

**General Discussion**

Do we use one number for calculating area of influence (AOI) or a range?

- Range addresses the uncertainty in the literature, but increases the work for the GIS and may not be feasible.
- Go with the minimum and explain that it is a minimum?
- May depend on the threat type – for example breaking roads into three types

Need to look at impacts/recommendations for common infrastructure (roads) and see how that fits in to the activities that share the infrastructure.

If we don't use the values commonly referenced in the literature we need to provide the justification.

% disturbance from activity will be key in CE and discussion of habitat fragmentation.

Need to consider connectivity – re-visit the 2010 finding.

Indirect buffer measured from the feature itself

**Habitat Conversion to Agriculture**

- most literature focuses on predator dispersal
- Aldridge – brood occurrence relative to agricultural activities, but no cut off of distance between occur and no occur.
- spatial arrangements/edges may be the bigger issue – more sagebrush is better
- need to tease apart habitat quality and loss vs. impacts from the threat itself
- Need to parse out by season, as older broods will use areas of agriculture and center pivot (or irrigated) areas
- But if ag is not irrigated then probably is no benefit or return to the agricultural area.

**Draft Recommendation:**

- short-term buffer of 1000 m during nesting period only; likely an over-estimated because of brood use of irrigated agriculture.
- Maybe only apply to non-irrigated agriculture - need to ask GIS if they can even parse out the types of agriculture (irrigated vs non-irrigated).
  - ACTION – Steve will review the LEPC literature to assess if applicable to sagr, and reach out to P. Coates to see if he has any analyses that may inform.
  - ACTION – Lief will reach out to GIS team to see if the data can be separated between irrigated and non-irrigated.

**Urbanization**

- may be covered with roads, powerlines, predators and human activities.
- Need to make sure are consistent with the GUSG building 4(d) rule. How define urbanization?
- BER used city boundaries. Developed lands (Knick and Johnson) may be more than urban. (reference spatial layer under buildings)
- May lump buildings into this after checking buildings.

- may be buildings that are outside of urban/ex-urban areas – primarily associated with energy development.
  - ACTION – Circle back to this after examination of spatial layer.

### **Buildings**

- Human Activity – human presence – can't be quantified in itself but be captured with infrastructure to support humans (roads, powerlines, buildings)
- BLM discussion – human activity resulted in habitat degradation – used a spatial layer – need to verify what this covered. – need to look at the developed lands spatial layer and see if that is an appropriate surrogate for buildings
- Bui citation for urbanization – 3 km.
  - ACTION – Also need to examine Aldridge et al 2012.

### **Predators**

- Literature reported distances for ravens vs. transmission lines and ravens vs. roads. Rest of literature says sagr avoid areas of high predator density but we lack the information to quantify that (brood locations, amount of edge).
- most mammal literature was related to WUI discussions, or presented home ranges
- Raven literature (Boarman and Heinrich) – small sample sizes and used known roost locations.
- Bui – said that increase in predators out to 3 km from urban areas.
- review of predator literature indicates that corvids contribute to approx. 50% of the nest mortality so us the corvid literature to estimate buffer.
- 2 to 3 km buffer in literatures are averages. May be larger in areas that are highly fragmented, less in areas with uninterrupted sagebrush. So if use average will conservatively capture the potential impact in areas most likely to support grouse.
- 2 to 3 km buffer based on the raven literature. Not using Boarman and Heinrich due to small sample sizes, different habitat type, and based on roost sites (and we don't want to assume that all structures are roost sites).
- Use BBS data – ask GIS to overlay data over sagr range (maybe look at the data from 20 years ago and then now to look at shift over time); also concentration of threat.
- Falcon – Gondor report – measured survival parameters for sagr and habitat selection.
  - ACTION – Steve will will check on the information and feed to back to the SLT for consideration (re: Falcon to Gondor)

### *Tentative recommendation*

- 2.13km (from roads)
- 2.2 km (from power lines)
  - ACTION – Steve will reach out to Gibson before finalizing (re: Falcon to Gondor)
- 3 km (from urban)

### **Roads**

- Break into 3 categories of use
- Need to consider noise – roads with consistent traffic – be above 10 Dba out to 3 km of road
- Holloran/Lyon/Anderson papers used 3 km as a breaking point for study design – effects could have extended out further.

