Current status of the Endangered White-breasted Thrasher (*Ramphocinclus brachyurus*), a dry forest songbird endemic to Saint Lucia and Martinique

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Current status of the Endangered White-breasted Thrasher (*Ramphocinclus brachyurus*), a dry forest songbird endemic to Saint Lucia and Martinique

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**Abstract** The Eastern Caribbean islands of Martinique and Saint Lucia are home to the Endangered White-breasted Thrasher (*Ramphocinclus brachyurus brachyurus* in Martinique and *R. b. sanctaeluciae* in Saint Lucia). This species is among the most threatened of Caribbean birds, with fewer than 1,500 individuals range-wide. Here we review current research on its distribution, demography, behavior, and population size, as well as ongoing threats and conservation work. The thrasher is restricted to three areas of dry forest within its two-island extent: the Caravelle Peninsula in Martinique, and its Saint Lucia Iyanola and Mandelé ranges. On both islands, the species was once more widespread and abundant than it is today, though by the early 20th century, it was described as “a very rare bird” by the ornithologist James Bond. The Saint Lucia Mandelé range, discovered in the mid-1990s, now holds the largest extant population for the species, supporting almost 75% of the global population. Recent extensive fieldwork in this range established that the thrasher has relatively low nesting success and high adult survival, a pattern seen in many tropical birds. This work also documented the unusual breeding behavior of the species, cooperative breeding, whereby some individuals delay dispersal and breeding to help raise non-descendant kin. A likely consequence of this behavior is short dispersal distances; for example, there is no evidence that individuals move between islands or between the two ranges in Saint Lucia that are separated by only 3 km. A lack of gene flow has consequences for conservation planning and for species limits reassessment. The greatest threats to the White-breasted Thrasher are habitat loss and fragmentation, habitat degradation, and pressure from non-native mammalian predators. This first threat is the most acute in Saint Lucia, where there is a lack of protected habitat and ongoing habitat loss, and the last is the most acute in Martinique, where 50% of the species’ range has been formally protected since the 1970s. These threats recently motivated the creation of the first conservation plan for the Saint Lucia subspecies.

**Keywords** Caribbean, habitat loss, island, *Ramphocinclus brachyurus*, threatened species, tropical birds, White-breasted Thrasher

**Resumen** Estado actual de *Ramphocinclus brachyurus*, paseriforme endémico y En Peligro del bosque seco de Santa Lucia y Martinica—Las islas de Martinica y Santa Lucia, del Caribe Oriental, son el hogar del ave En Peligro *Ramphocinclus brachyurus* (*R. b. brachyurus* en Martinica y *R. b. sanctaeluciae* en Santa Lucia). Esta especie está entre las más amenazadas de las aves caribeñas, con menos de 1,500 individuos en todo su rango de distribución. Revisamos las investigaciones actuales que existen sobre su distribución, demografía, conducta y tamaño poblacional, así como las amenazas actuales y el trabajo de conservación. Esta especie está restringida a tres áreas de bosque seco dentro de su rango de distribución en las dos islas: la península de Caravelle en Martinica y las regiones de Iyanola y Mandelé en Santa Lucia. En ambas islas, la especie fue más abundante y tuvo una distribución más amplia que la que se conoce hoy en día; aunque a principios del siglo 20, el ornitólogo James Bond la describió como “un ave muy rara”. La región de Mandelé en Santa Lucia, descubierta a mediados de los 90, contiene actualmente la población más grande de esta especie, soportando casi el 75% del estimado global. Un amplio y reciente trabajo de campo en esta zona comprobó que esta especie tiene un éxito de nidadificación relativamente bajo y una alta supervivencia adulta, un patrón visto en muchas especies de aves tropicales. Este trabajo también documentó la inusual conducta de cría de esta especie, la cría cooperativa, donde algunos individuos demoran la dispersión y la cría para ayudar en la cría de descendientes no emparentados. Una probable consecuencia de esta conducta son distancias de dispersión cortas; por ejemplo, no existe evidencia de que los individuos se muevan entre islas o entre las dos regiones de Santa Lucia que están separadas por sólo 3 km. La ausencia de flujo genético tiene consecuencias para los planes de conservación y la revaluación de los límites para esta especie. Las mayores amenazas para el *Ramphocinclus brachyurus* son la pérdida de hábitat, la fragmentación y la...
degradation of the habitat and the pressure from native mammals. The first threat is the most severe in Saint Lucia, where there is a lack of protected habitat; the second is the most severe in Martinique, where 50% of the range of distribution of the species has been protected formally since the decade of the 70s. These threats motivated recently the creation of the first conservation plan for protection for the subspecies of Saint Lucia.

