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OCCURRENCE OF SEASIDE AND SHARP-TAILED SPARROWS ON THE CENTRAL GULF COAST OF FLORIDA

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Abstract.—Historic information is sparse, but early writings suggest that Scott's Seaside Sparrows (*Ammodramus maritimus peninsulae*) and sharp-tailed sparrows (*A. caudacutus* and *A. nelsoni*) were relatively common in central Gulf coast marshes of Florida in the late 19th and early 20th centuries. Apart from a breeding bird atlas project completed in 1991, no recent systematic surveys have been conducted in these salt marshes. From the Anclote River marshes in Pinellas County, north to marshes in southern Hernando County, this study retraced historic locations of *Ammodramus* sparrow records with thorough searches from October 2006 through May 2007, and from October 2007 through April 2008. No marshland sparrows were detected in the remaining needle rush (*Juncus roemerianus*) marshes along the Anclote River where the original Scott's Seaside Sparrows and sharp-tailed sparrows were collected by W. E. D. Scott in the late nineteenth century. A total of 155 sharp-tailed sparrows were found in this study. Nelson's Sparrows outnumbered Saltmarsh Sparrows by over 75 to one. The frequency of sightings of Nelson's Sparrows in our study (99%) agreed closely with previously published data for Levy County (96%). In contrast, historic collections of sharp-tailed sparrows through the early twentieth century recorded only 16% Nelson's Sparrows. Resident Seaside Sparrows and wintering sharp-tailed sparrows were both present from Elfers, Pasco County, north to Weeki Wachee Preserve, Hernando County. The southern limit of resident, territorial Seaside Sparrows was Salt Springs Bayou, Port Richey, Pasco County. One nest was found at survey site 12, 2 miles north of Salt Springs Bayou. We observed a total of 169 Scott's Seaside Sparrows, and 185 were heard singing on territories.

The current distributional status of Scott's Seaside Sparrow (*Ammodramus maritimus peninsulae*) and wintering occurrence of sharp-

tailed sparrows (Nelson's Sparrow, *A. nelsoni*, and Saltmarsh Sparrow, *A. caudacutus*) on the central Gulf coast of Florida is poorly understood. The only previous survey of the region, which touched on the occurrence of Seaside Sparrows but not that of sharp-tailed sparrows, was from 1986-1991 during the state wide breeding bird atlas project (FWC 2003). The few historical references to marshland sparrows in the region (Pinellas, Pasco, Hernando counties) provided scant earlier detail (Allen 1888, Scott 1889, Fargo 1926, Baynard 1932, Howell 1932).

The central Gulf coast populations of Seaside Sparrows were first introduced to science under the name *A. m. peninsulae* in the late nineteenth century, based on two specimens taken in the vicinity of Tarpon Springs, Pinellas County (Allen 1888). The next mention of this sparrow concerned suspected (Fargo 1926) and actual breeding (Baynard 1932, Nicholson in Howell 1932) in southern Pasco County. The American Ornithologists' Union Check-List (AOU 1931, 1957) and Howell (1932) identified Old Tampa Bay in central Pinellas and Hillsborough counties as the southern breeding limit at that time. Stevenson and Anderson (1994) could find historical evidence of breeding only in northern Pinellas County from the Tarpon Springs area in 1890, and none from Hillsborough County. Thus, they corrected the historical breeding limit to the mouth of the Anclote River where tidal marshes still persist today, but the remaining needle rush marshes are 3 miles inland along the Anclote River. The recent southern breeding limit was given as Port Richey, Pasco County, just 10 miles north of the Anclote River (FWC 2003). Northward along the Gulf coast in peninsular Florida, Scott's Seaside Sparrow becomes more abundant (Post 1981b, McDonald 1982). The only Seaside Sparrows to receive serious field study anywhere along the Gulf coast were in a population of *A. m. peninsulae* in Levy County. Post (1981a) and Post et al. (1983) provided information on breeding ecology and habitat use in this population, and McDonald (1983, 1991) examined vocal repertoire and singing behavior there.

