

*Conservation Assessment*  
*For*  
*Upland Sandpiper (Bartramia longicauda)*



*USDA Forest Service, Eastern Region*  
2003

Prepared by:



*This Conservation Assessment was prepared to compile the published and unpublished information and serves as a Conservation Assessment for the Eastern Region of the Forest Service. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject community, please contact the Eastern Region of the Forest Service - Threatened and Endangered Species Program at 310 Wisconsin Avenue, Suite 580 Milwaukee, Wisconsin 53203.*

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## NOMENCLATURE AND TAXONOMY

**Scientific Name:** *Bartramia longicauda*

**Common Name:** Upland Sandpiper

**Family:** Scolopacidae

**Synonyms:**

**USFS Region 9 Status:** Sensitive

**USFWS Status:** None

**Illinois Status:** Endangered

**Global And State Rank:** The Illinois Natural Heritage Program ranks this species as G5/S2S3 (Illinois Natural Heritage Database 1999). This ranking means Upland Sandpipers are globally widespread and abundant, but imperiled in Illinois.

## RANGE:

**Breeding:** locally from north-central Alaska eastward across central Canada and throughout the Great Lakes region to southern New Brunswick, south in the interior to eastern Washington, northeastern Oregon, Idaho, Colorado, northwestern Oklahoma, Texas, central Missouri, southern Illinois, northern Kentucky, southern Ohio, West Virginia, central Virginia, and Maryland; formerly farther south (American Ornithologists Union 1983). Recently documented as breeding in British Columbia (van der Driessche et.al. 1994, Can. Field-Nat. 108:89-91). Populations are small and widely scattered in the northeastern U.S. Figure 1 shows the current range in North America based on breeding bird route data.

**Wintering:** South America from Surinam and northern Brazil south to central Argentina and Uruguay (AOU 1983); the largest concentrations occur in Argentina and Uruguay (White 1983).

**In Illinois,** this species can be found in 25 counties: Carroll, Champaign, Christian, Cook, Coles, Du Page, Fulton, Grundy, Hancock, Henry, Jasper, Kane, Knox, Lake, Lawrence, Lee, Livingston, Marion, McHenry, Morgan, Shelby, Vermilion, Will, Winnebago, Williamson (Illinois Natural Heritage Database 1999), see Figure 2.

## PHYSIOGRAPHIC DISTRIBUTION:

Upland Sandpipers in Illinois are found in the Central Till Plains Section and the Central Dissected Till Plains Section of the Prairie Parkland Province and the Central Till Plains,

Oak-Hickory Section and the Southwestern Great Lakes Morainal Section of the Eastern Broadleaf Forest Province (Keys et.al. 1995). Illinois has been divided up into Natural Divisions based on physiography, flora and fauna (Schwegman et.al. 1973). Upland Sandpipers are found within the Grand Prairie Division, the Northeastern Morainal Division, the Rock River Hill Country Division, the Illinois River and Mississippi River Sand Areas Division, the Western Forest-Prairie Division, the Middle Mississippi Border Division, the Southern Till Plain Division, and the Wabash Border Division.

## **HABITAT:**

In general, Upland Sandpipers use areas with low to moderate forb cover, low woody cover, moderate grass cover, moderate to high litter cover, and little bare ground (Kantrud and Higgins 1992, Dechant et.al. 1999). Fence posts or other display perches may be important components of suitable habitat (Bent 1962, White 1983, Dechant et.al. 1999). Upland Sandpipers use native and tame grasslands, wet meadows, hayland, pastures, planted cover (e.g. Conservation Reserve Program [CRP] and dense nesting cover, cropland, highway and railroad rights-of-way, and grassy areas of airports where mowing occurs (other species do not seem to be using airports) (Bent 1962, Kantrud and Higgins 1992, Dechant et.al. 1999). In Wisconsin, Upland Sandpipers were more numerous in non-forested areas with level terrain and with large, unfragmented agricultural fields, preferably hay, oats, or pasture, but not corn (White 1983, Dechant et.al. 1999). The upland sandpiper is an area-sensitive grassland bird. This species can tolerate some trees and woody vegetation (i.e. open canopy woodlands or even savannas). This species requires a grassland mosaic including both short (less than 20 cm) and intermediate (10-30 cm) height grasses for nesting and brood rearing (Jim Herkert pers. com.).

