

Migratory shorebirds in Barbados: hunting, management and conservation

David C. Wege (BirdLife International), Wayne Burke (Shorebird Conservation Trust), Eric T. Reed (Canadian Wildlife Service)

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Background

Barbados is situated in the Atlantic Ocean, towards the southern end and east of the Lesser Antilles (165 km east of St Vincent and 220 km north-north-east of Tobago). The island is teardrop shaped, 31 km long from north to south, and 22 km east to west at its widest (in the south). In contrast to the older, mountainous volcanic islands of the Lesser Antilles, Barbados is a geologically-recent, low-lying, coral island. It is densely populated with about 280,000 people. Barbados' climate is tropical marine with a dry season characterized by north-east trade winds between November and May, and rains falling mainly during June to October.

Barbados was settled from Britain starting in 1627. By about 1665, the deciduous and semi-deciduous forest that once cloaked the island was almost entirely removed to make way for sugar cane plantations (which at their height covered almost 60% of the island's land area; Gooding 1974). Continuous cultivation of sugar cane remained the normal pattern of agriculture for more than three centuries. However, much of the former sugar cane land has now been, or is being converted for other land uses.



Chancery Lane, previously a "shooting swamp", now a protected area (Ryan Chenery)

Surface water on the limestone island is scarce, and just two significant natural wetlands persist, namely the 33-ha [Graeme Hall Swamp Important Bird Area](#) on the south coast, and the smaller, seasonal [Chancery Lane Swamp Important Bird Area](#) (see Appendix 1).

Both were previously part of an island-wide network of (mostly artificial) wetlands managed exclusively for hunting migratory shorebirds, but are now managed as protected areas. However, it should be noted that Graeme Hall Swamp was far more productive for shorebirds

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when it was managed by hunters (who cleared areas of red mangrove to present bare mudflats, and managed sluice gates to the sea to regulate water levels optimally for shorebirds) whereas today it sustains little or no suitable shorebird habitat.

As the most easterly island of the Lesser Antilles, Barbados is one of the nearest potential landfalls for shorebirds undertaking a fall transoceanic flight over the western Atlantic, from the east coast of the USA and Canada to their non-breeding ("wintering") grounds in South America. Most species that follow this fall migration route usually fly well out at sea but will seek shelter and make landfall when facing adverse weather conditions. Thus, because of its location, large flocks (or "flights") of shorebirds (Matthiessen's "wind birds": Matthiessen 1973) can stop-over on Barbados when these conditions occur. Other shorebird species that migrate south along the Lesser Antillean island chain also stopover on Barbados in large numbers. It is as a staging post for these hundreds of thousands of Nearctic-nesting Neotropical migratory shorebirds that Barbados stands out as of global conservation importance.

Shorebird hunting








Representing such an abundant (sometimes exceptionally so) potential food resource, it is not surprising that migratory shorebirds have been hunted on Barbados since its settlement in the mid-seventeenth century. Hunting began in this early colonial period as an opportunistic harvest of large shorebirds (such as Eskimo Curlew and Upland Sandpiper) stopping over in wet depressions in harvested or fallow cane fields.







Short-billed Dowitchers at Woodbourne Shorebird Refuge (Edward Massiah)

The scale of the shorebird migration and the resultant harvest are vividly described in two accounts of notable "flights" during the mid-nineteenth century. Schomburgk (1848) reported that during a storm on 12 September 1837, shorebirds were so numerous that they were struck down with stones, and thousands were shot. Local newspapers at the time remarked that there had not been so great a flight since the storm of 1780 (which was so bad that 4,000 people were killed on the island). Many of the birds killed on the island during that storm were American Golden Plover and Eskimo Curlew. Similarly, Jackman (1901: see Appendix 2) noted that on 12 September 1846, such a vast flight of plover took place that men with whips killed the birds in the public streets, and one man is said to have shot 1,000 plover for that season with an old flint-lock blunderbuss. The shorebirds were then, as they are today, all used for food. They are now mostly eaten fresh (e.g. the very dark breast meat being deep fried), with some frozen or turned into pâté for subsequent consumption.

Table 1: Shorebirds in Barbados – current status

Species		Local Bajan name	Hunted	% of the Bajan hunt. Reed (2012)	North American Population. Andres <i>et al.</i> (2012)	IUCN Red List	USSCP (2004)	BCC (2008)	1907 Wild Birds Act
Black-bellied Plover	<i>Pluvialis squatarola cynosurae</i>	Squealing Plover		0.6%	100,000				
American Golden Plover	<i>Pluvialis dominica</i>	Black Breast Plover		1-6%	500,000		High Priority		
Semipalmated Plover	<i>Charadrius semipalmatus</i>	Ring Neck Plover							
Killdeer	<i>Charadrius vociferus</i>	Killdeer							
Black-necked Stilt	<i>Himantopus mexicanus</i>	Stilt							
Greater Yellowlegs	<i>Tringa melanoleuca</i>	Pica		3-7%	137,000				
Lesser Yellowlegs	<i>Tringa flavipes</i>	Long Leg		54-67%	660,000			Yes	
Solitary Sandpiper	<i>Tringa solitaria</i>	Black Back			189,000			Yes	
Willet	<i>Catoptrophorus semipalmatus semipalmatus</i>	White Tail		0.2%	90,000				
Spotted Sandpiper	<i>Actitis macularia</i>	Ass Wag							
Upland Sandpiper	<i>Bartramia longicauda</i>	Cotton Tree Plover		<0.1%	750,000			Yes	Protected
Eskimo Curlew	<i>Numenius borealis</i>				<50	CR-PE			
Whimbrel	<i>Numenius phaeopus hudsonicus</i>	Crook Bill		0.6%	40,000		High Priority	Yes	
Hudsonian Godwit	<i>Limosa haemastica</i>	Godwit		<0.1%	77,000		High Concern	Yes	Protected
Ruddy Turnstone	<i>Arenaria interpres morinella</i>	Sandy Plover		1.25%	180,000		High Priority		

Species		Local Bajan name	Hunted	% of the Bajan hunt. Reed (2012)	North American Population. Andres <i>et al.</i> (2012)	IUCN Red List	USSCP (2004)	BCC (2008)	1907 Wild Birds Act
Red Knot	<i>Calidris canutus rufa</i>	Silver Wing		Inadvertent kill	42,000		Highly Imperilled	Yes	
Sanderling	<i>Calidris alba</i>	Sand Snipe		<0.1%					
Semipalmated Sandpiper	<i>Calidris pusilla</i>	Knit			2,260,000	NT		Yes	
Western Sandpiper	<i>Calidris mauri</i>	Knitty							
Least Sandpiper	<i>Calidris minutilla</i>	Cockroach Nit							
White-rumped Sandpiper	<i>Calidris fuscicollis</i>	Grey Nit							
Pectoral Sandpiper	<i>Calidris melanotos</i>	Chirp		11-23%	1,600,000				
Stilt Sandpiper	<i>Calidris himantopus</i>	Cue		6-8%	1,243,700				
Dunlin	<i>Calidris alpina hudsonia</i>				450,000			Yes	
Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>	Buff Breast		Inadvertent kill	56,000	NT	Highly Imperilled	Yes	Protected
Ruff	<i>Philomachus pugnax</i>	Ruff		Inadvertent kill					Protected
Wilson's Phalarope	<i>Phalaropus tricolor</i>			<0.1%					
Short-billed Dowitcher	<i>Limnodromus griseus griseus/hendersoni</i>	Duck Leg		4-11%	78,000		High Priority	Yes	
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>	-							
Wilson's Snipe	<i>Gallinago delicata</i>	Snipe		0.2%	2,000,000				

Percentage "Hunted" figures are taken from Reed (2012) and thus relate to post-1988 harvest data. The percentages presented in Hutt (1991: see Appendix 3) relate to the period 1921-1979 and thus differ slightly.

- ***From opportunistic harvest to swamp shooting***

Recognizing the needs of the migrating shorebirds stopping over on the island, the emerging plantocracy (with "free" slave labor) would manage their fields to make them more attractive to shorebirds, leading to competition between the most wealthy planters as to which swamp could shoot the most birds. By early eighteenth century (when sugar was "king") many of these planters were extremely wealthy with the time on their hands to indulge in activities otherwise reserved for the privileged class back in England.

The period 1850–1900 saw the structured development of shorebird hunting in Barbados through the establishment of shooting swamps where diked impoundments are mechanically prepared and flooded to attract migrating shorebirds. Management at this time (Jackman 1901) involved cutting or digging out the vegetation (and removing it) that had choked the swamps from the previous season to expose the water. Banks and artificial shallow spots would then be created for shorebirds to land on.

The basics of this management regime remain the same today. For example, at Woodbourne Shorebird Refuge (see photos below), preparation of the shorebird feeding trays involves swiping vegetation regrowth (when it is dry enough to do this by tractor) from the previous season. The regrowth is sprayed, and manure is applied (all of which needs to be done so the tray is ready before 15 July). Swiping first, then spraying uses less herbicide and reduces the fire hazard from dry, dead vegetation. Banks between the various ponds are mowed every month – it is these short-grass banks that are favored by the American Golden Plover. It should be noted that management of Woodbourne differs from the other swamps in mulching and applying manure to the feeding tray whereby the soil is fed resulting in a higher density of macro-invertebrates, and thus a higher density of shorebirds (see Colwell 2010).

Swamp Management for Shorebirds at Woodbourne Shorebird Refuge



Grasses and sedges grow rapidly as water evaporates (Patrick Watson)

Overgrown vegetation in the feeding tray in January 2014 (Patrick Watson)



Tractor re-grading the feeding tray for 2013 shorebird season (Patrick Watson)



New bank after the first rains fall, with manure added to promote invertebrate density and diversity (Patrick Watson)



A diversity of shorebirds using the new bank during 2013 season (Patrick Watson)
























Grass banks between the ponds being mowed – a monthly task (Richard Roach)



Feeding the fish to be used for restocking other ponds in the 2014 rainy season (Patrick Watson)

The ponds are all stocked with fish. One pond is kept with deep water to maintain a fish population from which the other ponds are restocked each year as soon as water levels are high enough to sustain them. The fish eat the larvae of *Aedes aegypti* mosquitos – the vector for dengue fever – which the Ministry of Health checks for the presence of on a regular basis (at least at Woodbourne Shorebird Refuge). The fish are used to feed caged shorebirds (see below).

Table 2: The shooting swamp network in Barbados – status and importance

Swamp	Parish	Currently active/ shot	Conservation value	Notes
Alaska	St. Lucy			One pond kept wet (pumped water) all year
Cave	St. Lucy	X	X	Recently closed for hunting
Fosters	St. Lucy			Contributing samples for migratory connectivity study
Friendship	St. Lucy	X	X	
Hannay's	St. Lucy			
Hope	St. Lucy	X	X	Recently closed for hunting
Best	Christ Church	X	X	
Chancery Lane	Christ Church	X		Protected area
Graeme Hall	Christ Church	X		Protected area
Inch Marlowe	Christ Church	X	X	
Woodbourne/ Packers	Christ Church	X		Private protected area. Woodbourne Shorebird Refuge
Searle's/ Polly's Pond	Christ Church			
Rockley	Christ Church	X	X	
Long Pond	St. Andrew	X		Natural wetland at the mouth of the Bruce Vale river, retained by a sand berm
Cole's	St. Philip	X	X	
Congo Road	St. Philip			Ponds kept wet all year (pumped water). Gldn Plover not hunted.
Golden Grove	St. Philip			Ponds wet all year (diverted spring water). Not shot much in 2013.
Golden Pond	St. Philip			Ponds wet all year (diverted spring water).
Mangrove	St. Philip	X	X	
Muddy Waters	St. Philip	X		Rainfall and runoff fed. Conservation value when wet.
Phinney's Hill	St. Philip	X	X	
Hampton/ Tom's Pond	St. Philip			Ponds kept wet all year (pumped water). Contributing samples for migratory connectivity study.



Swamp currently active, with hunters shooting shorebirds



Swamp has a conservation value in terms of supporting populations of resident and migratory waterbirds

- **Attracting shorebirds to the shooting swamps**

In the quest to attract (and shoot) more shorebirds, swamp owners deployed a number of luring techniques, all of which are still in use – in some form or other – at some swamps. In the mid- to late nineteenth century, carved and painted wooden decoys of the various target species would be placed in numbers in and around the swamp. Then “swamp boys” or “whistlers” (plantation slaves) would imitate the calls of birds to attract them down to the decoys. The decoys are still used, but the whistlers were replaced either by the hunters themselves using whistles to imitate the birds’ calls or by broadcasting tape recordings of the birds (i.e. tape lures). The art of whistling birds in, making reed whistles, and carving decoys is however retained by former hunters (such as Harold Skeete). All the active shooting swamps keep injured birds (e.g. birds “winged” from the previous season’s hunting and in some cases trapped healthy birds) as caged lures.



Decoys at Golden Grove (Eric Reed)



Decoys at Woodbourne Shorebird Refuge (Edward Massiah)

- **Hunting legislation**

The 1907 Barbados Wild Birds Protection Act provides a measure of protection to most resident birds and some migrants. Four shorebird species are among this list of protected wild birds, for which hunting is illegal, and these are: Upland Sandpiper *Bartramia longicauda*, Buff-breasted Sandpiper *Tryngites subruficollis*, Hudsonian Godwit *Limosa haemastica* and Ruff *Philomachus pugnax*. Other species can be legally hunted, with no bag limits or hunting season written into the legislation. Proposals have been made to include the (IUCN Vulnerable) West Indian Whistling-duck *Dendrocygna arborea* (two were recorded at Woodbourne in 2011: see [threatened-whistling-ducks-arrive-woodbourne-barbados](#)), the island endemic Barbados Bullfinch *Loxigilla noctis*, and Red Knot *Calidris canutus* (the latter being proposed by CWS given its Species at Risk status in Canada and its presence on Annex 1 of the Convention of Migratory Species) to the list of protected birds when the Act is next reviewed. Wetland habitat protection has been afforded under various designations such as the Graeme Hall Swamp Nature Preserve and Bird Sanctuary (which was given legal protection after it was designated a Ramsar site) and the Chancery Lane Swamp “special study area”.

