

A Neotropical Migratory Bird Prioritization for National Forests and Grasslands

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Abstract.-The Rocky Mountain Region of the USDA Forest Service provides nesting habitat for 146 species of neotropical migratory birds. Interactive, prioritization databases were developed for each National Forest and National Grassland in the Region to assist land managers in making informed decisions about resource allocations. The data was processed using Paradox software. This paper summarizes the uses and application of the database for the Oglala and Ft. Pierre National Grasslands.

METHODS

We used data provided by Colorado Bird Observatory and ranked according to the Partners-In-Flight (PIF) ranking scheme for initial prioritization of neotropical migratory birds (NTMBs). The approach ranks species by their relative susceptibility to extinction (Carter and Barker 1993, Hunter et al. 1993). There are many factors that contribute to extinction probability. The PIF prioritization scheme uses seven criteria as the most important in gauging a species susceptibility to extirpation or extinction: 1) importance of area of consideration (IA), (percentage of a species range that is within a state or geographic area under consideration); 2) global abundance (GA); 3) the degree of threat to the species' persistence on the breeding ground (TB); 4) the degree of threat to species' persistence on the wintering ground (TW); 5) breeding distribution (BD); 6) extent of wintering distribution (WD); 7) population trend in area of consideration (PT); based upon U.S. Fish and Wildlife Service Breeding Bird Survey (BBS) data. Each of the seven criteria is weighted equally. An individual species is assigned a score in each of the seven categories ranging from one (low concern) to five (high concern). Each species is ranked according to the average of the seven scores. The importance of area

score (IA) was modified for our use to include a rank based upon the percentage of the area under consideration which meets breeding habitat requirements for a given species.

Uncertainty values are assigned to each species in conjunction with values assigned for threats to breeding (TBU) and wintering (TWU), and population trend (PTU). These uncertainty values reflect the extent of the available information for each of the associated criteria. They indicate the extent and location of gaps in our knowledge of neotropical migrant biology. These values help us differentiate between species with definite management concerns and those requiring additional monitoring or research in order to more clearly reflect their status.

Several criteria were modified for the Oglala and Ft. Pierre National Grasslands. Population trend (PT) and Population trend uncertainty scores were determined from USFWS Breeding Bird Survey (BBS) for the 10-year and 26-year scores. Data from physiographic region 39 (Missouri Plateau-Unglaciated) were used for both grasslands. Other population trend data more specific to the area under consideration can be used for these criteria if available. Threats to breeding habitat (TB) and Threats to breeding habitat uncertainty (TBU) criteria provided by PIF were used (Carter and Barker 1993). Additionally, known local threats were also considered such as reduction of prairie dog towns as a threat to burrowing owl habitat. In this case, a TB score of 5 was used because loss of prairie dog towns would result in elimination of burrowing owl habitat (Peterson 1994).

Several methods have been developed to determine priorities for community based conservation (Millsap et al. 1990, Master 1991, Reed 1992). The technique developed by Partners in Flight is essentially one that ranks individual species first, and secondarily ranks habitats based on individual species scores grouped by habitat preference. This ranking can then be used to develop and justify community based conservation programs. The

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tion of breeding occurrence and habitat preference of neotropical migratory landbirds on the Oglala and Ft. Pierre Grasslands was made using local expertise.

The habitat types and conditions developed for the Grasslands and assigned to each species have three levels:

- 1) Appropriate habitat contains six major breeding bird habitat types. They include trees/woodlands, shrubs/shrublands, grass/grasslands, edge-tree/grass-shrub/grass, wetlands and special topographic structure.
- 2) Suitable habitat, in general, additional conditions are needed for appropriate habitat to be suitable breeding habitat for a given species. For grasslands, additional conditions could be related to a given height and density of grasses or forbs. For trees/woodland habitat, additional conditions could include deciduous trees, cavities or a multi-layered canopy.
- 3) Special conditions includes topographic structures such as cliffs and cutbanks, but also includes features such as riparian areas and prairie dog towns.

These habitat categories enable development of habitat ranking based on a species' use of a wide variety of habitat types and variables.

Coding used for habitats and special features is as follows:

Habitats T-(t)rees/woodlands, coniferous, (d)eciduous, (o)ld growth, multi-layer canopy, and (c)avities.

E-(e)dge, tree-grass/shrub-grass.

S-(s)hrubs, (b)ig sagebrush, (2) thorny shrubs-esp. plum,

G-(g)ass/grasslands-open areas-esp. s(h)ort and/or sparse, t(a)ll and/or de(n)se, mi(x)ed/mid.

