface with its questions which included a map of the area to be covered, and described the reply format which would best suit the Subcommittees' needs. Prefatory remarks given below are those sent to the Forest Service; the remarks are typical though perhaps more detailed than for some agencies with less responsibility for land and resource management in the CVP. Prefatory remarks for other agencies will be included under each agency; listing only if the preface differed substantially from that sent to the Forest Service. In addition, Subcommittees staff and CRS analysts met with representatives of the Forest Service and of the Department of the Interior to assure that the intent of the questions was clear and that the information requests were feasible.

APPENDIX I QUESTIONS ASKED OF EACH AGENCY

SAMPLE PREFACE TO QUESTIONS - FOREST SERVICE

The following questions refer to lands listed in the following table and indicated on the enclosed map. The data should generally be displayed by Ranger Districts, and preferably separated data for the discontinuous portions of Ranger Districts, as identified. When information does not exist at the Ranger Districts, responses by the Forest Supervisor's Office, the Regional Office, or even the Washington Office may be acceptable, but provide answers from the level closest to the field whenever feasible. Identify where the response to a given question was prepared, if not at the Ranger Districts. Also, note the relevant time period covered by the answer if it varies from the time period requested or if no time period was specified.

Where replies call for maps, the following options are preferred:
1. USGS maps at 1:250,000, with overlays for each subject.
   (The eight maps are Boreman, Billings, Ashland, Cody, Driggs, Thermopolis, Preston, and Lander; these might be taped together to provide a comprehensive picture of the entire area.) This option would be the most convenient for the Committee.
2. Standard sizes of USGS quadrangles as base maps.
   (Use whatever quadrant is necessary - just detailed enough to do the job.) Overlays that can be superimposed on the same base map would be much appreciated. Even if option 1 is chosen, other maps of other sizes may be needed for particular questions.
3. The Forest Service Recreation Maps. Overlays that can be superimposed on the same base map would be much appreciated.

National Forests & Ranger Districts of Interest to the Committee

Beaverhead National Forest:
- Madison Ranger District (Provide data separately for the three discontinuous pieces: east of the Madison River, west of the Madison River, and northwest of Ennis)
- Gallatin National Forest:
   - Big Timber Ranger District (Provide data separately for the two discontinuous pieces: the Gallatin Maze, and south of 1.901)
   - Gardiner Ranger District
   - Helena Lake Ranger District
   - Livingston Ranger District (Provide data separately for the two discontinuous pieces: the Crazy Mountains, and south of the Yellowstone River)

Custer National Forest:
- Bearlodge Ranger District (Provide data separately for the two discontinuous pieces: contiguous to the Custer NF, and contiguous to the Crow Indian Reservation)

Shoshone National Forest:
- Clark Fork Ranger District
- Graybull Ranger District
- Lander Ranger District
- Wapiti Ranger District
- Wind River Ranger District
Bridger-Teton National Forest
Big Piney Ranger District
Buffalo Ranger District
Greys River Ranger District
Jackson Ranger District
Kummer Ranger District
Pinedale Ranger District
Targhee National Forest
Ashton Ranger District
Island Park Ranger District
Paiutes Ranger District (Provide data separately for the portion of the Caribou N.F. administered by the Paiutes R.D. of the Targhee N.F.)
Teton Basin Ranger District
Caribou National Forest
Soda Springs Ranger District (Provide data separately for the portion of the Caribou N.F. administered by the Paiutes R.D. of the Targhee N.F.)

Questions for the Forest Service

Employment and Local Effects
1. How many direct and indirect jobs, and how much local economic activity, result from the major activities which occur on the National Forests: distinguish jobs and economic activity resulting from (a) timber harvesting, (b) grazing, (c) energy and minerals leasing, exploration, and development (distinguish oil, gas, geothermal, minerals, and mining, if possible), (d) fishing, (e) hunting (distinguish by hunted species, if possible), (f) downhill skiing, and (g) other recreation (distinguish parkers and outfitters from other local business which benefit from recreation and tourism).
2. How many Forest Service employees (in FTE's) are associated with each of these activities, and what is the total Forest Service employment (separately for each Ranger District and for each Forest Supervisor's Office)? What proportion of the Forest Service budget is associated with each of these activities? In each Ranger District and each Forest Supervisor's Office, use the attached form to gather job responsibilities and professional experience of all management personnel and resource specialists.
3. Identify the Forest Service payments made to each county by each National Forest in the area annually for the past decade.
4. Identify the location of local sawmills and other timber purchasers. What percentage of the timber supply comes from each Ranger District? What other supply sources provide timber to the area? What is the mill capacity (based on 2 shifts per day and a 5-day week), and what has been the annual production for the past decade? How many employees work in each mill?

Timber Management
5. For the past decade, identify the volume and value of timber sold and of timber cut annually, by timber species. Separate the timber salvage sales and harvests from the standard commercial sales and harvests. Display on maps the commercial timber sale areas from which timber has been sold or cut in the past decade.
6. For the past 3 years, identify annual timber receipts (separate deposits to the National Forest Fund from other deposits), expenditures and cash costs, and other impacts (quantifiable effects on recreation, water quality, wildlife, etc). For expenditures and cash costs, separate by the following items: timber sale preparation & administration, resource support, N.F. other reforestation & timber sale improvement, and purchaser -ad credits. Provide estimates of average cost allowances in timber sale appraisals, excluding logging and milling costs (that is, such cost allowances as slash disposal, erosion control, snag disposal, temporary roads, and scaling costs). Estimate the percentage of costs necessary to maintain non-industrial timber programs (such as firewood permits, pine cone collection, and Christmas tree sales). Also, identify the annual acreage treated with each herbicide used in the past decade for reforestation or for
Intermediate timber stand treatments (including release). That percentage of this has occurred in Situation I and Situation II areas.

For all commercial timberlands (lands identified as suited for timber production in the Forest Planning process), identify the total acreage and the acreage in each age class by species. For each commercial timber species, identify (a) the standard rotation age used by the Forest Service, (b) the most common rotation ages used by private landowners in the area, (c) the age when the mean annual increment culminates, and (d) the natural rotation age (when insects, diseases, and/or old age typically kill the majority of the trees).

Describe -- in words, maps, and tables -- the extent of insect and disease infestations. Describe the options for controlling these infestations (prescribed fire, pre-salvage cutting, etc.) and identify the strengths (including research evidence) and limitations of each option. How much each has been used annually in the past 5 years, and the percentage that has occurred in Situation I and Situation II areas.

Describe forest service policy on pesticide/herbicide use and the agency's integrated pest management programs. Identify any usage planned for herbicide or pesticide treatment in the next decade, and how much of the planned acreage is in Situation I and II areas.

