CONSERVATION PLAN FOR THE UPLAND SANDPIPER

(*BARTRAMIA LONGICAUDA*)

Version 1.1

February 2010

Peter D. Vickery[1], Daniel E. Blanco[2], and Bernabé López-Lanús[3]

Peter D. Vickery

WHSRN

WESTERN HEMISPHERE SHOREBIRD RESERVE NETWORK

NOTE about Version 1.1:

The only difference between Version 1.1 (February 2010) and Version 1.0 (June 2008) is the addition of a Spanish executive summary.

Conservation Plan Authors:

[1]Center for Ecological Research, P.O. Box 127, Richmond, Maine 04357 USA; petervickery@adelphia.net.

[2] Wetlands International, 25 de Mayo 758 10 I, 1002 Buenos Aires, Argentina; deblanco@wamani.apc.org.

[3] Wetlands International, 25 de Mayo 758 10 I, 1002 Buenos Aires, Argentina. *Currently*: Aves Argentinas, Matheu 1246, 1249 Buenos Aires, Argentina; conservacion@avesargentinas.org.ar.

Conservation Plan Editor:

Meredith Gutowski, WHSRN Executive Office, Manomet Center for Conservation Sciences, P.O. Box 1770, Manomet, Massachusetts 02345, USA; mgutowski@manomet.org.

For further information:

Manomet Center for Conservation Sciences: www.manomet.org

Western Hemisphere Shorebird Reserve Network: www.whsrn.org

Financial Contributors:

National Fish and Wildlife Foundation

Acknowledgements:

We are grateful to the following institutions that provided data for this conservation plan: Wetlands International (South America Programme), Birdlife International, and the "Alianzas de Pastizal" Project; Asociación Calidris (Colombia); Association GEPOG (French Guyana); Aves

Argentina; Aves Uruguay; Guyra Paraguay; Aves & Conservación (Ecuador), CEMAVE-IBAMA (Brazil), and Colección Phelps (Venezuela).

We also are grateful to the following people who contributed their knowledge and time to this conservation plan: Iury Accordi, Joaquín Aldabe, Samuel Amoros, Brad Andres, Adrián Azpiroz, Marcos Babarskas, Federico Bruno, Hugo del Castillo, Fernando Castillo, Robert Clay, Eugenio Coconier, Virginia De Francesco, Martín de la Peña, Nicolás Delelis, Adrián S. Di Giacomo, Alejandro G. Di Giacomo, Rafael A. Dias, David Díaz, Rodolfo A. Fangauf, Luis Girón, Judith A. Hutton, Tom Jenner, Richard Johnston, Ernesto R. Krauczuk, Raquel Caroline Lacerda, Claudio Laredo, Dan Lebbin, Arne Lesterhuis, Margarita Martínez, Juan Mazzar-Barnett, Rodolfo Miatello, Pablo Michelutti, Blanca Molinuevo, Cristina Morales, Guy Morrison, Ruth Muñiz, Grant Munro, Johanna Murillo, Luis Germán Naranjo, Tito Narosky, Jorge Navas, Neal Niemuth, Luis Germán Olarte, Aníbal Parera, Viviana Peña Herrera, Gabriel Peralta, Pablo Petracci, Nyls de Pracontal, Agustin Quaglia, Ignacio Roesler, Carlos A. Saibene, Tatiana Santander, Rosemary Scoffield, Fabio Schunck, Diego Serra, Ines Lima Serrano, Enrique Sierra, Luís Fábio Silveira, Fabrice Smith, Fernando Straube, Darío Unterköfler, José Manuel Venzal, Rob Westerduijn and María Elena Zaccagnini.

We are especially grateful to Charles Duncan, Adrián Azpiroz, Joaquín Aldabe, Jim Herkert, David Sample, Jeff Walk, Neal Niemuth, Guy Morrison, Brett Sandercock, and Larry Igl for their valuable comments and suggestions.

Recommended Citation:

Vickery, P. D., D. E. Blanco, and B. López-Lanús. 2010. Conservation Plan for the Upland Sandpiper (*Bartramia longicauda*). Version 1.1. Manomet Center for Conservation Sciences, Manomet, Massachusetts.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Upland Sandpiper (*Bartramia longicauda*) is a medium-size shorebird that breeds in northwestern and central North America and migrates to southern South America in the nonbreeding season (Figure 1). Upland Sandpipers do not aggregate in large concentrations in their breeding range, and are even more dispersed on their nonbreeding grounds, which presents research and conservation efforts with the additional challenge of working at a landscape scale throughout the species' range.

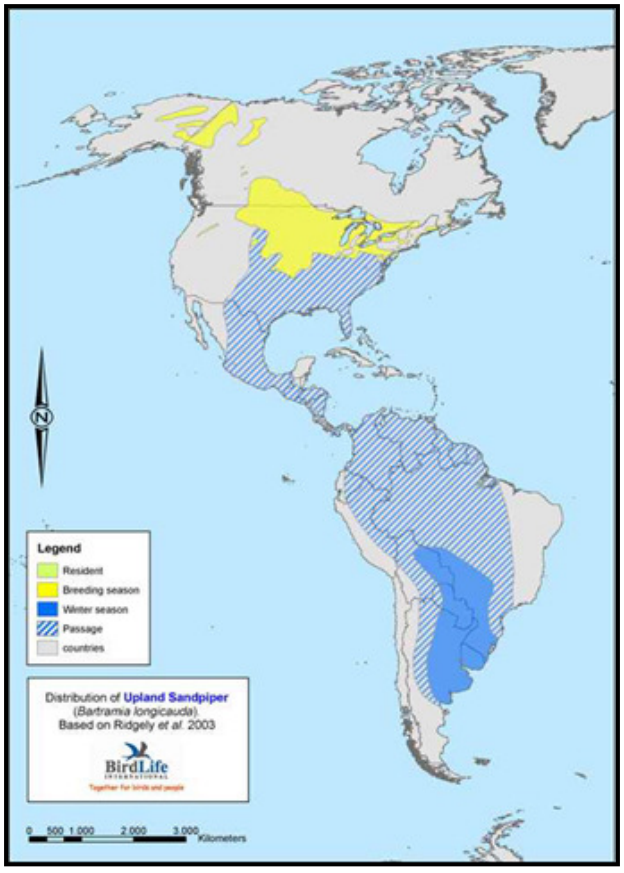

Figure 1. Upland Sandpiper breeding [yellow], migration [striped], and nonbreeding [blue] distribution (based on Ridgely *et al.* 2003).

Although the Upland Sandpiper has a substantial global population that has been increasing since 1966 (350,000+ individuals), it is clear that the species was once much more numerous. Upland Sandpipers are currently most abundant in the upper Midwest—however, this is a region where there is continued loss of natural grasslands to row-crop agriculture.

Substantial population decreases have occurred in the Canadian prairie provinces, Wisconsin, Michigan, Ontario, and along the St. Lawrence River (in New York and Ontario). There are concerns, in general, about ongoing habitat loss and degradation in both North and South America, as well as about the effects of agrochemicals.

In their breeding range, Upland Sandpipers seem to prefer large (100 hectares or more) grassland-associated landscapes that offer a mix of vegetation heights, including short grass areas for courtship displays as well as taller grasses for nesting cover. On migration and nonbreeding grounds, Upland Sandpipers will use a variety of habitats, from natural grasslands to cultivated or grazed fields. Grassland management and agricultural and grazing practices have the potential to greatly affect this species, either positively or negatively, throughout its range.

Major threats to this species include:

- loss and degradation of habitat, including its composition, on breeding and nonbreeding grounds;
- use of agrochemicals on breeding and nonbreeding grounds; and
- loss or degradation of critical stopover habitat.

Conservation actions recommended to address these threats include:

- protecting high-quality, heterogeneous breeding habitat by, for example, creating incentives for ranchers to maintain grassland and range habitat;
- conducting research to determine potential effects of agrochemicals, in both North and South America; and
- identifying critical stopover habitat and determining its condition;

RESUMEN EJECUTIVO

El *Bartramia longicauda* es un ave playera de tamaño medio que se reproduce en el noroeste y centro de Norte América y migra hacia el sur de Suramérica en la temporada de no reproducción (Figura 1). Los *Bartramia longicauda* no se agregan en grandes concentraciones en su rango de reproducción y aun están más dispersos en sus áreas de no reproducción. Esta característica presenta los esfuerzos de la investigación y de conservación con el desafío adicional de trabajo a escala de paisaje en todo el rango de la especie.

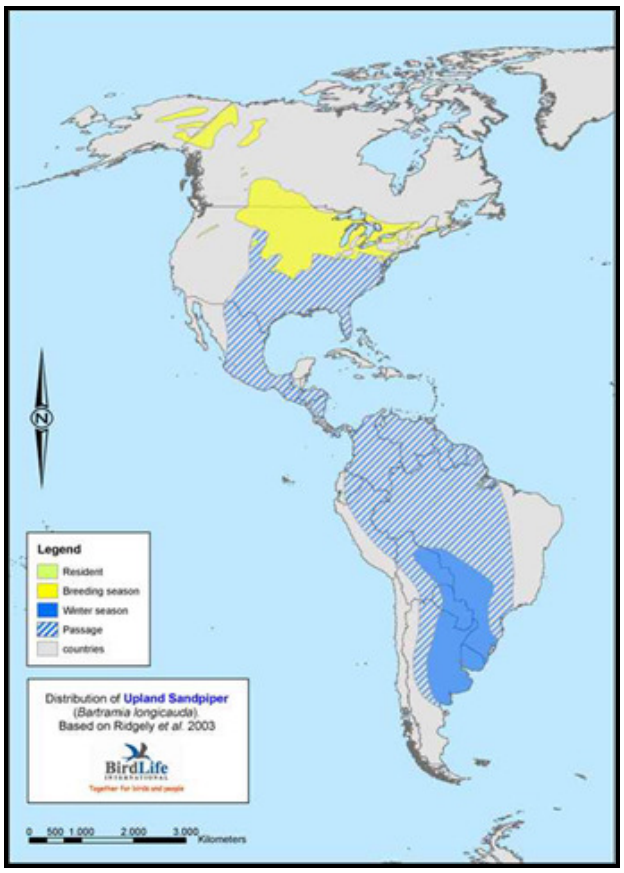

Figura 1. Distribución del *Bartramia longicauda* en las zonas de reproducción (en amarillo), sitios de migración (rayado), y de no reproducción (en azúl) (basado en Ridgely *et al*. 2003).

El *Bartramia longicauda* tiene una población mundial considerable que ha sido aumentando desde 1966 (350.000+ individuos), pero antiguamente la especie fuera mucho más numerosa. Actualmente la especie es más abundante en la Alta Medioeste de Norteamérica, sin

embargo ésta es una región donde hay una pérdida constante de pastizales naturales por la agricultura extensiva (los cultivos en hileras).

Las disminuciones sustanciales de la población se ha ocurrido en las provincias de las praderas de Canadá, los estados de Wisconsin y Michigan, la Provincia de Ontario, y a lo largo del Río San Lorenzo (en Nueva York y Ontario). En general existe la preocupación sobre la perdida y degradación continua de hábitat en el Norte América y Suramérica, además sobre los efectos de agroquímicos.

En su rango de reproducción, los *Bartramia longicauda* prefieren paisajes grandes (100 hectáreas o más) y asociados con pastizales, que ofrecen una mezcla de alturas en su vegetación, incluyendo áreas de hierba corta para el cortejo, así como los de hierba alta para la anidación. En los áreas de migración y no reproducción, los *Bartramia longicauda* usan una gran variedad de hábitats, desde pastizales naturales a zonas cultivadas o de pastoreo. El manejo de las praderas y las prácticas agrícolas y el pastoreo tienen la potencial de afectar en gran medida a esta especie, tanto positiva como negativamente, en toda su rango.

Las principales amenazas para esta especie incluyen:

- La pérdida y degradación de hábitats, incluyendo su composición, en las áreas de reproducción y no reproducción;
- El uso de agroquímicos en zonas de reproducción y no reproducción; y
- La pérdida y/o degradación de hábitat crítico en los sitios de paradas de la migración.

Las acciones de conservación recomendadas para hacer frente a las amenazas incluyen:

- Proteger el hábitat heterogéneo de alta prioridad en las zonas de reproducción, por la creación de incentivos para ganaderos en mantener los hábitats de praderas y pastizales, por ejemplo;
- Conducir las investigaciones para determinar los posibles efectos de los agroquímicos tanto en Norteamérica como Suramérica; y
- Identificar los hábitats críticos en los sitios de paradas y determinar su condición.

PURPOSE

The purpose of this conservation plan is to define the current conservation status of the Upland Sandpiper, understand its ecological requirements throughout the year, identify threats that affect the species and, thereby, recommend the most efficient conservation actions that can be taken to ensure its continued recovery. Because the Upland Sandpiper makes such long-distance migrations, this species faces a special suite of challenges on the breeding and nonbreeding grounds, and during migration. Agricultural changes in North and South America, as well as widespread use of agrochemicals, appear to pose substantial threats.

STATUS AND NATURAL HISTORY

The Upland Sandpiper has been extensively studied on the breeding grounds in North America, and its habitat preferences have been particularly well documented. However, major gaps remain in understanding Upland Sandpiper demography and genetic variation between breeding populations. Very little is known about the Upland Sandpiper's migration, either as it flies to South America for the nonbreeding season or as it flies north to reach its breeding areas. There is only a limited, non-quantitative understanding of habitat use and movements on the nonbreeding grounds. This is a critical research need to fill. Also, it is unclear to what degree use of agrochemicals affects Upland Sandpipers on their breeding and nonbreeding grounds.

MORPHOLOGY

The Upland Sandpiper (*Bartramia longicauda*) is a monotypic, medium-size shorebird that is closely related to curlews (*Numenius* spp.) (Sibley and Monroe 1990). Its overall length is 280 to 320 millimeters. Males have a mass of 135 grams (range of 112-179 grams [n = 258]); females' mass is 168 grams (range of 121–246 grams [n = 237]. Females greater than 200 grams are invariably gravid 26 grams (Hayman *et al*. 1986, Morrison *et al.* 2001, Sandercock, unpubl. data).

TAXONOMY

Although there is no evidence of separate races, there is a small decrease in the average size of Upland Sandpipers across North America, from west to east (Hayman *et al*. 1986). There

appear to be three discrete breeding populations that have little or no overlap, although this needs further study. Upland Sandpiper breeding east of the Appalachian Mountains may be separate from the main population that occurs from Ohio, Indiana, and Illinois west through the Great Plains to Alberta, Canada. There is a separate breeding population in central Alaska and Canada's Yukon Territory. It is unclear whether isolated breeding populations in Washington and Oregon represent dispersal from the Great Plains population. This species spends the austral spring-summer (November to March) in grasslands, pastures, and agricultural lands from southern Brazil and Paraguay to Uruguay and central Argentina.

POPULATION ESTIMATE AND TREND

The global population estimate of Upland Sandpipers is approximately 350,000 individuals (Morrison *et al.* 2001; U.S. Fish and Wildlife Service 2006). This estimate includes the calculation of approximately 10,000 individuals in Canada (Morrison *et al.* 2001). Houston and Bowen (2001) extrapolated from U.S. state estimates to generate a continental population total of 1,142,000 individuals, which is probably high and should be treated with caution. However, estimates of approximately 198,000 (95% C.I. 138,313–258,021) individuals in North Dakota in 1993 (Igl and Johnson 1997) and more than 175,000 in Illinois in 1958 (Graber and Graber 1963) seem to indicate that the estimate of 350,000 may be conservative. At present, there are fewer than 1,000 Upland Sandpipers in Illinois (J. Herkert, pers. comm.). This issue warrants further investigation and analysis.

There are no population estimates for the Upland Sandpiper during the nonbreeding season in South America, except for Paraguay, where the species' nonbreeding population was recently estimated to be approximately 5,000 birds (H. del Castillo *in litt*.).