W-(w)etlands/(w)ater-(1)riparian, (m)arsh/tall emergent, (3) wet meadow-tall grass/short emergent.

Specials s(P)ecial-top/structure-(4)cliffs/caves/ledges and cutbanks, (5)buildings/bridges/chimneys and bird houses, lands/bare shores.

s(p)ecial-other-(7)prairie dog towns, (i.e. burrows/bare ground/short grass and associated prey), forest fire locations-(B)urned areas, esp. large with tall snags, (9) cropland-esp alfalfa, (O)ld crow/magpie nests.

The mix of numbers and letters used in the coding may appear to be confusing; however, familiarization with the application of those codes as displayed in the habitat columns of the accompanying tables reveals that they provide a logical fit.

RESULTS

The Oglala and Ft. Pierre National Grasslands support 79 and 68 species of neotropical migratory landbirds which regularly nest there, or a combined total of 84 regular nesters. These are listed in Appendix 1 and 2 along with all associated prioritization scores for the seven criteria and some of the associated uncertainty scores. Species with R10 or R26 ranks of 3.00 or greater should be given high priority for management considerations (Thompson et al. 1993). Analysis of the data reveals that 18 of the 84 species have a R10 or R26 rank of 3.00 or greater (Appendix 1 and 2). The R10 and R26 rank scores along with importance of area, threats to breeding and breeding distribution scores help to provide a framework for setting management priorities. As an illustration, the chestnut-collared longspur has high and R26 rank scores but has an importance of area (IA) score of only 3.00.

Consequently, other species with higher IA scores should be given higher management priority. The two top ranked species on both grasslands (burrowing owl and ferruginous hawk) have a preference for short-grass prairie and prairie dog towns. Other species on these two grasslands have a preference for tall and mixed-grass prairie. Consequently, management of the National Grassland units for a diversity of heights and would provide habitat for both species.

The database contains scores for each criterion, for each species, for each unit where they are likely to occur. It is important that the data for each unit be analyzed separately for more specific insights into the top priority species and habitat for each unit. For

example, what is the importance of the habitat on the unit being analyzed for a given species. What are the threats to that habitat? What is the status and trend of that habitat?

This prioritization system reveals that the highest ranked habitat on the Oglala National Grassland is big sagebrush and that is based on one species (table 1). The next highest ranked habitat is short and mixed-grass prairie and prairie dog towns respectively. These habitats support six and four high priority ($= > 3$) species respectively. Edge habitat and riparian habitat are both important because of the diversity of species that they support. These values are based upon the relative susceptibility to extinction of species found in each habitat. Information on

species as presented in table 2 should also be considered along with the habitat information when weighing the consequences of management actions.

A total of 12 species from the Oglala National Grassland have a R26 Rank of 3.00 or greater. Brewer's Sparrow is the species in big sagebrush habitat which causes the high habitat rank in table 1. The rank of 1 for importance of area score (IA) indicates that only a small portion of the Oglala National Grassland provides suitable breeding habitat for Brewer's Sparrows. The two top-ranked species use prairie dog towns and the top five species also short to mixed grass prairie habitats. Therefore, the highest priority habitats for NTMBs on the Oglala National Grassland should be those that support these species.

Table 1. Habitat association scores for the Oglala National Grassland based on R26 species ranks.

Habitat	≤ 3	< 3 to 2	< 1.99	# Species	Average score	Total score
Short/Mix Grass	6	1	1	8	3.08	24.71
Prairie Dog Towns	4	2	1	7	2.94	20.57
Mix/tall Grass	2	7		9	2.81	29.00
Trees Deciduous	2	8	2	12	2.48	29.71
Shrub Big Sage	1			1	3.14	3.14
Shrub Dense		5		5	2.60	13.00
Edge	1	15	7	23	2.32	53.41
Water/marsh		7	4	11	2.18	24.00
Riparian	2	15	5	22	2.36	51.99

Table 2. Species on the Oglala National Grassland with 10R10 or $R \geq 3.00$.

