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### **Black-tailed Godwits (*Limosa limosa*) in southern Iberia, habitat description and finding colour marked birds from 1 – 26 February 2022**

Hooijmeijer, Jos; Howison, Ruth; Barba Escoto, Luis; Craft, Taylor; Stessens, Marie; Jager, Kees de; Loos, Bob; Bonthuis, Siebe; Hotting, Maarten; Franken, Marycha

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# Black-tailed Godwits (*Limosa limosa*) in southern Iberia, habitat description and finding colour marked birds from 1 – 26 February 2022

Portugal (Sado, Tejo & Algarve), Spain (Doñana & Extremadura)



Expedition report, University of Groningen & Global Flyway Network, The Netherlands

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Last but not least, all the people and organizations that gave us their hospitality to be as a guest in their areas. We are very pleased that we could make use of this. Hope to see you all again next year!

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Chapter 1. in this report is based on and partly identical to previous reports about searching and finding Black-tailed Godwits in Spain that can be found on:

<https://www.globalflywaynetwork.org/publications>

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© Photographs by the authors

## **0. Summary**

In this expedition from 1 to 26 February 2022 we visited the most important areas for Black-tailed Godwits in southern Spain and Portugal during northward migration. Our aim was to resight individual colour marked birds, describe the habitats godwits used and to gain information on threats and opportunities by field observations and meetings with local experts. In this report we present a daily overview of our findings with photos, locations we visited, numbers present and the first conclusions and recommendations. More reports from expeditions to Iberia and West Africa in previous years can be downloaded at: <https://www.globalflywaynetwork.org/publications>

### **Tejo and Sado**

The winter of 2021-22 has been very dry in southern Iberia and during our stay from 1-26 February it was no different. When we arrived we found some wet and recently ploughed fields in the Giganta fields but in general the amount of suitable fields was lower than in previous years and during our stay there was hardly any farming activity. Large stretches of the big rice fields at Comporta, Carregado, Cardal and Belmonte were dry as well as lots of smaller sites.

It is hard to say if this might have influenced the total number of godwits that could be supported. The maximum total number was reached by half February: ~40.000, definitely less than some years ago. But as the conditions were favourable to migrate further north, it might have been that some birds made a shorter stop-over and turn-over was simply higher. Arrival in The Netherlands was definitely early this year. In early February the night time roost was located south of the N10 in the Giganta rice fields but later they shifted to rice fields northeast of Samora Correia close to the Rio Sorraia. From there they explored nearby fields as well as the rice fields on the opposite side of the river at Zé do Pinho, but also flew to the fields south of the N10 at Cardal and Ponta da Erva which they also used as a daytime roost. Like in previous years the foraging activity was high just after dawn and in the late afternoon but many hours were spent on one leg between 10:00 and 15:00. We did not see any hunters shooting waders this year but birds were definitely disturbed on Sundays (hunting day) for instance near Samora Correia on 6 February. Disturbance also came from raptors but we did not see a successful capture of a godwit. In the second half of the month the numbers dropped rapidly but thanks to the godwits with satellite transmitters, we were always able to find them. For the first time in many years the Sado had a decent 4.000 godwits, predominantly in the area north of Comporta.

Previous studies show that the timing of flooding and ploughing in rice fields influences the sites selected by godwits during the staging period. During our expedition to Iberia, we aimed to collect sufficient ground data that will be used to detect the timing of management strategies and assess the correlation between ploughing dates, field water level, and godwit site selection in rice fields - at the landscape scale. As management controls the availability of spilled rice grains (the primary food source for staging godwits), we also attempted to get an idea of the spilled rice density in several different rice fields.

In the Tagus estuary, we found that rice grain densities were fairly low in sediment samples from several ploughed and flooded rice fields. This may be due in part to a limited sampling effort and limitations with hand sorting in the field. Like elsewhere in the Iberian peninsula, challenges with water management are quite apparent in the Tagus estuary. High salinity levels in the Tagus have compounded the already steep costs associated with pumping freshwater, resulting in poor economic returns for rice farming. Because of these issues, we expect a decrease in rice field coverage of the Tagus estuary in the coming years

### **Doñana**

In Veta la Palma we saw that some fishponds had dried up but others were filled to the rim and too deep for waders. Godwits numbers were low and most godwits (max.750) were concentrated in the more or less natural habitat in the canals and the estuary beside the fish ponds. The accurate positions of godwits equipped with a GPS-transmitter supported our findings during this period.



Most godwits were concentrated on the eastern side of the Guadalquivir river in the Natural Park 'Brazo del Este', which is an old tributary of the river, with a huge complex of rice fields besides some remaining natural habitat. It is located 17 kilometers south of Sevilla, where the main channel of the Guadalquivir forks off. After 39 kilometers of consecutive meanders, or vueltas, as the locals call them, it joins back up with the first channel, almost 16 kilometers further down. The natural park is the result of man made modifications to gain cropland from the Guadalquivir banks, one of the oldest branches of the river that runs through the marshes. Despite a large amount of human intervention, which started at the beginning of the last century, it has become an exceptionally important wetland for birds. Depending on the water levels in the old river arms, and the farming practices of the surrounding rice fields, godwits make use of this area for foraging, as well as roosting. During our visit we counted a maximum of 4.000 birds, even though we were not able to visit the whole arable complex due to closed gates and private area restrictions in the farmlands. Most birds concentrated in the natural wetlands. We saw very low numbers in the rice fields due to the drought and the shortage of wet and ploughed rice fields. Along with rice fields, we collected descriptions of other types of artificial wetlands used by non-breeding godwits in Iberia. The fish farms of Veta la Palma and Brazo del Este wetlands were one of the few areas near Doñana where relatively high numbers of foraging godwits could be found this year, apparently due to the drought. Formerly illegal wells that drain the aquifers underneath the coastal salt marsh wetlands of Doñana National Park are now legalised, and it would appear that the future prospects of Doñana as a favourable non-breeding destination are bleak. As such, the nearby fish farms of Veta la Palma are more important than ever before. We therefore recommend careful monitoring of future actions and water management that may impact the capacity of Veta la Palma to support staging godwits.

### **Extremadura**

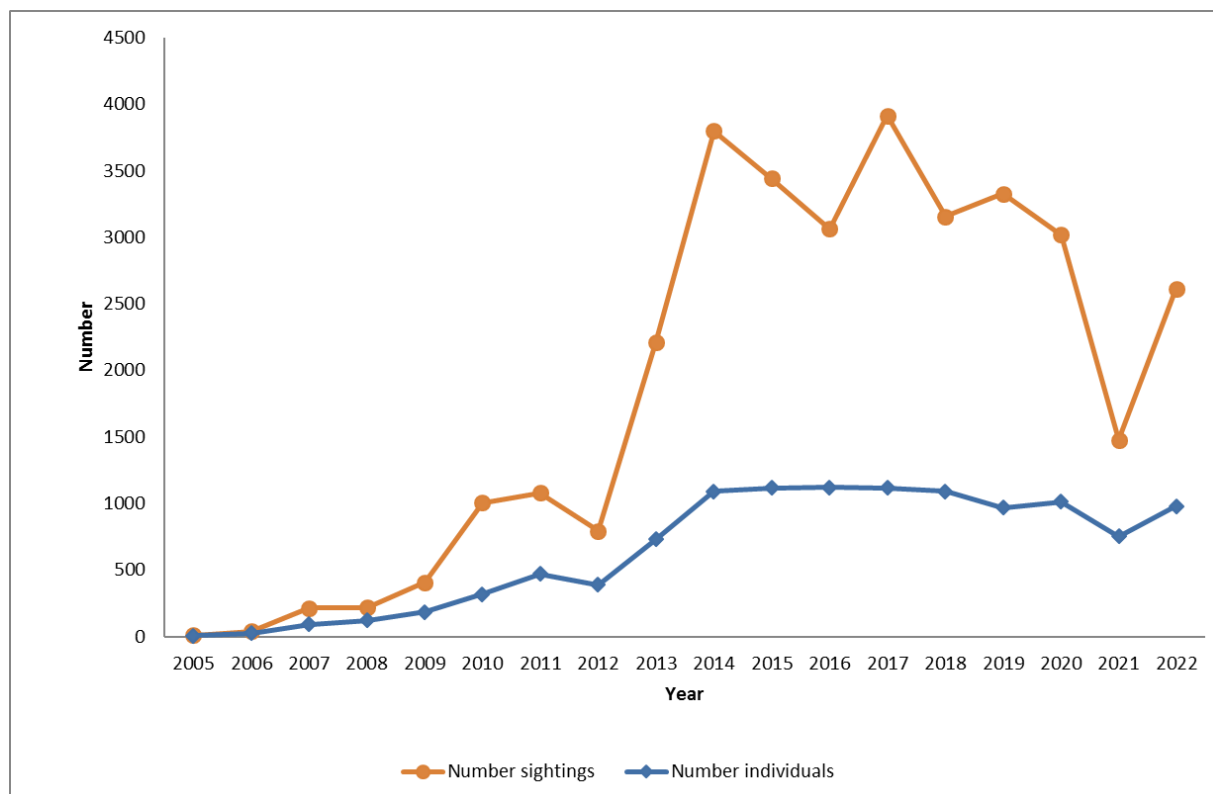
In the rice fields of the Extremadura the total number of godwits was very low this year and it was hard to find any reasonable numbers and flocks of any importance in the arable landscape. The maximum of birds we could count at one day was not more than 2.000 birds. We made several tours without finding any godwit at all! The few transmitter birds that were present helped us to find some flocks and fields used by them. The flocks we found were all concentrating in the eastern part of the area (see appendix A). We found a totally new area for us north of the village of Obando in a nature conservation area named "Periurbano de Conservación y Ocio Dehesa de Moheda Alta Park", in which a small complex of rice fields is located. The traditional core area around Santa Amalia and Hernan Cortes seems to lose its attraction for godwits more and more. Like in previous years we witnessed excessive spraying with glyphosate.

Recently more fields have been converted to alternative crops resulting in a reduced coverage of wet rice habitat in Extremadura. While drought and water shortages in the region undoubtedly contribute to the difficulties of rice farming in Spain, we learned from farmers in Extremadura that labour shortages, reduced subsidies, and restricted use of agrochemicals are playing a major role in the shrinkage of labour-intensive rice agriculture. Switching to crops that are less labour intensive become more attractive e.g. maize which can be cultivated with machinery. Although godwits were difficult to find in Extremadura this year, we did come across a decent amount of seemingly ideal foraging areas in flooded rice fields. This signals that habitat availability is not the only factor in deciding where to feed during stopovers. In previous years we have recognized illegal hunting as a possible cause but we did not come across anything like that this year. In our impression, raptors like Peregrine Falcons might have become more common and we witnessed raptor attacks almost on a daily basis. The landscape in Extremadura is much more suitable for surprise attacks than the more open rice fields in Doñana and the Tejo and could play a role in explaining the shift towards the greater Lisbon area.

Overall it is quite apparent that the natural wetlands, artificial wetlands, and the agricultural sector are competing for water. Comparable data collected in 2017 and now in 2022 provides crucial information to answer questions. What are the trends in the spatio-temporal distribution of available godwit staging habitat? What is the area of rice fields that are available (ploughed/flooded) for foraging during key stopover periods? Do godwits successfully take advantage of alternate staging grounds in the absence of their traditional staging areas? What are the impacts of agricultural inputs on habitat quality? What are the short and long-term prospects for wetlands (artificial and natural) in Iberian stopover sites? In answering these questions, we hope to forecast the impact of environmental changes on the non-breeding distribution of godwits, as well as guide conservation schemes that mitigate the loss of remaining high-quality staging areas.

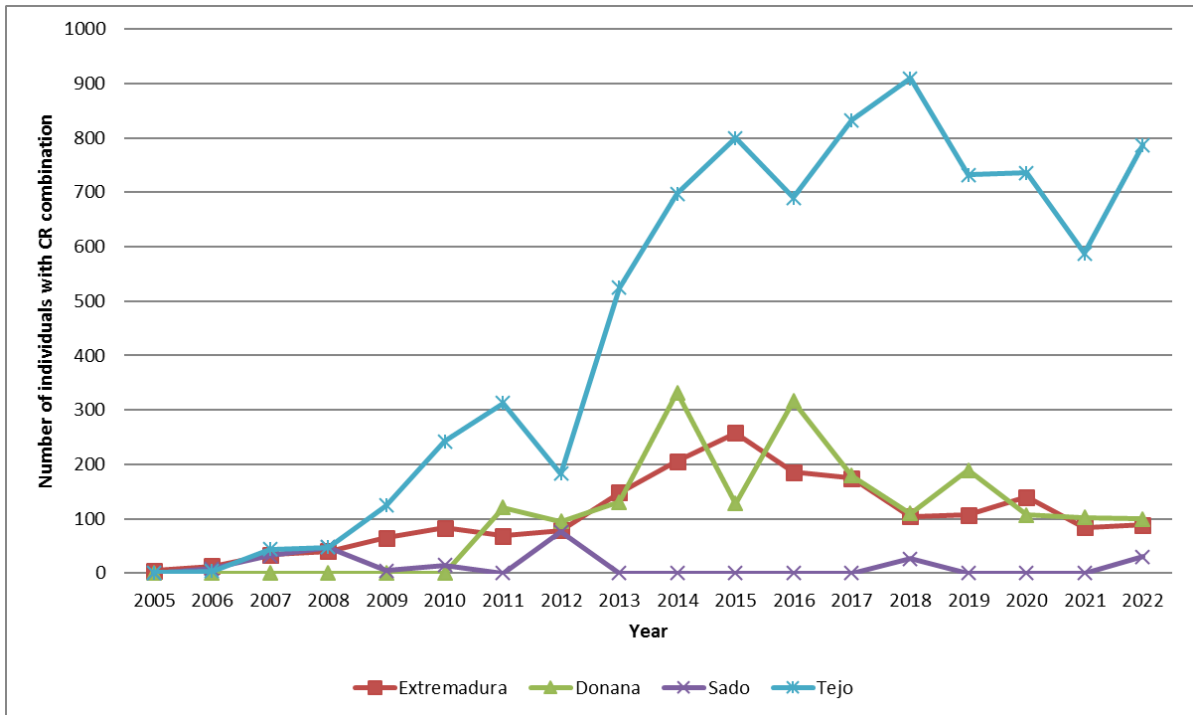
### Numbers, individuals and percentage of the population seen

A significant increase of the number of sightings of colour-ringed individuals from our own scheme was achieved between 2012 and 2014; despite a fairly constant resighting effort, since then the number of sightings has decreased slowly from about 3.800 to just over 3.000 in 2020. After a dip in the Corona-year 2021 the number increased again this year but did not get back at the 2014-2020 level. The number of individuals seen has remained fairly constant since 2014 but is slightly decreasing as well now, despite the fact that our Portuguese and Spanish colleagues contributed more than 500 resightings this year, considerably more than in previous years.



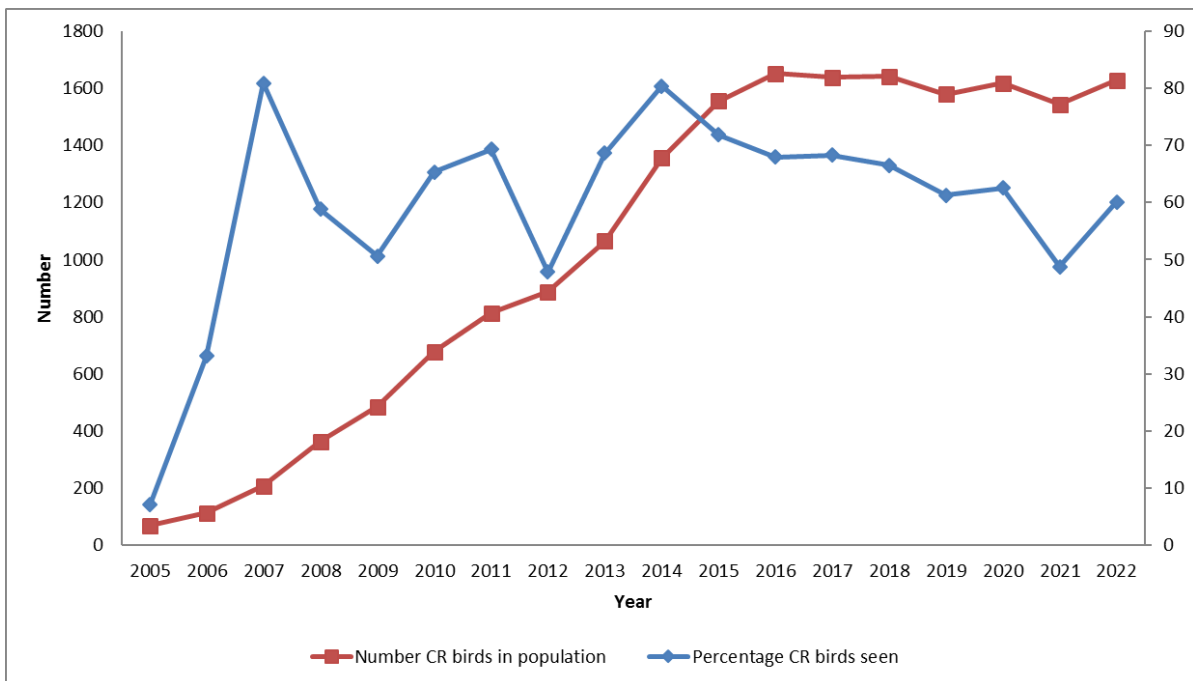
*Total number of sightings and observed ringed individuals from the RUG-scheme in Extremadura, Doñana NP, Tejo and Sado in January-February of each year (no code flags).*

If we zoom in to the different regions, it becomes clear that this decline is mainly caused by Doñana and Extremadura. This is no surprise as we counted less birds in these areas in recent years. The Tejo still by far produces most resightings and those numbers have remained fairly constant despite a possible decline in total numbers. The numbers in the Sado have been quite unpredictable for years now.



Total number of observed ringed individuals of the RUG scheme in Extremadura, Doñana NP, Sado and Tejo in January-February of each year (no code flags).

Less ringed birds seen could also be a result of less ringed birds in the population but that is not the case. The estimated number of alive ringed individuals has levelled off at around 1.600 birds, so with equal numbers ringed in a shrinking population, one would expect higher ring densities and a higher ring reading efficiency rather than a decrease in the numbers.



Estimated number of colour ringed birds in the population that are still alive and the observed percentage of those birds in Extremadura, Doñana NP, Sado and Tejo Estuary all together in January-February of each year (no code flags).

With equal numbers ringed in a declining population and a comparable resighting effort, you would also expect an increase in the resighting percentage of the colour ringed population but the opposite is true: we manage to find less ringed individuals every year.