The Upland Sandpiper's population trend has increased across its entire breeding range by 1.4% annually during the period 1966–2005 ($P = 0.035$) (Sauer *et al.* 2008) (Figure 2). However, Houston and Bowen (2001) point out that there were substantial population declines in the late 19th Century, when more than 50,000 Upland Sandpipers were shot annually for food. It is not possible to quantify this decline, but it seems unlikely that more recent increases this century have restored populations to historic levels.

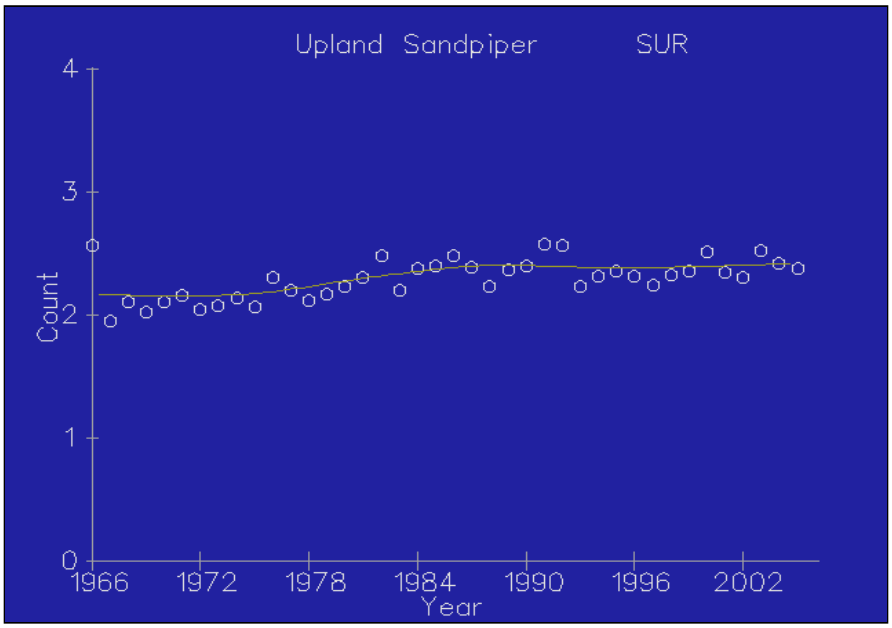

Figure 2. The Upland Sandpiper population trend increased by 1.4% annually across its entire range in North America during the period 1966–2005 (*P = 0.035*)(Sauer *et al.* 2008).

Population declines were noted by Houston and Bowen (2001) and were reported in Argentina (Bucher and Nores 1988), particularly for Buenos Aires (White 1988, in Houston and Bowen 2001; Narosky and Di Giacomo 1993), Córdoba (Miatello *et al.* 1999, R. Miatello pers. comm.), and Santa Fe Provinces (M. De La Peña *in litt*.). In Uruguay, the species used to be abundant in the 1800s (Cuello and Gerzenstein 1962).

Breeding Bird Survey (BBS) data indicate a significant increase in central North America in recent decades (Droege and Sauer 1990, Sauer and Droege 1992), but no significant population change for eastern North America in recent decades (Sauer and Droege 1992). However, a decline is evident based on data from 1980–1989, and large declines have occurred in parts of northeastern United States (Carter 1992) (Figure 3). Range-wide, areas exhibiting increases outnumber those showing declines, and the continental BBS trend for the period 1966–2005 was positive (Sauer *et al.* 2008). In the St. Lawrence Plains region, Upland Sandpipers have declined an average of 6.1% ($P \leq 0.10$) per year (BBS data: 1980–89, U.S. Fish and Wildlife Service, Office of Migratory Bird Management, unpubl. data, Laurel, Maryland), apparently as a result of reforestation and decreases in agriculture. The largest breeding population in the Northeast is increasing; it occurs on blueberry barrens in eastern Maine and New Brunswick, Canada, where there are probably more than 500 pairs (N. Famous, pers.

comm.). Upland Sandpipers are nearly extirpated as breeders from Rhode Island and Delaware. In Delaware, New Jersey, Connecticut, and Massachusetts, the largest breeding densities are restricted to airports (Carter 1992).

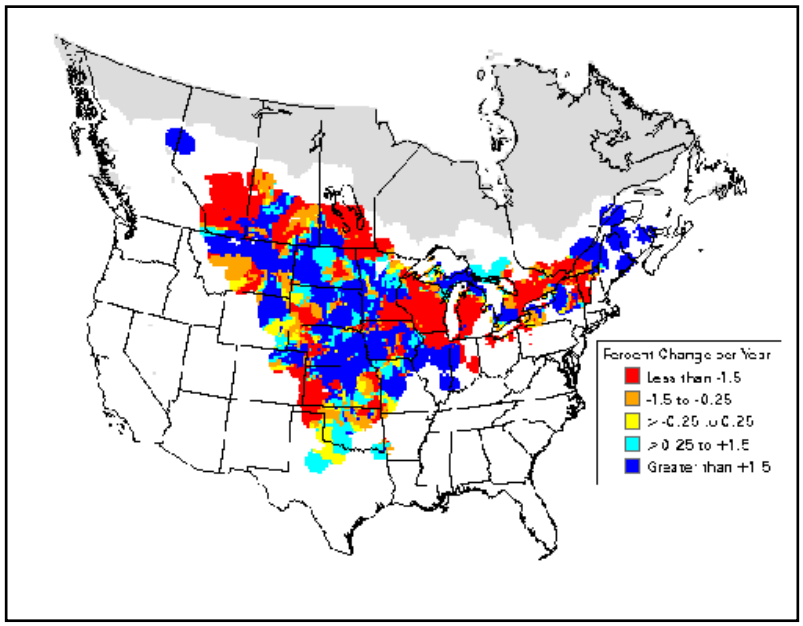

Figure 3. According to the percent change (-/+) per year, Upland Sandpiper population trends have increased substantially [dark blue] in the core of its range (North Dakota, South Dakota, Nebraska, and Kansas) since 1966. It also has increased in Maine and Quebec. Substantial decreases [red] have occurred in the Canadian prairie provinces, Wisconsin, Michigan, Ontario, and along the St. Lawrence River in New York and Ontario (Sauer *et al.* 2008).

Bart *et al.* (2007) analyzed International Shorebird Survey (ISS) and Maritimes Shorebird Survey data from Atlantic Canada and the northeastern Unites States, and found an annual declining trend of 0.94 (*P-value* < *0.05*); the same analysis for the Midwest found no significant trend.

DISTRIBUTION

Breeding Season

Upland Sandpiper distribution during the breeding season extends from the mixed grass prairie provinces in southern-central Canada (Saskatchewan, Manitoba, Alberta) to North Dakota, South Dakota, Minnesota, Wisconsin, Iowa, Kansas, east of the Rocky Mountains in

Montana, Wyoming, and Colorado south to northern Oklahoma and northwestern Missouri (Houston and Bowen 2001) (Figure 1). The Upland Sandpiper is generally rare and locally distributed in the eastern United States (Indiana to Maine, south to Virginia) and in eastern Canada, although this species has expanded its range and increased in numbers in certain areas (Figure 1). In Quebec, the Upland Sandpiper expanded to the northeast between 1970 and 1986 (Falardeau and DesGranges 1991), and has become more abundant on blueberry barrens in eastern Maine (Shriver *et al.* 2005) and in New Brunswick (Figure 4). The Upland Sandpiper also breeds discontinuously in central Alaska and Yukon Territory, rarely in British Columbia, and eastern Oregon (Houston and Bowen 2001) (Figure 1).

The upper Great Plains region supports nearly 70% of the Upland Sandpiper breeding population; South Dakota has approximately 34% of the global population, followed by North Dakota (19%), Nebraska (15%), and Kansas (11%) (Wells and Rosenberg 1999) (Figure 4). The Breeding Bird Survey (BBS), which provides an estimate of the numbers of individuals per route, is useful in determining Upland Sandpiper relative density. The BBS confirms that the Great Plains states have the highest mean numbers of Upland Sandpiper per BBS route: South Dakota (16.1), North Dakota (9.3), Nebraska (7.4), and Kansas (5.3) (Sauer *et al.* 2008). Lower densities were found on BBS routes in the Canadian prairie provinces, with an average of 1.9 individuals per route in Manitoba, 0.9 in Saskatchewan, and 0.6 in Alberta (Sauer *et al.* 2008, Houston and Bowen 2001).

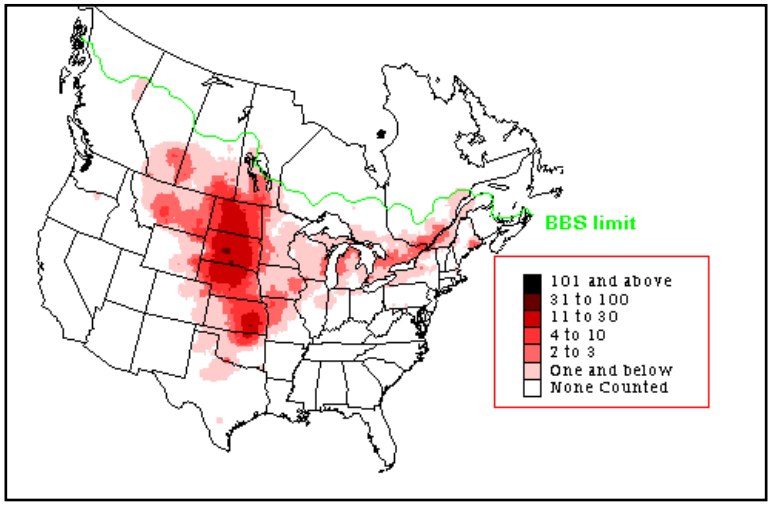

Figure 4. Upland Sandpiper breeding densities are greatest [dark red and brown] in South Dakota, North Dakota, Nebraska, and Kansas (Sauer *et al.* 2008).

Nonbreeding Season

During the nonbreeding season, the Upland Sandpiper has a very broad distribution, passing through many countries in South America, with the exception of Chile (Houston and Bowen 2001, Birdlife International 2006). The species' primary nonbreeding range is restricted to northeastern Argentina, Uruguay, southern Brazil, Paraguay, and eastern Bolivia (Figure 5). The species occurs most frequently on the Pampas and on the northern part of the Espinal ecoregion in Argentina, and on the Campos of Uruguay and southern Brazil (Figure 5). In the Pampas of Argentina, Upland Sandpipers are concentrated mainly on the rolling, inland, and southern Pampas, where the landscape is presently covered by crops such as wheat, linseed, sunflower, maize, soybean, and sorghum (Blanco *et al*. 1993, 2004) (Figures 5 and 6).

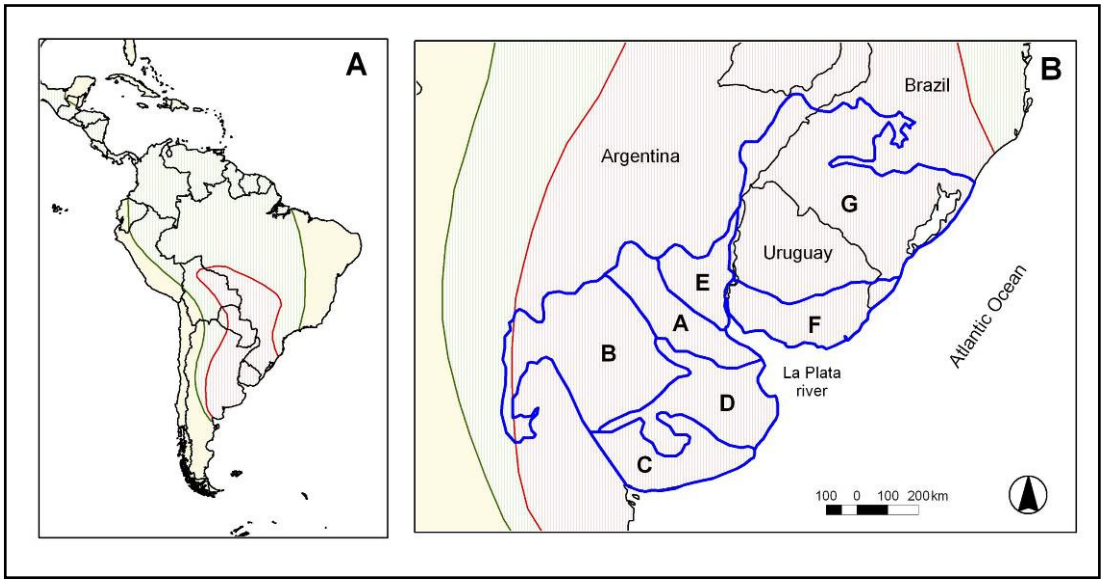

Figure 5. Upland Sandpiper distribution in Central and South America: **A)** primary nonbreeding range [red] and passage range [green] (according to Ridgely *et al.* 2003); and **B)** detail with the subregions of the Rio de La Plata grasslands (Soriano 1991) wherein A = Rolling Pampa, B = Inland Pampa, C = Southern Pampa, D = Flooding Pampa, E = Mesopotamic Pampa, F = Southern Campos, and G = Northern Campos.

In Uruguay, Upland Sandpipers once had a broad distribution. At present, they appear to be concentrated in the northeastern part of the country, especially in native grasslands along the Uruguay River, where the largest numbers have been recorded in the past 10 years (A. Azpiroz *in litt.*, J. Aldabe *in litt.*) (Figure 6). In Paraguay, the species has a broad distribution; small numbers are primarily recorded during southbound migration (Guyra Paraguay 2006) (Figure 6).

Data from Brazil and Bolivia are limited, and available records mainly correspond to migration seasons (Figure 6).

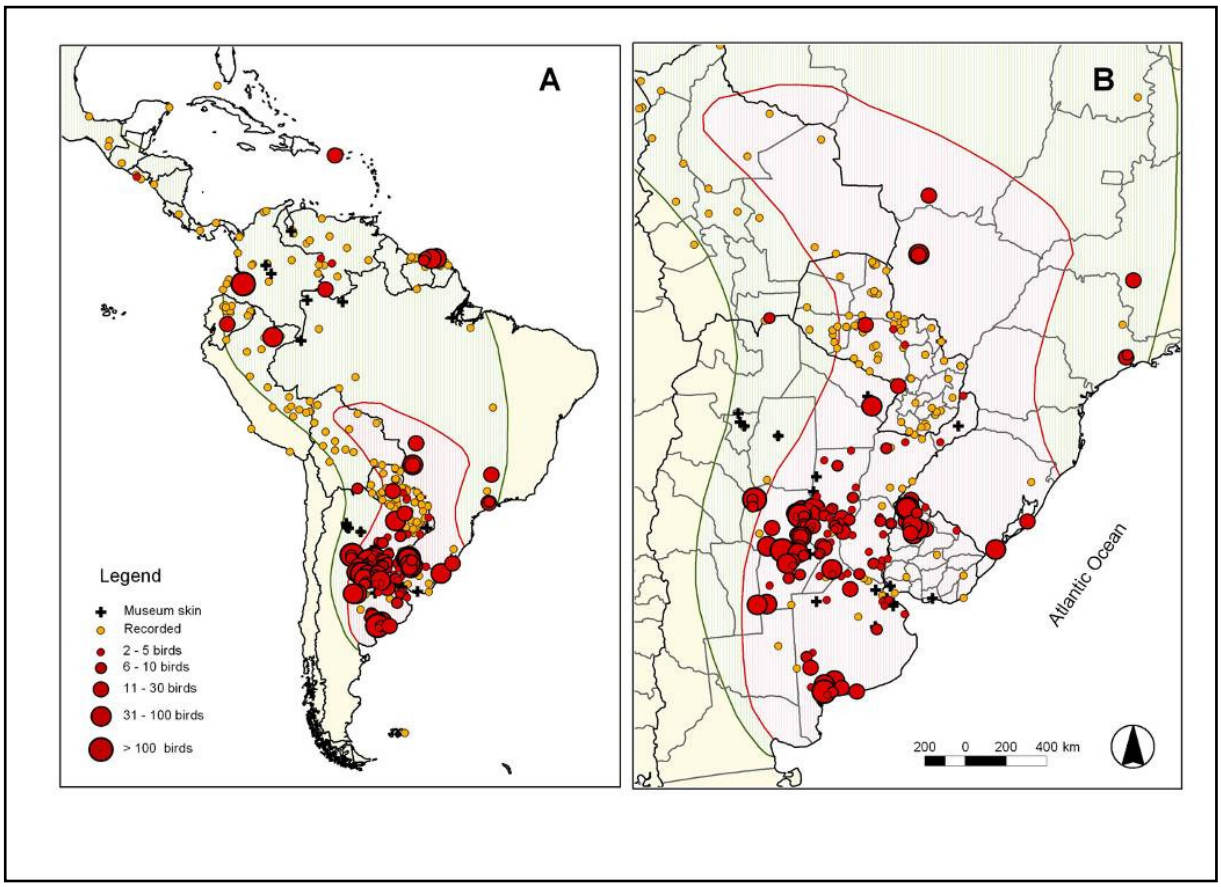

Figure 6. Upland Sandpiper records and abundances: **A)** Central and South America (*N = 544 records*); and **B)** primary nonbreeding range. The distribution map (taken from Ridgely *et al.* 2003) shows primary nonbreeding range [pale red] and passage range [pale green].

