

Using Digital Photography to Monitor Grassland Wildlife Habitat and Impacts of Livestock Grazing

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FREP Wildlife Objective

- ***Under the Forest and Range Practices Act (FRPA), Range Use Plans must be consistent with objectives set by government, which are associated with key values. One of the objectives relevant to range (and associated with the key value of wildlife) is to “Maintain or promote sustainable healthy, viable, productive and diverse wildlife populations and their associated habitat”.***

Grazing and Cover for Wildlife

- ***The physical structure of grasslands can be a critical component of wildlife habitat. The amount of cover, in terms of height, density and arrangement of grass, forb and shrub species, is important for visual screening, for nesting, to avoid detection by predators on land and from the air, and also helps to increase nesting success.***
- ***Grazing can change the structure and composition of the vegetation of grassland ecosystems as well as reduce litter cover. Some wildlife species have been shown to be adversely impacted by grazing while others may thrive under light, moderate or even heavy levels of grazing. The scope of this project is limited to studying the response of a selection of more structurally dependant wildlife species to different grazing regimes.***
- ***Does livestock grazing impact wildlife, wildlife habitat, breeding and nesting success and affect predator prey relationships by making nests and wildlife more visible? How much livestock grazing is acceptable before there are impacts? What are the threshold levels of use? How do we monitor the impacts?***

Monitoring Methods

- ***Visual screening monitoring methods can be used to evaluate the potential of grassland ecosystems for wildlife and the level of cover left following grazing by livestock.***
- ***Cover boards using the outline of the species is one method used in both the small mammal and the grassland nesting bird projects.***
- ***Clipping is used to simulate grazing levels and visual screening of the cover boards is measured using digital photography.***
- ***Small mammal trapping and surveys of nesting birds is underway to determine relationships between visual screening levels and wildlife presence and abundance in grazed and ungrazed grassland ecosystems.***

Visual Screening Monitoring and Small Mammals

- ***The small mammal project is centered in the Thompson Region and Thompson Rivers University (TRU) is taking a lead on this.***
- ***Visual screening monitoring is used to assess the impacts of grazing by livestock on grassland dwelling small mammal populations.***
- ***Eight sites are established in the Thompson area grasslands. (four grazed and four ungrazed)***
- ***Small mammal trapping sessions are conducted at each site between may and october using live trap, mark and recapture methods (Jolly-Seber method) and sampling methods recommended by Sullivan et al. (2003) and Lindgren (2005).***

Visual Screening Monitoring- Small Mammal Project



Montane Vole, Photo provided by Gerad Hales

Visual Screening Monitoring and Grassland Nesting Birds

- ***The grassland nesting bird project is centered in the Cariboo Region and is led by Simon Fraser University (SFU), the Canadian Wildlife Service (CWS), the Ministry of Environment (MOE) and Thompson Rivers University (TRU).***
- ***Grazed and ungrazed sites are located in the Cariboo Region at the OK Ranch, Churn Creek, Riske Creek, the Junction, and at Tranquille, and Lac du Bois in the Thompson Region.***
- ***The intent is to describe nest sites for selected grassland nesting bird species, to monitor the presence, abundance and nesting success of birds, and to use the visual screening monitoring method to measure the cover at nest sites.***
- ***Over 5000 digital photos were taken over two years to assess cover of the different grassland types. Stubble heights and robel pole measurements were recorded for each plot.***

Visual Screening Monitoring- Grassland Nesting Bird Project



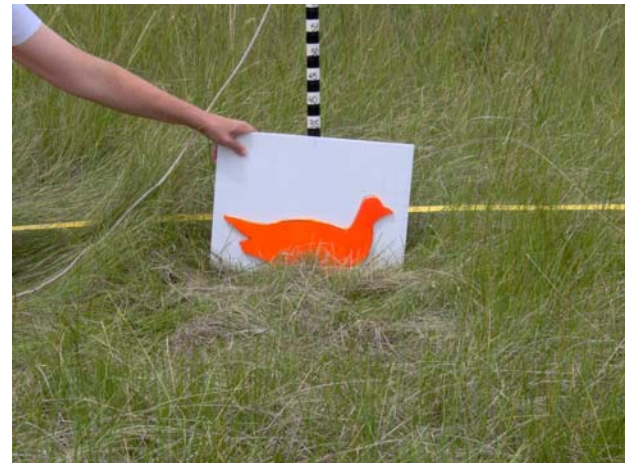
Sparrow nest, Photo provided by Becky Bings