Species	Hab	IA	AB	TB	BD	R10	R26
Burrowing Owl	Gh7	5	4	5	3	3.57	3.86
Long-billed Curlew	Gxh7	5	3	3	4	3.86	3.71
Chestnut-collared Longspur	Gxh	3	3	3	4	3.29	3.57
Lark Bunting	Gxhs	5	2	3	4	3.29	3.43
Ferruginous Hawk	Gxht7	3	4	4	3	3.29	3.29
Black-billed Cuckoo	Tds12	2	3	4	3	3.29	3.14
Bobolink*	Ga39	1	2	4	3	3.14	3.14
Brewer's Sparrow	Sb	1	2	4	3	3.00	3.14
Loggerhead Shrike	Es2	3	3	4	2	3.00	3.14
Dickcissel*	Ga9	1	2	4	3	2.86	3.00
Great Crested Flycatcher	Tdcl	1	2	4	3	3.00	3.00
Prairie Falcon	Gxh47	4	3	3	3	3.14	3.00

* Species found in the area but not confirmed nester on National Grassland.

Similar analysis of the data for the Ft Pierre National Grassland reveals somewhat different results (table 3). Ft Pierre is in a higher precipitation area and has taller grasses and more deciduous trees than the Oglala National Grassland. Bird species diversity is greater across habitat types than on the Oglala National Grassland and mixed/tall grass habitat higher priority. The burrowing owl is the highest ranked

species on both units (table 4). Dickcissel , bobolink, grasshopper sparrow, northern harrier and upland sandpiper had higher prioritization scores on the Ft. Pierre National Grassland. Management of prairie dog towns and short grass habitat should have some priority on Ft. Pierre, but management for mixed to tall grass habitat is of higher priority based on this analysis.

Table 3. Habitat association scores for the Ft. Pierre National Grassland based on R26 species ranks.

Habitat	≥3	>3 to 2	>1.99	# Species	Average score	Total score
Short/Mix Grass	5	1	1	7	3.06	21.43
Prairie Dog Towns	3	2	1	6	2.81	16.86
Mix/Tall Grass	5	5		10	3.13	31.29
Trees Deciduous	2	9	2	13	2.50	32.58
Shrub Dense	1	5		6	2.26	13.57
Edge	1	9	7	17	1.98	33.70
Water/marsh	1	8	5	14	2.01	28.13
Riparian	3	14	5	22	2.39	52.58

Table 4. Species on Ft. Pierre National Grassland with RIO or R26 scores ≥ 3.00.

Species	Hab	IA	TB	BD	AB	R10	R26
Burrowing Owl	Gh7	4	5	3	5	3.57	3.86
Baird's Sparrow*(Historic)	Gx3	4	5	5	0	3.86	3.71
Chestnut-collared Longspur	Gxh	3	3	4	3	3.29	3.57
Dickcissel	Ga9	2	3	3	5	3.29	3.43
Ferruginous Hawk	Gxht7	4	4	3	4	3.43	3.43
Lark Bunting	Gxhs	2	3	4	5	3.29	3.43
Bobolink	Ga39	2	3	3	3	3.29	3.29
Long-billed Curlew*	Gxh7	3	4	4	1	3.43	3.29
Bell's Vireo*	Sn12	3	4	3	1	3.14	3.14
Black-billed Cuckoo	Tdsl2	3	4	3	2	3.29	3.14
Grasshopper Sparrow	Gxa	2	2	2	5	2.57	3.00
Great Chrested Flycatcher*	Tdcl	2	4	3	1	3.00	3.00
Loggerhead Shrike	Es2	3	4	2	2	2.86	3.00
Northern Harrier	Gasm	3	3	1	5	3.00	3.00
Sprague's Pipit*(historic)	Gxa	3	5	4	0	3.00	3.00
Upland Sandpiper	Gx	3	2	3	5	3.14	3.00

Species found in the area but not confirmed nester on National Grassland.

CONCLUSIONS

The PIF species ranking system is a helpful tool in establishing priorities for Neotropical Migratory Bird species and habitat based management efforts for those species. It should not replace human judgment or additional information which might be important in setting resource priorities. Refinement of the PIF data as was done on the Oglala and Ft. Pierre National Grasslands with local expertise increases the utility value of the system. Only a few analysis examples were given here. However, an endless variety of queries can be used to tease additional information from the data.

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Appendix 1. Prioritization scores for the Neotropical Migratory Landbirds of the Oglala National Grasslands.

