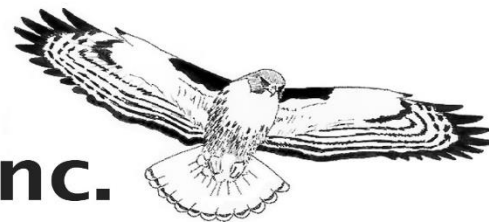


Changes in Avian Use in the Middle Rio Grande Bosque, 2004-2017

Trevor Fetz

Hawks Aloft, Inc.

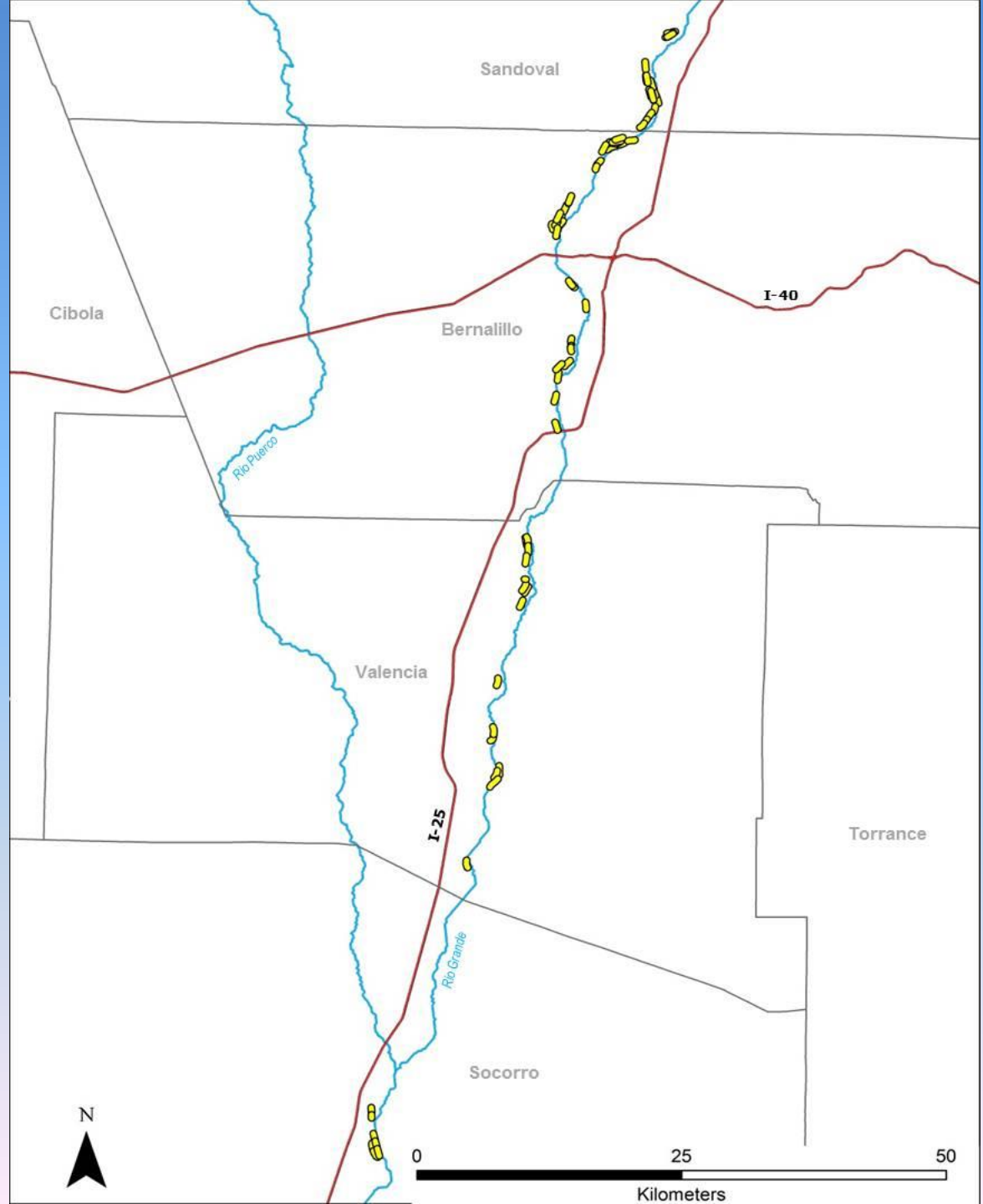


*Conservation Education, Avian Research, Raptor Rescue
& Collaboration with Others*

