

# Current range of the eastern population of Painted Bunting (*Passerina ciris*)

## Part 1: Breeding

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### ABSTRACT

This paper presents the current breeding range of Painted Bunting (*Passerina ciris*) in a series of maps and a narrative, in particular that of the eastern population, which is restricted to the states of North Carolina, South Carolina, Georgia, and Florida. Some conservation measures are recommended to protect this population. In light of the exten-

sive habitat loss in the Outer Coastal Plain of these states, which comprise the areas of the population's greatest density, it is imperative that a consortium of diverse interests work together to provide sufficient habitats for this colorful native songbird.

### OVERVIEW

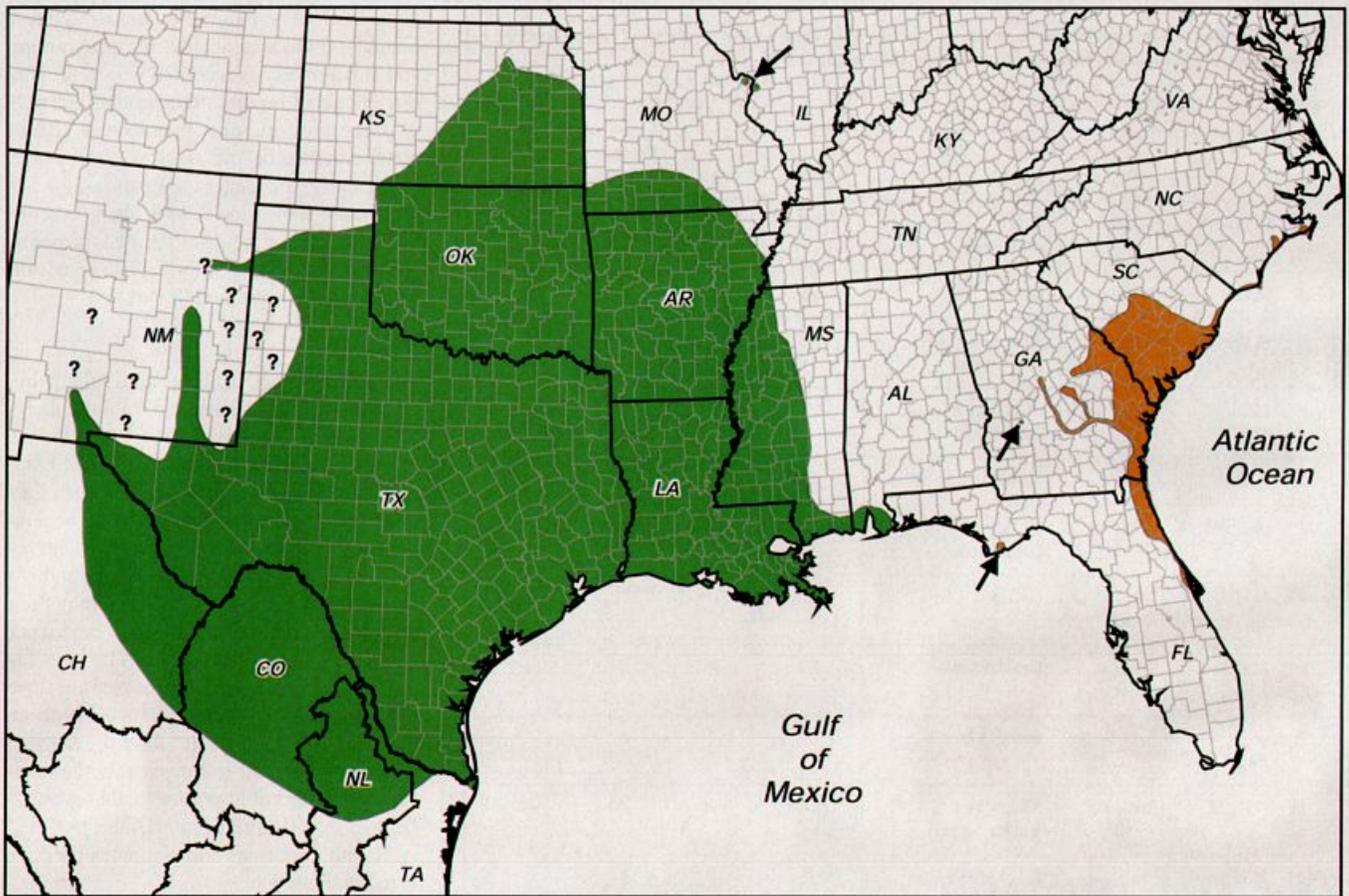
The breeding range of Painted Bunting (*Passerina ciris*) in the eastern United States is restricted to a small portion of the Atlantic Coastal Plain of four southeastern states. Partners in Flight (PIF) originally listed the bunting as a highly ranked Species at Risk (4.29/5.00) in need of attention in a physiographic region of high importance (Hunter et al. 1993a, 1993b). More recently, PIF revised and expanded its classification system and published it in the *North American Conservation Plan* (Rich et al. 2004), placing the Painted Bunting in the Species of Continental Importance for the United States and Canada: Watch List Species—Restricted distribution or low population size.

Two subspecies, *P. c. ciris* and *P. c. pallidior*, have been described based upon morphological variation. However, these two subspecies are only weakly differentiated (Storer 1951). Plumages and morphometrics show much overlap and are minor, clinal, and not distinctive enough to warrant nomenclatural distinctions (Thompson 1991a, Lowther et al. 1999). A further biological concern is that the two subspecies as currently described do not coincide with the

550-km (341-mi) gap centered on 85° W longitude that currently separates the eastern and western breeding populations (Figure 1). Given the current state of knowledge, it seems more accurate to treat the eastern and western populations rather than the eastern and western subspecies. From what is presently known, the eastern and western populations are allopatric on the breeding grounds as well as the wintering grounds. These two breeding populations differ dramatically in timing and pattern of molt, timing of migration, and in several morphological characteristics, thus suggesting differences at the species level (Thompson 1991a, 1991b). Based upon the work of Thompson (1991a, 1991b), Sibley and Monroe (1993) recognized the eastern and western populations as separate species: Eastern Painted-Bunting (*Passerina ciris*) and Western Painted-Bunting (*P. pallidior*). The Committee on Classification and Nomenclature of the American Ornithologists' Union has not yet made a decision on such a split. To clarify if such a split is warranted, a study of genetic divergence of the eastern and western populations of the Painted Bunting is currently underway by J. T. Klicka, C. W. Thompson, and Sykes; mitochondrial and nucleolar DNA are being examined from materials from the breeding and wintering ranges of the two populations.

Since the taxonomic question of a split has not yet been resolved, we simply refer to the eastern birds as the eastern population. This eastern breeding population of Painted Bunting is found along the Atlantic coast from southeastern North Carolina to northeastern Florida and extends inland in South Carolina and Georgia (Figures 1 and 2).

The recent literature gives the breeding range of the eastern population of Painted Bunting in relatively general terms (Stokes and Stokes 1996, A.O.U. 1998, Lowther et al.



**Figure 1.** The breeding range of the western (green) and eastern (orange) populations of Painted Bunting. Note the gap between the populations and the large difference in size of the two ranges. There are two small groups of breeding outliers shown for each population (black arrows); at Americus, Sumter County, GA, and at Apalachicola, Franklin County, FL, in the east and in the vicinity of St. Louis, MO, and at East St. Louis, IL, in the west. Mexican state abbreviations are CH for Chihuahua, CO for Coahuila, NL for Nuevo Leon, and TA for Tamaulipas. Data to create map adapted from Howell and Webb 1995, Lowther et al. 1999, Lockwood and Freeman 2004, and pers. comm. with Walter George (MO), Howard Horne (AL), Greg D. Jackson (AL), Mark Lockwood (TX), Jerry R. Oldenettel (NM), Chuck Otte (KS), Mark Robbins (KS, MO), Max Thompson (KS), Richard L. West (AL), and S.O. Williams (NM). The number of square kilometers within the breeding range of the western population of Painted Bunting as herein delineated is as follows (% of total for population is given parenthetically): **United States**—Alabama 3143 (0.2), Arkansas 117,911 (8.7), Illinois 165 (>0.01), Kansas 66,550 (4.9), Louisiana 107,847 (8.0), Mississippi 63,985 (4.7), Missouri 19,309 (1.4), New Mexico 15,996 (1.2), Oklahoma 147,582 (10.9), Tennessee 375 (>0.01), and Texas 580,501 (43.0); **Mexico**—Chihuahua 70,594 (5.2), Coahuila 111,958 (8.3), Nuevo Leon 38,145 (2.8), and Tamaulipas 7194 (0.5). Total range for the eastern and western populations combined is 1,405,608 km<sup>2</sup>.

1999, Sibley 2000, Dunn 2002, Peterson and Peterson 2002), and in several cases where range maps are presented, the maps contain numerous errors. We herein update and provide clarity for the breeding range of the eastern birds using the most current information in a series of maps, and the range is discussed for each of the four states. This appears to be the first attempt to map the breeding range of the eastern population of Painted Bunting in detail. Further refinement of the breeding range should evolve as further work is continued in the four-state area.

Many, but not all, of the public-owned lands within the range are shown on the state maps. The inclusion herein of public lands was requested by the newly formed Eastern Painted Bunting Working Group to aid land management agencies in developing conservation strategies for this declining species. This information should also be helpful for the birding public, but one needs to check about access in advance regarding a specific site, as some sites listed are not open to the public, or access is permitted in only

**Table 1. Abbreviations and acronyms used in Tables and text.**

|      |  |      |  |       |  |
|------|--|------|--|-------|--|
| a    | acre(s)  | FWCC | Fish and Wildlife Conservation Commission    | PRHSD | Parks, Recreation, and Historic Sites Division |
| AEC  | Atomic Energy Commission                           | FWS  | U.S. Fish and Wildlife Service               | Proj. | Project  |
| AFB  | U.S. Air Force Base                                | GIS  | Geographic Information System                | PSP   | Preserve State Park                            |
| AP   | Aquatic Preserve                                   | GPS  | Global Positioning System                    | Pt.   | Point  |
| AS   | Air Station  | ha   | hectare(s)                                   | RTC   | Reserve Training Center                        |
| BBA  | Breeding Bird Atlas Project                        | HM   | Historic Memorial                            | SF    | State Forest                                   |
| BBS  | Breeding Bird Survey                               | HP   | Heritage Preserve                            | SFS   | State Forest Service                           |
| CP   | City or County Park                                | HS   | Historic Site                                | SHP   | State Historic Park                            |
| CR   | Coastal Reserve                                    | Is.  | Island(s)                                    | SHS   | State Historic Site                            |
| DEP  | Department of Environmental Protection             | km   | kilometer(s)                                 | SNA   | State Natural Area                             |
| DNR  | Department of Natural Resources                    | mi   | mile(s)                                      | SP    | State Park                                     |
| DOA  | U.S. Department of Agriculture                     | MSRA | Memorial State Recreation Area               | SPr   | State Preserve                                 |
| DOD  | U.S. Department of Defense                         | NASA | National Aeronautic and Space Administration | SPS   | State Park Service                             |
| DOE  | U.S. Department of Energy                          | NER  | National Ecological Reserve                  | SR    | State Reserve                                  |
| DOI  | U.S. Department of the Interior                    | NERR | National Estuarine Research Reserve          | SRA   | State Recreation Area                          |
| DOT  | Department of Transportation                       | NF   | National Forest                              | Sta.  | Station  |
| DPR  | Division of Parks and Recreation                   | NM   | National Monument                            | TTRS  | Tall Timbers Research Station, Tallahassee     |
| DPRE | Department of Parks, Recreation, and Entertainment | NMe  | National Memorial                            | USA   | U.S. Army                                      |
| DRP  | Division of Recreation and Parks                   | NP   | National Park                                | USAF  | U.S. Air Force                                 |
| DSS  | Dredge Spoil Site                                  | NPr  | National Preserve                            | USMC  | U.S. Marine Corps                              |
| EHP  | Ecological and Historic Preserve                   | NPS  | National Park Service                        | USN   | U.S. Navy                                      |
| FISC | Fleet Industrial Supply Center                     | NRR  | National Research Reserve                    | WaMA  | State Waterfowl Management Area                |
| FS   | U.S. Forest Service                                | NS   | National Seashore                            | WC    | Wildlife Center                                |
|      |  | NWR  | National Wildlife Refuge                     | WMA   | State Wildlife Management Area                 |
|      |  | PA   | Power Authority                              | WMD   | Water Management District                      |
|      |  |      |  | WRD   | Wildlife Resources Division                    |

