NORTHERN GREAT PLAINS JOINT VENTURE

PRIORITY BIRD SPECIES

August 2012

By:

Northern Great Plains Joint Venture Technical Committee

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Cover photo: Little Missouri National Grassland with Lake Sakakawea in the background, McKenzie County, North Dakota. Photo by U.S.D.A. Forest Service.

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INTRODUCTION:

The Northern Great Plains Joint Venture (NGPJV) is a consortium of private businesses, landowners, conservation groups, and government agencies dedicated to bird conservation within the northern Great Plains. The NGPJV area encompasses eastern Montana, eastern Wyoming, and the western parts of North and South Dakota (Figure 1).

Although concerned with the conservation of all bird species (Pool and Austin 2006, p. 158), the NGPJV Board of Directors concluded that identification of priority bird species would facilitate the design, support, and funding of conservation actions. Toward that end, they directed the NGPJV Technical Committee to develop such a list. This report is the product of that effort.

> Note: Although this report identifies priority species for bird conservation efforts within the NGPJV area, NGPJV partners will pursue conservation efforts for other bird species of particular interest as well. Obvious examples include: American wigeon (*Anas americana),* gadwall (*Anas strepera*), peregrine falcon (*Falco peregrinus*), ring-necked pheasant (*Phasianus colchicus*), greater prairie-chicken (*Tympanuchus cupido*), least tern (*Sternula antillarum*), and piping plover (*Charadrius melodus*).

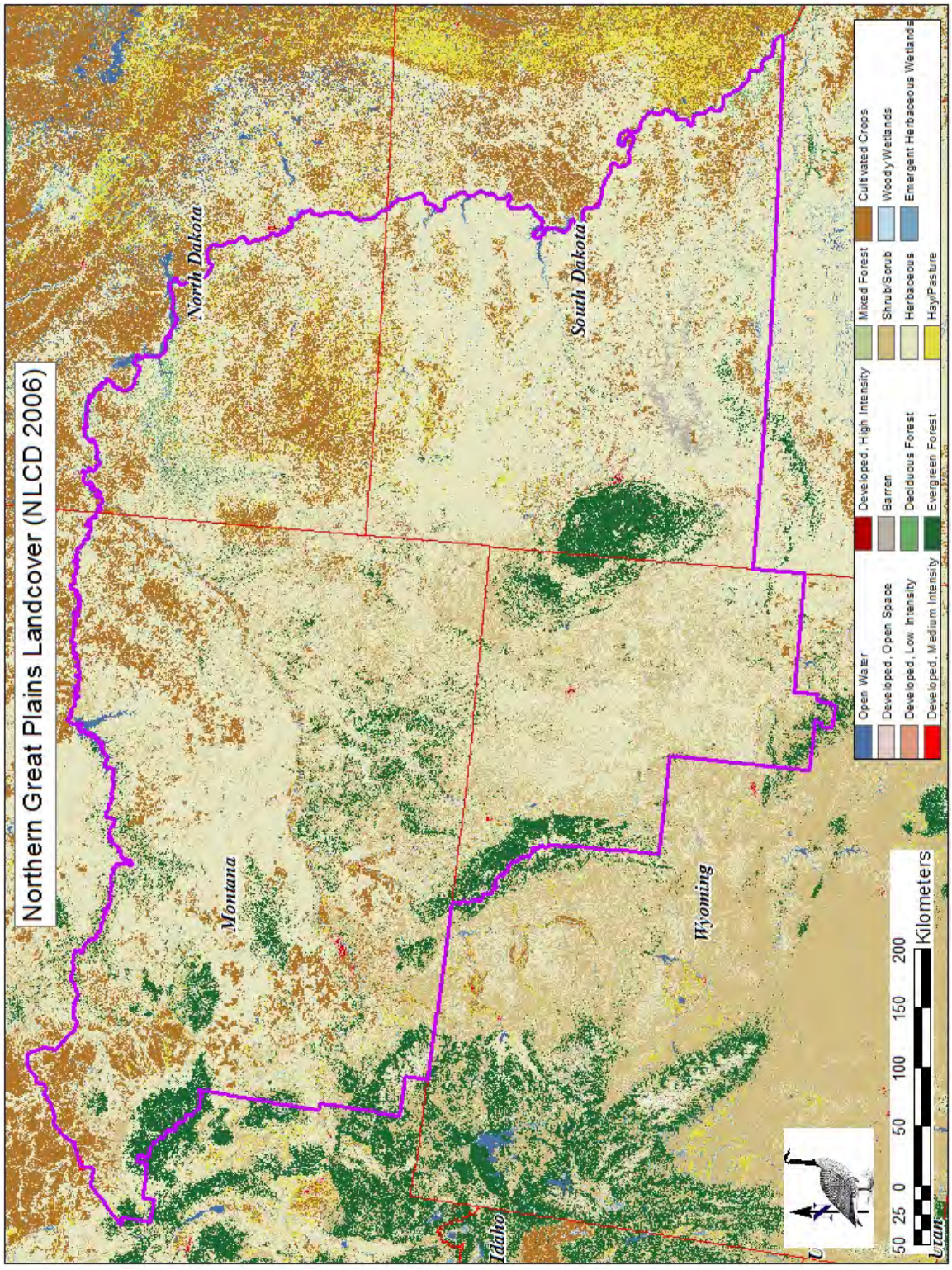
METHODS:

We selected priority species using a multi-faceted and subjective approach. In keeping with the NGPJV's philosophy of "all birds", we attempted to select a variety of birds (i.e. not all waterfowl, not all sparrows, etc.). We concentrated our analysis on breeding bird species. Although the NGPJV area provides important migration and wintering habitat for hundreds of bird species, the region is widely recognized for the critical role it plays in bird production.

When selecting priority birds, we reviewed ecological information about each species, as well as data regarding local status and distribution. Key sources for local status and distribution were: Faulkner 2010, McEneaney 1993, Stewart 1975, Tallman et al. 2002, and Wyoming (no date); as well as our local knowledge. Scientific names follow: American Ornithologists' Union 2011, Seabloom 2011, and USDA Natural Resources Conservation Service 2012.

> Note: to limit the size of the priority species list, we explicitly excluded bird species primarily associated with western coniferous forest. Although that habitat occurs in parts of the NGPJV area, it is more characteristic of the neighboring Intermountain Joint Venture area.

Figure 1. Map of the Northern Great Plains Joint Venture area (outlined in purple).



Birds were selected as priorities because they were of one or more of the following "priority types". The priority types were:

- **Area Importance**: Species of this priority type were those for which the NGPJV area provides core breeding habitat. This criterion was assessed using the "Relative Density" and "Breeding Distribution Score", wherein concentrated breeders were scored high on a scale of 1-5 (see Panjabi et al. 2005 and Partners in Flight 2005 for details; see also "Area Importance" score of Brown et al. 2001). Species particularly scrutinized were those that had scores of 4 or 5 in "Bird Conservation Area (BCR) 17", which is mostly congruent to the NGPJV area. We also assessed the "Percent Population" value (Partners in Flight 2005). Species particularly scrutinized were those in which 10% or more of the total population nested in BCR 17.
- **Conservation**: Species of this priority type were those in need of conservation action due to declining populations. When assessing this criterion we considered conservation designations of other organizations (see Table 1 for list). We also examined population trend information from the U.S. Geological Survey's Breeding Bird Survey (Sauer et al. 2011). We paid particular attention to those species which had statistically significant, negative population trends, either long-term (i.e. 1966-2009) or short-term (1999-2009). We also referenced the Partner in Flights (2005) "Population Trend Score". We paid particular attention to those species with a score of 4 (indicating that there had been a 15% to 49% decline in population within the last 30 years) or 5 (indicating that there had been more than a 50% decline in population in the last 30 years). For shorebirds we referenced Brown et al. 2000; we paid particular attention to taxa designated as either "Highly imperiled" (species listed as threatened or endangered nationally, plus all species with significant population declines and either low populations or some other high risk factor), or "High concern" (species known or thought to be declining, and that had some other known or potential threat).
- **Focal Species**: Species of this priority type were those which were already of heightened interest to NGPJV partners.
- **Guild Representative**: Species of this priority type were those particularly tied to one of the NGPJV's major or specialized habitats. Guild representatives were designated by us as we thought that their presence/absence, densities, and/or reproductive success would be informative regarding the status of other bird species using similar habitats. Major habitats considered included: mixed-grass prairie, short-grass prairie, and shrub-steppe. Specialized habitats considered included: black-tailed prairie dog (*Cynomys ludovicianus*) colonies, wetland, woody draw (Figure 2), and woody riparian (Figure 2). For the purposes of this document, "woody draw" was defined as shrub- or tree-dominated upland tracts. Woody draws vary in size from less than 1 acre to several hundred acres. Typical tree species, if present, include: American elm (*Ulmus americana*), boxelder (*Acer negundo*), bur oak (*Quercus macrocarpa*), green ash (*Fraxinus pennsylvanica*), paper birch (*Betula papyrifera*), and quaking aspen (*Populus tremuloides*). "Woody riparian" was defined as shrub- or tree- dominated linear tracts along one or both sides of creeks and rivers. Common species include American elm, boxelder, green ash, and willow (*Salix* spp.). The largest woody riparian tracts occur along the few major streams in the NGPJV area; those tracts are typically dominated by cottonwood (*Populus deltoides*).

Figure 2. (Top): Woody draw, Grand River National Grassland, Perkins County, SD. (Bottom): Woody riparian, Little Heart Bottom Wildlife Management Area, Morton County, ND.

RESULTS:

We reviewed information for ~75 bird species, selecting 26 (Table 1; see Table 2 for scientific names). Most of the selected species had been previously identified as priorities by other organizations and conservation plans. The chestnut-collared longspur had been highlighted by 8 of the 11 sources checked, whereas the long-billed curlew had been highlighted by 9 of the 11 sources. Only three species (black-billed magpie, spotted towhee, and wild turkey) had not been previously identified by any of the sources referenced.

The priority bird species selected were associated with a variety of habitats (Table 2). Habitat affiliations of priority species included: mixed-grass prairie (16 species), short-grass prairie (2 species), shrub-steppe (6 species), prairie dog colonies (3 species), wetlands (4 species), woody draws (3 species), and woody riparian (3 species).

As intended, the priority bird species selected pertained to several taxonomic groupings (Table 2). The most common taxa-groupings selected were shorebirds and sparrows, with 5 species each. Corvids, cuckoos, pipits, shrikes, and woodpeckers had only one species each designated as a priority species.

The priority bird species selected were unevenly divided among the four priority types (Table 3). The most used priority type was conservation (16 species). The least used priority type used was focal species (6 species). Most species qualified under more than one criterion, although the greater sage-grouse was the only species which qualified under all four.

Guild representatives were identified for all of the NGPJV area's major and specialized habitats. These included: 2 species for mixed-grass prairie (sharp-tailed grouse, upland sandpiper), 1 for prairie dog colonies (burrowing owl), 2 for shrub-steppe (Brewer's sparrow, greater sage-grouse), 2 for short-grass prairie (McCown's longspur and mountain plover), 2 for wetlands (mallard, northern pintail), 2 for woody draw (black-billed magpie, spotted towhee), and 2 for woody riparian (red-headed woodpecker, wild turkey).

The species selected as priorities are discussed below, in alphabetic order. We have noted the reasons each taxon was selected, and included a summary of their ecology, management, and the information and action needed.

Table 1. Status of priority bird species. *=species identified as a species of conservation concern by the group indicated. c.=collared. h.=headed.

	----------GROUP[1]----------										
SPECIES	**BLM**	**FS**	**FWS**	**MT**	**NAS**	**ND**	**PF**	**SCP**	**SD**	**WMP**	**WY**
Baird's sparrow	*	*	*		*	*	*		*		
Black-billed cuckoo			*			*					
Black-billed magpie											
Brewer's sparrow	*	*	*	*	*		*				*
Burrowing owl	*	*	*	*		*			*		*
Chestnut-c. longspur	*	*	*	*	*	*			*		*
Ferruginous hawk	*	*	*	*	*	*			*		
Grasshopper sparrow		*	*			*					
Greater sage-grouse	*	*		*		*			*		
Lark bunting			*		*	*			*		*
Loggerhead shrike	*	*	*	*		*					
Long-billed curlew	*	*	*	*	*	*		*	*		*
Mallard			*							*	
Marbled godwit	*		*		*	*		*	*		
McCown's longspur	*	*	*	*							*
Mountain plover	*	*	*	*	*			*			
Northern pintail			*			*				*	*
Red-h. woodpecker	*		*	*	*	*	*				
Sharp-tailed grouse						*					*
Short-eared owl		*	*		*	*	*				*
Spotted towhee											
Sprague's pipit	*	*	*		*	*	*		*		
Swainson's hawk	*		*		*	*	*				*
Upland sandpiper			*			*		*			*
Wild turkey											
Wilson's phalarope						*		*	*		

[1]BLM=USDI Bureau of Land Management, Species of Concern in MT, ND, SD, WY.
FS= USDA Forest Service, Sensitive Species, Regions 1, 2.
FWS=USDI Fish and Wildlife Service; Bird of Management Concern, 2009.
MT= Montana Fish, Wildlife and Parks, Animal Species of Concern, July 2009.
NAS=National Audubon Society, Watchlist, 2002.
ND=North Dakota Game and Fish Department, Priority Species, 2005.
PF=Partners in Flight, Species of Continental Importance in BCR 17, 2004.
SCP=United States Shorebird Conservation Plan, National Shorebird Priorization Scores, 2001.
SD=South Dakota Game, Fish, and Parks, Species of Greatest Conservation Need, 2012.
WMP=North American Waterfowl Management Plan, 2008.
WY=Wyoming Fish and Game Department, Tier I, II, III Bird Species, 2010.

Table 2. Common and scientific names, major native habitat(s), and taxa group of birds selected as priority species for the Northern Great Plains Joint Venture.

COMMON NAME	SCIENTIFIC NAME	HABITAT	GROUP
Baird's sparrow	*Ammodramus bairdii*	Mixed-grass prairie	Sparrows
Black-billed cuckoo	*Coccyzus erythropthalmus*	Woody draw	Cuckoos
Black-billed magpie	*Pica hudsonia*	Woody draw	Corvids
Brewer's sparrow	*Spizella brewerii*	Shrub-steppe	Sparrows
Burrowing owl	*Athene cunicularia*	Prairie dog colonies	Owls
Chestnut-collared longspur	*Calcarius ornatus*	Mixed-grass prairie	Longspurs
Ferruginous hawk	*Buteo regalis*	Mixed-grass prairie, Shrub-steppe	Raptors
Grasshopper sparrow	*Ammodramus savannarum*	Mixed-grass prairie	Sparrows
Greater sage-grouse	*Centrocercus urophasianus*	Shrub-steppe	Gamebirds
Lark bunting	*Calamospiza melanocorys*	Mixed-grass prairie, Shrub-steppe	Sparrows
Loggerhead shrike	*Lanius ludovicianus*	Mixed-grass prairie, Shrub-steppe	Shrikes
Long-billed curlew	*Numenius americanus*	Mixed-grass prairie, Shrub-steppe	Shorebirds
Mallard	*Anas platyrhynchos*	Mixed-grass prairie, Wetland	Waterfowl
Marbled godwit	*Lemosa fedoa*	Mixed-grass prairie, Wetland	Shorebirds
McCown's longspur	*Calcarius mccownii*	Short-grass prairie, Prairie dog colonies	Longspurs
Mountain plover	*Charadrius montanus*	Short-grass prairie, Prairie dog colonies	Shorebirds
Northern pintail	*Anas acuta*	Mixed-grass prairie, Wetland	Waterfowl
Red-headed woodpecker	*Melanerpes erthrocephalus*	Woody riparian	Woodpeckers
Sharp-tailed grouse	*Tympanuchus phasianellus*	Mixed-grass prairie	Gamebirds
Short-eared owl	*Asio flammeus*	Mixed-grass prairie	Owls
Spotted towhee	*Pipilo maculatus*	Woody draw, Woody riparian	Sparrows
Sprague's pipit	*Anthus spragueii*	Mixed-grass prairie	Pipits
Swainson's hawk	*Buteo swainsoni*	Mixed-grass prairie	Raptors
Upland sandpiper	*Bartramia longicauda*	Mixed-grass prairie	Shorebirds
Wild turkey	*Meleagris gallopavo*	Woody riparian	Gamebirds
Wilson's phalarope	*Phalaropus tricolor*	Mixed-grass prairie, Wetland	Shorebirds

Table 3. Summary of the reasons (priority type) that priority birds were selected. See text under METHODS (above, p. 3), for additional details.

	PRIORITY TYPE			
COMMON NAME	**AREA IMPORTANCE**	**CONSERVATION**	**FOCAL**	**GUILD**
Baird's sparrow	X	X		
Black-billed cuckoo		X		
Black-billed magpie		X		X
Brewer's sparrow		X		X
Burrowing owl		X		X
Chestnut-collared longspur	X	X		
Ferruginous hawk	X		X	
Grasshopper sparrow	X	X		
Greater sage-grouse	X	X	X	X
Lark bunting	X	X		
Loggerhead shrike		X		
Long-billed curlew		X		
Mallard			X	X
Marbled godwit	X			
McCown's longspur	X			X
Mountain plover		X		X
Northern pintail			X	X
Red-headed woodpecker		X		X
Sharp-tailed grouse	X		X	X
Short-eared owl	X	X		
Spotted towhee				X
Sprague's pipit	X	X		
Swainson's hawk	X			
Upland sandpiper				X
Wild turkey	X		X	X
Wilson's phalarope		X		
TOTALS	13	16	6	13

BAIRD'S SPARROW

Figure 3. Baird's sparrow.

PRIORITY TYPE:
Area Importance, Conservation.

RATIONALE:
The Baird's sparrow (Figure 3) is a declining northern Great Plains endemic. BCR 17 has a breeding distribution score of 4 and a population trend score of 4 for this species (Partners in Flight 2005).

DISTRIBUTION:
The Baird's sparrow is somewhat nomadic within its breeding range (Figure 4a), keying into the areas that provide suitable conditions within a given year (Kantrud and Faanes 1979). Wintering birds occur locally in grassland areas in Arizona, New Mexico, Texas, and north-central Mexico. In the NGPJV area, Baird's sparrows are most regular in the northeastern portion (Figure 4b). They are most widespread in the NGPJV area during wet years. During dry years, an even greater majority of birds summer east and north of the Missouri River in the adjacent Prairie Pothole Joint Venture area.

STATUS:
Baird's sparrows are rare to uncommon, but irregular, nesters within the occupied portion of the NGPJV area (Figure 4b). They are present there from early May into September. About 110,000 (9%) of the total 1,200,000 Baird's sparrows are believed to nest within BCR 17 (Blancher et al. 2007). The average population estimate from the Integrated Monitoring in Bird Conservation Regions (IMBCR) effort was 130,000 in that same area, 2009-2011 (Rocky Mountain Bird Observatory 2012).

Data from the Breeding Bird Survey 1966-2009 show an average annual population change of -2.9% for the Baird's sparrow (Sauer et al. 2011). From 1999-2009, the annual population change averaged -0.5%. Baird's sparrow annual population changes within BCR 17, averaged -1.6% and -1.2% during those same time periods, respectively.

HABITAT:
Baird's sparrows use native, mixed-grass prairie (Dechant et al. 2003a, Green et al. 2002, Jones and Green 1998). They also use some tame grasslands (Knowles 2001, Winter 2008). The species is sensitive to vegetative structure, especially vegetative height and litter depth. Baird's sparrows prefer lightly to moderately grazed pastures; they avoid both heavily grazed areas and long-idled ones (particularly in more mesic areas and time periods). Narrow-leaved grasses are

preferred over broad-leaved grasses. Nests are built on the ground, well concealed by surrounding grasses. The sparrow's diet includes insects and seeds (DeGraaf et al. 1991).

MANAGEMENT:
Preserving grasslands, particularly native prairie, is the single most important management technique for Baird's sparrow conservation (Dechant et al. 2003a, Green et al. 2002). Within existing suitable grassland areas, management should focus on providing preferred vegetative structure. Specifically, ecological disturbances (grazing, fire, mowing) should be managed to provide ~0.5" to 1" (i.e. ~1 cm to 2.5 cm) of vegetative litter. Standing vegetation should be moderately-high; ~6" to 12" average height (i.e. ~15 cm to 30 cm), and should be dominated by strong-stemmed narrow-leaved grasses, including: crested wheatgrass (*Agropyron cristatum*), green needlegrass (*Nassella viridula*), Junegrass (*Koeleria macrantha*), needle and thread (*Hesperostipa comata*), and western wheatgrass (*Pascopyrum smithii*). Species such as intermediate wheatgrass (*Thinopyrum intermedium*), Kentucky bluegrass (*Poa pratensis*), smooth brome (*Bromus inermis*), sweetclover (*Melilotus officinalis*), and timothy (*Phleum pratense*) should be reduced as much as possible. A scattering of low shrubs and forbs is preferred, but dense shrub patches should be minimized; trees should be removed. Optimally, disturbances should not occur during the peak of the breeding season (i.e. they should not occur mid-May to mid-July).

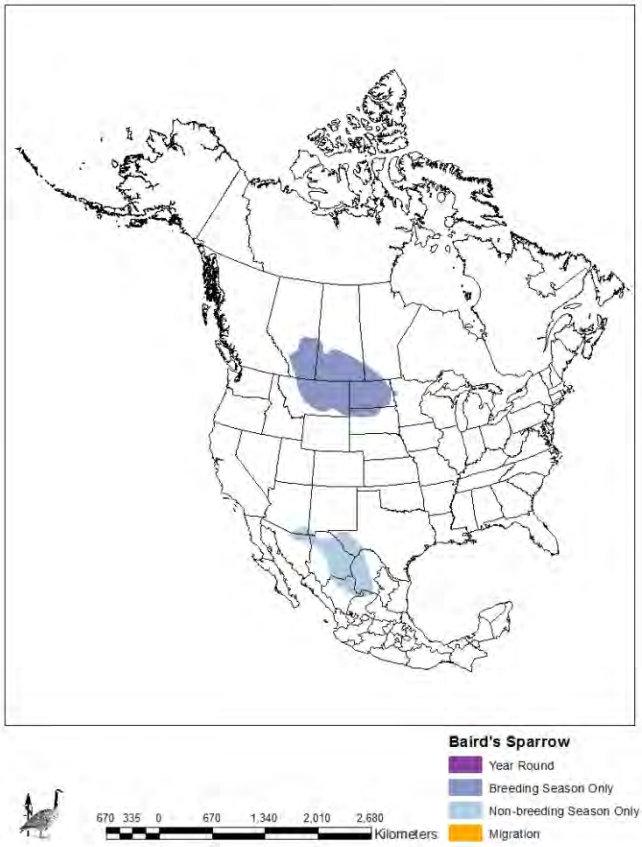
INFORMATION NEEDED:
More information is needed on this species' basic biology and ecology, particularly during migration and winter (Green et al. 2002). More information is also needed on the bird's reproductive success in non-native habitats. The Baird's sparrow's nomadic nature means that it may not be in a given management area every year. Management strategies should be developed to help landowners and managers address that reality, including development of disturbance regimes (i.e. grazing rotations, systems, stocking rates, etc.) designed to produce/maintain preferred vegetative structure within the prevailing local conditions, including consideration of soils, climates, vegetation types, and precipitation (seasonal, yearly, and multiple-year).

ACTION NEEDED:
Increased conservation of native grasslands on the breeding and wintering grounds is vital to this species. Benefits could be realized by application of far-reaching policies, such as "sodbuster" provisions in the U.S. farm bills, as well as increased use of technical outreach and financial support programs (including the range extension programs of state land grant universities as well as the USDI Fish and Wildlife Service's Partners for Fish and Wildlife program, and several programs of the USDA Natural Resource Conservation Service). The NGPJV should compile a "How to manage your land for Baird's sparrow" manual for use by landowners and managers.

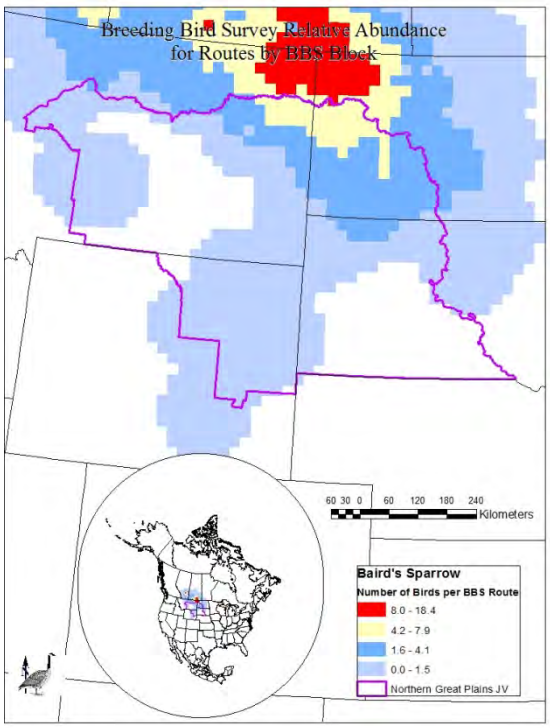
NOTES:
Knowles (2001) and Winter (2008) are among the few investigations of this species which have occurred within the NGPJV area.

Figure 4. Distribution maps of the Baird's sparrow in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



BLACK-BILLED CUCKOO

Figure 5. Black-billed cuckoo.

PRIORITY TYPE:
Conservation.

RATIONALE:
The black-billed cuckoo (Figure 5) is declining rapidly; it has a population trend score of 5 in BCR 17 (Partners in Flight 2005).

DISTRIBUTION:
The breeding range of the black-billed cuckoo encompasses eastern North America, extending from southern Canada to Colorado and Georgia (Figure 6a). Black-billed cuckoos winter in South America; the species' distribution there is poorly understood, though the center of its abundance is generally believed to be from Colombia east to western Venezuela, and south to Central Peru (Hughes 2001). The species occurs throughout the NGPJV area (Figure 6b).

STATUS:
In the NGPJV area, black-billed cuckoos are irregular, uncommon, and local (Figure 6b), where they are typically present for only a short time period, i.e. late May or early June through late July. Cuckoo densities fluctuate annually in response to prey availability (Hughes 2001), particularly outbreaks of caterpillars (i.e. *Lepidoptera* larvae) and cicadas (*Cicadidae*). Approximately 36,000 black-billed cuckoos occur within BCR 17, representing about 3% of the continental population (Blancher et al. 2007).

