

AVIAN RESPONSE TO PINE RESTORATION AT PECK RANCH CONSERVATION AREA

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EXTENDED ABSTRACT

Midco Pine Flats is a 2,223-acre region of Peck Ranch Conservation Area (CA) that is classified as a pine-oak plains land type association. Extensive logging in the early 1900s removed most overstory shortleaf pine allowing oak to become the primary overstory component. In 2000, Missouri Department of Conservation staff initiated a pine-oak woodland restoration project with the primary goal of determining whether management practices (selective black oak harvest, fire, leave pine) in the pine-oak-vaccinium natural community at Peck Ranch are restoring the natural community. The study used prescribed fire, harvest, or both as primary restoration tools.

In 2004, a concurrent study was initiated to focus more directly on pine regeneration. The Midco Pine Flats area was divided into 10 treatment units to examine the effects of different competition control methods used to advance pine regeneration. Three units were assigned to each of three treatments (chemical, mechanical, and prescribed fire), and the remaining unit was left untreated as the control. Within these units, restoration is focused on areas characterized by pine-oak/vaccinium Dry Upland and mixed oak-pine/Desmodium, vaccinium chert natural communities. Some of the area was planted in pine, while the rest was deemed adequate in natural regeneration. These sites also were slashed and site preparation prescribed burning was applied.

Methods

To monitor the effects of pine restoration on migrant and resident birds, a modified breeding bird survey (BBS) (Anonymous 1970) is conducted annually at Peck Ranch CA. The BBS route consists of 25 points, approximately 0.5 mi apart, on gravel roads and woods trails that are accessible by vehicle. At each point, observers exit the vehicle, stand for 5 minutes, and record all birds heard and seen. This route is run twice from May 15 to June 30. Data have been collected via this BBS since 2000. From these data, indexes to bird distribution and abundance have been generated.

Vegetation has also been sampled within the shortleaf pine restoration project area. Twenty-four permanent vegetation sampling plots (0.2 ac) were established randomly in 2000,

stratified by four ecological land types (ELT) (Rimer 2003.) Thirty additional plots were established in 2005 within designated pine restoration sites. Vegetation sampling includes percent class of ground flora/ground cover; sapling species, height and diameter at breast height (DBH); and overstory species and DBH. Initial plots were sampled in 2000, 2002 and 2006; sampling for ground flora and saplings began in 2006 for additional plots.

Results and Discussion

Fifty-two species of birds have been detected on the Peck Ranch CA BBS between 2000 and 2006 (Table 1). The number of species detected each year has trended upward, primarily because canopy-dwelling birds have remained on the site and early-successional species have responded positively to the treatment. Only one species has apparently disappeared from the survey. The rates and frequency of detection for these birds are varied (Table 1.)

Pine warbler was common prior to the pine restoration project (Table 1) but retention of pine in the overstory, along with opening the canopy, probably enhanced its habitat. This is consistent with increases in overstory pine throughout this period. Northern parula prefers large tree crowns that stick out from their surroundings; opening the canopy enhanced habitat for this species. One canopy dweller, red-eyed vireo, decreased, probably because of the reduction of deciduous trees in the canopy as evidenced by the overall decrease in stem density of overstory trees.

Mixed forest/open habitat-dweller Mourning Dove and early successional habitat-dwellers yellow-breasted chat, white-eyed vireo, and prairie warbler all increased (Table 1). At the same time, overstory density decreased, allowing an increase in sapling stem density. These species probably benefited from the more open canopy and the increased herbaceous and shrub vegetation at ground level. Early-successional habitat-dweller indigo bunting has remained essentially unchanged. This species already was abundant in the area when the pine restoration project began.

Finally, subcanopy-dweller yellow-billed cuckoo has disappeared from the survey (Table 1), probably as a result of a more open canopy and a reduction in midstory saplings. This change can be seen in the frequency of saplings occurring by foot class: Vegetation sampling from 2006 shows that the greatest number of saplings range from only 5 to 8 feet tall, creating more "brushy" habitat rather than a developed midstory at this time.