Have we become less efficient in finding them because they forage less (rings are better visible during foraging) or do they forage more in less accessible or unknown places? There is no evidence for that and actually the godwits with transmitters are a tremendous help nowadays to locate them anywhere. Godwits might also be using other stop-over areas like the Spanish east coast, sites in France or simply move up north faster as the winters in The Netherlands have become milder. Another explanation is an increasing dilution of *limosa's* with *islandica's*. That simply means that you have to check more birds before you encounter a bird from our scheme.

The estimate of the number of ringed birds in the population is based on an annual survival of 85% for adults and 45% for 1<sup>st</sup> cy birds (>10 d old). More recent estimates suggest that these figures might be too high for recent years which implies that we have probably seen a higher percentage of the ringed population than as suggested above. As you can see in the figure above, we still have resighted 60% of the ringed population which is an excellent score but clearly with a decreasing trend.

# 1. Black-tailed Godwit Habitat and Demographic Studies

## Introduction and backgrounds

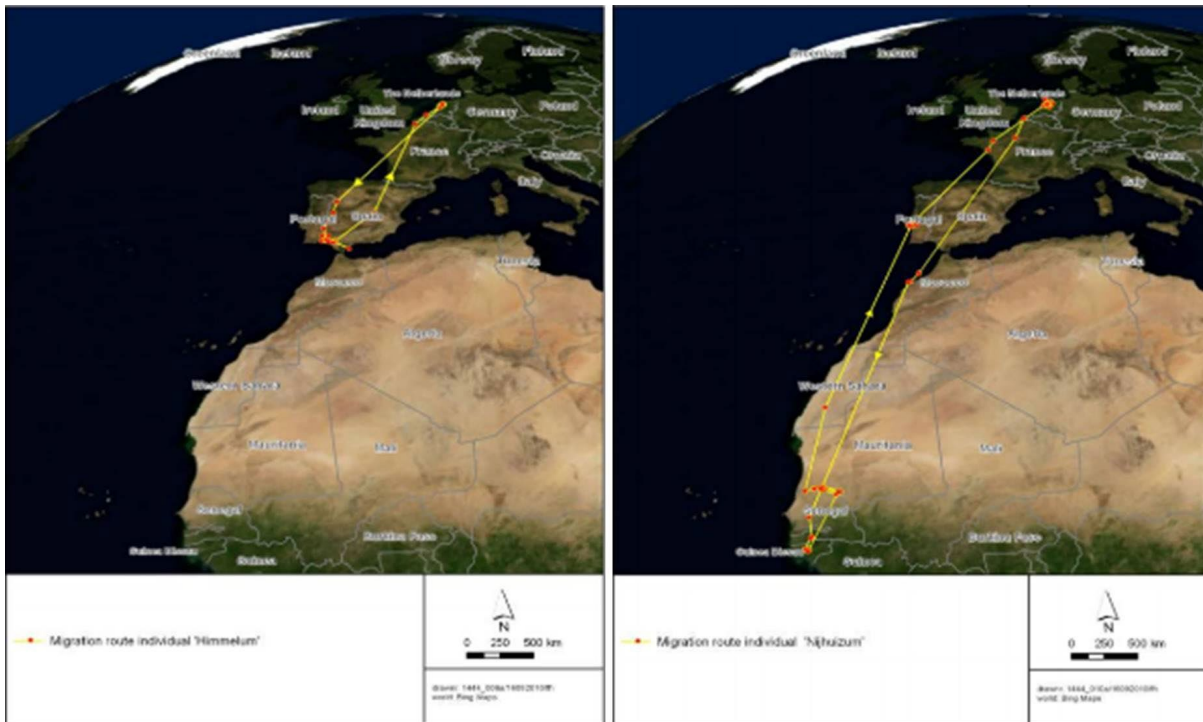
The Black-tailed Godwit (*Limosa limosa*; BTG) is a farmland bird that predominantly breeds in The Netherlands (Verstrael 1987; Thijssen 1904). The current Dutch population is estimated at 25.000 breeding pairs (extrapolated from Kentie et al. 2016) but still represents an important part of the total continental BTG population *Limosa limosa limosa*. However, the number of breeding pairs have declined rapidly over the last decades, as compared to the 120.000 pairs in the 1960s (Mulder 1972). This is mainly caused by a change in agricultural land use. Intensification and rationalisation have led to degradation of the breeding habitat, resulting in low reproduction. The population in the Netherlands cannot produce enough chicks for a stable population (Vickery et al. 2001; Newton 2004; Tscharnke et al. 2005; Teunissen & Soldaat 2006; Roodbergen et al. 2012). After the breeding season godwits migrate to southern Europe (Spain and Portugal) and West-Africa where they stay for wintering (Márquez-Ferrando et al. 2011; Hooijmeijer et al. 2013), mainly in agricultural areas such as rice fields. Throughout their annual cycle godwits select for farmland with a low to moderate land use intensity which makes them a key species to indicate routes towards sustainable agriculture. The Black-tailed Godwit qualifies since 2006 as “Near Threatened” on the IUCN Red List.

## Demographic research Southwest Friesland

To measure the changes in population numbers and the causes, the University of Groningen started in 2004 a long-term research in the south-western part of Fryslân, The Netherlands. In 2007 the research area expanded to 8400 hectares and since 2012 it increased again with another 1600 hectares (Groen et al. 2012). A colour-marked population of godwits was set up to make them individually recognizable. The knowledge that has been collected with this research has been implemented by policy makers and nature conservation organisations. Since 2020, the project has expanded into the Godwit Landscapes Project, still studying the godwit as a main focal species, but in context of the whole food-web of which it is part. Therefore studies on soil macrofauna, predators, insect availability, vegetation changes and human land use management have been included (Hooijmeijer et al., 2022).

## Migration and wintering sites Black-tailed Godwit

In 1983-1984 the wintering sites of godwits were explored for the first time. At that moment most godwits were wintering in rice areas along the West-African coast in Senegal, Gambia, Guinea-Bissau and further. Big numbers of godwits also occurred in the inner Niger delta in Mali (Altenburg & van der Kamp 1985), but they probably belonged to the eastern European population. Recently, the wintering behaviour has partly changed with an increasing number of godwits deciding to winter in southern Spain at National Park Doñana. In the 1980s during the first counts, only 4% of the NW-European population used this area as a wintering site but recent estimates suggest a big change with up to 23% of the population wintering in Spain. The most important reason for this is probably the creation of new artificial fishponds and rice fields. It is remarkable that this increase is not driven by climatic changes in the Sahel zone of West-Africa (Márquez-Ferrando et al. 2014). For godwits, staying in Iberia can be advantageous because they can skip a 3000 kilometre (v.v.) travel over the Sahara, a potentially dangerous migration route and save their fat stores for the next breeding season. The change in wintering grounds is remarkable and an important reason why we also want to do (demographic) research in West-Africa. We know now that juveniles are more likely to make these kinds of shifts than adults (Verhoeven et al., 2017), but not how they develop their individual migration strategy and perhaps thereby change the migration pattern of the species. These changes can also have consequences for the survival rate of both adults and juveniles. Moreover, they can lead to differences in reproductive success, for example due to differences in body condition upon arrival on the breeding grounds. Both are demographic parameters that can rapidly influence population dynamics.



Two classical migration routes of Black-tailed Godwits based on satellite tracking. The left map shows the route of an Iberian wintering bird. On the right an African wintering bird. Iberian wintering birds save a 6000 km flight and don't need to cross the Sahara twice (Hooijmeijer et al., 2013).

### Habitat study

Anthropogenic alteration of natural wetlands is having a major impact worldwide with consequences (both negative and positive) for migratory species such as continental Black-tailed Godwits. On their migratory route Black-tailed Godwits pass through France and either stage or spend the non-breeding period in southern Spain and Portugal. Many will make the Saharan crossing to overwintering sites in West Africa, namely; the Senegal Delta and coastal region of Senegal, The Gambia, Guinea-Bissau, Guinea, Sierra Leone and central Mali. In all these countries godwits are heavily dependent on man-made habitats like water buffers, fish farms, saltpans and rice fields.

With remote sensing techniques and the locations indicated by godwits with satellite transmitters, we found out that during the non-breeding period Black-tailed Godwits show a preference for stable habitats within a relatively low productivity range (EVI value 0.1-0.2), which are associated with open wetlands, low vegetation cover and shallow surface water (Howison et al., 2019). Additionally, godwits spend much of their time foraging either on the mudflats of saline mangrove wetlands or in wet rice fields, however little is known of the nature of the prey items at different times of the year. However, remote sensing data is difficult to interpret without accurate ground-truthing information. In the past years we conducted surveys categorising and describing habitats, measuring environmental variables such as water salinity and soil penetration pressure, feeding efficiency of the godwits and carefully searching the substrate to establish the identity of godwit prey items.

### Expeditions West-Africa and Iberia

In Southern Iberia godwits are largely confined to three major staging during northward migration: Doñana NP and Extremadura in Spain and the Tejo and Sado estuaries near Lisbon in Portugal.





Three main areas where many godwits can be observed during January-February; Extremadura (1), Doñana NP (2), Tejo-Sado (3)

Since 2005 we have started working every winter in those regions in close cooperation with local colleagues to study habitat use and collect resightings of individual godwits. Ring resightings in Iberia and West Africa are an important source of data for survival estimations in the different life stages of the godwits:

- If a godwit disperses outside our study area, the chance that it will be resighted elsewhere in The Netherlands is small. Without the resightings in the stopover areas, we would assume that this individual is dead and therefore underestimate annual survival, because in the breeding areas individuals have very different resighting probabilities.
- Secondly, with enough resightings from the Iberian Peninsula and West-Africa we can calculate seasonal survival. In other words, we can calculate in which period of the life cycle mortalities occur more often. Or we can find out if birds that cross the Sahara have a different survival rate than birds that stay the entire winter in southern Europe.
- By measuring the density of individuals with colour rings, we can monitor the population size of the western European part of the Black-tailed Godwit population (Kentie et al. 2016)

We also regularly visit southern Iberia, in particular Doñana in the first 2 weeks of October. The reason for the timing of this fieldwork is that in these two weeks one has the best chance to identify godwits that do not migrate to Africa at all, but stay in Europe for the entire non-breeding season. Based on tracks from geolocators and satellite tagged godwits we know now that godwits start returning from sub-Saharan Africa on a continuous scale between October and March, and that when the first ones are arriving the last ones are still on their way there. Thus, the first half of October is the best period for correct identification of godwits as a non-trans-Saharan-migrants; that is: the least chance to misidentify a bird. You could safely say that these birds winter in Europe but a trans-Saharan-migrant is not automatically a bird that winters in Africa!

Until recently, West-Africa was the only area along the migratory flyway from which we didn't have many observations of colour-marked individuals. In the past, only small numbers of colour-ringed birds have been reported, mainly by birdwatchers and, more recently, by local scientists. Therefore, in November 2014 the University of Groningen, in cooperation with Global Flyway Network and financially supported by Birdlife Netherlands, embarked upon their first expedition to the wintering grounds in West-Africa and since then we visited the region 2-3 times per year till 2019. This has yielded a great number of resightings. The most important goal of the first missions was to get a

good overview of the wintering grounds, resighting conditions, local facilities and knowledge and to make a start with setting up a dataset of individually recognizable godwits that winter in West-Africa. Secondly we made a pilot study of habitat choice and prey choice to collect ground truthing data for spatial analyses combining satellite imagery with GPS-tracking information. In the near future we aim to continue demographic research and set up habitat study and restorations projects in this area in close cooperation with local scientists, volunteers and conservation organisations as part of the EU LIFE-IP Project Grass-Bird-Habitat.

In this expedition from 1 to 26 February 2022 we visited the most important areas for Black-tailed Godwits in southern Spain and Portugal during northward migration. Our aim was to resight individual colour marked birds, describe the habitats godwits used and to gain information on threats and opportunities by field observations and meetings with local experts. In this report we present a daily overview of our findings with photos, locations we visited, numbers present and the first conclusions and recommendations.

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## **2. Birds and habitat, daily overviews 1 – 26 February 2022**

### **Portugal Team 1: Kees de Jager and Maarten Hotting, 1-10 February**

#### **1 February**

Due to personal circumstances, Kees had to decide to depart a few days later, so Maarten traveled to Portugal alone. The flight went well and once arrived in Lisbon it is already the end of the afternoon and there is no time left for a field visit. After picking up the luggage and the rental car it is almost dark. Our accommodation this year was in Salvaterra de Magos, close to the Tagus river.

#### **2 February**

Cold start of the day: 3C; clear blue sky and maximum temperature of 16C

Total amount of godwits: ~9.000

The day starts fresh, when leaving the house at 07:40 it is only 3C and a clear blue sky. At 08:15 arrived at Giganta and along the main road at Cara Larga there is the first group of Black-tailed Godwit, 1.400 exx foraging right along the road in a wet rice field. Amongst them the first ringed birds.

After picking up the entrance pass at Rui Paixão it was time for a reconnaissance tour through the Giganta Ricefields. In the central part of the area at Giganta were some wet rice fields that had already been ploughed. On these fields several large groups of Black-tailed Godwit varying between 750 – 1.300 birds. Ideal groups to read rings and score ring density. On the most wet field there was also a group of 69 Spoonbills.

During a further reconnaissance tour of the area, among the Greylag Geese there was a surprising species, a Pink-footed Goose (only the 3<sup>rd</sup> case for mainland Portugal).

The rice fields around the airport at Ponta da Erva are not yet ploughed and therefore not suitable for Black-tailed Godwits. From the transmitter data, there should be a suitable field on the east side of the area, but this area is closed with an additional fence making access not possible.

On the south side of Giganta only the central part seems to be suitable for Black-tailed Godwits. On the north side of the N10 there are still some fields that have been ploughed recently, next to the field in Cara Larga, where Black-tailed Godwits were present. Also right along the N10 there were about 1.000-2.000 birds, probably from the central part of Giganta where in the mid afternoon some panic was caused by Marsh Harriers after which about 2.000 birds departed in a northerly direction. The totals of the day are around 9.000 Black-tailed Godwit, less than expected so still work to do in the coming days. At the end of the day a roost of 12.000 Glossy Ibises near the central part of Giganta.

#### **3 February**

Cold start of the day: 5C; mostly high clouds and in the morning some fog in Giganta area, maximum temperature of 16C

Total amount of godwits: ~9.000

This morning at 07:45 we started again in the central part of Giganta where again several groups were foraging. There were quite a few high clouds present and on the way there were already some foggy spells. After reading the first color rings, the fog suddenly came up and visibility became too poor to look any further. Also in other places there was insufficient visibility. Time for a round through the area of Giganta where, among others, a Black-shouldered Kite cooperated beautifully for the photo.



*Black-shouldered Kite*

Only around 10:15 am visibility improved, at the place where yesterday's groups of Black-tailed Godwit were present, there were now several groups, including a group of 3.500. Also on Cara Larga a group was present again along the main road.

In the course of the morning, started looking for some new areas that are visited by the tagged birds. This yielded a group of about 350 birds in the north of the area around the highway of the A10, unfortunately, the accessibility of these fields is somewhat complicated. To be continued... Carregado is already ploughed but again too dry for Black-tailed Godwit, except for a field where mainly Lapwings and Common Snipes were foraging. Late in the afternoon I went to Lisbon Airport to pick up Kees.

Together we ended the day in the central part of Giganta where there were still about 6.000 Black-tailed Godwits present. Again the roost of the Glossy Ibisses was in that same area, also some groups of Black-tailed Godwits arrived from a northerly direction, and occasionally some left in the same direction. Possibly exchange with the groups in Cara Larga and surroundings.

The totals of the day are again around 9.000 Black-tailed Godwits.

#### **4 February**

Foggy start till mid-morning. Afterwards most cloudy with some sun, 2 Bft wind, 16C maximum  
Total amount of godwits: 12.000-13.000

We started at 7:15 with that much fog that we decided to do some reconnaissance around the group north of the A10 highway that Maarten saw yesterday. We found a gate that we could open just south of the highway and drove into the area. Unfortunately the road hit another gate without a keycard reader. So the area – also indicated by some of the satellite birds – was out of range for us. We decided to check some more fields in the parts we could reach. The fog was still dense and sight poor. Most of the fields in this area are not rice, but some of them that were, did not look too bad. Not yet ploughed, but wet.



While the fog was clearing a bit, we visited Rui Paixão again, to ask him about the fields north of the A10. It turned out these were not from the company, but he would try to contact the owner of those fields to check if we could visit; so to be continued hopefully.

With the fog gone, we drove towards the group in the Giganta rice fields to do some ring readings and samples. Maarten stayed in the car, while Kees walked around the backside of the fields. This way we could make the most out of the group. In total we estimated this group around 7.000 birds. Around 11:00 the sun broke through the clouds and that turned out to be the signal for the birds to start sleeping. Mostly – of course – on one leg, so reading became tough.



*Part of the group of 7.000*

With some shopping for lunch to do, we left the rice fields and went to Porto Alto. After the shopping we decided to check a spot indicated by satellite birds, just north of Samora Correia. Here some of the fields were already ploughed, but no godwit to be seen. However just at the other side of the river a nice group (first estimation 3.000 birds) took off, together with even more Glossy Ibis. After our field lunch, we decided first to check if we could enter the NW part of the Belmonte rice fields, where also some positions of satellite birds were registered. The gate was open, so we could access the fields by car. Most of the fields were not ploughed yet, but they were busy with the first fields. On the fields a lot of Storks, Glossy Ibis and one Scarlet Ibis, but no godwits. But it might be something to keep an eye on.

It was now around 14:00 and with the sun covered by clouds again, we decided to search for the group we saw flying and landing in the Zé do Pinho area. Before we found the godwits, we came across a Bonelli's Eagle that took off from a little tree. The eagle first flew away, but turned and gave us some nice photo opportunities, after which it also flushed the Ibises and godwits, making finding them easy for us.





*Bonelli's Eagle*

As the “road” became a bit too bumpy, we walked the last part and worked our way through a group of at least 5.000 godwits. Most of them were sleeping in a dense group and reading was not that easy. After a while some started to forage, giving us better chances for reading / sampling. After an hour or so, most of the birds took off – without any clear disturbance – and went over the river to the Samora Correia rice fields.

We decided to leave them for now and checked Cara Larga, that also held some smaller amount of godwits. With the idea of finishing the day at the Giganta group we went into that area. Just before the usual road we saw some small groups (<1.

000 birds) on recently ploughed fields. In the fading light, we managed to read two rings.

The main group was not there, most likely due to the fact some researchers (Afonso ??) were setting up nets to clearly catch some waders. As we weren't equipped to assist (and became a bit hungry), we just texted Afonso – hoping it was him – and wished him good luck. With some barn owls on our way back to the gate, another productive day came to an end.

## **5 February**

Sunny day, N 3 Bft wind, max. 18 C

Total amount of godwits: 11.000 – 12.000

Today no fog, clear view from the beginning! We decided to check the group at Ze do Pinho first, but unfortunately they were not present. Based on a small group falling in, they were foraging just at the other side of the dike in Samora Correia.