**Palabras clave** aves tropicales, Caribe, especie amenazada, isla, pérdida de hábitat, *Ramphocinclus brachyurus*

**Résumé** Situation actuelle du Moqueur gorge-blanc (Ramphocinclus brachyurus), espèce En danger endémique des forêts sèches de Sainte-Lucie et de la Martinique—Les îles de la Martinique et de Sainte-Lucie dans l’est de la Caraïbe abritent une espèce En danger, le Moqueur gorge-blanc (Ramphocinclus brachyurus brachyurus en Martinique et R. b. sanctaeluciae à Sainte-Lucie). Cette espèce est parmi les oiseaux caribéens les plus menacés, avec moins de 1,500 individus dans l’ensemble de son aire de répartition mondiale. Nous examinons ici les recherches actuelles sur la répartition, la démographie, le comportement et la taille de la population, ainsi que les menaces actuelles et les travaux de conservation en cours. Le Moqueur gorge-blanc est limité à trois zones de forêt sèche sur les deux îles : la péninsule de la Caravelle en Martinique et les zones de Iyanola et de Mandelé à Sainte-Lucie. L’espèce a été autrefois plus répandue et plus abondante sur les deux îles qu’elle ne l’est aujourd’hui, mais au début du XX° siècle, elle était décrite comme « un oiseau très rare » par l’ornithologue James Bond. Son occupation de la zone de Mandelé à Sainte-Lucie, découverte au milieu des années 1990, comprend actuellement la plus grande population existante, avec près de 75% de la population mondiale. Le travail de terrain mené récemment sur cette zone a montré que le Moqueur gorge-blanc présente un succès de reproduction relativement bas et une survie élevée des adultes, un schéma observé chez de nombreux oiseaux tropicaux. Ce travail a également documenté le comportement de reproduction inhabituel de l’espèce, l’élevage coopératif, dans lequel certains individus retardent leur dispersion et leur reproduction pour aider à l’élevage de jeunes qui ne sont pas leurs descendants. Une conséquence probable de ce comportement est la faible distance de dispersion ; il n’y a actuellement aucune preuve que les individus se déplacent entre les îles ou entre les deux zones d’occupation à Sainte-Lucie, qui ne sont séparées que de 3 km. L’absence de flux génétique a des conséquences pour la planification de la conservation et pour la réévaluation des limites de l’espèce. Les plus fortes menaces pesant sur le Moqueur gorge-blanc sont d’une part la perte, la fragmentation et la dégradation de ses habitats et d’autre part la pression des mammifères prédateurs non indigènes. Cette première menace est la plus grave à Sainte-Lucie où il y a actuellement un manque de protection et une perte de ses habitats, et la seconde est la plus sévère en Martinique où 50% de l’aire de répartition de l’espèce est formellement protégée depuis les années 1970. Ces menaces ont récemment motivé la création du premier plan de conservation de la sous-espèce de Sainte-Lucie.