Historical and modern records indicate that sharp-tailed sparrows have always commonly wintered in salt marshes along the central Florida Gulf coast (Allen 1888, Fargo 1926, Greenlaw and Woolfenden 2007). However, the status of the two species of sharp-tailed sparrows apparently has changed from the late nineteenth and early twentieth centuries to now (Greenlaw and Woolfenden 2007, this study). Fargo (1926) listed only Saltmarsh Sparrow (known as "Sharp-tailed Sparrow," *Passerherbulus caudacutus*, under the two-species concept then prevailing) in Pinellas and Pasco counties, and did not mention Nelson's Sparrow (then also called "Nelson's Sparrow," *P. nelsoni*; AOU 1899). He characterized the species as a "common winter resident . . .

from Tampa Bay northward.” Earlier, Allen (1888) remarked that his series of sharp-tailed sparrows from the Tarpon Springs area were similar to specimens from New Jersey and New York (i.e., *A. caudacutus*). In their study of wintering distributions of sharp-tailed sparrows, Greenlaw and Woolfenden (2007) confirmed that Saltmarsh Sparrows predominated in the historical sample of specimens from Pinellas and Pasco counties.

Our goals in this study are (1) to confirm the southern limit of occurrence of territorial Scott’s Seaside Sparrows on the Gulf coast of Florida, (2) to determine the current status of the two species of sharp-tailed sparrows along the central Gulf coast, and (3) to characterize habitat distributions of territorial Seaside Sparrows and non-breeding (wintering) sharp-tailed sparrows in the region. We also provide (4) additional information on the historic sample of sharp-tailed sparrows from Pinellas and Pasco counties analyzed by Greenlaw and Woolfenden (2007).

STUDY SITES AND METHODS

The study area extended along the Gulf coast of Florida from Weeki Wachee, Hernando County, south to the Anclote River, Pasco and Pinellas counties. One of us (KFT) surveyed marshes at 22 sites in this region: 3 along the Anclote River in Pinellas County, 17 along the Pasco coast, and 2 in southern Hernando County (Fig. 1). Within these sites, a total of 36 Global Positioning System (G.P.S.) locations were checked for sparrows (Table 1). Aerial photographs were available for all sites visited, and the habitat at each location surveyed within the sites was photographed. All marsh survey sites were dominated by needle rush (*Juncus roemerianus*), which was at least 90% of the salt grasses present. These needle rush marshes were chosen because they were the only habitat where the *Ammodramus* sparrows had been previously found. Mangroves, mostly black mangrove (*Avicennia germinans*) and white mangrove (*Laguncularia racemosa*), filled or surrounded the marshes. Mangroves also occurred along canals, ditches, creeks, and other water edges.

Mangrove intrusion in the surveyed marshes is readily apparent. The coastal marshes near the Anclote River have been covered by mangroves or filled and developed. Survey sites 1, 2, and 3 (Fig. 1) are three miles inland from the coast where needle rush stands have persisted. Farther north along the coast sites 4 and 5 in Elfers (Fig. 1), small pockets of needle rush occur in a marsh that otherwise is 90% mangroves. At Port Richey sites 8, 9, 10, and 11 (Fig. 1), 30% of these marshes are mangroves with larger stands of needle rush. The eastern edge of these marshes is bordered by salt barrens or upland vegetation. North through sites 19, 20, 21, and 22 (Fig. 1) the mangroves have decreased to approximately 10% of the salt marsh or were just edging the coast and creeks. Thus, mangroves dominated southern coastal marshes and diminished to about 10% cover in northernmost sites.

All marshes surveyed were impacted by mosquito-control ditching along nearby access roads and within the marshes. This ditching reduces standing water and tends to desiccate the marshes. Some marshes have been exposed to heavy airboat traffic that has converted broad areas of marsh grasses to mud trails. Some historical marshes in Pasco County no longer exist because of marsh-filling and residential development pressures that prevailed from 1950 to 1970.