MRGSS Background

- Survey protocol based on Middle Rio Grande Biological Survey (Hink and Ohmart 1984)
- Habitat classifications based on Hink and Ohmart community and structure (C/S) types
- Avian walking transect surveys began in winter 2004
- 81 transects between Rio Rancho and La Joya WMA

MRGSS Study Area



MRGSS Survey Methods

- Seasons: Summer (June-August), Winter (December-February)
- Transects surveyed 3 times/month (9 times/season)
- Distance bins (m): <5, 5-15, 16-30, 31-45, 46-60, 61-80, 81-122
- Avian density and richness calculations based on detections w/in 30 m of transect line

Key Factors Influencing Avian Change During 2004-2017

- Long-term, Exceptional Drought
 - September 2010-August 2013 2nd driest 36 month period on record
(www.ncdc.noaa.gov)
- Catastrophic Wildfire
- Restoration Work (USACE)
- Thinning/Clearing
- Increased Human Use
- Factors Outside the Bosque

Analysis Methods

- Compared data from 2004-2010 with 2011-2017 (before and after the onset of drought)
- Density comparisons at the study area and C/S type levels based mean # birds/100 acres
- Richness comparisons at the study area and C/S type levels based on # species present at densities ≥ 1.5 birds/100 acres
- Species comparisons based on detection rates (# individuals/# visits) within 30 m of transect lines

