From:	Davis, Dawn
To:	Jesse DElia; Pat Deibert; Lief Wiechman; Steve Abele
Subject:	Draft Table - Indirect Effects
Date:	Thursday, March 26, 2015 2:20:22 PM
Attachments:	Avoidance Buffers - Draft Table 20150326.xlsx

All,

I don't know how helpful this will be but here is a spreadsheet I began populating following yesterday's conversation. If people are interested we could use google drive to add or track changes.

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Dawn Davis, Ph.D.
Certified Wildlife Biologist ®
U.S. Fish and Wildlife Service, Pacific Regional Office
911 NE 11th Avenue, 4th Floor, Portland, OR 97232
Office: 503.231.6194; Cell: 503.784.7429; FAX: 503.231.6243
dawn_davis@fws.gov

Feature	Avoidance Distance	Source
Habitat Conversion to Ag	1049 m	Hagen et al. 2004
Center-pivots	977-1142 m	Pitman et al. 2005
Ubanization		
Power lines	1106-1320 m	Hagen et al. 2004
	1254 - 1385 m	Pitman et al. 2005
	≥100 m	Pruett et al. 2009
	500 m	Horton et al. 2009
	600 m	Gillan et al. 2013
	1 km	Braun 1998
	500 m	Hanser et al. 2011
		Johnson et al. 2011
	3500 m	Durtsche et al. unpublished report
		Nonne et al. 2013
		LeBeau et al. 2014
		Ellis 1985
Communication Towers		Johnson et al. 2011

	500 m	Durtsche et al. unpublished report
Other Vertical Structure	500 m	Horton et al. 2009
Buildings	1397-2129 m	Hagen et al. 2004
	1951-2306 m	Pitman et al. 2005
	2129 m	Horton et al. 2009
	150 m	Gillan et al. 2013
	800 m	Braun 1998
	950 m	Holloran et al. 2010
	2.5 km	Aldridge et al. 2012
Fences		
Pipelines	30 m active; 15 m inactive	Durtsche et al. unpublished report
Roads	≥100 m	Pruet et al. 2009
	2000 m major highways; 300 m major roads; 30 m local roads; 15 m minor roads	Durtsche et al. unpublished report
	8 km	Aldridge et al. 2012
	193-214 m	Hagen et al. 2004
Unimproved	208-224m	Pitman et al. 2005
	2377 m	Hagen et al. 2004

Improved	1526-3149 m	Pitman et al. 2005
	2377 m	Horton et al. 2009
	450 m	Gillan et al. 2013
Railroads	90 m	Durtsche et al. unpublished report
O&G	435-564 m	Hagen et al. 2004
	539-588 m	Pitman et al. 2005
	564 m	Horton et al. 2009
	1.9 km	Carpenter et al. 2009
	3 km	Holloran et al. 2010
	300 m	Durtsche et al. unpublished report
Coal		
Mining		
Wind	2000 m	Horton et al. 2009
	1.6 km	Robel et al. 2004
		LeBeau et al. 2014
Geothermal		

Predation		
Noise		

Comments
Distances from LEPC nests taken from Pitman (2003) and othe use sites from Hagen (2003) to Ag edge.
Distances of LEPC nests to antrhopogenic features on 2 areas in SW Kansas
Distances from LEPC nests taken from Pitman (2003) and othe use sites from Hagen (2003)
Distances of LEPC nests to antrhopogenic features on 2 areas in SW Kansas
Avoidance behavior of prairie grouse
Avoidance buffers based on Pruett et al. (2009) applied to LEPC spatially-based planning tool for Oklahoma
GRSG avoidance of infrastructure
Study fuond there was less probablility of GRSG pellet occurance w/in 500 m of power lines
Found no negative effect of power lines on lek counts
Represents constructed buffers to incorporate factors that may impacto or influence GRSG use byeond the direct physical limits of the disturbance component; Intended to represent the impact of raptor predation on the use of perches on transmission line towers.
Preliminary analysis suggested no negative effects on demographic rates (male survival and movement, female survival, pre-fledging survival, and nest survival) that could be explained by proximity to the transmission line.
The releative risk of a nest failing decreased in habitats closer to transmission lines but the relationship between nest survival and distance to transmission line was not substantial.
The placement of transmission lines in close proximity to a lek (w/in 200 m) will cause an incrase in usage of the structures as hunting sites by raptors; Recommended that new transmission lines should avoid leks and/or use areas aby at least 1.2 km and preferably by 1.5 km.
Found lek trends were reduced when communication towers were nearby

Represents constructed buffers to incorporate factors that may impacto or influence GRSG use byeond the direct physical limits of the disturbance component; Intended to represent the impact of raptor predation
Vertical structures >99 ft; applied to LEPC spatially-based planning tool for Oklahoma
Distances from LEPC nests taken from Pitman (2003) and othe use sites from Hagen (2003)
Distances of LEPC nests to antrhopogenic features on 2 areas in SW Kansas
Avoidance buffers based on Pitman 2003 in Hagen et al. 2004 applied to LEPC spatially-based planning tool for Oklahoma
GRSG avoidance of infrastructure
Fewer GRSG yearling females nested w/in 950 m of infrastructures than was expected
High density residential development was avoided at a lanscape scale and nesting GUSG females chose to nest farther away from any single development at the patch scale.
30 m represents constructed buffers to incorporate factors that may impacto or influence GRSG use byeond the direct physical limits of the disturbance component; Represents the average width of disturbance and associated zone of vegetation removal
Avoidance behavior of prairie grouse
Represents constructed buffers to incorporate factors that may impacto or influence GRSG use byeond the direct physical limits of the disturbance component
GUSG females avoied areas with road densities >0.50 km/km2 for nesting; relative probability of nesting increased >8 km from high volume roads
Distances from LEPC nests taken from Pitman (2003) and othe use sites from Hagen (2003); Hagen (2003) did not differentiaate between road types
Distances of LEPC nests to antrhopogenic features on 2 areas in SW Kansas
Distances from LEPC nests taken from Pitman (2003) and othe use sites from Hagen (2003)

Distances of LEPC nests to antrhopogenic features on 2 areas in SW Kansas
Avoidance buffers based on Pitman 2003 in Hagen et al. 2004 applied to LEPC spatially-based planning tool for Oklahoma
GRSG avoidance of minor roads; GRSG exhibited no dectable avoidance of major and minor roads;
Represents constructed buffers to incorporate factors that may impacto or influence GRSG use byeond the direct physical limits of the disturbance component
Distances from LEPC nests taken from Pitman (2003) and othe use sites from Hagen (2003)
Distances of LEPC nests to antrhopogenic features on 2 areas in SW Kansas
Avoidance buffers based on Pitman 2003 in Hagen et al. 2004 applied to LEPC spatially-based planning tool for Oklahoma
GRSG avoidance of endery wells during the winter
GrSG yearling males establihed themselves less often than expected on leks w/in 3 km of producing wells and more often on leks >3 km
Represents constructed buffers to incorporate factors that may impacto or influence GRSG use byeond the direct physical limits of the disturbance component
Avoidance buffer based on Hagen et al. (2004) applied to LEPC spatially-based planning tool for Oklahoma
The Risk of a nest or brood failing decreased by
7.1% and 38.1%, respectively, with every 1.0 km increase in distance from nearest turbine