**Table 2. Selected lands in public ownership within the breeding range of the eastern population of Painted Bunting in North Carolina. Site numbers correspond to numbers on state map (Figure 3).**

| No. | AGENCY                    | SITE                      |   | SIZE (acres)   |               |                     |                 |
|-----|---------------------------|---------------------------|---|----------------|---------------|---------------------|-----------------|
|     |                           | COUNTY                    | NAME  | TOTAL          | UPLAND        | FRESHWATER WETLANDS | SALINE WETLANDS |
| 1   | NC DPR                    | Carteret                  | Rachel Carson Ecol. Reserve                     | 2025           | 303           | 0                   | 1722            |
| 2   | NC DPR                    | Carteret                  | Ft. Macon SP                                    | 389            | 229           | 4                   | 156             |
| 3   | NC DPR                    | Carteret                  | Theodore Roosevelt State Nat. Area <sup>1</sup> | 265            | 230           | 8                   | 27              |
| 4   | DOD, USMC                 | Carteret                  | U.S. Military Reservation, Bogue Airfield       | 853            | 853           | 0                   | 0               |
| 5   | NC DPR                    | Onslow                    | Hammocks Beach SP                               | 835            | 793           | 0                   | 42              |
| 6   | DOD, USMC                 | Onslow                    | Marine Corps Base, Camp LeJeune                 | 146,156        | 69,382        | 70,859              | 5915            |
| 7   | NC DPR                    | New Hanover               | Masonboro Is. CR                                | 5515           | 827           | 0                   | 4688            |
| 8   | NC DPR                    | New Hanover               | Caroline Beach SP                               | 420            | 394           | 13                  | 13              |
| 9   | NC Div. of Historic Sites | Brunswick                 | Brunswick Town HS                               | 120            | 94            | 6                   | 20              |
| 10  | DOD, USA                  | Brunswick                 | Military Ocean Terminal, Sunny Pt.              | 11,100         | 8600          | 2000                | 500             |
| 11  | NC DPR                    | New Hanover               | Ft. Fisher SHS                                  | 38             | 38            | 0                   | 0               |
| 12  | NC DPR                    | New Hanover               | Ft. Fisher SRA                                  | 287            | 187           | 14                  | 86              |
| 13  | NC DPR                    | New Hanover/<br>Brunswick | Zekes Is. CR                                    | 1650           | 412           | 0                   | 1238            |
| 14  | NC DPR                    | New Hanover               | Bald Head Is. SNA                               | 1195           | 119           | 0                   | 1076            |
| 15  | NC DPR                    | Brunswick                 | Bald Head Is. CR                                | 173            | 164           | 0                   | 9               |
| 16  | NC DPR                    | Brunswick                 | Battery Is.                                     | 55             | 25            | 0                   | 30              |
| 17  | NC DPR                    | Brunswick                 | Bird Is. CR                                     | 1438           | 144           | 0                   | 1294            |
|     |                           | <b>TOTAL</b>              | <b>Acres</b>                                    | <b>172,514</b> | <b>82,794</b> | <b>72,904</b>       | <b>16,816</b>   |
|     |                           |                           | <b>Hectares</b>                                 | <b>69,818</b>  | <b>33,507</b> | <b>29,505</b>       | <b>6806</b>     |

<sup>1</sup>Includes 25 acres occupied by the North Carolina Aquarium.

limited areas within a given site.

The eastern Painted Bunting uses a wide range of habitats and local landscapes, including: maritime shrub-scrub communities; Live Oak maritime forests; mixed pine-deciduous and/or broadleaf evergreen woodlands; managed mixed forest types; early successional stages following timbering operations; some pine plantations during the early stages when hardwoods are not suppressed; upland edges of swamp forests; vegetated edges of creeks and rivers; shrub-scrub edges; hedgerows; overgrown agricul-

tural fields; salt, brackish, and freshwater marshes (for foraging); shrub-scrub communities on the leeward side of barrier islands between developed areas and the salt marsh; small isolated hammocks (islands) within the salt marsh ecosystem; shrub-scrub edge of dredge-spoil areas; undeveloped property in suburban areas with large lots; some suburban gardens with lush plantings of native vegetation, etc. (Howell 1932, Pearson et al. 1942, Burleigh 1958, Sprunt and Chamberlain 1970, Cox 1996, Lowther et al. 1999, Sykes and Holzman,

pers. obs.). Where buntings are using forest habitats, there is generally an open canopy and small openings scattered within the forest. The most heavily used habitats generally are patchy mosaics that have a shrub-scrub component and areas of grasses (i.e., particularly the genera *Paspalum* and *Setaria*) with some vine tangles often present.

The wintering range of the eastern population of the bunting (Florida, Bahamas, and Cuba) will be presented in Part II.

## METHODS

The current range of the eastern population of Painted Bunting is derived from the literature, state Breeding Bird Atlas (BBA) results (none of which have yet been published, but several of which are on-line, as in South Carolina and Florida; Georgia's atlas is to be published in a year or two), Breeding Bird Survey (BBS) data, consultation with key individuals knowledgeable about the distribution in their respective state, and our overall experience with the species in the region. The breeding range is presented in a suite of maps at three different scales in order to provide both an overview and adequate details of the range in relation to physical features across the landscape. The breeding season in this paper is defined as mid-April through August.

The abbreviations and acronyms used are listed in Table 1.

The series of maps were designed to provide for the information needs of a broad spectrum of users. These maps were created in the following manner. The range was drawn on state maps from available data. These paper maps were scanned and georeferenced to digital county boundaries obtained from each state's Geographic Information System (GIS) clearinghouse website. Environmental Systems Research Institute (ESRI) ArcGIS software was then used to create an ArcGIS shapefile by digitizing the boundary onscreen.

The numbers in the first column in Tables 2 through 5 list selected public-owned lands and correspond to the numbers on the maps for the respective states. All acreage figures for public lands were obtained in consultations with staff members of the agencies that manage these properties. The total acreage of public lands in the tables is divided into three categories: (1) upland, which includes both developed and undeveloped lands not generally flooded, with or without vegetative cover, (2) freshwater wetlands, which include swamps, marshes, impoundments, creeks, rivers, ponds, and lakes, and (3) saline wetlands, which include all brackish and salt marshes, mud and sand flats, brackish and saline tidal creeks and rivers, and shallow sounds and bays. Eastern birds use parts of freshwater and saline wetlands adjoining upland habitats for foraging. Table 6

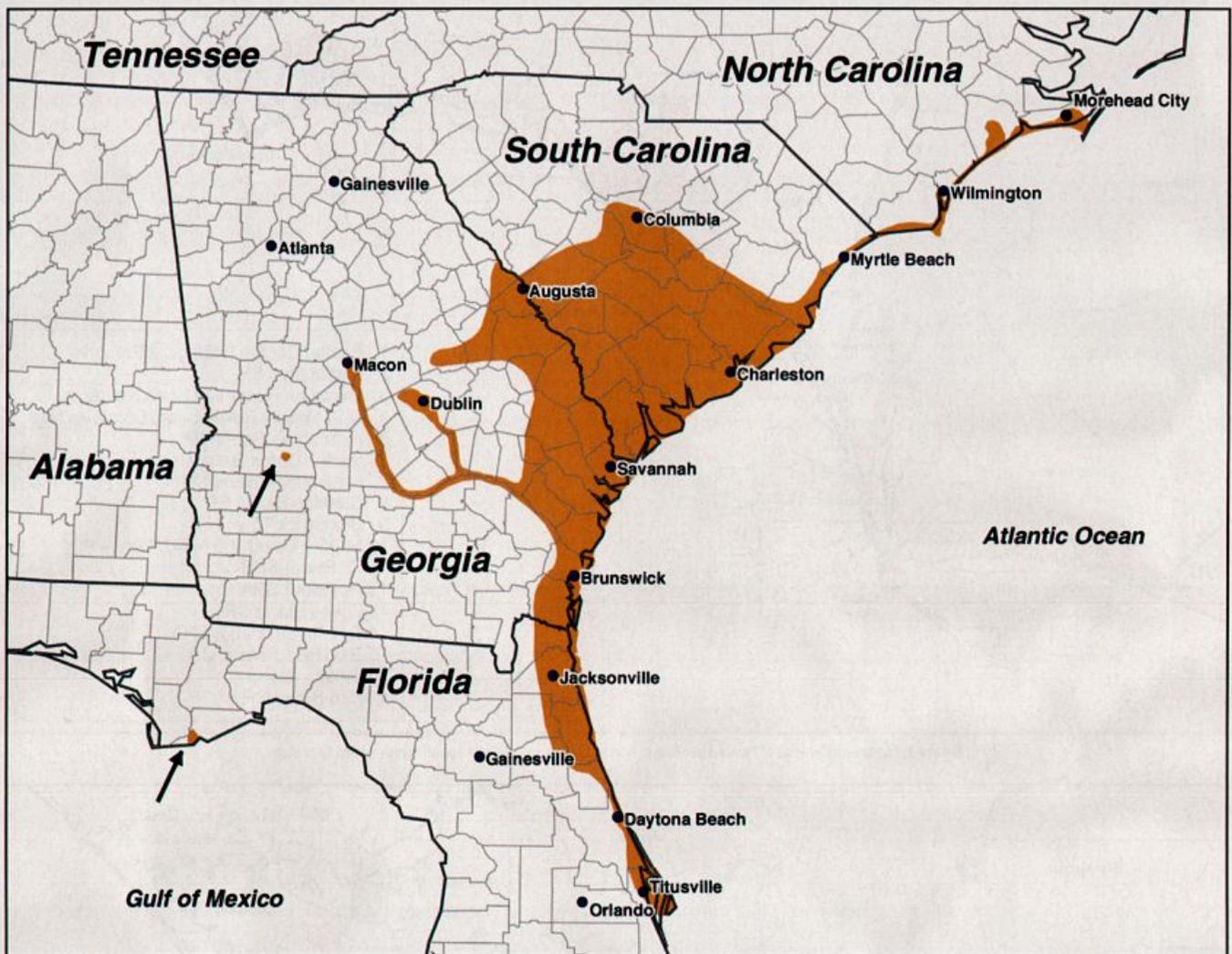


Figure 2. The breeding range of the eastern population of Painted Bunting in the southeastern United States. Black arrows point to isolated small breeding sites at Americus, Sumter County, GA, and Apalachicola, Franklin County, FL.

lists all BBS routes within the range. The tables cross-reference with the maps and present additional information.