For timber sales planned for the next decade, identify (a) the planned commercial timber sale area locations (on maps), (b) the anticipated volume and receipts, (c) the expected expenditures and cash costs, and (d) other likely benefits and costs. Identify any currently roadless areas (including those released in wilderness acts) which are included in timber sales plans for the next decade. Identify harvesting restrictions that will be put into sale contracts to minimize human-grizzly bear encounters. Finally, identify planned annual timber sale levels for the next 50 years.

Range Management

10. Identify number of grazing permits, the number of AUMs, the months of use, permit fees, and range condition, separate this information for free use versus paid permits and for/low/horses versus sheep/goats. Identify annual investments in the various ages of structural and non-structural range improvements for the past decade; include acreage of pesticide and herbicide applications, for each chemical used. Identify the total fees collected and the FY95 grazing fee for AUM. How did the FY95 Forest Service grazing fee compare with fees for private grazing in the area? How many ranchers use Forest Service grazing permits? What portion of their grazing is under Forest Service permits? How many of these ranchers also use BLM permits or leases?

11. Identify livestock losses to grizzly bears, other predators, brucellosis, poisonous plants, and other such agents over the past 5 years. What Forest Service programs exist for predation control, and how much federal money has been spent annually in the past decade on these programs? Describe (and provide any data on the effectiveness of these programs): What is the population of wild horses and burros, and how has it changed in the past decade? How many AUMs of forage do wild horses and burros consume annually, and what is the carrying capacity for these animals?

Watered Management

12. Identify and locate (on maps) all water project applications, licenses, and permits (excluding PFBO projects). Provide any analyses of the benefits and costs of proposed projects. How have possible cumulative impacts (on fishing and on other resources) of multiple projects in a given watershed been analyzed?

13. Identify any existing studies about relationships between surface waters, groundwater recharge zones, groundwater, and the hydrothermal features of the area. What analyses have been conducted to identify these relationships and the possible impacts of timber harvesting, energy drilling, mining, salt area development, and other activities on water quality and groundwater recharge?

Energy and Mineral Management

14. Identify and locate (on maps) all oil leases, gas leases, and geothermal leases; applications for leasing; applications for exploration and exploration in the past decade (identify those which were successful); and applications for development, developments in the past decade, and any developments which have been abandoned.

NOTE: provide only the data maintained by the Forest Service, data maintained by the BLM is being provided under a separate cover.

What standard provisions are included in leases for environmental protection? (be sure to include restrictions to protect grizzly bears.) What analyses are conducted prior to leasing to determine sensitivity of an area to exploration and drilling? Identify all applications for exploration and/or development which have been denied in the past decade, and the rationale for the denial. Does the Forest Service have the authority to override a BLM decision to issue a lease or permit? Identify all such occurrences in the past decade in the area. Identify any legal challenges to lease stipulations (either too restrictive stipulations or a lack of necessary stipulations) in the past decade, and their current status.

15. Identify and locate (on maps) all mining claims and mineral leases, by type of mineral being claimed or leased; any claims or leases which have been abandoned; and any active exploration and/or development.

NOTE: provide only the data maintained by the Forest Service, data maintained by the BLM is being provided under a separate cover.

Identify all claims which have been denied in the past, decade, and the rationale for the denial. Does the Forest Service have the authority to override a BLM decision to issue a lease, permit, or claim? Identify all such occurrences in the past decade in the area.
standard provisions are included in leases for environmental protection? (Be sure to include restrictions to protect grizzly bears.)

Fish and Wildlife Management
16. Identify the fishing recreation visitor days (RVDs) annually for the past decade. Locate (on maps) the areas of concentrated fishing use. What is the economic value of a fishing RVD used in Forest Planning? How does this compare to expenditures by fishermen? What programs exist to eliminate or minimize the impacts of timber harvesting, energy and mineral exploration and development, road construction, and other activities on fishing? What are the policies and practices used to eradicate undesirable fish and/or rehabilitate lakes for native fish? Describe the extent of Forest Service participation in stocking lakes with native or introduced fish species.

17. Identify hunting RVDs annually for the past decade. What species are hunted, and how much hunting effort is focused on each species? Identify areas with particularly intense hunting pressures. What is the economic value of a hunting RVD (separate for the major categories of hunting) used in Forest Planning? How does this compare to expenditures by hunters? Identify all physical barriers (such as fences, roads, and other developments) which affect wildlife populations, including traditional migration routes for elk or other animals. What programs exist to minimize or eliminate the harmful impacts of timber harvesting, energy and mineral exploration and development, road construction, and other activities on hunting? Identify any poaching problems (including locations if applicable) and steps which have been taken to minimize these problems. What policies or plans are in place to control the possible spread of brucellosis?

18. Locate (on maps) all grizzly bear-human conflicts in the past 5 years. Locate (on the same maps) Situation I, II, and III areas. Identify the rationale for the boundaries between these areas; are these boundaries changed when bears are sighted in areas with previously unknown use? How many grizzlies have been killed in the national forests in the past decade (locate on maps)? Identify the principal causes of known grizzly deaths (such as natural causes, road kills, human self-defense, poaching, livestock protection, etc.) and the number attributable to each cause in the past decade. What Forest Service programs exist to protect people from grizzly bears and to protect grizzly bears from people? What analyses have been conducted to examine the cumulative impacts of timber harvesting, energy and mineral exploration and development, recreation, and other activities on grizzly populations?

19. Locate (on maps) bald eagle and trumpeter swan concentration areas in the National Forests. Provide a brief description of the preferred nesting habitat for these species. What Forest Service programs exist to protect these species? What is the extent of Forest Service involvement in peregrine falcon recovery efforts? Describe Forest Service habitat management programs for these and other species. What Forest Service programs exist to protect endangered and
threatened species (both listed and candidate species) in the area.
Identify forest service management policies and monitoring progress on introduced species such as eastern brook trout and grizzly.

Utilization Management
21. Identify the RODs annually for the past decade for downhill ski areas on the national forests. Provide maps of existing and proposed ski developments. What is the economic value of a downhill skiing ROD used in Forest Planning? How does this compare to expenditures by skiers? What are the current economic conditions of the ski areas in the National Forests? What is the status of ski yellowwood development permits/applications? If development has begun, how large is the irreversible investment cost of any timber values, etc.? Provide an analysis of the economic and environmental impacts of ski yellowwood. Describe the efforts expended to determine the accuracy of recent reports of grizzly bear activity in the ski yellowwood areas. Would development be halted or altered if grizzly use was proven?

