



**PROGRESS REPORT September 2015  
Rufford Small Grant Foundation**

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17373-1. Evaluating the fragmentation of potential habitat of *Campylorhynchus yucatanicus*, an endemic bird of Yucatan Peninsula for conservation aims.

**Implementation of research activities during the period May to September 2015**

During the first part of May the area between Ria Celestun and Ria Lagartos was explored in a joint collaboration with the “Niños y Crías” (children and fledglings) Civil Association. We located and georeferenced sites where individuals of the Yucatan Wren were sighted. In addition, we recorded localities which could potentially be inhabited by this species, due to the presence of its characteristic habitat. The potential distribution and ecological niche of this species was modelled using the 78 presence points obtained in the field. Contact was established with potential field guides in the communities of Celestún, Sisal and Ría Lagartos, where possibilities for collaboration were discussed.

Twelve sites were visited between the month of May and September 2015 (Table I, Figure 1), where individual bird counts were carried out in order to determine the relative abundance of the species. In addition to the planned counts, a total of 152 Yucatan Wren (17 in Celestún\_Oeste, 18 in Celestún\_Este, 12 in Ría Lagartos\_Basurero, 8 in Ría Lagartos\_Ranchos, 10 in Sisal\_Oeste, 14 in Sisal\_Este, 1 en Chelem, 13 en Chixchulub\_Sur, 16 en Chixchulub\_San Benito, 13 en Xcambo\_Sur, 16 in Dzilam\_Sur, 14 in Santa Clara) individuals were captured and marked by a combination of coloured rings in order to identify if there is a flow of individual birds between fragments of suitable vegetation. Out of the 152 individuals captured, only 26 birds were re-sighted in the fragments where they were captured. The bird observers and guides from the local communities have collaborated in the reporting of any sightings of marked individuals (Figure 2).

During bird capture, measurements of external structures such as tarsus, beak, wing, tail and body as well as weight, were recorded. These measurements could identify morphometric variables that differentiate between male and female individuals. Figure 3 shows the distribution of data for each variable as well as the best-fit Kernel density estimation, calculated using the Past 2.17 statistical package. As the measured variable curves presented a bimodal distribution, we expected to find differences between male and female individuals with regard to weight, wing length, tarsus length, and beak+skull length.



**Figura 1.** Photographs of several threats identified at the 12 sampling sites (see Table I) where the Yucatan Wren is present.

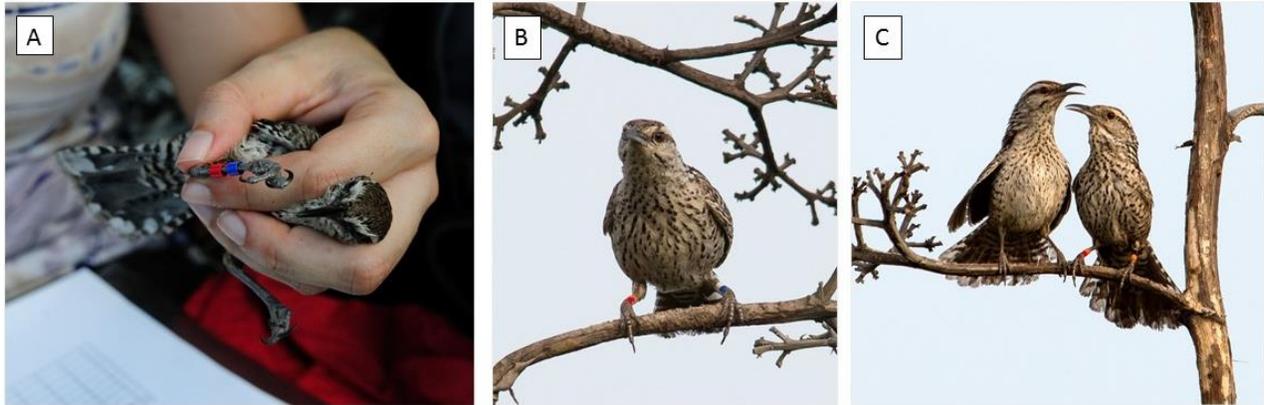
A vegetation and land use map was produced, using six Landsat 8 satellite images that were taken during the dry season of 2015 (Figure 4). Bands 2 and 7 were coupled, while the thermal and panchromatic bands were removed, creating a mosaic which was used to assemble the images using the Erdas Imagine 2014 software package. To obtain the vegetation map, a supervised classification was carried out by implementing the maximum likelihood method on data collected in the field, with between 30 to 65 training areas for each class/ type of vegetation. We identified 14 classes of vegetation and/or soil type that correspond to a simplification of the Series V, INEGI (National Institute for Statistics and Geography) Classification.