## RESULTS

The breeding range of the eastern population of Painted Bunting is shown in Figures 1 and 2, and in more detail for each of the four states in Figures 3 through 10. In North Carolina and Florida, the birds are mainly coastal, while in South Carolina and Georgia, they extend well inland. The western limit of the range in many places is somewhat problematic, in that data are too incomplete to be precise. Also, buntings are not evenly distributed across the landscape but are habitat dependent. For discussion of habitats, refer to Lowther et al. (1999). The greatest densities are on the barrier islands, the islands within the estuarine systems, and in suitable habitats on the immediate mainland adjoining the saline and brackish areas (Sykes, unpubl. data). Away from the immediate coast, the distribution of Painted Buntings becomes patchy and the densities decrease precipi-

tously (Sykes, pers. obs.), the exact reverse of the situation with Indigo Bunting (*P. cyanea*) in these areas. It should be noted that none of the BBS routes (N=38; Table 6) are located within that part of the range with the highest densities of Painted Buntings.

The selected public lands listed are primarily state and federal properties; a few county and city areas are also included. The list for each state is by no means complete, but we have selected what we judged to be the most important for Painted Bunting. A few of these areas may have little use by buntings at any given time, depending upon land use and type of habitats, and the duration such habitats are available.

The total acreages given for public-owned lands are relatively accurate, but the accuracy of the three breakdown categories of (1) upland, (2) freshwater wetlands, and (3) saline wetlands are variable, some being quite accurate, while in other cases the figures shown are simply best estimates of those most familiar with the given areas.

**North Carolina.** The breeding range as de-

lined for the eastern population in North Carolina is 1288 km<sup>2</sup> or 2.4% of the total area for that population. The breeding range extends from the vicinity of Cape Lookout and Morehead City southwestward along the immediate coast to South Carolina (Figures 3 and 4) (Pearson et al. 1959, Potter et al. 1980; John O. Fussell, John Gerwin, and James F. Parnell, pers. comm.). It is found almost exclusively in areas within the tidal influence in five coastal counties: Carteret, Onslow, Pender, New Hanover, and Brunswick. Extralimital reports (not shown on maps) during the breeding season include confirmed breeding at Washington, Beaufort County, 1–10 June 1970 (Potter et al. 1980) and at least 19 reports of unconfirmed breeding in the following counties: Beaufort, Carteret (Cedar Is.), Cumberland (2 reports), Dare (6), Edgecombe, Gates, Pamlico (2), Onslow (2, both at Richlands), Stanly, and Wake (2) (Pearson et al. 1959, Potter et al. 1980; Ricky J. Davis, pers. comm.).

Seventeen selected public-owned properties are shown in Figure 3 and listed in Table 2, out

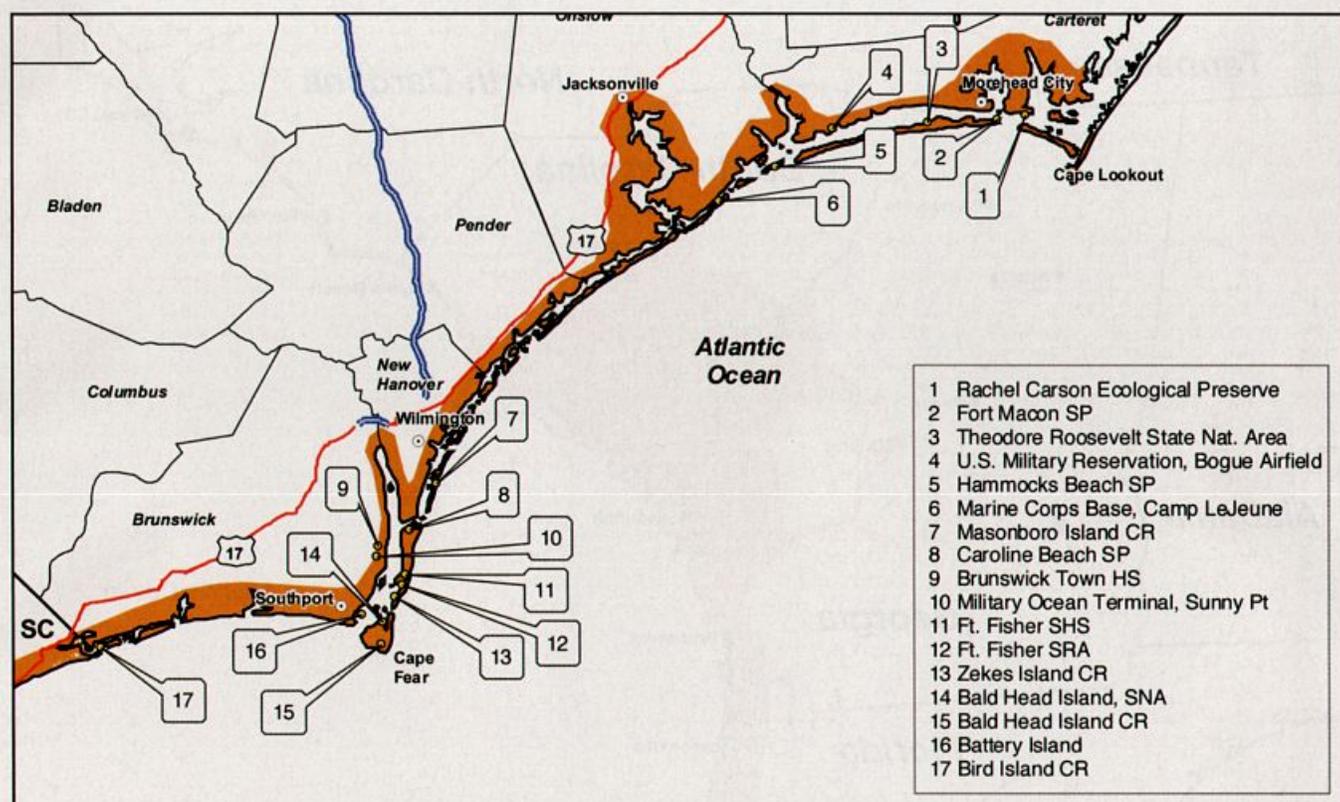


Figure 3. The breeding range of Painted Bunting in North Carolina with selected public lands within the range.

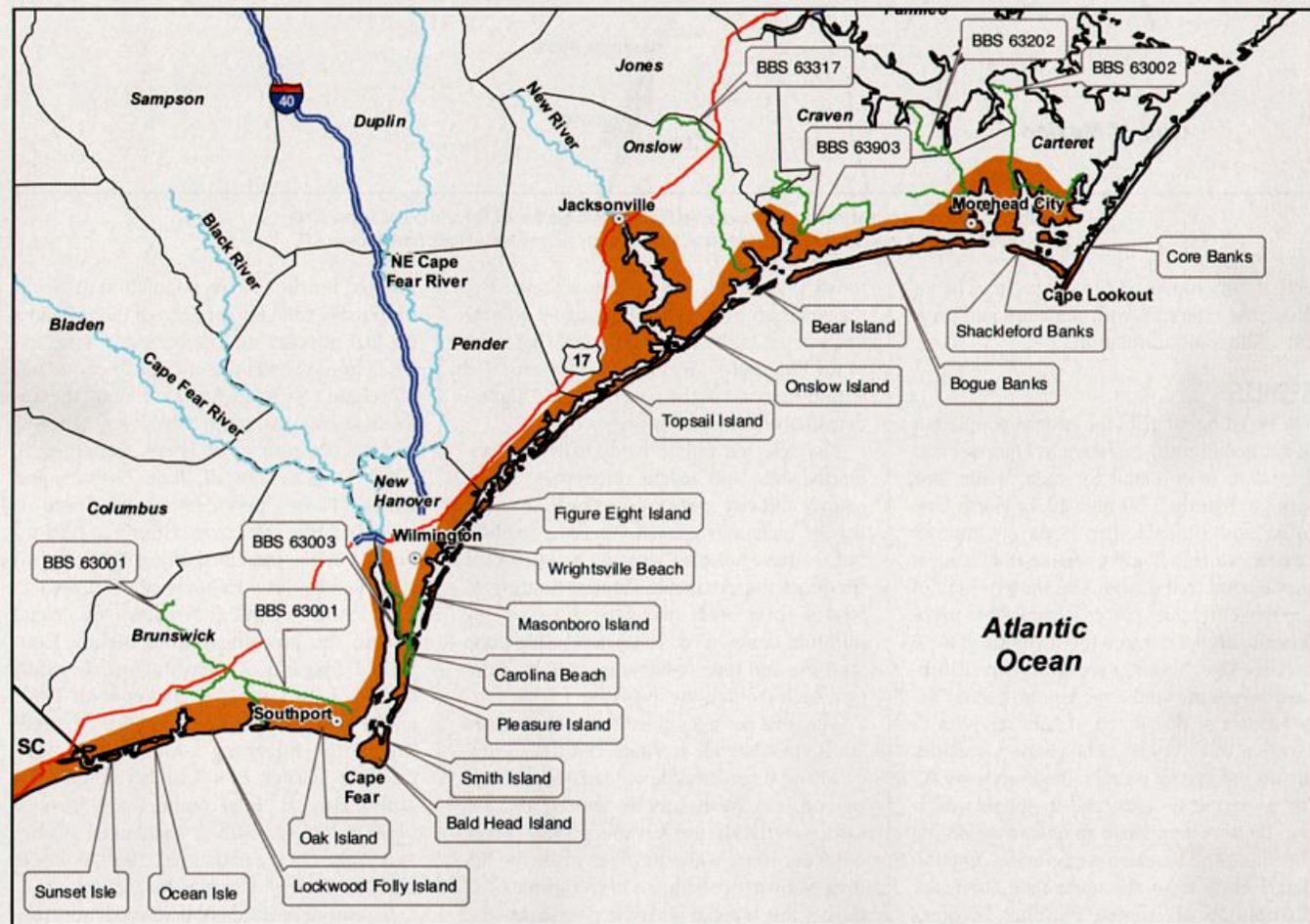


Figure 4. The breeding range of Painted Bunting in North Carolina with the major rivers, barrier islands, and BBS routes within the range.

**Table 3. Selected lands in public ownership within the breeding range of the eastern population of Painted Bunting in South Carolina. Site numbers correspond to numbers on state map (Figure 5).**

