A Workshop on

The Uses and Impacts of Drones around the Humber Estuary

To examine trends in drone use for economic, survey and recreational use. How are other areas tackling issues and what policies and practices should we adopt for the Humber?

15 March, 10.00am – 12.30pm Waters' Edge Visitor Centre, Barton upon Humber DN18 5JR

Workshop notes

Present

Kevin Bayes	Humber Nature Partnership
Nick Cutts	IECS, Hull University
Andrew Gibson	Yorkshire Wildlife Trust
Ron Jessop	EIFCA
Simon Lee	EIFCA
Matt Blissett	Lincs Wildlife Trust
Rob Lidstone-Scott	Lincs Wildlife Trust
Jennifer Woollin	Hull City Council
Anne Armitstead	Natural England
Darren Clarke	Humber Nature Partnership
Clare Langrick	NEY Environmental Data Centre
Tim Smith	NEIFCA
Dan Normandale	Environment Agency
Andrew Taylor	North Lincs Council
Will Bartle	Lincs Chalk Streams Project
Heather Davison	Flamborough Head EMS

Apologies

Cliff Morrison	Humber Nature Partnership
Simon Wellock	Lincs Wildlife Trust
Tim Page	Natural England
Vaughan Grantham	East Riding of Yorkshire Council

Aim

The workshop is intended to address the following questions

- What is the current level of drone use around the Humber?
- What are the key issues raised?
- What does the science tell us?
- What is the current consent/assent process and who does it apply to?
- What is the role of the relevant authorities?
- What has happened elsewhere?

Presentation 1

Drones (Unmanned Aerial Vehicles UAVs): Control of Use, Research Value and Operational Issues –

Nick Cutts, Institute of Estuarine and Coastal Studies

The slides accompanying Nick's presentation are available on the Humber Nature Partnership Website

Background

This is an evolving issue. Drones that can be flown straight from the box have been available for a decade, but falling prices has seen a significant rise in uptake over the last 5 years, mainly for recreational use. It is estimated that there were 3.5 million drones in the UK in 2017. Surveys have shown that 25% of new recreational users are unaware of the existence of any controls or duties on them on how, where or when to fly their drones.

Compliance

Drone operation in the UK is controlled by the Civil Aviation Authority. The rules are split between **Recreational** and **Commercial** uses with different levels of control associated with each.

For recreational use, the DroneCode states

- 120m max elevation to avoid aircraft issues
- Keep the drone in sight at all time (no BVLOS – Beyond Visual Line of Sight)
- Fly at least 50m away from people & property
- Fly at least 150m from crowds and built-up areas
- Stay away from airfields and airports
- Legal responsibility is with the pilot

To date, there has been no consideration of any environmental issues.

Wildlife Regulation

The commercial regulatory framework for UAVs is designed to ensure human safety in terms of airspace use, local populations and personal security.

Currently, wildlife considerations relate only to birdstrike and control of this risk

The CAAs CAP 772 document does identify the legal aspects of wildlife protection, but primarily in the context of impacts on safety rather than on wildlife protection. It does however mention the need to consider the Wildlife and Countryside Act and the Habitats Regulations relating to Natura 2000 sites.

Wildlife Guidance

There are no prescriptive requirements for wildlife impact assessments from the CAA, but as a potentially damaging operation, basic considerations relating to SSSIs and Habitats Regulations are required by Natural England.

In New Zealand, their Drone Code of Conduct states

Don't fly over or within 50m of livestock on parks, sensitive wildlife habitats such as wetlands, or nesting or roosting birds

There is a byelaw for Dunedin (a New Zealand town) that bans drones from ecologically sensitive areas although there is a discretionary consent clause designed to allow commercial flights.

Natural England recently included drones in their Marine Recreation Evidence Briefing – EIN 035

It noted that disturbance to birds was dependent on a range of factors including altitude, drone model and levels of habituation to disturbance.

