Seas of change

The environment is changing. We need to understand how birds will react to these changes to make informed conservation decisions. Tracking provides key information, as **Emily Scragg** explains.

How will birds be affected by changes to their habitats? One way we can assess this is by looking at their movements, which tell us which areas are important to them and how this varies through time. Global Positioning System (GPS) tracking is an increasingly popular way of providing such information. GPS devices collect signals from satellites, giving position to within a few metres. Researchers set up a sampling regime on the tag, attach it to a bird, and then sit back and wait for it to collect data.

CLIMATE CHANGE AND TIDAL ENERGY

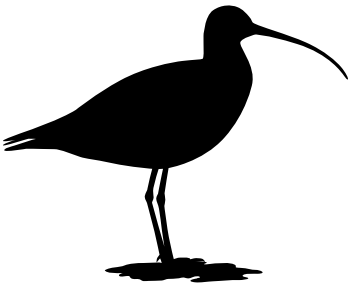
Renewable energy is a key weapon in our fight against climate change. However, renewable energy developments can be large and built in places that are important for wildlife. Effects on wildlife include disturbance and changes to, or loss of, foraging habitat, which can result in increased mortality. Such negative impacts should be minimised and mitigated.

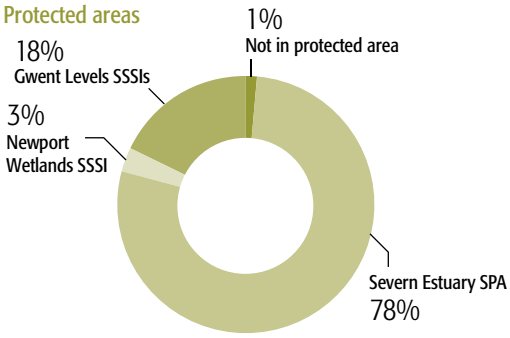
Tidal Lagoon Cardiff is proposing to harness the extraordinary power of the Severn Estuary, which has the second highest tidal range in the world. By enclosing approximately 70 km^2 of the estuary, over 800 million m^3 of water would pass through the lagoon's turbines on each tidal cycle, generating enough power for all the homes in Wales. However, the Severn Estuary is classified as a Special Protected Area (SPA) under the EU Birds Directive, due to its international importance for wintering waterbirds, and the area that would be enclosed by the lagoon includes mudflat and saltmarsh habitats important for these species. While these habitats will remain, the impacts of changes to the tidal cycle on their availability to birds requires investigation and Tidal Lagoon Power is funding BTO to help to do this. Our work is gathering baseline data on the numbers and distributions of birds both within the proposed lagoon area and across the estuary as a whole, and inform proposed mitigation and compensation measures.

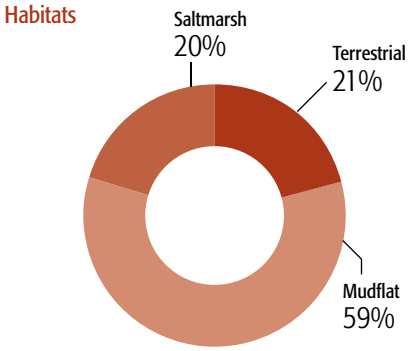
Wetland Bird Survey (WeBS) counts are providing data on the numbers and distributions of birds using the entire Severn Estuary SPA, while BTO is collaborating with the Wildfowl & Wetlands Trust (WWT) to GPS-track waterbirds, showing how they use habitat within and outside the lagoon footprint.

Protected area and habitat use by GPS-tagged waders

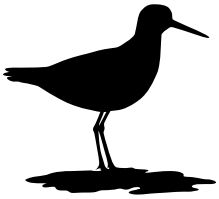
CURLEW

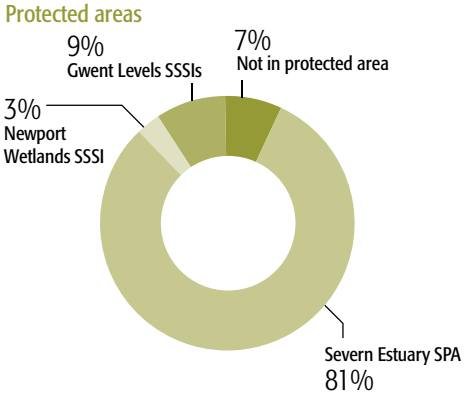


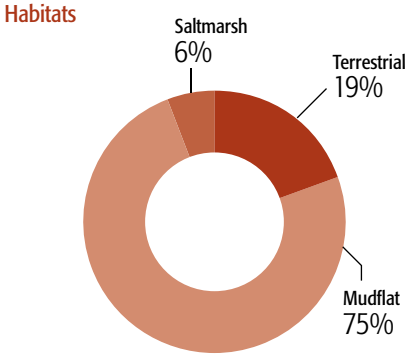




REDSHANK







▲ A dye-marked Dunlin roosting at WWT Steart Marshes, Somerset, in January 2016.

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In winter 2015–16, we caught and tagged 121 birds of five species: Curlew, Redshank, Shelduck, Teal and Wigeon. Our tags uploaded data wirelessly to base stations, and collected data over two complete tidal cycles (spring-neap-spring). We also dye-marked just under 200 Dunlin, a species too small to carry remote-download GPS tags.

SEVERN SURPRISES

Our 52,000 GPS locations were full of surprises! Birds moved further than we expected. Redshank roosting near Cardiff regularly flew 14 km to the Newport Wetlands Site of Special Scientific Interest (SSSI), usually at night. Redshank had larger home ranges than found by previous BTO research and they used larger areas at night than by day. In contrast, Curlew did not show any differences in behaviour between night and day, and were site-faithful to mudflat foraging locations. All species used more terrestrial habitat than we expected, and for waders this was mostly at night. Birds spent most of their time in protected areas – for the waders this was the Severn Estuary SPA, and for the Wigeon and Teal, the Newport Wetlands SSSI. Shelduck proved tricky to track: one by one, their tags stopped uploading data. Fortunately we had also dye-marked them, and when we started receiving reports of birds well outside the range of our base stations (e.g. Gower and Porthmadog, further afield in Wales), we were able to establish that they were moving quite some distance! Dunlin also moved further than expected from previous studies, with re-sightings showing movements across the estuary. This work will now be analysed to quantify the potential impacts of the proposed development and funds from the Curlew Appeal will be used to publish the results in the scientific literature.

Our work on the Severn Estuary is a great example of how technology can reveal previously unknown aspects of bird's behaviour. As anthropogenic pressures mount on birds, this understanding is ever more crucial to protecting the internationally important populations that we are privileged to have in our country. ■

Humber waders

Through funding from the Humber Nature Partnership, Natural England, Yorkshire Wildlife Trust and an anonymous donor, we did a pilot tracking study on the Humber Estuary SPA in winter 2015–16, fitting GPS tags to five Redshank and three Curlew. There were some differences in results for these species to birds on the Severn, with less use of terrestrial habitats, although the small sample size and limited data collection period means more work is needed to establish why. This pilot demonstrates the value of tracking studies in evaluating the potential impacts of developments in the Humber Strategic Economic Plan (a five-year vision for economic development on the estuary), representing a great opportunity for business and conservation alike.

Get involved

Take part in WeBS: **www.bto.org/webs**

For more on the Cardiff Tidal Lagoon, visit **www.tidallagoonpower.com/projects/cardiff/** and **www.tidallagoonpower.com/environment/ecosystems-enhancement-programme/**