## Appendix C

# Rationale for Subdivision Design Recommendations, with Pertinent Scientific References

#### **Table of Contents**

Preface	
Appendix C.1. Water Bodies	
Appendix C.2. Big Game Winter Range	
Appendix C.3. Public Hunting	
Appendix C.4. Human/Bear Conflicts	
Appendix C.5. Native Grasslands and Native Shrub Habitats	
Appendix C.6. Selected Species of Concern	
A. Common Loon	
B. Great Blue Heron	
C. Trumpeter Swan	
D. Long-billed Curlew	
E. Burrowing Owl	
F. Bald Eagle and Golden Eagle	
G. Ferruginous Hawk	C-107
H. Peregrine Falcon	
I. Greater Sage-Grouse and Sharp-tailed Grouse	

### -Tables -----

Appendix C.	5. Native Grasslands and Native Shrub Habitats:	
C.5-1.	Recommended development limits for native grassland or native shrub habitat patches located within a proposed subdivision	C-70
Figures		
Appendix C.	.1. Water Bodies:	
C.1-1.	Distribution of Montana's water bodies.	C-7
C.1-2.	Illustration of total building setback	C-9
C.1-3.	CMZ map showing three cross sections	C-16
C.1-4.	Illustration of CMZ/riparian example—cross section #1	C-17
C.1-5.	Illustration of CMZ/riparian example—cross section #2	C-17
C.1-6.	Illustration of CMZ/riparian example—cross section #3	C-17
Appendix C.	.2. Big Game Winter Range:	
C.2-1.	Map showing general range and winter/general range of Elk in Montana	C-31
C.2-2.	Map showing general range and winter/general range of Mule Deer in Montana	
C.2-3.	Map showing general range and winter/general range of White-tailed Deer in Montana	C-32
C.2-4.	Map showing general range and winter/general range of Moose in Montana	C-32
C.2-5.	Map showing general range and winter/general range of Mountain Goat in Montana	
C.2-6.	Map showing general range and winter/general range of Bighorn Sheep in Montana	C-33
C.2-7	Map showing general range and winter/general range of Antelope in Montana	C-33
C.2-8.	Examples of dispersed and clustered development on winter range	C-39

Appendix (	C.4. Human/Bear Conflicts:	
C.4-1	. Map showing the year-round general distribution of Grizzly Bear in Montana	<b>.</b> C-55
C.4-2	. Map showing the year-round general distribution of Black Bear in Montana	C-55
C.4-3	. Illustrations of (A)-type Bear-Resistant Enclosures	C-60
C.4-4	. Illustrations of (B)-type Bear-Resistant Enclosures	<u>.</u> C-60
Appendix (	C.5. Native Grasslands and Native Shrub Habitats:	
C.5-1	. Map showing the general location of prairie grasslands identified in Montana	C-62
C.5-2	2. Map showing the general location of intermountain/foothill grasslands identified in Montana	C-63
C.5-3	3. Map showing the general location of sagebrush shrub-steppe identified in Montana	C-64
C.5-4	4. Map showing the general location of sagebrush shrublands identified in Montana	C-65
C.5-5	5. Examples of dispersed and clustered development on native grasslands	C-69
Appendix (	C.6. Selected Species of Concern:	
C.6-1	. Map showing the general distribution of Common Loons in Montana, including nesting and migration areas	C-82
C.6-2	2. Map showing the general distribution of Great Blue Herons in Montana	C-85
C.6-3	3. Map showing the general distribution of Trumpeter Swans in Montana, including breeding and overwintering areas	C-88
C.6-4	l. Map showing the known locations of Long-billed Curlew breeding areas identified in Montana	C-92
C.6-5	5. Illustration showing the radius of a circular 104-acre Long-billed Curlew habitat area	C-93
C.6-6	6. Map showing the general distribution of known Burrowing Owl nesting areas identified in Montana	C-95
C.6-7	7. Illustration showing the radii of circular Burrowing Owl habitat ranges found in Saskatchewan	C-96

C.6-8. Map showing the year-round, statewide distribution of Bald Eagles in Montana	C-98
C.6-9. Map showing the year-round, statewide distribution of Golden Eagles in Montana	C-99
C.6-10. Map showing the general distribution of Ferruginous Hawks in Montana, including nesting and migration areas	
C.6-11. Map showing the year-round, statewide distribution of Peregrine Falcons in Montana	C-111
C.6-12. Map showing the year-round distribution of Greater Sage-Grouse in Montana	
C.6-13. Map showing the year-round current and historic distribution of Sharp-tailed Grouse in Montana	

#### **Preface**

In keeping with its mission to "provide for the stewardship of fish, wildlife, parks and recreational resources of Montana while contributing to the quality of life for present and future generations," the Fish and Wildlife Division of Montana Fish, Wildlife & Parks has assembled Fish and Wildlife Recommendations for Subdivision Development in Montana: A Working Document, to guide FWP field biologists as they respond to requests for information and input into the local subdivision application and review process. The recommendations offer a science-based approach that local governments, developers, their project team members, and citizens in Montana may also find useful in their efforts to consider the effects of proposed subdivisions on species and habitats.

This Appendix describes the reasoning and rationale behind the recommended subdivision design standards found in the *Working Document*, and it outlines the scientific literature and professional biologist opinions that support each recommendation. The level of scientific research and general understanding about these topics varies, depending upon species and habitat type. In some instances, knowledge about the impacts of human development on fish and wildlife is found in peer-reviewed documents; in other cases, we must rely upon the professional experience of trained field biologists. Regardless of the existing research and data, it is widely recognized that more studies are needed to better understand all the factors involved in accommodating subdivisions for people *and* healthy habitats for fish and wildlife.

In order to help ensure that all *Working Document* users have the same basic understanding of the various habitat types and species, this Appendix also provides background information about them. With feedback from its own biologists and other users of the recommended design standards, FWP intends to evaluate, modify, and perhaps expand the standards over time as resources allow, and as knowledge of the interactions between people and wildlife grows.

FWP welcomes the opportunity to work with developers, local governments, and others in monitoring pre- and post-subdivision development conditions and expanding our collective understanding of the effects of different subdivision developments on Montana's fish and wildlife, and their habitats.