The table below is taken from the NE Briefing Note

Table 3 Assessment of indicative likelihood of significant impacts from recreational drone activity at the coast

Pressure	Likely overlap between activity and feature (confidence)	Evidence of impact (confidence)	Sensitivity of feature to pressure (confidence)	Likelihood of observable/measurable effect on the feature	Likelihood of significant impact on Conservation Objectives
Above water noise changes and visual disturbance – marine mammals (hauled out seals)	Low – Medium depending on geographical location. Low for most established seal colonies on rocky coastline which are generally remote with difficult access. Possibly higher for seal colonies in more accessible locations, depending on potential range of drone operating system (expert judgement)	Evidence of seals 'flushing' into the sea as a result of flying UAS at low levels above seal colonies in Scotland (one study). Additional evidence of relative lack of response of various marine mammal species (from cetaceans, sirenians and pinnipeds) when UAS operated above certain altitudes (medium)	Medium (expert judgement)	**Low-Medium** based on the relatively low likelihood of overlap (recognising some colonies may be particularly vulnerable), and the sensitivity of feature. Additional risk arises from the potential for the drone to crash if flown beyond the range of the operating system	**Low-Medium**
Above water noise changes and visual disturbance – birds	**Low-High** depending on geographical location of activity (expert judgement)	Evidence from one study of relatively little impact on wild and semi-wild waterbirds; evidence from another study that visible disturbance of wild waterfowl when UAV flown below a certain altitude (low)	**Low–High** (medium) Based difference in sensitivity to these pressures between some species e.g. red-throated diver, curlew, are highly sensitive to disturbance; other species e.g. gulls, have high thresholds (low sensitivity) to disturbance. Certain behavioural activities are considered more susceptible to disturbance e.g. nesting seabirds or breeding birds (expert judgement)	**Low - Medium** based on wide range of likely overlap between pressure and feature. Where overlap occurs mixed evidence regarding impact from drones. Strong evidence base for impact from analogous pressure (i.e. noise or visual disturbance caused by other anthropogenic activities), especially if high feature sensitivity	**Low - Medium**

The briefing also states that

Guidance is precautionary, based on a limited evidence base & expert judgement.

There is a need therefore to provide a greater evidence base and code(s) of practice.

Natural Resources Wales (NRW) have produced a Guidance Note which states:

- All relevant legislation regarding the safe and proper operation and use of drones must be followed (see the CAA website).
- Ensure that the landowner's permission is given before flying a drone.
- The welfare of birds and other wildlife, and the value of the habitats in which that wildlife is found, are more important than the drone and its use.
- Birds and other wildlife should not be harassed or disturbed by drone flights.
- Drones should not be flown over nesting areas, colonies, roosts and important feeding areas, unless a scientific or conservation need can be demonstrated, and as long as fulfilling that need is not outweighed by potential impacts on the target population.
- If it is considered that the use of a drone is likely to inhibit normal bird behavior, or may solicit an adverse reaction by the birds to the drone, then the flight should not be made.
- Where the use of a drone is likely to cause disturbance to any bird species that is listed on Schedule 1 of the Wildlife & Countryside Act (1981), alternatives must be sought. If potential impacts cannot be avoided, a license must be sought from NRW, setting out the purpose for which the drone is to be used.
- Where the drone is to be used on an SPA, it may be necessary to conduct an HRA assessment and NRW advice should be sought.

Potential Value of Drones for Research and Management

Despite the potential for disturbance, there is clearly considerable opportunity to use drones to assist conservation management. Their cheapness and ease of operation makes them extremely valuable, when fitted with a simple camera to

- Assess emergency activities eg oil spills or seabird wrecks
- Support habitat mapping eg saltmarsh surveys
- Bird surveys

Drones would reduce the potential disturbance from the presence of a surveyor on the ground.

Drones could also be equipped with LIDAR (Light detection and ranging), or Hyperspectral cameras to provide CASI (Compact Airborne Spectrographic Imagery) for mapping eg algal growth, water quality or thermal plumes.

Recommendation

There should be a Code of Practice for drone users operating around and over an estuary which needs to be evidence based and targeted specifically at estuarine sensitivities.

Presentation 2

Developing policy and practice for drone use around Flamborough Head European Marine Site.

