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Publication Date

2001-09-24

WHY DID THE BEAR CROSS THE ROAD? IT DIDN'T!

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Abstract: The Interagency Grizzly Bear Committee (IGBC) was formed in 1983 to promote and facilitate recovery of the threatened grizzly bear. In the lower 48 states the IGBC is a group of high-level administrators that represent the federal and state agencies involved in grizzly bear recovery. Obstacles have been overcome since then. However, the effective passage of significant numbers of grizzly bears across major highways to extend distribution and connect ecosystems has been a problem. Many bear deaths caused by automobiles have been documented. In December 1999, the IGBC decided that wildlife linkage areas are important conservation measures for grizzly bears and for other rare species such as the lynx, wolf, and wolverine. During 2000, state and federal agencies and many non-government conservation organizations met to map out and identify major habitat linkage/highway segments in the Northern Rockies. Reports, planning, and other habitat linkage information can be found at the IGBC web site: www.fs.fed.us/r1/wildlife/igbc/

The IGBC is addressing three areas for action.

- Public land management. A list of tasks and actions will be prepared for each grizzly bear recovery ecosystem, a multi-interest work group lead by the Forest Service will develop public land recommendations, such as road management, acquisition units, timing of management actions, and other habitat linkage improvements,
- Highway/transportation management. A multi-interest work group, lead by transportation specialists from the Forest Service and state departments of transportation will identify specific recommendations for critical segments of highways where wildlife passage problems have been determined. Work would include research and monitoring of wildlife use and crossings, maintenance or effective wildlife cover approaches to crossing structures, and selecting and testing of types of crossing structures.
- Private lands/rural communities' involvement action. In many areas, private land separates highway right of way and public land. People occupying this space need to understand and embrace the need for wildlife habitat connectivity. These work groups would consist of community leaders and private interests with a desire to co-exist with wildlife and promote species habitat connectivity.

IGBC discussions revolved around the conservation biology foundations that large areas are better than smaller areas and connected habitats are better than isolated habitats for maintaining wildlife populations. The IGBC will be working toward these goals.

Background

Grizzly bears are affected by roads in a number of ways. Traffic on roads, we know, will displace bears from using nearby habitats, thereby reducing the amount of habitat available for bears to use. Traffic can cause direct mortality to bears. In the past four years at least two grizzly bears have been killed in the Mission-Valley by automobiles on US Highway 93 north of Missoula. At the December 7-9, 1999, Interagency Grizzly Bear Committee (IGBC) meeting in Jackson, Wyoming, there were several presentations on the importance of wildlife linkage habitat in the Northern Rocky Mountains. These discussions revolved around the conservation biology foundations that larger areas are better than smaller areas for maintaining wildlife populations, as well as "connected habitats" being better than "isolated habitats." At the Jackson meeting, IGBC assigned Jack Blackwell, regional forester, USDA Forest Service (USFS), Ogden, Utah, and Steve Huffaker, acting director for the Idaho Fish and Game Department, to review the issues involved with wildlife linkage habitat and report back to IGBC at the 2000 winter IGBC meeting.

There was a second meeting on February 17, 2000, hosted by Jack Blackwell and Steve Huffaker in Boise, Idaho. This meeting was attended by several interested parties including the departments of transportation's (DOTs) from Idaho and Montana, Federal Highway Administration, conservation groups, Idaho Department of Fish and Game, US Forest Service, US Fish and Wildlife Service (FWS), Bureau of Land Management, and citizens and representatives from most of the IGBC member agencies in the Northern Rocky Mountains. At this meeting, there was a full day of presentations and discussions about wildlife linkage habitat. The presentations included a number of wildlife linkage habitat proposals prepared by agencies and conservation groups. After reviewing the presentations, Mr. Blackwell and Mr. Huffaker asked if there was any way to get the various wildlife linkage habitat proposal groups together, with other involved or interested parties and consolidate the

linkage proposals – and provide ideas for prioritization. Bill Ruediger, USDA Forest Service, Missoula, was asked to do the staff work for this effort.