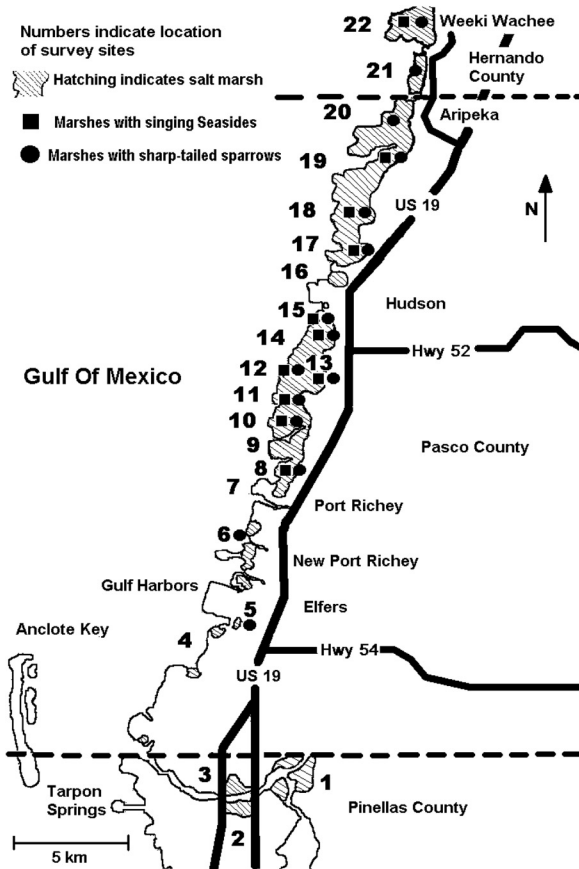


Figure 1. Map showing distribution of salt marshes in northern Pinellas, Pasco, and southern Hernando counties, Florida. Numbers identify study sites and indicate whether singing Seaside or sharp-tailed sparrows were found there. The local names of these sites with latitude / longitude locations and size (ha), as follows: 1, Anclote River, east of US-19 (28.166 N, 82.741 W; 13.5 ha); 2, Anclote River, southwest of US-19 (28.154, 82.752; 0.5); 3, Anclote River Park, west of US-19 (28.163, 82.752; 0.5); 4, Sand Bay (28.220, 82.763; 0.5); 5, Eagle Point (28.221, 82.752; 1); 6, Green Key, New Port Richey (28.252, 82.741; 8); 7, Winslow Park, Port Richey (28.279, 82.733; 2); 8, Brasher Park, Port Richey (28.285, 82.731; 4); 9, Energy Marine Center (28.289, 82.724; 1); 10, Werner-Boyce Salt Springs State Park, Salt Springs Bayou (28.292, 82.731; 19); 11, Werner-Boyce Salt Springs State Park, Airboat Trails (28.301, 82.725; 163); 12, Werner-Boyce Salt Springs State Park, Salt Barrens (28.321, 82.708; 54); 13, Werner-Boyce Salt Springs State Park, south of Hwy 52 (28.325, 82.707; 9); 14, Werner-Boyce Salt Springs State Park, Hwy 52 (28.326, 82.705; 4); 15, Werner-Boyce Salt Springs State Park, north of Hwy 52 (28.334, 82.705; 4); 16, Port Hudson (28.366, 82.702; 2); 17, Seabird Sanctuary (28.373, 82.691; 13); 18, North Sea Pines (28.387, 82.694; 25); 19, Fillman's Bayou (28.406, 82.674; 23); 20, South Aripeka (28.425, 82.671; 25); 21, Osowaw Blvd. (28.442, 82.666; 3); 22, Weeki Wachee Preserve (28.467, 82.661; 40).

Table 1. Total number of Scott's Seaside Sparrows (SSSP) observed and heard, total number of Nelson's Sparrows (NESP) observed, and total number of Salt-marsh Sparrows (SMSP) observed during the survey seasons of 2006, 2007, and 2008 along the central Gulf coast of Florida at each location. The maximum number of sparrows observed or heard during one or more surveys at each survey site within a season was summed to find the total number of birds present in the study area during the count season.

Location	SSSP Observed	SSSP Singing	NESP Observed	SMSP Observed
1 A	0	0	0	0
1 B	0	0	0	0
1 C	0	0	0	0
1 D	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	1	0	0	0
5	0	0	5	0
6 A	0	0	1	0
6 B	0	0	0	0
7	0	0	0	0
8	6	1	3	0
9	0	0	0	0
10 A	5	4	0	0
10 B	3	6	0	0
11 A	19	12	5	0
11 B	5	7	2	0
11 C	4	2	20	0
11 D	16	10	7	0
12 A	0	0	0	0
12 B	3	8	2	0
12 C	8	20	10	1
12 D	11	14	20	0
13	10	20	4	0
14	24	14	8	0
15	14	13	7	0
16	0	0	1	0
17 A	4	17	0	0
17 B	19	17	14	0
18	12	8	8	0
19 A	0	0	0	0
19 B	0	2	7	0
20 A	0	0	3	0
20 B	0	0	0	0
21	0	0	7	0
22	5	10	19	1
Totals	169	185	153	2