| No. | AGENCY                          | SITE                             |   | SIZE (acres) |              |                     |                 | TOTAL          | UPLAND         | FRESHWATER WETLANDS | SALINE WETLANDS |
|-----|---------------------------------|----------------------------------|---|--------------|--------------|---------------------|-----------------|----------------|----------------|---------------------|-----------------|
|     |                                 | COUNTY                           | NAME                                      | TOTAL        | UPLAND       | FRESHWATER WETLANDS | SALINE WETLANDS |                |                |                     |                 |
| 1   | SC SPS                          | Aiken                            | Aiken SP                                  | 1067         | 796          | 271                 | 0               |                |                |                     |                 |
| 2   | SC SPS                          | Aiken                            | Redcliffe Plantation SP                   | 369          | 365          | 4                   | 0               |                |                |                     |                 |
| 3   | DOE, AEC                        | Aiken & Barnwell                 | Savannah River Site <sup>1</sup>          | 198,552      | 148,903      | 49,649              | 0               |                |                |                     |                 |
| 4   | SC SPS                          | Barnwell                         | Barnwell SP                               | 307          | 257          | 50                  | 0               |                |                |                     |                 |
| 5   | DOI, NPS                        | Richland                         | Congaree Swamp NP                         | 22,200       | 2,200        | 20,000              | 0               |                |                |                     |                 |
| 6   | SC SPS                          | Sumter                           | Poinsett SP                               | 1000         | 853          | 147                 | 0               |                |                |                     |                 |
| 7   | SC SFS                          | Sumter                           | Manchester SF                             | 24,789       | 19,044       | 5745                | 0               |                |                |                     |                 |
| 8   | DOD, USA                        | Sumter                           | Poinsett Electronic Combat Range          | 12,500       | 7,917        | 4583                | 0               |                |                |                     |                 |
| 9   | SC DNR                          | Clarendon                        | Hickory Top WMA <sup>2</sup>              | (1836)1      | --           | --                  | 0               |                |                |                     |                 |
| 10  | SC SPS                          | Orangeburg                       | Santee SP                                 | 2495         | 2165         | 330                 | 0               |                |                |                     |                 |
| 11  | SC DNR                          | Orangeburg                       | Santee Cooper WMA <sup>2</sup>            | (3274)1      | --           | --                  | 0               |                |                |                     |                 |
| 12  | DOI, FWS                        | Clarendon                        | Santee NWR                                | 15,095       | 14,195       | 900                 | 0               |                |                |                     |                 |
| 13  | Santee Cooper Lakes PA          | Clarendon & Berkeley             | Santee Cooper Tract <sup>1</sup>          | 32,000       | 23,500       | 8500                | 0               |                |                |                     |                 |
| 14  | SC SPS                          | Bamberg                          | Rivers Bridge SP                          | 390          | 360          | 30                  | 0               |                |                |                     |                 |
| 15  | SC SPS                          | Dorchester & Colleton            | Colleton SP                               | 35           | 30           | 5                   | 0               |                |                |                     |                 |
| 16  | SC SPS                          | Dorchester & Colleton            | Givhans SP                                | 1022         | 480          | 542                 | 0               |                |                |                     |                 |
| 17  | DOA, FS                         | Berkeley & Charleston            | Francis Marion NF                         | 253,941      | 175,192      | 76,249              | 2,500           |                |                |                     |                 |
| 18  | SC SFS                          | Williamsburg & Georgetown        | Wee Tee SF                                | 12,439       | 939          | 11,500              | 0               |                |                |                     |                 |
| 19  | SC SPS                          | Hampton                          | Lake Warren SP                            | 430          | 330          | 100                 | 0               |                |                |                     |                 |
| 20  | SC DNR                          | Hampton                          | J. W. Webb WC & WMA                       | 5866         | 3366         | 2500                | 0               |                |                |                     |                 |
| 21  | SC DNR                          | Hampton & Jasper                 | Palachucola WMA                           | 6757         | 4187         | 2570                | 0               |                |                |                     |                 |
| 22  | SC DNR                          | Colleton                         | Donnelly WMA                              | 8048         | 5700         | 2044                | 304             |                |                |                     |                 |
| 23  | SC SPS                          | Dorchester                       | Colonial Dorchester HS                    | 325          | 156          | 154                 | 15              |                |                |                     |                 |
| 24  | SC DNR                          | Colleton                         | Bear Is. WMA                              | 12,055       | 1627         | 5543                | 4885            |                |                |                     |                 |
| 25  | DOD, USAF                       | Charleston                       | Charleston Air Force Base                 | 3,733        | 3,379        | 0                   | 354             |                |                |                     |                 |
| 26  | DOD, USN                        | Berkeley                         | Naval Weapons Station, Charleston         | 16,307       | 12,957       | 1994                | 1356            |                |                |                     |                 |
| 27  | SC DNR                          | Jasper                           | Tillman Sand Ridge HP                     | 963          | 963          | 0                   | 0               |                |                |                     |                 |
| 28  | DOD, USMC                       | Beaufort                         | Marine Corps AS, Beaufort                 | 6850         | 5930         | 651                 | 269             |                |                |                     |                 |
| 29  | DOI, FWS                        | Beaufort, Charleston, & Colleton | ACE Basin NWR                             | 11,707       | 3,767        | 3981                | 3959            |                |                |                     |                 |
| 30  | SC SPS                          | Horry                            | Myrtle Beach SP                           | 312          | 307          | 5                   | 0               |                |                |                     |                 |
| 31  | SC DOT & The Nature Conservancy | Georgetown                       | Sandy Is. WMA                             | 9164         | 4000         | 5164                | 0               |                |                |                     |                 |
| 32  | SC SPS                          | Georgetown                       | Huntington Beach SP                       | 2500         | 1350         | 90                  | 1060            |                |                |                     |                 |
| 33  | SC DNR                          | Georgetown                       | Samworth WMA                              | 1588         | 301          | 936                 | 351             |                |                |                     |                 |
| 34  | SC DNR                          | Georgetown                       | Tom Yawkey WC & HP                        | 18,545       | 5825         | 100                 | 12,620          |                |                |                     |                 |
| 35  | SC DNR                          | Georgetown                       | Santee Delta WMA                          | 1792         | 35           | 1515                | 242             |                |                |                     |                 |
| 36  | SC DNR                          | Charleston                       | Santee Coastal WMA                        | 19,368       | 6166         | 1300                | 11,902          |                |                |                     |                 |
| 37  | DOI, FWS                        | Charleston                       | Cape Romain NWR                           | 64,229       | 2427         | 701                 | 61,101          |                |                |                     |                 |
| 38  | SC DNR                          | Charleston                       | Capers Is. HP                             | 2000         | 875          | 0                   | 1125            |                |                |                     |                 |
| 39  | SC DNR                          | Charleston                       | Ft. Lamar HP                              | 14           | 14           | 0                   | 0               |                |                |                     |                 |
| 40  | City of Charleston              | Charleston                       | James Is. CP                              | 648          | 292          | 36                  | 320             |                |                |                     |                 |
| 41  | DOI, FWS                        | Charleston                       | Bears Bluff Natl. Fish Hatchery           | 35           | 30           | 5                   | 0               |                |                |                     |                 |
| 42  | SC SPS                          | Charleston                       | Edisto Beach SP                           | 1255         | 834          | 23                  | 398             |                |                |                     |                 |
| 43  | SC DNR                          | Colleton & Beaufort              | St. Helena Sound HP <sup>3</sup>          | 72,050       | 6050         | 0                   | 66,000          |                |                |                     |                 |
| 44  | SC SPS                          | Beaufort                         | Hunting Is. SP                            | 5000         | 1250         | 30                  | 3720            |                |                |                     |                 |
| 45  | SC DNR                          | Beaufort                         | Old Is. HP                                | 1500         | 450          | 0                   | 1050            |                |                |                     |                 |
| 46  | DOD, USMC                       | Beaufort                         | Marine Corps Recruitment Depot, Paris Is. | 8047         | 3264         | 10                  | 4773            |                |                |                     |                 |
| 47  | SC DNR                          | Beaufort                         | Daws Is. HP                               | 1866         | 200          | 0                   | 1666            |                |                |                     |                 |
| 48  | SC DNR                          | Beaufort                         | Victoria Bluff HP                         | 1111         | 1111         | 0                   | 0               |                |                |                     |                 |
| 49  | DOI, FWS                        | Beaufort                         | Pinckney NWR                              | 4073         | 1333         | 40                  | 2700            |                |                |                     |                 |
| 50  | SC DNR                          | Beaufort                         | Greens Shell Enclosure HP <sup>4</sup>    | 7            | 7            | 0                   | 0               |                |                |                     |                 |
| 51  | SC DNR                          | Jasper                           | Turtle Is. WMA                            | 1700         | 100          | 0                   | 1600            |                |                |                     |                 |
| 52  | GA DOT                          | Jasper                           | Savannah River Dredge-Spoil Area          | 10,674       | 5974         | 0                   | 4700            |                |                |                     |                 |
| 53  | DOI, FWS                        | Jasper (SC) & Chatham (GA)       | Savannah NWR                              | 28,168       | 2578         | 25,590              | 0               |                |                |                     |                 |
|     |                                 |                                  |   | <b>TOTAL</b> | <b>Acres</b> | <b>Hectares</b>     | <b>906,888</b>  | <b>484,331</b> | <b>233,587</b> | <b>188,970</b>      | <b>367,027</b>  |
|     |                                 |                                  |   |              |              |                     |                 | <b>196,014</b> | <b>94,535</b>  | <b>76,478</b>       |                 |

<sup>1</sup>Crackerneck WMA (10,470a) is a part of the Savannah River Site and is included in that site acreage.<sup>2</sup>Santee Cooper Tract includes the Old Santee Canal (formerly a SP), and the Hickory Top WMA (Clarendon Co.; 1836a), and the Santee Cooper WMA (Orangeburg Co.; 3274a) are leased by SC DNR from the Santee Cooper PA. These two WMA are managed by SC DNR and are included in the acreage listed under the Santee Cooper Tract.<sup>3</sup>St. Helena Sound WMA is a part of St. Helena Sound Heritage Preserve and is included in acreage for that preserve.<sup>4</sup>In Greens Shell Enclosure HP (Native American Midden Site), 4a belonging to Beaufort Co. are included with the 3a of the state.

**Table 4. Selected lands in public ownership within the breeding range of the eastern population of the Painted Bunting in Georgia. Site numbers correspond to numbers on state map (Figure 7).**

| No.             | AGENCY                       | SITE                          |   | SIZE (acres)   |                |                     |                 |
|-----------------|------------------------------|-------------------------------|---|----------------|----------------|---------------------|-----------------|
|                 |                              | COUNTY                        | NAME                                    | TOTAL          | UPLAND         | FRESHWATER WETLANDS | SALINE WETLANDS |
| 1               | GA DNR                       | Tattnall                      | Big Hammock Natural Area                | 6049           | 2592           | 3457                | 0               |
| 2               | DOD, USA                     | Bryan, Evans, Liberty, & Long | Ft. Stewart                             | 279,000        | 189,000        | 90,000              | 0               |
| 3               | DOI, NPS                     | Chatham                       | Ft. Pulaski NM                          | 5623           | 270            | 0                   | 5353            |
| 4               | DOI, FWS                     | Chatham                       | Tybee NWR                               | 100            | 80             | 0                   | 20              |
| 5               | DOD, USA                     | Chatham                       | Hunter Army Air Field                   | 5457           | 3993           | 639                 | 825             |
| 6               | GA DNR, PRHSD                | Chatham                       | Little Tybee Is.                        | 6505           | 5905           | 0                   | 600             |
| 7               | GA DNR, PRHSD                | Chatham                       | Wormsloe HS                             | 1233           | 1233           | 0                   | 0               |
| 8               | GA DNR, PRHSD                | Chatham                       | Cabbage Is.                             | 1216           | 0              | 0                   | 1216            |
| 9               | GA DNR, PRHSD                | Chatham                       | Skidaway Is. SP                         | 506            | 506            | 0                   | 0               |
| 10              | DOI, FWS                     | Chatham                       | Wassaw NWR                              | 10,053         | 2400           | 200                 | 7453            |
| 11              | GA DNR, PRHSD                | Bryan                         | Ft. McAllister/<br>Richmond Hill SHP    | 1725           | 1725           | 0                   | 0               |
| 12              | GA DNR, WRD                  | Bryan                         | Ossabaw Is. HP                          | 22,405         | 7889           | 2653                | 11,863          |
| 13              | GA DNR, WRD                  | Bryan                         | Richmond Hill WMA                       | 22,329         | 5860           | 3066                | 13,403          |
| 14              | GA DNR, PRHSD                | Liberty                       | Ft. Morris HS                           | 66             | 66             | 0                   | 0               |
| 15              | DOI, FWS                     | McIntosh                      | Harris Neck NWR                         | 2824           | 1368           | 159                 | 1297            |
| 16              | DOI, FWS                     | McIntosh                      | Blackbeard Is. NWR                      | 5618           | 2455           | 1163                | 2000            |
| 17              | DOD                          | McIntosh                      | Townsend Range                          | 5400           | 4057           | 1343                | 0               |
| 18              | GA DNR, WRD                  | McIntosh                      | Sapelo Is. WMA                          | 16,651         | 8880           | 2293                | 5478            |
| 19              | GA DNR, PRHSD                | McIntosh                      | Ft. King George HS                      | 22             | 22             | 0                   | 0               |
| 20              | GA DNR, WRD                  | McIntosh                      | Altamaha WaMA <sup>1</sup>              | 27,783         | 1529           | 18,426              | 7828            |
| 21              | DOI, FWS                     | McIntosh                      | Wolfe Is. NWR                           | 5126           | 500            | 0                   | 4626            |
| 22              | GA DNR, PRHSD                | Glynn                         | Hofwyl-Bradfield Plantation HS          | 1268           | 1268           | 0                   | 0               |
| 23              | DOD, NPS                     | Glynn                         | Ft. Frederica NM                        | 230            | 130            | 0                   | 100             |
| 24              | GA DOT                       | Glynn                         | Andrews Is.                             | 920            | 800            | 0                   | 120             |
| 25              | GA DNR, Jekyll Is. Authority | Glynn                         | Jekyll Is.                              | 5700           | 4375           | 25                  | 1300            |
| 26              | DOD, NPS                     | Camden                        | Cumberland Is. NS                       | 33,154         | 13,580         | 2724                | 16,850          |
| 27              | GA DNR, PRHSD                | Camden                        | Crooked River SP                        | 500            | 500            | 0                   | 0               |
| 28              | DOD, USN                     | Camden                        | Naval Submarine Support Base, Kings Bay | 16,168         | 12,168         | 1000                | 3000            |
| <b>TOTAL</b>    |                              |                               |   | <b>483,631</b> | <b>273,151</b> | <b>127,148</b>      | <b>83,332</b>   |
| <b>Acres</b>    |                              |                               |   | <b>195,730</b> | <b>110,547</b> | <b>51,458</b>       | <b>33,725</b>   |
| <b>Hectares</b> |                              |                               |   |                |                |                     |                 |

