APPENDIX A

Avimor Conservation Director (ACD)
Potential Conservation and Education Activities

This appendix identifies miscellaneous conservation and education activities that the Avimor Conservation Director could undertake. It is used only as an example, with the primary emphasis of the position being associated with the implementation and management of the HMP.

Tasks	Description of Task
Conservation Education	Coordinate and facilitate: • Neighborhood Ed. Program • Local Schools Ed. Program • Educational Videos and Manuals • Newsletter • Website • Interpretive sign information • And others as needed or identified

Conservation Education

Conservation education activities would be a supplementary priority for the Avimor Conservation Director. The highest level of beneficial impacts regarding wildlife may result from an increased public understanding and knowledge of wildlife in the area, and how human presence and disturbance can impact them. Public education can occur through several mechanisms that range from direct interaction in classrooms to informative websites. This educational effort is designed to improve local awareness of their natural surroundings and to create new patterns of behavior towards the open areas in the community and surrounding foothills. This education could include infom1ation about the environment and practices that will benefit it; with some integration of education that takes place outdoors in the environment surrounding the proposed AD. If these approaches are successful, learning individuals could gain some knowledge, understanding, and on the ground experience regarding the foothills and associated plant and wildlife communities. The ultimate end goal would be an enhanced value system or concern that residents and local children would have for these natural places and the wildlife that inhabit them. Potential conservation education responsibilities for the Avimor Conservation Director are outlined below.

Neighborhood Conservation Education

Public education sessions could be made available to all residents living at the proposed AD. Several avenues of inf01mation would be the most effective way of ensuring an understanding and respect of the conservation objectives and management regarding the open spaces surrounding Avimor. Upon purchase of a home at Avimor, buyers should be inforn1ed about seminar/workshop classes, instructed by the Avimor Conservation Director (and

possibly IDFG), which could cover the gambit of conservation issues surrounding the proposed AD. This would be an effective tool illustrating the potential impacts residents have on local wildlife, the reasoning behind the conservation objectives and restrictions, and each resident's individual responsibility while living at the proposed AD.

Other alternative educational possibilities could include an informative homeowner's wildlife video or manual that could be included in a 'welcome package' associated with the initial purchase of a home at Avimor. This could be a collaborative effort with the IDFG or other interested agencies or groups.

Local Schools Conservation Education

The Avimor Conservation Director could develop a school level environmental education program. This program could be incorporated into local school learning through assemblies, field trips, or other mechanisms. The Avimor Conservation Director could visit each local school once annually (minimum) and provide information and resources pertaining to the educational topics covered in Table 1. This effo1t could be achieved cooperatively with local agencies and resources (Idaho Fish and Game, Birds of Prey, Boise State University, Bird Observatory, Park Service, etc.). An alternative may be to present local teachers with information and literature/pamphlets to relay info1mation to their students about conservation issues in the Boise Foothills. A video could also be created and distributed to local schools, which could outline Foothills conservation issues. Volunteering programs could be established through local schools to build up the needed habitat enhancement workforce.

Table 1. Potential Conservation Education Topics

Topic	Description
Raptor Education Program	An overview of raptors of the area and how they use the habitats near the proposed AD.
Foothill Trails Rules and Regulations	Proper Trail Use and Etiquette
Seasonal Trail Closures	Explanation
Wildfire Risks	Discussion of the Fire Risks: -Fire-wise landscaping techniques -Firework Regulations -Outdoor Fire Safety -Off-Road Driving consequences -Motorized Recreation Risks
Habitat Enhancement Projects	Description and Volunteering
Pets	Regulations, Rules, and Risks to Wildlife
Wildlife and Neighborhood Interaction	Info about skunks, deer, ground squirrels, etc.

Took	Description
Homeowners Wildlife Manual	• Definition of Habitat.
	• Description of the habitat types and wildlife surrounding the proposed APC.
	• Encouragement to use native vegetation for landscaping and decoration.
	• Encouragement to provide alternative nest sites for wildlife.
	• Ways to provide alternative water sources for wildlife
	• Discussion about feeding wildlife (good and bad)
	• Suggestions for feeding songbirds properly and information about attracting other species inadvertently.
	• Advise about dealing with different species of wildlife that will enter the neighborhood.
	• Advise about wildlife viewing
	• A list of suggested reading material and field guides relating to the above topics
	• List of local native plant and seed sources
	A copy of "Landscaping with Native Plants," a BLM publication.

Avimor Conservation Website

The Avimor Conservation Director could design and organize a comprehensive website for the AD dedicated to informing residents and the general public about conservation issues relating to the Boise Foothills adjacent to the proposed AD. The actual creation of the website could likely be contracted to a webpage professional. This info1mation could also be provided through a *'link'* to the main Avimor webpage.

Conservation/Wildlife Newsletter and Email List

A newsletter could be developed by the ACD that will infom1 the residents of the proposed AD about seasonal wildlife and conservation issues in the foothills and other pertinent subjects. It could be released four times per year (four seasons), or more or less as appropriate. The Avimor Conservation Director could maintain a residential email list to

provide the conservation newsletter digitally. The email list can be used to send out seasonal notifications about wildlife and recreation issues. Email can also be used as a communication mechanism between residents and the Avimor Conservation Director to resolve and address any issues, concerns, or questions that residents may have regarding wildlife and conservation.

Interpretive Signs

Informational signage could be strategically placed at various locations throughout the AD. These signs could outline wildlife conservation issues, as well as regulations that pertain to recreation and neighborhood wildlife . Access areas for recreational trails should be a place to utilize interpretive signage regarding wildlife concerns and regulation in the foothills. The Avimor Conservation Director could develop the signs, with feedback from IDFG, Ada County, and other interested parties, then install them at appropriate locations.

Annual Avimor Festival

Each fall the Avimor Conservation Director may be coordinating and implementing habitat restoration and enhancement programs in the foothills and riparian areas. Community residents could be strongly encouraged to participate in restoration, enhancement, and other conservation related activities. Incentives could be a main focus of promoting public participation in these efforts. For legacy purposes, an annual festival in the McLeod's honor could be conducted each year. This festival would celebrate the conservation efforts of the AD, give the community residents a chance to intermingle and meet one another, and provide a setting to communicate conservation issues and goals, while celebrating the ranching history of the McLeod Family and the Boise Valley. A primary focus of the festival would be a display or speaker that highlights the history and legacy of the McLeod Family. Children's activities could be centered on learning what the historic rural way of life entailed. This could be illustrated with interactive activities that would give children a sense of the valley's past. This festival could be coordinated with historical societies, the Foothills Learning center, and various other interested parties.

APPENDIX B

Avimor Development Soils Table

The following is the list of soils, by map unit, found throughout the Avimor Development Area. Soils were delineated using ARC-GIS and broken down based on soil type and individual county soil maps. The total acreage for each soil type, by county, is also included.

Ada County Soil Survey			
Map Unit	Cnt_musym	GIS Acres	Soil Type Name
15	1	12.76	Brent loam, low rainfall, 4 to 8 percent slopes
16	1	2.14	Brent loam, 8 to 12 percent slopes
17	3	38.94	Brent loam, 12 to 30 percent slopes
19	7	121.22	Brent-Ladd loams, 4 to 15 percent slopes
20	15	639.80	Brent-Ladd loams, 15 to 30 percent slopes
21	5	257.74	Brent-Searles complex, 15 to 30 percent slopes
22	5	138.98	Cashmere coarse sandy loam, 0 to 4 percent slopes
63	3	64.53	Gem silty clay loam, 2 to 15 percent slopes
64	5	67.37	Gem-Rock outcrop complex, 5 to 40 percent slopes
65	2	97.40	Goose Creek loam
66	1	129.22	Harpt loam, 0 to 2 percent slopes
67	5	84.21	Harpt loam, 2 to 4 percent slopes
69	2	15.05	Haw-Lankbush complex, 15 to 25 percent slopes
70	2	5.72	Haw-Lankbush complex, 25 to 40 percent slopes
79	1	9.36	Ladd loam, 4 to 15 percent slopes
80	8	457.04	Ladd loam, 15 to 30 percent slopes
81	5	96.15	Ladd loam, 30 to 65 percent slopes
82	5	309.68	Ladd-Ada complex, 15 to 30 percent slopes
83	6	91.94	Ladd-Ada complex, 30 to 60 percent slopes
84	4	197.15	Ladd-Haw loams, 30 to 60 percent slopes
85	1	65.63	Ladd-Searles complex, 4 to 15 percent slopes
86	6	154.72	Ladd-Searles complex, 15 to 30 percent slopes
87	4	131.51	Ladd-Searles complex, 30 to 65 percent slopes
88	7	173.24	Ladd-Van Dusen loams, 30 to 60 percent slopes
89	1	12.41	Lankbush-Brent sandy loams, 4 to 12 percent slopes
90	3	101.70	Lankbush-Brent sandy loams, 12 to 30 percent slopes
91	18	314.83	Lankbush-Brent sandy loams, 30 to 65 percent slopes
93	14	473.09	Lankbush-Ladd complex, 15 to 30 percent slopes
94	12	275.66	Lankbush-Ladd complex, 30 to 60 percent slopes
114	1	7.00	Ola-Searles complex, 30 to 80 percent slopes
150	1	40.56	Quincy-Lankbush complex, 4 to 12 percent slopes

Map Unit	Cnt_musym	GIS Acres	Soil Type Name
151	9	297.46	Quincy-Lankbush complex, 12 to 30 percent slopes
152	18	541.63	Quincy-Lankbush complex, 30 to 80 percent slopes
159	1	118.05	Rubble land
167	6	200.92	Searles-Ladd complex, 4 to 15 percent slopes
168	6	467.87	Searles-Ladd complex, 15 to 30 percent slopes
169	2	119.47	Searles-Ladd complex, 30 to 65 percent slopes
171	3	84.46	Searles-Rock outcrop complex, 30 to 80 percent slopes
197	1	23.58	Van Dusen-Payette complex, 30 to 65 percent slopes
Total Area (Acres)		**6,416.61**	

Gem County soil survey			
Map Unit	**Cnt_musym**	**GIS Acres**	**Soil Type Name**
BaE	1	11.78	Bakeoven and lickskillet extremely rocky soils, 0 to 30 percent slopes
BgA	1	37.57	Bissell loam, 0 to 1 percent slopes
BrE	1	2.44	Brownlee coarse sandy loam, 12 to 30 percent slopes
BtF	3	124.32	Brownlee and ola rocky soils, 30 to 60 percent slopes
BuE	1	10.44	Brownlee and rainey soils, 12 to 30 percent slopes
Cn	1	5.95	Chance fine sandy loam
Doc	13	453.41	Dishner extremely stony loam, 0 to 12 percent slopes
FfA	1	9.88	Falk fine sandy loam, deep, 0 to 1 percent slopes
GmE	2	147.33	Gem extremely stony clay loam, 0 to 30 percent slopes
GnE	1	5.19	Gem and bakeoven extremely stony soils, 0 to 30 percent slopes
HrD	2	145.12	Harpt loam, 7 to 12 percent slopes
HrE	1	15.93	Harpt loam, 12 to 30 percent slopes
HwC	1	17.79	Haw loam, 3 to 7 percent slopes
HwD	2	43.88	Haw loam, 7 to 12 percent slopes
HwE	15	354.51	Haw loam, 12 to 30 percent slopes
HxE	3	99.25	Haw extremely stony loam, 12 to 30 percent slopes
LyE	1	39.25	Lolalita coarse sandy loam, 12 to 30 percent slopes
LyF	9	179.81	Lolalita coarse sandy loam, 30 to 60 percent slopes
MfD	3	72.71	Montour clay loam, 7 to 12 percent slopes
MfE	9	242.93	Montour clay loam, 12 to 30 percent slopes
NcD	1	19.37	Newell clay loam, 7 to 12 percent slopes
PaE	4	42.47	Payette coarse sandy loam, 0 to 30 percent slopes
PaF	18	190.06	Payette coarse sandy loam, 30 to 60 percent slopes
PaG	1	6.72	Payette coarse sandy loam, 60 to 75 percent slopes
PgF	3	102.85	Payette very stony soils, 30 to 60 percent slopes
PmE	4	61.46	Perla stony loam, 12 to 30 percent slopes
PnE	10	1323.57	Perla extremely stony loam, 12 to 30 percent slopes
PnF	15	739.39	Perla extremely stony loam, 30 to 60 percent slopes
PpE	2	23.99	Perla and payette extremely stony soils, 12 to 30 percent slopes
PpF	1	11.46	Perla and payette extremely stony soils, 30 to 60 percent slopes
QcA	1	16.03	Quenzer silty clay, 0 to 1 percent slopes
RaE	2	9.25	Rainey coarse sandy loam, 12 to 30 percent slopes
RcF	7	162..88	Rainey rocky sandy loam, 30 to 60 percent slopes
VdF	7	130.13	Van Dusen loam, 30 to 60 percent slopes
VdG	1	0.99	Van Dusen loam, 60 to 75 percent slopes
VnF	11	304.96	Van Dusen stony loam, 30 to 60 percent slopes-
W	1	0.19	Water

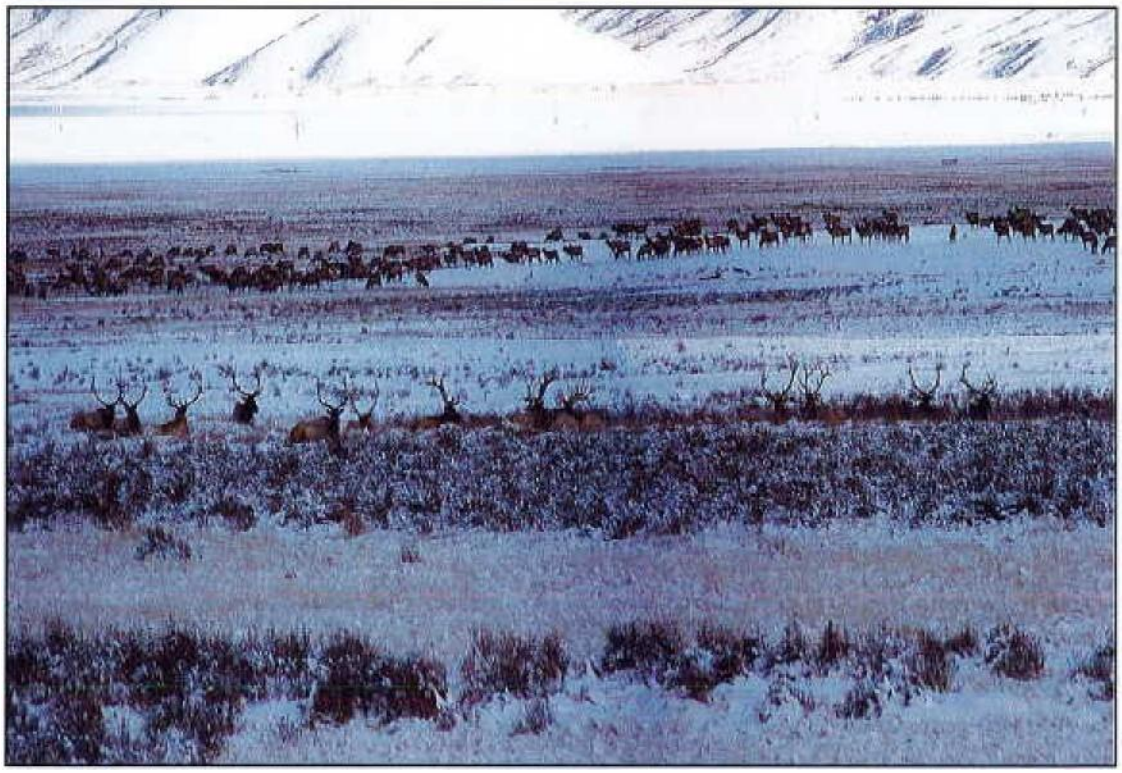
Total Area (Acres)	15,165.26		
Boise County soil survey			
Map Unit	**Cnt_musym**	**GIS Acres**	**Soil Type Name**
223	1	19.52	Staircase sandy loam, dry, 1 to 4 percent slopes
227	1	0.34	Piercepark loam, 2 to 4 percent slopes
230	1	25.62	Hann-Doubledia complex, 2 to 15 percent slopes
238	1	31.60	Adaboi silt loam, 1 to 4 percent slopes
240	3	116.86	Collister-Flofeather complex, 1 to 3 percent slopes
301	5	82.65	Breadloaf-Doubledia complex, 4 to 15 percent slopes
302	5	820.70	Breadloaf-Doubledia-Hann complex, 15 to 50 percent slopes
303	5	413.94	Doubledia-Hann-Breadloaf complex, 15 to 50 percent slopes
305	2	264.68	Siphonlake-Solarview complex, 35 to 65 percent slopes
306	6	93.89	Van Dusen-Siphonlake complex, 35 to 65 percent slopes
307	4	123.98	Adaboi-Meclo complex, 4 to 15 percent slopes
311	3	367.10	Meclo-Crawley-Adaboi complex, 15 to 50 percent slopes
506	3	41.47	Brownlee-Robbscreek-Whisk complex, 8 to 35 percent slopes
513	1	0.39	Shimo-Cartwright-Robbscreek complex, 35 to 90 percent slopes
525	11	2371.51	Robbscreek-Dobson-Brownlee complex, 25 to 65 percent slopes
526	30	1244.68	Cartwright-Brownlee-Robbscreek complex, 25 to 65 percent slopes
527	24	492.17	Dobson-Roney complex, 35 to 90 percent slopes
533	1	4.70	Olaton-Roney complex, 35 to 90 percent slopes
534	1	12.68	Shimo-Kisky-Schiller complex, 35 to 90 percent slopes
600	1	15.10	McDesh-Immig-Gwin complex, 4 to 25 percent slopes
601	3	213.30	Hann-Gwin-Shafer complex, 2 to 25 percent slopes
602	2	62.42	Hillcreek-Hovelton-Hann complex, 25 to 65 percent slopes
606	1	30.00	Hillcreek-Hovelton complex, 35 to 65 percent slopes
610	2	81.79	Hovelton-Duco-McDesh complex, 25 to 65 percent slopes
641	1	25.44	Aradaran-Yad complex, 4 to 15 percent slopes
Total Area (Acres)		**6,956.53**	

APPENDIX C

Northwest Ada County Big Game Survey Summary

&

Northwest Ada County Wildlife Crossing Assessment



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Missoula, Montana

2009

Author's Biography (Charles Baun)

NW Ada County Big Game Survey Summmy-2009

Charles Baun is a native of Ada County and President/owner of Environmental Conservation Services, Inc., a small consulting firm in Boise, Idaho specializing in environmental planning and ecological surveys/reports. He received his Masters Degree in Natural Resource Management (Disturbance Ecology emphasis) from the University of Idaho in 2001 and his

B.S. in Biology (Ecology emphasis) from the College of Idaho in 1998. Mr. Baun has over 15 years of academic and work-related experience with natural resource management and planning, almost exclusively in Southwestern Idaho, and has been the lead or assisted in preparing and authoring environmental reports for federal/state agencies and private industry including, but not limited to: BLM, USFWS, USFS, IDFG, IDL, ITO, DOD, PERC, various engineering and development groups; and a number of private conservation organizations.

Mr. Baun specializes in interdisciplinary collaboration, public involvement, and the ecology of the Great Basin and Columbia Plateau. In the past he has been primarily associated with projects in Idaho related to: wildlife and botanical inventories and mapping, including special status species; environmental planning and documentation, including 13 Wildlife Mitigation Plans in Ada, Canyon, and Elmore Counties; transportation; wind energy; land use data collection and analysis; and regulatory compliance including but not limited to: NEPA, ESA, CWA, CAA, FLPMA, NHPA, MBTA. Mr. Baun has been doing annual botanical and wildlife surveys, as well as recreational planning over much of the area identified in the report for the last six years.

Author's Biography (Bill Ruediger)

NW Ada County Wildlife Crossing Assessment-2009

Bill Ruediger is a wildlife biologist and operates his own transportation/wildlife consulting business called Wildlife Consulting Resources (WCR). Bill has worked with numerous State Departments of Transportation on wildlife habitat linkage analysis and designing effective wildlife crossings. Some of the DOT's Bill has worked with include Alaska, Arizona, California, Colorado, Florida, Idaho, Montana, New Mexico, New York, Oregon, Utah and Wyoming. He has also worked with agencies or groups in Canada, Europe and Africa on wildlife crossings and transportation issues.

Bill has authored or co-authored over 30 published papers on wildlife, carnivores, fish and/or highways. Bill has received over twenty Forest Service and interagency awards including the Chiefs Award for Excellence in Endangered Species Management and the Forest Service/ELM Combined Award for Best Project of the Year (2000 - Lynx Conservation Assessment and Strategy). In April 2005 he received "Environmental Leadership Award" from FHWA, the first time this award has been presented to a non-transportation agency person. He has a BS in wildlife management from Utah State University and a Master's degree in Forestry from University of Idaho.

Bill retired in December 2005 after 35 years with the US Forest Service. Bill's last position was that of Ecology Program Leader for Highways, a National level position. In this position, Bill worked throughout the US and in other countries on trouble-shooting difficult highway projects with wildlife and fish coordination issues, helping states organize and establish wildlife habitat linkage programs, developing processes to assess and mitigate wildlife and fish habitat with roads and highways and worked with State DOT's on wildlife crossings. He also was a founder and chairperson of the Western Forest Carnivore Committee and a co-founder of the International Conference on Ecology and Transp01iation.

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I would like to thank those that were instrumental in the development of this big game summary and supplemental wildlife crossing rep01i, as well as those that supplied insight, data, observations, opinions, and comments. These include: the Ada County Commissioners-Fred Tilman, Sharon Ullman, and Rick Yzaguirre; SunCor Idaho Inc.; M3 Eagle LLC; Bill Ruediger (Wildlife Consulting Resources); Greg Burak, Rick Ward, Eric Leitzinger, Bill London, Jon Rachael, and Kevin Warner (IDFG Biologists); Kim Just, Scott Rudel, and their staff (ITD Biologist); Greg Johnston, Dan Bryant, Paul Stanley, and their staff (ITD District 3 Maintenance); Kelly Campbell (ITD Research Analyst); Lynn Nowotny (Silverhawk Aviation Academy); John Ringert (Kittelson & Associates, Inc.); Kavi Koleini (URS); Sandy McLeod and Jerry Thompson (McLeod Farm); Sabrina Bowman and Craig Herndon (ACHD Pla1111ers); the 16 residents that filled out the north Eagle survey form; Brandt Elwell (TRS Range Services); and the ECS staff (Kenn Hardin, Danielle Maguire, and Hilary Heist).

Disclosure

These reports were developed as reference documents only, with the intent of educating the public on big game in the region, and the issue of transportation and wildlife crossings as it relates to big game. This is a living document and can change in the future based on additional information. It should also be clear to the reader that this report is not meant to endorse or discourage any specific projects. It was funded by the Ada County Board of Commissioners, SunCor Idaho Inc. and M3 Eagle LLC, with support from the City of Eagle and the Ada County Parks and Waterways.

Northwest Ada County Big Game Survey Summary-2009

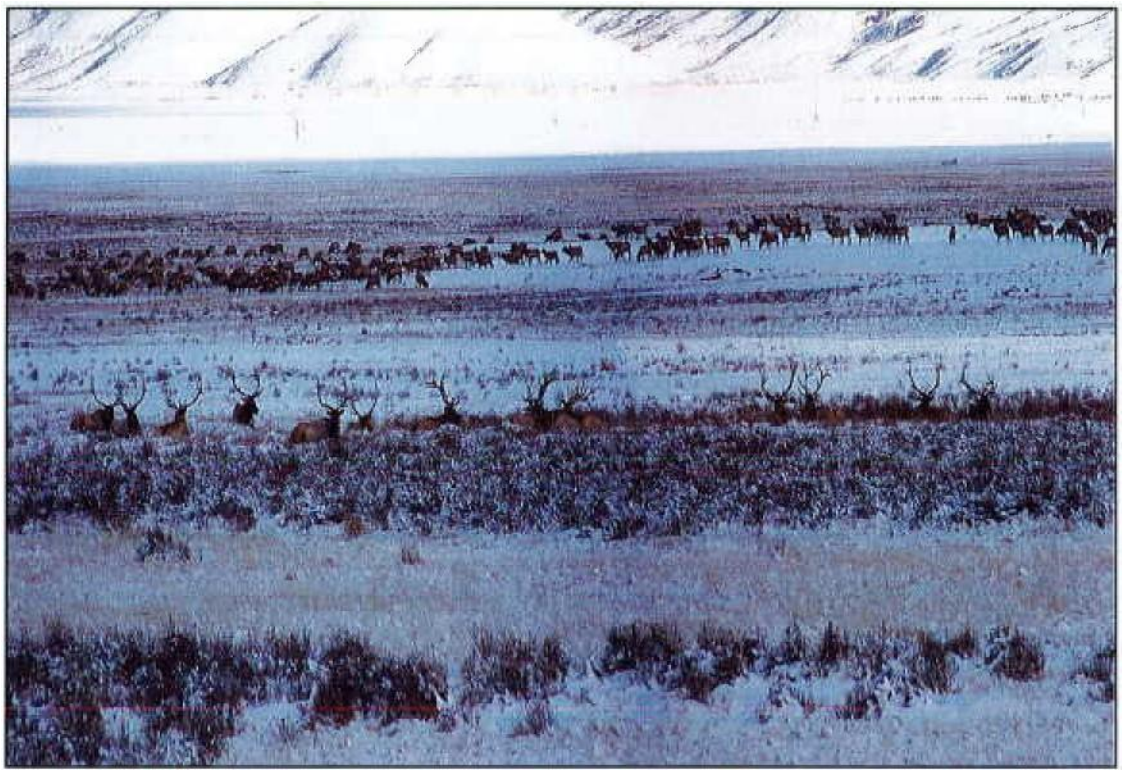


Table of Contents-NW Ada County Big Game Survey Summary

1.0 Introduction

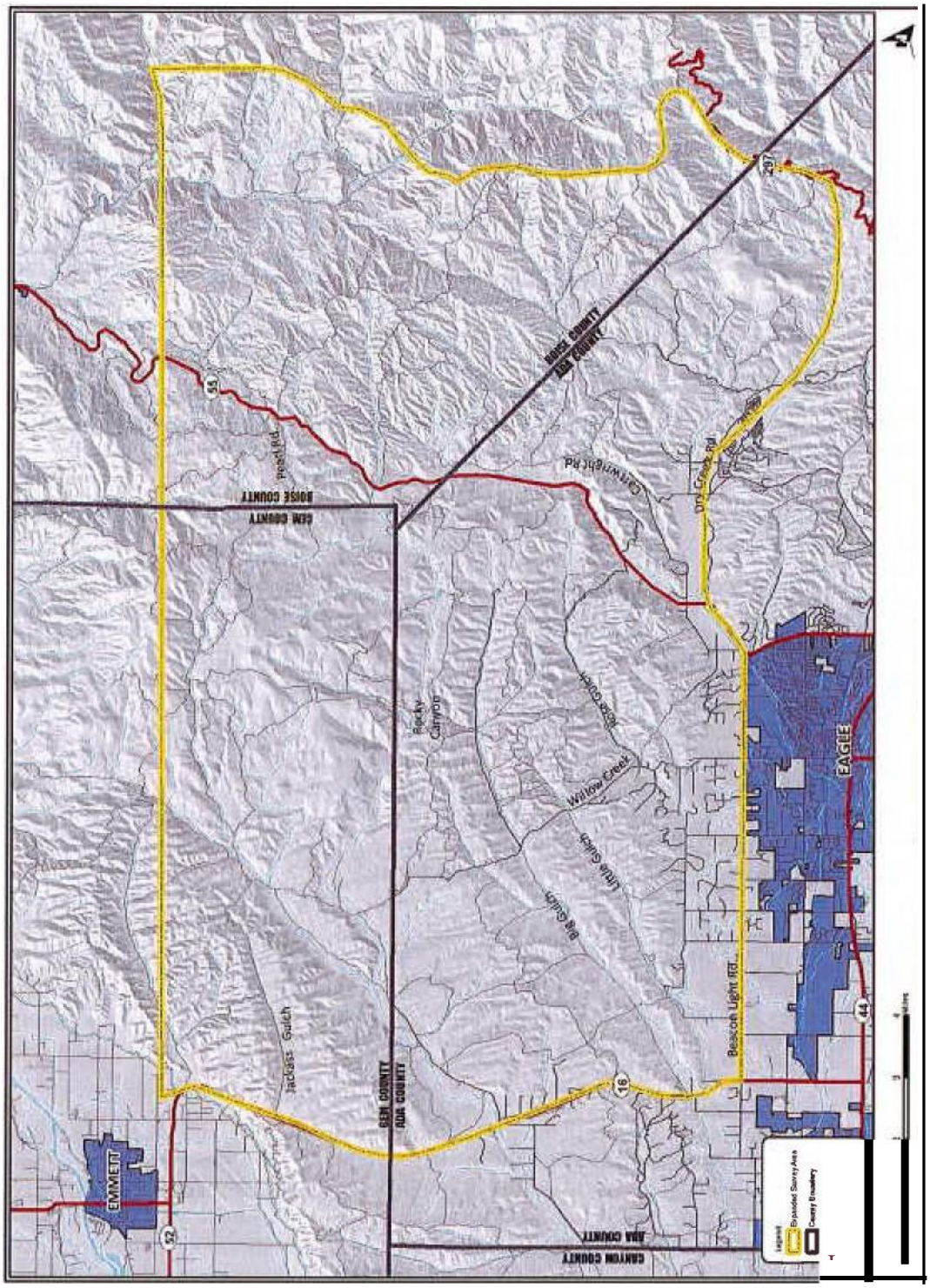
As the population of the Treasure Valley expands and grows into more rural areas, the need to reduce impacts on wildlife and their habitat is becoming an increasing priority for land use planners. Therefore, an understanding of how, when, and where wildlife use habitat, as well as their interaction with existing human uses (agriculture, recreation, development, transportation, etc.) can assist planners and developers in avoiding, reducing, or mitigating current and potential impacts by incorporating wildlife use and movement patterns into their development designs and long-term planning. At the same time, we can identify existing planning inadequacies and try to correct those with future planning.

Beginning in 2003, site surveys were conducted by Environmental Conservation Services Inc. (ECS) within the Suncor ownership near State Highway (SH)-55 to identify and inventory the existing type and condition of plant communities and associated wildlife, including the presence and distribution of big game. In 2007, ECS planned and designed, with assistance from the Idaho Department of Fish and Game (IDFG) and other professional biologists, an area wide inventory of big game winter usage and movement patterns in the n01thwest p01tion of Ada County, southeast portion of Gem County, and southwest po1tion of Boise County associated with game management unit (GMU) 39 and GMU 32. Data collected from residential, ground, and aerial surveys conducted by ECS in 2007 and 2008 were combined with the nonspecific survey data collected between 2003 and 2006, and all IDFG big gamedata available.

In 2009 the survey area was expanded to include all private and public lands within the n01them portion of the proposed City of Eagle Impact Area, as identified in the 2007 City of Eagle Amended Comprehensive Plan, as well as adjacent lands in Ada, Boise, and Gem Counties (Map 1). The expanded survey area, in conjunction with data, observations and input from ECS biologists, the IDFG, and the Idaho Transportation Department (ITD), is intended to describe the general demographics of big game populations in the region, including species composition, use and distribution patterns, migration corridors, and auto- related mortality patterns associated with SH-16 and SH-55.

In addition to the 2009 survey, ECS biologists worked with national wildlife crossing expert Bill Ruediger, of Wildlife Consulting Resources, to develop a wildlife crossing reference for the region. The report outlines: potential wildlife crossing locations associated with SH-16, SH-55, and the Ada County Highway District (ACHD) proposed collectors and aite1ials between; the recommended type(s) and associated guidelines for those crossings; and general discussion for each location.

While a considerable amount of data and personal/agency observations were included in this document, knowledge is, and always will be, incomplete regarding the interrelationships between wildlife and human uses. Therefore, it should be made clear to the reader that this is a reference document only and is not intended to advocate or discourage specific actions or assess the impacts to wildlife associated with existing or proposed transportation corridors, which is under jurisdiction of the IDFG, ITD, and the ACHD.



Map **1:** Project Area.

2.0 Existing Conditions

The project area (Map 1) includes parts of northwestern Ada County, southwestern Boise County, and southeastern Gem County, Idaho. The total project area is approximately 100,000-acres, with Beacon Light and Dry Creek/Cartwright Roads as the southern border, SH-16 the western border, Bogus Basin Road north along the forest line as the eastern border, and the northern border as the first aerial survey line between the northeastern most point and the city of Emmet. The area is bisected by SH-55, north of Dry Creek Road (mile post (MP) 47.4), to Pearl Road (MP 57.7). Elevation ranges between 2,600-feet (ft) and 5,600-ft above mean sea level.

General climate conditions in the area can be described as cold, moist winters, and hot dry summers. Average precipitation varies greatly depending on elevation and location, with the wettest portions of the project area in the northeast, getting dry further west and south. November through February is typically the wettest months, while June through August is the driest (Western Regional Climate Center 2007). Temperatures for the area vary seasonally and, according to the National Oceanic and Atmospheric Administration (NOAA) website (2008), have been as cold as -25 °F in winter 1990 and as hot as 111 °F in summer 1960.

The project area transitions from mountain forests/woodlands and high-elevation shrublands in the east, to rolling hills and large connected flatlands dominated by expansive grasslands and isolated pockets of xeric shrublands in the west (Map 2). An expanded description of the vegetative communities is found in Appendix B. The primary human uses in the area include, but are not limited to: crop production, some timber production, ranching, residential development, recreation; and transportation. Historic human use of the area has directly (agriculture, development, etc.) or indirectly (invasive and noxious weeds, increased wildfires, etc.) altered the community dynamics (interaction between soils, hydrology, vegetation, wildlife, and disturbances) of a considerable portion of the project area.

