

Current range of the eastern population of Painted Bunting (*Passerina ciris*)—Part II: Winter range

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Abstract

The importance of wintering areas for Neotropical migrants is well established. The wintering range of the eastern population of Painted Bunting (*Passerina ciris*) is described in detail and presented in maps. The paper also discusses extralimital records from islands in the Caribbean Basin as well as scattered wintering individuals outside the winter range. The possibility of eastern birds wintering on the Yucatán Peninsula and adjacent Central America is considered.

An extensive treatment of the protected areas of Peninsular Florida, the northern Bahamas, and Cuba describes the importance of upland habitats within these protected areas for wintering buntings. This information should be useful to land management agencies, conservation organizations, and private landholders for the welfare of the bunting and biodiversity in general and may also be of interest to ornithologists, other biological disciplines, naturalists, and birders.

Overview

In Part I of this article, we describe the current breeding range of the eastern population of Painted Bunting (*Passerina ciris*) (Sykes and Holzman 2005). Herein we present the winter distribution of this population. We define the winter season as 15 November through 31 March, although it is clear that some migration may occur on either side of this time frame. The winter range of the eastern breeding birds given in the current literature is somewhat generalized, to include

much of the Florida Peninsula, the Florida Keys, the northern Bahamas, and Cuba (Robertson and Woolfenden 1992, Stevenson and Anderson 1994, A.O.U. 1998, Raffaele et al. 1998, White 1998, Lowther et al. 1999, Garrido and Kirkconnell 2000).

The vital importance of wintering areas to Neotropical migrants has been widely discussed in the contemporary ornithological literature (Soulé and Wilcox 1980, Hagan and Johnston 1992, Stotz et al. 1996, Parker et al. 1996, Greenberg and Marra 2005), and so we have attempted to present the winter range of the eastern population of Painted Bunting in as much detail as possible, using the most current information. However, there are still gaps in our knowledge about the winter range of this population. This appears to be the first attempt to develop detailed maps for the winter range of the eastern population. Further refinement of this winter range should evolve as research and field activities continue in the region; thus the maps should be considered works in progress.

Most protected lands within the winter range in Florida, the Bahamas, and Cuba are shown on the maps, with additional information provided in the tables and appendices. The inclusion of public lands was suggested by the Eastern Painted Bunting Working Group to aid land management agencies in developing conservation strategies for this declining species. This information may be of interest to the birding public, although some of these sites are not open to the public or have other access restrictions.

Methods

The current winter range of the eastern population of Painted Bunting in Florida is derived from the literature, Christmas Bird Counts (C.B.C.), Cornell Lab of Ornithology Feeder Watch Program, recoveries of banded birds from the United States Geological Survey Bird Banding Lab, a study in progress on the survival of eastern Painted Buntings (Sykes et al., in prep.), various web sites, and personal insights contributed by biologists and others with current or recent experience in various areas of the region, as well as our own work. The winter range is presented in a suite of maps at different scales in order to provide adequate details of the range in relation to

physical features and political boundaries. Abbreviations and acronyms are listed in Table 1.

The maps were designed to meet the information needs of a broad spectrum of users. The range was drawn onto paper maps from available data. These paper maps were scanned and georeferenced to digital county boundaries obtained from the Florida Geographic Information Systems (GIS) clearinghouse website and Environmental Systems Research Institute (ESRI) standard data sets. ESRI ArcGIS software was used to create an

the Gulf Coast counties. When a protected land parcel (e.g., Everglades National Park) encompasses portions of more than one Florida county or Cuban province, these lands are generally listed under that county/province with the largest portion; the portions in other counties/provinces are given in parentheses. The size of a given land parcel is for the entire area in all counties or provinces; thus the total size of these protected areas is not additive for those counties or provinces in which it is listed (counties of Brevard, Broward, Charlotte, Collier, Dade, Glades, Highlands, Lake, Orange, Osceola, Palm Beach, Sarasota, and Seminole in Florida and provinces of Granma, Holguin, Pinar del Río, and Villa Clara in Cuba). However, in Table 2 only that portion of the given area occurring within a county is listed. Three protected status categories for public lands in Florida are used in the appendices. These categories are adapted from the Florida Natural Areas Inventory, Florida State University, Tallahassee.

Category I. The highest protection is reserved for lands that are specifically and judiciously managed for biodiversity. This category includes lands owned by private entities that are managed for biodiversity conservation and lands administered by public agencies that are designated for biodiversity through legislative action where natural events proceed without interference or are mimicked through management. The governmental agency acting alone cannot change these designations without legislative action and public involvement. Examples include preserves owned and managed by The Nature Conservancy, Florida Audubon Society, National Audubon Society, and Archbold Expeditions, Inc.; preserves and other private preserves committed to biodiversity conservation; preserves that are state-owned and managed; most national parks and seashores; federal wilderness areas; and some local preserves.

Category II. This category applies to lands managed for their natural values but may incur additional uses such as habitat manipulation for game species and/or some recreation infrastructure. These activities will likely degrade the quality of natural communities locally, but the majority of the land will be managed for biodiversity protection. It also includes public lands with administrative designations for biodiversity conservation. Exam-

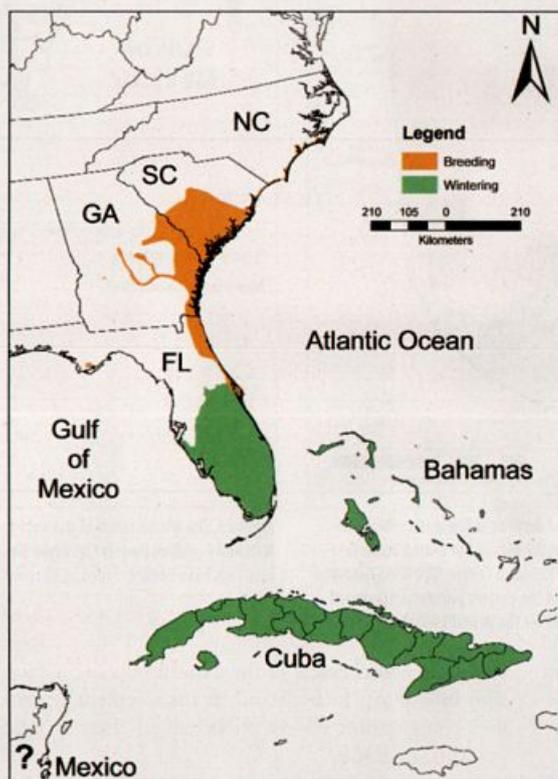


Figure 1. The breeding and wintering range of the eastern population of Painted Bunting. The breeding range is approximately 55,190 km² and the winter range 173,902 km² as shown. See discussion for explanation of the question mark in the Yucatan Peninsula of Mexico.

ArcGIS shapefile by digitizing the boundary onscreen. This boundary was adjusted by overlaying data from Christmas Bird Counts, Project Feeder Watch, and band recoveries.

For Florida and Cuba, the extent of each protected area is presented in the appendices. Information was obtained through consultations with staff members of the agencies managing these properties and from owner/agency websites. Florida counties are listed from north to south, Atlantic coastal counties first, then noncoastal counties, followed by

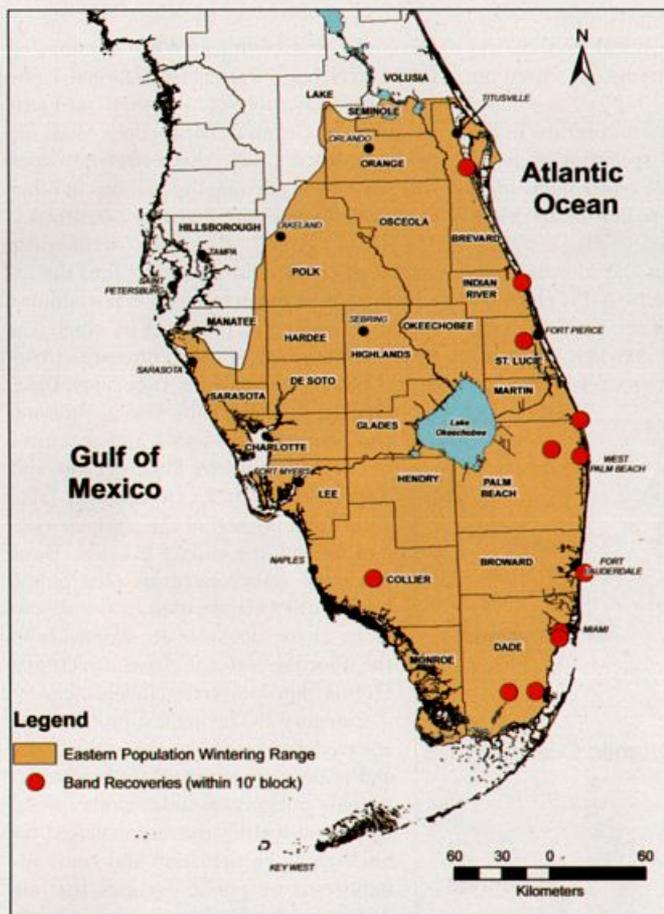


Figure 2. The winter range of the eastern population of Painted Bunting in Florida in relation to band recoveries. The recovery of wintering banded birds is from the files of the United States Geological Survey, Biological Resources Division, Patuxent Wildlife Research Center, Bird Band Laboratory, Laurel, Maryland, and study in progress on annual survival of the eastern population (Sykes et al., ms. in prep.). The twelve sites shown represent 94 recoveries for the period 1940 through 2005.

ples include private preserves managed for game species; national wildlife refuges; Bureau of Land Management areas of critical environmental concern; and state parks.

Category III. This category applies to lands maintained for multiple uses, including consumptive or recreational values, and not specifically or wholly dedicated to biodiversity conservation. It also includes lands with restricted development rights. Unrestricted public access is one criterion that may result in a property being placed into this category. Examples include most nondesignated (i.e., multiple-use) public lands administered by the United States Forest Service and Bureau of Land Management; Department of Defense lands; state forests; regional and large local parks and open space; and private lands protected from subdivision by conservation easements and other title restrictions.

With our maps and discussion, we hope to

bring the winter range of the eastern population into sharp focus to aid in management and conservation efforts on behalf of these colorful songbirds.

Results

The seventh edition of the American Ornithologists' Union's *Check-list of North American Birds* (1998), does not specifically describe the winter range of the eastern population of Painted Bunting, although one could interpret the text to indicate that its range extends from southern Florida and the northwestern Bahama Islands south through Cuba and Jamaica. Bond (1956) describes the winter range as southern Florida, Cuba, and the Bahamas; Bond (1974) later indicates it winters in southern Florida, Cuba, casually in Jamaica, and in the Bahamas is recorded from the "north-west" islands; and Raffaele et al. (1998) list the bunting as a nonbreeding resi-

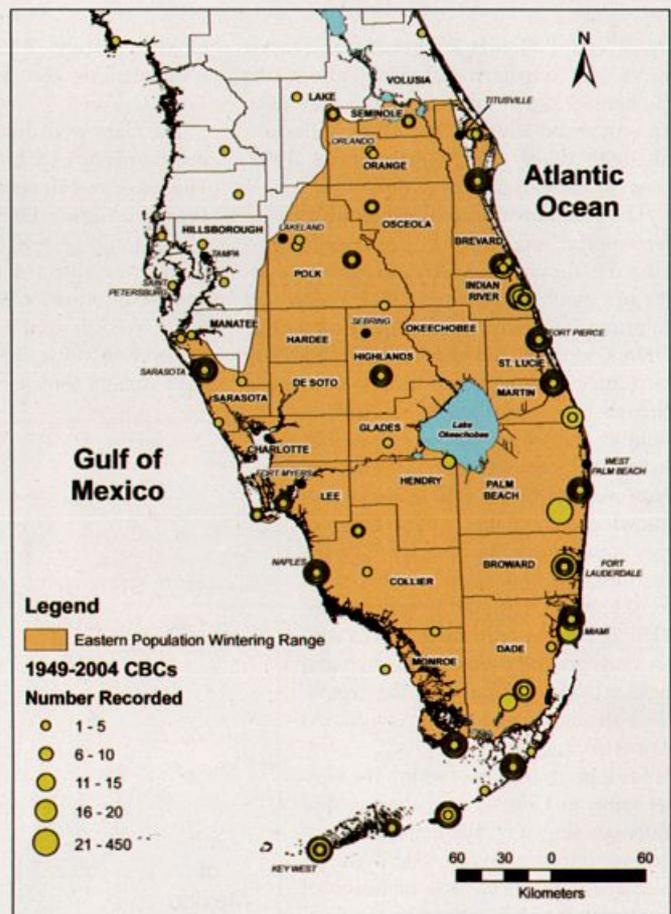


Figure 3. The winter range of the eastern population of Painted Bunting in Florida in relation to National Audubon Society Christmas Bird Counts, 1949 through 2004. Within the range shown, the buntings have been recorded at 43 count circles with an approximation of 601 count years.

dent in the Bahamas and Cuba primarily from mid-October to the end of April. The popular North American field guides likewise provide generalized and somewhat different interpretations of this winter distribution on maps and in texts, some not showing or mentioning Cuba or the Bahamas as a part of the winter range (Pough 1949, Robbins et al. 1983, Farland 1983, Sibley 2000, Peterson 2002, National Geographic Society 2002).

The known distribution of the eastern birds is depicted in Figure 1. As readily seen here, the distance traveled during its spring and fall migrations is rather short for a Neotropical migrant. The breeding and wintering ranges overlap primarily in Volusia and Brevard Counties, Florida. The winter range is roughly 174,902 km² versus 55,190 km² for the breeding range. Thus, the breeding range is only 31% of the winter range. The question mark in the Yucatan Peninsula of Mexico is explained below.