On May 10-11, agencies and people interested in wildlife linkage habitat met in Dillon, Montana, to review the agency and conservation group wildlife linkage habitat proposals with the objectives of:

1. Reviewing available wildlife linkage habitat proposals.
2. Discussing common linkage areas or gaps.
3. Discussing priorities.
4. Providing information that could aid in implementation.

The following is a summary of the May 10-11 meeting. This is a combined effort from those at the Dillon, Montana, meeting, as well as other contributors. Participants included Joel Marshik, Montana Department of Transportation; Mellanie Parker, Northwest Connections; Kim Davitt, American Wildlands; Dr. Sterling Miller, National Wildlife Federation; Dr. Lance Craighead, Craighead Environmental Research Institute; Steve Primm, Northern Rockies Conservation Cooperative; Dr. Wayne Melquist, Idaho Fish and Game Department; Kurt Alt, Montana Department of Fish, Wildlife, and Parks; Ken Wall, Geo Data Services; Mary Maj, Rocky Mountain Elk Foundation; Bob Ralphs, Jim Claar, Jay Gore, Bill Noblitt, Monica Schwalbach, Mark Orme, and Bill Ruediger, USFS; Dr. Chris Servheen and Sunni Baker, FWS; Marcy Mahr, Greg Jones, and Alex Dieckman.

On December 12, 2000, Bill Ruediger met with conservation groups from the Greater Yellowstone Area and Montana Fish, Wildlife, and Parks (Arnie Dood) to discuss the draft report and mapping options. At this meeting, in Bozeman, Montana, it was recommended that a “second option” map be developed that would include only the specific highway segments associated with the wildlife linkage habitat map recommended at the Dillon meeting. This map edition provided a more precise view of the specific priority wildlife linkage habitat.

Definitions and Terminology

It became apparent that definitions and terminology for wildlife linkage habitat is important. There are many terms and phrases used to describe wildlife linkage habitat, and confusion can arise as to what is actually being described. As the term *wildlife linkage habitat* implies, there are three important elements involved. The first is “wildlife.” Wildlife linkage habitat is important for many or most wildlife species. This includes common species like deer and elk, less common species like bighorn sheep, forest carnivores, and large carnivores, such as the wolf and grizzly bear. Small mammals and birds also benefit from wildlife linkage habitat. Wildlife linkage habitat is important for the entire wildlife community to function properly.

The second word, “linkage,” in the phrase has important meaning. Linkage implies connectivity of wildlife habitat and populations. Wilcox and Murphy (1985) have stated that “habitat fragmentation is the most serious threat to biological diversity and is the primary cause of the present extinction crisis.” Human-induced habitat fragmentation -- the isolation and loss of wildlife habitat and populations caused by linear fractures like highways and the loss of habitat and connectivity associated with houses and other developments -- is a common threat to wildlife worldwide. Highways, private land development, and highly modified or used public lands can lead to the isolation of wildlife habitats and populations, loss of habitat and eventually reduced viability or loss of wildlife. The best habitats are those with little or no human induced fragmentation. For wide-ranging species like elk, moose, forest carnivores and large carnivores, the development of valley bottoms and some uplands has already had effects on connectivity between the largest and best habitats, such as the Greater Yellowstone Area (GYA), the Northern Continental Divide (NCDE), the Selway-Bitterroot (SB), and the Cabinet-Yaak-Selkirk Mountains (CY/S). Grizzly bear and other wildlife habitat north of the U.S. border in Canada suffer from similar human-caused habitat fragmentation and loss. Maintaining or restoring wildlife linkage habitat is critical to the natural functioning of healthy grizzly bear, carnivores, and other wildlife populations.