Entering Giganta we saw a large flock in the sky. They seemed to land in a reachable spot, but some Marsh Harriers chased them off again, now landing out of sight. We managed just to find a small group in belly deep water.

At the site of the main group of last days, we met Afonso and team just finished with processing of their catch of the night. They made an even too big catch and had to release some birds without ringing. If we would have known upfront we would have volunteered to assist; maybe for next year.

There were still godwits in this area so we started with reading and sampling. Again Maarten from the car and Kees by foot at the other end of the fields. Maarten spotted a small group leaving and followed them. They went a few blocks away and start foraging on half ploughed fields, together with a lot of Glossy Ibis. Hard to read rings, let alone take samples ...

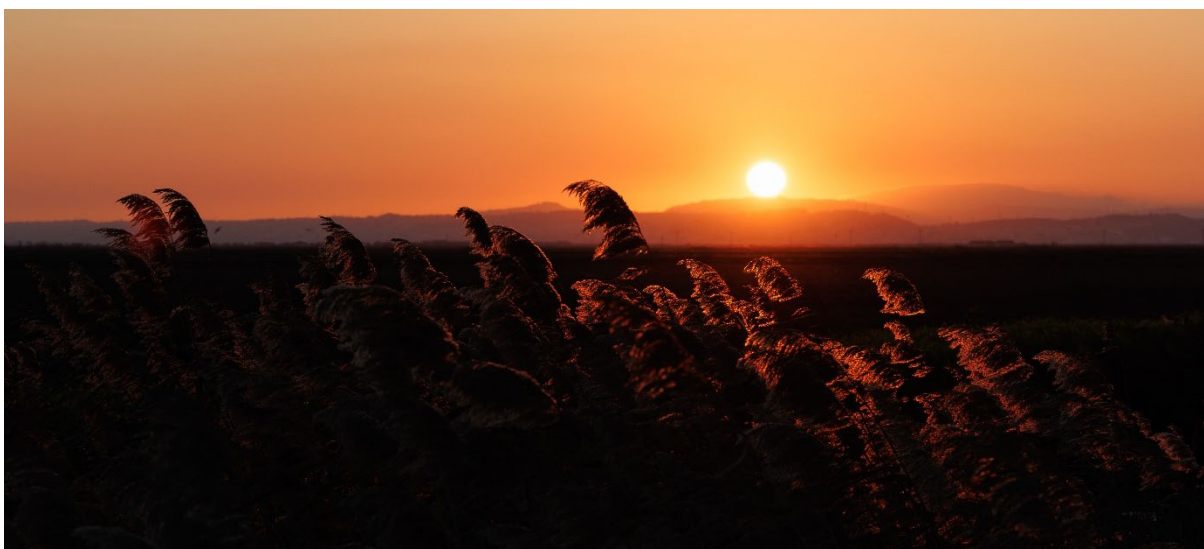
Around noon the birds started to rest and reading became near impossible. We decided to buy some lunch and then have a look at Alcochete as some transmitter birds visited that area. At the coast it appeared to be low tide, but some godwit were foraging close by and even some ringed (but no RUG schema).



*RY/GY(H) resting on the mudflats of Alcochete*

At the rice fields east of Alcochete we discovered a small (50 exx) group of godwits on an inundated, but not yet ploughed field. While approaching them, a larger flog came in and finally some 500 birds were foraging. We managed to find one (German) satellite bird and some other rings. Reading was hard because most of the field had belly deep water on it.

Around 16:00 we were back at Giganta to check for some more rings. The large group of the morning did not take air again, and we did not spend much time to find them. At the usual spot a few thousand birds were present, but light was difficult until we drove to the other side of the fields. In the fading light we managed to do some more readings, until it became too dark to be certain about the colours.



*A nice day coming to an end*

At (almost) dusk we drove some more in the area to check potential good field to check the next day, when we stumbled upon a large group of Spoonbills, resting and foraging on a wet field. We managed to read some rings before it became really too dark to continue.

### 6 February

Sunny day, NE 3 Bft wind, max. 18 C

Total amount of godwits: 12.000 – 16.000; difficult to be precise due to a lot of movements

We started this morning at Samora Correia with a small (~400) group of godwits in a flooded field. While reading more birds came in and we ended up with around 950 birds. At that moment it turned out to be Sunday, hunting day ☹️ Some loud bangs made most of the birds flush and disappear in the direction of Giganta. The same shots also disturbed a much larger group (~5.000 birds) that must have been foraging around the corner. Also these birds flew in the direction of Giganta. With most of the birds gone, we followed them to Giganta as well.

In Giganta (entrance Cardal) we soon spotted some birds taking off from field far from the road and not easy to access. We decided to leave them for now and look for bigger groups in the direction of the airport. Soon we came across a ~500 bird group next to the road in nice light.

With a small intermezzo to read some Spoonbills (most of them sleeping on 1 leg) we went towards the area where we encountered the most birds last week.

Again a nice group of around 8.000-10.000 birds was presented and gave us the opportunity to read some rings and do samples. As noon was approaching, the usual behavior of the godwits was to go for a nap – of course on one leg – making readings nearly impossible. Luckily for us a pretty tame Hoopoe gave us some nice photo opportunities.



*A "tame" Hoopoe gave some nice photo opportunities*

As the birds were asleep we went to the store to shop our lunch and ate this – back at Giganta – near the Tagus river. Around 15:00 we drove slowly back to the godwit area. In a group of Greylag



geese, Maarten discovered first a White-fronted Goose (rare in Portugal) and soon also the Pink-footed Goose he saw a few days ago as well.

After this “rarity” feast, we went back to business with a nice group of godwits on a field where the ploughing was half done (stopped due to the weekend). This group somehow took off (no predator seen) and went away in the direction of Ponta da Erva. While driving in that direction, we spotted some other birds and stopped for more ring readings.

At the fields in Ponta da Erva we also spotted a group of around 750 birds at the far edge of the fields. Luckily they flew off and landed way closer. While reading more birds came in and even more (3.000-5.000) flew over in the direction of Samora Correia. A spot we need to give some more attention the coming days.

As we observed a recently marked godwit of Afonso the last two days at the same field, without any other birds in the area. Afonso came to have a look for his self. Unfortunately – or maybe not – we couldn’t find the bird back. Afonso even tried with walking through the field to flush the bird possibly hiding in a ditch. Hopefully the bird joined his friends; time will tell.

### **7 February**

Sunny day, NE 3 Bft wind, max. 21 C

Total amount of godwits: 3.500-4.000

Today was the day we decided to do the Sado trip. We first drove to Comporta in the early morning. The rice fields just south-west of Comporta were wet and some ploughing was done, but besides a lot of Glossy Ibis, no godwits to be seen.



*The rice fields just south-west of Comporta were wet and some ploughing was done, but besides a lot of Glossy Ibis, no godwits to be seen.*

This changed when we entered the main rice fields (between the town and the estuary). We discovered quickly a wet – but not yet ploughed - field with around 500 birds and started checking them. They appeared to be very restless and took off after some minutes without any clear cause. This however caused a chain reaction and from some other fields more godwits took the sky.

After a while they landed a few fields further and we could read / sample for a while before they took off again. This time they landed at the far back of the fields. As they were this restless, we decided to first check the rest of the area in the direction of the estuary.

This area was – as usual – dry and not ploughed, so no godwit to be seen. At the estuary itself it was low tide and some waders were present. A ringed Bar-tailed Godwit was just out of reach and we couldn't find a way closer (without going into the mud). A sighting of Common Loon eased the "pain" a bit.

Back at the good rice fields the godwits seemed to have eased down a bit and that gave us the opportunity to do some more readings. They were fanatically foraging in a few dense groups. We estimated the total number around 3.500 birds. The satellite birds that should be in the area stayed out of our sight; most likely foraging in belly deep water, hiding their rings.

As the time went fast, and the heat haze began to be troublesome, we decided to leave the birds around 13:00 and head for the next destination.

Although the fields on the south side of the river Sado looked good, we couldn't find an (open) road leading towards them. Only at Alcácer do Sal we had a good view on the fields. Again no godwits, but the field looked good (ploughed and wet).

After a field lunch we went on with our trip. Now checking some spots on the north side of the Sado river. At the now closed bridge towards Zambujal we discovered a few godwits foraging on the mudbanks of the river (still low tide), no rings. Also at the coast east of Setubal we had some small groups in abandoned fish ponds and at the estuary itself. Again no rings to be seen.

With the now rapidly rising tide, the last spot (south of Setubal), had no mudflats left anymore. So no godwits to be seen. With the sun setting, we went back home.

A good, productive Sado trip. The first in many years.

### **8 February**

Sunny day, 2 Bft ENE wind, 21C maximum

Total amount of godwits: 35.000-40.000

We started at Samora Correia again in the hope to find the big flog we saw two days ago flying over. At the entrance there was again a small group, this time around 200 birds with some ringed ones amongst them. After reading them all (??) Kees went by foot along the edge of the fields towards the N118 to see if any birds were foraging over there. Maarten took the car and went towards the position of some satellite birds. Officially a private road, but we decided to ignore that sign.

Kees found 2 birds, Maarten around 32.000. Most of the birds that Maarten found took off and went towards Giganta. Some 8.000 stayed in belly deep water, making ring reading very difficult.

We decided to follow the birds towards Giganta – with an intermediate stop to collect the key for Belmonte - were we found a nice field with around 900 birds with a lot of rings. This group kept us occupied almost the rest of the morning as birds left and entered the group. One particular bird we were very pleased to see foraging in this group. The ringed bird that we searched for two days ago, seems to have got its wings back and was now acting absolutely normal in the group.



*WBN/WY(V), a newly ringed and satellite tagged bird*

At the main location of last week, the numbers were much higher than before. We estimated a total of 10.000 birds in two fields with more in others. Most of them were sleeping, so ring reading was tough. The combination of a Marsh Harrier and Peregrine Falcon however was too much for them and they took off. They gave us a nice flight show, but at last decided to fly to some other location. Most seemed to go towards Samora Correia again.

As it was lunch time we decided to take a break, did some shopping and went to Belmonte to have our field lunch in that nice area. After lunch we did a quick check of the Belmonte rice fields, but most of them were dry and none of them ploughed. The forest area was however nice and we spotted some new birds for the trip.

The afternoon we spent in Giganta at the same field as the morning. Based on all the new rings we saw, there is a large portion of movement in the birds. They seem to use a lot of fields to forage and rest.

With dusk appearing quickly we did some checks on other fields, found the Spoonbills again, this time a bit more active (and so a lot more ring readings) and also the pink footed goose was still present. We ended the day in Giganta with some owling, resulting in views of three species: Little, Short-eared and Barn Owl. We also heard Common Quail in the more grassy area towards Ponta da Erva.





*Little Owl in the setting sun*

### **9 February**

Sunny day, 2 Bft NE wind, 20C maximum

Total amount of godwits: 35.000-40.000

We started at Ze do Pinho, but only a handful of birds there. Just after we left (around 8:00 am), we saw birds taking the air from the sleeping area. So we headed back and now we had around 1.500-2.000 birds present. They were however very nervous and as soon as we stepped out of the car – still at a reasonable distance – they took off again and disappeared in the direction of Samora Correia (sleeping area) and Giganta. So we decided to go towards Giganta as well.

At the same place as yesterday a nice group was already foraging and gave us a nice number of ringed birds. Here we also met with Jos and team, who is doing a trip to some godwit spots in both Portugal and Spain. We chatted a bit, exchanged some info and then returned to “work”. The group at the main foraging site gave us a hard time. Most of them were sleeping (it was just 10:30) and the birds foraging were at quite some distance. We managed to get some rings nevertheless.

We had lunch again at Benavente, just for some birding as we had seen the dry rice fields yesterday. After lunch we went back to Ze do Pinho again. This time a nice group of 7.000 birds were present and allowed us to get close. Some nice readings and samples later, the farmer however came and told us to leave. Most probably because we were walking on the small dikes between the fields and did not stay on the road. As we already had a good session we decided not to argue that we had permission, etc. and went towards Giganta.

There we checked some fields in the Cardal area, but no luck. Our nice field of the morning however still had a nice group (~3.500 birds) and new rings amongst them. We stayed here till dusk.



*Group of around 3.500 godwits resting and foraging in late light*

We met again with Jos and team to allow them to pass the gate after closing (18:00) as they did not have a key card. After saying goodbye and wishing them good luck for the rest of their trip, we went home to pack our baggage, wash the car (Maarten did a good job) and have diner.

After diner the next team (Bob and Jacob) arrived and we gave them the info off the last week, places to check and most of all the advice to keep a close eye on the satellite birds via the website.

## **Portugal Team 2: Jacob de Vries and Bob Loos, 9-26 February**

### **10 February**

Cloudy in the morning, completely cloudy in the afternoon, E 1, 18° C maximum  
Total amount of godwits: ~16.500

After we got the tips and tricks from Kees and Maarten yesterday evening, we left our new shelter Casas do Falcoeiro in Salvaterra de Magos, to visit the Cardal rice fields in the morning. We noticed immediately that it was very dry in the area. Roughly 10-20% of the rice fields were completely submerged or at least wet, and so attractive for godwits, as far as we could assess. We found a large group of godwits in the southeastern part of Ponta da Erva. At 11:00 we counted 13.000 birds of which 90% was sleeping and 10% was foraging or preening. One hour later the group had grown to 16.400 birds. Ring reading is a big challenge when the vast majority is sleeping, traditionally on one leg.... So we crossed the whole area of Ponta da Erva and Cardal, but we only found small flocks of foraging godwits, a few tens as a maximum. A large group of 313 resting Spoonbills (the largest group we would see during our stay here) caught our attention with some colour ring reading as a result. We returned to the large flock of godwits, but no significant change in activity. At 16:58 all the birds flew up, and left the area in northern direction, without warning the observers. A Western Great Egret (more common than in the last few years) with a red colour ring was ringed in 2017 as a nestling in Hungary, 2.455 km eastern from Cardal.

### **11 February**

Thin veil clouds (or smog?), sunny, SW2, 22° C maximum  
Total amount of godwits: ~22.500

The morning started with a singing Barn Swallow on the powerline in front of our temporary territory in Salvaterra de Magos. Spring is in the air! Also a singing Black Redstart, next to several Eurasian Collared Doves of course. We spent the morning in Cardal scanning for godwits, but they were scarce today. In a rice field, where the godwits were absent yesterday, we counted 850 birds at 9:40. Roughly 80% was sleeping, and 20% foraging, so ring reading was a challenge again. A Dunlin with a white flag from Poland was just too far away to read the three tinny inscriptions. At 11:00 there were only a few hundred godwits on the roosting place, where we counted 16.400 yesterday, possibly as a result of a spraying tractor along the borders of their favorite rice fields. We were told that spraying is necessary to diminish the vegetation on the borders of the rice fields. We crossed the complete northwestern part of Giganta, but in two plots only we found godwits, in total 500 ex, together with a flock of 125 roosting Golden Plovers.

As a by-catch we photographed an Osprey with German colour rings on a bridge railing. After a short coffee break in Porto Alto we visited the well-known plots in Giganta again in the afternoon, but no success. Then we visited Zé do Pinho, north of the N10, where the main roosting place was situated, as Kees and Maarten had told us. And indeed, at 15:50 we counted 20.600 birds in just three adjacent rice fields. Almost all godwits were foraging with great success given the high frequency of swallowing movements. At 17:00 their dinner party was ended by an unsuccessful hunting Peregrine. All godwits flew in southern direction to the roosting place quite close to the border of the river Sorraia. They told us that this area is not accessible, but we will give it a try in the forthcoming days...



*Osprey black C8/B8 colourranged as pull 01.07.2021 Mecklenburgische Seenplatte*

### **12 February**

Dense fog till approx 10 o'clock, then heavily clouded, N2-3, 16° C maximum

Total amount of godwits: 4.400

A typical Black-tailed Godwit Day today. Due to the dense fog we started later than usual, but at 10:45 we were present on the same roosting place as yesterday in Ponta da Erva. At 11:05 we counted 4.400 birds, 90% resting, and only 10% foraging.

A new strategy; sleeping birds seem more approachable than foraging birds, so we tried to get in an optimal position when the majority was sleeping. Step by step we got slowly very close to the flock of sleeping birds, (distance to the birds max. 50 meter) and then we had to wait more than an hour before more birds started foraging and showing both legs. Then: Harvest Time! In about seven hours we had read a little bit more than 100 colour ring combinations, the majority of Dutch origin.

We heard, for the first (and last) time Greylag Geese, but today we were fully concentrated on the reason being here: Black-tailed Godwits.

### **13 February**

Completely cloudy with some light rain showers in the late afternoon, S 3 turning to SW 4, 15° C max.

Total amount of godwits: ~10.000

We started at Zé do Pinho, the place where we found 20.600 godwits in the afternoon of the 11<sup>th</sup>, but this morning we saw only two hunters walking with a dog. No gun shots heard, but nevertheless no Godwits at all.

In Cardal we had the same strategy as yesterday, but at different locations; the birds were spread over more rice fields today, although we haven't encountered any form of (human) disturbance. At noon we counted 8.000 birds on the main spot, only 400 foraging birds, the rest sleeping. So we had to wait....At the end we had together roughly 100 readings again, although we had to finish our work earlier because of the rain. According to the long term weather forecast it should be the only day with rain during our stay in Portugal. We will see...

### **14 February**

Cloud fields, but also quite sunny periods. Fogbanks in the morning (4° C) , NW 3, 17° max.  
Total amount of godwits: 2.800

Today we visited the south bank of the river Sado, with the first stop in the picturesque Porto Palafita da Carrasqueira at rising tide. Hundreds of waders, including Dunlin, Ringed and Grey Plover, a single Whimbrel, but no godwits . At the same time Shoveler, Shelduck and Wigeon, a few hundred Flamingo's and about 25 foraging Spoonbills, escorted by Little Egrets. Quite unexpected three Black-necked Grebes and an adult Caspian Tern. Then to Comporta where we saw the first ploughing tractor in a rice field this week, to great enthusiasm of hundreds of Glossy Ibises and tens of Black-headed and Lesser Black-backed Gulls. At 12:00 we counted 1.070 godwits in belly deep water of which only 64 foraging. Two hours later we found in the same rice field to our surprise 1.480 godwits of which at best a hundred was asleep, the others foraging, such as another 1.350 birds in the adjacent rice field. So in total aprox. 2.800 godwits. Did these newcomers come from a rice field which we had overlooked, or from the in the mean time flooded banks of the Sado?

At the visitor center Moinho de Mare da Mourisca (closed!) the tide was too high to accommodate large numbers of waders. Unfortunately, the number of godwit colour rings read today could be counted on one hand.