According to our classification, only 7.21% of the total area within the buffer zone (a strip that extends from the sea to 20km inland and stretches along the coast from Ría Celestún to Ría Lagartos) consists of vegetation types that are characteristic for this species; therefore, the distribution of this species could be more restricted than defined by CONABIO (National Commission for Biodiversity). The inclusion of more accurate vegetation maps, with an adequate spatial and spectral resolution, will help reveal the actual conservation state of this threatened species. During the next stage of the

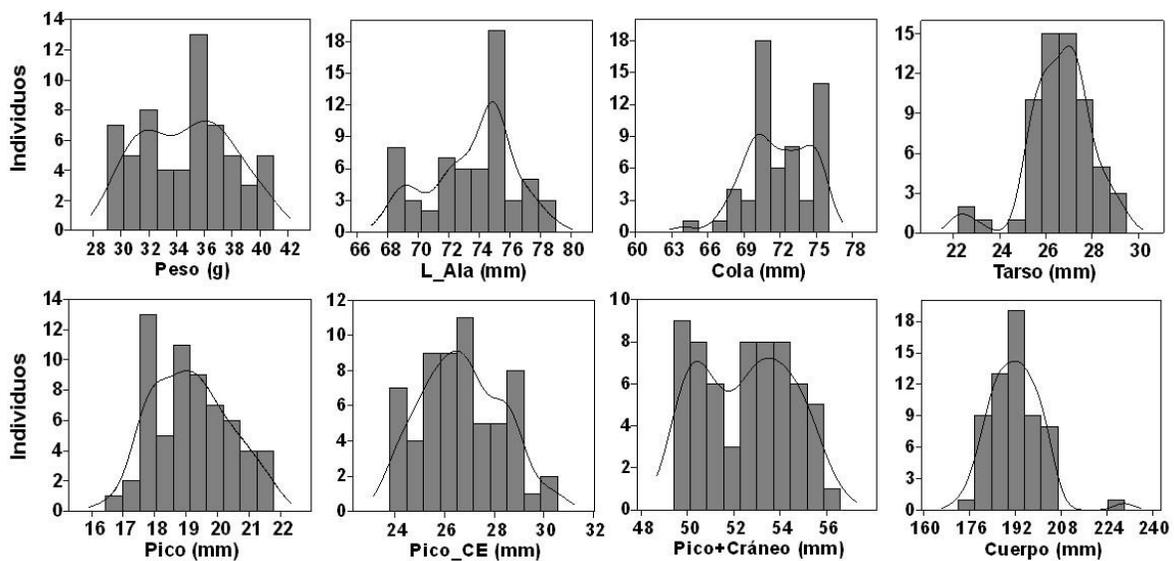
project, the maps will determine the relationships between landscape structure and the conservation state of this endemic species of wren.

**Table I.** Characterization of visited sites and identified threats to the Yucatan Wren in the north of the Yucatan Peninsula.