**Mots clés** Caraïbe, espèces menacées, île, Moqueur gorge-blanc, oiseaux tropicaux, perte d’habitat, *Ramphocinclus brachyurus*

The White-breasted Thrasher (*Ramphocinclus brachyurus*; Fig. 1) has been referred to as one of the highest priority avian species for research and conservation in the Caribbean (Stotz et al. 1996). This non-migratory songbird is endemic to Martinique (where it is known as Moqueur Gorge Blanche) and Saint Lucia (where it is known as the Gôj Blan—or Gorge Blanc in older spellings). It has subspecies status on each island (*R. b. brachyurus* in Martinique and *R. b. sanctaeluciae* in Saint Lucia) and it exists in three populations within this two-island extent (Fig. 2; BirdLife International 2017). This extremely small and increasingly fragmented range is the justification for the species’ IUCN status of Endangered (BirdLife International 2017). The call for White-breasted Thrasher research and conservation has been answered in part by field studies of the species’ geographic range (Temple 2005), habitat requirements (Temple 2005), demography (Temple 2005, Mortensen 2009, Mortensen and Reed 2016), behavior (Temple et al. 2006, 2009, Mortensen 2009, Gros-Desormeaux et al. 2015), and population size (Temple 2005, Young et al. 2010); modeling of habitat suitability (White et al. 2012, Sass et al. 2017) and extinction risk (Mortensen and Reed 2016); and the completion of the first conservation plan for the Saint Lucia subspecies (Felix et al. 2014). Here we review the existing body of work on the White-breasted Thrasher, and discuss anticipated environmental changes and conservation objectives with a particular focus on the Saint Lucia subspecies.

**Fig. 1.** White-breasted Thrasher adult in the Mandelé range, Saint Lucia. Photo used with permission of Gunnar Kramer.
Distribution and Habitat Requirements

The White-breasted Thrasher was considered to be a more common and widespread species in the 19th century compared to today (Danforth 1935, Diamond 1973, Keith 1997, Temple 2005, Gros-Desormeaux et al. 2015). By the early 20th century, James Bond was already describing the species as “a very rare bird” (Bond 1928:536), writing, “I was told by an old hunter that ‘the gorge-blanc’ was at one time not uncommon in the southern mountains of Saint Lucia. But that they were now extinct in these parts.” In the mid-20th century he wrote, “The White-breasted Thrasher (*Ramphocinclus brachyurus*) is one of the rarest of West Indian birds. Formerly it was much more numerous and widespread, but it has decreased steadily during the past hundred years, with the result that both the Martinique and Saint Lucia races are now threatened with extinction” (Bond 1957:259). The primary driver of these distributional changes was habitat loss (BirdLife International 2017). The coastal forest in which the species lives has been, and continues to be, attractive for uses by people—because of its less mountainous topography, low relative humidity, easier access, and proximity to the ocean—and consequently, White-breasted Thrasher habitat has been lost and fragmented due to urban and suburban development and agriculture (BirdLife International 2017).

The species is now found in three areas. It inhabits the Caravelle Peninsula on the central east coast of Martinique and two areas on the east coast of Saint Lucia: between Fond d’Or and Marquis (the ‘Iyanola’ range), and further south between the Dennery and Praslin Rivers (the ‘Mandelé’ range) (Fig. 3; Felix et al. 2014, BirdLife International 2017). There are no records of it ever occurring on any other Lesser Antillean islands. These occupied areas are not large. Within the 1,700 ha Iyanola range, thrashers inhabit only ~126 ha of riparian dry forest within the total area (Temple 2005), whereas they occur in ~450 ha of the 681 ha Mandelé range (Temple 2005, Felix et al. 2014). Current estimates of the species’ total occupancy are ~519 ha in Martinique (Temple 2005) and ~576 ha in Saint Lucia (Temple 2005, Felix et al. 2014), 0.5% and 0.9% of the islands’ total land areas, respectively. Actual area of occupancy in Saint Lucia is likely slightly larger, as thrashers have been sighted occasionally outside of the Iyanola and Mandelé ranges, particularly during the non-breeding season (Young et al. 2010; A. Toussaint pers. comm.).