The black-billed cuckoo was once much more common (Hughes 2011). Range-wide, the Breeding Bird Survey data indicated statistically-significant population changes of -3.4% /year, 1966–2009; and -3.3% per year, 1999-2009 (Sauer et al. 2011). Within BCR 17, the black-billed cuckoo population changed on average of -4.9% per year during 1966-2009, and -3.9% per year during 1999-2009.

HABITAT:
Black-billed cuckoos are found in deciduous woodlands, often in association with wetlands and riparian areas (Hughes 2001). In the northern Great Plains, they use a variety of woodland types, including brushy margins of woodlands, woody riparian areas, woody draws, thickets of small trees and scrubs, shelterbelts, and occasionally partially-wooded areas of towns and farms (Stewart 1975, Dobkin 1994). Woodland size may be an important factor in habitat suitability. Nests are well concealed in shrubs or trees, often within 6 feet of the ground (DeGraff et al. 1991). Black-billed cuckoos eat primarily large arthropods, particularly caterpillars

MANAGEMENT:
Hughes (2001) noted that no management measures had been proposed or undertaken for black-billed cuckoo conservation. Presumably, the best management strategy on the breeding grounds would be to facilitate development and retention of large patches of multi-storied wooded habitats such as riparian woodlands, wooded draws or groves, and shelterbelts. It would be particularly important to prevent overgrazing. Furthermore, insecticide use should be minimized in suitable habitat, especially during the cuckoo's breeding season (i.e. June and July).

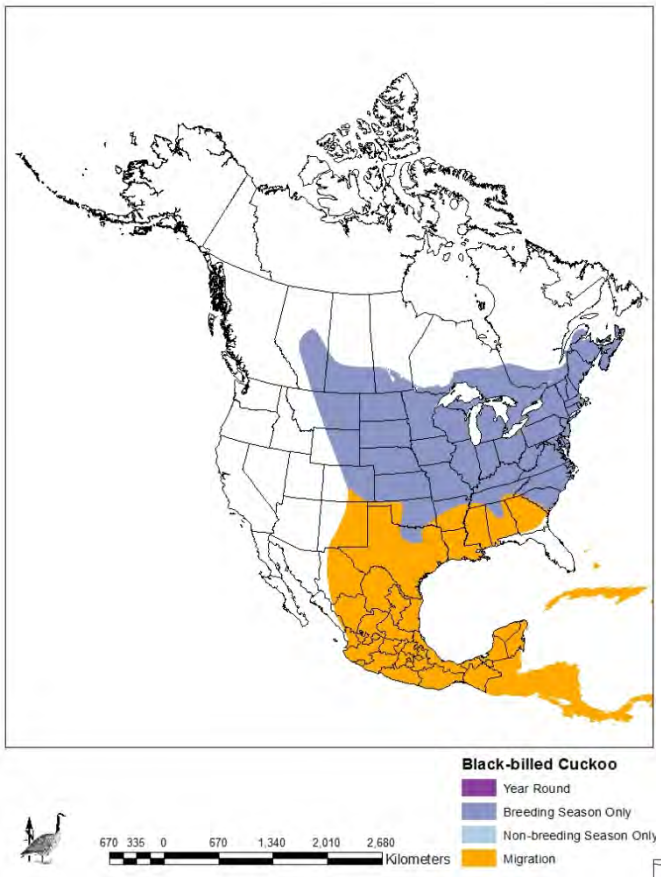
INFORMATION NEEDED:
A better understanding of the drivers of tent caterpillar outbreaks would facilitate real-time management for cuckoos. Hughes (2001) stated that research was also needed to determine the factors of the black-billed cuckoo's long-term population decline. Research is needed too on the cuckoo's life history, especially: migration routes, winter survival, extent of tower collisions during migration, factors influencing local distribution, philopatry, productivity and mortality, and population structure and regulation. The issues of greatest concern identified by Hughes (2001), however, are the effects of pesticide use, habitat fragmentation, and habitat modification.

ACTION NEEDED:
The most urgent actions needed for black-billed cuckoo conservation within the NGPJV area is the protection of existing riparian woodlands and woody draws from excessive livestock grazing. Numerous programs, including "EQUIP" and "WHIP", administered by the USDA Natural Resources Conservation Service and the Partners for Fish and Wildlife Program of the USDI Fish and Wildlife Service are well suited to improve and expand natural woodland habitat.

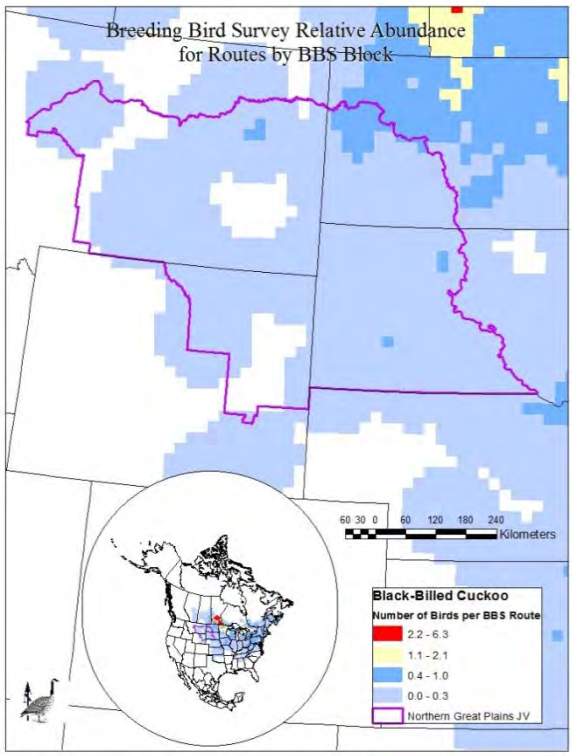
NOTES:
The black-billed cuckoo is secretive and irruptive, making it very difficult to accurately monitor its population trends. Hence, estimates of population sizes and trends have low reliability. Some ornithologists have suggested that the black-billed cuckoo is largely nocturnal during the breeding season (Hughes 2001).

Figure 6. Distribution maps of the black-billed cuckoo in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



BLACK-BILLED MAGPIE

Figure 7. Black-billed magpie.

PRIORITY TYPE:
Conservation, Guild Representative.

RATIONALE:
The declining black-billed magpie (Figure 7) has a population trend score of 4 in BCR 17 (Partners in Flight 2005). In the NGPJV area, the species is closely tied to riparian deciduous woodland. The magpie was selected as a guild representative for that habitat.

DISTRIBUTION:
The black-billed magpie is resident across much of western North America, from the southern half of Alaska, southeast through the Rocky Mountains, Great Basin, and Great Plains to central New Mexico (Figure 8a). During the fall and winter, some birds regularly wander eastwards into adjacent portions of Minnesota. Magpies are widespread in the NGPJV area (Figure 8b).

STATUS:
The resident black-billed magpie is rare to uncommon in the northeastern portion of the NGPJV area, but uncommon to common elsewhere (Figure 8b). About 1.3% (i.e. ~42,000) of all black-billed magpies are found within BCR 17 (Blancher et al. 2007). Rocky Mountain Bird Observatory (2012) estimated that there was an average of 246,000 black-billed magpies in BCR 17, 2009-2011.

Breeding Bird Survey data show statistically significant annual population changes of -0.7% and -0.6%, respectively, rangewide. In BCR 17, statistically significant population changes of -2.4% per year, 1966-2009, and -1.9% per year, 1999-2009 were recorded (Sauer et al. 2011).

HABITAT:
In the northern Great Plains area, the black-billed magpie is closely associated with riparian deciduous woodland stringers imbedded in grassland and shrubland. It also makes use of open pine forest. During the non-breeding season, it is often seen near human habitations, including livestock feedlots (Trost 1999, Tallman et al. 2002). Magpie nests are large, complex, globular structures of interwoven twigs, placed high in trees or large shrubs. Magpies forage mostly on the ground. Food includes insects (especially grasshoppers), snails, small fish, reptiles, birds, mammals, carrion, and fruit (DeGraaf et al. 1991).

MANAGEMENT:
Historically, black-billed magpie populations suffered from the loss of bison and widespread use of poisons and baited traps (Trost 2001). From the late 19th century to the to mid-20th century, numerous states and organizations offered bounties for killing black-billed magpies. The bounties were intended to reduce the magpie's perceived negative impacts on: orchards, trapping lines, livestock, songbirds, and gamebirds. Toxic chemicals, including Compound 1080, have been implicated in several relatively recent die-offs. An organophosphate called *Famphur* or *Warbex* is currently used throughout much of western North America to control warble fly larvae (*Hypoderma lineatum*). The chemical's toxic effect lasts 90 days. Because magpies land on the backs of cattle to glean ectoparasites, they may be especially vulnerable to secondary poisoning from that insecticide (Birkhead 1991, Henny et al. 1985). Habitat fragmentation due to agricultural developments and urban sprawl also can negatively impact black-billed magpies, especially if there is not a protected deciduous riparian woodland habitat nearby. West Nile virus apparently caused substantial mortality in this species (McLean 2005).

Little effort has been made to manage this species for its own conservation. Conservation recommendations emphasize maintaining healthy deciduous woodland along riparian areas, and limiting the impact of shooting, trapping, and pesticides.

INFORMATION NEEDED:
Little information is available on the amount, connectivity, and quality of riparian and upland habitat needed to sustain a black-billed magpie population. The past, current, and future impact of West Nile virus on this species is largely unknown. A better understanding of insecticide impacts, and alternatives to their use (through integrated pest management), is needed.

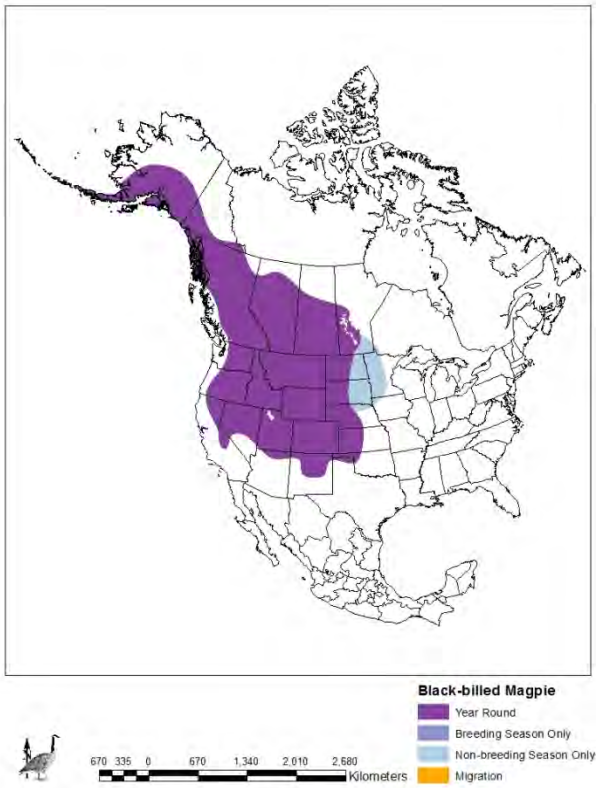
ACTION NEEDED:
Black-billed magpies would most benefit from management efforts that maintained or restored the NGPJV area's woody habitats, particularly the stringers of deciduous woodland along riparian zones. Numerous programs, including the EQUIP and WHIP programs administered by the USDA Natural Resources Conservation Service as well as the USDI Fish and Wildlife Service's Partners for Fish and Wildlife program are well suited to improve and expand natural woodland habitat. Increasing public awareness and adoption of an integrated pest management system that reduced insecticide use as part of a systemic grazing system would also benefit this species.

NOTES:
In 1998, the American Ornithologists' Union split the North American races of black-billed magpies from those in Eurasia. The latter are now known as Eurasian magpie (*Pica pica*).

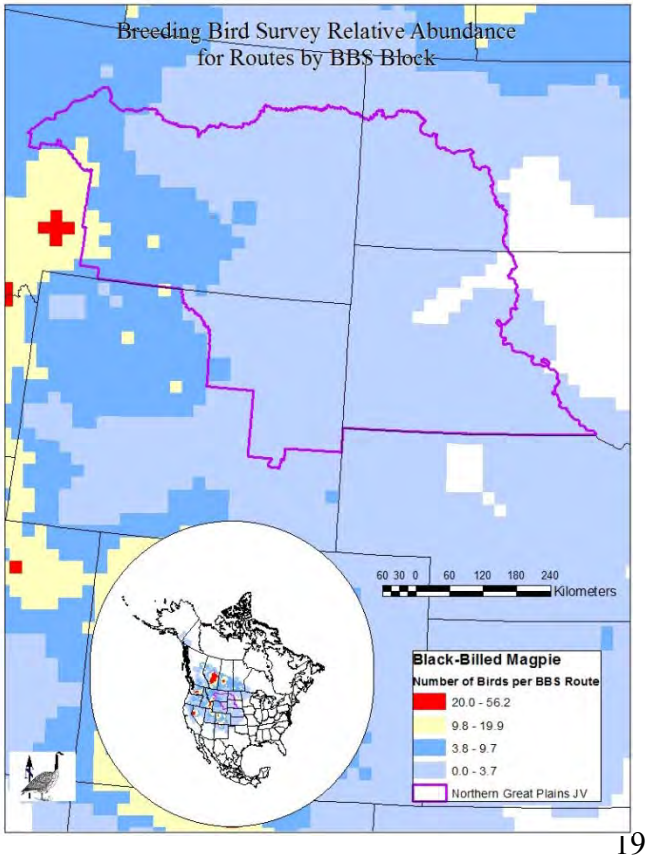
Birds which we considered likely members of the black-billed magpie guild include, but are not limited to: black-billed cuckoo, eastern kingbird (*Tyrannus tyrannus*), lazuli bunting (*Passerina amoena*), spotted towhee, and yellow warbler (*Dendroica petechia*).

Figure 8. Distribution maps of the black-billed magpie in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



BREWER'S SPARROW

PRIORITY TYPE:
Conservation, Guild Representative.

Figure 9. Brewer's sparrow.

RATIONALE:
The rapidly declining Brewer's sparrow (Figure 9) has a population trend score of 5 for BCR 17 (Partners in Flight 2005). The Brewer's sparrow is used in this document as a guild representative for shrub-steppe habitat, particularly that dominated by big sagebrush.

DISTRIBUTION:
The Brewer's sparrow can be found throughout much of western North America (Figure 10a). Wintering birds occur locally in shrub-steppe areas in Arizona, New Mexico, Texas, and north-central Mexico. In the NGPJV area, Brewer's sparrows occur throughout much of eastern Montana and Wyoming, and in localized areas of southwestern North Dakota and western South Dakota (Figure 10b).

STATUS:
In the NGPJV area, the Brewer's sparrow is generally common within preferred habitats (Figure 10b). It is typically present May through September. About 4.1% (or 670,000) of all Brewer's sparrows nest within BCR 17 (Blancher et al. 2007). Rocky Mountain Bird Observatory (2012) estimated that there was an average of 5,889,000 Brewer's sparrows in BCR 17, 2009-2011.

Breeding Bird Survey data from 1966-2009 showed an average annual population change of -0.6%, range wide (Sauer et al. 2011). For the 1999-2009 period, the annual rate of population change averaged -1.0%. The species' decline was even more dramatic in BCR 17, averaging an annual population change of -4.6% for both 1966-2009 and 1999-2009.

HABITAT:
Within the NGPJV area, the Brewer's sparrow prefers flat or rolling shrublands dominated (i.e. >25% canopy cover) by sagebrush, particularly big sagebrush (*Artemisia tridentata*). Brewer's sparrows prefer a shrub canopy height of less than 5' (i.e. 1.5 meters). This species is positively correlated with percent cover of shrubs, forbs and bare ground, but negatively correlated with percent cover of grasses and litter (Rotenberry et al. 1999, VerCarteren and Gillihan 2004). The bird's cup nest is placed in a shrub, typically sagebrush. Brewer's sparrows consume mostly weed seeds, insects, and spiders (DeGraaf et al. 1991).

MANAGEMENT:
The conservation of unfragmented landscapes dominated by big sagebrush is the primary habitat management measure used to benefit Brewer's sparrow (Paige and Ritter 1999). Managers should particularly focus on maintaining sagebrush dominated landscapes that have shrub heights of less than 5' (1.5m), sagebrush canopies of 10% to 30%, and an understory of native grasses and forbs (California Partners in Flight 2005). Within each sagebrush stand, managers should maintain some areas with relatively dense sagebrush cover (i.e. 25% to 40% canopy cover) of medium-sized shrubs (i.e. 8" to 35" or 0.5m to 0.9m) that Brewer's Sparrows prefer for nesting (Walker 2004).
Fires generally reduce Brewer's sparrow populations (Knick et al. 2005, Welch 2002), but may be useful in reducing invading conifers, such as junipers (Holmes and Martz 2004).

INFORMATION NEEDED:
The impact of livestock grazing on the Brewer's sparrow's reproductive success is largely unknown (California Partners in Flight 2005). More information is needed on this species' basic biology, particularly during winter (Rottenberry et al. 1999). Decision support systems are needed to determine the priority areas to focus conservation efforts.

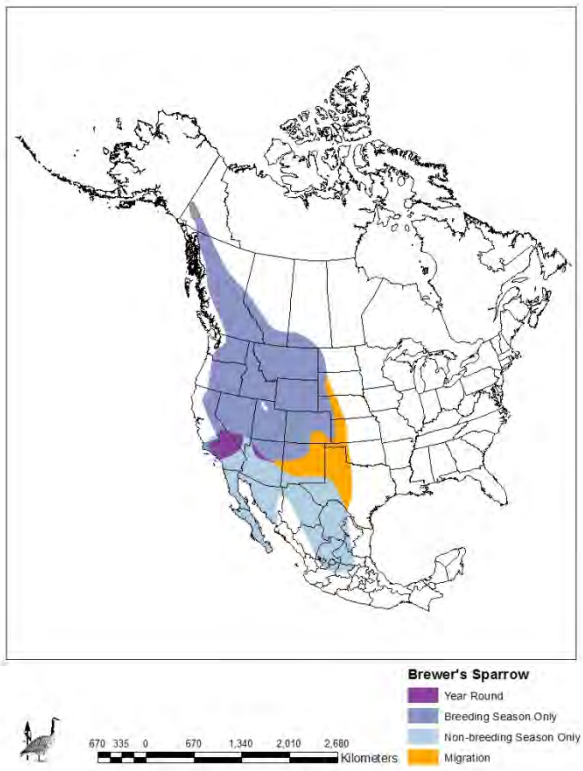
ACTION NEEDED:
The most urgent need for Brewer's sparrow conservation in the NGPJV area is to accelerate and expand efforts to preserve unfragmented big sagebrush steppe. The NGPJV, along with a variety of other partners, should incorporate Brewer's sparrow habitat management needs into the sagebrush management guidelines proposed for greater sage-grouse.

NOTES:
Some authorities consider the Brewer's sparrow northern subspecies (*S. b. taverneri*) to be a separate species. That subspecies nests at timberline in the northern Rocky Mountains.

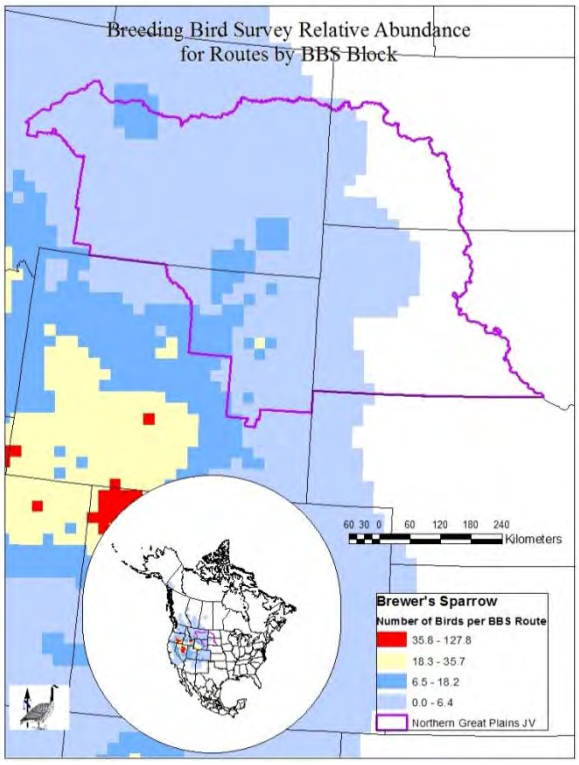
Birds which we considered likely members of the Brewer's sparrow guild include, but are not limited to: Brewer's blackbird (*Euphagus cyanocephalus*), golden eagle (*Aquila chrysaetos*), greater sage-grouse, lark bunting, sage sparrow (*Amphispiza belli*), sage thrasher (*Oreoscoptes montanus*), vesper sparrow (*Pooecetes gramineus*), and western meadowlark (*Sturnella neglecta*).

Figure 10. Distribution maps of the Brewer's sparrow in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



BURROWING OWL

Figure 11. Burrowing owl.

PRIORITY TYPE:
Conservation, Guild Representative.

RATIONALE:
The declining burrowing owl (Figure 11) has a population trend score of 4 in BCR 17 (Partners in Flight 2005). In the NGPJV area, it is closely tied to the availability of black-tailed prairie dog colonies, and as such is used as a guild representative for that habitat.

DISTRIBUTION:
Nesting burrowing owls are found from Prairie Canada south to central Mexico (Figure 12a). Additional populations are found in Florida and the Caribbean. The northern-most portions of the breeding range are not used in winter, when birds move further south. Within the NGPJV area, the species is widespread (Figure 12b), but local.

STATUS:
The burrowing owl is uncommon to rare and local in the NGPJV area (Figure 12b), where it is present from April to October. Based on Breeding Bird Survey data, Blancher et al. (2007) estimated that 40,000 burrowing owls, or about 2% of the species' population, nest within BCR 17.

Range-wide, burrowing owl populations declined -0.8% annually, 1966-2009, with the greatest declines occurring prior to 1999 (Sauer et al. 2011). Burrowing owl populations within BCR 17 showed a similar declining trend during 1966–1999 (-1.6%) and a slower rate of decline (-0.2%) between 1999 and 2009. This species is endangered in Canada. The burrowing owl's range has also declined in North Dakota (Murphy et al. 2001).

HABITAT:
Burrowing owls use open (mostly treeless) mixed-grass and shortgrass prairie and shrub-steppe habitat with gentle slopes and low vegetation (Dechant et al. 2003b, Poulin et al. 2011). The presence of a nest/roost burrow is a critical requirement; previously excavated holes dug by burrowing mammals are most often used. In the NGPJV area, burrowing owls are most regularly seen in black-tailed prairie dog colonies (Restani et al. 2008). Burrowing owls are active day and night and forage in a variety of habitats including pasture, cropland, fallow fields, and native prairie. They prey heavily on arthropods (especially crickets and grasshoppers, i.e. *Orthopterans*), particularly on prairie dog colonies. Small mammals (especially mice and voles,

i.e. *Cricetidae*) are also important prey, especially when the owls are foraging off of prairie dog colonies and/or during the night. Diverse and abundant foods are important to breeding success and post-fledging juvenile survival (Conrey 2010, Davies and Restani 2006, Todd et al. 2003).

MANAGEMENT:
Intensive cultivation of grasslands has long been recognized as a major cause of declining owl populations (Poulin et al. 2011). The control of colonial rodents (e.g., prairie dog species, *Cynomys* spcs.; Richardson's ground squirrel, *Urocitellus richardsonii*; etc.) has also destroyed vast areas of once-suitable nesting habitat. Habitat recommendations typically focus on protection of grassland/shrubland habitat; protection/expansion of colonial burrowing mammals; and limitation of insecticides. Habitat suitability can be enhanced by management practices that result in low vegetation and bare ground (e.g., moderately or heavily grazing) and abundant foods.

INFORMATION NEEDED:
Very little is known of this species' ecology during migration and winter (Poulin et al. 2011, but see Woodin et al. 2007). Range-wide monitoring on breeding and wintering grounds is needed to better assess changes in distribution and abundance. Further research is needed to understand the effects of grazing and fire management practices, landscape fragmentation, and factors influencing food resource availability. Burrowing owls can be tolerant to non-threatening human activities, but their response to disturbance from energy development and associated infrastructure is unknown. Research also is needed to develop approaches that minimize predation, which appears to be an important factor in nest success and survival (e.g, Barclay et al. 2011, James et al. 1997). Prairie dog shooting is popular throughout the NGPJV area; the impact of that shooting on burrowing owls is unknown.

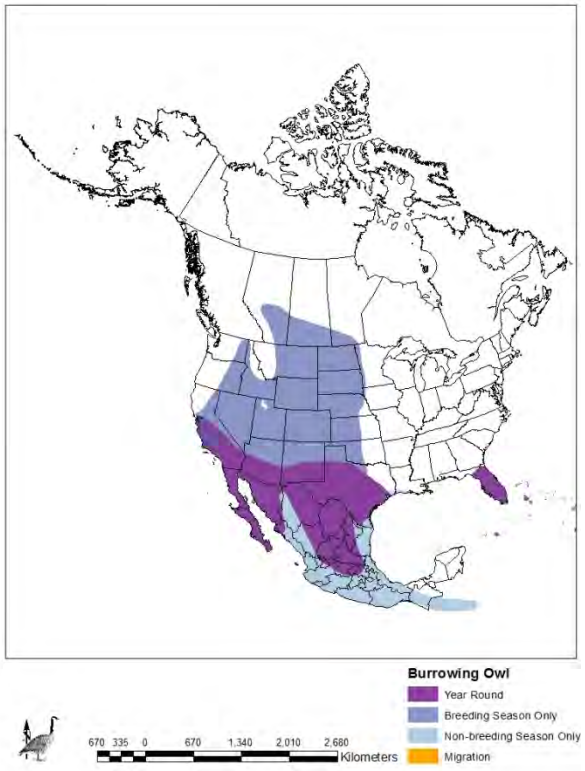
ACTION NEEDED:
The most urgent action needed for burrowing owl management in the NGPJV area is to conserve colonial burrowing mammals, particularly black-tailed prairie dogs. It is also important to educate prairie dog shooters about burrowing owl presence and appearance to reduce accidental shootings. Landowners and managers that poison prairie dogs should be encouraged to do so outside of the period when owls are present (i.e. outside of the period of April through September).