Species	Hab	AB	TB	TBU	TW	BD	IA	PT26	PTU26	PT10	PTU10	R10	R26
American Goldfinch	Tdes1	1.00	2.00	3.00	1.00	1.00	2.00	3.00	3.00	2.00	3.00	1.43	1.57
American Kestrel	Ec8	1.00	1.00	2.00	2.00	1.00	4.00	1.00	1.00	2.00	3.00	1.71	1.57
American Robin	Ethw	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	4.00	3.00	1.57	1.29
Barn Swallow	Pgw5	1.00	1.00	1.00	2.00	1.00	2.00	1.00	1.00	5.00	1.00	1.86	1.29
Belted Kingfisher	W4	2.00	4.00	2.00	2.00	1.00	1.00	4.00	3.00	3.00	4.00	2.00	2.14
Black-billed Cuckoo	Tds12	3.00	4.00	3.00	3.00	3.00	2.00	3.00	3.00	4.00	3.00	3.29	3.14
Black-headed Grosbeak	Tds1	2.00	3.00	4.00	2.00	3.00	2.00	2.00	3.00	2.00	2.00	2.57	2.57
Blue Grosbeak	Sn2	3.00	3.00	3.00	2.00	2.00	1.00	4.00	3.00	3.00	4.00	2.43	2.57
Bobolink	Ga39	2.00	4.00	2.00	3.00	3.00	1.00	5.00	2.00	5.00	2.00	3.14	3.14
Brewer's Blackbird	Es29	2.00	3.00	5.00	2.00	3.00	1.00	3.00	3.00	3.00	3.00	2.29	2.29
Brewer's Sparrow	Sb	2.00	4.00	3.00	4.00	3.00	1.00	5.00	1.00	4.00	3.00	3.00	3.14
Brown-headed Cowbird	Egsm	1.00	1.00	1.00	1.00	1.00	5.00	1.00	1.00	1.00	1.00	1.71	1.71
Burrowing Owl	Gh7	4.00	5.00	2.00	3.00	3.00	5.00	4.00	3.00	2.00	3.00	3.57	3.86
Cedar Waxwing	Ts	2.00	2.00	3.00	2.00	2.00	1.00	4.00	3.00	3.00	4.00	2.00	2.14
Chestnut-collared Longspur	Gxh	3.00	3.00	4.00	4.00	4.00	3.00	4.00	3.00	2.00	3.00	3.29	3.57
Chipping Sparrow	Efs	1.00	3.00	4.00	2.00	1.00	3.00	4.00	3.00	4.00	3.00	2.29	2.29
Cliff Swallow	Pw45	2.00	2.00	4.00	2.00	1.00	1.00	3.00	3.00	3.00	3.00	2.00	2.00
Common Nighthawk	Eh	2.00	2.00	4.00	2.00	1.00	5.00	3.00	3.00	4.00	3.00	2.43	2.29
Common Poorwill	Ef4	3.00	2.00	4.00	3.00	3.00	2.00	3.00	4.00	3.00	4.00	2.71	2.71