### **15 February**

Cloud fields, but also many sunny periods. Dense fog in the morning (4° C) , N1 later NW 3, 17° max.  
Total amount of godwits: ~40.000

In Cardal at 8:40 we saw 164 Spoonbills with partly different birds than observed on the 10<sup>th</sup> as shown by the colour rings. We saw just two small groups of sleeping godwits in backlight, so we left the area to scan the rice fields of Carregado and Vala da Azambuja. Unlike two years ago, when we were very successful there, all the rice fields were dry and seemed to be abandoned. So no godwits at all in this area. Reason to return to Cardal were we counted at 15:15 10.300 godwits, roughly 75% sleeping in almost belly deep water. We were totally surprised and delighted to get a message from Astrid and Ronald who were facing approx. 30.000 birds at the same time in Samora Correia, close to the border of Rio Sorraia. The godwits foraged very close to the blind alley, so we got out of the car with the utmost care, trying to avoid any disturbance. That wasn't necessary at all; a friendly old man on a motorcycle drove slowly past us without any reaction of the godwits! The ring reading festival ended at 17:45 when the light conditions were getting worse, but more important, we were advised to leave the area before 18:00; at that time the main gate would be closed!

Reason enough to celebrate the ring reading festival and a new record number of 40.000 godwits with Astrid, Ronald en Otto Plantema in the famous fish restaurant A Torre in Porto Alto.





*Carregado: no water, no rice, no godwits.....*

### **16 February**

Overcast with a few clear spells. NW 2-3, 17° max.

Total amount of godwits: max. 10.000

Past performance is no guarantee for the future! We had to wait till 8:30 before the main gate to the Samora Correia rice fields was opened, and then, much to our disappointment and against expectations, the rice fields were completely abandoned. On the other side of the Sorraia river, in Zé do Pinho, we saw only 750 godwits. So we went to Ponta da Erva and Cardal where we counted at 11:45 2.800 godwits (860 foraging, 1.930 sleeping) in good light conditions for Happy Ring Reading. Jacob made a nice picture of L3BRRR; Zé do Pinho.

Between approx. 15 Ringed Plovers we found also one Kentish Plover. At 13:00 we were back on the hotspot at Samora Correia, but still no godwits. We had to wait till 13:30 when the first 500 birds fell in. We waited and crossed our fingers, in vain. At 16:10 there were only aprox. 800 godwits, and we had viewed all the 1.600 legs at least once. So time to return to Cardal. There we saw 5.000 – 10.000 birds sleeping in dense groups in belly deep water and in backlight. So we focused on a group of 171 resting Spoonbills to satisfy our colour ring hunger successfully; with birds from The Netherlands, Spain and Denmark.



### **17 February**

Cloud fields but also lots of sunshine. N 2-3, 19° max. in the sun.

Total amount of godwits: 10-15.000

The godwits in Cardal were widely spread over the various rice fields, so we could easily spend the whole day in Cardal. And so we did. We have not counted the birds today, partly due to intensive air traffic between the different rice fields, but a rough estimate: at least 10-15.000 godwits in total.

We spent some ring reading time for a group of 216 Spoonbills, as a kind of by-catch.

We had seen the majority of these colour ringed birds before in the last seven days, except two Dutch and one German bird.

Godwits, like most birds, do not like raptors, but just a minority of them will fly up when a Marsh Harrier (the most abundant raptor in this area) comes too close. The majority is only alert, and quickly resumes his/her activities, including sleeping. Unlike the Teal and Shoveler; they rise every time in large flocks when a raptor arrives. There is real panic when a Bonelli's Eagle flies over, as we saw this afternoon; all the birds in the wide area go up in the air, and it takes a few minutes and spectacular flight formations before they will land again, still excited. At 18:30 we left Cardal with our promise to return tomorrow.

### **18 February**

Overcast with a few clear spells, drizzle in the early morning till 9:00. Much more wind than in the previous days N 4, 17° max.

Total amount of godwits: ~

In the morning and early afternoon we visited several rice fields in Cardal, and we were happy to read five inscription flags. That's no sinecure; or the ink is totally faded, or the flag is covered with a (thin) layer of mud, or the flag is in the wrong direction, or a congener decides just to sleep exactly in front of the flagged bird, or a combination of these four troubles. At 16:30 we visited Belmonte, but we saw only dry stubble fields, so no waders at all. In Benavente almost the same story, although in the extreme south we found some small patches with a little water. As a result we counted 151 godwits, one of them colour ringed (Germany), 40 Lapwings, several Grey Herons, Great en Little Egrets and approx. 20 Spoonbills, two of them colour-ringed in Germany.

### **19 February**

Sunny almost all day, but the wind was a bummer; N 5-6, 17° max.

Total amount of godwits: 150

Today, with unfavorable strong wind, we decided to visit some other areas; Praia de Caparica, at the Atlantic coast where you could expect thousands of Lesser Black-backed and Yellow-legged Gulls.

Unfortunately we saw just roughly 150 gulls, without doubt due to the strong northern wind.

Tens of adult Gannets and four Black Scoters made our species list longer, including two Crested Larks. We expected also Sandwich Terns, but we haven't seen them up to now.

Today we got easily permission to visit the Salinas do Samouco by car. Only 38 foraging godwits in belly deep water, and just one Spoonbill flying over. At the other hand there were approx. 250 foraging Flamingos, so we could practice our ring reading skills. On the riverbanks near Alcochete we saw tens of people digging shellfish. We haven't seen this phenomenon in previous years.

Also a group of 120 foraging godwits quite close to the main road, but in too deep water for ring readers. It was the first time that we entered our holiday resort during daylight.

## **20 February**

Sunny all day. N 3, 20° max.

Total amount of godwits: 26.000 – 27.500

A real sunny Sunday. In the early morning (8:00) motorcyclists courting, considering the impressive noise they made with their engines, and hunters at the northeastern side of N10. No shooting at all in Cardal, although we found some old hail cartridges. Also the godwits had a real Sunday; at 9:00 we counted a group of 6.700 birds, of which more than 95% was sleeping/resting. Quite close to this group was an even a larger group of 18.500 birds (counted at 9:50) all sleeping/resting with only a few exceptions. In the rice field just behind the field with the 18.500 birds, there were also godwits, together with 1.000+ Shoveler and Teal. As a result we estimated the total number of godwits in the NW corner of Cardal to be at least 26.000 – 27.500. We approached the sleeping birds step by step until we were in front of the group with the sun at our back and the first birds less than 50 m. away. We had to wait till approx. 15:00 before more birds started preening and/or foraging. In the meantime we saw a 2cy Peregrine hunting on the ducks, and two Gull-billed terns flying over. But after 15:00 we were totally focused on the godwits legs. As a result 15 inscription flags could be noted. From 16:15 flocks of hundreds of godwits left the group and flew high in eastern direction. This continued for at least one hour (we left the place at 17:15). We expect that they flew to the sleeping grounds at Samora Correia, close to the border of Rio Sorraia, but we couldn't visit this area; in the weekend the main gate is closed! So, tomorrow, the first thing in the morning.....

## **21 February**

Sunny all day. N 3, 20° max.

Total amount of godwits: 22.500

At 8:30 sharp we were at the sleeping place of Samora Correia, but we were, together with some Lapwings, the only ones. We visited also Zé do Pinho, at the other side of the river, but we found only 3.500 foraging godwits in sunny backlight.

You would expect the same results in Cardal when the (weather) conditions are the same as the day before, but birds, especially godwits, surprise us every time, both positively and negatively. Today it was in the negative way; although the number of birds in the three rice fields was almost the same as yesterday (18.950 counted at 12:00 almost all sleeping) they slept at a greater distance than yesterday, and we had not the possibility to get closer. Also the air vibrations were more intense than yesterday. As a result we could read only five inscription flags. So, to be honest, it was a little bit boring waiting till the birds would start foraging on two legs. At 15:30 large flocks left the area in eastern direction, so at 16:30 we entered the sleeping place Samora Correia for the second time this day, with the same disappointing result as this morning. A visit to Benavente from 17:45 till 18:30 brought us no godwits, but as a compensation 25-30 Spoonbills at different places, with some colour ringed birds; two from Germany and one from The Netherlands and Spain. A squeaking and screaming Water Rail was the last bird sound of the day.

## **22 February**

Sunny all day. NE 3, 22° max.

Total amount of godwits: 1.400

At 7:55 we counted in the Cardal wet rice field area 1.350 godwits, much less than the 16.400 we counted here on the 10<sup>th</sup>. In the central area there were also less godwits than the day before, although it is only an impression; we did not count them today. Declining numbers is not surprising given the fact that in The Netherlands 1.100 godwits were reported today from Wommels (Fryslân) and 1.500 from Landje van Geijsel.

Their behaviour was the same as the days before; sleeping till 14 -15:00, preening and then foraging. At 15:30 the first groups departed in eastern direction. In the morning we crossed also through Zé

do Pinho , but we did not find any godwit at all. In the late afternoon we visited Benavente again, found approx. 35 godwits, but they flew away when we got too close. A singing Chiffchaff brought a real spring feeling enhanced by the nice sunny weather.

### **23 February**

Sunny all day with some cloud fields. NE/E 2, 23° max.

Total amount of godwits: ~

A change of food whets the appetite, although we are eager every day! So, today we left Salvaterra de Magos at 6:00 to visit the fishing port of Sesimbra, looking for (colour ringed) Lesser Black-backed Gulls (one from Iceland!) and Yellow-legged Gulls. In the harbour we saw our first Sandwich Tern and a 2cy Razorbill. After that we drove along the scenic route of Arrábida through Setúbal to visit the Reserva Natural Praias do Sado and the industrial area on the northern shore of the Rio Sado during low tide. Unfortunately we did not find any godwit, but we could scan several colour ringed Lesser Black-backed Gulls from Belgium, Germany, France, Scotland and three Dutch birds, and also three Dutch Spoonbills. In the small village Praias do Sado we saw nesting House Martins. We visited the sleeping place of Samora Correia at 15:50 in vain; no godwits at all, so we went to Cardal where we could read the first inscription flag at 16:15. We did not count the birds, because we know from the last few days that birds start leaving this area from half past three. So tomorrow morning we will try to produce an as accurate as possible number of godwits present at Cardal. We noticed that the birds were very noisy this late afternoon, at least till 18:25 when we left the area. Zugunruhe?? For the first time we saw a female Marsh Harrier hunting on godwits; she flew at high speed just one meter above the water surface, trying to surprise the godwits and/or ducks. An attack on a Teal or Shoveler was unsuccessful. The godwits returned quickly to their sleeping site, still sounding excited. We were a bit more than 13 hours on our way and/or in the field today, but still feeling young, eager and enthusiastic....

### **24 February**

Heavily clouded. NE 2, 18° max.

Total amount of godwits: 1.500

Was yesterday's excitement among the godwits the prelude to massive departure? That's what it looks like, because this morning we counted between 8:00 and 8:30 in the Cardal rice fields where they were present during the last few days only 1.350 – 1.500 birds!

Egyptian Goose was our second new bird species in this area, after two hunting Gull-billed Terns.

We crossed through Ponta da Erva, but no trace of godwits. We returned to the main sleeping place in Cardal hoping to see birds coming in, vainly. Their numbers remained stable during the afternoon. The number of Glossy Ibises dropped since the last few days, in contrast to Black-winged Stilts; their numbers increased from 5-10 around the 10<sup>th</sup> to 75-100 today, with the largest flock of exactly 50 birds, including several 2cy birds. Just returned from their wintering grounds in Africa north of the equator, we presume. To our surprise we saw a male Shoveler with a nasal saddle, marked at EVOA in October 2017, real close to the place where we observed the bird.

It was the first resighting of this bird in the Cardal rice fields. We may expect an eastern origin, given the observation of this bird on 20.08.2021 in NW Poland.



*Shoveler with (discolored) white nasal saddle D!D*

In Benavente we counted only 20 godwits at 15:30, so it seems very likely that most of the group has left the Cardal rice fields. If we have the same results tomorrow, we would do well to follow the godwit's example, and leave the Tejo region, heading for The Netherlands.....



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*Egyptian Goose; how many next year??*

## 25 February

Heavily clouded. NE 2, 18° max.  
Total amount of godwits: 20.000

Following indications from Head Quarters (Jos) we came to the conclusion that a part of the tagged birds was located at Zé do Pinho. To our surprise; we had visited this area on the 22<sup>nd</sup> and, despite intensive research, we haven't seen any godwit at all. Fortunately, Jos' marching orders were grandiose; the first combination was written down at 7:35, and more would follow.

At 12:00 we counted 20.100 godwits, almost all sleeping and digesting the rice (on one leg). From 12:45 the first birds started foraging again, as a result at sunset we had together 184 ring readings including 19 different inscription flags. The last blow is half the battle!

## 26 February 2022

True to tradition we had the car thoroughly cleaned outside and inside in Samora Correia, tidied up Casas do Falcoeiro, packed and then, tired but satisfied, to the Lisbon airport. We liked the double fieldwork period (sixteen instead of eight days) very much, it also gives you the opportunity to do some birdwatching in the neighborhood, not having to look constantly at Black-tailed godwit legs (however very beautiful). Worth repeating!

Hopefully the area will be even wetter next field season; we have already anticipated it by making a reservation for our means of transport for next year.



*Heavy machinery to plough the rice fields*



## **Spain Team 3 & 4: Wim Tijssen, Siebe Bonthuis and Marycha Franken, 3-20 February**

### **3 February**

Bright skies afternoon, 1-2 Bft wind SE, 21°C maximum, and around 1.000 godwits

Travelling from the Netherlands to Sevilla, Spain. Day 1 of the Black-tailed Godwit research in the Cota Doñana for the University of Groningen (RUG) and Global Flywork Network. We (Siebe Bonthuis and Wim Tijssen) sleep in a B&B in San Juan de Aznalfarache, where the river Guadalquivir runs right through, and which is a good central base for driving to the right side of the river, depending on which side the godwits are foraging, this is a fine central place, because there are no bridges to cross the river further south. The river feeds the delta of the Cota Doñana, where rice is grown on a large 'industrially' scale, and the area of the fishponds.

After our arrival in the morning and finding our B&B, we drove into an area called the Brazo del Este on the east side of the river. We got information from Belgium researcher Wouter Vansteelant, that good numbers of godwits are on the eastside of the river. This is an old branch on the east bank of the Guadalquivir river and part of the Doñana Natural Park surrounded by vast rice fields.

We knew from GPS-tagged Black-tailed Godwits that there must be birds, but the area has never been properly investigated in this study before. So it was quite a surprise that after an hour's drive we saw the first small flock of birds on a wet ploughed rice field. We first ask permission from two farm employees in the field, which were spraying the last green borders of the ditches..., but nevertheless we were allowed to enter the field by car. It has not been raining for weeks in the area, and the drought means we don't need a 4wheel drive. In total we read eight Black-tailed Godwits and one Spoonbill on our first half day of fieldwork. The very wide arable area has also a few wet rice paddies out there, full of other species such as the purple swamp-hen, which run across the wet paddy fields. Common Sandpipers, Northern Lapwing, European Golden Plover, Little Ringed Plover, Common Snipe, Ruff, etcetera. And with plenty of sun, almost no wind and 21 degrees our first day is not a punishment at all!

When the sun went down we discovered by sounds behind the reedbeds that in an old arm of the river, there must be a sleeping place where about 4K Black-tailed Godwits were standing and chatting with each other before going to sleep. Also groups of Greater Flamingos and White Storks were foraging over there. A good goal for tomorrow. But we were already very satisfied, because three years ago we didn't read anything at all due to delays on airports on the 1st day. We will meet Wouter Vansteelant tomorrow to explore the area further and read more rings hopefully.

### **4 February**

A bit cloudy, wind 1 Bft mostly from NE, 16°C maximum, 1.500 godwits

We started sunny today with a field full of Storks, but no godwits in the same rice field as yesterday. On our first round in this new area we filmed a beautiful spectacle of clever Spoonbills and cormorants; catching fish together at an inlet sluice of an irrigation canal. Fish are apparently easier to catch due to disorientation and there was a whole army of spectators on the side-bank who also occasionally took a grain: Grey Heron's, a color ringed Black Stork, Little and Great White Egrets, Glossy Ibis and about forty Eurasian Spoonbills.



*Our first godwits at Brazo del Este*



*I think our lunch will be bright and large oranges... Siebes' favorite!*





*Every species is taking their advantage near the inlet sluice from the side-canals in Brazo del Este*

Then on to a tributary of the river, where we met our informant Wouter Vansteelant, having a wonderful day in the field wandering around and reading lots of ringed Black-tailed Godwits. It was cloudy almost all day, and that's nice for reading rings; we read a good 20. Including transmitter bird "Annemieke", who was originally ringed in the province of South Holland. We noticed that the Black-tailed Godwits have to watch out, because up to three times we witnessed an attack by a Peregrine Falcon, which failed every time. Also Marsh Harrier, Red Kite and Booted Eagle were present. According to information from Wouter the marshes in the neighborhood hold one of the largest roosts for Marsh Harrier! A ride along a side canal became a bit too tricky at a certain point, so we turned around on a small dike. Colleague Siebe gave good instructions how to move and turn, so we survived... We saw just very small groups of godwits in the very few wet rice fields. Tomorrow we will visit our old area at the fish ponds of Veta da Palma on the west side of the river near Isla Mayor and the large-scale rice complex in the surroundings. Siebe and I have very good memories of that...



*Our 'informant' from the Brazo del Este, Wouter Vansteelant(I), who speaks fluently Dutch/Flemish...*



*Water levels in the Brazo del Este old side arms of the Guadalquivir were low due to the drought*



## 5 February

Bright skies all day, Wind North, 0-1Bft, 18°C maximum, 750 godwits

Today we went to the area on the west side of the river Guadalquivir, with more or less in the center the village of Isla Mayor. We headed for Veta la Palma. The core area of Veta la Palma is an ecological aquaculture complex of 12 by 8 km in the Natural Park, and part of the Natura2000 area together with the Doñana National Park. As well as the surrounding area, a part of the fish ponds were dried up. It seemed that at least some of the fish ponds look a bit abandoned. During our visits in 2019, this area was always good for 25.000 Black-tailed Godwits, mostly at lake Lucio del Cuquero Grande. But now the lake was virtually dry, due to a long period of no rainfall last weeks.



*A dried up Lake Lucio del Cuquero Grande*

The rest of the Veta la Palma area looks like a total industrial agricultural area dominated by rice fields and arable land. For comparison, it's a bit larger than polder Wieringermeer (20.600 ha) in The Netherlands, but with only 5 to 10 farm sheds, a really bare and desolate agricultural area with little space for nature.

Water is THE problem in southern Spain..., especially with the increasing droughts due to global warming and an increasing demand for growing crops. Also here some farmland has been sacrificed for solar panels.