In general, the land to the east of SH-55 has better overall quality habitat for a greater number of wildlife species, including big game, based on higher levels of precipitation; the diversity of vegetative communities (habitat) present; the amount and connectivity of native plant communities; the availability of water; and the limited amount of human disturbance. The topography of the project area ranges from nearly flat near the highway and valley bottoms (Spring Valley and Dry Creek Valley) to moderately and severely steep slopes toward the northern and eastern border. Key features include, but are not limited to: Cartwright Canyon, Stack Rock, Dry Creek, Currant Creek, Daniels Creek, McFarland Creek, Spring Valley Creek, Cartwright Canyon, Shafer Creek, Cottonwood Creek, and their tributaries.

In comparison, the eastern portion of the project area, those lands west of SH-55, have considerably less quality habitat, and support fewer overall species, both type and number, including big game. This is primarily due to reduced precipitation, more homogenous vegetative communities, a lower percentage of native vegetation, and a greater amount of human disturbance. The area is generally characterized by rolling hills and flatlands, and is significantly less constrained by topography, i.e. greater percentage of flatlands. Residual sagebrush and bitterbrush communities are found scattered throughout the area; however, due to historic human uses, establishment and spread of invasive and noxious weeds, and

increased number and size of wildfires in the area, these are generally isolated pockets. Key features include, but are not limited to: Rocky Canyon, Jack Ass Gulch, Big Gulch, Little Gulch, Rose Gulch, Spring Valley Creek, Willow Creek, Sand Hollow Creek, Dry Creek, and their tributaries.

The data and observations used to make the conclusions above are based on six years of botanical and wildlife surveys (ground and aerial) conducted by ECS and URS staff between 2003 and 2009 (Baun, English, and MacDaniels 2003; Baun et al. 2004; Baun et al. 2005; Baun 2006; Baun et al. 2007; Baun et al. 2008; URS 2006; and URS 2008). Community classification and conditions were based on the methods identified below. In addition to site-specific survey data, the conclusions were also based on the data compiled by the Open Space Committee associated with the 2007 Amended Eagle Comprehensive Plan. Professional observations by the author, based on six years of site reconnaissance, were also used.

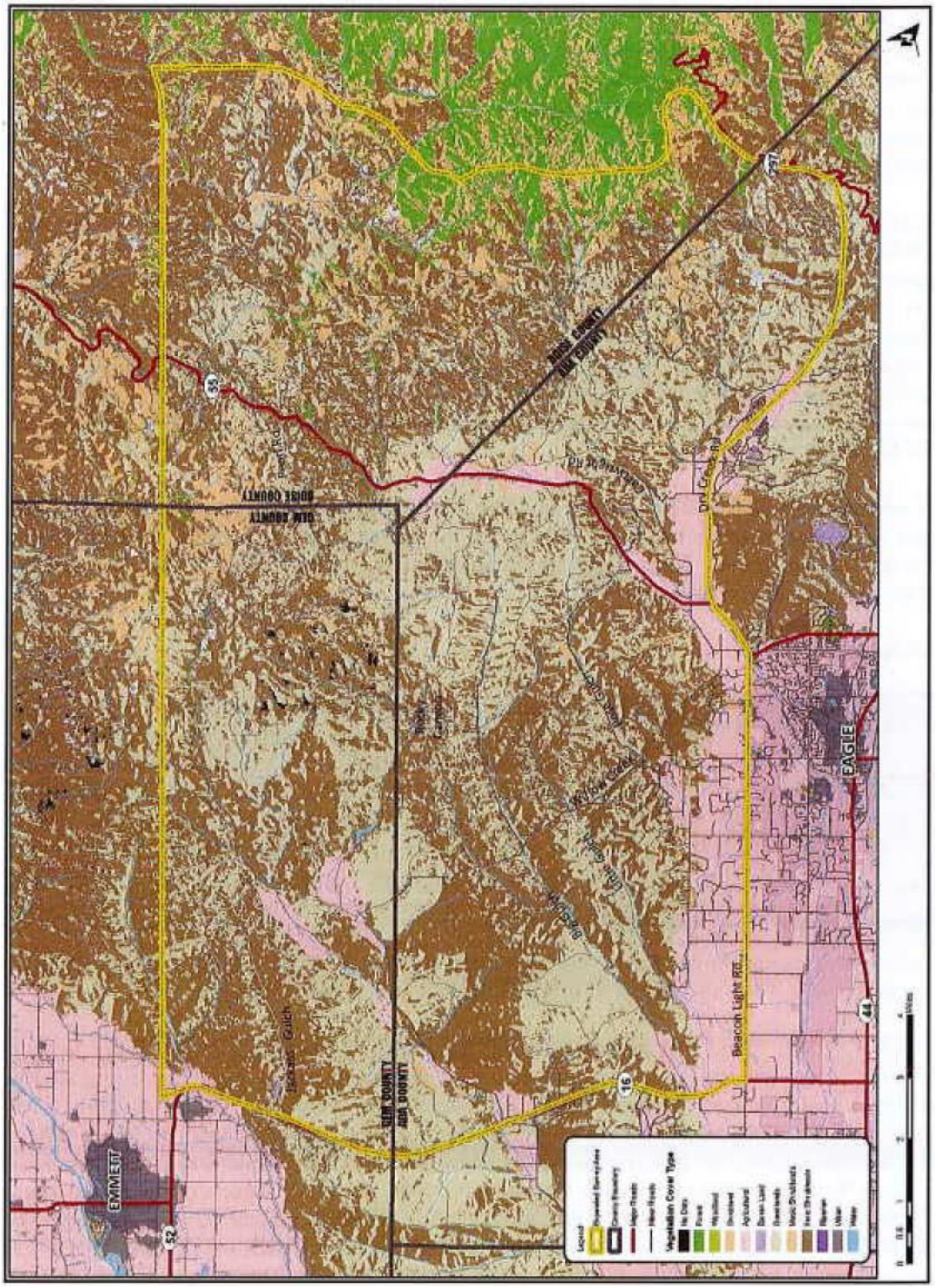
Vegetation Classification and Condition Methods

Vegetative Community Types: Environmental Conservation Services' (ECS) staff used aerial photographs provided by the U.S. Department of Agriculture (2006) to delineate vegetative community types at a rough linear scale. Based on the information from these initial maps, site surveys were done to confirm and adjust the delineated classifications, including: agricultural; grassland; shrub; riparian; rock outcrop; and disturbed. After the classifications were ground-trued during field surveys, Arc-GIS version 9.2 with Spatial Annalist software was used to quantify each of the communities.

Detailed notes were recorded regarding plant associations, noxious weeds, and land use patterns. The surveyors kept lists of all plants encountered and identified during the site survey. Unknown species were collected and identified with the following reference material: Vascular Plants of the Pacific No1thwest (Hitchcock et al. 1964) and Flora of The Pacific Northwest: An Illustrated Manual (Hitchcock and Cronquist 1976).

Habitat Condition Class: ECS staff used the initial vegetative community data and further separated each community type based on its overall ecological condition. The ecological condition of the site is directly related to the presence and absence of structural and functional components of the system. Condition classification was based on the Indicators for Rangeland Health, technical reference 1734-6. This is a national standard (US Department of Agriculture and US Department of Interior) using 17 indicators to identify soil/ site stability, watershed function, and biotic integrity, as well as its departure from reference condition. The condition of the vegetation has a direct con-elation with wildlife habitat availability and sustainability.

Riparian and wetland areas on the property were classified using the standard for Proper Functioning Condition (PFC) as outlined by the BLM's proper functioning condition workgroup. BLM depicts natural riparian-wetland areas as resources whose capability and potential is defined by the interaction of three components: 1) vegetation, 2) landform/soils, and 3) hydrology (BLM 1998). For the purpose of maintaining consistency throughout this rep01t riparian condition was categorized in poor, marginal, and satisfactory condition to flow with the upland habitat classifications. Poor condition relates to non-functioning condition, marginal to functioning at risk, and satisfactory to proper functioning condition.



Map2: Project Area Vegetation.

2.1 Big Game

The project area falls within the Boise River Elk Management Zone (EMZ) and GMU 39, with the Weiser River EMZ and GMU-32 on the west side of SH-55. There are three primary big game species identified within the unit: mule deer *(Odocoileus hemionus),* elk *(Cervus elaphus),* and antelope *(Antilocapra americana).* Hunting seasons within the unit are restricted to deer and elk, and do not include pronghorn antelope.

Small changes to vegetation communities in the lower foothills can have large repercussions for big game winter range across a broad area, especially during hard winters. Big game is pushed down to lower elevation areas, identified by the IDFG as winter range, in order to ove1winter, i.e. taking up residence in a particular place through the winter months. These sites require shallow snow levels, adequate food, sight and thermal cover, and limited disturbances in order to maintain energy balance and minimize overwinter weight loss (IDFG 2004; Thomas et al. 1988). If these conditions are not present, energy losses could exceed gains over an extended time, potentially resulting in winter mortality or failure to reproduce the following year.

In addition to a final destination for big game during their winter migrations, the region also acts as a movement corridor for big game to access different aspects of their habitat throughout the season. These areas are identified as big game migration corridors and are crucial for winter survival.

Mule Deer

Mule deer are one of Idaho's most abundant and widely distributed big game animals and provide more recreational opportunity than any other big game species (IDFG 2005; IDFG 2004). Mule deer are best adapted to seral transitional habitat types. They generally browse on a wide variety of woody plants, primarily during the winter when snow covers most grasses and forbs. Common browse plants include bitterbrush, sagebrush, aspen, dogwood, juniper and Douglas-fir. They graze on various grasses and forbs heavily during spring, summer and fall, and to a lesser extent on woody browse. They also forage in irrigated fields during winter and spring.

Streubel (2000) found that migratory mule deer in Idaho showed a high fidelity to their summer range, but less so to their winter range; deer from one summer range migrated to different winter ranges. However, individual animals may show high fidelity to their winter range as well. Mule deer generally migrate from high mountainous country to lower valleys and foothills during late fall to avoid heavy snow (Brown 1992). Mule deer winter habitat in western North America is generally defined as S, SW, SE, or W aspects of mild to medium slopes (10-45%) below 4,500-ft in elevation, and are generally associated with some type of thermal cover, such as mature trees with a closed canopy or rock overhangs, with shrub species present for forage (Thomas et al. 1988, Thomas 1979; and Hoover and Willis 1987).

The mule deer migration from summer range in the Boise Mountains to the historic winter range along the Foothills is generally triggered by cold temperatures and snow depth. Lower elevation habitat in the foothills is very important during hard winters as mule deer groups try to avoid deep snow, which can hamper their abilities to find forage and quickly deplete their necessary fat storage (IDFG 2005).

While the majority of mule deer associated with the Boise Foothills are migratory populations, there are also a number of isolated residential herds that are present year round. These groups are generally much more acclimated to human presence and development (residential and commercial) in comparison to migratory populations (Nicholson, Boweer, and Kie 1997).

Elk

Elk are widespread and abundant throughout Idaho and seem to prefer mountainous country with mixed open- grassy meadows, marshy meadows, river flats, and aspen parkland, as well as coniferous forests, brushy clearcuts, forest edges, and shrub-steppe. Some populations live year-round in sagebrush dese1i, using grass-shrub for feeding and tall shrub or pole timber for resting in the spring. They feed in clearcuts and shrub fields and rest in pole timber in the summer and stay in mesic (moderate moisture) pole timber in the autumn (Streubel 2000). Elk habitat varies greatly according to location. They are primarily a grazing species, relying on grasses for most of the year, but they also consume forbs in summer, and may browse on woody plants where grass availability is low, especially during winter months.

Elk migration to winter range is very similar to that of mule deer in the region. In Idaho, and throughout the northern Rockies, herds generally move to lower elevations in winter to feed. Individuals exhibit a high fidelity to their home range but may abandon it if they are excessively disturbed (Streubel 2000).

Antelope

Antelope are generally found on grasslands, shrub-steppe, and foothills. They prefer rangeland with vegetation less than two feet in height and wide-open, expansive range. They are often found in low shrubs such as sagebrush, and in grassy vegetation in arid regions with less than 10 to 12 inches of snow on the ground in the winter. This may lead them to upper, wind-swept slopes in the winter, or fairly long migrations between summer and winter range. In the winter, southern Idaho antelope depend heavily on browse, especially sagebrush.

Antelope home range varies, but an Idaho study (Autenreith et al. 1975) found summer home ranges averaged about eight square miles. Home range of yearlings was two to five times greater than adults. Large herds form in the winter but disperse in spring and form separate bachelor and female-fawn groups in spring and summer. In Idaho, antelope typically migrate to lower elevations in winter and move back to the heads of mountain valleys in the spring.

Antelope have some unique adaptations for their existence in open country. These adaptations allow them to be the fastest mammals in No1ih America. They have been clocked at nearly 70 mph and they can obtain and maintain speeds of 30 to 45 miles per hour (mph) for fairly long distances. Historically, antelope were abundant throughout the west, but agricultural development, cattle grazing and construction of fences has reduced their populations. While some antelope do crawl under fences, many pronghorn populations have not adapted to fences, and their movements, even seasonal migrations, have been blocked by fences.

2.2 Idaho State Highway-55

State Highway-55 has been in existence since 1969, when it replaced former state highways 72 and 15. It runs from its southern junction with SH-95 in Marsing 150-miles north, to the SH-95 junction in New Meadows. The section of SH-55 between the city of Eagle (SH-55/44 junction) and the SH-55/95 junction in New Meadows is currently designated as the Payette River Scenic Byway and is one of the most heavily used highways in Idaho.

The section of highway within the project area initially only included the portion of SH-55 from Beacon Light (mp 47. l) to the top of Horseshoe Bend Hill (mp57.7). However, based on big game mortality data and input from the ITD and IDFG biologists, we expanded the area of discussion to include the section between Beacon Light and the junction of SH-44 and SH-55 (mp 44.7). As this was identified after the surveys had been completed, the actual project area did not change, just the area of discussion.

The expanded area of influence starts at junction of SH-44 and SH-55 and runs north through a high density commercial and residential area for 2.5 miles past Beacon Light Road. There are two primary gaps in the residential and commercial corridor adjacent to SH-55 that are of significance. These occur at a field between Home Depot and storage area (mp-45.5), and just south of Beacon Light on the east side of the road where the high-density residential transitions to low density (mp-46.9).

From Beacon Light, SH-55 runs northeast and transitions from urban to rural residents, past Shadow Valley Golf Course into a steep canyon at mile marker 50. The canyon area is approximately one and a half miles, at which point the road straightens into the Spring Valley and the speed limit increases from 55 to 60 miles per hour (mph). The highway bisects Spring Valley approximately a mile and a half from the canyon, where it splits to two northbound lanes and one south bound. At the base of Horseshoe Bend Hill (mp-54.8), the road increases to four lanes and continues as this to the Horseshoe Bend Hill Summit near the Pearl Road tum-off(mp-57.7).

The number of daily traffic trips on SH-55, based on average daily trips (ADT) at Dry Creek, has been increasing on average every year since 1990 (ITD 2009a). ADT are generally

lowest in January, about half the ADT of July, which is normally the highest (Table 1). Traffic levels associated with commuter traffic between Boise, Horseshoe Bend, and other outlying communities has been increasing, but are fairly consistent year-round with only small fluctuations. However, the primary increase in summer use is associated with recreational users from Boise, Meridian, Kuna, Eagle, Star, and the rest of the Treasure Valley traveling north.

Table 1. Average Daily Traffic for Dry Creek (010).

YEAR	Jan**	Feb	Mar	Apr	May	Jun	Jul*	Aug	Sep	Oct	Nov	Dec	Annual 24-hr Avg.
1990	2496	2624	3066	3634	4690	5240	6207	5783	5000	4251	3321	2507	4077
1991	2297	3348	3162	3577	4610	5471	6619	6421	5380	5050	3547	3267	4403
1992	3031	3646	4010	4387	5993	6101	7002	6944	5513	5533	3952	3067	4951
1993	2982	3517	3519	4273	5980	6223	7859	7414	6467	6011	4503	3948	5237
1994	3829	3578	4123	4864	5671	6777	8655	7554	6794	6386	4194	3872	5539
1995	3778	4423	4261	4877	6195	7123	8691	7872	6407	6226	4742	3822	5701
1996	3439	4303	4426	4875	6039	7145	8813	8317	6742	6142	4629	3578	5704
1997	2639	4375	4173	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1998	3847	4387	4449	5069	6114	7371	9192	8741	7393	6471	5280	4323	6053
1999	4188	4124	4600	5175	6470	7609	9439	8705	7427	6684	5397	4444	6189
2000	4049	4745	4867	5558	6421	8093	9626	8770	7312	6569	5035	4520	6297
2001	4287	4620	4986	5518	7413	8320	9668	9184	7346	6919	5660	4506	6536
2002	4437	4901	4877	5531	7317	8579	10027	9734	7816	7129	5780	5079	6767
2003	4794	5263	5225	5685	7526	8941	10327	9864	7962	7529	5766	5141	7002
2004	4407	5113	5574	6359	7718	9105	10729	9403	8523	7671	6122	5558	7190
2005	5252	5870	6004	6407	7884	9076	11052	10093	8337	7600	6238	5464	7440
2006	5178	5720	5728	6227	7604	9225	11022	10048	8648	8045	6555	5802	7484
2007	5666	5950	6297	6790	8403	9671	10910	10052	8179	7847	6636	5743	7679

*Highest Level of Use.
**Lowest Level of Use.

Note: N/A indicates where one or more months did not contain any data, and years may have been excluded because data was not available at all sites. Data derived from ITD Website:
http://www.itd.idaho.gov/planning/roadwaydata/counters/compare.asp

2.3 Idaho State Highway 16

State Highway 16 was originated in 1929 and historically ran from Star, Idaho to Horseshoe Bend, Idaho. Through the years, with the induction and extension of SH-52, it is now the main thoroughfare from Star to Emmett, ending in Emmett with its intersection with SH-52. The highway is a two lane highway with tum lanes for larger road intersections and heads north from SH-44 through some low density residential and agricultural areas and runs adjacent to River Birch golf course where it opens up to grazing lands and ranchettes. The

highway peaks in elevation on the top of Freezeout Hill near the junction with Jackass Gulch Road at mile 10.13, before descending into the city of Emmett.

Table 2. Average Daily Traffic for Firebird (274).

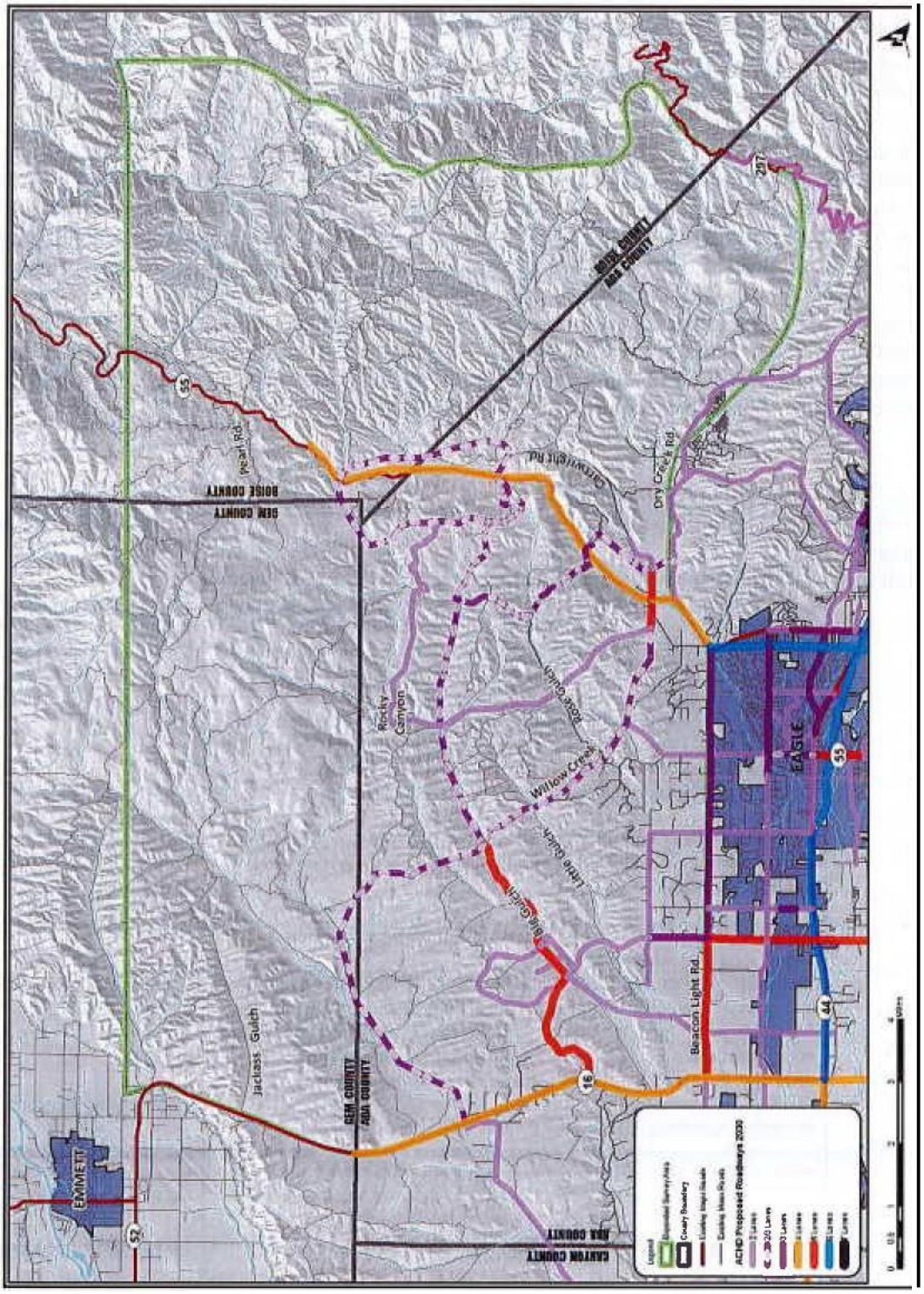
YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec**	Annual 24-hr Avg.
2005	N/A	N/A	N/A	9337	9119	9630	9083	9511	8569	8539	7844	8171	N/A
2006	8100	8667	8776	8400	9437	9585	8617	9826	8545	N/A	8500	7465	N/A
2007	8262	8407	8978	9497	10139	9358	N/A	N/A	9536	9274	8599	7990	N/A

*Highest Level of Use.
**Lowest Level of Use.

Note: N/A indicates where one or more months did not contain any data, and years may have been excluded because data was not available at all sites. Data derived from ITD Website:
http://www.itd.idaho.gov/planning/roadwaydata/counters/compare.asp

2.4 Interior and ACHD Proposed Roadways

There are several limited maintained and unmaintained roads dissecting the area between SH-55 and SH-16 within the survey area. Pearl, Willow Creek, Jackass Gulch, Chaparral and Sand Hollow roads are the main, seasonally maintained roads through the area; the other access roads consist of smaller dirt roads and two track auxiliary roads. In addition to the existing network of roads, ACHD has developed a Northwest Foothills Transportation Study for the area (Map 3). The transportation study was initiated to assess the needs and impacts of the future transportation system in the area and act as a policy guide for developing and improving the transportation system. This document is currently in draft form.



Map 3. ACHD Proposed Transportation Plan.

3.0 Estimated Big Game Mortality

Based on the historic and current level of traffic use in the area, auto-related mortality of wildlife, primarily mule deer, has been identified by the ITD and IDFG as a potential safety issue (ITO 2008; IDFG 2009), the IDFG as a wildlife issue, and the surrounding land owners as a conservation issue. In order to determine the relative magnitude of the issue for the region, ECS has compiled all available big game mo1iality data associated with SH-55 and SH-16 (Table 3). Currently, there are no official records associated with big game mortality kept by either the ITD or IDFG associated with the project area. The data used for this summary was collected from: ECS survey records and personal observations (2003-present); IDFG observations; ITD accident records (2009); ITO linkage project (ITO 2008); and personal observations from IDFG biologists and ITD maintenance crews (pers. 'comm. Greg Johnston 2009; pers. comm. Paul Stanley 2009). Additional observations associated with the section between SH-44/55 junction and Beacon Light was also included from City of Eagle maintenance personnel (pers. comm. Mike Echeita 2009).

Table 3 Bi2 Game Mortality Summary.

Data Set/ Observer	Description/Observation	Estimated Mortality
ECS Survey	ECS biologists have kept an ongoing record (2003-present) of any big game road mortality on SH-55, no data for SH-16. Observations were only recorded for the area between mp-51.3 and mp-55.0, with additional personal observations (not recorded) from SH-44/55 junction (mp 44.7) north to mp-51.3. ECS staff was on site at least 3 times per week (on average) from April 1 to August 1 between 2003 and 2006, with little or no observations outside that time period. ECS staff was on site at least 3 times per week from November 1 to July 1, dropping down to 1 visit per two weeks (on average), between August and October of 2007 to present. Recorded Observations: One doe at mp 51.2 (7-3-03); One fawn at mp-54.3 (4-16-05); One doe .3 miles north of Avimor main entrance near mp-52.5 (5-10-06). Personal Observations (Charlie Baun): Two mule deer near Home Depot; Five mule deer near mp-47.	Estimated auto-related big game mortality between mp 44.7 to mp 57.7 (2003 to present): 1.7 animals killed annually.
ITD Accident Reports	Accident report data obtained from ITD-Office of Highway Operations and Safety for wildlife mo1iality between mp 44.7 and mp 57.7 on SH-55, and between mp 0.0 to mp 13.9 on SH-16 (ITO 2009b). It should be noted that these were only wildlife collisions that were reported; therefore, the actual number of collisions is probably higher. Recorded Accidents (SH-55): 25 records from 1990-2007. *Recorded Accidents (SH-16): 29 records from 1990-2007.	Estimated auto-related big game mortality on SH-55 between mp 44.7 to mp 57.7 (1990 to present): 1.4 animals killed annually. Estimated auto-related big game mortality on SH-16 between mp 0.0 to mp 13.9 (1990 to present): 1.6 animals killed annually.

Data Set/ Observer	Description/Observation	Estimated Mortality
ITD Linkage Data	Idaho State Highway Wildlife Linkage project (ITD 2008). There were three sections associated with SH-55: Shadow Valley (ID3-13); Sp1ing Valley Ranch (ID3-14); Horseshoe Bend Hill (ID3-15), and two associated with SH-16: (Firebird North (ID3-42); and Freeze Out **Hill** (ID3-43), cited in the report. It should be noted that this is a very quick, large scale (state-wide) planning process with limited site specific data and meant to quickly identify and prioritize key areas for more site- specific analysis (per. Comm. Bill Ruediger 2009). Shadow Valley, Spring Valley Ranch, and Firebird North: No Mortality Data.	Estimated big game mortality Horseshoe Bend Hill (mp 54.3 to mp 58.8): 5-20 animals killed annually Estimated big game mortality Freezeout Hill (mp 10.2 to mp 13.3): 5-20 animals killed annually.
IDFG Estimate	The IDFG has no records associated with big game mortality on SH-55 or **SH-I** 6. Therefore, big game mortality numbers Me based on personal observations of IDFG biologists (personal communication Greg Burak 2009). IDFG observations were estimated mortality between Beacon Light (mp 47.0) to the top of Horse Shoe Bend Hill (mp-57.7)	Estimated auto-related big game mortality on SH-55 between mp 47.0 to mp 57.7 (no time frame): 20-30 animals killed annually.
ITD Maintenance Crew-Estimate	The ITD has no records associated with big game mortality on SH-55 or SH-16. Therefore, big game mortality numbers are based on personal observations of ITD maintenance crews. SH-55 *(pers.* Comm. Greg Johnson 2009; pers. comm. Scott Rudel 2009). SH-16 (pers. Comm. Stragley 2009). SH-55 between Beacon Light (mp 47.0) north to Horseshoe Bend Hilltop (57.7): approximately 3-5 animals per week. SH-55 between Beacon Light (mp 47.0) south to SH-44/55 junction (mp 44.7): approximately 2-4 animals per week. *SH-16 between SH-44/16 junction (mp 0.0) to mp 13.9. Mortality numbers concentrated around mp10.5 and mp12 (pers. Comm. Paul Stanley 2009).	Estimated auto-related big game mortality on SH-55 between mp 44.7 to mp 57.7 (no time frame): 260-468 animals killed annually. Estimated auto-related big game mortality on SH-16 between mp 0.0 to mp 13.9 (no time frame): IO animals killed annually.
*ITD's 2004 Corridor Improvement Study for SH-16, which included work on Freezeout Hill, did not identify mule deer or any other big game in their affected environment, impacts, or mitigations (ITD 2004). Note: There was no mortality data associated with these interior roads; however, the remote rural nature, low level of traffic use, and limited speeds would indicate very few big game automobile interactions.		

Based on the significant variance in mortality estimates, ranging from 1.4 to 468 big game animals killed annually on SH-55, and general consensus with representatives from the IDFG and ITD biologists, during the April 1, 2009 site meeting, was that general mortality rates are too inconsistent to be used as a primary indicator for this report. Instead, it was determined that this report would isolate specific areas that have had greater than average observed mortality in the past, which have been termed 'hot-spots'. These hot spots (Map 4) were based on data and observations from all five sources cited in table 3, and the site meeting with ECS, IDFG, and ITO biologists on April 1, 2009.

A general description of each area and relative mortality rating by location is found in table 4. This mortality index arranges the hotspots in order from greatest to least observed mortality based on the overall number of recorded observations (ECS and ITD data) and personal observations (IDFG, ITD, ECS, and City of Eagle), with greater weight given to personal observations, as there is still limited mortality data available. There were no identified hotspots on SH-16, based on the relatively low recorded mortality rates and limited big game observation in proximity to the highway (section 5.1).

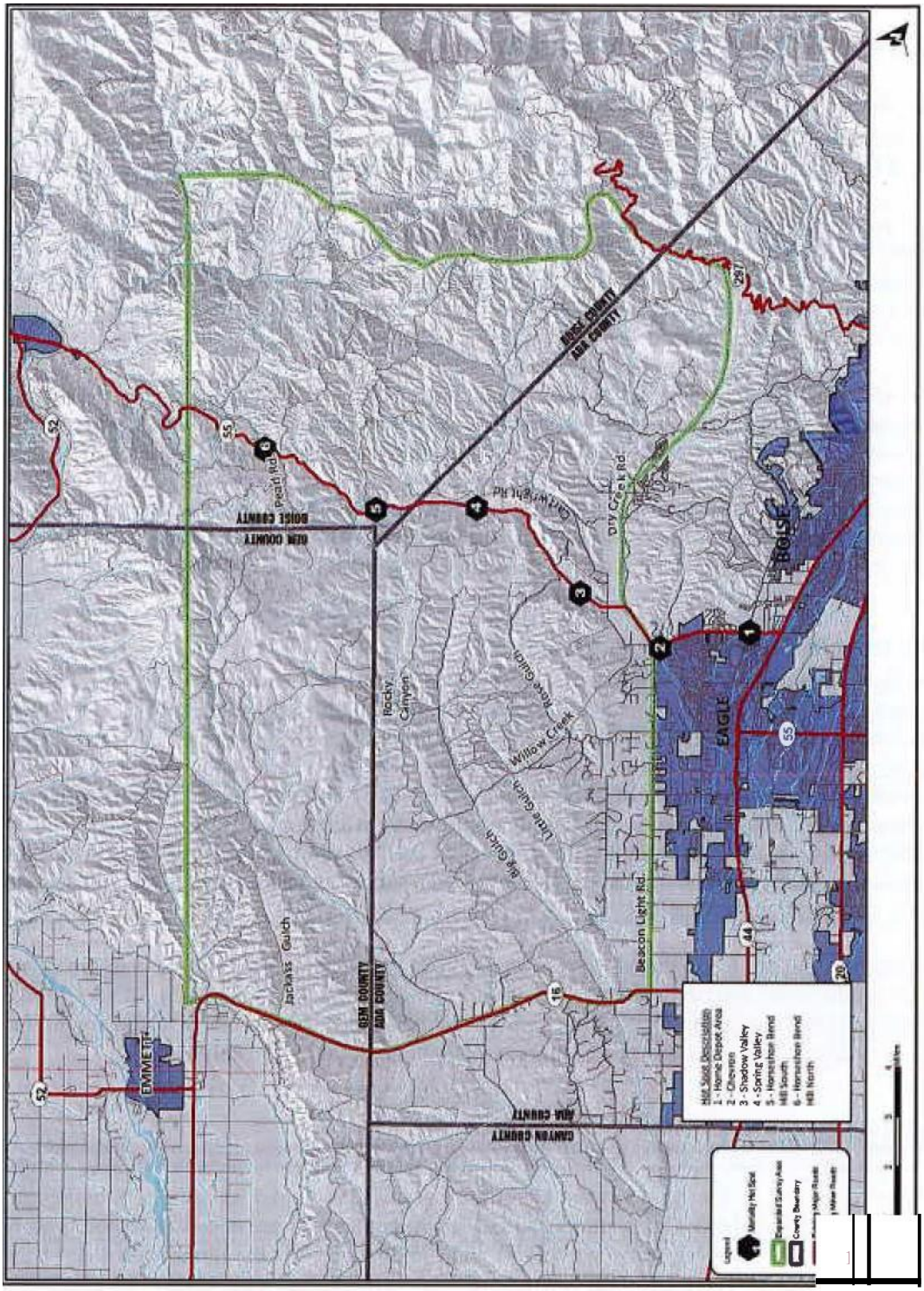
Table 4. Hotspot Mortality Index

Site Description	Mortality Rating:	Reason
Home Depot: The area north of Home Depot and south of X-storage unit nearmp-45.	I	1) Third highest recorded mortalities, greatest number of personal observations (all parties but IDFG).
Chevron: The area southeast of the Chevron station near mp-46.9.	5	3) Lowest recorded mortalities, second lowest personal observations.
Shadow Valley: The area from the Dry Creek bridge, through the Shadow Valley golf course to the southern portion of the canyon at mp-50.3.	3	2) Second highest recorded mortalities, third most observations.
Spring Valley: The area from the northern canyon opening (mp-51.3) through Spring Valley Creek valley.	4	5) Second fewest recorded mortalities, third lowest observations.
Horseshoe Bend Hill South: The area on Horseshoe Bend Hill from mp-54.6 to the top 57.7.	6	4) Third fewest recorded mortalities, lowest observations.
Horseshoe Bend Hill North: The area from the top of Horseshoe Bend Hill at mp-57.7 to the bottom of the grade at Horseshoe bend.	2	6) Highest recorded mortalities, second highest observations.