KFT discovered that broadcasting taped songs of Seaside Sparrows in marshes or "pishing" elicited watchful behavior from the tops of needle rush by Seaside Sparrows and sharp-tailed sparrows, and often caused them to approach the observer. Seaside

Sparrow surveys were conducted from stationary points in the 22 sites. Sharp-tailed sparrow surveys were conducted at the Seaside Sparrow sites along 50 m wide transects through accessible portions of the marshes. We estimated that sparrows responded up to 150 m away from tape broadcast locations. Surveys for sharp-tailed sparrows began on 24 October 2006 when the first individual was encountered, and continued through 1 May 2007. In 2007, surveys for Seaside Sparrows began on 10 February, when the first Seaside Sparrows were heard singing on territories in site 14 (Fig. 1), and continued until 17 April. In 2007, sharp-tailed sparrow surveys began in October and continued through April 2008. Seaside Sparrow surveys began in February 2008 and continued through April 2008. All surveys were assigned a site number (1-22, Fig. 1) and, when applicable, a letter designation (A-D, Table 1) that represented the locations of two or more surveys within a site. A total of 36 locations, each localized by a G.P.S. reading, were visited among the 22 survey sites in 2006, 2007, and 2008. The closest survey locations (sites 14 and 15; Fig. 1) were 300 m apart.

The standard survey protocol for Seaside Sparrows consisted of playing a taped song for about two minutes followed by about eight minutes of observation. This procedure was repeated three or more times, totaling at least 30 minutes at each location. For sharp-tailed sparrow surveys, the Seaside Sparrow tape was used to start the survey followed by "pishing," followed by excursions through the marsh where possible. Because most locations were surveyed several times each season, the maximum number of individuals/species observed at each location was used as an estimate of the number present at that location during the season. Most count points were accessible by car or by hiking. Two were reached by kayak and one (site 11) by airboat along some of the pre-existing airboat trails.

In most cases, identifications of sparrows were straightforward. However, a risk of mis-identification exists between Nelson's and Saltmarsh sparrows (Howell and Sibley 1998). To minimize this risk, KFT photographed as many individuals as possible and JSG reviewed the photographs. All photographs of sparrows taken in this study are being maintained by KFT as an archival record. For quick identification of the two sharp-tailed sparrows in the field, KFT used the following plumage characters for Saltmarsh Sparrows: chest and flank streaking well defined and dark; streaking present in post-ocular portion of supercilium; malar and breast color strongly contrasting, orange ocher on face to pale yellow ocher on chest; pale dorsal streaking dull; and for Nelson's Sparrows: breast streaking reduced to absent, or indistinct (some exhibit extensive dark streaking underneath, but this is rare); no streaking in broad post-ocular portion of supercilium; little or no contrast between malar and breast, colors yellow ocher; dorsal streaking bright white. Seaside Sparrows also were photographed to confirm identification of resident birds. We found no evidence of wintering occurrence of the northern, migratory subspecies, *A. m. maritimus*, in our study sites. For our purposes, we assume that persistently singing *A. m. peninsulae* and associated territorial (agonistic) behavior represented breeding evidence.

RESULTS

Seaside Sparrow distribution and numbers.—The most southerly location of breeding Scott's Seaside Sparrows was site 8 in Brasher Park, Port Richey, Pasco County (Fig. 1). A singing male was heard at this site on one survey date and several birds were observed on another survey. Consistent singing by several Seaside Sparrows occurred at site 10 (Fig. 1) along the north side of Salt Springs Bayou in Port Richey. Singing Seaside Sparrows were found at all large marsh sites

north of 10 through site 19 (Fig. 1). None were found at sites 20 and 21, which have relatively short needle rush. At site 22 (Fig. 1) singing Seaside Sparrows were again located in taller needle rush. Combining both survey seasons, a total of 169 Scott's Seaside Sparrows were observed and 185 were heard singing on territories (Table 1). One Scott's Seaside Sparrow nest was found at site 12 (Fig. 1) on 18 March 2007. This nest was in the center of a stand of needle rush 20 m wide, bordered on one side by mangroves along a salt pond edge and a salt barren on the other. The nest was 0.5 m above ground, attached to and comprised of woven needle rush stems. The nest was built under some dead needle rush stems, which formed a concealing roof.