*Siebe Bonthuis tries to raise the water level in the rain gauge... maybe it helps! 😊*

So we saw very few Black-tailed Godwits today, almost all a bit on the edges, or outside the fish farm complex itself. All at all not more than 750 birds at most, due to the drought? The more we could focus on other species...

At the end of the afternoon they took a lovely bath in the evening sun at the hottest point!

We saw two times a red fox and yes, there are also unexpected wild boars in the area. Which we saw sneaking away and unexpected, especially in such a wetland area. We read a total of 11 Black-tailed Godwits, but highlights were the thousands of Dunlins, hundreds of Little Grebes and Avocets and 1000's of Flamingos and a Black-shouldered Kite. One godwit from polder Zeevang (NL) and a nice one was from a project from England where eggs of Black-tailed Godwits are placed in the incubator to save the last birds... hopefully it won't come to that in our country either! Despite the low numbers of Black-tailed Godwits and few ring readings, we thoroughly enjoyed ourselves.





*Dried up fish ponds in Veta la Palma*



*Bathing Flamingo's just outside the Veta la Palma fishponds*



*Godwits were scarce at Veta la Palma, but all the more Dunlins, Avocets and Flamingo's we saw!*

### **6 February**

Sunny all day, 2 Bft wind East, 21°C maximum, 3.000 godwits

Day 4 in Black-tailed Godwit research with Siebe Bonthuis: a sunny day in the Brazo del Este today, T-shirt and suntan lotion at the ready... At first with 3.000 Black-tailed Godwits in front of us that didn't want to move much. Every now and then a Marsh Harrier came over, causing them to move a bit. But later on they didn't care much, as witnessed by the photo with a snapshot with the Marsh Harrier just ten meters away. They were also in too deep water, so reading rings was surely difficult.

Belgian colleague Wouter Vansteelant came to visit us by the end of the afternoon and he pointed out several ringed birds at other places for us later, so a great collaboration again! At the end of the day we discovered two Black-tailed Godwits with transmitters. One is Warkumermar and the other is probably a hand-raised bird from 2016 from a study into whether young godwits choose another flyway direction after having been replaced from The Netherlands to Poland. Once again we filmed those Purple Swamp-hens that we encounter here every day, while all birders in the Netherlands have been under the spell of this rarity in South Holland for the past weeks...





*Marsh Harrier looking for some food, although the Black-tailed Godwits seemed to know by his attitude that there is no need for panic?*



*Our road was blocked several times today by a herd of sheep with piggyback sheep egrets 😊*



*Purple Swamp-hens were very common here, while the first one ever was discovered in The Netherlands last winter.*

The first Barn Swallows were flying around here, chattering around, looks like a wonderful spring sound, although it's still winter meteorologically.... We stayed an extra day here because we had not read every godwit yet. And in Extremadura it was not busy yet in terms of Black-tailed Godwits. Tomorrow we will go to the most southern tip of Doñana to discover new places and to see if there could be more suitable places along the eastside of the river Guadalquivir.

### **7 February**

Hazy blue skies, Wind NE-3 Bft in morning (Brazo del Este), rest of the day no wind in Southern area, 24°C maximum, 1.650 godwits

Today an early start, because Siebe Bonthuis and I had a mission. First satisfy our ring hunger in the Brazo del Este and after this, if all goes well, we sorted a bit out that we could drive all the way down the Guadalquivir to end up in the village of La Algaida right by the Atlantic Ocean... a trip of 60 km. One of the German Black-tailed Godwits with a satellite transmitter, called Tinadja had been there for a while, so we have our goal. But first an hour's drive from Seville to the Brazo del Este.

The Black-tailed Godwits and Flamingos were already waiting for us... The Greater Flamingos helped us every now and then, by getting the Black-tailed Godwits moving, so we could see both legs. For ring reading the most important thing and not in too deep water.... ring readers have their wishes... 😊 We discovered transmitter bird Rosalie, also a German transmitter godwit, who foraged right in front of us! And a ringed bird from the English head-starting project at the WWT Welney in the Ouse Washes, where Wim has been watching Bewick's Swans for 25 years and of course knows the people from that Black-tailed Godwit project as well.





*Flamingo's helped to move the godwits, and us in better ring reading...*



*E-bird from Project Godwit, a EU-LIFE nature program to increase the population of breeding Black-tailed Godwits in the UK by habitat work, head-starting, education, research and conservation.*



So we quickly made a twitter message about this 'project-godwit' in Spain. Meanwhile, the wind picked up considerably, although today we did hit 24 degrees and plenty of sun. That wind blew the water in one of the side arms of the river completely to one side, so Black-tailed Godwit's legs became more visible while foraging in that rift. That resulted in a lot of new ringed godwits.



*The wide river Guadalquivir which ends finally in the Atlantic Ocean*

It wasn't until two o'clock when we headed 'for the south'. The bad and dirty gravel roads were getting worse, so we drove mostly in 2<sup>nd</sup> or 3<sup>rd</sup> gear.



*Very bad roads along our trip south; second or third gear were most common in use...*



Many White Storks along our way south and further a fairly desolate complete dry agricultural area. With constructions in the field to get rid of rain water with many concrete drainage pipes in ditches and dams to drain the rainwater to the pumping stations by canals into the river Guadalquivir. The strange thing is that irrigating the fields and crops has also to be done again with a lot of tube and pipe constructions. And water from the rain river Guadalquivir is scarce this year.



*Dry arable fields along the riverside in the southern part of the Brazo del Este*



*Watering the growing crops already in February is really necessary and maybe even for farmers...*

It is hard to imagine that in 2010 there were several severe floodings in this area.

Nice observation was an Osprey who caught not the usual fish, but a Grey Plover and was trying to eat it, sitting on a pole.



*Osprey flying away with a Grey Plover as prey, which took some effort.*

After surviving the first deep potholes in the road surface and some bad road sections that had been cut away, we arrived at the spot where the transmitter godwit had been traced recently, which was in a newly developed wet nature area. In the end we only saw 17 Black-tailed Godwits and... yes! There was Tinadja standing right in front of the observatory with an osprey next to it on a pole, as long as that goes well?





*Restoration of the estuary of Trebujena near the Guadalquivir*



*German transmitter godwit Tinadja right in front of the observatory while an osprey is passing by*



We felt very lucky, because in such a large area it's like looking for a needle in a haystack! But it is worth looking at the tracks of the transmitter godwits, who will learn us how they use the area and sometimes discover unknown new foraging areas.



*The course of the river Guadalquivir has undergone many changes in recent decades*

We continued our way through the normally wet floodplains of the river, which were now dry and dusty, to a salt pan area where the bird had been too. Who knows we might even come across more Black-tailed Godwits; at least the biotope looked good from Google maps.



*Normally this estuary of the Salinas de Bonanza was unable to visit by car, now it looks like a desert...*



The road became a cart track and we drove through some low dunes on the salt marsh to the old salt pans. And yes, we saw small groups of Black-tailed Godwits, mostly on one leg and sleeping, but by sunset we had caught a few ringed ones, super happy! We arrived at the observatory, or what was supposed to pass for it. This was where the dirty and sandy track was split. It was either left or right, we chose to stay right along the river. Well we knew that afterwards very well!!!! In total we drove exactly in one hour not more than 6km! It became already dark and we only drove in the 1st gear with sweat in our hands , phew...! With headlights on high beam to be able to see even better the potholes and deep, deeply worn cart tracks in front of us to choose the best possible track. Turning back was not an option... but miraculously, and mainly thanks to the extreme drought, we made it through all the deep rifts and dunes. All without 4-wheel drive, Wim's experiences of the Fens around Welney(UK) came in handy. We think we can participate in Paris-Dakar next year together with navigator Siebe. We were very happy that we made it and didn't get home until 9 pm and treated ourselves to a delicious Chinese rice table after this adventure. Oh well, that's how you experience something again, but a TOP day with a total of almost 30 ring readings finally! Tomorrow we leave for Extremadura, but first a morning in the Brazo del Este area.

### 8 February

Sunny, Wind East 0-2 Bft, 22°C maximum, 1.350 godwits

Relocation day. We had to leave early to hand over the keys to our host and pay our extra day. But we did not skip our normal early coffee and hand cut smoked bacon sandwiches at our local café below our Airbnb...

After this fine routine we went quickly to our permanent 'home' in the fields of Brazo del Este. On arrival a beautiful palette of Black-tailed Godwits in the first morning sun, many foraging birds in the shallow part, so all legs clearly visible... that's what we ring readers/researchers love! Siebe quickly started ring reading while Wim was taking some ring density samples, almost our daily routine now. But after 10 minutes there was panic, because there was a Peregrine Falcon who tried to surprise a sandpiper, in which he does not succeed. All birds in the air and the flock landed again as a complete dense brown flock...



*Hand carved smoked bacon as breakfast*

... and spontaneously went into sleep mode on one leg, grrrrr! We still read something, but it's gleaning. As the sun gets warmer, the air starts to vibrate and with strong magnifications and most birds on one leg you miss half of the ring combinations.



*One of the natural canals in the Brazo del Este where we had often lunch 'out of a Corona-box' in the back of the car*

In the tributary the same image of napping birds, which occurs more and more as it gets warmer. And between 1 and 4 pm the Black-tailed Godwits in Spain also have a siesta, of course! After one last failed attempt to get into a rice field somewhere down the road, where one of the transmitter birds had been recorded the day before, we came to the conclusion that all accesses were closed with fences. So off to the North for a 3.5 hrs drive to Extremadura. We arrived just before sunset and noticed that just a few rice stubble fields had been ploughed, but least some were wet. We just witnessed the last Cranes, which left for the roosting places. A new shipment of Black-tailed Godwits with transmitters has left the African continent was what we saw on the Global Flyway Network website that night. Tomorrow from our Airbnb at Miajadas we will try to track down a transmitter godwit in this large rice field complex between the mountains...

### **9 February**

Half cloudy, Wind NE, 1-2 Bft, 19°C maximum, zero godwits

Zero Black-tailed Godwits, but also very interesting from a scientific point of view... that is what happened to us today. It is the 3rd time in 4 years that we are here now in this rice paddy complex at height, around Don Benito and Santa Amalia in the Extremadura. We drove 235 km today and saw zero Black-tailed Godwits, while we actually visited all the places we knew from previous years with godwits. We noticed that the area is changing: large-scale planting of olive trees, groundwater extraction to supply all those new plantations with water, which often goes hand in hand with large-scale leveling of the surface. Glyphosate sprayed fields with Cranes and regularly we see that the only colorful green in the ditch and ditch sides is sprayed to death and there is more and more planting of almond trees. It's really changing here! One of the hotspots for Black-tailed Godwits up to ten years ago, but the numbers here have been decreasing in recent years to about 3 to 4.000 birds (see reports 2019, 2020 and 2021).





*Spraying the last green patches on the edges of the rice fields*



*Land use changes are an ongoing process in the Extremadura*

Earlier reports this winter from the people from the University of Extremadura were not too rosy either. There is only one transmitter godwit, named “Woudburen”, and in such an immense area with many terraces, it is like looking for a needle in a haystack! But yes, measuring = knowing, so this is also a part of research. Only in the eastern area around the village of Palazuelo the rice fields seemed a bit wetter and already ploughed or crumbled, whatever you want to call it.





*Just a few wet rice fields on our first day in Extremadura*

Here and there the tractors on cage wheels were ready, but yes, water... THE problem in Spain. With this drought you also could see that as soon as there is tractor at work somewhere in the field, the 'tractor Herons', better known as Cattle Egrets☺, and the Lapwings would show up.



*A tractor in the field during dryness attracts lots of birds who try to pick up some food*

The White Storks also made advantage of this and like hungry wolves they dive into the field to grab a grain or an animal from the dry ground that was worked with a cultivator.



Fortunately, we saw on the Global Flyway Network website, the map with tagged Black-tailed Godwits moving to the European continent on their way from Africa. So our hopes are based on that and yes, we see one more transmitter godwit coming, so there is hope... In the meantime, we also enjoyed Hoopoes, Ruffs, Red Kites, Red-legged Partridges and the atmosphere with a lovely temperature and no wind at 19 degrees. And keeping the zero is also worth something, as Wim watched the football match of his favorite club AZ-Alkmaar against RKC(score 0-0), but we would like to get rid of it... Tomorrow new opportunities for science!



*No godwits today! Not even on our favourite hotspots near Hernan Cortes*

### **10 February**

Hazy blue sky, wind NE, 1 Bft, 20°C maximum, 147 godwits

After yesterday's off day, having a look at the Global Flyway Network website, transmitter Black-tailed Godwit Ojeda has landed somewhere in Extremadura and maybe brought some 'friends' with her! She was released, in our presence, by our colleagues from the University of Badajoz in 2019 (photo 2019) so that should be our goal for today!

Since 2019 she has been breeding somewhere around Mijdrecht, Nths. Based on the GPS-signal from her, we headed directly east around Palazuelo. After looking at a few possible wet plots, finally we saw the first Black-tailed Godwits on a quiet country road... And YES also transmitter godwit Ojeda, which Siebe Bonthuis released three years ago, walked in front of us and is of course the first bird to be ring read and filmed. A group of 147 birds, of which five were ringed and that was today's harvest. We had contact with our Spanish colleague Arturo Esteban Pineda from the University of Extremadura, who came to accompany us. He indicated that until now up to 750 or 800 birds had been seen in the entire area. We exchanged all kinds of things, especially places where birds had been seen recently, and he would text us if he would discover more Black-tailed Godwits. But it remained quiet on the line...



We further explored a lot of fields today, including an area where yesterday a rice farmer started ploughing. But no Black-tailed Godwits, while normally this is supposed to attract them.



*Ojeda on 9<sup>th</sup> February 2019 during release!*



*Siebe & Wim celebrating their first ring reading in Extremadura near bus stop Villar de Rena*

Later in the afternoon we visited a totally unknown area south of the Guadiana river between Valdetorres and Medellin. The river Guadiana held a very low water table and finally runs into the Atlantic Ocean as a border river between Spain and Portugal. The tip to have a look around the village of Valdetorres came from last years researcher Pablo Macias, who monitored the entire area on his own for the RUG because of Corona restrictions in 2021. It was a fairly early end of the day in the field, because we only saw Northern Lapwings, Golden Plovers and Cranes on the site, but no Black-tailed Godwits!





*Famous castle of Medellin along the river Guadiana, good view but no godwits in the neighborhood*

Of course we took some pictures of interesting things, such as the famous castle of Medellin along the river Guadiana. We had an interview for Bird Life Netherlands with science journalist Rob Buiters about the current situation here in terms of migration of the Black-tailed Godwit in relationship to the extreme drought. Tomorrow our new colleague, Marycha Franken will arrive by train and we will pick her up in the city of Merida, just outside our research area. Siebe will go back on Saturday, so in fact it's his last day here. And if all goes well our Dutch colleagues Jos Hooijmeijer, Ruth Howison, Luis Barba, Marie Stessens and Taylor Craft from the SW-Friesland RUG research team, will come over during the weekend. As a Black-tailed Godwit researcher you also need to know everything about the stopovers, although the breeding areas in SW-Friesland look totally different. That is indispensable as a scientist, you have to have your feet in the clay, in this case mostly dust..., to better understand the birds and their decisions, or so at least you hope!

### **11 February**

About 80% sunny, Wind North, 1 Bft, 21°C, maximum 850 godwits

Before we arrived in our area of yesterday, some problems had to be solved. Our car indicated that oil level was too low. So we visited a garage in the nearby village of Zurbarán via Arturo. A garage where time went back 50 years... no bridge present, so simply a jack under the car and see if there was a leak somewhere. That was not the case, so we were really happy. And with a handwritten bill with stamps, 19.50 Euro's poorer for some new oil, we set off again into the field.



*Handwritten bill for checking oil leakage in a garage where time stood still... we were happy!*

Same field as yesterday near Villar de Rena, but the number of godwits had increased a bit to 250. The sun started to play tricks on us with vibration in the air, bad for ring readers. Then out of the corner of our eyes we saw some Black-tailed Godwits a few fields further away. Tactics discussion followed how we could best approach them via a bumpy cart track, taking into account to have the sun preferably in the back, otherwise you can't see any color differences on rings at all.

It turned out that we made a good choice. And the number of 'some birds' was adjusted to a few hundred! We drove very carefully towards them to eventually arrive at 600+. And yes, also the 2nd transmitter godwit Woudburen in the pocket! We took some ring density samples, so that was a nice hit in the last hour for Siebe. We picked up our new teammate Marycha Franken from Merida train station, who will accompany Wim for the next period. Siebe picked up his rental car to deliver it tomorrow in Seville before leaving by plane. So we had all and all a beautiful day. We presented the Dutch local cookies, 'Wieringer Jodekoeken' to our Spanish colleague/friend Arturo, which only can be served after a successful catch. So hopefully this will happen...!





*Finally an bigger flock of godwits to make a density sample of color ringed birds!*



*Transmitter Black-tailed Godwit Woudburen near Villar de Rena, who showed us the way to more!*





*Spanish colleague Arturo Esteban Pineda (University Extremadura), Siebe Bonthuis and Wim Tijssen*

We started in Extremadura our first day with zero godwits, yesterday 150 and today 850, so we are moving forward! Hopefully it will continue like this, and Marycha and Wim will pick up even some more tomorrow! As always Siebe and Wim had another super good cooperation and friendship like in all previous Black-tailed Godwit expeditions. It's nice when you feel good about each other in the Black-tailed Godwit research for the University of Groningen (RUG) and have lots of fun together!

### **12 February**

Cloudy start of the day, ending sunny. Wind NW 2 Bft, 2 drops of rain..., 600 godwits

Day 10 in Black-tailed Godwit research Global Flyway Network Team Piersma and RUG: today on the road with Marycha. After we had waved goodbye to Siebe, we headed straight for Villar de Rena to our field from yesterday. There, the transmitter Black-tailed Godwit Woudburen immediately came into view, and was filmed rapidly. That was a good thing because an older farmer came to take a look in the field and everything went up in the air. We went to the field where the bunch landed, but then tractor nr. 2 came to the place. In the meantime Marycha picked up a Kingfisher, a Black-shouldered Kite, Hoopoe and an Iberian gray shrike. The field where we saw 600 yesterday was also empty, probably because of the Sparrow hawk that flew up from a tree. It was not easy... Meanwhile the Black-tailed Godwits had returned to their favorite field at the old farmer. So the tripods were set out again. After a while our old farmer came over again. With google-translate we were able to explain to him what we were doing and he had a look through the telescope. That resulted in a lifelong permission to stand on his land... Quite a few rings were read and also a few new ringed birds, so there must have been arrival from Africa or Doñana. Happy with that! It was partly cloudy almost all day and ring reading conditions were excellent. However, the legs and rings of the Black-tailed Godwits were often gray from the dried up mud and difficult to read.