Mortality Rating: Ranked from (greatest observed mortality) to 6 (least observed mortality).

Note: The index is based on all available data (records and personal observations). However, big game mortality data currently available is very limited; therefore, the index relies heavily on personal observations that are subject to interpretation and could change as additional information is included.

While the project area and area of influence are limited to Sh-16, SH-55, and the secondary roads between, there were two other transportation c01Tidors in the area that are of interest to ECS. The first is Dry Creek/Cartwright Road between SH-55 and Bogus Basin Road. This is a winding two lane road with limited visibility in locations that run east to west across IDFG-identified winter habitat. Based on potential changes to the area associated with development and transp01iation, it should be identified for long-term monitoring and planning. The second section is Semen Gulch Road, running north/south between Dry Creek and Hill Road. This is also a winding two lane road with limited visibility in a location with a known residential mule deer population associated with the Ada County Land Fill (pers. comm. Eric Leitzinger 2006, ECS observations). This section was also identified by ITD as an area of high mortality for mule deer (pers. comm. Greg Johnston 2009). ADT were not known for either section but was assumed to be significantly lower than SH-55.



Map. 4 Big Game Mortality Hot-Spots (SH-55)'.

4.0 Big Game Survey Methods

4.0 Background Data (Quantitative and Qualitative)-

in order to identify big game use and distribution patterns associated with the project area, ECS biologists has been working with the local, state, and federal agencies, as well as local residents, to collect all available information on: species composition, temporal and spatial use patterns, as well as mortality data. The primary data sets collected have been from the IDFG and ECS surveys (ground and aerial), as well as ITD accident and linkage data sets. In addition to quantifiable data, ECS biologists have integrated the personal observations (qualitative data) from IDFG wildlife biologists and mangers, ITD biologists and maintenance crews, City of Eagle maintenance staff, and area residents.

In addition, supplemental information including, but not limited to: soils, hydrology, vegetation, wildfire, recreation, transportation and development has been collected from the Bureau of Land Management (BLM), National Resource Conservation Services (NRCS), Ada County Highway District (ACHD), City of Eagle and Ada County planners, and local developers and residents. This information was used in conjunction with big game data to determine the conditions and characteristics associated with specific patterns of use, which can be used to identify potential impacts associated with current and future planning efforts.

4.1 Local Residential Surveys-

In November of 2007, residential surveys were conducted to identify big game use patterns based on personal observations of local residents. ECS biologists conducted house to house interviews with residents on Willow Creek, Sand Hollow, and Pearl Roads. If the residents were not present, their mailing addresses were recorded and a letter survey was sent. Nineteen letters were mailed out that included the survey and a map for residents to record where, when, and how many big game (mule deer, white-tail deer, elk, and pronghorn antelope) they had observed in the area (Appendix A). An additional ten local residents, who recreate regularly in the foothills, were also mailed a survey and asked to complete it based on their familiarity with the area.

A combination of 16 completed surveys and/or verbal interviews were collected and mapped. The results were used as a reference in determining survey points (Map 5). The seasonal observations were also used to identify where and what species used the area year round, i.e. resident population (year round) vs. migratory population (winter use only).

4.2 Ground Surveys-

Ground surveys were conducted from November of 2007 to March of 2008. Fourteen high.-elevation survey points (Map 5) were identified based on residential surveys, ECS biologists' observations, and IDFG observations and past point counts. These observation points were developed to monitor big game winter use and distribution. Observations included: visual sightings, tracks (Figures 1 and 2), scat, and remains. GPS points were taken at all points and mapped. The points were designed to give the observer an unobstructed landscape view of an

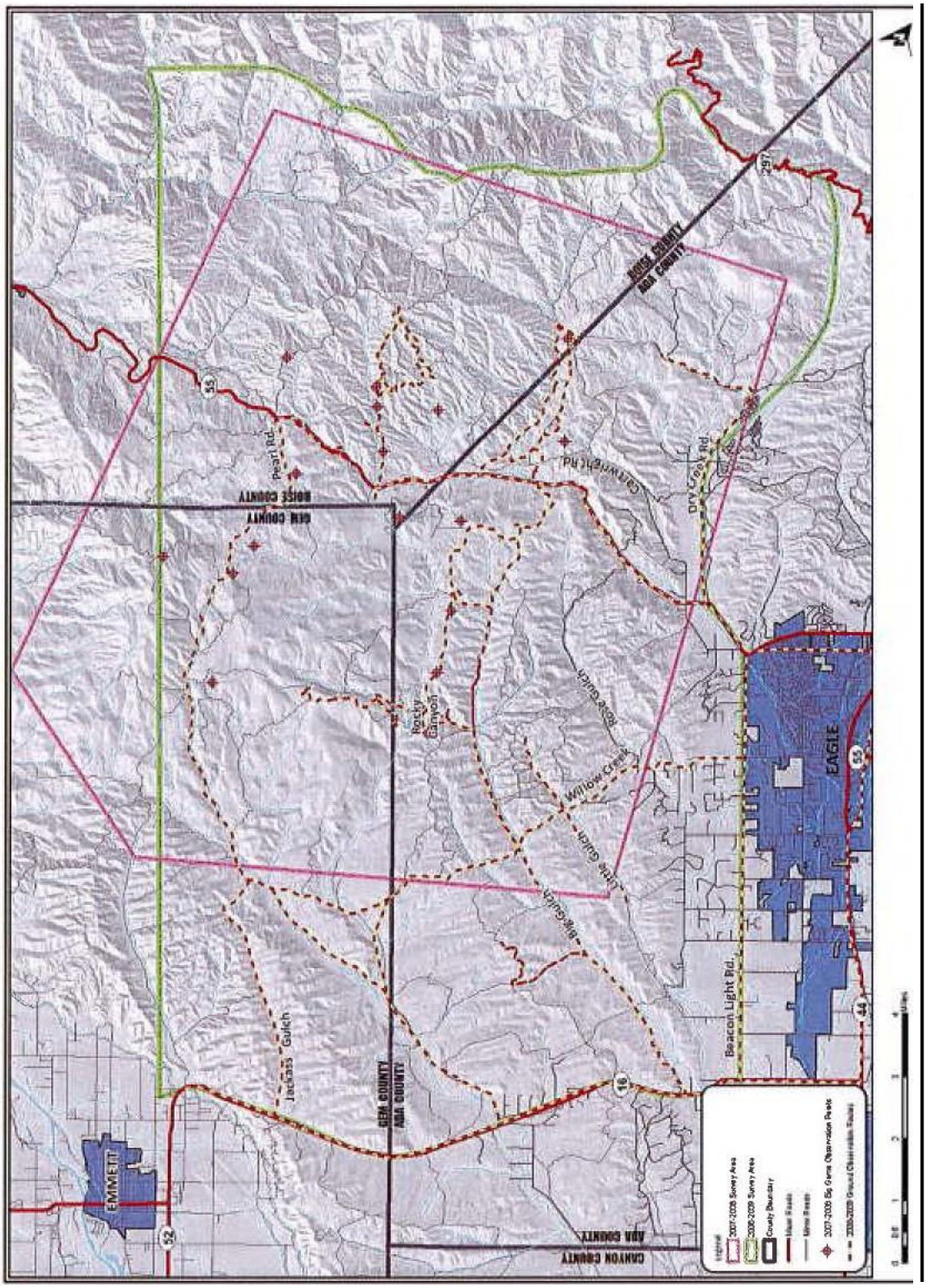
area that had some overlap with an adjacent viewpoint so that only a small portion of the project area was not visually surveyed.

As the snow levels increased, access to these points became limited to snowshoeing or cross-country skiing. Two of the original monitoring points were removed from the initial survey route because their vantages were too repetitive with other points, i.e. too much overlap reduces monitoring efficiency. To compensate, three additional cross-country survey routes were created in January to access more te1Tain.

Monitoring points were generally surveyed once a week for any observation of big game. Based on the amount of activity associated with each point, some areas were surveyed less often, i.e. dropped to once every second or third week based on the potential for observations. Areas where big game observations had been identified continued to be surveyed weekly.

All big game observations were recorded on a map and a survey form (Appendix A) was completed. The point was either correlated to an established survey point or a new GPS point was taken. Identified tracks (Figures l and 2) and pellets were also recorded on data forms and a point taken. Winter field work was always done in pairs for safety purposes.

Ground surveys were also conducted from December of 2008 through March of 2009. The primary survey points identified in the 2007-2008 survey were surveyed again (Map 5); however, these points were only visited one or two times over the duration of the survey based on similar use patterns observed and additional aerial surveys. Based on fewer point surveys on the ground, ECS staff took a more comprehensive approach to dispersal and migration patterns associated with SH-55 and SH-16 and the secondary roads between, including: Willow Creek, Rose Gulch, Little Gulch, Big Gulch, Jack Ass Gulch, and Pearl roads (Map 5). These roads were driven at very low speeds, or walked, in order to identify signs of wildlife use, including: tracks (Figures 1 and 2), scat, bedding sites, remains, and even evidence of winter browse on shrubs and grasses. Surveyors also hiked side drainages and ridge tops not accessible by vehicle to look for signs of use. Use and migration surveys conducted to the east ofSH-55 were restricted to non-motorized surveys (cross-country skiing and hiking).



Map 5: Ground Survey Routes.

Figure 1. Example of Mule Deer Tracks Used to Identify Use or Movement.

Figure 2. Example of Elk Tracks Used to Identify Use or Movement.

4.3 Aerial Surveys-

On January 14th and February 11th, 2008, ECS contracted Silverhawk Aviation to complete two aerial surveys (point counts) using a Robinson 44/Raven II helicopter. In order to duplicate the IDFG's aerial survey protocol for point counts, not including sex determination procedures, ECS worked with IDFG staff and contracted Mike Schlegel, a retired IDFG biologist from McCall, ECS biologists worked with Mr. Schlegel to develop an aerial survey form (Appendix A) and he instructed/participated in aerial point counts to acclimate ECS biologists.

Aerial surveys were flown in ½ mile wide swaths from north to south and worked from the east side to the west side (Map 5). The pilot flew from 35-60 knots, depending on snow coverage and topography, with a minimal visibility of three miles and able to fly 1000-ft below cloud level. Total flight time was approximately four hours on January 14th, and seven hours on February 11th.

In addition to the pilot, two observers, one on each side of the helicopter, with equal viewing coverage on both sides of the aircraft, were always used. Generally, one person would record information on elk while the other recorded on mule deer. If any white-tailed deer, antelope, or moose were identified, the same information would be recorded on either the mule deer or elk data sheet. All big game species observed during aerial surveys were counted and a single GPS waypoint taken at each observation point. The ECS-developed data sheet contains information on: species, number of animals, weather conditions, animal activity, vegetation class, snow cover, slope, aspect, and UTM coordinates.

In 2009, a single aerial survey (point count) was completed using the same protocol, and Silverhawk Aviation was contracted again. Flights were conducted on February 24th, flight time of seven hours, and March 3rd, flight time of three hours. Based on the expanded search area, aerials surveys were conducted in east to west patterns between the east and west borders, starting from the northeast boundary and working south (Map 5). The entire project area could not be completed with a single flight, so the March 3rd flight was concentrated in the southeast comer of the project area to complete the survey. Observation data for both days was combined for the 2009-point count data.

5.0 Survey Results

5.0 Combined (IDFG/ECS) Big Game Winter Use Data -

All available big game winter use data (count totals only, no associated locations) recorded between 1989 and 2007 by the IDFG is shown in tables 5, 6, and 7. The count data received from the IDFG is grouped by unit and broken down based on year and subunit. Specific dates were not included in either data set, but big game winter counts are normally completed between December and March (pers. Comm. Greg Burak 2009). Big game counts associated with units 32 and 39 are not completed annually in this area based on relative use (low and moderate) by big game and IDFG funding/resource limitations (personal communications Eric Leitzinger 2006, Jon Rachael and Kevin Warner 2007; Rick Ward 2008; and Kevin Warner 2009).

The ECS count data was also grouped by unit and broken down based on year, flight, and subunit (Tables 5-7) and added to the IDFG data for comparison over time. Point locations were also mapped (Maps 6-8) to show observation points. ECS ground survey data was not included in the tables or maps as these would be redundant point counts, i.e. same individuals and groups counted twice. However, both the ground data and ECS aerial observation data were combined with IDFG observation points (no count data available) to develop a project area-wide distribution map (Map 9) to illustrate general use areas. It should be understood by the reader that the distribution map includes multiple years of data overlaid on each other and multiple observations of the same animals in the same year. The map is intended to show the overall spatial distribution relative to use on the east and west sides of SH-55 only.

It should also be understood by the reader that these observations are single points in time and will vary year to year. This report uses all of the existing data and observations to try and extrapolate use and distribution patterns. However, without actual long-term tracking data these are just suppositions based on the author's professional observations and the best available data.

5.1 GMU-32 (Winter Count Data)

Table 5 is associated with mule deer counts within the project area in unit 32. Based on IDFG survey results, the overall number of animals using the area dropped considerably between 1989 and 1993 (92% reduction). Mule deer observation data by the IDFG averaged 453 animals, or 280 animals excluding the 1,588 (high) and 45 (low) observed **in** 1989 and 2003. For comparison in this report, we will use 280 mule deer as the IDFG average. ECS observations in 2008a were approximately 74% lower, in 2008b were approximately 67% lower, and in 2009 were approximately 72% lower than the IDFG average. There were no recorded counts for either elk or antelope.

ECS surveys were conducted in years with greater than average snow fall and accumulation, 2008, and average to less than average snow fall and accumulation, 2009. In comparison to the IDFG data, the ECS point count data generally exhibits reduced use within the project associated with GMU 32 within the project area. Anecdotal evidence, based on seasonal mortality data from ITD, personal observations and surveys from ECS, and resident survey

results, also indicated that the majority of the groups observed within the project area are likely residential populations rather than migratory ones.

In addition to mule deer, six groups of antelope and elk were also recorded. There were no observations of antelope in 2008. However, this could be attributed to insufficient surveys completed in the western portion of the project area in 2008. In 2009 there were four observations of antelope, with a total of 19 animals found in subunits 3, 7, and 8. The group in the n01theast p01tion of subunit 3 had 15 animals but was the only antelope observation with more than 2 animals at a single location. It is probable, based on the limited overall number of antelope observed, the amount, quality, and connectivity of habitat in the north Eagle Foothills west of SH-55, as well as the amount and type of fencing in the area, that this is not a sustainable population (Trainer *et al.* 1983).

Only two groups of elk were observed in unit 32. In 2008, a single herd of 34 elk were observed in subunit 18. This subunit is outside the project area boundary but was included in the results. Based on the proximity, it is assumed that this group is part of the Montour Wildlife Management Area (WMA) and is not likely a migratory population associated with the group to the east of SH-55 (see below). In 2009, a single group of 54 elk were located in the western portion of subunit 8. This group was within the project area, but it is still likely associated with the Montour WMA population.

Table 5. Combined Mule Deer Winter Counts (Unit 32).

Subunit	1989	1993	1994	1996	2003	2004	2008a	2008b	2009
1	4	-	-	-	-	-	-	-	-
3		-	-	-	-	-	-		-
4	92	-	-	-	-	135	3	39	44
5	162	6	-	-	-	61	4J	8	9
6	121	15	-		-	30	-	-	-
7	408	32	-		-	41	28	16	17
8	139	-	-	-	-	8	-	-	9
9	629	-	-	-	-	80	-	-	-
10	-	-	10	-	-	-	-	9	
11	-	91	104	97	45	45	-	21	-
12		-	-	149	-	-	-	-	-
13	-	-	-		-	-	-	-	-
14	-	-	-	-	-	-	-		-
15	-	-	-	-	-	-	-	-	-
16	-	-	-		-	-	-	-	7
17	3	-		12	-	40	-	-	-
18		-	53	107	-	-	-	3l	-
Total	1,558	144	167	365	45	440	74	93	79
*2008a	-95%	-49%	-56%	-80%	+64%	-83%	t	-20%	-6%
*2008b	94%	-35%	-44%	-75%	+107%	-79%	+26%	*	+18%
*2009	-95%	-45%	-53%	-78%	+76%	-82%	+7%	-15%	*

*Percent reduced(-) or percent increased (+) observations in comparison to 2008a, 2008b, and 2009 ECS surveys.

5.2 GMU-39 (Winter Count Data)

Tables 6 and 7 are associated with elk and mule deer count data for unit 39, east of SH-55. No antelope were recorded east of SH-55 during any ECS or IDFG surveys. Based on IDFG survey results, the overall number of elk using the area dropped by almost half (44%) between 1990 and 1994. Elk observation data by the IDFG averaged 250 animals, or 270 animals excluding the 422 (high) and 2 (low) observed in 1990 and 2000. For comparison in this report we will use 270 elk as the IDFG average. ECS observations in 2008a were approximately 50% lower than the IDFG average, but were 188% greater in 2008b, and 174% greater in 2009.

Mule deer observation data by the IDFG was fairly consistent between 1991 and 2005, averaging 422 animals, or 460 animals excluding the 549 (high) and 41 (low) observed in 1999 and 1994. For comparison in this rep01t we will use 460 mule deer as the IDFG average. ECS observations in 2008a were approximately 92% lower, in 2008b were approximately 91% lower, and in 2009 were approximately 88% lower than the IDFG average.

In general, ECS count data demonstrated a sizable increase in the number of elk in comparison to IDFG records, while mule deer counts were much lower, approximately one- tenth that recorded by IDFG on average. One possible explanation for the significant changein mule deer m1mbers could be attributed to the increased presence of elk in the area, which tend to displace mule deer populations (Lindzey *et al.* 1997; Johnson *et al.* 2000; Stewart *et al.* 2002). Another potential explanation could be the increased amount of human use in the area (recreation and development). Mule deer generally have a lower fidelity to their home ranges, e.g. they are more likely to move away from their home range in response to disturbance (Streubel 2000). However, mule deer populations, even migratory ones, are generally more acclimated to human presence than migratory elk herds (Nicholson, Boweer, and Kie 1997). Therefore, if human disturbance was the primary impact, we should also see greater reductions in elk use, which is not the case as of yet.

Table 6. Combined Elk Winter Counts (Unit 39).

Subunit	1990	1994	1998	2000	2008	2008a	20Hh	2009
166	-	-	-	-	189	-	13	-
167	422	-	286	-	-	135	445	-
168	-		-	-	.	-	32	-
170	-	-	-	-	-	-	-	300
214	-	-	.5	-	-	-	1	90
215	-	253	-	2	76		16	-
218	-	-	-	-	-	-	-	80
Total	422	253	291	2	265	135	507	470
*2008a	-68%	-47%	-54%	+6650%	-49%	*	-73%	-7t%
*Z008b	+20%	+100%	+74%	+25250%	+91%	+276%	*	+8%
*2009	+11%	+86%	+62%	+23400%	+77%	+248%	-7%	*

*Percent reduced (-) or percent increased (+) observations in comparison to 2008a, 2008b, and 2009 ECS surveys.

Table 7. Combined Mule Deer Winter Counts (Unit 39).

Subunit	1991	1993	1994	1995	1998	1999	2001	2003	2005	2008a	2008b	2009
166	13	194	-	-	222	137	148	166	89	-	9	42
167	316	92	-	164	117	66	49	1°89	140	20	4	6
168	-	-	-	-	-	-	-	-	-	-	10	-
170	-	-	-		-	-	-	-	-	5	-	8
214	40	19	-	-	57	70	I8	36	27	-	1	-
215	109	83	41	79	63	I3S	132	53	58	-	16	-
216	60	98	-	122	125	14l	36	-	94		.	-
Total	538	486	41	365	584	549	38.3	444	408	38	40	56
*2008a	-93%	-92%	-7%	-90%	-93%	-93%	-90%	-91%	-91%		-5%	-32%
*2008b	-93%	-92%	-2%	-89%	-93%	-93%	-90%	-91%	-90%	+5%		-29%
*2009	-90%	-88%	+37%	-85%	-90%	-90%	-85%	-87%	-86%	+47%	+40%	*

*Percent reduced (-) or percent increased (+) observations in comparison to 2008a, 2008b, and 2009 ECS surveys.

5.3 Ground Survey Observations {SH-55, SH-16, and Secondary Roads)

Ground surveys associated with movement patterns across SH-55 and SH-16, and the secondary roads between, were conducted for approximately 16 weeks in 2009 (section 4.3). ECS field crews specifically looked for any signs of big game movement patterns, emphasizing those areas in close proximity to SH-55 and SH-16. There was significant evidence (tracks and scat) of both mule deer and elk movement east of SH-55 in the higher elevation hills between Spring Valley and Cartwright Canyon. Observations were generally associated with high-elevation ridge tops, south-facing slopes, and drainage bottoms with riparian communities and water. There was also a number of gut piles (elk) observed where Cartwright Canyon and Sp1ing Valley Creek met. These were identified in December during the hunting season. Of note, there were a number of wolf tracks associated with the gut piles in Cartwright Canyon.

While there was significant evidence of large migratory groups moving to the east of SH-55 on the ridgelines, there were no observable signs of large groups moving across (trailing) SH- 55 or SH-16, and only limited trailing associated with the secondary roads between. The trailing associated with the secondary roads was minimal, normally individual or pairs of tracks, always isolated, and no discernable movement patterns. Based on these observations, the amount of area, and limited existing use associated with the roads, the ground survey results will be limited to SH-55 and SH-16.

There were no observations associated with big game use in close proximity to SH-16 anywhere during the 16 weeks of ground surveys. There were however, four sites with nine recorded observations of big game use in close proximity to SH-55. The first two sites were associated with recorded tracks, both on the west side of SH-55 north of Willow Creek (mp- 54.7). The first set of tracks was an individual mule deer traveling from Willow Creek to the roadside (within 5ft), where it parallels the highway north for approximately 75 feet then back to the hillside and up into the hills. Based on no visual tracks on the east side of the highway for at least 100 feet in either direction, it was assumed the animal did not cross the highway.

The second set of tracks was located just north of mp-56.1. The tracks were associated with a well defined drainage basin on the west side of SH-55 (Figure 3). Based on the direction, number, and type of tracks observed we believe these were made by a small group of mule deer that use the area regularly. The tracks crossed the basin bottom north and south, in both directions, but there was no evidence that any animals crossed the highway, i.e. no tracks on the other side of the road, 200 feet in either direction. The tracks to the north and south of the drainage tum west and go up into the hills away from the highway (Figure 4).

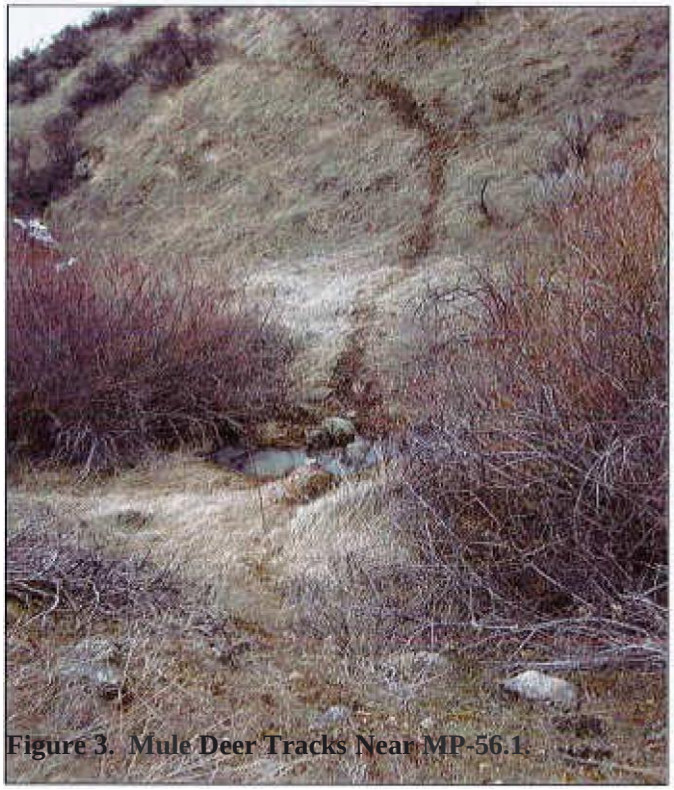


Figure 3. Mule Deer Tracks Near MP-56.1

Figure 4. Mule Deer Tracks Near MP-56.1.

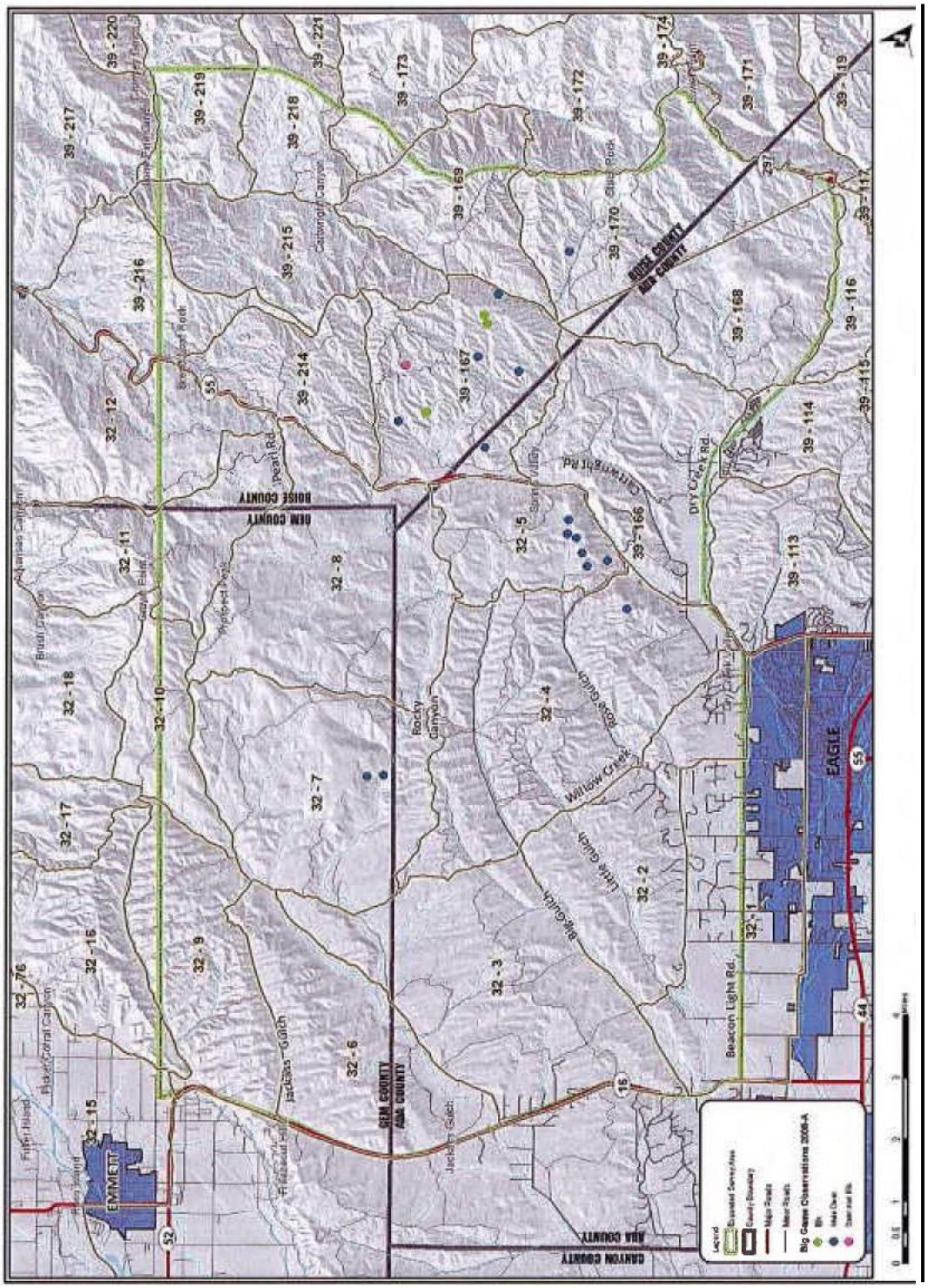
The third site was a group of mule deer, ranging in size between 2 and 6 animals, on the southeast side of SH-55 just north of Spring Creek Road near mp-50.0. The group was observed and recorded for five, nearly-consecutive days (March 25, 26, 27, 28, and 30 of 2009) in the same drainage basin, just northeast of the highway sign pullout. The area exhibited significant' signs of use, including tracks and scat. The tracks were most concentrated following the drainage up to the ridgeline, with several individuals following the canyon up (northeast) on the west facing slopes (same side of the road). There was also large distribution of multi-aged scat observed in the area, i.e. multiple piles of both new and desiccated scat. Based on the number of age of the desiccated scat, we assumed this area is used annually.

The roadside opposite where the mule deer group was observed was also walked by ECS field crews. Starting at the driveway of the last resident before the canyon on the northwest side of the highway, surveyors walked approximately 0.5 miles up the canyon, n01ihwest. There were several observed side hilling tracks approximately one quarter of the way up the hill side on the northwest side of the canyon that paralleled the road, but they ended at a riparian zone with water and willows. There was no signs (tracks or scat) from the point of observation north through the canyon that displayed evidence of big game crossing the highway.

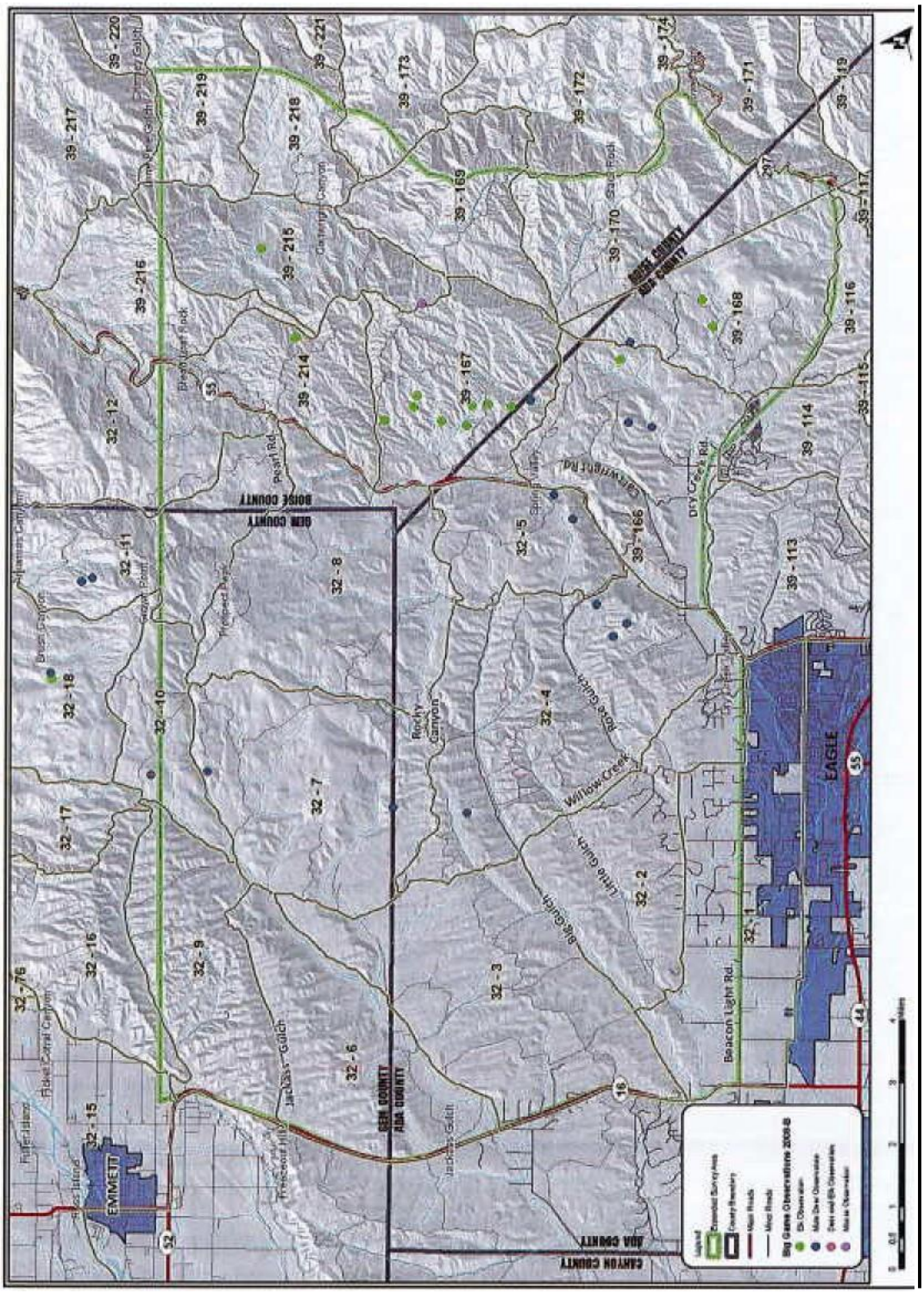
The last site was just north of mp-51.3 on the west side of SH-55 under the power lines. A pair of mule deer was observed on two separate days (March 25 and 28 of 2009). Both times the pair was observed in the same location, about half way up the hill side, foraging on a pileof hay or alfalfa that was put out for livestock earlier in the year. There is a well used livestock trail from the feeding site down the hill to where Spring Valley Creek crosses under the highway. Mule deer tracks were observed in the trail and around the stream bank, but

there were no tracks or scat on the east side of the road or around Spring Valley Creek, i.e. no evidence that these or any other big game have crossed the highway at this location.