22. Identify the RODs annually for the past decade for other significant recreational activities in the area— including camping and picnicking, backpacking, wilderness use, cross-country skiing, other dispersed winter and summer uses, etc. What percentage of each use is in Situation I and in Situation II areas? Locate on maps all developed recreation sites, including any National Forest sites leased for summer homes or cabins. What is the current Forest Service policy regarding such leases? What Forest Service policies and programs exist to eliminate or minimize the detrimental effects of recreation on wildlife? What is the economic value of these RODs (separate these which have different values) used in Forest Planning? How does this compare to expenditures by recreationists? How much National Forest recreation is dependent on, or occurs because of, areas particularly because of the I National Parks?

Cultural and Historic Resource Management
23. Identify Forest Service policies regarding access by native Americans to traditional religious or ceremonial sites. Have there been conflicts in the past ten years over access to such sites? Describe such conflicts and indicate the location of the area on a map.

24. What are the cultural resources or historic sites in the area? What are the predicted ROD sites and, briefly, describe what inventories have been made of the sites. Describe Forest Service policies on historic sites within wilderness areas.

SUPPORT PROGRAMS
25. For all existing roads, identify their location (on maps), their mileage by maintenance level, and the annual maintenance costs. If any road is maintained by an agency other than the Forest Service, give the name of the agency, and outline its responsibilities. Provide existing information on the annual use of each of these roads preferably by major activity (timber harvesting, energy & mineral exploration or development, hunting or fishing, other recreation.

26. Identify (and locate on maps) mileage of planned road construction and re-construction for the next decade, by type of road to be built (artificial, collector, or local). Identify the primary reason for the road construction and re-construction, and distinguish roads for timber harvesting from roads built for other (or multiple) purposes. Identify (and locate on maps) planned temporary or permanent road closures, and identify the rationale for the planned closures.

27. What is Forest policy on wildlife suppression in the area? Identify the mileage hurt by policy for the past decade.

Coordination
28. Briefly describe any regular meetings of professional staff with officials of other Federal, State, or local agencies on management issues related to the area indicated on the Committee map. How often or how regularly do these meetings occur?

etc. ID: T. Describe use policies for: 1) In Situation I, II, and III areas.
25. For all road provide annual data for the past decade on the mileage constructed and re-constructed by type of road (artificial, collector, or local) and the costs of these roads (separate for (a) planning and engineering, (b) planning and engineering for FRP, (c) FRP construction and re-construction). Identify the primary reason for the construction of the road. Check to identify the reason for the construction of the road. Identify the total for roads built primarily for timber harvesting from or built for other purposes.

26. Identify (and locate on maps) mileage of planned road construction and re-construction for the next decade, by type of road to be built (artificial, collector, or local). Identify the primary reason for the road construction and re-construction, and distinguish roads for timber harvesting from roads built for other (or multiple) purposes. Identify (and locate on maps) planned temporary or permanent road closures, and identify the rationale for the planned closures.

27. What is Forest policy on wildlife suppression in the area? Identify the mileage hurt by policy for the past decade.

Coordination
28. Briefly describe any regular meetings of professional staff with officials of other Federal, State, or local agencies on management issues related to the area indicated on the Committee map. How often or how regularly do these meetings occur?
JOB RESPONSIBILITIES AND PROFESSIONAL EXPERIENCE

The following information should be identified for each professional or technical employee. If you complete a separate form for each employee, follow the instructions for completing the form. Under RESPONSIBILITIES, District Rangers, Forest Supervisors, and their deputies should identify themselves as "Line Officers." Others should rank their areas of responsibility, with a "1" being the most important area. Rankings should be limited to 3 or fewer subjects. EXPERIENCE should be identified as the number of years working in each of the areas, for any employee, including volunteer work or special projects. Finally, under EDUCATION, each person should specify each degree attained, and a specialty or emphasis studied, if there is one.

JOB TITLE: ____________

RESPONSIBILITIES

<table>
<thead>
<tr>
<th>Administrative Mgt</th>
<th>N.R.</th>
<th>Cultural/Historic</th>
<th>Cultural/Historic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Economics</td>
<td>Economics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Energy/Minerals</td>
<td>Energy/Minerals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engineering</td>
<td>Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Finance/Personal</td>
<td>Finance/Personal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fire Protection</td>
<td>Fire Protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fisheries Mgmt.</td>
<td>Fisheries Mgmt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Forest Planning</td>
<td>Forest Planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Law Enforcement</td>
<td>Law Enforcement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Line Officer</td>
<td>Line Officer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Policy/Mgt Anal.</td>
<td>Policy/Mgt Anal.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pest Mgmt</td>
<td>Pest Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Range Mgmt</td>
<td>Range Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recreation Mgmt.</td>
<td>Recreation Mgmt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timber Mgmt</td>
<td>Timber Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watershed/Soils</td>
<td>Watershed/Soils</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wildlife Mgmt</td>
<td>Wildlife Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other (specify)</td>
<td>Other (specify)</td>
</tr>
</tbody>
</table>

EXPERIENCE

<table>
<thead>
<tr>
<th>Administrative Mgt</th>
<th>N.R.</th>
<th>Cultural/Historic</th>
<th>Cultural/Historic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Economics</td>
<td>Economics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Energy/Minerals</td>
<td>Energy/Minerals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engineering</td>
<td>Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Finance/Personal</td>
<td>Finance/Personal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fire Protection</td>
<td>Fire Protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fisheries Mgmt.</td>
<td>Fisheries Mgmt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Forest Planning</td>
<td>Forest Planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Law Enforcement</td>
<td>Law Enforcement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Line Officer</td>
<td>Line Officer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Policy/Mgt Anal.</td>
<td>Policy/Mgt Anal.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pest Mgmt</td>
<td>Pest Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Range Mgmt</td>
<td>Range Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recreation Mgmt.</td>
<td>Recreation Mgmt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timber Mgmt</td>
<td>Timber Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watershed/Soils</td>
<td>Watershed/Soils</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wildlife Mgmt</td>
<td>Wildlife Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other (specify)</td>
<td>Other (specify)</td>
</tr>
</tbody>
</table>

EDUCATION

<table>
<thead>
<tr>
<th>Administrative Mgt</th>
<th>N.R.</th>
<th>Cultural/Historic</th>
<th>Cultural/Historic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Economics</td>
<td>Economics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Energy/Minerals</td>
<td>Energy/Minerals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engineering</td>
<td>Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Finance/Personal</td>
<td>Finance/Personal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fire Protection</td>
<td>Fire Protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fisheries Mgmt.</td>
<td>Fisheries Mgmt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Forest Planning</td>
<td>Forest Planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Law Enforcement</td>
<td>Law Enforcement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Line Officer</td>
<td>Line Officer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Policy/Mgt Anal.</td>
<td>Policy/Mgt Anal.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pest Mgmt</td>
<td>Pest Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Range Mgmt</td>
<td>Range Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recreation Mgmt.</td>
<td>Recreation Mgmt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timber Mgmt</td>
<td>Timber Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watershed/Soils</td>
<td>Watershed/Soils</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wildlife Mgmt</td>
<td>Wildlife Mgmt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other (specify)</td>
<td>Other (specify)</td>
</tr>
</tbody>
</table>

Questions for Animal and Plant Health Inspection Service (APHS)

1. Briefly describe the effects of the disease brucellosis and its means of transmission. What policies and plans are in place to control the possible spread of the disease? Describe the effects of recent court actions on any plans for thinning herd of elk or buffalo as a means of controlling the disease. Have there been any documented cases of brucellosis transmission from wild to domestic animals in the area? (See enclosed map.)