The shorebird harvest

Open season for hunting shorebirds in Barbados is July 15 to October 15. These dates essentially define the southward migration period and they are not written into legislation, but they are adhered to by the community of hunters. At its peak, Barbados supported 20 active shooting swamps, each with 5-10 active hunters. About 24 (or possibly more) swamps have been managed at one time or another as shooting swamps. The number of active swamps in 2014 is eight, down from 10 in 2010 with the recent closure of Cave and Hope swamps. Table 2 below lists these swamps and which are still actively hunted, and also highlights whether they still retain conservation value as a wetland (which is discussed in more detail below).

Certainly by the 1920s, each shooting swamp was maintaining a log book (“scorebook”), recording numbers of birds shot each day, week, month or season (depending on the swamp). Data from these scorebooks (from some but not all swamps) was released to Maurice Hutt for the period 1921–1979. He published a synthesis of these data (Hutt 1991: see Appendix 3) that showed the scale of the hunt and how the average annual total (of all the swamps that contributed data) increased steadily from c.6,700 shorebirds shot per year in the 1920s and 1930s, to 17,500 during the late 1960s and 1970s. There was significant annual variation, with some peaks including 38,500 birds shot in 1963 (which Hutt 1991 extrapolated to suggest that the total for all active swamps that year was in excess of 46,000 birds shot, i.e. 20% more). It is interesting to note that 1963 was also the year in which the last certain record of the Critically Endangered Eskimo Curlew *Numenius borealis* (a regular autumn passage migrant into the late nineteenth century) anywhere was of a bird shot in September at Fosters swamp (Bond 1965, Burke 2008).

The steady increase in the number of birds shot each year is attributable to a number of factors including: the extension and improvement of swamps; better water pumps; pump-action shotguns; and more intensive inter-swamp competition. The use of tape lures also probably led to an increase in the numbers of birds shot. The harvest during the 1960s and 1970s increased substantially, resulting in annual harvests averaging 15,000–20,000 birds across the island and peaking as high as 38,514 in 1963.

Recent analysis of data from 1988-1992 and 2001-2010 (Reed 2012) shows an annual harvest (for all 10 shooting swamps active at this time) ranging from 12,200 to 34,570 birds shot. One hunter has suggested that the number of birds shot represents "just" 10% of the total number of birds passing, indicating that 120,000-350,000 shorebirds could be using the island's wetlands each autumn, although this estimate comes with obvious biases (i.e. is highly speculative) (Burke 2008) and would benefit from a statistically robust analysis of shorebird use of Barbados during the southward migration.

Six species have consistently comprised the majority of the Barbados harvest. Between 1988 and 2010 they represented 97.5% of the overall shorebird harvest, and are (in order of importance): Lesser Yellowlegs (54-67% of the harvest with annual bags varying from 5,700 to 19,900 individuals per year), Pectoral Sandpiper (11.2-22.9% of the harvest, 1,500-5,000 individuals per year), Stilt Sandpiper (5.9-8.1% of the harvest, 1,300 - 2,800 individuals), American Golden Plover (1-6% of the harvest, 600-1,800 birds), Short-billed Dowitcher (3.8-10.8% of the harvest, 700-2,400 birds), and Greater Yellowlegs (3.3-7.3% of the harvest, 500-1,600 birds). An additional 12 species were recorded in the harvest with Ruddy Turnstone (190-350 individuals per year), Whimbrel (100-160 individuals), Black-bellied Plover (70-200) and Willet (30-60) the most commonly harvested species in that group. Harvest levels for all other reported species were low (Table 1). Some species that are usually avoided by the hunters were sometimes inadvertently harvested from mixed species flocks (e.g. Ruff, Buff-breasted Sandpiper, and Red Knot).

Species composition in the harvest changes over the course of the season. Lesser Yellowlegs are the most important species in the harvest throughout the season, particularly so early on. Pectoral Sandpiper and American Golden Plover appear later in the harvest and Pectoral Sandpipers are a particularly important species later on in the hunting season. Harvest of the other three main shorebird species is more evenly spread out across the season. The first flights (i.e. the first birds to show up in the swamps) of most species comprise adult birds, with hatch-year birds arriving later.

Shorebird harvest 1921–1979

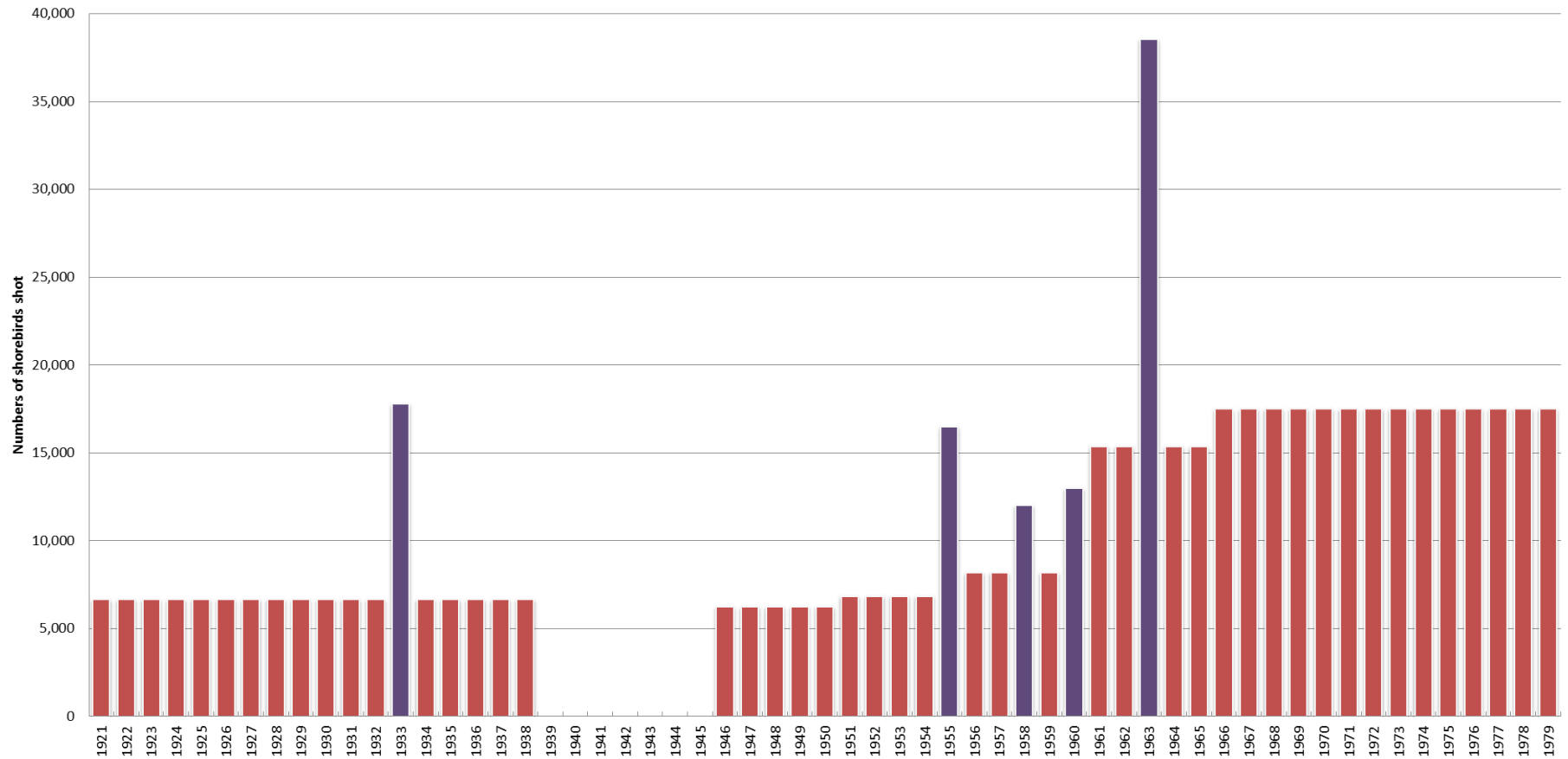


Figure 1: Indicative shorebird harvest on Barbados 1921 – 1979. The data presented in this graph have been extracted from Hutt (1991) (see Appendix 3). Unfortunately, Hutt’s paper does not present the raw data, so these have been reconstructed as best they can be. The red bars represent averages across a range of years, with the blue bars representing specific high counts (which have been taken out of the average calculations for the period). Data from 1921-1938 are from four swamps. 1951-1965 data from a varying number of swamps (4 – 10). The 38,514 shorebirds shot in 1963 probably represents an island total of >46,000 birds (the highest known total for the island).

Shorebird harvest 1988–2010

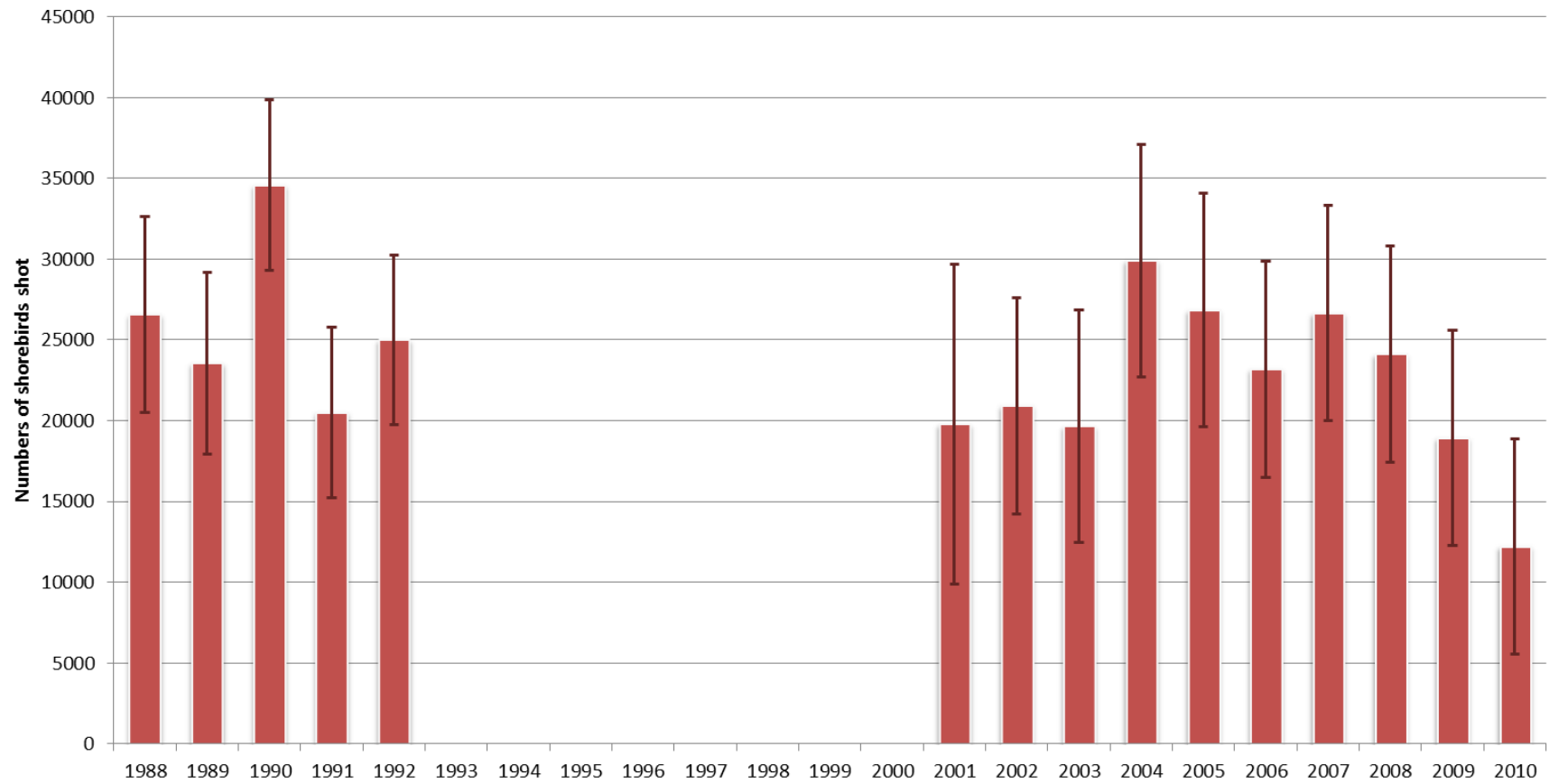


Figure 2: Estimated annual Barbados shorebird harvest for 1988-1992 and 2001-2010. This graph represents harvest data released from up to half of the active shooting swamps that has then been extrapolated to give an estimated annual harvest for all 10 shooting swamps active during the period. 95% confidence limits have been calculated and are presented due to the uncertainty of extrapolation to swamps for which there are no data. These data are presented in a range of forms in Reed (2012).

Shorebird hunting and conservation

The hunting of migratory shorebirds on Barbados is a well-entrenched tradition dating back to the early colonial period. However, since Hutt (1991) published his paper about the hunt there has been international concern about shorebird hunting in Barbados, particularly related to the sustainability of the harvest. In the last five years, this concern has sometimes escalated to outrage in the international media against the “annual slaughter” of tens of thousands of shorebirds, leading to calls for strong measures to stop the practice. However, lack of contemporary information on the harvest, including species harvested and level of harvest has precluded scientific assessments of the impact of the harvest on continental and local populations and has generally resulted in a polarized debate about the future of the hunt based on perceptions instead of facts.

In October 1981 the Barbados Wildfowlers Association (BWFA) was established by a founding group of c.40 hunters (Harrold Skeete, BWFA Treasurer, pers. comm to W. Burke). In 2014, the membership of BWFA stands at c.80 individuals, representing all hunters (although it should be noted that not all members are active hunters).

In 2008, BirdLife International – in collaboration with the BWFA, Canadian Wildlife Service, the US Fish and Wildlife Service – started work to ensure that the Barbados harvest is managed sustainably, without population-level effects on the shorebird species involved. The focus has been on change and evolution of the tradition of hunting rather than elimination – to regulate (where necessary) based on an objective analysis of accurate data about the harvest of each species being shot. The pace of evolution over the past five years in terms of changed attitudes, regulation, information availability and conservation has been impressive. The major advances are detailed in the following sections.