Several authors have suggested that a small population of Upland Sandpipers "winters" in northern South American countries such as Suriname (Haverschmidt 1966), French Guyana (N. Delelis *in litt*.), Venezuela (Hilty 2003) and the Orinoco basin of eastern Colombia, where the species has been regularly observed in January (L.G. Olarte, pers. comm.). According to Haverschmidt (1966), these sandpipers spend the entire nonbreeding season in Suriname, where small flocks have been observed from late August to mid- to late-April.

MIGRATION

Northbound

The northbound migration proceeds from Argentina in February and continues through March, with some birds remaining until April (Hudson 1923). In Córdoba Province, the northbound migration takes place from early March to late April (R. Miatello *in litt*.), where recent observations of thousands of birds passing through Miramar City suggest the existence of an important migratory corridor (P. Michelutti *in litt.*). Some northbound individuals reach Ecuador by 30 March or Chiapas, Mexico, by 29 March [in Mexico, the species is mostly absent from the Yucatán Peninsula and the Northwest (Figure 1)]. From Mexico, most migrants proceed north via central Texas, Kansas, and Mississippi, with smaller numbers occurring farther west and east of that geographic span (Houston and Bowen 2001). Early arrivals were reported reaching four localities in Texas during 5–13 March (Bent 1929).

The peak spring migration in North America passes through Texas in late March (formerly up to 1,000 birds at Corpus Christi); Oklahoma in early April (400 birds at Norman); and Kansas from late March to early April (B. Sandercock, pers. comm.). In Nebraska's Platte River valley, the main migration occurs between 24 April and 10 May (Faanes and Lingle 1995). In North Dakota, birds arrive in early May (139 at Minot) (Skagen *et al*. 1999); in Minnesota's Mahnomen County, they arrive during 1–6 May (Lindmeier 1960). Further east, migrants usually arrive in western Pennsylvania after 20 April (Wilhelm 1995), and in New Jersey (Walsh *et al.* 1999) and Maine from mid-April through mid-May. In Alaska, they generally appear in mid-May.

Southbound

Little is known about the extent of over-water flights, or about what proportion of the population moves south through the Americas versus directly to South America. Upland Sandpipers are more numerous along the Atlantic Coast during the southbound migration than during the northbound (Veit and Petersen 1993). The species is generally rare in Florida and the West Indies (Raffaele *et al*. 1998).

In North America, the southbound migration takes place from mid-July to mid-August, starting earlier in more northern latitudes. In Oklahoma, numbers peak in late July; in northern Texas, the first half of August (Skagen *et al.* 1999). Farther east, most have departed Quebec, Canada, and Maine by late August (Yank and Breton 1996, P. D. Vickery pers. obs). In Jalisco,

Mexico, migrants were recorded between 1 August and 29 September, with maximum counts of 153 and 135 individuals on 17 and 21 August, respectively (O. Reyna pers. comm., Houston and Bowen 2001).

In South America, the Upland Sandpiper southern migration is mainly through the High Andes and, secondarily, through the Orinoco Basin in Colombia (L.G. Naranjo *in litt.*). There are some records for the eastern *llanos* in Venezuela (V. Peña *in litt.*) and the Cordillera of Popayán in Colombia (L.G. Naranjo *in litt.*). In Ecuador, the earliest record is 10 August in Carapungo (Bent 1929); in northeastern Argentina, the earliest are 25 and 30 August for Formosa and Corrientes Provinces, respectively (J.R. Contreras and A.S. Di Giacomo pers. comm.).

In the Central Andes of Ecuador, hundreds of Upland Sandpipers are found dead each year in September, during the southbound migration. This phenomenon, well-known by local people, occurs at the Atillo and Ozogoche Lagoons—more than 3,000 meters above sea level. Its extent has not been studied, however, and it is not known if there is similar mortality in other Andean wetlands. Harsh weather and poor body condition appear to be potential causes (S. Lasso *in litt*., T. Santander *in litt.*, R. Clay *in litt.*).

The migration of Upland Sandpipers continues southbound along the Central Brazil Flyway (Antas 1983) and across Paraguay, where small numbers remain during the whole nonbreeding season (H. del Castillo *in litt*.). The species reaches Argentina's Formosa and Corrientes Provinces by late August (A.S. Di Giacomo and J.R. Contreras pers. comm., in Houston and Bowen 2001); the sierras in Córdoba Province by late September (M. Nores in P. Michelutti *in litt.*); and Salto in northern Buenos Aires Province by 11 October (A.S. Di Giacomo pers. comm., in Houston and Bowen 2001; A.G. Di Giacomo *in litt*.). It arrives at Uruguay's Artigas Department by 16 October (Venzal *et al.* in press).

MAJOR HABITATS

Breeding Range

Nesting Upland Sandpipers are restricted primarily to extensive, open tracts of short grassland habitat. They occur, for example, in native prairies, dry meadows, pastures, domestic hayfields, short-grass savannas, plowed fields, along highway rights-of-way, and on airfields; in Alaska, they use scattered woodlands and scree slopes at or above timberline (Forbush 1925, Higgins *et al.* 1969, AOU 1983, Osborne and Peterson 1984). Nesting also occurs in dry patches

of wet meadows (Stewart 1975, Herman *et al.* 1984) and in lowbush blueberry (*Vaccinium angustifolium*) barrens (Vickery *et al*. 1994, 1999). It should be noted that this species does not breed in large, concentrated colonies; instead, it tends to be widely distributed across its breeding range, occurring in loose aggregations.

The size of the grassland habitat appears to be critical to the Upland Sandpiper, at least in the central part of its range. In Kansas, Mong (2005) found that some individual sandpipers had home ranges of more than 200 hectares. In Maine, Vickery *et al.* (1994) found that Upland Sandpipers preferred larger sites (greater than 200 hectares) and rarely occupied patches less than 50 hectares.

Heterogeneity appears to be an important component of Upland Sandpiper breeding habitat. Studies in Wisconsin (Ailes 1980), Illinois (Buhnerkempe and Westmeier 1988), and Maine (Vickery *et al*. 1994, 1999) document that sandpipers avoid uniform vegetation, such as tall grasses, and generally prefer areas that provide patchy micro-sites with a variety of vegetation heights. In North Dakota and Maine, Upland Sandpipers preferred sites that had been recently disturbed by prescribed fire (Kirsch and Higgins 1976, Vickery *et al.* 1999). Upland Sandpipers also have large minimum-area requirements, generally selecting grasslands sites that are larger than 100 hectares for breeding (Herkert 1994, Vickery *et al.* 1994). Optimal breeding habitat contains a mixture of short grass (10–20 centimeters) areas for feeding and courtship, interspersed with taller grasses and forbs for nesting and brood cover (Kirsch and Higgins 1976, Ailes 1980). Having the preferred height and density of grasses in nesting and feeding areas permits adults and chicks to move through the vegetation easily. In Wisconsin, Upland Sandpipers preferred a level topography with a minimum of tall vegetation edges (White 1983). In many eastern states, airports support the majority of nesting Upland Sandpipers, including 74% of all Upland Sandpipers observed in Ohio (Osborne and Peterson 1984).

Agricultural land-use patterns and farming practices influence the choice of nesting sites. In central Wisconsin, Ailes (1980) found that idle fields and hayfields accounted for the majority of nesting habitats. In North and South Dakota, the majority of nests were found in ungrazed grasslands of medium density with abundant ground litter (Higgins *et al*. 1969). A 5-year survey (1969–74) of intensively cultivated areas in the Prairie Pothole Region of east-central North Dakota recorded 57% of nests in untilled habitats, which comprised only 7% of the total study area (Higgins 1975). In North Dakota, Kirsch and Higgins (1976) recorded lowest mean nest

densities in annually tilled croplands and highest mean nest densities in native grasslands the second season after a prescribed burn. Seeded grass/legume mixtures generally grew too tall and dense to support Upland Sandpipers. Kirsch and Higgins (1976) found that the majority of North Dakota nests were located in either thin, uniform vegetative cover or in scattered clumps of fairly dense cover characterized by standing stubble fields, moderately grazed pastures, mowed areas with heavy regrowth, brush clumps with some understory vegetation, and undisturbed vegetation on poor soils. In Illinois, Buhnerkempe and Westemeir (1988) reported that sandpipers selected stands of grass and forbs for nesting and avoided fields of uniform grass and legumes.

Upland Sandpipers use grassy areas of low vegetation height for feeding and brood rearing. In Wisconsin, Ailes (1980) observed 66% of adults with young in heavily grazed pastures, 13% in ungrazed pastures, and 11% in hayfields. In Illinois, Buhnerkempe and Westemeir (1988) reported that Upland Sandpipers selected brood-rearing habitats of wheat stubble fields, recently hayed legumes, old redtop meadows (*Agrostis* spp.), and moderately grazed pastures. A South Dakota grasslands management study revealed that habitat use was highest in recently burned fields with short, open, new growth and no litter or old growth (Huber and Steuter 1984).

In Quebec, Upland Sandpipers use large peatlands (greater than 160 hectares) (Calmé and Haddad 1996). In Maine, large numbers of sandpipers nest in commercial blueberry barrens that are mowed and burned biennially (Vickery *et al.* 1999). In Illinois, Upland Sandpipers preferred nesting in fields 1 to 2 years post-burn (Buhnerkempe and Westemeier 1988), but were absent 3 years post-burn (Herkert 1994).

Burning appears to be helpful to Upland Sandpipers by providing greater invertebrate abundance, which is likely to benefit young birds. Kirsch (1974) reported gross increases in insect life, especially grasshoppers (*Orthoptera*), on burned grasslands in North Dakota. Similarly, Queal (1973) noted a greater variety of small insects on burned grasslands in Kansas.

In two studies in the Dakotas, apparent nest success was lower (32% versus 53%) on grazed fields than on idle land (Kantrud and Higgins 1992), and lower on grazed land (48%) than on undisturbed grassland (71%) or on grassland burned twice during the 5-year study (71%) (Kirsch and Higgins 1976). However, in south-central North Dakota, Messmer (1985) found highest nest density and nest success on the twice-over deferred grazing rotation system and on season-long grazing pasture. There were no nests in idle, ungrazed fields until they were mowed

(Messmer 1990). In another study in North Dakota, nest success showed little response to grazing (Kantrud 1981). In Saskatchewan, Upland Sandpipers only nested in grazed pastures (Dale 1984). Grazing cattle should be restricted from nesting fields during the egg-laying and incubation periods, 1 May to 15 July. Annual grazing of native grasses may not be a suitable management method to control vegetational succession. In Wisconsin, light to moderate grazing did not control encroachment of woody species in natural grasslands. On the other hand, heavy, prolonged grazing can lead to destruction of desirable components of prairie vegetation (Tester and Marshall 1962).

Migration

- ***North America***

Upland Sandpiper generally use large plowed fields, mowed hayfields, and pastures for staging and stopover feeding sites. They also occur in dry salt-hay marshes. Upland Sandpiper densities in southern Texas were greatest in shrub-grass (0.38 per 10 hectares), compared to open grassland (0.06) and parkland (0.07) (Igl and Ballard 1999). In Mexico, Upland Sandpipers have been found in fields of harvested corn (*Zea mays*) and agave (*Agave* sp.), as well as in fields of flooded acacia (*Acacia* sp.) and sorghum (*Sorghum vulgar*)(O. Reyna pers. comm., Houston and Bowen 2001).

- ***South America***

Information about Upland Sandpiper habitat use during migration in South America is scarce. Canevari *et al.* (2001) mention sandpiper use of the High Andes grasslands of Argentina, Colombia, and Ecuador, and the deforested areas of rainforest on the Pacific side of Colombia. In Paraguay, the species was observed in natural grasslands, planted pastures, and agricultural lands (Guyra Paraguay 2004), and also has been observed in soybean fields (H. del Castillo *in litt*.). In Peru, Bolster and Robinson (1990) reported that this species used beach habitats overgrown with *Tessaria* and weeds along the Manu River.

Nonbreeding Range

In its nonbreeding range, Upland Sandpipers have adapted to a variety of human-disturbed habitats. Habitats used by this species include natural grasslands and grazed pastures (primarily by

cattle), open saline steppes, alfalfa fields (*Medicago sativa*), and other artificial pastures such as oat (*Avena* sp.) and *Agropyron* sp., as well as cultivated lands (plowed fields, wheat, soybean, maize, sunflower, and unflooded rice fields), where the species is mainly found in stubble fields (Blanco *et al*. 1993, 2004, 2006; Miatello *et al.* 1999, A. Azpiroz *in litt*., J. Aldabe *in litt.*, I. Roesler *in litt*., P. Michelutti *in litt.*).

In the Pampas of Argentina, Upland Sandpipers are common in upland areas where more than 25% of lands are under cultivation; they are found mainly in tall vegetation fields where crops and ruderal plants dominate (Blanco *et. al*. 1993, 2004). In the inland Pampas, Upland Sandpipers inhabit crops and pastures, and appear to prefer wheat stubble fields (I. Roesler *in litt*.). Abundances in native pastures are similar to those in crops or artificial pastures like alfalfa, oat, and *Agropyron* sp. In Villegas (west of Buenos Aires Province, Argentina), this habitat is only available during December and January, as these fields are later used for soybean cultivation. Upland Sandpipers occupy soybean, maize, and sunflower fields when these plants are less than 20 centimeters tall (I. Roesler *in litt*.).

In Uruguay's Salto and Paysandú Departments, Upland Sandpipers have been recorded in both natural and artificial grasslands, but abundances were significantly greater in natural grasslands grazed by cattle, sheep, or the native Pampas Deer (*Ozotoceros bezoarcticus*) (A. Azpiroz *in litt*., J. Aldabe *in litt.*). In Salto and Artigas Departments, Upland Sandpipers once inhabited grasslands having a mixture of short grass areas (5 centimeters; 80–90% of coverage) interspersed with taller grasses (30 centimeters; 10–20% of coverage) (J. Aldabe *in litt.*).