2. Does the agency engage in any other activities inside the area indicated? Very briefly, describe any other activities of the agency within the area indicated on the Committee's map.

Questions for National Organic and Atmospheric Administration and National Marine Fisheries Service (NOAA)

Very briefly, describe any activities of the agency within the area indicated on the Committee's map. Has the agency commented on Forest Service plans for any of the National Forests indicated on the Committee map? If so, please provide copies of these comments.

Questions for the Army Corps of Engineers

Very briefly, describe any activities of the agency within the area indicated on the Committee's map. Has the agency commented on Forest Service plans for any of the National Forests indicated on the Committee map? If so, please provide copies of these comments.

Questions for the Environmental Protection Agency

Very briefly, describe any activities of the agency within the area indicated on the Committee's map. Has the agency commented on Forest Service plans for any of the National Forests indicated on the Committee map? If so, please provide copies of these comments. Describe EPA's review of the EIS's for the Forest Service plans in the area, and for the EIS's for the other agencies' activities in the same area. Provide EPA evaluations of those EIS's. (Summaries and recommendations are sufficient.) To what extent have cumulative effects been examined by the agencies?

Questions for the Bonneville Power Administration

Very briefly, describe any activities of the agency within the area indicated on the Committee's map. Has the agency commented on Forest Service plans for any of the National Forests indicated on the Committee map? If so, please provide copies of these comments.
QUESTIONS FOR FEDERAL ENERGY REGULATORY COMMISSION

The following questions refer to areas indicated on the enclosed map.

1. How many low head hydroelectric facilities have received licenses or permits in the area? What studies have been done on the cumulative impacts of these projects? Provide copies of any such studies.

2. Is there a shortage of electricity in the area? Will there be in the foreseeable future? To whom would any power generated be sold? What is the current price of electricity (per kilowatt-hour) in the tri-state area?

3. What are your activities in this area for other energy resources, including other hydroelectric projects?

4. Can FERC issue a permit or a license in the area over the objections of the forest owners? Fish and Wildlife Service? Other tributary governments? The State? The County? Distinction between objections raised by an agency over projects proposed for land owned by the agency and those related to other land that would merely affect the agency’s own land. Give examples of agency objections that have stopped projects on their own or other land.

5. Has the agency commented on forest service plans for any of the National forests indicated on the Committee map? If so, please provide copies of these comments. Very briefly, describe any activities of the agency within the area indicated on the Committee’s map.

QUESTIONS FOR THE ADVISORY COUNCIL ON HISTORIC PRESERVATION

Very briefly, describe any activities of the agency within the area indicated on the Committee’s map, please include a listing of any particularly important historic or cultural resources in the area, and indicate their location on a map. Was the ACHP commented in the past on federal agencies’ management of historic and cultural resources in the area? If so, what has been their effect of these comments? Has the agency commented on forest service plans for any of the National forests indicated on the Committee map? If so, please provide copies of these comments.

QUESTIONS FOR THE U.S. FISH AND WILDLIFE SERVICE

The following questions are for the Fish and Wildlife Service, and refer to the Upper Green Lake National Wildlife Refuge, the Bear Lakes National Wildlife Refuge, and the National Elk Refuge, unless otherwise indicated. Some questions regarding the general biology of various species (in whatever part of the enclosed map) are also included.

Employment

1. How many direct jobs outside the US (if any) result from the project activities which occur on the National Wildlife Refuge.

2. How many indirect jobs outside the US (if any) result from (a) grazing and timber harvesting (if any), (b) energy and mineral leasing, exploration, and development (distinguish oil, gas, geothermal, minerals, and mining, if possible), (c) hunting (distinguish by hunted species, if possible), (d) recreation (distinguish parkers and outfitters from other local business which benefit from recreation and tourism)?

3. Are many FW personnel (in US) associated with each of the above activities, and is the total FW employment (separately for each refuge) for all management personnel or resource specialists at the refuges or who work on species in the area, give their job title (and a phrase identifying their primary duties if the title doesn’t convey their responsibilities), trade level, and a brief summary of their professional experience (education and years of experience relevant to their current duties).

Leasing and Mining

1. Identify and locate (on refuge maps) any oil, gas, or geothermal leases, applications for leasing, applications for exploration and exploitation in the past decade (identify which were successful), applications for development, developments in the past decade, and identify any developments which have been abandoned. Give the total acreage of these areas. Identify all applications which have been denied in the past decade, and the rationale for the denial. State any restrictions that have been or will be included in contracts or leases in situation 1. II, or III (grizzly bear 1). Include any leasing or mining projects which are now abandoned, the location of such projects, and the date of abandonment.

2. Identify all federal receipts (including all funds returned to state governments) and all expenditures (excluding the intergovernmental transfers) associated with oil, gas, and geothermal leasing, exploration, and development in the past decade.

3. Identify and locate (on maps) any mining claims and mineral leases, by type of mineral, being claimed or leased, any claims or

[252]The replies from the Fish and Wildlife Service did not include information from the Evans Lake National Wildlife Refuge except for the responses concerning changing cones. The reason for the omission was not explained by the Department of the Interior.
leases which have been abandoned, and any active exploration and/or development. Identify all claims which have been denied in the past decade, and the rationale for the denial. State any restrictions that have been or will be included in contracts or leases in Situation I, II, or III grizzly bear areas.

Hunting and Fishing:
1. Identify the fishing recreation visitor days (RVDs) annually for the past decade on the Refuge. Where are the favorite fishing sites? Label them on maps. What is the economic value of a fishing RVD? How do FWS estimates of value compare to expenditures by fishermen? How many other recreation RVDs (such as camping) are associated with fishing? Have timber harvesting, energy and mineral exploration and development, and other activities affected fishing? If so, how and where? What actions have been taken to minimize or eliminate possible impacts?