The last term in the phrase wildlife linkage habitat is “habitat.” It is often not clear to many that the linkages are “habitat.” Functionally, these are areas where wildlife live and exist in. They are not “travel corridors,” an anthropomorphic concept of narrow paths that wildlife use like humans traveling on highways, moving directly from point A to point B. Wildlife linkage habitat is used by species year-round or seasonally as a portion of their home range, or, it may be natural land features used for movement and dispersal. Effective use would include back-and-forth movement by wildlife on a regular basis, as well as dispersal.

Thinking Like a Mountain

Aldo Leopold once said that people need to begin “thinking like a mountain.” What was implied is that society should become more aware of and sensitive to the effects of people’s activities on nature and ecological processes. If wildlife is to continue to exist in functional ecological communities, people must learn to appreciate the concepts of habitat connectivity. Wildlife habitat connectivity is affected by many human activities including highway development, private and public land management practices, open space policies, subdivision policies, road access and densities, and many other factors. The effectiveness of wildlife habitat connectivity relies on citizens, local, county, state and federal government, private and corporate landowners and conservation groups acting with awareness about how their actions affect wildlife. Many decisions are permanent and irreversible, and prevention of problems will be far more effective and less costly than trying to restore wildlife linkage habitat. Our current options for maintaining wildlife linkage habitat are limited by past developments and decisions, and we should not lose future options carelessly.

Connecting the Dots and Blocks

A variety of linkage proposals was shared with the Wildlife Linkage Habitat work-group. These include alternatives prepared by conservation groups, such as American Wildlands (Dr. Lance Craighead), the US Fish and Wildlife Service (Dr. Chris Servheen), two from the USDA Forest Service (Ruediger, Claar, and Gore and Dr. Fred Samson), and the Alliance for the Northern Rockies. What all these proposals had in common was a matrix where the “big patches” (Greater Yellowstone Area, Northern Continental Divide, Cabinet Mountains-Yaak-Selkirk Mountains and Selway-Bitterroot Mountains) are linked together using the “little patches” (roadless areas, Forest Service lands, minimally developed private lands). There are remarkable similarities between all alternatives, primarily because all consider the importance of connecting the “big patches” and also because the number of feasible options is limited.

The four common denominators to all proposals were:

1. Management of public lands as the primary core areas.
2. Permeability of highways (wildlife crossings).
3. Maintaining private lands in a rural condition.
4. Connection of the four major grizzly bear ecosystems: GYA, S/B, C/Y/S and NCD.

A Consolidated Wildlife Linkage Habitat Proposal For IGBC

After reviewing the wildlife linkage habitat area proposals shared at the May, Dillon, Montana, meeting, a small group of people met in Missoula to review these and draft a consolidated wildlife linkage habitat proposal. This meeting was held on August 10, 2000, and was attended by Ken Wall (Geo Data Services), Mary Maj (Rocky Mountain Elk Foundation), Jay Gore (USDA Forest Service), Jim Claar (USDA Forest Service), and Bill Ruediger (USDA Forest Service). Several attempts were made at having greater representation of all involved to develop a draft proposal, but people were apparently too busy.

In addition to the information on wildlife linkage habitat obtained from participants at the Dillon, Montana, meeting, Dr. Rolly Redmond, from the Spatial Analysis Lab in Missoula composed a map from a number of satellite images. This map (figure1), which is color infrared, provided an excellent view of the Northern Rocky Mountain area – including various terrain and vegetation features. Dr. Chris Servheen had used a similar map in delineating his wildlife linkage habitat proposal. It became evident using the color infrared map that several viable linkage habitats existed that had not been identified by other efforts.

The draft consolidated wildlife linkage habitat map consisted of all the proposals provided – plus a few linkage habitats not identified previously. This map was digitized and provided to the work-committee chairs as the first working draft of a consolidated approach. It was also shared with as many of the Boise and Dillon attendees as we could get it to. The wildlife linkage habitat map was presented to the IGBC and the Linkage Zone Sub-Committee Chairs (Jack Blackwell, US Forest Service, and Steve Huffaker, Idaho Department of Fish and Game) for comments and further direction. As mentioned previously, the intent was to continue to have the draft wildlife linkage habitat map reviewed by as many involved individuals, agencies, and organizations as time would allow.