*Muddy color rings doesn't make it easy to distinguish the right color for a researcher*

And that doesn't make it easier... Apparently there was also too little water in the roost site, so that the rings were not washed clean and remained difficult to read. It shouldn't be too easy either! Then, due to all kinds of disturbances, we drove around the area between Villar de Rena and Puebla de Alcollarín three times because the birds kept moving, but in the end we read 20 rings, which was not bad. Finally we did a round at Palazuelo where they were ploughing earlier this week, but this field turned out to be especially popular with seagulls and there was a car on the quiet country road this time. We thought with a few bird watchers in it, but when we got closer it turned out to be mainly 'legs', given the moving images in the car when we passed it...☺ I can't say whether this was the highlight of the day, but hopefully for this couple!





*Rice silos and old rusty equipment for rice cultivation nearby Palazuelo*

In the evening we had a visit from colleagues Jos Hooijmeijer, Marie Stessens, Ruth Howison, Luis Barba Escoto and Taylor Craft. They made an Iberian tour with the team of scientists through the main godwit staging areas, the Tagus estuary, the Algarve coast, southern Spain and ending in Extremadura. Tomorrow we will go to the area with them, which will probably be a beautiful and content-rich day with fun, discussions and new insights about our national bird!

### **13 February**

Cloudy start ending with 25% sun, Wind West 1-2 Bft, 10 raindrops, 22°C maximum, 1.000 godwits

An almost completely cloudy day and yes, 10 drops of rain! First the sad news that we found a dead otter near Puebla de Alcollarin. Most villages are named after small rivers, which now hardly contain any water. So maybe that's why this fish otter was on the move? Who's to say...



*First raindrops on the windshield, a special feature this expedition!*

We rushed straight to yesterday's spot, but no Black-tailed Godwit in sight... oops! It turned out to be quite a journey over all unpaved and semi-paved roads in an immense area to find them back. Lots of areas were visited, but no godwits to be found due to the drought. Lots of Cranes on the corn stubble fields and Wim saw his first live fish otter on our path

along the river Ruecas. Farmers here regularly set fire to the reed beds and old litter in combination with the edges of the rice fields. Only at two o'clock we finally found Black-tailed Godwits near Villar



de Rena. About 1.000 birds and the other team from the University of Groningen, with Jos Hooijmeijer as tour guide, came to help us. We saw Ruth Howison and Marie Stessens making frantic efforts to read some Black-tailed Godwits as well. But lots of the birds had dried mud on the rings, so that was not easy at all!



*Expedition leader Jos Hooijmeijer(l), Marie Stessens and Marycha Franken(r) checking and comparing ring readings near Villar de Rena on a cloudy and windy day*

Marycha tried to read the rings on the lee side of the car, because there was a strong wind today. In the end we ended up with a score of 20 and that was not bad, because the lights went out early today. On Sundays many restaurants are closed in Miajadas, so we'll see if we can get some pub food somewhere with the Jos-gang...

#### **14 February**

Some fog patches in the morning, cloudy 25%, Wind NW 3-4 Bft, 15°C maximum, 540 godwits

Some rain has fallen during the last night... not even enough for the dust, but still! This morning resulted in a few patches of fog, but the sun quickly washed this away. The Black-tailed Godwits were sitting in the same corner where we left them yesterday. We picked up a few new ringed birds, but otherwise few changes in the numbers and status of color ringed Black-tailed Godwits. Beautiful Kentish Plovers and Little ringed Plovers on our small godwit field. We spoke briefly with our Spanish colleague Arturo, who has to find out the sleeping place for eventually a mist net catch in the next days. Which is not easy with so few birds around in the area. It was only fifteen degrees today and later a strong NW wind came up, so we occasionally looked for shelter behind the car.



*Marycha and Wim behind the car, to find some shelter and being able to read a terrible dirty code-flag with inscription, but they succeeded after three days!*

That was certainly necessary in being able to read that old dirty Lime code flag after three days, which always flies away on the 'moment suprême', when it gets close enough to discover the three letter/number combination. And he did that again while I was filming him....grrrr! But finally it ended in a snicker moment for

Marycha and Wim, because we managed to extract the code from the flag after an hour of attempts in the field! After that we visited some other (sub) areas, but unfortunately we couldn't find a Black-tailed Godwit anywhere. We saw that the river Burdalo is almost dry and cows were grazing here on an old weed field with plastic ridges, which didn't seem very beneficial to their health. We went home on time too, to work out some data and we saw at the entrance to the small city of Miajadas, that the Storks also celebrated Valentine's Day...



*Valentine's Day also for the Storks on the large and high advertising tomato billboard near Miajadas*

### **15 February**

Cold night, but sunny day. Wind West 2 Bft, 15°C maximum, 750 godwits

It was a cold night here with some white grassland patches here and there, although you could hardly find those here. First we revisited the White Storks; Marycha wanted to portrait them with beautiful light in the background. The nice thing is that the Spanish Sparrows and the Spotless Starlings also breed in such a colossal nest.





*Lots of White Storks nesting on an old abandoned factory*

Then on to our place from yesterday near Villar de Rena. Half of the Black-tailed Godwits appeared to have flown away... and we were not happy with a man walking his dogs. We read some new birds, until a Peregrine Falcon attempted to kill a Black-tailed Godwit, but that ended well for the godwit. After that, the falcon made two more attempts at a Lapwing high in the air, but he also missed it by a hair. After a while some birds came back, until a 2<sup>nd</sup> man had to walk his dogs by car! We looked for some other fields that had just been ploughed and with some water on them, but they were hard to find in this very dry period. But that resulted still in more than 100 Black-tailed Godwits. We didn't see any more today. We had a nice resighting however of a Black-tailed Godwit from the LIFE Project Godwit area at Welney (UK), which is special for this area.



*Looking out for incoming groups of godwits flying to a roosting place for the night*

At the end of the day we stood on a hill, to explore together with the Spanish researchers from the University of Extremadura, where the birds went to sleep in a wet rice field. They wanted to catch birds in the oncoming days with mist nets for color ringing and to put some GPS-transmitters on a few birds. But it was a bit of searching for a needle in a haystack and no Black-tailed Godwits passed by at our post. There were Cranes and Robins and we had a beautiful sunset in the mountains. Tomorrow with the help of new information from transmitter godwit Woudburen, we will go far east to near Madrigalego. And hopefully with many friends! If the numbers remain this low in the oncoming days, we will go back to Doñana for the last period.



## 16 February

Half cloudy, ending sunny. Wind NW 1, later 3-4 Bft, 22°C maximum, 1.480 godwits

We started half an hour earlier, because we wanted to visit some areas in the far eastern parts, which we did not know and had not been visited before. So first we satisfied our hunger for color rings at our 1<sup>st</sup> site with 280 birds at Villar de Rena with 10 now well-known ring combinations of Black-tailed Godwits for us. No transmitter birds... on to the fields around Palazuelo, sadly nothing now after we saw more than 100 birds here yesterday. A nice group of Spanish Sparrows on the photo, you will never see such large groups in the Netherlands.



*Flock of Spanish Sparrows in a rice stubble field*

Then up to a rice field complex north of Madrigalejo. Once a Black-tailed Godwit with transmitter was named after this village, and Wim experienced beautiful episodes with Jeannette Parramore for the Dutch radio program Vroege Vogels about this bird. It often visited bio-dynamic pig farmers Wennekers' pool at the Keinsmerwiel in North-Holland. We noticed that rice farmers here now changed some parts of the area into solar panel fields on a large scale.



*Thermosolar park (in background) near Madrigalejo, in the front rice fields*

A part of the rice fields area has been sacrificed for it. We picked up a Booted eagle along the way and saw 22 Black-tailed Godwits far away. Scenically beautiful area and we had lunch in the field with Storks nesting on the roof of the observatory. In the meantime sunny but scanty NW-Wind of 3 to 4B that started picking up. We also visited another area near Madrigalejo, where the fields were leveled with the laser and agricultural machinery... no future for Black-tailed Godwits here in combination with the drought.

We went over the ridge to the area around the village of Vegas Altas, a small rice field complex. And Yes! Almost two o'clock and finally we saw a big group from above, which exceeded our wildest expectations! So we went through the tactics together. How to approach them, and from which unpaved road. They walked with this strong wind close to a high ridge around the plot, very clever! We went around it in a wide bow and then up against the wind so that they would hear us less, and the car is always the best shelter. As long as you always move slowly and stay close to the car. We arrived at 200 meters from the foraging flock, but a bird of prey made the 1.200 birds fly up in panic. But they came back, Black-tailed Godwits are not crazy, because on this field you could forage a while out of the wind. We eventually managed to get the car to 150 meters and than we could start scoring rings! 5 of the 10 birds of the morning had also flown here and we read 22 new ring combinations, yes!



*Nice snicker moment after finding a nice large new group of godwits near Vegas Altas*

That was a snicker moment of course, well deserved! In the meantime, we had contact with our Spanish colleagues from the University of Extremadura, Badajoz. Arturo had a flat tire, the question was whether we wanted to stay until dark to see where the sleeping place of this large group would be. Around 400 birds went over the mountains to the east and the rest dived into a wet rice field a little further. Hopefully they would be on the same field tomorrow and a catching attempt could be made. Of course we would like to help with that and the reward is, as usual, Wieringer Jodekoeken for a successful catch. We'll be curious... So far the most beautiful and successful day in Extremadura in the mega-sized rice field complex around Santa Amalia, Extremadura.



## 17 February

Foggy patches at the start, later on sunny, wind NE 1-2 Bft, 18°C maximum, 1.760 godwits

We started in the fog on route to our hotspot at Vegas Altas, where we actually found 1.160 Black-tailed Godwits far outside the regular survey area yesterday. The intention of our colleagues from the University of Extremadura was to catch them here in the evening, because they partly went to sleep here while the other part flew all the way over the mountains in a NE direction. We had a look on Google maps in the evening and there was a water reservoir in that direction, which could be a night roosting place...?



*Foggy circumstances, but some godwits were foraging close by enough for ring reading*

We were lucky in the fog, because some birds walked very close by on a quiet road and we read 3 code flags, two Finnish godwits and I even read a metal ring with seven digits; they were that close. Meanwhile, the Spanish/Portuguese team was preparing for the possible catch in the evening at that spot. In the meantime we checked the next rice field, while the fog disappeared, where they foraged as beautifully in shallow water as the day before. So again the ring reading started in full scale.



*Reservoir near Obando;  
unsuitable for roosting godwits*

Suddenly all godwits went up in the air in great panic... A Peregrine Falcon attacked and hit a Black-tailed Godwit that landed in the field and tried to dive into water. The falcon did two more attacks on the Black-tailed Godwit and left the bird with some hanging wings, but the falcon gave up. We saw the Black-tailed Godwits flying high



to NE but lost them, somewhat in the same direction as the night before. Almost all birds were gone, except fifty and the injured Black-tailed Godwit with some hanging wings. Bad news for the catching team around 2 o'clock in the afternoon. Just hope they come back...?

In the meantime went to check the rice fields NE of the village; who knows, maybe we would pick them up there, or they would come back. This only resulted however in very dry unsuitable rice- and maize fields. We got around the mountain and at an observation point you could almost look into the reservoir, which we thought part of the group yesterday might have visited for the night. We climbed over the small dike, but the water level seemed too deep. Black-tailed Godwits always want ground under their feet in water when sleeping.

So Marycha, as being the navigator, looked a little further at the map. There seemed to be a small suitable area 5km away and now that we were so far from home...? Let's give it a try. It looked as a suitable area in the middle of nature reserves and we drove towards it, although it was not visible from a normal road and hidden behind olive trees. There were still some wet fields and at an old abandoned farm. Here we could go straight on a nice path, or turn right on a narrow path.



*Finally a very nice group of Black-tailed Godwits near Obando!*

We chose the right path and that turned out to be a good choice, because a few fields further we saw 1.760 Black-tailed Godwits foraging and also some resting in belly deep water! It was 16:00 already. So we quickly texted Jorge Sánchez Gutiérrez from the University of Extremadura that this could be the right place to catch. And researchers should actually be able to be flexible just like Black-tailed Godwits! And there was an old abandoned farm to possibly process birds. We heard afterwards that there were no longer any Black-tailed Godwits left at the originally intended location. We started reading with the sun in our backs, we saw many birds from the morning session but also quite a few new ones in this largest group so far! The catching team arrived at 17:00 and tactics were quickly discussed where and how the nets would be set up. In the meantime we read quite a few new birds, the wind force went down, so perfect circumstances for ring reading. We did not know that this area was the place where Cranes have a joint sleeping place... But one hour later we couldn't deny them... Incredible numbers and sounds and the full moon appeared, very nice but



with full moon it's very hard to catch birds! Beautiful atmosphere and sounds. We could hear the high-pitched squeak of the young Cranes as they flew over!



*Preparing for a catch in an old barn in the Extremadura near Obando*

In the old barn everything was prepared by a team consisting of people from the Spanish University of Extremadura, Jorge Sánchez Gutiérrez, Jose Antonio Maséro, Portuguese researchers (Afonso Rocha and colleagues), a Mexican and an Argentinian, a colorful international group! And then the great waiting begins... Will the godwits do what we want them to do, or don't they? With a full moon and thousands of Cranes nearby, virtually impossible work and I didn't give a dime for it... on the first round of control of the mistnets nothing, nada, as expected. The Cranes were discouraged to land nearby the nets by a few members of the team. This caused great sounds on an windless



evening with the moon in fact TOO crystal clear and Black-tailed Godwits see nets better in such conditions.

*A sky full of Cranes heading for the roosting place, gives great sounds and views, but also nervous ringers if you want to catch Black-tailed Godwits...!*



In the 2<sup>nd</sup> control round there were 20 Black-tailed Godwits and 2 Ruffs in the nets! The measurements, ringing and so on was done in a carousel to process them as fast as possible. Six got a GPS-transmitter and fourteen were released only with color rings, including, no coincidence, one in the colors of the Dutch flag! *Limosa limosa Hollandica* 😊! There is a prize for whoever sees it first in The Netherlands. At 03:00 in the late night/early morning the catching team was ready and the famous 'Wieringer Jodekoeken' could be handed out... So Arturo could finally serve them, as a reward for this successful catch! We had a delicious night-lunch that was well deserved with such a great team performance. So lots of work for us tomorrow to find and admire them again in the fields and see how they behave. The Spanish/Portuguese researchers will come to the Netherlands in April/May to resight their birds and possibly catch them back in the breeding areas where they end up. What a great TOP day and we really have to thank the Peregrine Falcon...



*The complete international catching team after a full night of hard work ringing Black-tailed Godwits*

### **18 February**

Foggy at first, later on 50% cloudy ending sunny. Wind NE 1-2 Bft, 16°C maximum, 1.110 godwits

The day after... just like in the Netherlands, we tried to find out how the captive birds behaved in the field and whether everything was okay with them. There was a persistent fog in the morning, so we were able to get a bit more sleep after an intensive night work... We started at 11 am in the Vegas Altas area. There were again 650 Black-tailed Godwits on the Peregrine Falcon spot, and one of the first birds we saw was *Hollandica*!





*Spanish ringed Black-tailed Godwit in the colors of the Dutch flag: Limosa limosa Hollandica!*

In fact it was getting a bit too hot with vibrations in the air. We saw several birds from the catch and some old friends. We sat comfortably watching them until a Spanish farmer walked by to give the flower rich vegetation on the track a treatment with the backpack... eventually most Black-tailed Godwits left and the Dunlins gave a show. Everything flew off in a NE direction, so they seemed to be on their way to last night's catch. I measured it on a map, it was only 10km over the mountain for the Black-tailed Godwits, double that by car. But they were there again, about 1,110 birds in deep water and many still asleep at 3 pm, so no legs in sight and many one-legged... But usually the birds start foraging again during the afternoon. And they did!

Arturo also arrived, so that helped her a bit. Finally we saw all the tagged birds from yesterday in good condition. And we picked up 18 of the 20 birds that were ringed during the night. A very nice result. We also saw a 'white-headed' Black-tailed Godwit, which stood out. We only missed the transmitter bird Woudburen... But we saw that it was correct on the website of the transmitter Black-tailed Godwits. It had left Extremadura for the Netherlands in the wake of storm Eunice and flew at 11:00 over La Rochelle near the French coast. Will that be the first to reach the Netherlands?



*Arturo and Marycha looking for freshly ringed godwits near Obando; we might have been sitting in the poison! (see below)*



*Spraying pesticides, even on gravel paths, is common practice in many places*



## 19 February

Cloudy morning, sunny afternoon. Wind NE 2 Bft, 15°C maximum, 760 godwits

Last day Extremadura and a cold cloudy start. For the first time we finally saw some of the landscape and surroundings on our way to Vegas Altas. The previous times it was either dark or foggy on this almost one hour drive from our Airbnb at Miajadas. There were 760 godwits waiting for us and 'Hollandica' was showing her rings! We had already seen many different color ring combinations the last few days, but this was our favorite off course... Dunlins gave a flight show and a few Black-tailed Godwits started to perform their courting calls. The pesticide spray had done its job on the path, we noticed.

We couldn't find any transmitter birds, but Jorge gave us some current information where they had spent the night. His colleague Arturo was standing at the catching spot, 10 km further away and saw three of them, but very few other birds over there. So there were a thousand missing... after we had read every ringed bird we went on a scavenger hunt in the wide area. This resulted in 4 Black-tailed Godwits and 12 Griffon Vultures before lunch and a Marsh Harrier who had a carcass of a duck for lunch. Then to Palazuelo where earlier some freshly ploughed stubble fields with water were created and we once saw a hundred Black-tailed Godwits. Now there were twelve, but with a transmitter bird and a color ringed one which we had not seen before, so a high score! And we had never read any rings here. Those turned out to be the last ones... We felt ourselves free for the last two hours of daylight to do some free birdwatching with Hoopoe's, Little Owl and Azure-winged Magpies. We visited the famous castle of Medellin along the Guadiana river again, but now with Marycha who had never been here before.



*Purple Swamp-hen feeding two chicks at Medellin-bridge*

And from the old Roman bridge we saw that the first Purple Swamp-hen already had two chicks here! We couldn't think of a better ending. Tomorrow we will make a short visit to the Doñana NP or in the Brazo del Este, before boarding the plane to the Netherlands in the evening. If it goes... because wind seems to be a thing in Holland and heavy storm is being forecasted!

