NATIONAL FOREST FOUNDATION
Final Report Cover Sheet

Organization Name: Rocky Mountain Bird Observatory **Project #**CF-214

Project Title: Sagebrush Enhancement Project: Monitoring the effects of sagebrush treatments on the bird community.

Award Date: 4/15/2013 **Completion Date**: 4/15/2014 **Primary Contact**: Matthew McLaren

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Actual Project Accomplishments: **Please use the relevant provided categories to the greatest extent possible, creating your own clear categories, if necessary**

Number	Unit & Description	Number	Unit & Description	Number	Unit & Description
	Number of volunteers		Number of trees and shrubs planted		
	Number of volunteer hours		Miles of road decommissioned or obliterated		
	Miles trail improved, repaired or maintained		Number of campsites restored, obliterated or naturalized		
	Miles of trail restored, obliterated or naturalized		Acres restored from recreation damage due to overuse or misuse		
	Miles of fence constructed, maintained or repaired	5	Number of partnering organizations		
	Acres of fuel reduction planned		Number of people reached through outreach (estimated)		
	Acres of fuel reduction completed		Number trail drainage structures (Waterbars, etc.) inst. or repaired		
	Number of road crossings or culverts repaired or installed	5	Number of people involved in monitoring		
	Acres of wetland or riparian area restored	168	Number of hours of monitoring		
	Acres of habitat restored or maintained		Number of ecological indicators monitored		
	Acres treated for invasive plants		Number of social indicators monitored		
	Number of youth involved (under 18)		Number of economic indicators monitored		
	Miles of stream restored				
	Miles of stream surveyed				

Executive Summary

Rocky Mountain Bird Observatory (RMBO) is working with the Eagle/Holy Cross Ranger District of the White River National Forest (WRNF) to monitor the effects of the Sagebrush Enhancement Project on sagebrush bird communities. The sampling design we used is consistent with that of "Integrated Monitoring in Bird Conservation Regions" (IMBCR), a regional bird monitoring program ongoing in 13 western states, including Colorado, and coordinated by RMBO (White et al. 2013). One of the benefits of IMBCR is that it provides state-wide, BCR-wide and National Forest-wide estimates of species densities and occupancy rates, including estimates from the White River National Forest. This will help us to determine whether any changes in the bird community observed within the Sagebrush Enhancement Project area were unique to the Project or were also observed in the surrounding Forest, State, or region. Furthermore, collecting the Sagebrush Enhancement data with the same design as the IMBCR data provided logistical and statistical efficiency in that all data were jointly analyzed.

Narrative Summary

The overall purpose of the Sagebrush Enhancement Project, as stated in the Scoping Letter from the Eagle/Holy Cross District Ranger (2/17/2012) is "to maintain and improve the quality of habitat for sagebrush-associated wildlife species whose populations are declining and are federally, state or locally listed; and to improve the ecological conditions of sagebrush so that healthy sagebrush patches will persist and be resilient over time". Measuring the responses of plant, wildlife and insect communities to the Sagebrush Enhancement Project is a collaborative effort of several nonprofit organizations, including RMBO, working collaboratively with the Eagle/Holy Cross Ranger District.

RMBO's objective in the context of this program is to monitor the effect of sagebrush treatments on the bird community. Specifically, we will estimate densities and/or occupancy rates of numerous bird species in the Project area, pre- and post-treatment, with a focus on sagebrush-associated species.

Methods

In 2013 we collected data within 3 of the 6 treatment areas (Table 1). We made an effort to sample all of the grids with treatments planned between the 2013 and 2014 avian breeding seasons (in Berry Creek and Cottonwood Mesa; Lara Duran, District Biologist, personal communication). Sampling units for bird monitoring were defined as 1 km^2 areas, each containing a grid of 16 evenly-spaced sampling points, 250 m apart. This design is consistent with that of "Integrated Monitoring in Bird Conservation Regions" (IMBCR), a regional bird monitoring program ongoing in 13 western states, including Colorado, and coordinated by RMBO (White et al. 2013). One of the benefits of IMBCR is that it provides state-wide, BCR-wide and National Forest-wide estimates of species densities and occupancy rates, including estimates from the White River National Forest. This will help us to determine whether any changes in the bird community observed within the Sagebrush Enhancement Project area were unique to the Project or were also observed in the surrounding Forest, State, or region. Furthermore, collecting the Sagebrush Enhancement data with the same design as the IMBCR data provided logistical and statistical efficiency in that all data were jointly analyzed. We followed field methods developed for the IMBCR program (Hanni et al. 2012).

