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BirdWatch Ireland consultation on the further information requested from Oriel Wind Farm and their addendums

A report by staff at BirdWatch Ireland

Contact: Rochelle Streker, Marine Spatial Planning Officer

BirdWatch Ireland Address for correspondence: BirdWatch Ireland, Unit 20 Block D, Bullford Business Campus, Kilcoole/Greystones, Co. Wicklow.

Phone: + 353 01 2819878

Email: rstreker@birdwatchireland.ie

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Directors: A Mulligan (Chairman), L Benson, Y Kelly, C McGuire, M O'Briain, C O'Brien, E O'Brien, J Taylor.

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Introduction

BirdWatch Ireland is Ireland's leading charity focused on the conservation of wild birds. Established in 1968, we currently have over 15,000 members and supporters and a local network of over 30 branches nationwide. As an organisation, our conservation team is actively involved in seabird conservation, research, and monitoring. Our policy and advocacy team are active stakeholders contributing to marine conservation at a national and EU level. We are the Irish partner of Birdlife International and are members of the Irish Environmental Network, Stop Climate Chaos, and the Sustainable Water Network, and a founding partner of the Fair Seas coalition. Our vision is that Ireland should become a world leader in marine conservation and the sustainable management of our marine environment, in which the protection and restoration of Ireland's biodiversity is vital.

Ireland's Seabirds

Ireland's marine environment plays host to a huge diversity of ornithological life year-round. In summer, our offshore islands and cliffs host seabird breeding colonies, many of which are of international importance or regional significance. In winter, our coasts and estuaries are of huge importance for wintering waterbirds. Seabirds, as apex marine feeders, are exposed to all threats affecting the ocean and are excellent biodiversity indicators, providing us with an insight into the health of, and pressures facing, our marine environment [1].

However, 23 of 24 breeding seabirds in Ireland are either Red or Amber listed Birds of Conservation Concern [2]. They are highly vulnerable, facing current pressures and future threats [3], including bycatch and incidental killing (due to fishing and hunting activities) [4], desynchronisation of biological/ecological processes due to climate change, decline or extinction of related species (e.g. food source/prey, predator/parasite, symbiote, etc.), other invasive alien species (other than species of Union concern), and now new potential impacts from wind, wave, and tidal power, including the associated infrastructure

The main impacts of ORE windfarm projects on seabirds and waterbirds include displacement, disturbance, and collision risks. However, there are a range of other possible impacts, including barrier effects (where wind turbines and structural development can interfere with birds foraging and migration routes, potentially increasing their individual energy expenditure and limiting the available habitat), cumulative impacts (how impacts of all current and future ORE projects within and around the Irish marine environment work in partnership with each other and how this will affect birds who interact with them), wider ecological impacts on fish stocks/prey base and ORE development's impact on fishing effort and location, (impact on the prey base/fish stocks during construction and post-construction with additional disturbance and new structures within the marine environment and how it may change prey location and numbers, therefore impacting

seabird foraging opportunities), and impacts on non-seabird species, waterbirds and other larger birds using the air space.

Even though Ireland has designated a network of Special Protected Areas (SPAs) at coastal sites aimed at protecting the most important areas for breeding seabirds, trends in population and range show that some species are in decline [5] and more needs to be done to address threats to seabirds. In particular, the cumulative effects of multiple types of activities and developments within the marine environment must be adequately assessed. For many years BirdWatch Ireland has been working to gather data and information on the importance and usage of our marine environment for seabirds and waterbirds, including tagging and tracking of seabirds at key sites, Digital Aerial Survey (DAS) work, observations on the daily movements and flight lines of a range of species, annual monitoring and management of key seabird colonies for more than 20 years (carried out largely under contract to the National Parks and Wildlife Service (NPWS)), advocacy for increased protections and concise management plans for seabirds, and responding to consultations regarding proposed offshore developments in Irish and UK waters that have the potential to seriously impact Irish seabirds. BirdWatch Ireland therefore has a unique understanding of the importance of Ireland for birds and the possible impacts of continuing and increasing marine activities on their populations.

BirdWatch Ireland consultation on the further information requested from Oriel Wind Farm and their addendums

We at BirdWatch Ireland welcome the opportunity to respond to the addendums from Oriel Wind Farm (hereafter referred to as Oriel) produced in response to the further information requested by An Coimisiún Pleanála (hereafter referred to as ACP). In our original submission to Oriel's project application, we expressed some concerns around the way birds using the Oriel project area were being considered within the environmental impact assessment (EIAR) and were glad to see similar and expanded bird concerns expressed by submissions from other entities and ACP in the documentation that has since been made available.

While we appreciate that our concerns were addressed in the further information requested by ACP and the further information provided through addendums by Oriel, we believe some of our concerns still require further information or research, either within additional addendums to Oriel's planning application or within whatever decision that ACP makes on the project, before we can agree with the determination that Oriel's offshore wind development will not have a significant impact on birds. We have detailed where we continue to have strong concerns below along with the data and rationale that warrants either further consideration or appropriate mitigation in order to limit impacts to birds to an acceptable level before a determination is made and/or construction begins.