Heather Davison, Flamborough Head EMS Project Officer

The slides accompanying Heather's presentation are available on the Humber Nature Website

East Riding and Natural England get regular requests from external companies for permissions to fly drones around Flamborough Head. Currently NE receives about 1 per week.

During the summer there are regular instances of recreational drone use in the area.

During the breeding season, there is a significant risk of causing seabirds to leave the cliff in a panic which could lead to loss of eggs and or chicks.

There are also the considerations of public safety and landowner liability.

Whilst there are risks, there are also potential benefits. There are opportunities for research and survey. Good quality footage could be used for marketing and tourism purposes. A number of the relevant authorities associated with Flamborough own and operate drones for their own purposes.

East Riding Council are in the process of creating a flow chart to assist drone users in identifying the various regulations (CAA requirements, designated land permissions, landowner permissions) that apply to them if they wish to fly around the East Riding coast. A copy of the draft chart is provided as an accompanying document.

Examples of Research and Commercial Use

In 2016 and 2017, drones were used to assist in seabird monitoring, showing limited disturbance.

North and East Yorkshire Environmental Data Centre used their own drone to survey habitat distribution around a section of Flamborough Head

Recent filming for BBC Countryfile showed seabirds leaving the cliff as the drone approached.

East Riding Council have internal procurement procedures for securing drone work.

ERYC are producing an internal framework and policies for use across all departments of the Council. These will deal with both commercial and recreational issues.

These will make reference to existing material eg the CAA Drone Code.

There will be an ERYC webpage for drone use which will link to other resources such as NE's Magic mapping system to show designated sites.

There is currently an APP called Altitude Angel which maps sensitive sites to alert potential drone users to sensitive sites such as schools, hospitals, MOD sites, airfields etc. It should therefore be possible to get information on sensitive wildlife sites provided in a similar way.

ERYC will share their approach to drones with all of the relevant authorities which they work with.

Further Discussions

Scale of Activity

There is no current system for monitoring drone use around the Humber. Many of the attendees had experienced drone activity on sites they work on. Examples of activity included –

1 application for permission for a commercial flight per week at Flamborough. These included nature programme making, outdoor clothing catalogue photography as examples.

There is estimated to be 1 flight each weekend somewhere between Spurn and Hull.

There are numerous examples of drone use in and around Hull.

There are regular flights on the beach at Boston and at Holbeach bombing range.

A number of recent complaints have been received from birdwatchers regarding disturbance by drones at Alkborough.

Five requests for permission to fly drones have been received by Lincs Trust relating to Donna Nook this year.

Drone flights have been noted at Faxfleet and from Brough Haven Car Park.

A number of flights have been noted around Waters Edge Country Park.

These scattered examples do not suggest heavy drone usage of sites around the estuary, but a number of attendees expressed concern at their perception of increasing use.

Issues Raised

AG described some basic drone experiments undertaken by Yorkshire Wildlife Trust to investigate the sensitivity of waders to drone flights. His notes are attached as Appendix 1 below.

Whilst there is not a massive usage issue at present, attendees were keen to point out the potentially catastrophic effects that a single bad fight could have on some sensitive sites. Potential impact on Flamborough seabirds during the breeding season has been mentioned. A mass panic from the cliffs could lead to hundreds of egg or chick losses impacting on the breeding success of the colony for that season. Similar concerns were raised for the little tern colony at Beacon Lagoons near Easington and for any of the breeding avocet colonies around the estuary where disturbance of adults could open up nests to attack by predators such as crows.

Disturbance of overwintering birds may create less impact, but at some times, such as during hard winters individual flights could again be an issue for concern. Wildfowling is banned during hard weather, should drone flights be treated similarly?

Discussions returned repeatedly to the potential conflict between the desire to minimise disturbing recreational flights and the potential benefits to research and survey work of well regulated commercial flights.

A number of the attendees owned and operated drones including NEIFCA, NEYEDC, Lincs Chalk Streams project, YWT and IECS. NEYEDC operated their drone commercially. All were keen to stress the rigors involved in achieving a CAA drone pilots license, the importance of obtaining appropriate liability insurance and the strictures of the CAA regulations surrounding commercial drone use.