2. Identify hunting RVDs annually for the past decade on the Refuge, and distinguish elk hunting from other hunting RVDs. What other species are hunted, and how much hunting effort is focused on each species? Identify areas with particularly intense hunting pressures. What is the economic value of a hunting RVD (separate for the major categories of hunting)? How does this compare to expenditures by hunters? How many other recreation RVDs (such as camping) are associated with hunting? Have timber harvest, energy and mineral exploration and development and other activities affected hunting? If so, how and where? How do roads affect hunting values and animal populations? Identify all physical barriers (such as fences, roads, and other development) which affect traditional migration routes for elk or other animals. What actions have been taken to minimize or eliminate potential harmful impacts? Identify any poaching problems (including locations if appropriate), and steps which have been taken to minimize these problems.

3. Identify the RVDs annually for the past decade for other significant recreational activities on the Refuge — including camping and picnicking, backpacking/wilderness use, skiing, dispersed winter use, dispersed summer use, etc. Identify the location for all developed recreation sites. What other animal populations (including elk, bald eagles, trumpeter swans, listed and candidate endangered and threatened species, and other animals) are known to be affected by recreational activities? What FWS policies and programs exist to eliminate or minimize the detrimental impacts of recreation on wildlife? Identify which roads are most heavily used for recreation access, and what use restrictions exist and the rationale for these restrictions.

Other Wildlife:
1. What policies or plans are in place to control the possible spread of brucellosis? Describe the effects of recent court actions on any plans for thinning herds of elk as a means of controlling the disease. Does the Refuge have any documented cases of brucellosis transmission from wild to domestic animals in the area?
15. What are FWS management policies on introduced, non-native species? Describe any regular monitoring to locate introduced species such as eastern brook trout. What are the policies on eradicating undesirable fish with such substances as Rotenone? What techniques are used in rehabilitating lakes for re-introduction of native fish? What are policies on predator control on Refuge? Describe any measurements that may exist on the effectiveness of these policies.

Other Agencies
16. What activities of the Bureau of Reclamation have affected the Refuge in the area? Does the FWS anticipate any potential problems from proposed actions of the Bureau in the area? What authority does the FWS have to alter proposed actions?

17. Has FWS commented formally on any of the seven draft National Forest Plans (for the Beaverhead, Gallatin, Custer, Shoshone, Bridger-Teton, Caribou, and Targhee National Forests) or on the land use plans of the other Federal agencies in the area? If so, provide copies of formal comments. Does FWS plan to comment on any other Forest Plans in the area? If so, which ones? When will these comments be available? In the final plans which have been issued (apparently only for the Targhee National Forest to date), have your comments had a discernable impact on the proposed activities? Has FWS commented formally on activities in the area of the Committee map on the actions of any other Federal agencies? If so, provide a copy of the executive summary, or the actual document if no summary is available.

Roads
18. For all existing roads on the Refuges, identify their location (on maps), their mileage by maintenance level, and the annual maintenance costs. (If any road is maintained by an agency other than the Fish and Wildlife Service, give the name of the agency, and outline its responsibilities.) Specify the principle use of each of these roads for the past 5 years, and describe any proposed changes in their use. Identify use restrictions and their rationale.

19. What is FWS policy on wildlife suppression in the area? Identify the acreage burned annually for the past decade, the losses resulting from fire (identify the method of calculating the losses), and the annual suppression and repressurization costs.

20. What are the cultural resources or historic sites in the area? What are the prehistoric sites and, briefly, describe what information has been made of the sites. Describe Fish and Wildlife Service policy on historic sites within Refuges.

21. Briefly describe any regular meetings of professional staff with officials of other Federal, State, or local agencies on maintenance issues related to the area indicated on the Committee map. How often or how regularly do these meetings occur?

Questions for the National Park Service

The following questions are for the National Park Service, and refer to both Yellowstone and Grand Teton National Parks. Data concerning the John D. Rockefeller, Jr. Memorial Parkway should also be included as appropriate. Additional questions on more general subjects outside the Parks' boundaries are also included.

Employment and Economy Assessments
1. How many direct jobs are there in the community and how much local economic activity results from the major activities which occur in the National Parks: distinguish jobs resulting from (a) fishing, (b) cross-country skiing, and (c) other recreation (distinguish packers and outfitters from other local business which benefit from recreation and tourism)? How many indirect jobs result from each activity? What proportion of the Park Service personnel (in FTEs) are associated with each of these activities, and what is the total Park Service employment (separately for each Park)? For all management personnel or resource specialists in each Park and other professionals who are concerned with this general area, give their job title (and a phrase identifying their primary duties if the title doesn't convey their responsibilities), and a brief summary of their professional experience (education and years of experience relevant to their current duties).

2. How many Park Service personnel (in FTEs) are associated with each of these activities, and what is the total Park Service employment (separately for each Park)? For all management personnel or resource specialists in each Park and other professionals who are concerned with this general area, give their job title (and a phrase identifying their primary duties if the title doesn't convey their responsibilities), and a brief summary of their professional experience (education and years of experience relevant to their current duties).

3. Identify the RVs annually for the past decade for all significant recreational activities in the Parks: distinguished by activity: include camping and picnicning, backpacking/wilderness use, cross-country skiing, other dispersed winter use, dispersed summer use, etc. Identify the location of all developed recreation sites. How many sites, and what proportion of each use, are in Situaction 1 and in Situation 2 (primarily spring, summer programs exist to protect people from grizzly bears and to protect grizzlies from people? What other animal populations (including elk, bald eagles, trumpeter swans, listed and candidate endangered and threatened species, and other animals) are affected by recreational activities? What policies and programs exist to eliminate or minimize the detrimental impacts of recreation on wildlife? What is the economic value of these RVs in the Parks (separate those which have different values)? What research has been done on recreation values in the Parks, and what are the results of such research? How much of the recreation in the Parks is dependent on, or occurs because of, other recreational opportunities (such as the other Park, the National Forests, the National Wildlife Refuges, etc.?)

Fish and Wildlife
1. How many fishing recreation visit days (RVs) were spent in the area annually in the last five years? What are the principle species caught? Where are the favorite fishing sites? What is the economic value of a fishing RV? How do managers estimate the value of expenditures by fishermen? How many other recreation RVs (such as camping) are associated with fishing? How might any FWS or other
water projects outside the Parks pose problems for fish or other resources inside the Parks?

5. What are the current estimates on the grizzly population for the entire area indicated on the Committee map? What is the age structure of the population? What, currently, are thought to be the principle causes of death? Indicate, on maps, the sites of man-caused bear deaths over the last five years. What effect is the Park Service making to reduce these causes? Approximately how many bears spend the entire year in the Parks and how many are substantially dependent on resources outside the Parks? If oil, gas, or genital herpes is increased around the Parks boundaries, what sort of impacts, if any, would such activity pose to bears? (Quantify if possible.) If NPS predicts that bear deaths would increase, what would be the chief cause of such deaths (e.g., direct interactions with workers, road kills, loss of habitat, or others)? Describe the issues surrounding Fishing Bridge will the area be closed, and if so, how will its closure affect grizzly populations and human-bear encounters? What will the impact of this closure be on counties and communities outside the Park?