Comparison of Avian Density at Study Area Level

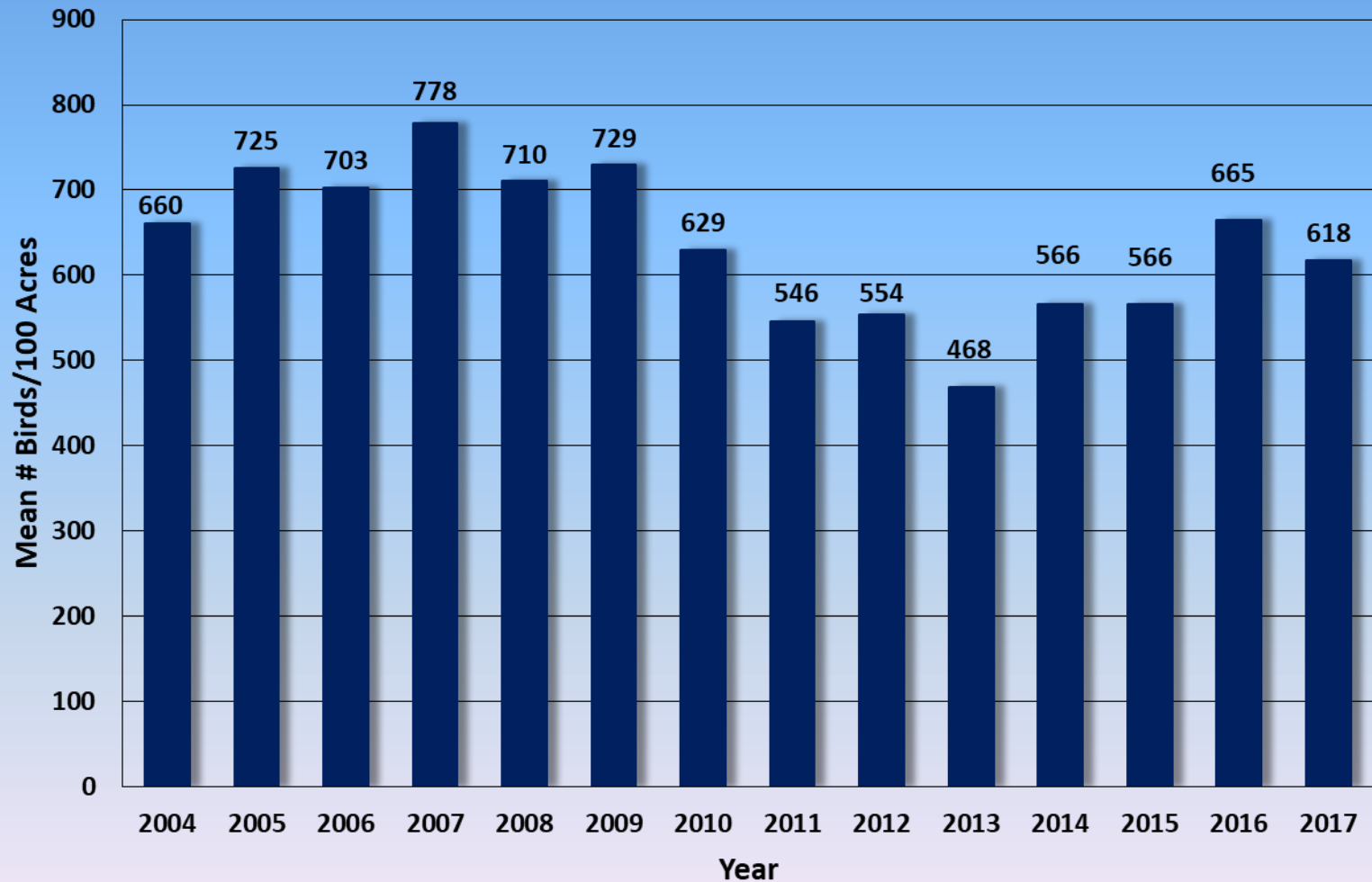
Summer Avian Density

Years		# Birds/100 Acres
2004-10	A	706
2011-17	B	571

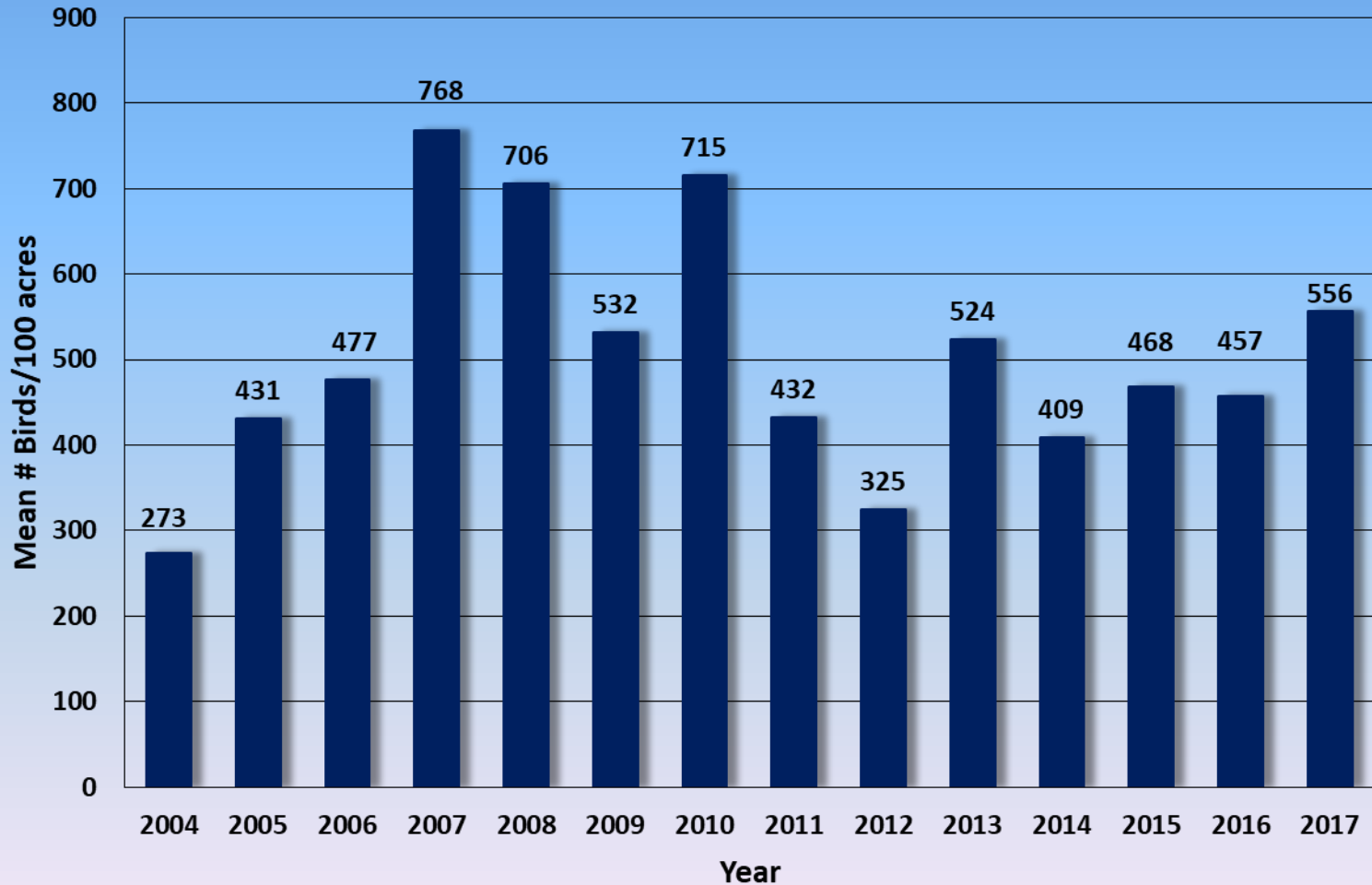
Winter Avian Density

Years		# Birds/100 Acres
2004-10	A	589
2011-17	B	454

Summer Avian Density by Year



Winter Avian Density by Year



Comparison of Avian Richness at Study Area Level

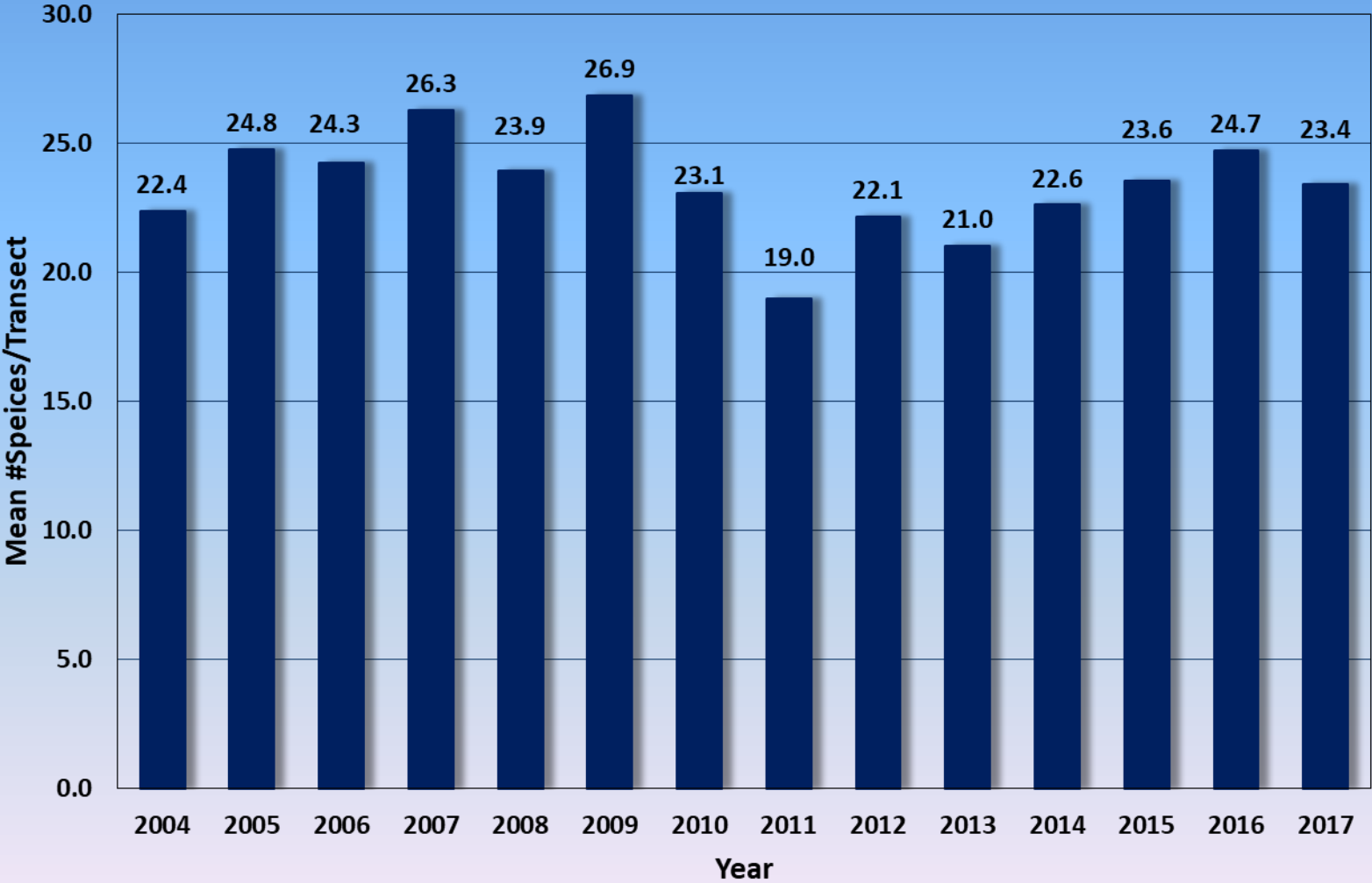