## 20 February

Sunny, Wind NE 1 Bft, 21°C maximum, 650 godwits

Last (18th) day of godwit survey for the Global Flyway Network Team Piersma and the RUG in Spain: we said goodbye to Miajadas at 08:30. After almost a four hour drive we arrived at the Brazo del Este, where Wim started earlier this month with Siebe. A new area for Marycha and, in the context of research, good to see again how many Black-tailed Godwits were left. Siebe and Wim, together with Wouter Vansteelant, had counted a sloppy 3.000 to 3.500 in the first week of February. The RUG-Team by Jos Hooijmeijer and colleagues (Fabulous-5) visited this area on the 12th of February and counted 1.025 birds on their expedition, and we saw now no more than 650. We also noticed that the area again dried up even more and more. But lovely weather with 21 degrees, less wind and

sunny. We picked up 11 more color ringed Black-tailed Godwits and read some Spoonbills as well, Marychas' fieldwork in the spring for the university of Groningen (RUG) and the Global Flyway Network. Greater Flamingos made the godwits move a bit, but in the arms of the old river it was difficult to read rings between the reedbeds. Black-tailed Godwits also regularly walked in water that was too deep for good ring reading.



*"Up-end-feeding" by Black-tailed Godwits, not very common, but for good food birds do everything*

Like ducks and swans, they did "up-end-feeding" by standing upside down with legs up to reach the nutritious mosquito larvae. Good numbers of male Shovelers, who already had their very nice breeding plumage. A code flagged Black-tailed Godwit walked behind the reed plumes every time, grrr.... but after half an hour focusing we had it complete, YNV. Unfortunately, there was no color-ringed Redshank of Wims' Redshank

ringing project, that would have been a blow to a flare this 'holiday'! Which is in fact not a holiday, but mainly hard work to collect research data. But one with a golden edge because of the atmosphere, mainly nice weather (although more rain would have benefitted the birds!), discovering new areas and very pleasant cooperation in the research team. Although we had much less Black-tailed Godwits in both areas in comparison to earlier visits, we have enjoyed it and have been able to make a good contribution to better understand 'our' Black-tailed Godwits on migration. We monitor what changes they all have to deal with in our rapidly changing landscape and environment.



*Last official day in the field of the second team: Marycha Franken and Wim Tijssen*

Apparently Wim had a premonition about our departure, wearing this Dutch T-shirt it seems..., which means "not going home yet". Our plane had a long delay in the evening due to technical faults (and not because of the stormy weather in the Netherlands), so we only arrived at Schiphol at 3 am. Wim made good use of the waiting time by reading this Dutch book about the godwits by Gerrit Gerritsen which describes exactly what we experienced in 2.5 weeks, namely decreasing numbers of our National Bird, the Black-tailed Godwit!





**Team 5 Portugal and Spain: Ruth Howison, Marie Stessens, Luis Barba Escoto, Taylor Craft and Jos Hooijmeijer, 7-14 February**

**7 February**

Travelling from The Netherlands to Lisbon, Portugal. We slept in Atalaia.

**8 February**

Bright skies all day, 1-2 Bft wind, 21°C maximum, 1.500 godwits

In the morning we started with checking the Tagus mudflats at Hortas but unfortunately it was still high tide. We saw just a few godwits in the distance. We were also not successful in finding godwits at the former Alcochete saltworks but encountered plenty of Black-winged Stilts, Flamingos, Shoveler ducks, and a few Spoonbills. Nor did we spot any godwits at the Barroca da Alva rice fields. None of them had been ploughed yet but they were quite wet and potentially attractive for godwits. We decided to go south to visit the Sado Estuary. The Zambujal rice fields were very dry and unsuitable for godwits but we saw 38 on the mudflats near the old bridge; none of them were ringed. Then we decided to head for Comporta where 3.500 godwits were seen earlier this week. We readily found them in freshly ploughed ricefields but no more than 1.500. They were foraging frantically together with at least 5.000 Glossy Ibises. Near the villages the rice fields were wet and ploughed but > 90% was unploughed and further to the North they were also dry.

Salinity in the Tagus at Hortas was 32.7 mS resembling that of sea water, while in the Sado near Zambujal we measured 5.6 mS, and freshwater conditions (0.98 mS) were found in the rice fields adjacent to the Sado at Comporta. On inspection we found 100's of polychaetes, *Hydrobia*, and rice kernels in the flooded sediment in the Sado rice field where the godwits had just been foraging. Foraging efficiency ranged from 17-20 items per minute in the estuary, to 10-12 items per minute in the rice fields.



*Godwits foraging in the mudflats at low tide at the Sado estuary at Zambujal*



*Cattle grazing in the dry rice fields around Monte Novo in the Sado estuary*



*An assortment of polychaetes, Hydrobia and rice kernels to forage from in the Sado rice sediment*

### **9 February**

Bright skies all day, 1-2 Bft wind, 21°C maximum, 10.000 godwits

Today we spent the whole day in the Giganta/ Cardal/Ponta da Erva rice fields. We immediately found a flock of 2.500 godwits close to the Cardal entrance that grew till 4.500 at noon. As we only arrived at 9:30 most birds were already standing on one leg but there were enough birds moving around or arriving to make the ring reading worthwhile. We continued just a few kilometres along the road after lunch before we encountered another 5.500 godwits. About 95% were asleep and only woke up around 17:00. Announced by growing chatter, every now and then groups of a few hundred individuals flew off in the direction of the night time roosts. All in all we did not see many foraging birds today but we were not unhappy with 40-50 ring combinations read. Feeding efficiency of godwits foraging on the outer edges of the big resting group ranged from 6 - 10 items per minute.

While ringreading, we saw a farmer spraying herbicides on the paths surrounding the rice fields. This really struck us as these fields are supposed to be 'pesticide-free'. We met our team members Kees de Jager and Maarten Hotting that had found the night time roost near Samora Correia; yesterday they saw 30-40.000 birds there but they all left soon after sunrise. We also ran into Afonso Rocha and João Belo who work on godwits, Redshanks and Grey Plovers in the Tagus estuary. Afonso told



us that the drought is now so severe that, like in Doñana and Extremadura, the surface of rice might have to be reduced, simply because there is not enough fresh water to supply all rice and other crops.

We met Rui Paixão at the office of Giganta rice fields. He informed us about the farming management in the fields. Many farmers own the land in the region, so each plot has a different management. Some fields are flooded while some are not, some have stubble from last year, some were ploughed already and some seem to be in fallow. This may play a role in the quality and abundance of the habitat available for meadow birds and is something that can be explored, maybe farmers would be interested in testing which management regime is more beneficial for their production and at the same time, consider what conditions would benefit the most the birds' populations that transit these areas. Is interesting also, to know how the area has experienced different transitions driven by external factors, for example the transformation from grasslands for grazing cattle to rice fields which might be in the future also affected by water shortage by policies interventions or scarcity because of changes in the weather.

We sampled 12cm (high) x 10cm (deep) soil cores in rice fields with different flooding. 1) Water covering the soil surface (water salinity ~2.7 mS) and 2) Water just below the soil surface (higher water salinity, probably due to evaporation ~ 3.9 mS). Husks of rice seeds, and gastropods were present in the soil cores. On the surface of the exposed mud in the wet field we observed many crisscrossing tracks of gastropods.



*A few of the 5.500 resting godwits*



*Herbicide spraying along the roads between the rice fields, the swath of the sprayers extend beyond the edges of the road*

### **10 February 2022**

Clouded most of the day, 2 Bft wind, 18°C maximum, 120 godwits

This morning we left on a 3-hour drive to the Algarve. We checked 2 sites in the Olhão salt pans, close to the city and at the Salinas do Grelha. In the first site we found about 94 godwits standing in high water, checked 68 but found no rings. At Salinas do Grelha we found 32, checked 9 but again no rings. At both places godwits seemed to be foraging on Chironomids. When we visited Salinas do Grelha in 2017, the saltworks seemed abandoned but now the ones on the west side seem to have been restored recently. The godwits we found were using an abandoned salt pan. During our salinity measures of the salinas, we found a salt pan with record high levels. Interestingly, the deeper salinas had higher levels of salinity than the shallow pans. Foraging godwits intake rates were much higher than those of the Tagus rice fields, ranging from 14 - 30 items per minute.

We moved on to the Santa Luzia salt pans but only found 1 godwit there and most pans were fairly dry. The salt mining seemed very active with new no-entry signs and a mountain of salt next to the central complex. Our last stop today was at Castro Marim where we checked salt pans on the northeast of the village but found only 15 individuals. We made an attempt to locate a transmitter bird southwest of Castro Marim but were unable to access the road and saw no flocks nearby. By that time it was getting late and we headed for our next address in Mazagon close to Matalascanas.

The observations of today accentuated the diversity in the habitats that godwits use. While yesterday we saw godwits in groups of 5.000 packed in one sweet-water flooded rice field, today we saw very small groups (in the Santa Luzia salt pans only one godwit) in very saline water.





*Inactive salt pans of the Salinas do Grelha with several species (Black-tailed Godwits, Bar-tailed godwits, Grey Plover, Kentish Plover, Dunlin, Stilts, Avocets, and Sanderlings) foraging and resting.*



*Godwits foraging on Chironomids in hypersaline sediments ranging in salinity from 79 mS in the open estuary to 112 mS in the closed salt pans*



*Record high salinity measured in the recently restored Salinas do Grelha, 143 mS, and in one pan the salinity was so high it was not possible to record with the salinity meter (>200 mS)*



*A small group of 15 godwits foraging in the late evening at Castro Marim with around 27 items per minute in a small closed pond with salinity measuring 57 mS*

### **11 February**

Hazy blue skies, 1-2 Bft wind, 22°C maximum, 791 godwits

Our first stop today was at the El Rocio lagoon where we found 368 godwits and read a few rings; unfortunately the light was bad and a lot of birds were far out or foraging in belly deep water. When we were here in October, the lagoon was completely dry but now it seems to have been filled up to normal levels, apparently with rainwater since the conditions were very fresh <1 mS and foraging intakes between 4-11 items per minute.



The past weeks it has been all over the news that the Doñana ecosystem is about to disappear because of the ongoing drought due to climate change (less rain) aggravated tremendously by the soft fruit agriculture surrounding the National Park. Groundwater is being pumped up legally but to a large extent also illegally and because of that the natural marshlands are facing complete and long term desiccation. The natural lagoons dry out and are no longer an important habitat for the huge numbers of waders, including godwits, and waterfowl that inhabited these marshes in winter time and the vulnerable flora and fauna that used to be so characteristic for this world heritage site. One would expect that the government would take action and force farmers to refrain from their illegal activities but the opposite has happened: 2 days ago they agreed to legalise all illegal pumps (...) which means that they will deliberately sacrifice one of the most important wetlands of southern Europe for illegal economic activities. Let 's hope that the EU will force Spain to come back on their decision.

When we continued towards the JA Valverde visitor centre we drove past many greenhouses with strawberries, berries and other fruits. The ride continued through large scale agricultural fields without much biodiversity and from the high road between the visitor centre and Isla Mayor we could witness ourselves how dry the national park has become. It was hardly greener than in October before the winter rains. Close to the visitor centre, there was a pool of water but all other land was as dry as a bone. Also all the rice fields were dry all the way to Veta la Palma, some had been ploughed earlier but others had not been used at all last year. No godwits to be found and not many other birds either.

At Veta la Palma the first cereals had sprouted on the irrigated fields but almost all natural lagoons were dry, the little remaining water was brackish at 13 mS, but there were no water birds present. Large sprayers were irrigating some fields in the middle of the day. Standing on the edge of the enormous man-made reservoir and looking over the bone dry land was really impressive. The agro-industrial feeling of the extremely dry land struck us all. The big fishponds however were filled to the rim with water except for one: that was the only place where we found godwits (380 in D3) and managed to read some rings. Salinity levels were quite high at 56 mS and intakes ranged from 3-6 items per minute. Many small netted fish tanks already seemed out of use; in October we heard that these will be turned into the larger ecological basins. Overall, the fish basins full of Flamingo's, Spoonbills and other water birds were a relief after a day full of dry fields.

We finished the day at Dehesa de Abajo that fortunately was filled completely with water but we saw no godwits and less waterfowl than normally are present.



*Dried out lagoons, Lucio del Cuquero Grande*



*Relatively good water levels at El Rocio, quite comparable to February 2017, with a group of 368 foraging godwits*



*Foraging godwits at El Rocio, 4-11 items per minute*





*Intensive farming of rice and other crops at Veta La Palma, all water is now diverted to canals and the huge reservoir*



*A variety of water birds including a group of 380 godwits foraging and resting in the fish pond where the water levels were shallow enough*

**12 February**

About 50% sunny, 1-2 Bft wind, 21°C maximum, 1.025 godwits

In the morning we first headed south towards Brazo del Este. This is an old branch on the east bank of the Guadalquivir river and part of the Doñana Natural Park surrounded by vast rice fields.

We started with checking a site where a transmitter godwit had been present just outside Los Palacios Vilafranca. Most rice fields were again ploughed and very dry but at this site we could see that it had recently been ploughed and the soil was still moist but not with a layer of water anymore.

We found no godwits but at least 10 carcasses of White Storks close to each other; were they shot, poisoned or simply died of hunger in the mostly bone dry rice fields?

When we reached Brazo del Este we immediately found godwits all along the old river branch; half of them were resting and the other half foraging in small groups spread out over the entire area. By 15:00, we had scanned most of them: just over a 1.000 individuals and we found 11 ringed birds, including 2 German and 1 Dutch transmitter bird. Water conditions were on the fresh side with salinity ranging from 4-5.5 mS along the river, foraging godwits had intake rates between 1-10 items per minute. The only remaining wetland habitat in this area is narrowly restricted to the river water course and river banks next to the river. Otherwise almost every square metre of land has been converted to agricultural production and most of the water is transported to the fields via narrow concrete aqueducts running along the edges of the fields.

On the way out we scanned more rice fields but found no more birds. We tried to reach some sites where birds with satellite transmitters had been in the past week but most of them were private property. Apart from the main road and a few side paths this area is pretty inaccessible. Also, the land was overall pretty dry so there were not a lot of suitable fields present.

After a late lunch we drove to Extremadura where we will stay in Miajadas till Monday.



*Dry ploughed rice fields around Los Palacios Villafranca, where we encountered at least 10 White Stork carcasses*





*Along the river bends at Brazo del Este we encountered ~1.000 godwits scattered along the winding river*



*Godwits foraging in the deep water of the river*

### 13 February

Mostly cloudy, 2-3 Bft wind, 19°C maximum, 820 godwits

From our colleagues Marycha Franken and Wim Tijssen that were already in the area for a week, we heard that the numbers were still very low; a maximum 1.000 godwits in the whole area. In the morning we checked the traditional core area between Hernan Cortes and Santa Amalia but, as they predicted, we found not a single godwit. The rice fields were mostly dry but the unploughed stubble fields held some water. Only a few fields had optimal conditions, ploughed with a thin layer of water. We also saw some fields where they recently burned the stubble, as well as some fields turning brown from glyphosate usage.

We can say that the experience of this trip gives us the opportunity to analyse the problem of the habitat of Black-tailed Godwits as a socio-ecological complex system. That is, that the habitat is not only possible because of ecological or climatic conditions (or interactions) but that it is affected by many factors at many scales. These go from human actions and decisions at the farm (field) level that collectively alter the whole landscape, to external shocks like droughts, to subsidies from the government.

In general, the area has changed a lot over recent years. Nowadays, rice agriculture is rapidly converting to dryland crops such as olive trees, fruit trees, maize, wheat. We had the opportunity to make short interviews with local farmers. They told us that the switch to alternative agricultural crops is not because of the current droughts (although droughts seem to occur more often, and the farmers are pessimistic about water shortages). According to them, the main reason is that rice is a labour intensive crop and most young people go to the cities for work. This trend is perhaps exacerbated by water shortages. Lack of labour forces farmers to cultivate alternative crops. For example, one of the farmers mentioned that maize is easier to cultivate by a single man with the help of machinery, while fig trees require more intensive labour during harvesting. He added that due to COVID-19, one of his sons who was helping in the tree plantation, had to stop working. Finding a substitute was impossible due to the shortage of labour in the region. This is not only because people leave rural areas, but often people would rather work in something less demanding. Moreover, the EU no longer subsidises rice. This results in a striking difference of land use compared to 10 years ago..

Both farmers we talked to acknowledged that it was a very dry year and that the drought has not been this severe since 1995. One farmer even mentioned that he sowed cereal, but was not sure if he could harvest it because of the drought. The farmers told us that they can get water only for maintenance of the trees in his plantation, but not for production. So no production is expected this year in the region. Also, they were not sure if the government would give monetary support given that the income from agricultural production will be severely affected. That is still to be decided.

Another factor the farmers mentioned about rice cultivation, is that they pay more attention to the use of agrochemicals like herbicides. Maintaining a high quality uniform crop of rice (uncontaminated by other plants) is perceived to be more difficult without the use of agrochemicals. This also may discourage farmers from producing rice. Moreover, we asked the farmers why some rice fields were wet and others were dry. They said it was a combination of 1) how they had leveled the field for rice, which converts it into a water catchment, where some fields seem to drain faster than others and 2) the current distribution of flooded fields were due to accumulated rainfall, as there had been no irrigation since last year. As we can see the landscape is very dynamic and factors that determine the current state are multiple and interlinked.



In the afternoon we searched for godwits in the larger area around Palazuelo. Most fields here had been ploughed and seemed a little wetter than what we had seen in the morning, with many seemingly suitable for foraging habitat. Crop changes here were not as eminent. At some point Wim and Marycha texted us that they had found a group of 820 near Villar de Rena in a freshly ploughed, wet field. This gave us the opportunity to read another 11 ring combinations, of course with great overlap with our other team members and we managed to see the two transmitter birds Woudburen and Ojeda. The rings were hard to read as they were covered with mud.



*Fields with newly planted olive trees (left) and fallow (right) where ricefields were found before.*



*Dry field where the transmitter bird Ojeda appeared the day prior*





*Flock of 820 godwits near Villa de Rena. The only two transmitter birds of Extremadura (Woudburen and Ojeda) were located in this flock.*



*Foraging godwits at Villa de Rena; the edges of the rice fields sprayed with pesticides*



## 14 February

About 80% sunny, 1-2 Bft wind, 22°C maximum, 85 godwits

Unfortunately, we could not meet our Spanish colleagues with Juan Navedo, Jose Masero, and Jorge Gutierrez in person, however we have made tentative arrangements to meet online while the expedition is still fresh.

We then decided to drive from Extremadura to the Tagus estuary to scan the mudflats.

At Barreiro we found two ringed godwits from Jose Alves' project. They were foraging close to where the city sewer ended up in the estuary together with other waders. Water salinity was quite low (2-6 mS) because of the municipal sewer water flowing into this point of the estuary and the organic material levels were very high. Foraging rates ranged from 1-6 items per minute.

The tide was coming in and the birds flew off to a high tide roost. We scanned several other sites between Barreiro, and the Samouco salt pans, but we did not find any other godwits. At 15:00 we left to catch our flight back home from Lisbon airport and arrived at home after midnight.