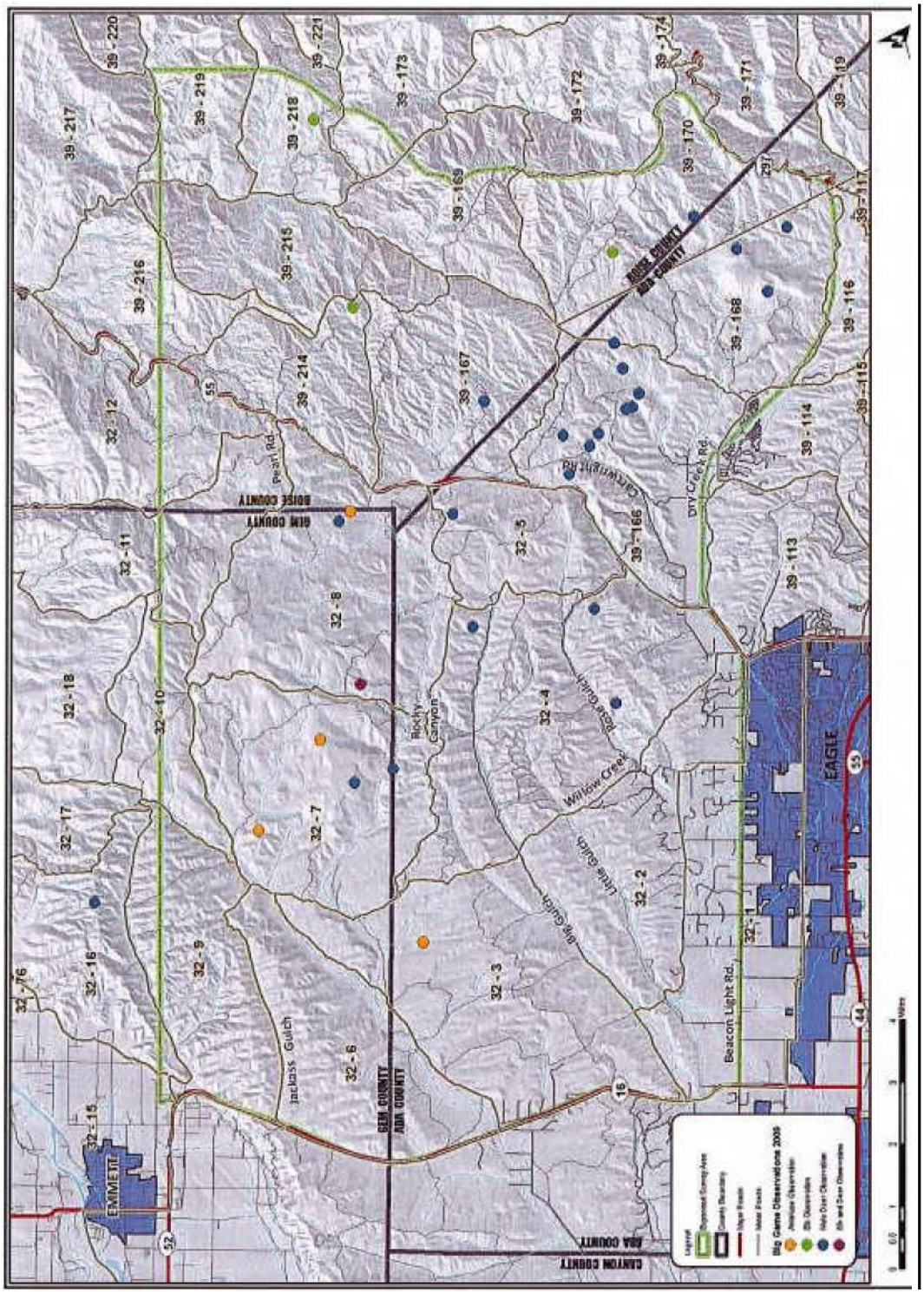
All four site observations, including subsequent site surveys of each location, exhibit use on only that side of the road, e.g. there was no noticeable evidence, tracks, scat, or otherwise, that these groups crossed the highway at these locations. This is not to say that we do not think that animals cross the highway (sections 3.0 and 6.0). Rather, the lack of crossing evidence coupled with the personal observations (ECS Staff 2003-2009) and mortality data, suggests that big game that do cross the highway are generally individuals, or very small groups. This would account for the lack of crossing evidence that would likely be apparent with larger groups. Furthermore, the lack of trailing evidence associated with SH-55 and SH-16 coupled with the migratory observations to the east, strongly suggest that large groups and migratory populations do not cross either SR-55 or SH-16.



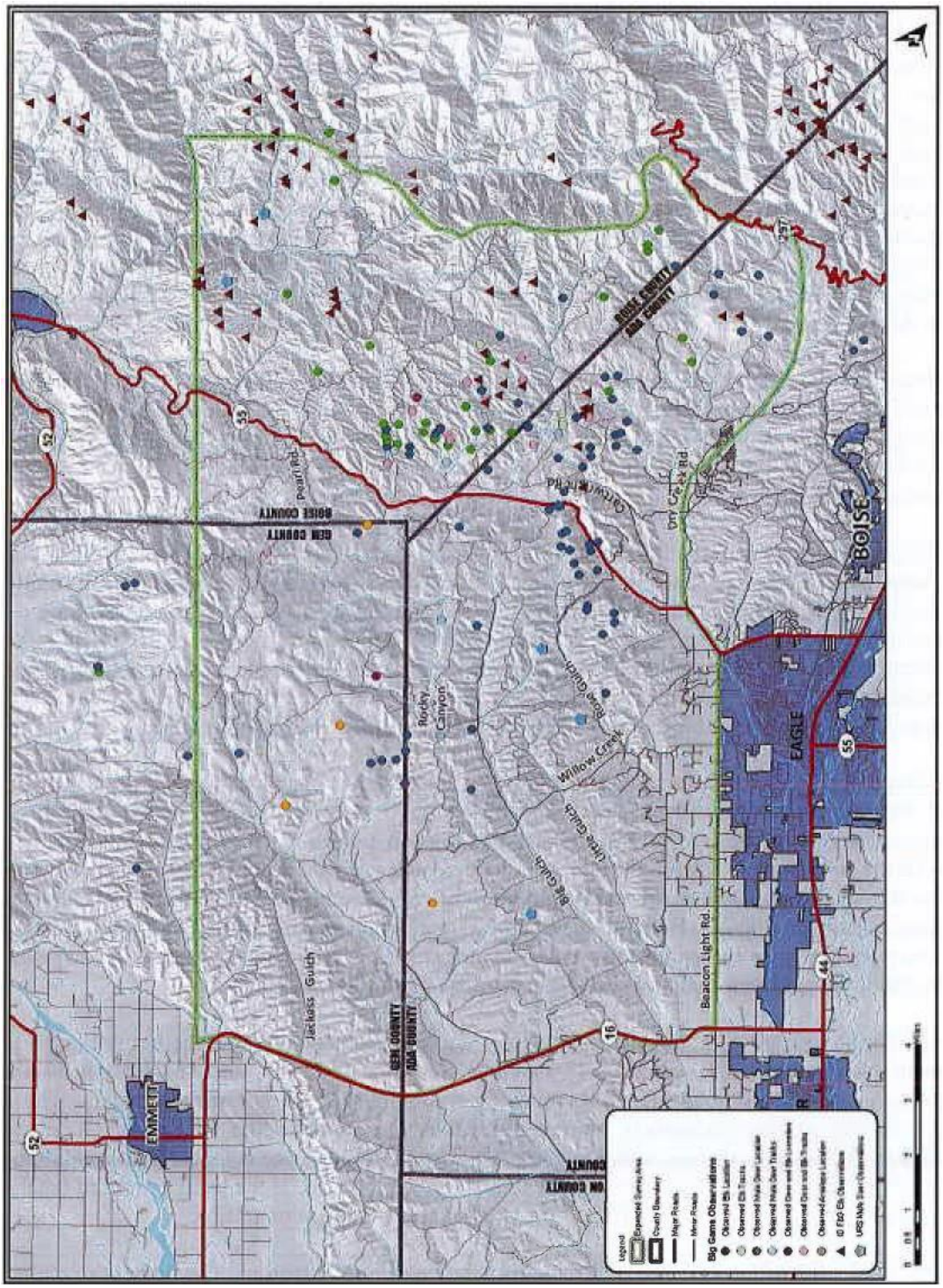
Map 6: ECS Point Locations by Subunits within Unit 32 and 39 (2008a).



Map7: ECS Point Locations by Subunits within Unit 32 and 39 (2008b).



Map 8: ECS Point Locations by Subunits within Unit 32 and 39 (2009).



Map9: Combined Observations by Subunits within Unit 32 and 39.
Note: There is 110 IDFG observation data for GMU 32 (West side of SH-55).

6.0 Discussion/Conclusion

General information on distribution, movement, and seasonal use patterns of big game within the project area was compiled and summarized from multiple sources including BLM vegetation data; spatial and temporal data from the IDFG, ITD, and ECS; personal observations by IDFG, ITD, and ECS biologists; mortality observations by ITD and city of Eagle maintenance crews; and residential surveys. By compiling the data, we can make several inferences regarding: the quantity, quality, and connectivity of general wildlife habitat; seasonal use and distribution of big game relevant to GMUs 32 and 39, including migration patterns; and areas of greatest observed auto-related mortality of big game. The information identified in this report will be used as the baseline data for the discussion points in the associated wildlife crossing report.

Based on the quantity, quality, and variability; its overall connectivity; and its relative proximity to human disturbance, the habitat found in the higher elevations and Cartwright Canyon to the east of SH-55 is considerably better than the habitat to the west. The region to the east also supports a greater amount and variety of wildlife species relative to the west, including big game species.

Big game species identified in the area included mule deer, elk, and antelope. Based on the compiled data we can make several suppositions. First, overall big game use, especially winter use, is greater to the east of SH-55 relative to the west. Mule deer numbers are on average twice as large as those to the west, and elk populations are 6 to 10 times as large (Section 5.0). Antelope are the only big game species that utilize the western portion of the project area to a greater extent than the eastern p01tion, and based on a number of factors, this population is unsustainable and will likely be extirpated from the region in time.

The second supposition is related to migration patterns associated with mule deer and elk. Based on the distribution data and personal observations, we can conclude that the majority of mule deer observed west of SH-55, and the western p01tion of unit 39-subunit 166, are resident populations. There is also a well-documented residential population associated with the Ada County land fill in the southern p01tion of unit 39-subunits 113 and 114 (pers. comm. Eric Leitzinger 2006). Both of these groups are found in the area year round and are generally much more acclimated to human presence, i.e. more likely to cross roads than migratory populations that are much less acclimated to human presence.

In addition to resident mule deer populations, we can also conclude that the larger big game populations, mostly elk, observed in subunits 214, 215, 166, 167, and 168 of unit 39 are primarily migratory herds traveling south from around the Harris Creek corridor. These populations almost exclusively migrate from north to south in the fall/winter along the Cartwright Canyon corridor, and do not cross SH-55. Our inference is that habitat conditions, noise from the highway and high fidelity to historic winter range is the primary reason for the migration pattern, and not that SH-55 acts as a barrier or restricts migration.

Our final supposition is associated with big game m01tality patterns. The hotspot mortality index (Table 4) identifies and ranks six primary sections associated with big game mortality on SH-55. There were no hot-spots identified for SH-16. Two of the three highest ranked

sites, Home Depot (1) and Shadow Valley (3) are associated with areas that have known resident mule deer populations and little or no migratory elk populations. In contrast, two of the three lowest ranked areas, Spring Valley (4) and Horseshoe Bend Hill South (6), have fewer resident populations and sizable migratory elk populations to the east. Insufficient information is known about the population associated with Horseshoe Bend Hill North (2) to make a similar assertion. Based on the distribution of preserved residential and migratory populations, the level of auto-related mortality seems to be greater in areas associated with residential populations relative to migratory ones; however, more studies are needed to make this determination.

7.0 Recommendations

Based on the results summarized in section 5.0 and the conclusions identified in section 6.0, the author recommends three lines of action. The first and most critical recommendation, in the author's opinion, is to continue to collect data on the size and distribution of migratory and residential big game populations in the region, seasonal use patterns, and auto-related mortality data. We recommend that point counts continue on an annual basis, a migratory tracking study is developed and implemented utilizing tracking collars, and that ITD, IDFG, and other agencies and private groups develop and implement a mortality data base that identifies and records where, when, and the type of animal killed. This could be easily done using a mobile recording device with GPS capability, or even a daily log. While we recommend that monitoring takes place on at least SH-55, SH l6, SH-44, Dry Creek/Cartwright, and Semen Gulch Roads, we strongly recommend that this monitoring take place county-wide and in perpetuity.

The second recommendation would be to develop and implement a regional plan that protects and aggressive restores habitat to the east of SH-55 associated with Cartwright Canyon and the high elevation mesic shrublands between the Harris Creek Drainage and the Boise Front. Because this area is primarily private property, and therefore habitat values are secondary based on state law, we recommend that this region be identified for acquisition; set aside in conservation easements for landowner tax benefits; or that an incentive-based approach be incorporated into the Ada County or City of Eagle Comprehensive Plans that allows for density bonuses associated with permanent protection and /or enhancement of these sites. These are only a few potential mechanisms that could be identified to permanently protect this habitat.

This is not to say that there is no valuable habitat to the west of SH-55. Many of the areas with desirable habitat have already been identified, as have some of the mechanisms to protect them, during the City of Eagle's comprehensive planning process (2008). However, in the authors opinion and based solely on habitat values associated with native plant and wildlife communities, the habitat to the west of SH-55 is significantly better and should be of higher priority relative to those lands west of SH-55.

The last recommendation is associated with short and long-term transportation planning associated with SH-55, Sh-16, and the ACHD-proposed arterials and collectors between. Based on the annually increasing use of SH-16 and SH-55 for commuting and recreation, as

well as the proposed amount of development in the north Eagle Foothills, we recommend that a wildlife crossing repo1t be completed to address potential types, design guidelines, and locations of wildlife crossings associated with the project area. The author strongly believes that combination of long-term big game monitoring, coupled with active restoration and regional land use/transportation planning will have a significant effect on reducing existing and potential impacts to big game and other wildlife populations. However, in order to successfully develop and implement these recommendations on a landscape-wide scale, public agencies, private interest groups, and private landowners/developers need to work collaboratively, think holistically, and plan regionally.

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Appendix B1- Forms

2007-2008 Big Game Residents Survey

Outline on the map (see back) where you have seen the group(s) of big game.

Mule deer ☐ White-tailed Deer ☐ Elk ☐ Pronghorn Antelope ☐ Unknown ☐

What month or season did you see them?

_____

Estimate how many animals were in the herd/group? 1-5 ☐ 6-20 ☐ 20+ ☐

How many times have you seen them using this area?

Once ☐ Occasionally ☐ Regularly ☐

Comments:

_____

_____

_____

_____

_____

_____

_____

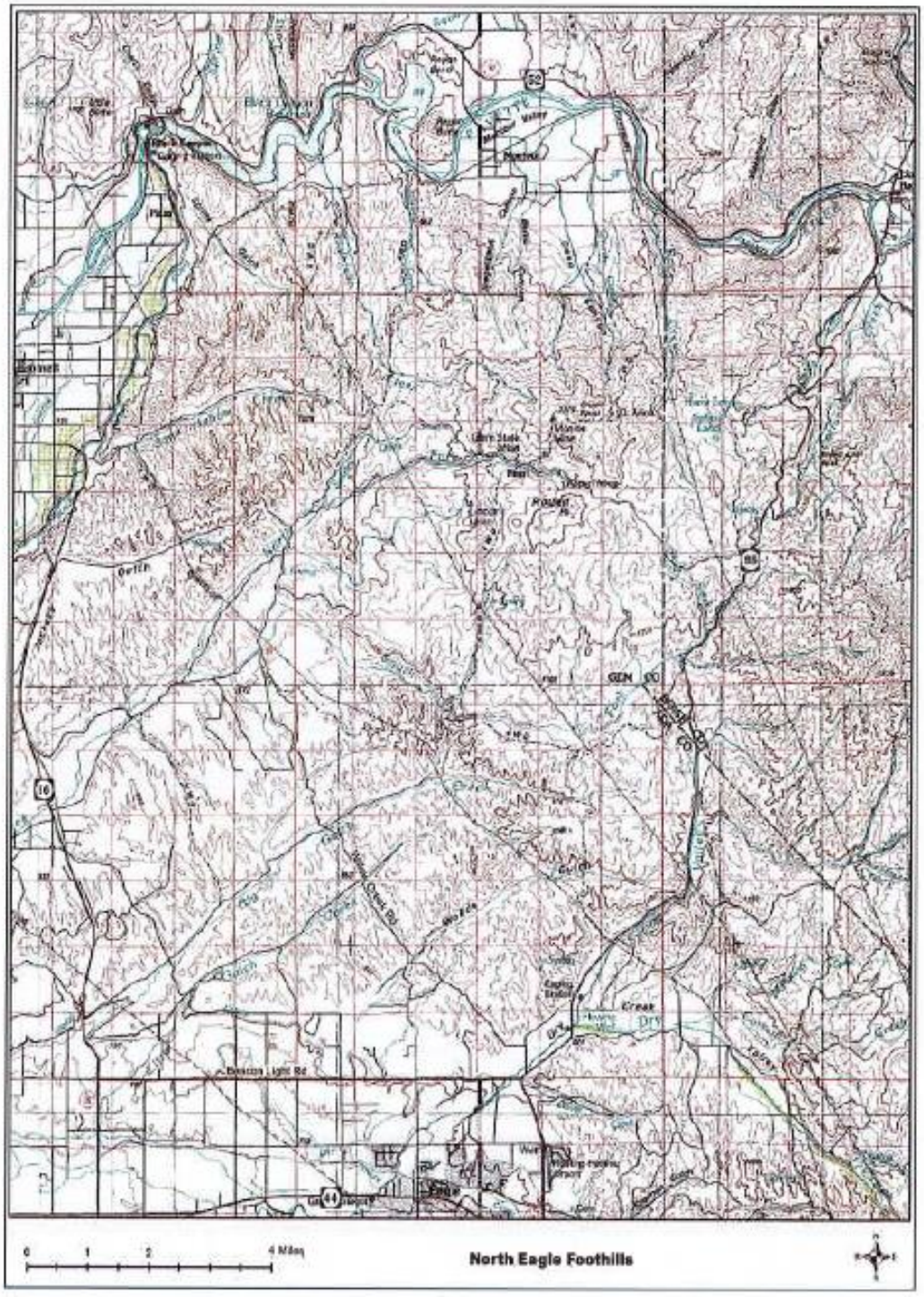
Can we contact you if there are further questions? Yes, ☐ No ☐

If yes, please list your contact information.

Name:_____

Address:_____

Phone Number and/or E-mail Address:_____


0 1 2 4 Miles
North Eagle Foothills

Big Game Ground Survey Observation Data Sheet

Date: _____ Time: _____

Area surveyed.: _____ __

Species Identified:

Mule deer ☐ White-tailed Deer ☐ Elk ☐ Pronghorn Antelope ☐ Unknown ☐

ID Method: tracks ☐ scat ☐ visual ☐ remains ☐

Estimated number of animals: _____

Comments:

Aerial Survey Form for Deer

Page____ of____

Date:_____ Time:_____

Weather:_____ Cloud Cover:_____

Temperature:_____ Precipitation:_____

Wind:_____

Primary Observer:_____

Secondary Observer:_____

Time Spent Flying:					
Start					
End					

Total	Activity	Veg Class	% Snow Cover	Aspect	Slope	GPS Point	Elevation	UTM Coordinates	Notes

Veg Class: 1= grassland, 2= agriculture field, 3= shrubland, 4= riparian, 5= other

Activity: 1= bedded, 2= standing, 3= moving

Slope: 1= less than 5%, 2= 6-25%, 3= 26% +

Appendix B2- Community Classification Crosswalk

The land cover classes and subclasses in the project area were determined from Pacific Northwest National Laboratory's (PNNL) raw vegetation data (2004). The PNNL data identified 50 dominant vegetation associations within the project area. The raw PNNL data was then combined into nine classes and 13 different subclasses based on the BLM/RMP Area Land Cover Classification System to increase the accuracy and usefulness of the map (Table 1).

Table 1. Plant Community Crosswalk.

Class	Subclass	Association	PNNL Raw Data
VEGETATED			
(SEMI)-NATURAL VEGETATION			
Forest	Evergreen Forest		PIPO
			ABLA
			PSME
			PIPO-PSME
			ABLA-PSME
			Picea-PSME
			JUNIPER
			JUNIPER-ARTR
	Mixed Evergreen Deciduous		PSME-ASPEN
Woodland	Deciduous Woodland		ASPEN
Shrubland	Deciduous Shrubland	Tall Shrubland	RIPARIAN
			MTNSHRUB
			CEVE
Grassland	Herbaceous Wetland		WET MEADOW
Semi-Desert	Annual Grassland		BRTE
			BRTE-AGCR
			Exotic Annuals
	: Perennial Grassland	Native	BG
			BG/(shrub)
			BG-BRTE
		Non-Native	Forbs
			Wheatgrass Seeding
	Evergreen Shrubland	Tall Shrubland	PUTR/BG
			PUTR/BG-BRTE
			ARTR/BG
			ARTR/BG-BRTE
			ARTR/BRTE
			ARTR-MIX/BG
			ARTR-MIX/BG-BRTE

Class	Subclass	Association	PNNL Raw Data
Semi-Desert (Cont'd)	Evergreen Shrubland (Cont'd)	Tall Shrubland (Cont'd)	ARTR-MIX/BRTE
			(ARTR)/BG-BRTE
			ARTRV/BG
			ARTRV-MTNSHRUB
			ARTRV-PUTR/BG
			CHVI/BG
			CHVI/BG-BRTE
			CHVI-ARTR/Wheatgrass
			CHVI-MIX
			CELE
			GREASEWOOD-ARTR
			SAVE
			ATCO/BG
			ATCO/BRTE
			ATCO-MIX/BG
			ATCO-MIX/BG-BRTE
Sparse Vegetation and Natural Barren Land			SPARSE VEG
			SPARSE VEG/ROCK
CULTURAL VEGETATION			
Agriculture	Crops		Agriculture
	Pasture/ Hay/ Other		
NON-VEGETATED			
(SEMI) NATURAL			
Open Water			WATER
CULTURAL			
Urban/ Industrial/ Extraction Areas			Urban
			Urban2

Land Cover Subclass Descriptions:

Forest

Evergreen Forest

Principal species associated with the Evergreen Forest subclass include ponderosa pine, Douglas fir, subalpine fir, serviceberry, sagebrush species, Oregon grape, snowberry, bitterbrush, and spiraea. Typical forbs and grasses include lupine species, blue bunch, wheatgrass, and Idaho fescue.

Mixed Evergreen/ Deciduous Forest

This community is dominated by a combination of aspen and Douglas fir. Common shrubs include serviceberry, sagebrush speci.es, Oregon grape, western chokecherry, wild rose, snowberry, bitterbrush, red-osier dogwood, willow species, and spiraea.

Woodland

Deciduous Woodland

The Deciduous Woodland subclass consists of aspen dominated communities. Common shrub species include serviceberry, sagebrush species, Oregon grape, and chokecherry.

Shrubland

Deciduous Shrub/and (Tall)

The Deciduous Shrubland subclass includes the Tall Shrubland association. As stated above, the Deciduous Shrubland subclass in the project area consists of mountain shrub and riparian communities. Riparian communities make up a very small percentage of the subclass. Typical shrubs associated with this subclass include alder species, serviceberry, Oregon grape, snowberry, ninebark, western chokecherry, wild rose, currant species, willow species, elderberry species, and spirea.

Semi-Desert

Evergreen Shrubland (Tall)

The Semi-Desert Evergreen Shrubland subclass includes the Tall Slm1bland association. Typical shrub species of the Evergreen Shrubland subclass are bitterbrush; xeric, basin and Wyoming big sagebrush; and rabbitbrush communities. Commonly associated grass Species include bluebunch wheatgrass and Idaho fescue.

Annual Grassland

Typical annual grass species include cheatgrass and medusahead wildrye. Associated forbs include exotic annuals such as tumble mustard, prickly lettuce, Russian thistle, field bindweed and rush skeleton weed.

Perennial Grassland (Native)

The Semi-Desert Perennial Grassland subclass, Native Grassland association is typical made up from perennial grass species including, but are not limited to, bluebunch wheatgrass, Idaho fescue, three-awn, needle-and-thread grass, Thurber's needlegrass and Great Basin wildrye. Associated forb species include lupine, arrowleaf balsamroot, slender-tipped hawksbeard, Pursh's milkvetch, and common sunflower.

Perennial Grassland (Non-native)

The Semi-Desert Perennial Grassland subclass, Non-native Grassland association is typically made up from grassland areas that are dominated by wheatgrass species planted during previous seeding eff01ts.

Sparse Vegetation and Natural Barren Areas

The Sparse Vegetation and Natural Barren Areas subclass is composed of areas with sparse vegetation caused by either natural circumstances or human degradation.

Northwest Ada County Wildlife Crossing Assessment-2009

Table of Contents-NW Ada County Wildlife Crossing Assessment

1.0 Introduction

The project area is located in two areas to the east and west of State Highway (SH)-55 in Ada County. There are two proposed planned communities and several large private land holdings that would impact traffic volume, present highway design and the location of SH-55, and potentially the same factors on SH-16. Several interior roads, now single land, gravel or forest- type primitive "di1t" roads are proposed for upgrading to 2, 3, 4 or even 5 lane roads. The total increase in housing could be as much as 24,000 units. Even so, a majority of the present landscape is proposed to remain in parks, recreation areas or other open space. One of the factors being considered is "how can wildlife be accommodated with the development and future highway expansion and construction".

The issues of integrating wildlife and wildlife habitat issues with urban growth and development is faced by many communities around the United States. San Diego County has developed an open space plan that protects many of the most critical habitats for threatened and endangered species and also provides living space and habitat connectivity for endemic resident species (The Nature Conservancy 2009). Tucson, Arizona is also developing a plan where open space is integrated with wildlife habitat, bike and hiking trails, riparian (river and stream) set asides and other relatively natural habitats (T. Davis 2009). In Europe, where human densities are generally higher than the United States or Canada, there are many examples of incorporating wildlife and ecology concerns with high human densities (F. Bank, et al. 2002).

The information in this report will provide several recommendations, based on the author's experience, for wildlife crossings, fencing and other potential mitigation measures, as well as a set of "general guidelines" that can be applied to road and highway situations within any planned development. Most of the proposed guidelines are used by Federal or State Government agencies.

Cost is a major concern for Federal agencies, for State Departments of Transportation (DOT) and for County governments and developers. Often, there are relatively inexpensive modifications to drainage or cross-drainage pipes that would allow for use by small species of terrestrial or aquatic animals. Slightly different stream crossings designs often can provide much better passage for wildlife species, fish and other aquatic organisms. Providing wildlife and aquatic habitat and population connectivity can become expensive and complex for major highways, such as SH-55 and SH-16.

All attempts were made to provide options for the Idaho Transportation Department (ITD) and Ada County Highway District (ACHD), as well as the most cost-effective wildlife crossing structures to meet the overall wildlife, development, and highway objectives. Previous to the present review of North Ada County, ITD, Idaho Department of Fish and Game (IFG) and other agencies and groups had assessed SH-55 and 16 for wildlife habitat connectivity as well as highway safety. This effort was a part of an Idaho Statewide Highway Linkages effort principally directed towards Idaho's highway system (ITD 2008). This report used the

information from the Idaho State Highway Linkages, but also made site specific recommendations for structures and crossings not possible with in a broad-scale (statewide) assessment.

Wildlife crossings contained in the assessment and report are intended to provide an overview of potential crossing opportunities and have not had engineering assessments, cost analysis or feasibility repo1ts or review of specific compatibility with some adjacent private lands. These potential crossings and guideline also are not a commitment from the developers or any agency to implement the findings and recommendations. They are solely the author's best professional appraisal of options that appear to be present to facilitate wildlife habitat and population connectivity.

A field review was taken by the author, Charles Baun, Kenn Hardin and Danielle McGuire on March 2, 3 and 4th 2009, which included an aerial review on March 3rd.

2.0 Wildlife Habitat and Wildlife Use of North Ada County

See preceding North Ada County Big Game Summary Repo1t. Wildlife habitat **in** North Ada County is varied from mountainous, high elevation Douglas fir forests in the northeastern county signified by Douglas fir forest types near Bogus Basin on the Boise National Forest. Moving down in elevation, aspen and willow communities are mixed with Douglas fir on the eastern slopes of Boise Ridge, intermixed with sagebrush habitats. To the east, near SH-55 the habitat is almost entirely sagebrush habitat, with southern slopes being bunchgrass or xeric sagebrush stands. Streams in the eastern portion of the study area, near Boise Ridge are well defined and run water either perennially or intermittently and often have well developed or fairly well-developed riparian habitat, consisting of willows and other shrubs in the more mesic areas. The area north of SH-44 and Eagle is historical irrigated farmland and grazing lands and is the most productive in the study area. Most of this habitat is now giving way to housing and commercial development as populations in Ada County grow.

Mammals east of SH-55 include, but are not limited to mule deer, elk, black-tailed jack rabbits, Piute ground squirrels and a few antelope. Carnivores include black bear mountain lion, bobcat, coyote, skunks, and raccoons. Reptiles and amphibians include gaiter snakes, gopher snake, western skink, short-horned lizard, Western fence lizard, long-toed salamander, Western toad, and Great Basin spadefoot toad.

Between SH-55 and 16, the elevation decreases, as does the amount of moisture. The result is a mixture of sagebrush and bunchgrass habitats that area sparse and less productive compared to the areas near Boise Ridge to the east. Terrain moderates and is gently rolling with distinct valleys. Some of the only standing water is in willow creek and the lack water results in a desert habitat. Many of the stream channels only run water in the most intense rain events and are poorly defined. Wildlife in this portion is less varied and consist of mostly wintering mule deer, a

small heard of antelope and occasional elk, likely associated with the Montour Wildlife Management Area. However, groups of elk could also cross SH-55 during winter periods. Smaller mammals include dese1i cottontails and black-tailed jack rabbits. Carnivores would include coyotes, skunks, and occasional raccoons.

East of SH-16, habitat is lower in elevation and moisture, resulting is very sparse, desert habitat similar to much of southeastern Idaho. Animals include, but are not limited to mule deer, antelope, mountain cottontails and black-tailed jack rabbits. Mule deer and antelope undoubtedly cross SH-16, however, the amount of developments, lack of standing water, and more desert-like habitat likely results in less attractions for large mammals to move back and forth. The exception to this is that antelope usually inhabit drier habitats than mule deer and also exist in limited numbers throughout North Ada County. If antelope are to persist in the study area, it is certain that wildlife habitat linkages must remain as populations are small, fragmented, and subject to demographic, genetic and stochastic issues and problems. No time was spent during the field review east of SH-16.

The ability of these areas to sustain wildlife over time will be partly a factor of habitat and population connectivity. Small, isolated wildlife populations, such as the mule deer and antelope populations in the central and western portions of the study area, are not likely to persist unless efforts are taken to ensure their connectivity with other larger populations (Bissonette and Storch 2002, Garrison 2005, Mills 2007, Wilcox and Murphy 1985).

2.0 Potential Wildlife Crossings on State SH-55

Potential sites were reviewed on State SH-55 for wildlife habitat and population connectivity. The identified sites were determined based completely on the current site characteristics (topography, drainages, existing structures, etc.), without regard to wildlife presence or use patterns, mo1iality rates, or human uses (planned development and recreation use). This process was used in order to identify all potential sites without biasing the observer.

After the sites were identified and described, we developed a number of discussion points for each site. These discussion points were developed to characterize the conditions of the site based on the preceding big game summary report, and to promote dialogue on the issue of wildlife crossing from a regional perspective. It should be made clear to the reader, these points are not meant to be planning tools or recommendations for or against future planning eff01is, which are under the jurisdiction of the ITD.

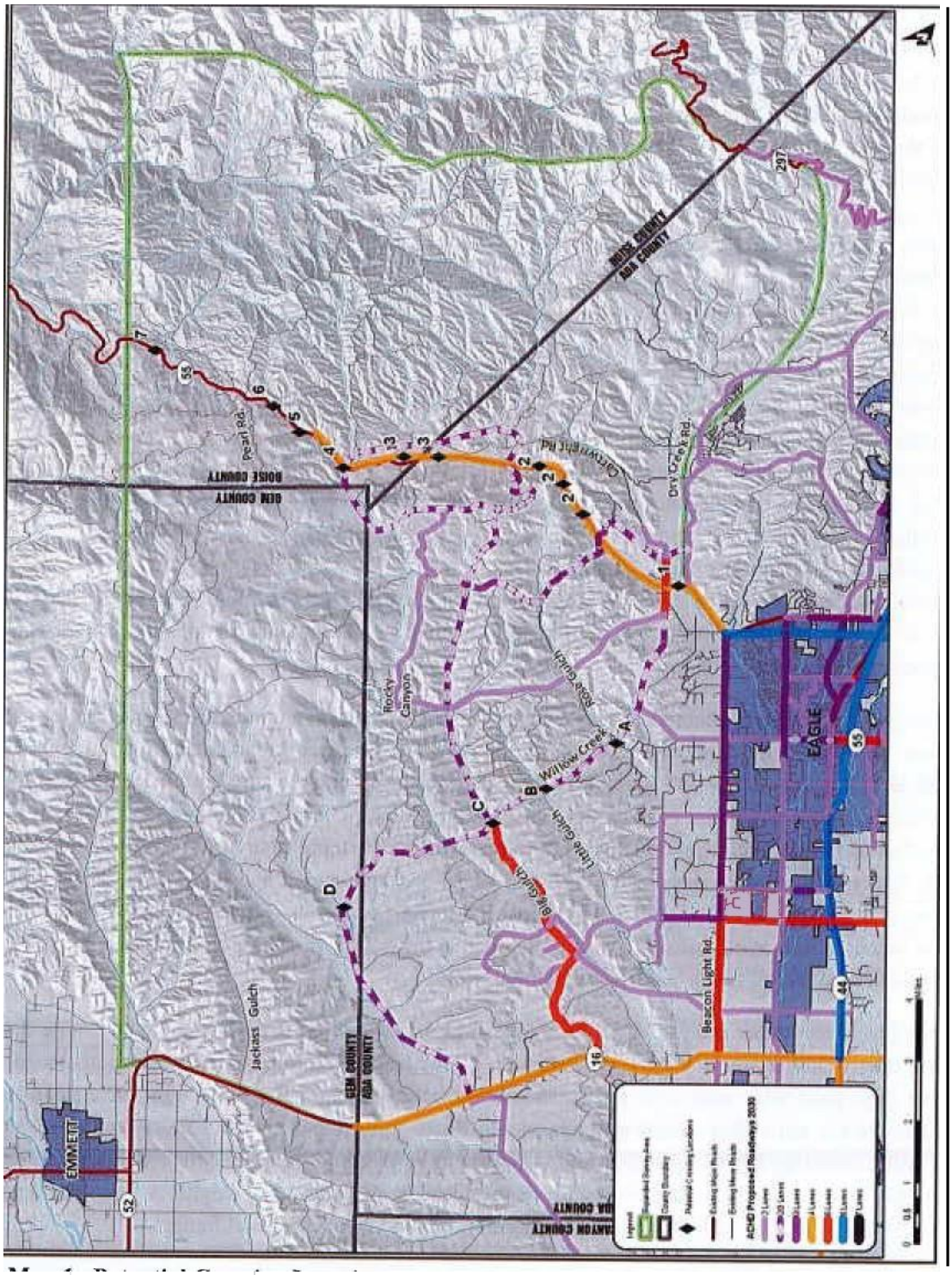
In general, there are three primary discussion points relative to wildlife crossings that we feel need to be discussed and addressed. First, is there a need for a crossing based on the existing/proposed conditions, or is there other avenues?