NOTES:
Birds which we considered likely members of the burrowing owl's guild include, but are not limited to: ferruginous hawk, golden eagle, prairie falcon (*Falco mexicanus*), horned lark (*Eremophila alpestris*), McCown's longspur, and mountain plover.

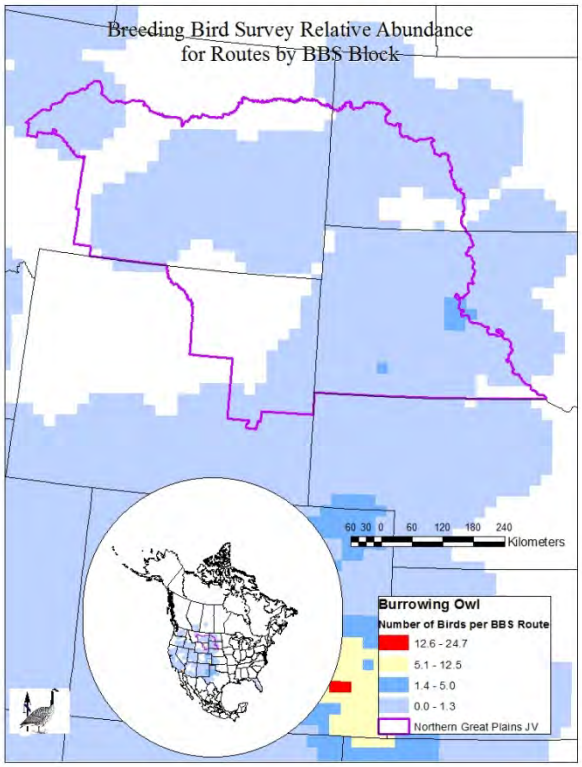
Numerous studies have been conducted on the burrowing owl within the NGPJV area, including, but not limited to: Davies and Restani 2006, Griebel and Savidege 2003, Knowles 2001, Knowles 2006, MacCracken et al. 1985, Martell et al. 1991, Restani et al. 2001, Sidle et al. 2001.

Figure 12. Distribution maps of the burrowing owl in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



CHESTNUT-COLLARED LONGSPUR

Figure 13. Chestnut-collared longspur.

PRIORITY TYPE:
Area Importance, Conservation.

RATIONALE:
A Great Plains endemic, the chestnut-collared longspur (Figure 13) has a relative density score of 5 and a breeding distribution score of 4 for BCR 17 (Partners in Flight 2005); an estimated 26% of the total population nests there (Blancher et al. 2007). This declining species has a population trend score of 5 (Partners in Flight 2005).

DISTRIBUTION:
The chestnut-collared longspur nests mostly in the northern Great Plains (Figure 14a). The species winters in the southern Great Plains. Chestnut-collared longspurs are widespread throughout the NGPJV area (Figure 14b).

STATUS:
In the occupied portion of the NGPJV area, chestnut-collared longspurs are generally uncommon, though they may be abundant locally (Figure 14b). They are present on the breeding grounds from April through October. An estimated 1,500,000 chestnut-collared longspurs nest within BCR 17 (Blancher et al. 2007). The IMBCR program estimated that there was an average annual population of 9,444,000 million chestnut-collared longspurs with BCR 17 from 2009-2011 (Rocky Mountain Bird Observatory 2012).

Based on Breeding Bird Survey data from 1966-2009, chestnut-collared longspurs declined an average of -4.4% per year, rangewide (Sauer et al. 2011). From 1999-2009, the rangewide annual population declined by -4.1%. Population changes within BCR 17 averaged -4.0% and -4.4%, respectively, during those same time periods.

HABITAT:
Chestnut-collared longspurs prefer shortgrass and mixed-grass, but will use heavily-grazed or recently burned tallgrass prairie, as well as tame grassland and even cropland (Hill and Gould 1997). Vegetative structure is important. Areas dominated by short grass and minimal litter are preferred. Dechant et al. (2003c) summarized past research on this species; several studies reported that chestnut-collared longspurs preferred grass heights <12" (i.e. <30 cm). Specifically, Creighton (1974) and Creighton and Baldwin (1974) reported that occupied habitat

in Colorado had an average vegetation height of 6" (15 cm) and 12% bare ground; Fairfield (1968) reported that occupied habitat had an average vegetation height of <8" to 12" (i.e. <20-30 cm) in Saskatchewan. Kantrud and Kologiski (1982, 1983) reported that occupied habitat had an average vegetation height of 7" to 9" (17-23 cm) with 8% to 15% bare ground in Colorado, Montana, Nebraska, North Dakota, South Dakota, and Wyoming.

Recently grazed, mowed, or burned sites are often used by chestnut-collared longspurs; in the more productive portions of the species range, these are the only habitats which are suitable (Hill and Gould 1997). Although native prairie is most often selected, chestnut-collared longspurs will use tame grass pastures, including those dominated by crested wheatgrass. In South Dakota, nesting chestnut-collared longspur are adversely affected both by exotic grass species and woody vegetation, including shrubs >3 feet (1 meter) high (Greer 2009). During migration and winter this species regularly uses cropland, as well as grassland habitats.

The chestnut-collared longspur's nest is placed within a shallow depression, on the ground (Hill and Gould 1997). DeGraff et al. (1991) list this bird's diet as: seeds, insects (especially crickets, grasshoppers, and beetles, i.e. *Orthoptera* and *Coleoptera*), and spiders (*Araneae*).

MANAGEMENT:
The preservation and restoration of grassland areas, particularly native prairie, is vital to this species' conservation (Hill and Gould 1997). Management of existing grassland areas should focus on providing the chestnut-collared longspur's preferred vegetative structure through management of prescribed grazing, mowing, and fire. In general, more frequent and intensive uses of these tools will be required in the eastern portion of the NGPJV area.

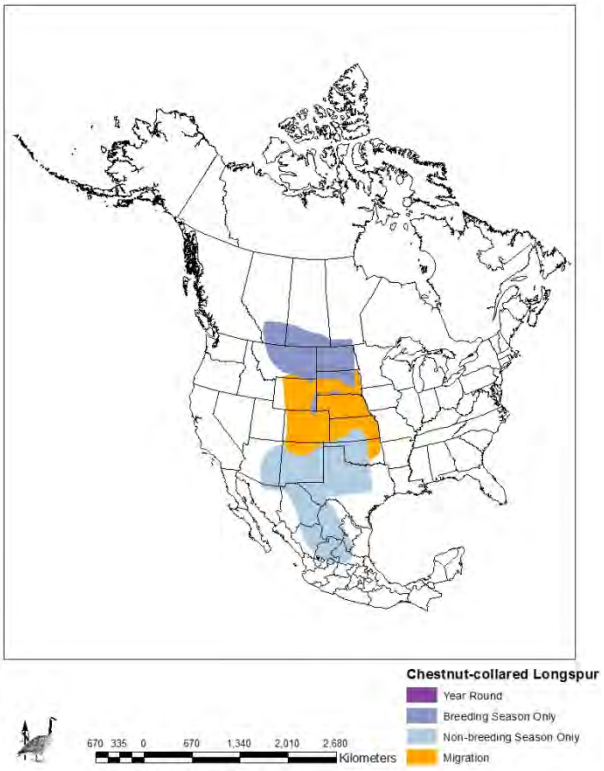
INFORMATION NEEDED:
Little is known about this species' ecology and habitat use during migration or on the wintering grounds (Hill and Gould 1997). Banding studies during the nonbreeding season could provide information on specific migration routes, individual fidelity to wintering sites, and winter social behavior. A better understanding of this longspur's physiology may also help inform conservation design. Breeding populations should be closely monitored for additional declines.

ACTION NEEDED:
The most urgent action item needed for conservation of the chestnut-collared longspur is creation of programs (such as private lands easements) or policies which slow or prevent the continued conversion of native prairie to cropland production.

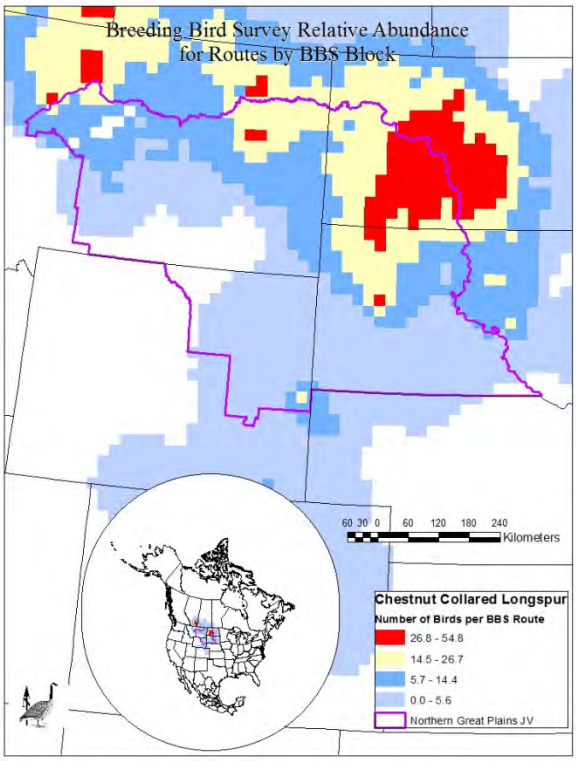
NOTES:
The chestnut-collared longspur was once considered the most common bird species in parts of its former range (Stewart 1975).

Figure 14. Distribution maps of the chestnut-collared longspur in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



FERRUGINOUS HAWK

Figure 15. Ferruginous hawk.

PRIORITY TYPE:
Area Importance, Focal Species.

RATIONALE:
BCR 17 has a relative density score of 5 for the ferruginous hawk (Figure 15); an estimated 15% of all ferruginous hawks nest there (Partners in Flight 2005, Blancher et al. 2007). This species receives special management attention from several NGPJV partners, due to its association with black-tailed prairie dogs and its reported sensitivity to nest disturbance, including that due to energy development.

DISTRIBUTION:
Ferruginous hawks nest from the Prairie Provinces of Canada south through the western United States (Figure 16a). Birds winter in the southern half of the breeding range as well as further west and south into western Nevada, California, and northern Mexico. The species is widespread in the NGPJV area (Figure 16b).

STATUS:
Ferruginous hawks are rare to uncommon in the NGPJV area, being most numerous in central Montana and eastern Wyoming (Figure 16b). In the northern portion of the NGPJV area, birds are typically only present from early March to late October. In the southern one-half of the NGPJV area, ferruginous hawks can be found year-round. Based on Breeding Bird Survey data, there are about 3,000 ferruginous hawks nesting within BCR 17 (Blancher et al. 2007).

Assessing this species' population trend is difficult, as ferruginous hawks are poorly sampled by most large-scale monitoring programs, including the Breeding Bird Survey (Bechard and Schmutz 1995). Ferruginous hawks are believed to be declining in several areas, particularly prairie Canada and in northeastern North Dakota. Nevertheless, Breeding Bird Survey data indicate a statistically-significant increase of +1.4% per year during 1966-2009, and +2.7% per year during 1999-2009 (Sauer et al. 2011). Trends within BCR 17 also are positive, though not statistically significant.

HABITAT:
Ferruginous hawks prefer open grassland and shrubsteppe communities (Bechard and Schmutz 1995, Dechant et al. 2003d). Historically, the bulky stick nests were built atop clay buttes, on cliff sides, or on the ground. The majority of current nests, however, are located in isolated trees. Foraging occurs in native and tame grasslands, pastures, hayland, and cropland. Vulnerability of prey is an important factor in habitat suitability; ferruginous hawks avoid areas where dense hiding cover is abundant. Small mammals, such as rabbits and hares (*Leporidae*), ground-squirrels and prairie-dogs (*Sciuridae*), pocket gophers (*Geomyidae*) comprise the bird's primary prey (Bechard and Schmutz 1995); other prey items include snakes, locusts, and crickets (DeGraff et al. 1991).

MANAGEMENT:
Some studies have indicated that ferruginous hawks are particularly susceptible to anthropogenic disturbance at nest sites. Based on that concern, several authors have recommended limiting disturbance during the nesting season (March through July) within 0.2 to 0.6 mile (0.3 to 1 km) of active nests. This species' sensitivity to disturbance may vary by location, type of disturbance, and that year's food resources (Bechard and Schmutz 1995, Dechant et al. 2003d).

Other management recommendations for ferruginous hawk conservation focus on restoring/preserving native grassland and shrubland vegetation; and enhancing, protecting, and creating nest sites. In some areas this species has readily accepted artificial nests sites (Migaj et al. 2001, Niemuth 1992). Ranching is generally considered compatible with ferruginous hawk conservation, while widespread conversion to crop production is not (Bechard and Schmutz 1995). Protecting/enhancing prey populations, including black-tailed prairie dogs, has also been suggested as an important management technique.

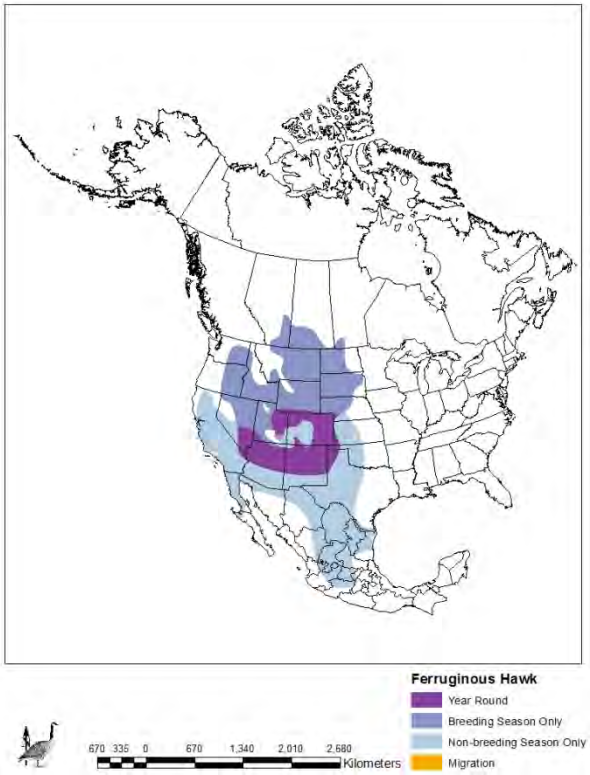
INFORMATION NEEDED:
The winter ecology of this species, especially in Mexico, is poorly understood, as is dispersal, (Bechard and Schmutz 1995). Further research is also needed to determine how prey abundance affects ferruginous hawk densities, annual reproduction, and dietary habits. Little is known concerning the response of this species to management efforts. A better understanding of the actual impacts of human disturbance on would be very useful to this species' management.

ACTION NEEDED:
Priority actions should include: establishing a robust monitoring program and establishing and populating a central raptor nest database. The most important, and urgent need, is to foster conservation of native grassland and shrubland communities, particularly those supporting large populations of prairie dogs.

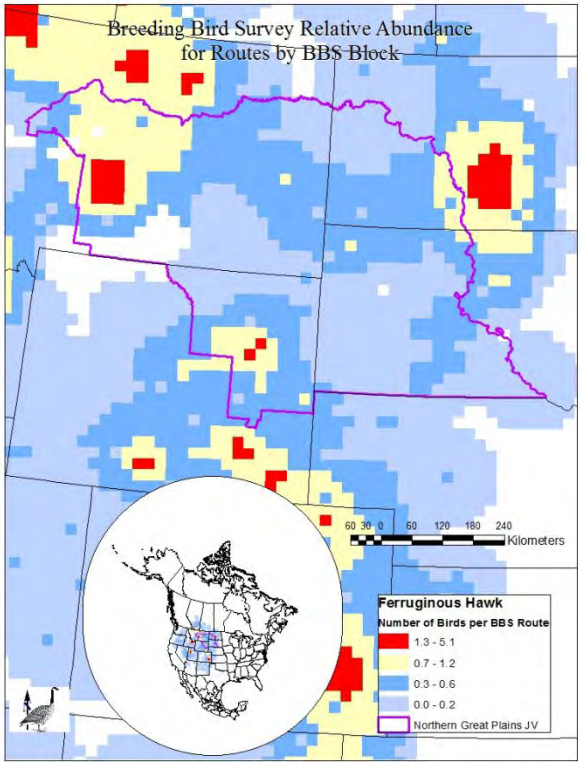
NOTES:
One of the first projects initiated by the NGPJV was underwriting satellite-telemetry monitoring of this species' movements. The data is currently (2012) in analysis.

Figure 16. Distribution maps for the ferruginous hawk in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



GRASSHOPPER

GRASSHOPPER SPARROW

PRIORITY TYPE:
Area Importance, Conservation.

Figure 17. Grasshopper sparrow.

RATIONALE:
The grasshopper sparrow (Figure 17) has a relative density score of 5 in BCR 17; an estimated 14% of the total population nests there (Partners in Flight 2005, Blancher et al. 2007). This declining species has a population trend score of 5 (Partners in Flight 2005).

DISTRIBUTION:
Grasshopper sparrows breed from southwestern British Columbia south to southern Texas and east to the Atlantic seaboard (Figure 18a). Additional populations are found in portions of the intermountain west. Wintering grasshopper sparrows occur from the southern-most United States through most of Mexico. The species is widespread in the NGPJV area (Figure 18b).

STATUS:
The grasshopper sparrow is generally uncommon to abundant in suitable habitat within the NGPJV area (Figure 18b). It is present there from May to October. An estimated 2,100,000 grasshopper sparrows nest within BCR 17 (Blancher et al. 2007). Rocky Mountain Bird Observatory (2012) estimated that there was an average of 19,586,000 grasshopper sparrows in BCR 17, 2009-2011.

Breeding Bird Survey data show an average annual population change of -2.8% throughout North America for the period 1966–2009, and -2.2% for the period 1999-2009 (Sauer et al. 2011). The trends within BCR 17 for those same time periods show average annual populations changes of -3.8% and -5.3%, respectively.

HABITAT:
Grasshopper sparrows prefer open, nearly treeless, grasslands and shrublands with moderate herbaceous structure and patchy bare ground (Dechant et al. 2003eVickery 1996). Extensive shrub cover is avoided, though the presence of some scattered, low shrubs apparently increases habitat attractiveness in some areas. Dechant et al. 1998 summarized past research on this species; in the vicinity of the NGPJV area, this species preferred sites with ~0.5” to 1” (i.e. 1 to 3 cm) vegetative litter and standing vegetation averaging ~6” to 16” (i.e. 10 cm to 40 cm) tall. The nest is well hidden on the ground, and is typically covered by overarching grass. Grasshopper

sparrows forage on the ground, consuming seeds and arthropods, especially insects (DeGraaf et al. 1991).

MANAGEMENT:
Habitat loss, fragmentation, and degradation are the primary reasons for grasshopper sparrow declines (Vickery 1996). The loss of vast acreages of native grassland habitat is now being exacerbated by the loss of tame grasslands, including conservation reserve program (i.e. "CRP") fields. Conservation efforts, therefore, should focus on preserving/restoring grassland and shrubland habitats. In existing habitats, management should focus on applying ecological disturbances (grazing, mowing, fire) to create preferred vegetative structure. In xeric portions of the NGPJV area, that might require infrequent application of those tools. Conversely, in mesic areas (or years), frequent grazing, mowing, or prescribed fire might be required to maintain habitat suitability for breeding grasshopper sparrows.

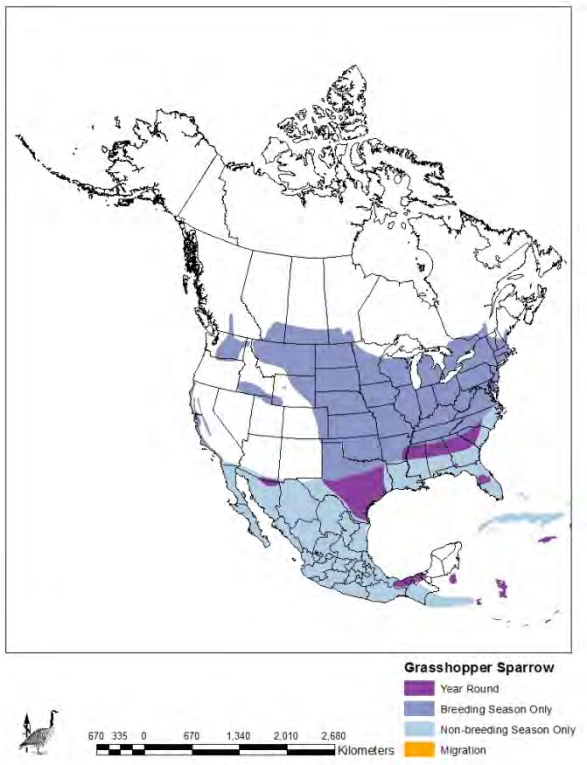
INFORMATION NEEDED:
Many occupied habitats during the breeding season apparently act as population "sinks"; additional research is needed to better describe and understand source-sink dynamics (Vickery 1996). Little is known about the grasshopper sparrow on it wintering grounds, including mortality and survivorship rates.

ACTION NEEDED:
Conservation efforts should focus on preserving grasslands, both native and tame. In the NGPJV area, grasshopper sparrows would benefit from moderate to light use of prescribed burning, mowing, and grazing. The establishment of prescribed grazing systems would benefit this species; programs such as the EQUIP and WHIP programs of the USDA Natural Resources Conservation Service or the Partners for Fish and Wildlife program of the USDI Fish and Wildlife Service could facilitate that establishment.

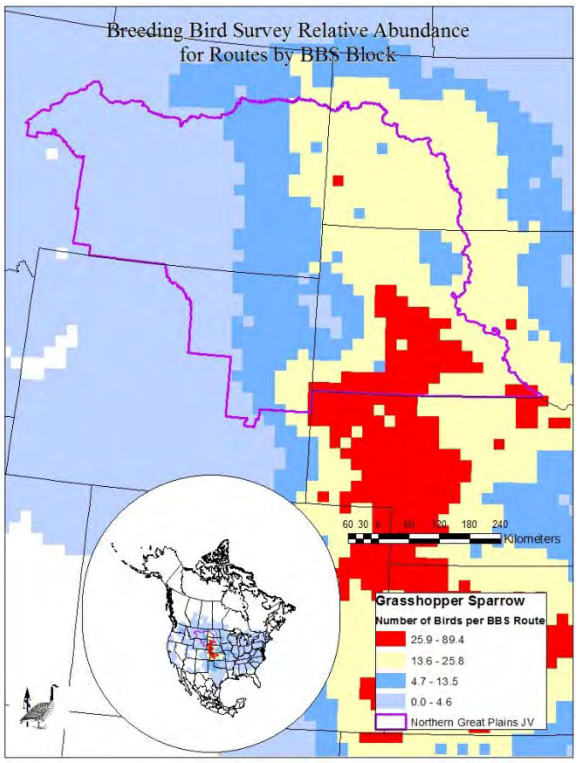
NOTES:
The projected loss of Conservation Reserve Program (CRP) acreage within the NGPJV and across the United States is likely to cause significant, additional declines of grasshopper sparrows in the near future.

Figure 18. Distribution maps of the grasshopper sparrow in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



GREATER SAGE-GROUSE

Figure 19. Greater sage-grouse.

PRIORITY TYPE:
Area Importance, Conservation, Focal Species, Guild Representative.

RATIONALE:
The greater sage-grouse (Figure 19) has a relative density score of 5 for BCR 17; an estimated 18% of all greater sage-grouse occur there (Blancher et al. 2007, Partners in Flight 2005). This species' recent and well-publicized decline has led to its designation as a candidate species under the federal Endangered Species Act (USDI Fish and Wildlife Service 2010). A popular gamebird, the greater sage-grouse is of special interest to several NGPJV area partners. The greater sage-grouse is used in this document as a guild representative for shrub-steppe habitat, especially that dominated by big sagebrush.

DISTRIBUTION:
The greater sage-grouse's range is centered on the Great Basin of the western United States (Figure 20a). Within the NGPJV area, it is found throughout eastern Montana and eastern Wyoming, and very locally within the western Dakotas (Figure 20b).

STATUS:
The greater sage-grouse is a local, rare to uncommon resident in the NGPJV area, being most numerous in north-central and southeastern Montana (Figure 20b).

Sauer et al. (2012) report that the Breeding Bird Survey shows statistically significant declines for the greater sage-grouse, both range-wide (-3.4% per year 1966-2010 and -1.9% per year 2000-2010) and in BCR 17 (-7.7% per year 1966-2010 and -12.8% per year 2000-2010).

HABITAT:
The greater sage-grouse uses sagebrush habitat, particularly that dominated by big sagebrush (Schroeder et al. 1999). The use of agricultural habitats such as alfalfa (*Medicago sativa*), wheat (*Triticum* spp.), and crested wheatgrass (*Agropyron cristatum*) depends on those sites' positioning within native habitats. Wet meadow and riparian habitats are often important during brood-rearing. Nests are built on the ground, typically underneath a sagebrush plant. In winter, greater sage-grouse subsist on sagebrush leaves, especially those of the Wyoming big sagebrush. During other seasons sage-grouse consume forbs and insects (DeGraaf et al. 1991).

MANAGEMENT:
The preservation of unfragmented landscapes dominated by big sagebrush is critical for greater sage-grouse management (Connelly et al. 2004, Paige and Ritter 1999, Rowland 2004); this might involve use of conservation easements (Davies et al. 2011). Connelly et al. (2000) recommend that mesic sites that are to be managed for sage-grouse breeding and brood-rearing have a sagebrush canopy of 10% or 15% to 25%, with the height of that canopy being 16" to 31" (40 cm to 80 cm). Canopy coverage should be at least 15% for perennial grasses and 10% for forbs. Breeding habitat can often be improved by implementing prescribed grazing to better ensure retention of adequate grass cover for nesting and brood rearing; protection or restoration of riparian areas and wet meadow habitats can benefit sage-grouse broods. Prescribed fire can be used to diversify shrub age and structural classes, or increase grass cover. Habitat restoration may entail seeding or transplanting big sagebrush (Pyke 2011). Other ongoing management efforts include: reducing collision risk by moving or marking fences near areas of high use by greater sage-grouse (Stevens et al. 2012) and increasing habitat suitability by removing encroaching conifers.