CONSERVATION STATUS

Birdlife International (2006) considers the Upland Sandpiper as "Not Threatened / Least Concern" status. In the United States, this species is considered to be one of National Conservation Concern by the U.S. Fish and Wildlife Service (2002), due to population declines during the last century. The U.S. Shorebird Conservation Plan (Brown *et al.* 2001) (2004) lists Upland Sandpiper as a Species of High Concern (Category 4), based on scores for the six national shorebird prioritization variables. The species earned a "5" (the highest score) for the Population Trend variable because of "demonstrated declines," and a "4" for the Threats During the Nonbreeding Season variable. These scores should probably be reviewed.

This species is listed in the Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention; United Nations Environment Programme 1979). This species also is listed as "Endangered" or "Threatened" in many states in the eastern United States (Vickery 1992, Houston and Bowen 2001), and is listed as "Endangered," "Threatened," or of "Special Concern" in five of eight Midwestern states (Herkert *et al.* 1996). In some South American countries, such as Paraguay and Brazil (State of Rio Grande do Sul), it is not considered threatened at the local level (Fontana *et al.* 2003, Guyra Paraguay 2004). In other South American countries, such as Argentina, the species is categorized as "Low Risk / Near Threatened" (García Fernández *et al.* 1997); in Suriname, the species is "Fully Protected" and no exploitation is allowed (Jong and Spaans 1984).

Given that the Breeding Bird Survey has determined that Upland Sandpiper populations have increased annually across North America since 1966, this species does not appear to be in imminent danger across its breeding range. However, there are areas where Upland Sandpiper populations have decreased substantially, most notably in the Canadian Prairie provinces and southern Ontario; parts of the U.S. Midwest (Illinois, Wisconsin, Minnesota, and Michigan); and New York and other eastern states. Moreover, as Andres has pointed out (2007, *in litt.*), populations that have shown an increase have presumably been benefiting from the U.S. Conservation Reserve Program (CRP). However, because Upland Sandpiper habitat created under the CRP is not permanent, there is continued concern about future losses.

POPULATION GOAL

The U.S. Shorebird Conservation Plan (Brown *et al*. 2001) has set a target of 470,000 individuals as a population goal—an estimated return to the numbers present in the 1970s. If the species continues to increase annually at a rate of 1.4%, this target would be reached in 2016. Andres (2007, *in litt.*) suggests that a "no net loss" figure of holding at the current population size is more realistic. Given the population increases demonstrated in parts of its range, we recommend that the U.S. Shorebird Conservation Plan's conservation ranks for this species be reviewed, and that the Population Trend variable be lowered from a rank of "5" (most severe category of decline) to a rank of "4."

CONSERVATION SITES

This portion of the plan identifies the main areas and key sites where 1% or more of the estimated population for the Upland Sandpiper can be found.

BREEDING SITES

The upper Great Plains Region of the United States (South Dakota, North Dakota, Nebraska, and Kansas) is critically important for the Upland Sandpiper, supporting nearly 70% of this species' breeding population. In North Dakota, Upland Sandpipers breed in comparable numbers on both private and public lands (L. Igl, pers. comm.). Eastern Maine and adjacent New Brunswick, Canada, appear to support substantial numbers of Upland Sandpipers, and should be thoroughly inventoried.

Spatial models have been applied to the Prairie Pothole Region to target landscapes for grassland conservation there (Niemuth *et al.* 2005) (Figure 7). For example, the spatial model used in producing Figure 7 predicted the probability (red = high; blue = low) of Upland Sandpiper presence in the Prairie Pothole portion of North Dakota in 1995. Models such as this one are empirically based, assess landscape context, and are designed to maximize the efficiency of conservation efforts. They often help to guide the use of Federal Duck Stamp revenue and North American Wetlands Conservation Act grant funds in the acquisition of grassland easements.

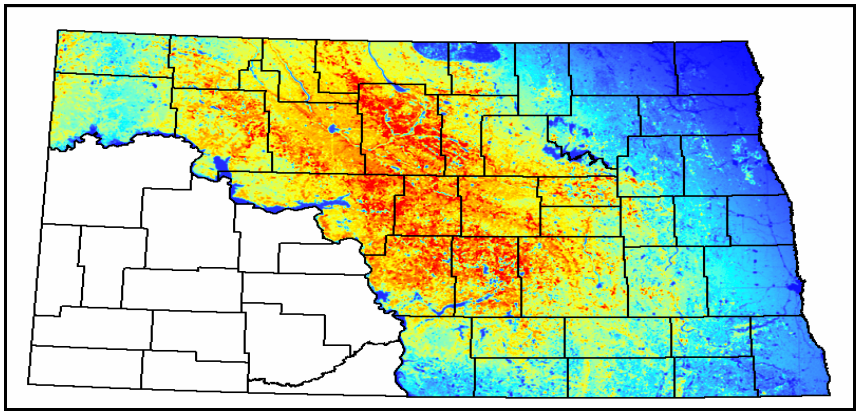

Figure 7. Spatial model used to identify Upland Sandpiper habitat in North Dakota. Red areas indicate high probability of Upland Sandpiper presence; blue areas indicate low likelihood of the species' occurrence (Niemuth *et al*. 2005).

MIGRATION SITES

Northbound

The agricultural lands in south Texas appear to be a major stopover region in spring. Beyond this, sites used by Upland Sandpipers during northbound migration are not well known and need to be identified.

Southbound

Sites used by Upland Sandpipers during southbound migration are either poorly known or not yet adequately identified. In September and October, numbers of Upland Sandpipers have been recorded at Iquitos, Peru (R. Westerduijn in F. Smith *in litt.*), and at two farms in Mato Grosso do Sul, Brazil, Fazenda Sao Vicente and Fazenda Campinas (I. Serrano unpublished data), suggesting these as potential conservation areas to be assessed. Given that the Upland Sandpiper's southern migration is mainly through the High Andes, it should be a high priority to identify major stopover sites in this region.

NONBREEDING SITES

Because the Upland Sandpiper is widely dispersed during the nonbreeding season, rather than concentrated at particular areas, it is not possible to identify specific sites used by at least 1% of the species' global population. Therefore, this criterion was not useful in identifying key sites for conservation.

As an alternative, we have delineated the Upland Sandpiper's primary nonbreeding range into "Main" and "Secondary" distribution zones (Figure 8). To create these zones, we used the map adapted from Ridgely *et al.* (2003) (Figure 6) and available data on habitats, current land use, and Upland Sandpiper numbers and dates. We updated the species' primary nonbreeding range accordingly and later divided it into a Main Nonbreeding Range and a Secondary Nonbreeding Range (Figure 8):

- The **Main Nonbreeding Range (MNR)** encompasses the Río de La Plata Grasslands region (which includes the Pampas of Argentina and the Campos of Uruguay and southern Brazil), and the northern portion of the Espinal ecoregion in Argentina.
- The **Secondary Nonbreeding Range (SNR)** encompasses northeastern Argentina, Paraguay, southwest Brazil, and eastern Bolivia.

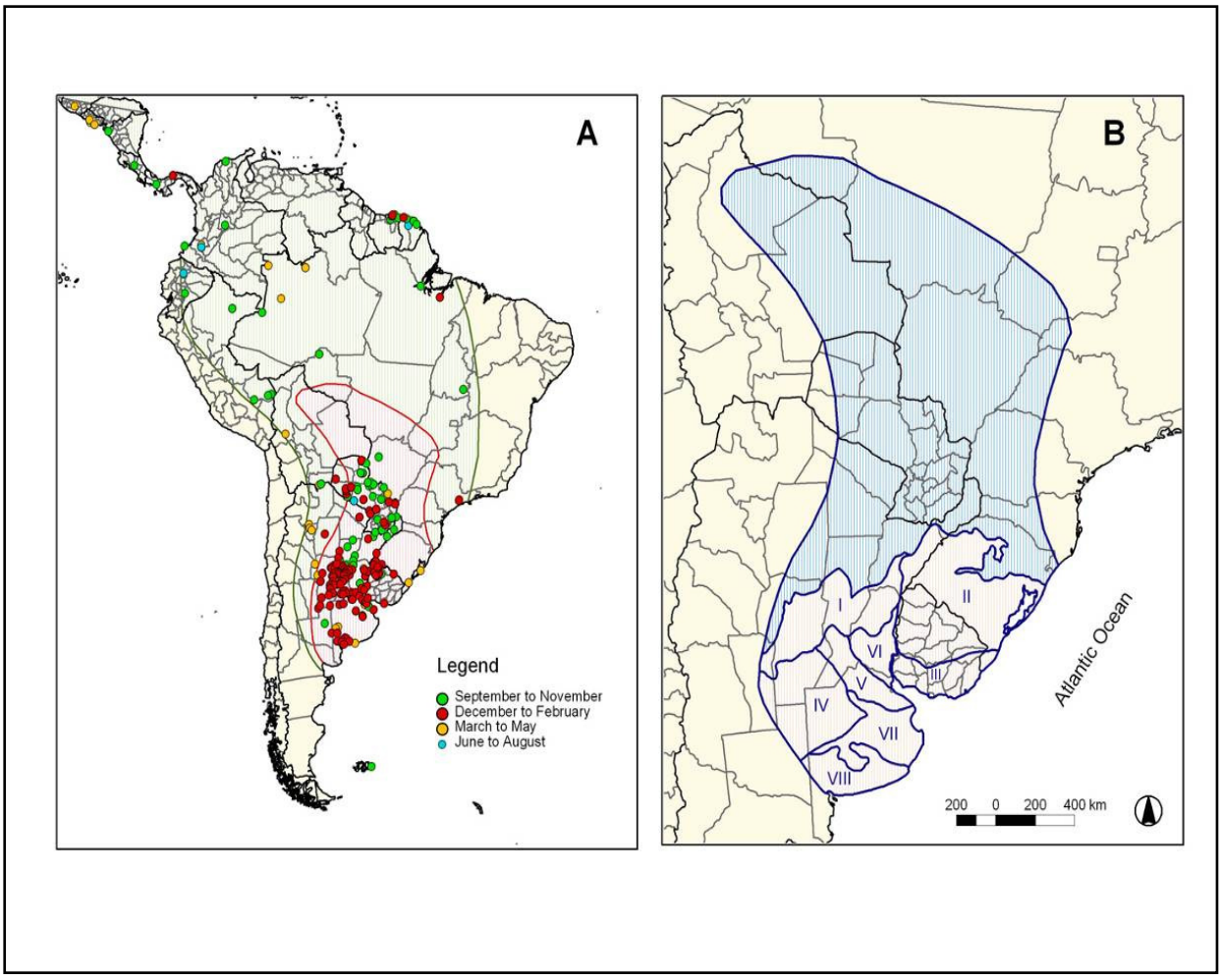

Figure 8. Upland Sandpiper seasonality of records **(A)**, and division of the nonbreeding range (**B**). The eight distribution zones of the Main Nonbreeding Range (MNR) are in tan and numbered accordingly: I) Modified Espinal; II) Northern Campos; III) Southern Campos; IV) Inland Pampa; V) Rolling Pampa; VI) Mesopotamic Pampa; VII) Flooding Pampa; and VIII) Southern Pampa. The Secondary Nonbreeding Range (SNR) is based on Ridgely *et al.* (2003) and is indicated in blue.

The MNR localities are characterized by larger numbers of Upland Sandpipers observed during the austral summer months. The SNR localities generally have lower numbers, with the highest counts recorded during migration. For example, in Salto, Argentina (within the MNR), the species was recorded from October to March, and the highest counts occurred in December and January (Figures 8A and 9A, A.G. Di Giacomo *in litt.*). Conversely, data from Bahía de Asunción, Paraguay (within the SNR), clearly revealed that sightings and abundances of the

species were higher during the period of southbound migration in October and November (Figures 8A and 9B, Guyra Paraguay 2006).

The Upland Sandpiper MNR has been divided into eight zones based mainly on the Rio de la Plata Grasslands and the Ecoregions of Argentina maps (Soriano 1991, Administración de Parques Nacionales 1999). These zones are: I) Modified Espinal; II) Northern Campos; III) Southern Campos; IV) Inland Pampa; V) Rolling Pampa; VI) Mesopotamic Pampa; VII) Flooding Pampa; and VIII) Southern Pampa (Table 1 [see Appendix], Figure 8).

Data on Upland Sandpiper abundances within the MNR are not consistent, but this species seems to be quite common in many sectors, where it is regularly observed in small groups. Records of large flocks are rare, and abundances per locality tend to be low (Table 1 [see Appendix]; Figure 10).

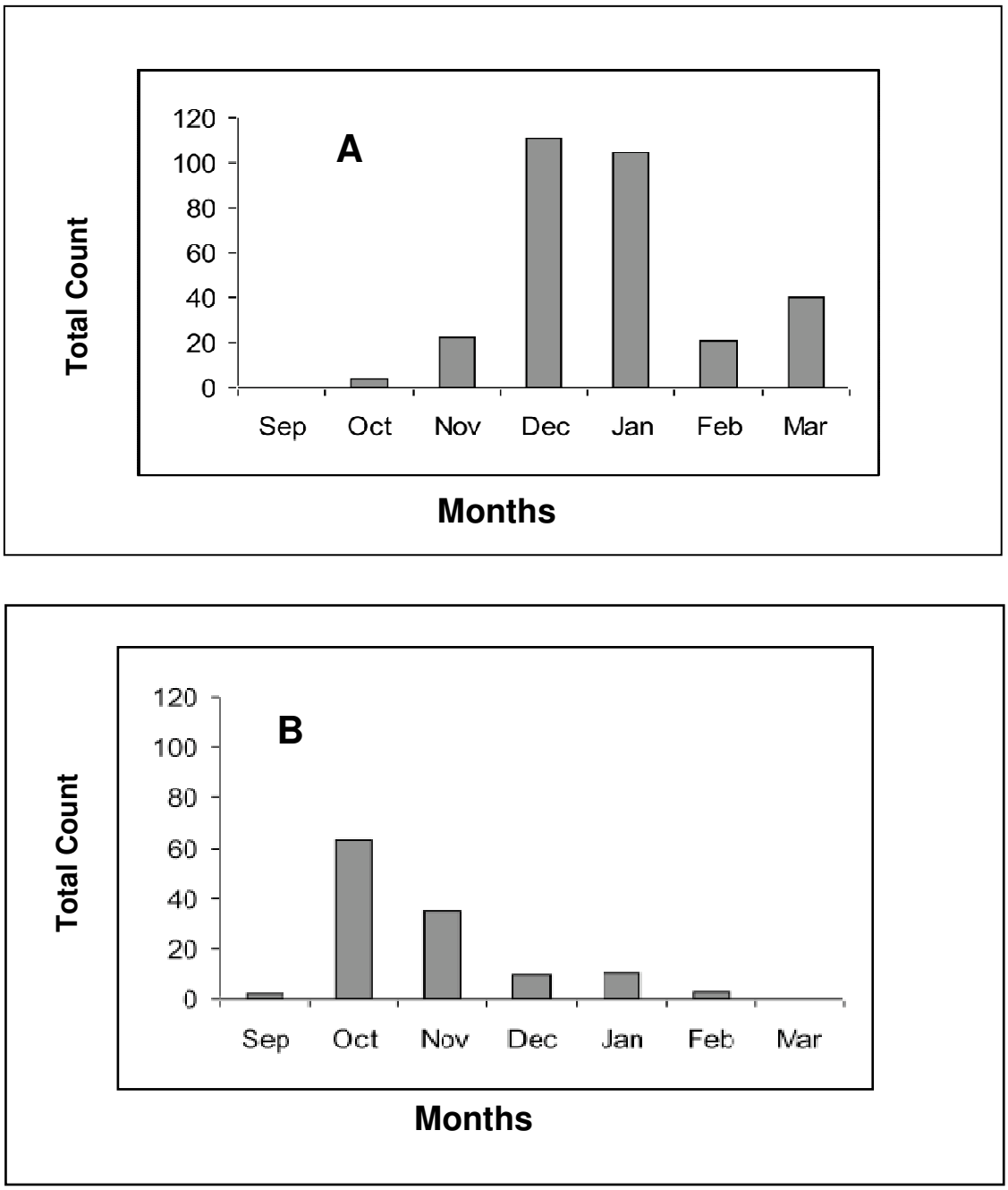

Figure 9. Total Upland Sandpiper counted per month at: (**A**) Salto (Buenos Aires Province, Argentina) from December 1984 to January 1995 (A.G. Di Giacomo *in litt*.); and (**B**) Asunción Bay (Central Department, Paraguay) from October 2000 to September 2003 (Guyra Paraguay 2006).