Results

We met our objectives in 2013; we recorded 1,541 detections of 76 species during our surveys in 2013 (5 June – 30 June). We obtained precise density estimates of 24 species in the project area and precise occupancy rates of an additional 7 species. Results for the Berry Creek treatment area are presented in Tables 2 and 3. Results are presented for the Cottonwood Mesa treatment areas in Tables 4 and 5. The IMBCR program completed 36 surveys on the White River National Forest, outside of the Sagebrush Enhancement Project area in 2013 (White et al. 2013). Density and occupancy rate estimates from the IMBCR program can be obtained from RMBO's Avian Data Center at

http://rmbo.org/v3/avian/ExploretheData.aspx; (White et al. 2013).

Table 1. Avian surveys completed for the Sagebrush Enhancement Project, White River National Forest, 2013.

Treatment Area	Samples Surveyed	Points Surveyed
Berry Creek	11	116
Cottonwood Mesa	9	90
Gypsum Creek	2	15
Total	22	221

Table 2. Estimated density (D; birds per km^2) and percent Coefficient of Variation of estimated density (%CV(D)) for 15 landbird species in the Berry Creek Treatment Area of the Sagebrush Enhancement Project, White River National Forest, 2013. Sample size (n) represents the number of independent detections used to estimate density.

Species	**D**	**% CV**	**n**	**Nesting Habitat**
American Goldfinch	1.54	46	4	Shrubs; open areas
American Robin	7.84	25	21	Trees and shrubs; generalist
Black-billed Magpie	1.41	28	16	Areas with scattered trees
Blue-gray Gnatcatcher	24	38	18	Brushy woodlands & thickets
Brewer's Sparrow	14	25	37	**Sagebrush specialist**
Broad-tailed Hummingbird	94.3	33	40	Generalist
Chipping Sparrow	10.5	42	13	Trees and shrubs
Green-tailed Towhee	52.7	18	143	Shrubs; **Sagebrush-associated**
Mountain Bluebird	2.66	47	6	Cavity-nesting; open areas
Mountain Chickadee	3.75	45	5	Cavity-nesting; forests
Mourning Dove	1.7	39	11	Open woodlands
Rock Wren	0.61	49	5	Rocks
Violet-green Swallow	30.9	47	7	Tree cavities and cliff crevices
Virginia's Warbler	3.75	30	6	Dry Shrublands
Western Scrub-Jay	6	38	18	Open woodlands

Table 3. Estimated Occupancy rate (Psi; proportion of 1- km^2 sampling units occupied) and percent Coefficient of Variation of estimated occupancy rate (%CV(Psi)) for 20 landbird species in the Berry Creek Treatment Area of the Sagebrush Enhancement Project, White River National Forest, 2013. Sample size (nTran) represents the number of sampling units in which each species was observed.

Species	Psi	% CV (Psi)	nTran	Nesting Habitat
American Goldfinch	0.431	40	4	Shrubs; open areas
American Robin	0.752	18	8	Trees and shrubs; generalist
Black-billed Magpie	0.712	28	6	Areas with scattered trees
Black-throated Gray Warbler	0.28	49	3	Pinon-juniper woodlands
Blue-gray Gnatcatcher	0.877	14	9	Brushy woodlands & thickets
Brewer's Sparrow	0.865	14	9	**Sagebrush specialist**
Broad-tailed Hummingbird	0.932	13	9	Generalist
Chipping Sparrow	0.489	33	5	Trees and shrubs
Cordilleran Flycatcher	0.328	49	3	Forests; riparian or moist areas
Dusky Flycatcher	0.299	49	3	Brushy woodlands & thickets
Gray Flycatcher	0.38	40	4	Pinon-juniper woodlands
Lesser Goldfinch	0.567	43	4	Shrublands and riparian forests
Mountain Bluebird	0.478	40	4	Cavity-nesting; open areas
Mountain Chickadee	0.367	40	4	Cavity-nesting; forests
Mourning Dove	0.409	40	4	Open woodlands
Pine Siskin	0.48	33	5	Coniferous forests
Rock Wren	0.313	49	3	Rocks
Violet-green Swallow	0.946	13	9	Tree cavities and cliff crevices
Virginia's Warbler	0.584	27	6	Dry Shrublands
Western Scrub-Jay	0.55	33	5	Open woodlands

Table 4. Estimated density (D; birds per km^2) and percent Coefficient of Variation of estimated density (%CV(D)) for 15 landbird species in the Cottonwood Mesa Treatment Area of the Sagebrush Enhancement Project, White River National Forest, 2013. Sample size (n) represents the number of independent detections used to estimate density.