INFORMATION NEEDED:
Critical information needs for greater sage-grouse management include: a population monitoring system; identification of priority lands on which to concentrate conservation efforts, and determination of the causal mechanisms that affect the growth and density of Wyoming big sagebrush on the eastern edge of the greater sage-grouse's range.

ACTION NEEDED:
There is a variety of ongoing conservation planning and implementation efforts aimed at benefiting greater sage-grouse. The NGJPV should participate with these efforts, with special emphasis on management to reduce the fragmentation and loss of Wyoming big sagebrush.

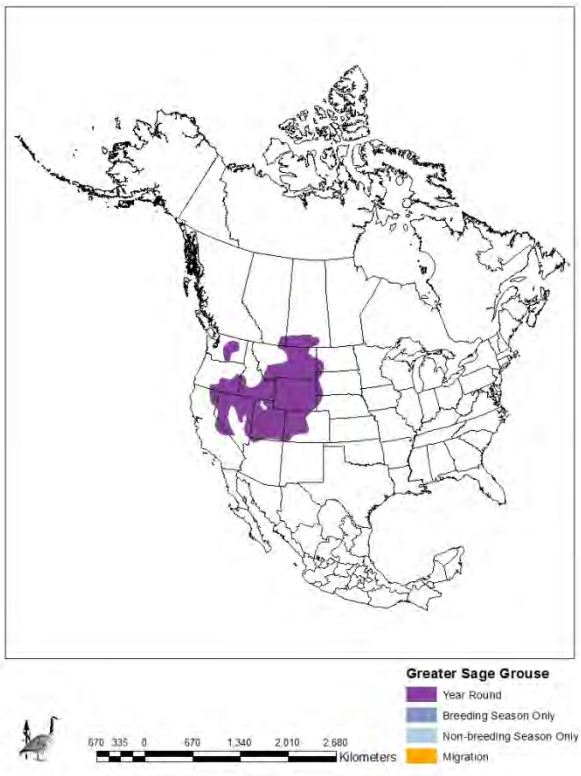
NOTES:
This species has garnered the most attention of the NGPJV's priority species in recent years (see for example: Stiver et al. 2006, Knick and Connelly 2011). Public lands, particularly those managed by the U.S.D.I. Bureau of Land Management, are key to the future sustainability of greater sage-grouse populations. That agency administers >50% of sage-grouse habitat (Connelly et al. 2004). Other state and federal land ownerships account for an additional 20%. Private, tribal and other non-public lands comprise about 25% of the habitat.

Birds which we considered likely members of the greater sage-grouse guild include, but are not limited to those listed for the Brewer's sparrow, i.e. Brewer's blackbird, Brewer's sparrow, golden eagle, lark bunting, sage sparrow, sage thrasher, vesper sparrow, and western meadowlark. The NGPJV area is mostly encompassed by "Sage-Grouse Management Zone I-Great Plains" (Sage- and Columbian Sharp-tailed Grouse Technical Committee 2008). One of the sage grouse conservation efforts is the "Sage Grouse Initiative", begun by the USDA NRCS (for details see http://www.sagegrouseinitiative.com/. Local research has included, but has not

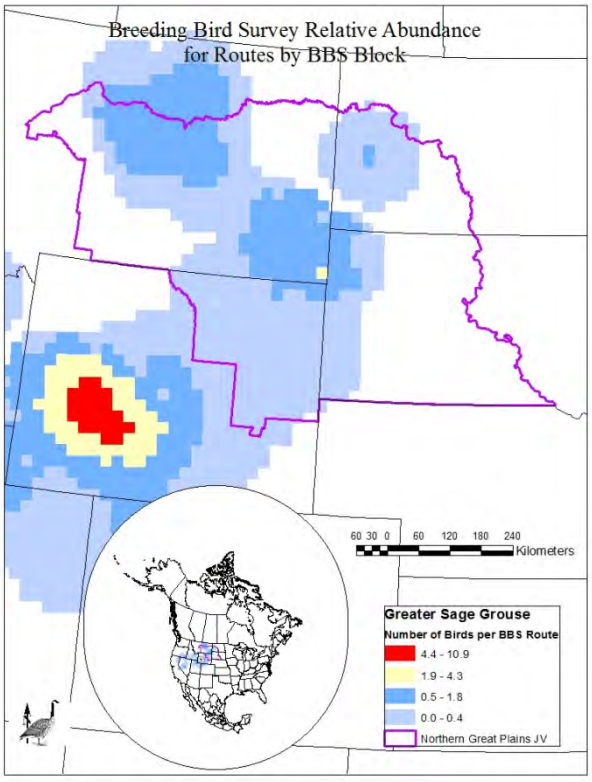
been limited to: Doherty et al. 2008, Eustace 2002, Kaczor 2008, Smith et al. 2005, and Walker et al. 2007.

Figure 20. Distribution maps of the greater sage-grouse in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



LARK BUNTING

Figure 21. Lark bunting.

PRIORITY TYPE:
Area Importance, Conservation.

RATIONALE:
The NGPJV area is the core breeding habitat for the lark bunting (Figure 21), a rapidly declining species. BCR 17 has a relative density score of 5, with 48% of the population nesting there (Blancher et al. 2007, Partners in Flight 2005). Although the BCR 17 population trend score was 3 (Partners in Flight 2005), we still identified this species as one of conservation concern due to the statistically significant declines found by the Breeding Bird Survey (see below).

DISTRIBUTION:
The breeding distribution of the lark bunting is limited to the Great Plains (Figure 22a). Wintering birds occur in the southern-most Great Plains, south into central Mexico. Lark buntings occur throughout the NGPJV area (Figure 22b).

STATUS:
Lark buntings are uncommon to abundant, but irruptive and irregular, throughout the NGPJV area (Figure 22b). They are present on the breeding grounds from May through August. Bird presence and density is dictated by prevailing vegetative conditions in any given year.

BCR 17 is extremely important to lark buntings, supporting an estimated 13,000,000 birds (Blancher et al. 2007). Rocky Mountain Bird Observatory (2012) estimated that there was an average of 6,793,000 lark buntings in BCR 17, 2009-2011.

The Breeding Bird Survey from 1966-2009 found an average annual population change of -5.7%; for the 1999-2009 period, that rate was -9.7% (Sauer et al. 2011). The population decline was also evident in BCR 17, averaging -3.9% and -9%, respectively.

HABITAT:
Within the NGPJV area, the lark bunting prefers grassland with short and tall grasses and scattered shrubs (Dechant et al. 2003f, Shane 2000). They also nest in cropland and hayland. Finch et al. 1(1987) described optimal habitat as having less than 10% bare earth, 10% to 30% shrub cover, and 60% to 90% grass cover, with grass height averaging 3" to 8" (7.5cm to 20cm). Lark buntings nest on the ground, typically hiding the nest under protective vegetation. This

species forages on the ground for weed and grass seeds and insects, especially grasshoppers (DeGraaf et al. 1991).

MANAGEMENT:
The conservation of unfragmented tracts of grassland is critical to the conservation of lark buntings (Dechant et al. 2003f, Shane 2000). Existing grasslands should be managed to produce the preferred vegetative structure. Light to moderate grazing should be used in shortgrass habitats to avoid the creation of excessive bare ground. Conversely, intense livestock grazing can be used to improve habitat suitability in areas where tall grasses predominant. In areas where haylands are used by nesting birds, mowing should be delayed until August 1. Prescribed fire should not be used where it would result in great reductions of shrub cover, as sites with a shrub and brush component are preferred by the lark bunting.

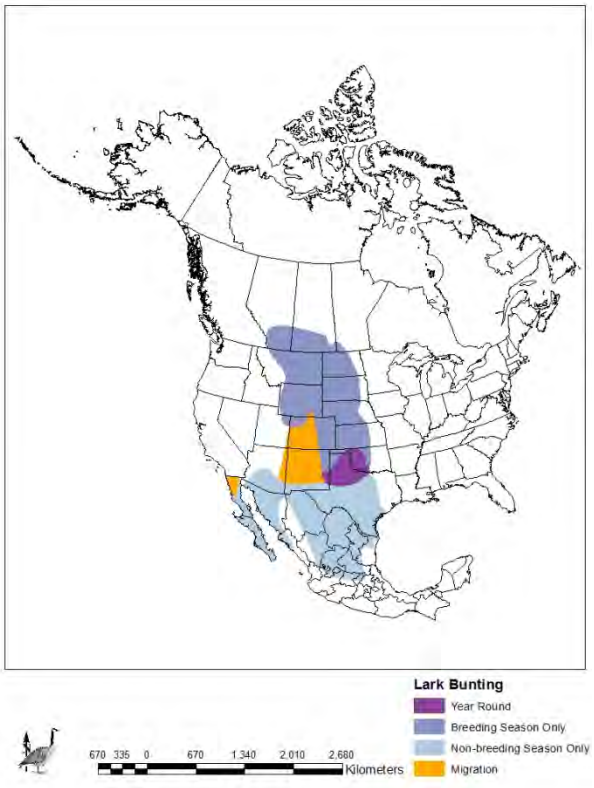
INFORMATION NEEDED:
Shane (2000) pointed out that research is needed regarding the lark bunting's: molts, plumages, mating systems, dominance hierarchies, and winter ecology.

ACTION NEEDED:
Conservation of grasslands, both native and tame, is the most urgent need for lark bunting conservation; the use of grassland easements for this purpose should be pursued. Management of existing grassland tracts should focus on providing adequate vegetative structure. Management for the lark bunting's preferred habitat structure might be facilitated by numerous programs that provide help with establishing prescribed grazing regimes. These include, but are not limited to those through the USDA Natural Resource Conservation Service and the USDI Fish and Wildlife Service's Partners for Wildlife program.

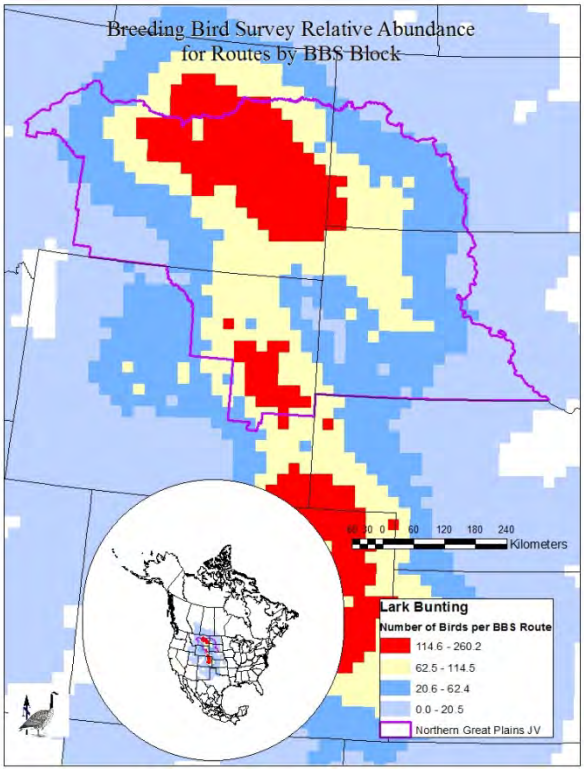
NOTES:
This large sparrow is unusual in several aspects (Shane 2000). These include its: nomadic nature within its breeding and wintering areas, sexual dimorphism, the male's striking alternate plumage, and the male's use of two different flight songs.

Figure 22. Distribution maps of the lark bunting in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



LOGGERHEAD SHRIKE

Figure 23. Loggerhead shrike.

PRIORITY TYPE:
Conservation.

RATIONALE:
The loggerhead shrike (Figure 23) has a population score of 3 (Partners in Flight 2005). However, the species is declining in many areas of its range. Because of this fact, we identified this species being of conservation concern despite its relatively low population score.

DISTRIBUTION:
The range of loggerhead shrikes is extensive, extending across much of central and southern North America (Figure 24a). Loggerhead shrikes are migratory in the northern portion of their range, including the NGPJV area. Birds from the northern Great Plains are suspected to winter in the southwestern U.S. and Mexico (Wiggins 2005). The species is widespread in the NGPJV area (Figure 24b).

STATUS:
Loggerhead shrikes are uncommon to rare throughout the NGPJV area (Figure 24b), where they are present from April through September. About 230,000 shrikes, or about 6% of the continental population, occur in BCR 17 (Blancher et al. 2007). The Rocky Mountain Bird Observatory (2012) estimated that there was an average of 222,000 loggerhead shrikes in BCR 17, 2009-2011.

Range-wide, the Breeding Bird Survey data (Sauer et al. 2011) indicate significant annual population changes of -4.5% per year during 1966–1979, and -2.6% per year during 1980-2002. Within BCR 17, the population changed an average of -1.0% per year during 1966-2009, and -1.5% per year during 1999-2009.

HABITAT:
Loggerhead shrikes inhabit open grasslands with scattered trees and shrubs, woody edges, hedgerows, and open woodlands, with interspersed cropland (Dechant et al. 2003g, Yosef 1996). Foraging areas are comprised of open, short vegetation with some relatively bare areas; intermingled areas of heavier vegetation likely function as important sources of the shrike prey. Scattered trees, shrubs, or low bushes are used for nesting, with a preference for woody vegetation that provides concealment (foliage density) and defense (thorns) to the nest. Elevated perches such as trees and fences are used for hunting and courtship activities. Birds use barb-wire fences and thorns to impale invertebrate and small vertebrate prey. Most prey items are

taken on the ground; the shrike's diet consists mostly of grasshopper and crickets, although a variety of other insects, as well as small birds, mammals and reptiles are also taken (DeGraaf et al. 1991).

MANAGEMENT:
Dechant et al. 2003 summarized available literature on this species. Overall, habitat management guidelines include: maintaining scattered trees and shrubs in pastures and fields as well as limiting grassland and shrubland conversion. Another recommendation include using prescribed mowing, burning, and grazing to maintain a mosaic of herbaceous vegetative structure, as taller grass areas often support high prey density, whereas prey vulnerability is often highest in short grass areas. Limitation of the use of biocides, especially the use of insecticedes during the nesting season, would also benefit loggerhead shrikes.

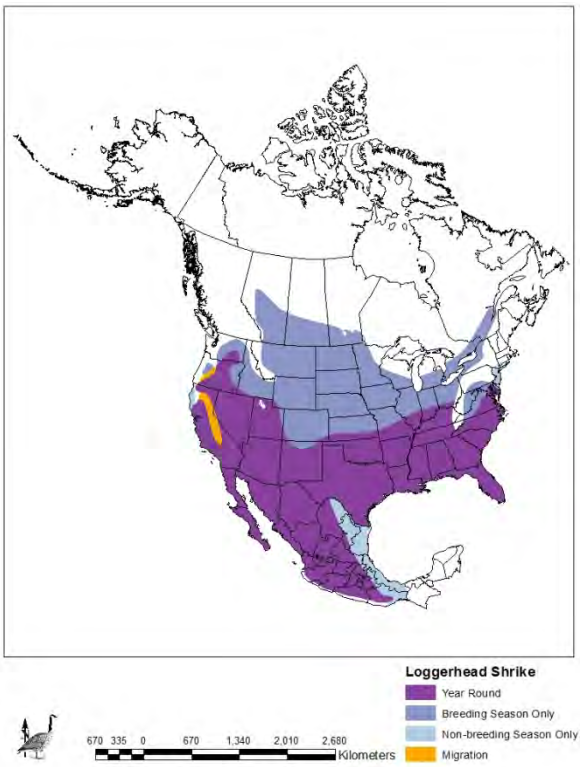
INFORMATION NEEDED:
More information is needed on this species' ecology to understand its habitat needs, productivity, and population demographics (Yosef 1996). Studies investigating factors influencing habitat suitability for nesting, foraging, and survival are needed to help direct management and conservation actions. Specific issues include: evaluation of the effect of livestock on the shrike's foraging ecology; influence of landscape composition and habitat fragmentation on shrike territory size and reproductive success; identification of any local-scale differences in nest productivity; evaluation of the impact of vehicle/shrike collisions; and identification of locations suitable for the establishment of shrike monitoring areas. Studies on the impacts of pesticides (e.g., grasshopper control) on loggerhead shrikes survival and reproduction are still needed on both breeding and wintering areas. Identification of the migration and wintering areas for birds breeding in the northern Great Plains would help clarify the nature of demographic threats (e.g. overwinter survival vs. reproduction).

ACTION NEEDED:
NGPJV efforts should focus on maintaining grassland areas, both tame and native. Programs designed to implement prescribed grazing should be supported, as should efforts to protect or expand existing native trees and shrubs (especially thorny species).

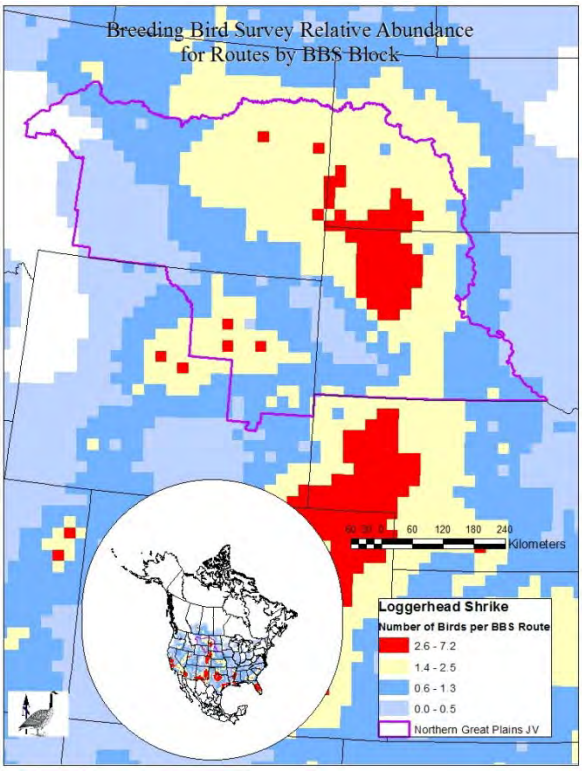
NOTES:
Loggerhead shrikes typically occur at relatively low densities on Breeding Bird Survey routes; therefore, statistical power is relatively low and survey results are difficult to interpret. The decline at the continental scale is clear, but trends at BCR and state levels are uncertain.

Figure 24. Distribution maps of the loggerhead shrike in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



LONG-BILLED CURLEW

Figure 25. Long-billed curlew.

PRIORITY TYPE:
Conservation.

RATIONALE:
The long-billed curlew (Figure 25) is classified as highly imperiled; it has a priority score of 5 for BCR 17 (U.S. Shorebird Conservation Plan 2004).

DISTRIBUTION:
The long-billed curlew's current breeding range extends from southwestern and south-central Saskatchewan, south through the western Great Plains to the Texas panhandle, and west through Nevada and eastern California (Figure 26a). Most birds winter in coastal areas of central California, Texas, and Mexico; though birds are also present at inland locations. Long-billed curlews are widespread, but local in the NGPJV area (Figure 26b)

STATUS:
Long-billed curlews are generally uncommon to rare, and very local, within the NGPJV area; they are most regularly found there in central Montana and southwestern South Dakota (Figure 26b). The species is present in the NPGJV area, from April to August.

Morrison et al. (2006) estimated a total population of 55,000 to 123,500 long-billed curlews. Based on field surveys in 2004 and 2005, Jones et al. (2008) estimated a total world population of 161,181 individuals. The IMBCR effort estimated an average of 74,496 long-billed curlews within BCR 17 from 2009-2011 (Rocky Mountain Bird Observatory 2012). Note: these two survey methods are not directly comparable (i.e. it is inappropriate to assume that 46% [74,496/161,181] of all curlews nest in BCR 17).

Breeding Bird Survey data indicate moderate long-term (1966-2009) and short-term (1999-2009) increases in long-billed curlew populations, both range-wide, and within BCR 17 (Sauer et al 2011).

HABITAT:
Long-billed curlews use a variety of habitats (Dechant et al. 2003h, Dugger and Dugger 2002). Within the NGPJV area, long-billed curlews are most closely associated with relatively flat, extensive areas of short, native grassland. Curlews also will nest in cropland and in fallow fields. In Wyoming, preferred nesting habitat is a complex of short-grass prairies, agricultural fields, wet and dry meadows, and grazed mixed-grass and scrub habitat (Cochrane and Anderson

1987). In South Dakota, nest sites were in native mixed-grass prairie of short cover and low shrub cover (Clarke 2006). The nest itself is placed on the ground.

Beetles, grasshoppers, and caterpillars provide the bulk of the long-billed curlew's diet during the seasons they are within the NPGJV area. During the remainder of the year, long-billed curlews consume mud crab, fiddler-crab, ghost shrimp, small fish, and berries (DeGraaf et al. 1991).

MANAGEMENT:
Breeding long-billed curlew habitat management is based on preserving native prairie, particularly tracts 250 acres (>100 ha) in size (Dechant et al. 2003h, Dugger and Dugger 2002). Site management should focus on providing the bird's preferred vegetative structure and a diverse community of native graminoid and forb species (Clarke 2006). This requires controlling invasive vegetation and using grazing, haying, and/or periodic burning to provide a mix of cover conditions for nesting (short cover) and brood-rearing (taller, heterogeneous cover). Grazing pressure should be adjusted to local site conditions, i.e. more grazing should occur in productive mesic areas, less grazing should occur in unproductive xeric areas (see Kantrud and Kologiski 1982). At occupied nesting areas, vegetative management activities should occur outside of the curlew's peak nesting and early brood-rearing season (Clarke 2006). This corresponds to early May until early July in North Dakota (Stewart 1975), mid-May to late July in southwest Wyoming (Cochran and Anderson 1987), and 10 April to 25 June in South Dakota (Clarke 2006). Shrub and tree plantings should be discouraged in or adjacent to long-billed curlew habitat.

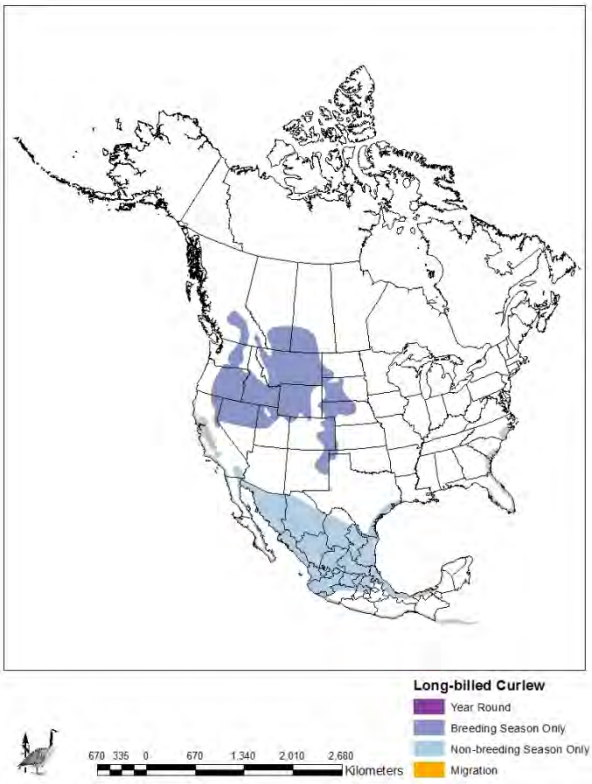
INFORMATION NEEDED:
Better information is needed on the long-billed curlew population status and trends, as well as the species' response to specific habitat management efforts (Fellow and Jones 2009). More should be learned regarding adult survival rates, as that factor likely drives the species' population trends (Dugger and Dugger 2002). See also Skagen and Thompson 2000.

ACTION NEEDED:
The most urgent need for long-billed curlew conservation in the NGPJV area is protection of native grassland habitats throughout its breeding range.

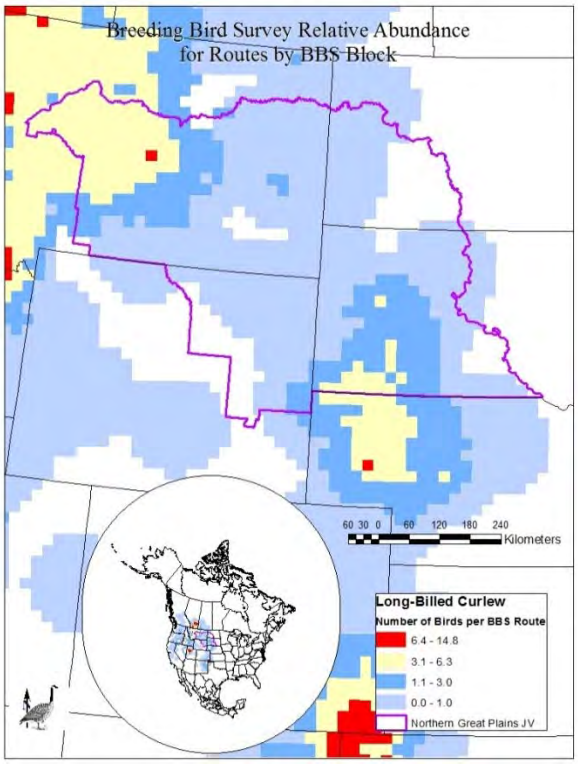
NOTES:
Although breeding Breeding Bird Survey data have been used to assess population trends for the long-billed curlew, those data may be biased low as surveys are typically conducted in June, a time when long-billed curlews are largely inconspicuous because of incubating and early brood-rearing behaviors. The long-billed curlew was assigned an Area Importance score of 3 for BCR 17 (U.S. Shorebird Conservation Plan, undated). Stanley and Skagen (2007) suggested that the long-billed curlew's classification as highly imperiled be revisited.

Figure 26. Distribution maps of the long-billed curlew in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



MALLARD

Figure 27. Mallard.

PRIORITY TYPE:
Focal Species, Guild Representative.

RATIONALE:
The mallard (Figure 27), a popular gamebird, is of particular interest to several NGPJV partners. It was designated as a "species of continental importance" by the North American Waterfowl Management Plan (U.S. Department of the Interior and Environment Canada 1986). The mallard is used in this document as a guild representative for wetland habitat.

DISTRIBUTION:
The mallard occurs throughout the world, including most of North America (Figure 28a), and all of the NGPJV area (Figure 28b). Birds that depart the NGPJV during winter go primarily to the area from Mississippi and Arkansas west to Colorado and Texas.