Florida—Robertson and Woolfenden

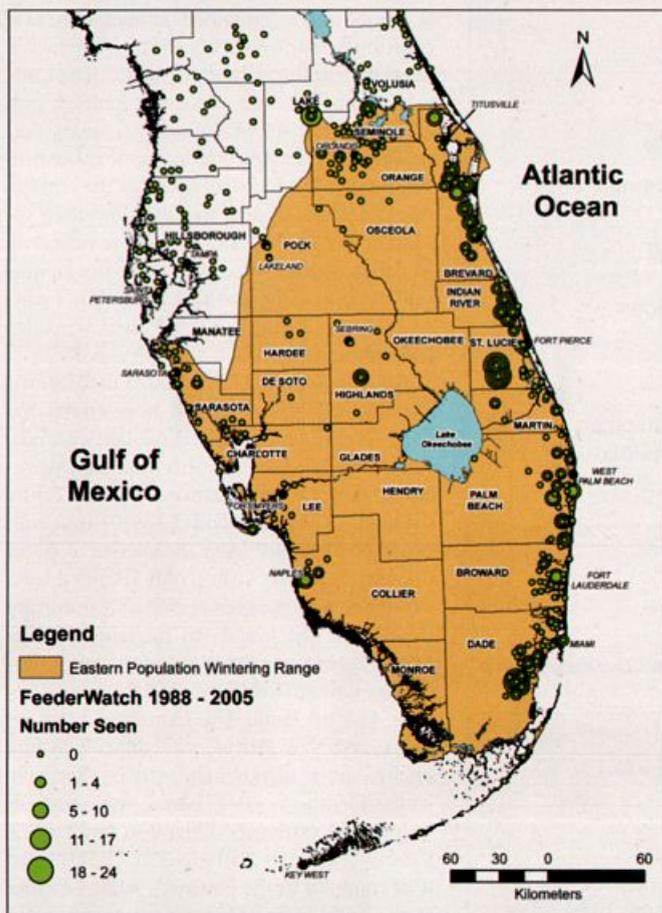


Figure 4. The winter range of the eastern population of Painted Bunting in relation to Project Feeder Watch Program, Laboratory of Ornithology, Cornell University, Ithaca, New York, 1988-2005. Sixty-one sites have recorded buntings within the designated winter range in Florida and represent 907 site days on which buntings were observed at feeders.

(1992) list Painted Bunting as regular in winter in much of the Peninsula and on the Keys and occasional to irregular elsewhere in the state. Stevenson and Anderson (1994) give the winter range from Central Florida southward and indicate that it is a fairly common but formerly more common winter resident at Ft. Lauderdale and uncommon throughout the remainder of the South Florida mainland, the Upper Keys, and north to Brevard County on the east coast and Collier County on the west coast. They further state that it is rare to casual on the Lower Keys and in the Peninsula north to Pinellas, Polk, and Lake Counties, and occasional in North Florida (Jacksonville, Tallahassee, Panama City, and Pensacola).

The winter range in Florida extends from the keys northward to Volusia, Seminole, Lake, Polk, Hillsborough, and Manatee Counties (Figures 2-5). Twenty-six counties are within this range. The northern limit of the

range may vary annually. Individuals and small numbers of buntings are frequently observed north of the delineated range (Robertson and Woolfenden 1992, Stevenson and Anderson 1994) but are not consistently present at most of these localities for more than two or three winters. Most information on wintering buntings comes from the coastal counties (Figures 2, 3, 4). Whether this is an artifact of observer coverage is uncertain; however, most observers live near the coast or visit coastal birding areas more frequently than the interior.

Protected lands within the Florida winter range are concentrated in the eastern and southern parts of the Peninsula (Figure 5), with some of the larger areas named for general reference. Protected lands total 2,229,907 ha or 32% of the range (Table 2). Of these areas, 2,201,235 ha are in public ownership (local governments 117,371 ha, state government 1,133,739 ha, and federal government

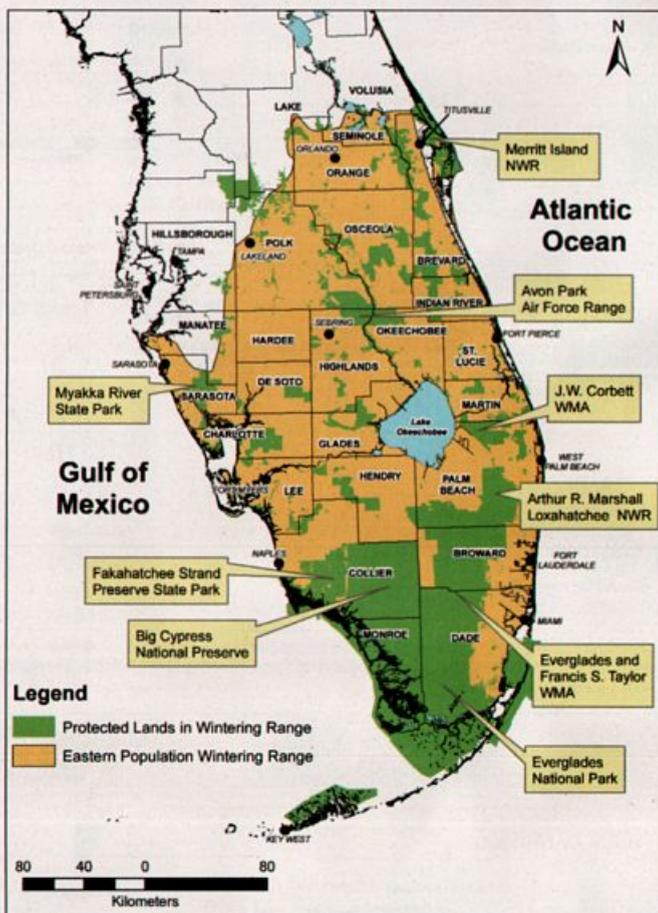


Figure 5. The winter range of the eastern population of Painted Bunting in Florida in relation to protected lands. Some of the larger protected areas are named to help orient the reader. A complete listing of all protected lands by county is presented in Appendices 1-12.

950,125 ha) and 28,676 ha are in private ownership. Details of ownership, protected status, and size of protected lands for individual counties are given in Appendices 1-12.

In addition to the protected lands in public and private ownership within the winter range of Painted Bunting in Florida, there are two international categories of cooperative management. These are the Biosphere Reserve System (Florida Everglades) and the Ramsar Sites (Florida Everglades and Pelican Island).

A biosphere reserve is a unique concept that includes one or more protected areas and surrounding lands that are managed to combine both conservation and sustainable use of natural resources. It is an area of international significance. Each biosphere reserve conserves examples of characteristic ecosystems of one of the world's natural regions, managed for their protection and study. It is a land and/or coastal/marine area in which people are an integral component; and it is managed for objec-

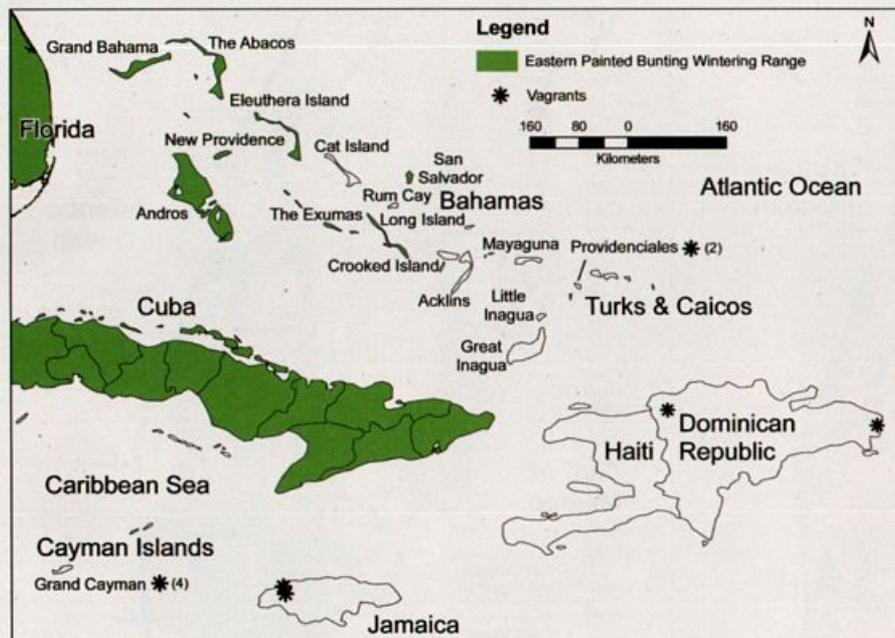


Figure 6. The winter range of the eastern population of Painted Bunting in the Bahamas and nearby regions. Locations for known vagrants are shown.

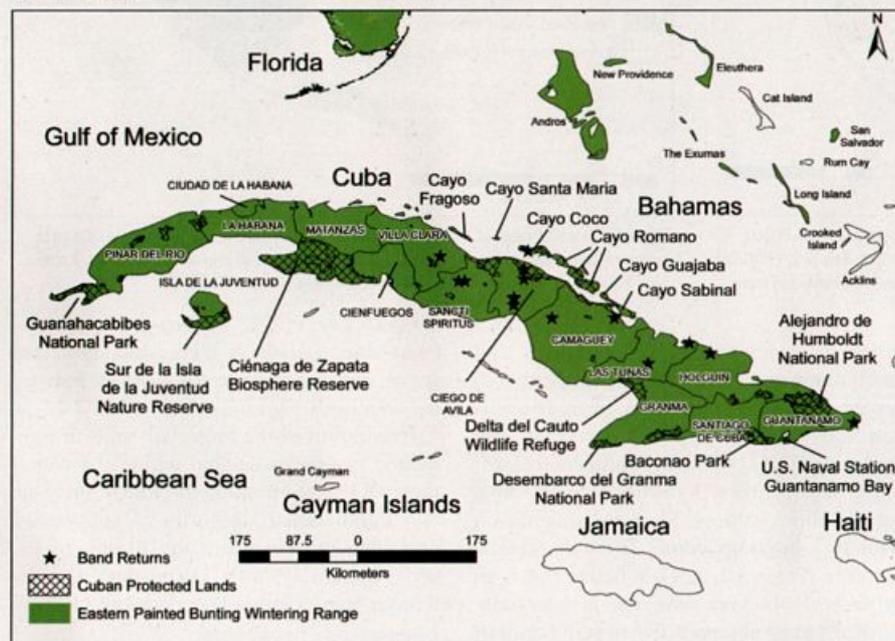


Figure 7. The winter range of the eastern population of Painted Bunting in Cuba and nearby regions. All 15 provinces are in capital letters and other localities in upper and lower case. The keys (cayos) named along the northern coast are a part of the extensive Archipiélago de Sabana-Camagüey. Localities for band recoveries (Table 6) of the eastern birds through 2006 are shown by black stars (*). A few stars represent more than one bunting at a given locality. All band recoveries are of birds initially banded in the southeastern United States, except for one bird banded in Cuba that was recovered in Georgia. Many of the protected areas in Cuba are shown by cross-hatching, and a selected few are named (see Appendices 13, 14, and 15).

al actions and international cooperation, as a contribution towards achieving sustainable development throughout the world. The Convention on Wetlands, signed in Ramsar, Iran in 1971, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. While the Ramsar Sites are primarily wetlands, within these sites there is a significant amount of upland that is used by Painted Buntings during winter in the Everglades and Pelican Island.

Bahamas—Bond (1956) stated that Painted Bunting had been recorded from Grand Bahama, New Providence, and the Berry Islands, and nearly 20 years later, from the northwestern islands of the Bahamas Group, 22 July through 27 April (Bond 1974). Brudenell-Bruce (1979) considered the species to be an uncommon winter visitor, only recorded from the northern islands but presumably occurring throughout the islands in migration. White (1998) listed it as readily found in winter (December through February) on five islands (Andros, Cay Sal Bank, The Exumas, Grand Bahama, and New Providence); difficult to find on five other islands (The Abacos, Berry Islands, Eleuthera, Long Island, and San Salvador); and extremely difficult to find on the Biminis (Figure 6). Raffaele et al. (1998) listed it as common in the Bahamas, while Lowther et al. (1999) indicated that it is uncommon in the islands. The most recent publication on birds in the Bahamas (Hallett 2006) calls Painted Bunting a rare to uncommon winter resident and transient in the northern Bahamas and portions of the central Bahamas and unrecorded or accidental in southern Bahamas. Thus there is some variance in describing the winter status and distribution of Painted Bunting in the Bahamas. Research on Kirtland's Warbler (*Dendroica kirtlandii*) on southern Eleuthera, in progress since 2004, has commonly captured Painted Buntings in mist-nets at the study sites during the winter months (Joseph M. Wunderle, pers. comm.). The bunting has not been reported from Cat Island nor from islands in the southern Bahamas (Buden 1987a, 1987b; White 1998; Hallett 2006).

Painted Bunting has been recorded from 11 islands or island groups (Figure 6) in the Bahamas (White 1998; Table 3). Those islands or island groups where the species has not been recorded are also given in this table. What is surprising is that there have been no reports from Cat Island, Conception Islands, or Rum Cay, but birds have been found on San Salvador.

tives ranging from complete protection to intensive yet sustainable production. Biosphere Reserve is an international designation made by the United Nations Educational, Scientific, and Cultural Organization on the basis of

nominations submitted by countries participating in the Man and the Biosphere Program. The mission statement of the Ramsar Convention is the conservation and wise use of all wetlands through local, regional, and nation-

Table 1. Abbreviations and acronyms used in this paper.

a	Acres
AS	Air Station
ASY	after second year
BLM	Bureau of Land Management
BR	Biosphere Reserve
CA	Conservation Area
Co(s).	County/Counties
DEP	Department of Environmental Protection
DOF	Division of Forestry
DRP	Division of Recreation and Parks
EP	Environmental Park
ER	Ecological Reserve (Cuba)
FNAI	Florida Natural Areas Inventory, Florida State University
FR	Floral Reserve (Cuba)
Ft.	Fort
FWCC	Fish & Wildlife Conservation Commission
FWS	U.S. Fish & Wildlife Service
ha	hectares
HP	Heritage Park
HSP	Historic State Park
Is.	Island
MA	Management Area
NA	Natural Area
NC	Nature Center
ND	Navigation District
NP	National Park
NPS	National Park Service
NR	Nature Reserve (Cuba)
NS	National Seashore
NWR	National Wildlife Refuge
ONF	Outstanding Natural Feature (Cuba)
PAOMR	Protected Area of Managed Resources (Cuba)
Pk	Park
PNL	Protected Natural Landscape (Cuba)
PSP	Preserve State Park
Pt.	Point
RA	Recreation Area
RP	Regional Park
RS	Research Station
RtA	Restoration Area
SAS	State Archaeological Site
SF	State Forest
Soc.	Society
SP	State Park
SR	State Reserve
Sta.	Station
TIIF	Trustees of the Internal Improvement Fund
USAF	U.S. Air Force
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USN	U.S. Navy
WA	Wilderness Area
WaMA	Waterfowl Management Area
WCA	Water Conservation Area
WEA	Wildlife & Environmental Area
WMA	Wildlife Management Area
WMD	Water Management District
WP	Wilderness Preserve
WR	Wildlife Refuge (local or national) (Cuba)

There are twelve protected areas for biodiversity in the islands within the bunting winter range, totaling about 21,000 ha or about 1.6% of the total land mass (Table 4). These areas are listed in Table 5; much of the protected area includes open water, as most encompass primarily marine ecosystems. The largest single area consists of five tracts that form the Central Andros Park on the largest island in the archipelago. There are no Biosphere Reserves or Ramsar Sites in the winter range of the bunting in the Bahamas.