<sup>1</sup>Includes Lewis Island Natural Area.

of a total of 43 listed by the North Carolina Department of Environmental and Natural Resources, Division of Parks and Recreation, Natural Heritage Program, Managed Areas (GIS layer). The total acreage for all public lands within the range as delineated for North Carolina is 110,983 a (44,915 ha), much of which is not habitat for Painted Buntings. Seven BBS routes are located in or partly in the range in the state (Figure 4 and Table 6).

**South Carolina.** The breeding range as delineated for the eastern population in South Carolina is 27,394 km<sup>2</sup> or 50.4% of the total area for that population. The breeding range in the state spans the entire coast and extends inland into the Upper Coastal Plain to Columbia, to include most of Aiken County, and parts of the counties of Lexington, Richland, Sumter, Clarendon, and Williamsburg (Figures 5 and 6) (Sprunt and Chamberlain 1970, LeGrand 1980, Post and Gauthreaux 1989, SC BBA; John E. Cely, Lex Glover, pers. comm.). Breeding has been recorded in 22 counties. Away from the coast, the birds are very localized, and there are large areas in which none are found. Also, there are extralimital records (not shown on the maps) of confirmed breeding: near Lugoff, Kershaw County, 21 July and 19 August 1990 (McNair and Post 1993, Lex Glover, pers. comm.) and near Ruby, Chesterfield County, 21 July 1991 (SC BBA; Lex Glover, pers. comm.). Possible breeding has been documented: east of Trenton, Edgefield County, 16 May 1998 (Lex Glover, pers. comm.); west of Bennettsville, Marlboro County, 12 June 1999 (SC BBA; Lex Glover, pers. comm.); near Camden, 1986 and 1987 (McNair and Post 1993); and near Lugoff 21 July 1991, 21 April 1996, 13 August 1998, and 19 August 1999 (Lex Glover, pers. comm.), all Kershaw County; at Jefferson, Chesterfield County, 31 July 1976 (Post and Gauthreaux 1989); southeast of Maysville, Sumter County, 30 April 1991 (Lex Glover, pers. comm.); and Florence, Florence County, 26 June 1947 (Sprunt and Chamberlain 1970).

Fifty-three selected public lands within the breeding range are shown in Figure 5 and listed in Table 3, out of a total of 331 listed by the South Carolina Department of Natural Resources, South Carolina Gap Analysis Program, Stewardship GIS Layer. The total acreage for all public lands within the range as delineated for South Carolina is 1,198,270 a (484,940 ha), much of which is not habitat for Painted Buntings. There are 14 BBS routes located in or partly in the range in the state (Figure 6 and Table 6).

**Georgia.** The breeding range as delineated for the eastern population in Georgia is 19,369 km<sup>2</sup> or 35.6% of the total area for that population. The breeding range extends along the entire coast and inland to the counties of Columbia, Richmond, Jefferson,

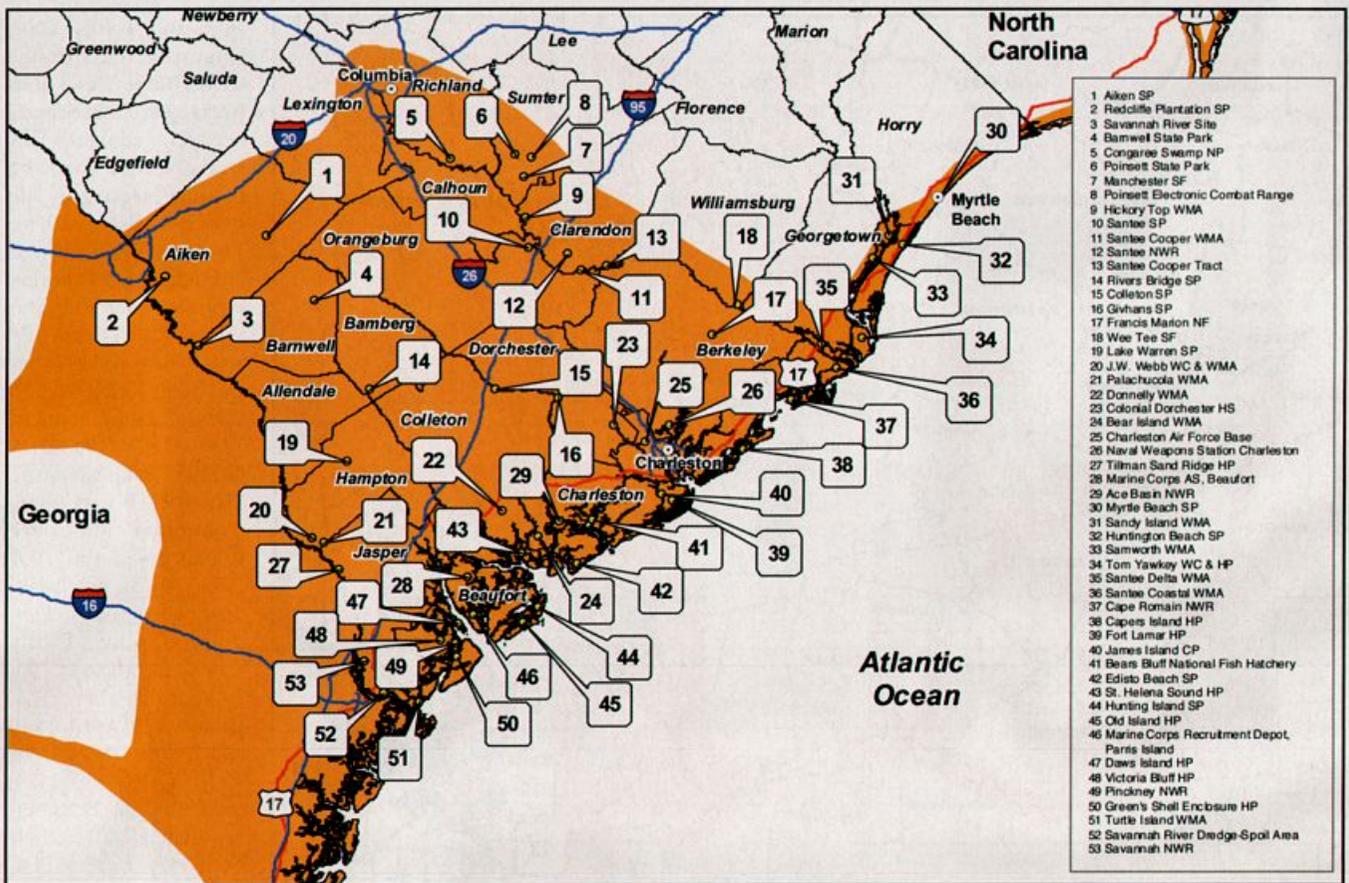


Figure 5. The breeding range of Painted Bunting in South Carolina with selected public lands within the range.