Common Yellowthroat	Wmsl	1.00	3.00	2.00	2.00	1.00	2.00	4.00	3.00	5.00	2.00	2.29	2.14
Cooper's Hawk	To1	3.00	3.00	3.00	3.00	1.00	1.00	3.00	4.00	3.00	5.00	2.29	2.29
Dickcissel	Ga9	2.00	4.00	3.00	2.00	3.00	1.00	5.00	1.00	4.00	3.00	2.86	3.00
Eastern Bluebird	Ec85	2.00	3.00	2.00	3.00	3.00	1.00	3.00	4.00	3.00	4.00	2.43	2.43
Eastern Kingbird	E	1.00	1.00	2.00	3.00	2.00	3.00	2.00	3.00	1.00	1.00	2.00	2.14
Eastern Phoebe	Td15	2.00	4.00	4.00	3.00	3.00	1.00	3.00	4.00	3.00	5.00	2.57	2.57
Ferruginous Hawk	Gxht7	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.29	3.29
Golden Eagle	Et47	3.00	2.00	2.00	2.00	2.00	5.00	4.00	3.00	2.00	3.00	2.57	2.86
Grasshopper Sparrow	Gxa	2.00	2.00	3.00	2.00	2.00	4.00	5.00	1.00	2.00	3.00	2.43	2.86
Gray Catbird	Sn12	2.00	4.00	2.00	2.00	2.00	2.00	4.00	2.00	2.00	3.00	2.43	2.71
Great Crested Flycatcher	Tdcl	2.00	4.00	3.00	4.00	3.00	1.00	3.00	4.00	3.00	4.00	3.00	3.00
Horned Lark	Gh7	1.00	1.00	1.00	1.00	1.00	5.00	2.00	2.00	2.00	3.00	1.71	1.71
House Wren	Tc15	1.00	2.00	1.00	1.00	1.00	2.00	1.00	1.00	1.00	2.00	1.29	1.29
Indigo Bunting	Tds1	1.00	3.00	3.00	2.00	3.00	1.00	3.00	4.00	3.00	4.00	2.29	2.29
Killdeer	Gh67	1.00	2.00	2.00	1.00	1.00	5.00	4.00	1.00	5.00	1.00	2.29	2.14
Lark Bunting	Gxhs	2.00	3.00	3.00	3.00	4.00	5.00	4.00	2.00	3.00	3.00	3.29	3.43
Lark Sparrow	E	3.00	2.00	3.00	2.00	2.00	3.00	3.00	3.00	1.00	2.00	2.29	2.57
Lazuli Bunting	Tsl	2.00	3.00	4.00	2.00	3.00	2.00	4.00	3.00	2.00	3.00	2.57	2.86
Loggerhead Shrike	Es2	3.00	4.00	4.00	4.00	2.00	3.00	3.00	3.00	2.00	2.00	3.00	3.14
Long-billed Curlew	Gxh7	3.00	3.00	4.00	3.00	4.00	5.00	4.00	3.00	5.00	1.00	3.86	3.71
Long-eared Owl	Efo0	3.00	3.00	3.00	3.00	1.00	1.00	3.00	5.00	3.00	5.00	2.14	2.14