Cuba—The literature (1939-1990) on Cuban birds gives few specific details on the distribution and status of Painted Bunting, and many publications for specific localities or regions of the island do not mention the species at all or report it as rare, as summarized by Thompson (1991). Barbour (1943) simply says a few winter in Cuba, and we interpret this to mean the entire island. Bond (1956) reports that it is found throughout the island in winter but is rather rare, occurring generally from 15 October through 12 April. Garrido and García-Montaña (1975) considered the bunting to be common during migration, and later Garrido (1988) listed it as not rare. Raffaele et al. (1998) listed it as a migrant and nonbreeding resident from mid-October through the end of April, uncommon during migration and rare in winter, while Garrido and Kirkconnell (2000) list it as a common transient and rare winter resident on the main island, Isla de Pinos (Isla de la Juventud), and some large northern keys 15 October through 29 April. Thompson (1991; *vide* O. Garrido) was able to locate only 15 Painted Bunting specimens collected in Cuba, seven in United States museum collections and eight elsewhere. There do not appear to be any specimens of Painted Buntings collected in the West Indies (excluding the Bahamas) outside of Cuba (Bond 1956 and supplements 1951-1987; Thompson 1991; Christopher W. Thompson, pers. comm.).

Painted Bunting has been recorded in all 15 provinces of Cuba (Figure 7). Current evidence suggests the species is more common during spring and fall migrations from western Cuba and along the northern part of the island, at least as far east as central Holguin Province, but less common to rare over much of the island in winter. While regularly recorded from keys along the northern coast, they are absent from the offshore keys of the southern coast (Garrido 1980, Buden and Olson 1989, Rodríguez et al. 1994, González et al. 1999, Garrido and Kirkconnell 2000, González et al. 2000, González and Barrio 2005, González et al., in press, Kirkconnell et al., in press, Llanes et al., in press, Iñigo-Elias, pers. obs., Hiram González, Guy M. Kirwan, Nils Navarro, Daisy Rodríguez Batista, Kenneth Rosenberg, Douglas F. Stotz, and George E. Wallace, pers. comm.). During a Rapid Biological Inventory on the Zapata Peninsula, Painted Bunting was considered a rare winter visitor (Kirkconnell et al. 2005). Because Painted Buntings generally do not sing while in Cuba, many individuals may be overlooked in the scrub-shrub habitats where they tend to occur (Guy M. Kirwan, pers. comm.).

Some important regions for buntings in Cuba include but are not limited to: (1) The keys within the Archipiélago de Sabana-Camagüey along the northern coasts in the provinces of Matanzas, Villa Clara, Sancti Spiritus, Ciego de Ávila, and Camagüey (this region is rapidly being developed for the growing tourist trade); (2) From the north-eastern coast of Las Tunas Province, eastward along the northern coast of Holguin Province to Bahía de Naranjo, to include areas in and around the village of Gibara, City of Holguín, Bahía de Nipe, and from Mayarí and Nipe eastward to Bahía Sagua de Tanamo (Nils Navarro, pers. comm.); (3) The Peninsula de Guanahacabibes; (4) Mil Cumbres in Pinar Del Rio Province; (5) The northern coast of La Habana Province; and (6) The Peninsula de Zapata in Matanzas Province, including the Zapata Swamp, the area from Jagüey Grande southward to Pálpite (Nils Navarro, pers. comm.), and nearby areas in the southern part of the province.

Large numbers of Painted Buntings have been observed at some localities. During several days in early May 2003, an estimated 700 buntings were trapped for the cagebird trade at a single locality along the northern coast of La Habana Province, just west of the capital city of La Habana (Iñigo-Elias, pers. obs.). In city markets of the City of La Habana and Gibara (Holguin Province), large numbers of Painted Buntings are sold in the cagebird trade to foreign tourists and local people (James W. Wiley and Nils Navarro, pers. comm., Iñigo-Elias, pers. obs.). For example, Iñigo-Elias took a photograph of a cage containing 15 adult (ASY) male buntings at the La Habana City Market. Painted Bunting has apparently become rarer in Cuba recently in winter, particularly in the heavily trapped region at Gibara (Peña 2003). At Playa Larga at the north

Table 2. Summary of protected lands (in hectares) by county (n=26) within the wintering range of the eastern population of the Painted Bunting in Florida.

County	Public Owned				Protected Total	County Total	Percent Protected
	Local	State	Federal	Private ¹			
Brevard	4,516	63,965	58,364	0	126,845	270,185	47
Broward	2,149	172,914	69	0	175,132	314,028	56
Charlotte	720	40,558	0	81	41,359	180,452	23
Collier	316	91,625	269,387	4,014	365,342	525,595	70
Miami-Dade	3,909	110,503	224,022	36	338,475	506,007	67
DeSoto	0	16,268	0	0	16,268	164,998	10
Glades	0	25,588	0	10,587	36,179	199,650	18
Hardee	0	275	0	0	279	165,344	<1
Hendry	0	37,393	24	8	37,421	301,205	12
Highlands	587	20,182	22,788	3,719	47,275	286,404	17
Hillsborough ²	23,735	13,286	2,254	0	39,275	276,086	14
Indian River	482	36,551	2,206	0	39,242	132,949	30
Lake ²	3,153	42,569	34,710	16	80,443	298,928	27
Lee	6,297	19,441	1,505	1,246	28,490	208,215	14
Manatee ²	10,186	10,918	12	522	21,634	193,967	11
Martin	915	28,000	425	49	29,388	143,778	20
Monroe	12	4,500	234,867	308	239,683	255,490	94
Okeechobee	0	31,897	53	125	32,075	201,196	16
Orange ²	2,485	32,079	0	65	34,629	259,940	13
Osceola	441	63,119	0	2,137	65,693	390,155	17
Palm Beach	18,442	113,405	57,421	93	189,361	511,524	37
Polk ²	4,213	71,880	21,837	5,253	103,179	520,582	20
Sarasota ²	15,192	22,314	0	166	37,672	148,482	25
Seminole ²	2,683	8,660	190	247	11,784	82,876	14
St. Lucie	3,675	6,904	0	0	10,578	148,364	7
Volusia ²	13,266	48,943	19,991	4	82,204	291,833	28
Totals (ha)	117,371	1,133,739	950,125	28,676	2,229,907	6,978,235	32
Totals (acres)	290,030	2,801,530	2,347,810	70,860	5,510,220	17,243,594	32

¹Protected private lands include owners such as Florida Audubon Society, National Audubon Society, The Nature Conservancy, research institutions, and private individuals.

²The protected area summaries for these eight counties include some areas outside of the winter range as delineated.

end of Bahia de los Cochinos in the Zapata Region of Matanzas Province, Arturo Kirkconnell has reported observing flocks of 30-50 buntings in late winter (George E. Wallace, pers. comm.). During two winter seasons (1995-1997), Wallace (pers. comm.) trapped and banded 35 Painted Buntings at Cayo Coco, Ciego de Ávila Province.

Buntings are scarce and erratic along the arid southeastern coast of Cuba. At the United States Naval Station at Guantanamo Bay, Guantanamo Province, during the October through March seasons 1998-2002, a research team from the Institute for Bird Populations (Point Reyes Station, California) captured 17 different individuals at their study sites (none in 1999; 4 in October, 12 in November, and one on 12 December) but observed none except those trapped in mist-nets. No banded buntings were seen or recaptured in subsequent years (Rodney Siegel, pers. comm.). From 21 January through 3 February 2005, a survey of the 166 km² Naval Station at Guantanamo Bay found no Painted Buntings (Sykes, pers. obs.). During the period 2-9 February 2004, only one green-plumaged bird was

observed in a survey of the El Zapato area of Bayamesa National Park, in Granma Province and Santiago de Cuba Province, and during an additional two weeks in other localities of eastern Cuba in February 2004, there were no encounters with the species (Douglas F. Stotz, pers. comm.).

We are aware of at least 17 eastern Painted Buntings banded in the United States that have been recovered, primarily during the winter period, in central and eastern Cuba (Figure 7). These banding records are summarized in Table 6. Nine of the 10 buntings banded by Sykes on the breeding grounds in the southeastern United States and reported in Cuba were birds trapped for the cagebird trade. An adult male banded 9 December 1995 near Cayo Coco, Cuba by Hiram González Alonso was found dead 3 May 1997 on Skidaway Island, Georgia by John P. Davis. The specimen is retained at Harris Neck National Wildlife Refuge. The absence of banding recoveries from the western provinces of Cuba cannot be readily explained.

Thompson (1991) suggests that Painted Buntings may only migrate through Cuba, and we now believe that this is probably the case for some undetermined percentage of the birds, based on circumstantial evidence (see Discussion).

The National System of Protected Areas (Sistema Nacional de Áreas Protegidas de Cuba—SNAP) consists of 263 natural terrestrial and marine areas important to Cuba that currently are established or proposed. SNAP is a part of the National Center for Protected Areas (Centro Nacional de Áreas Protegidas—CNAP) of the Ministry of Science, Technology, and Environment (Ministerio de Ciencia Tecnología y Medio Ambiente—CITMA) which coordinates the work of SNAP with the principal agencies that physically administer these areas. The

main mission of SNAP is to guarantee continued protection and conservation of the natural resources of national heritage for the use of present and future generations as a part of the sustainable development of Cuba. The fully established protected areas (70 of the 263) are summarized in Table 7.

The protected areas listed in Appendices 13, 14, and 15 are the terrestrial portions and exclude all marine areas. These terrestrial habitats include both uplands and freshwater wetlands. The protected upland area for Cuba totals over 1,936,267 ha; of this, about 1,340,970 ha are currently included in established management entities, and 595,297 ha are sites that are proposed. Some of the larger protected areas are shown in Figure 7.

Cuba uses eight classifications for its protected areas: Reserva Natural (Nature Reserve); Parque Nacional (National Park); Reserva Ecológica (Ecological Reserve); Reserva Florística Manejada (Flora Reserve); Elemento Natural Destacado (Outstanding Natural Feature); Paisaje Natural Protegida (Protected Natural Landscape); Refu-

Table 3. Painted Bunting winter distribution on the principal islands and island groups in the Bahama Archipelago (Norton 1986; Aldridge 1987; Buden 1987a, 1987b; White 1998; B. Hallett and A. W. White, pers. comm.).

The Bahamas	
Reported	Not Reported
The Abacos	Acklins Island
Andros	Cat Island
Berry Islands	Conception Island
The Biminis	Crooked Island
Cay Sal Bank	Great Inagua
Eleuthera	Little Inagua
The Exumas	Mayaguana
Grand Bahama	Ragged Islands
Long Island	Rum Cay
New Providence	
San Salvador	
Turks and Caicos	
Reported	Not Reported
Providenciales	Grand Turk
	Middle Caicos
	North Caicos
	South Caicos

gio de Fauna (Wildlife Refuge); and Area Protegida de Recursos Manejados (Protected Area of Managed Resources, which includes Biosphere Reserves). In the last category, we have separated out Biosphere Reserves from other Protected Area of Managed Resources. There are six Biosphere Reserves and five Ramsar Sites in Cuba, many of which may be used by wintering Painted Buntings.

Turks and Caicos—Painted Bunting is a vagrant to these islands (Figure 6), with just two reports. Two were at Providenciales 30 March 1985, seen by Beverlea Aldridge (Norton 1986), possibly individuals that were banded at that locale (the first for the species in these islands) in 1985-1986 (Aldridge 1987). Aldridge's table lists only one bird, while the text states two, so it is not clear if one or two were banded. She gives arrival and departure dates of 20 December and 22 April in Table 3 without further explanation. Ground (2001) reports photographs taken in the islands of a green-plumaged bunting listed in the text as a "bird of passage." No specific locality, date, or additional details were provided.

Dominican Republic—Painted Bunting is a vagrant to this country, with just two reports, one published and one unpublished. An ASY male was captured in a mist-net at Punta Cana, at the east end of Hispaniola and released after being measured, weighed, and photographed on 3 January 2007 (Dhondt and Dhondt 2007). As many as six green-plumaged Painted Buntings were seen in an opening at the edge of a marsh surrounded by xeric shrub/scrub on 24 March 2003 in Monti Cristi National Park and about 1 km north of Copey, Rio Chacuey (19° 41.5' N, 71° 40.6' W; Figure 6). This locality is within a few kilometers of the border with Haiti. The observer had excellent views of the birds but could not be certain of the exact number, as the site was teeming with birds of various species (Mark P. Robbins, pers. comm.).