1. Clarification around our use of the term ‘fishing effort’ and need for more information on potential changes and impacts to forage fish for marine birds

Firstly, we would like to clarify a misunderstanding that we believe occurred about our use of the phrase ‘fishing effort’ in our original consultation. In the Oriel Response to Submissions Report under ‘3.6.3 Impacts of fishing effort’, when commenting on our original submission to their planning application, Oriel references its ‘*comprehensive assessment on commercial fisheries*’; however, our comments were directed at our concerns around impacts the Oriel development might have on bird fishing or foraging effort, not commercial fishing/fisheries. Offshore wind developments often shift and change the fish communities within their area, which in turn changes forage fish availability for birds [6]. It is our concern around any changes to forage fish for birds leading to negative impacts through increased fishing/foraging effort and decreased individual fitness and/or reproductive success that we were trying to highlight in our original submission. We acknowledge that the similar term may have caused undue confusion, and apologise for this, but we still do not believe that enough was done in Oriel’s EIAR or addendums to properly address our concerns around the potential impacts to foraging birds, particularly in light of the importance of Dundalk Bay and the Oriel project area as a foraging habitat for a variety of bird species.

The final sentence in the Oriel Response to Submissions Report ‘3.6.3 Impacts of fishing effort’ does seem to acknowledge that our concern was about bird ‘fishing effort’ as it mentions ‘*an assessment of indirect displacement resulting from changes to prey and habitats... which considered the potential effects on the fish assemblages during the construction and decommissioning phases which may indirectly effect and have implications for ornithological features*’. This concern was echoed and expanded upon by ACP in their Further Information Request under the ‘Ornithology and Disturbance & Displacement’ section, where it is stated that ‘*Dundalk Bay is noted to be a very important foraging area for birds, likely linked to the prey resources known to exist there, including spawning habitat of the Atlantic Herring (Clupea harengus). The rate of displacement does not appear to have been fully considered in the context of potential indirect and cumulative effects of the project on birds, such as Manx Shearwater (Puffinus puffinus), who forage in Dundalk Bay in large numbers, where a low rate of displacement may induce a population scale impact*’. For these reasons, ACP requested that Oriel ‘*address potential changes in the distribution and abundance of important prey populations on birds*’; however, we do not feel that this was adequately done in the addendums and we still remain concerned that the Oriel development will have serious impacts for foraging birds.

There is evidence that this area is critical to Ireland’s breeding seabirds, for whom nearby accessible foraging areas are crucial, with ObSERVE II aerial data showing that the Oriel array area is located within one of the 1% most used areas in Irish waters by breeding seabird species in summer (Figure 1).

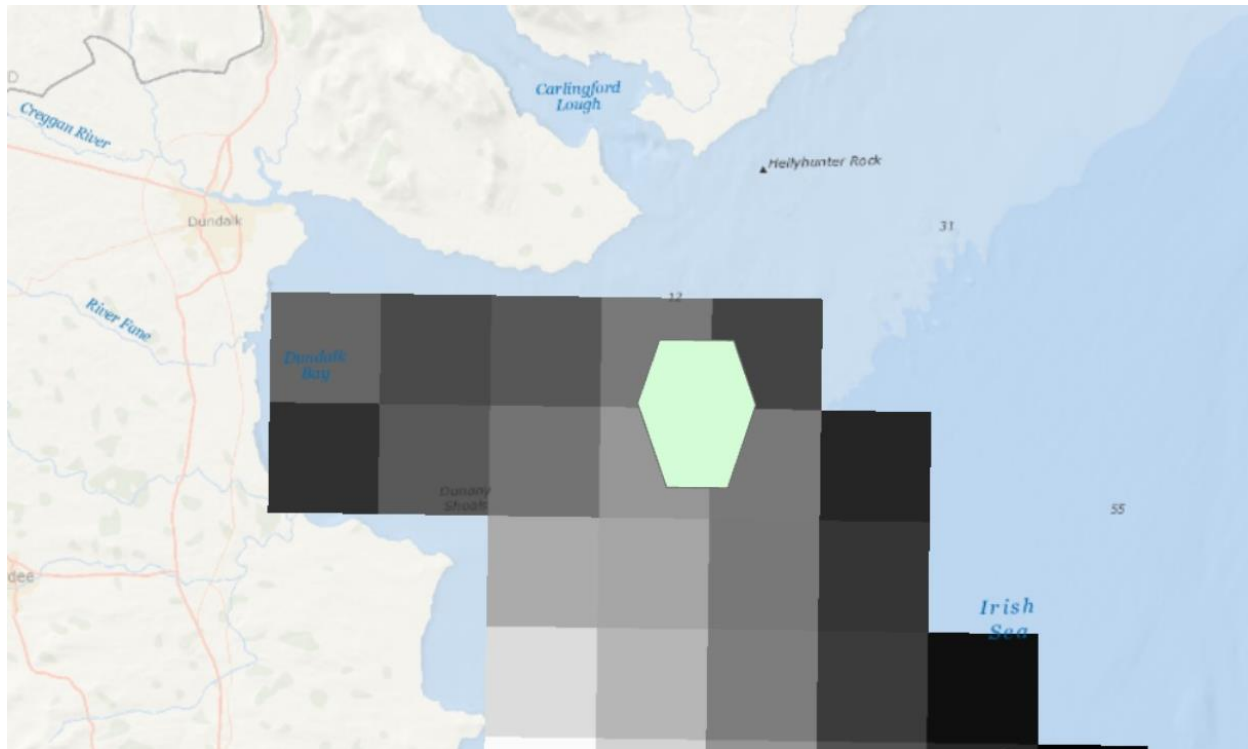


Figure 1: Map of the Oriel array area (light green polygon) and a section of the national top 1% of areas used in summer by all breeding seabirds (black and white raster layer going from black to white as highest to lowest use within the top 1% use threshold) from ObSERVE II survey data.