<b>Nombre del sitio</b>	<b>Characterization and identified threats</b>
1. Celestún_Oeste	The site is located to the west of the town of Celustun. The coastal dunes are one of the areas most affected by deforestation and provoked fires. There is a high level of exploitation of mangroves associated with the dune vegetation for household use and fishing.
2. Celestún_Este	The site is located to the east of Celustun. It is characterized by internal lagoons or ponds that are exploited for salt production (salt pans).
3. Ría Lagartos_Basurero	The habitat has been modified and fragmented due to tree felling for mainly household use, the development of livestock farming, and illegal rubbish dumps.
4. Ría Lagartos_Ranchos	The habitat has been modified and fragmented by the development of livestock farming.
5. Sisal_Oeste	The site is located to the west of the town of Sisal and within the El Palmar State Nature Reserve, which helps maintain habitat conservation. However, there are plans to sell land plots that will probably be used for infrastructure. Furthermore, it is a game preserve and during the hunting season (from approximately February to May) there is heavy traffic of hunter's vehicles which may affect the start of the breeding season.
6. Sisal_Este	Habitat fragmentation due to poorly-planned development of urban and tourism infrastructure was identified
7. Chelem	Habitat fragmentation due to poorly-planned development of urban infrastructure and plantations of commercial species such as coconut.
8. Chixchulub_Sur	The site is affected by land use changes for the development of other human activities such as livestock farming.
9. Chixchulub_ San Benito	Habitat fragmentation due to poorly-planned urban and tourism.
10. Xcambo_Sur	The site is affected by land use changes for the development of other human activities such as livestock farming, the establishment of illegal rubbish dumps and deforestation for household uses.
11. Dzilam_Sur	One of the areas most affected by land use changes due to the development of other activities such as livestock farming. There are plans for a windfarm at this site. This could result in severe damage by vegetation clearance for the construction of the planned windfarm.
12. Santa Clara	Habitat fragmentation due to poorly-planned development of urban infrastructure and plantations of species such as coconut