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Although vegetation sampling is still in the preliminary stage, we are finding that structural changes due to management activities may account for changes in avifauna in the pine restoration area of Peck Ranch CA.

LITERATURE CITED

Anonymous. 1970. An international standard for a mapping method in bird census work recommended by the international Bird Census Committee. Audubon Field Notes. 24: 722-726.

Rimer, R.L. 2004. Project evaluates burning and timber harvest for restoring Ozark pine-oak woodlands (Missouri). Ecological Restoration. 22: 3.

Table 1.—Mean number of birds and detection frequency per stop, 2000-2006.

Species	Mean number of birds per stop							Mean number of stops at which birds were detected						
	2000	2001	2002	2003	2004	2005	2006	2000	2001	2002	2003	2004	2005	2006
Turkey vulture	0	0	0.04	0.02	0	0	0	0	0	0.5	0.5	0	0	0
Red-tailed hawk	0	0	0.04	0.02	0.04	0	0.04	0	0	1	0.5	1	0	1
Red-shouldered hawk	0	0.04	0	0	0	0.1	0.02	0	1	0	0	0	2.5	0.5
Broad-winged hawk	0	0	0	0	0.04	0	0	0	0	0	0	0.5	0	0
Wild turkey	0.08	0.04	0.08	0.14	0.02	0.12	0	1.5	0.5	2	2.5	0.5	2.5	0
Mourning dove	0.08	0.04	0.12	0.1	0.22	0.22	0.32	1.5	1	2.5	2.5	4.5	5	7
Yellow-billed cuckoo	0.4	0.68	0.64	0.5	0.2	0.06	0	9	12	12.5	9	4.5	1.5	0
Chimney swift	0	0	0	0.04	0	0	0	0	0	0	0.5	0	0	0
Ruby-throat. hummingbird	0.04	0.06	0.04	0.1	0.06	0.02	0.08	1	1.5	1	2	1.5	0.5	1.5
Pileated woodpecker	0.46	0.7	0.94	0.84	0.5	0.76	0.52	8	14	15.5	14	10	13.5	8.5
Red-bellied woodpecker	0.16	0.14	0.16	0.2	0.12	0.24	0.16	3.5	3.5	4	5	2.5	5.5	4
Red-headed woodpecker	0	0.02	0	0	0	0.06	0.06	0	0.5	0	0	0	1.5	1.5
Hairy woodpecker	0	0	0.02	0.02	0.08	0.02	0	0	0	0.5	0.5	1.5	0.5	0
Downy woodpecker	0.02	0.2	0.06	0.04	0.02	0.06	0.1	0.5	4	1.5	1	0.5	1.5	2.5
Great-crested flycatcher	0.26	0.2	0.24	0.34	0.12	0.08	0.14	6	4	5.5	7	3	1.5	3.5
Acadian flycatcher	0.08	0	0.02	0.04	0.04	0.04	0.08	2	0	0.5	1	1	1	2
Eastern wood pewee	0.54	0.68	0.54	0.64	0.66	0.74	0.5	12.5	16	11.5	11.5	13	16	11.5
Purple martin	0	0	0	0.02	0	0	0	0	0	0	0.5	0	0	0
Blue jay	0.02	0.1	0.12	0.12	0.06	0.26	0.04	0.5	2.5	1	2	1.5	6	1
Common crow	0.94	1.12	0.88	1.2	0.74	0.94	0.98	12.5	18	14	18	10.5	16.5	16
Carolina chickadee	0.08	0.14	0.14	0.14	0.12	0.2	0.04	1	2.5	2.5	2.5	2.5	3.5	0.5
E. tufted titmouse	0.36	0.32	0.7	0.38	0.42	0.24	0.34	8	5.5	11.5	7.5	8.5	6	7
White-breasted nuthatch	0.42	0.12	0.3	0.2	0.4	0.36	0.32	8	3	7	5	8	6.5	6.5
Carolina wren	0.12	0	0.06	0.08	0.24	0.2	0.28	3	0	1.5	2	5	4	6
Wood thrush	0.02	0	0.04	0	0.02	0.02	0.04	0.5	0	1	0	0.5	0.5	1