The habitat requirements of the White-breasted Thrasher are relatively well described. It is a habitat specialist, occurring only in deciduous seasonal forest (hereafter ‘dry forest’) with a canopy higher than 5 m (Diamond 1973, Babbs et al. 1988, Temple 2005). However, the forest it uses need not be primary; a large portion of its current habitat in the Mandelé range was under cultivation until the last few decades of the 20th century (Graveson 2009; D. Anthony pers. comm.) and it then regenerated over the short period between then and the end of that century. Similarly, in Martinique, much of the extant forest on the Caravelle Peninsula is secondary, as the peninsula was extensively deforested for agriculture in the late 17th century (Gros-Desormeaux et al.)
Finer-scale habitat associations of the Saint Lucia subspecies were characterized by Temple (2005). Within dry forest, thrashers are associated with areas that have a higher canopy and higher tree density, abundant leaf litter, and few herbaceous plants. The areas thrashers use also have relatively high invertebrate density and are more likely to contain the shrub Myrica citrifolia—used by the species to nest in and as food (berries) for adults and chicks—than are areas not occupied by the birds.

White et al. (2012) and Sass et al. (2017) used habitat suitability modeling to further understand environmental correlates of White-breasted Thrasher occurrence in Saint Lucia. Despite using different environmental data sets to build suitability models, both results support the species’ strong positive association with coastal, riparian dry forest and negative association with areas near high human density. Beyond that, model results differ. Sass et al. (2017) also included the relationship between thrasher occurrence and predator distributions in their model, and found that thrashers were associated with areas closer to the Saint Lucia fer-de-lance (Bothrops caribbaeus). Whether this relationship is due to common habitat requirements, or due to fer-de-lance restricting the abundance or distribution of introduced mammalian predators of the thrasher, requires further study.

Further goals of this habitat suitability modeling were to identify key sites for protection or management, as well as suitable sites for species introduction or habitat restoration. Island-wide suitability maps produced by White et al. (2012) and Sass et al.

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**Fig. 3.** White-breasted Thrasher distribution within its Mandelé and Iyanola ranges in Saint Lucia, and Caravelle Peninsula range in Martinique (breeding range boundaries from Temple [2005]).
Demography and Behavior

Much of what is known about White-breasted Thrasher survival, reproduction, and behavior comes from studies of the Mandelé population during the breeding season (April–September). Similar to many other non-migratory tropical passerines, the thrasher has relatively low nesting success and high annual adult survival (Temple 2005, Mortensen 2009). Annual nest success (the percent of nests fledging ≥ 1 chick) ranges from 20% to 39% (John 1995, Gilardi 1998, Temple 2005, Mortensen 2009), though studies with the largest sample sizes and corrections for overestimating success reported rates of 31–37% (Temple 2005, Mortensen 2009). Breeding females may lay up to four clutches during a breeding season (Temple 2005), though no more than two of these clutches usually fledge young (Mortensen and Reed 2016). Predation is the primary cause of White-breasted Thrasher nest failure (Temple 2005, Mortensen 2009). Native nest predators in Saint Lucia include the Saint Lucia boa (Boa orophias; Temple 2005, Freeman 2015), Saint Lucia fer-de-lance (Freeman 2015; JLM pers. obs.), American Kestrel (Falco sparverius; JLM pers. obs.), Broad-winged Hawk (Buteo platypterus; Freeman 2015), and possibly the Pearly-eyed Thrasher (Margarops fuscatus; Babbs et al. 1988). Recent trapping work suggests that predation by introduced mammals may become more common in Saint Lucia (Freeman 2015); the small Asian mongoose (Herpestes javanicus; Temple 2005, Freeman 2015), mannikou (common opossum [Didelphis marsupialis]; Temple 2005), and black rat (Rattus rattus; Freeman 2015) are known introduced predators, and a putative predator includes the domestic cat (Felis catus; Freeman 2015). In Martinique, predators include the Broad-winged Hawk and the same suite of introduced mammals as in Saint Lucia (Gros-Desormeaux et al. 2015). Predation is also suspected to be the most important cause of juvenile mortality, especially when fledglings are not yet fully capable of flight and spend much of their time on or near the ground (John 1995, Temple 2005, Gros-Desormeaux et al. 2015), but little is known about this life-history stage.