Setting Priorities

There is a variety of ways that priority setting can be achieved. Establishing priorities is important because it is not possible to work on all areas simultaneously, and some opportunities existing today could be lost quickly. The most important factors for priority setting recommended at the Dillon, MT, meeting included:

1. Areas used by multiple species.
2. Fracture zones between the larger core areas that may be most important.
3. Areas animals currently use and exist in. It is better to maintain an existing linkage habitat than to restore one.
4. Ensure the smaller "stepping stones" such as core habitats, roadless areas and areas of low human population are maintained and connected.
5. Focus effort on high-risk situations such as highway upgrades, land sales in important linkage habitat and subdivisions as well as areas planned for future highway development.
6. Areas where obstacles to animals already exist (4-lane highways and highways with high traffic densities).
7. Areas where "social tolerance" by humans has been established. This is particularly important for large carnivores like grizzly bears and wolves.

Recommended Factors To Be Considered When Identifying Wildlife Linkage Habitat

1. It is important to look at wildlife linkage habitat from three scales -- that is, a hierarchical approach: first, at a landscape or large geographic area scale (figure 1); second, at a linkage zone scale (figure 2); and third, at an individual "crossing site" scale.
2. Landform and topography are important. Mountain passes river bottoms and protruding ridges are often natural migration and movement areas.
3. Vegetation is important. Forested areas are often used the most by wildlife. Vegetation should be maintained as close as possible to highways at crossing sites. Research indicates that animals will seek out areas where clearing distance is minimal. Conversely, animals may not attempt to cross highways where clearing distances are great.
4. The quality of habitat is important. Wildlife is naturally attracted to and will use high quality habitats.
5. Areas with low road density and low levels of human use are important for wildlife security.
6. Areas where the best data are available will be more successful than areas where little or no data are available. Data should be collected for all wildlife linkage habitats.
7. Maintain large, intact blocks of habitat – regardless of ownership patterns.