Summer Avian Richness

Years		Mean # Species/Transect
2004-10	A	24.6
2011-17	B	22.6

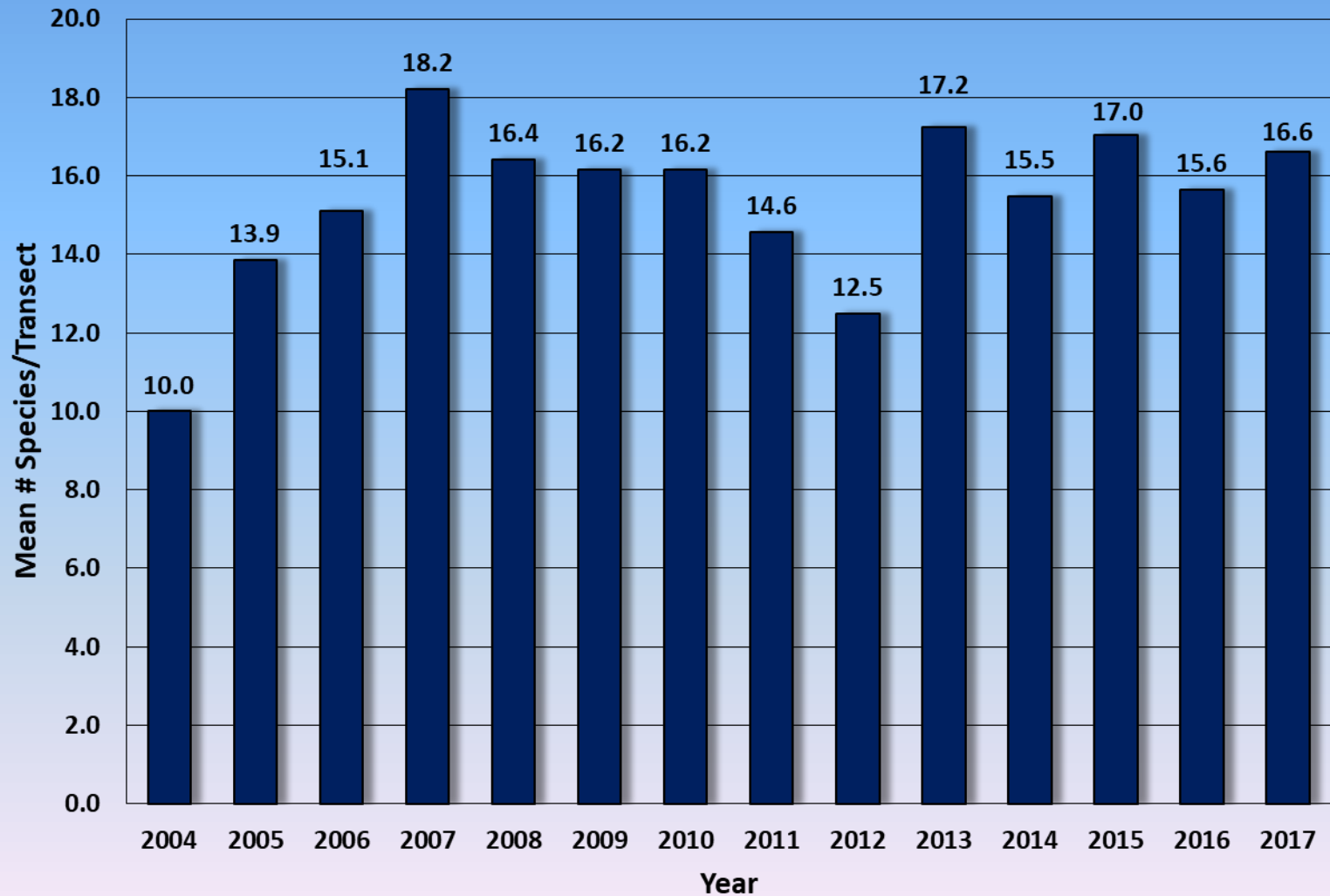
Winter Avian Richness

Years		Mean # Species/Transect
2004-10	A	15.7
2011-17	A	15.6

Summer Avian Richness by Year



Winter Avian Richness by Year



Changes in Summer Avian Density by C/S Type

- Summer density during 2011-2017 was lower at 14 of 18 C/S types, significant decrease in 11 C/S types
- None of the C/S types with increased density in 2011-2017 were significant
- The 4 C/S types with increased density in 2011-2017 were either dominated by non-native vegetation or recovering from catastrophic fire

Comparison of Summer Avian Density by C/S Type

C/S Type	2004-2010	2011-2017	Change
Marsh 5-Open water	1602	1153	lower*
New Mexico olive 5	1262	1058	lower*
Cottonwood/New Mexico olive 1	1033	931	lower*
Coyote willow-Russian olive 5	867	678	lower*
Russian olive 3	865	1094	higher
Cottonwood-R. olive/Coyote willow 3	840	698	lower*
Russian olive 5	833	890	higher
Cottonwood/Russian olive 1	804	539	lower*
Cottonwood/Coyote willow 1	745	550	lower*
Coyote willow 6	745	410	lower*
Cottonwood/Mulberry 1	711	466	lower*
Drain 5	694	638	lower
Cottonwood 2 natural	658	488	lower*
Drain 6	488	329	lower*
Burn 2	423	518	higher
Cottonwood 2 artificial	365	260	lower
Salt cedar 5	193	233	higher
Open	192	166	lower