In North Dakota, South Dakota, Montana, Wyoming, Colorado, and Nebraska, densities of Upland Sandpipers were highest in areas with moderately grazed typic ustoll soils (Dechant et.al. 1999). Upland Sandpipers were associated with silty range and thin upland range sites in North Dakota; these sites were characterized by thin topsoil, loamy soil, 1-25% slope, grassy cover, low shrub cover, and moderate to high litter cover (Dechant et.al. 1999). Maximum vegetation height ranged from 50 to 70 cm and average litter depth ranged from 3.8 to 9.1 cm. Sedivec (1994 in Dechant et.al. 1999), however, in the same study area found that Upland Sandpipers preferred overflow range sites (areas receiving more than normal soil moisture because of run-off from higher land or from flooding) to silty range sites. In Kansas, Upland Sandpipers appeared to prefer clay, upland range sites and to avoid loamy, upland range sites and limestone breaks. In Wisconsin, Upland Sandpipers were found on areas of Clyde silt loam and peat, but did not use Miami silt loam, possibly because these areas supported trees (Dechant et.al. 1999).

In general, Upland Sandpipers forage within short vegetation and nest and rear broods within taller vegetation. However, time of day, daily activities, and phase of nesting cycle also influence habitat use (Dechant et.al. 1999). For example, in Colorado, Upland Sandpipers were encountered most frequently on heavily grazed (average vegetation <10 cm high) pastures and on cut and baled alfalfa (*Medicago sativa*) fields during the morning; during the evening, they preferred bare ground and small-grain fields (vegetation <27 cm high; Dechant

et.al. 1999). This account will first present information on foraging, followed by nesting, then brood rearing.

Upland Sandpipers prefer short vegetation for foraging. Upland Sandpipers exhibited seasonal use of foraging habitats in Minnesota (Dechant et.al. 1999). Upon first arriving on the breeding grounds, Upland Sandpipers used plowed and seeded fields; in May, sedge (*Carex*)/grass meadows were used until vegetation was 30 cm high; over grazed pastures were used in May and June; and mowed fields of red clover (*Trifolium pratense*) were used in late summer when vegetation was 2.5-15.0 cm high. In Wisconsin, a few sandpipers were observed foraging in plowed and fallow (previously pasture, but plowed and left idle) fields and recently seeded corn fields, in which corn was >15 cm high (Ailes and Toepfer 1977, Dechant et.al. 1999). The corn field was no longer used when the corn was >15 cm high. Overall, however, idle fields, plowed fields, and cropland were used infrequently for foraging, and feeding occurred mostly in grazed pastures, followed by ungrazed pastures and hayfields (Ailes 1976, Dechant et.al. 1999). Upland Sandpipers foraged in pastures and corn fields before corn emerged and while corn was still short (Dechant et.al. 1999). Graber and Graber (1963) suggested that open and idle fields and cropland were used for foraging in Illinois. In Minnesota, both young and adults preferred to feed in vegetation <10 cm high (Dechant et.al. 1999). In Kansas, Zimmerman (1993 in Dechant et.al. 1999) surmised that Upland Sandpiper was most abundant in annually burned grassland because it used these areas as foraging habitat. Goering (1964 in Dechant et.al. 1999) found Upland Sandpipers foraged in areas with short grass, especially burned pasture, upon their arrival in spring. In Nebraska, Upland Sandpipers foraged in wheat stubble (Dechant et.al. 1999).

Upland Sandpipers nest in a variety of habitats and vegetation heights and densities, from idle prairie with dense, homogeneous vegetation to wet meadows, old fields, pastures, hayland, cropland, tame vegetation, burned areas, and sandy areas with sparse vegetation (Bent 1962, Graber and Graber 1963, Ailes 1976, Kantrud and Higgins 1992, Dechant et.al. 1999). Nests may occur in depressions covered by grass arching over the top, in grass clumps, in dense vegetation, or at the base of forbs or shrubs (Bent 1962, Ailes 1976, Dechant et.al. 1999). In Wisconsin, Upland Sandpiper territories included loafing, nesting, and feeding sites; loafing and feeding sites were near nesting sites, and were shared by several pairs (Dechant et.al. 1999). Suitable loafing areas were pastures with low-growing grass clumps, sparsely vegetated prairie, or open hayland. Choice of nesting site may change as the season progresses; early nests were located in pasture and later nests were in ungrazed prairie. Prior to the time when Upland Sandpipers in Colorado began incubating nests, they used heavily grazed fields more often and weedy fields less often than expected (Dechant et.al. 1999). During incubation, Upland Sandpipers appeared to prefer lightly grazed fields (average vegetation 17-23 cm tall) and small-grain fields (vegetation <27 cm tall), and to use tall (>27 cm) alfalfa and small-grain fields (vegetation >27 cm tall) less than expected (Dechant et.al. 1999). White (1983) found that 38% of 553 nests were in pastures, one-fifth of which were in burned pastures. An additional 28% of nests were in tallgrass prairie, 7% in hayfields, and the remainder in woody areas, cropland, wetlands, and idle fields adjacent to airport runways.