STATUS:
The mallard is common to abundant in the NGPJV area (Figure 28b). It can be found within the NGPJV area year-around, though wintering occurs only where food and open water are available. Elsewhere within the NGPJV area, the species is present March to November.

The Breeding Bird Survey provides a poor index to mallard populations compared to the Waterfowl Breeding Population and Habitat Survey (commonly referred to as the May BPOP Survey), which was designed specifically for breeding waterfowl. The survey includes the western Dakotas and eastern Montana in an area that largely coincides with the boundaries of the NGPJV in those three states. Mallard abundance is closely associated with wetland abundance, with higher mallard numbers in years with abundant wetlands. The mallard estimate varies widely and has ranged from 354,000 to 1,068,000 since 1998; overall, about 5% to 7% of North America's mallard breed in the NGPJV area. The mallard breeding population estimate for the May BPOP in the Montana and Western Dakota region for 2011 was 837,000 which was a 57% increase over 2010 and 67% above the long-term (1955-2010) average of 501,000 (U.S.D.I. Fish and Wildlife Service 2011). Population estimates generated through the IMBCR program was that there was an average population of 1,149,000 mallards within BCR 17 from 2009 – 2011 (Rocky Mountain Bird Observatory 2012).

HABITAT:
Mallards use a variety of wetland types through the year (Drilling et al. 2002). During the breeding season, freshwater wetlands with some emergent vegetation are preferred, although mallards are more tolerant of open water and bare shores than most dabbling ducks (Bellrose 1976). In the NGPJV area, many of the wetlands used for breeding are stock ponds and small reservoirs associated with ranching; these are often very productive habitats (e.g. Ball et al. 1995). Mallards, which are early nesters, are aided by shallow water that warms early in the spring, producing invertebrates, including snails. The availability of invertebrates is an important determinant of subsequent breeding success. Mallards prefer upland nest sites within a quarter mile (0.4 km) of water, although both more distant sites and sites marshes are used on occasion. Dense nesting cover about 24 inches (61 cm) high is preferred in some areas, but small areas of good cover often have a lower nest success rate than large areas with poorer quality nesting cover due to predation. Throughout the year, mallards feed on insects and larvae, aquatic invertebrates, seeds, aquatic vegetation, agricultural crops, and mollusks (Bellrose 1976).

MANAGEMENT:
Habitat management for mallards entails protection, creation, and restoration of a diversity of wetlands and large tracts of grassland nesting cover. Management of existing wetlands includes providing sufficient water for brood-rearing, maintaining at least some emergent vegetation for pairs and broods, and providing sufficient residual herbaceous cover for nesting in spring. Optimally, disturbances (mowing, grazing, prescribed burning, etc.) should occur outside of the peak breeding season, which occurs early April to mid-July.

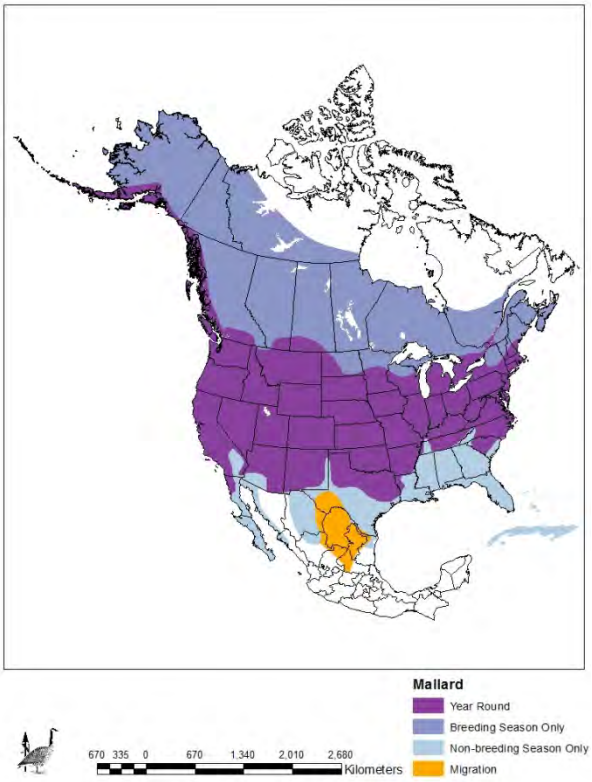
INFORMATION NEEDED:
Completion of the National Wetlands Inventory data for eastern Montana will help identify areas lacking appropriate wetland habitat. The ability of the NGPJV area to function as a "source" population under a range of climatic conditions should be better determined.

ACTION NEEDED:
The most important actions for mallard conservation in the NGPJV area include: creation and enhancement of stock ponds and support of wide-reaching policies (such as in the U.S. Farm Bill) that facilitate wetland and grassland conservation.

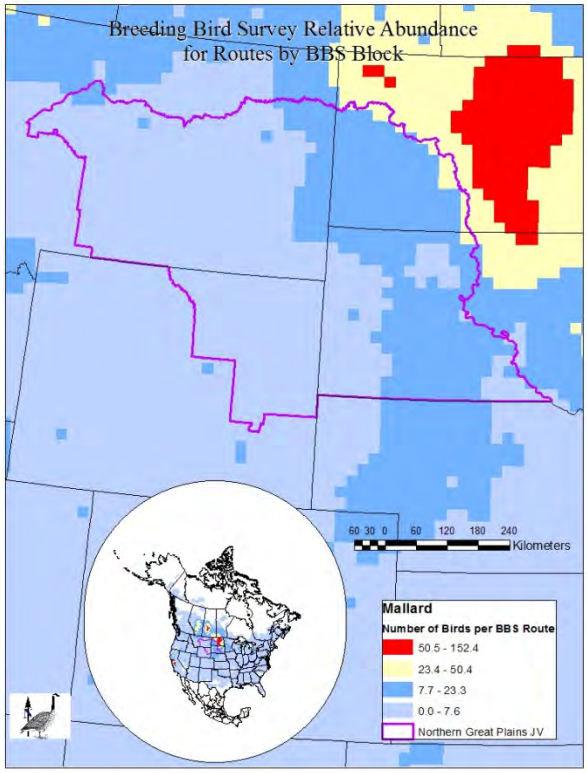
NOTES:
The projected loss of Conservation Reserve Program (CRP) acreage and the continued conversion of grasslands to crops are likely to cause significant population declines in the near future for this species. Birds which we considered likely members of the mallard guild include, but are not limited to: a wide variety of nesting and migrating waterfowl (including northern pintail), migrating shorebirds, and red-winged blackbird (*Agelaius phoeniceus),* wilson's phalarope, and yellow-headed blackbird (*Xanthocephalus xanthocephalus*).

Figure 28. Distribution maps of the mallard in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



MARBLED GODWIT

Figure 29. Marbled godwit.

PRIORITY TYPE:
Area Importance.

RATIONALE:
The northern Great Plains, including part of the NGPJV area, forms the core of the marbled godwit's (Figure 29) breeding range. BCR 17 has an area importance score of 5 for the species (U.S. Shorebird Conservation Plan, undated).

DISTRIBUTION:
The marbled godwit nests in the northern Great Plains (Figure 30a). Isolated populations nest on the Alaska Peninsula and along the southwest shore of James Bay. Marbled godwits winter along the Atlantic, Gulf, and Pacific coasts of North America. In the NGPJV area, the species is found in the northern and eastern portions (Figure 30b).

STATUS:
In the NGPJV area, marbled godwits are local and uncommon nesters (Figure 30b). The species is typically present from April into October.

Marbled godwit populations rangewide changed by an annual average of -0.3%, 1966-2009, and +0.8%, 1999-2009, though these changes were not deemed statistically-significant (Sauer et al. 2011). Populations within Bird Conservation Region 17 increased significantly during both periods. Annual population changes there averaged +6.5% and +9.9%, respectively. Morrison et al. (2006) estimated a total rangewide population of 170,000 marbled godwits.

HABITAT:
During the breeding season, marbled godwits require a mix of wetlands and grasslands (Gratto-Trevor 2000). They prefer areas with a diversity of wetland types (i.e. temporary, seasonal, and semi-permanent). Native grasslands are preferred, though tame-grass pastures are used. Short, sparse to moderately vegetated uplands are used for nesting. In North Dakota, birds preferred nesting in vegetation <6" (15cm) in height (Higgins et al. 1979). Broods use taller (i.e. 6" to 24", 15cm to 60 cm), denser grass cover than did nesting pairs (Ryan et al. 1984). Marbled godwits consume a variety of invertebrate species captured in upland or wetland habitats; they most often forage in water a few inches (several cm) deep (DeGraaf et al. 1991). Plant tubers are used heavily during migration (Gratto-Trevor 2000).

MANAGEMENT:
Management of marbled godwit breeding habitat requires the conservation of large tracts of native grassland containing a diversity of wetlands. Site management should focus on providing the bird's preferred vegetative structure by use of prescribed burning, mowing, and/or grazing. More productive areas will require greater use of these tools. In occupied nesting areas, disturbance should occur outside of the May/June period. Seasonal and semipermanent wetlands should be managed to provide a mix of open (i.e. bare) and emergent vegetated shorelines for broods. Staging birds will benefit from provision of large, shallow wetlands with extensive unvegetated shorelines and/or islands (Gratto-Trevor 2000).

INFORMATION NEEDED:
Little is known of differing breeding success and survival of birds using native versus tame grasslands (Gratto-Trevor 2000). In addition, demographic data is largely lacking regarding marbled godwits. See also Skagen and Thompson 2000.

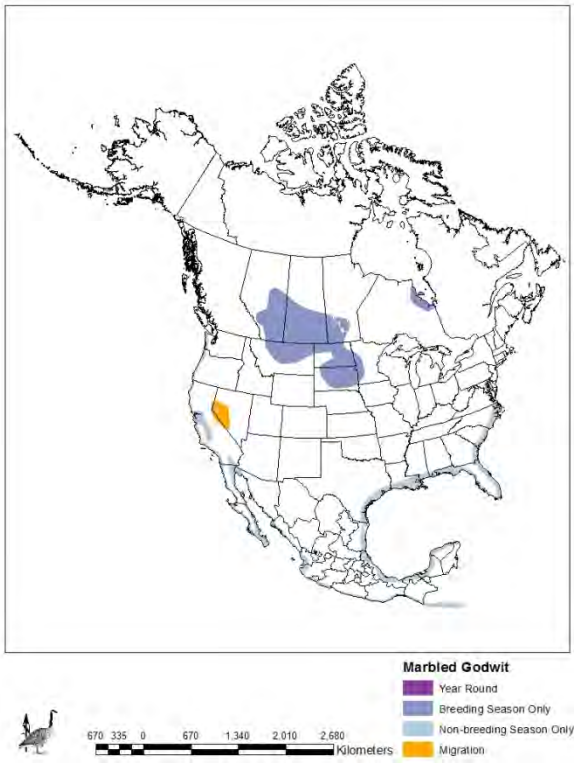
ACTION NEEDED:
Identification and protection of important staging areas within the NGPJV area should be immediately pursued, keeping in mind that locations may vary with the wet-dry cycle. Landowners and managers of large tracts of grassland/wetland complexes should be encouraged to provide suitable vegetative structure. Marbled godwit habitat needs should be planned for when designing created wetlands throughout the NGPJV area.

NOTES:
The marbled godwit was classified as a species of high concern in the U.S. Shorebird Conservation Plan (2004); it has a population trend score of 4. We did not identify this species as one of conservation concern however, due to contrasting population trend data for the area developed by the Breeding Bird Survey (see above).

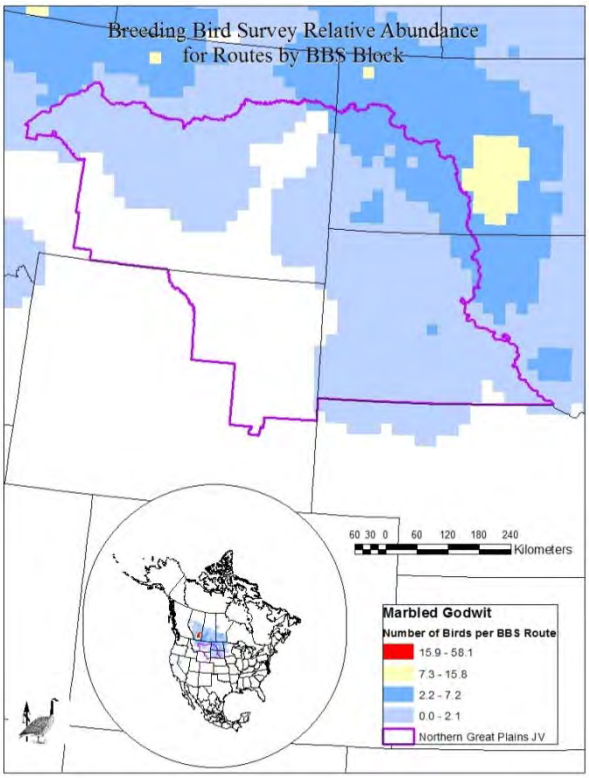
In late June, the number of adults frequenting staging areas in the NGPJV increases quickly. It is unknown how many of these birds represent non-breeders vs. failed breeders vs. adults who have abandoned their young. Olson (2011) equipped 28 marbled godwits with satellite transmitters to better understand the birds' movements between breeding and wintering areas.

Figure 30. Distribution maps of the marbled godwit in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



McCOWN'S LONGSPUR

PRIORITY TYPE:
Area Importance, Guild Representative.

Figure 31. McCown's longspur.

RATIONALE:
The McCown's longspur (Figure 31) is a Great Plains endemic. BCR 17 has a breeding distribution score of 5 for this species; an estimated 13% of the population nests there (Blancher et al. 2007, Partners in Flight 2005). This species is closely associated with shortgrass prairie and is used in this document as a guild representative for that habitat.

DISTRIBUTION:
The McCown's longspur's breeding range extends from southeastern Alberta to northern Colorado (Figure 32a). Breeding birds are mostly concentrated in two general areas: southwestern Saskatchewan/central Montana and southeastern Wyoming/northern Colorado. Wintering birds occur mostly in the Texas and Oklahoma Panhandles, southern New Mexico, and north-central Mexico. Within the NGPJV area, this species is mostly limited to central Montana and southeastern Wyoming (Figure 32b). A few scattered pairs occur in southwestern-most North Dakota.

STATUS:
McCown's longspurs are rare to locally uncommon within the occupied-portion of the NGPJV area (Figure 32b). McCown's longspurs are on the breeding grounds from early to mid-April into October. An estimated 150,000 McCown's longspurs nest within BCR 17 (Blancher et al. 2007). Rocky Mountain Bird Observatory (2012) estimated that there was an average of 133,000 McCown's longspurs in BCR 17, 2009-2011.

Breeding Bird Survey data for this species are neither statistically significant nor reliable, but show modest long-term (-1.5%) and short-term (-1.2%) declines (Sauer et al. 2011). A more holistic assessment of the species' short-term and long-term population trends, however, concluded that the species has declined dramatically since 1900 (see With 2010 for details).

HABITAT:
McCown's longspurs are shortgrass specialists (Dechant et al. 2003j, With 2010). They use habitats such as grazed shortgrass prairie, very heavily grazed mixed-grass prairie, prairie dog colonies, and summer fallow. Typical breeding habitat is a matrix of perennial shortgrass species, especially blue grama (*Bouteloua gracilis)* and buffalo grass (*Buchloe dactyloides*)

interspersed with cactus, such as plains prickly-pear (*Opuntia polyacantha*). Shrubs and mid-height and tall grasses are typically present in only low amounts, if at all, whereas bare earth is usually abundant. Nests are placed on the ground, often next to a grass clump, shrub, or fecal pat. McCown's longspurs forage on the ground for weed and grasses seeds and insects, particularly grasshoppers (DeGraaf et al. 1991).

MANAGEMENT:
Management is focused on preserving and restoring native short-grass prairie (With 2010). Management of existing habitat consists of providing this species' preferred habitat structure. In the more mesic portions of the breeding range (such as in the NGPJV area), McCown's longspur habitat is provided by heavily grazed season-long pastures and black-tailed prairie dog colonies. Summer fallow is also used. Although implementation of prescribed grazing systems would benefit many grasslands specialists (example: Baird's sparrow), they are likely to harm McCown's longspurs by increasing overall vegetative height and vigor, evening-out grazing pressure, and decreasing the extent of bare earth. Similarly, no-till conservation, use of cover crops, and other soil conservation methods, which are no doubt of benefit to many birds, likely degrade a site's suitability to McCown's longspurs compared to traditional summer fallowing. Past fire suppression may have degraded current habitat quality for McCown's longspur, suggesting that prescribed burning may benefit the species.

INFORMATION NEEDED:
Little is known of the McCown's longspur's migration or wintering habitat or ecology. With (2010) recommended conducting a population viability analysis, based on demographic data. Such an effort should focus on determining source-sink dynamics by gathering information on productivity, and adult and juvenile survivorship. This would likely require a multi-year investigation of a banded population.

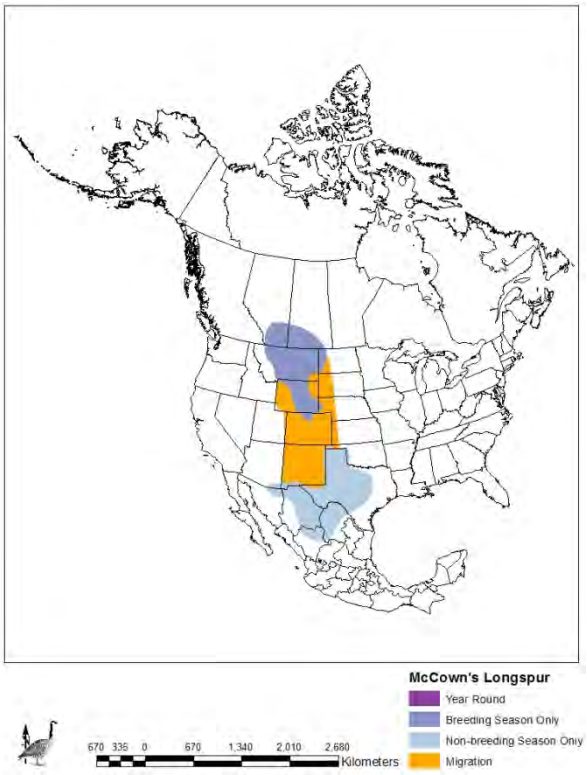
The primary causes of this species' evident decline are still poorly understood (With 2010). Little is known of the particulars of land management (grazing management, fire management, pesticide use, cultivation practices, etc.). Once such details are known, more specific management recommendations should be developed.

ACTION NEEDED:
Conservation of prairie dog colonies should be encouraged. Habitat requirements for McCown's longspurs should be considered when prescribed grazing systems are implemented within occupied habitat.

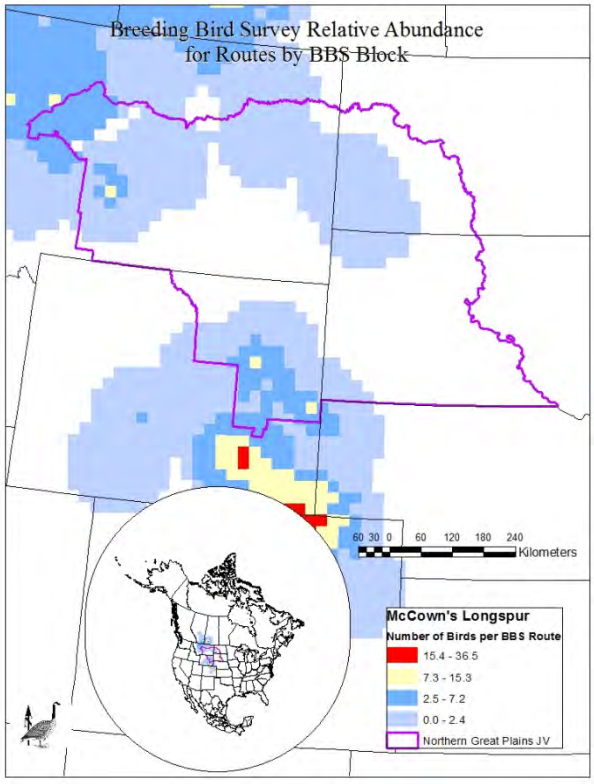
NOTES:
Birds which we considered likely members of the McCown's longspur guild include, but are not limited to: chestnut-collared longspur, ferruginous hawk, horned lark, long-billed curlew, mountain plover, and vesper sparrow.

Figure 32. Distribution maps of the McCown's longspur in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



MOUNTAIN PLOVER

Figure 33. Mountain plover.

PRIORITY TYPE:
Conservation, Guild Representative.

RATIONALE:
The mountain plover (Figure 33) is classified as highly imperiled (U.S. Shorebird Conservation Plan 2004). It has a population trend score of 5. This species is closely associated with shortgrass prairie and is used in this document as a guild representative for that habitat.

DISTRIBUTION:
The mountain plover's breeding range extends from southeastern-most Alberta to southwest Texas (Figure 34a). Wintering birds occur throughout a wide area from north-central California to the Gulf Coast of Tamaulipas. In the NGPJV area, mountain plover are restricted to central Montana and northeast Wyoming (Figure 34b).

STATUS:
Within the NGPJV area, mountain plovers are rare and local in eastern Montana and eastern Wyoming (Figure 34b). They are extirpated from the western Dakotas (Stewart 1973, Tallman et al. 2002). Mountain plovers are present on their breeding grounds from April to August.

The mountain plover has declined by at least 66% in recent decades (Knopf and Wunder 2006). The Breeding Bird Survey estimated an average annual change of -2.6%, 1966-2009; the average annual change was -1.1%, 1999-2009 (Sauer et al. 2011). No data are available specific to BCR 17 (Sauer et al. 2011). Morrison et al. (2006) estimated a total rangewide population of 12,500 individuals.

HABITAT:
Mountain plovers prefer open, xeric, level lands dominated by very low-structure vegetation (Dechant et al. 2003k, Knopf and Wunder 2006). A high percentage of bare earth is necessary. In some areas, including southwest Kansas, southeast Colorado, northeast New Mexico, and in the Oklahoma and Texas panhandles, mountain plovers nest in active agricultural fields, such as those planted to milo (*Sorghum bicolor*). Throughout its range, the mountain plover uses black-tailed prairie dog colonies, and in some areas (such as eastern Montana) is highly reliant on that habitat. Nests are placed on the ground. Grasshoppers, crickets, beetles, and flies (*Diptera*) are the primary prey items of the mountain plover (DeGraaf et al. 1991).

MANAGEMENT:
Current management activities intended to benefit mountain plovers include: maintaining and expanding prairie dog colonies, conducting nest-clearance surveys in active agricultural fields, and using prescribed burns in suitable breeding habitat (Dechant et al. 2003k, Knopf and Wunder 2006, Svingen and Giesen 1999). A recent study (Augustine and Derner 2012) pointed out that black-tailed prairie dog colonies and recently burned sites provided better mountain plover habitat than did areas heavily grazed by livestock.

INFORMATION NEEDED:
Research priorities include: development of standardized monitoring methods on both breeding and wintering grounds, identification of important wintering ground, and determination of the effects of different livestock grazing practices and energy development (Knopf and Wunder 2006). See also Skagen and Thompson 2000.

ACTION NEEDED:
The most urgent actions needed within the NPGJV area for mountain plover conservation are: 1) maintaining and expanding black-tailed prairie dog colonies, and 2) conducting prescribed burns in suitable habitat.

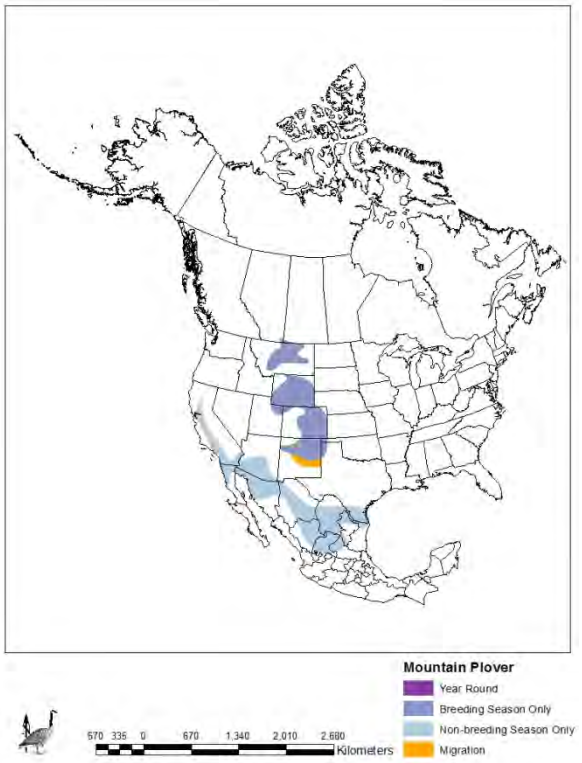
NOTES:
Although the mountain plover is a moderate-sized bird (i.e. ~9" total length, and ~100 grams in mass) which frequents wide-open spaces with very low vegetation, it can be surprisingly hard to see, earning it the nickname "prairie ghost".

Birds which we considered likely members of the mountain plover guild are the same as those listed for the McCown's longpsur guild and include, but are not limited to: chestnut-collared longspur, ferruginous hawk, horned lark, long-billed curlew, McCown's longspur and vesper sparrow.