The White-breasted Thrasher is a facultative cooperative breeder (Temple et al. 2006, 2009, Mortensen 2009). This uncommon social behavior typically involves individuals (so-called helpers) caring for young that are not their own offspring (Brown 1987, Cockburn 2006). In the thrasher, some adult offspring stay on their natal territory and help their parents raise new offspring (their siblings) rather than disperse and breed on their own; breeding pairs can have 0–4 helpers (Mortensen 2009, Temple et al. 2009). Lack of suitable habitat is one hypothesis for the maintenance of cooperative breeding (Emlen 1982), and is thought to be the explanation for this behavior by the thrasher (Temple 2005). This idea was supported by an increase in cooperative breeding behavior after habitat loss associated with resort construction in the Mandelé range, where family groups increased in size following habitat loss (Mortensen 2009). Presumably, this change was due in part to more severely limited dispersal options or to displaced birds returning to previous family groups.

A common feature of cooperative breeders is short dispersal distances (Zach 1999), and this is true of the White-breasted Thrasher. Adults rarely change territories—in 3 yr, only 2 out of 94 adults moved—and many juveniles stay on their natal territories at least 1 yr post-fledging (Temple 2005). Of the birds that dispersed from their natal territory, males moved an average of 103 m and females an average of 360 m (Temple et al. 2006). Mortensen (2009), studying juvenile birds in the same population, found that average distance moved between re-sighting intervals (for the sexes combined) was 243 m. These dispersal distances are more than an order of magnitude lower than those reported for most avian species for which data are available (e.g., Paradis et al. 1998, Sutherland et al. 2000).

These reported very short dispersal distances raise questions about population connectivity; specifically, whether thrashers are moving among their three occupied regions. Banding and survey evidence to date (> 600 thrashers have been color-banded in Mandelé since 2002; Temple 2005, Mortensen 2009, 2016) suggest that individuals are not moving between Martinique and Saint Lucia, nor between the Iyanola and Mandelé ranges within Saint Lucia, even though these latter two areas are only 3 km apart (Felix et al. 2014). Recent genomic work, which provides the first description of genetic diversity and population structure of the species across its entire range, supports the field data (J.L. Mortensen et al. in prep.). This ongoing genomic work will also be used in re-evaluation of species limits. There is some debate about whether the Saint Lucia and Martinique subspecies merit elevation to species status (Storer 1989). While the subspecies are clearly diagnosable by plumage traits, morphological characteristics, and degree of sexual dimorphism (Storer 1989), and were sometimes considered to be distinct species (Cory 1887, Ridgway 1907), most authors have considered them as one (Hellmayr 1934, Davis and Miller 1960, AOU 1998). Ongoing analyses will help assess the existing species limits, and recognition of species-level differences would require revision of the species’ IUCN Red List status.

Population Size and Trends

White-breasted Thrasher population size estimates do not exist from before the 20th century, but based on anecdotes, the population had declined greatly by then. In 1876 in Martinique, thrashers were “widespread on the island,” yet in 1905, they were described as “on the verge of extinction,” and in 1950, they were considered extinct (Gros-Desormeaux et al. 2015). In
Table 1. White-breasted Thrasher population size estimates.