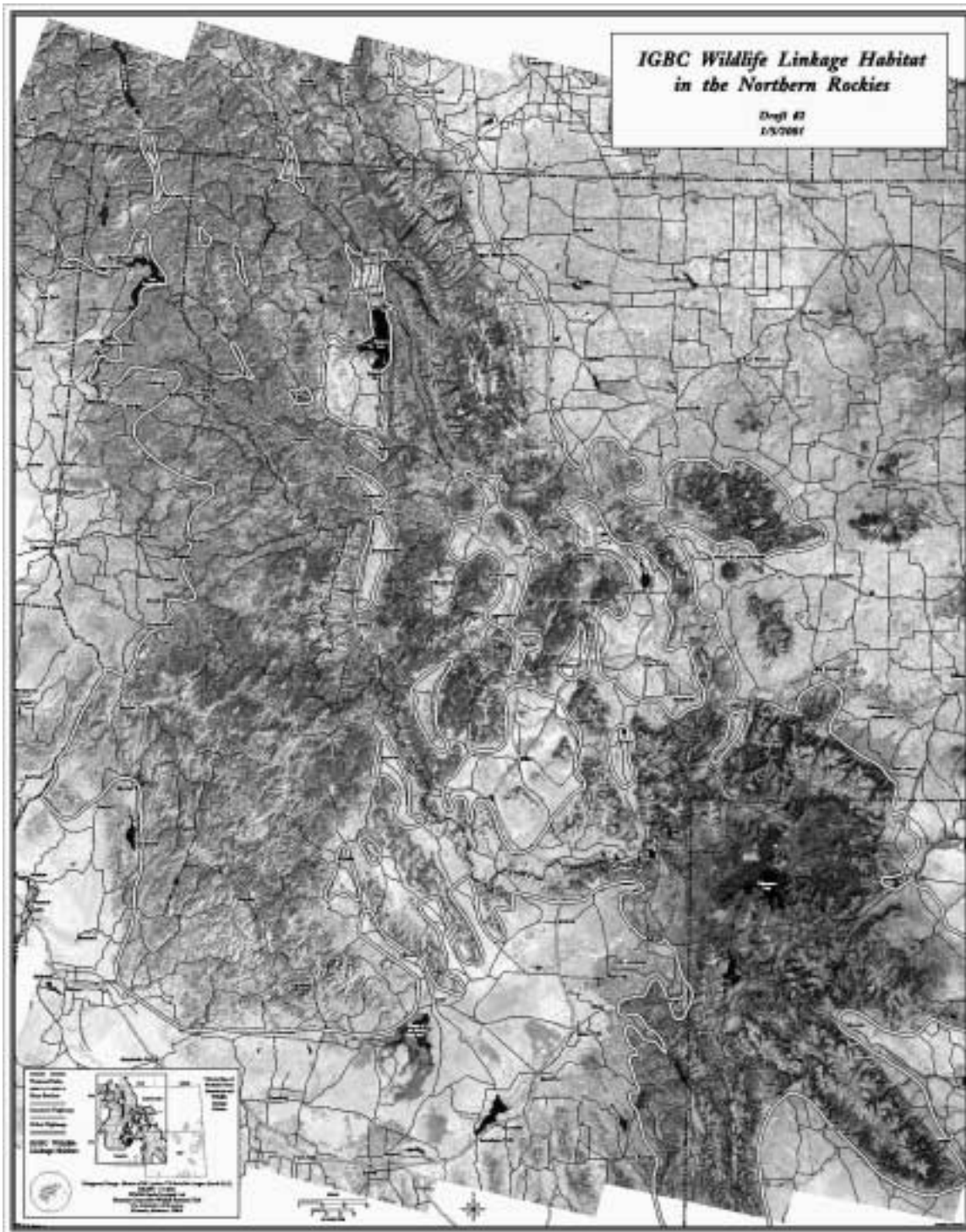


Fig. 1. IGBC Wildlife linkage habitat in the Northern Rockies

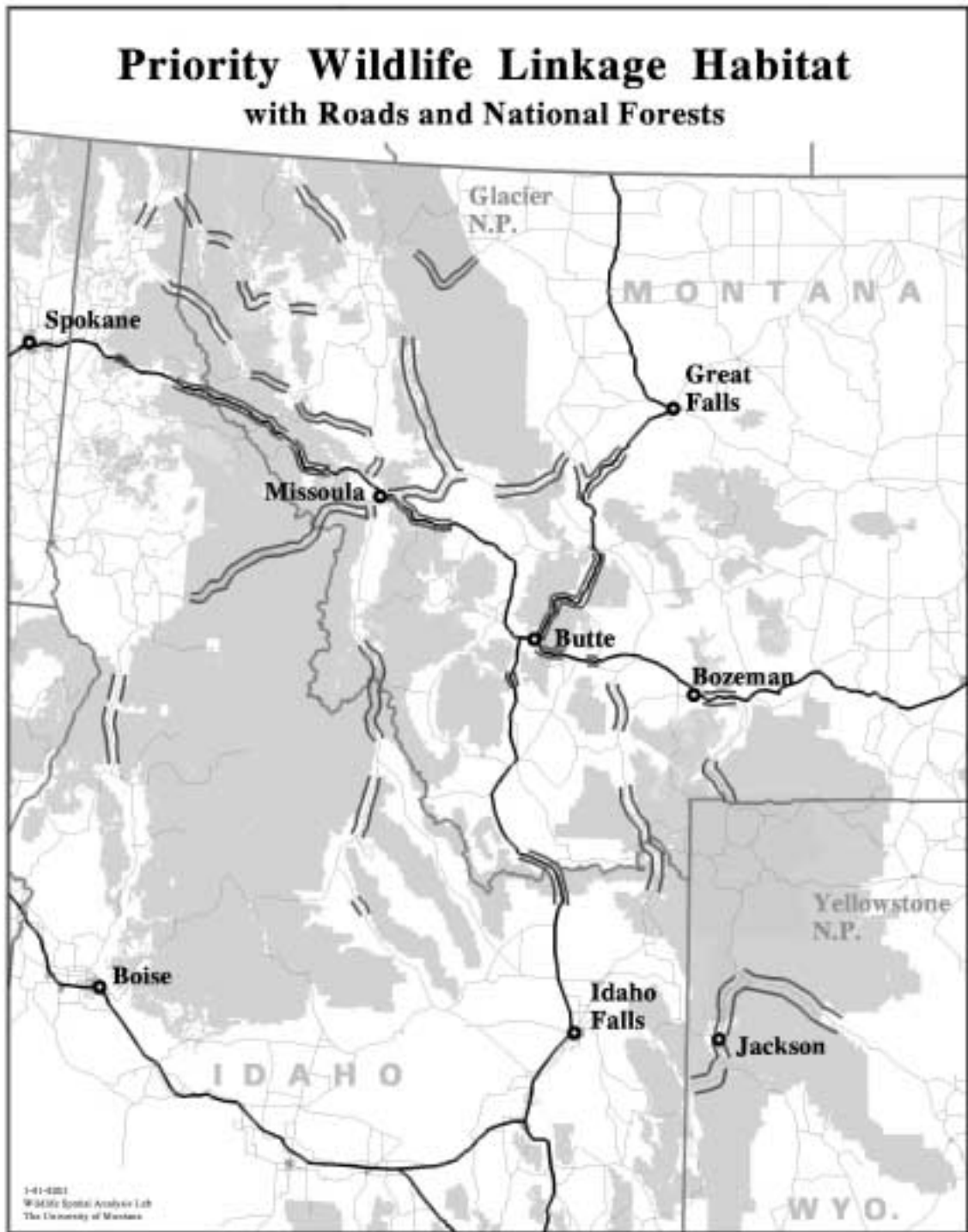


Fig. 2. Priority wildlife linkage habitat with roads and national forests

Priority Wildlife Linkage Habitat

From our work, the following high-priority areas were identified as needing immediate attention:

1. Cabinet-Yaak-Selkirks: McCarthur Lake Corridor (Highway 95), Highway 200, Highway 2.
2. Selway-Bitterroot Mountains: Highway 12 (Lolo Pass), Lookout Pass and I-90, Lost Trail Pass vicinity and Highway 93, Highway 95 McCall to Whitebird Junction.
3. Northern Continental Divide: Swan Valley, Highway 2, Highway 93 (Evaro Hill, Ravalli Canyon and Whitefish to Eureka), I-15 north from Helena, Trans-Canada Highway, Crow's Nest Pass (Canada).
4. Greater Yellowstone Area: Monida Pass and I-15, Bozeman Pass and I-90, movement across the Madison Valley, Moran Junction to Dubois, Idaho, Alpine, WY to Moran Junction (Hwy 89), Highway 20 from Centennial Mountains. to Targhee Pass, Highway 87 from Targhee Pass to Junction with 287, Gardner to Yankee Jim Canyon (Hwy 89).

Organizations Interested or Involved in Wildlife Linkage Habitat

One of the first observations to come from the Boise and Dillon meetings was that many organizations were already working on proposals for key wildlife habitat acquisition and conservation easements, defining wildlife linkage habitat, working with private landowners to maintain important wildlife habitat (including linkages), meeting with each other, and identifying other important work related to this effort.