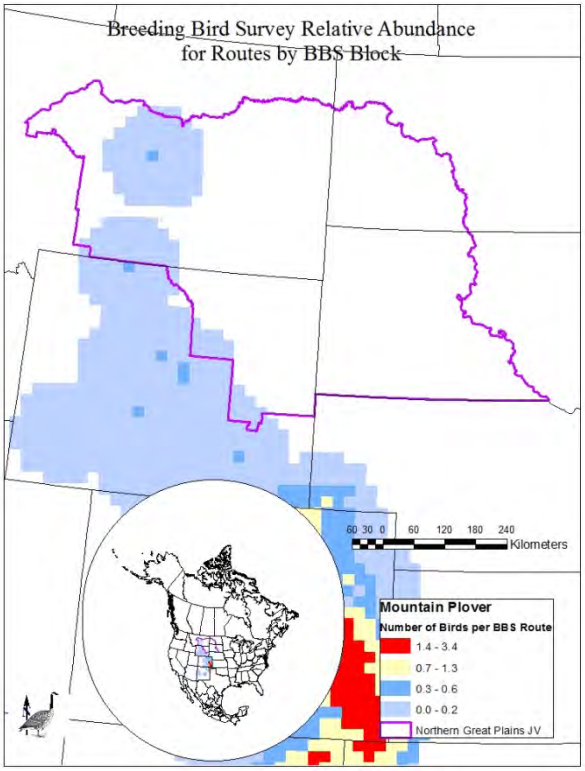
Roosevelt (1885) noted: "A more curious bird than any of these is the plains plover [a.k.a. mountain plover], which avoids the water and seems to prefer the barren plateaus and almost desert-like reaches of the sage-brush and alkali. Plains plovers, are pretty birds and not at all shy. In all, they are fat and good eating, but they are not plentiful enough to be worth going after.....Last spring one pair nested in a broken piece of Bad Lands near my ranch [in present-day Billings County, ND], where the ground is riven and twisted into abrupt, steep crests and deep canyons. The soil is seemingly wholly unfitted to support bird life, as it is almost bare of vegetation, being covered with fossil plants, shells, fishes, etc."

Figure 34. Distribution maps of the mountain plover in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



NORTHERN PINTAIL

PRIORITY TYPE:
Focal species, Guild Representative.

Figure 35. Northern pintail.

RATIONALE:
The northern pintail (Figure 35), a popular gamebird, is of particular interest to several NGPJV partners. It was designated as a "species of continental importance" by the North American Waterfowl Management Plan (US Department of the Interior and Environment Canada 1986). The northern pintail is used in this document as a guild representative for wetland habitat.

DISTRIBUTION:
The northern pintail is circumpolar in its distribution; it occurs throughout most of North America (Figure 36a), and all of the NGPJV area (Figure 36b). Wintering birds are found throughout southern North America.

STATUS:
Northern pintails are generally uncommon in the NGPJV area (Figure 36b). Bird numbers vary between years; the species is more abundant in wet years, less abundant in dry years. Northern pintail are present in the NGPJV area from March to November.

The continental population of northern pintails experienced a substantial decline from over 6 million birds in the 1970s, to a record low of 1.8 million birds in 2002 (Zimpfer et al. 2012). While numbers have since increased to 4.4 million in 2011, the number of northern pintails in North America remains below the goal of 5.6 million set by the North American Waterfowl Management Plan.

HABITAT:
Northern pintail breeding pair density is positively correlated with wetland area (Austin and Miller 1995). Nesting northern pintails favor shallow ephemeral to seasonal wetlands interspersed throughout prairie grasslands. They nest on the ground, sometimes far from water. This species will nest in sparser herbaceous cover than other dabblers, and is more likely to nest in stubble or fallowed fields. This practice makes them particularly vulnerable to subsequent field treatments (i.e. tillage, spraying, etc.). Pintail broods use seasonal to semipermanent wetlands with emergent cover. Northern pintails feed primarily in shallow waters and in grainfields. The most common items consumed are seeds of wetland plants and small grains. Northern pintail also take a variety of aquatic and semi-aquatic invertebrates (DeGraaf et al. 1991).

MANAGEMENT:
Northern pintail conservation is focused on preserving grasslands (especially native grasslands) and preserving, or restoring, wetlands (particularly seasonal wetlands). Existing grasslands (both native and tame) should be managed to provide at least some residual standing cover for nesting birds. The restoration or creation of wetlands is very useful to this species; grassland restoration can also be very beneficial if suitable wetlands are nearby. On active cropland, use of winter annuals (as opposed to spring annuals) provides suitable spring nesting cover.

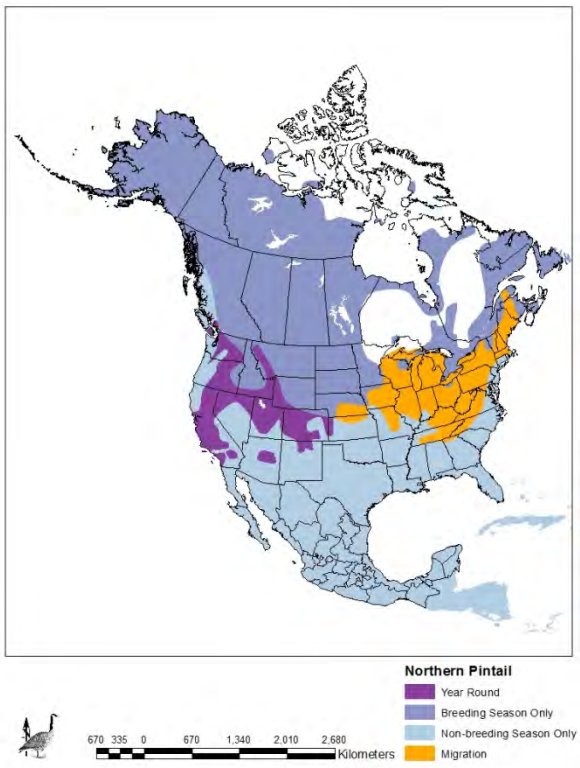
INFORMATION NEEDED:
The great mobility of northern pintails complicates research on the species (Austin and Miller 1995). As a result, significant information on the northern pintail's life history and population dynamics remain poorly known. Specifically, better understanding is desired regarding: the pintail's settlement patterns in response to environmental conditions; the pintail's nutrition, energy metabolism, and daily energy expenditure during winter; and the pintail's use of spring habitats to acquire nutrient reserves for breeding. Northern pintails are managed as a single continental population, but issues of population size and productivity need to be assessed regionally to better understand the current population status of this species (Austin and Miller 1995). Long-term nesting studies over a variety of geographic areas are needed to measure factors controlling annual variation in production (e.g., nest and hen success, duckling survival). In the NGPJV area, a complete digital National Wetland Inventory datalayer is urgently needed. Other data needs include: a map showing the current amount and location of native prairie, impact of grazing on reproductive success, and an assessment of reproductive success in natural and created wetlands under a variety of climatic conditions. Habitat-management techniques need to be developed locally and regionally to enhance nesting effort, nest success, and recruitment.

ACTION NEEDED:
Immediate actions that would benefit northern pintails in the NGPJV area include: continued support and expansion of wetland creation projects (such as the U.S.D.I. Fish and Wildlife Service's Partners for Wildlife program); increased protection for wetlands (such as through the use of wetland easements); and encouraging national farm policies which favor the retention of native and tame grasslands. The promotion of the use of winter annuals (as opposed to spring annuals) on active cropland would likely also benefit the early-nesting northern pintail.

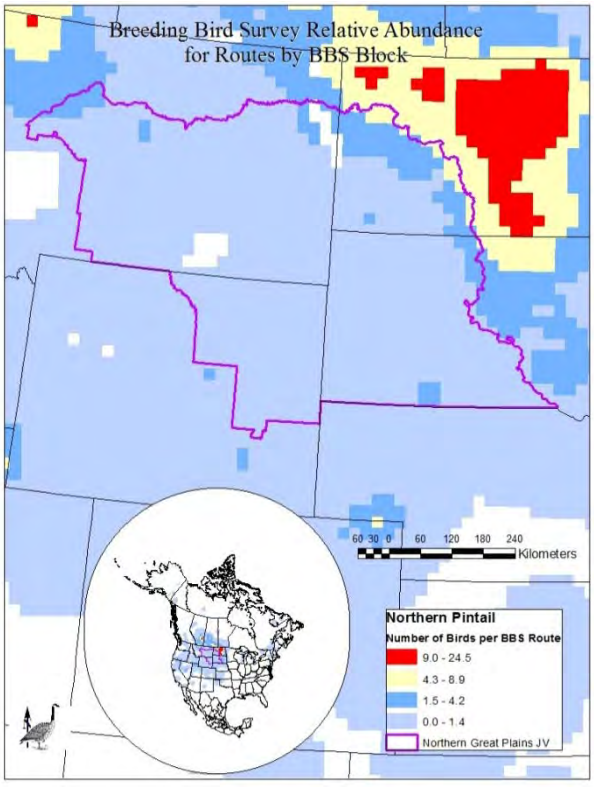
NOTES:
As regards the northern pintail, the NGPJV area is considered of high importance for breeding conservation needs, of moderately high importance for breeding importance, and of moderate importance for non-breeding needs (US Department of the Interior and Environment Canada 1986). Birds which we considered likely members of the northern pintail guild are the same as those listed above for mallard, i.e. a wide variety of nesting and migrating waterfowl (including mallard), migrating and nesting shorebirds (including marbled godwit and Wilson's phalarope), red-winged blackbird, and yellow-headed blackbird.

Figure 36. Distribution maps for the northern pintail in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



RED-HEADED WOODPECKER

Figure 37. Red-headed woodpecker.

PRIORITY TYPE:
Conservation, Guild Representative.

RATIONALE:
The red-headed woodpecker (Figure 37) has a population trend score of 4 (Partners in Flight 2005). The red-headed woodpecker is used in this document as a guild representative for wooded riparian, particularly open-grown cottonwood forest.

DISTRIBUTION:
Red-headed woodpeckers occur throughout the central and eastern portions of the United States, as well as in adjacent portions of southern-most Canada (Figure 38a). Wintering occurs within the southern two-thirds of the breeding range. Red-headed woodpeckers are found locally throughout the NGPJV area (Figure 38b).

STATUS:
Red-headed woodpeckers are rare and local throughout the NGPJV area (Figure 38b). In occupied areas, red-headed woodpeckers are generally present April to September. Of an estimated 2,500,000 total red-headed woodpeckers rangewide (Blancher et al. 2007), only about 19,000 (1%) occur in the NGPJV area.

Based on Breeding Bird Survey data, red-headed woodpeckers declined approximately -2.8% annually, 1966 to 2009 (Sauer et al. 2011). Between 1999 and 2009, the rate of decline was estimated at -1.2% annually. The annual population change within BCR 17 during those same time periods averaged -2.2% and -0.3%, respectively. All of these trends are statistically significant.

HABITAT:
Red-headed woodpeckers use open deciduous woodlands, including riparian woodland and shelterbelts (Smith et al. 2000). Closed-canopy forest, as well as forest with dense understories, are typically avoided. Within the NGPJV area, cottonwood, green ash, American elm, boxelder, and peachleaf willow (*Salix amygdaloides*) are often used. Abundance of large-diameter dead trees is an important determinant of habitat quality. In eastern Wyoming, Gutzwiller and Anderson (1987) found that red-headed woodpeckers preferred larger patches of riparian woodland, especially those with both large diameter trees and clearings. Birds often use woodlands where virtually all the trees have been killed, such as by herbicide, flooding, or fire.

The red-headed woodpecker nests in tree cavities. It normally excavates the cavity itself, but may use pre-existing cavities. This woodpecker's summer diet consists of both animal (mainly insects) and plant material (various seeds, nuts, berries, and fruit). Their winter diet consists primarily of hard mast (DeGraaf et al. 1991).

MANAGEMENT:
Red-headed woodpeckers are declining due to both habitat loss and habitat degradation. The primary cause of habitat degradation is the loss of snags and reduction in living trees with dead branches. Habitat degradation also results from forest succession, wherein open woodland is replaced with closed-canopy forest with thick understories. Habitat management should focus on providing large patches of open-canopied, large-diameter trees, with an open understory, a good number of mast trees, and abundant snags and dead-limbed trees.

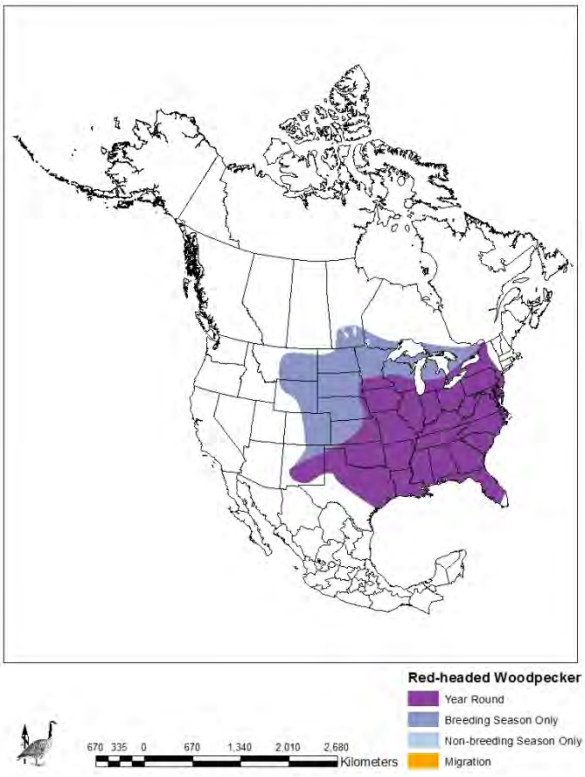
INFORMATION NEEDED:
Much remains to be learned regarding the likely causes of the red-headed woodpecker's decline. Information gaps also remain regarding this species' basic biology. These gaps include data on juvenile survival and dispersal; the red-headed woodpecker's importance as a primary excavator; and the woodpecker's reliance on and interaction with mast-producing trees (Smith et al. 2000).

ACTION NEEDED:
Riparian conservation and flood plain development policies that allow natural river processes to occur would benefit the red-headed woodpecker. Such natural river processes would include: seasonal flooding, riverbank erosion, and sediment deposition. Landowners and managers should be informed on how to benefit red-headed woodpeckers in the NGPJV area. Opportunities for program assistance (such as through the USDA Natural Resource Conservation Service's EQUIP and WHIP programs or the USDI Fish and Wildlife Service's Partners for Fish and Wildlife program) should be articulated.

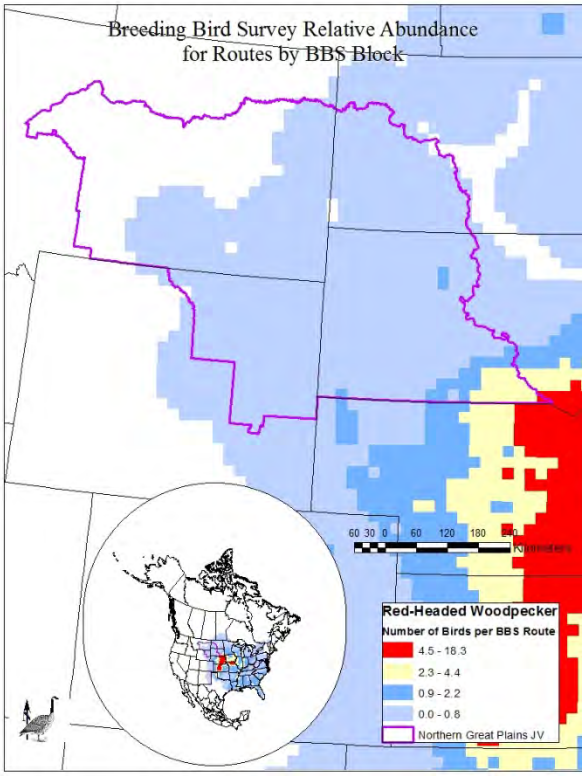
NOTES:
The red-headed woodpecker is the most omnivorous North American woodpecker. It is also the most persistent flycatcher. Birds which we considered likely members of the red-headed woodpecker guild include, but are not limited to: American kestrel (*Falco sparverius*), black-billed cuckoo, house wren (*Troglodytes aedon*), lark sparrow (*Chondestes* grammacus), mountain bluebird (*Sialia currucoides*), northern flicker (*Colaptes auratus*), and wild turkey.

Figure 38. Distribution maps of the red-headed woodpecker in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



SHARP-TAILED GROUSE

Figure 39. Sharp-tailed grouse.

PRIORITY TYPE:
Area Importance, Focal Species, Guild Representative.

RATIONALE:
The NGPJV area provides the core range for the "plains" sharp-tailed grouse (Figure 39). BCR 17 has a relative density score of 5; an estimated 29% of all sharp-tailed grouse occur there (Partners in Flight 2005). As a popular gamebird, the sharp-tailed grouse receives special attention from several NGPJV partners. It is characteristic of mixed-grass prairie, and is used in this document as a guild representative for that habitat, particularly mixed-grass prairie with varying vegetative structures.

DISTRIBUTION:
Sharp-tailed grouse occur from Alaska to Quebec south to northern Colorado (Figure 40a). The "plains" subspecies (i.e. *Tympanuchus phasianellus jamesi*) is found in the northern Great Plains. The entire NGPJV area is occupied by that resident subspecies (Figure 40b).

STATUS:
The sharp-tailed grouse is generally considered fairly common within the NGPJV area (Figure 40b). Blancher et al. (2007) estimated that 350,000 sharp-tailed grouse nest within BCR 17.

The sharp-tailed grouse's characteristic large population changes associated with weather-driven habitat quality greatly complicates population data analysis. Trend data collected by various state agencies show declines over the last several decades in the NGPJV area (Dan Svingen, pers. know.). The Breeding Bird Survey protocol is ill suited to monitor this species; not surprisingly, therefore, that survey's trend data is not statistically-significant. Those trends are: -0.2% per year for 1966-2010 and +2.2% per year for 2000-2010 survey-wide; and -1.0% per year for 1966-2010 and -1.4% per year for 2000-2010 for BCR 17.

HABITAT:
Plains sharp-tailed grouse prefer landscapes with extensive tracts of native mixed-grass prairie; areas intermingled with moderate levels of short- and mid- shrubs are used (Connelly et al. 1998). Prominent sites with very short vegetation are preferred as leks. Nests are placed on the ground at spots with high, dense screening cover. An average visual obstruction reading of 8" (i.e. 20 cm) or more is considered optimum for nesting and brood cover (Prose 1987). Most nests are initiated in late April/early May before extensive spring vegetative growth has occurred, making the availability of residual herbaceous cover from the previous growing season

of critical importance (Connelly et al. 1998, Prose 1987). Vegetative litter depths of 0.5"-1" are preferred. Shrub patches and agricultural lands are often used for foraging, though landscapes comprised of too much cropland are unsuitable. The critical level of agricultural land varies by location, but habitat quality is believed to increasingly degrade once the level of active cropland exceeds 40% of a landscape. Key food items include: insects (especially during summer and early fall); mast and waste grain (both important especially in the fall and winter), forbs (particularly during summer), and seeds (used year-round).

MANAGEMENT:
Sharp-tailed grouse habitat management is focused on preventing grassland (particularly native prairie) loss and fragmentation, as well as maintaining preferred vegetative structure in existing nesting habitats. The provision of adequate nesting cover is particularly important, especially in the form of carryover residual herbaceous vegetation from the previous growing season. Grassland habitat should be managed with periodic mowing, grazing, or burning to prevent the loss of forbs and to prevent the accumulation of excessive vegetative litter. Other habitat management measures include leaving some waste grain, such as corn (*Zea mays*) and sunflower (*Helianthus annuus*), for winter forage; and planting tree and shrub patches for winter food and shelter.

INFORMATION NEEDED:
Information needs for this species include a better understanding of how ring-necked pheasant and various land management methods (particularly livestock grazing and prescribed fire) effect sharp-tailed grouse. The effect of energy development on this species has been little studied (but see Williamson 2009).

ACTION NEEDED:
The protection and restoration of grasslands is the most important management need for this species. The NGPJV should also assist land managers and owners with the design of disturbance regimes that optimize vegetative conditions for plains sharp-tailed grouse.

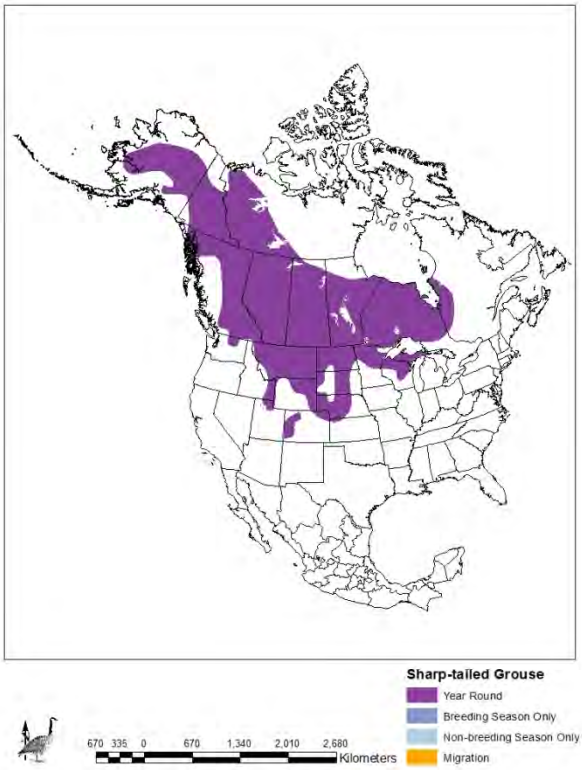
NOTES:
This species is poorly sampled by the Breeding Bird Survey or point-counts. Numerous entities, especially Game and Fish Departments, annually track population changes using spring lek, summer brood, and autumn "wing barrel" data as indices.

Birds which we considered likely members of the sharp-tailed grouse guild include, but are not limited to: Baird's sparrow, chestnut-collared longspur, grasshopper sparrow, marbled godwit, northern harrier (*Circus cyaneus*), ring-necked pheasant (*Phasianus colchicus*), short-eared owl, upland sandpiper, vesper sparrow, and western meadowlark.

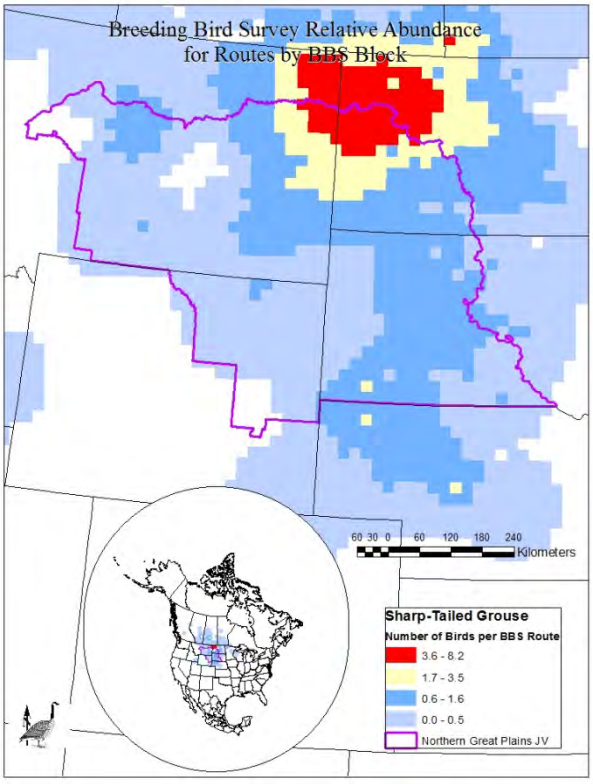
This species has been extensively studied in the NGPJV area; studies have included, but are not limited to: Kirsch et al. 1973, Kohn 1974, Norton et al. 2010, and Williamson 2009.

Figure 40. Distribution maps of the sharp-tailed grouse in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



SHORT-EARED OWL

PRIORITY TYPE:
Area Importance, Conservation.

Figure 41. Short-eared owl.

RATIONALE:
The short-eared owl (Figure 41) is a grasslands specialist that is believed to be declining. BCR 17 has a relative density score of 5 and a population trend score of 4 for this species.

DISTRIBUTION:
The short-eared owl is found widely throughout the world. In North America it occurs wherever there is suitable habitat, being absent only from the high Arctic and central and southern Mexico (Figure 42a). It is found throughout the NGPJV area (Figure 42b).

STATUS:
Short-eared owls are generally considered uncommon, local, and very irregular in the NGPJV area (Figure 42b); it can occur at any time of year. The species' presence varies widely in both space and time, with the local abundance of voles (*Microtus* spcs.) being a primary determinant of the owl's presence or absence. An estimated 60,000 short-eared owls occur within BCR 17, equating to about 3% of the species' global population (Blancher et al. 2007).

Within the range of the Breeding Bird Survey, short-eared owls have declined dramatically, with an annual population change of -3.6% for the 1966-2009 periods (Sauer et al. 2011). Between 1999-2009, the species declined an average of -6.2% per annum. During those same time periods, short-eared owl populations within BCR 17 are believed to have declined approximately -2.6% and -12.6% per year, respectively. None of these trends, however, are considered statistically significant, likely due to the small sample sizes involved.

HABITAT:
Short-eared owls prefer large patches of relatively tall, dense grassland (Dechant et al. 2003l, Wiggins et al. 2006). Areas that have been recently disturbed by burning, grazing, or mowing receive relatively little use. Nests are built on the ground in heavy herbaceous cover. Short-eared owls prey primarily on small mammlas, especially voles (DeGraaf et al. 1991).

MANAGEMENT:
Short-eared owls appear particularly sensitive to habitat loss and fragmentation, as they require relatively large tracts of grassland (Wiggins et al. 2006). The preservation or restoration of large grassland tracts, therefore, is the primary management technique to conserve short-eared owls. In existing grassland areas, management should focus on providing multiple-year accumulations of vegetative litter to maximize habitat quality for voles, the owl's primary prey. In more-productive areas periodic disturbance will likely be necessary to maintain habitat suitability (see literature review in Dechant et al. 2003). Disturbance (grazing, fire, mowing) should be avoided during the nesting season (i.e. May through July).

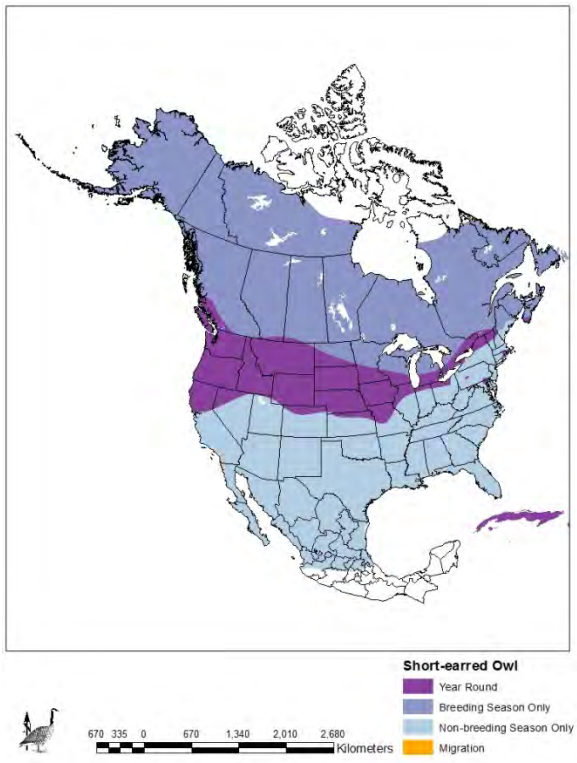
INFORMATION NEEDED:
A critical research priority is to establish a long-term population monitoring program. This would best be carried out by annually monitoring breeding and wintering abundance at sites where owls are known to occur on a frequent basis (Wiggins et al. 2006). Satellite monitors should be used to track movement of individual owls and provide data on seasonal and annual movements, including fidelity to breeding and wintering areas. Assessments are needed on how land set-aside programs (e.g., Conservation Reserve Program, Grassland Reserve Program) affect this species, year-round.