Second, will wildlife use the crossing? The overall success of a wildlife crossing is related to the probability of use by wildlife, which is directly related to a number of factors, including but not limited to: the type and orientation of the crossing; light; noise; limiting alternative access to the

roadway; the presence, amount, movement patterns of wildlife in an area; and the amount, type, and proximity of human uses (development, agriculture, recreation, etc.), especially at night (Cramer and Bissonette 2006).

Third, what is the cost and benefit of the crossing in the short and long tem1? Specific costs would be dependent on the type of structure, required modifications to the highway, and other components including fencing and long-tem1 monit01ing, and will not be specified in this rep01i as there are too many variables and limited design specifics to do so. Rather, refer to section 3.2 for general cost differences. However, all of the identified options associated with SH-55, with the exception of Dry Creek, would be costly and require significant modifications to the existing highway.

One other aspect that was considered but will not be included in the report was visual impacts. The section of highway within the project area is currently part of the Payette River National Scenic Byway. As such, visual impacts associated with the development of potential crossings and the associated fencing would need to be considered. As we have insufficient information on specific designs and it would be required under any ITD project, visual impacts will not be included in the discussion points.



Map 1. Potential Crossing

2.0.1 Dry Creek Bridge (1)

Dry Creek, located at Mile Post (MP) 48.5, is a perennial stream that has good flows through the wetter parts of the year and has a well-developed riparian area for a stream in an arid climate. Species present include mule deer, raccoon, garter snakes (one observed at bridge site) and other local mammals, amphibians, and reptiles. The presence of fish in this section of stream is not known. If there are fish, the bridge provides adequate passage - there are no blockages. The riparian habitat up and downstream from the bridge includes cottonwood and other deciduous vegetation. Dry Creek could and probably is a corridor for wildlife and aquatic organisms moving from the Boise River. This corridor should be protected and managed as much as possible as part of a floodplain, open space and green-way.

Figure 1. Dry Creek Bridge.

The present bridge is adequate for movement of most terrestrial and aquatic species up to mule deer. Based on current guidelines, the bridge is slightly low, appearing to be approximately 8 feet tall at the upstream side. Also, there is rip-rap armoring throughout the bottom of the structure which hampers movement of mule deer through the structure. It is recommended that the rip-rap be moved to the concrete abutments so the stream channel is more easily traversed by wildlife. In the future, if the bridge is replaced, it should be 10 feet high and at approximately 10 feet wider thai1 it is now. Bridge substrate should mimic the surrounding soils. The area near Dry Creek has the highest number of collisions with mule deer in the SH-55 project area, probably because of the lush agricultural fields and riparian habitat.

Fencing is recommended for all wildlife crossings and would be necessary to funnel mule deer and other wildlife into the crossing structure. Normal big game highway fencing consists of 8 foot high page wire with stout posts. The author believes that a five foot high fence might be adequate for mule deer. Some animals would likely jump the fence, but most would use the wildlife crossing. In the event that mule deer continue to jump the fence (after monitoring), one or two wires could be added to the top of the fence to provide more height. A five foot fence would be experimental but would cost less and probably have less visual impact.

Discussion Points (1): This proposed site is unlike any others identified, as it has an existing structure that already provides connectivity to wildlife. The structure is located within the third

highest ranked hot-spot (see summary report), with known residential mule deer populations to the southeast (Ada County land fill) and north/northwest. The structure can easily be modified, with little or no impact to the function of the structure, and at a minimal cost. The structure canbe used by a number of wildlife (mule deer, small mammals, birds, and aquatic species), with existing habitat and com1ectivity, via riparian corridor, with large tracts of natural open space to the east and west. It is very unlikely that elk would use this crossing based on proximity to existing and proposed development in the area.

There are currently development plans for both sides of SH-55, and the area directly north of the site has been identified as a commercial center, with a proposed grade separated intersection (Brookside). While there will be a significant amount of development in the area, there will be a riparian corridor that would be adequate for wildlife use, all be it at a reduced Level. The proposed corridor to the west (Alpine Creek) would be approximately 400 feet (200 feet on each side), and the proposed corridor to the east (Dry Creek) would be approximately 100 feet (50 feet on each side). The riparian corridor connects, generally across low density residential, to the foothills to the north on the west side, and to the north and south on the east side. While the riparian c01Tidor would connect wildlife from one side of the highway to the other, the higher density residential and commercial developments would act as a barrier, restricting movement across the highway, likely reducing auto-related mortality, and increasing driver safety.

Based on the location in proximity to an identified hot-spot, the type of existing structure and low cost for modification, and the existing use by wildlife, this site should be highly considered as a wildlife crossing.

2.0.2 Mile Post 50 (2)

There is little opportunity for any large mammal crossing sites between Dry Creek Bridge and MP 50. At approximately MP 50, the canyon converges and would allow big game, primarily mule deer, to move from the hilly te1nin to the east and west across the highway. There are some houses and minor facilities near MP 50, but a linkage could be developed through this site. Unfortunately, there is no place to locate an underpass structure unless the entire highway fill is elevated. The only feasible option at the south entrance of the canyon would be an overpass. There are two locations just north of MP 50. The recommended size for an overpass suitable for big game and other wildlife would be 75 feet wide. This is less than half the width of most wildlife overpasses (see Ecopasses 3.1). In the United States, Ecopasses are designed and constructed for major landscape linkages for plant and animal communities. The MP 50 wildlife overpass would be focused primarily on maintaining some connectivity for big game.

2.1.3 Mile Post 50.5-51.2 (2)

Further north, at approximately MP 50.5 to MP 51.1, there are several potential sites for wildlife underpasses. The underpass locations are provided by the highway being elevated across draws. The road fill at the potential locations appeared to be adequate to provide a 12 foot high arch, box culvert or bridge to pass mule deer or elk. If only mule deer passage were required, a 10 foot

high structure would be adequate. Other wildlife would use the structure such as bobcats, mountain lion, coyotes, skunks and other local fauna. The recommended structure if only mule deer passage is required would be an arch or box culve1t at least 1O' high by 25 feet wide. If elk passage is an objective, the recommend structure would be a box culvert or bridge at least 12' high by 25' to 30' wide. Elk appear to have more rigid passage requirements compared to mule deer, mountain lion or black bear, probably because they often cross in larger herds where if one animal does not cross, the entire herd will not.

The author prefers box culverts to arches because they allow more light coming in from above and appear to be more "open" compared to arches. Often, costs are similar, but not always. Arches can be an effective wildlife crossing for all species or large animals, especially mule deer, black bear and mountain lion that are resident animals. Whenever migratory elk or mule deer herds are target animals for the crossings, more open structures are recommended - such as box culverts or bridges.

2.1.4 Mile Post 51.6 (2)

At the north entrance to the canyon (MP 51.4), representatives from the ITD identified a third location for a potential underpass. This would be a 12-foot box culve1t or bridge, bridge option preferred by **ITD,** which could be located just north of canyon where the power lines cross the highway, near where the Avimor water treatment facility is located (Pers. comm. Scott Rudel 2009).

Discussion Points (2): This area consists of three general crossing locations: canyon-south overpass, mid-canyon underpasses, canyon-north underpass. In general, all three locations are in close proximity to known big game populations, primarily resident mule deer, but does not exhibit use by elk or any large migratory populations (see preceding summary report). The area within the canyon itself has relatively little mortality in comparison to the south and north entrances, both identified as hot-spots (south ranked 3rd and the north ranked 4th of six). Based on the proximity to each other, and the big game populations in the area, any of the three proposed locations could provide connectivity across SH-55.

Based on the location and type of structures identified for these three proposed locations the south canyon overpass would likely have the second most human use, but would probably be the most costly, noting that this is the only option that would likely be done without an associated expansion project. The area is in close proximity to a golf course and several residents to either side of the highway, including a number of residents on the southeast side above where the overpass would be located. It would be assumed, based on the location and accessibility of the overpass that it would get at least some recreational use, including equestrian.

The mid-canyon underpass locations would likely have the least amount of human use and would be the least expensive, assuming it was done in conjunction with a highway expansion project.

This option would get little or no human use based on the topography of the area, which would significantly limit human presence and recreational use.

The north canyon underpass would have by far the most human presence and would be the second most costly; again assuming it was done in conjunction with highway expansion project. This location would be directly adjacent to the Avimor water treatment facility, a paved walking trail with lighting, and a recreational trail connected to the Ridge to Rivers system. In addition, the site is in close proximity to where a proposed realignment of SH-55 would be located.

Regardless of the location, a successful crossing would need a fence system or other means to limit big game access to the highway, including jump-out points throughout, before and after the canyon entrances. Restricting access to the highway, primarily at the north and south entrances would likely reduce auto-related mortality and increasing driver safety. Again, estimated costs are relative (section 3.2) without specific design information.

2.1.5 Mile Post 54.0 (3)

There appears to be a suitable location for a potential overpass. Target species would be mule deer and elk. The recommended size for an overpass suitable for mule deer, elk and other wildlife would be 75 feet wide.

2.1.6 Mile Post 54.2 (3)

There appears to be a suitable location for a potential underpass. Target species would be mule deer and elk. The recommended structure type would be an arch or box culvert approximately 12' high by 25' to 30' wide.

Discussion Points (3): Big game use associated with the Spring Valley Creek area (MP 51.4 through 55.7) is generally limited to small resident groups and individuals, primarily mule deer and to a lesser extent antelope. There is little evidence that supports movement across SH-55 by large migratory elk herds, which make up the largest percentage of big game in the area, or large groups of mule deer or antelope, i.e. wildlife movement across SH-55 is n01mally small groups or individuals (see preceding summary repo1i). The area was ranked as the 4th of six hot-spots.

In addition to big game movement in the area, proposed development patterns associated with regional planning efforts (City of Eagle's Amended 2007 Comprehensive Plan-Final and 2008 ACHD No1ih Ada County Transp01tation Plan-Draft) have identified high density residential and commercial, including two regional commercial centers (east and west sides of the highway), as well as a grade separated intersection associated with the northern portion of the Spring Valley corridor (Willow Creek).

Based on the amount of planned development in the area, these sites would be costly and of limited or no value to wildlife. However, development patterns would act as a barrier and restrict big game access to the highway within the corridor, reducing auto-related mortality and increasing driver safety.

2.1.7 Mile Post 55.7 (4)

This is probably the best single potential crossing for elk on SH-55. There is a natural stream channel and riparian area that would funnel elk from the east side habitat (Mores Mountain and Boise Peak - National Forest lands), across SH-55 to the Pearlarea in upper Willow Creek.

Figure 2. Elk herd east of SH-55 near Mores Mtn.

The site lends itself to a wildlife bridge such as is used in Banff National Park (Canada) and Highway 260 near Payson, Arizona. Bridges provide one of the most reliable highway crossing structures for elk, but are more expensive than either concrete or steel arches or box culverts. Mule deer, mountain lion, bobcats, coyotes and smaller mammals would also readily use a bridge type crossing but would also use an arch or box culvert. The size of the bridge should be at least 12' feet high to allow elk passage. The length of a potential bridge would be determined by engineering feasibility and cost but should allow elk and other wildlife to pass along the South Fork of Willow Creek unimpeded. On-site determination would be needed, but thirty feet wide at structure bottom would allow 15 feet of useable space on each side of the creek.

Alternative structures would include either an arch structure or box culvert at least 12-feet high and 30-feet wide. Since elk would be a target species, the recommendation would be for a box culve1t (3-sided box).

Discussion Points (4): The discussion associated with this proposed site is the same as Mile Post 51.2/55.7. The proximity to the amount of human use at Willow Creek and the adjacent lands would considerably limit the probability of use by most big game and other large wildlife. While there would be a buffer and trail system around the riparian corridor similar to the east side of Dry Creek, the potential amount and proximity of traffic east/west would be much greater, as would the amount of commercial development, and the cost would be exponentially greater. In addition, the populations associated with Dry Creek corridor are likely limited to residential populations acclimated to human disturbance, while the populations east of Willow Creek are migratory and much less adapted, therefore less likely to use a crossing with that much human disturbance. While a crossing may have limited benefits for larger animals, designs associated with the proposed intersection should take small mammals and aquatic species into consideration (Section 3.0).

2.1.8 Mile Post 56.0 (5)

This is a good underpass location with a small stream that ran water during the field review. The fill would have to be removed and the existing culvert, which is only adequate to pass water, replaced with a wildlife crossing. Since this area has one of the highest uses by elk in the SH-55 project area, a 3-sided box culvert would be recommended. This would allow mule deer and perhaps antelope to use the structure, too. The terrain does not lend itself to antelope, being steep. A box culvert or bridge at least 12 feet high and twenty five feet wide is recommended. Fencing would be recommended from the South Fork of Willow Creek to the divide. Eight foot page wire with stout poles is recommended since elk are a target species.

2.1.9 Mile Post 56.6 (6)

This location is on a fill, near an old and abandoned bend of SH-55. The location appears to be adequate to provide a box culvert for mule deer, elk, mountain lion and smaller wildlife. The existing fill road fill appears adequate to provide for a box culvert or arch. The recommended height would be at least 12' and a width or 25 to 30 feet. Fencing is recommended from the divide to Willow Creek. Standard 8 foot high page wire wildlife fencing is recommended.

Discussion Points (5/6): Big game use associated with the Horseshoe Bend Hill-South area (MP 55.7 through 57.7) is generally limited to small resident groups and individuals, primarily mule deer and to a lesser extent antelope. There is little evidence that supports movement across SH-55 by large migratory elk herds, which make up the largest percentage of big game in the area, or large groups of mule deer or antelope, i.e. wildlife movement across SH 55 are normally small groups or individuals (see summary report). The area was ranked as the 6th of six hot- spots.

However, unlike sites three and four, this area will remain as natural open space, with little or no direct impacts from human use, including recreation, which could increase use of the area by big game in the future. Therefore, this site, and site six, should be highly considered in long-term planning efforts. As part of the planning for the area, it is critical that adequate fencing and associated jump-out points be included in the overall design and construction.

Currently, there is no expansion projects proposed for that section of SH-55 that would facilitate the construction of a wildlife crossing (pers. comm. Kim Just 2009). However, based on existing safety issues associated with winding roads and high speed, coupled with existing wildlife crossings and mortality in this section, a set of activated signs could be put in place to increase driver safety. These signs incorporate sensors on the road side that activate lighted signs and issue warnings to drivers to slow down. The overall affects of these types of signs vary but would at least be a cost effective way to increase driver safety in the short-term.

2.1.10 Bread Loaf Rock (7)

Bread Loaf Rock is approximately one mile north of the Pearl location. There is a very large road fill that spans a live creek that eventually flows into Robbs Creek. Mule deer tracks were observed crossing SH-55 on the north side of the drainage. Passage across the highway is difficult because of cement rails, steep fill slopes, livestock fencing and side road cuts. The fill is so high at the stream crossing that it would be unfeasible to place a wildlife crossing at the drainage structure. The best locations for wildlife crossings would be in the fill slope where the fill is only 15 feet deep.

Figure 3. SH-55 Adjacent to Bread Loaf Rock.

Any potential wildlife crossings would be primarily for large and mid-sized mammals and should be at least 12 feet high, if elk passage is an objective. Wildlife crossings at the edges of the large road fill would not be easy for wildlife to find, however, over time use would likely occur. Wildlife fencing would be necessary to funnel elk and mule deer into the crossings structure.

Locating good wildlife crossings on the highway heading down to Horseshoe bend will not be easy. Highway fill slopes are large and steep and draws have been completely filled in. It may be best only to provide crossing south of the divide.

Discussion Points (7): Big game use and distribution information associated with the Horseshoe Bend Hill-North area (MP 57.7 through 63.3) is limited, as this area was outside the project area. However, the area had the greatest number of recorded mortalities (ITD 2009) and was ranked second out of the six hot-spots; therefore, it should be highly considered in long-term transportation planning. Similar signage identified for sites 5 and 6 could also be incorporated in this section.

2.1 Potential Wildlife Crossings on SH-16

Wildlife habitat becomes more sparse and dry to the east of SH-55. The center portion of the project area, between SH-55 and 16 is drier than east of SH-55 where conifers (forest) and aspen (woodland) stands exist within healthy stands of sagebrush (xeric shrubland). The center of the project area is almost all sagebrush and grassland, indicating drier habitats. To the west of SH-16 most of the habitat is grassland, with some sage and other xeric shrub lands. Along SH-16 much of the landscape is occupied by ranches and ranchettes, with fencing, livestock and domestic animals. The only riparian area observed that had any vestige of water or riparian vegetation was

Willow Creek. Lower Willow Creek, near SH-16 appeared to be channelized, over grazed and of minimal use as wildlife habitat.

Two trips were made through the SH-
16 corridor, the first on Monday, March 2, 2009 and the second on Wednesday, March 4th. During both these field reviews, there seem to be almost no opportunities for wildlife crossings without either: 1. Building up highways fills to provide the height necessary for a wildlife crossing, or: 2. Building an overpass. Before either of these options were considered there needs to be a considerable assessment of the need for wildlife connectivity and the present ownership patterns, which are almost entirely private.

Figure 4. Antelope occur in low numbers adjacent to SH-16 and in other parts of North Ada County.

Wildlife use of the area seems minimal, as does the quality of wildlife habitat.

There is one marginal site for a wildlife crossing that would provide connectivity to public lands to the west, which are mostly BLM properties associated with the Payette River Breaks. This would include parts of Hartley Gulch, Sand Hollow and Homestead Gulch (east of interstate 84). The best location for a wildlife crossing would be in Sections 5 or 32 at the head end of Jack Ass Gulch. There is a road cut as SH-16 crosses the ridge that could be bridged. The cost of such a structure would be considerable, however the terrain appears to provide the abutment slopes, and so fill on each end would be minimal. If an overpass was considered at this location, it should be approximately 75 wide. A narrower overpass may be suitable. Use would be by mule deer, antelope, coyotes, badger, and similar desert biota. Fencing would need to be placed to guide animals to the structure. Standard 8 foot page wire is recommended.

Discussion Points: The general consensus by ECS, the author and ITD (pers. comm. Scott Rudel 2009), is that the constrained placement opportunities coupled with the limited use of the area by big game does not warrant a crossing within the project area. However, the area around Freezeout Hill should be at least considered in future planning efforts. It was also noted by ITD (pers. comm. Scott Rudel 2009) that a potential crossing associated with livestock movement across SH-16 has been identified for future consideration.

2.2 Potential Crossings and Other Mitigation Measures for Proposed Arterial and Connectors Between SH-55 and 16

Figure 5, Mule deer occur in the desert shrub and grassland between SH-55 and 16.

A number of low standard, low **traffic** volume roads would be upgraded into paved two-lane, three-lane and five-lane roads. Traffic volume would increase commensurate with the size of roads. Even with the large number of proposed housing units, there would be adequate open space to provide habitat for some mule deer, antelope (unlikely), elk and other smaller mammals, birds, reptiles, and amphibians. A short review was conducted of the project area to see if options would be available to provide passage across the interior roads, linking open space areas for wildlife. Much of the open space would also be used by recreation and the question was asked whether or not crossings could be multiple-use for low volume roads, recreation (hiking, biking and equestrian) and wildlife. To some extent, the answer to this is there is compatibility. However, for species like elk, mule deer and antelope human use will be inverse to use by large wildlife (Clevenger and Waltho 2000). Studies in Banff National Park indicated that the wildlife crossings on the Trans-Canada Highway received more use the further away from the town site of Banff. The reason for this was that hikers and other recreationalists commonly used the wildlife crossings to cross the highway, even though there were no developed trails to facilitate this use.

Since the objective of the development is housing and limited commercial use for humans, the amount of wildlife use will be severely limited especially for large mammals. Even large mammals are adaptable to human developments if adequate open space is available. When large animals are present in densely populated areas, factors like animal-vehicle collisions and potentials for conflicts between animals and humans exists. The objective of this review was to make recommendations on where habitat connectivity could be developed or maintained. To address the wildlife habitat connectivity issues, two approaches are suggested. The first was to review the proposed development area to see if there were obvious places where habitat connectivity was feasible. The second was to address various types of wildlife crossing options for large, medium and small animals - and for aquatic organisms (fish and other water dependent species). The second option will be described in the report following specific site recommendations. There will be no discussion

points in this section.

The field review for potential wildlife connectivity areas was started on the west portion of the Willow Creek Road.

2.2.1 Rose Gulch (A)

There was vi1tually no defined stream channel and it appears that the stream rarely, if ever, runs water. Vegetation, even in the valley bottom was sparse. No recommendation is provided for this drainage. Opportunities for wildlife habitat connectivity are minimal to none.

2.2.2 Little Gulch (B)

Has a slightly better defined stream channel with a small culvert. Vegetation is nearly absent near the Willow Creek Road. Livestock grazing has been heavy over a prolonged period. There is minimal wildlife habitat and wildlife in this area. No recommendation is provided.

2.3.4 Big Gulch (C)

Has a defined stream channel and 5 foot diameter culvert going under the Willow Creek Road. The stream is intermittent and flows only at high rainfall or snowmelt periods. Use by livestock is high and the riparian habitat degraded. When the steel culvert is replaced, a concrete box culvert at least 4 feet high by 4 feet wide is recommended. This would allow passage of small mammals (up to the size of coyotes and badger, not including mule deer), reptiles and Amphibians up and down Big Gulch. The bottom of the structure should be below the stream grade so there is a natural soil substrate provided throughout the structure. Care should be taken to minimize or eliminate scouring at the downstream end of the road crossing and sand deposits at the upstream end. The riparian area should be restored. Wing-fencing should be at least four feet high with page wire that is 2" x 4" in diameter. Fencing would reduce the number of small animals trying to cross the road and decrease road-kill.

Figure 6. Piute ground squirrel in Big Gulch.

2.3.5 South Fork of Willow Creek Road (D)

There was water in the channel, which is fed by a small reservoir upstream. The channel is well defined but has been modified in various ways. Riparian vegetation had been removed by the present land-owner; however, there were still some willows and other brush in the channel. This stream channel is by far the best wildlife habitat for riparian species in the interior project area. The existing crossing structure bottom was completely covered by water, which would require some species to move over the road surface. If the present concrete bridge were replaced (figure 7), the recommendation would be to make the new structure 4-6 feet wider to allow small and mid- sized mammals to walk on either side of the stream. A bridge or concrete structure would be suitable. There also may be an opportunity in the future to work with land owners along Willow Creek to improve the riparian vegetation.

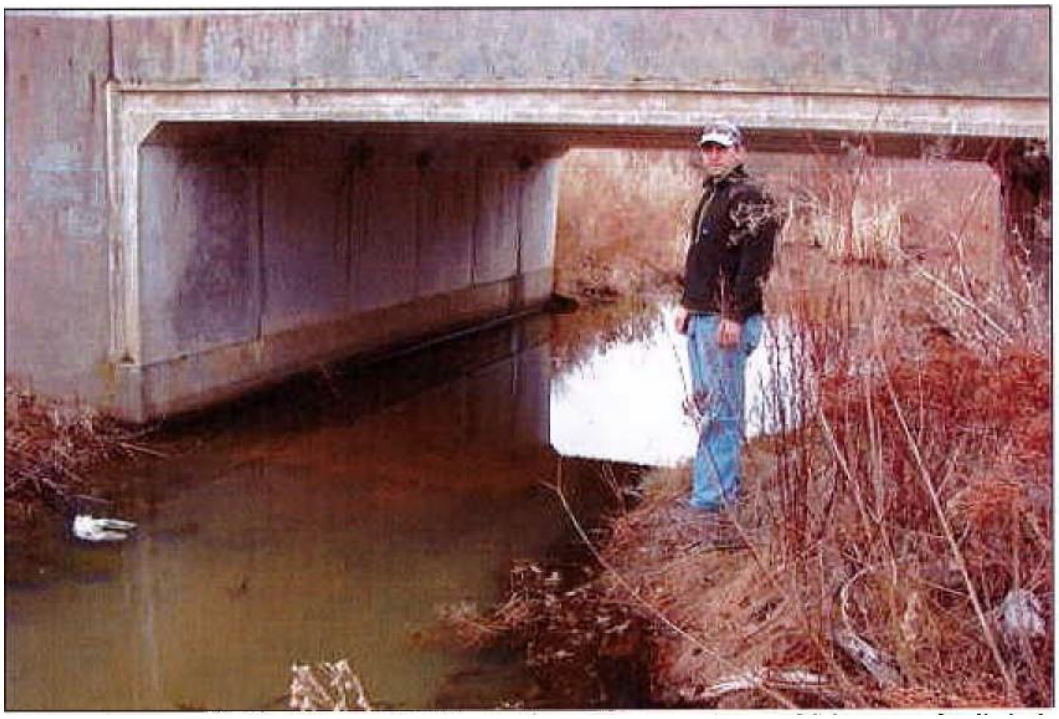


Figure 7. Bridge at crossing of South Fork of Willow Creek. Bridge provides good fish passage, but limited passage for terrestrial species. Kenn Hardin from Environmental Conservation Services in photo.

3.0 General Guidelines for Wildlife and Aquatic Organism Crossings

The following are some general guidelines for providing wildlife crossings and wildlife and aquatic habitat connectivity. They are useful whenever road or highways cross habitats that are important to terrestrial or aquatic species. The appropriate use of these "tools" is up to the decision-makers, agencies, and their staffs. Not every road crossing is important as a wildlife habitat linkage. Some areas have too much habitat fragmentation, too few acres of useable habitat - or are of too little value to justify placing expensive structures for minimal gains. Having mentioned this, many riparian or riverine habitats are highly used by wildlife and often existing or new structures can be used effectively for minimal costs. Using existing drainage and other crossing, with additional fencing or other modifications, is called "retro-fitting" and often can provide substantial benefits with a fraction of the cost of "stand-alone" wildlife crossings. The other issue encountered in developments is using a recreational, traffic or other type of crossing to benefit wildlife. Each situation needs to be analyzed on the merits of the situation. Not every wildlife crossing is going to be an ideal situation, in fact, few are. Any opportunity to improve wildlife habitat connectivity and reduce road or highway mortality should receive serious consideration.

Figure 8. Newberg wildlife crossing in Canada.

Fencing with associated wildlife crossings has been shown to be an effective measure to substantially reduce large animal roadkill mortality and reduce highway, collisions (Romin and Bissonette 1996a). The efficiency of various structures to pass wildlife across highways continues to mount (Foster and Humphrey 1995, Clevenger and Waltho 2003, Gordon and Anderson 2003, Dodd et al. 2007a). There is little doubt that the most effective highway crossing structures are wildlife overpasses and large multi-span "eco-bridges", but these structures are also much more expensive than many DOT's can or will afford. One of the benefits of wildlife overpasses and "eco-bridges" is that they allow for habitat (grass, shrubs, and often tree cover) to extend over or under the highway. For large species like mule deer and elk, bridges are also favored for highway crossings. These structures are less expensive compared to wildlife overpasses and eco-bridges, but can still cost $3,000,000 per structure, or more. Large box culverts have many of the characteristics of bridges (relatively wide at the top of the structure, which allows light to penetrate), but are usually less expensive. Arches may be the least expensive structures, but also may be the least effective for some species (elk, moose, antelope). Arches and box culverts are readily used by common large species such as mule deer, black bear, and mountain lion.

Species tend to use all types of structures more over time. This increase in use may extend for 10 years, or more, and make a decision for less costly structures a good alternative. If the animalsare resident to the area (as opposed to migrato1y) and have access year-round to the crossing

structure, it is thought that they have more exposure and hence may adapt faster than ungulates that only see the structures two or three times per year. Virtually all species (except antelope) use all of the structures defined above. The correct decision as to type and number of structures involves both economic and biological factors. Redundancy is often and impo1tant aspect of wildlife crossing efficacy and 2 or 3 structures are often recommended within a wildlife habitat linkage.

3.1 Terrestrial Wildlife Crossings Recommendations

3.1.1 Across-Grade Wildlife Crossings

These are normally situations where traffic volume is relatively low and where wildlife crossing structures are either too expensive, or otherwise not feasible. Fencing may be employed to funnel animals across the highway grade at a specific point. The crossing location might be 50 to 100 feet wide to several hundred yards. The most sophisticated crossings have animal detection systems that are connected to wildlife warning signs that flash or light up only when animals are in the right of way. The "interactive signing" is needed because motorists will not slow down when standard wildlife signs are used (Huijser, et al. March 2009). The downside of across grade wildlife crossings is that the detection systems now available only detect large animals the size of mule deer and elk (sometimes as small as coyote). The systems currently used often fail for a variety of reasons relating to maintenance, weather and equipment failure. The good news is that the detection and interactive signing is getting better as equipment improvements continue. A recent development is called Electro-MATs which are placed across the highway so animals do not walk into the highway right-of-way and get trapped by the fencing in the traffic lanes. The Electro-MATs provide a mild electrical shock when animals try to cross them. The cost of an across grade wildlife crossing is not inexpensive, but is less than many higher cost structures would be. Electric power is often provided by solar panels – or directly off power lines when available (Gagnon, et al 2008).

Figure 9. Interactive Highway Sign (Switzerland).

3.1.2 Small Culverts for Reptiles, Amphibians and Small Mammals

These are usually pipes or box culverts 12" to 24" in diameter or width. These structures are adequate for frogs, lizards, salamanders, toads, small turtles, and mammals such as mice, voles, ground squirrels, badger and marmots (Forman, et al. 2003). Wing-fencing is almost always necessary and can be plastic, fabric, or woven wire 18" to 24" in height. Erosion fencing works well for this purpose (used to minimize sediment going into ditches and streams). Wire mesh of ¼" to ½" also can be used. Small pipes work better if a small amount of soil or sand is available throughout the length of the culvert to provide a natural. surface (Bank, et al. 2002, Clevenger etal 2001).

Figure 10. Small culvert in 'The Netherlands used for badger and other small animals. Note fencing.

3.1.3 Medium-sized Culverts for Reptiles, Amphibians, and Small to Medium Sized Mammals

This usually includes 24" to 36" pipes and box culverts (Forman, et al. 2003). Three-sided or box culverts are often better wildlife crossing structures than corrugated steel round pipes, since the bottom is flat, wider and more natural than corrugated steel. Concrete is also better than corrugated steel. The reasons for this are that concrete usually retains or absorbs some moisture, which is important to some species (especially amphibians) and provides a more natural-like surface. Soil, sand or gravel should be placed in the bottom of the structure to provide a more natural surface. Fencing is usually at least 36" tall, with approp1iate mesh size to avoid target species from crawling through the fence. Erosion control fencing provides a suitable barrier. Target species include animals up to raccoon (use at least 36" pipes), badger, marmots, skunks and similar sized, or smaller animals. Coyotes and bobcats will use 36" culverts, but structures at least 48" wide and high provide more suitable crossings. Coyotes and bobcats will also jump three foot high fences. Concrete is the recommended structure material, but steel pipe with soil, gravel or sand will also suffice.

Figure 11. Another example of a **badger crossing from The Netherlands. Note that fencing is only 3 feet high. This structure and fencing also work well for other small mammals and amphibians.**

3.1.4 Four to Six Foot Culverts for Wildlife up to and Including Coyotes and Bobcats

Round or box type (3-sided) culverts are recommended. Concrete is preferred, as are "box" structures. Fencing should be at least four feet high page wire with one or two strands of wire and cannot have areas where coyotes and bobcat will push under the fencing. All animals up to and including coyote and bobcat will use 48" structures, but mule deer will not use structures this small (Ruediger and DiGiorgio 2007).

3.1.5 Large Animal Wildlife Underpass Crossings

Size requirements for large animals like mule deer, bighorn sheep, black bear and mountain lion are generally at least 10 feet high and 20 feet wide (or larger). Structures should be at least 12 feet high and 30 feet wide for elk, antelope and moose. Moose and antelope may require larger structures for consistent use - 14 feet to 18 feet high if possible. Both antelope and moose have been observed using the 12' x 30' crossing sizes, but scientific studies are not conclusive at this time as to structure size or types preferred (Clevenger and Waltho 2000, Dodd et al 2007a, Evink 2002, F01man et al 2003, Gordon 2003, Hardy et al 2003, Ruediger et al 2007a, Ruediger and DiGiorgio 2007b, Watson and Klingel 2000).