Changes in Winter Avian Density by C/S Type

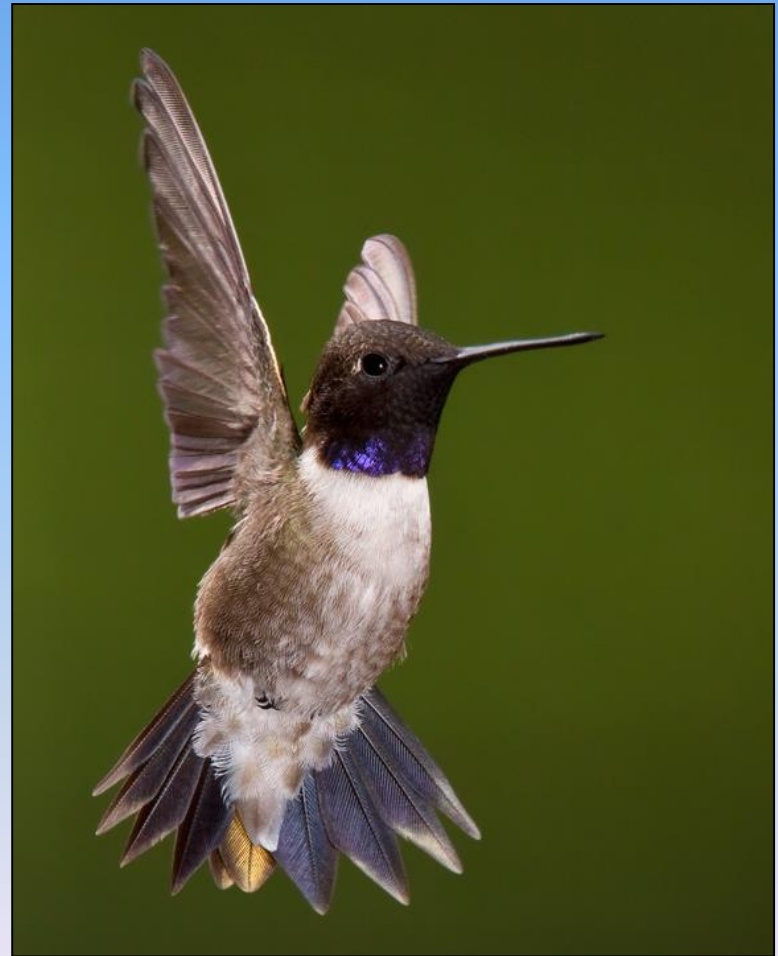
- Winter density during 2011-2017 was lower at 15 of 18 C/S types, significant decrease in 5 C/S types
- Neither of the C/S types with increased density in 2011-2017 were significant
- The 2 C/S types with increased density in 2011-2017 were either dominated by non-native vegetation or recovering from catastrophic disturbance

Comparison of Winter Avian Density by C/S Type

C/S Type	2004-2010	2011-2017	Change
Russian olive 3	1945	1110	lower*
Marsh 5-Open water	1264	962	lower*
Drain 5	1243	991	lower*
Cottonwood/New Mexico olive 1	833	708	lower
Russian olive 5	785	719	lower
New Mexico olive 5	739	381	lower*
Drain 6	664	433	lower*
BURN 2	643	441	lower
Coyote willow-Russian olive 5	465	313	lower
Coyote willow 6	444	295	lower
Cottonwood-R. olive/Coyote willow 3	435	256	lower
Cottonwood 2 natural	349	331	lower
Cottonwood/Russian olive 1	343	298	lower
Cottonwood/Coyote willow 1	230	184	lower
Open	178	114	lower
Cottonwood/Mulberry 1	176	176	none
Salt cedar 5	111	211	higher
Cottonwood 2 artificial	82	114	higher

Changes in Summer Density by Species

- 217 total species
- Among 50 most common species, 35 decreased & 15 increased in 2011-2017
- 45 species changed significantly: 32 decreased, 13 increased