The largest numbers were recorded in Zone I (Modified Espinal), followed by Zones VIII (Southern Pampa), II (Northern Campos, particularly the northwest Uruguay sector), IV (Inland Pampa), and V (Rolling Pampa) (Tables 1 and 2 [see Appendix]). The maximum count of 1,265 birds was recorded at Mar Chiquita Lagoon, Córdoba Province, Argentina (P. Michelutti *in litt.*). In the Inland Pampa, the species is regularly observed in small groups; the highest densities have been recorded in wheat stubble, where groups of five to 10 birds are common, sometimes in the same field (I. Roesler *in litt.*). Recent data from Uruguay suggest the importance of the Artigas and Salto Departments' grasslands for this sandpiper, with densities of 1.18 to 1.34 individuals per kilometer of transect (J. Aldabe *in litt.*).

Smaller numbers were registered within the SNR and the migration range, with the highest counts in the austral spring months (Guyra Paraguay 2006, Belton 2000, R.A. Dias *in litt.*, I. Accordi *in litt.*). A maximum record of 1,100 birds was recorded at Monte de Las Barrancas-Salinas Grandes (Córdoba Province, Argentina) during the northbound migration (R. Miatello *in litt*.) (Table 2 [see Appendix]).

Based on Upland Sandpiper numbers (Tables 1 and 2 [see Appendix]; Figure 8B), the following areas and localities should be considered in future conservation initiatives:

- **Zone I**, particularly the surroundings of Laguna Mar Chiquita and Bañados del Río Dulce in Cordoba Province, Argentina. This site has protection status as a Provincial Reserve, and is also a WHSRN Site, Ramsar Site, and an Important Bird Area (IBA CO07).
- **Zone II**, particularly the grasslands of Salto and Artigas Departments in Uruguay (A. Azpiroz *in litt.*, J.M. Venzal *in litt.*, J. Aldabe *in litt.*).
- **Zone VIII**, particularly the Counties of Bahía Blanca, Coronel Rosales, Tornquist, Coronel Dorrego, Coronel Pringles, and Tres Arroyos in Buenos Aires province, Argentina.

Other zones to be assessed and also considered:

- **Zone IV**, particularly the following areas of Argentina: northwest Buenos Aires Province (Counties of General Villegas, America, Carlos Tejedor, Trenque Lauquen, Ameghino and Pinto); northeast La Pampa Province (County of Chapaleufú); and southern Córdoba Province (from the County of Rufino to the Río Cuarto region) (I. Roesler *in litt.*).
- **Zone II**, particularly the southern portion of the State of Rio Grande do Sul, Brazil.

- **Zone V**, particularly the northern tip of Buenos Aires and the south of Santa Fe Provinces, Argentina.

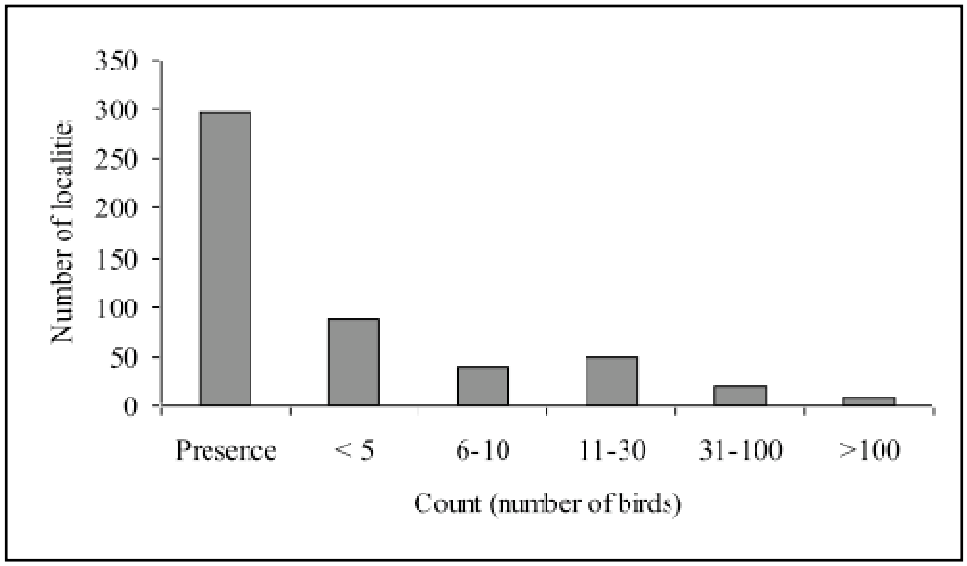

Figure 10. Number of Upland Sandpipers registered per locality (*N = 523*) in South and Central America.

CONSERVATION THREATS

The greatest threats the Upland Sandpiper faces are loss of habitat and the use of agrochemicals on both the breeding and nonbreeding grounds.

HABITAT LOSS AND DEGRADATION

In North America, changes in ranching and farming practices pose the greatest threats to Upland Sandpiper breeding populations. The conversion of rangeland to row-cropping in the Prairie Pothole Region is probably the greatest threat for nesting sandpipers. In the East, loss and fragmentation of habitat due to increased urbanization and natural forest succession are also substantial threats (Carter 1992). This species has disappeared or declined in portions of the eastern United States (Massachusetts, New York, Pennsylvania, Ohio, Indiana, and Illinois). Frequent cutting of hayfields, usually several times per year, has a substantial adverse impact on nesting sandpipers. In addition, eggs and chicks are vulnerable to mammalian and avian predators; raptors, primarily falcons, pose threats to adults.

In Argentina, much of the original natural grassland in the Pampas has been replaced by croplands—mainly wheat, maize, sorghum, soybeans, and pastures like alfalfa (Soriano 1991)—with more than 80% of the initial grasslands being converted (S. Krapovickas pers. comm.). The association of nonbreeding Upland Sandpipers with cultivated lands suggests that this shorebird may actually have benefited from this change in land use, at least within some areas of its main nonbreeding range. This was particularly noted for Paraguay (H. del Castillo *in litt.*). In other sectors in northwest Uruguay, the species is more frequently observed in natural grasslands than in planted pastures and crops (A. Azpiroz *in litt*., J. Aldabe *in litt.*).

SHOOTING AND TRAPPING

Historically, Upland Sandpipers were intensively hunted in North America. For example, in 1890, two game dealers in Boston received over 9,000 Upland Sandpipers for sale (Mackay 1891). From the late 1870s to approximately 1890, some 50,000 to 60,000 Upland Sandpipers were shipped annually from Nebraska (Houston and Bowen 2001). Hunting pressure in North America abated after the passage of Canada's Migratory Birds Convention Act in 1917 and the U.S. Migratory Bird Treaty in 1918 (Houston and Bowen 2001). However, the effects of market hunting may persist to the present. Subsistence hunting was not a major threat to the Upland Sandpiper in Argentina (Canevari and Blanco 1994), but it could have some impact in specific locations in Paraguay (R. Clay *in litt.*) and in Barbados (Hutt 1991, in Houston and Bowen 2001).

PESTICIDES AND OTHER CONTAMINANTS/TOXIC MATERIALS

The use of insecticides and other agrochemicals associated with cultivation practices has been identified as one of the main threats to the Upland Sandpiper in Argentina (R. Miatello pers comm., P. Michelutti *in litt.*) and in Paraguay (H. del Castillo *in litt*.). Specifically, in the case of Swainson's Hawk (*Buteo swainsoni*), the use of Monocrotophos to kill grasshoppers in the 1990s resulted in the death of thousands of hawks (Goldstein *et al*. 1996). In Argentina, dead Upland Sandpipers have been found after the spraying of pesticides in southern Córdoba Province (S. Salvador, in A.G. Di Giacomo *in litt*.), but the real impact to the population is not known. In Santa Fe Province, spraying of agrochemicals is thought to be one of the potential causes of the species' decline in this region (M. De La Peña *in litt*.).

Detrimental effects have not been documented for Upland Sandpipers on the breeding grounds despite the use of insecticides such as Guthion® there, but this has not been adequately studied. It is unclear whether insecticide use might affect invertebrate abundance or be toxic to fledglings or adults, and should be studied.

HUMAN DISTURBANCE

Farming practices, such as haying, can adversely affect Upland Sandpipers, but this is probably not a substantial problem in most of the species' breeding range. Human activities in Paraguay have been mentioned as a threat to nonbreeding Upland Sandpipers, but without identifying specific disturbances (R. Clay *in litt.*).

CONSERVATION STRATEGIES AND ACTIONS

HABITAT PROTECTION

Protect large tracts of suitable or potential nesting habitat. The Prairie Pothole Joint Venture has adopted the U.S. Shorebird Conservation Plan's goal of increasing the Upland Sandpiper population size to 126,900 birds, or approximately 63,500 pairs (Casey *et al.* 2005). If Upland Sandpiper rely primarily on blocks of 100 hectares, and there are approximately 4 pairs per 100 hectares (or 1 pair per 25 hectares), then nearly 1.6 million hectares of suitable grassland habitat would need to be protected. The Upper Mississippi–Great Lakes Joint Venture has a population target of 45,000 pairs, but has estimated that only 225,000 hectares of preferred habitat would be necessary to achieve this goal (Potter *et al.* 2007). This habitat total implies a calculation of 1 pair per 5 hectares, or 20 pairs per 100 hectares. This habitat estimate, therefore, might be too low, and worth reconsideration.

Maintain grazed lands on private cattle ranches. Upland Sandpipers are abundant in grazed native prairies, many of which are found on large private ranches in the Prairie Pothole Region. Given the variability in cattle prices, private ranches are frequently obliged to diversify their operations, often by planting row crops. Because crop agriculture receives federal subsidies whereas ranching does not, there is considerable financial incentive to plow the prairie for row crops. Any program that helps ranchers to keep grazing cattle in a way that is beneficial to Upland Sandpipers should be encouraged. This could be accomplished through acquisition of

grassland easements, assistance with water projects, and grazing systems. The same concerns are also true for South America.

Manage public grasslands for birds. Public grasslands on federal and state protected areas in Illinois and throughout the Midwestern states should be managed in a way that benefits nesting Upland Sandpipers and other grassland-dependent birds. Management on public lands can partially compensate for loss and deterioration of habitat on private land (Kirsch and Higgins 1976).

Provide incentives for private grasslands conservation. Incentive-based or subsidy programs should be developed to encourage or assist private landowners in maintaining large grassland pastures, especially in regions where the species has declined or where the breeding population is not increasing (i.e., St. Lawrence Plains and the Northeast in general).

HABITAT MANAGEMENT

Breeding Season

High-quality nesting habitat should be established within grasslands by maintaining a mosaic of vegetation heights through appropriate grazing, prescribed burning, or mowing (Carter 1992). The intensity of grazing and the frequency of burning or mowing will vary over the species' geographic range and will accommodate differences in successional stages of the vegetation. More detailed habitat-management recommendations include the following:

Burning: Prescribed burning of fields, rotating every 2 to 4 years, is recommended depending on precipitation patterns. To maintain native mixed grasslands, Kirsch and Higgins (1976) recommended rotational burning at 3-year intervals. Higgins' studies on grassland management in North Dakota (1986) suggest that, when averaged over the subsequent three to four growing seasons, fall burns may enhance nest success more than spring burns. Grasslands managed by fire need periods of rest to allow for vegetation re-growth and some residual cover accumulation. Where possible, burning should be conducted when sandpipers are not actively nesting. Only part of large units (greater than 75 hectares) should be burned in any year (Jones and Vickery 1997).

Grazing: Moderate grazing can provide optimal nesting habitat. The appropriate grazing intensity will need to be determined for each region, but should ultimately result in a mosaic of grass heights.

Hay Fields: Grasses in nesting fields should be short (10–20 centimeters) at the time of spring arrival. In the Northeast, mowing every 1 to 3 years usually maintains grass in this height range each spring (Jones and Vickery 1997). All haying operations in nesting fields should be curtailed until after chicks have hatched in mid-July.

Airfields: At airfields, grasses should be maintained at a height of 20 to 30 centimeters in areas not directly adjacent to runways or taxiways. Mowing of these taller-grass areas should be restricted during the nesting and brood-rearing period (1 May to 15 July) to reduce the potential for nest destruction and mortality of incubating adults or flightless young. Maintaining such taller-grass areas provides nesting habitat for Upland Sandpipers, discourages large concentrations of social flocking birds, and reduces overall mowing costs.

Nonbreeding Season

Partnerships with national and local authorities and with governmental institutions should promote best cultivation practices among farmers. Such practices would involve reducing the use of agrochemicals and adjusting grassland burning regimes to benefit Upland Sandpipers and other grassland bird species in agro-ecosystems.

Partnerships with private landowners should promote native grassland conservation. Additionally, national and local campaigns should be developed to raise awareness about the importance of conserving Upland Sandpiper populations and habitats. Target groups would include farmers and other relevant landowners or managers, school children, and the general public.

RESEARCH AND MONITORING NEEDS

Upland Sandpipers have been studied on the breeding grounds for many years, and this research continues to the present. Very little is known about Upland Sandpiper migrations and staging areas, however. The species has received relatively little quantitative study in South

America during the nonbreeding season. The primary research needs are presented below, categorized by lifecycle stages and in no particular priority order therein:

RESEARCH

Range-wide

- Determine whether breeding populations are discrete in both the breeding and nonbreeding seasons.
- Determine whether Upland Sandpipers in the Midwestern United States have a different nonbreeding range than those in the East.
- Preliminary observations from different localities within the Upland Sandpiper's main nonbreeding range (MNR) suggest a decline in numbers. Therefore, assess the species' current population status and trends overall, and determine which threats and factors are contributing to this possible decline.

Breeding Range

- Refine grassland management techniques such as grazing, prescribed burning, and mowing for each major ecological region in order to maintain high-quality nesting habitat throughout the species' breeding range.
- Determine whether the breeding populations are genetically distinct.
- Expand the use and development of spatial models to identify high-quality Upland Sandpiper breeding habitat.
- Continue, as well as expand, efforts to monitor Upland Sandpiper populations. The Breeding Bird Survey (BBS) provides a reasonable method for monitoring Upland Sandpipers in the upper Midwest (North Dakota, South Dakota, Nebraska, Kansas) where the species is quite common; the BBS is less valuable in areas where sandpipers are less common and more locally distributed. Additional programs, such as the Illinois Species Bird Count, can provide more detailed data regarding population trends in such areas (J. Herkert, pers. comm.).

- In the Midwest, where Upland Sandpipers have traditionally relied on pastures, determine if this species is using additional habitats; if so, determine brood survival in those areas.
- Determine Upland Sandpiper demography with greater accuracy. For instance, do first-year sandpipers breed? If so, what are the rates of success? How long do Upland Sandpipers live?

Migration

- Develop more precise knowledge of Upland Sandpiper migration routes, timing, and energetic requirements.
- Determine if males migrate at different times than females and juveniles.
- Identify the primary risks during migration. In particular, determine the regularity, source, and significance of Upland Sandpiper mortality during southbound migration in the High Andes of Ecuador.
- Develop and refine spatial models to identify important migratory stopover sites.
- Determine the degree and timing of Upland Sandpiper movements in South America. For instance, does this species migrate directly to nonbreeding grounds or are there stopover sites?
- Identify the main stopover sites used, if any, during migration in South America.