Additional impacts and threats from offshore wind in this critically important and highly used area could be extremely detrimental to the reproductive success of Irish breeding seabirds and, as mentioned above, 23 of 24 breeding Irish seabirds are already Red or Amber listed Birds of Conservation Concern [2]. The high use of this area during summer corresponds to the breeding season for seabirds, when individuals and populations are at their most vulnerable due to the stress of breeding, as well as being at their most restricted movement-wise when adults must remain close to their breeding sites and when fledging chicks are limited in their flight ability and movement [7]. Additionally, this restricted movement means that adults are unable to forage as far away from the colony as they might during the winter and therefore nearby foraging habitats, such as Dundalk Bay, are critical to the success and survival of these birds.

Looking at data of specific species, there is evidence that both Black-legged Kittiwakes (*Rissa tridactyla*; hereby referred to as Kittiwakes) and a grouping of both Lesser (*Larus fuscus*) and Great (*Larus marinus*) Black-backed gulls also use the Oriel array area heavily during the breeding season (Figure 2). Both of these species have high collision risks with offshore wind turbines [8,9,10,11] and could be impacted by the offshore wind development within this important high use area by both a change in prey species available and increased risks from collision with turbines.

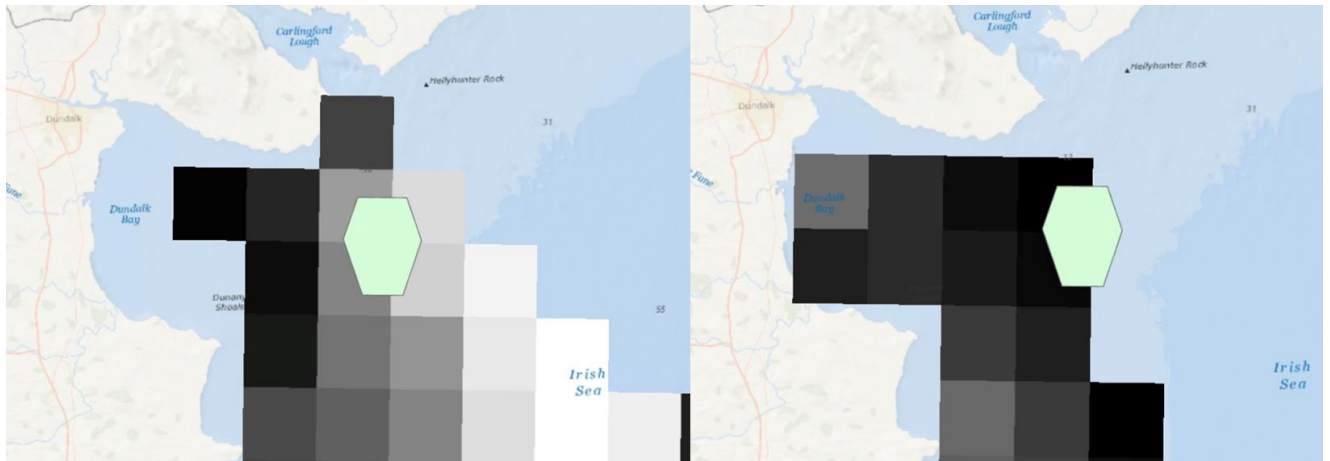


Figure 2: Left- Map of the Oriel array area (light green polygon) and a section of the national top 1% of areas used in summer by Kittiwakes (black and white raster layer going from black to white as highest to lowest use within the top 1% use threshold) from ObSERVE II survey data. Right- Map of the Oriel array area (light green polygon) and a section of the national top 1% of areas used in summer by Black-backed gulls (black and white raster layer going from black to white as highest to lowest use within the top 1% use threshold) from ObSERVE II survey data.

Additionally, Oriel has the potential to impact foraging areas for seabirds breeding outside of the Republic of Ireland as well. The array area for Oriel is located near the border with Northern Ireland and Dundalk Bay is also used by birds breeding within Northern Ireland, as well as birds migrating between the two countries. The Oriel array area is also within a core use area identified for Manx Shearwaters (*Puffinus puffinus*) nesting in Wales using tracking data (Figure 3).