- ***Shooting swamps as wetlands of conservation importance***

In a landscape now mainly devoid of natural wetlands, the artificially-maintained and managed network of shooting swamps provides habitat for many non-target waterbirds for at least part of the year, with some swamps that are maintained throughout the year providing year-round habitat. The shooting swamps represent important components of the island’s wetland network, but they exist solely as a result of shooting-specific management actions.





Large numbers of fish-eating birds (especially herons and egrets, such as these at Woodbourne Shorebird Refuge) congregate in large numbers as the ponds dry out (Richard Roach)

For example, the ponds are stocked with fish (for management purposes: see above), which has the indirect consequence of attracting fish-eating birds to the swamps.

This network of natural and artificially maintained wetlands provides critical habitat for an increasing number of waterbird species. In recent decades, a range of waterbirds have been added as breeding species to the Barbados avifauna – a testament to the importance of the wetland network. For example, Little Egret *Egretta garzetta* first nested in 1994 (representing the first breeding record of this species in the New World); Snowy Egret *E. thula* also nested for the first time in 1994; Pied-billed Grebe *Podilymbus podiceps* in 2004; Black-bellied Whistling-duck *Dendrocygna autumnalis* in 2002; and Masked Duck *Nomonyx dominicus* in 1990. These, and many other waterbirds, rely on a functioning network of wetlands to provide their various feeding and breeding requirements throughout the year, and this network functions only due to the continued management of the private shooting swamps. A tangible conservation ethic has been adopted by a range of hunters – as a result of BirdLife’s work over the last five years – resulting in a number of swamps owners pumping water to maintain their artificial wetlands all year (instead of only during the hunting season), thus providing critical year-round wetland habitat for all waterbirds.

Table 2 lists the various past and present shooting swamps and shows clearly that the conservation value (in terms of important waterbird/ shorebird habitat) of a shooting swamp disappears once shooting (and the management for it) has stopped. Those that remain important are the swamps that are now protected areas (i.e. Graeme Hall and Chancery Lane IBAs, and Woodbourne Shorebird Refuge) and/ or natural wetlands (i.e. Long Pond).



Golden Grove Shooting Swamp (Jim Kushlan)



Shooting hut and impoundments at Tom's Pond (aka Hampton) shooting swamp. Water in front of the hut is maintained low to attract incoming shorebirds to pass within shooting range (Eric Reed).

- ***Harvest evaluation***

The lack of contemporary information and detailed analysis on the Barbados shorebird harvest was identified as the major barrier to making a robust assessment of its impact on shorebird populations, and to making informed, objective management decisions.

To address this barrier, BirdLife and the Canadian Wildlife Service worked closely with the Barbados Wildfowlers Association and individual shooting swamp owners to facilitate the voluntary release of harvest data from the scorebooks that each swamp maintains. The original scorebook data are believed to be highly accurate. Harvest data for the 1988-1992 period were provided by seven shooting swamps (via Julia Horrocks at the University of the West Indies), and five out of 10 swamps active during the 2001-2010 period collaborated by either providing access to daily harvest data from their scorebooks or summarized estimates of species-specific annual harvest. This voluntary release of harvest data is unprecedented and

demonstrates the willingness of Barbados shorebird hunters to collaborate towards the development of long-term sustainable hunting practices in the country.

The released data were analysed by Dr Eric Reed (Migratory Bird Population Analyst at Canadian Wildlife Service) to provide a quantitative description of recent harvest of shorebirds in Barbados, and the basis for assessing impacts of the harvest and determining the effects of potential changes in hunting practices. The estimated overall shorebird harvest for the 1988–2010 period, which varied between 12,000 and 35,000 birds per year (Reed 2012), is comparable to estimates from the 1970s which were derived from a small sample of swamps (Hutt 1991). However, robust estimates from the 1970s of species-specific harvest were not available for comparison with these most recent data.

Harvest levels for individual species were compared with estimates of Potential Biological Removal (PBR) – an approach developed to determine appropriate and sustainable take levels of species with incomplete demographic information – to determine whether current harvest levels were consistent with long-term sustainability of the hunt, and to make recommendations to ensure that the harvest is sustainable in the long-term.

- **Lesser Yellowlegs** The most frequently harvested species in Barbados, with levels estimated (for most years) in excess of 10,000 individuals. A crude index of harvest rate indicates that in most years, 3-5% of the continental population is harvested in Barbados, representing a relatively large percentage of PBR in most years, and up to 29% of PBR taken in the highest harvest year during the 2001-2010 period. Given the potential for high levels of harvest at the continental scale and the observed population decline of the species, it has been recommended that the hunting pressure on Lesser Yellowlegs be reduced in Barbados, especially avoiding the high harvest levels observed in some years. Protection of adults and reductions in annual bags would likely have the greatest positive impacts on the species' long-term conservation.
- **Pectoral Sandpiper** Lack of demographic data prevents an analysis of PBR for this species. However, indications are that current Barbados harvest levels for this species are relatively low in comparison with the overall population size (Barbados harvest rate is less than or equal than 0.3% of the continental population) and thus requires no restrictions at this point. However, given the high level of uncertainty surrounding the sustainability of the hunt, it is recommended that harvest levels are not increased at this time.
- **Stilt Sandpiper** With an apparently stable continental population estimated, conservatively, at 1,243,700, it does not appear that current harvest levels are an issue for this species.
- **American Golden Plover** This species was historically harvested in large numbers in North America, and to a lesser extent on its staging and wintering grounds, leading to an important population decline (Clay *et al.* 2010). The population responded positively to the end of the hunt in North America in the early twentieth century, but the population has been undergoing important declines in recent years. Some of the Barbados shooting swamps have restricted their take of American Golden Plover in recent years, in response to the elevated conservation concern of the species. Given the information available, harvest levels of American Golden plover in Barbados appear to be sustainable, representing no more than 5% of the estimated PBR.
- **Short-billed Dowitcher** Lack of demographic data prevents an analysis of PBR for this species. However, the Barbados harvest has reached as high as 3% of the population – a population that appears to be decreasing (Andres *et al.* 2012). It is recommended that harvest levels are not increased at this time.

- **Greater Yellowlegs** Due to the small size of the continental population, Barbados harvest levels amounted to 3–12% of PBR in the highest harvest years. Care should be taken to maintain the Barbados harvest at or below these levels.

- **Other shorebirds** Harvest levels of other shorebird species recorded in the Barbados harvest were low. However, Red Knot (Endangered in Canada and proposed as Threatened in the US under species at risk legislation) and Buff-breasted Sandpiper (Special Concern in Canada) were recorded in the harvest, even though they are generally avoided by Barbados hunters and their harvest is mainly incidental when in mixed flocks. Harvest of these species should be avoided as much as possible given the current status of their respective populations.

- ***Limiting the harvest***

The Barbados Wildfowlers Association (BWFA) has been instrumental in acting upon information provided to them by BirdLife and Canadian Wildlife Service over the last 6-7 years. An initial intervention was made to the hunters related to American Golden Plover which, in 2007 was considered by USFWS as a High Priority “Bird of Conservation Concern”. Attempts, supported by the President of the BWFA (Damian Edghill), to put a moratorium on shooting this species were unsuccessful when it was announced that the species had been dropped from the 2008 Birds of Conservation Concern list (although Robin Hunte and members of Congo Road Swamp maintain a moratorium on this species). Hunters were also alerted (and responded positively) to the possibility of satellite-tagged Whimbrel passing through – two of which had been shot in Guadeloupe ([shooting-whimbrels-sparks-calls-regulation-shorebird-hunting-caribbean](#)) – with a view to further restricting the legal hunt of this species in case a satellite-tagged bird was shot.

These events demonstrated willingness of the hunters to consider justifiable changes to their shooting practices, but also that we – the conservationists and wildlife managers – need to make sure our reasoning is based on robust, objective and quantifiable data. This catalyzed immediate efforts to secure and analyze the hunting data, the initial results from which led (in 2011) to the BWFA passing a series of resolutions at their AGM to limit the harvest of certain species and control the use of certain hunting methods. These resolutions committed members of the association to the following actions:

1. Limiting the gross annual harvest on the island to 22,500 shorebirds;
2. Allowing no more than 2,500 shorebirds to be shot per swamp each year;
3. Shooting no more than 300 birds in a given day per swamp;
4. Limiting the Lesser Yellowlegs harvest per swamp to 1,250 birds annually; and
5. Restricting the shooting of American Golden Plovers to 100 birds in any swamp on any given day.
6. No use of speakers to lure shorebirds;
7. No use of shotgun extension magazines; and
8. Restricting the number of hunters such that no more than three hunters present arms in each swamp at one time.

Items 1–5 (inclusive) were to take effect from the 2012 season, but it was asked that in good faith the principle of this be adhered to as much possible in 2011. A suggestion to reduce the harvest of adult Lesser Yellowlegs by reducing pressure in the first weeks of the season (which would benefit the species by allowing a greater proportion of breeders to survive the hunting season) was also debated but no decision was forthcoming. The impacts of these items (1–5) were predicted from the analysis of 1988–2010 harvest data (Reed 2012):

1. Limiting gross annual harvest to 22,500 shorebirds. Total estimated shorebird harvest exceeded 22,500 in nine out of 15 years, so this measure would be expected to reduce the harvest about 60% of the time. The maximum annual harvest reduction would have been c.12,000 birds during the analysis period.
2. No more than 2,500 shorebirds shot per swamp. With just eight swamps now active, this measure would reduce the gross annual harvest to 20,000 shorebirds, reducing the harvest yet further.
3. No more than 300 birds shot in a given day per swamp. The daily shorebird harvest rarely exceeded 300 per day for the three swamps for which data was available. This restriction would have resulted in a relatively small reduction, but will guard against excessive harvest during important migratory passages.
4. Lesser Yellowlegs harvest per swamp limited to 1,250 annually. With eight active swamps, this would limit the overall harvest to 10,000 Lesser Yellowlegs per year, which would have reduced the harvest in six years during the 2001-2010 period, and will (if adhered to) reduce the overall harvest to 20-35% of PBR, which appears to be a reasonable target based on our current knowledge of Lesser Yellowlegs harvest and population status.
5. No more than 100 American Golden Plover shot in a given day per swamp. There were no occasions American Golden Plover harvest exceeded 100 individuals per swamp. This restriction would thus be expected to have a limited impact, if any, on predicted plover harvest levels but would guard against excessive harvest during important migratory passages.

Several swamps have complied with the 2011 resolutions but some hunters are still reluctant to accept the conservation ethics advocated by BWFA. Thus, the resolutions have only been partially implemented to date. This situation highlights the need to reinforce the partnership with all of BWFA's membership and continue to build a relationship based on trust and collaboration with the hunters. The new BWFA Constitution will (when completed) provide for ways to address non-compliance in this regard. It will not be possible to predict the impact of items 6–8 on realized shorebird harvest until they have been applied for a few years.

- ***Establishing "no-shooting" swamps***

Even with regulated hunting, it was quickly realized that the maintenance of (ideally two - one in the north and one in the east) abandoned shooting swamps as "no-shooting" wetlands would be ideal to offer sanctuary for migratory shorebirds. With this in mind, BirdLife International secured the lease on a 10-acre abandoned shooting swamp at Woodbourne - on



the flank of the St. Philip Shooting Swamps Important Bird Area – as a shorebird refuge. Hunting and maintenance ceased at Woodbourne (previously Woodbourne Club, and sometimes referred to as Packers Swamp) in October 2004, and the swamp fell into disrepair with minimal wetland conservation value. However, two former hunters were instrumental in securing the swamp lease for BirdLife and in financing the initial restoration which started in



May 2009, making sure the swamp was ready for the southbound shorebird migration that fall. Many hunters and ex-hunters have been most generous in offering advice, equipment, and other resources for restoration and improvements at what is now Woodbourne Shorebird Refuge (the lease for which is now held by the [Shorebird Conservation Trust](#)). The restoration work was also made possible through support from West Pasco Audubon Society and Bird Studies Canada, with ongoing maintenance funded primarily through US Fish and Wildlife Service, but also with support from the Barbados Wildfowlers Association. With small additions of neighboring fields over the last few years, Woodbourne Shorebird Refuge is now 14 acres (5.7 ha) in extent, and has attracted an astonishing 24 species of shorebirds (see list below). Not only shorebirds, but many other species of waterbird (39 species so far, including a number of trans-Atlantic vagrants) have found refuge at Woodbourne (Table 3).



Woodbourne is managed exactly as if it were a shooting swamp still – just without the shooting. A broad description (and photos) of this management regime is given above. The constant nature of the relatively intensive (and thus expensive) management at Woodbourne has proven difficult to secure sustainable financing for, and this has delayed securing the leases and/ or management of additional no-shooting swamps, although the

conservation benefits of such areas are clear for all to see in the photos from Woodbourne.