Nonbreeding Range

- Refine our knowledge of important nonbreeding sites or regions in South America. As with many species, lack of data about Upland Sandpipers in the nonbreeding range prevents the implementation of targeted actions to help conserve them. For instance, important information gaps exist in the Inland Pampa of Argentina (Figure 8, Zone IV). More studies are also needed to assess the size of the nonbreeding population in northern South America, particularly in Suriname, Guyana, and French Guiana.
- Determine if Upland Sandpipers return to the same sites in South America each year.
- Determine more precisely what habitats Upland Sandpipers use during the nonbreeding season. For instance, we know that nonbreeding Upland Sandpipers are associated with

crops, pastures, and natural grasslands, but it is not clear what proportion of the population uses these habitats. It is also unclear how Upland Sandpipers use different crops during this time of year. For instance, does the species undertake local or regional movements to follow the crop cycle? Do alfalfa fields play a key role as nonbreeding habitat for this species?

- Assess the species' habitat requirements in relation to cattle management practices in cattle-raising fields.
- The use of agrochemicals is very likely one of the main threats to nonbreeding Upland Sandpiper. It should be a priority to study and quantify the impacts of agrochemicals on the nonbreeding population.

MONITORING

South America

The highest monitoring priority is in South America. There are no data that identify critical nonbreeding habitats or provide clear population trends. It will be important to develop a randomized sampling protocol that stratifies major habitat types (native grassland, grazed grassland, agricultural crops, etc.). Once identified, these sites should be sampled on a regular basis, ideally as part of a multi-species monitoring program such as the Program for Regional and International Shorebird Monitoring (PRISM) or as an expansion of the Neotropical Waterbird Census. In the breeding season, the Breeding Bird Survey provides an adequate measure of population trends in the Midwest, but this system should be expanded into areas that are not adequately monitored, including the blueberry barrens of Maine and New Brunswick.

Management Programs

Assessing the effectiveness of active management programs should be a high priority. As new information becomes available, it could be communicated via the U.S. Geological Survey's management practices document (http://www.npwrc.usgs.gov/resource/literatr/grasbird/upsa/upsa.htm). Information on regional fledging success and characterization of nesting cover will be important for making local management recommendations.

Environmental Contaminants

Determining if and how agrochemicals adversely affect the Upland Sandpiper, both on breeding and nonbreeding grounds, is very important. Conducting coordinated studies in North America and South America on potential chemical accumulation and the potential effects should be a high priority.

CONSERVATION ACTION TIMELINE

The recommended priority actions for the conservation of Upland Sandpipers in the Western Hemisphere are:

By 2008, permanently protect an additional 5,000 hectares of native prairie in landscapes identified as having high densities of Upland Sandpipers in the core of the species' breeding range. Continue annually until at least a total of 100,000 hectares are protected.

By 2008, initiate a research project(s) to determine the causes and magnitude of Upland Sandpiper mortality occurring in the high Andes of Ecuador.

By 2008, develop a system for monitoring nonbreeding Upland Sandpiper populations through a hemispheric-scale cooperative network, using the most current survey techniques and occupancy models.

By 2009, convene an Upland Sandpiper conservation and management workshop with participation from federal, state, and local agencies, agricultural and ranching landowners/managers, and other relevant science and conservation organizations (U.S. and Latin American) to assess current land management practices in light of the species' population declines and breeding-range needs.

By 2009, design and implement research project(s) to discern nonbreeding Upland Sandpiper's use of agricultural/ranching habitat. In particular, study its use of different crops in relation to the crop cycles, and its habitat requirements in relation to how cattle-raising fields are managed.

By 2009, design and implement a program to assess and monitor the impact of agrochemicals on nonbreeding Upland Sandpiper population in the Pampas of Argentina.

By 2009, initiate a research project(s) to quantify the importance of habitats to Upland Sandpipers in lesser-known areas/regions of its main nonbreeding range. Focal areas could include:

- Zone II (Brazil): southern portion of the Rio Grande do Sul State.
- Zone IV (Argentina): northwest of Buenos Aires Province [counties of General Villegas, America, Carlos Tejedor, Trenque Lauquen, Ameghino and Pinto]; northeast of La Pampa Province [county of Chapaleufú]; and south of Córdoba Province.
- Zone V (Argentina): northern tip of Buenos Aires Province and south of Santa Fe Province.

By 2010, initiate a research project(s) to determine important demographic parameters related to the age when Upland Sandpipers first breed; further determine nest success of inexperienced breeders versus experienced adults.

By 2010, determine which factors are limiting the Upland Sandpiper population: In particular, is population growth limited by inadequate reproductive success, high rates of mortality in migration, or low survival rates on the nonbreeding grounds? In South America, how does the use of agrochemicals affect the species' mortality rate within the Pampas?

By 2010, refine knowledge about Upland Sandpiper nonbreeding areas in southern South America by better identifying and quantifying key sites, and assessing main threats to the species. Focal areas would include:

- Zone I (Argentina): modified Espinal, particularly the surroundings of Laguna Mar Chiquita and Bañados del Río Dulce.
- Zone II (Uruguay): grasslands of Salto and Artigas Departments.
- Zone VIII (Argentina): southern Pampas, particularly the Counties of Bahía Blanca, Coronel Rosales, Tornquist, Coronel Dorrego, Coronel Pringles and Tres Arroyos.

By 2010, initiate a research project(s) to determine whether the three geographically concentrated populations of breeding Upland Sandpipers differ genetically or are panmictic.

By 2010, refine and expand the system for monitoring breeding Upland Sandpipers in the U.S. Northeast, Illinois, and Oregon, where the species is inadequately sampled by the Breeding Bird Survey.

By 2010, using satellite radio technology, determine the Upland Sandpiper's migration routes to and from its nonbreeding range in South America, as well as the timing of its movements between sites within South America.

By 2012, convene two workshops (one in North America, another in South America) between national and local governmental representatives, agricultural-related authorities, farmers, and local environmental organizations to address the use of agrochemicals and their impact on Upland Sandpiper populations. Attendees will discern the best cultivation practices, and develop mechanisms for implementing them.

By 2015, following genetic studies conducted on breeding populations, determine if the southern and north-eastern South American nonbreeding populations are genetically related, and which breeding areas they are using.

By 2015, determine the age structure for Upland Sandpipers, particularly how long the species breeds and lives.

EVALUATION

Conservation actions should be evaluated separately for each part of the Upland Sandpiper's year round requirements. Breeding-season actions should be linked to increased population and productivity, which should increase by > 1.0% annually in the Midwest and Northeast. Once the degree and regularity of Upland Sandpiper mortality in the Andes is accurately determined, and if this point of mortality is found to be a limiting factor, actions in this region need to demonstrate reduced mortality. Efforts in South America should also result in improved monitoring protocols and the identification of preferred habitats. If toxicity studies demonstrate detrimental affects to Upland Sandpipers, efforts to reduce use of agrochemicals need to show declines in chemical residue and mortality of birds in agro-ecosystems during the nonbreeding season.

CURRENT OR POTENTIAL COLLABORATORS

Table 3 (see Appendix) lists the contact information for researchers and other conservationists, by country, that have been involved in grassland-associated shorebird initiatives and, more specifically, in Upland Sandpiper research and monitoring. They represent potential collaborators on efforts to research, monitor, and conserve this species, and would be welcomed participants in various initiatives.

LITERATURE CITED

Administración de Parques Nacionales.1999. Eco-regiones de la Argentina. Componente de Política Ambiental. PRODIA-SRNyDS. Buenos Aires, Argentina.

Ailes, I.W. 1980. Breeding biology and habitat use of the upland sandpiper in central Wisconsin. Passenger Pigeon 42:53–63.

American Ornithologists' Union (AOU) Committee on Classification and Nomenclature. 1983. Check-list of North American Birds. Sixth Edition. American Ornithologists' Union, Allen Press, Inc., Lawrence, Kansas, USA.

Antas, de Tarso Zuquin P. 1983. Migration of Neartic Shorebirds (Charadriidae and Scolopacidae) in Brasil, flyways and their different seasonal use. Wader Study Group Bulletin. 39: 52–56.

Antas, de Tarso Zuquin P. 2004. Pantanal: Guía de Aves. Sesc. Depto. Nacional. Rio de Janeiro, Brazil.

Bart, J., S. Brown, B. Harrington, and R.I.G. Morrison. 2007. Survey trends of North American Shorebirds: population declines or shifting distributions? Journal of Avian Biololgy. 38: 73–82.

Belton, W. 2000. Aves do Rio Grande do Sul. Distribuiçao e Biologia. Editora Unisinos, Coleçao Fisionomia Gaúcha 2. Sao Paulo, Brasil.

Bennett, A.G. 1938. Bartram's Sandpiper on the Falkland Islands. Ibis 14(2): 764.

Bent, A. C. 1929. Life histories of North American shore birds. Part II. U.S. National Museum Bulletin No. 146. Washington, D.C., USA.

BirdLife International. 2006. Upland Sandpiper *Bartramia longicauda* - Neotropical factsheet. On line at: http://www.birdlife.info/neotropical /speciesfactsheets (accessed June 2006).

Blanco, D.E., R. Banchs, and P. Canevari. 1993. Critical sites for the Eskimo Curlew (*Numenius borealis*), and other Neartic grassland shorebirds in Argentina and Uruguay. Report to the U.S. Fish and Wildlife Service, Wetlands for the Americas. Buenos Aires, Argentina.

Blanco, D.E., R.B. Lanctot, J.P. Isacch, and V.A. Gill. 2004. Pastizales templados del Sur de América del Sur como hábitat de aves playeras migratorias. Ornitología Neotropical 15 (Suppl.): 159–167.

Blanco, D.E., B. López-Lanús, R.A. Dias, A. Azpiroz, and F. Rilla. 2006. Uso de arroceras por chorlos y playeros migratorios en el sur de América del Sur. Implicancias de conservación y manejo. Wetlands International. Buenos Aires, Argentina.

Bolster, D. C. 1990. Habitat use by the Upland Sandpiper in northeastern Colorado. MS thesis, University of Colorado, Boulder, Colorado, USA.

Bolster, D.C. and S.K. Robinson. 1990. Habitat use and relative abundance of migrant shorebirds in a western amazonian site. Condor 92: 239–242.

Brown, S., C. Hickey, B. Harrington, and R. Gill (Eds.). 2001. The U.S. Shorebird Conservation Plan, 2nd Ed. Manomet Center for Conservation Sciences, Manomet, Massachusetts, USA.

Bucher, E.H. and M. Nores. 1988. Present status of birds in steppes and savannas of northern and central Argentina. *In* Goriup, P.D. (Ed.): Ecology and Conservation of Grassland Birds (ICBP Technical Publication 7): 71–79.

Buhnerkempke, J. E., and R. L. Westemeir. 1988. Breeding biology and habitat of upland sandpipers on prairie-chicken sanctuaries in Illinois, USA. Trans. Illinois State Academy of Science 81:153–162.

Calmé, S., and S. Haddad. 1996. Peatlands: a new habitat for the Upland Sandpiper, *Bartramia longicauda*, in eastern Canada. Canadian Field-Naturalist. 110: 326–330.

Canevari, P. and D.E. Blanco. 1994. Literature Search for the Eskimo Curlew (*Numenius borealis*). U.S. Fish and Wildlife Service. 66 pp.

Canevari, P., G. Castro, M. Sallaberry, and L.G. Naranjo. 2001. Guía de los chorlos y playeros de la Región Neotropical. American Bird Conservancy, WWF-US, Humedales para las Américas, Manomet Center for Conservation Sciences and Asociación Calidris. Santiago de Cali, Colombia.

Carter, J. W. 1992. Upland Sandpiper, BARTRAMIA LONGICAUDA. Pages 235–252 *in* Migratory nongame birds of management concern in the Northeast (K. J. Schneider and D. M. Pence, Editors). U.S. Dept. of Interior–U.S. Fish and Wildlife Service, Newton Corner, Massachusetts USA. 400 pp.

Casey, D., K. Forman, D. Granfors, R. Johnson, C. Lively, D. Naugle, N. Niemuth, R. Reynolds, and J. Ringelman. 2005. Prairie Pothole Joint Venture – 2005 Implementation Plan (J. Ringelman, Ed.). Available at http://www.ppjv.org.

Cuello, J. and E. Gerzenstein. 1962. Las Aves del Uruguay. Lista sistemática, distribución y notas. Com. Zool. Museo Hist. Nat. de Montevideo 6 (93):1191.

Dale, B. C. 1984. Birds of grazed and ungrazed grasslands in Saskatchewan. Blue Jay 42:102–105.

Delhey, K.J.V., P. F. Petracci, and C.H.F. Pérez. 2001. Observaciones de Charadriiformes en el sur de la Provincia de Buenos Aires, Argentina. Nuestras Aves 42: 14–16.

Di Giacomo, A.G. 2005. Aves de la Reserva El Bagual. *In* Di Giacomo, A.G. and S.F. Krapovickas (Eds.): Historial natural y paisaje de la Reserva El Bagual, Provincia de Formosa, Argentina (Temas de Naturaleza y Conservación 4. Aves Argentinas, Buenos Aires): 203–465.

Droege, S., and J.R. Sauer. 1990. North American Breeding Bird Survey, annual summary, 1989. U.S. Fish and Wildlife Service, Biological Report 90(8). 22 pp.

Faanes, C. A., and G. R. Lingle. 1995. Breeding birds of the Platte River valley of Nebraska. Northern Prairie Wildlife Research Center home page, Jamestown, North Dakota, USA. http://www.npwrc.org/resource/distr/birds/platte/platte.html (Version 16JUL97).

Falardeau, G., and J.-L. Desgranges. 1991. Sélection de l'habitat et fluctuations récentes des populations d'oiseaux des milieux agricoles du Québec. Canadian Field-Naturalist 105: 469–482.

Fontana, C.S., G.A. Bencke, and E.R. Rey (Organizers). 2003. Livro vermelho da fauna ameaçada de extinção do Rio Grande do Sul. Ed. Edipuc. Porto Alegre. 632 pp.

Forbush, E. H. 1925. Birds of Massachusetts and other New England states. Part 1: Water birds, marsh birds and shore birds. Massachusetts Department of Agriculture, Boston, Massachusetts, USA. 486 pp.

García Fernández, J.J., R.A. Ojeda, R.M. Fraga, G.B. Díaz, and R.J. Baigún (compilers). 1997. Libro rojo de mamíferos y aves amenazados de la Argentina. FUCEMA-SAREM-AOP-APN. 221 pp.

Goldstein, M.I., B. Woodbridge, M.E. Zaccagnini, S.B. Canavelli, and A. Lanusse. 1996. Assessment of mortality of Swainson's Hawks on austral grounds in Argentina. Journal of Raptor Research 30: 106–107.

Graber, R. R., and J. W. Graber. 1963. A comparative study of bird populations in Illinois, 1906–1909 ana 1956–1958. Illinois Natural History Survey Bulletin 28:383–528.

Guyra Paraguay. 2004. Annotated checklist of the Birds of Paraguay. Asociación Guyra Paraguay. Asunción, Paraguay.

Guyra Paraguay. 2006. Base de datos de biodiversidad de Guyra Paraguay (August 2006). Asunción, Paraguay.

Haverschmidt, F. 1966. The migration and wintering of the upland sandpiper in Surinam. Wilson Bulletin 78:319–320.

Hayman, P., J. Marchant, and T. Prater. 1986. Shorebirds: an identification guide to the waders of the world. Houghton Mifflin Company, Boston, Massachusetts, USA. 412 pp.

Herkert, J.R. 1994. The effects of habitat fragmentation on Midwestern grassland bird communities. Ecological Applications 4:461–471.

Herkert, J.R., D.W. Sample, and R.E. Warner. 1996. Management of grassland landscapes for the conservation of migratory birds. Pp. 89–116. *In* Managing Midwest Landscapes for the Conservation of Neotropical Migratory Birds. F.R. Thompson III (Ed.). U.S. Forest Service, General Technical Report, NC-187. North Central Forest Experiment Station, St. Paul, Minnesota, USA.