Vegetation height around the majority of nests ranges from 10.2 to 63.5 cm (Ailes 1976, Dechant et.al. 1999). In North Dakota, South Dakota, Montana, and Manitoba, nests were

located in grass-dominated sites with 100% visual obstruction at <15 cm, effective vegetation height <30 cm, and 30-99% litter cover (Kantrud and Higgins 1992, Dechant et.al. 1999); Upland Sandpipers avoided nesting where visual obstruction was >40 cm or vegetation height was >8 cm. In South Dakota, nest concealment for nests in grazed prairie was measured from various angles: all nests had >50% vertical concealment by residual and living vegetation, 33% of nests were concealed on all sides, 55% were concealed on two sides, and 12% had no side concealment (Dechant et.al. 1999). In Wisconsin, Upland Sandpipers did not initiate nests in vegetation >40 cm tall, although when eggs hatched, vegetation was as tall as 70 cm (Ailes 1976, 1980, Dechant et.al. 1999). In North Dakota, Upland Sandpipers most commonly nested in areas where grass accounted for >50% canopy cover and forbs for <50% canopy cover (Dechant et.al. 1999). Other habitats used for nesting were those in which forbs accounted for >50% canopy cover and grass for <50% canopy cover, in which western snowberry (*Symphoricarpos occidentalis*) with a grassy understory accounted for <50% canopy cover, and in which grass accounted for >50% canopy cover and forbs for <50% canopy cover; habitats in which western snowberry with a grass understory accounted for >50% canopy cover were avoided. In Minnesota, vegetation height measured within 10 days after first egg was laid averaged 25.4 cm, and consisted largely of residual vegetation (Dechant et.al. 1999). Standing vegetation over Upland Sandpiper nests was fairly thin, with a light intensity average of 222 candles/m<sup>2</sup> for 12 nests. Territories in northwestern Minnesota were characterized by 35% ground cover and vegetation height of 79 cm (Dechant et.al. 1999). In Saskatchewan, Upland Sandpipers nested in tall, dense, homogeneous vegetation >15 cm in height (Dechant et.al. 1999).

No clear pattern of preference for native versus tame vegetation over the breeding range of the Upland Sandpiper is discernible. In central Wisconsin and central Minnesota, Upland Sandpipers were found nesting in tame vegetation; study areas, however, may have contained little or no native vegetation (Ailes 1976, Dechant et.al. 1999). In northwestern Minnesota, 20 of 22 nests were found in native grasses; the other two were in alfalfa (Dechant et.al. 1999). Likewise, in southeastern Wisconsin, nests were placed in both tame and native vegetation; two nests were found in legumes (alfalfa and sweet clover [*Melilotus* sp.]; Dechant et.al. 1999). Musselman (1935 in Dechant et.al. 1999) noted that Upland Sandpipers in Missouri and Illinois nested in abandoned clover fields and grass. In Illinois, Upland Sandpipers preferred stands of Kentucky bluegrass (*Poa pratensis*) and other tame grass species as opposed to tallgrass prairie, and preferred older (>5 yr) plantings of tame grasses and forbs (Dechant et.al. 1999). In Kansas, Upland Sandpipers nested in tallgrass as well as tame grasses (Dechant et.al. 1999). In a study encompassing Great Plains grasslands, areas considered to be the best habitat for Upland Sandpipers were dominated by wheatgrass (*Agropyron*) and Kentucky bluegrass, followed by green needlegrass (*Stipa viridula*), buffalo grass (*Buchloe dactyloides*), western snowberry, and slimspike three-awn (*Aristida longiseta*; Dechant et.al. 1999). Dominant vegetation at nest sites in North Dakota, South Dakota, Montana, and Manitoba were Kentucky bluegrass, smooth brome (*Bromus inermis*), needle-and-thread (*Stipa comata*), and quackgrass (*Agropyron repens*); although most nests were located within mixed-grass, Upland Sandpipers readily nested in stands of tame grasses (Kantrud and Higgins 1992, Dechant et.al. 1999). King and Salvidge (1995 in Dechant et.al. 1999) observed Upland Sandpipers in CRP fields seeded with warm-season grasses and native tallgrass in Nebraska. Within ungrazed grasslands in North Dakota and South Dakota,