Table 3: Wetland birds observed at Woodbourne Shorebird Refuge (2009–2014)

SHOREBIRDS

Southern Lapwing *Vanellus chilensis*
 Black-bellied Plover *Pluvialis squatarola*
 American Golden Plover *Pluvialis dominica*
 Semipalmated Plover *Charadrius semipalmatus*
 Killdeer *Charadrius vociferus*
 Spotted Sandpiper *Actitis macularia*
 Solitary Sandpiper *Tringa solitaria*
 Greater Yellowlegs *Tringa melanoleuca*
 Common Greenshank *Tringa nebularia*
 Lesser Yellowlegs *Tringa flavipes*
 Whimbrel *Numenius phaeopus*
 Hudsonian Godwit *Limosa haemastica*
 Ruddy Turnstone *Arenaria interpres*
 Red Knot *Calidris canutus*
 Semipalmated Sandpiper *Calidris pusilla*
 Western Sandpiper *Calidris mauri*
 Least Sandpiper *Calidris minutilla*
 White-rumped Sandpiper *Calidris fuscicollis*
 Pectoral Sandpiper *Calidris melanotos*
 Stilt Sandpiper *Calidris himantopus*
 Ruff *Philomachus pugnax*
 Short-billed Dowitcher *Limnodromus griseus*
 Long-billed Dowitcher *Limnodromus scolopaceus*
 Wilson's Snipe *Gallinago delicata*



WATERBIRDS

West Indian Whistling-duck *Dendrocygna arborea*
 Black-bellied Whistling-duck *Dendrocygna autumnalis*
 American Wigeon *Anas americana*
 Blue-winged Teal *Anas discors*
 Northern Shoveler *Anas clypeata*
 Northern Pintail *Anas acuta*
 Green-winged Teal *Anas carolinensis*
 Ring-necked Duck *Aythya collaris*
 Greater Scaup *Aythya marila*
 Lesser Scaup *Aythya affinis*
 Masked Duck *Nomonyx dominicus*
 Pied-billed Grebe *Podilymbus podiceps*
 Magnificent Frigatebird *Fregata magnificens*
 Brown Booby *Sula leucogaster*
 Great Blue Heron *Ardea herodias*
 Grey Heron *Ardea cinerea*
 Great Egret *Ardea alba*
 Little Egret *Egretta garzetta*
 Snowy Egret *Egretta thula*
 Little Blue Heron *Egretta caerulea*
 Cattle Egret *Bubulcus ibis*
 Green Heron *Butorides virescens*
 Yellow-crowned Night-heron *Nyctanassa violacea*
 Black-crowned Night-heron *Nycticorax nycticorax*
 Glossy Ibis *Plegadis falcinellus*
 Eurasian Spoonbill *Platalea leucorodia*
 Osprey *Pandion haliaetus*
 Sora *Porzana carolina*
 Purple Gallinule *Porphyrio martinica*
 Common Moorhen *Gallinula chloropus*
 Caribbean Coot *Fulica caribaea*
 Laughing Gull *Larus atricilla*
 Herring Gull *Larus argentatus*
 Lesser Black-backed Gull *Larus fuscus*
 Gull-billed Tern *Sterna nilotica*
 Common Tern *Sterna hirundo*
 Least Tern *Sterna antillarum*
 White-winged Tern *Chlidonias leucoptera*
 Belted Kingfisher *Ceryle alcyon*



Conclusion

Although the overall magnitude of the Barbados shorebird harvest remains important, it appears that it could have negative impacts on just a limited number of species. Hunters' self-restrictions on American Golden Plover, Whimbrel, and Red Knot appear to be successful in that their respective harvests are well below estimated sustainable levels. However, there are limited data in pre-restriction periods to compare the realized harvest with or to fully determine the performance of the regulatory changes. Although it appears that the impact on some of the most commonly harvested species may be low, it would be premature to interpret this to mean that increases in harvest would be inconsequential.

The maintenance of the shorebird harvest in Barbados has had some positive repercussions on the country's biodiversity. The creation of wetlands for hunting and the recent (encouraged) trend of shooting swamps to maintain these wetlands year-round provides wetland habitat to migratory and resident birds that is available throughout their annual cycles. Benefits are likely to be highest outside of the hunting season given the daily presence of hunters during the season, but they could also provide habitat and resting sites at night during the season. Recently, Woodbourne swamp has been restored and is now managed as a "no-shooting" shorebird refuge, but other swamps might be available for similar shorebird conservation purposes and the ideal would be to maintain at least two such reserves – one in the north of the island and one in the south.

The collaborative, non-confrontational approach between conservationists and Bajan hunters has started to demonstrate its potential for significant returns in the survival prospects of shorebirds. Additional refuges for shorebirds and the establishment and adherence to bag limits on species of concern will ensure that Barbados earns a reputation as a haven for passage shorebirds rather than be discredited with notoriety as one of the places where shorebirds are shot. Towards this end, some of the hunters must be commended for starting to release data to BirdLife International for analysis by the Canadian Wildlife Service. This signals a most welcome locally-driven change from unexamined resource consumption to data-informed resource conservation. In the long term, this transparent alliance will benefit all. Not least, the magnificent flights of shorebirds.

In spite of recent shorebird conservation advances on a number of fronts in Barbados, there remain important sources of uncertainty concerning shorebird hunting and harvest on the island, the most critical being: the actual composition/ origins of shorebird populations that migrate through Barbados during the fall migration; their population levels and trends; and the overall magnitude of the unmeasured harvest occurring throughout the Americas.

Building on the Barbados Wildfowling Association's (BWFA) expression of interest to help with further studies, a collaborative study between BWFA, University of the West Indies, Shorebird Conservation Trust and Canadian Wildlife Service was initiated in 2013, with the objective to understand the migratory connectivity between breeding areas in North America and Barbados for Lesser Yellowlegs and American Golden Plover. The first year of the study saw two swamps – Hampton's in the south and Foster's in the north – provide 1,400 wings from yellowlegs and plovers harvested during the season. The wings have been checked to determine species and age of the bird based on plumage characteristics which will provide critical information on the occurrence of immature and adult birds during the hunting season on Barbados. Feather and claw samples from 495 individuals will be analyzed for isotopic signatures to determine the likely breeding or natal origin of these birds, allowing a better understanding of populations that are exposed to harvest, but also shedding light on migration patterns of these two species. In the future, we hope to be able to expand this study to the whole Caribbean basin and important shorebird areas of northern South America to gain a better understanding of migratory connectivity between these various sites and the assess the global impact of the harvest in the Americas.

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Our work in Barbados since 2008 has been supported financially by US Fish and Wildlife Service (including through a Neotropical Migratory Bird Conservation Act grant), Canadian Wildlife Service, Bird Studies Canada, West Pasco Audubon Society. Many individuals were generous with advice, equipment, and other resources in restoring and improving shorebird habitat at Woodbourne Shorebird Refuge. Among them were ex-hunters, hunters, conservationists, and a growing group of hunter-conservationists. Through the agency of Dr. Karl Watson, President of the Barbados National Trust, a grant was secured from the Peter Moores Barbados Trust for the construction of a comfortable shelter from which to monitor shorebird flights.

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APPENDIX 1: Shorebird/ wetland Important Bird Areas on Barbados from Burke (2008).

BB002 St Lucy Shooting Swamps		Unprotected
<p>COORDINATES 13°20'N 59°37'W ADMIN REGION St Lucy AREA 9 ha ALTITUDE 18–41 m HABITAT Freshwater wetland</p>	 <p>American Golden Plover</p>	<p>RESTRICTED-RANGE BIRDS 3</p> <p>CONGREGATORY BIRDS ✓</p>

■ Site description

The St Lucy Shooting Swamps IBA comprises five separate wetlands, each less than 2 ha in extent, in the northernmost parish of St Lucy. The wetlands are all on private lands and are artificially created and maintained for the express purpose of providing habitat to lure migrating Neotropical shorebirds down so they can be shot. Generally, the immediate environs of these wetlands are farmed for cattle pasture or sugarcane.

■ Birds

This IBA is critical for Neotropical migratory shorebirds migrating south between July and October. It is reported that a collective total of 10,000–15,000 Nearctic nesting shorebirds (70–75% of which are Pectoral Sandpipers *Calidris melanotos* and Lesser Yellowlegs *Tringa flavipes*) are shot each year in the swamps of this IBA. The number of birds shot is an unknown percentage of the total numbers using the wetlands, but could be c.10% or more. Numbers of birds stopping (and thus the numbers shot) vary from year to year as a result of weather conditions. More birds stop when affected by adverse weather associated with tropical Atlantic depressions and storms. These wetlands also provide useful year-round habitat

for non-target wetland birds, and three (of the four) Lesser Antilles IBA restricted-range birds occur. The last confirmed record of Eskimo Curlew *Numenius borealis* was shot at Fosters Swamp in this IBA.

■ Other biodiversity

The endemic lizard *Anolis extremus* occurs.

■ Conservation

Each of the individual shooting swamps is privately-owned and managed for shooting. Swamp management by the shooting clubs includes water being pumped onto them in the wet (shooting) season. A ban or restriction on hunting would result in the cessation of swamp management and the gradual drying out of the wetlands. Of particular concern are the numbers of American Golden Plovers *Pluvialis dominica* being shot (10% of the total bag from this IBA)—depending on the year this can be up to 0.6% of the global population shot solely within this IBA. Setting bag limits for this species and establishing “no-shooting” swamps within St Lucy would be desirable conservation goals, as would the pumping of water during the dry season to maintain habitat for other waterbirds.

BB006 St Philip Shooting Swamps		Unprotected
<p>COORDINATES 13°09'N 59°27'W ADMIN REGION St Philip AREA 2 ha ALTITUDE 38–42 m HABITAT Freshwater wetland</p>	 <p>Lesser Yellowlegs</p>	<p>RESTRICTED-RANGE BIRDS 3</p> <p>CONGREGATORY BIRDS ✓</p>

■ Site description

The St Philip Shooting Swamps IBA comprises four shooting swamp wetlands, each less than 2 ha in extent, in the south-eastern parish of St Philip. Two of the swamps are contiguous, while Congo Road and Hampton Swamp are separate. The wetlands are all on private lands and are artificially created and maintained for the express purpose of providing habitat to lure migrating Neotropical shorebirds down so they can be shot. Generally, the immediate environs of these wetlands are cattle pasture.

■ Birds

This IBA is critical for Neotropical migratory shorebirds migrating south between July and October. It is reported that a collective total of 10,000–15,000 Nearctic nesting shorebirds (70–75% of which are Pectoral Sandpipers *Calidris melanotos* and Lesser Yellowlegs *Tringa flavipes*) are shot each year in the swamps of this IBA. The number of birds shot is an unknown percentage of the total numbers using the wetlands, but it could be c.10% or more. Numbers of birds stopping (and thus the numbers shot) vary from year to year as a result of weather conditions. More birds stop when affected by adverse weather associated with tropical Atlantic depressions and storms. These wetlands also provide useful year-round

habitat for non-target wetland birds, and for populations of three (of the four) Lesser Antilles IBA restricted-range birds.

■ Other biodiversity

The endemic lizard *Anolis extremus* occurs.

■ Conservation

These four shooting swamps are privately-owned and managed for shooting. Swamp management by the shooting clubs includes water being pumped onto them during the wet (shooting) season. A ban or restriction on hunting would likely result in the cessation of swamp management and the gradual drying out of the wetlands. Of particular concern are the numbers of American Golden Plovers *Pluvialis dominica* being shot (10% of the total bag from this IBA)—depending on the year this can be up to 0.6% of the global population shot solely within this IBA. Setting bag limits for this species and establishing “no-shooting” swamps within St Philip would be desirable conservation goals, as would pumping water onto the swamps in the dry season to maintain habitat for waterbirds. Pressure from residential development is a constant and real threat in this parish—any such developments adjacent to the swamps would likely result in the abandonment of management.

BB003 Graeme Hall Swamp		National Heritage Site/Ramsar Site	
COORDINATES 13°04'N 59°35'W ADMIN REGION Christ Church AREA 33 ha ALTITUDE 6–13 m HABITAT Fresh and brackish water wetland, mangroves	 	RESTRICTED-RANGE BIRDS 4	CONGREGATORY BIRDS <input checked="" type="checkbox"/>

Site description

Graeme Hall Swamp IBA is in south-west Barbados, 5 km east of Bridgetown, just inland from the coast. Residential and commercial tourism development surrounds the swamp along the southern, eastern, western and north-western boundaries. The coast road (Highway 7) runs between the swamp and the sea to the south, and agricultural lands border the swamp in the north-east. The IBA supports the largest body of inland water on the island. The swamp is divided into a freshwater marsh (eastern section) and a brackish lake (western section) by a north-south, man-made roadway and drainage canal (the swamp's only connection to the sea).

Birds

This IBA is one of only two documented breeding sites for Little Egret *Egretta garzetta* in the Western Hemisphere, with up to 24 birds counted on their favoured mangrove island in the brackish lake. The wetlands support a wide diversity of waterbirds (residents, migrants and vagrants) although not the numbers of shorebirds that used to occur when it was managed as a shooting swamp. Populations of all four Lesser Antilles EBA restricted-range birds occur in this IBA. The mangroves support the highest density of resident Yellow Warblers *Dendroica petechia* on the island.

Other biodiversity

Graeme Hall Swamp IBA supports the largest remaining stands of red and white mangrove woodland on the island. Introduced green monkeys and mongooses occur.

Conservation

The brackish western sector of this IBA is privately-owned and managed by the Graeme Hall Nature Sanctuary, and has been the focus of restoration activities. The eastern sector of the IBA is government-controlled and has not undergone any significant restorative effort, being managed by the Ministry of Health for mosquito control. This control consists of clearing vegetation, removing obstructing mangroves and intensive thermal fogging with Malathion. Increased protection is required for this IBA although a proposed plan for a national park describes the significant reduction of suitable waterbird habitat in preference to human recreational use. Invasive alien species are presumably impacting the avifauna. Increasing noise and light pollution from events at Graeme Hall Nature Sanctuary is a concern for nesting egrets. Further manipulation or modification of this already heavily modified wetland must be careful not to disrupt or disturb its attractiveness for birds in favour of human recreation.

BB005 Chancery Lane Swamp		Heritage Conservation Area/Special Study Area	
COORDINATES 13°04'N 59°30'W ADMIN REGION Christ Church AREA 3 ha ALTITUDE 6–9 m HABITAT Freshwater wetland and sand dunes	 	RESTRICTED-RANGE BIRDS 3	CONGREGATORY BIRDS <input checked="" type="checkbox"/>

Site description

Chancery Lane Swamp IBA is on the south coast of Barbados. It is a seasonal, coastal wetland comprising an irregular mosaic of shallow open water, mudflats and grassy areas. This natural wetland IBA is behind a well developed coralline sand-dune system bound by a vegetated berm to seaward, pasture and an inland cliff. Residential development is encroaching towards the western end of the marsh from Fairy Valley Rock and Chancery Lane.

Birds

This IBA is a critical refuge for Neotropical migratory (and vagrant) shorebirds but is significant as a feeding area for the Little Egrets *Egretta garzetta* (>20) that breed at Graeme Hall Swamp IBA (BB003). Populations of three (of the four) Lesser Antilles EBA restricted-range birds occur, namely Green-throated Carib *Eulampis holosericeus*, Antillean Crested Hummingbird *Orthorhynchus cristatus* and the island-endemic Barbados Bullfinch *Loxigilla barbadensis*.