6. Are any of the herds of elk in VNP essentially independent of resources outside the Park? What are the physical barriers to the migration of elk to or from the Park? Indicate these barriers on a map. Can the herds transmit brucellosis? Is the disease native to this species in this area? Have these been any documented cases of brucellosis transmission from wild to domestic animals in the area? Are any controls being planned to stop transmission of the disease? Describe and analyze recent court actions regarding control of brucellosis.

7. Locate (on maps) trumpeter swan nesting sites in the parks. What have been the principle causes of nesting failures over the last five years? What steps has NPS taken to reduce such problems? Do swans winter in the parks? Where? Any sites in the area important feeding areas for geese? If so, where and in what seasons?

8. Locate (on maps) bald eagle nest sites in the parks. Have any of the eagles failed to produce fledglings due to human interference? If so, what are plans or policies for reducing such interference? How dependent is the bald eagle population inside the Parks on recruitment from eagles fledged outside the Parks?

9. What are NPS management policies on introduced, non-native species? Is there regular monitoring to locate introduced species such as eastern brook trout? What are the policies on eradicate introductions with such substances as Iminet? What techniques are used in rehabilitating lakes for re-introduction of native fish? What are policies, if any, on predator control on Park land? Describe any measures that may exist on the effectiveness of these policies identify any poaching problems (including locations if appropriate), and steps taken to minimize these problems.

10. Describe the Parks' current situation regarding intensive visitor use or overuse. In what areas is overuse a serious problem? How are the Parks managing and controlling use to protect vital natural resources where visitor use and resource protection conflict? Are current structural facilities adequate (e.g., sewers, roads, road equipment, etc.)? If not, what are the deficiencies?

11. How in visitor use in the 3 Park system areas projected to increase in the next 20 years? What plans does the agency have for managing the influx? (In area, lower facilities, public transportation, and so on) What steps (e.g., trail permits, limiting entrances, raising fees, closing areas) can be made to reduce the impact of visitors on the Park's natural resources?

12. Has the Park Service conducted Formally on any of the seven draft National Forest Plans (for the Beaverhead, Gallatin, Gros Ventre, Shoshone, Bridger-Teton, Caribou, and Tahoe National Forests) or the land use plans of other Federal agencies in the area? Is so, provide copies of formal comments. Does NPS plan to comment on any other Forest Plans in the area? If so, which ones? Where will these comments be available? In the final plans which have been issued to date have your comments had a discernible impact on the proposed activities? If so, how.

13. Has NPS commented on the oil, gas, or genital herpes plans of the other Federal or the State agencies? If so, please provide copies of these comments. Based on geological information so far available, which areas of proposed leasing could have the greatest impact the Parks' geothermal resources?

14. Briefly describe what is known and what is suspected about relationships between surface waters, groundwater recharge zones, ground water, and the hydrothermal features of Yellowstone National Park. What restrictions are likely to include water sources both internal and external to the Park. What analyses have been conducted to identify these relationships and the possible impacts of timber harvesting, energy drilling, mining, ski area development, and other activities on water quality and groundwater recharge? Describe how the cumulative effects have been considered.

15. For all existing roads, identify their location (on maps), their mileage by water source, and the annual maintenance costs. (If any road is maintained by another agency, show on map the agency, and outline its responsibilities.) Specify the annual use of each of these roads for the past 5 years. Identify any poaching problems (including locations if appropriate), and steps taken to minimize these problems.

16. Review the study and/or provide an update of the 1975 study used as the basis of the 1978 report. Identify the primary reason for the road construction and reconstruction. Identify (and locate on maps) any roads under study or near the Parks that are proposed for the next 10 years. Identify (and locate on maps) any reduction in number and miles of roads.
1. Identify, on maps, areas of known or potential oil, gas, and geothermal resources. Also indicate areas of commercial mineral deposits, showing on the map what minerals are thought to be present in these leasing interest for any of these energy resources in the area? Explain.

2. In which of these areas is the resource extractable with technologies currently available? How many of the deposits which are technically extractable are also economically profitable under current or reasonably foreseeable market conditions? Would any of the methods required for profitable exploitation require waivers from current law (e.g., substantial surface disturbance inside Wilderness areas)?

3. Identify the USGS study cited previously by Yellowstone National Park Superintendent Barbee, and apparently conducted by the Menlo Park, looking the groundwater supply for Yellowstone Park with the Gallatin National Forest. Describe the status of this or any similar studies. Identify the researchers, and present any preliminary findings.

4. If any portion of the Overthrust Belt lies within the area outlined, indicate the area of overlap.

5. Very briefly, describe any activities of the agency within the area indicated on the Committee's map.

6. Briefly describe any regular meetings of professional staff with officials of other Federal, State, or local agencies on management issues related to the area indicated on the Committee's map. How often or how regularly do these meetings occur?

QUESTIONS FOR U.S. GEOLOGICAL SURVEY

1. Indicate, on maps, areas of known or potential oil, gas, and geothermal resources. Also indicate areas of commercial mineral deposits, showing on the map what minerals are thought to be present in these leasing interest for any of these energy resources in the area? Explain.

2. In which of these areas is the resource extractable with technologies currently available? How many of the deposits which are technically extractable are also economically profitable under current or reasonably foreseeable market conditions? Would any of the methods required for profitable exploitation require waivers from current law (e.g., substantial surface disturbance inside Wilderness areas)?

3. Identify the USGS study cited previously by Yellowstone National Park Superintendent Barbee, and apparently conducted by the Menlo Park, looking the groundwater supply for Yellowstone Park with the Gallatin National Forest. Describe the status of this or any similar studies. Identify the researchers, and present any preliminary findings.

4. If any portion of the Overthrust Belt lies within the area outlined, indicate the area of overlap.

6. Briefly describe any regular meetings of professional staff with officials of other Federal, State, or local agencies on management issues related to the area indicated on the Committee's map. How often or how regularly do these meetings occur?

QUESTIONS FOR BUREAU OF INDIAN AFFAIRS

The following questions refer to the Wind River Indian Reservation, in the portion southwest of U.S. 287, and generally above 7000 feet elevation.