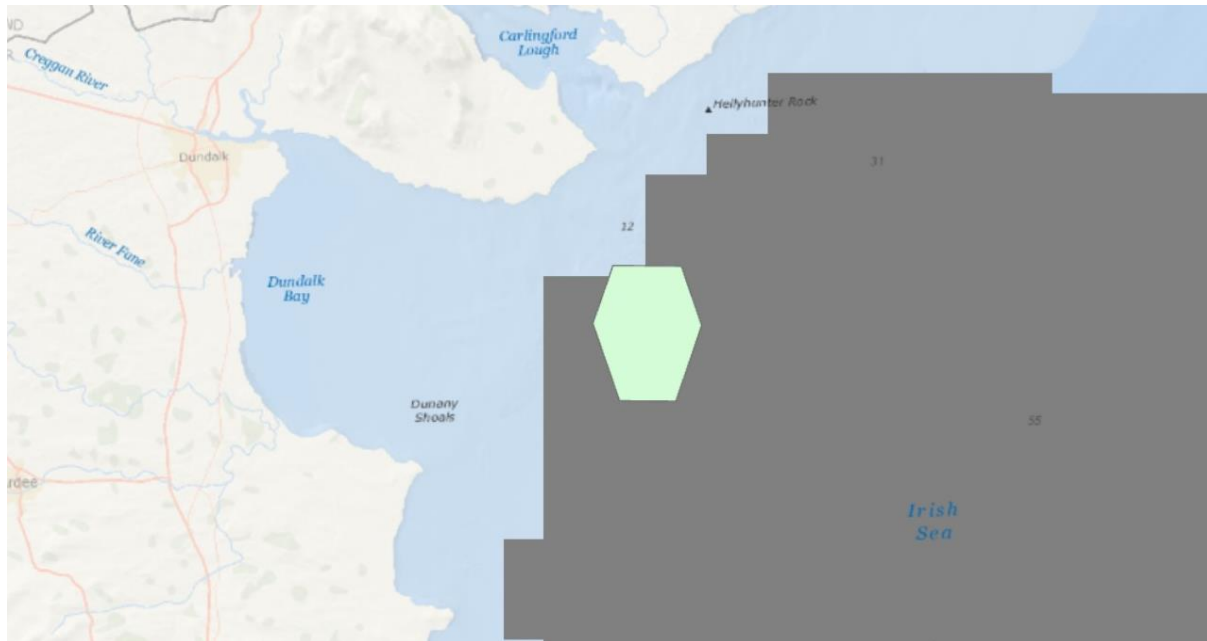


Figure 3: Map of the Oriel array area (light green polygon) and a section of core use area identified from tracking data from Manx Shearwaters breeding in Skomer, Wales (grey polygon).

The overlap between Oriel's array area and the Manx Shearwater core use polygon identified from tracked individuals breeding on Skomer Island in Wales highlights that this marine space is an important foraging area for birds breeding outside of the Republic of Ireland as well, who will also face the impacts of any changes to forage/prey availability in the area. It is worth noting that Skomer Island in Wales is also one of the largest colonies of Manx Shearwaters and therefore of particular importance to the European and international populations [12].

With this evidence on the importance of Dundalk Bay and its wider marine area to both seabirds breeding within and outside the Republic of Ireland, it is clear that there needs to be more research or data presented within Oriel's EIA or addendums to address how Oriel's development will alter and change prey fish availability for birds and how this might impact the foraging patterns and survival of these birds. This is of particular importance as it seems that '*implications for ornithological features*' from '*potential effects on fish assemblages*' was only considered during construction and decommissioning and not during operation, despite the potential that construction will alter the undersea habitat and availability of appropriate habitat for forage fish species throughout the windfarm's lifespan (and potentially after it as well). The hard infrastructure that is put in place during offshore windfarm development changes the sea bottom substrate from soft to hard, which can alter the suitability of the habitat for certain fish including sandeel (*Ammodytidae*) which are a core forage species for many seabird species that prefer sandy/soft substrates [13]. It is important to acknowledge that the change in seabed substrate may also permanently displace these sandeels due to the habitat loss and therefore alter the availability of these important prey fish for foraging and breeding seabirds. Extra

consideration should be given to ensuring that the impact to these fish populations and their habitats is minimal in order to protect this forage supply and ensure that there are enough sandeels and other acceptable prey fish for the surrounding breeding colonies.

We suggest that further studies be done to show how important prey species, such as Atlantic herring and sandeel, might be altered by the development of Oriel and what alternative foraging areas might be available to breeding birds if Dundalk Bay's quality of foraging habitat is removed or deteriorated. We also suggest that a literature review examining the flexibility of individual bird species to changing foraging habitats and prey availability (as not all birds have the same adaptability) is done in order to better understand how the Oriel development might impact the foraging availability and survival of the birds that rely on Dundalk Bay and its greater marine space. This is particularly important for the breeding birds that are QIs of the surrounding SPAs, as altering foraging availability for these species could threaten their populations and go against the conservation objectives of the SPAs. It is really regrettable that these types of studies have not been commissioned by government years ago to prepare for the roll out of renewable infrastructure.

2. Need for inclusion of more information and data, including on foraging auks and divers

Throughout the addendums, Oriel's insistence that no additional surveying was needed or the addition of other data sources (like ObSERVE) isn't necessary was very difficult for us to understand. While the baseline surveys done by Oriel were in accordance with UK and other developers practice, every survey type has limitations. By including multiple and additional surveys, a clearer understanding of bird usage of an area is achieved and it is incomprehensible why Oriel would continuously refuse to add or assess other bird data of the area along with their own surveys in order to address any impacts with the best information available. This was also emphasised in the Further Information Requested by ACP where they stated '*concerns that there is an over- reliance on baseline surveys to include, and exclude, important ecological features potentially affected by the project ... particularly given the risk of excluding species that are less readily sampled by the particular survey methodologies applied and given the location of the site partially within the North-west Irish Sea cSPA, and location relative to bird colonies at Rockabill SPA, Lambay Island SPA & Ireland's Eye SPA*'. By refusing to add in alternative methods, such as new tracking research or previous studies like ObSERVE II, we believe that the picture of offshore use by birds presented by Oriel in their documentation is incomplete and the risk to birds within the area is not accurately being identified and assessed appropriately.