Other biodiversity

Chancery Lane is the only place in Barbados known to support stands of buttonwood *Conocarpus erectus*. The coastal wetlands are rare in terms of the island's ecosystems. The

beach is an important nesting site for globally threatened sea-turtles (especially the Critically Endangered hawksbill *Eretmochelys imbricata* and [possibly] leatherback *Dermochelys coriacea* turtles).

Conservation

Chancery Lane Swamp IBA is privately owned but has been designated a Natural Heritage Conservation Area and a Special Study Area. It also embraces an important archaeological site. The Chancery Lane beach and surroundings are a popular recreation area for local residents and tourists who stay in hotels and guesthouses nearby. A large portion of the land in the Special Study Area has been approved for development. Any commercial or residential development that does not leave it intact or does not allow an adequate buffer zone will degrade the wetland, and severely damage the landscape value. A permanent protective status preventing development encroachment and enabling appropriate water management are essential for the long-term survival of Chancery Lane Swamp IBA. This IBA forms part of an island-wide network of wetlands that the waterbirds of Barbados rely on to satisfy their annual feeding and breeding requirements.

Swamp Shooting in Barbados.

BY CLARENCE JACKMAN, OF FONTABELLE, BARBADOS.

A West Indian resident tells us in the following paper many curious facts about sport in the extensive swamps of Barbados. Huts or "stands" are erected so that the sportsman shoots from an easy chair, his quarry being enticed down to his decoy birds by expert negro whistlers. The photographs were taken by the author.

MANY varieties of birds of passage make Barbados a port of call on their southern flight. They usually make their first appearance in any number towards the end of July—though some few are shot earlier; and they continue their visits during August, September, and the early part of October. Among the first arrivals are the small, graceful nits (*Ereunetes Pusillus*), not quite the size of a sparrow, but more elegant and fragile. They

swamp rents out to his friends such stands as he does not require for his own use, and the lessee sets the boys to work to get this "sphere of influence" in order. Since last season the reeds and grasses and mosses have had their own slimy way with the stand, and their rank growths cover the water and form a tangle of noisomeness. All this has now to be cut or dug away and removed, and the clear, bright water exposed. Then banks and artificial shallow spots have to be formed, on which the



THESE ARE SOME OF THE EXPERT WHISTLERS WHO ACCOMPANIED THE AUTHOR'S PARTY
From a] IN ORDER TO ENTICER THE BIRDS. [Photo.

appear in large flocks, and their shrill, rolling cry warns sportsmen that it is time to prepare their "stands," for the shooting season is at hand. Now comes a busy time for the swamp boys, or whistlers, as they are called, by reason of the skill with which they imitate the calls of the different feathered quarry on whistles of reed, bamboo, or bone. A rough wooden hut, just large enough to hold a chair or two, and an expanse of swamp more or less circumscribed by your neighbour's hut are known as a "stand."

At the beginning of a season the owner of a

birds can alight. When this has been done the mock or decoy birds have to be examined, and bills or heads shot off last season replaced on these dummies. These mock birds are cleverly cut or carved out of soft wood, and carefully painted. Some are so well done that tyros have not infrequently "potted" them in mistake for the real bird.

Then comes the placing of these decoys, an operation that an old swamp-hand takes great pride in, and which affords room for his wonderful skill. They are so placed that birds ap-



[From a] HERE IS A TYPICAL SHOOTING "SEARD" AS DESCRIBED BY THE AUTHOR. [Photo.]

proaching from any direction have a broadside view of several decoys, and not a mere tail or breast view, which does not show to such advantage. The sides of the hut from half-way up are pushed outwards and propped with sticks, so that a good view all round can be obtained by the inmates.

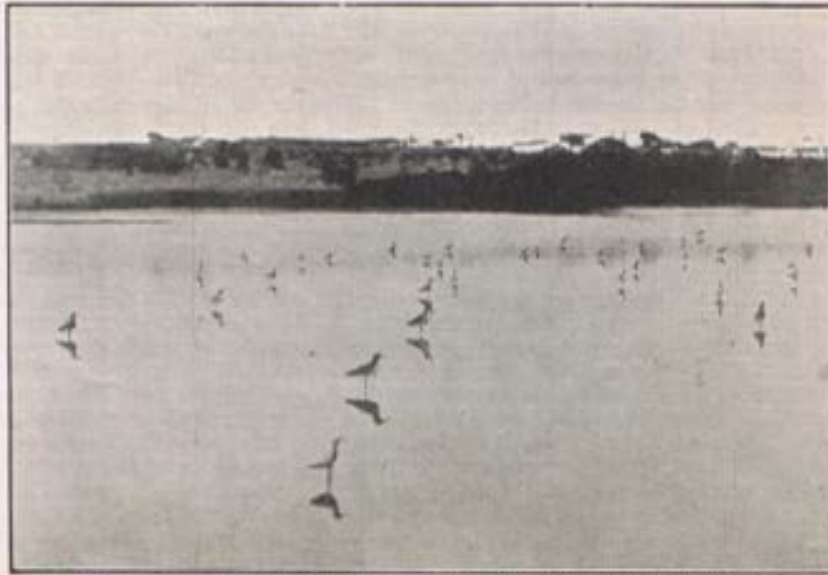
Next to make their appearance after the nits are the "long-legs" (*Totanus Flavipes*), or, as they are called in British Guiana, "yellow-legs," from the pronounced colour of those limbs. The long-leg is a graceful, slender bird, with an ash-coloured back and soft, white feathers in his breast. His hovering note is a gush of liquid music. A bird very like him in appearance, only larger and with legs of a less brilliant hue, is the "pika" (*Totanus Melanocephalus*). He is a very shy bird, and if missed with the first barrel is difficult to stop with the next. It is a frequent occur-

sence to observe large flocks of nits and long-legs, but pikas generally fly in twos or fours; a really large flock of them is rare.

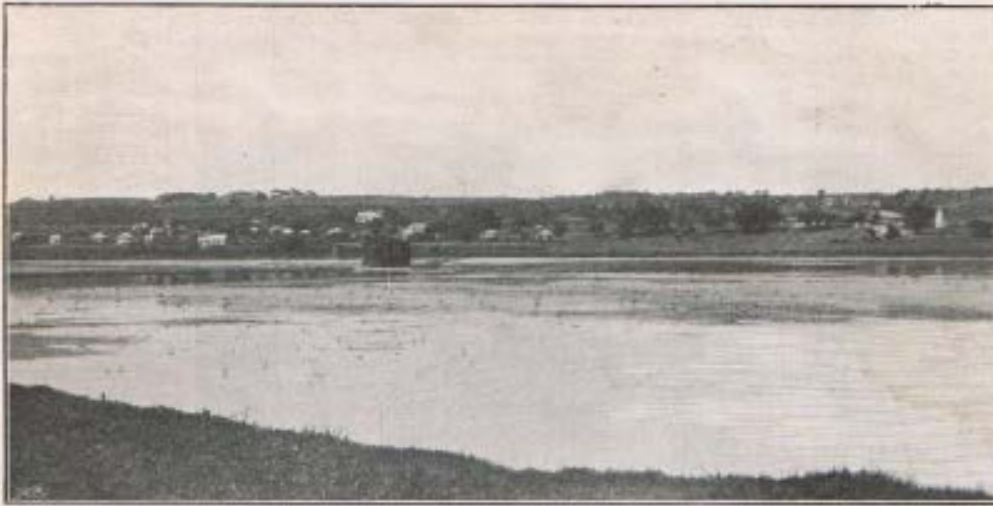
The best-known swamps are about five miles from Bridgetown, in the parish of Christ Church, and are known as the Graeme Hall Swamps. Taken with the adjoining smaller swamps, some hundreds of

acres are submerged. After the hurricane of the 10th September, 1898, a vast sea of fresh water occupied the neighbourhood of the swamps for several days. It extended the swamp area fifty-fold. Huts were thrown down and demolished, and even the large hut was laid in ruins—it has since been replaced—and hundreds of mock birds were buried or carried off by the rush of water. It was several days before the deluge could find a passage to the sea.

Other well-known shooting places are Chan-



THE GREAT BIRDS. THE LIVING BIRDS WERE ENTICED DOWN TO THESE BY THE WHISTLES. [From a Photo.]



[Drawn]

GENERAL VIEW OF THE GRANDE HALL SWAMP, WHICH ABUNDANTLY GAMES.

[Photo]

cery Lane (fancy shooting in Chancery Lane! I wonder how the name came to be applied to a sugar estate and thence to its swamp), Finney's Hill, and Cole's. The two last are in St. Philip's parish and have no permanent springs, but depend on a tropical downpour in August or September to fill the natural and artificial surface cavities and irregularities. In the old days, when plover used to appear in large flocks, the St. Philip's sportsmen had no need to attract water-birds, as the plover alone afforded sufficient sport. But now, with a lamentable decrease in plover, has come the necessity of digging ponds and laying out attractions for the once-despised water birds.

Just below Cole's, and contiguous to the sea, are hundreds of acres of rocky, barren soil too poor to repay cultivation. A kind of grass, locally known as "sour grass," springs up between the scattered rocks to the height of 2½ ft. or 3 ft., and in some places covers entire acres. In this grassy and rocky expanse a bird of passage which, to my mind, yields better sport than any other takes temporary refuge. He is known locally as the "cotton-tree" plover (*Bartramia Longicauda*), and is a plump bird of dark-greyish hue. The local name given to him is said to have originated from his habit of chiefly frequenting the cotton-fields when that plant was cultivated in Barbados. Of quick flight, strong, a swift runner, and extremely shy, he tests the stalking tactics of the best sportsmen. The cotton-tree plover shooting is more like English shooting, as this shy bird will not respond to the best whistling, and has to be walked after and

flushed. Sometimes the sportsmen hide behind rocks and hedges, and nigger-boys are sent into the grass to drive the birds. Oh, those long walks over rough, uneven ground, with a blazing sun overhead and a heavy gun to carry! But the tired feeling vanishes at once when the sharp, staccato "quat, quat, quat," of the plover is heard as he rises from his cosy refuge twenty-five yards or so away.

In British Guiana, where there are vast savannas and limitless swamps, birds of passage have to be followed up on foot or in punts; but in Barbados the shooter reclines in a chair and waits for the birds to come to him! And a weary probation time it is, too. You may go out on an ideal bird day, with the wind south, the sun fierce, weather sultry, and large black banks of clouds in the north-west, between whose masses the forked lightning plays hide-and-seek. The whistler greets you with a "Mawnin', sah; surenuff birds will fly to-day." You murmur a sanguine assent, slip two cartridges into your Greener, and sit down expectantly. But the hour flies, and save for a few nits with their "Cheep," "Cheep," circling round the pond, no prey of any importance appears. You yawn and mutter maledictions and stretch your limbs, and presently try a constitutional on the mud-bank on which your hut is perched. But the sun is hot and drives you back in despair to your canvas chair.

You are a lucky man if presently your watchful whistler cries, "I hear a long-leg"; and then, after peering about in the blue heaven above, says, "Mark, sah!" You look up, but fail to see anything at first. But presently you

blinking eyes observe one and then another dark spot wheeling hundreds of yards above. Meanwhile, the other stands have awakened into activity, and their whistlers are piping lustily. Your own boy is a skilled whistler, and with an eye on the birds he varies the notes as the distance decreases. Down and down they circle, their white breasts gleaming and their throats pouring forth answering notes, till at last with a wild, perpendicular dive they are down among your mock birds, wheeling hither and thither in graceful curves.

Don't make any mistake. You are not to shoot as you would over a Scotch moor or English stubble. You are shooting at strangers, at birds of passage, who will immediately resume their journey towards other lands the moment you scare them with your shots. You want as many as possible for your two barrels, and, besides, the rivalry between the different stands demands that you should score more than your neighbours if at all possible. It may be your only opportunity for the day. So you watch your chance, and as they wheel you let fly—the right into the "brown," and then the left as they close up again from the shock. Snatching your other gun, you get yet another shot at the remainder, stop a straggler with the last barrel, and then the fun is over for the time.

It sometimes happens that birds will continue to enter the swamp for the greater part of a particular day. If you have chanced to hit upon that very day, you are indeed lucky. On such rare occasions as many as 200 or 300 birds have fallen to a single sportsman, but it would be considered a good day's sport if you bagged between thirty and forty birds. Of course many days during each season are altogether barren. Fifty years ago when shooters were

fewer, and vast tracts of land in America and Canada knew not even the smell of a farmer's smoke, and the breeding grounds and swamps of the wild birds had hardly been disturbed, the number of migrating birds was vast. Black and white-breast plover (*Charadrius Dominicus*) could be observed going by in vast horse-shoe flocks. Various kinds of curlews visited the island in great numbers, and the birds that now continue to come used to appear in vastly greater flocks.

On the 12th of September, 1846, such a vast flight of plover took place that men with whips killed the birds in the public streets, and one man is said to have shot 1,000 plover for that season with an old flint-lock blunderbuss. But nowadays the numbers have greatly decreased. Especially is this so with the plover and curlews which build on grass lands. The swamp birds have held their own better, as their habitat is more difficult of approach. In the museum at Ottawa I have seen specimens of the identical species of wild birds that visit Barbados, though I also observed some that, so far as I know, have never appeared here in my home.

The majority of the regular shooters are thorough good sportsmen and kind, hospitable fellows. You would have to go far before finding a nicer fellow to shoot with, and a more unselfish companion generally, than Mr. Addie Evelyn, of "Spencer's." I have very pleasant recollections, indeed, of the few days I had the pleasure of spending with him at Chancery Lane Swamp. If there were no birds, there were at least the interesting recollections of past battues to be recalled; or a pack of cards was found, and my host proceeded to show his skill with the paste-board wonders.



FIGURE 4

RELAXING TIME AT GREEN HALL—A GAME OF CARDS ON THE VERANDA.

FIGURE 5

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SHOOTING OF MIGRATING SHOREBIRDS IN BARBADOS

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ABSTRACT

The small island of Barbados, the most easterly of the Lesser Antilles, situated 150 km east of St Vincent, is favourably placed geographically to serve as a way-station for thousands of migrant shorebirds undertaking long flights south and south-east from North American breeding areas to South American winter quarters. During the fall migration, from early July to mid-October, large numbers of these birds are shot each year in a number of mostly artificial shooting swamps by a small number of hunters (probably fewer than 100). This annual slaughter, little known outside Barbados, is arousing growing opposition amongst members of the Barbadian public.