Haiti—We have been unable to locate any published reports of Painted Buntings from this country (Bond 1956 and supplements, 1974, 1993; A.O.U. 1957, 1983, 1998 and supplements; Raffaele et al. 1998; Lowther et al. 1999; Figure 6). Thompson (1991) included it in

Table 4. Biodiversity and protected areas adapted from Earthtrends 2003 for the Bahamas. Areas given in hectares.¹

Category ¹	Bahamas
Total Land Area	1,388,000
Protected Areas— (Extent of Protected Areas by IUCN Category, 2003):	
Nature Reserves, Wilderness Areas, and National Parks (Categories I and II)	21,000
Total Area Protected (all categories)	21,000
Protected Areas as a Percent of Total Land Area, 2003	1.6
Number of Protected Areas, 2003	12

¹Sources: United Nations Educational, Scientific, and Cultural Organization (2002), United Nations Environmental Programme (2003), and World Resources Institute (2003).

PROTECTED AREAS

Total Land Area as reported by the Food and Agriculture Organization of the United Nations (FAO). The area of inland water bodies is included in the totals.

Extent of Protected Areas by IUCN Category

An IUCN Management Protected Area is defined by IUCN as "an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means." IUCN categorizes protected areas by management objective. All calculations for the analyses were performed by WRI using the WDPA GIS point file containing all nationally designated protected areas, joined with a corresponding table showing area in hectares (provided by UNEP-WCMC). Due to variations in consistency and methodology of collection, data on protected areas are highly variable among countries.

Nature Reserves, Wilderness Areas, and National Parks (categories I and II)

include all land area protected in the following IUCN categories:

Category Ia. Strict nature reserve: a protected area managed mainly for scientific research and monitoring; an area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species.

Category Ib. Wilderness area: a protected area managed mainly for wilderness protection; a large area of unmodified or slightly modified land and/or sea retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.

Category II. National park: a protected area managed mainly for ecosystem protection and recreation; a natural area of land and/or sea designated to: (a) protect the ecological integrity of one or more ecosystems for present and future generations; (b) exclude exploitation or occupation inimical to the purposes of designation of the area; and (c) provide a foundation for spiritual, scientific, educational, recreational, and visitor opportunities, all of which must be environmentally and culturally compatible.

the winter range but gave no reference.

Puerto Rico—Painted Bunting has not been reported from this island (Bond 1956 and supplements, 1974, 1993; Leopold 1963; Raffaele 1983; Raffaele et al. 1998; Oberle 2000).

Jamaica—Painted Bunting is a vagrant to this country, with two published sight records for the island (Figure 6) as cited by Levy (1993). On 30 December 1962, a green-plumaged bird was at Montego Bay (it was described as "a female," but females cannot be separated in the field in winter from young males less than two years of age). This individual remained at the site until 10 February 1963 (Downer 1963, Bond 1964). Very near Montego Bay, another individual was cited as seen on 29 October 1980 by Lisa Salmon at Anchovy (Anonymous 1981).

Table 5. Protected areas in the Bahamas within the winter range of the Painted Bunting.¹

Number	Area Name	Island	Area ² Size (ha)
1	The Rand NC	Grand Bahama	41
2	Lucayan NP	Grand Bahama	16
3	Walker's Cay	Abaco	1,554 ³
4	Pelican Cays Land and Sea Park	Abaco	850 ³
5	Abaco NP	Abaco	8,297
6	Central Andros Pk Area (5)	Andros	115,780 ³
7	The Retreat	New Providence	5
8	Harrold and Wilson Ponds	New Providence	101 ³
9	Bonefish Pond	New Providence	518 ³
10	Primeval Forest	New Providence	3
11	Exuma Cays Land and Sea Pk	Exuma	45,587 ³
12	Moriah Harbour Cay	Exuma	5,439 ³
Total	—	—	178,191 ²

¹Information contained in this table obtained from the Bahamas National Trust, courtesy of Eric Carey.

²Areas rounded to nearest whole unit.

³These sites include open water areas; size of upland habitats not available.

Table 6. Banded Painted Buntings of the eastern population recovered in Cuba that were banded in the southeastern United States.

Wintering in Cuba				Banded in U.S. on Breeding Grounds			
Band No.	Sex ¹	Date Observed	Locality	Date	Age ²	Locality	Bander
0500-17200	?	19 Nov 1954	Vicinity Punta de Quemados, Guantanamo Province	02 Nov 1954	?	Miami-Dade, FL	?
0730-08016	?	28 Mar 1967	Villa Clara Province	31 Oct 1966	HY	Vicinity Naples, FL	?
0950-97159	?	28 Oct 1983	Playa Caletones, Holguin Province	7 Oct 1982	?	South end Jekyll Is., Glynn Co., GA	Doris Cohrs (1983)
2020-86887	F	10 Mar 1988	Granma Province	6 Oct 1986	AHY	Isle of Palms, Charleston Co., SC	Will Post
2011-02729	?	___ Nov 1992	Las Tunas Province	5 Oct 1988	?	South end Jekyll Is., Glynn Co., GA	?
2191-31268	F	21 Dec 1996	Gurugú, Camagüey Province	29 Sep 1996	HY	South end Jekyll Is., Glynn Co., GA	Don Cohrs
2191-71099	M	16 Feb 2001	Cabaiguán, Sancti Spiritus Province	21 Jun 1999	ASY	Black Hammock Is., FL	Paul Sykes
2020-65189	M	___ Nov 2001	Morón, Ciego de Ávila Province	18 Aug 1999	ASY	St. Catherines Is., GA	Paul Sykes
2020-65234	M	2 Dec 2001	Ciego de Ávila, Ciego de Ávila Province	23 Aug 1999	ASY	ACE Basin NWR, SC	Paul Sykes
2020-65440	M	13 Mar 2001	14 km north of Morón, Ciego de Ávila Province	22 Sep 1999	ASY	Spring Is., SC	Paul Sykes
2020-52400	M	23 Dec 2000	9 km south of Ciego de Ávila in Caroline, Ciego de Ávila Province	8 Aug 2000	HY	Harris Neck NWR, GA	Paul Sykes
2020-65574	F	10 Jan 2001	SE of Gibara, Holguin Province	24 Aug 2000	HY	Carolina Beach St. Pk., NC	Paul Sykes
1561-12065	?	20 Oct. 2000	Mejía, Holguin Province	28 Aug 2000	HY	Charleston, Charleston Co., SC	Will Post
2020-52567	M	10 Feb 2004	Gibara, Holguin Province	30 Jul 2001	SY	Ft. Clinch St. Pk., FL	Paul Sykes
2020-67357	F	11 Dec 2002	2 km north of Ciego de Ávila, Ciego de Ávila Province	14 Aug 2002	HY	Black Hammock Is., FL	Paul Sykes
2020-67605	F	11 Dec 2002	2 km north of Ciego de Ávila, Ciego de Ávila Province	1 Sep 2002	HY	James Is., SC	Paul Sykes
2020-68243	M	27 Oct 2003	Las Tunas, Las Tunas Province	21 Aug. 2003	HY	Little Talbot Is. St. Pk., FL	Paul Sykes

¹Sex: F = female; M = male.

²Age: ASY = after second year; HY = hatch year; SY = second year.

Cayman Islands—Painted Bunting is a vagrant to this country, with four reports of Painted Buntings at Grand Cayman (Figure 6). Three were photographed at George Town over four days in early April 1981; a green bird was at Government House 15 December 1994; an adult male and two green birds were observed daily at English Point, 26 January through 12 February 1998, with the male remaining until 16 April; and an individual was at Wight's 28 February 1999 (Bradley 2000).

Discussion

We have attempted to clarify the winter range of the eastern population of Painted Bunting in the three principal regions in which it has been documented to occur: the peninsula of Florida, the northern portion of the Bahamas, and Cuba. Much is yet to be learned of the winter distribution and status of the buntings in the Bahamas and Cuba and to a lesser degree in Florida. Further field work in these regions should clarify the gaps in our knowledge.

Outside the winter range, there are at least 160+ reports through 2005 from coastal areas in winter from Georgia north to New Jersey (Georgia—6+ [Beaton et al. 2003; Sykes, unpubl. data], South Carolina—15+, North Carolina—65+ [AVENDEX data file program; Ricky Davis, John O. Fussell, Jeff Lewis, and Patricia Moore, pers. comm.], Virginia—39, Maryland—14, Delaware—9, and New Jersey—19 [Mlodinow and Hamilton 2005]). Of these 160+ reports, 146 were north of the breeding range. Work is in progress to determine which population(s) is represented by these buntings (J. Klicka, Sykes et al., unpubl. data). The number of reports has increased in recent years, as Mlodinow and Hamilton (2005) indicate. Many reports from North Carolina are of multiple birds ranging up to 15 individuals per site, especially since the mid-1980s (Ricky Davis, pers. comm.). Whether this increase is real or an artifact of increased coverage is not known (Mlodinow and Hamilton 2005). Are these birds vagrants, or do they indicate a shift in the winter range in response to global warming? It will be interesting to see if this trend continues in future decades.

Circumstantial evidence suggests that some eastern Painted Buntings probably cross from Cuba to the Yucatan Peninsula of Mexico during migration and possibly winter somewhere in Mexico or Central America.

In Cuba, this species is considered common in spring and fall migrations but rare to uncommon in winter in Cuba (Bond 1956, Raffaele et al. 1998, Garrido and Kirkconnell 2000), an appraisal that fits this hypothesis. In the Greater Antilles, Painted Buntings are vagrants away from Cuba in winter, and we are not aware of any reports from the Lesser Antilles or northern South America. Thus, they are probably going somewhere other than Cuba, and the most likely scenario is to the Yucatan and possibly farther south into Central America. Furthermore, on three days in early May 2003, Inigo-Elias accompanied three Cuban bird trappers to Santa Fe in the province of La Habana. During the course of this brief time, the three men captured 700 or so Painted Buntings of all ages and both sexes to sell in the cagebird trade. More than likely, most, if not all, of these birds were migrants coming from the west. Painted Buntings in the Yucatan, adjacent areas of Mexico, and throughout their Central American range should be examined genetically or by stable isotope analysis to establish the distribution and status of eastern Painted Buntings in this region. We are not aware of any band returns of eastern Painted Buntings from Mexico or Central America, where buntings of the western population winter.

Protected lands within Florida, the Bahamas, and Cuba must be maintained to support wintering eastern Painted Buntings as well as retaining biodiversity in these areas. The buntings spend at least half of each year on the wintering grounds, so adequate habitats in these areas are essential to maintain healthy populations.

Several questions regarding the winter distribution of the eastern population of Painted Bunting need to be resolved. What are the origins of buntings found during the winter months north of the breeding range along the Atlantic Coast, and do these individuals signal a permanent shift in their winter distribution? Are the eastern and western populations separate species as Thompson (1991) suggested? Do some eastern birds pass through Florida (Dry Tortugas) and Cuba to the Yucatan Peninsula of Mexico, and perhaps elsewhere in Central America? Genetic studies underway at the Barrick Museum of Natural History, University of Nevada at Las Vegas (John Klicka, pers. comm.), may enable us to answer some of these questions.

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Table 7. Summary of established protected areas of Cuba by region and province. See Appendices 13, 14, and 15 for details on individual sites within provinces.

Region	Province	Number of Established (E) ¹ Areas	Area Size ² (ha)
Western	Pinar de Río	8	189,522
"	Isla de la Juventud	5	14,124+ ⁴
"	Habana	2	1,180
"	Cuidad de la Habana	2	1,467
"	Matanzas	15	399,644
Central	Cienfuegos	1	1,704
"	Villa Clara	8 (1) ³	125,759
"	Sancti Spiritus	7	54,769
"	Ciego de Ávila	4	38,760
"	Camaguey	5	21,874
Eastern	Las Tunas	1	5,213
"	Holguin	4 (2) ³	292,413
"	Granma	3 (2) ³	105,834
"	Santiago de Cuba	3	77,341
"	Guantánamo	2	11,366
Total 3	15	70	1,340,970+ ⁴

¹E refers to Established status listing in Appendices 13, 14, and 15.

²Only upland areas are included.

³Numbers in parentheses indicate that part of an area is in an adjacent province; sites herein are listed only in one province, that being the province containing the site's greatest number of hectares.

⁴Area size not available for one protected area in Isla de la Juventud.

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Appendix 1. Protected lands within the winter range of the eastern population of the Painted Bunting on the Atlantic coast of Florida: **Brevard County**. Sites are ranked by size, large to small; parcels less than 10 hectares are excluded (n=9). Where a property extends into other counties, those counties are given in parenthesis under the site name.