- Mechanism of impacts from roads unclear (could be the road itself, or associated noise, predators, habitat change from invasive species)
- Need to look at Forman and Alexander for potential impacts of invasives (but not likely to help with buffers).
- Federal and State highways – if use 3 km, should capture the raven/predator distance
- pick the largest buffer but state what other buffers that may capture (like the noise buffer captures the raven distance)
- Seasonal only since the recommendations are based on breeding data (but so is our abundance and distribution layer). But noise will be impacting the reproductive season so impacts will affect all birds.
- Need to understand how GIS is looking at roads – Interstate, major roads, surface streets (BER report definitions) – should include crown and ditch roads regardless of the surface.
  - ACTION – Lief – will check with our GIS folks to see what they are using.
- not including two –tracks – low use, low volume and not likely to impact to grouse beyond initial disturbance (likely minimal effect on nesting success, etc).

#### *Tentative Recommendation:*

- Interstate – 7.5 based on Connelly et al. 2004
- Federal and State Highway – 3.3 km based on Patricelli et al. 2013 (noise dispersal)
- Secondary – 3 km – Holloran/Lyon/Anderson literature complex. Secondary roads will include all surface types for our purposes.

#### **Transmission**

- Messmer – 1.2 km for transmission, 600 m for distribution lines (unpublished)
- Roads associated with transmission had a bigger impact according to Messmer
- Where overlap with other linear features the buffers are not additive but inclusive using the larger relevant buffer.

#### *Tentative Recommendation:*

- Use the larger buffer of 2.2 km (reference ravens) and not be concerned with the information presented in the rest of the literature (which is less than 2.2). (Need to explain why varied from BER and buffer report – 6.9 km).
- still need to circle back to Falcon-Gondor line recommendations.
- Schroeder examined connectivity in the Columbia Basin
  - ACTION – Pat will check with Mike to see if there was a distance component.

#### **Pipelines**

- assumption is underground
- Not covered by Wisdom 2011, BER report; Johnson et al was inconclusive
- All depends on how the pipeline is reclaimed and its success
- in some cases birds may use the reclamation due to presence of desirable forbs
- is a fragmentation issue probably more so than anything else

#### *Tentative Recommendation:*

- 30 m based on Durtsche et al.

#### **Railroads**

- BER referenced Knick of 3 km –
  - ACTION – Dawn will check what Knick based the 3 km on.
- the Durtsche may be an underestimate due to the permanency of the structure, crown and ditch nature of the feature and high volume traffic of loud noise vehicles.
- Cross-reference with Patricelli et al. roads. But she measured constant noise and vehicle traffic – is that comparable to trains? Trains may be louder.

### Fences

- may provide more perching opportunities for predators
- do we have a spatial layer for fences? not all fences are mapped so this may be moot
- may not have the comprehensive information on fences and literature support to make a recommendation.

### Communication Towers

- need to re-visit Johnson et al. 2011 for recommendation
- Wisdom 2011 – mean was 21 km for occupied , 12 km for extirpated
- BER used the raven predation reference
- Need to check Leu 2008
- should we lump this with other tall structures, such as transmission lines

### *Tentative recommendation:*

- Lump with transmission unless Johnson et al. 2011 or Leu 2008 provide specific information to suggest communication towers need to a separate entity.
  - ACTION – Dawn will review

### Coal

- Subsurface mines – probably lump into building/urban buffer because only activity above ground is support structures
- Surface mines
  - BER used Taylor et al. 2012 and Johnson 2011 – buffer of 19 – why would be we be different (not specific information).
  - ACTION – Pat will check
  - Maybe use noise? constant traffic associated with coal retrieval. Patricelli et al. 2012 reference for roads may be applicable and extend to 3.0 km vs. the 2 km in older literature on coal impacts from the North Park

### Mining

- If use noise – maybe also use for mining?
- type of mine is relevant – commercial mines only – don't include small claims for personal use.
- Use a plan of operation as the break point?
  - ACTION – Steve - Cross-check w/ mining chapter
  - ACTION – Lief – GIS data layers
- Frequency of use may also be influential – if only used occasional (like county gravel pit) different level of impact – need to check GIS data
- How to deal with drilling of locatables? maybe place with non-renewable energy? particularly uranium

### *Tentative recommendation:*

- Use commercial mines only

### **Wind**

- LeBeau
  - ACTION –Pat will check thesis to see if there is an outer distance where there was no or minimal effect
- hard to lump in with other tall structures due to structural differences and movement.
- may have to reference to other species literature
- Manville recommendations (2004) was lek based – Pat
  - ACTION –Pat will check

### **Oil and Gas**

- need to consider individual wells vs. fields
- density vs. individual wells.
- if have all the well locations spatial – calculate a raster that identifies a density. For cells above threshold apply AOI. – we should ask GIS folks if possible –
  - ACTION –Lief will check
- difference in response based on seasonal habitat – use the most conservative? but abundance and distribution is lek based so better to stick with consistent seasons.