The limited nature of existing research on the behavioural impacts of drones was noted. Whilst there a few research papers on the effects of drones on birds, seals and bears amongst others, few,

if any relate specifically to estuarine situation or to migrating wading birds. There is clearly an opportunity for further good quality research relating to

- The varying response of different species at different times of year
- The influence of habituation
- The varying responses to different types of UAVs (fixed wing, quadricopter etc)
- The influence of differing flight patterns. Might a particular flight pattern be less disturbing?
- Possible safe operating distances be for bird flocks around the estuary. Could we set a sensible precautionary distance?
- Key stimuli that a particular species is responding to? Is it visual, noise or both?
- Identifying the most sensitive times of year for a particular site

Given that any research to investigate these issues would, by its very nature, create disturbance, it would be important to assess the risks carefully and to ensure high quality methodologies to maximise the quality of any data obtained.

Natural England are keen to minimise potentially disturbing drone flights and are considering collecting library footage which could be provided in lieu of permissions to fly at the most sensitive periods.

What has happened elsewhere

A number of responses to drone activity from different organisations are provided with the list of background information attached as Appendix 2 below. These vary from outright bans on drone activity due to concern over liability taken by Leicester City Council and Newcastle City Council, much more measured approaches by a range of national parks and other designated sites, to a rather relaxed view taken by e.g. Crown Estates which grant a blanket permission on their land (most of the English foreshore) to fly UAVs provided that pilots comply with all existing laws, statutes, regulations and codes and obtain all necessary consents. (Though they do not say what these may be).

Next Steps

There was a consensus amongst the group that there was sufficient cause for concern about disturbance from drones around the estuary, that it wold be worthwhile raising the issue of drone impacts and ensuring that drone users have a central point of contact whereby they could readily obtain the information that they require to fly safely and sustainably in the vicinity of the estuary

Humber Nature Partnership will

Develop a Code of Practice for drones based on best available information

Set up a web-page to provide an easy point of access for drone users to the information they need

Signpost drone users to basic CAA regulations and to their requirement for consents from landowners and from Natural England.

Drafts of all information will be circulated for comment.

Notes produced by K. Bayes

19th March 2018

Appendix 1 Yorkshire Wildlife Trust notes on drone disturbance

Drone disturbance on the outer Humber estuary.

4th May 2015

Andrew Gibson

Following requests from organisations and individuals to conduct drone filming at Spurn I looked into the availability of research paper on drone disturbance to birds and found there to be very little available.

I arranged with George Stoyle to conduct a very simple exercise as a basis for more works.

The aim was to fly a drone at various heights over the mudflats and record the actions of feeding waders and wildfowl.

Basic details -

4 rota drone with hand held control panel providing height and distance details.

Weather clear 8-9mph south westerly

3pm on a bank holiday with people walking past at all sites.

Tide times and height – Low water 12.46pm @1.1m, High water 18.41pm @6.6m

The first location was at the gate entrance to the NNR at Spurn. I observed to waders and found them to be feeding around 1000m and more, at this distance it is very difficult to be species specific with guaranteed id of each bird but it was clear to me that the mix of waders contained dunlin, grey plover redshank and curlew. The waders where feeding in a very loose group and numbered around 1000 to 2000 birds stretching from wash over to Crown and Anchor. There was no flight movement of birds other than would be expected and no flock forming in flight. Close in, just beyond the saltmarsh was 3 redshank, 1 curlew and 2 shelduck. The drone was calibrated and raised with the plan to take it to 50m. The reaction from the 3 close in species was mixed, the redshank carried on as normal the curlew and shelduck where aware. The drone was then flown out towards the feeding waders distant. As the drone went to 150m away, dunlin where noted to have lifted and be flocking flying both left and right as a flock. There was about 100 birds that had been in front of the main feeding group. As the drone pushed out to 200m more waders lifted and there was 3 groups

wheeling around, landing and lifting off again. At this point the test was stopped and the drone brought back to us. The close redshank carried on as normal but the curlew and shelduck had moved off.