38 of 41 nests were in either native or tame grasses located in idle fields or in rights-of-way; one of these nests was in alfalfa and brome (Dechant et.al. 1999). The other three nests were in pasture. Within grazed grasslands in North Dakota, vegetation within 1 m of nests was composed of native grasses and small amounts of tame grasses such as Kentucky bluegrass and smooth brome (Bowen and Kruse 1993, Dechant et.al. 1999). In South Dakota, Upland Sandpipers nested only in native prairie; 32 of the 33 nests were in prairie classified as in good or excellent range condition (Dechant et.al. 1999). In Manitoba, numbers of Upland Sandpipers were positively correlated with presence of native vegetation and negatively correlated with presence of tame vegetation (Dechant et.al. 1999). In Saskatchewan, Upland Sandpipers were present in low abundance in both native mixed-grass and tame grasslands dominated by crested wheatgrass (*Agropyron cristatum*; Dechant et.al. 1999).

Moderate amounts of forbs may be an important component in suitable nesting habitat (Dechant et.al. 1999). In North Dakota Waterfowl Production Areas, Upland Sandpipers used plots that had 57.4% grass cover and 23.5% forb cover (Dechant et.al. 1999). In Illinois Greater Prairie-Chicken (*Tympanuchus cupido*) sanctuaries, Upland Sandpipers preferred to nest in fields containing a mixture of grasses and forbs; they preferred fields of seeded grasses that were being invaded by forbs (Dechant et.al. 1999). In Kansas tallgrass prairie, Upland Sandpipers were significantly more abundant in pasture than in CRP; grazed pastures had significantly greater coverage of total vegetation, live vegetation, grasses, and forbs than did CRP (Dechant et.al. 1999). In Kansas CRP fields, Upland Sandpipers were present in fields described as having a medium frequency of occurrence of forbs (Dechant et.al. 1999). Skinner (1974 in Dechant et.al. 1999) found fewer Upland Sandpipers in fields that were predominantly forbs than in fields with scattered forbs or with no forbs.

Upland Sandpipers require grasslands of various heights for rearing broods. In Minnesota, broods used weedy fields, open areas within old fields, and over grazed pastures (Dechant et.al. 1999). Marshy areas of sedge and cattails (*Typha*) that had dried during drought were used as escape cover by broods (Dechant et.al. 1999). In Wisconsin, brood rearing occurred mostly in heavily grazed (vegetation <10 cm tall) pastures, followed by ungrazed pastures and hayfields (Ailes 1976, Dechant et.al. 1999). Some broods were observed in idle fields, plowed fields, and cropland. Late-summer feeding occurred mainly in heavily and moderately grazed pastures; lightly grazed pastures were used infrequently (Ailes 1980, Dechant et.al. 1999). In Illinois, broods were observed in wheat stubble, recently hayed legumes, redtop (*Agrostis stolonifera*) intermixed with weeds, and moderately grazed pastures (Dechant et.al. 1999). In Colorado, brood rearing occurred within short (<27 cm high) and cut alfalfa and small-grain fields (vegetation <27cm tall) more often than expected, whereas small-grain fields (vegetation >27 cm tall) were used less often than expected (Dechant et.al. 1999). Bolster (1990 in Dechant et.al. 1999) observed a noticeable movement of broods from pastures to alfalfa fields. During pre-migration, heavily grazed fields, and cut and baled alfalfa were used more often, and lightly grazed fields, weedy fields, tall alfalfa, and small-grain fields (vegetation >27 cm) were used less often than expected.