*Godwits foraging in freshwater, and high organic material conditions near the sewer outlet, Bareiro*



*High organic material conditions at the sewer outlet, Bareiro*





*High tide covering the mudflats at Montijo*



*Salt pans at Samouco, no godwits, but plenty of other water birds*

**7 March 2022**

**Online meeting, Juan Navedo, Jose Masero, Jorge Gutierrez, Ruth Howison, Jos Hooijmeijer, Luis Barba, Taylor Craft.**

Juan Navedo shared a presentation on his plans for setting up adaptive rice management in the Guadiana basin. They have approached the farming cooperative who have offered 24 fields (70 ha) for the pilot projects to be carried out. Initially a baseline survey will be carried out to establish the conditions at T0. In a paired plot design, adaptive management will be compared to control

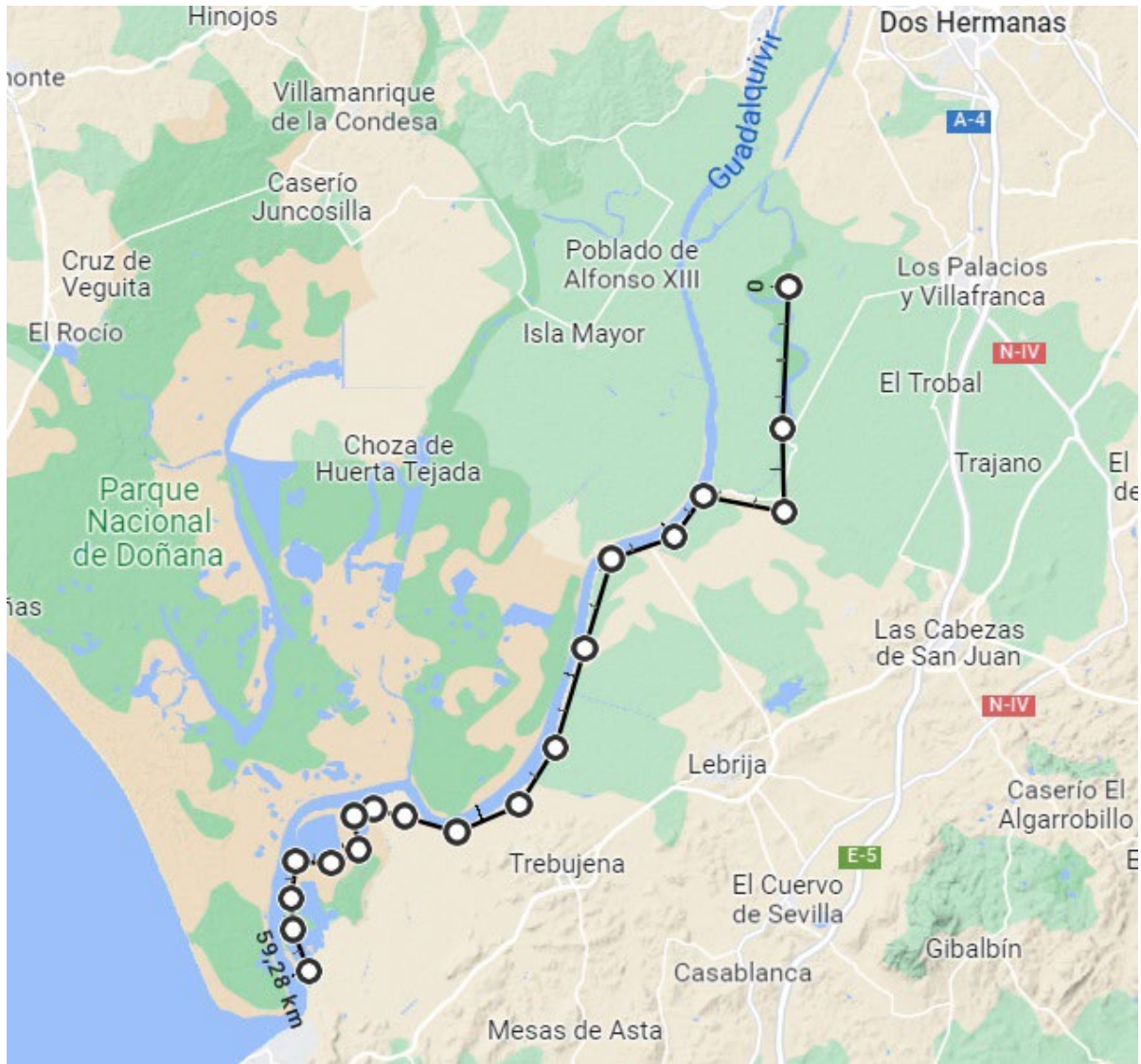


treatments. In particular, water management outside of rice production will be addressed, taking into account substrate type (sand or clay) and rice type. The ultimate goal is to produce farm products with added biodiversity value, and increase awareness that the local activities of farmers in Extremadura have large scale impacts on the conservation of migrant waders throughout the East Atlantic Flyway (focal species are: Black-tailed Godwits, Dunlin, Golden Plover, Ruffs).

EU subsidies heavily influence the decisions of farmers in maintaining rice production or switching to alternative crops where subsidies can be earned. The decision to switch to alternative crops cascades to large landscape changes when many individual farmers change to alternatives such as fruit trees or dryland crops that alter the spatial footprint of available wet areas for water birds. Our colleagues aim to provide evidence through the pilot projects for valuable alternatives to encourage farmers to continue to maintain wet agriculture in a way that is also beneficial to the birds.

Jorge and Jose have successfully tagged 30 Black-tailed Godwits this spring, and Jorge will follow these birds to Iceland and The Netherlands to study levels of oxidative stress in these godwits after migration and arrival in the breeding grounds.

Appendix A: Locations visited (see text)

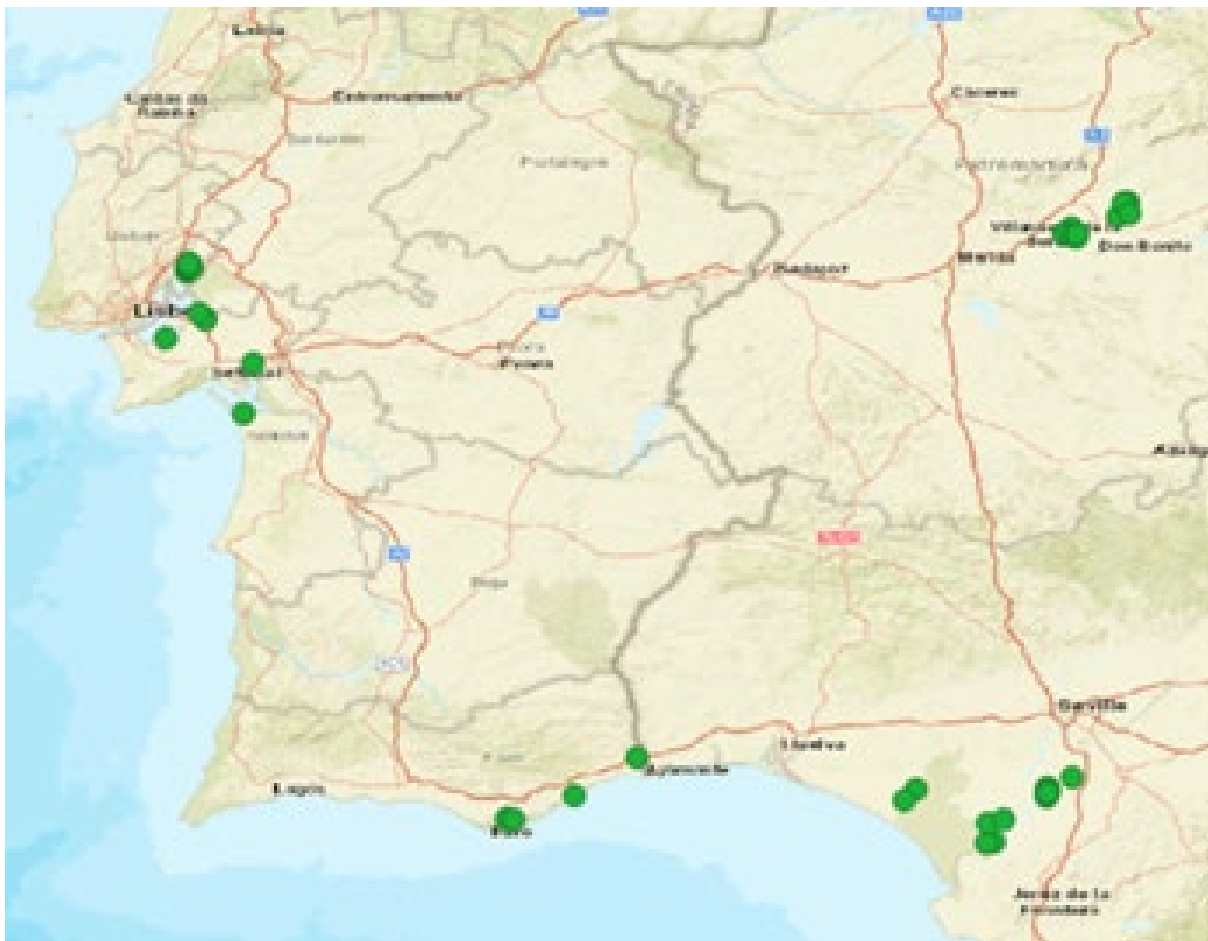


*Locations visited during the southward-expedition along the river Guadalquivir 7-2-2022 by Siebe and Wim. A trip of 60km downwards from the Brazo del Este rice field complex.*





Map of Extremadura where Black-tailed Godwits were found between 8-19 February



Sites visited by RUG-expedition team from 7-14 February 2022

Appendix B: Godwit locations in S Iberia

ID	Region	Location	Latitude	Longitude
26	Extremadura	Hernan Cortes	39.03333	-5.93333
33	Tejo	Samouco, Samouco saltpans	38.73472	-9.00361
37	Algarve	Tavira, Ria Formosa NP, Tavira saltpans	37.10833	-7.63611
40	Algarve	Castro Marim, Cerro do Bufo	37.2	-7.45
46	Extremadura	Santa Amalia	39.00389	-5.98611
56	Extremadura	Valdehornillos	39.05028	-5.97583
57	Tejo	Samora Correia, Samora Correia ricefields	38.94194	-8.88528
58	Sado	Montevil, Cachopos	38.4	-8.60806
59	Sado	Carrasqueira	38.40222	-8.76028
60	Sado	Comporta	38.40417	-8.70972
61	Sado	Monte Novo da Palma, Rib. De S. Martinho	38.42944	-8.64278
77	Extremadura	Don Benito	38.98333	-5.88333
103	Algarve	Ludo, Ludo salt pans	37.03056	-8.00028
104	Sado	Zambujal	38.57306	-8.73472
105	Sado	Palma, bridge over Rib. de Sao Martinho	38.47222	-8.585
106	Sado	Alcacer do Sal	38.365	-8.50389
107	Tejo	Santo Estevão, Paul de Belmonte	38.85556	-8.745
108	Algarve	Vila Real de Santo António, Esteiro da Carrasqueira	37.18917	-7.46417
110	Sado	Marateca	38.58444	-8.675
111	Tejo	Benavente	38.98389	-8.81167
112	Extremadura	Yelbes	38.96944	-6.00167
174	Tejo	Vila Franca de Xira	38.83861	-8.96028
182	Extremadura	Palazuelo	39.11583	-5.73778
183	Extremadura	Ruecas	39.04528	-5.875
192	Tejo	Porto Alto, Giganta ricefields, Ponta da Erva	38.91667	-8.93333
194	Doñana	Puebla del Rio, Dehesa de Abajo	37.20139	-6.18028
196	Extremadura	Guadiana del Caudillo	38.93333	-6.68333
199	Doñana	Trebujena, Donana NP, El Codo de la Esparraguera	36.9	-6.28333
200	Doñana	El Rocio, Cota Donana, Lucio de las Gangas	37.07611	-6.38583
203	Tejo	Alhos Vedros, Alhos Vedros saltpans	38.65	-9.01667
204	Algarve	Olhão, Fuseta saltpans	37.05	-7.73333
211	Algarve	Faro, airport saltpans	37	-7.96667
221	Sado	Hortas West	38.76111	-8.93417
221	Tejo	Hortas West	38.76111	-8.93417
222	Extremadura	Conquista del Guadiana	39.05611	-6.0575
223	Extremadura	Medellín	38.98861	-5.96056
224	Tejo	Alcochete, Alcochete saltpans	38.74694	-8.92583
256	Algarve	Olhão, Olhão saltpans	37.01667	-7.85
268	Algarve	Tavira, East of Tavira saltpans	37.11667	-7.61667
278	Algarve	Tavira, West of Tavira saltpans	37.1	-7.63333
284	Doñana	Matalascañas, Laguna del Zahillo, Parque Natural de Doñana	36.98778	-6.50722
285	Doñana	Isla Mayor, Entremuros (Parque Natural de Doñana)	37.08611	-6.26028
286	Doñana	El Rocio, Marismas de El Rocío (Parque Nacional de Doñana)	37.12833	-6.50528
296	Algarve	Castro Marim, Natural Reserve saltpans	37.21667	-7.41667



297	Algarve	Bias, Bias saltpans	37.03333	-7.75
307	Tejo	Samorra Correia, Belmonte ricefields	38.91667	-8.83333
310	Extremadura	Pizarro	39.15139	-5.80528
315	Extremadura	Vivares	39.08333	-5.88722
382	Tejo	Alcochete, Pata salt pans	38.73222	-8.98861
383	Tejo	Alcochete, Almada salt pans	38.74194	-8.9825
384	Tejo	Alcochete, Restinga salt pans	38.73167	-9.00917
385	Tejo	Alcochete, Vasa Sacos	38.83333	-8.95
386	Tejo	Benavente, Paul de Trejoito	39.01917	-8.72222
387	Tejo	Alcochete, Barroca d'Alva	38.73056	-8.9
388	Tejo	Porto Alto, Ze do Pinho	38.96222	-8.89167
435	Doñana	Sanlúcar de Barrameda, Salinas de Bonanza, PN de Doñana	36.86667	-6.33333
452	Algarve	Santa Lucia, Santa Lucia saltpans	37.11139	-7.645
473	Tejo	Alcochete, Hortas	38.76306	-8.93694
475	Doñana	Isla Mayor, Veta la Palma	36.97083	-6.235
476	Sado	Monte Novo do Sul	38.40889	-8.68111
516	Algarve	Faro, Salgados de Faro	37.01889	-7.89472
529	Algarve	Armação de Pêra, Lagoa dos Salgados	37.1	-8.33333
552	Sado	Pontes, Pinheiro Torto saltpans	38.54889	-8.7925
559	Extremadura	Gargáligas	39.06556	-5.645
560	Extremadura	Zurbarán	39.0575	-5.71528
590	Doñana	Isla Mayor, Veta la Palma, rice fields	37.03556	-6.195
591	Doñana	Puebla del Río, Isla Mínima, rice fields	37.14278	-6.12417
594	Doñana	Isla Mayor, rice fields	37.13944	-6.18944
598	Tejo	Porto Alto, Cara Larga	38.96167	-8.92056
599	Tejo	Porto Alto, Toneca	38.95361	-8.93639
600	Tejo	Porto Alto, Ruivo	38.96667	-8.90194
601	Tejo	Granho, Foros de Benfica, Paul da Casa do Cadaval	39.10639	-8.6475
626	Doñana	Matalascañas, Laguna de Santa Olalla	36.98389	-6.46694
655	Tejo	Lisbon, Sacavém, Vasco da Gama bridge	38.78833	-9.08889
680	Sado	Setúbal, Salinas da Bonita	38.51667	-8.8
692	Doñana	La Puebla del Rio, Paraje Natural Brazo del Este	37.13333	-6.03333
713	Doñana	El Rocio, Lucio de Mari Lopez	37.04833	-6.30472
719	Extremadura	Puebla de Alcollarín	39.11667	-5.78333
720	Algarve	Lagoa, incl. Alagoas Brancas	37.13333	-8.45
721	Extremadura	Campo Lugar	39.2	-5.76667
724	Extremadura	Almoharin	39.15	-6.03333
725	Extremadura	Casar de Miajadas	39.13333	-5.85
742	Extremadura	Miajadas	39.14056	-5.89333
863	Extremadura	Valverde de Mérida	38.9	-6.16667
894	Doñana	Trebujena, Algaida Saltpans	36.88722	6.32944
932	Doñana	Matalascañas, Donana NP	36.93333	-6.45
945	Tejo	Porto Alto, Evoa	38.85	-8.96667
1032	Tejo	Alcochete, Murraça (sapal) salt pans	38.74184	-8.99042
1089	Algarve	Olhão, Ilha do Lebre	37.01	-7.86
1130	Extremadura	Galisteo	40.03	-6.28
1138	Extremadura	La Albuera, Laguna de la Albuera	38.686	-6.74567

1147	Doñana	Isla Mayor, Arrozales next to Brazo de la Torre	37.194	-6.186
1148	Doñana	Aznalcázar, Caracoles	37.3	-6.25
1296	Tejo	Porto Alto, Paul das Lavouras ricefields	38.866396	-8.8468
1307	Doñana	Las Cabezas de San Juan, Guadalquivir marshes	37.0569	-6.0833
1308	Doñana	Los Palacios y Villafranca, Isla Menor, Brazo del Este	37.103	-6.039
1337	Extremadura	Navalvillar de la Pela	39.09	-5.47
1338	Doñana	Isla Mayor, Lucio del Cuquero Grande, Veta la Palma	37.012	-6.241
1430	Sado	Bairro da Bonita, Salinas do Pinheiro Torto	38.549469	-8.79327
1434	Tejo	Lisbon, Parque Tejo	38.782691	-9.0913
1439	Algarve	Quarteira, Praia do Almargem	37.06	-8.08
1447	Extremadura	Hernan Cortes - Santa Amalia	39.03	-5.959
1448	Extremadura	Hernan Cortes - Medellín	39.006	-5.943
1449	Extremadura	Casa del Cuadradillo	39.057	-6.056
1450	Extremadura	Alonso de Ojeda	39.103	-5.956
1451	Extremadura	Santa Amalia, Tomato Factory	39.004	-6.013
1452	Extremadura	Santa Amalia - Valdehornillos	39.037	-5.993
1453	Tejo	Vila Franca de Xira, Giganta ricefields	38.938	-8.968
1454	Tejo	Porto Alto, Giganta ricefields, Ponta da Erva, East	38.910421	-8.920
1455	Tejo	Samorra Correia, Belmonte ricefields, Southeast	38.893934	-8.79492
1456	Tejo	Porto Alto, Giganta ricefields, Cardal	38.921737	-8.977
1460	Tejo	Benavente, Vale de Frades salt pans	38.78	-8.923
1564	Sado	Grândola	38.22	-8.47
1579	Sado	Montijo	38.698	-8.965
1609	Tejo	Carregado, ricefields	39.029416	-8.941



# Tejo North





# Tejo South





# Sado









# Doñana





# Extremadura