Appendix 1 (Continued).

Species	Hab	AB	TB	TBU	TW	BD	IA	PT26	PTU26	PT10	PTU10	R10	R26
Marsh Wren	Wm	2.00	4.00	2.00	4.00	3.00	2.00	3.00	4.00	3.00	4.00	2.71	2.71
Merlin	Ef0	4.00	4.00	4.00	3.00	2.00	2.00	3.00	4.00	3.00	4.00	2.86	2.86
Mountain Bluebird	Ec85	2.00	3.00	3.00	3.00	3.00	2.00	4.00	2.00	3.00	3.00	2.57	2.71
Mourning Dove	Ew	1.00	1.00	1.00	1.00	1.00	4.00	1.00	1.00	3.00	3.00	1.71	1.43
N. Rough-winged Swallow	Pw4	3.00	3.00	3.00	2.00	1.00	2.00	4.00	3.00	3.00	3.00	2.43	2.57
Northern Flicker	Ec8	1.00	2.00	1.00	1.00	1.00	2.00	4.00	2.00	3.00	3.00	1.57	1.71
Northern Harrier	Gasm	3.00	4.00	3.00	4.00	1.00	3.00	4.00	3.00	4.00	3.00	2.86	2.86
Northern Mockingbird	Eds12	1.00	2.00	2.00	1.00	2.00	1.00	3.00	4.00	3.00	4.00	1.71	1.71
Northern Oriole	Tdsl	2.00	3.00	3.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	2.43	2.43
Orchard Oriole	Tdsl	3.00	3.00	3.00	2.00	3.00	2.00	2.00	2.00	4.00	3.00	2.86	2.57
Oven bird	Tu	2.00	4.00	4.00	4.00	3.00	1.00	3.00	4.00	3.00	4.00	2.86	2.86
Pine Siskin	Tfe	1.00	2.00	3.00	1.00	2.00	2.00	3.00	4.00	3.00	4.00	1.71	1.71
Prairie Falcon	Gxh47	3.00	3.00	3.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.14	3.00
Red-eyed Vireo	Tdul	1.00	4.00	4.00	2.00	2.00	1.00	3.00	3.00	3.00	4.00	2.29	2.29
Red-tailed Hawk	Etg	1.00	2.00	2.00	2.00	1.00	5.00	3.00	3.00	3.00	3.00	2.14	2.14
Red-winged Blackbird	Wms1	1.00	2.00	1.00	1.00	1.00	2.00	4.00	2.00	4.00	3.00	1.71	1.71
Rock Wren	P4	3.00	2.00	2.00	2.00	3.00	3.00	4.00	2.00	4.00	3.00	2.71	2.71
Rufous-sided Towhee	Sn	1.00	3.00	4.00	2.00	2.00	2.00	4.00	3.00	4.00	3.00	2.29	2.29
Say's Phoebe	G45	3.00	2.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	2.71	2.71
Sharp-shinned Hawk	Tfo	3.00	3.00	2.00	3.00	1.00	1.00	3.00	4.00	3.00	4.00	2.14	2.14
Short-eared Owl	Gasm	3.00	4.00	4.00	4.00	1.00	2.00	2.00	3.00	4.00	3.00	2.71	2.43
Swainson's Hawk	Gxt9	3.00	2.00	2.00	3.00	2.00	5.00	2.00	1.00	2.00	3.00	2.86	2.86
Tree Swallow	Ec15	2.00	4.00	3.00	3.00	1.00	1.00	2.00	3.00	3.00	3.00	2.29	2.14
Turkey Vulture	E4	1.00	2.00	4.00	2.00	1.00	4.00	2.00	2.00	4.00	3.00	2.14	1.86
Upland Sandpiper	Gx	3.00	2.00	3.00	3.00	3.00	4.00	2.00	3.00	3.00	3.00	3.00	2.86
Vesper Sparrow	Gxs	3.00	3.00	4.00	2.00	2.00	2.00	4.00	3.00	4.00	3.00	2.57	2.57
Violet-green Swallow	Efc4	2.00	3.00	3.00	2.00	3.00	2.00	3.00	4.00	3.00	4.00	2.57	2.57
Warbling Vireo	Td1	2.00	3.00	4.00	2.00	2.00	2.00	5.00	1.00	4.00	3.00	2.57	2.71
Western Kingbird	E	1.00	1.00	2.00	2.00	3.00	3.00	1.00	1.00	1.00	2.00	2.14	2.14
Western Meadowlark	Gx7	1.00	2.00	2.00	3.00	2.00	5.00	3.00	3.00	3.00	3.00	2.43	2.43
Western Tanager	Tf	2.00	3.00	4.00	2.00	3.00	2.00	3.00	4.00	3.00	4.00	2.57	2.57
Western Wood-Pewee	T	2.00	3.00	4.00	3.00	2.00	2.00	2.00	2.00	1.00	1.00	2.43	2.57
White-throated Swift	P4	3.00	2.00	3.00	2.00	3.00	1.00	3.00	4.00	3.00	4.00	2.43	2.43
Willow Flycatcher	Sn12	3.00	4.00	3.00	3.00	3.00	1.00	3.00	5.00	4.00	3.00	3.00	2.86
Yellow Warbler	Tds1	1.00	4.00	3.00	2.00	1.00	2.00	2.00	3.00	2.00	3.00	1.86	1.86
Yellow-billed Cuckoo	Tds12	3.00	4.00	3.00	3.00	2.00	2.00	2.00	3.00	3.00	4.00	2.86	2.71
Yellow-breasted Chat	Sn12	2.00	3.00	3.00	3.00	2.00	2.00	3.00	3.00	1.00	1.00	2.29	2.57
Yellow-headed Blackbird	Wm	3.00	4.00	2.00	3.00	3.00	2.00	2.00	3.00	4.00	3.00	3.14	2.86
Yellow-rumped Warbler	Tf	1.00	2.00	2.00	1.00	1.00	2.00		4.00	3.00	4.00	1.71	1.29