Status of wintering sharp-tailed sparrows.—A total of 153 (99%) Nelson's Sparrows were seen during the study, while only two (1%) Saltmarsh Sparrows were encountered (Table 1). These frequencies contrasted with those in historic collections of specimens collected before the 1950s (Table 2), when 56 specimens represented 47 (84%) Saltmarsh and 8 (14%) Nelson's sparrows (and one hybrid).

Habitat distributions of marshland sparrows.—Most singing Seaside Sparrows were found in stands of needle rush at least 1 m high, corresponding to the wettest and muddiest sections of the marshes. Although other salt grasses were present in the needle rush marshes surveyed, they were found under the needle rush in small amounts or along the marsh edges and did not make up more than 5-10% of the

Table 2. Numbers of specimens of sharp-tailed sparrows in historic collections obtained from Pinellas and Pasco counties, Florida, organized by collector and years of collection. See Greenlaw and Woolfenden (2007) for methods.

Collector	County	Species ^a	N (%)	Years ^b
W. E. D. Scott	Pinellas	Saltmarsh	15	1888, 1890
	Pinellas	Nelson's	0	
Louis B. Bishop	Pasco	Saltmarsh	2	1897
R. D. Hoyt	Pinellas	Saltmarsh	2	1901, 1913
A. C. Bent	Pinellas	Saltmarsh	1	1925
Wm. G. Fargo	Pinellas	Saltmarsh	22	1925-1934
	Pasco	Saltmarsh	4	1927-1934
	Pinellas	Nelson's	8	1925-1934
T. D. Burleigh	Pasco	Saltmarsh	1	1937
Carole F. Sumner	Pinellas	Nelson's	1	1969
Total specimens ^c		Saltmarsh	47 (82.4)	
		Nelson's	9 (15.8)	

^a"Saltmarsh" is Saltmarsh Sparrow; "Nelson's" is Nelson's Sparrow.

^bYears or range of years during which collections were made.

^cOne hybrid specimen also was collected in Pinellas County by W. E. D. Scott in January 1890. Percentages (parentheses) were calculated on a total of 57 specimens, including the hybrid.

surveyed marsh grass areas. All survey sites in this study were characterized by needle rush coverage of 90% or more, in contrast to a study site approximately 60 miles north, at Gulf Hammock, Levy County (Post 1981b, Post et al. 1983), where smooth cordgrass (*Spartina alterniflora*) dominated at 38% coverage and needle rush comprised 26%.

Site 13 (Fig. 1) registered one of the highest counts (20) of singing Seaside Sparrows. Characteristics of this site were muck soil, tall needle rush patches, some as high as 170 cm (5.5 ft), no mosquito-ditching, and presence of many natural saltwater channels and bayous. At low tide, sparrows foraged on exposed open mud. The ground cover at this site consisted of 96% needle rush, 2% smooth cordgrass, and 2% mangroves and other grasses. At sites 20 and 21 (Fig. 1), where limestone lay at the surface or under a thin layer of muck, stands of needle rush were sparse and only 0.5 m high. No Seaside Sparrows were seen or heard there. In other sites, two Seaside Sparrows were noted singing in small black mangroves and one was photographed singing in a christmasberry (*Lycium carolinianum*). These plants were isolated in meter-high needle rush.

Sharp-tailed sparrows occupied the same marsh patch-types as did Seaside Sparrows. Often both species appeared in view simultaneously in a small area of rushes. However, sharp-tailed sparrows were found in other patch-types as well, with some present in shorter stands of needle rush and at other sites where no Seaside Sparrows were found. The two Saltmarsh Sparrows were associated with small groups of Nelson's Sparrows.

Interspecific interactions.—In 2007, male Seaside Sparrows were first heard singing on 2 February, and in 2008, on 5 February. On 28 February 2007 at site 11D (Table 1), 11 Seaside Sparrows approached or sang in response to the tape playing protocol. At the same location, seven Nelson's Sparrows also responded to the taped calls and perhaps to Seaside Sparrow lookout activity. The sharp-tailed sparrows approached and settled in the tops of needle rush plants, whereupon nearby Seaside Sparrows interrupted their singing and chased them.