<table>
<thead>
<tr>
<th>Area Covered*</th>
<th>Year</th>
<th>Population Size Estimate</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Martinique</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Réserve Naturelle de la Caravelle</td>
<td>1987</td>
<td>15 pairs</td>
<td>Bénito-Espinal and Hautcastel 1988 in</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Gros-Desormeaux et al. 2015</td>
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<tr>
<td>Réserve Naturelle de la Caravelle</td>
<td>1990</td>
<td>40 pairs</td>
<td>Evans 1990 in Gros-Desormeaux et al. 2015</td>
</tr>
<tr>
<td>Caravelle Peninsula</td>
<td>2004</td>
<td>249–482</td>
<td>Temple 2005</td>
</tr>
<tr>
<td><strong>Saint Lucia Iyanola range</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Anse to Louvet</td>
<td>1971</td>
<td>75 pairs</td>
<td>King 1981</td>
</tr>
<tr>
<td>Petite Anse to Dennery Knob</td>
<td>1987</td>
<td>58 pairs</td>
<td>Babbs et al. 1988</td>
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<tr>
<td>Petite Anse to Dennery Knob</td>
<td>1992</td>
<td>46 pairs</td>
<td>Ijsselstein 1992</td>
</tr>
<tr>
<td>Petite Anse to Lumiere</td>
<td>2002</td>
<td>108–221</td>
<td>Temple 2005</td>
</tr>
<tr>
<td>La Ti Tanse to Dennery Knob</td>
<td>2006</td>
<td>80 (95% CI: 33–197)</td>
<td>Young et al. 2010</td>
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<tr>
<td><strong>Saint Lucia Mandelé range</strong></td>
<td></td>
<td></td>
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<tr>
<td>Ravine Pascal to Praslin River</td>
<td>1994</td>
<td>16</td>
<td>John 1995</td>
</tr>
<tr>
<td>Entire Mandelé range</td>
<td>2002</td>
<td>1,184–2,655</td>
<td>Temple 2005</td>
</tr>
<tr>
<td>Entire Mandelé range</td>
<td>2006</td>
<td>1,121 (95% CI: 696–1,807)</td>
<td>Young et al. 2010</td>
</tr>
<tr>
<td>Entire Mandelé range</td>
<td>2007</td>
<td>1,034 (95% CI: 731–1,463)</td>
<td>Young et al. 2010</td>
</tr>
</tbody>
</table>

*See Fig. 3 for differences in survey coverage. La Ti Tanse and Petite Anse refer to the same location.

1951, however, a pair was rediscovered on the Caravelle Peninsula (Pinchon and Bon Saint Come 1951 in Gros-Desormeaux et al. 2015), and by the 2000s, the population decline driven by conversion of dry forest to agriculture and pasture and introduction of the mongoose appeared to have reversed (Table 1; Gros-Desormeaux et al. 2015). For the Saint Lucia Iyanola population, the decline continued throughout the 20th century (Table 1; Temple 2005, Young et al. 2010), but the discovery (and presumable growth) of the Mandelé population in the 1990s (John 1995) had by the 2000s reversed this declining trend for the total estimate in Saint Lucia (Table 1). Current population size estimates from Mandelé are an order-of-magnitude higher than any of the 20th or 21st century estimates from Iyanola (Table 1). Distance sampling in the Mandelé range by the Saint Lucia Department of Forest and Lands Resources Development and Durrell Wildlife Conservation Trust has occurred annually since 2006, and the published estimates from 2006 and 2007 put the population at ~1,000 individuals (Young et al. 2010). Using the most recent published mean estimates from each range (Table 1) produces a global population estimate of under 1,500 individuals with 21% of it residing in Martinique, 6% in Iyanola, and 73% in Mandelé. However, a recent re-analysis of the 2006 and 2007 data from Mandelé that incorporates additional data on detectability has increased the early estimates by 40–60% (M.N. Morton et al. in prep.) indicating that the population may be somewhat larger.