## **SPECIES DESCRIPTION:**

Ranges from 27.9-32.5 cm in size and is the most territorial of North American shorebirds



inhabiting open grasslands of the Western Hemisphere. The sexes are outwardly alike; females average slightly larger than males. Breeding adults are overall scaly-brown in appearance above with a long slender neck, small rounded head, and a relatively long tail. The upper neck is buff-streaked brown with sharply defined V-shaped markings becoming more barred on the lower breast and flanks. The throat and abdomen are white. The eye is large with a dark iris. The bill is short, slightly decurved and dusky at the tip. The tail feathers are barred, dark brown with outer tertials pale orange-brown basally, tipped with white. Legs and feet are yellow-gray. Adults captured at the nest may be sexed by wing chord and tail length. This method of sex determination is estimated to be 88.3% accurate for mated pairs (The Nature Conservancy 1999).

Downy young are a fine, mixed pattern of black, white and buff yellowish-brown above. A black stripe runs from the base of the bill over the top of the head. There is a band of buff or yellowish-brown across the upper breast. The sides of the head, chin and underparts are generally white (The Nature Conservancy 1999).

Juveniles resemble adults, but the upper parts are darker and scaller with the buffy color of the neck, breast and wings much deeper and the streaks of the foreneck and breast less distinct. The wing coverts have clear buffy edges and dark submarginal lines. The scapulars are uniformly dark with narrow defined buff-white fringes. The tail feathers are notched with pale buff. Following the first prenuptial molt the young become indistinguishable from adults. Winter plumage is similar to that of the breeding adult, but paler (The Nature Conservancy 1999).

The nest is a shallow depression in the ground approximately 10-13 cm in diameter and five cm deep, lined with pieces of dry grass. Nests are usually well hidden, frequently by vegetation that hangs over the nest hiding it from above. The eggs are cinnamon to pale olive-buff or greenish-white in color, spotted with brown and underlaying spots of ecru or pale grey. Clutch size is normally four eggs, sometimes three, and rarely five (The Nature Conservancy 1999).

## **LIFE HISTORY:**

Upland Sandpipers arrive on the breeding grounds in the Midwest in April. Average spring arrival dates for Illinois are in mid-April (Dechant et.al. 1999). Arrival dates vary little from year to year (Dechant et.al. 1999). Most birds are paired on arrival to the breeding grounds and nesting activity begins about two weeks after the first birds return (Ailes 1976, 1980, Dechant et.al. 1999). Hatching peaks in the first half of June with a second less pronounced hatching peak occurring in early July, probably a result of renesting (Ailes 1976, 1980, Dechant et.al. 1999). The species is single brooded (Dechant et.al. 1999). Within 24 hours after hatching, broods are moved to brood rearing fields. Ailes (1976, 1980) reported movements of 48 - 338 m between nesting areas and brood rearing areas in Wisconsin. In southeastern Illinois, Buhnerkempe and Westemeier (1988) reported brood movements up to 410 m, and Dorio and Grewe (1979) reported brood movements up to 495 m in Minnesota. Brood rearing fields consist of short grass areas with a majority of these being grazed pastures with grass heights less than 20 cm tall (Ailes 1976, 1980; Buhnerkempe and

Westemeier 1988). Idle grasslands are rarely used for brood rearing (Ailes 1976, 1980).

## **NATURAL AND HUMAN LAND USE THREATS:**

Initial declines of upland sandpipers were due largely to market hunting. The Upland Sandpiper has disappeared or declined in portions of the eastern U.S. due to destruction (sub-urbanization) and natural succession of habitat, and probably also frequent disturbance of pastures and hayfields (cut too often to allow breeding). Extensive row-cropping and early crop-cutting probably pose threats to breeders. Some western populations may have declined due to overgrazing. On the other hand, the upland sandpiper is dependent on disturbances such as grazing. Densities are an order of magnitude higher in grazed areas than they are in ungrazed areas, and reductions in grazing would undoubtedly result in a related loss of birds (Jim Herkert pers. com.). Thus, too little grazing can also be a threat. Much of the wintering habitat has been usurped by agriculture. Loss and fragmentation of habitat due to increased urbanization, changes in farming practices and natural forest succession pose the most serious threats to populations (The Nature Conservancy 1999).

Territory size in Wisconsin was 8-12 ha (Dechant et.al. 1999). Upland Sandpipers are highly sensitive to habitat fragmentation (Herkert 1991a, Herkert et.al. 1993, Dechant et.al. 1999). Abundance has been positively correlated to field or patch size (Herkert 1994, Dechant et.al. 1999). In Nebraska, Upland Sandpipers required a minimum area of 50 ha to reach 50% incidence (Dechant et.al. 1999). In Illinois, Upland Sandpipers required areas >30 ha (Herkert 1991a, 1991b, Dechant et.al. 1999). In southwestern Missouri, Upland Sandpipers occurred only on tallgrass prairie fragments >75 ha in size (Dechant et.al. 1999). In Maine, Upland Sandpipers were rare in areas <50 ha, and reached 50% incidence at 200 ha (Dechant et.al. 1999).