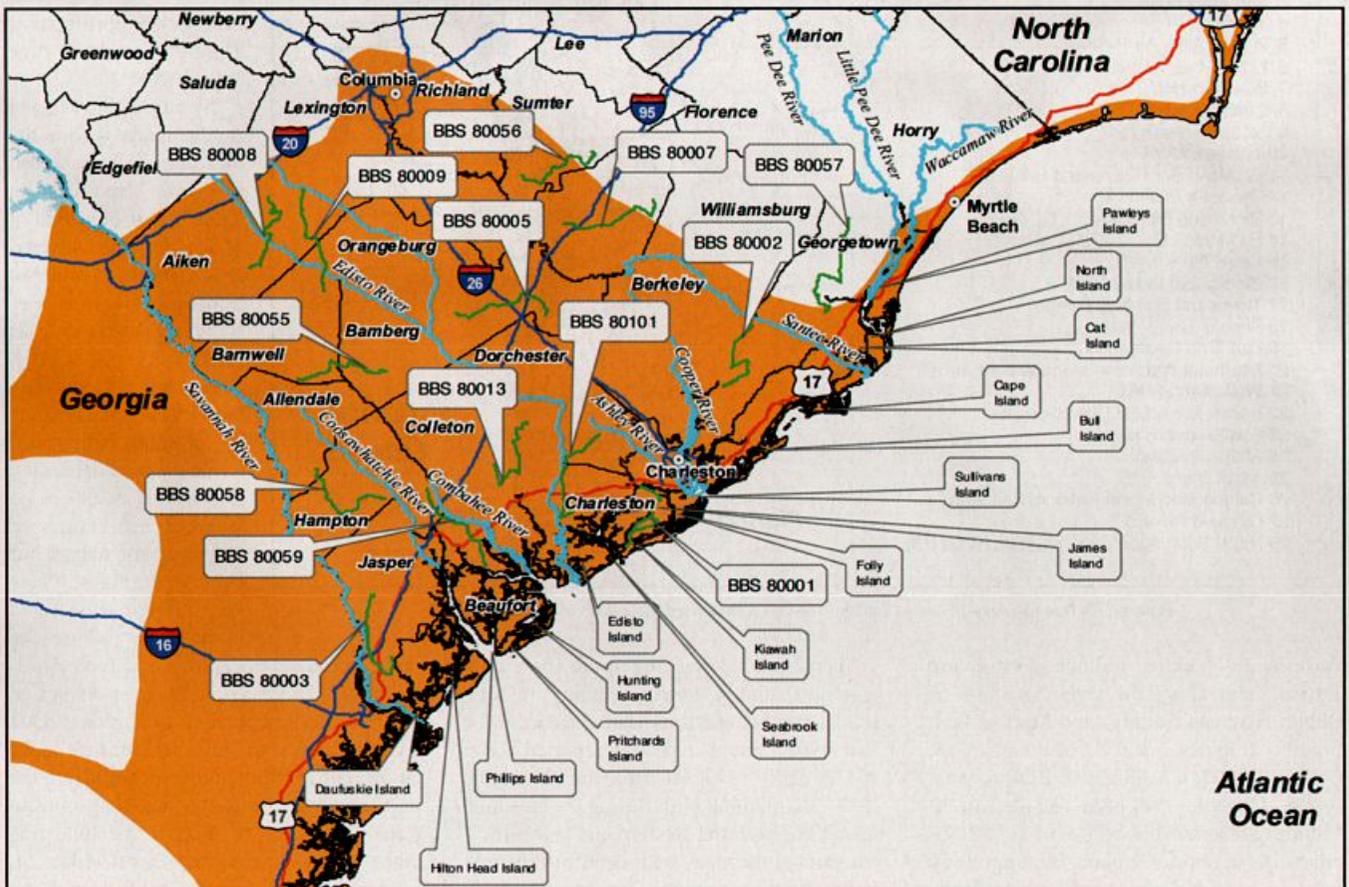
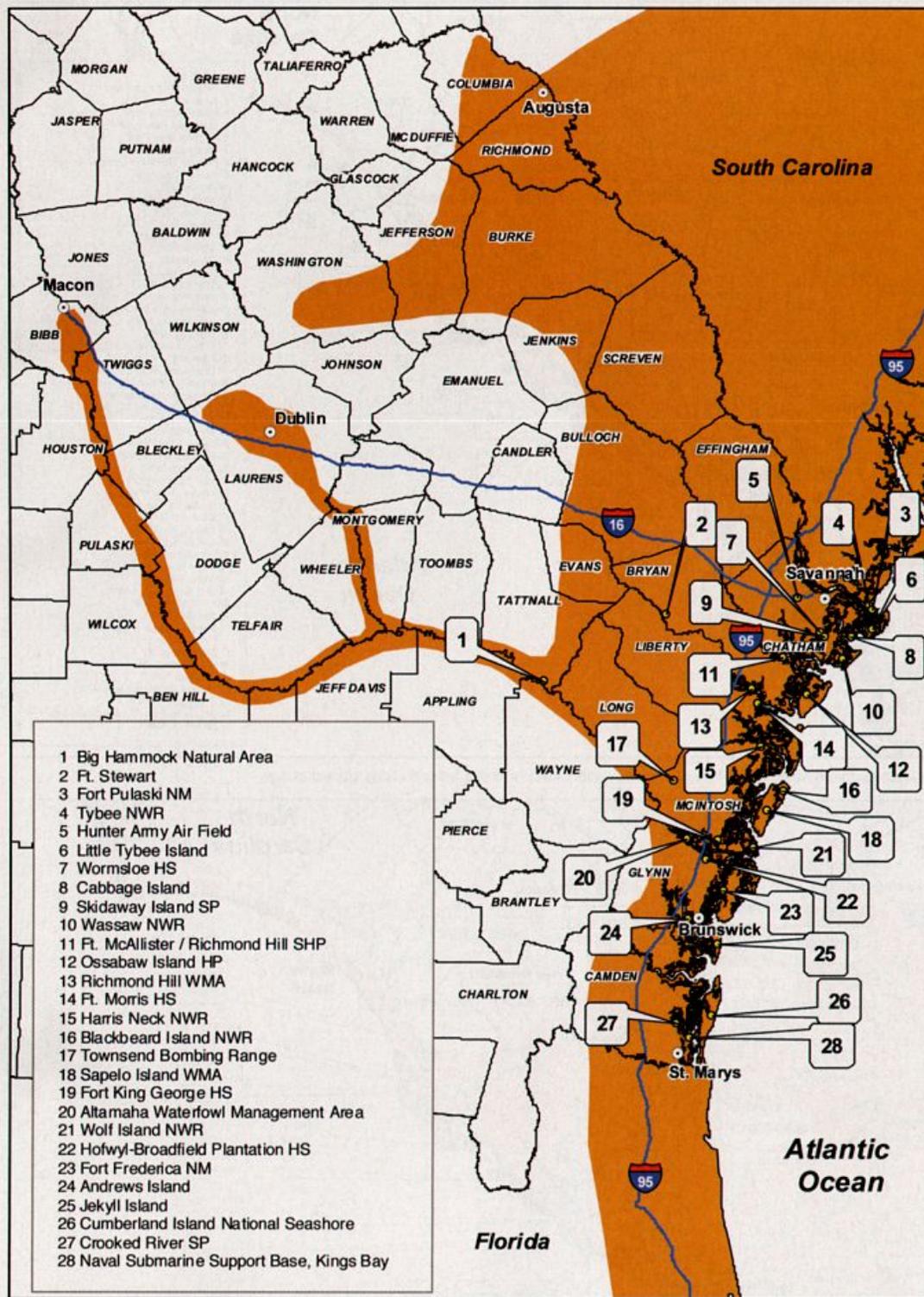


Figure 6. The breeding range of Painted Bunting in South Carolina with the major rivers, barrier islands, and BBS routes within the range.



- 1 Big Hammock Natural Area
- 2 Ft. Stewart
- 3 Fort Pulaski NM
- 4 Tybee NWR
- 5 Hunter Army Air Field
- 6 Little Tybee Island
- 7 Wormsloe HS
- 8 Cabbage Island
- 9 Skidaway Island SP
- 10 Wassaw NWR
- 11 Ft. McAllister / Richmond Hill SHP
- 12 Ossabaw Island HP
- 13 Richmond Hill WMA
- 14 Ft. Morris HS
- 15 Harris Neck NWR
- 16 Blackbeard Island NWR
- 17 Townsend Bombing Range
- 18 Sapelo Island WMA
- 19 Fort King George HS
- 20 Altamaha Waterfowl Management Area
- 21 Wolf Island NWR
- 22 Hofwyl-Broadfield Plantation HS
- 23 Fort Frederica NM
- 24 Andrews Island
- 25 Jekyll Island
- 26 Cumberland Island National Seashore
- 27 Crooked River SP
- 28 Naval Submarine Support Base, Kings Bay

Figure 7. The breeding range of Painted Bunting in Georgia with selected public lands within the range.

Washington, Jenkins, Bulloch, Evans, and Tattnall, and along the river corridors to Dublin (Laurens County) and Macon (Bibb County) (Figures 7 and 8) (Burleigh 1958, GOSCR 2003, GA BBA; Giff Beaton, pers. comm.). Breeding has been recorded in 20 counties and probably occurs in at least 18 others. As in South Carolina, buntings away from the coast in Georgia are very localized.

There is an old breeding record (nest with eggs) at Eatonton, Putnam County, 12 May 1888, the only Piedmont nesting record (McNair 1991), and a male was reported there 20–29 April 1974 (Denton and Newsom 1974). Extralimital birds during the breeding season are from the western and southwestern parts of the state, with confirmed breeding at Americus, central Sumter County 23

range in the state (Figure 8 and Table 6).

**Florida.** The breeding range as delineated for the eastern population in Florida is 6302 km<sup>2</sup> or 11.6% of the total area for that population. The breeding range is confined to the northeast coast, from the state line south to Cape Canaveral, to include the following eight counties: Nassau, Duval, Clay, St. Johns, Putnam, Flagler, Volusia, and the

June and 1 July 2002 (Figure 2; Phil Hardy, Clive Rainey, and Bob Norris, *vide* Todd Schneider, pers. comm.). This was preceded there by possible breeding in late June 1976 (Norris 1976). There is unconfirmed breeding at the following localities: Marietta and Vinings, Cobb County, 24 and 29 April 1997, respectively (*Oriole* 62: 50); Coweta County, 4 August 1956 (McKay 1956); LaGrange, Troup County, 1 May 1994 (Waters 1994); Columbus, Muscogee County, 14–15 April 1969 (Wells 1973); near Shellman, northeastern Randolph County, 1 July 1999 (*Oriole* 64: 72); Fitzgerald, Ben Hill County, 29 April 1940 and 2 June 1994 (Norris 1940; *Oriole* 59: 112); Early County, 22 February–March 2001 (*Oriole* 66: 65); near Cecil, southern Cook County, 6 June 1997 (GA BBA); and near Pavo, northeastern Thomas County, 7 June 1997 (GA BBA).

Twenty-eight selected public lands within the breeding range are shown in Figure 7 and listed in Table 4, out of a total of 41 listed by the University of Georgia, Institute of Ecology, Natural Resources Spatial Analysis Laboratory (NARSAL), Conservation Lands (GIS layer). The total acreage for all public lands within the range as delineated for Georgia is 245,793 a (99,472 ha), much of which is not habitat for Painted Buntings. There are 13 BBS routes located in or partly within the

northern part of Brevard (Figures 9 and 10) (Kale et al. 1992, Robertson and Woolfenden 1992, Stevenson and Anderson 1994). There is also a breeding site (Figure 2) on the northern Gulf Coast at Apalachicola, Franklin County (a female feeding two young), 29 July 1966 (Ogden and Chapman 1967); a juvenile was collected there 3 August 1966 (TTRS #29973; Stevenson and Anderson 1994). This breeding site is still active (Kale et al. 1992; Richard L. West, pers. comm.). Breeding has never been documented on the west coast of the peninsula, and neither Howell (1932) nor Sprunt (1954) made specific reference to Florida nests in that part of the state (Stevenson and Anderson 1992). Away from the immediate coast, the buntings tend to be localized. Breeding has been suspected across much of northern Florida from Orlando north and west to Pensacola, based primarily on reports since the 1960s of persistent singing males in spring and summer (Taylor et al. 1989). Breeding is suspected, but definite evidence is lacking, in the counties of Santa Rosa, Bay, Liberty, Wakulla, Leon, Alachua, Marion, Orange, and Seminole (Taylor et al. 1989, Robertson and Woolfenden 1992, Kale et al. 1992, Stevenson and Anderson 1994; Bruce H. Anderson, Karl E. Miller, pers. comm.). These numerous extralimital reports are not shown on the maps.

Twenty-one selected public lands within the breeding range are shown in Figure 9 and listed in Table 5, out of a total of 94 listed by the Florida Natural Areas Inventory, Florida Managed Areas (GIS layer). The total acreage for all public lands within the range as delineated for Florida is 326,917 a (132,303 ha), much of which is not habitat for Painted Buntings. There are only four BBS routes in or partly in the range of the bunting in Florida (Figure 10 and Table 6).

## DISCUSSION

The eastern population of Painted Bunting breeds in parts of four southeastern Atlantic coastal states, while the western population breeds in all or parts of 11 south-central states and parts of four states in northeastern Mexico. The combined range of the two populations is 1,405,608 km<sup>2</sup>. The range of the eastern population is relatively small, being about 3.9% of that of the total range of both populations and 4.0% of the western population (approximately 54,352 km<sup>2</sup> versus 1,351,256 km<sup>2</sup> as we have delineated the two ranges; Figure 1). This limited distribution, hence smaller population, makes the eastern birds more vulnerable than their western counterparts to habitat losses and modification, as well as other negative impacts both natural and anthropogenic. Therefore, we recommend that measures be taken to insure that adequate habitat is