The partial list of these organizations includes the following:

1. American Wildlands
2. Kendall Foundation
3. Rocky Mountain Elk Foundation
4. Turner Endangered Species Fund
5. Northern Rockies Conservation Cooperative
6. Geo Data
7. Craighead Environmental Research Institute
8. Greater Yellowstone Coalition
9. Sierra Club Grizzly Bear Ecology Project
10. National Wildlife Federation
11. Defenders of Wildlife
12. Trust for Public Lands
13. Nature Conservancy
14. Alliance of the Rockies
15. Northwest Connections
16. Great Bear Foundation
17. Montana Fish, Wildlife and Parks
18. Idaho Department of Fish and Game
19. Montana Department of Transportation
20. Idaho Department of Transportation
21. University of Montana: Spatial Analysis Lab
22. Federal Highways Administration
23. USDI Fish and Wildlife Service
24. USDA Forest Service
25. USDI Bureau of Land Management

Building Ownership and Communications

Communications and ownership building were identified as important to successfully identifying and implementing wildlife linkage habitat. At the meeting in Dillon, the group identified recommended ways to help maintain and foster communications:

1. IGBC website with linkage hotlink to "Critter Crossings (Federal Highway Administration), American Wildlands and Canada (site unknown).
2. Add hotlinks on State Fish and Wildlife Department (ID, MT and WY), Forest Service, Fish and Wildlife Service and all cooperator websites to IGBC Wildlife Linkage Habitat website.
3. Establish email lists.
4. Repeat meetings like those at Boise and Dillon in Helena, Coeur d' Alene, and Wyoming (Jackson Hole).

5. Provide presentations and training at the International Conference on Ecology and Transportation, state and section Wildlife Society meetings, state and federal agency wildlife biologist meetings, and transportation planners meetings.

Another important factor in building ownership is to ensure that local people who live and work in the wildlife linkage habitat are involved in decisions and plans. This includes how public lands are managed and private lands. In many of the most critical wildlife linkage habitats, tolerance of grizzly bear, wolves, and other wildlife by local people is perhaps the most important factor in conserving them. Often, local rural people have the best knowledge of wildlife crossings and other important information. Agencies should ensure that local people are queried for important information, as well as being involved in planning, locating wildlife crossings, and being engaged in ownership and easement issues.

IGBC Actions

The importance of habitat linkage was discussed at the March and July, 2001, IGBC meetings. To aid implementation of linkage action on the ground, the following items are being put into place for IGBC and subcommittee use and action:

1. Highway/Transportation Management Task Force
2. Public Lands Task Force; this group will also coordinate private land concerns.
3. IGBC "Letter of Support" of Linkage zones. At the July meeting, the IGBC member agencies signed a letter jointly approving work on habitat linkage and explaining importance and priority of habitat linkage for grizzly bear and other carnivore conservation.

Conclusion

The Interagency Grizzly Bear Committee has determined that identification and management of wildlife linkage habitat is important to grizzly bears and other wildlife species. At the Jackson meeting an ad hoc committee was assigned to follow up on the resolution to begin exploring the interest and issues involved. Mr. Steve Huffaker and Mr. Jack Blackwell were assigned leads for IGBC. Linkage management was further discussed and acted upon at the March and July, 2001, IGBC meetings. Based on the attendance at the Boise and Dillon coordination meetings, and level of discussions at IGBC meetings, interest in managing wildlife habitat linkage is high from state and federal agencies, conservation groups, and individuals. The outcome of these meetings was the recommendations contained in this paper and the wildlife linkage habitat maps. It is gratifying to see so many people and agencies come together and work together. The quality of the products speaks to this cooperation and interest.

Biographical Sketch: James J. Claar is the carnivore program leader for the Northern Region, US Forest Service, in Missoula, Montana. Jim is particularly interested in the conservation biology of forest carnivores, such as grizzly bears, wolves, Canada lynx, wolverine, and fisher at geographic/landscape scale levels. Habitat management coordination and wildlife linkage zone delineation are a part of his current assignment. Jim serves as the national coordinator for Canada lynx and wolverine conservation programs in the Forest Service.

Reference

Wilcox, B.A. and D.D. Murphy. 1985. Conservation strategy: the effects of fragmentation on extinction. American Naturalist 125: 879-887.