## **VIABILITY:**

A viable population is “a population that has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range within a planning area.” This will be accomplished by providing special management as necessary to allow the continued existence of this species. The minimum viable population is defined as the smallest size that can persist over a period of 100 years with a low extinction probability (less than 5 %) (Soule 1980).

Based on population models described by Dennis et.al. (1991) and Morris et.al. (1999) and using census data from Illinois at the Joliet Army Ammunition Plant (JAAP), a population of 123 pairs is needed to sustain a viable population (less than 5% probability of local extinction within 50 years). For 100 years a population of 1,956 pairs is needed to sustain a viable population. In all probability the number for 100 years is high due to lack of good yearly population data. For this reason, it would be appropriate to use the 50 year population number.

## **MANAGEMENT:**

To maintain and/or increase the existing population of *Bartramia longicauda* by improving the current habitat to reach a viable population.

Expand the acreage of grasslands suitable to upland sandpipers to a size capable of supporting a population of at least 123 pairs on an annual basis. At least 8,100 acres of highly suitable habitat will be required to achieve this goal (based on the average number of upland sandpipers per acre over three years at JAAP (1993-1995). Since suitability of different habitat types may vary the habitat goal should be calculated using the habitat suitability index model developed for upland sandpipers by Herkert (1997). Using the formula: habitat specific HSI \* habitat acres summed for all habitat types:

$$3HSI*acres=XXXX.$$

Besides the acreage requirements, management prescriptions are necessary to maintain the required acres in habitat suitable for upland sandpipers. In general, Upland Sandpipers are very dependent on disturbance, primarily grazing. Grazing is the best management tool to achieve the landscape patchiness which upland sandpipers favor. Densities in grazed areas are higher by an order of magnitude than in ungrazed areas. Reductions in grazing would likely result in a related loss of birds. Keeping in mind the overall importance of grazing, management techniques can be implemented in the following specific manners:

A) Grasslands utilized for breeding should be managed with periodic fire, grazing, or mowing in order to provide nesting cover that is between 15-30 cm high in late May (Herkert 1997). Mowing or periodic fire should not be performed during the nesting season, mid-April through August 1.

B) Grasslands should be managed to keep woody cover to a minimum through a use of fire, mowing, grazing, brush cutting and herbicide use (Herkert 1997). Optimal upland sandpiper habitat is treeless. Mowing, periodic fire and mechanical brush cutting should not be performed during the nesting season, mid-April through August 1.

C) Herbaceous cover should exceed 60% live vegetative cover (Herkert 1997). This herbaceous/grass cover mix can be provided for by planting ratios and maintained through different mowing regimes, periodic fire and grazing.

D) Areas managed for upland sandpipers should be as large as possible (Herkert 1997). Preferably 500 ha (1235 acres) or more in size.

E) Upland sandpipers require short grass areas for brood rearing. Grasslands managed for brood cover should be maintained at 20 cm or less (measured between mid-June and mid-July) by grazing (Herkert 1997). Burning and mowing in the spring create suitable habitat for nesting but without grazing leave the grass too tall for brood habitat. Furthermore, grazing may be a better management tool than mowing in this circumstance due to the patchiness left behind by grazing. Upland sandpipers need interspecific brood habitat with patches of taller grass scattered throughout short grass.

## MONITORING

Continued yearly monitoring of the upland sandpiper populations and habitat preference should take place to fine tune the habitat suitability model and viable population estimates. Point counts that cover the entire breeding area are adequate in getting good population estimates. Monitoring is also necessary to assess the impacts of management practices on upland sandpipers.

## RESEARCH NEEDS

- 1) Research is needed to help determine the number of cattle per acre that are necessary to achieve some of the prescriptions mentioned above. Research is also needed to determine if other grazers such as bison can be used in the place of cattle to achieve the goals.
- 2) Research is needed on brood habitat use of this species.

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## **FIGURES**

Figure 1. Current range in North America

Figure 2. Current range in Illinois by county