Religious Freedom

1. Are the areas of religious significance to the Shoshone or Arapaho tribe? Briefly describe the religious, cultural, and ceremonial use of the area. On a map, indicate generally the areas of major significance. (If this information is considered confidential by the tribe, then provide whatever is available at a suitable level of detail.) Are these areas in adjacent National Forests that are also used for such purposes? If so, indicate these areas on a map, and describe briefly the uses. Are there any disputes over the boundaries of the reservation in this area? Describe any dispute.

2. What are agency policies regarding newly discovered modern or prehistoric burial sites? Describe the action the agency takes when such a site is discovered in, for example, the process of road construction. Describe any consultations that have taken place with the tribal government or religious leadership under the American Indian Religious Freedom Act (42 U.S.C. 1996) and the Antiquities Act (16 U.S.C. 431-445), or the Archeological Resources Protection Act (16 U.S.C. 470k, et seq.) regarding burial sites or any other land management issue in this area.

Natural Resources and Subsistence

1. Does the tribe depend on the area for subsistence use? If so, what are the uses, and what is the current status of the resources? Are there any resource conflicts, such as water rights or hunting, and if so, what are they? Have steps been taken to address these concerns? Does the reservation need assistance in meeting these goals? If so, what sort of assistance?

2. Are some of the animals (e.g., grizzlies, elk, bighorn sheep, trumpeter swans, buffalo, endangered species, etc.) of special concern in Yellowstone National Park, used in religious, ceremonial, or cultural activities of the tribe? Are these animals still present on the reservation? Are attempts being made to reintroduce them or are they populations on reservation land, and is the tribal government involved in these efforts? Describe any such restoration activities.
1. What are current policies regarding access of non-Indians to tribal land for hiking, fishing, hunting, and other recreation? Are limitations placed on access to sacred areas? Describe the nature of these limitations.

2. What are current plans for road-building and timber harvest in the area? Please indicate such plans and the location of existing roads.

3. Might hoped timber sales affect important tribal or Native religious ceremonial, cultural, or subsistence? Do the revenues from these sales exceed the costs to sell the timber for the tribes and/or the Federal Government? How are payments allocated to the tribe? Have any sales in the last 10 years been made under the objections of the tribal government or religious organizations?

4. Briefly describe the nature of the objections and provide copies of tribal objections. Are there differences between the tribe and the BLM regarding preferred management practices? If so, outline the differences.

5. Tax status of on-mob, who actually owns the land in question? List leaseholders, either tribe alone or both tribes together, non-members of the tribe or other types of ownership. Does the tribe have a natural resource management plan for the area? If so, provide copies.

6. If there is no actual plan, is there a policy on a set of regulations guiding management practices on the land? If so, provide a copy of the policy or the regulations.

7. For all management personnel and resource specialists that deal with the subjects of these questions, give their job title and a brief description of their primary duties if the title doesn’t convey these responsibilities; their grade level; and a brief summary of their professional experience, education and years of experience relevant to their current duties.

8. Questions for Review of Land Management

   The following questions refer to the public lands indicated on the enclosed map, unless otherwise specified.

   a. Employment

       How many direct and indirect jobs and how much local economic activity result from the water activities which occur on the public lands? If possible, distinguish jobs and economic activity resulting from (a) timber harvesting (if any), (b) grazing, (c) energy and mineral leasing, exploration, and development (distinguish oil, gas, geothermal, minerals, and mining, if possible), (e) fishing, (f) hunting (distinguish by hunted species, if possible), (g) downhill skiing, and (h) other recreation (distinguish parkers and outfitters from other local business which benefit from recreation and tourism).

   b. How many BLM employees (in FITA) are associated with each of these activities, and what is the total BLM employment in the area? Do these employees work with each of these activities? For all management personnel and resource specialists that deal with this area, give their primary duties if the title doesn’t convey these responsibilities; their grade level; and a brief summary of their professional experience, education and years of experience relevant to their current duties.

   c. Payments and Financing

       Identify all payments made by the BLM or M & U to State and local governments in the area annually for the past decade. Be sure to include all receipt-sharing payments as well as Payments in Lieu of Taxes.

   d. What is the status of BLM planning for public lands in this area? What proportion of the area has Resource Management Plans and where were these plans completed? What other plans exist that apply to the public lands in this area? Provide details on the public elements which were received on each of these plans. Identify the BLM administrative units which encompass the lands identified on the enclosed maps, and the boundaries of these administrative units.

   e. Range Management

       Identify the number of grazing leases and permits, the number of AUM, the months of use, permit boundaries and range condition. Separate this information for free use versus paid permits and for cow/horses versus sheep/goats. How many cooperative agreements exist between BLM and livestock operators? Identify annual Federal investments in the various types of structural and non-structural range improvements for the past decade, include acreage of pesticide and herbicide applica- tions for range improvement, for each chemical used. Locate (on maps) all existing structural improvements which can benefit or restrict wildlife populations. Identify fees collected (in FITA) and the fee per AUM in 1980. How did these fees compare with fees for private grazing in the area? How many ranchers are dependent on BLM grazing leases or permits? What portion of grazing. For each rancher with a BLM permit of lease, is under those permits or leases? How many of these ranchers also use Forest Service permits?

   f. Identify livestock losses to grizzly bears, other predators, brucellosis, poisons plants, and other such agents. What are BLM policies on predator control? Describe the general data and the effectiveness of these policies. What is the population of wild horses and burros, and how has the population changed in the past decade? How many AUMs of forage do wild horses and burros consume.
and what is the carrying capacity for these animals?

What are RM management policies on introduced, non-native species such as eastern brook trout?

What are the policies on eradicating undesirable fish with such as bass as罗 creams? What techniques are used in rehabilitation? Are lakes for re-introduction of native fish?

Forestry and Mineral Leasing

For all Federal land in the area indicated on the enclosed map, identify and locate (on maps) all oil leases, gas leases, and geothermal applications for leasing, applications for exploration and exploration in the past decade (identify which were successful); applications for development, developments in the past decade, and identify any developments which have been abandoned. What standard provisions are included in leases for environmental protection? Do the leases include provisions to protect grizzlies? What analyses are conducted prior to leasing to determine sensitivity of an area to exploration and drilling? Identify all applications which have been denied in the past decade, and the rationale for the denial. Does the RM have the authority to issue a lease or approve an application in national forests, regardless of Forest Service recommendations?

Hunting and Fishing

For the public lands, identify hunting recreation visitor days (HVRD) annually for the past decade. What species are hunted, and how many HVRD are associated with each species? What is the economic value of a hunting HVRD (e.g., by major category of hunting, if possible)? How does this compare to expenditures by hunters? How many other recreation (e.g., such as camping) are associated with hunting? How much hunting effort occurs in Situation I and II (grizzly bears)? Is hunting success different (better or worse) in these areas? What actions are taken to minimize the impacts of timber harvesting, energy and mineral exploration and development, road construction, and other activities? Describe any poaching problems and steps which have been taken to minimize these problems. What policies or plans are in place to control the possible spread of nonindigenous? How many fishing HVRD have there been annually over the past decade?