Field data (Temple 2005, Mortensen 2009, Young et al. 2010) were used to parameterize the first demographic population projection model for the White-breasted Thrasher (Mortensen and Reed 2016). The focus was on the Mandelé population because Mandelé is the species’ current stronghold and is the site of recent, significant habitat loss. Extinction risk was sensitive to juvenile and adult survival rates. As long as survival rates remained close to the high values estimated before habitat loss, quasi-extinction risk, defined as the population falling below 100 individuals, was low under extant habitat area. However, estimated quasi-extinction risk increased under the reduced habitat area expected when current plans for resort construction are completed (Ernest 2005; see next section). Improving survival estimates and determining the cause or causes of juvenile mortality were identified as research priorities.

**Threats and Conservation**

The primary extant threat to the White-breasted Thrasher in Saint Lucia is habitat loss, and in Martinique, it is predation by introduced mammals (Gros-Desormeaux et al. 2015, BirdLife International 2017). The thrasher has been on Schedule One (Fully Protected) of Saint Lucia’s Wildlife Protection Act since 1980, which prohibits take without a permit and makes it an offense to destroy the species’ nests (Saint Lucia Wildlife Protection Act of 1980). However, only 4% of White-breasted Thraser habitat in Saint Lucia is under any form of formal protection (Felix et al. 2014). The Mandelé range in southeastern Saint Lucia, which is largely unprotected, has recently been reduced again, due to loss of dry forest during construction of Le Paradis beach, golf, and marina resort (Mortensen 2009, White 2009, White et al. 2012). Forest clearing began in 2006, but has been at a standstill since 2008. To date, 20% of White-breasted Thrasher habitat in the Mandelé range has been lost to this development, which
is a 16% loss of thrasher habitat across all of Saint Lucia. When (or if) construction is complete, a projected 34% of the Mandelé habitat will have been lost (Felix et al. 2014). Since this estimate by Felix et al. (2014a), a wind farm has been proposed adjacent to Le Paradis, to be built on land parcels representing an additional 16% of the Mandelé range (Caribbean News Now 2015). Potential impacts to thrasher habitat and thrasher populations during this project’s operational phase are unclear. They may include positive ones for the species, such as restricted access to inhabited areas. In contrast, potential impacts during the construction phase are also unclear, but expected habitat loss and disturbance could lead to shifts in distribution away from affected areas, as was observed during construction of Le Paradis (Mortensen 2009, Young et al. 2010). In the future, the biggest drivers of habitat loss are likely to be heavy-footprint touristic developments, like Le Paradis, and a proposed extension of Saint Lucia’s highway through the island’s north-east corridor, i.e., Iyanola (Felix et al. 2014). In contrast, at least 50% of the species’ habitat in Martinique is protected (Gros-Desormeaux et al. 2015) in the Réserve Naturelle de la Caravelle (established in 1976) and areas designated as zones naturelles d’intérêt écologique, faunistique et floristique (ZNIEFFs) (Temple 2005).

Another threat to the White-breasted Thrasher is non-native species, primarily predatory mammals (BirdLife International 2017). The suite of known and putative mammalian predators was discussed above. Other non-native species are not known to be thrasher predators, but some can still have negative impacts. In particular, feral and free-roaming domestic pigs (Sus scrofa) have destroyed the ground layer and lower vegetation over a wide area of the Iyanola range in Saint Lucia (Felix et al. 2014). The Shiny Cowbird (Molothrus bonariensis) has likely been present in Martinique since 1948 and in Saint Lucia since 1931 (Post and Wiley 1977), and it is now commonly seen in the Saint Lucia Mandelé range (JLM pers. obs.). So far, White-breasted Thrashers do not appear to be a target of nest parasitism (0 of 326 monitored nests were parasitized; John 1995, Gilardi 1998, Temple 2005, Mortensen 2009), though the Shiny Cowbird is recorded parasitizing the St. Lucia Oriole (Icterus laudabilis; Post et al. 1990; JLM pers. obs.).