In our response to our concerns around the importance of Dundalk Bay as a foraging area, we presented several different surveys and methods (including ObSERVE II and tracking data) that show a different picture bird usage of the Oriel project area, showing high use by different seabird species (Figures 1, 2, and 3) and clearly showing the importance of the area to

seabirds. We would also highlight that while the Oriel array area is located '*partially within the North-west Irish Sea cSPA*' as stated by ACP in the Further Information Requested document, it is entirely within our Northwest Irish Sea Important Bird and Biodiversity Area (IBA) (Figure 4).

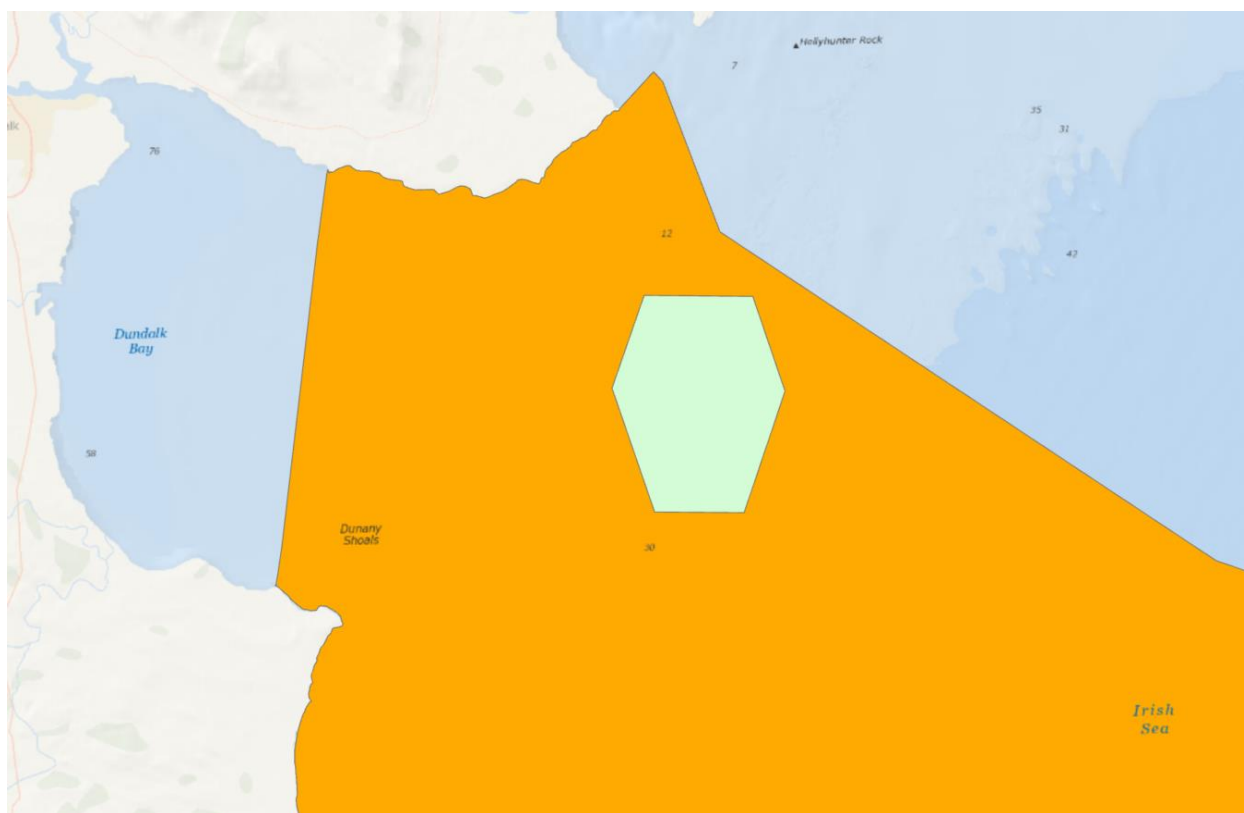


Figure 4: Map of the Oriel array area (light green polygon) and a section of our Northwest Irish Sea IBA (orange polygon)

BirdLife International maintains a global database of IBAs, sites which are of particular importance for the conservation of wild birds and their habitats [14]. While IBAs do not afford legal protection to a site, they are identified using a globally agreed standardised set of data-driven criteria and thresholds. In 2024, BirdWatch Ireland, working with BirdLife International, completed the identification of a network of colony and marine IBAs in Ireland's Exclusive Economic Zone (EEZ) for seabirds, including the Northwest Irish Sea IBA [15]. Within these sites, the species identified as criteria triggering species occur in regionally or nationally significant numbers [14]. The sites also support other important populations (though they may not meet the thresholds for IBA designation), highlighting how these IBAs represent the most important areas for breeding and foraging seabirds in our waters.