Figure 12. Wildlife underpass (box culvert) on the Copeland Project, Highway 95, north of Bonners Ferry, Idaho.

3.2 Specific Types of Large Animal Wildlife Crossings

3.2.1 Steel or Concrete Arches

These are generally the most economical of large animal underpass designs. Lower cost is a primary benefit of these structures. Since arches are narrow at the top and wide at the bottom, the amount of direct and ambient light that penetrates the structure is lower than for either box culverts or bridges. All species use arch type structures, but more open designs are often recommended for migratory elk, migratory mule deer, antelope and moose.

For resident wildlife such as mule deer and elk, arches provide an economical and effective wildlife crossing. Black bear, mountain lion and most mule deer readily use arch structures (Forman et al 2003). See fencing section.

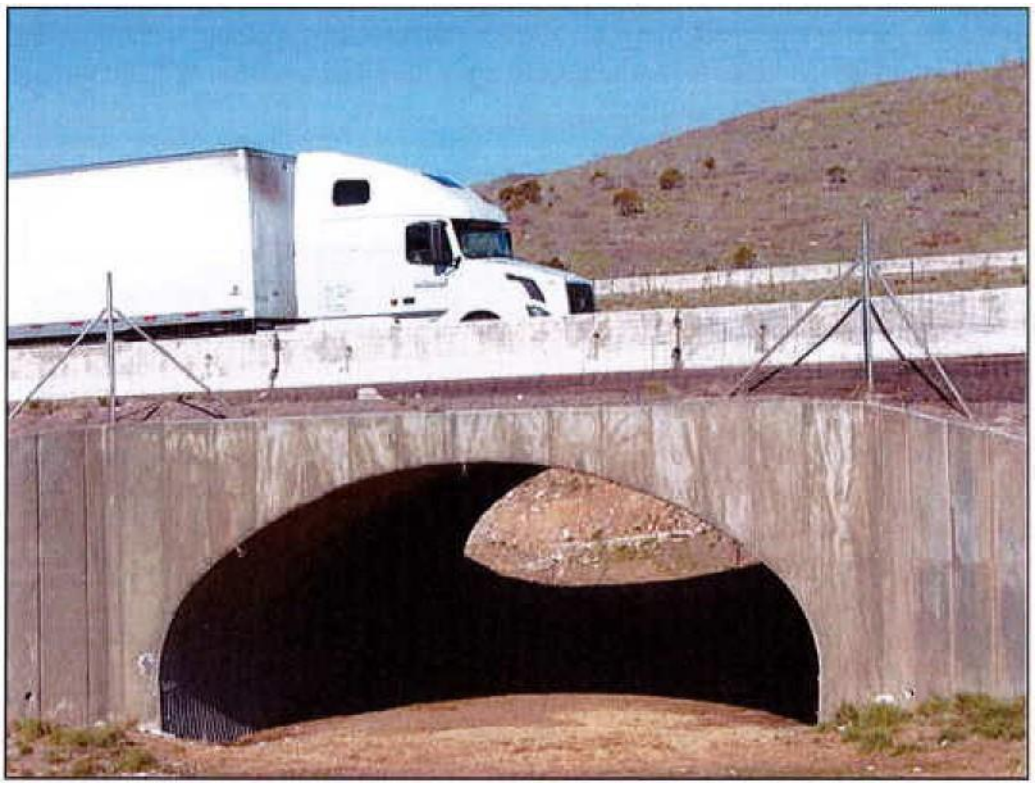


Figure 13. Steel arch wildlife crossing on 1-15, Utah.

3.2.2 Three-Sided Boxes and Box Culverts

These are intermediate in cost and effectiveness for all large species. The structures are wider at the top than arches and allow more light and interior room. All species are known to use adequate sized box-type wildlife crossings, including migratory elk, migratory mule deer, moose and antelope. Cost is usually slightly more than arches, but often worth the additional funds. See fencing section.

Figure 14. Large box culvert wildlife underpass in France.

3.2.3 Wildlife Bridges

These are normally wide at the top and narrower at the bottom. Provide more light and interior space than either box culverts or arches. Also cost more (up to three times as much). Bridges are often recommended for high volume migratory elk herds, grizzly bear and are probably superior for moose and antelope because they are more open. Often used in four-lane highways or greater, Interstate Highways in combination with divided highways that minimize the length of structure encountered at any one time (Forman et al 2003). See fencing section.

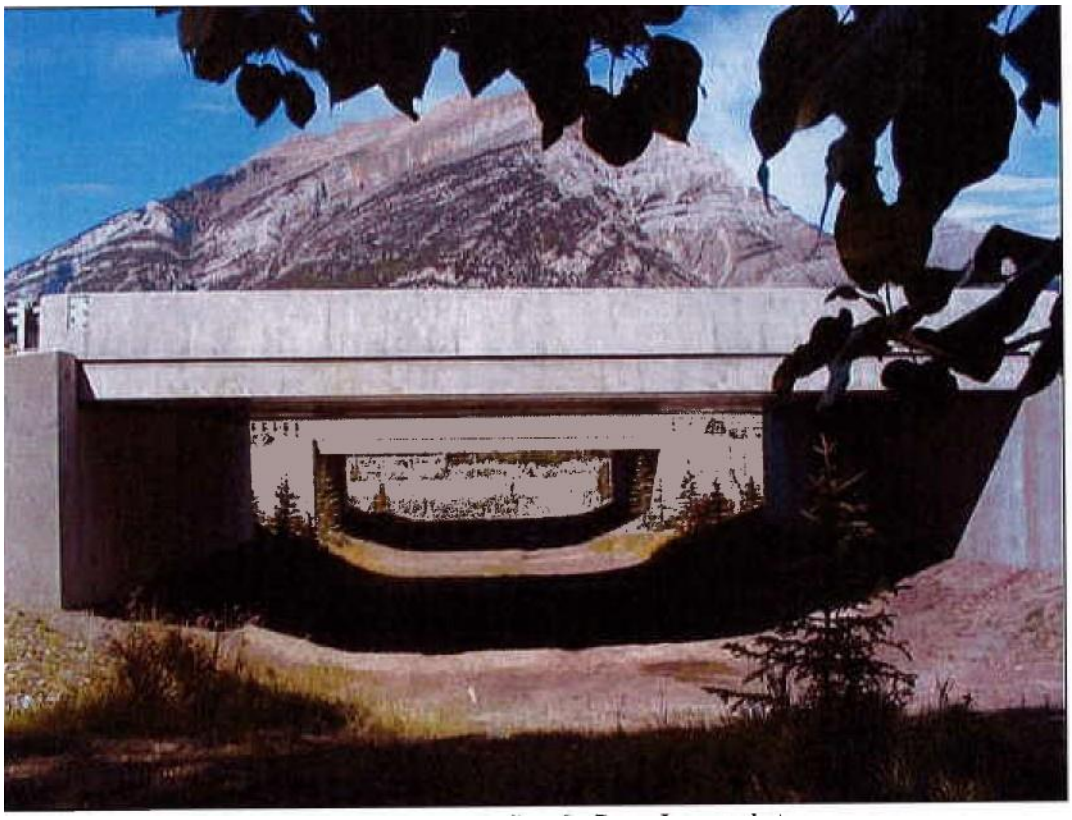


Figure 15. Wildlife bridge in Banff National Park, Canada. Bruce Leeson photo.

3.2.4 Multi-Span Bridges (Eco-bridges or Viaducts)

These structures are almost never built strictly for wildlife alone but provide high and wide bridges that may span large floodplains, rivers or other habitat. Are often large enough that rain and light are adequate for vegetation to grow naturally under the structures. See fencing section.

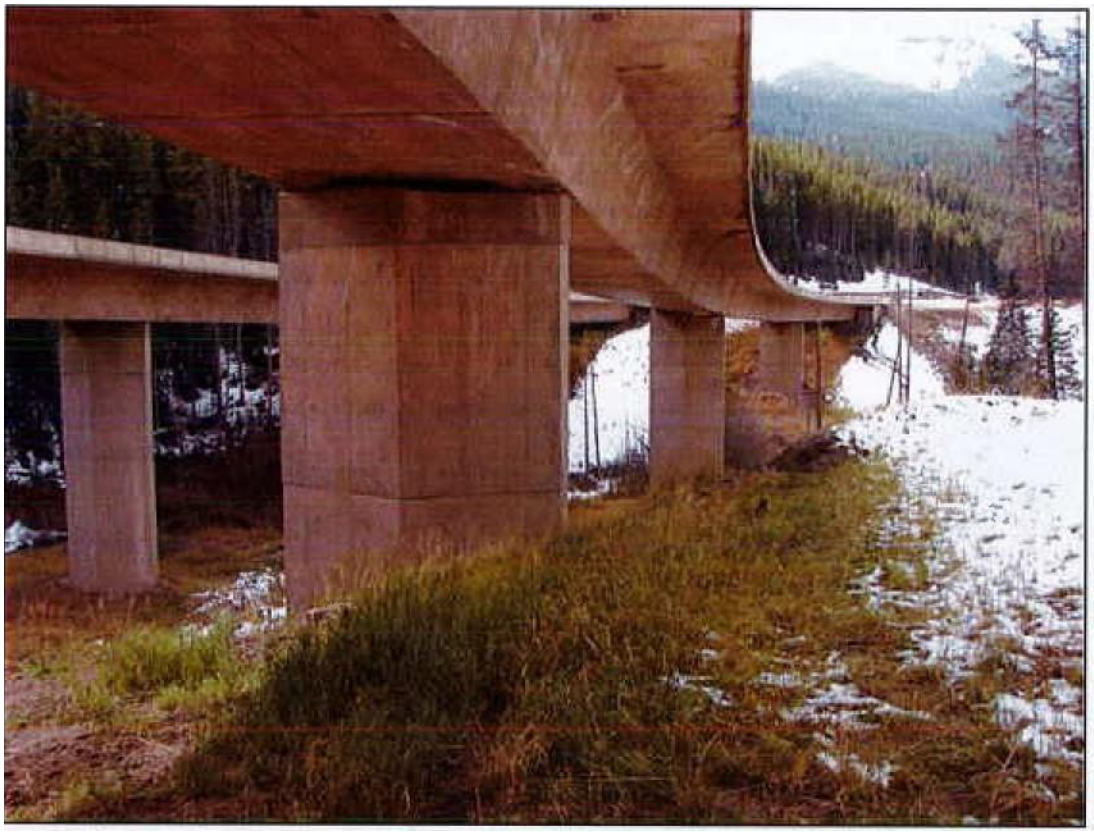


Figure 16. Multispan bridge near Vail, Colorado on 1-70. Provides excellent habitat and population connectivity.

3.2.5 Wildlife Overpasses or Eco-passes

These are extremely expensive, but effective wildlife and habitat connectivity structures. Since these structures span over highways, they are light and receive the same moisture and climate as surrounding natural habitat. Benefits include having the habitat transcend the highway, which provides continuous plant and animal habitat connectivity. The larger of these structures, called ecopasses, are used to connect plant and animal communities and provide supe1ior crossing opportunities for everything from inve1tebrates (including insects) to grizzly bears. Ecopasses are often used in Europe where they have been constructed for decades and are where acceptance of the extra cost is required or accepted. Ecopasses are generally 50 meters, or more in width and are planted with vegetation similar to the surrounding area, including trees. Smaller wildlife overpasses are used where underpass locations are not available for mule deer, elk, moose, antelope, bighorn sheep and all carnivores. Even these smaller structures provide small strips of native grass or shrub communities and superior to most underpass designs because they are completely open and have natural moon, sun and moisture regimes (Bank et al 2002). See fencing section.

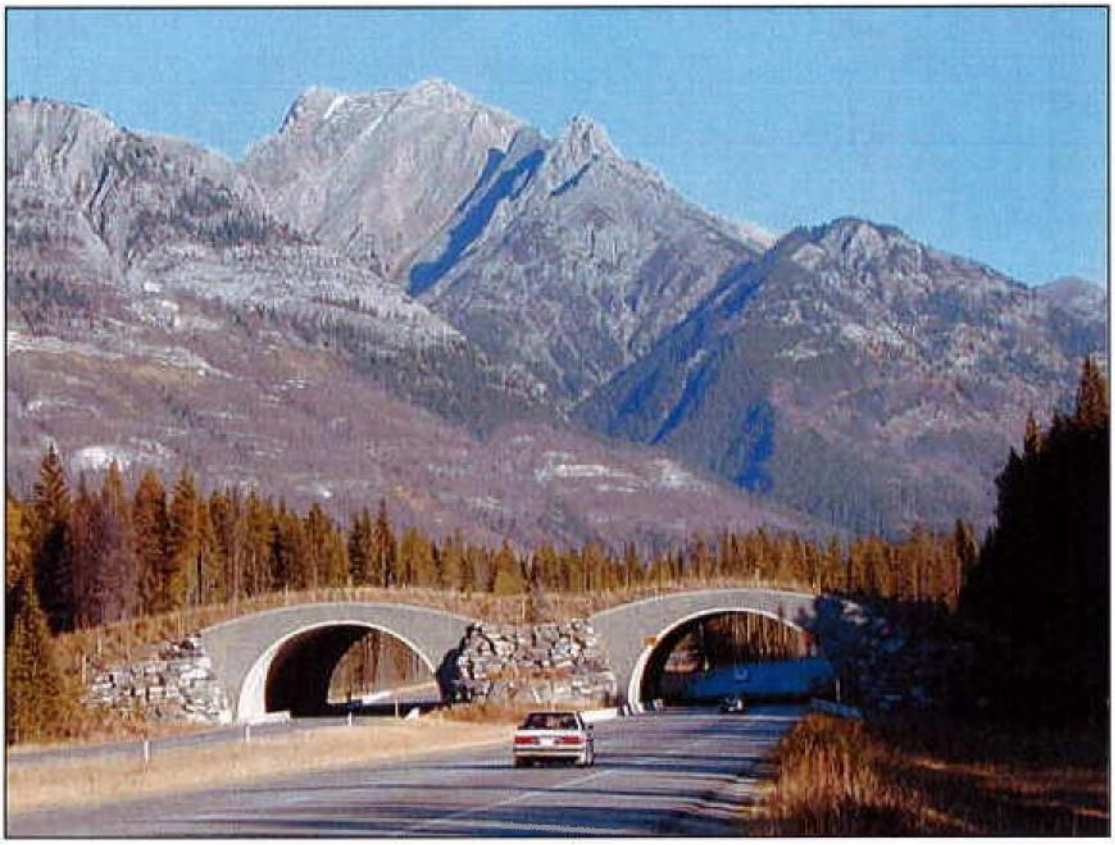


Figure 17. Wolverine overpass in Banff, Canada. Tony Clevenger photo.

3.2.6 Fencing for Large Animals

Fencing is an important aspect of wildlife crossings for large and small animals. Most animals are intimidated to cross under a highway through a structure that appears unnatural and even dangerous. Fencing forces animals to use crossings, rather than cross highways - which is dangerous for both motorists and wildlife. The usual big game fencing is 8 foot high page wire (stout wire) with sturdy poles (Clevenger et al 2001). Fencing is not an incidental part of wildlife crossings; either from a planning or cost standpoint. Once a wildlife crossing type and size is determined, a detailed assessment of fencing needs to be conducted. Some fencing will likely be continuous (from one crossing to another) and most will likely be "wing-fencing", which is placed on all sides to a length that funnels most wildlife into the structure. There is no set length for wing-fencing, and it depends on topography and vegetation, target species, cost considerations and other factors. Often, wing-fencing must be monitored for effectiveness and modified if a significant number of animals go around the structure and attempt to cross the highway surface (Dodd et al 2007c).

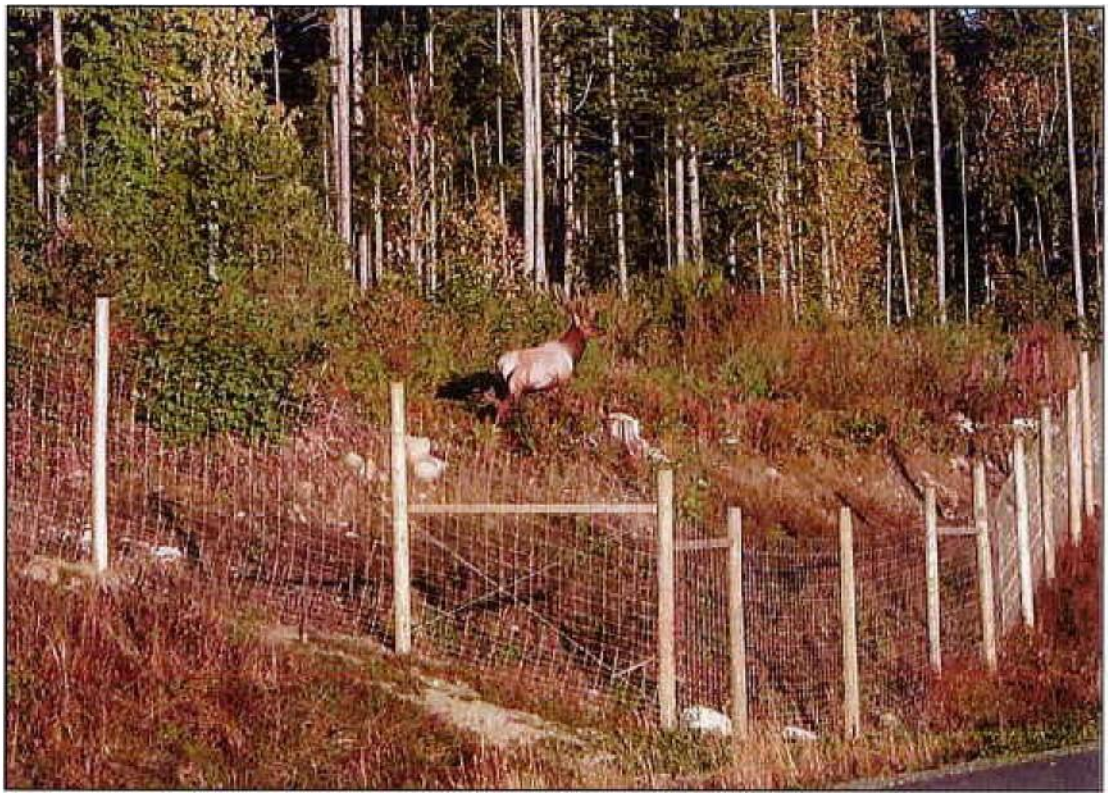


Figure 18. Wildlife fencing on TransCanada Highway (for big game). Katie McDermott photo.

In many situations, contractors do not have experience with building wildlife fencing and the result can be fencing that is too fragile or not constructed so that wildlife cannot enter the highway right-of-way. A good source of information on contracting species and wildlife fencing requirements is the following:

MDT's website has their contract specifications. This information can be accessed at:

http://www.mdt.mt.gov/other/csd/extemal/us93 corridor specials/DETAILS/

Also at:

http://www.mdt.mt.gov/other/csd/extemal/us93 corridor specials/SECTION%20E

For coyotes, badger and similar sized animals, three foot fencing will usually funnel animals the along highways, but individuals may dig under or climb these fences. Adding two wires on top will provide some additional security and will also dissuade mule deer from crossing if it is at least 5 feet high. This is for wing fences and not recommended for big game crossings, even if mule deer are target species.

3.2.7 Fencing for Small Wildlife

There are many situations where fencing will allow small wildlife species to move into structures (could be either existing stream crossings or highway cross ditches) and avoid becoming highway mortality. Fencing for small wildlife is common in Europe but has not evolved in much of North America (Banks, et al 2002). Often, fencing, used to indicate the right of way and control human and wildlife movement, is an existing element on highways. This fencing can incorporate features to funnel small wildlife species into structures and allow passage across highways. Small wildlife would include animals from approximately the size of raccoons or smaller. It includes wildlife such as small carnivores (weasels, skunks, raccoon and badgers), squirrels, other rodents, snakes, turtles, frogs, toads and salamanders. These species are often not thought of as significant wildlife deserving of protection from road impacts but are part of the native wildlife that provide citizens with contact with nature. Small wildlife crossings are not as expensive as large wildlife crossings and can often be accommodated with little cost or effo1t. Fencing for coyotes, badger and similar sized animals should be at least three feet high and be anchored or tightened closely to the ground so animals do not find holes or dig under the fence.

There are several fencing designs that will funnel wildlife through culverts or small crossings. These include:

1. Right-of-way fencing. This is often three to four feet high, using page wire (also called sheep fencing or hog wire). Instead of using normal sized mesh (4"x4") mesh size can be reduced to l"x2" for small mammals (down to large squirrel sized wildlife), or even¼" x ¼" for reptiles, amphibians and small mammals. Another option is using 18" of small (¼" x ¼") mesh fencing attached to larger fencing.

2. For only reptiles and amphibians, a stand-alone fence 18" to 24" high will funnel most species. Lizards may climb this fencing. Small (¼" x ¼") wire mesh or cloth (similar to erosion fencing used on highways) can be used.

Figure 19. Screening is used on the bottom half of this wildlife fence in The Netherlands to prevent amphibians and small mammals from crossing onto the highway surface.

3.2.8 Aquatic and Riparian Crossing Recommendations

Riparian habitats are unusually rich in plant and wildlife abundance and productivity. Many highway and road crossings designed and built even a few decades ago considered only transmission of water. Later on, starting about 1970, emphasis began to be placed on culverts and bridges moving water and fish (usually adult trout or salmon) through structures. In the last two decades, knowledge of terrestrial and aquatic systems has grown and has changed the way many agencies view stream crossings. Now, there is emphasis on maintaining natural stream channels (with similar bottoms and grade as natural surrounding channels), passage of fish, other aquatic organisms and terrestrial species likely to use riparian channels. Many motorists take note that

road-killed wildlife is often most common near bridges and culverts that cross streams. This is because many animals use riparian corridors for travel.

http://www.fs.fed.us/eng/pubs/pdf/StreamSimulation/index.shtml

http://www.mass.gov/dfwele/river/pdf/stream crossings handbook.pdf

http://www.umass.edu/nrec/pdf files/guidelines river stream_crossings.pdf

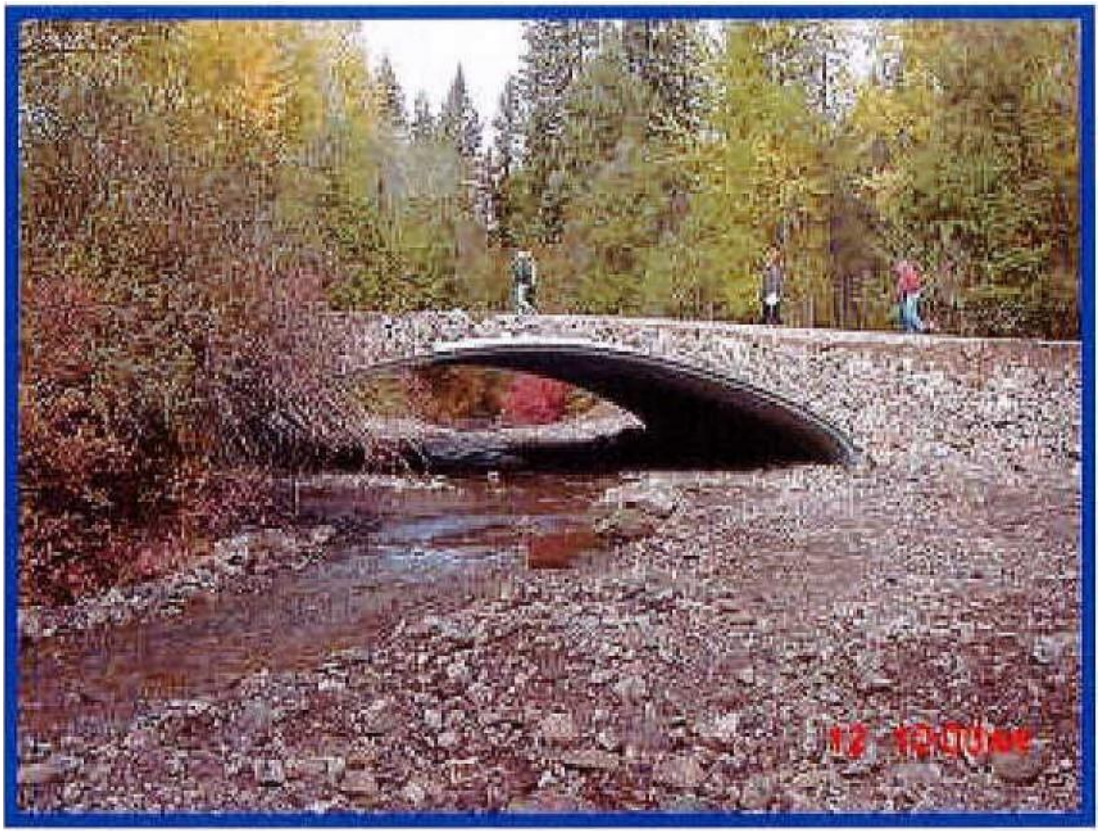


Figure20. Large bottomless arch on a stream on the Wenatchee National Forest (USFS photo).
Note: that the stream can move within the structure and small animals are allowed passage.

Stream crossings provide an opportunity to allow aquatic and terrestrial animal passage. To allow passage the following should be considered:

1. A natural substrate (bottom) is recommended to allow fish, aquatic organism and terrestrial animal passage.

2. Adequate dry area is recommended on each side of the structure to allow a natural stream bank for animals needing to pass under the bridge. Ideally, this includes a wetted

perimeter next to the water for salamanders and other species that require damp habitat. There should also be adequate dry or upland habitat to allow target species to walk along the stream bank.

3. There should be enough height to the structure to allow passage of target species. Examples of heights necessary include three feet height for species up to raccoon in size; four feet height for species up to coyote and bobcat; 10 feet height for species up to mule deer (includes black bear and cougar) and 12 feet height for elk and moose (and antelope until better research is available).

4. Fencing is recommended to funnel animals into the crossing structure and prevent them from accessing the highway.

5. Based on wildlife passage requirements, the best structures are often bottomless, such as bridges, three sided box culverts and arches. In situations where streams are intermittent, cement box culve1is and pipes are somewhat better for small animal crossings than corrugated steel pipes. Steel pipes are functional if a natural substrate is maintained in the structure bottom to facilitate fish and wildlife use. Getting soil into pipes and keeping it stable if water runs through the structure is challenging.

3.2.9 Bat boxes and Other Structures Useful to Wildlife on Bridges

Bat boxes can be either designed into, or added to bridges to provide roosting areas for bats. Other structural aspects of bridges useful to wildlife include places where swallows can attach mud nests and roosting areas on top of beams for owls and other birds.

Bat Boxes - see the following websites:

http://www.batcon.net/news2/scripts/article.asp?article1D=73&newsletter1D=7

http://books.google.com/books?id=XS 0XH0GGOYC&pg=PA34&lpg-::PA34&dg_=bridges+and+bat+boxes&source=bl&ots=l--SvfHaWH&sig=OzOOpcwOa-5eDDpEEbJH-3cm5Rw&hl=en&ei=uJ3KSaj jL4G0sAO YgeG2Bg&sa='=X&oi=book result&res.num=9&ct=result#PPA31,M1

http://www.dnr.state.md.us/wildlife/bats/batboxes.asp

http://www.batcon.org/bhresearcher/bv7n2-3.html

4.0 Potential Funding Sources

While we have identified a number of potential tools and guidelines that could be incorporated into future transportation and development projects, it is seldom that lack of options or information is the limiting factor in implementing these types of projects, rather it is the cost. More specifically, it is the lack of funding. This section identifies several potential funding sources and opportunities that could be used in future projects. Please note, these are only a small fraction of the options available, and we should aggressively seek additional sources.

One of, if not the largest funding source for projects of this nature is the DOT-Federal Highway Administration (FHWA). As part of the national environmental program the FHWA has developed the Streamlining/Stewardship toolkit, which identifies a number of funding opportunities and associated examples (FHWA 2009). These include but are not limited to:

- Federal Program Funding;
- Funding Matches Through Partnering;
- Innovative Financial Tools; and
- Special Funding and Use of Funds within Programs.

Examples and descriptions can be found at URL:
http://www.environment.fhwa.dot.gov/ecological/eco_app_b.asp

In addition to these programs there is a number of potential funding or supplemental sources including but not limited to:

- Transportation Related Taxes (Fuel, Registration, etc.);
- Portions of Hunting Related Fees (Permits, Tags, etc.);
- Federal and State grants;
- Private Grants with share funding.
- Use and Consolidation of Regional County Payment in Lieu of Taxes, or PILT funds;
- Serial Levy's;
- Regional Impact Fees; and
- Others.

There are numerous potential funding mechanisms, and we should explore all reasonablemethods to secure regional funding for these types of projects, as this is a regional issue.

5.0 Summary

Wildlife and wildlife habitats are often neglected on both highway and development projects. The North Ada County development plan would provide for many wildlife species to continue within a matrix of homes, businesses and open space. There is presently the technology to address wildlife habitat mo1iality, wildlife habitat and population connectivity and protect muchof our wildlife heritage when designing highways and home developments. This report provides North Ada County with some of the tools to develop livable human communities that incorporate wildlife and nature.