The methods and techniques used to decoy the passing flocks are described, with a short history of the shooting from 1902 to the 1980s, with figures for the numbers of birds of different species shot and a review of those shorebird species that are the principal quarry of the hunters.

The failure of attempted conservation efforts is reported, particularly the refusal of the Barbados National Trust to support the cause of bird protection. Although committed by a resolution agreed to at the Trust's AGM in 1980 to campaign for the inclusion of all migrant shorebird species in a new, revised schedule to the existing 1907 Wild Birds' Protection Act, sufficient pressure has still not been placed on the government to end this annual slaughter.

A list of all migrant shorebird species is given, along with a brief note of four possible wildlife refuges for these birds.

INTRODUCTION

In recent years, much publicity has been given to campaigns against the annual slaughter of many western Palearctic migrants in a number of Mediterranean countries. There has been strong focus on the small island of Malta, where the killing of migrant birds is a way of life.

But for a hundred persons willing to support campaigns to stop the massacre in Portugal, Spain, France, Italy, Greece and Turkey, how many have even heard of the continued annual slaughter of thousands of migrating shorebirds from North America in a small West Indian island not much larger than Malta, with a population not much less?

These shorebirds, of more than a dozen species, mostly nesting in Canada on the far northern tundra, undergo long-distance migrations south and south-east to

winter quarters in various regions of South America (Bent 1927, 1929). In Canada and in transit through the U.S.A. these birds are fully protected by law, but when they arrive in Barbados, weary after traversing varying distances of open sea, they are blasted out of existence by waiting gunners.

Some 70-75 per cent of the estimated 15,000-20,000 shorebirds killed each year belong to two species with large populations, the Lesser Yellowlegs (*Tringa flavipes*) and the Pectoral Sandpiper (*Calidris melanotos*), while another 10-12 per cent are American Golden Plovers (*Pluvialis dominica*) (classification according to Hayman *et al.* 1986). But as all birds, except the small *Calidris* sandpipers – the Least, Semipalmated, Western and White-rumped (*C. minutilla*, *C. pusilla*, *C. mauri* and *C. fuscicollis*), the Spotted Sandpiper (*Actitis macularia*) and the Semipalmated Plover (*Charadrius semipalmatus*) are shot, regardless of species identity, when they fly into man-made artificial swamps, it has happened that members of endangered species have also been killed. The most notable example was the shooting, on 4 September 1963, at Fosters swamp in St Lucy, of an Eskimo Curlew (*Numenius borealis*), a species on the verge of extinction (specimen in the Hutt Collection at the Philadelphia Academy of Sciences).

BARBADOS: GENERAL NATURAL HISTORY

Barbados in the West Indies is a small island, 34 km north to south, 22 km east to west at the widest point, of relatively low relief, with hills rising to 338 m in the form of a raised plateau (Figure 1). It is situated about 150 km east of the Lesser Antillean island arc, equidistant from the islands of St Vincent, due west, and St Lucia, due west-north-west. With an area of 430 km² and a population of more than 250,000 persons, it is one of the most densely populated islands in the world, with an average density of 581 p/km².

In geological terms Barbados is very young. Six-sevenths of the island are covered with a blanket of raised coral limestone terraces, at least ten in number, successive coral reef tracts varying in age from the youngest, just above sea level, at 60,000 years B.P. to the uppermost at just over 300 m at c.1,000,000 years B.P. This coral rock capping is extensively fissured with a series of irregular longitudinal cuts up to 30 m deep and 100 m wide known locally as 'gullies'. The other one-seventh of the surface consists of a semi-circular erosional bowl adjoining part of the north-east coast, with irregular relief in the form of heavily eroded Tertiary rocks, and one small river system.

The climate is tropical, but as a result of the cooling effects of the prevailing east-north-east trade wind, temperatures rarely exceed 32°C. The average annual rainfall varies from about 1,150 mm on the coast to 1,900 mm in the hills, falling mostly during the rainy season from June to November.

Settled from Britain from 1627 onwards, by about 1665 practically all of the original forest cover had been destroyed to make way for sugar cane plantations which replaced the subsistence smallholdings producing low-grade tobacco and cotton for export. By that date the island, uninhabited in 1627, had a population of about 20,000 white settlers from Britain and about the same number of black slaves brought in from various regions of West Africa to work on the sugar cane plantations. Continuous cultivation of sugar cane remained the normal pattern of agriculture for more than three centuries from 1665; only in the 1980s has the acreage under cane shown a marked decline.

Only a few small residual areas of woodland survive, notably the 20-ha Turner's Hall Wood in St Andrew's parish, sited on a steep hill slope. In this relict

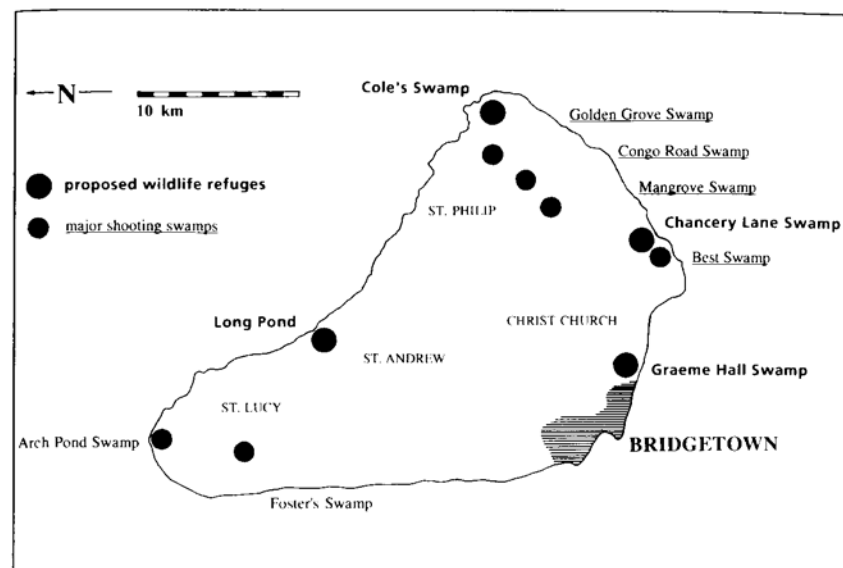


Figure 1: The island of Barbados (located 13°2'N, 59°30'W) showing the location of major shooting swamps and sites of wildlife refuges required.

woodland, just over 110 plant species survive, including over 30 trees, about 20 shrubs and a handful of lianas. It is a debased fragment of the original tropical mesophytic forest, of which other remnants survive as undercliff woods on the exposed eastern slopes below the 4.8-km-long Hackleton's Cliff inland escarpment system in St Joseph and St John (Gooding 1974).

Of a total of about 700 plant species, more than 150 are introduced naturalized species, many of them weeds of cane-fields.

THE BREEDING BIRDS

The relative geographical isolation of Barbados and its limited range of habitats contribute to the small number of breeding species, as does the brief period of its geological history (Bond 1954). There are no mountains and so no montane forest; no lakes, no rivers flowing all the year round, no estuary with saltings and mudflats and no real marshland. Endless fields of sugar cane, until recently covering about 35 per cent of the total surface area, hold no birds except a small finch, the Black-faced Grassquit (*Tiaris bicolor*).

The sole breeding seabird is Audubon's Shearwater (*Puffinus lherminieri*), of which a few pairs nest in a coral rock stack close inshore off the north coast, in St Lucy's parish. The two resident species of heron and egret are the wide-ranging Green-backed Heron (*Butorides striatus* ssp. *virescens*) and the Cattle Egret (*Bubulcus ibis*) which began nesting in Graeme Hall swamp in Christ Church in 1972, increasing rapidly in numbers to 10,000+ by 1989.

There are no breeding anatids, no resident raptors and no nesting shorebirds. The endemic race, *barbadensis*, of the wide-ranging Common Moorhen (*Gallinula chloropus*) is much reduced in numbers by habitat destruction, down to c.30 pairs.

Very abundant are the small Common Ground Dove (*Columbina passerina*) and the medium-sized Zenaida Dove (*Zenaida aurita*), while the large Red-necked Pigeon (*Columba squamosa*), very rare in 1954, has increased markedly since about 1970, partly as a result of deliberate introductions.

The White-tailed Nightjar (*Caprimulgus cayennensis*) probably breeds in small numbers, but no eggs or nestlings have been found. The two resident hummingbirds, both common, are the small, straight-billed Antillean Crested Hummingbird (*Orthorhynchus cristatus*) and the larger, curve-billed, Green-throated Carib (*Eulampis holosericeus*). The two resident tyrant flycatchers are the common, conspicuous, Grey Kingbird (*Tyrannus dominicensis*) and the smaller, retiring, less numerous Caribbean Elaenia (*Elaenia martinica*).

The handsome, large Caribbean Martin (*Progne dominicensis*) nests in small numbers in buildings in Bridgetown, the capital, and sparingly on both seacliffs and inland crags. The birds are absent from the island from November to late February, migrating south to South America. The 23-cm Scaly-breasted Thrasher (*Margarops fuscus*) barely survives in the wilder, remoter parts of the island, in a few of the more inaccessible gullies, but the 17-cm Black-whiskered Vireo (*Vireo altiloquus*) is widespread in surviving woodland tracts and in gardens with clumps of thickly-foliaged trees, especially *Ficus* spp.

The endemic nominate race of the Yellow Warbler (*Dendroica petechia*) has declined in range and numbers over the years. Its preferred habitat is mangrove, both the Red Mangrove (*Rhizophora mangle*) confined to Graeme Hall swamp in Christ Church, situated just inland from the south coast 5 km east of Bridgetown, and the White Mangrove (*Laguncularia racemosa*) growing commonly in Graeme Hall swamp and in a few limited locations along the west coast. The Graeme Hall swamp is the stronghold of the species, with 12-15 pairs; the total population may be 35-40 pairs. Brood parasitism by the numerous Shiny Cowbird (*Molothrus bonariensis*), and habitat loss through tourist development along the west coast, have contributed to the low population level of this endangered endemic race of a species widely distributed through North and Central America, the Caribbean islands and northern South America.

The attractive small black and yellow Bananaquit (*Coereba flaveola*) is common and confiding, as is the highly gregarious Caribbean Grackle (*Quiscalus lugubris*) the common host of the Shiny Cowbird, the latter now widespread over most of the island. The Grassland Yellowfinch (*Sicalis luteola*), introduced probably about 1900 (Bond 1955), reached a population peak about 1955, declining in numbers rapidly from about 1965. Numerous sugar cane fires spreading into Sour Grass pastures where the birds nested, and later, predation of nestlings by Cattle Egrets, may account for the decline in numbers. Both the Lesser Antillean Bullfinch (*Loxigilla noctis barbadensis*) and the Black-faced Grassquit are common in most habitats.

Barbados, geographically isolated, geologically young, densely populated, with a limited range of habitats and with only c.25 breeding species, contrasts markedly with the neighbouring much older, volcanic, mountainous islands; both St Lucia and St Vincent, the two nearest islands to westward, have c.50 breeding species each, with a number of endemic species.

SHOOTING OF MIGRATORY SHOREBIRDS

Hunting techniques

The somewhat isolated position of Barbados makes it a favoured location for the occurrence, in varying numbers, of a considerable range of North American migrant shorebird species. These birds are transients through the island during the mid-July to late-October fall migration season, flocks and individuals en route from northern North American breeding areas to South American winter quarters. A majority of the birds on passage belong to species representing the family Scolopacidae, and are far-flying, long-distance migrants which, in the absence of coastal saltmarsh and mudflats, are attracted to the relatively small areas of surface water available.

Numbers of these transient shorebirds are shot each year in what are known locally as 'shooting swamps', which are carefully designed to offer major attractions to tired migrants seeking resting and feeding grounds on an island almost completely lacking coastal mudflats and either salt or freshwater marshes suitable for their needs. These artificial swamps vary in size, the larger ones having up to 2 ha of open water contained in a series of embanked enclosures formed with bulldozers and known as 'trays', with shallow water suited to shorebird needs, especially those of the most commonly shot species, the Lesser Yellowlegs.

Every possible device and stratagem is employed by the shooting men who own and operate the swamps to decoy passing flocks, smaller parties and single birds down to the 'trays', where the gunners wait, concealed from view in the shelter of a wooden shooting hut. Special flat mudbanks of limited size, known as 'alighting land', are constructed within easy shotgun range of the shooting hut. Live birds of all the species habitually shot are kept in wired enclosures close to the hut, so that they will 'mark' flocks approaching and passing overhead by uttering repeated calls. These birds are usually individuals slightly wounded by shotgun pellets which have subsequently recovered. A few are birds trapped at the cages.

To supplement the calls of the caged birds, most of the gunners use skilfully made whistles cut to imitate the calls of a particular species, usually those of the Lesser Yellowlegs, locally called the 'Longleg', which make up a little over half of all birds shot. Other whistles imitate the calls of the American Golden Plover, known locally in breeding plumage as the 'Black-breast Plover', for which specially prepared short grass areas are maintained close to the shooting hut in the larger swamps.

Since about 1960, such whistled calls have been supplemented by the use of amplified tape recordings of the calls of approaching flocks, broadcast through loudspeakers placed on top of the hut. These tapes are switched on when the live birds 'mark', or when the gunners spot such flocks, some of which, especially plover flocks, may be flying at heights of 450-500 m. In addition, artificial decoys made of wood, metal and plastic, painted to imitate the various species to be decoyed, are extensively used.

Historical development of shooting techniques

Between the two World Wars, and up to the 1950s, shooting swamps were small, the water sometimes drying out during the somewhat erratic rainy season extending from June to early December. In default of adequate rainfall, trays could be filled with water pumped up by means of unreliable wind-driven 'fan mills'. 'No water, no birds' was axiomatic.

Up to the 1950s, double-barrelled shotguns were used to kill the migrant shorebirds, and there did survive among many of the older gunners a tradition and code of sportsmanship by which, normally, only flying shots were taken. Even that code was forgotten on days of big flights, when the pressure to achieve a large score for the swamp, in order to get ahead of other, rival swamps, tended to become paramount.