Number	Agency	Site	Protected Status ¹	Size ² (ha)
		Name		
1	FWS	Merritt Is. NWR (Volusia)	2	30,835
2	NPS	Canaveral NS (Volusia)	1	23,336
3	St. Johns WMD	Blue Cypress CA (Indian River)	3	21,672
4	St. Johns WMD	Three Forks Marsh CA	3	20,611
5	St. Johns WMD	River Lakes CA (Orange, Osceola)	3	15,118
6	Florida TITF	William Beardall Tosohatchee SR (Orange, Osceola)	2	13,653
7	St. Johns WMD	Seminole Ranch CA (Orange, Seminole, Volusia)	3	11,766
8	Florida DRP	St. Sebastian River PSP (Indian River)	1	8,959
9	USAF	Cape Canaveral AS	3	6,348
10	St. Johns WMD	Buck Lake CA (Volusia)	3	3,919
11	FWS	St. Johns NWR	2	2,511
12	St. Johns WMD	Salt Lake WMA	3	1,998
13	St. Johns WMD	Canaveral Marshes CA (Orange)	3	1,797
14	Brevard Co.	Micco Scrub Sanctuary	2	1,713
15	St. Johns WMD	T. M. Goodwin WaMA	3	1,490
16	USAF	Patrick AFB	3	773
17	St. Johns WMD	Pine Is. CA	2	336
18	Brevard Co.	Valkaria Scrub Sanctuary	2	311
19	St. Johns WMD	Bird Lake Marsh	3	295
20	Florida DRP	Sebastian Inlet SP (Indian River)	3	295
21	Florida TITF	Grissom Parkway	3	290
22	Brevard Co.	Valkaria Expansion	2	254
23	USAF	Malabar Transmitter Annex	3	247
24	St. Johns WMD	Met Life & Wheeler Farms Parcels	3	186
25	Brevard Co.	Kabboord Sanctuary	2	182
26	Brevard Co.	Malabar Scrub Sanctuary	2	159
27	Florida TITF	Enchanted Forest Sanctuary	2	157
28	Florida DRP	Indian River Lagoon PSP	1	154
29	Brevard Co.	Jordan Scrub Sanctuary	2	150
30	Brevard Co.	South Babcock	2	73
31	St. Johns WMD	Wal-mart Parcels (Orange)	3	65
32	Brevard Co.	South Lake	2	65
33	Florida TITF	Micco Expansion	3	65
34	Florida TITF	Helen & Allan Cruickshank Sanctuary	2	60
35	Florida TITF	Ten Mile Ridge	3	55
36	Brevard Co.	Malabar Expansion	2	52
37	Florida Audubon Soc.	Turkey Creek Sanctuary	2	49
38	FWS	Archie Carr NWR (Indian River)	2	41
39	Brevard Co.	Tico Scrub Sanctuary	2	40
40	Brevard Co.	Maritime Hammock Sanctuary	2	39
41	St. Johns WMD	Snag Point	3	39
42	St. Johns WMD	Chain-of-Lakes Storm-Water Pk	3	26
43	Brevard Co.	Coconut Pt. Sanctuary	2	21
44	Brevard Co.	Erna Nixon Pk	3	21
45	Brevard Co.	Diceranda Scrub Pk	2	18
46	Florida DRP	Coconut Pt. Pk	3	18
47	Brevard Co.	Washburn Cove Sanctuary	2	15
48	Brevard Co.	Lori Wilson Pk	3	11
49	Brevard Co.	Barrier Is. Ecosystem Center	2	11
50	Brevard Co.	Twin Shores Pk	3	10

¹Categories (1, 2, and 3) of protected status are presented in Methods section.

²Areas are rounded to nearest whole hectare; includes uplands and wetlands but not open water areas.

Appendix 2. Protected lands within the winter range of the eastern population of the Painted Bunting on the Atlantic coast of Florida: **Indian River** and **St. Lucie Counties**. Sites are ranked by size, large to small; parcels less than 10 hectares are excluded (n=1 Indian River, 4 St. Lucie).

Site			Protected Status ¹	Size ² (ha)
Number	Agency	Name		
INDIAN RIVER COUNTY				
1	St. Johns WMD	Ft. Drum Marsh CA	3	8,464
2	St. Johns WMD	Sand Lakes RtA	3	1,329
3	FWS	Pelican Is. NWR	2	262
4	Indian River Co.	Lost Tree Islands CA	2	139
5	St. Johns WMD	Oslo Riverfront CA	3	133
6	St. Johns WMD	Adams Property	3	73
7	Florida TITF	Jungle Trail CA	2	54
8	Indian River Co.	Treasure Shores	3	29
ST. LUCIE COUNTY				
1	Florida DRP	Savannas PSP	2	2,269
2	St. Lucie Co.	Bluefield Ranch	2	1,329
3	South Florida WMD	C-23/C-24 Storage Reservoirs	3	840
4	South Florida WMD	Ten Mile Creek	3	372
5	Florida DRP	Ft. Pierce Inlet SP	3	328
6	St. Lucie Co.	St. Lucie Pinelands	2	304
7	Florida DRP	Avalon SP	3	260
8	St. Lucie Co.	Greene Swamp Preserve	2	214
9	City of Ft. Pierce	Savannas Outdoor RA	3	198
10	Florida DRP	John Brooks Pk	2	164
11	Florida TITF	Queens Is.	2	156
12	Florida DRP	Blind Creek Pk	2	146
13	St. Lucie Co.	Indrio North Savannas	2	142
14	St. Lucie Co.	Bear Pt.	2	139
15	St. Lucie Co.	Dollman Tract	2	112
16	South Florida WMD	Oxbow EcoCenter	2	93
17	St. Lucie Co.	Kings Is.	2	67
18	St. Lucie Co.	Cappon Trail Pk	2	63
19	St. Lucie Co.	Middle Cove	2	56
20	St. Lucie Co.	Indrio Blueway Buffer	2	43
21	St. Lucie Co.	Platt's Creek Mitigation Pk	3	39
22	St. Lucie Co.	Spruce Bluff	2	32
23	St. Lucie Co.	Paleo Hammock	2	32
24	St. Lucie Co.	Wildcat Cove	2	32
25	Village of St. Lucie	St. Lucie Village HP	3	29
26	St. Lucie Co.	Ocean Bay	2	28
27	St. Lucie Co.	Pepper Pk	2	19
28	St. Lucie Co.	Ancient Oaks	2	19
29	City of Port St. Lucie	Oak Hammock Pk	3	17
30	St. Lucie Co.	Impoundment 5	3	13
31	St. Lucie Co.	Walton Scrub	2	12
32	St. Lucie Co.	Project 10B	3	11

¹Categories (1, 2, and 3) of protected status are presented in Methods section.
²Areas are rounded to nearest whole acre; includes uplands and wetlands but not open water areas.

Appendix 3. Protected lands within the winter range of the eastern population of the Painted Bunting on the Atlantic coast of Florida: **Martin County**. Sites are ranked by size, large to small; parcels less than 10 hectares are excluded (n=24). Where a property extends into another county, that county is given in parenthesis under the site name.

Number	Site		Protected Status ¹	Size ² (ha)
	Agency	Name		
1	South Florida WMD	Dupuis Reserve	3	8,923
2	South Florida WMD	Allapattah Flats	3	8,053
3	Florida SP	Jonathan Dickinson SP (Palm Beach)	2	4,586
4	South Florida WMD	John C. and Mariana Jones/Hungryland WEA (Palm Beach)	3	4,374
5	South Florida WMD	Atlantic Ridge	3	2,321
6	South Florida WMD	Cypress Creek/Loxahatchee (Palm Beach)	3	1,362
7	FWS	Hobe Sound NWR (St. Lucie)	2	435
8	Florida DRP	Seabranck PSP	2	372
9	Florida DRP	St. Lucie Inlet PSP	1	366
10	Martin Co.	Bessemer	2	177
11	South Florida WMD	South Fork Addition	3	139
12	Martin Co.	Halpatiokee Regional Pk CA	2	88
13	Martin Co.	Lake Okeechobee Ridge	2	84
14	Martin Co.	Kiplinger	2	56
15	The Nature Conservancy	Blowing Rocks Preserve	1	44
16	Florida Inland ND	Peck Lake Pk	2	30
17	Martin Co.	Stuart Beach Pk	2	27
18	Martin Co.	Dutcher	2	24
19	Martin Co.	Palm City CA	2	24
20	Martin Co.	Gomez	2	23
21	Martin Co.	Phipp's Pk CA	2	21
22	Martin Co.	Pendavis Cove Pk	2	17
23	Martin Co.	Jensen Beach	2	17
24	Florida Inland ND	Martin County Spoil Islands	2	15
25	Martin Co.	Tilton	2	15
26	Martin Co.	Timer Powers Pk CA	2	14
27	Martin Co.	Jimmy Graham Pk	2	12
28	Martin Co.	Danforth Pk	2	10
29	Martin Co.	Indian River Pk CA	2	18

¹Categories (1, 2, and 3) of protected status are presented in Methods section.
²Areas are rounded to nearest whole acre; includes uplands and wetlands but not open water areas.

Appendix 4. Protected lands within the winter range of the eastern population of the Painted Bunting on the Atlantic Coast of Florida: **Palm Beach County**. Sites are ranked by size, large to small; parcels less than 10 hectares are excluded (n=10). Where properties extend into other counties, those counties are given in parenthesis under the site name.

Number	Site		Protected Status ¹	Size ² (ha)
	Agency	Name		
1	South Florida WMD, FWS	Arthur R. Marshall Loxahatchee NWR (CA1)	2	56,175
2	Florida FWCC	J. W. Corbett WMA (Martin)	3	24,728
3	South Florida WMD	Everglades Agricultural Area	3	21,052
4	City of West Palm Beach	Grassy Waters Preserve	3	5,332
5	Palm Beach Co.	Loxahatchee Slough NA	1	4,453
6	Palm Beach Co.	Pat-Mar NA	1	2,991
7	Palm Beach Co.	Hungryland Slough NA	1	1,197
8	South Florida WMD	Strazzulla Tract	3	1,108
9	Florida TIITF	Loxahatchee Slough Research NA	1	941
10	Palm Beach Co.	Pond Cypress NA	1	623
11	South Florida WMD	Loxahatchee Slough	3	599
12	South Florida WMD	C-5/L-8 Basin Mod & Reservoir	3	494
13	Palm Beach Co.	Sweetbay NA	1	400
14	Palm Beach Co.	South Co. RP	2	358
15	Palm Beach Co.	Okeehelée Pk	2	353
16	Palm Beach Co.	Cholee Pk	2	319
17	Palm Beach Co.	Royal Palm Beach Pines NA	1	311
18	Florida TIITF	Loxahatchee Slough Public Use NA	3	256
19	Florida FWCC	Lake Harbor Public WA	3	249
20	Palm Beach Co.	Cypress Creek NA	1	237
21	Florida TIITF	Juno Dunes NA	1	232
22	Palm Beach Co.	Winding Waters NA	1	220
23	South Florida WMD	Reese Groves	3	216
24	Palm Beach Co.	Loxahatchee River NA	1	151
25	South Florida WMD	Wellington/Acme Marsh	3	141
26	Florida DRP	John D. MacArthur Beach SP	2	124
27	Florida TIITF	Jupiter Ridge NA	1	106
28	Florida TIITF	Yamato Scrub NA	1	88
29	Palm Beach Co.	Morikami Museum & Japanese Gardens	2	75
30	Palm Beach Co.	River Bend Pk	3	68
31	Palm Beach Co.	Frenchman's Forest	1	63
32	Palm Beach Co.	Radnor	2	63
33	Palm Beach Co.	East CA	1	59
34	Palm Beach Co.	North Jupiter Flatwoods NA	1	53
35	Florida Atlantic Univ.	Florida Atlantic Univ. Ecological Site	2	49
36	Palm Beach Co.	Acreage Pines NA	1	48
37	Palm Beach Co.	Carlin Pk	2	44
38	Palm Beach Co.	C-18 Triangle NA	1	41
39	Palm Beach Co.	Hypoluxo Scrub NA	1	39
40	City of Boca Raton	Spanish River Pk	3	39
41	USDI, BLM	Jupiter Inlet	3	37
42	Palm Beach Co.	Pondhawk NA	1	32
43	Palm Beach Co.	Lake Pk Scrub NA	1	25
44	Palm Beach Co.	Seacrest Scrub NA	1	22
45	Florida TIITF	Pahokee Marina & Campground	3	20
46	Palm Beach Co.	Dubois Pk	2	20
47	City of Boca Raton	South Beach Pk	2	16
48	Palm Beach Co.	High Ridge Scrub NA	1	16
49	Florida TIITF	Big Mound State SAS	3	13
50	City of Boca Raton	Gumbo Limbo Environmental Complex	2	12
51	City of Boca Raton	Red Reef Pk	2	12
52	Palm Beach Co.	Delray Oaks NA	1	10
53	Palm Beach Co.	Jupiter Beach Pk	2	10

¹Categories (1, 2, and 3) of protected status are presented in Methods section.

²Areas are rounded to nearest whole acre; includes uplands and wetlands but not open water areas.

Appendix 5. Protected lands within the winter range of the eastern population of the Painted Bunting on the Atlantic Coast of Florida: **Broward County**. Sites are ranked by size, large to small; parcels less than 10 hectares are excluded (n=50). Where properties extend into other counties, those counties are given in parenthesis under the site name.

Number	Agency	Site	Protected Status ¹	Size ² (ha)
		Name		
1	Florida TITF, Florida FWCC	Everglades (WCA 2 & 3) & Francis S. Taylor WMA (Dade, Palm Beach)	3	269,518
2	South Florida WMD	Stormwater Treatment Areas (Hendry, Palm Beach)	3	19,277
3	Florida TITF, Florida FWCC	Holey Land WMA (Palm Beach)	3	14,307
4	Florida TITF, Florida FWCC	Rotenberger WMA (Hendry, Palm Beach)	3	11,639
5	South Florida WMD	East Coast Buffer (Dade, Palm Beach)	3	8,673
6	Broward Co.	West Lake Pk/Anne Kolb NC	3	421
7	City of Pembroke Pines	Florida Wetlands Bank	2	186
8	Broward Co.	Tradewinds RP	3	156
9	Florida DRP	John U. Lloyd Beach SP	3	106
10	Broward Co.	Dania Saltmarsh	1	103
11	Broward Co.	Fern Forest NC	2	101
12	Broward Co.	Tree Tops RP	3	98
13	City of Plantation	Plantation Central Open Space	3	84
14	Florida DRP	Hugh Taylor Birch SP	3	69
15	Broward Co.	Pond Apple Slough	1	68
16	Broward Co.	Snake Creek/Miramar Pineland NA	1	65
17	Broward Co.	Long Key/Flamingo Road NA	1	58
18	Broward Co.	Pine Is. Ridge NA	1	40
19	City of Ft. Lauderdale	Snyder Pk	2	36
20	City of Pompano Beach	Pompano Airpak	3	32
21	Broward Co.	Hollywood North Beach RP	3	27
22	Broward Co.	Hillsboro Pineland NA	1	27
23	City of Coral Springs	Tall Cypress NA	1	27
24	Broward Co.	Vista View	2	25
25	City of Pembroke Pines	Pines and 196th Avenue	3	22
26	Florida Inland ND	Deerfield Is. RP	3	22
27	City of Ft. Lauderdale	Mills Pond Pk	2	22
28	Broward Co.	Secret Woods Buffer & NC	1	21
29	Florida TITF	Snake Warrior's Is.	2	21
30	Broward Co.	Easterlin RP	3	19
31	Town of SouthWest Ranches	Rolling Oaks	2	18
32	City of North Lauderdale	Hampton Pines Pk	1	17
33	City of Coral Springs	Sandy Ridge	2	16
34	Broward Co.	The Jungle NA	1	13
35	City of Plantation	Volunteer Pk Addition	3	13
36	City of Coral Springs	Sherwood Forest	2	12
37	City of Coconut Creek	Winston Pk	2	12
38	Broward Co.	Parkland	2	10
39	Broward Co.	Crystal Lake Sand Pine Scrub NA	1	10
40	City of Parkland	Holmberg Road Pk Complex	2	10

¹Categories (1, 2, and 3) of protected status are presented in Methods section.
²Areas are rounded to nearest whole acre; includes uplands and wetlands but not open water areas.