Appendix 2. Prioritization scores for the Neotropical Migratory Landbirds of the Ft. Pierre National Grasslands.

Species	Hab	AB	TB	TBU	TW	BD	IA	PT26	PTU26	PT10	PTU10	R10	R26
American Goldfinch	Tdes1	1.00	2.00	3.00	1.00	1.00	2.00	3.00	3.00	2.00	3.00	1.43	1.57
American Kestrel	Ec8	1.00	2.00	2.00	2.00	1.00	4.00	1.00	1.00	2.00	3.00	1.86	1.71
American Robin	Ethw	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	4.00	3.00	1.57	1.29
Baird's Sparrow(historic)	Gx3	4.00	5.00	4.00	4.00	5.00	0.00	4.00	3.00	5.00	2.00	3.86	3.71
Bank Swallow	Pw4	3.00	3.00	4.00	2.00	1.00	1.00	2.00	3.00	2.00	2.00	2.14	2.14
Barn Swallow	Pgw5	1.00	1.00	1.00	2.00	1.00	2.00	1.00	1.00	5.00	1.00	1.86	1.29
Bell's Vireo	Sn12	3.00	4.00	3.00	4.00	3.00	1.00	3.00	4.00	3.00	4.00	3.14	3.14
Belted Kingfisher	w4	2.00	4.00	2.00	2.00	1.00	1.00	4.00	3.00	3.00	4.00	2.00	2.14
Black-billed Cuckoo	Tds12	3.00	4.00	3.00	3.00	3.00	2.00	3.00	3.00	4.00	3.00	3.29	3.14
Black-headed Grosbeak	Tds1	2.00	3.00	4.00	2.00	3.00	1.00	2.00	3.00	2.00	2.00	2.43	2.43
Blue Grosbeak	Sn2	3.00	3.00	3.00	2.00	2.00	1.00	4.00	3.00	3.00	4.00	2.43	2.57
Bobolink	Ga39	2.00	3.00	2.00	3.00	3.00	3.00	5.00	2.00	5.00	2.00	3.29	3.29
Brown-headed Cowbird	Egsm	1.00	1.00	1.00	1.00	1.00	5.00	1.00	1.00	1.00	1.00	1.71	1.71
Burrowing Owl	Gh7	4.00	5.00	2.00	3.00	3.00	5.00	4.00	3.00	2.00	3.00	3.57	3.86
Cedar Waxwing	Ts	2.00	3.00	3.00	2.00	2.00	1.00	4.00	3.00	3.00	4.00	2.14	2.29
Chestnut-collared Longspur	Gxh	3.00	3.00	4.00	4.00	4.00	3.00	4.00	3.00	2.00	3.00	3.29	3.57
Chipping Sparrow	Efs	1.00	3.00	4.00	2.00	1.00	1.00	4.00	3.00	4.00	3.00	2.00	2.00
Cliff Swallow	Pw45	2.00	2.00	4.00	2.00	1.00	1.00	3.00	3.00	3.00	3.00	2.00	2.00
Common Nighthawk	Eh	2.00	2.00	4.00	2.00	1.00	5.00	3.00	3.00	4.00	3.00	2.43	2.29
Common Yellowthroat	Wms1	1.00	3.00	2.00	2.00	1.00	2.00	4.00	3.00	5.00	2.00	2.29	2.14
Dickcissel	Ga9	2.00	3.00	3.00	2.00	3.00	5.00	5.00	1.00	4.00	3.00	3.29	3.43
Eastern Bluebird	Ec85	2.00	3.00	2.00	3.00	3.00	1.00	3.00	4.00	3.00	4.00	2.43	2.43
Eastern Kingbird	E	1.00	1.00	2.00	3.00	2.00	3.00	2.00	3.00	1.00	1.00	2.00	2.14
Eastern Phoebe	Td15	2.00	4.00	4.00	3.00	3.00	1.00	3.00	4.00	3.00	5.00	2.57	2.57
Ferruginous Hawk	Gxht7	4.00	4.00	3.00	3.00	3.00	4.00	3.00	3.00	3.00	3.00	3.43	3.43
Grasshopper Sparrow	Gxa	2.00	2.00	3.00	2.00	2.00	5.00	5.00	1.00	2.00	3.00	2.57	3.00
Gray Catbird	Sn12	2.00	4.00	2.00	2.00	2.00	1.00	4.00	2.00	2.00	3.00	2.29	2.57
Great Crested Flycatcher	Tdc1	2.00	4.00	3.00	4.00	3.00	1.00	3.00	4.00	3.00	4.00	3.00	3.00
Horned Lark	Gh7	1.00	1.00	1.00	1.00	1.00	5.00	2.00	2.00	2.00	3.00	1.71	1.71
House Wren	Tc1	1.00	2.00	1.00	1.00	1.00	2.00	1.00	1.00	1.00	2.00	1.29	1.29
Indigo Bunting	Tds1	1.00	3.00	3.00	2.00	3.00	1.00	3.00	4.00	3.00	4.00	2.29	2.29
Killdeer	Gh67	1.00	2.00	2.00	1.00	1.00	5.00	4.00	1.00	5.00	1.00	2.29	2.14
Lark Bunting	Gxhs	2.00	3.00	3.00	3.00	4.00	5.00	4.00	2.00	3.00	3.00	3.29	3.43
Lark Sparrow	E	3.00	2.00	3.00	2.00	2.00	2.00	3.00	3.00	1.00	2.00	2.14	2.43
Least Flycatcher	Td1	3.00	4.00	5.00	4.00	2.00	1.00	3.00	3.00	2.00	3.00	2.71	2.86

Appendix 2 (Continued).