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Appendix A:

Boise Foothills Wildlife Checklist

Mammals	
Common Name	**Scientific Name**
Masked shrew	*Sorex cinereus*
Merriam's shrew*	*Sorex merriami*
Dusky shrew	*Sorex obscurus*
Northern water shrew	*Sorex palustris*
Vagrant shrew	*Sorex vagrans*
California myotis	*Myotis californicus*
Long-eared myotis	*Myotis evotis*
Little brown myotis	*Myotis lucifugus*
Small-footed myotis	*Myotis subulatus*
Fringed myotis*	*Myotis thusanodes*
Long-legged myotis*	*Myotis volans*
Yuma myotis	*Myotis yumanensis*
Silver-haired bat	*Lasionycteris noctivagans*
Hoary bat	*Lasiurus cinereus*
Big brown bat	*Eptesicusfi1scus*
Western big-eared bat	*Plecotus townsendi*
Black bear	*Ursus americanus*
Raccoon	*Procyon lotor*
Short-tailed weasel	*Mustela erminea*

Long-tailed weasel	*Mustela frenataa*
Mink	*Mustela vison*
Badger	*Taxidea taxus*
Spotted skunk	*Spilogale putorius*
Striped skunk	*Mephitis mephitis*
Coyote	*Canis latrans*
Red fox	*Vulpes fulva*
Mountain lion	*Felis concolor*
Bobcat	*Lynx rufus*
Yellowbelly marmot	*Marmota flavivenetris*
Piute ground squirrel	*Spermophilus mollis-idahoensis*
Golden-mantled squirrel	*Citellus lateralis*
Forest chipmunk	*Eutamias minimus*
Yellow pine chipmunk	*Eutamias amoenus*
Fox squirrel	*Sciurus niger*
Northern pocket gopher	*Thomomys talpoides*
Great Basin pocket mouse	*Perognathus parvus*
Ord's kangaroo rat	*Dipodomys ordi*
Mountain vole	*Microtus montanus*
Western harvest mouse	*Reithrodontomys megalotis*
Mule deer mouse	*Peromyscus maniculatus*
Desert woodrat	*Neotoma lepida*
Meadow vole	*Microtus pennsylvanicus*
Richardson vole	*Microtus richardsoni*

House mouse	*Mus musculus*
Porcupine	*Erethizon dorsatum*
Beaver	*Castor canadensis*
Snowshoe hare	*Lepus americanus*
Black-tailed jackrabbit	*Lepus californicus*
Mountain cottontail	*Sylvilagus nuttalli*
Pygmy rabbit *	*Sylvilagus idahoensis*
Rocky mountain elk	*Cervus elaphus*
Mule deer	*Odocoileus hemionus*
Pronghorn Antelope	*Antilocapra americana*

Birds

Common Name	**Scientific Name**
Great blue heron	*Ardea herodias*
Mallard	*Anas platyrhynochos*
Cinnamon teal	*Anas cyanoptera*
Turkey vulture	*Cathartes aura*
Bald eagle*	*Haliaeetus leucocephalus*
Northern harrier	*Circus cyaneus*
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Northern goshawk*	*Accipiter gentilis*
Red-tailed hawk	*Buteo jamaicensis*
Golden eagle*	*Aquila chrysaetos*
American kestrel	*Falco sparverius*

Merlin*	*Falco colunbarius*
Peregrine falcon*	*Falco peregrinus*
Prairie falcon	*Falco mexicanus*
Gray partridge	*Perdix perdix*
Ring-necked pheasant	*Phasianus colchicus*
California quail	*Callipepla californica*
Virginia rail	*Rallus limicola*
American coot	*Fulica Americana*
Killmule deer	*Charadrius vociferous*
Spotted sandpiper	*Actitis macularia*
Common snipe	*Gallinago gallinago*
Ring-billed gull	*Larus delawarensis*
California gull	*Larus californicus*
Rock dove	*Columba livia*
Mourning dove	*Zenaida macroura*
Common barn-owl	*Tyto alba*
Western screech-owl	*Otus kennicottii*
Great horned owl	*Bubo virginianus*
Northern pygmy-owl	*Glaucidium gnoma*
Long-eared owl	*Asia otus*
Northern saw-whet owl	*Aegolius acadicus*
Common nighthawk	*Chordeiles minor*
Black-chinned hummingbird	*Archilochus alexandri*
Anna's hummingbird	*Calypte anna*

Calliope hummingbird	*Stellula calliope*
Rufous hummingbird	*Selasphorus rufus*
Belted kingfisher	*Ceryle alcyon*
Lewis' woodpecker	*Melanerpes lewis*
Red-naped sapsucker	*Sphyrapicus varius nuchalis*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Northern flicker	*Colaptes auratus*
Olive-sided flycatcher	*Contopus borealis*
Western wood-pewee	*Contopus sordidulus*
Willow flycatcher	*Empidonax trailii*
Say's phoebe	*Sayornis saya*
Western kingbird	*Tyrannus verticalis*
Eastern kingbird	*Tyrannus tyrannus*
Tree swallow	*Tachycinata bicolor*
Violet-green swallow	*Tachycineta thalassina*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Bark swallow	*Riparia riparia*
Cliff swallow	*Hirunda pyrronota*
Barn swallow	*Hirunda rustica*
Steller's jay	*Cyanocitta stelleri*
Blue jay	*Cyanocitta cristata*
Clark's nutcracker	*Nucifraga columbiana*
Black-billed magpie	*Pica pica*

American crow	*Corvus brachyrhynchos*
Common raven	*Corvus corax*
Black-capped chickadee	*Parus atricapillus*
Mountain chickadee	*Pants gambeli*
Red-breasted nuthatch	*Sitta canadensis*
White-breasted nuthatch	*Sitta carolinensis*
Brown creeper	*Certhia americana*
Rock wren	*Salpinctes obsoletus*
House wren	*Troglodytes sedon*
Winter wren	*Troglodytes troglodytes*
Marsh wren	*Cisthohorus palustris*
Golden-crowned kinglet	*Regulus satrapa*
Ruby-crowned kinglet	*Regulus calendula*
Blue-gray gnatcatcher	*Polioptila caerulea*
Townsend's solitaire	*Myadestes townsendi*
American robin	*Turdus migratorius*
Sage thrasher	*Oreoascoptes montanus*
Bohemian waxwing	*Bombycilla garrulous*
Cedar waxwing	*Bombycilla cedrorum*
Northern shrike	*Lanius excubitor*
Loggerhead shrike	*Lanius ludovicianus*
European starling	*Sturnus vulgaris*
Solitary vireo	*Vireo solitarius*
Warbling vireo	*Vireo gilvus*

Orange-crowned warbler	*Vermivora celata*
Nashville warbler	*Vermivora ruficapilla*
Yellow warbler	*Dendroica peyechia*
Yellow-rumped warbler	*Dendroica coronata*
MacGillivray's warbler	*Oporornis tolmeiei*
Wilson's warbler	*Wilsonia pusilla*
Yellow-breasted chat	*Icteria virens*
Western tanager	*Piranga ludoviciana*
Black-headed grosbeak	*Pheucticus melanocephalus*
Lazuli bunting	*Passerina amoena*
Rufous-sided towhee	*Pipilo erythrophthalmus*
American tree sparrow	*Spizella arborea*
Chipping sparrow	*Spizella passerina*
Lark sparrow	*Chondestes grammacus*
Fox sparrow	*Passerella iliaca*
Song sparrow	*Melospiza melodia*
White-crowned sparrow	*Zonotrichia leucophrys*
Harris Sparrow	*Zonotrichia querula*
Dark-eyed junco	*Junco hyemalis*
Red-winged blackbird	*Agelaius phoeniceus*
Western meadowlark	*Sturnella neglecta*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown-headed cowbird	*Molothrus ater*

Northern oriole	*Icterus galbula*
Cassin's finch	*Carpadacus cassinii*
House finch	*Carpadacus mexicanus*
Red crossbill	*Laxia curvirastra*
Pine siskin	*Carduelis pinus*
American goldfinch	*Carduelis tristis*
Evening grosbeak	*Coccathraustes vespertinus*
House span-ow	*Passer domesticus*

Amphibians

Common Name	**Scientific Name**
Long-toed salamander	*Ambystoma macrodactylum*
Western toad*	*Bufo boreas*
Woodhouse's toad*	*Bufo woodhausei*
Pacific treefrog	*Hyla regilla*
Striped chorus frog	*Pseudacris triseriata*
Bullfrog	*Rana catesbiana*
Northern leopard frog*	*Rana pipiens*
Great Basin spadefoot toad	*Spea intermontanus*

Reptiles

Common Name	**Scientific Name**
Mohave black-collared lizard	*Crotaphytes bicinctares*
Western skink	*Eumeces skiltonianus*
Longnose leopard lizard	*Gambelia wislizenii*

Short-homed lizard	*Phyrnosoma douglassi*
Sagebrush lizard	*Sceloporus graciosus*
Western fence lizard	*Sceloporus occidentalis*
Side-blotched lizard	*Uta stansburiana*
Rubber boa	*Charina bottae*
Western whiptail	*Cnemidophorus tigris*
Racer	*Coulber constrictor*
Western rattlesnake	*Crotalus viridus*
Ringneck snake	*Diadophis punctatus*
Striped whipsnake	*Masticophis taeniatus*
Gopher snake	*Pituophis melanoleucus*
Wandering garter snake	*Thamnophis elegans vagrans*
Common gaiter snake	*Thamnophis sittalis*
Fish	
Common Name	**Scientific Name**
Bluegill	*Lepomis macrochirus*
Trout	*Oncorynchus sp.*
Inland Redband Trout*	*Oncorynchus mykiss gairdneri*
Sculpins	*Cottus sp.*
Sunfish	*Centrarchidae*
Dace	*Rhinichthys sp.*
Mountain Whitefish	*Prosopium williamsoni*
**** Indicates "Special Status Species" in Ada, Gem, and Boise County***	

Visit Digital Atlas of Idaho online to look up photos, descriptions, diet, ecology, etc. on each of these wildlife species http://imnh.isu.edu/digitalatlas/index.htm#

The US Geological Survey and Patuxent Wildlife Research Center have created an online bird identification.

APPENDIX D

Avimor Development - Invasive and NoxiousWeed Management Plan

This AD weed management plan follows the model set forth by the Ada County Comprehensive Noxious Weed Plan. The first priority of weed management plan will be to establish weed management zones. All areas associated with each proposed project will be placed into one of four weed management zones:

Zone I -Potential New Invaders Identified: There are no known infestations of the specific invasive or noxious weed in this designated zone so the target species will be treated as a potential new invader. Emphasis will be placed on an education, awareness, identification, recognition and monitoring program to prevent introduction.

Zone 2 - New Invaders Exist: These are very limited infestations of specific invasive or noxious weeds in this zone so the target species will be treated as a new invader. Emphasis will be placed on a community-wide eradication and extensive monitoring program.

- Zone 3 - Widespread but Limited Infestations Exist: The infestations of the specific invasive or noxious weed in this designated zone will be treated as small enough that reducing the stand or the vigor of the infestation is achievable. Emphasis will be placed on area-wide control with the ultimate goal as being eradication.

Zone 4 - Established Infestations: The infestation of the specific invasive or noxious weed in this designated zone will be treated as being so well established that eradication is impractical and uneconomical. Various treatment Alternatives will be utilized to control and contain the target species. Specific sites or rights-of-way will be designated within this zone for receiving special treatment considerations. Emphasis will be placed on Integrated Pest Management, resident education, and participation.

A specific set of policies and guidelines will direct the approach to managing weeds within each of the weed management zones. The policies and guidelines for each zone are presented below:

Noxious Weed Management (Zone 1)

1. Record source of weed species from other areas where potential introduction may occur.
2. Identify possible avenues or methods of introduction into the community.
3. Conduct weed tours and educational and awareness programs to alert construction crews, residents, land management agencies and the general public to be on the alert for these weeds.
4. Identify appropriate quarantine and exclusion procedures.
5. Utilize the University of Idaho's plant identification program for verification of suspected newly introduced weed species.

6. Once a new weed is confirmed in the area, reclassify it to an appropriate category **(**II**,** II, IV) utilizing the invasive and noxious weed management program.

Weed control in Zone 1 areas will include education, awareness, identification, recognition and monitoring to prevent introduction(s) into the community. Noxious weed update meetings will be convened by the Conservation Director annually to update residents on the types of weeds to look for, how to identify invasive and noxious weeds, and where to report new occurrences. In addition, the Conservation Director will publish a list of those invasive and noxious weeds present in and around the community for distribution to all residents of the AD.

The Conservation Director will inspect all occurrences of weeds in this zone within two days of the reported observation. Further, the Conservation Director will conduct ongoing inspections monthly during the growing season to identify new weed infestations. All new infestations will be mapped and logged into a data base for future reference and inspections.

Noxious Weed Management (Zone 2)

1. Target species confirmed in AD.
2. Identify extent of infestation(s) and boundaries.
3. Determine accessibility of infestation(s).
4. Dete1mine feasibility of eradication, monitoring and treatment capabilities.

Invasive and noxious weed eradication is the goal in all Zone 2 areas. Weeds will be considered eradicated if the target invasive and noxious weed species is absent from the zone for a period of two (2) years. The Conservation Director will inspect all reports of weeds in this zone within two days of the first observation. Further the Conservation Director will conduct ongoing inspections of Zone 2 areas for any new weed infestations. When a new infestation occurs it will be mapped and logged into a data base for future reference and inspections.

Community newsletters giving facts for the AD will be published and distributed as often as possible. Education will help residents identify early life stages of the weed species in these areas through annual invasive and noxious weed abatement meetings and/or brochures and pamphlets. Personal contact and consultation with the Conservation Director will be made for each homeowner with an infestation in this category.

Noxious Weed Management (Zone 3)

1. Determine that under existing programs the target species cannot be eradicated in two years due to the large number or size of infestations.
2. Dete1mine extent of infestations.

Control will be community-wide to reduce the vigor and stand of the infestation with the ultimate goal of eradication. Integrated methods of control will be incorporated, including, but not limited to, agreements with and extensive landowner participation and monitoring. Weed complaints will be inspected within two working days of the complaint and processed as any other infestation within the respective category. The Conservation Director will conduct ongoing inspections of the county for the purposes of identifying new weed infestations in this category.

Infestations will be mapped and logged into a data base for future reference and inspections. Each homeowner with weeds in this category present on their parcel will receive consultation by the Conservation Director on how best to control the weeds.

Community newsletters giving facts for the AD will be published and distributed as often as possible. Educational community meetings set up by the Conservation Director will help residents identify early life stages of the weed species in these areas. Personal contact and consultation with the Conservation Director will be made for each homeowner with an infestation in this category.

Noxious Weed Management (Zone 4)

1. Determine the extent of infestation(s).
2. Determine that target species cannot be eradicated within two years.
3. Determine containment possibilities.
4. Determine identifiable and defensible boundaries.
5. Determine technical, economical and manpower considerations.
6. Determine environmental and wildlife considerations.
7. Determine integrated weed management principles to be utilized.
8. Determine appropriate zones.

Control treatments will be Alternatives ranging from no action to several levels of integrated weed management, including prevention, eradication, restoration.

Invasive and noxious weeds will continue to be an ongoing issue at the proposed AD due to established infestations, initial construction ground disturbance, and increased population and recreation levels. Invasive and noxious weed management goals for the AD development and the Conservation Director are as follows:

- Control the current spread of noxious and undesirable weeds at the AD, map existing locations, and keep record of species present
- Prevent new infestations, monitor the effectiveness of control measures and adapt new management strategies and control measures as necessary;
- Meet state and federal safety guidelines for the use of prescribed burning and chemicalapplication; and
- Work and coordinate with Ada County, state, and federal weed supervisors on weed control and mapping.

The Conservation Director will be responsible for the development and implementation of an invasive and noxious weed management plan. This weed program will be implemented and carried out indefinitely. This program will utilize various treatments including mechanical, chemical, and biological. For example, spot spraying of weeds in areas with established native species will likely reduce competition for limited resource and increase the ability of young natives to establish and reproduce. However, the use of herbicides can have adverse effects on native species, as well; therefore, mechanical and biological controls will be used as much as possible.

Biological control agents will be utilized to the extent possible in order to manage and control invasive and noxious weed species. While invasive and noxious weed species can be reduced with chemical and mechanical treatments, these require significant amounts of time and resources, and can result in adverse impacts to remnant native populations. Bio-control agents are often species-specific and have limited effects on other species. In addition, these treatments are less time and resource consumptive, and can affect a very large area with a minimal application.

The Conservation Director will pursue the use of a burrowing weevil *(Bradyrrhoa gilveolella)* to control and reduce rush skeleton weed populations. Rush skeleton weed is a dominant noxious weed species in the area. The release of this burrowing weevil in the area could have a significant affect by limiting the spread of an extremely aggressive weed species, while having little or no effect on any other species. This is only one example of a successful biological control that could be used in the area.

Initial and continuous treatments (mechanical, chemical, and biological) of the area will be required to control and manage these invasive communities. However, the primary factor in managing the establishment and spread of new populations will be education and support of the residents of the community and the public. An aggressive education program will be emphasized so that residents and the general public are aware of the impacts from these species on native communities and wildlife.

APPENDIX E

Avimor Recreation Plan

Executive Summary

The following plan describes the existing and future planning guidelines for development of the Avimor Development Area Trail System (ADATS). For the purposes of this document, the ADATS only refers to the trails and access roads under the ownership of the Avimor Dual Beneficiary Trust, First American Title Insurance Company as Trustee, and does not encumber or manage any lands (private, state, or federal) outside said ownership. The goal of this document is to provide an outline of trail development, maintenance, and use designations to provide a quality recreational experience within a conservation driven community. In the event there is a conflict between the Avimor Recreation Plan (ARP) and the Avimor Habitat Management Plan (HMP), the HMP shall govern in all regards.

The ARP outlines the decision process for: races and events; development and design of new or modified trails; changes to season closures for protection of wildlife habitat; trail designations or use exclusions for user safety; and trail construction/maintenance guidelines for long-term sustainable use. As recreational patterns, regional trail systems, and adjacent landownership changes, the ARP will adapt to the needs and opportunities to provide the best user experience and recreational opportunities while maintaining the conservation goals outlined in the Avimor HMP. The overall intent of the ARP is to create a sustainable trail system that balances the resources requirements of the wildlife with public recreation.

ADATS Management Process

A formalized process was developed in order to manage all aspects of the APCS including, but not limited to: race and event applications; annual maintenance planning, implementation, and funding; development and design of new trails; changes in seasonal trail closures; modifications to trail use designations; and modifications to the ARP. This management process is directed by three coordinated entities: the Avimor Trail Board (ATB), the Avimor Stewardship Organization (ASO), and the Avimor Conservation Advisory Committee (CAC). The City of Eagle is also included in the process as it relates to any modifications and/or amendments and/or repeal of the ARP.

The ATB is a technical group responsible for: monitoring trail use/users; identifying and addressing user concerns/conflicts; developing the annual work plan to address trail sustainability; and reviewing proposals for races and new or modified trail developments. The six member board will be made up technical and subject matter experts, with one representative from each of the following groups: the ASO; Avimor Home Owners Association (HOA); trail construction specialist; a mountain bike user group; an equestrian user group; and the Avimor Conservation Director (CD). Additional members may be added to increase the technical capabilities of the ATB in the future. The ATB will meet three times annually (spring, fall, and summer) with additional meetings if necessary. For a full description of the ASO and CAC see the Avimor HMP.

The ADATS management process will adhere to the following format. All applications to modify trail use designations, spatial or temporal changes to seasonal trail closures, and policy amendments for the ARP will be submitted to the ATB for initial review. The ATB will review the applications and make recommendations to the ASO, which in tum will make the final recommendation for implementation to the CAC. Minor administrative corrections to the ARP may be approved by the CAC; however, any modifications and/or amendments and/or repeal of the ARP must be made in coordination with the City of Eagle.

The ATB will also review race applications and develop an annual work plan for trail construction and maintenance activities. Recommendations on race applications will be made by the ATB to the ASO, who will have final authority on approval or denial. The annual work planwill include recommended trail construction and maintenance activities with work dates, infrastructure and equipment requirements, and a funding proposal. The work plan will be submitted to the ASO for review and approval of maintenance activities and funding only. The ASO will make recommendations to the CAC for any new trail construction. The CAC will review the application to ensure that is conforms to the requirements and objectives outlined in the Avimor HMP and ARP.

Use Designations and User Groups

The ADATS is predominantly private lands that have been made available for use by the general public. A wide range of recreational opportunities exist throughout the system for a wide range of users. In an effort to create the most enjoyable recreational experience, while balancing conservation requirements, user safety, and trail limitations/impacts, Avimor and its partners have developed use designations for specific areas and trails. Understanding that this may restrict some user groups from desirable areas and trails, it is the most practical approach for managing the trail system while providing the best overall recreational experience in a safe and sustainable format. As new trails or recreation opportunities are added to the AD the plan will beupdated to reflect the changes.

Use Designations

Seasonal Closures-

The upper elevation of the ADATS is one of the largest remaining areas in the Treasure Valley for wintering populations of elk and mule deer, and provide expansive habitat for migratory bird populations, and other wildlife species. In order to protect these species and their habitat, all trails within the ADATS, except those identified below, will be closed during the winter months (November 1- March 1). In addition to seasonal trail closures, all dogs using the ADATS must be on leash at all times, on all trails from November 1 through May 1. Exceptions to these restrictions may be made on an individual basis with special use permits approved by the ASO. Any changes associated with seasonal closures or use restrictions will be authorized through the ADATS management process (see above).

While portions of the ADATS will have seasonal access restrictions, designated lower elevation trails would be available for year-round use. The availability of these trails during winter monthsmay vary by year dependent on weather conditions, trail impacts, and future monitoring of big game and migratory bird populations. However, if the winter snow line is low or persistent, or big game are found to use these areas frequently for winter bedding and foraging, access may be restricted based on an index developed by the ASO and CAC in coordination with the IDFG. Regardless of conditions, all trail users must comply with seasonal closures.

Based on historic winter monitoring of big game and wildlife movement patterns within andadjacent to the ADATS, the following trails will be available for year-round use, unless additional restrictions are needed (see above):

- All internal walking paths within the Avimor Village development (gravel paths withinthe development)
- All Heritage Park Trails
- Trail 3- Whistling Pig: entire trail
- Trail 5-Shooting Range: portion of trail south of posted closure
- Trail 7- Knecht Loop: entire trail
- Trail 9- Spring Valley Creek Trail: open from the trailhead to the canyon gate (posted annually)

- Trail 9a- Twisted Spring Trail: entire trail to intersection with Spring Creek Trail
- Trail 16 and 16a: Harlow Hallow/Connector: entire trail
- Trail 10- Burnt Car Draw Trail: open from trailhead to junction with trails 12 and 13, closed from junction with trails 12/13 to Cartwright Road (posted annually)
- Trail 15- Baun's-Eye Trail: open from trailhead to junction with Trail 13
- Trail 12- Fischer Lane Trail: open from junction with Trail 11 to junction with Trail 12 (posted annually)
- Trail 13- Fiddleneck Ridge Trail- open from trailhead to junction with trails 10 and 12 (posted annually).

User Groups

To maximize the user experience and preserve the natural resources on the land, specific trails have been designated by user type, season of use, and motorized access. Trail users may includehikers and wildlife viewers, mountain bikers, equestrians, on and controlled off-leash dogs, managed hunting, and use of motorized vehicles on specified two-tracks. Specific management requirements for general uses are defined below.

Hikers/Foot-traffic-

Trails in the ADATS are open for all hikers and other foot traffic. However, hikers must complywith the season closures listed in the prior section.

Mountain Bikers-

Currently, all trails in the ADATS are available for use by mountain bikers. However, bikers must comply with the season closures listed in the prior section. Based on the current and projected increased use of the trails, future plans could include directional trail use to manage potentially dangerous encounters (see ADATS Management Process). If directional designationsare implemented, clear signage will be posted to inform and direct users. At this time there are no directional trails.

Equestrian-

The majority of trails in the ADATS are available for equestrian trail users with three exceptions. These trails have been designated for foot traffic and mountain biking use only to reduce user conflicts or maintain trail integrity. In general, these trails are narrow, steep, and have limited line of sight. As such they create a potential safety issue for users. Therefore, the following trails are restricted from all equestrian use:

- Trail 1- Willow Creek Trail- Posted
- Trail 9- Spring Valley Creek Trail (Canyon Portion Only)- Posted
- Trail 16a- Harlow Hallow Connector- Posted

Motorized Vehicles-

All motorized vehicles use in the ADATS is by special permit only or for maintenance activities. In order to monitor and promote sustainable use by motorized vehicles, Avimor has implemented a permit system with a limited number of motorized vehicle users per day. All motorized vehicle use on Avimor trails are restricted to designated routes only, i.e. no off road or cross country travel is allowed. A day permit can be acquired at the Avimor administrative office. Once a special use permit is acquired, motorized vehicle users are allowed to access the following Avimor trails:

- All existing two-tracks
- Trail 10- Burnt Car Draw Trail
- Trail 13- Fiddleneck Ridge Trail
- Trail 14-Stack Rock Ridge Trail

Motorized vehicle use associated with emergency medical services (EMS), trail maintenance activities, or permitted livestock operations are exempt from the restrictions.

Dogs (On and Controlled Off-Leash)

Dogs are permitted on all trails in the ADATS. However, to prevent user conflicts, protect wildlife, and ensure the safety for dogs and other trail users, seasonal and year round leash restrictions exist on identified trails. **All dogs must remain on leash at all times on all open trails from November 1 to May l, with the exception of designated off-leash dog areas.** The on-leash restrictive time period is extended beyond winter trail closures to ensure wildlife safety and to protect nesting birds in the area. Some wildlife may be present near open trails during this time of year and off-leash dogs threaten winter survival by chasing or disturbing wintering wildlife.

From **May 1 to November 1,** controlled off-leash dog use i.e. dogs must remain within 30 ft. of owner, not approach other trail users, and respond inm1ediately to voice commands, is allowed on all Avimor trails with the exception of the following trails which are on-leash year round for user safety and to reduce user conflicts.

- Trail 1- Willow Creek Trail- Posted
- Trail 9- Spring Valley Creek Trail - Posted
- Trail 9a-Twisted Creek -Posted
- Trail l6a- Harlow Hallow Connector- Posted

Hunting

In the past, Avimor had a depredation hunt with a number of tags for big game within their property. While Avimor is not currently part of the Fish and Game's depredation hunt, it could be in the future, and Avimor does have access to a number of privately held tags for their

property. Like motorized vehicles (see above), hunting is only allowed via specializedpermission, inquire at the Avimor administrative office.

Use of motorized vehicles during hunting season will be restricted, with the exception of permitted use for disabled hunters and game removal on an as needed basis. All motorizedvehicles will stay on designated trails, and hunting directly from any motorized vehicles is strictly prohibited.

Trail Design Guidelines and Maintenance

For any new trail construction or modification of existing trails, general trail building guidelineswill be followed during each step in the planning and construction process. Following the general guidelines will help create a more sustainable and user friendly trail system, while reducing maintenance or reconstruction requirements of faulty trail design and construction.

Trail design should follow the five essential elements of sustainable trails as presented in the US Forest Services trail design parameters (http://www.fs.fed.us/recreation/programs/trail-management/trail-fundamentals/National_Design_Parameters_l0_l6_2008.pdf). Although certain stretches of new trails may require deviations, the following five principals should be used during planning and construction of all new trails at Avimor.

1. The Half Rule. The grade of the trail should not exceed half the grade of the hillside or side slope that the trail traverses. Trails that exceed the half rule are considered fall-line trails and encourage water flow down the trail rather than across it, increasing probabilityof erosion damage.

2. The Ten Percent Average Guideline. On average the overall trail grade ([elevation gain/trail length] x' s 100) should not exceed 10 percent. Although some trail segments may exceed ten percent grade, the general rule for a sustainable trail is an average of tenpercent over the length of the trail.

3. Maximum Sustainable Trail Grade. Although the ten percent rule is a general rule for an entire trail, detem1ining a maximum grade (typically 15-20 percent) for trail segments should be determined in planning based on site specific factors:

    - Half rule
    - Soil type
    - Rock
    - Annual rainfall
    - Grade reversals
    - Types of users

- Number of users
- Difficulty level.

4. Grade Reversals. Grade reversals are spots in the trail where a climbing trail levels out then changes direction, dropping subtly for up to 50 feet before rising again. The changein grade allows water to exit the trail at the low point, reducing erosive power of water running down the trail. Depending on soil stability, grade reversals should be placed every 20 to 50 feet.

5. Outslope. When a trail contours across a hillside, the downhill edge of the tread surface should tilt slightly down and away from the high side of the trail, promoting water flow across the trail rather than down the trail. A general rule is to build all trails with a 5-percent outslope. In looser soils, i.e. sandy soils, frequent grade reversals will aid in cross-trail drainage.

In addition to using these five design guidelines, all new trail construction proposals will adherethe ACTS management process outline above.

Annual Trail Maintenance

Trail maintenance is a critical component to a sustainable trail system. As such, an annual work plan will be developed by the ATB. The trail plan will be submitted to the ASO for review, funding (in necessary), and approval. The annual work plan will outline the dates, recommendedactions, and associated justification for more intensive maintenance actions throughout the ADATS. Intensive maintenance actions will adhere to the ADATS management process. These types of actions include but are not limited to: trail diversions or reroutes; projects associated with wetlands/riparian areas; and new construction projects.

In contrast, routine maintenance actions may not be included in the annual work plan, and do not require approval via the ADATS management process. Routine maintenance actions include but are not limited to: light mechanical vegetation control to include pruning, grubbing, lopping, and hand pulling; noxious weed control; and minor erosion control and emergency trail stabilization. However, these actions will still require approval from the ASO (land owner) prior to implementation.

Annual Race Events.

The ADATS has a long history with organized mountain biking race events and will continue to do so. However, as the population of the region continues to grow with the use of the ADATS, itwill be imperative that future races are well organized, have a minimal effect on the public use ofthe trail system (temporal or spatial), and result in a net gain for the trail system. As such, the number of annual race events will not exceed five (5) in any calendar year, with one of the five

reserved for the Knobby Tire Series and Broken Spoke Cycling. Additional races may be approved on a case by case basis with consensus from the ASO.

Regardless of the applicant, all races will go through the ATB application process and be submitted to the ASO and CAC for review and approval no later than September 1 of each year; some exceptions may apply. However, the ASO reserves the right to disapprove any applicant orevent.

Funding

Funding for all trail projects, including trail construction, maintenance, signage, and kiosks canbe provided by a combination of funds from the Avimor Conservation Fund (managed by the ASO), Ada County, external private partners, and by actively pursuing grants or other funding through local, state, and federal sources. Ada County does hold some easements within the Avimor Planned Community. Ada County explicitly retains authority as to whether the Countywill appropriate funding, including but not limited to trail construction, maintenance, signage, and kiosk for the easements that Ada County holds.

Appendix F:
Avimor Fire and Vegetation Management Plan –Final

Introduction

Currently, there is no defined Wildland-Urban Interface (WUI) district or associated ordnances within the City of Eagle or the City's Area of Impact. Based on the high probability of wildland fire in the foothills surrounding the proposed Avimor development area, Avimor has developed its own WUI requirements, outlined in this Fire and Vegetation Management Plan (FVMP). The Avimor WUI requirements are based on the National Fire Protection Association (NFPA) Standards for Reducing Structure, the principles from Ignition Hazards from Wildland Fire-1144 (NFPA 2018) and guidelines outline in the 2018 International Urban-Wildland Interface Code (IUWIC). This plan will be submitted for review by the Eagle Fire District Chief and City of Eagle staff for approval. The intent of this Avimor-specific FVMP is to develop a plan that satisfactorily addresses structural, landscaping, and open space standards for residential and commercial development within the WUI, that is equivalent to or exceeds similar codes in Ada County WUI districts.

The proposed Avimor FVMP requirements incorporate components of the existing WUI requirements, requirements identified in the Avimor Habitat Management Plan (HMP), and additional management tools identified by the Fire-wise Counties Program. The plan provides guidelines for Avimor home owners, and steps to be taken by the Home Owners Association (HOA) and Avimor Conservation Director (CD) to mitigate or reduce the potential risk of wildfire and to improve the health and stability of the surrounding vegetation and wildlife habitat. In addition, the plan will be used in the re-certification process for Avimor to become a registered Fire-wise Development.

Project Description

The proposed AD is located in parts of eastern Ada County, western Boise County, and southern Gem County Idaho in Townships 05 and 06 North, and Range 01 and 02 East (Figure 1). The AD is approximately 19,000-acres in size and is surrounded by privet, state, and public lands. The property is bisected by Highway 55, north of Dry Creek Road and South of Horseshoe Bend. Portions of the South Fork of Willow Creek, Alkali Creek, Big Gulch and Gulch Creeks, Woods Gulch Creek, Spring Valley Creek, Custer Creek run through the property, as does roughly 4.5 miles of Pear Road. Elevation ranges between approximately 3,200 and 4,500 feet above mean sea level. The AD property is primarily used for agricultural purposes, including an alfalfa field and pastures/open range for domestic livestock grazing.

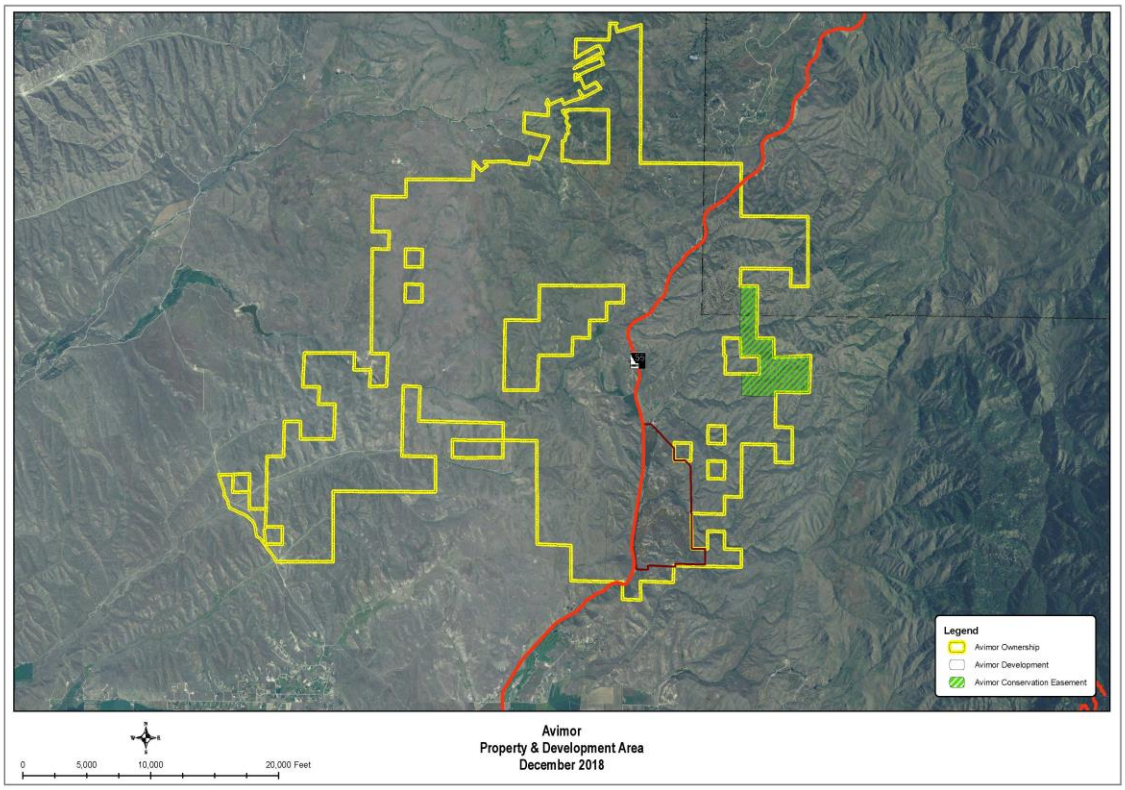


Figure 1. Vicinity Map – Avimor Development

The plant communities and associated species composition found within the AD are those commonly found throughout the western portion of the Snake River Plains (See Avimor HMP Section 4.0). Based on the amount of area with similar habitat found throughout the Snake River Plains (millions of acres), the AD (19,000-acres) is only a very small fraction of that area.

The AD area generally supports five general vegetation communities: riparian, grassland, shrub, agriculture, and disturbed; and one non-vegetative community, rock (Table 1 and Figure 2). These communities were determined by the dominant vegetation or characteristic present (Avimor HMP Section 4.0). In addition, past and current use and disturbance, as well as defining boundaries including roads, slope, and aspect were also considered. Table 1 quantifies the amount and percent of each community type found within the proposed AD boundary.

Table 1. General Vegetation Types by Community Type

Community Type	Total Acres	Percent
Agriculture	290	1.52%
Disturbed	160	0.84%
Grasslands	16,183	84.92%
Riparian	380	1.99%
Rock	7	0.04%
Shrubs	2,000	10.50%
Total Acres	**19,056**	

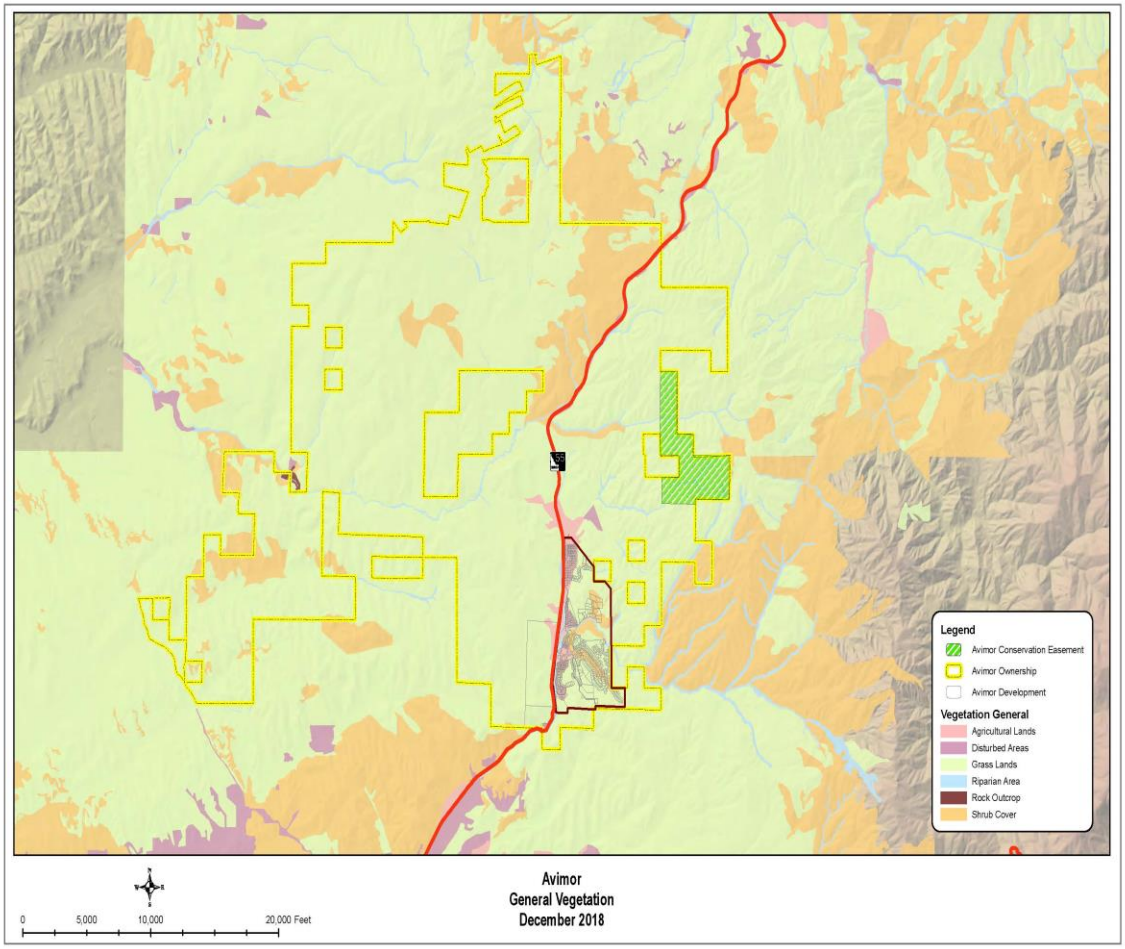


Figure 2. Vegetative Communities within the APC.