The Northwest Irish Sea IBA was identified using ObSERVE II surveys, tracking data, MarPAMM surveys, and the use of seaward extensions on important breeding colonies of seabirds that also met IBA criteria. Within this IBA, Kittiwake, Manx Shearwater, Northern

Gannet (*Morus bassana*), and Razorbill (*Alca torda*) all met IBA criteria, as did the seabird species groupings of Auks and Black-backed gulls. It is worth noting that all of the IBA triggering species (including species within the Auks and Black-backed gull groupings), with the exception of Northern Gannets, are also Qualifying Interest (QI) species for the Northwest Irish Sea cSPA [16]. As mentioned, and shown in the figures above, these species are found in high numbers and during vulnerable periods within this marine space. Our IBA dataset, produced from combining these various surveys and sources together, shows the best picture currently possible of seabird use and numbers within Ireland's marine space, and paints a different picture than the Oriel surveys do on their own. Without the inclusion of additional data sources by Oriel into their analyses, it is hard to trust their assessments of potential impacts to birds by their development, as other data sources show higher use and importance of the area to seabirds and hint that the true impact of the Oriel offshore wind farm development to birds may be more detrimental than is reported in the EIAR and addendums.

In addition to the species highlighted above within the Northwest Irish Sea IBA, we also have serious concerns about the potential impacts of the Oriel project on both foraging auks and wintering divers which we will go into further detail below.

2.1: Need for more study of foraging auks with Oriel project area and wider marine space

Within our original submission, we called for further information on the movement of foraging auks from nearby critical colonies, such as nearby island SPAs mentioned above, to the Oriel project area and Dundalk Bay. This concern was echoed by ACP within the Further Information Requested where they request that Oriel *'provide additional information on the movement of auks (Guillemot (Uria aalge) and Razorbills from Lambay to show that there is no significant impact on the Rockabill, Lambay and Irelands Eye populations, given their range of foraging grounds, including the area of the project'*; however, in their addendums, Oriel did not provide additional information about the movement of these auk species under the justification of it being unnecessary due to the apportioning assessment of impacts to SPA populations already handling this concern. Oriel also mentions that tracking data as a new data source would not *'change how the impacts are assessed'* (which we believe is missing the point of additional data providing a better picture of the true assemblages of birds using an area and the severe limitations of relying on a single source and/or survey type). Data from ObSERVE shows why both we and ACP were concerned about the impacts to foraging auks by Oriel's offshore development. In Figure 5 (below), ObSERVE II data on the top 1% use areas across Irish waters by auks in both winter and summer is shown, highlighting how important and well-used Dundalk Bay, as well as Oriel project area, is to these species throughout the year.

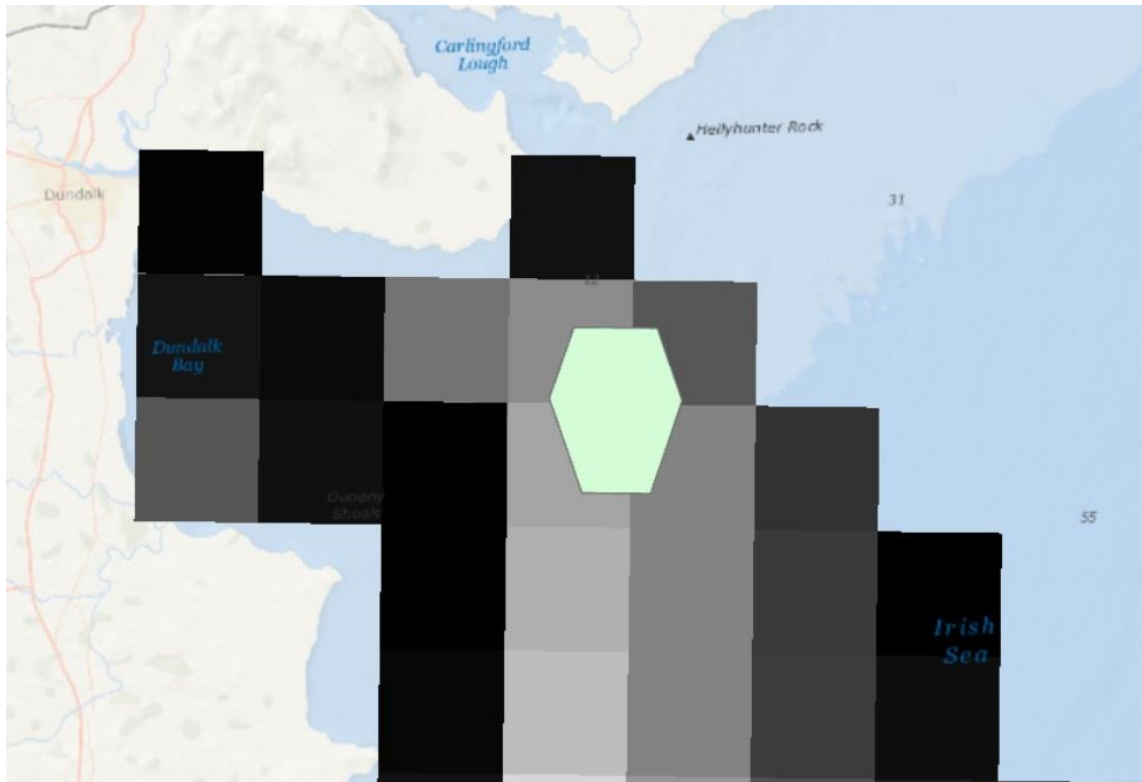


Figure 5: Map of the Oriel array area (light green polygon) and a section of the national top 1% of areas used year-round by auks (black and white raster layer going from black to white as highest to lowest use within the top 1% use threshold) from ObSERVE II survey data.