Species	Hab	AB	TB	TBU	TW	BD	IA	PT 26	PTU 26	PT10	PTU10	R10	R26
Loggerhead Shrike	Es2	3.00	4.00	4.00	4.00	2.00	2.00	3.00	3.00	2.00	2.00	2.86	3.00
Long-billed Curlew	Gxh7	3.00	4.00	4.00	3.00	4.00	1.00	4.00	3.00	5.00	1.00	3.43	3.29
Long-eared Owl	Efo0	3.00	3.00	3.00	3.00	1.00	1.00	3.00	5.00	3.00	5.00	2.14	2.14
Marsh Wren	Wm	2.00	4.00	2.00	4.00	3.00	1.00	3.00	3.00	3.00	4.00	2.57	2.57
Mourning Dove	Ew	1.00	1.00	1.00	1.00	1.00	4.00	1.00	1.00	3.00	3.00	1.71	1.43
N. Rough-winged Swallow	Pw4	3.00	3.00	3.00	2.00	1.00	2.00	4.00	3.00	3.00	3.00	2.43	2.57
Northern Flicker	Ec8	1.00	2.00	1.00	1.00	1.00	2.00	4.00	2.00	3.00	3.00	1.57	1.71
Northern Harrier	Gasm	3.00	3.00	3.00	4.00	1.00	5.00	4.00	3.00	4.00	3.00	3.00	3.00
Northern Mockingbird	Eds12	1.00	2.00	2.00	1.00	2.00	1.00	3.00	4.00	3.00	4.00	1.71	1.71
Northern Oriole	Tdsl	2.00	3.00	3.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	2.43	2.43
Orchard Oriole	Tdsl	3.00	3.00	3.00	2.00	3.00	3.00	2.00	2.00	4.00	3.00	3.00	2.71
Red-eyed Vireo	Tdul	1.00	4.00	4.00	2.00	2.00	1.00	3.00	3.00	3.00	4.00	2.29	2.29
Red-tailed Hawk	Etg	1.00	2.00	2.00	2.00	1.00	5.00	3.00	3.00	3.00	3.00	2.14	2.14
Red-winged Blackbird	Wms1	1.00	2.00	1.00	1.00	1.00	3.00	4.00	2.00	4.00	3.00	1.86	1.86
Rock Wren	P4	3.00	3.00	2.00	2.00	3.00	1.00	4.00	2.00	4.00	3.00	2.57	2.57
Rufous-sided Towhee	Sn	1.00	3.00	4.00	2.00	2.00	2.00	4.00	3.00	4.00	3.00	2.29	2.29
Savannah Sparrow	Gx3	3.00	4.00	4.00	3.00	1.00	1.00	5.00	1.00	5.00	1.00	2.71	2.71
Say's Phoebe	G45	3.00	2.00	3.00	3.00	2.00	1.00	3.00	3.00	3.00	3.00	2.43	2.43
Short-eared Owl	Gasm	3.00	3.00	4.00	4.00	1.00	5.00	2.00	3.00	4.00	3.00	3.00	2.71
Sprague's Pipit (historic)	Gxa	3.00	5.00	5.00	3.00	4.00	0.00	3.00	3.00	3.00	3.00	3.00	3.00
Swainson's Hawk	Gxt9	3.00	2.00	2.00	3.00	2.00	5.00	2.00	1.00	2.00	3.00	2.86	2.86
Tree Swallow	Ec15	2.00	3.00	3.00	3.00	1.00	1.00	2.00	3.00	3.00	3.00	2.14	2.00
Turkey Vulture (no nest?)	E4	1.00	2.00	4.00	2.00	1.00	1.00	2.00	2.00	4.00	3.00	1.71	1.43
Upland Sandpiper	Gx	3.00	2.00	3.00	3.00	3.00	5.00	2.00	3.00	3.00	3.00	3.74	3.00
Vesper Sparrow	Gxs	3.00	3.00	4.00	2.00	2.00	1.00	4.00	3.00	4.00	3.00	2.43	2.43
Warbling Vireo	Td1	2.00	4.00	4.00	2.00	2.00	2.00	5.00	1.00	4.00	3.00	2.71	2.86
Western Kingbird	E	1.00	1.00	2.00	2.00	3.00	3.00	1.00	1.00	1.00	2.00	2.14	2.14
Western Meadowlark	Gx7	1.00	2.00	2.00	3.00	2.00	5.00	3.00	3.00	3.00	3.00	2.43	2.43
Willow Flycatcher	Sn12	3.00	4.00	3.00	3.00	3.00	1.00	3.00	5.00	4.00	3.00	3.00	2.86
Yellow Warbler	Tdsl	1.00	4.00	3.00	2.00	1.00	2.00	2.00	3.00	2.00	3.00	1.86	1.86
Yellow-billed Cuckoo	Tds12	3.00	4.00	3.00	3.00	2.00	1.00	2.00	3.00	3.00	4.00	2.71	2.43
Yellow-breasted Chat	Sn12	2.00	3.00	3.00	3.00	2.00	1.00	3.00	3.00	1.00	1.00	2.14	2.43
Yellow-headed Blackbird	Wm	3.00	3.00	2.00	3.00	3.00	2.00	2.00	3.00	4.00	3.00	3.00	2.71