(Table 1 continued on next page)

Table 1.—Mean number of birds and detection frequency per stop, 2000-2006. (*continued*)

Species	Mean number of birds per stop							Mean number of stops at which birds were detected						
	2000	2001	2002	2003	2004	2005	2006	2000	2001	2002	2003	2004	2005	2006
Eastern bluebird	0	0	0	0.04	0	0.12	0	0	0	0	0.5	0	1.5	0
Blue-gray gnatcatcher	0.44	0.56	0.62	0.64	0.44	0.3	0.54	10.5	11	13.5	10.5	9.5	6	11
White-eyed vireo	0	0	0.08	0.08	0.38	0.32	0.48	0	0	2	2	8	6.5	8.5
Yellow-throated vireo	0.08	0.04	0.1	0.02	0.1	0	0.08	2	1	2	0.5	2.5	0	2
Red-eyed vireo	1.38	1.32	1.66	1.34	1.34	1.04	0.92	21	21.5	20.5	24	18.5	18.5	15.5
Black and white warbler	0.08	0.06	0.06	0.24	0.2	0.14	0.1	2	1.5	1.5	6	5	3.5	2.5
Worm-eating warbler	0.04	0	0	0	0.04	0	0	1	0	0	0	1	0	0
Blue-winged warbler	0	0.02	0	0.04	0.04	0.12	0.06	0	0.5	0	1	1	3	1.5
Northern Parula	0.18	0.12	0.3	0.4	0.62	0.48	0.6	4.5	3	6.5	4	11	9.5	12
Cerulean warbler	0	0	0.02	0	0.02	0	0	0	0	0.5	0	0.5	0	0
Yellow-throated warbler	0.5	0.42	0.56	0.38	0.58	0.36	0.34	11	9	11	9	11.5	8	7
Pine warbler	0.78	0.56	1.12	0.82	1.24	1.12	1.08	16	11	17.5	15.5	20	17	18
Prairie warbler	0.16	0.12	0.36	0.48	0.46	0.4	0.22	4	3	8	10.5	10.5	8.5	5.5
Ovenbird	0	0.04	0	0.02	0	0.04	0.02	0	1	0	0.5	0	1	0.5
Common Yellowthroat	0	0	0	0	0.06	0.04	0.06	0	0	0	0	1.5	1	1.5
Yellow-breasted Chat	0.22	0.62	0.82	0.96	1.32	1.22	1.24	5	12.5	13.5	17	19	20	19
Kentucky Warbler	0	0	0	0.02	0.02	0.1	0.08	0	0	0	0.5	0.5	2	2
Orchard Oriole	0	0	0	0	0.02	0.02	0	0	0	0	0	0.5	0.5	0
Brown-headed Cowbird	0.26	0.08	0.4	0.16	0.12	0.16	0.12	6	2	8.5	3.5	3	3.5	3
Scarlet Tanager	0.22	0.46	0.26	0.36	0.26	0.34	0.16	4	9.5	5.5	8.5	6	8	3.5
Summer Tanager	0.56	0.64	0.74	0.3	0.22	0.44	0.34	11.5	13.5	14.5	7.5	5	10.5	7
Northern Cardinal	0.2	0.12	0.28	0.14	0.26	0.28	0.18	5	2.5	7	3.5	5.5	7	3.5
Indigo Bunting	1.24	1.52	1.88	1.7	1.54	1.36	1.44	20.5	22.5	22.5	22	20	21	19
American Goldfinch	0	0	0	0.04	0.06	0.04	0	0	0	0	0.5	1.5	0.5	0
Eastern Towhee	0.04	0.06	0.12	0.12	0.16	0.14	0.18	1	1.5	3	3	3.5	3.5	4
Chipping Sparrow	0	0.06	0	0	0.02	0.1	0.06	0	0.5	0	0	0.5	2	1
Field Sparrow	0	0.02	0.04	0.1	0.06	0.04	0.2	0	0.5	1	2	1.5	1	5
Total No. Species Observed	33	35	38	43	45	44	40							