Visual Screening Monitoring- Grassland Nesting Bird Project

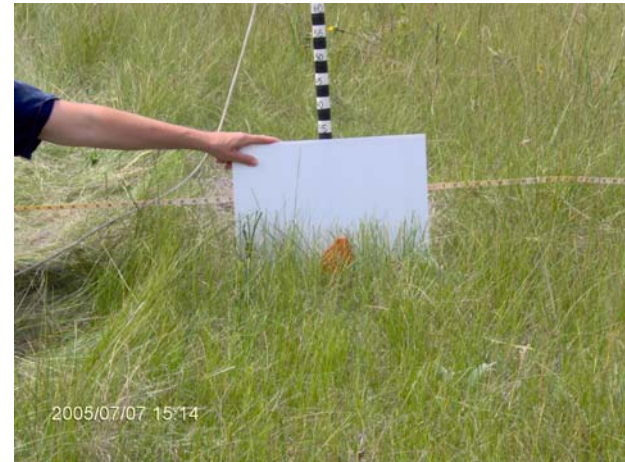


Vesper Sparrow chicks, Photo provided by Pat Robinson

Visual Screening and Clipping Heights- 5cm Intervals- Sharp-Tailed Grouse



Visual Screening and Clipping Heights- 5cm Intervals- Savannah Sparrow



***Paired photos-with litter, without litter-inside
Loran C enclosure left-outside Snake Pitt
exclosure right.(Dowels represent voles.)***



Using GIMP Program to Analyse Visual Screening of Cutouts and Dowels.

- ***Using a colour select tool in GIMP, the orange colour of the cutouts and dowels is selected for. The colour threshold is set to 40 and fine tuned down to 15. We are able to pick out most of the visible orange areas not screened by vegetation.***
- ***The GIMP software counts the number of pixels of a specified colour in the photo.***

Photo of Sharp-Tailed Grouse Cutout and Analysis of Visibility

Using GIMP.

The screenshot displays the GIMP (GNU Image Manipulation Program) interface. The main window shows a photograph of a Sharp-Tailed Grouse cutout, which is highlighted in orange. The cutout is positioned in the center of the image, set against a light blue background. The Grouse cutout is a silhouette with a textured orange fill. The background image shows a field of tall, dry grass with a utility pole in the distance. The GIMP interface includes a menu bar (File, Xtns, Help), a toolbar with various tools, and a 'Select by Colour' dialog box on the left. The 'Select by Colour' dialog box has the following settings: Mode: [Red], [Green], [Blue] (Red is selected); Antialiasing; Feather edges; Select transparent areas; Sample merged; Threshold: 40.0; Select by: Composite. A 'Histogram' dialog box is open on the right, showing the 'Background' channel selected. The histogram data is as follows:

Channel	Value
Background	Value

Mean: 252.7 Pixels: 21242
Std dev: 7.2 Count: 21242
Median: 255.0 Percentile: 100.0

The status bar at the bottom shows the cursor at 892, 135 px, zoomed at 67%. The Windows taskbar at the very bottom shows the Start button, several open applications (GIMP, Histogram..., *IM00..., Micros...), and the system tray with the time 9:22 AM.

Linear regression used to predict the stubble height (cm) required for visual cover of three bird species in four different grass types.

Stubble height (cm) required for the visual obstruction of birds at six different percent visibility values.

	Grass species	<i>Degrees of freedom</i>	r^2	f-value	Intercept	Slope	0%	10%	25%	50%	75%	90%
Grouse	Bluebunch wheatgrass	156	0.42	111	0.942305	-0.022188	42.5	38.0	31.2	19.9	8.7	1.9
	Rough fescue	206	0.73	544	0.787143	-0.026438	29.8	26.0	20.3	10.9	1.4	-4.3
	Kentucky bluegrass	213	0.6	320.3	0.788156	-0.022702	34.7	30.3	23.7	12.7	1.7	-4.9
	Richardson's needlegrass	83	0.69	181.8	0.786405	-0.022164	35.5	31.0	24.2	12.9	1.6	-5.1
Meadowlark	Bluebunch wheatgrass	157	0.41	107.3	0.97143	-0.02424	40.1	36.0	29.8	19.4	9.1	2.9
	Rough fescue	204	0.71	487.6	0.800733	-0.028759	27.8	24.4	19.1	10.5	1.8	-3.5
	Kentucky bluegrass	212	0.59	310.2	0.823635	-0.025687	32.1	28.2	22.3	12.6	2.9	-3.0
	Richardson's needlegrass	82	0.7	192.2	0.82166	-0.02427	33.9	29.7	23.6	13.3	3.0	-3.2
Sparrow	Bluebunch wheatgrass	154	0.41	105.3	0.856815	-0.025387	33.8	29.8	23.9	14.1	4.2	-1.7
	Rough fescue	191	0.61	302.7	0.693038	-0.028384	24.4	20.9	15.6	6.8	-2.0	-7.3
	Kentucky bluegrass	205	0.55	249	0.717835	-0.026952	26.6	22.9	17.4	8.1	-1.2	-6.8
	Richardson's needlegrass	81	0.66	158.3	0.723923	-0.026441	27.4	23.6	17.9	8.5	-1.0	-6.7

Partners in Project

- ***Ministry of Environment***
- ***Ministry of Forests and Range***
- ***Thompson Rivers University***
- ***Simon Fraser University***
- ***The Grasslands Conservation Council of BC***
- ***The Upland Bird Society***
- ***The National Science and Engineering Research Council of Canada***
- ***The Canadian Wildlife Service***
- ***The OK Ranch***