In the 1960s came the adoption of the new pump-action and automatic shotguns, able to fire six cartridges with machinegun-like rapidity. With this new development came a new, callous, intensely competitive spirit, especially among the younger gunners, but including several of the older, more senior men who owned some of the larger swamps. This new attitude quickly replaced the older, more restrained sporting attitudes. Bird flocks, decoyed into the swamp, were allowed to alight on the special mudbanks close to the hut. On a given signal all the gunners present, often up to half a dozen at the larger swamps on good 'flight days', fired simultaneously at the densely crowded birds. The object was to kill all the birds that could be decoyed into the swamp, and it was considered a matter of much regret, almost a disgrace, if any got away.

This drastic change in attitude led to the enlargement of the bigger swamps, some owned by wealthy individuals, others by syndicates. Larger areas of water were impounded by bulldozing more 'trays'; large, powerful diesel-electric pumps were installed at several of the large swamps to keep the water levels constant and every effort was made to maximize the effectiveness of the methods used to call down passing flocks. Intense rivalry developed between the ten or so top shooting swamps to have the largest score of birds shot for the day, the week, and above all for the three months of the official shooting season, 15 July to 15 October. A number of swamps installed telephones and it became customary to call up rival swamps during the morning to ascertain their current scores.

In the nineteenth century a law had been passed by the Legislature prohibiting any shooting on Sundays, and this had been adhered to for many years, even if Sunday produced a notable shorebird passage. But in the early 1960s this law was 'reinterpreted' by a lawyer who was himself a keen shooting man. Henceforward the law was ignored by most of the gunners. No action was taken by the authorities, probably because the Premier, who became the first Prime Minister when Barbados achieved independence within the Commonwealth in 1966, was himself a keen shooting man.

The number of shooting swamps reached a high point in the 1960s, when more than 20 were being operated, chiefly in the parishes of St Lucy, in the north of the island, and in Christ Church and St Philip, in the south and east respectively, with a few in other parishes, including St Michael in the south-west. Of these, about ten were major establishments. The big swamps had an average membership of five to six gunners, who shared the operating expenses, with others turning up on big flight days. Such swamps were, and still are, normally manned each day of the shooting season from dawn until about noon, the time of day when most birds fly, especially from August through to early October. If a flight was being sustained at midday, some gunners would stay on until darkness fell. In a number of the larger swamps, members not present that morning were notified by telephone around 9.00-10.00 am if a heavy flight was in progress, so they could take time off work to go to the swamp and join in the shooting.

The standard ambition at any swamp was to have 'a hundred day', with over 100 individuals of all shootable species killed. By the early 1960s the ambition was to achieve 'two-hundred days' and more. The old record for one day's shooting at any swamp stood at 522 birds killed at the old Rockley swamp in Christ Church,

later a nine-hole golf course, now a large tourist hotel complex. This was broken in the early 1970s when over 700 birds were shot in one day at the Friendship swamp in St Lucy.

NUMBERS OF BIRDS SHOT

A number of scores of shooting swamps available over varying periods give valuable information on the numbers of birds shot and the seasonal variations. They are analysed in the remainder of this paper.

The Chancery Lane swamp in eastern Christ Church adjoins the south-east coast of the island where the coastal configuration funnels flocks moving southwards over Inch Marlowe Point out to sea, bringing about a concentration of flylines. It is a saltmarsh complex of c.20 ha lying just inland of a sand-dune area well covered with coastal scrub, and a low oblique coral limestone escarpment. In the July-November rainy season it accumulates shallow surface water, making it attractive to many shorebirds. Close to the south is an area of open Sour Grass pasture attractive to the American Golden Plover. From around 1960, housing has been built on the north and west sides in increasing densities, but before that date almost no houses existed. Since the Second World War, when an airstrip was built close to the northern side of the swamp area, increasing airport usage by numbers of wide-bodied jets has produced an increasing disturbance factor, as has tourist developments to both north and south.

The Chancery Lane swamp scores of birds shot for the years 1902-1921 inclusive total 30,376, an annual average of 1,518. Variations were very marked, attributable to differences in rainfall and the passage of cyclonic weather, and to the extent to which shooters were present day by day during the mid-July to mid-October shooting season.

For the period of 20 years, the total number of Lesser Yellowlegs shot, 16,371, made up 54 per cent of all birds killed, but this proportion varied annually between 38 per cent and 78 per cent. Pectoral Sandpipers were accounting on average for 33 per cent (29-53 per cent) or 10,073 birds shot. A good passage of both species was needed to produce high totals. During these years, American Golden Plovers were scarce, totalling only 1,066 (3.5 per cent of all birds shot), a very different pattern from that of the 1950s and 1960s when the species had recovered from the heavy shooting pressure in North America in earlier decades (Figure 2). Greater Yellowlegs totalled 1,583 (5.3 per cent). Stilt Sandpipers (*Micropalma himantopus*) and Short-billed Dowitchers (*Limnodromus griseus*) were not scored separately, being included in a 'Various' column. Ruddy Turnstones (*Arenaria interpres*) were listed in a separate column: as Chancery Lane is a coastal swamp, the birds occur quite commonly there.

A notable Christ Church swamp was situated at Rockley, a few hundred metres inland from the south coast in an area of c.4 ha of flat grassy pasture, an artificial swamp well designed and maintained by the owner. The coastal zone between the open pastureland and the coast was much built up from the 1920s on, and further encroachment of built-up areas brought about the closing down of the swamp in 1947. By that time a nine-hole golf course had been set up on part of the pastureland.

Detailed scores for the Rockley swamp, kept by Charles Manning and his son, the late Eric Manning, cover the years 1921 to 1947. Rockley Swamp was the leading swamp, in numbers of birds shot, during the earlier years, but declined rapidly after 1939. The run of scores from 1921 to 1939 only are analysed. During

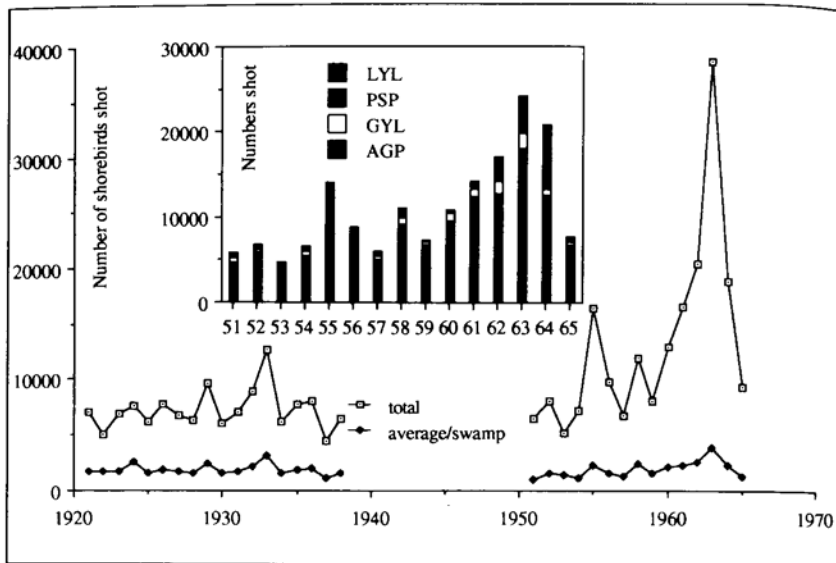


Figure 2: Annual shorebird shooting scores for the period 1921-1938 (four swamps) and 1951-1965 (varying number of four to ten swamps). The scores for the four most commonly shot species are given for the period 1951-1965. LYL = Lesser Yellowlegs (*Tringa flavipes*); PSP = Pectoral Sandpiper (*Calidris melanotos*); GYL = Greater Yellowlegs (*Tringa melanoleuca*); AGP = American Golden Plover (*Pluvialis dominicana*).

this period of 19 years inclusive, a total of 57,284 birds were shot and recorded, giving the high annual average of 3,014 ranging from 2,463 in the drought year 1934 following a year with notable hurricanes, to a maximum of 4,980. Lesser Yellowlegs shot totalled 28,996 birds (51 per cent), followed by Pectoral Sandpipers which totalled 18,198 (32 per cent). Good Pectoral flights in late September and early October were hoped for by the shooting men to boost the scores accumulated from modest Lesser Yellowlegs flights in the period 15 August to 15 September, the peak period for the movement of this species through the island.

American Golden Plovers shot over the period totalled 3,107 (5.4 per cent).

Shooting patterns after the war

The closing down of the successful Rockley swamp in Christ Church was partly compensated for by the development of Phinney's Hill, in St Philip, from 1932, by the neighbouring Golden Grove swamp, and by the gradual establishment of a successful shooting swamp at Fosters, in St Lucy. For the five-year period 1946-1950, the total number of birds shot for which records are available was 31,244, an average per annum of 6,248 per annum.

The next five-year period, 1951-1955, produced a total of 43,875 birds killed, an average per annum of 8,775. Much of this increase came from the massive score of 16,393 for 1955, a total to which weather-affected flights contributed a good deal.

Of the 1955 record score, the Lesser Yellowlegs shot numbered 8,907 (54 per cent), a total second only to that of the great hurricane year, 1933, which

yielded 9,056. The Pectoral Sandpiper score, at 4,086, was slightly more than the 3,935 of 1933, making up 25 per cent. A marked increase was seen in the number of American Golden Plovers shot, numbering from 534 to 965 in the years 1946-1950, reflecting the recovery in the breeding population in North America. The total for the period 1956-1960 was 49,553 with an annual average of 9,911 birds shot. The appreciably higher average of birds shot was attributable to the extension and improvement of several of the larger swamps, with the installation of better pumps, the more regular manning of several swamps, the increasing use of pump-action and automatic shotguns and the growth of competition between the leading swamps. The year 1960 produced the highest score with 12,986 birds shot: 1958 was a close second with 11,990.

The early sixties

During the five-year period 1961-1965, the average number of birds shot per annum in the major swamps, which had climbed rather slowly from around 7,275 in the years from 1921 to 1938 and had risen to just under 10,000 in 1956-1960, doubled to the enormous figure of 20,000 (Figure 2). This massive increase was attributable to a number of factors.

Some of older swamps were much altered. The Golden Grove swamp was completely resited on a low hill about 600 m south of the old location. Fosters swamp was much extended with improved water pumping facilities, emerging as a tremendous draw for birds coming into the island from the north-west, probably on passage from the Vieux Fort swamp complex in south-west St Lucia, studied by the author in 1955-1956. A completely new swamp was established at Mangrove, near Six Cross Roads in St Philip, with ample surface water, proving to be very much 'in the line' of birds on passage overland through the eastern part of the island, and a rival to Golden Grove and neighbouring Phinney's Hill swamps. The old-established Chancery Lane was more efficiently managed, while Best Swamp, between Chancery Lane and Inch Marlowe, emerged as a major shooting swamp.

Of this massive five-year total of 103,717 birds shot, no fewer than 38,514 were killed in the peak year, 1963. (If an estimate is included for birds shot in swamps for which no formal records are available, the 1963 total for the whole island would probably exceed 46,000.)

Although several of the flights for 1963 were plainly affected by weather patterns, the greatest sustained flight ever known in the island, which lasted from 23-29 August and produced a total of 7,687 birds shot in the major swamps, was not obviously produced by bad weather in the vicinity of the island. Figure 3 summarizes the three major flights in 1963. The great flight of 23-29 August was primarily a migration of Lesser Yellowlegs. The three days of 2-4 September were primarily a plover flight, while the last period 30 September-2 October is a good example of a flight of Pectoral Sandpipers.

After 1963

The very heavy flights of 1963 encouraged swamp owners to undertake more extensions and improvements. A large new swamp was created at Friendship in St Lucy, on the site of a traditional 'plover pasture'. But the two following seasons, especially 1965, were disappointing to the shooting fraternity while costs were rising rapidly.

In various swamps, new 'trays' were added, shooting huts were resited in more favourable locations within the swamp complex and more members were recruited to share the additional expense. Competition among the major swamps was greatly

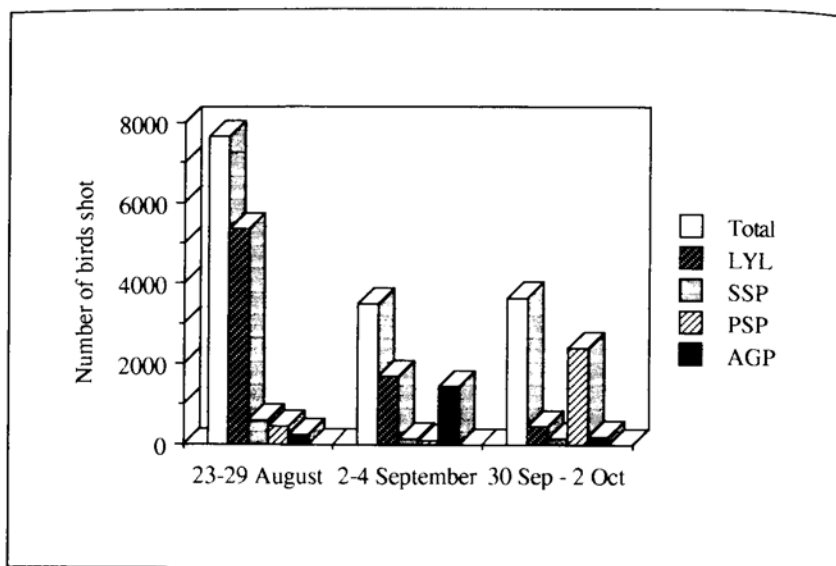


Figure 3: Total shooting scores and scores of selected species shot during the exceptionally large flights of the 1963 migrating season. LYL = Lesser Yellowlegs (*Tringa flavipes*); SSP = Stilt Sandpiper (*Calidris himantopus*); PSP = Pectoral Sandpiper (*Calidris melanotos*); AGP = American Golden Plover (*Pluvialis dominicana*).

intensified, and all remaining scruples about shooting birds on the ground, known as 'ground bouncing', were abandoned. While no subsequent year produced quite the same combination of favourable factors for the gunners, in the later 1960s and in the 1970s totals shot each year stayed in the 15,000 to 20,000 range, and each of the three or four leading swamps reckoned to score 4,000 birds per annum. However, swamp operating costs have escalated, from the cost of shotgun cartridges to water pumping expenses, and a number of the older swamp owners have died, leaving no successors. Graeme Hall swamp complex, once with a 30-ha mosaic of mangrove and sedge, the foremost wetland of Barbados, ceased to operate as a shooting swamp after 1970. Increased housing to the west and north-west has also affected adversely the pattern of migrant shorebird flights to the swamp.