Identify, by timber species, the volume and value of any timber sold and of any timber cut annually, and the average cut annually for the past decade. Provide annual data for the past decade on herbicide and pesticide use (for forestry) by chemical

Compliance

11. Briefly describe any regular meetings of professional staff with officials of other Federal, State, or local agencies on management issues related to the area indicated on the Committee map. How often or how regularly do these meetings occur?

Questions for Bureau of Reclamation

1. What is the policy of the agency regarding release of water into the area encompassing the Red Rock Lakes? What are the requirements for the release of water into the area? What is the policy regarding the regulation of water releases?

2. Are any other dams in the area proposed for such conversion? If so, what studies have been done on the effects of such conversion on natural resources such as native fish or water-dependent birds?

3. Very briefly, describe any other activities of the agency within the area indicated on the Committee's map.

Questions for the Bureau of Mines

Very briefly, describe any activities of the agency within the area indicated on the Committee's map.

Questions for the Office of Surface Mining

Very briefly, describe any activities of the agency within the area indicated on the Committee's map.

Questions for State Fish and Game Agencies

The following questions refer to State lands in the areas indicated on the enclosed map, unless otherwise specified. Where possible, the Committee would appreciate the use of the enclosed map and overlays that can be superimposed on it:

1. For State and private lands, identify the fishing and hunting recreation (HVRD or other appropriate measure) annually for the past five years. Distinguish among major types of wildlife recreation, such as elk hunting, antelope hunting, trout fishing, etc. Identify the
most popular areas for these types of wildlife recreation. What is the economic value used by the agency for a fishing or hunting Kyle? Identify and quantify the known, local impacts of timber harvesting, energy and mineral exploration and development, developed recreation, and other activities on fishing and hunting. What State programs exist to eliminate or minimize the impacts of these activities on fish and wildlife populations?

2. For State and private lands, locate (on maps) all grizzly bear sightings and all human-bear encounters in the past few years. How many grizzlies have been killed in the past decade (locate on maps), what are the principal causes of known grizzly deaths? What State programs exist to protect people from grizzlies? Do the grizzly deaths? What analyses have been conducted to examine the cumulative impacts of timber harvesting, energy and mineral exploration and development, recreation, and other activities on grizzly populations? Does the State agree with the locations of Situation 1 and Situation 2 grizzly areas on Federal lands?

3. Locate (on maps) all significant habitat areas for bald eagles, trumpeter swans, and whooping cranes on State and private lands. Describe population trends and any known causes of declines. What State programs exist to protect these species?

4. Does the State have an endangered and threatened species program? For the gracious, identify the species listed or those under consideration. Highlight species which are not included on the Federal list. What State programs exist to protect these species? If the State is making significant efforts on other non-federal species in this area, outline these programs briefly.

5. Has the Department commented formally on any of the seven draft National Forest Plans (for the Beartooth, Gallatin, Custer, Shoshone Bridger-Teton, Caribou, and Targhee National Forests)? If so, provide copies of formal comments. In the final plan which has been issued (apparently only for the Targhee National Forest to date), have your comments had a discernible impact on the proposed activities? Has the Department commented formally on managers or development plans of the other Federal agencies (National Park Service, Fish and Wildlife Service, BLM)? If so, provide copies of those comments. Has the Department had an adequate opportunity to comment on these plans? Have the Department's comments had any discernible influence on the plans or the activities of the agencies?

APPENDIX I: FOREST SERVICE PAYMENTS TO COUNTIES

The Forest Service returns 25 percent of its gross receipts to the counties within which the National Forests are located. This receipt-sharing provision was enacted in 1908 to approximate counties for the tax-exempt status of the National Forests. However, Forest Service deposits to the General Treasury are less than the gross receipts because the Forest Service is authorized to use timber sale receipts for special purposes, particularly for road construction and reforestation and other timber sale area improvements. The counties' shares of Forest Service receipts are calculated on the basis of these expenditures are deducted from gross receipts, and thus the counties actually receive more than 25 percent of Forest Service deposits to the General Treasury.

The Forest Service payments are distributed according to the proportion of a National Forest's acreage in each county, rather than to the specific counties where the receipts are generated. The gross receipts for each National Forest are calculated among the counties where that Forest is located. For example, Lemhi County, Idaho, contains 65 percent of the Targhee National Forest's lands (26,490 acres out of 4,662,755 total acres), so Lemhi County payment would be calculated on a 65 percent of the Targhee's gross receipts. Lemhi County would also receive payments (calculated in the same manner) from the Challis and Salmon National Forests, since these Forests also have lands in the county.

Forest Service payments to counties in the COBR must be estimated, because several counties have National Forest lands both inside and outside the COBR. Table 29 shows the estimated National Forest acreage in the COBR for each county. Estimated Forest Service payments to counties with National Forest land in the COBR are calculated for each Forest, using the percentage of the county's National Forest land inside the COBR. For example, approximately 8.9 percent of the Targhee National Forest land in Clark County, Idaho, is paid about $5,200 to Clark County (8.9 percent of $59,320) for its National Forest land in the COBR. Table 29 shows that the total...
TABLE 29

<table>
<thead>
<tr>
<th>County</th>
<th>NF Acres in COY (S.F.)</th>
<th>Forest Service Payments by Decade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>6,500</td>
<td>$1,500</td>
</tr>
<tr>
<td>California</td>
<td>8,000</td>
<td>$2,200</td>
</tr>
<tr>
<td>Colorado</td>
<td>9,000</td>
<td>$2,500</td>
</tr>
<tr>
<td>Idaho</td>
<td>10,000</td>
<td>$3,000</td>
</tr>
<tr>
<td>Montana</td>
<td>11,000</td>
<td>$3,500</td>
</tr>
<tr>
<td>Nevada</td>
<td>12,000</td>
<td>$4,000</td>
</tr>
<tr>
<td>Utah</td>
<td>13,000</td>
<td>$4,500</td>
</tr>
<tr>
<td>Wyoming</td>
<td>14,000</td>
<td>$5,000</td>
</tr>
</tbody>
</table>

*COY = County of Inheritance*
acres from Forest Service and PILT payments. When Forest Service receipts fall, counties receive less than $0.75 per acre; however, when receipts rise, as they have been since 1982, counties receive more than $0.75 per acre.

FIGURE 11. Forest Service and PILT Payments Per Acre to Counties

Federal Payment (dollars/acre)

Forest Service Revenues (dollars/acre)

PILT Payments

Forest Service Payments