Appendix 6. Protected lands within the winter range of the eastern population of the Painted Bunting on the Atlantic Coast of Florida: **Dade County**. Sites are ranked by size, large to small; parcels less than 10 hectares are excluded (n=53). Where properties extend into other counties, those counties are given in parenthesis under the site name.

Number	Agency	Site	Protected Status ¹	Size ² (ha)
		Name		
1	NPS	Everglades National Pk (Collier & Monroe)	1	387,633
2	South Florida WMD	Southern Glades	3	13,560
3	Miami-Dade Co.	Model Lands Basin	2	4,741
4	South Florida WMD	Frog Pond/L-31 N Transition Lands	3	3,847
5	NPS	Biscayne National Pk (Monroe)	1	2,895
6	USAF	Homestead Air Reserve Base	3	778
7	Miami-Dade Co.	Crandon Pk	2	362
8	Florida TITF	Oleta River SP	3	345
9	Miami-Dade Co.	Miami Metrozoo	2	295
10	Miami-Dade Co.	Trail Glades Range	2	286
11	Florida TITF	R. Hardy Matheson Preserve	2	264
12	Miami-Dade Co.	Milton E. Thompson Pk	2	259
13	South Florida WMD	Biscayne Coastal Wetlands	3	188
14	Miami-Dade Co.	Matheson Hammock Pk	2	182
15	Miami-Dade Co.	Chapman Field Pk	2	180
16	Miami-Dade Co.	Cutler Wetlands	1	175
17	Florida DRP	Bill Baggs Cape Florida SP	3	162
18	Miami-Dade Co.	Mangrove Preserve	2	162
19	Miami-Dade Co.	Navy Wells Pk	2	144
20	Florida TITF	Deering Estate at Cutler Ridge	1	141
21	Miami-Dade Co.	Tropical Pk	2	115
22	U.S. Coast Guard	U.S. Coast Guard Communication Sta.	3	114
23	Miami-Dade Co.	Larry & Penny Thompson Pk	2	113
24	Miami-Dade Co.	Homestead Bayfront Pk	2	111
25	USDA	Subtropical Horticulture RS	3	80
26	Miami-Dade Co.	Haulover Beach Pk	2	71
27	Miami-Dade Co.	Greynolds Pk	2	61
28	Miami-Dade Co.	Tree Is. Pk.	1	49
29	Miami-Dade Co.	Kendall Indian Hammocks Pk	2	49
30	Miami-Dade Co.	Black Pt. Pk & Marina	2	44
31	Miami-Dade Co.	Lakes by the Bay Pk	2	40
32	Miami-Dade Co.	Ives Estate Pk	2	38
33	Miami-Dade Co.	Camp Owaissa Bauer	2	37
34	Miami-Dade Co.	Fairchild Tropical Garden	3	33
35	Miami-Dade Co.	Black Pt. Wetlands	1	32
36	Florida TITF	Boystown Pineland	1	31
37	University of Miami Campus	University of Miami Richmond	2	31
38	Miami-Dade Co.	Tamiami #8 Pineland (Nixon Smiley Addition)	1	27
39	Miami-Dade Co.	Nixon Smiley Pineland Preserve	2	25
40	Miami-Dade Co.	Castellow Hammock Preserve	2	24
41	Miami-Dade Co.	A. O. "Doug" Barnes Pk	2	23
42	Florida TITF	Quail Roost Pineland	1	20
43	Miami-Dade Co.	Gold Coast Railroad Museum Pk	2	19
44	Miami-Dade Co.	Coral Reef Pk	1	19
45	Miami-Dade Co.	Sunny Palms Pineland	1	16
46	Florida TITF	Goulds Pineland Addition	1	15
47	Florida TITF	North Shore Pk	2	15
48	Florida TITF	Deering Estate South Addition	1	14
49	Miami-Dade Co.	Highland Oaks Pk	2	14
50	Miami-Dade Co.	Deering Estate North Addition	1	13
51	City of Miami	Virginia Key and Marine Stadium	3	13
52	Miami-Dade Co.	Dolphin Center Stadium Neighborhood Pk	2	11
53	Florida TITF	Tamiami Pineland Complex Addition	1	11
54	Florida TITF	Ross Hammock	1	11
55	Miami-Dade Co.	Bill Sadowski Preserve	2	10
56	Miami-Dade Co.	Seminole Wayside Pk	2	10
57	Florida TITF	Rockdale Pineland	1	10
58	Miami-Dade Co.	Fuchs Hammock Preserve	2	10
59	Florida TITF	Florida City Pineland	1	10

¹Categories (1, 2, and 3) of protected status are presented in Methods section.

²Areas are rounded to nearest whole acre; includes uplands and wetlands but not open water areas.

Appendix 7. Protected lands within the winter range of the eastern population of the Painted Bunting inland in Florida: **Seminole, Lake, and Orange Counties.** Sites are ranked by size, large to small. Parcels less than 10 hectares are excluded (n=Seminole 3, Orange 1). Where properties extend into other counties, those counties are given in parenthesis under the site name.

Number	Agency	Site		Protected Status ¹	Size ² (ha)
		Name			
SEMINOLE COUNTY					
1	St. Johns River WMD	Lake Jessup CA (Volusia)		3	2,161
2	St. Johns River WMD	Little Big Econlockhatchee SF (Volusia)		3	2,235
3	St. Johns River WMD	Wekiva River CA		3	943
4	Seminole Co.	Black Bear WA		2	628
5	Florida TITF	Spring Hammock Preserve		2	609
6	Seminole Co.	Black Hammock WA		2	283
7	Seminole Co.	Chuluota WA		2	251
8	Seminole Co.	Lake Proctor WA		2	193
9	USFS	Pineloch Tract		3	191
10	Seminole Co.	Lake Jessup WA		2	184
11	St. Johns River WMD	Econlockhatchee Corridor Project		3	175
12	Florida Audubon Soc.	Sabal Pt. Sanctuary		1	114
13	Seminole Co.	Econlockhatchee River WA		2	97
14	Seminole Co.	East 417 Property		2	74
15	Seminole Co.	Geneva WA		2	71
16	Seminole Co.	Electrical Workers Property		2	63
17	Seminole Co.	Charles Lee Property		2	47
18	City of Oviedo	Twin Rivers Two Preserve		2	16
LAKE COUNTY					
1	Southwest Florida WMD	Green Swamp (Pasco, Polk, and Sumter)		3	44,338
2	Florida FWCC	Hilochee WMA (Polk)		3	3,955
3	Florida DRP	Lake Louise SP		2	1,784
4	Florida TITF	General James A. Van Fleet Trail (Polk, Sumter)		3	146
5	St. Johns River WMD	Don McCaffrey Parcels		3	35
ORANGE COUNTY					
1	Florida TITF	William Beardall Tosohatchee State Preserve		2	13,653
2	St. Johns River WMD	Lake Apopka Restoration Area		3	8,129
3	Florida TITF	Rock Springs Run State Reserve		2	5,693
4	St. Johns River WMD	Hal Scott Regional Preserve & Pk		3	3,464
5	Florida DRP	Wekiva Springs SP (Seminole)		2	3,127
6	Orange Co.	Split Oak Forest Mitigation Pk (Osceola)		3	724
7	South Florida WMD	Shingle Creek (Osceola)		3	714
8	Orange Co.	Moss Pk		3	401
9	Orange Co.	Long Branch Pk		3	234
10	South Florida WMD	Tibet-Butler Preserve		2	178
11	Orange Co.	Kelly Pk		3	79
12	City of Orlando	Turkey Lake Pk		2	69
13	City of Orlando	Lake Fran Conservation Easement		3	62
14	Town of Oakland	Oakland Nature Preserve		3	54
15	Orange Co.	Shadow Bay Pk		3	45
16	Florida Audubon Soc.	Egret Isle Sanctuary		1	10

¹Categories (1, 2, and 3) of protected status are presented in Methods section.

²Areas are rounded to nearest whole acre; includes uplands and wetlands but not open water areas.

Appendix 8. Protected lands within the winter range of the eastern population of the Painted Bunting inland in Florida: **Polk** and **Osceola Counties**. Sites are ranked by size, large to small; parcels less than 10 hectares are excluded (n=Polk 2). Where properties extend into other counties, those counties are given in parenthesis under the site name.

Number	Site		Protected Status ¹	Size ² (ha)
	Agency	Name		
POLK COUNTY				
1	Florida USFS	Lake Wales Ridge SF	3	10,791
2	Florida DRP	Allen David Broussard Catfish Creek PSP	1	3,339
3	Florida FWCC	Tenoroc Fish MA	3	3,019
4	Florida TITF	Osprey Unit	3	2,470
5	The Nature Conservancy	Tiger Creek Preserve	1	1,927
6	Polk Co.	Sumica/Lake Walk-in-the-Water Tract	3	1,634
7	Florida TITF	Homeland	3	778
8	Florida Port & Comp.	Hines Conservation Easement	3	667
9	Florida TITF	Clear Springs	3	582
10	Polk Co.	Lake Hancock Circle B Bar Reserve	2	511
11	Polk Co.	Gator Creek Preserve	2	439
12	Florida TITF	Bowlegs Creek	3	372
13	The Nature Conservancy	Saddle Blanket Lakes Preserve	1	303
14	Polk Co.	Saddle Creek County Pk	3	295
15	Polk Co.	North/Walk-in-Water Creek	2	260
16	Polk Co.	Lakeland Highlands Scrub	2	223
17	Polk Co.	Crooked Lake Prairie	2	213
18	Polk Co.	IMC-Peace River Pk	3	188
19	Florida Audubon Soc.	Saddle Creek Sanctuary	1	166
20	St. Johns River WMD	Lake Lowery Marsh	2	157
21	Florida TITF	South Peace River	3	148
22	Southwest Florida WMD	Alafia Reserve	3	135
23	Southwest Florida WMD	Upper Lake Marion Creek Watershed	3	117
24	Florida TITF	Little Payne Creek	3	110
25	Polk Co.	Sherwood L. Stokes Preserve/Lake Marion	2	89
26	Polk Co.	Lake Bonnet Marsh	2	68
27	Florida TITF	South Prong Alafia River	3	55
28	Polk Co.	Hickory Lake Scrub County Pk	3	22
29	Polk Co.	Peace River Hammock	2	17
30	Polk Co.	Crooked Lake Sandhill	2	10
OSCEOLA COUNTY				
1	Florida FWCC	Three Lakes WMA	3	24,920
2	South Florida WMD	Kissimmee Chain of Lakes (Polk)	3	10,899
3	St. Johns River WMD, Florida FWCC	Bull Creek WMA	3	9,483
4	Florida FWCC	Triple N Ranch WMA	3	6,315
5	South Florida WMD	Upper Lakes Basin Watershed (Polk)	3	5,018
6	The Nature Conservancy	Disney WP (Polk)	1	4,850
7	Florida DRP	Lake Kissimmee SP (Polk)	2	2,375
8	Osceola Co.	Lake Lizzie Nature Preserve	3	386
9	Florida TITF	Makinson Is. (Cypress Is.)	3	77
10	South Florida WMD	Oak Street Extension Preserve	3	58
11	Florida TITF	Paradise Is.	3	49
12	City of Kissimmee	Shingle Creek Recreation Preserve	3	46
13	Florida USFS	Holopaw SF	3	26

¹Categories (1, 2, and 3) of protected status are presented in Methods section.

²Areas are rounded to nearest whole acre; includes uplands and wetlands but not open water areas.

Appendix 9. Protected lands within the winter range of the eastern population of the Painted Bunting inland in Florida: **Hardee, DeSoto, Highlands, Okeechobee, Glades, and Hendry Counties.** Sites are ranked by size, large to small; parcels less than 10 hectares are excluded (n=Highlands 1). Where properties extend into other counties, those counties are given in parenthesis under the site name.

Number	Site		Protected Status ¹	Size ² (ha)
	Agency	Name		
HARDEE COUNTY				
1	Florida DRP	Paynes Creek HSP	3	161
DESOTO COUNTY				
1	Southwest Florida WMD	RV Griffin Reserve	3	2,367
2	Southwest Florida WMD	Lower Peace River Corridor	3	800
HIGHLANDS COUNTY				
1	USAF	Avon Pk Air Force Range (Okeechobee, Polk)	3	43,896
2	Florida DRP	Kissimmee Prairie PSP (Okeechobee, Osceola, Polk)	1	21,766
3	South Florida WMD	Kissimmee River (Okeechobee, Osceola, Polk)	3	14,897
4	Florida TIITF	Lake Wales Ridge WEA (Polk)	2	5,948
5	Florida DRP	Highland s Hammock SP (Hardee)	2	3,760
6	Archbold Expeditions, Inc.	Archbold Biological Sta.	1	3,580
7	South Florida WMD	Paradise Run (Okeechobee)	3	1,324
8	Florida FWCC	Platt Branch Mitigation Pk WEA	3	805
9	FWS	Lake Wales Ridge NWR (Polk)	2	755
10	Highlands Co.	The Preserve	2	543
11	Southwest Florida WMD	Jack Creek	3	519
12	Florida DRP	Lake June-in-Winter SP	2	350
13	The Nature Conservancy	Venus Flatwoods Preserve	1	33
14	The Nature Conservancy	Carter Creek	1	15
OKEECHOBEE COUNTY				
1	South Florida WMD	Lake Okeechobee Critical Project	3	2,024
2	South Florida WMD	New Palm Dairy	3	869
GLADES COUNTY				
1	Florida FWCC	Fisheating Creek WMA	3	7,255
2	Florida TIITF Sanctuaries	Lake Okeechobee	1	1,188
3	South Florida WMD	Nicodemus Slough	3	824
4	Floraglates Foundation	Moya Sanctuary (Hendry)	1	78
HENDRY COUNTY				
1	Florida FWCC	Dinner Is. Ranch WMA	3	7,960
2	South Florida WMD	Caloosahatchee Basin Storage Reservoir	3	3,661
3	Florida FWCC	Canoe Slough WMA	3	3,030
4	Florida FWCC	Okaloacoochee Slough WMA	3	1,183
5	South Florida WMD	C-43 Basin Aquifer Storage Part 1	3	410

¹Categories (1, 2, and 3) of protected status are presented in Methods section.
²Areas are rounded to nearest whole acre; includes uplands and wetlands but not open water areas.