ACTION NEEDED:
The most urgent actions needed for short-eared owl conservation in the NGPJV area is to secure large tracts of grassland habitat. This could most effectively be done through a grassland easement program. Maintaining or increasing the availability of grassland tracts with multiple-year accumulations of vegetative litter (i.e. no burning, no mowing, no grazing) is also an important need. This could be accomplished on the National Grassland by increasing the amount of idled land (Bock et al. 1993).

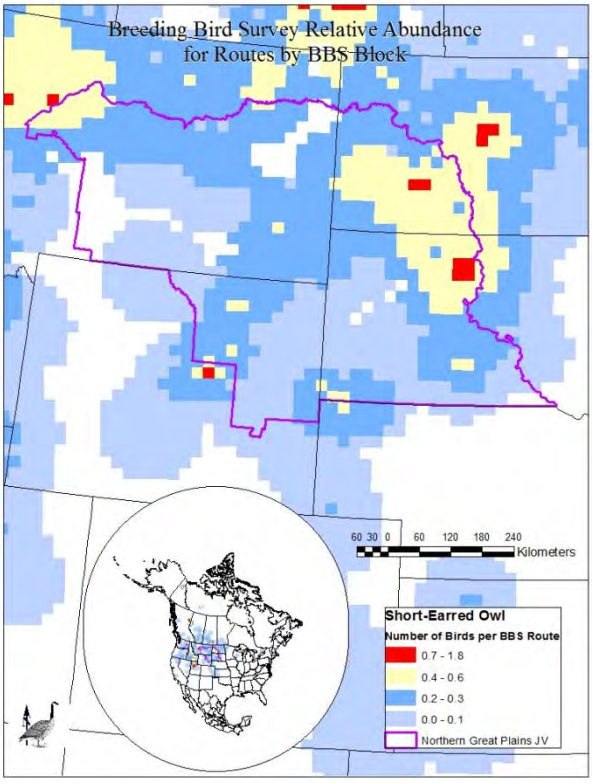
NOTES:
In late winter and into early summer, male short-eared owls perform sky dances to attract mates. The displays involve exaggerated wing flapping, acrobatic flying, singing, and talon grappling (Wiggins et al. 2006).

Figure 42. Distribution maps of the short-eared owl in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



SPOTTED TOWHEE

PRIORITY TYPE:
Guild Representative.

Figure 43. Spotted towhee.

RATIONALE:
Spotted towhees (Figure 43) are tied to woody draws and woody riparian. The spotted towhee is used in this document as a guild representative for those habitats.

DISTRIBUTION:
The spotted towhee occurs from southwestern Canada into central Mexico and from the California coast to the Great Plains (Figure 44a). The species winters widely in western North America. Spotted towhees occur throughout the NGPJV area (Figure 44b).

STATUS:
Spotted towhees are generally uncommon to common in suitable habitat throughout the NGPJV area (Figure 44b), April through October. Blancher et al. 2007 estimated that the NGPJV area supports about 6% (i.e. ~800,000) of all spotted towhees. Rocky Mountain Bird Observatory (2012) estimated that there was an average of 2,077,000 spotted towhees in BCR 17, 2009-2011.

Breeding Bird Survey data show a non-statistically significant change of +0.2% per year, 1966-2010, and 0.0% per year, 2000-2010 rangewide (Sauer et al. 2011). The data from BCR 17 show a non-statistically significant decline of -0.3% per year, 1966-2009, and -0.9% per year, 1999-2009. Overall the species is considered stable.

HABITAT:
In the northern Great Plains, spotted towhees occupy shrubby thickets in woody draws and in woody riparian habitats (Greenlaw 1996). Nests are placed on the ground or low in a shrub. Spotted towhees consume mostly vegetable matter gleaned from the ground, with acorns, weed seeds, and small fruit being particularly important. Small arthropods are also eaten, especially during the breeding season (DeGraaf et al. 1991).

MANAGEMENT:
Conservation of woody draws is imperative since this species is sensitive to habitat loss and degradation (Greenlaw 1996). Hodorff et al. (1988) compared bird communities in closed-canopy vs. open-canopy green ash stands in Harding County, SD. Spotted towhees were significantly more abundant in the closed-canopy habitat. Closed-canopy stands were

characterized as multilayered communities with a tree canopy of green ash and a few box elder, a dense shrub stratum of chokecherry (*Prunus virginiana*) and Saskatoon serviceberry (*Amelanchier alnifolia*), and a ground layer dominated by long-beaked sedge (*Carex sprengelii*), Virginia wildrye (*Elymus virginicus*) and associated forbs. Open-canopy stands had a tree canopy of green ash, but the shrub layer was absent or nearly so. The ground cover was characterized by Kentucky bluegrass (*Poa pratensis*) and invasive forbs. Heavy livestock grazing was thought to be the major contributor to the change from closed-cancopy to open-canopy stands. Based on these findings, management should focus on providing structurally complex woody vegetation within woody draws and riparian areas. This could be most dependably done by excluding livestock grazing, especially May to September.

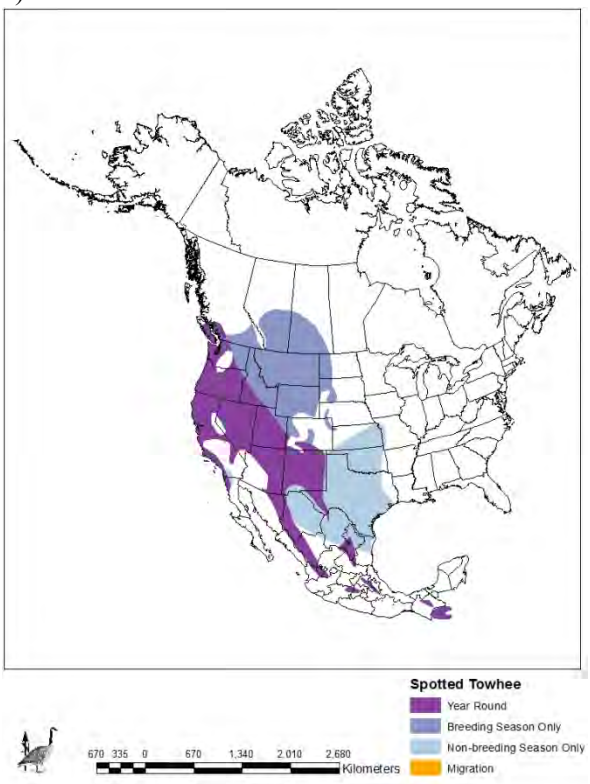
INFORMATION NEEDED:
The state of knowledge of the spotted towhee is seriously incomplete (Greenlaw 1996). In most populations, especially in those of the interior West and Mexico, information on nearly all kinds of basic descriptive attributes (e.g., phenology, breeding biology, molt, display repertoire) is unavailable or imperfectly known. Analytical studies of all sorts on behavior, ecology, demography (life tables), patterns of geographic movement, composition (sex, age, source) of most wintering populations, and physiology are badly needed. The impacts of livestock grazing on spotted towhee habitat quality needs to be better quantified; and compatible vs. incompatible stocking densities, grazing rotations, and seasons and frequency of grazing established. The impact of further fragmentation of the spotted towhees' naturally fragmented habitat needs to be determined.

ACTION NEEDED:
Woody draws within the Northern Great Plains Joint Venture are critical to the spotted towhee. The development of grazing plans that conserve these areas would benefit this species. Implementation of compatible grazing systems could be cost-shared on private land thorough several programs, including the USDA Natural Resource Conservation Service's EQUIP and WHIP programs and the USDI Fish and Wildlife Service's Partners for Fish and Wildlife program.

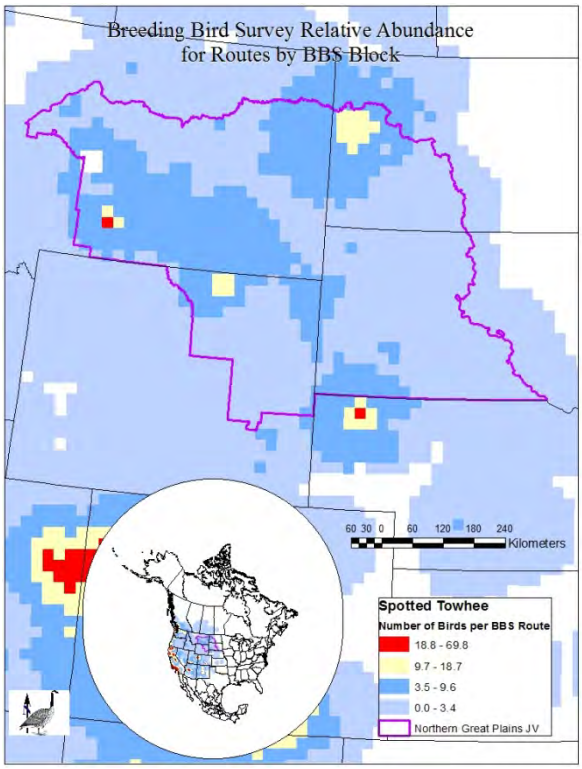
NOTES:
Birds which we considered likely members of the spotted towhee guild include, but are not limited to those listed for the black-billed magpie guild, i.e. black-billed magpie, eastern kingbird, lazuli bunting, and yellow warbler. Additional species include: American redstart (*Setophaga ruticilla*), black-billed cuckoo, house wren, ovenbird (*Seiurus aurocapillus*), and red-eyed vireo (*Vireo olivaceus*).

Figure 44. Distribution maps of the spotted towhee in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



SPRAGUE'S PIPIT

Figure 45. Sprague's pipit.

PRIORITY TYPE:
Area Importance, Conservation.

RATIONALE:
The declining Sprague's pipit (Figure 45) is a breeding endemic to the northern Great Plains. BCR 17 has a relative density score of 4 and a population trend score of 4 (Partners in Flight 2005).

DISTRIBUTION:
Sprague's pipits breed from central Alberta to east-central North Dakota, south into south-central Montana and north-central South Dakota (Figure 46a). The wintering range extends from central Texas to southeastern Arizona south through central Mexico. In the NGPJV area, Sprague's pipits are largely restricted to the northern half (Figure 46b).

STATUS:
The Sprague's pipit is fairly common in western North Dakota and eastern Montana, uncommon and local in west-central South Dakota, and absent from eastern Wyoming (Figure 46b). They are present on the breeding grounds from April through October. Blancher et al. 2007 estimated that about 9% (or 80,000) of the species' total population is believed to nest within BCR 17. Rocky Mountain Bird Observatory (2012) estimated that there was an average of 124,000 Sprague's pipit in BCR 17, 2009-2011.

Breeding Bird Survey data suggest that the Sprague's pipit population is in steep decline. Between 1966 and 2007, the species declined by 80%. Between 1966 and 2009, Sprague's pipit populations changed by an average -1.9% per year; from 1999-2009, the average annual change was +2.6% (Sauer et al. 2011). Average population changes during those same time periods within BCR 17 were -0.4% and +0.5%, respectively.

HABITAT:
Sprague's pipits are closely associated with native mixed-grass prairie (Dechant et al. 2003m, Jones 2010, Robbins and Dale 1999). In some portions of their range, the species also uses tame grassland. Vegetative structure is important; preferred structure may vary regionally. Vegetative litter can be either deficient or excessive; the pipit avoids both heavily grazed (or recently burned) areas, and idled ones. Litter depths of about 0.5" to 1" (i.e. 1.25 cm to 2.4 cm) are preferred. Preferred vegetative heights are described as "intermediate"; based on various

studies, vegetation of about 4" to 12" (i.e. ~10 cm to 30 cm) average height is preferred. Large grassland patches are needed; the minimum acceptable patch size is between 170 acres and 776 acres (68 ha to 310 ha); shrubby areas are avoided. The pipit's ground nest is very well hidden in grass. Weed seeds and insects comprise the pipit's diet; foraging is done on the ground (DeGraaf et al. 1991).

MANAGEMENT:
The preservation, maintenance, and restoration of large patches of native mixed-grass prairie is the single most important management action for the conservation of Sprague's pipits (Jones 2010). In existing habitat, management should focus on providing suitable vegetative structure (i.e. vegetative litter of about 0.5" to 1" depths and standing vegetation of 4" to 12" heights) by management of mowing, grazing, and prescribed burning. Woody vegetation should be removed from the interior of potential habitat sites; invasive grasses and forbs (especially high structure species such as sweet clover) should be minimized.

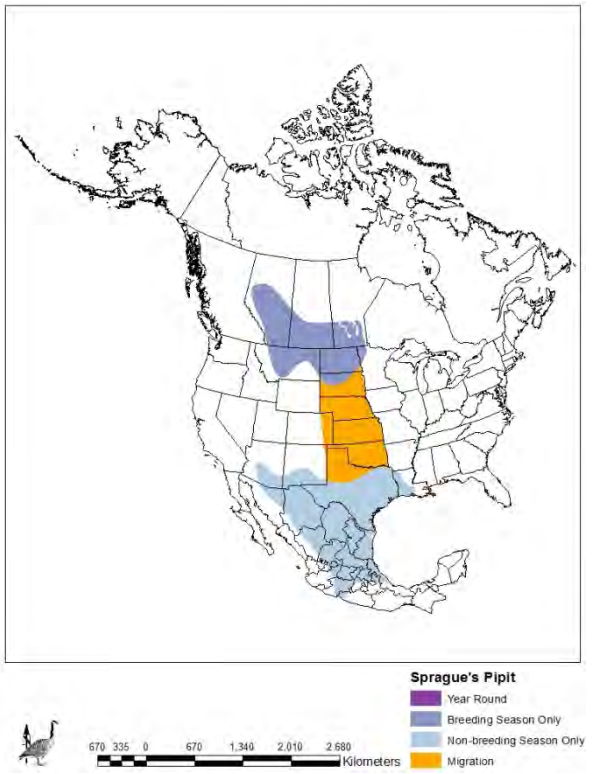
INFORMATION NEEDED:
Important research needs include addressing the following. What are the demographic factors driving this species' decline? How productive are pipits nesting in tame grasslands? How do various management regimes affect nesting pipits? What is the status of migratory and wintering habitats?

ACTION NEEDED:
Immediate action is needed to help preserve existing large blocks of native grasslands. Grassland easement programs could help preserve important habitat. The NGPJV should help determine the absolute values of preferred habitat structure used by Sprague's pipits in the NGPJV area, then compile a "How to manage your land for Sprague's pipit" manual for use by landowners and land managers in the NGPJV area.

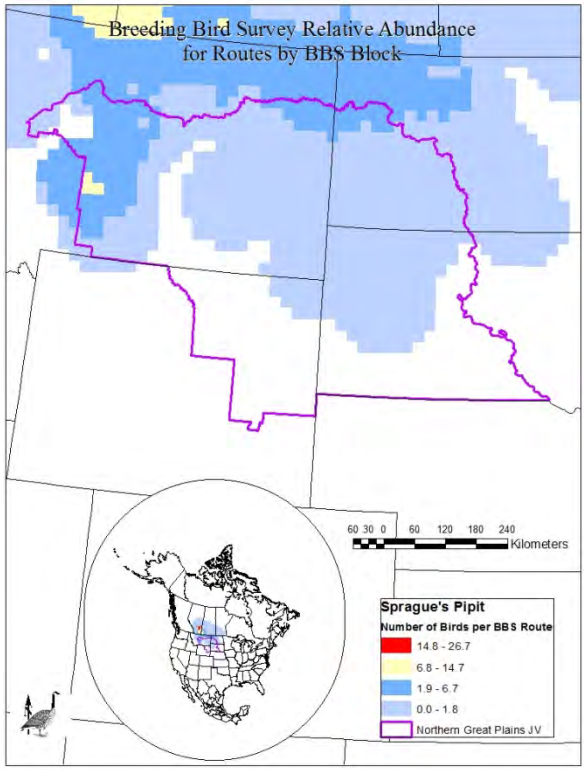
NOTES:
This is one of the very few species endemic to the northern Great Plains. This rapidly-declining species was recently found to be warranted (but precluded) for listing under the federal Endangered Species Act.

Figure 46. Distribution maps of the Sprague's pipit in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



SWAINSON'S HAWK

Figure 47. Swainson's hawk.

PRIORITY TYPE:
Area Importance.

RATIONALE:
The Swainson's hawk (Figure 47) has a relative density score of 4 for BCR 17 (Partners in Flight 2005).

DISTRIBUTION:
Swainson's hawks summer throughout most of the grassland and shrubland areas of west-central North America (Figure 48a). The bulk of the population spends the boreal winter (i.e. austral summer) in and near the Argentine Pampas. The species occurs throughout the NGPJV area (Figure 48b).

STATUS:
Swainson's hawks are uncommon to common in the NGPJV area (Figure 48b), being generally more common in the northern portion (Figure 48b). The species is typically present from late April to early October. Blancher et al. (2007) estimated that there were about 29,000 Swainson's hawks nesting within BCR 17, representing about 6% of the species' total population. Rocky Mountain Bird Observatory (2012) estimated that there was an average of 16,000 Swainson's hawks in BCR 17, 2009-2011.

Estimating population trend is problematic for this species. Historically, the Swainson's hawk was common throughout the western United States, but it is now much reduced in numbers and distribution (Bechard et al. 2010). It is of particular concern in the Canadian prairies, Utah, Nevada, Oregon, Washington, and California (Bechard et al. 2010, Woodbridge 1998). Despite these historical and recent regional declines, Breeding Bird Survey data indicate statistically significant increases in populations, both long-term (i.e. 1966-2009) and short-term (i.e. 1999-2009), across the entire survey area, and within BCR 17 (Sauer et al. 2011).

HABITAT:
Swainson's hawks prefer open grassland habitat intermixed with isolated trees or groves, but will also use shrublands (Bechard et al. 2010, Dechant et al. 2003n). They are comparatively tolerant of agricultural conversion, even benefiting from the addition of some hayland and irrigated cropland to their home range. Nests are typically placed in deciduous trees. During the breeding season, they feed primarily on small mammals, especially voles, and Richardson's and thirteen-striped ground-squirrels (*Ictidomys tridecemlineatus*). During the non-breeding season, they focus on insects, especially grasshoppers, crickets, and dragonflies (*Odonata*).

MANAGEMENT:
Management for Swainson's hawks focuses on reducing mortality (i.e. wire collisions, electrocutions, shootings, poisoning, etc.); maintaining foraging areas and prey populations; and providing suitable nesting sites (Bechard et al. 2010). The spread of exotic vegetation is most likely to affect Swainson's hawks by reducing prey populations and/or availability. In some parts of the Great Plains, nest trees are primarily the result of human activities. Long-term loss of trees, due to drought, herbicide use, livestock impacts, senescence, etc., could lead to local population limitation and decline (Bechard et al. 2010). In such areas, plantings replacement trees could be an important management technique.

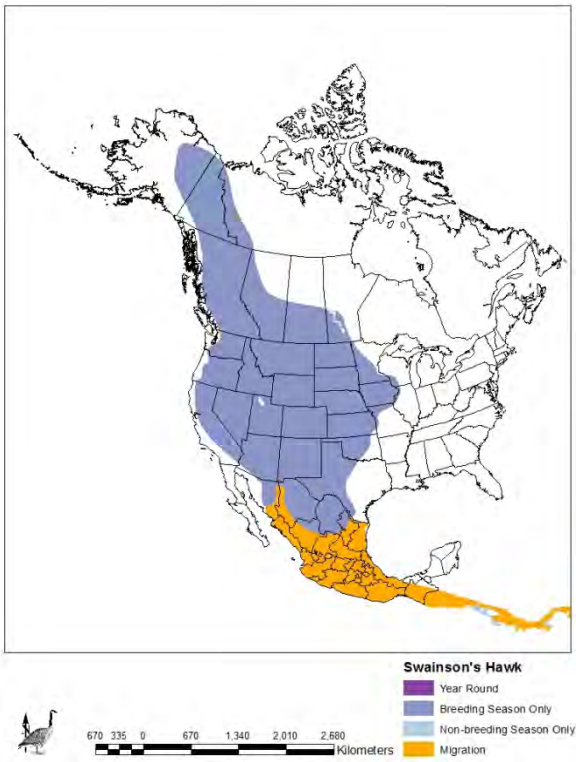
INFORMATION NEEDED:
Much remains to be learned regarding this species' winter ecology, including the potential impacts of pesticide exposure and the conversion of native Pampas grasslands to other vegetation types. In North America, research should focus on determining the causes of regional population declines. Long-term population monitoring should be initiated on the Swainson's hawk's primary prey species, as well as on the hawks themselves. For additional details, see Bechard et al. 2010.

ACTION NEEDED:
Although Swainson's hawks are relatively tolerant of agricultural conversion of native habitats, widespread conversion is still a threat, particularly as it affects prey availability. This species is known to be susceptible to pesticide bioaccumulation, particularly on the wintering grounds where it forms foraging flocks (Be3chard et al. 2010). The proper application and monitoring of pesticides is arguably the most critical action item, rangewide. Within the NGPJV area, priority actions should include: establishment of a monitoring program, protection of grassland foraging areas, and protection and planting of nest trees.

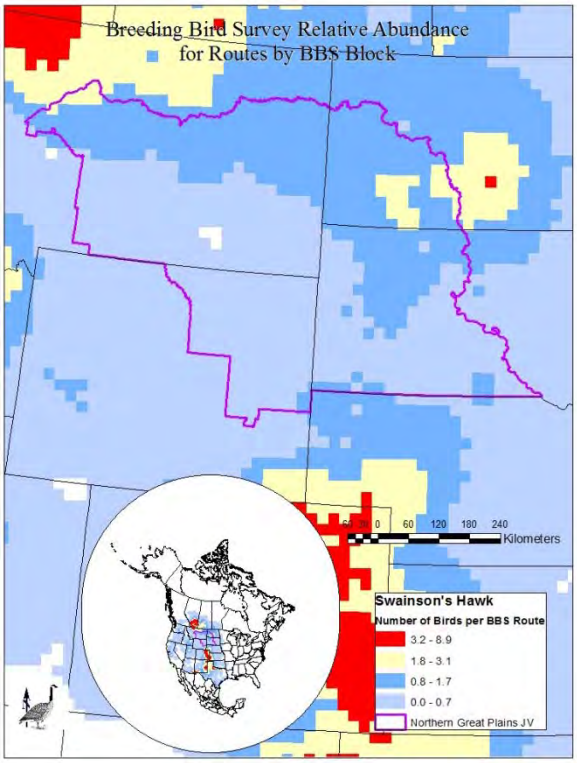
NOTES:
This polymorphic species has three color morphs: light, dark, and rufous.

Figure 48. Distribution maps for the Swainson's hawk in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



UPLAND SANDPIPER

Figure 49. Upland sandpiper.

PRIORITY TYPE:
Guild Representative.

RATIONALE:
The upland sandpiper (Figure 49) is recognized as an indicator of tallgrass prairie health (Houston et al. 2011). In this document it is used as a guild representative for species which require a diversity of vegetative structure within mixed-grass prairie.

DISTRIBUTION:
The upland sandpiper breeds across a wide swath of north-central North America (Figure 50a). Several isolated populations have been extirpated in both the northwest and northeast United States. Upland sandpipers winter on the Southern Cone grasslands. In the NGPJV area, the species is widespread (Figure 50b).

STATUS:
Upland sandpipers are generally uncommon in the NGPJV area (Figure 50b). They are present there from May to August. Based on Breeding Bird Survey data (Sauer et al. 2011), upland sandpiper populations showed statistically-significant population increases, both rangewide and within BCR 17, during the 1966-2009 and 1999-2009 time periods. Morrison et al. (2006) estimated a total population 350,000 upland sandpipers. Rocky Mountain Bird Observatory (2012) estimated that there was an average of 1,743,000 upland sandpipers in BCR 17, 2009-2011.

HABITAT:
This is a grassland sandpiper, characteristic of mixed-grass and tallgrass prairies (Dechant et al. 2003o). It prefers areas with a mosaic of vegetative structure (i.e. some areas of short grass, some of moderate grass, some of tall grass). Low structure grassland is used for courtship; nesting is done in high, dense vegetation; and brood-rearing is accomplished in moderate-structure areas with sufficient hiding cover and abundant food. Upland sandpipers nest on the ground. The species uses both native and cultivated vegetation for nest sites, with no clear preference over their breeding range (Dechant et al. 1999). In North America, the upland sandpiper's diet is made up almost entirely of small invertebrates (Houston et al. 2011).

MANAGEMENT:
Preserving and restoring grassland areas is critical for this species' conservation (Vickery et al. 2008). Within existing grassland areas, management should focus on providing acceptable grassland structure. This would entail providing a diversity of grassland heights and densities (Dechant et al. 2003o). The managed area should include some areas with short vegetation (sites preferred for foraging), some areas with moderate vegetation (sites preferred for brood cover), and sites with tall vegetation (sites preferred for nesting). Maintaining such a diversity of grassland structure will require manipulation of the amount, timing, duration, and intensity of ecological disturbances (burning, grazing, and mowing). Mowing should be delayed until July to help preserve eggs and flightless young.

INFORMATION NEEDED:
Although the upland sandpiper is one of the most studied shorebirds in North America, much remains to be learned, particularly regarding migration and wintering. In addition, nothing is known about annual and lifetime reproductive success, especially survival of fledglings and annual survival of adults (Houston et al. 2011). No one has explained why this species is so numerous in the Dakotas and southernmost Saskatchewan, and yet sparsely distributed in large pastures in other parts of the 3 Prairie Provinces. See also Skagen and Thompson 2000.