Herman, S.G., J.W. Scoville, and S.G. Waltcher. 1984. The upland sandpiper in Bear Valley and Logan Valley, Grant County, Oregon. Special Report submitted to Oregon Department of Fish and Wildlife, Oregon, USA. 23 pp.

Higgins, K.F. 1986. A comparison of burn season effects on nesting birds in North Dakota mixed-grass prairie. Prairie Naturalist 18(4):219–28.

Higgins, K.F., H.F. Duebbert, and R.B. Oetting. 1969. Nesting of the upland plover on the Missouri Couteau. Prairie Naturalist 1:45–48.

Higgins, K.F., L.M. Kirsch, and I.J. Ball, Jr. 1969. A cable-chain device for locating duck nests. Journal of Wildlife Management 33(4):166–171.

Higgins, K.F., and L.M. Kirsch. 1975. Some aspects of the breeding biology of the upland sandpiper in North Dakota. Wilson Bulletin 87:96–102.

Hilty, S.L. 2003. Birds of Venezuela. Princeton University Press, Princeton and Oxford.

Houston, C.S. and D.E. Bowen, Jr. 2001. Upland Sandpiper (*Bartramia longicauda*). *In* Poole, A. and F. Gill (Eds.): The Birds of North America 580. The Birds of North America, Inc., Philadelphia, Pennsylvania, USA.

Huber, G.E., and A.A. Steuter. 1984. Vegetation profile and grassland bird response to spring burning. Prairie Naturalist 16: 55–61.

Hudson, W.H. 1923. Birds of La Plata. E.P. Dutton, New York, New York, USA.

Igl, L.D., D.H. Johnson. 1997. Changes in breeding bird populations in North Dakota: 1967 to 1992–93. Auk 114: 74–92.

Igl, L.D., and B.M. Ballard. 1999. Habitat associations of migrating and overwintering grassland birds in southern Texas. Condor 101:771–782.

Jones, A.L., and P.D. Vickery. 1997. Conserving grassland birds: managing agricultural lands including hayfields, crop fields, and pastures for grassland birds. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

Jong, B.H. and A.L. Spans. 1984. Waterfowl and wetlands in Suriname. Suriname Forest Service Report 1984-1. Research Institute for Nature Management, Arnhem, Suriname.

Johnson, D.H., and L.D. Igl. 1995. Contributions to the conservation reserve program to populations of breeding birds in North Dakota. Wilson Bulletin 107:709–718.

Kantrud, H.A. 1981. Grazing intensity effects on the breeding avifauna of North Dakota native grasslands. Canadian Field-Naturalist. 95:404–417.

Kantrud, H.A., and K.F. Higgins. 1992. Nest and nest site characteristics of some ground-nesting non-passerine birds of northern grasslands. Prairie Naturalist 24:67–84.

Kirsch, L.M. 1974. Habitat management considerations for prairie chickens. Wildlife Society Bulletin 2:124–129.

Kirsch, L.M., and K.F. Higgins. 1976. Upland sandpiper nesting and management in North Dakota. Wildlife Society Bulletin 4:16–20.

Lindmeier, J.P. 1960. Plover, rail, and godwit nesting on a study area in Mahnomen County, Minnesota, USA. Flicker 32:5–9.

Mackay, H. 1891. The habits of the Golden Plover (*Charadrius dominicus*) in Massachusetts. Auk 8: 17–24.

Messmer, T.A. 1985. Effects of specialized grazing systems on upland nesting birds in southcentral North Dakota. MS thesis, University North Dakota, Fargo, North Dakota, USA.

Messmer, T.A. 1990. Influence of grazing treatments on nongame birds and vegetation strucutre in south central North Dakota. Ph.D. dissertation, University North Dakota, Fargo, North Dakota, USA.

Miatello, R., J. Baldo, M. Ordano, C. Rosacher, and L. Biancucci. 1999. Avifauna del Parque Nacional Quebrada del Condorito y Reserva Hídrica Provincial de Achala, Córdoba, Argentina. Secretaría de Agricultura, Ganadería y Recursos Renovables. Córdoba, Argentina.

Mong, T. W. 2005. Using radio-telemetry to determine range and resource requirements of upland sandpipers at an experimentally managed prairie landscape. MS Thesis, Kansas State University, Manhatten, Kansas, USA.

Morrison, R.I.G. 1993/1994. Shorebird population status and trends in Canada. Bird Trends (3):3–5. Canadian Wildlife Service.

Morrison, R.I.G., R.E. Gill Jr., B.A. Harrington, S. Skagen, G.W. Page, C.L. Gratto-Trevor, and S.M. Haig. 2001. Estimates of shorebirds populations in North America. Occasional Paper 104. Canadian Wildlife Service, Ottawa, Ontario.

Narosky, T. and A.G. Di Giacomo. 1993. Las aves de la provincia de Buenos Aires: distribución y estatus. Asociación Ornitológica del Plata, Vázquez Mazzini Ed. y LOLA. Buenos Aires, Argentina. 128 pp.

Niemuth, N.D., M.E. Estey, and C.R. Loesch. 2005. Developing spatially explicit habitat models for grassland bird conservation planning in the Prairie Pothole Region of North Dakota. Pages 469-477. *In* Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference 2002 (C.J. Ralph and T.D. Rich, Eds.). USDA Forest Service PSW-GTR-191, Albany, California.

Osborne, D.R., and A.T. Peterson. 1984. Decline of the upland sandpiper (BARTRAMIA LONGICAUDA) *in* Ohio: an endangered species. Ohio Journal of Science 84(1):8–10.

Potter, B. A., R. J. Gates, G. J. Soulliere, R. P. Russell, D. A. Granfors, and D. N. Ewert. 2007. Upper Mississippi River and Great Lakes Region Joint Venture Shorebird Habitat Conservation Strategy. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota. 101pp. Available at http://www.uppermissgreatlakesjv.org.

Queal, L. 1973. Fire: tool or tyrant. Kansas Game and Fish 30(1):7–9.

Raffaele, H., J. Wiley, O. Garrido, A. Keith, J. Raffaele. 1998. A guide to the birds of the West Indies. Princeton University Press, Princeton, New Jersey, USA.

Ridgely, R.S., T. Allnutt, T. Brooks, D.K. McNicol, D.W. Mehlman, R.E. Young and R. Zook. 2003. Digital distribution maps on the birds of the Western Hemisphere. Version 1.0. Nature-Serve, Arlington, Virginia.

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, Maryland. Available at http://www.mbr-pwrc.usgs.gov/bbs/bbs.html.

Sauer, J.R., and S. Droege. 1992. Geographical patterns in population trends of Neotropical migrants in North America. Pages 26-42. *In* J.M. Hagan, III, and D.W. Johnston (Editors): Ecology and conservation of Neotropical migrant landbirds. Smithsonian Institution Press, Washington, D.C., USA.

Shriver, W.G., A.L. Jones, P.D. Vickery, A.P. Weik, and J.V. Wells. 2005. The distribution and abundance of obligate grassland birds breeding in New England and New York. Pages 511–518. *In* Bird Conservation and Integration in the Americas (C. J. Ralph and T. D. Rich, Eds.). U.S. Forest Service General Technical Report, Pacific Southwest Research Station, General Technical Report PSW-GTR-191.

Sibley, C.G., and B.L. Monroe, Jr. 1990. Distribution and Taxonomy of birds of the world. Yale University Press, New Haven, Connecticut, USA.

Silveira, L.F. 1998. The birds of Serra da Canastra National Park and adjacent areas, Minas Gerais, Brazil. Cotinga 10: 55–63.

Skagen, S.K., P.B. Sharpe, R.G. Waltermire, M.B. Dillon. 1999. Biogeographical profiles of shorebird migration in midcontinental North America. U.S. Geological Survey's Biological Science Report 2000-003.

Soriano, A. 1991. Río de La Plata Grasslands. *In* Coupland, R.T. (Ed.): Natural grasslands (Volume 8A. Introduction and Western Hemisphere. Ecosystems of the World): 367–407. Elsevier, Amsterdam.

Stewart, R.E. 1975. Breeding birds of North Dakota. Tri-College Center for Environmental Studies, Fargo, North Dakota, USA. 295 pp.

Tester, J.R., and W.H. Marshall. 1962. Minnesota prairie management techniques and their wildlife implications. Transactions of the North American Wildlife and Natural Resources Conference 27:267–87.

United Nations Environment Programme. 1979. Convention on the Conservation of Migratory Species of Wild Animals. Bonn, Germany. Appendix II available at http://www.cms.int/documents/appendix/cms_app1_2.htm#appendix_II.

U.S. Fish and Wildlife Service. 2002. Birds of Conservation Concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99 pp. Available online at http://migratorybirds.fws.gov/reports/bcc2002.pdf.

U.S. Fish and Wildlife Service. 2006. Biogeographic shorebird populations in the U.S. and Canada and regional, international, and hemispheric thresholds for WHSRN status. Available online at http://www.fws.gov/shorebirdplan/USShorebird/downloads/WhsrnPopulation ThresholdsDec05.xls (accessed May 2006).

U.S. Shorebird Conservation Plan. 2004. High Priority Shorebirds—2004. Unpublished report, U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MBSP-4107, Arlington, Virginia, 22203 USA. 5 pp.

Veit, R.R., and W.R. Petersen. 1993. Birds of Massachusetts. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

Venzal, J.M., A. Stagi, and I. Loinaz (in press). Chorlos de Pastizal. ACHARA.

Vickery, P.D. 1992. A Regional analysis of endangered, threatened and special concern birds in the northeastern United States. Trans. Northeast Sector of the Wildlife Society 48:1–10.

Vickery, P.D., M.L. Hunter, Jr., and S.M. Melvin. 1994. Effects of habitat area on the distribution of grassland birds in Maine. Conservation Biology 8:1087–1097.

Vickery, P.D., M.L. Hunter, Jr., and J.V. Wells. 1999. Effects of fire and herbicide treatment on habitat selection of grassland birds in southern Maine. Studies in Avian Biology 19:149–159.

Walsh, J., V. Elia, R. Kane, T. Halliwell. 1999. Birds of New Jersey. New Jersey Audubon Society, Bernardsville, New Jersey, USA.

Wells, J.V., and K.V. Rosenberg. 1999. Grassland bird conservation in northeastern North America. Studies in Avian Biology 19:72–80.

Wetlands International. 2006. Neotropical Waterbird Census database. Wetlands International, Buenos Aires, Argentina.

White, R.P. 1983. Distribution and habitat preferences of the upland sandpiper (BARTRAMIA LONGICAUDA) in Wisconsin. American Birds 37:16–22.

White, R.P. 1988. Wintering grounds and migration patterns of the upland sandpiper. American Birds 42:1247–1253.

Wilcove, D. 1996. Prairie home companions. Living Bird 15:6–7.

Wilhelm, G. 1995. Scenario of the Upland Sandpiper in western Pennsylvania. Pennsylvania Birds 8: 204–205.

Yank, R., and L. Breton. 1996. Upland Sandpiper. Pp. 482–483. *In* The breeding birds of Québec: atlas of the breeding birds of southern Québec (J. Gauthier and Y. Aubry, Eds.). Assoc. québecoise des groupes d'ornithologues, Province of Québec Society for the Protection of Birds, Canadian Wildlife Service, Environment Canada, Québec Region, Montreal, Canada.

ADDITIONAL BIBLIOGRAPHY

The following references were used to develop the maps in Figures 6 and 8, but were not quoted in the main text:

Areta, I. (in prep.). *Bartramia longicauda*. *In* López-Lanús, B. (Ed.): Bird sounds of southern South America. Audiornis Producciones and Aves Argentinas (DVD format).

Berterame, G., G. Bonomi, G. Corthey, E. Rivarola, and F. Torrano. 2000. Conteo primavera 2000, Departamento Concordia, Entre Ríos, Argentina. Ceydas: Centro para el Estudio and Defensa de las Aves Silvestres. Concordia, Argentina.

Fraga, R. (in prep.). *Bartramia longicauda*. *In* López-Lanús, B (Ed.): Bird sounds of Southern South America. Audiornis Producciones and Aves Argentinas (DVD format).

Giraudo, A.R., M.L. Chatellenaz, C.A. Saibene, M.A. Ordano, E.R. Krauczuk, J. Alonso, and A.S. Di Giacomo. 2003. Avifauna del Iberá: composición y datos sobre su historia natural. *In* Álvarez, B.B. (Ed.): Fauna del Iberá: 195–234 . EUDENE, Corrientes, Argentina.

Guyra Paraguay. 2005. Atlas de las aves de Paraguay. Asunción, Paraguay.

Hayes, F.H., S.M. Goodman, J.A. Fox, T. Granizo Tamayo, and N.E. López. 1990. North American bird migrants in Paraguay. Condor 92: 947–960.

Lemke, T. 1977. Check list of the birds of El Parque Nacional Natural de La Macarena, Meta, Colombia.

López-Lanús, B., A. Bodrati, D. Monteleone, I. Roesler, P. Blendinger, and M.E. Álvarez (in press). Sonidos de aves de Acambuco, Provincia de Salta, Argentina (apéndice auditivo del inventario de aves de la Unidad de Gestión Acambuco). *In* Coconier, E. (Ed.): Inventario de las Aves Silvestres de la Unidad de Gestión Acambuco (Temas de Naturaleza y Conservación. Monografía de Aves Argentinas Nº 6. Serie Audio No.1). Buenos Aires (CD format).

Negret, A.J. 1994. Nota sobre los chorlitos migratorios en los alrededores de Popayán. Boletín SAO No. 5(10): 8–10.

Nores, M., D. Izurieta, and S.A. Salvador. 1991. Lista y distribución de las aves de Santiago del Estero, Argentina. Boletín de la Academia Nacional de Ciencias, Córdoba, Argentina.

Pacheco, J.F. and F. Olmos. 2006. As aves do Tocantins 1: Regiao Sudeste. Revista Brasileira de Ornitología 14: 85–100.

Petracci, P.F., K.J.V. Delhey, C.H.F. Pérez, D. Basanta, M.V. Massola, M. Zamorano, and M. Fosatti. 2004. Nuevos aportes al conocimiento de la distribución y anidación de algunas especies de aves en la Argentina. Nuestras Aves 48: 25–31.

Ridgely, R.S. and P.J. Greenfield. 2001. The birds of Ecuador, status, distribution and taxonomy. Cornell University Press, Ithaca, New York, USA.

Ruiz, C.J.G. 2004. Distribución espacio-temporal y comportamiento de aves playeras en el Parque Nacional Natural Sanquianga (Nariño, Colombia). Universidad del Atlántico, Facultad de Ciencias Básicas, Programa de Biología. Barranquilla, Colombia.

Swennen, C. and A.L. Spaans. 1985. Habitat use of feeding migratory and local Ciconiiform, Anseriform and Charadriiform birds in coastal wetlands of Surinam. Le Gerfaut 75: 225–251.

Wetmore, A. 1926. Observations on the birds of Argentina, Paraguay, Uruguay, and Chile. U.S. National Museum Bulletin 133: 1–448.

APPENDIX

Table 1. Characterization of the Upland Sandpiper (UPSA) Main Nonbreeding Range (MNR) Zones.

