Grizzly bears and pipelines: response to unique linear features

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Project Background

- Some wildlife species (e.g. caribou) may avoid linear features.
- Some predators (e.g. wolves) may use linear features as travel routes.

What about grizzly bears?
Our work in the Kakwa area started in 2007 and was focused on bear response to changing landscapes associated with forestry.

In 2010 and 2011 we investigated how bears responded to oil and gas well sites. (2 Year Project)

For the past two years we focused our attention on how bears may be responding to pipelines in this area. (2012-2013)
Research Objectives

1. Grizzly bear *habitat selection* patterns along pipeline right-of-ways (RoWs). A measure of use.
2. Understanding Grizzly bear *activities* on pipeline RoWs.
3. Grizzly bear *movement* patterns along pipeline RoWs.
4. Do bears use pipeline RoWs to increase predation on ungulates?
5. Evaluation of factors that might influence grizzly bear mortality risk on pipelines.
Required capture and collaring of bears
Datasets

(125,624 locations)
- 15 females, 15 males.
- 1 location each hour

Oil and gas wellsite data from Alberta Energy
- spatial and attribute data were updated annually to match GPS collar data
- ROW widths were calculated in the field and through GIS analysis
Results

1. Grizzly bear *habitat selection* patterns along pipeline right-of-ways (RoWs).
   - A measure of use, based on availability.

*Both male and female grizzly bears used pipelines, pipeline-road RoWs, and roads more than expected by availability, across all seasons*
Results

However:

Surrounding pipeline and road density had a negative influence on use of pipelines in the fall and pipeline-road RoWs across all seasons. With increasing pipeline and road densities in the 400m surrounding pipelines/pipeline-road Rows, the probability of use decreased.
2. Understanding Grizzly bear *activities* on pipelines – what do bears use pipelines for?

Methods:
- Field crews visited grizzly bear use points on RoWs in 2012 and 2013, within ~14 days of the collar location date.
- Searched study plots for evidence of anting, digging, foraging on plants, bedding, kill sites, rub trees, other bear sign.

Results summary:
- **only 36%** of bear use points on pipeline RoWs (2012 and 2013 field seasons) had evidence of bear activities.
- **Anting** was the most common foraging activity (~20% of sites).
- Root digging (sweet vetch), herbivory (foraging on clover, dandelion, alfalfa, cow parsnip), berry feeding, and rub “trees” (powerpoles!) were also observed.

*Conclusion: Primary use for travel and secondary use is feeding*
3. What factors influence whether bears use pipelines?

We found differences in age, sex class and season influence use of pipelines and pipeline-road RoW combination.
3. What factors influence whether bears use pipelines?

Disturbance age and original pipeline age both had a negative influence on use of pipelines/pipeline-road RoWs, with the probability of use decreasing as pipeline age increased. This finding has implications for worker safety.
Results

3. What factors influence whether bears use pipelines?

Our data suggests that this pipeline use and the observed age response (Bears prefer pipeline areas <7 yrs post disturbance) is related to the presence of bear foods. Known bear foods are more common on pipelines and edges than in other available habitat. This includes dandelions, clover and ants.
4. Do Grizzly Bears use pipelines to increase hunting efficiency on ungulates in the area?

No evidence found of ungulate predation events occurring closer to pipelines that we investigated. This suggests that pipelines do not increase predation efficiency for grizzly bears in this area.
5. Evaluation of factors that might influence grizzly bear mortality risk on pipelines.

Sightability of Bears from pipeline/road intersections.

Methods:
- Pipeline-road intersections were stratified by age class of pipeline and randomly subsampled to generate field sites.
- Using a “bear” 1m tall by 1.5m long, estimated the percent visible at measured distances from the road, recorded the cause of any obstruction (grass/forbs, shrubs, trees, hill, depression, corner), and the maximum line of sight down the pipeline.

Results summary:
- At 50m from the road, on average 20% of the “bear” was visible.
- Average maximum line of site down the pipeline = 165m.
- Visibility was reduced most often by shrubs/trees, followed by topography, grass/forbs, and corners.
Conclusions

- Grizzly bears are not generally displaced from pipelines; most bears in our study area selected for these features. However, density of roads and pipelines appear to influence use.

- Bears appear to use pipeline RoWs for foraging and movement.

- The use of pipelines for foraging is likely due to the abundance of some bear foods along pipelines.

- It does not appear that grizzly bears are using linear features to access prey.

- Sightability of “bears” is relatively low from road-pipeline intersections.

- Increased human access from pipelines has the potential to increase the risk of human caused grizzly bear mortality.
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Questions?