The proposed AD will incorporate residential housing, commercial space, sporting and recreation facilities, as well as parks, natural open areas, trails, paths, roads, and natural open space. Table 2 is a breakdown of each development category. As each PUMP is submitted to the City of Eagle, all residential and commercial units will be defined by Phase and Final plat as either an external or internal unit relative to natural open space. This estimated delineation will be used for management requirements outlined below.

Table 2. AD Development and Open Space Estimate.

Planning Area	Estimated Planning Area Acreage	Estimated Developed Acres	Estimated Open Space within Developed Area (Natural and Developed)	Open Space Outside Developed Area
1	7,908	3,500	2,100	2,000
2	3,858	2,100	1,260	1,000
3	7,292	2,560	1,538	1,000
Total	**19,058**	**8,160**	**4,898**	**4,000**

Based on the vegetative communities associated with the DA (Figure 2), there are only three fuel models identified by the IUWIC, including models:

A- This fuel model represents western grasslands vegetated by annual grasses and forbs. Brush or trees may be present but are very sparse, occupying less than a third of the area. Examples of types where Fuel Model A should be used are cheatgrass and medusahead. Open pinyon-juniper, sagebrush-grass, and desert shrub associations may appropriately be assigned this fuel model if the woody plants meet the density criteria. The quantity and continuity of the ground fuels vary greatly with rainfall from year to year.

L- This fuel model is meant to represent western grasslands vegetated by perennial grasses. The principal species are coarser and the loadings heavier than those in Model A fuels. Otherwise, the situations are very similar; shrubs and trees occupy less than one-third of the area. The quantity of fuel in these areas is more stable from year to year. In sagebrush areas, Fuel Model T may be more appropriate.

T- The sagebrush-grass types of the Great Basin and the Intermountain West are characteristic of T fuels. The shrubs burn easily and are not dense enough to shade out grass and other herbaceous plants. The shrubs must occupy at least one-third of the site or the A or L fuel models should be used. Fuel Model T might be used for immature scrub oak and desert shrub associations in the West, and the scrub oak-wire grass type in the Southeast.

Of these models, the predominant fuel type directly adjacent to the development is model A, with scattered patches of T throughout, and only limited patches of model L (Figure 2). Based on the fuel models identified for the site, and compliance with access and water supply requirements identified in the IUWIC, the fire hazard severity was determined by completing the IUWIC Fire Hazard Severity Form (Appendix B). Avimor was determined to have a moderate to low hazard rating.

Based on the high probability of wildland fire in the foothills surrounding the proposed DA, Avimor has developed its own WUI requirements, outlined in this FVMP. The Avimor WUI requirements are based on the NFPA Standards for Reducing Structure Ignition Hazards from Wildland Fire-1144 (2018) and guidelines outline in the 2018 IUWIC (2018). Under this Plan, perimeter residential units within the development must comply with the ignition-resistant construction codes identified in Chapter 5.2 through 5.8 of the NFPA 1144, as amended (Appendix A).

In addition, residential and commercial structures directly adjacent to natural open space, as defined for each PUMP and final plat, will also conform to the Avimor-specific standards identified in Appendix A, and be required to have: landscape plans reviewed and approved by a certified specialist; home inspection by a certified specialist within 12 months of occupancy; and follow up inspections every 5-years. Plan reviews and inspections will be tracked with an integrated geo-database, with an annual summary report given to the City of Eagle and Eagle Fire district during the annual Advisory Committee meetings. The specific phase, block, and unit numbers will be defined prior

to final plat for each PUMP. As the final plats of future PUMPs are completed, the phase, block, and lot numbers in will be added to the database.

Avimor-Specific Fire Management Plan

All units directly adjacent to areas of natural open space will permanently maintain defensible spaces in accordance with the zoning plan identified in figure 4.

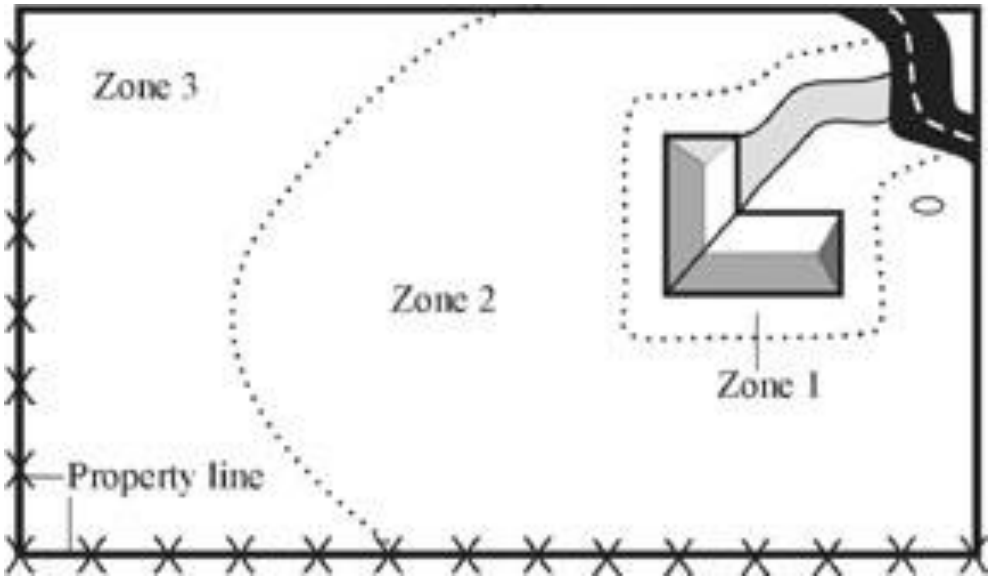


Figure 4. Management Zones

Zone 1 is the area of maximum modification and treatment. It consists of a minimum area of 30-feet on hill tops and sides, and a minimum of 20-feet on hill bases around the structure in which all combustible vegetation is significantly reduced or removed. This area will normally consist of irrigated lawns and stone landscaping. The area is measured from the outside edge of the home's eaves or any attached structures, such as decks. This area will be developed and maintained by the homeowner in accordance with the requirements identified below. In the event that the homeowner's property is less than the required zone 1 distance (30-ft), the Avimor HOA or ASO will coordinate with the homeowner for the development and maintenance of the remaining portion of zone 1.
Landscaping within three feet of the structure will be restricted to widely spaced foundation plantings of low growing shrubs or other "fire-wise" plants to be approved by the CD and Design Committee. These foundation plants will not be planted directly beneath windows or next to foundation vents. These plants will be frequently pruned and maintain by the homeowner. Storage of firewood or other combustible materials will be prohibited in these areas, unless in an enclosed, non-combustible storage structure. This includes storage of materials under attached decks.

Highly flammable trees and shrubs (conifers, junipers, arborvitaes, etc.) in Zone 1 shall be limited to no more than one tree per 2,000-sf and one shrub per 250-sf, and they must be incorporated into the landscape design, taking into consideration the slope of the property as well (Table 2). Contiguous fuels and ladder fuels will be restricted. The placement of trees and bushes will not create contiguous fuel connections between Zone 2 and the structure or attached deck (see table 2 for requirements). Trees within Zone 1

will be isolated from each other (minimum of 18 feet crown width) and pruned to at least 10-feet above ground (or 1/2 the height, whichever is the least). In addition, trees and shrubs will be restricted from contacting the roof and must be pruned to at least 10 to 15-feet from the structure. The CD will work with homeowners to identify site-appropriate species and educate residence on wildfire, fire hazards, and fire-wise concepts.

Table 2. Minimum tree crown and shrub clump spacing.

% slope	Tree Crown Spacing	Brush and Shrub Clump Spacing
0 -10 %	10´	2 1/2 x shrub height
11 - 20%	15´	3 x shrub height
21 - 40%	20´	4 x shrub height
> 40%	30´	6 x shrub height

Zone 2 is an area of fuel reduction designed to reduce the intensity of any fire approaching the structure. Typically, this zone should extend at least 75 to 125 feet from the structure depending on slope. Within this zone, the continuity and arrangement of vegetation will be based on a modified natural community emphasizing native species that have reduced fuels or stay green longer. Diseased, dead, or dying trees and shrubs will be removed to the extent possible. This area forms a buffer and provides a transition between zones 1 and 3. In the event that homeowner property boundary goes beyond zone 1 distance, the homeowner will be responsible for developing and maintaining the area in accordance to zone 2 standards. However, this area can also be managed and maintained by the homeowner in coordination with the Avimor HOA and CD. Treatment and restoration programs, as well as funding mechanisms and adaptive approaches for fuels and vegetation management are described in detail in the Avimor HMP

Zone 3 is of no particular size. Fuels and community composition will generally be managed by the CD or HOA, in accordance with the Avimor HMP, and restored to the extent possible. In the event that the homeowner's property boundary includes zone 3, the homeowner will work collaboratively with the CD or HOA to develop and maintain the area based on the required standards. Invasive and noxious weed treatments and native community restoration programs are described in detail in the Avimor HMP, as are the associated funding mechanisms and adaptive approaches for fuels and vegetation management.

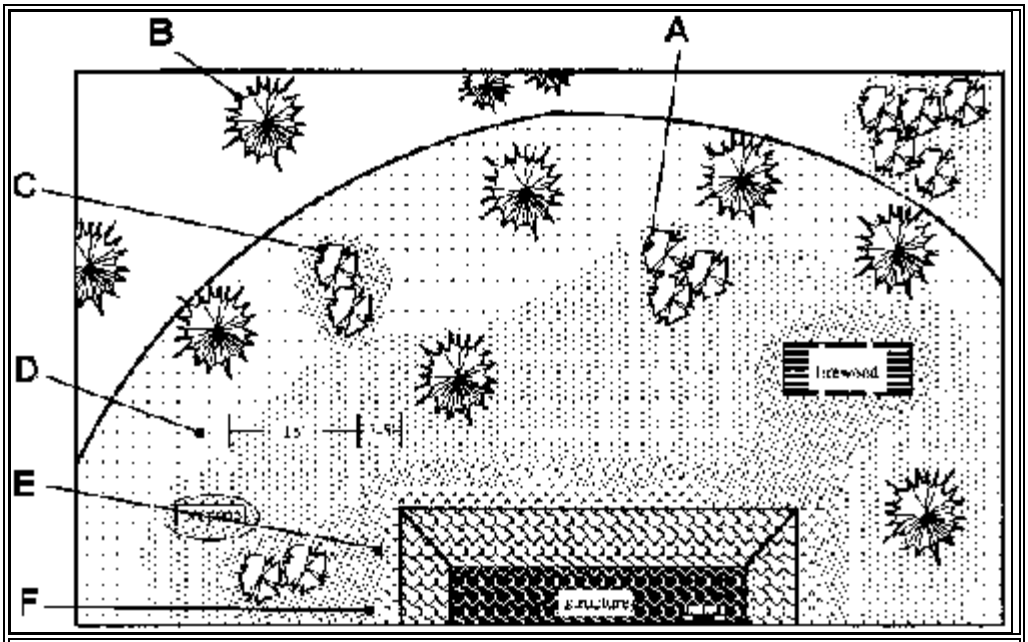
Requirements for Defensible Space

The following checklist will be used to determine if the home site is meeting requirements identified by this fire plan, or if additional work or maintenance is necessary:

- Requirements identified in the Avimor HMP will be implemented and monitored annually.

- Zone 1 will be maintained by the homeowner at a minimum 20-feet from the base of hill slopes, and 30-feet from the top of hill slopes.

- There are no contiguous fuel sources that connect zone 2 with the structure.
- There are no ladder fuels that connect zone 1 to the structure.
- Trees and shrubs are properly thinned and pruned within the defensible space. Slash from the thinning is disposed of off site, with the exception of limited mulching.
- Roof and gutters are to be clear of debris in the spring and checked regularly throughout the fire season.
- Branches overhanging the roof or chimney will be removed.
- Grasses are mowed to a maximum height of 4 inches, with the exception of ornamental landscaping grasses that are fire-wise recommended or pose little or no threat as a contiguous fuel sources.
- An outdoor water supply is available, complete with a hose and nozzle that can reach all parts of the structure.
- Road signs and access requirements are met, see Avimor design guidelines, and house numbers are posted and easily visible.
- Trash and debris accumulations will be taken off site, and restricted from storage on site, with the exception of limited mulching.
- Non-combustible materials, such as stone or irrigated lawn, shall be used to create a three-foot buffer around the base of the foundation. Landscaping within this area will be restricted to widely spaced foundation plantings of low growing grasses, forbs, or shrubs that have low ignition thresholds.
- Decks, benches, and outdoor storage units shall be constructed of non-combustible materials, such as fire-rated composite products.
- Non-combustible materials, such as decorative rock, gravel, irrigated lawn, and stepping stone pathways shall be used to break up the continuity of the vegetation and fuels. This can modify fire behavior and slow the spread of fire across property.



A. Mow grass short around shrubs (4–inches or less).
B. The best tree species to plant generally are those naturally occurring on or near the site (See HMP, Fire-wise Literature, and Avimor Conservation Director).
C. Plant low-growing shrubs near structures away from windows and vents, limit connectivity with .
D. Keep grass mown around structure to a maximum of 4 inches, and irrigate regularly, with conservation in mind, based on recommendations from the CD.
E. Plant wildflowers near structures only if they are well-irrigated and cut back during the dormant season.
F. Gravel area or mow grass short next to the structure.

Note: Figure from the Colorado State University Extension Program found at URL: http://www.ext.colostate.edu/PUBS/NATRES/06304.html

Figure 5: Example for landscaping and placement of vegetation near the structure.

Requirements for the Residents, Homeowners Association, and CD
Outdoor fireplaces/pits that use wood, pellets, or other similar fuel types that produce embers, are not permitted for use on any units within the AD. Only gas, propane, or similar are allowed. Indoor fireplaces must be gas, or have industry standard spark/ember screens installed by a licensed professional and approved by the Avimor Design Board.

The use of fireworks (as defined below) are prohibited during fire season (as defined below). Exemptions to these prohibitions must be obtained from the City of Eagle or the Avimor Stewardship Organization, along with the approval from the Eagle Fire Department.

CURRENT FIRE SEASON: The period of time between April 1 and October 31 annually.

FIREWORKS: Any combustible or explosive composition, or any substance or combination of substances, or article prepared for the purpose of producing a visible or audible effect by combustion, explosion, deflagration or detonation. Fireworks include items classified as common or special fireworks by the United States Bureau of Explosives or contained in the regulations of the United States Department of Transportation and designated as UN 0335 1.3 or UN 03336 1.4G. The term "fireworks" shall not include any automotive safety flares, toy guns, toy cannons, party poppers, or pop-its or other devices which contain twenty-five hundredths (.25) of a grain or less of explosive substance (see Idaho Code § 39-2602(3)).

The HOA, in conjunction with the CD will be responsible for the control and management of fuels directly adjacent to all walking paths and trails within the boundary of the APC. These areas will be primary dispersal sites for invasive and noxious weed species that could increase the overall amount and connectivity of fuels. These areas will be treated annually to control the establishment and spread on invasive and noxious weeds species, per the HMP, and targeted for restoration and enhancement projects. Minimum widths of the paths/ trails and associated fuels reduction will be 8-feet.

The intent of controlling fuels and reestablishing natural vegetation adjacent to these paths is two-fold. First, they will be used as fire breaks in areas of natural open space in order to reduce the overall connectivity of fuels. This can limit the size and spread of wildfires in the area. Second, vegetation associated with these paths are the primary connection between the natural open where wildfires are more likely to be, with the internal residential and commercial structures that will have fewer fire-associated restrictions. By limiting fuel connectivity with natural open areas, the probability of wildfire affecting structures that are not directly adjacent to natural open space will be significantly reduced.

In addition to treatment activity and restoration programs within the boundary of the APC, the CD will work in coordination with adjacent private land owners, the Eagle Fire District, BLM, and other agencies to do similar fuels reduction and restoration projects on lands adjacent to the development. The intent of off-site projects will be to reestablish historically altered vegetative communities and associated fire regimes on a larger area to

create a buffer, i.e. reduce the overall probability and frequency of wildfires in the area as appose to just the APC.

In concept, other developments in the area and throughout the Boise Foothills will be doing similar programs that could have the long-term cumulative effect of reducing the establishment and spread of invasive and noxious weeds species, reestablishing native vegetative communities and the associated structural and functional components, and reestablishing more natural fire regimes which would reduce the overall adverse impacts of wildfire in the Boise Foothills. Funding for these types of off-site projects will be associated with the Avimor Conservation and Education program identified in the HMP, as well as potential cooperative grant opportunities.

Registered Fire-Wise Development Program

The APC will initiate the application process to become a nationally recognized Fire-wise Development. The CD will work in cooperation with local fire agencies and Fire-wise representatives to complete the application process and enforce the requirements set forth by the Fire-wise committee (www.firewise.org). The CD will also be familiar with the science of wildfire ecology or behavior, and how to conduct home inspections and hazard assessments per Fire-wise guidelines.

As the APC grows and changes, so will the needs and requirements of a FVMP. Therefore, this will be a living document to be altered and updated on an as needed basis. Similar to the Avimor HMP, the Conservation Director and HOA will be able to use all tools identified in the current FVMP and HMP. However, in order to make changes to the FVMP, it will require the approval of the CAC, City of Eagle, and Eagle District Fire Chief.

APPENDIX A:

WILDLAND-URBAN FIRE INTERFACE CONSTRUCTION REQUIREMENTS (Revised NFPA 1144 Standards)

5.2 Construction Design and Materials.

5.2.1 Noncombustible building materials shall be materials that comply with any one of the following:

(1) The building material, in the form in which it is used, and under the conditions anticipated, will not ignite, burn, support combustion, or release combustible vapors when subjected to fire or heat.

(2) The building material is reported as passing ASTM E136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C.

(3) The building material is reported as complying with the pass/fail criteria of ASTM E136 when tested in accordance with the test method and procedure in ASTM E2652, Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C.

5.2.2 Ignition-resistant building materials shall maintain their fire performance and their mechanical performance under conditions of use.

5.2.2.1 Material shall be tested on all sides with the extended ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials (UL 723, Standard for Test for Surface Burning Characteristics of Building Materials), test. Panel products shall be permitted to test only the front and back faces and shall be tested with a ripped or cut longitudinal gap of 1⁄8 in. (3.2 mm). Materials that, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test), shall comply with 5.2.2.2 through 5.2.2.5.

5.2.2.2 Flame Spread. Material shall exhibit a flame spread index not exceeding 25 and shall not show evidence of progressive combustion following the extended 30-minute test.

5.2.2.3 Flame Front. Material shall exhibit a flame front that does not progress more than 10 1⁄2 ft. (3.2 m) beyond the centerline of the burner at any time during the extended 30-minute test.

5.2.2.4 Weathering. Ignition-resistant building materials shall maintain their performance in accordance with 5.2.2 under conditions of use. Materials shall meet the performance requirements for weathering (including exposure to temperature, moisture, and ultraviolet

radiation) contained in the following standards, as applicable to the materials and the conditions of use:

(1) Method A in ASTM D2898, Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing, for fire-retardant-treated wood, wood-plastic composite, and plastic lumber materials (2) ASTM D7032, Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails), for wood-plastic composite materials (3) ASTM D6662, Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards, for plastic lumber materials.

5.2.2.5 Identification. All materials shall bear identification showing the fire test results in accordance with NFPA 703.

5.2.3 Building materials shall meet the performance requirements for weathering (including exposure to temperature, moisture, and ultraviolet radiation) contained in the applicable standards for the building materials and the conditions of use.

5.3 Roof Design and Materials.

5.3.1 The requirements for roof covering assemblies shall be according to 5.3.1.1 through 5.3.1.1.4.

5.3.1.1 Only listed roof coverings tested and rated as Class A in accordance with ASTM E108, Standard Test Methods for Fire Tests of Roof Coverings, or UL 790, Standard for Test Methods for Fire Tests of Roof Coverings, shall be used.

5.3.1.1.1 The roof covering shall be tested with all of the assembly components representing the as-built condition in service.

5.3.1.1.2 Any panel products in addition to the structural deck incorporated to improve the fire-performance of the assembly in the test shall be tested with a between-panel joint in the tested assembly.

5.3.1.1.3 The between-panel joint shall be located in vertical alignment with the appropriate burning brand.

5.3.1.1.4 The between-panel joint shall be located no further than 6 in. (150 mm) from the between-panel joint of the wood-based sheathing material.

5.3.2 Roof gutters, downspouts, and connectors shall be noncombustible.
5.3.3 Vents or vent assemblies shall resist the intrusion of flames and embers according to either of the following:
(1) Vents shall be screened with a corrosion-resistant, noncombustible wire mesh with the mesh opening not to exceed nominal 1⁄8 in. (3.1 mm) in size.

(2) Vents and assemblies shall demonstrate the ability to resist the intrusion of flame or embers through the opening when tested in accordance with ASTM E2886, Test Method for Evaluating the Ability of Exterior Vents to Resist the Entry of Embers and Direct Flame Impingement, and complying with all of the following:

(a) There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.

(b) There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.

(c) The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

5.3.4 Eaves shall be enclosed with exterior fire-retardant treated wood, ignition-resistant materials, noncombustible materials, or materials exhibiting resistance to wildfire penetration when tested to ASTM E2957-15, Standard Test Method for Resistance to Wildfire Penetration of Eaves, Soffits and Other Projections.

5.3.4.1 The test shall be conducted on a minimum of three test specimens, and the following conditions of acceptance shall be met:

(1) Absence of flame penetration of the eaves or horizontal projection assembly at any time

(2) Absence of structural failure of the eaves or horizontal projection subassembly at any time

(3) Absence of sustained combustion of any kind at the conclusion of the 40-minute test

5.3.4.2 If any one of the three tests do not meet the conditions of acceptance in 5.3.4.1, three additional tests shall be run.

5.3.4.3 All of the additional tests shall meet the conditions of acceptance in 5.3.4.1.

5.3.5 Where roofing material has an airspace under the roof covering over a combustible deck, a 72 lb (32.7 Kg) cap sheet complying with ASTM D3909, Standard Specification for Asphalt Roll Roofing (Glass Felt) Surfaced With Mineral Granules, shall be rolled out under the entire roof deck or fire-retardant-treated plywood, be used as sheathing, and be blocked with noncombustible materials at the eaves, ridges, and hips.

5.3.6 Attic spaces shall be ventilated as approved for the building configuration, the climatological conditions of the site, and the moisture and temperature conditions associated with the occupancy and use of the building. [5000:38.8.1]

5.3.7 Metal drip edge shall be installed at all the rake and eave edges.

5.4 Overhanging Projections.
All projections (exterior balconies, carports, decks, patio covers, unenclosed roofs and floors, and similar architectural appendages and projections) shall be constructed of heavy timber, noncombustible material, exterior fire-retardant-treated wood, or ignition-resistant materials.

5.5 Overhanging Buildings.
The underside of overhanging buildings and supporting structural elements shall be constructed of heavy timber, noncombustible materials, fire-retardant treated wood, ignition-resistant materials, or be an assembly with a 1-hour fire resistance rating when tested in accordance with ASTM E119, Standard Test Methods for Fire Tests of Building Construction and Materials.

5.6 Exterior Vertical Walls.

5.6.1 Exterior vertical wall coverings shall meet the requirements for an ignition-resistant material, exterior fire-retardant treated wood, noncombustible material, or be an exterior wall assembly exhibiting a minimum 1-hour fire resistance rating, when tested in accordance with ASTM E119, Standard Test Methods for Fire Tests of Building Construction and Materials, and exhibiting a minimum Class B flame spread index, when tested in accordance with ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials, where walls are potentially exposed to a wildland fire, unless the AHJ determines that the wildland fire risk and structure assessment requires greater protection.

5.6.2 All exterior walls shall be protected with 2 in. (50 mm) nominal solid blocking between exposed rafters at all roof overhangs, under the exterior wall covering on all sides exposed to native vegetation, as determined by the AHJ.

5.6.3 When appendages and projections are attached to exterior walls required to exhibit a fire resistance rating, they shall be constructed to maintain the fire resistance rating of the wall.

5.6.4 A minimum of 6 in. (150 mm) noncombustible vertical separation between a horizontal surface and siding shall be maintained.

5.7 Exterior Openings.

5.7.1 Exterior windows, windows within exterior doors, and skylights shall be multilayered glazed panels, glass block, or have a fire-resistance rating of no less than 20 minutes.

5.7.2 Window screening shall be installed and constructed using noncombustible mesh to minimize the collection of embers (firebrands) and their entry through open windows.

5.7.3 Exterior doors shall be solid-core no less than 13⁄4 in. (45 mm) thick, be constructed with noncombustible materials, or have a fire protection rating of no less than 20 minutes.

5.7.4 Vents for attics, subfloors, and walls, excluding dryer vents, shall resist the intrusion of flames and embers in accordance with 5.3.3.

5.8 Chimneys and Flues.

5.8.1 Every fireplace and wood stove chimney and flue shall be provided with an approved spark arrester constructed of a minimum 12-gauge welded wire or woven wire mesh, with openings not exceeding 1⁄2 in. (12.7 mm).

5.8.2 Vegetation shall not be allowed within 10 ft. (3 m) of a chimney outlet.

5.9 Accessory Structure(s).
Accessory structures shall be constructed to meet the requirements of this chapter or shall be separated from the main structure by a minimum of 30 ft (9 m).

Compliance Alternatives.

Practical Difficulties. When there are practical difficulties involved in carrying out the provisions of this section, Eagle Fire District Chief or their representative is authorized to grant modifications for individual cases on application in writing by the owner or a duly authorized Avimor representative. The Fire Chief or their representative shall work with Avimor representatives to identify that a special individual reason makes enforcement of the strict letter of this section impractical, the modification is in conformance with the intent and purpose of this section, and the modification does not lessen any fire-protection requirements or any degree of structural integrity. The details of any action granting modifications shall be recorded and entered into the files of the code enforcement agency. If the Fire Chief or their representative determines that difficult terrain, danger of erosion or other unusual circumstances make strict compliance with the vegetation control provisions of this section detrimental to safety or impractical, enforcement thereof may be suspended provided that reasonable alternative measures are taken.

Technical Assistance. To determine the acceptability of technologies, processes, products, facilities, materials and uses attending the design, operation or use of a building or premises subject to the inspection of the Eagle Fire Chief or their representative, the Eagle Fire Chief or their representative is authorized to require the owner or the person in possession or control of the building or premises to provide, without charge to the jurisdiction, a technical opinion and report. The opinion and report shall be prepared by an approved engineer, specialist, laboratory or fire-safety specialty organization acceptable to the Eagle Fire Chief, or their representative and the owner and shall analyze the fire-safety of the design, operation or use of the building or premises, the facilities and appurtenances situated thereon and fuel management for purposes of establishing fire hazard severity to recommend necessary changes.

Alternative Materials or Methods. If the Eagle Fire Chief or their representative concurs, they are authorized to approve alternative materials or methods, provided that they find that the proposed design, use or operation satisfactorily complies with the intent of this section and that the alternative is, for the purpose intended, at least equivalent to the level of quality, strength, effectiveness, fire resistance, durability and safety prescribed by this section. Approvals under the authority herein contained shall be subject to the approval of the Eagle Fire Chief or their representative whenever the alternate material or method involves matters regulated by the Fire Code. The Eagle Fire Chief or their representative shall require that sufficient evidence or proof be submitted to substantiate any claims that may be made regarding its use. The details of any action granting approval of an alternate shall be recorded and entered in all the files of the code enforcement agency.

APPENDIX B

FIRE HAZARD SEVERITY FORM

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

This appendix is used to determine the fire hazard severity of the proposed development and is based on IWUIC 29 (2018).

A. Subdivision Design Points

1. Ingress/Egress:
Two or more primary roads 1_X_
One road 3___
One-way road in, one-way road out 5___

2. Width of Primary Road:
20 feet or more 1_X_
Less than 20 feet 3___

3. Accessibility:
Road grade5%or less 1___
Road grade more than5% 3_X_

4. Secondary Road Terminus:
Loop roads, cul-de-sacs with an outside turning
radius of 45 feet or greater 1_X_
Cul-de-sac turnaround
Dead-end roads 200 feet or less in length 3___
Dead-end roads greater than 200 feet in length 5___

5. Street Signs:
Present 1_X_
Not present 3___

B. Vegetation (IWUIC Definitions)

1. Fuel Types
Light 1_X_
Medium 5___
Heavy 10___

2. Defensible Space
70% or more of site 1___
30% or more, but less than 70% of site 10_X_
Less than 30% of site 20___

C. Topography
8% or less 1___
More than 8%, but less than 20% 4_X_
20% or more, but less than 30% 7___
30% or more 10___

D. Roofing Material
Class A Fire Rated 1_X_
Class B Fire Rated 5___
Class C Fire Rated 10___
Nonrated 20___

E. Fire Protection—Water Source
500GPMhydrant within 1,000 feet 1_X__
Hydrant farther than 1,000 feet or draft site 2__
Water source 20 min. or less, round trip 5 ___
Water source farther than 20 min., and
45 min. or less, round trip 7 ___
Water source farther than 45 min., round trip 10___

F. Existing Building Construction Materials
Noncombustible siding/deck 1_X_
Noncombustible siding/combustible deck 5___
Combustible siding and deck 10___

G . Utilities (gas and/or electric)
All underground utilities 1_X_
One underground, one aboveground 3___
All aboveground 5___

Total for Subdivision__27__
Moderate Hazard 40–59
High Hazard 60–74
Extreme Hazard 75+

APPENDIX G

Avimor Development IPaC Report (April 2022)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Idaho Fish And Wildlife Office
1387 South Vinnell Way, Suite 368
Boise, ID 83709-1657
Phone: (208) 378-5243 Fax: (208) 378-5262

In Reply Refer To: April 07, 2022
Project Code: 2022-0029136
Project Name: Avimor- Habitat Management Plan (2022 Revision)

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

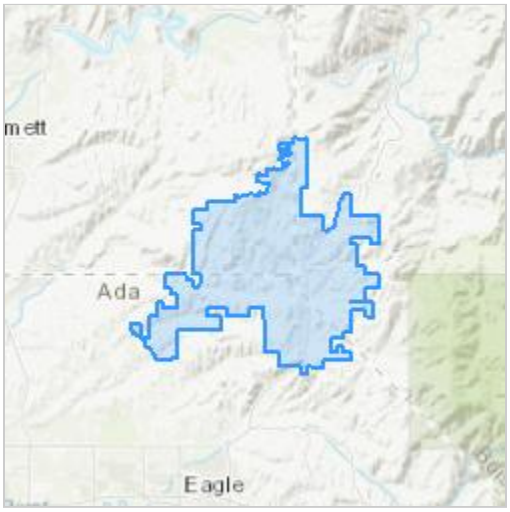
Idaho Fish And Wildlife Office
1387 South Vinnell Way, Suite 368
Boise, ID 83709-1657
(208) 378-5243

Project Summary

Project Code: 2022-0029136
Event Code: None
Project Name: Avimor- Habitat Management Plan (2022 Revision)
Project Type: Management Plans Land Management/Restoration
Project Description: IPaC report pulled for Avimor Habitat Management Plan 2022 Revision to ensure most to-date reporting for recently listed or de-listed species since 2017 HMP document version.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.8163483,-116.28650187346702,14z



Counties: Ada , Boise , and Gem counties, Idaho

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Slickspot Peppergrass *Lepidium papilliferum* Population: There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/4027	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Black Rosy-finch *Leucosticte atrata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9460	Breeds Jun 15 to Aug 31

NAME	BREEDING SEASON
Cassin's Finch *Carpodacus cassinii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Aug 31
Evening Grosbeak *Coccothraustes vespertinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31
Lewis's Woodpecker *Melanerpes lewis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30
Long-eared Owl *asio otus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3631	Breeds Mar 1 to Jul 15
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Rufous Hummingbird *selasphorus rufus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds Apr 15 to Jul 15
Sage Thrasher *Oreoscoptes montanus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9433	Breeds Apr 15 to Aug 10

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the

FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your

project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no

data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER POND

- PUSCh
- PUBFh
- PUSC
- PUBHx

RIVERINE

- R4SBA
- R3USC
- R5UBH
- R4SBC
- R3UBF
- R3UBH

FRESHWATER FORESTED/SHRUB WETLAND

- PSS1A
- PSS1B
- PSS1C

FRESHWATER EMERGENT WETLAND

- PEM1B
- PEM1C
- PEM2F

IPaC User Contact Information

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