MNR Zones	Habitat [1]	Current land use	Upland Sandpiper numbers (see Table 2 for more detail about localities)
I – Modified Espinal	"Espinal," which encompasses woodlands, savannas, and grasslands, is severely modified today by grazing and cultivation. The landscape varies from flat to gently rolling.	Mainly agriculture.	UPSA Records= 106 (88 with count data) Averaged count= **31 birds** (N= 88) Maximum count= **1,265 birds** (Miramar- Mar Chiquita Lagoon). Other important localities: NE of Morteros (350 birds) and S of Hernando (160 birds).
II - Northern Campos	Grasslands structurally similar to those of the Pampas and of the Southern Campos, but with different floristic composition. The relief is generally flat; sometimes interrupted by rock outcrops and sand deposits.		UPSA Records= 48 (43 with count data) Averaged count= **16 birds** (N=43) Maximum count= **105 birds** (Baltasar Brum, Artigas, Uruguay).
III - Southern Campos	Grasslands similar to those of the Rolling and Mesopotamic Pampas. This subregion has a gently rolling area and the drainage is good.	Agriculture, cattle raising, and other uses.	UPSA Records= 6 (no count data)
IV – Inland Pampa	Grasslands severely modified by grazing and cultivation. Disturbance is universal in the eastern portion, while in the western part (where agriculture is almost non-existent) pristine grasslands still exist. This subregion lacks a fluvial network, where the flat landscape is broken by ridges of fixed sand dunes.	Agriculture (25-50% of counties' area) and cattle raising. Mainly summer crops like maize, sunflower, etc.	UPSA Records= 18 (15 with count data) Averaged count= **16 birds** (N=15) Maximum count= **80 birds** (Ucacha).
V – Rolling Pampa	Grasslands severely modified by agriculture. Vegetation structure corresponds to a prairie in humid years and to a pseudo-steppe in dry periods. This subregion has a gently rolling relief and a good drainage network.	Agriculture occupying more than 50% of counties' area (summer crops like maize, sunflower, etc), and more intensive crops in the surroundings of urban areas.	UPSA Records= 24 (15 with count data) Averaged count= **9 birds** (N=15) Maximum count= **38 birds** (Bigand)

MNR Zones	Habitat [1]	Current land use	Upland Sandpiper numbers (see Table 2 for more detail about localities)
VI – Mesopotamic Pampa	Grasslands similar to those of other Pampas zones but with high abundance of subtropical grasses. This subregion has a rolling relief (even hilly in some parts) with a well-defined drainage network.		UPSA Records= 12 (8 with count data) Averaged count= **4 birds** (N=8) Maximum count= **8 birds** (Larroque).
VII - Flooding Pampa	Grasslands modified by cattle grazing, in term of floristic composition and structure of vegetation. This subregion corresponds to lowlands with limited drainage and periodic flooding events, where saline soils can occupy vast areas.	Mainly cattle raising, with agriculture occupying < 10% (eastern part) and between 10-25% (western part) of counties' area.	UPSA Records= 5 (3 with count data) Averaged count= **5 birds** (N= 3) Maximum count= **10 birds** (Ea. El Toro).
VIII - Southern Pampa	Grasslands similar to other subregions of the Pampas. This subregion includes rock outcrops, as well as their pediment and a coastal plain with a moderate slope to the Atlantic. It is characterized by a well-defined drainage system.	Agriculture (25-50% of counties' area) and cattle raising. Mainly winter cereals like wheat, etc.	UPSA Records= 19 (17 with count data) Averaged count= **39 birds** (N=17) Maximum count= **350 birds** (ca. Bajo Hondo).

[1] Based in Soriano (1991).

Table 2. List of nonbreeding and migration localities with records of 20 or more Upland Sandpipers. Distribution zones: MNR= Main Nonbreeding Range (Zones I to VIII), SNR= Secondary Nonbreeding Range, and MR= Migration Range. Site designation criteria: WHSRN = Western Hemisphere Shorebird Reserve Network Site; IBA = Important Bird Area; RAMSAR = Ramsar Site; NP = National Park; PR = Provincial Reserve; PPA = Private Protected Area; EE = Ecological Station. Seasonality: SM = Southbound migration; WI = Wintering (Nonbreeding); NM = Northbound migration; OV = Over-summering; and N/D = No data.

Zone	Country	Province / department	Site	Max. Count	Site designation	Seasonality	Source
I	Argentina	Córdoba	Laguna Mar Chiquita and Bañados del Río Dulce (Est. Río Segundo, Campo de Mare)	1265	PR,WHSRN, RAMSAR, IBA-CO07	WI	Wetlands International (2006), P. Michelutti (*in litt*.)
	Argentina	Córdoba	NE of Morteros	350		N/D	R. Miatello (*in litt*.)
	Argentina	Córdoba	South of Hernando	160		N/D	R. Miatello (*in litt*.)
	Argentina	Córdoba	Bajo de Cagliero	48		WI	Wetlands International (2006)
	Argentina	Córdoba	Unnamed lagoon, close to Ballesteros	48		WI	Wetlands International (2006)
	Argentina	Córdoba	Unnamed lagoon, close to Morrison	39		WI	Wetlands International (2006)
	Argentina	Córdoba	Seeber	35		WI	Blanco *et al*. (1993)
	Argentina	Córdoba	Embalse Río Tercero	32		WI	Wetlands International (2006)
	Argentina	Santa Fe	Cayastacito	30		WI	M. de La Peña (*in litt*.)
	Argentina	Córdoba	East of Córdoba city	25		N/D	G. Peralta (*in litt*.)
	Argentina	Córdoba	Las Varas	23		WI	Blanco *et al*. (1993)
	Argentina	Córdoba	Laguna del Francés (ca. Varillas)	23		WI	Wetlands International (2006)
	Argentina	Córdoba	Planta Depuradora de Líquidos Cloacales	22		WI	Wetlands International (2006)
	Argentina	Córdoba	Bajo de Marchisio	22		WI	Wetlands International (2006)

Zone	Country	Province / department	Site	Max. Count	Site designation	Seasonality	Source
	Argentina	Córdoba	Bajo de Trinchera	21		WI	Wetlands International (2006)
II	Uruguay	Artigas	Baltasar Brum	105		WI	Aldabe and Rocca pers. obs.
	Brazil	Rio Grande do Sul	Estação Ecológica do Taim	100	EE (IBAMA)	NM	I. Lima Serrano (*in litt*.)
	Uruguay	Salto	Cerros de Vera	44		WI	Rocca, Alfaro and García pers. obs.
	Uruguay	Salto	Colonia Rubio	25		WI	Venzal *et al*. (in press)
	Uruguay	Salto	Estancia Los Venados	20		SW	A. Azpiroz (*in litt*.)
IV	Argentina	Córdoba	Ucacha	80		N/D	R. Miatello (*in litt*.)
	Argentina	Córdoba	Laguna Ralicó	50		WI	Wetlands International (2006)
	Argentina	San Luis	Buena Esperanza	50	IBA-SL02	N/D	J. Mazzar Barnett (*in litt*.)
V	Argentina	Santa Fe	Bigand	38		WI	Blanco *et al*. (1993)
	Argentina	Buenos Aires	Salto	25		WI	A. Di Giacomo (*in litt*.)
VIII	Argentina	Buenos Aires	Bajo Hondo surroundings	350		NM	Delhey *et al*. (2001)
	Argentina	Buenos Aires	Estancia "El Francés" (ca. Cabildo)	93		WI	Delhey *et al*. (2001)
	Argentina	Buenos Aires	Coronel Pringles	45		WI	Blanco *et al*. (1993)
	Argentina	Buenos Aires	Goyena	28		WI	Blanco *et al*. (1993)
	Argentina	Buenos Aires	Cabildo	27		WI	Blanco *et al*. (1993)
SNR	Brazil	Mato Grosso do Sul	Fazenda São Vicente	70		SM	I. Lima Serrano (*in litt*.)
	Paraguay	Central	Bahía de Asunción	16		SM	Guyra Paraguay (2006)
	Argentina	Formosa	Reserva El Bagual	35	PPA, IBA-FO03	N/D	Di Giacomo (2005)
	Paraguay	Presidente Hayes	Lagunas Saladas	29		SM	Guyra Paraguay (2006)

Zone	Country	Province / department	Site	Max. Count	Site designation	Seasonality	Source
		Mato Grosso do Sul	Fazenda Campinas	25		SM	I. Lima Serrano (*in litt*.)
	Brazil	Mato Grosso	Pantanal del Barão de Melgaço	20		N/D	Antas (2004)
	Argentina	Córdoba	Monte de Las Barrancas, Salinas Grandes	1100	IBA-CO01	NM	R. Miatello (*in litt*.)
	Colombia	Cauca	Meseta de Popayán	253		OV	Negret (1994; in R. Johnston *in litt*.)
	Peru	Loreto	Iquitos	60		SM	R. Westerduijn (*in litt*.)
	Suriname	Marowijne	Río Cottica, close to Moengo	40		SM	Haverschmidt (1966)
MR	French Guayana	Saint Laurent du Maroni	Arroceras de Mana	31		WI	N. Delelis (*in litt*.)
	Ecuador	Chimborazo	Laguna de Atillo and Ozogoche (P.N. Sangay)	30	NP, IBA-EC061	SM	BirdLife International (2006)
	Venezuela	Amazonas	San Carlos de Río Negro	27		N/D	Hilty (2003)
	Brazil	Minas Gerais	P.N. Serra da Canastra	25	NP	N/D	Silveira (1998)

Table 3. List of, and contact information for, potential Upland Sandpiper collaborators.
(alphabetical by last name, by country; N/D = No data)

Country	Name	Title	Affiliation	Location	Phone	E-mail
Argentina	Blanco, Daniel Blanco	Biologist	Wetlands International	Buenos Aires	(54) 11 43120932	deblanco@ wamani.apc.org
	Casañas, Hernán	Naturalist	Seriema Tours	Córdoba	(54) 3548 452578	hercbw@ arnet.com.ar
	De la Peña, Martín	Naturalist	N/D	Esperanza	N/D	martin@ fca.unl.edu.ar
	Di Giacomo, Adrián	Conserva-tion Director	Aves Argentinas	Buenos Aires	(54) 11 4312 8958	digiacomo@ avesargentinas.org.ar
	Di Giacomo, Alejandro	Reserve Director	Aves Argentinas	Reserva El Bagual	(54) 3717 15 549369	elbagual@ avesargentinas.org.ar
	Giraudo, Alejandro	Biologist	INALI-CONICET	Santo Tomé	(54) 342 4698236	alegiraudo@ arnet.com.ar
	González, Patricia	Biologist	Fundación Inalafquen	San Antonio Oeste	(54) 2934 422294	ccanutus@ yahoo.com.ar
	Heinonen, Sofía	Wildlife Manager	Estancia Rincón del Socorro	Colonia Pellegrini	N/D	info@delsocorro.com
	Miatello, Rodolfo	Biologist	N/D	Villa Allende	(54) 3543 452288	chipimiatello@ yahoo.com.ar
	Michelutti, Pablo	Ranger	N/D	Miramar	(54) 3563 15 563271	miche@ redcoop.com.ar
	Nores, Manuel	Biologist/ Professor	Centro de Zoología Aplicada	Córdoba	(54) 351 4332055	mnores@ gtwing.efn.uncor.edu
	Petracci, Pablo	Biologist	N/D	Bahía Blanca	(54) 291 4539863	pablopetracci@ yahoo.com.ar
	Roesler, Ignacio	Student	N/D	La Plata	(54) 221 4531482	ignacioroesler@ ciudad.com.ar
	Salvador, Sergio	Naturalist	N/D	Villa María	(54) 353 422797	N/D
	Zaccagnini, María Elena	Biologist	CIRN-Instituto Nacional de Tecnologia Agropecuaria	Buenos Aires	(54) 11 44812360	mzaccag@ cirn.inta.gov.ar
	Zalba, Sergio	Biologist	Universidad Nacional del Sur	Bahía Blanca	(54) 291 4595100 (ext. 2420)	szalba@criba.edu.ar
Bolivia	Davis, Susan	Biologist	Museo Historia Natural Noel Kempff Mercado	Santa Cruz de la Sierra	(591) 33 366574	sedavis@141.com

Country	Name	Title	Affiliation	Location	Phone	E-mail
Brazil	Accordi, Iury	Biologist / Professor	Universidade Federal do Rio Grande do Sul	Porto Alegre	(55) 51 33166000	iaccordi@ brturbo.com.br
	Antunes Dias, Rafael	Biologist / Professor	Universidade Católica de Pelotas	Pelotas	(55) 53 32848264	radias.sul@ terra.com.br
	Lima Serrano, Ines	Biologist	IBAMA	N/D	(55) 81 32434710	Ines.serrano@ ibama.gov.br
	Lacerda, Raquel	Biologist	Sistema Nacional de Anilhamento de Aves Silvestres/ CEMAVE	N/D	(55) 83 32455001	Raquel.Lacerda@ ibama.gov.br
	Menegheti, João Oldair	Biologist / Professor	Universidade Federal do Rio Grande do Sul	Porto Alegre	(55) 51 33810774	menegheti@ fabian.com.br
	Silveira, Luís Fábio	Biologist / Professor	Universidade de São Paulo	São Paulo	(55) 11 30917575	lfsilvei@usp.br
Brazil / USA	Bosi de Almeida, Juliana	PhD. Student	University of Nevada	Reno	(1) 775 7846393	jalmeida@ unr.nevada.edu
Canada	Garry Donaldson	Conserva-tion Biologist	Species Population and Standards Management (SPASM), Canadian Wildlife Service	Gatineau, Quebec, Canada	(1) 819 953 3166	Garry.Donaldson@ ec.gc.ca
Colombia	Castillo, Fernando	Biologist	Asociación Calidris	Cali	(57) 2 6812853	calidris@ calidris.org.co
	Johnson, Richard	Biologist	Asociación Calidris	Cali	(57) 2 6812853	rjohnston@ calidris.org.co
	Naranjo, Luis Giacomo	Biologist	World Wildlife Fund	Cali	(57) 2 558 2577	lgnaranjo@ wwf.org.co
	Peña, Viviana	Biologist	Asociación Calidris	Cali	(57) 2 6812853	vivipena@ calidris.org.co
Ecuador	Clay, Robert	Biologist	Birdlife International	Quito	(593) 2 2453645	rob.clay@ birdlife.org.ec
	Santander, Tatiana	Biologist	Aves&Conser vación	Quito	(593) 2 2271800	cecia_de@ uio.satnet.net
El Salvador	Girón, Luis	Biologist	SalvaNATUR A	San Salvador	(503) 2791515	legiron@ salvanatura.org
French Guyana	Nicolas, Delelis	N/D	Association GEPOG	Cayenne	(594) 294696	ndelelis@no-log.org

Country	Name	Title	Affiliation	Location	Phone	E-mail
Mexico	Picos Vega, Xicotencatl	Deputy Director	WHSRN Exec. Office	Sinaloa	(011)(52)667-759-1653	xicovega@ manomet.org
Paraguay	del Castillo, Hugo	Biologist	Guyra Paraguay	Asunción	(595) 21 227777	hugodc@guyra.org.py
	Lesterhuis, Arne	Biologist	Guyra Paraguay	Asunción	(595) 21 227777	arne_j_lesterhuis@ yahoo.co.uk
	Morales, Cristina	Biologist	Guyra Paraguay	Asunción	(595) 21 227777	cristinam@ guyra.org.py
Uruguay	Aldabe, Joaquín	Biologist	Aves Uruguay	Montevideo	(598) 2 9022362	joaquin@aldabe.org
Uruguay / USA	Azpiroz, Adrián	Biologist	University of Missouri	St. Louis	(1) 314 5166200	abavg5@umsl.edu
USA	Niemuth, Neal	Biologist	USFWS-Habitat and Population Evaluation Team	Bismarck, North Dakota	(701) 355-8542	neal_niemuth@ fws.gov
	Sandercock, Brett	Associate Professor	Div. of Biology, Kansas State University	Manhattan, Kansas	(1) 785 532 0120	bsanderc@ksu.edu
Venezuela	Martínez, Margarita	Biologist	Colección Ornitológica Phelps	Caracas	(58) 212 7615631	lmmmartinezv@ hotmail.com