Summer: Species with Significant Changes in Detection Rates

Species	2004-10	2011-17	Change	B or M
Black-chinned Hummingbird	16.967	12.345	down	B
Spotted Towhee	6.850	6.267	down	B
Blue Grosbeak	3.937	3.118	down	B
Yellow-breasted Chat	2.878	3.493	up	B
Mourning Dove	3.515	2.834	down	B
Lesser Goldfinch	1.837	1.643	down	B
Black-headed Grosbeak	2.053	1.341	down	B
Bushtit	1.291	1.816	up	B
Downy Woodpecker	0.970	0.790	down	B
Northern Flicker	0.579	0.428	down	B
Wilson's Warbler	0.606	0.354	down	M
Western Wood-Pewee	0.285	0.414	up	B
Virginia's Warbler	0.384	0.173	down	M
Gray Catbird	0.358	0.190	down	B
Eastern Bluebird	0.175	0.372	up	B
Bullock's Oriole	0.309	0.236	down	B
MacGillivray's Warbler	0.242	0.206	down	M
Rufous Hummingbird	0.284	0.108	down	M
Western Tanager	0.203	0.173	down	M
White-winged Dove	0.109	0.235	up	B
Lark Sparrow	0.192	0.115	down	B
Lazuli Bunting	0.172	0.083	down	B
Hairy Woodpecker	0.077	0.127	up	B
Western Bluebird	0.004	0.155	up	B
Ladder-backed Woodpecker	0.033	0.045	up	B
Lucy's Warbler	0.001	0.053	up	B
Townsend's Warbler	0.018	0.005	down	M
Verdin	0.000	0.015	up	B
Bell's Vireo	0.000	0.008	up	B

Changes in Winter Density by Species

- 152 total species
- Among 50 most common species, 30 decreased & 20 increased in 2011-2017
- 38 species changed significantly: 23 decreased, 15 increased



Winter: Significant Changes in Detection Rates by Species

Species	2004-10	2011-17	Change	R or W
Dark-eyed Junco	8.779	5.368	down	W
White-crowned Sparrow	3.633	5.425	up	W
American Robin	6.590	2.323	down	R
Spotted Towhee	3.079	2.856	down	R
Red-winged Blackbird	1.821	1.133	down	R
Northern Flicker	1.401	1.202	down	R
Bushtit	0.721	0.999	up	R
Yellow-rumped Warbler	0.906	0.732	down	W
Black-capped Chickadee	0.837	0.635	down	R
American Goldfinch	0.810	0.551	down	W
Mourning Dove	0.570	0.744	up	R
Hermit Thrush	0.619	0.419	down	W
Downy Woodpecker	0.518	0.452	down	R
Western Bluebird	0.314	0.628	up	R
Eastern Bluebird	0.373	0.477	up	R
Ruby-crowned Kinglet	0.422	0.382	down	W
Cedar Waxwing	0.449	0.256	down	R
Pine Siskin	0.260	0.161	down	W
Lesser Goldfinch	0.185	0.390	up	R
White-winged Dove	0.192	0.359	up	R
Mountain Bluebird	0.375	0.086	down	W
Mountain Chickadee	0.217	0.069	down	R
Brown Creeper	0.154	0.075	down	W
White-throated Sparrow	0.130	0.070	down	W
Great Blue Heron	0.074	0.053	down	R
Black Phoebe	0.036	0.063	up	R
Ladder-backed Woodpecker	0.017	0.030	up	R
Verdin	0.000	0.008	up	R

Conclusions

- Long-term drought had a significant, mostly negative impact on avian use in the bosque during both summer and winter
- Negative impact apparent at the study area, specific C/S type and individual species levels
- C/S types showing increased avian use in 2011-2017 were either dominated by non-native vegetation or recovering from catastrophic disturbance
- Bird species increasing in 2011-2017 were often moving into the bosque from upland areas or expanding their range north

Acknowledgements

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