Species	D	% CV	n	Nesting Habitat
American Robin	8.18	31	16	Trees and shrubs; generalist
Black-billed Magpie	2.14	40	19	Areas with scattered trees
Broad-tailed Hummingbird	45.56	35	15	Generalist
Chipping Sparrow	19.7	28	19	Trees and shrubs
Dusky Flycatcher	14.68	46	18	Brushy woodlands & thickets
Green-tailed Towhee	48.41	16	101	Shrubs; **Sagebrush-associated**
House Wren	17.58	31	31	Cavity-nesting; woodland habitats
Mountain Chickadee	5.81	47	6	Cavity-nesting; forests
Northern Flicker	3.14	39	14	lowland and foothill forests
Orange-crowned Warbler	14.94	43	12	Dense deciduous brush
Pine Siskin	16.37	29	16	Coniferous forests
Ruby-crowned Kinglet	7.78	40	15	Coniferous forests
Vesper Sparrow	4.27	29	20	Grasslands
Warbling Vireo	19.34	26	35	deciduous forests

Species	D	% CV	n	Nesting Habitat
Yellow-rumped Warbler	8.52	42	10	Open coniferous forest

Table 5. Estimated Occupancy rate (Psi; proportion of 1- km^2 sampling units occupied) and percent Coefficient of Variation of estimated occupancy rate (%CV(Psi)) for 21 landbird species in the Cottonwood Mesa Treatment Area of the Sagebrush Enhancement Project, White River National Forest, 2013. Sample size (nTran) represents the number of sampling units in which each species was observed.

Species	Psi	% CV	nTran	Nesting Habitat
American Robin	0.72	23	6	Trees and shrubs; generalist
Black-billed Magpie	0.42	47	3	Areas with scattered trees
Brewer's Sparrow	0.36	47	3	**Sagebrush specialist**
Broad-tailed Hummingbird	0.98	12	8	Generalist
Chipping Sparrow	0.63	29	5	Trees and shrubs
Clark's Nutcracker	0.43	47	3	Coniferous forests
Dusky Flycatcher	0.64	29	5	Brushy woodlands & thickets
Dusky Grouse	1	0	3	Open forests with shrubs
Green-tailed Towhee	1	0	9	Shrubs; **Sagebrush-associated**
House Wren	0.94	12	8	Cavity-nesting; woodland habitats
MacGillivray's Warbler	0.41	47	3	Riparian shrublands
Mountain Chickadee	0.45	37	4	Cavity-nesting; forests
Northern Flicker	0.78	30	5	Lowland and foothill forests
Orange-crowned Warbler	0.53	37	4	Dense deciduous brush
Pine Siskin	0.88	17	7	Coniferous forests
Ruby-crowned Kinglet	0.56	30	5	Coniferous forests
Vesper Sparrow	0.73	23	6	Grasslands
Violet-green Swallow	0.4	47	3	Tree cavities and cliff crevices
Warbling Vireo	0.79	18	7	Deciduous forests
Western Wood-Pewee	0.36	47	3	Forests
Yellow-rumped Warbler	0.67	24	6	Open coniferous forest

Discussion

We have not yet shared the results with the community. Given that treatments have just started and will happen incrementally, it will be several years before we can assess the effects of the treatments on the bird community. In 2013 the data produced precise density and/or occupancy estimates for 15 new species compared to 2012 (American Goldfinch, Chipping Sparrow, Clark's Nutcracker, Mourning Dove, Virginia's Warbler, Cordilleran Flycatcher, Dusky Flycatcher, Dusky Grouse, Pine Siskin, House Wren, MacGillivray's Warbler, Northern Flicker, Ruby-crowned Kinglet, Warbling Vireo, and Western Wood-Pewee). Two sagebrush associated species had precise density estimates in Berry Creek in 2012 and 2013 (Brewer's Sparrow and Green-tailed Towhee). Brewer's Sparrow had a higher density estimate in 2013 compared to 2012, while Green-tailed Towhee had a lower density estimate in 2013 compared to 2012. Species densities at a given location can vary from year to year and additional years of data are needed to run trend analyses. Our

primary partner was the Eagle/Holy Cross Ranger District of the White River National Forest. Other partners in this project, including the Colorado Natural Heritage Program and Rocky Mountain Youth Corps were coordinated by the Ranger District.

The biggest challenge of this project is that it will take several years for bird monitoring results to be useful, given that it will take several years for the treatments to be completed; this is the nature of monitoring vertebrate species. We look forward to a continued partnership with the National Forest Foundation and the White River National Forest.

Literature Cited

Hanni, D. J., C. M. White, J. J. Birek, N. J. Van Lanen, and M. F. McLaren. 2012. Field protocol for spatially-balanced sampling of landbird populations. Unpublished report. Rocky Mountain Bird Observatory, Brighton, Colorado, USA.

White, C. M., N. J. Van Lanen, D.C. Pavlacky Jr., J. A. Blakesley, R. A. Sparks, M. F. McLaren, J. J. Birek and D. J. Hanni. 2013. Integrated Monitoring in Bird Conservation Regions (IMBCR): 2012 Annual Report. Rocky Mountain Bird Observatory. Brighton, Colorado, USA.

Attachments:

Financial Report.