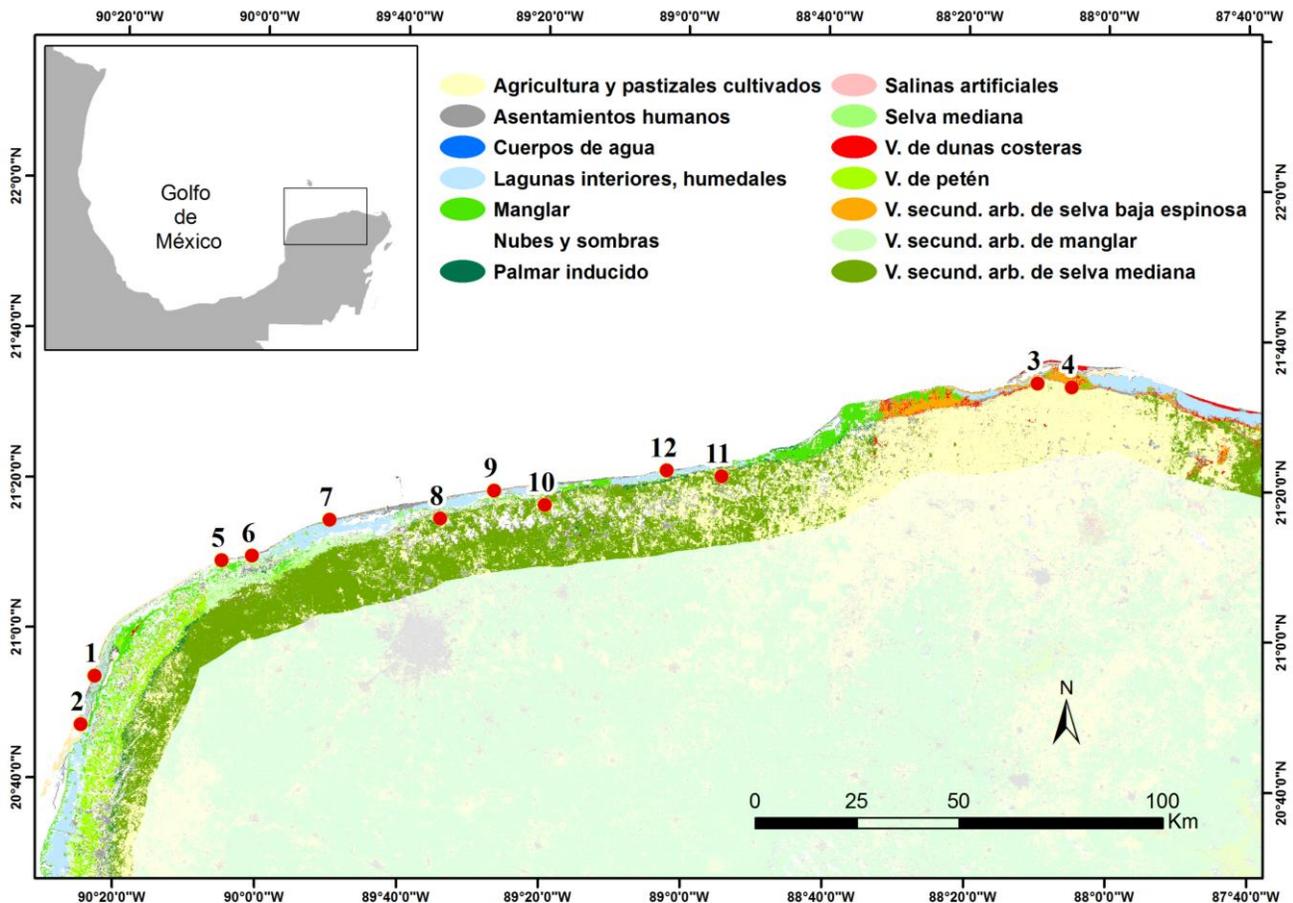


**Figure 2.** Photographs of the ringing of *C. yucatanicus* individuals (**A**) and those re-sighted by bird observers (**B** and **C**), **B**: individual captured in Sisal on May 27, 2015, and sighted carrying nest material on June 10, 2015, a few metres from where it had initially been captured (photo and information: Apolinar Basora), **C**: individual captured in Sisal on May 28, 2015, and sighted with mate (unringed) on 3 June 2015 (photo and information: Yarky Moguel Ortega).



**Figure 3.** Data distribution of each measured variable for captured individuals of *C. yucatanicus* (the sites at Sisal are not included). The Kernel density curve of best fit is displayed. Pico\_CE: beak length; L\_Ala: wing length.

However, during the next stage of the project, we plan to repeat the process using images taken from the Modis satellite. These have a greater spatial resolution, thus will produce improved results. On this map, fragmentation indexes will be measured for all the established plots where counts were conducted.



**Figure 4.** Location of the sites visited during this period, displayed on a vegetation and land use map created using Landsat 8 satellite images of the Yucatan Peninsula, Mexico.

### **Training and Environmental Education.**

There was a call for local field guides, inhabitants of communities close to the sampling sites and owners of livestock farms. The guides from Ría Lagartos and Celestún participated in the counts and capture of individuals. We trained local bird observers to read the rings and record re-sightings. Talks with local inhabitants were undertaken with the aim of training them to recognize the species and in the re-sighting of marked species. All the guides we talked to, were familiar with the Yucatan Wren; however, they were not aware of its threatened category or of the factors that place its populations at risk. The majority of the inhabitants of nearby communities that we interviewed were not familiar with the species and thus could not identify any threats to its survival. The conservation of homegardens and patios with native vegetation is one of the proposed management actions that could help maintain a certain level of habitat continuity, and therefore, the overall health of Yucatan Wren populations. As

part of the Festival de las Aves (Bird Festival) in the state of Campeche, organized by ECOSUR ( El Colegio de La Frontera Sur), we interacted with children, giving talks and offering participative games with the aim of exhibiting the Yucatan Wren and emphasizing the importance of protecting this species (Figure 5).



**Figure 5.** Training of guides, inhabitants of communities near to the study sites and bird observers in Ría Lagartos (A), collaboration with researchers of ECOSUR and the Children and Fledglings Civil Organization (B and C) and environmental education of the children participating in the Campeche Bird Festival (D).

### Dissemination

An oral presentation will be imparted during the “I Simposio Nacional de Especies en Riesgo : recuperando nuestro futuro”, (1<sup>st</sup> National Symposium of Species at Risk: Recovering our Future) which will take place between the 3<sup>rd</sup> and 6<sup>th</sup> of November, 2015 , in the city of Queretaro and organized by the Autonomous University of Queretaro and CONANP (National Commission for Protected Natural Areas). The presentation is titled “*Campylorhynchus yucatanicus*: an endemic bird with a restricted distribution and climatic niche that requires urgent attention”