ACTION NEEDED:
Grassland preservation, restoration, and management in the northern half of the NGPJV area is vital to this species conservation. Research should be initiated as soon as possible (i.e. while it is still relatively common in the Northern Great Plains) regarding this species vital rates and winter ecology.

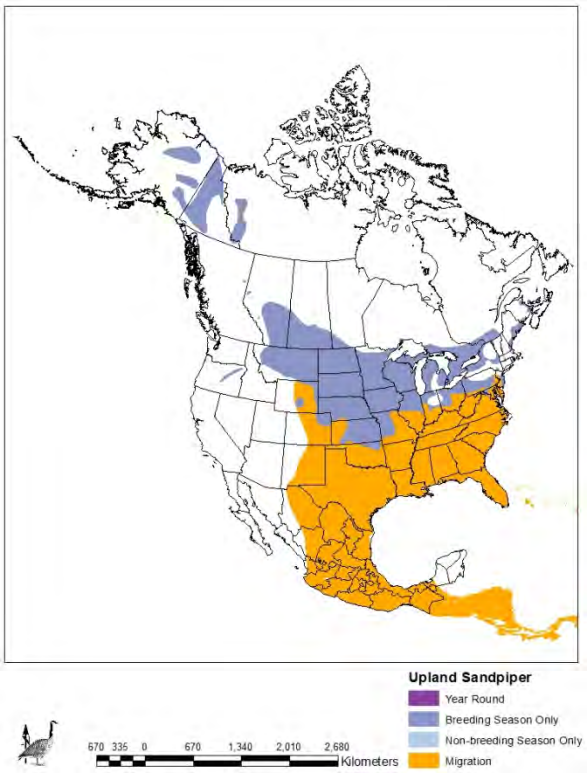
NOTES:
The upland sandpiper was classified as a species of high concern in the U.S. Shorebird Conservation Plan (2004); it has a population trend score of 5. We did not identify this species as one of conservation concern, however, due to contrasting population trend data for the area developed by the Breeding Bird Survey (see above).

The upland sandpiper has undergone range-wide loss of habitat, yet regional declines are largely confined to areas outside of the NGPJV area. As a result, the only NGPJV partner that identified this species as one of conservation concern was the North Dakota Game and Fish Department (Table 2), with that designation being driven by the species heavy reliance on that state as a nesting area. Houston et al. (2011) note this species' capability for long flights, with individuals transiting from the central North American plains to the South American Southern Cone in a week.

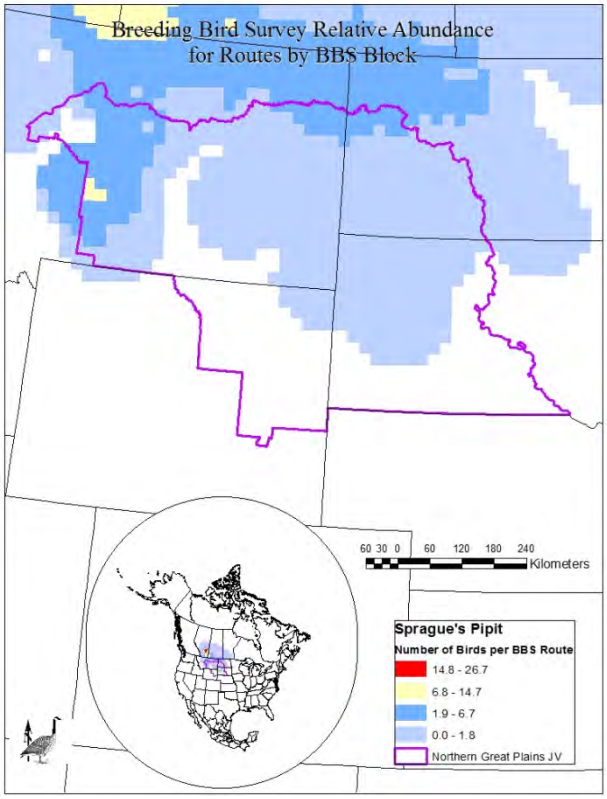
Birds which we considered likely members of the upland sandpiper guild include, but are not limited to the species listed for the sharp-tailed grouse guild: i.e. Baird's sparrow, chestnut-collared longspur, grasshopper sparrow, marbled godwit, northern harrier, ring-necked pheasant, sharp-tailed grouse, short-eared owl, vesper sparrow, and western meadowlark.

Figure 50. Distribution maps of the upland sandpiper in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



WILD TURKEY

Figure 51. Wild turkey.

PRIORITY TYPE:
Area Importance, Focal Species, Guild Representative.

RATIONALE:
The wild turkey (Figure 51) has a relative density score of 4 for BCR 17 (Partners in Flight 2005). The wild turkey is a popular gamebird. As such, it receives special management attention from several NGPJV partners. It is characteristic of woody riparian, and is used here as a guild representative for that habitat.

DISTRIBUTION:
The wild turkey is found throughout much of North America (Figure 52a), including the NGPJV area (Figure 52b).

STATUS:
Wild turkeys are uncommon, but local, residents within the NGPJV area (Figure 52b). Blancher et al. (2007) estimated that 110,000 wild turkey, or about 9% of the species' entire population, nests within BCR 17. The IMBCR program estimated that there was an average annual population of 170,000 wild turkeys within BCR 17 from 2009-2011 (Rocky Mountain Bird Observatory 2012).

Breeding Bird Survey show statistically-significant wild turkey population increases. Range-wide, wild turkey populations changed an average of +8.9% between 1966-2009 and +14.4% between 1999-2009 (Sauer et al. 2011). Similar trends were apparent within BCR 17, with average population changes of +11.5% and +14.6% annually, during those same time periods.

HABITAT:
The wild turkey uses a variety of habitat types ranging from grassland to forest (Eaton 1992). Areas with large stands of ponderosa pine (*Pinus ponderosa*) and cottonwood are particularly important in the NGPJV area. At night, birds roost in trees. In the NGPJV area, wild turkeys are mainly associated with wooded riparian habitat. Wild turkeys nest on the ground. Approximately 90% of the wild turkey's diet is plant food, with mast, fruit, seeds (including small grains), and greens of grasses and forbs being particularly. Insects, particularly grasshoppers, are seasonably important as well (DeGraaf et al. 1991).

MANAGEMENT:
The North American Wild Turkey Management Plan's habitat management goals for Montana, North Dakota, South Dakota, and Wyoming are: restore historical fire regimes to 10% of the landscape, increase riparian health (including use of riparian buffer programs), actively manage forestlands (particularly USDA Forest Service lands), and establish winter food sources by planting fruit-bearing trees and shrubs as well as encouraging farmers to leave standing grain groups over winter (National Wild Turkey Federation, undated). Other management strategies focus on regulation of hunting.

INFORMATION NEEDED:
The North American Wild Turkey Management Plan (National Wild Turkey Federation undated) identified the following research priorities for the states encompassed by the NGPJV: quantify gobbler mortality rates resulting from various harvest management strategies; describe gobbler movements in the Black Hills; investigate habitat suitability for turkeys at release sites along the Missouri Plateau in South Dakota; determine the effects of grazing systems on gamebird nesting and brood-rearing; and research the dynamics of small turkey populations.

ACTION NEEDED:
Landowners and managers in the NGPJV area should focus on: 1) riparian restoration projects and 2) use of prescribed fire to restore and maintain large, open stands of ponderosa pine.

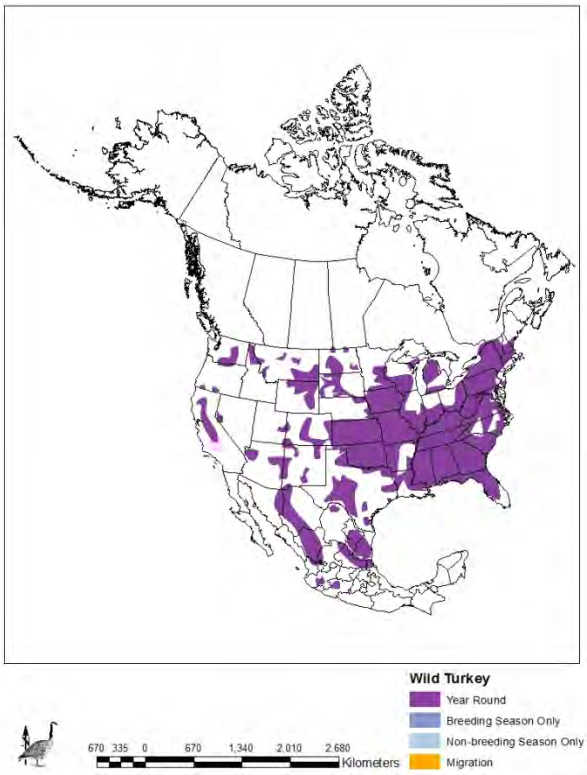
NOTES:
The wild turkey is the only bird in the Western Hemisphere to receive worldwide importance through domestication (Eaton 1992). The bulk of wild turkeys occurring within the NGPJV area are attributable to the Merriam's subspecies (i.e. *M. g. merriami*).

Birds which we considered likely members of the wild turkey guild include, but are not limited to those listed for red-headed woodpecker, i.e. American kestrel, black-billed cuckoo, house wren, lark sparrow, mountain bluebird, northern flicker, and red-headed woodpecker. An additional species would include: ring-necked pheasant.

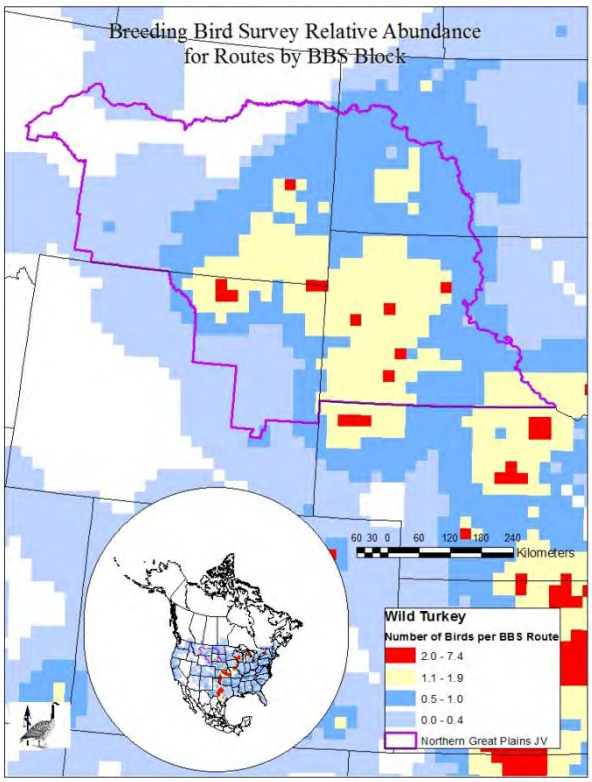
Research within the NGPJV area has included: Lehman 2005 and Rumble and Hodorff 1993.

Figure 52. Distribution maps of the wild turkey in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



WILSON'S PHALAROPE

Figure 53. Wilson's phalarope.

PRIORITY TYPE:
Conservation.

RATIONALE:
The Wilson's phalarope (Figure 53) was designated as a species of high concern; it has a population trend score of 5 (U.S. Shorebird Conservation Plan 2004).

DISTRIBUTION:
Wilson's phalaropes nest throughout much of western Canada and the western United States; it also nests locally east to the Atlantic coast (Figure 54a). Migrants occur throughout most of western North America. Wintering birds are widely scattered throughout western and southern South America, with the highest concentrations occurring at saline lakes in the central Andes (Dechant 2003d). In the NGPJV area, Wilson's phalaropes are widespread (Figure 54b).

STATUS:
Wilson's phalaropes are generally common spring and fall migrants, and uncommon nesters in the NGPJV area (Figure 54b). The species is present there from April to September. Population numbers and trends are poorly known.

HABITAT:
Wilson's phalaropes use a variety of wetland types throughout the year (Dechant et al. 2003p). During the breeding season, freshwater wetlands with some emergent vegetation and some open shoreline are preferred (Hagen et al. 2005). Nests are placed on the ground in thick herbaceous cover within the adjacent wet-meadow zone or surrounding upland. Although freshwater wetlands are used year-round, during the non-breeding season, saline wetlands are preferred (Colwell and Jehl 1994). Non-breeding concentrations often involve tens of thousands of birds. Throughout the year, Wilson's phalaropes feed on small, mostly aquatic, invertebrates (DeGraaf et al. 1991). Some aquatic plant seeds also are consumed.

MANAGEMENT:
The Wilson's phalarope needs a matrix of grasslands and wetlands to successfully reproduce, so the preservation and restoration of such habitats is critical. The protection of favored staging areas is also of primary importance (Colwell and Jehl 1994).

Dechant et al. (2003d) summarized published management recommendations, which see for citations and discussion. In brief, these recommendations focused on:

- Protect wetland complexes with both seasonal and semipermanent wetlands to provide suitable habitat during both wet and dry years.
- Ensure the presence of wet-meadow areas near deeper wetlands during the breeding season.
- Prevent diversion of water from saline lakes and wetlands in western staging areas.
- Preserve and/or restore wetlands.
- Consider shorebird needs when creating impoundments for waterfowl; provide nesting islands and beaches with gentle inclines.
- Do not disturb (e.g., drain, mow, burn, or heavily graze) nesting habitat during the breeding season, which generally extends from early May to late July.
- Use burning to improve nesting habitat
- Do not construct power lines through or within 0.6 mile (1 km) of known historical high-water marks of wetlands or dry basins known to hold water intermittently. Avoid constructing power lines through flight lines or heavily used waterbird migration routes.

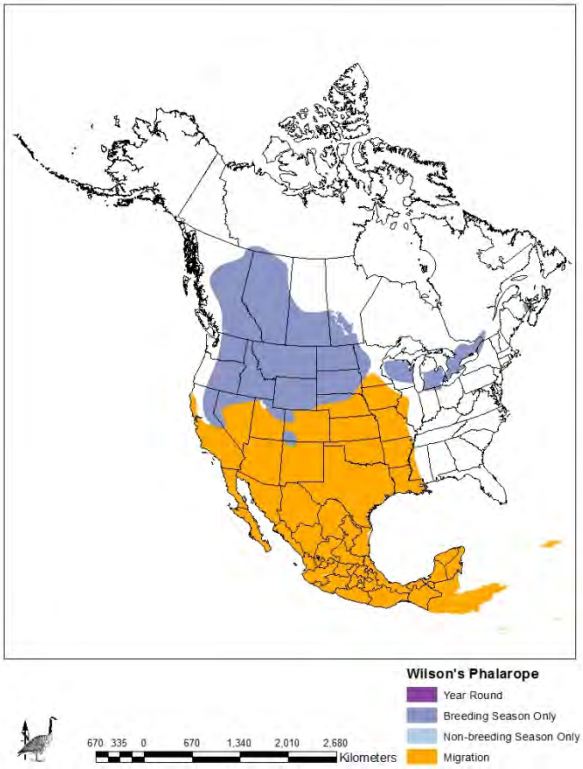
INFORMATION NEEDED:
Identification of any regionally-important staging areas would be important to this species' management. Such sites are most likely to be saline wetlands, and may change over time in relation to wet-dry cycles. See also Skagen and Thompson 2000.

ACTION NEEDED:
The most urgent conservation need is to increase awareness of how to manage for this species. In particular, landowners and managers should be encouraged to provide wetlands with a mix of open and emergent vegetated shorelines. Created wetlands are numerous in the NGPJV area; provision of islands and gently sloping beaches in those projects could have an immediate benefit to Wilson's phalaropes. The identification of important staging areas within the NGPJV area is also an effort that should be immediately pursued.

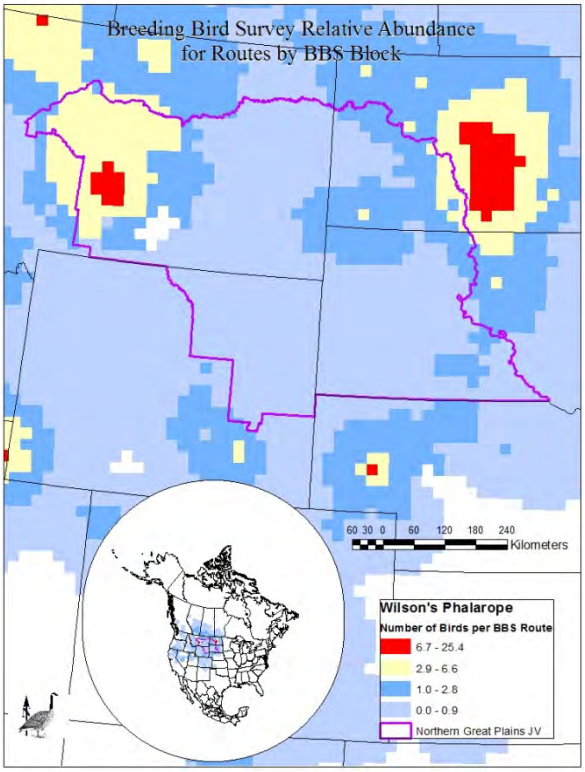
NOTES:
All three phalarope species exhibit a reversed sex-role mating system in which the larger and more brightly-plumaged females compete for mates. The males provide all parental care.

Figure 54. Distribution maps of the Wilson's phalarope in North America (a) and the Northern Great Plains Joint Venture area (b).

a)



b)



DISCUSSION:
The NGPJV Technical Committee began this project in 2011. We used Panjabi 2005 as our main reference for assessing area importance and conservation priority for non-waterfowl and non-shorebird species. That reference was superceded by a newer edition as this project was nearing completion. The new edition contains not only updated information, but also new direction on how to use that database to select priority bird species. Using that approach, several species would have received greater scrutiny due to the "regional concern score" or "regional stewardship" designation. These taxa include: golden eagle (*Aquila chrysaetos*), greater prairie-chicken, lazuli bunting (*Passerina amoena*), northern harrier (*Circus cyaneus*), prairie falcon (*Falco mexicanus*), and vesper sparrow (*Pooecetes gramineus*). We recommend that these species in particular be reassessed during the next revision of this priority bird species list.

Our literature review regarding the information needs and action needs for the priority bird species revealed several commonalities. Among these was a dearth of information on these species' winter ecology and response to management, particularly: livestock grazing, energy development, insecticide use, and tame grass establishment (Table 4). The most common item listed among action needs was the recommendation to preserve or restore: native grasslands, shrublands, wetlands, and riparian woodlands (Table 4). Conversion of these habitats to cropland continues throughout the NGPJV area (e.g. Faber et al. 2012); such conversion is the greatest threat to priority birds in the NGJV area. Besides the all-pervasive threat of habitat loss, the impacts of habitat fragmentation and invasive species deserve particular attention. The latter includes not only a plethora of noxious weeds, but also the increasing dominance of grassland habitats by tame grasses and forbs.

Many of the existing native woodlands in the NGPJV area are classified as American elm-green ash habitat types. American elms have been greatly reduced as a result of Dutch elm disease. The emerald ash borer (*Agrilus planipennis*), an invasive wood-boring beetle from Asia, threatens similar destruction of the remaining green ash trees. Land managers and owners should remain vigilant and monitor their areas for emerald ash borer infestations.

Table 4. Summary of information needs and action items identified for the Northern Great Plains Joint Venture's priority bird species.

SPECIES	INFORMATION NEEDS	ACTION NEEDS
Baird's sparrow	Data is needed on: winter ecology and reproductive success in tame vs. native grasses. Management strategies designed to account for this species' nomadic nature should be developed.	Managers should: reserve/restore native grasslands and provide preferred vegetative conditions (i.e. lightly to moderately grazed mixed-grass prairie with ~1" of vegetative litter & ~6"-12" standing herbaceous cover dominated by strong-stemmed narrow-leaved grasses. Management disturbance should be avoided mid-May to mid-July, if possible.
Black-billed cuckoo	There is a need to determine the effects of pesticide use, habitat fragmentation, and habitat modification.	Managers should reserve/restore deciduous riparian woodlands, and then manage those woodlands for multiple canopy layers.
Black-billed magpie	Research should focus on determining: the amount of woody habitat needed by the magpie; the role of the West Nile virus in population regulation, and the impacts of insecticides.	Managers should preserve/restore deciduous riparian woodlands
Brewer's sparrow	The impact of livestock grazing on the Brewer's sparrow's reproductive success is largely unknown. More information is also needed on this species' basic biology, particularly during winter.	Managers should preserve/restore native shrublands.
Burrowing owl	Information is needed regarding migration and winter ecology, population trends, and the species' response to: fires, grazing, energy development, and prairie dog shooting.	Managers should preserve/restore/expand prairie dog colonies.
Chestnut-collared longspur	Little is known about this species' ecology during migration and winter.	Managers should preserve/restore native grasslands.
Ferruginous hawk	The ferruginous hawk's winter ecology, response to changing prey populations, response to human disturbance, and response to management regimes are poorly understood.	Managers should preserve/restore native grasslands.

SPECIES	INFORMATION NEEDS	ACTION NEEDS
Grasshopper sparrow	Little is known of this species' winter ecology and its' source-sink dynamics.	Managers should preserve/restore native grasslands.
Greater sage-grouse	Information needs include: a population monitoring system; identification of priority lands on which to concentrate conservation efforts, and determination of the causal mechanisms that affect the growth and density of Wyoming big sagebrush.	Managers should preserve/restore native shrublands.
Lark bunting	Little is known of this species' winter ecology.	Managers should preserve/restore native grasslands and shrublands.
Loggerhead shrike	More information is needed on: the shrike's migration and wintering areas, the effects of livestock grazing, pesticides, and vehicle strikes; and the influence of landscape composition and habitat fragmentation.	Managers should preserve/restore deciduous riparian woodlands
Long-billed curlew	Better information is needed on: the curlew's population status and trends and adult survival rates; as well as the effects of habitat management efforts.	Managers should preserve/restore native grasslands.
Mallard	Information needs include a complete National Wetlands Inventory map layer, and a better understanding of the role of the NGPJV area as a population source.	Managers should preserve/restore grasslands; and preserve/restore/expand wetlands.
Marbled godwit	Little is known of differing breeding success and survival of birds using native versus tame grasslands. In addition, demographic data for the marbled godwit is largely lacking.	Managers should preserve/restore native grasslands and wetlands, and provide preferred vegetative structure.

SPECIES	INFORMATION NEEDS	ACTION NEEDS
McCown's longspur	Little is known of the McCown's longspur's: source-sink dynamics, response to management (fire and livestock grazing), and migration and winter ecology.	Managers should preserve/restore prairie dog colonies
Mountain plover	Research priorities for the mountain plover include: development of standardized monitoring methods, identification of important wintering ground, and determination of the effects of livestock grazing and energy development.	Managers should preserve/restore prairie dog colonies
Northern pintail	A better understanding is desired regarding: the pintail's nutritional needs and the species' settlement patterns in response to environmental conditions. In the NGPJV area, a complete digital National Wetland Inventory datalayer is urgently needed.	Managers should preserve/restore grasslands; and preserve/restore/expand wetlands.
Red-headed woodpecker	Much remains to be learned regarding the likely causes of the red-headed woodpecker's decline.	Managers should preserve/restore open woodland forest.
Sharp-tailed grouse	The effects of ring-necked pheasants, energy development, prescribed fire, and livestock grazing should be investigated.	Managers should preserve/restore native grasslands.
Short-eared owl	Determination of the short-eared owl's population trends is needed, as is information on the role of land set-aside programs.	Managers should preserve/restore native grasslands; some idle grasslands should be provided for this species in each open landscape.
Spotted towhee	Much remains to be learned about this species' ecology, including the effects of livestock grazing.	Managers should preserve/restore deciduous riparian woodlands

SPECIES	INFORMATION NEEDS	ACTION NEEDS
Sprague's pipit	Information is needed on the pipit's migration and winter ecology, the demographic factors driving population declines, the effect of grassland management regimes, and the species' reproductive success in tame grasslands.	Managers should preserve/restore native grasslands, and manage those habitats for preferred vegetative structure.
Swainson's hawk	More information is needed on the Swainson's hawk's population trends, causes of regional declines in North America, and its winter ecology in South America.	Managers should preserve/restore native grasslands.
Upland sandpiper	Much remains to be learned regarding this species' migration and wintering ecology and survival rates.	Managers should preserve/restore native grasslands, and provide a variety of vegetative structures in those grasslands.
Wild turkey	Better data is needed on: gobbler mortality rates, habitat suitability, and the effects of livestock grazing.	Managers should preserve/restore/restore riparian woodland.
Wilson's phalarope	Researchers should identify this species' regionally-important staging areas.	Managers should preserve/restore matrix of grasslands and wetland.

REVISIONS:
It is our intention to periodically assess this list for additions, deletions, updates, and corrections. Your suggestions are welcome. Please submit all such comments to: www.ngpjv.org.

CONTRIBUTORS:
Adam Ryba, U.S.D.I. Fish and Wildlife Service
Boyd Schultz, U.S.D.I. Fish and Wildlife Service
Chad Lehman, South Dakota Game, Fish, and Parks
Chuck Berdan, U.S.D.I. Bureau of Land Management
Dan Svingen, U.S.D.A. Forest Service
David Hanni, Rocky Mountain Bird Observatory
Jane Austin, U.S.D.I. Geological Survey
Jim Hansen, Montana Fish, Wildlife, and Parks
John Carlson, U.S.D.I. Bureau of Land Management
Ken Sambor, Northern Great Plains Joint Venture
Larry Igl, U.S.D.I. Geological Survey
Larry Roberts, Wyoming Game and Fish Department
Mike Olson, U.S.D.I. Fish and Wildlife Service
Neil Niemuth, U.S.D.I. Fish and Wildlife Service
Sandra Johnson, North Dakota Game & Fish Department
Scott McLeod, Ducks Unlimited
Silka Kempema, South Dakota Game, Fish, and Parks
Steve Fairbairn, U.S.D.I. Fish and Wildlife Service

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Breeding bird survey maps based on: Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2011. The North American Breeding Bird Survey, Results and Analysis 1966 - 2010. Version 12.07.2011 USGS Patuxent Wildlife Research Center, Laurel, MD. http://www.mbr-pwrc.usgs.gov/bbs/bbs.html

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