In the past two decades, avian diseases have attracted much attention for their impacts on people, domestic animals, and wild birds (Paul 2012). Two avian diseases known to be spreading through the Caribbean region are West Nile virus (Komar and Clarke 2006) and influenza A (e.g., Senne 2020). Avian pox, though possibly already present, was only recently characterized in the Caribbean (Arathy et al. 2010). So far, there is no evidence of White-breasted Thrasher infection with any of these diseases (Felix et al. 2014). However, the blood parasites (Haemoproteus and Plasmodium species) that cause avian malaria have been recorded in the White-breasted Thrasher in Saint Lucia (Fallon et al. 2004) and are present in other avian species in Martinique (Fallon et al. 2003). The severe impacts, including species extinctions, of avian malaria on birds in Hawaii, where the disease was introduced in the late 19th century (Atkinson and LaPointe 2009), have not been reported in the Caribbean where evidence suggests the parasites and their host species have co-existed for a much longer time (Fallon et al. 2003).

Any small populations, and particularly those concentrated at one or a few sites, are vulnerable to stochastic environmental events such as hurricanes, flooding, and wildfires (Shaffer 1981). For example, Hurricane Allen in 1980 damaged or destroyed 80% of Saint Lucia’s forests (Jeggo and Taynton 1980). More recently in 2010, Hurricane Tomas inflicted considerable, though localized, damage, primarily through landslides and flooding (Kambon et al. 2011). While such stochastic events may actually act to maintain tropical dry forest structure (Van Bloem et al. 2005), further habitat destruction, degradation, and fragmentation can be expected to reduce the resilience of these forests to the impacts of stochastic events (Laurance and Curran 2008, but see Van Bloem et al. 2005).

These ongoing threats motivated the development of a conservation plan for the White-breasted Thrasher (Felix et al. 2014). The plan is specific to the Saint Lucia subspecies, which constitutes ~80% of the thrasher’s total population and faces different primary threats than the Martinique subspecies. This is the first White-breasted Thrasher conservation plan, although it was certainly not the first to recommend conservation and management actions (e.g., Temple 2005, Daltry 2009, Morton 2009, Toussaint et al. 2009). The plan was produced with input from a two-day participatory workshop held in Dennery, Saint Lucia, in February 2014. The main recommendations of this plan, called the Gòj Blan Plan after the species’ local Kwéyòl name, are: (1) no net loss of thrasher habitat and bringing at least three sites under management, starting with existing forest reserves; (2) improvement of degraded areas within the sites under active management; and (3) reduction of non-native predators at thrasher sites. As part of meeting these objectives, high value is ascribed to education, and public awareness and participation. This approach, along with habitat protection, was key in the improved status of the St. Lucia Parrot (Amazona versicolor), whose population increased from ~100 individuals in the 1980s to ~2,000 today (Morton et al. 2011).

Conclusions

The White-breasted Thrasher is a rare species by most definitions (Rabinowitz 1981). It has a narrow geographic distribution, restricted habitat specificity, and locally small population sizes. All of these traits are linked with population persistence (Lee and Jetz 2011), with range size, in particular, being a very strong predictor of long-term extinction risk (Lee and Jetz 2011, Harnik et al. 2012). Clearly, stemming further loss of thrasher habitat should be a priority for species conservation. In Martinique, 50% of thrasher habitat is already under formal protection, but in Saint Lucia, only 4% is protected. However, there are current recommendations to designate the Mandelé and Iyanola ranges, both of which have already been designated Globally Important Bird Areas (Anthony and Dornelly 2008) and Key Biodiversity Areas (Wege et al. 2010), as a Protected Landscape and a National Park, respectively (Haffey 2009). Currently, the Government of Saint Lucia is engaged in the Iyanola Project, which aims to develop a land use plan for Iyanola and surrounding areas and put in place sustainable land management policies (Ministry of Sustainable Development, Energy, Science and Technology 2015). Beyond habitat protection, further efforts should be directed to research on forest restoration, improved annual survival estimates, and continued monitoring of population sizes.
While the call for White-breasted Thrasher research and conservation has been answered in part, further work and management interventions are needed.

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