DISCUSSION

Two significant findings are worth highlighting here. The first is that the southernmost territorial Seaside Sparrows were found near Port Richey at sites 8 and 10 (Fig. 1), just south and north of Salt Springs Bayou, respectively. Stevenson and Anderson (1994) stated that Scott's Seaside Sparrows were observed and probably breeding 8 km (5 miles) north of the Anclote Keys. This would be close to survey site 10 (Fig. 1). Older sources claimed nesting in 1926 as far south as Elfers (Allen 1888, Baynard 1932, Howell 1932), but those marshes

were partly eliminated by the Gulf Harbors development, with mangroves filling in most of the remaining surface. The Florida Breeding Bird Atlas project (FWC 2003), completed in summer 1991, found nesting birds at Hudson (site 14). We found individuals exhibiting breeding behavior 4.8 km (3 miles) south of Hudson in Port Richey, thus confirming the observation reported in Stevenson and Anderson (1994).

The second finding pertains to the relative frequency of the two species of sharp-tailed sparrows on their mid-Gulf coast wintering grounds in Florida. In two years, we found only two Saltmarsh Sparrows out of a total of 155 encounters. The high frequency (99%) of Nelson's Sparrows in Pasco County in this study is comparable to that (96%) reported by Post (1998) in Levy County. In contrast, historic collections of specimens taken during the late nineteenth and early twentieth centuries (to 1950) in Pinellas and Pasco counties ($n = 56$) documented the presence of a localized concentration of Saltmarsh Sparrows (84%) along this section of the Gulf coast (Greenlaw and Woolfenden 2007; Table 2 here). Considering that this result derives from the work of two major, non-contemporaneous collectors (W. E. D. Scott and W. G. Fargo) and four incidental collectors, it is unlikely that this difference can be explained entirely by selective collecting. We found that sharp-tailed sparrows often appeared in the tops of marsh vegetation at moderate distances, and then quickly disappeared. Without modern optics, obviously unavailable in those early decades, identification at a distance would be difficult. An early collector was likely to shoot first and examine the result later. Thus, we believe that this difference reflects a recent change in the relative representation of sharp-tailed sparrows from historic times. The Cape Sable area in the extreme southern peninsular mainland also was characterized by a high frequency of Saltmarsh Sparrows in specimen collections (Greenlaw and Woolfenden 2007). Otherwise, information from collections and from modern observations indicate that Nelson's Sparrows continue to predominate north of Pasco County along the Gulf coast to Wakulla County, and are exclusively present westward to Texas (Post 1998, Greenlaw and Woolfenden 2007). The modern situation at Cape Sable remains unresolved.

Ammodramus sparrows in this study were absent from the remaining Anclote River marshes. The southernmost birds found in this study were one Seaside Sparrow seen at site 4 on 16 February 2006 (Fig. 1), and two Nelson's Sparrows found at site 5 on 15 December 2006 (Fig. 1) and three at site 5 on 12 November 2007 (Fig. 1). Historic information and specimens collected there indicate that the Anclote marshes were a wintering area for both Seaside Sparrows and sharp-tailed sparrows. W. E. D. Scott collected the first Seaside Sparrows here along with 17 Saltmarsh Sparrows and one Salt-

marsh/Nelson's hybrid (Greenlaw and Woolfenden 2007). These marshes now are much smaller in area than in Scott's time with mangroves growing over most of the rush marshes after coastal development had claimed the rest. The modern absence of almost any suitable marshes, except for a few coastal islands and sandbars, along the Pinellas County coast south to St. Petersburg, has probably reduced most wintering *Ammodramus* in that county.

Compared to the historic information, current conditions on all the surveyed marshes must be regarded as degraded. All have been deeply ditched along roadside edges and most have been ditched for water-level (mosquito) control. Today a general absence of deep mud and tall needle rush prevails in contrast to conditions described by Baynard (1932) when he found the first nests of Scott's Seaside Sparrows. Almost all marshes surveyed were dry or had very shallow mud and only a few sites had tall (ca. 170 cm) needle rush stands.

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