**Table 5. Selected lands in public ownership within the breeding range of the eastern population of Painted Bunting in Florida. Site numbers correspond to numbers on state map (Figure 9).**

| No.                                       | AGENCY                     | SITE              |  | SIZE (acres)   |                |                     |                 |
|---|----------------------------|-------------------|--|----------------|----------------|---------------------|-----------------|
|   |                            | COUNTY            | NAME   | TOTAL          | UPLAND         | FRESHWATER WETLANDS | SALINE WETLANDS |
| 1   | Florida DEP, DRP           | Nassau            | Ft. Clinch SP                                | 2002           | 1302           | 0                   | 700             |
| 2   | DOD, USN                   | Duval             | Naval FISC                                   | 150            | 130            | 15                  | 5               |
| 3   | DOD, USMC                  | Duval             | Marine Corps RTC, Jacksonville               | 110            | 27             | 33                  | 50              |
| 4   | DOI, NPS                   | Duval             | Timucuan EHP <sup>1</sup>                    | 8306           | 2160           | 237                 | 5909            |
|   |                            |                   | (1) Black Hammock Is.                        | 753            | 737            | 16                  | 0               |
|   |                            |                   | (2) Kingsley Plantation                      | 52             | 52             | 0                   | 0               |
|   |                            |                   | (3) Ft. Caroline NME                         | 109            | 95             | 1                   | 13              |
|   |                            |                   | (4) Spanish Pond                             | 31             | 21             | 10                  | 0               |
|   |                            |                   | (5) Rebauld NM                               | 5              | 5              | 0                   | 0               |
|   |                            |                   | (6) Theodore Roosevelt Preserve              | 547            | 361            | 5                   | 181             |
|   |                            |                   | (7) Thomas Creek                             | 740            | 415            | 205                 | 120             |
| (8) Island Group 6069 (dispersed parcels) | 474                        | 0                 | 5595   |                |                |                     |                 |
| 5   | Florida DEP, DRP           | Duval             | Talbot Is(s) State Parks <sup>2</sup>        | 8230           | 8138           | 0                   | 92              |
|   |                            |                   | (1) Big Talbot Is.                           | 1709           | 1671           | 0                   | 38              |
|   |                            |                   | (2) Ft. George Is. SP                        | 622            | 612            | 0                   | 10              |
|   |                            |                   | (3) George Crady Br. SP                      | 2              | 2              | 0                   | 0               |
|   |                            |                   | (4) Little Talbot Is. SP                     | 1768           | 1724           | 0                   | 44              |
|   |                            |                   | (5) Pumpkin Hill Creek SP                    | 3896           | 3896           | 0                   | 0               |
|   |                            |                   | (6) Yellow Bluff SP                          | 2              | 2              | 0                   | 0               |
| (7) Amelia Is. SP                         | 231                        | 231               | 0  | 0              |                |                     |                 |
| 6   | City of Jacksonville, DPRE | Duval             | Huguenot Memorial CP                         | 449            | 444            | 0                   | 5               |
|   |                            |                   |  |                |                |                     |                 |
| 7   | DOD, USN                   | Duval             | Naval Sta., Mayport                          | 3349           | 1548           | 51                  | 1750            |
| 8   | DOD, USN                   | Duval             | Naval Air Sta., Jacksonville                 | 3816           | 3168           | 648                 | 0               |
| 9   | Florida DEP, DRP           | St. Johns         | Guana Tolomato Matanzas NERR (Guana Riv. SP) | 2478           | 1615           | 22                  | 841             |
| 10  | Florida DEP, DRP           | St. Johns         | Ft. Mose Historic SP                         | 42             | 15             | 2                   | 25              |
| 11  | Florida DEP, DRP           | St. Johns         | Anastasia SP                                 | 1609           | 1104           | 0                   | 505             |
| 12  | Florida DEP, DRP           | St. Johns         | Faver-Dykes SP                               | 5900           | 4560           | 1113                | 227             |
| 13  | Florida DEP, DRP           | Flagler           | Washington Oaks Gardens SP                   | 424            | 411            | 1                   | 12              |
| 14  | Florida DEP, DRP           | Flagler           | Gamble Rodgers Memorial SP                   | 111            | 88             | 0                   | 23              |
| 15  | Florida DEP, DRP           | Flagler           | Bulow Plantation Ruins SP                    | 151            | 150            | 1                   | 0               |
| 16  | Florida DEP, DRP           | Volusia           | Bulow Creek SP                               | 5119           | 3687           | 0                   | 1432            |
| 17  | Florida DEP, DRP           | Volusia           | North Peninsula SP                           | 527            | 457            | 0                   | 70              |
| 18  | Florida DEP, DRP           | Volusia           | Tomoka SP                                    | 1610           | 1488           | 0                   | 122             |
| 19  | DOI, NPS                   | Brevard & Volusia | Canaveral NS                                 | 60,089         | 15,190         | 1872                | 43,027          |
| 20  | DOI, FWS & NASA            | Brevard           | Merrit Is. NWR & J. F. Kennedy Space Center  | 141,000        | 44,622         | 22,378              | 74,000          |
| 21  | DOD, USAF                  | Brevard           | Cape Canaveral AFB                           | 15,804         | 13,992         | 1308                | 504             |
| <b>TOTAL</b>                              |                            |                   |  | <b>261,276</b> | <b>104,296</b> | <b>27,681</b>       | <b>129,299</b>  |
|   |                            |                   |  | <b>105,738</b> | <b>42,209</b>  | <b>11,202</b>       | <b>52,327</b>   |

<sup>1</sup>Within the boundary of the Timucuan Preserve, there are state and federal lands, but only NPS lands are included at locality number 2, and the state lands are treated at other localities in this table. The Timucuan Preserve is composed of 8+ separate land parcels.

<sup>2</sup>The Talbot Islands State Parks consist of seven separate parcels.

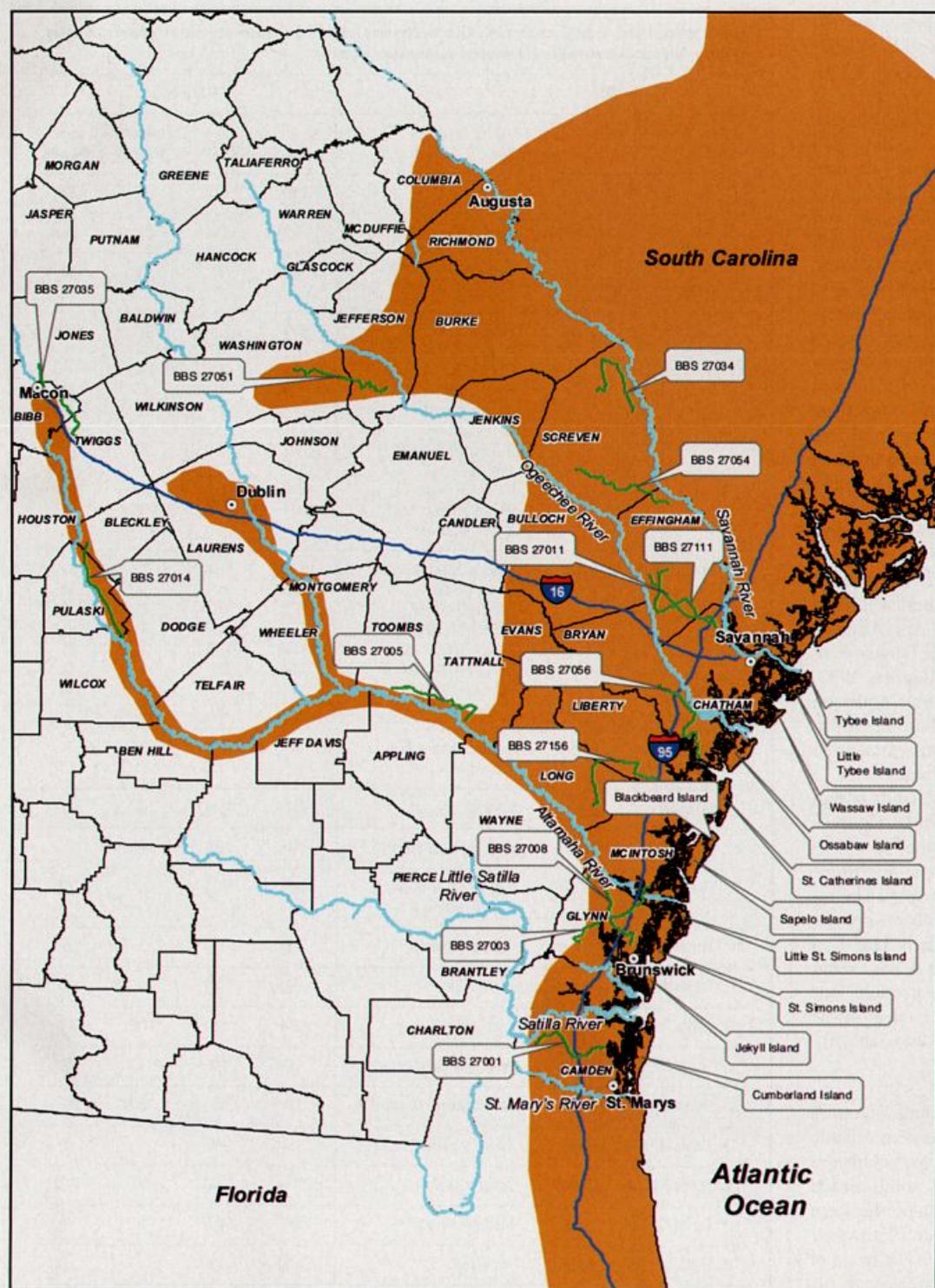


Figure 8. The breeding range of Painted Bunting in Georgia with the major rivers, barrier islands, and BBS routes within the range.

maintained within the four-state area, negative factors impacting the population be investigated and countered, and the population be monitored.

For the small disjunct pockets of buntings at Americus, Sumter County, Georgia, and Apalachicola, Franklin County, Florida (Figures 1 and 2), we have assumed these birds are of the eastern population, but there is no definitive evidence as to which population

they might belong. There are probably other such small groups as yet undiscovered within the gap between the two populations.

The range maps are considered "works in progress," as much refinement is needed. We challenge the birding and ornithological communities to refine further the breeding range of the eastern population of Painted Bunting by determining the inland (western) limits of nesting in each county within

the four states. With the use of widely available Global Positioning System (GPS) units, the range could easily be plotted accurately and entered into any of the computer mapping programs. The growing popularity among birders of "county listing" is perfectly suited to such a project. This would also make a good research project for a graduate student in a Master of Science program. State agencies, the American Birding Association, Audubon societies, bird clubs, or state ornithological societies might consider organizing such a "citizen science" effort, perhaps through eBird ([www.ebird.org](http://www.ebird.org)).

The low number of BBS routes (N=38) within the range of the eastern population (Table 6) might be explained by the design limitations associated with coverage at the continental scale, the randomization of starting points, lack of available routes long enough on barrier islands and the immediate coastal areas, water barriers, and heavy development in coastal areas and resulting vehicle traffic. In the case of the eastern Painted Bunting population, the fact that the number of BBS routes is small (and none are in the areas of greatest bunting abundance) suggest that the current BBS routes may have little or no bearing on population trends due to uneven and biased sampling in the southeastern United States. Perhaps a modification of the BBS routes tailored to monitor Painted Buntings (for example, 15 to 25 stops rather than 50), could be instituted within the southeastern range apart from the established BBS routes.

In the future, public-owned lands within the range of the eastern population of Painted Bunting will provide the principal refugia as rapid coastal development continues in the areas of greatest density of the birds. We fore-

see no abatement in the intense development in these coastal areas. The demand for permanent and vacation homes, motel and hotels, shopping centers, outdoor recreation, and other services on or near the ocean continues to grow as the human population grows. Much of the coastline within the range of the bunting in the Southeast is currently developed, and the remaining undeveloped areas are fast disappearing to meet increasing demand. Georgia has less than 10% of its coast developed (only four of the 16 or so barrier islands are connected to the mainland by roads) in the four-state area within the buntings' breeding range, while the other three states have approximately 75–80% of their coasts intensely developed. In the case of Georgia, most of the barrier islands are owned by federal and state agencies, plus one private trust (St. Catherines Island) and several private family-controlled islands, all of which are either mandated or have chosen to keep the islands in or near their natural state, resulting in considerable acreage of high-quality habitat for Painted Buntings.