To sum up the current situation, five large shooting swamps are still operating; Golden Grove, Congo Road and Mangrove in St Philip, Fosters in St Lucy, and Best swamp in Christ Church. Hunters in each of these swamps aspire to kill up to 4,000 and more birds each shooting season. A figure of 15,000 to 20,000 birds killed per annum is realistic, most birds being shot by about 50 men who are financial partners in one of the major swamps, gunners invited for a day's shooting, and casual gunners – mostly young men who take a day off work when birds are flying.

MIGRANT SHOREBIRD SPECIES SHOT IN BARBADOS

The bird most commonly shot is the Lesser Yellowlegs, which makes up about half of all birds shot. These birds commonly arrive in small flocks of 10-15

individuals, but in heavy weather may occur in flocks of 50 plus, and exceptionally 200 plus. They occur from mid-July through to late September, first arrivals being the adults, followed later in the season by immatures – known to the gunners as 'second flight Longlegs'. Birds of this species decoy easily to the swamps and tend to alight in close company on the special 'alighting land' mudbanks. The immature birds are easy prey, decoying readily, to be blown up on the ground in patterns of slaughter highly offensive to any person of sensibility and concern for wildlife. It is unusual for large numbers to occur after about 15 September in a normal year.

Often flying in mixed flocks with the Lesser Yellowlegs is the smaller, Stilt Sandpiper, known in Barbados as the 'Cue' from the single 'whu' flight call. These birds are almost always seen in non-breeding plumage.

The larger Greater Yellowlegs (*Tringa melanoleuca*), known locally as the 'Pica' or 'Piker', makes up about 7-8 per cent of birds shot. They usually fly in flocks of less than a dozen individuals, but sometimes up to twenty birds; in heavy weather they may occur in large mixed flocks with Lesser Yellowlegs, Stilt Sandpipers, Short-billed Dowitchers (*Limnodromus griseus*) and Pectoral Sandpipers, known locally as the 'Chirp', from its harsh, reedy 'churk' flight call. Pectoral Sandpipers are common fall transients in Barbados, occurring as single individuals, small parties and flocks, the latter usually of no more than about 25 birds, but sometimes larger. This species makes up, on average, about 25 per cent of all birds shot.

Pectoral Sandpiper flights are particularly dependent on weather patterns, the birds occurring in varying numbers all through the three-month mid-July to mid-October shooting season. As with most species of migrant shorebirds in Barbados, the adult birds pass through first, followed later by the birds of the year. In some years, if there is heavy weather during the first two weeks of October, there may be extensive flights of immature Pectorals, known as 'October Chirp'. During a heavy flight there may be flocks of 10-25 birds coming into a swamp, such as Best swamp, every 15-20 minutes for some hours after dawn, pitching down in a compact mass, often forward on their breasts, while they are shot at by the gunners. In the absence of heavy weather at the critical migration time, there may be virtually no passage of these 'October Chirp'. The birds probably pass well out in the Atlantic to the east of the island. The slightly smaller (200-210 mm) Sanderling (*Calidris alba*), known in Barbados as the 'Sandy Snipe', is found along sandy beaches, and in one or two coastal swamps.

A shorebird species shot regularly in varying numbers, especially in the coastal swamps, is the Short-billed Dowitcher, known in Barbados as the 'Duckleg'. The birds usually arrive as single individuals or in small parties of up to 5-10, only rarely in flocks.

Other large shorebirds occurring in Barbados in small numbers, and which are regularly shot, are the American race of Whimbrel, or Hudsonian Curlew (*Numenius phaeopus hudsonicus*), named 'Crookbill' in Barbados from its decurved bill, and the Willet (*Catoptrophorus semipalmatus*), known misleadingly as the 'White-tailed Curlew'. Whimbrels occur chiefly as single birds and in small parties of up to half a dozen birds. While they may be observed at any time during the migration season, my records over more than thirty years indicate the peak passage period to be 10-19 September, thus substantiating the traditional designation by the gunners of 12 September as 'Crookbill Day'. The birds occur chiefly at swamps near the coast. Willets occur uncommonly, usually fairly early in the season, in July-August, mostly at coastal swamps but also inland.

The Hudsonian Godwit (*Limosa haemastica*) occurs uncommonly at the south-eastern tip of the island, from which birds take off on the c.480-km over-ocean

flight to northern South America. Godwits are seen only during or just after heavy weather; normally the flyline is well out in the Atlantic to the east of Barbados.

The Ruddy Turnstone (*Arenaria interpres*) is a regular fall transient, flying in small parties of up to half a dozen individuals, and alighting chiefly in the coastal swamps.

Apart from the Scolopacids, one species of the plover family, Charadriidae, is a prime target of the Barbadian gunners, and that is the handsome American Golden Plover (*Pluvialis dominica*), known in Barbados as the 'Black-breast Plover' in adult plumage, and as the 'Grey-breast Plover' in winter dress and for birds of the year. This species is even more subject to variations in occurrence patterns and numbers than the Pectoral Sandpiper, particularly the immatures. The period from 25 August to 20 September is the time of the plover passage, while single adults may occur from about 10 August.

The long-distance over-ocean flight from Nova Scotia to northern South America of c.3,860 km passes well to the east of Barbados, but some flocks pass over the island even in fine weather, with the east-north-east trade wind blowing. Flocks of 50-75 birds, and sometimes up to 200 plus birds, can be observed flying straight over the island at heights of 460-615 m, chiefly from the parishes of St Philip and eastern Christ Church in the south-east parts of the island.

Heavy weather resulting from the passage in a westerly to north-westerly direction of tropical depressions, some of them incipient hurricanes, will force the plover flocks westwards to Barbados, and bring them down on to the open grassy pastures and freshly ploughed ground. After really severe weather conditions which coincide with the 25 days peak of the plover migration, with strong winds and torrential tropical rain (up to 150 mm in 12 hours and more), there may be hundreds of plover scattered in flocks over much of the island, including the playing fields of Harrison College, not far from the centre of Bridgetown, the capital. As the passage period lasts for no more than three to four weeks, in the absence of low pressure tropical easterly waves, relatively few plover will be shot, while in other years with suitable weather conditions, large numbers may be killed.

A few Black-bellied Plover (*Pluvialis squatarola*), known in Barbados as 'Squealer Plover' or 'Loggerhead Plover', are shot in coastal swamps, always as single birds. The balance of birds shot include such uncommon if fairly regular transients as Wilson's Phalarope (*Phalaropus tricolor*), Buff-breasted Sandpiper (*Tryngites subruficollis*) and Killdeer (*Charadrius vociferus*). A few Solitary Sandpipers (*Tringa solitaria*), known as 'Blackbacks', are shot, as is the American race of Snipe (*Gallinago gallinago delicata*), mostly in October and in November, after the official shooting season is over. A few of these birds may winter in Graeme Hall and Chancery Lane swamps.

A shorebird of great appeal is the finely streaked and chevroned Upland Sandpiper (*Bertramia longicauda*), known as the 'Cotton Tree Plover', which occurs as single birds, small parties and flocks of up to 15 individuals. Single birds fly over at heights of 90-150 m, uttering at regular intervals the far-carrying 'kip-ip-ip' call. Very early dates are 4 August 1942 and 8 August 1927, but 15-20 August covers most early occurrences, the bulk of the passage taking place in September, with stragglers in October (19 October 1957 was a late date, and 20 November 1964 exceptionally late). Fortunately the bird prefers dry grassland to muddy swamp margins, and does not respond to decoy whistling, but the gunners pursue them on rough grassland.

In heavy weather a few Red Knot (*Calidris canutus*) may occur – mostly at coastal swamps, and mainly during the last week of August and the first two weeks of September.

POSSIBLE CONSERVATION MEASURES

In Barbados the Wild Birds' Protection Act dates from 1907, with a very short schedule including only a handful of local breeding species considered to be beneficial to agriculture, and the attractive regular winter resident Parulid Warbler, the American Redstart (*Setophaga ruticilla*), locally known as the 'Christmas Bird'.

As a founder member of the Council of the Barbados National Trust, established in 1961, I drew up a revised schedule to the act in 1976, in which I included 46 species of resident, transient and winter resident bird species. I did include four shorebird species, as a very modest first instalment (as I hoped) of protection for the group. These were the Buff-breasted Sandpiper (*Tryngites subruficollis*), a rare visitor to coastal pastures, many of which are being built over for housing; the Ruff (*Philomachus pugnax*), a transatlantic migrant which occurs regularly in small numbers; the uncommon Hudsonian Godwit and the Upland Sandpiper.

I did not include in the proposed new schedule any of the shorebirds normally shot in some numbers, being well aware that if this was done, the amendment to the act would have been voted down in the Legislature. The shooting men are a small but influential lobby, many of them wealthy, able and willing to exert a great deal of behind-the-scenes pressure in many fields. Nevertheless, the new schedule was accepted by the Legislature and became law in 1977; but the protection afforded the four rare shorebird species remains a dead letter, with no attempt made to enforce it.

Further efforts for bird protection

In 1980, when a vice-president of the Barbados National Trust, I succeeded in carrying at the Annual General Meeting a resolution in favour of placing all the shorebird species known to visit Barbados on a proposed new revised schedule to the Wild Birds' Protection Act. This thus became the official policy of the National Trust.

I campaigned for an end to the annual slaughter in my two weekly columns in the local newspaper, *The Barbados Advocate*. One, entitled 'The Need for Conservation', was published from 1975 on; the other, 'Barbadian Nature Diary', from 1977 (Hutt 1979, 1986). Unfortunately, the powerful hunters' lobby succeeded in terminating these columns, and after 1981 the National Trust executive tacitly abandoned any attempt to press the cause of bird protection on the government. In response to this situation, in 1983 I founded a pressure group, the Barbados Wildlife Protection Association, to campaign for the total abolition of bird shooting in the island. Barbados is the only island in the English-speaking Caribbean where migrant shorebirds are shot systematically. All the shorebird species habitually shot on the island receive total protection at all seasons both in Canada and in the U.S.A., where they breed in various habitats from Arctic tundra to muskeg swamps.

RECOMMENDATIONS FOR THE FUTURE

A simple amendment to the existing Wild Birds' Protection Act of 1907, bringing in a new schedule of totally protected species listing all the species of migrant shorebirds which have been recorded in Barbados, including common, uncommon, rare species and vagrants, so as to leave no loophole, would suffice. Once such a revised schedule to the act, listing the species included in the Appendix below, is accepted by the Legislature and effectively and consistently enforced, Barbados

could take its place as a community willing to join those nations of the world which do more than pay mere lip service to the need for effective conservation measures.

The next step

Wildlife Refuges, established primarily to preserve all birdlife – resident species, winter visitors and transients – should be set up at the following locations (cf. Hutt *In* Scott & Carbonell 1986):

1. Graeme Hall Swamp in Christ Church: c.31 ha.
2. Chancery Lane Swamp in Christ Church: c.20 ha.
3. Long Pond in St Andrew: c.20 ha.
4. Cole's Swamp in St Philip: c.8 ha.

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APPENDIX

(to be included in a revised schedule to the
Wild Birds' Protection Act, 1907)

<i>Haematopus palliatus</i>	American Oystercatcher
<i>Himantopus himantopus</i>	Black-necked Stilt
<i>Recurvirostra americana</i>	American Avocet
<i>Pluvialis dominica</i>	American Golden Plover; Black-breast Plover; Grey-breast Plover
<i>Pluvialis squatarola</i>	Black-bellied Plover; Squealer Plover; Loggerhead Plover
<i>Charadrius semipalmatus</i>	Semipalmated Plover; Ringneck Plover
<i>Charadrius wilsonia</i>	Wilson's Plover; Thick-billed Plover
<i>Charadrius vociferus</i>	Killdeer
<i>Charadrius melodus</i>	Piping Plover
<i>Charadrius alexandrinus</i>	Snowy Plover
<i>Charadrius collaris</i>	Collared Plover
<i>Limosa haemastica</i>	Hudsonian Godwit
<i>Numenius borealis</i>	Eskimo Curlew; Chattering Curlew
<i>Numenius phaeopus</i>	Whimbrel; Hudsonian Curlew; Crookbill
<i>Bartramia longicauda</i>	Upland Sandpiper; Cotton Tree Plover
<i>Tringa melanoleuca</i>	Greater Yellowlegs; Pica; Piker
<i>Tringa flavipes</i>	Lesser Yellowlegs; Longleg
<i>Tringa solitaria</i>	Solitary Sandpiper; Blackback
<i>Catoptrophorus semipalmatus</i>	Willet; White-tailed Curlew
<i>Actitis macularia</i>	Spotted Sandpiper; Wag
<i>Arenaria interpres</i>	Ruddy Turnstone; Sandy Plover; Redleg
<i>Phalaropus tricolor</i>	Wilson's Phalarope
<i>Gallinago gallinago</i>	Common Snipe

<i>Limnodromus griseus</i>	Short-billed Dowitcher; Duckleg
<i>Limnodromus scolopaceus</i>	Long-billed Dowitcher; Duckleg
<i>Calidris canutus</i>	Red Knot; Rock Plover; Silverwing
<i>Calidris alba</i>	Sanderling; Sandy Snipe
<i>Calidris pusilla</i>	Semipalmated Sandpiper; Nit
<i>Calidris mauri</i>	Western Sandpiper; Nit
<i>Calidris minutilla</i>	Least Sandpiper; Nit
<i>Calidris fuscicollis</i>	White-rumped Sandpiper; Grey Nit
<i>Calidris bairdii</i>	Baird's Sandpiper
<i>Calidris melanotos</i>	Pectoral Sandpiper; Chirp
<i>Micropalama himantopus</i>	Stilt Sandpiper; Cue
<i>Tryngites subruficollis</i>	Buff-breasted Sandpiper
<i>Philomachus pugnax</i>	Ruff; Reeve (female)

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