Appendix 10. Protected lands within the winter range of the eastern population of the Painted Bunting inland in Florida: **Manatee, Sarasota, and Charlotte Counties.** Sites are ranked by size, large to small; parcels less than 10 hectares are excluded (n=Charlotte 1). Where properties extend into other counties, those counties are given in parenthesis under the site name.

Site		Protected Status ¹	Size ² (ha)
Number	Agency	Name	
MANATEE COUNTY			
1	Manatee Co.	Duette Pk	3 7,235
2	Manatee Co.	Headwaters of Duette Pk	3 1,369
3	Southwest WMD	Upper Myakka Watershed	3 954
4	Florida TIITF	Beker	3 685
SARASOTA COUNTY			
1	Florida DRP	Myakka River SP (Manatee)	2 14,961
2	Sarasota Co.	T. Mabry Carlton, Jr. Memorial Pk	3 9,938
3	Florida DOF	Myakka SF	3 3,289
4	Sarasota Co.	Pinelands Reserve	2 2,485
5	Southwest Florida WMD	Deer Prairie Creek	2 2,481
6	Southwest Florida WMD	Myakka River	3 1,584
7	City of North Port	Myakkahatchee Creek EP	3 80
CHARLOTTE COUNTY			
1	Florida FWCC	Fred C. Babcock-Cecil M. Webb WMA (Lee)	3 28,229
2	Florida DRP	Charlotte Harbor PSP (Lee)	1 17,135
3	Florida TIITF	Yucca Pens Unit (Lee)	3 5,749
4	Southwest Florida WMD	Prairie/Shell Creek	3 246
5	Charlotte Co.	Charlotte Flatwoods	3 204
6	Charlotte Co.	Tippecanoe EP	2 144
7	Florida DRP	Don Pedro Is. SP	3 94
8	Charlotte Co.	Amberjack EP	2 89
9	Florida DRP	Stump Pass Beach SP	3 77
10	Charlotte Co.	San Casa Pk	3 75
11	City of Punta Gorda	Alligator Creek	3 58
12	Charlotte Co.	Oyster Creek EP	3 55
13	Florida TIITF	Charlotte Harbor Environmental Center	2 51
14	Charlotte Co.	Cedar Pt. EP	2 45
15	Charlotte Co.	Ollie's Pond Pk	3 17
16	Charlotte Co.	Sunrise Pk	3 16
17	Charlotte Co.	Hathaway Pk	3 16
18	The Nature Conservancy	James E. Cook Memorial Preserve	1 12
19	FWS	Island Bay NWR	2 10

¹Categories (1, 2, and 3) of protected status are presented in Methods section.

²Areas are rounded to nearest whole acre; includes uplands and wetlands but not open water areas.

Appendix 11. Protected lands within the winter range of the eastern population of the Painted Bunting along the Gulf of Mexico of Florida: **Lee County**. Sites are ranked by size, large to small; parcels less than 10 hectares are excluded (n=4).

Site			Protected Status ¹	Size ² (ha)
Number	Agency	Name		
1	Florida DRP	Estero Bay PSP	1	4,217
2	FWS	J. N. Ding Darling NWR	2	1,551
3	Lee Co.	Prairie Pines Preserve	2	1,092
4	Lee Co.	Wild Turkey Strand Preserve	2	1,070
5	Florida DRP	Cayo Costa SP	2	892
6	Lee Co.	Six Mile Cypress Slough Preserve	2	825
7	Sanibel-Captiva Conservation Foundation	Sanibel-Captiva Conservation Foundation Land	1	674
8	Lee Co.	Caloosahatchee Creek Preserve	2	497
9	Lee Co.	Hickey Creek Mitigation Pk WEA	3	315
10	Florida DRP	Caloosahatchee RP	3	305
11	Lee Co.	San Carlos Bay-Bunche Beach Preserve	2	288
12	South Florida WMD	Corkscrew Regional Mitigation Bank	3	260
13	Lee Co.	Pine Is. Flatwoods Preserve	2	240
14	Lee Co.	Lovers Key Pk	3	205
15	FWS	Matlacha Pass NWR	2	182
16	FWS	Pine Is. NWR	2	165
17	Lee Co.	Greenbriar Swamp Preserve	3	157
18	Lee Co.	Charlotte Harbor Buffer Preserve	2	153
19	Lee Co.	Yellow Fever Creek Preserve	2	137
20	Lee Co.	Popash Creek Preserve	1	129
21	Lee Co.	Lakes Pk	3	116
22	Lee Co.	Hickey's Creek Mitigation Pk	2	114
23	Lee Co.	Deep Lagoon Preserve	2	96
24	Lee Co.	Estero Bay Buffer Preserve	2	96
25	Lee Co.	Imperial Marsh Preserve	2	95
26	Lee Co.	Yucca Pens Preserve	2	79
27	Lee Co.	Gator Hole Preserve	2	72
28	Lee Co.	Alva Scrub Preserve	2	70
29	Lee Co.	Bocilla Preserve	1	69
30	Florida TITF	Four Mile Cove Ecological Preserve	3	67
31	Florida DRP	Mound Key Archeological SP	3	67
32	Lee Co.	Galt Preserve	2	65
33	Florida DRP	Koreshan State Historic Site	3	57
34	Lee Co.	Big Hickory Is. Preserve	1	54
35	Lee Co.	Pine Lake Preserve	2	51
36	Florida DRP	Gasparilla Is. SP	3	48
37	Lee Co.	Mullock Creek Preserve	1	48
38	Lee Co.	St. James Creek Preserve	1	46
39	FWS	Norberg Research NA	1	41
40	City of Ft. Myers	Calusa NC & Planetarium	2	41
41	Lee Co.	Powell Creek Preserve	2	31
42	Lee Co.	Flag Pond Preserve	2	31
43	Lee Co.	Hickory Swamp Preserve	2	27
44	Lee Co.	Hickey's Creek/Greenbriar Connector	3	27
45	South Florida WMD	Six Mile Cypress II	3	26
46	Univ. of Florida Foundation	Randell Research Center	3	25
47	Lee Co.	Orange River Preserve	2	23
48	Lee Co.	Matanzas Pass Preserve	1	23
49	Lee Co.	Old Bridge Preserve	1	19
50	Lee Co.	Conservation 2020 Site #216	2	17
51	Lee Co.	Eagle Lake Preserve	1	17
52	FWS	Caloosahatchee NWR	2	16
53	Lee Co.	Persimmon Ridge Preserve	1	15
54	Lee Co.	Imperial River Preserve	1	13
55	South Florida WMD	Critical Flowway	3	10

¹Categories (1, 2, and 3) of protected status are presented in Methods section.
²Areas are rounded to nearest whole acre; includes uplands and wetlands but not open water areas.

Appendix 12. Protected lands within the winter range of the eastern population of the Painted Bunting along the Gulf of Mexico of Florida: **Collier and Monroe Counties**. Sites are ranked by size, large to small; parcels less than 10 hectares are excluded (n=Monroe 3). Where properties extend into other counties, those counties are given in parenthesis under the site name.

Number	Agency	Site	Protected Status ¹	Size ² (ha)
		Name		
COLLIER COUNTY				
1	NPS	Big Cypress Preserve (Broward, Dade, Hendry, Monroe)	1	119,410
2	Florida DRP	Fakahatchee Strand PSP	1	32,064
3	Florida DOF	Picayune Strand SF	3	29,983
4	South Florida WMD	Okaloacoochee Slough SF (Hendry)	3	13,058
5	Florida TIITF	Rookery Bay National Estuarine Reserve	2	12,306
6	South Florida WMD	Corkscrew Regional Ecosystem Watershed (Lee)	3	9,886
7	FWS	Florida Panther NWR	2	10,684
8	FWS	Ten Thousand Is. NWR	2	8,676
9	National Audubon Soc.	Corkscrew Swamp Sanctuary (Lee)	1	4,282
10	Florida DRP	Collier-Seminole SP	2	2,760
11	South Florida WMD	Lake Trafford Impoundment	3	253
12	Florida DRP	Delnor-Wiggins Pass SP	3	56
13	Collier Co.	Barefoot Beach Preserve	3	47
14	Florida TIITF	Jentgen Parcel	3	39
MONROE COUNTY				
1	FWS	Great White Heron NWR	2	6,210
2	FWS	Crocodile Lake NWR	2	2,258
3	USN	Key West Naval Air Sta.	3	1,517
4	Florida DRP	John Pennekamp Coral Reef SP	2	1,381
5	Florida DRP	Dagny Johnson-Key Largo Hammock Botanical SP	1	1,006
6	FWS	Key West NWR	2	790
7	Florida TIITF	Florida Keys WEA	2	762
8	FWS	National Key Deer Refuge	2	649
9	Florida DRP	Long Key SP	3	292
10	Florida DRP	San Pedro Archaeological SP	1	260
11	Florida DRP	Curry Hammock SP	2	229
12	Florida DRP	Lignumvitae Key Botanical SP	1	206
13	The Nature Conservancy	Saddle Bunch Keys	1	138
14	Florida DRP	Bahia Honda SP	2	125
15	The Nature Conservancy	Torchwood Hammock Preserve	1	68
16	The Nature Conservancy	Cross Key	1	50
17	Florida DRP	Indian Key Historic SP	3	45
18	FWS	Cottrell Key Research NA	1	19
19	Florida DRP	Ft. Zachary Taylor Historic SP	3	16
20	Florida DRP	Windley Key Fossil Reef Geological SP	2	13

¹Categories (1, 2, and 3) of protected status are presented in Methods section.
²Areas are rounded to nearest whole acre; includes uplands and wetlands but not open water areas.

Appendix 13. Protected areas of Western Cuba in the provinces of **Pinar del Río, Isla de la Juventud, Habana, Ciudad de la Habana, and Matanzas.** Data was obtained from the web site of Sistema Nacional de Areas Protegidas (System of National Protected Areas of Cuba) <www.SNAP.cu/>, Cuban Centro Nacional de Areas Protegidas.

Province	Area Name	Type of Land Management	Total Area (ha)	Total Upland Area (ha)	Status ¹
Pinar del Río	Reserva de la Biosfera Guanahacabibes	Biosphere Reserve (BR)	153,136	103,628	E
	Guanahacabibes	National Park (NP)	39,826	23,633	E
	Ciénaga de Lugones	Wildlife Refuge (WR)	1,282	1,282	P
	Los Pretiles	Ecological Reserve (ER)	590	548	P
	Los Caimanes (PR)	Flora Reserve (FR)	169	169	P
	Culebra	FR	278	278	P
	Los Ocujes	FR	1,252	1,252	P
	Paso Real	FR	90	90	P
	San Ubaldo-Sabanalamar	FR	5,212	4,858	E
	Sierra de Guane	Outstanding Natural Feature (ONF)	391	391	P
	Punta Coco	WR	1,116	591	P
	Sierra del Pesquero-Mesa-Sumidero	ONF	5,319	5,319	P
	Sierra de San Carlos	ER	2,852	2,852	P
	Sierra de Contadores	FR	1,517	1,517	P
	Gramales-Caliente-La Pena	FR	3,375	3,375	P
	Cayo Ratones	WR	269	269	P
	Viñales	NP	11,119	11,119	E
	Cerro de Cabras-Guanito	FR	2,614	2,614	P
	Punta Caribe	WR	1,970	1,970	P
	Finca La Caridad	FR	10	1	P
	Cayo Levisa	Protected Natural Landscape (PNL)	31,516	679	P
	Mogote La Mina	ONF	70	70	P
	Sierra de la Guacamaya	ONF	2,074	2,074	P
	Los Paredones-Presa El Punto	FR	128	128	P
Encinar de Puerta de Golpe	FR	268	268	P	
Cayo Mono	WR	2,795	2,795	P	
Mogote de Pico Chico	FR	271	271	P	
Pinar del Río & Isla de la Juventud	San Felipe	NP	42,934	2,079	P
	Sierra Preluda-Cuabales de Cajalbano	Nature Reserve (NR)	1,416	1,416	P
	Mil Cumbres	Protected Area of Managed Resources (PAOMR)	17,129	17,129	E
	Sierra la Güira	NR	1,252	1,252	P
	Reserva de San Marcos	NR	254	254	P
	Pan de Guajabón	ONF	755	755	P
	Toscano-Cayo Alfiler	FR	764	764	P
	Cañón del Río Santa Cruz	ONF	937	937	P
	Reserva de la Biosfera Sierra del Rosario	BR	26,686	26,686	E
	Las Peladas	NR	1,429	1,429	E
	El Salón	ER	1,040	1,040	E
Isla de la Juventud	Punta Francés	NP	4,610	1,596	E
	Sur de la Isla de la Juventud	PAOMR, Ramsar Site	— No Data —		E
	Los Indios	ER	5,504	5,397	E
	Cerro Cristal	FR	85	85	P
	Sierra de la Cañada	PAOMR	765	76	E
	Sierra de las Casa	FR	579	579	P
	Sierra de Caballos	FR	447	447	P
	Pinar Calizo	ONF	684	684	P
	Cerro Daquilla	ONF	92	92	P
	Cerros Santa Isabel	FR	30	30	P
	Cerro San Juan	FR	75	75	P
	Punta del Este	ER	41,779	7,055	E
	Cayo Campos	WR	10,099	1,334	P
	Cayo Cantiles-Avalo-Rosario	NP	56,430	5,641	P
Cay Largo	ER	71,151	2,905	P	