Next stop was Sammy's Point, again the waders where well out 1000m plus and of a similar mix but a lower density. There where a group of 17 redshank just off the marsh and rutted mudflats. The feeding action of all the waders was observed and as at the previous site all where feeding normally with no flocking flinging. This time the drone was set up and raised from behind the flood bank. It was taken to 100m and flown out over the close redshank and onto the wader. Waders started to flight with the drone at around 200m away, again dunlin size birds lifting initially and flocking , going both left and right. We pushed the drone out to 350m with more birds lifting. At this location the majority of the birds was over 1000m. As the drone was returned we dropped it to 50m to fly over the close redshank group, again they did not react so we flow it back over them at 30m, two birds heads lifted but the rest continued to feed. It was dropped then to 20m and passed over again. Some birds stopped feeding and where alert but no flight occurred.

Final location was Skeffling pumping station, the waders where again at around 1000m and a similar mix but with godwits in and more grey plover. The initial observation at this site found the birds to be much more active in flight and all flights where with a westward movement. This may well have been due to a rising tide and push into the feeding areas at Welwick. The drone was again set up at the back of the bank and raised to 100m. It was flown owt to the flocks and flocking and wheeling of the dunlin types occurred around 200m, whilst there was still this westward flight going on, bird perceived to be moved by the drone wheeled round before moving west. The drone was brought back and flown along the edge of the saltmarsh towards 3 shelduck and around 20 brent geese. The shelduck lifted very soon after we went towards them but this may well have been natural as the flew towards the drone but then split up as they neared the drone (I could not estimate what distances for this action) The brent geese where around 750m away as we flew towards them and lifted with the drone 300m away from us. They turned out over the mudflats and left the area towards Welwick. The drone was returned and the exercise stopped.

Conclusion

This drone clearly had an effect on feeding waders and wildfowl. It was not the sound carried by the wind as the wind direction was towards us and away from the birds. Redshank feeding close in to the saltmarsh in small numbers do not react to the drone at 50m and up to 100m.

This was very much a crude experiment but clearly demonstrates that before any drone flights are +undertaken where birds are present the potential impacts need to be carefully considered.

Appendix 2 Drone Background information

Drone Info – taken from internet

Standard Drone Guidance

https://www.gov.uk/government/news/drones-are-you-flying-yours-safely-and-legally

http://dronesafe.uk/drone-code/

Drones and Wildlife

https://www.sciencedaily.com/releases/2016/05/160523125855.htm

https://www.drdrone.ca/blogs/drone-news-drone-help-blog/how-drones-are-saving-the-environment

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4623858/

https://www.thespruce.com/birds-and-drones-3571688

https://www.theweathernetwork.com/news/articles/drone-uav-marine-science-santuary-national-oceanographic-and-atmospheric-administration/90252

https://www.bou.org.uk/of-drones-and-birds/

http://www.audubon.org/news/how-will-drones-affect-birds

https://www.nature.com/articles/s41598-017-18202-3

https://peerj.com/articles/1831/

Drones and sites

http://www.lakedistrict.gov.uk/visiting/thingstodo/drones

http://www.dartmoor.gov.uk/enjoy-dartmoor/outdoor-activities/drones-and-model-aircraft

http://www.yorkshiredales.org.uk/visit-the-dales/get-outdoors-dales/where-can-i-go/drone-flying

https://www.belfast-harbour.co.uk/harbour-estate-access/drones

https://www.newcastle.gov.uk/leisure-libraries-and-tourism/events/organising-events/drone-use

https://www.gateshead.gov.uk/DocumentLibrary/council/Drones-guidelines.pdf

https://www.leicester.gov.uk/media/180601/drone-policy.pdf

Drones and organisations

https://www.nationaltrust.org.uk/giants-causeway/features/our-policy-on-drone-use

https://www.forestry.gov.uk/forestry/beeh-aevgs5

http://www.english-heritage.org.uk/about-us/film-and-tv-locations/Drone-Filming/

https://www.thecrownestate.co.uk/rural-and-coastal/coastal/uad-drones/

http://www.broads-authority.gov.uk/news-and-publications/drone-use

http://www.pla.co.uk/Safety/Use-of-drones/unmanned-aerial-vehicles-UAVs

Drones and the public

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/579550/drones-uk-public-dialogue.pdf