Regardless of which colony these auks come from in summer, Figure 5 highlights the heavy use and importance of this area for auks throughout the year in both summer and winter, particularly within Dundalk Bay. Given auks high sensitivity to displacement from offshore wind development [8,17], the Oriel development has a strong potential to alter and negatively impact auks' movements and usage of this critical area. For this reason, we believe that it is of critical importance that the movement and use of Dundalk Bay and its greater marine space, including Oriel project area, by auks is better understood before development permission is granted, either through inclusion of other data sources in assessments or partaking in additional studies and tracking, particularly from Lambay Island, the nearest Guillemot colony to the Oriel project area and the largest Guillemot colony in Ireland.

2.2: Concerns over potential impacts to divers and other wintering seabirds

As we mentioned in our original consultation submission to the Oriel development, we are concerned about the potential impacts to divers, specifically Great Northern Divers (*Gavia immer*), due to the large concentrations of divers that utilise Oriel's project area and the surrounding waters of outer Dundalk Bay in winter. This concern was acknowledged by Oriel within the Response to Submissions Report and during the updated assessment to construction

and decommissioning phases disturbance and displacement, it is stated that ‘*the predicted mortality is negligible and the impact is short-term*’. While we appreciate the additional assessment and response to our concern around the potential impact of construction works, Oriel ultimately decided to ‘*not propose any seasonal restrictions for Great Northern Divers during the construction and decommissioning phases of the Project*’ which we believe is necessary. Also, we still have serious concerns about the potential impact of this project to Great Northern Divers, other wintering divers, and seabirds.

In our original submission, we made reference to and showed maps from a report produced by Hi Def for BirdWatch Ireland as part of the MarPAMM project [18]. This report is the basis for our understanding of the use of the outer Dundalk Bay marine area by marine birds and shows high density use of the Dundalk Bay and its surrounding marine space, including the Oriel project area, by Great Northern Divers, Common Scoters (*Melanitta nigra*), Red-breasted Merganser (*Mergus serrator*), and Red-throated Diver (*Gavia stellata*) (Figure 6).

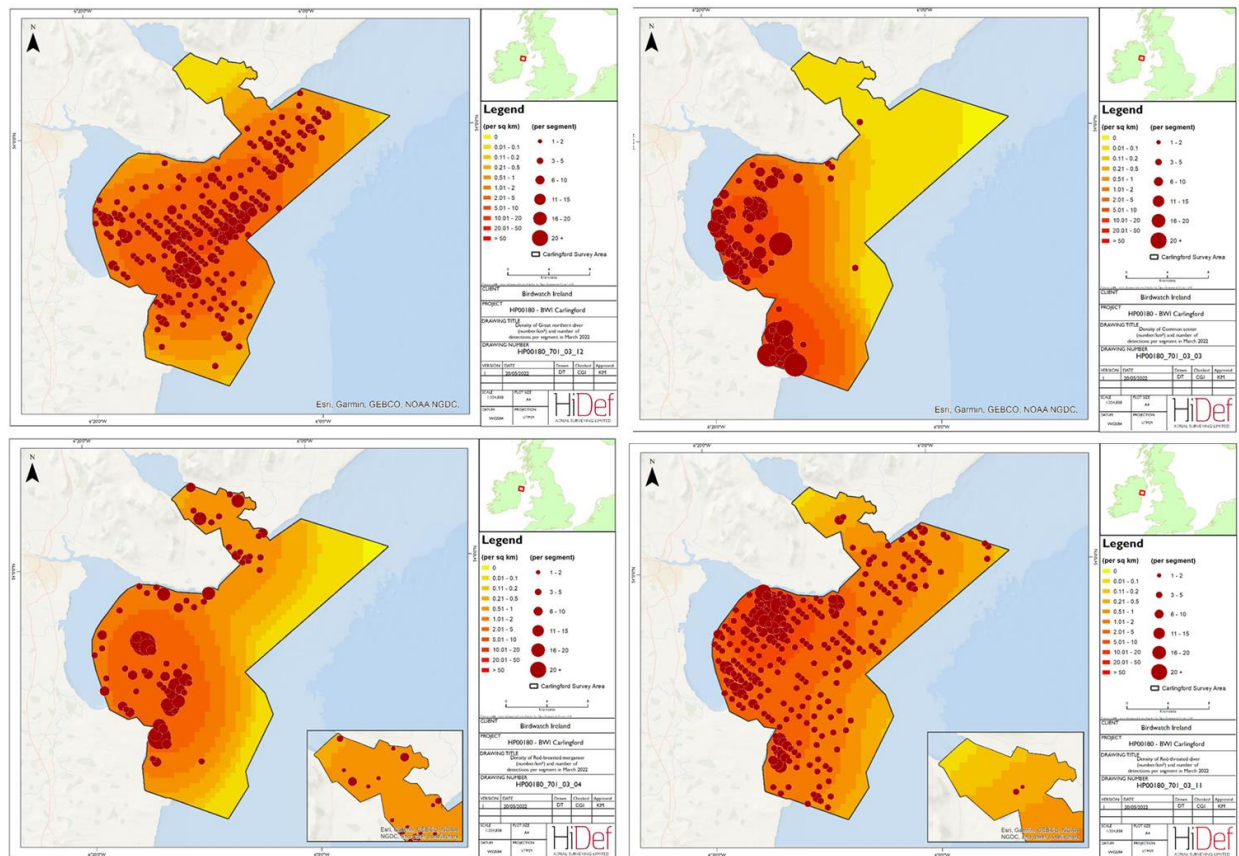


Figure 6: Density maps of Great Northern Diver (top left), Common Scoter (top right), Red-breasted Merganser (bottom left), and Red-throated Diver (bottom right) as produced by Hi Def during the Carlingford surveys in March 2022 [18]