Appendix 13 continued.					
Province	Area Name	Type of Land Management	Total Area (ha)	Total Upland Area (ha)	Status ¹
Habana	Mariel-Mosquito	WR	5,220	12	P
	Guajaibón	PNL	177	177	E
	Rotilla	FR	10	10	P
	Anafe	FR	200	200	P
	Cayamas	WR	7,832	2,458	P
	Río Ariguanabo	ONF	495	495	P
	Escalera de Jaruco- Tapaste	PAOMR	1,290	1,290	P
	Loma del Grillo	FR	730	730	P
	Camaronés	ONF	401	401	P
	Canasí	FR	847	431	P
	Lomas de Galindo	FR	1,003	1,003	E
	Palenque	ONF	233	233	P
Sureste de El Inglés	WR	9,318	9,310	P	
Ciudad de la Habana	Ensenada de Portier- Lamas	PAOMR	216	69	P
	Monte Barreto	PNL	12	12	P
	Cojímar	FR	105	58	P
	Manigua Costera Celimar-Río Tará	PNL	54	47	P
	Ensenada de Sibarimar	PAOMR	3,089	242	P
	Caubal de la Minas	FR	130	130	P
	Laguna del Cobre-Itado	WR	774	218	P
	Cubal de Bajurayabo	FR	139	139	P
	Loma de Guanabo	ONF	192	192	P
	La Coca	ER	1,392	1,392	E
Rincón de Guanabo	PNL	582	75	E	
Matanzas	Ciénaga de Zapata	NP	426,076	289,796	E
	Cayos Juan Ruiz-Cristóbal-Providencia	WR	17,333	952	P
	Pan de Matanzas	ONF	210	210	P
	Valle de Yumuri	PAOMR	10,229	9,753	E
	Bacunayagua	ER	645	224	E
	Tres Ceibas de Clavelinas	FR	390	390	E
	Cueva de la Pluma	ONF	150	150	P
	Reserva de la Biosfera Ciénaga de Zapata	BR, Ramsar Site	223,443	69,452	E
	Bellamar-Jarrito	ONF	1,629	1,629	E
	Cañón del Río Canimar	PNL	1,502	1,470	E
	Albufera Maya	WR	873	857	E
	Caverna de Santa Catalina	ONF	247	247	E
	Botinos	FR	4,141	4,141	P
	Jacán	FR	2,517	2,517	P
	Sistema Espelo-Lacistre de Zapata	ONF	14,912	10,506	E
	Varahicacos	ER	38,662	5,164	E
	Cayo Mono-Galindo	ER	19,073	2,582	E
	Los Sábalo	WR	3,242	3,242	E
	Cayos de la Cinco Leguas	WR	3,611	3,467	E
	Bermeja	WR	865	865	E
Sierra de Bibansí	WR	3,568	3,568	P	
Bahía de Cádiz	ONF	1,162	109	P	

¹We list only two categories for status of the protected areas: E = Established—The protected area has a staff of personnel with infrastructure and is operational; and P = Proposed—Area is proposed for protection by SNAP (this also includes all other processes leading up to the establishment phase).

Appendix 14. Protected areas of Central Cuba in the provinces of **Cienfuegos, Villa Clara, Sancti Spiritus, Ciego de Avila,** and **Camaguey.** Data was obtained from the web site of Sistema Nacional de Areas Protegidas (System of National Protected Areas of Cuba) <www.SNAP.cu/>, Cuban Centro Nacional de Areas Protegidas.

Province	Area Name	Type of Land Management	Total Area (ha)	Total Upland Area (ha)	Status ¹
Cienfuegos	Guajimico-Gavilanes	Protected Natural Landscape (PNL)	1,624	127	P
	Guanaroca-Punta Gavilan	Wildlife Refuge (WR)	3,038	1,704	E
	Mataguá	Flora Reserve (FR)	1,677	1,677	P
	Yaguanabo	Protected Areas of Managed Resources (PAOMR)	3,904	3,904	P
	Pico San-Juan	Ecological Reserve (ER)	3,296	3,296	P
	Cueva de Martín Inferno	Outstanding Natural Feature (ONF)	44	44	P
	Mameyal	WR	1,452	1,452	P
	Aguacate Boca de Carreras	PNL	616	616	P
Villa Clara	Motembo	FR	756	756	P
	Monte Ramonal	FR	2,474	2,474	E
	Las Picúas-Cayo Cristo	WR	55,972	15,726	E
	Mogotes de Jumagua	ER	479	479	E
	Sabanas de Santa Clara	FR	7,237	7,237	E
	Lanzanillo-Pajonal-Fragoso	WR	87,071	10,586	E
Villa Clara & Sancti Spiritus	Reserva de la Biosfera Buena Vista	Biosphere Reserve (BR) Ramsar Site,	313,770	87,502	E
Villa Clara	Las Loras	WR	6,378	1,641	E
	Cayo Francés	ER	6,181	642	P
	Cayo Majá-Español de Adentro	WR	4,901	843	P
	Cayo Santa María	WR	2,567	1,547	P
	Los Caimanes	National Park (NP)	28,831	114	E
Sancti Spiritus	Topes de Collantes	PNL	29,425	29,425	E
	Pico Potrerillo	ER	328	328	P
	Arena Sílice de Casilda	FR	771	771	P
	Delta del Agabama	WR	8,477	5,464	P
	Lomas de Fomento	FR	225	225	E
	Delta del Higuanojo	WR	853	754	P
	Alturas de Banao	ER	6,177	6,177	E
	Tunas de Zasa	WR	6,044	5,312	E
	Hornos de Cal	ONF	50	50	P
	Loma Tasajeras	ONF	248	248	P
	Palmar de Romero	WR	191	191	P
	Caguanes	NP	20,488	8,499	E
	Jobo Rosado	PAOMR	4,181	4,181	E
	La Chucha	ONF	233	233	P
	Lebrige	WR	950	950	E
	El Piñon	FR	19	19	P
Ciego de Ávila	Jardines de la Reina	NP	217,036	16,079	E
	Boquerón (CA)	ONF	3,190	3,190	P
	Monte Revacadero	FR	422	422	P
	Monte Cacarrata	FR	558	558	P
	Cayos de Ana María	WR	19,098	982	E
	Humedales del Norte de Ciego de Avila	PAOMR, Ramsar Site	259,189	103,829	P
	El Coy	FR	7,055	7,055	P
	Dunas de Cayo Guillermo	ONF	247	247	P
	Centro y Oeste de Cayo Coco	ER	36,387	17,980	E
	Laguna La Redonda	WR	602	602	P
	Cayo Alto	WR	95	95	P
	Loma de Cunagua	WR	8,228	8,228	P
	El Venero	WR	3,719	3,719	E

Appendix 14 continued.					
Province	Area Name	Type of Land Management	Total Area (ha)	Total Upland Area (ha)	Status ¹
Camaguey	Humedales de Cayo Romano y Norte de Camaguey	PAOMR	347,329	116,920	P
	Monte Caimanes	FR	4,153	4,153	P
	Escarpe de San Felipe	FR	3,817	3,817	P
	Noroeste de Cayo Cruz	FR	320	320	P
	Cayo Cruz	WR	18,698	1,223	P
	Tuabaquey-Limonos	ER	1,962	1,962	P
	Sierra de Maraguán	FR	5,600	5,600	P
	Correa	WR	6,049	3,895	P
	Sierra de Guaicanamar	FR	1,868	1,868	P
	Silla de Romano	FR	2,141	2,141	P
	Cangilones de Río Máximo	ONF	564	564	P
	Sierra de Camaján	FR	2,106	2,106	P
	Sierra del Chorrillo	PAOMR	3,410	3,410	E
	Bosque Fósil de Najasa	ONF	127	127	E
	Hornos de Cayo Guajaba	FR	1,007	925	P
	Río Máximo	WR, Ramsar Site	22,580	8,161	E
	Laguna Larga	FR	4,783	4,630	P
	Maternillo-Tortuquilla	ER	8,967	3,882	E
	Monte Grande	FR	3,893	3,893	P
	Barrera Submarina Santa Lucía	PNL	4,938	234	P
Cayos Los Ballenatos y Manglares de la Bahía de Nuevitas	WR	6,968	6,294	E	
Nuevas Grandes-La Isleta	ER	10,091	8,684	P	
Laguna de San Felipe	FR	41	41	P	

¹We list only two categories for status of the protected areas: E = Established—The protected area has a staff of personnel with infrastructure and is operational; and P = Proposed—Area is proposed for protection by SNAP (this also includes all other processes leading up to the establishment phase).

Appendix 15. Protected areas of Eastern Cuba in the provinces of Las Tunas, Holguin, Granma, Santiago de Cuba, and Guantánamo. Data was obtained from the Sistema Nacional de Areas Protegidas (System of National Protected Areas of Cuba), www.SNAP.cu/, Cuban Centro Nacional de Areas Protegidas.					
Province	Area Name	Type of Land Management	Total Area (ha)	Total Upland Area (ha)	Status ¹
Las Tunas	San Miguel de Junco	Flora Reserve (FR)	5,765	5,484	P
	Ojo de Agua-Guajairal	Wildlife Refuge (WR)	5,330	5,213	E
	Arenas Blancas de Tunas	FR	906	906	P
	Nuevas Grandes-La Isleta	Ecological Reserve (ER)	10,091	8,684	P
	Monte Naranjito	FR	782	782	P
	Bahía de Malagueta	WR	23,262	14,054	P
	Guayacán	FR	5,301	4,340	P
Holguin	Hacienda Las Calabazas	WR	358	358	P
	Cupey-Guacacoa	FR	1,387	1,387	P
	Dos Ríos	FR	103	103	P
	Caletones	ER	33,515	29,794	P
	Balsas de Gibara	WR	747	697	P
	Cerros de Norte de Holguin	Protected Natural Landscape (PNL)	823	823	P
	La Ceja de Melones	FR	996	996	P
	Cerro Galano	Nature Reserve (NR)	2,986	2,986	P
	Bahía de Naranjo	PNL	1,934	1,825	P
	La Española	WR	198	198	P
	La Mensura-Pilotos	National Park (NP)	8,467	8,467	E
	Cabo Lucrecia Punta de Mulas	FR	2,701	2,690	P
	Península de Ramón	PNL	1,566	1,526	P
	Cayo Saetía	PNL	4,779	3,663	P
	Pico Cristal	NP	18,537	18,537	E
	Bahía de Sagua de Tánamo y sus Cayos	WR	9,395	5,082	P
	Saltadero	WR	48	48	P
	Voceadero	WR	516	314	P
	Boca de Cananova	WR	582	463	P
	Cerro Miraflores	FR	7,839	7,362	P
" & Guantánamo	Reserva de la Biosfera Cuchillas del Toa	Biosphere Reserve (BR)	202,353	196,837	E
" & Guantánamo	Alejandro de Humbolt	NP	70,835	68,572	E
Granma	Desembarco del Granma	NP	32,660	26,528	E
	Desembocadura del Río Tana	FR	482	463	P
" & Las Tunas	Delta del Cauto	WR, Ramsar Site	66,375	56,384	E
	Peñón de Mota	PNL	55	32	P
" & Santiago de Cuba	Turquino	NP	22,926	22,922	E
Granma	Monte Palmarito	FR	657	657	P
" & Santiago de Cuba	La Bayamesa	NP	24,211	24,211	P
Granma	Batalla de Guisa	FR	1,240	1,240	P
	El Gigante	Outstanding Natural Feature (ONF)	694	694	P
Santiago de Cuba	Pico Caracas	FR	468	468	P
	Pozo Prieto	FR	1,596	1,596	P
	Los Galeones	WR	3,296	43	P
	Monte Bisse	FR	570	570	P
	Loma el Gato	FR	763	763	P
	Monte Barrancas	FR	301	301	P
	Cayo Rey	FR	919	919	P
	San Miguel de Parada	WR	297	297	P
	Siboney-Justisí	ER	1,857	908	E
	Reserva de la Biosfera Baconao	BR	84,857	75,342	E
	La Caoba	FR	927	927	P
	Gran Piedra	PNL	3,039	3,039	P
	El Retiro	PNL	1,490	1,091	E
	Pico Mogote	ER	1,493	1,493	P
	Charrascales de Micara	FR	430	430	P
	Monte Micara	FR	357	357	P

Appendix 15 continued.					
Province	Area Name	Type of Land Management	Total Area (ha)	Total Upland Area (ha)	Status ¹
Guantánamo	Hatibonico	ER	6,274	5,390	E
	Sierra de la Canasta (Majagual)	FR	5,976	5,976	E
	Parnaso-Los Montes	ER	9,091	9,091	P
	Resolladero del Río Cuzco	ONF	200	200	P
	Pinar de Montecristo	NR	76	76	P
	Monte Verde	FR	2,000	2,000	P
	Baitiquirí	NR	4,436	2,981	P
	Boquerón (Ote)	ER	9,492	7,823	P
	Pico Galán	FR	437	437	P
	Pan de Azúcar	ONF	93	93	P
	Abra de Marina	ONF	286	286	P
	Sierra del Convento	FR	1,046	1,046	P
	Macambo	FR	2,296	2,296	P
	Imías	NR	2,261	1,572	P
	Puriales	ER	3,012	3,012	P
	Quibiján-Yunque de Baracoa	ER	14,295	14,295	P
	Tacre	NR	2,329	2,328	P
	Alto de Cotilla	FR	388	388	P
	Esparto	FR	2,535	2,401	P
	Caleta	ONF	7,034	6,779	P
La Victoria-Yumurí	ER	6,367	6,367	P	
Cañón del Río Yumurí	ONF	870	870	P	
Maisí	ER	8,207	5,826	P	
Maisí-Yumurí	PNL	5,450	5,445	P	

¹We list only two categories for status of the protected areas: E = Established—The protected area has a staff of personnel with infrastructure and is operational; and P = Proposed—Area is proposed for protection by SNAP (this also includes all other processes leading up to the establishment phase).