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**Table 6. Breeding Bird Survey (BBS) routes within breeding range of the eastern population of Painted Bunting.**

| STATE                    | BBS NUMBER <sup>1</sup> | BBS NAME               | COUNTY                     | STATUS |              |
|--------------------------|-------------------------|------------------------|----------------------------|--------|--------------|
|                          |                         |                        |                            | ACTIVE | DISCONTINUED |
| North Carolina<br>(N=7)  | 63001                   | Shalotte               | Brunswick                  |        | X            |
|                          | 63002                   | Merrimon               | Carteret                   | X      |              |
|                          | 63003                   | Myrtle Grove           | New Hanover                | X      |              |
|                          | 63101                   | Supply                 | Brunswick                  | X      |              |
|                          | 63202                   | Newport                | Craven & Carteret          | X      |              |
|                          | 63317                   | Belgrade               | Onslow                     | X      |              |
|                          | 63903                   | Broad Creek            | Carteret                   | X      |              |
| South Carolina<br>(N=14) | 80001                   | Johns Is.              | Charleston                 |        | X            |
|                          | 80002                   | Jamestown              | Berkeley                   | X      |              |
|                          | 80003                   | Hardeeville            | Jasper                     | X      |              |
|                          | 80005                   | Holly Hill             | Orangeburg                 | X      |              |
|                          | 80007                   | Foreston               | Clarendon                  | X      |              |
|                          | 80008                   | New Holland            | Aiken                      | X      |              |
|                          | 80009                   | Wagener                | Aiken, Bamberg, & Barnwell | X      |              |
|                          | 80013                   | Walterboro             | Colleton                   | X      |              |
|                          | 80055                   | Olar                   | Bamberg & Barnwell         | X      |              |
|                          | 80056                   | Pineland               | Sumter                     | X      |              |
|                          | 80057                   | Carvers Bay            | Georgetown                 | X      |              |
| Georgia<br>(N=13)        | 80058                   | Nixville               | Allendale & Hampton        | X      |              |
|                          | 80059                   | Dale                   | Beaufort & Hampton         | X      |              |
|                          | 80101                   | Adams Run              | Dorchester & Charleston    | X      |              |
|                          | 27001                   | Harriets Bluff         | Camden                     | X      |              |
|                          | 27003                   | Darien                 | McIntosh & Glynn           | X      |              |
|                          | 27005                   | Baxley                 | Toombs & Tattnall          | X      |              |
|                          | 27008                   | Everett city           | Glynn                      | X      |              |
|                          | 27011                   | Guyton                 | Effingham & Chatham        |        | X            |
|                          | 27014                   | Hawkinsville           | Bleckley, Pulaski, & Dodge | X      |              |
|                          | 27034                   | Jacksonboro            | Screven                    | X      |              |
| 27035                    | Macon                   | Bibb                   | X                          |        |              |
| 27051                    | Wadley                  | Jefferson & Washington | X                          |        |              |
| 27054                    | Dover                   | Screven & Effingham    | X                          |        |              |
| 27056                    | Keller                  | Bryan                  | X                          |        |              |
| 27111                    | Pineora                 | Effingham & Chatham    | X                          |        |              |
| 27156                    | Riceboro                | Long & Liberty         | X                          |        |              |
| Florida<br>(N=4)         | 25018                   | St. Augustine          | St. Johns                  | X      |              |
|                          | 25025                   | Scottsmore             | Brevard                    | X      |              |
|                          | 25038                   | Doctors Inlet          | St. Johns                  | X      |              |
|                          | 25915                   | Merritt Is.            | Brevard                    | X      |              |

<sup>1</sup>The first two digits designate the state code; the remaining three digits designate the route number.

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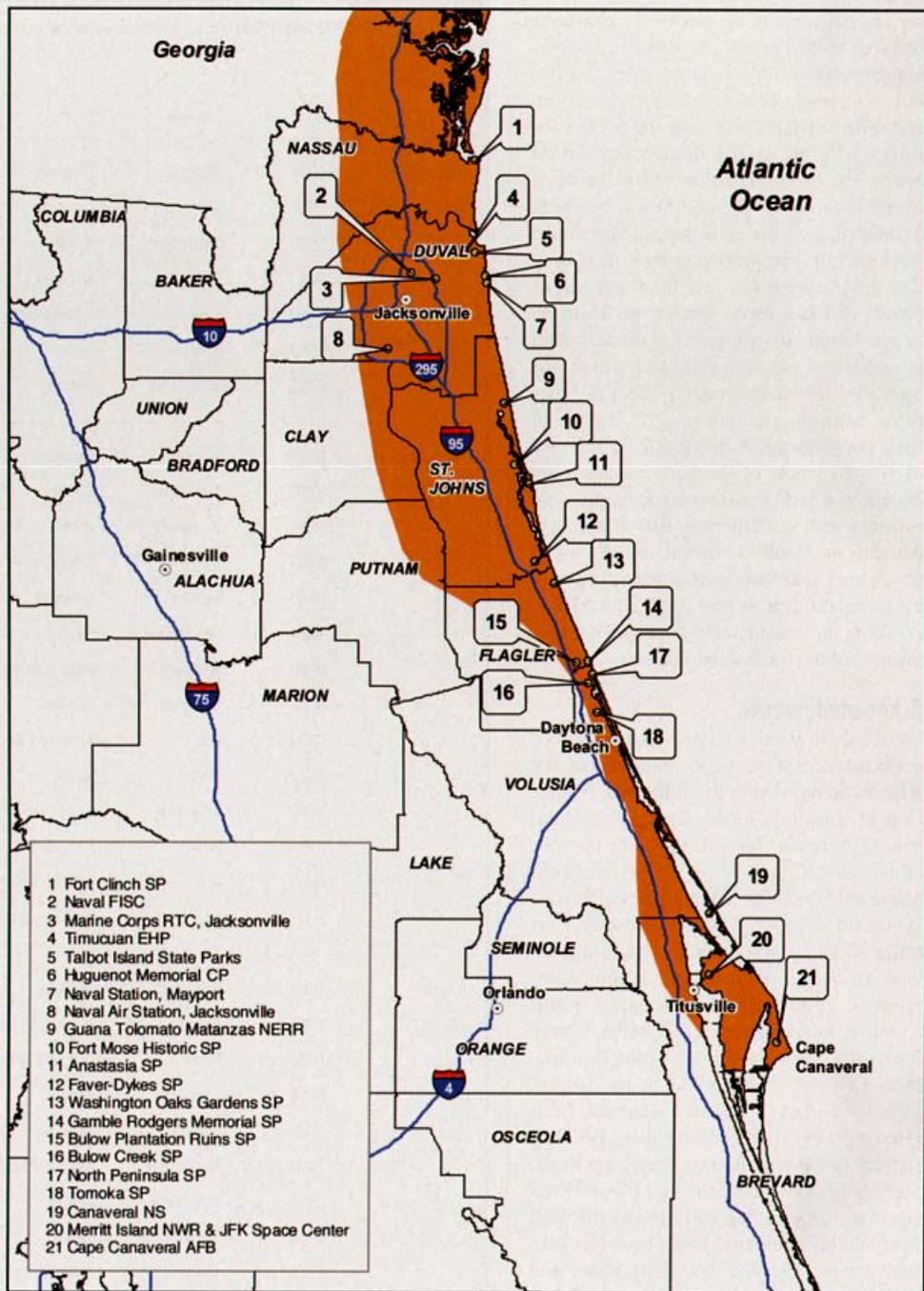


Figure 9. The breeding range of Painted Bunting in Florida with selected public lands within the range.

- 1 Fort Clinch SP
- 2 Naval FISC
- 3 Marine Corps RTC, Jacksonville
- 4 Timucuan EHP
- 5 Talbot Island State Parks
- 6 Huguenot Memorial CP
- 7 Naval Station, Mayport
- 8 Naval Air Station, Jacksonville
- 9 Guana Tolomato Matanzas NERR
- 10 Fort Mose Historic SP
- 11 Anastasia SP
- 12 Faver-Dykes SP
- 13 Washington Oaks Gardens SP
- 14 Gamble Rodgers Memorial SP
- 15 Bulow Plantation Ruins SP
- 16 Bulow Creek SP
- 17 North Peninsula SP
- 18 Tomoka SP
- 19 Canaveral NS
- 20 Merritt Island NWR & JFK Space Center
- 21 Cape Canaveral AFB

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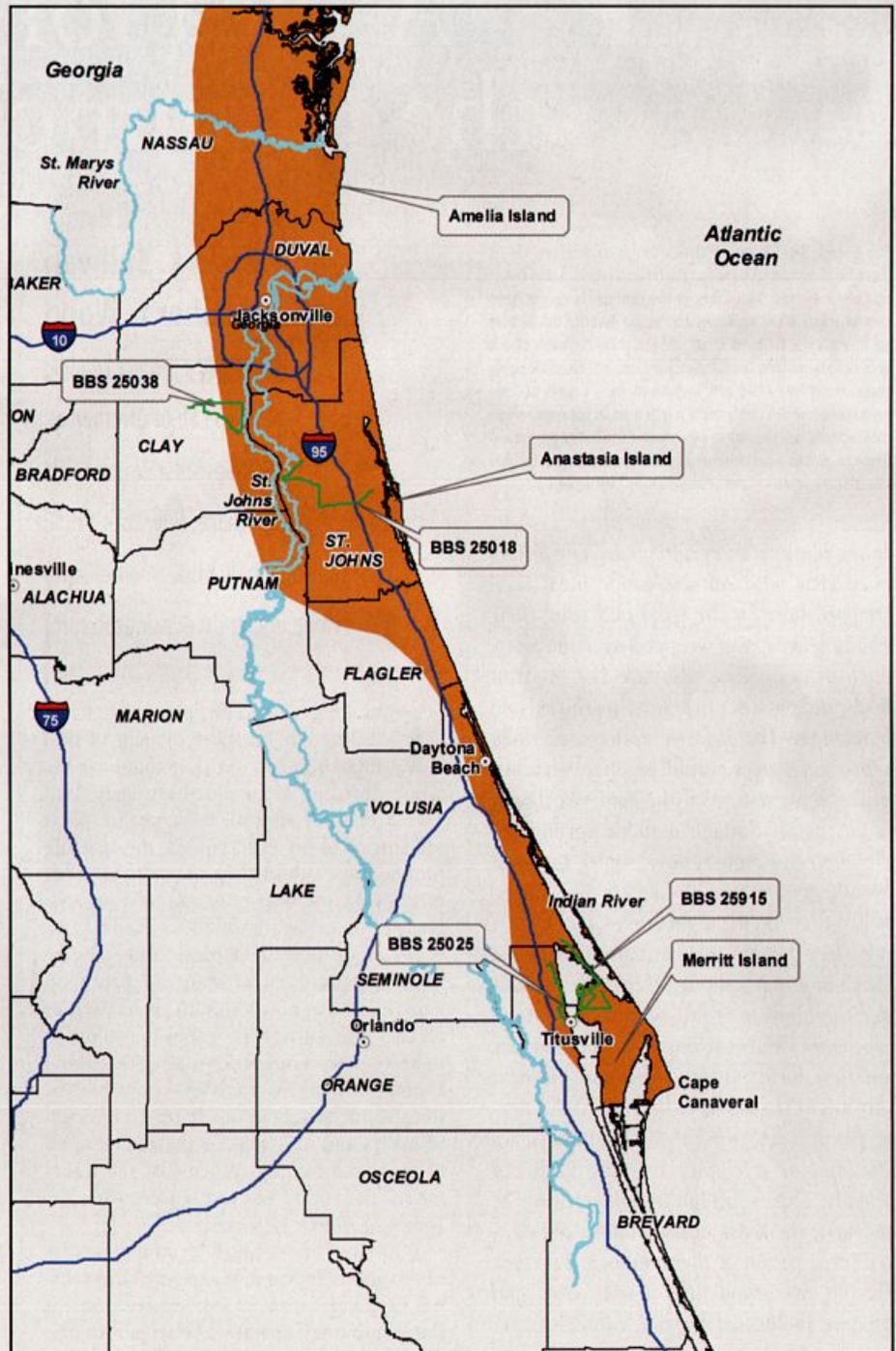


Figure 10. The breeding range of Painted Bunting in Florida with the major rivers, barrier islands, and BBS routes within the range.