All of these species show high density and use of Dundalk Bay and its outer marine area during the winter, and as we mentioned in our original submission, the concentrations of Great Northern Divers in the outer Dundalk Bay area likely reach thresholds for international importance [19]; it is worth noting that our IBA work (referenced above) only considered seabirds and therefore did not analyze information about divers and seaducks, so it is possible that this area would qualify as an IBA for these species in a different analysis. This is of particular importance in terms of the Oriel development as all of these species show strong displacement vulnerability to offshore windfarms [20,21,22]. Assessments of offshore wind impacts to various marine birds found that both diver species and Common Scoters had significant long-term displacement impacts during the operation of offshore windfarms, with one study showing a continual decrease in Common Scoters 2 years after construction with numbers only partially recovering after that period [23]. Given the potential long-term displacement of these species after construction and during the operation of the windfarm, we do not agree with the assertion that the impact Oriel will have on these species is '*short-term*' but rather believe that there is evidence that the impact could displace these species from critically important and highly used wintering habitat for years to come. For this reason, we believe that more research needs to be done to better understand the importance of Dundalk Bay and its outer marine area to wintering divers and seaducks, as well as investigation into if there is other habitat available to support these birds if Dundalk Bay's marine area is no longer accessible for them to use, before the Oriel project continues.

Overall, this disinterest in and lack of use of additional surveys, whether they be surveys undertaken in the area already or any additional research that should be undertaken such as tracking of specific species like auks or divers, is very concerning to us at BirdWatch Ireland. With so much uncertainty around the impacts that increasing offshore wind in Irish waters could have on our bird populations, this lack of inclusion of all relevant and available data to best represent the numbers and movement of birds within the Oriel project area is short-sighted and does not take into account the limitations or biases of relying on a single survey type; therefore it makes it hard to trust the assertions and assumptions of the projected impacts to birds being presented. Additionally, work like offshore sensitivity mapping for birds is only currently being done (by ourselves at BirdWatch Ireland in conjunction with BirdLife International), and the Oriel project area was selected without this critical information about how sensitive the area, and the birds who use it, might be to offshore wind development in Oriel's project location. Without the addition of other data, either through inclusion of existing research or additional survey types like tracking, we still do not believe that the information presented by Oriel offers adequate assurance that negative impacts to birds and other biodiversity will not be significant.

3. Mitigation and post-construction monitoring

We would also like to take this opportunity to comment on potential mitigation measures and post-construction requirements that we believe should be implemented to ensure that, should

Oriel receive planning permission, the real impacts of the development on birds can be minimized and documented, with any issues that may arise being addressed as soon as possible. In the addendums, the Request for Further Information 7.J quotes ACP as stating ‘*Any potential specific mitigation measures to minimise the effects of the project on birds, such as painting of turbine blades, the use of curtailment systems in particular conditions or at particular times etc., if considered appropriate, should be included and addressed in the application documentation*’. In response, Oriel states that they ‘*considered that there is no requirement to incorporate these technologies*’. While we appreciate Oriel’s stated commitment to ‘*post-construction monitoring including review of requirements for on-turbine detection systems to improve understanding of risks to migrating birds and to inform adaptive management*’, we believe that there should be mitigation measures and post-construction requirements that are explicitly required by any planning permissions given to the project, particularly in light of the evidence we have shown in this and our previous submissions about the importance of the Oriel project area and Dundalk Bay’s greater marine space to a variety of birds, including QI species of SPAs.

Firstly, we would like to address Oriel’s comments surrounding blade-painting and continue to advocate for this as a potentially easy mitigation win. While we acknowledge that blade painting is a relatively new and untested measure, particularly in the offshore, and that studies have shown different levels of effectiveness, we still think there is merit in trialling this potential mitigation strategy on the Phase I projects, including Oriel. Staff from BirdWatch attended a panel at the 2025 Conference on Wind energy and Wildlife Impacts called ‘*Exploring blade patterning as a mitigation strategy- Results from studies across the globe, lessons learned, and the way forward*’ where experts expressed the opinion that blade painting is worth trying at offshore developments (in fact, many of the panelists were the authors of or involved in the specific studies mentioned by Oriel in their addendums, from projects in Belgium, Norway, and South Africa). Since most of these studies did a Before-After Control study, which required the construction and running of the turbines for a certain period of time without painted blades before then turning off the turbines and painting blades while the turbines are in-place and constructed, the panelists lamented that the cost reduced their ability to blade paint at scale and really test this novel method at the scale they wanted. At the end of the panel, they all expressed that they would recommend that future projects paint blades ahead of construction in order to reduce costs and allow for more research on the effectiveness of this strategy in different environments and with different setups. Given the nascency of Ireland’s offshore wind environment, trialling blade painting is a relatively cheap mitigation option that could be a chance for Ireland to be a pioneer if blade painting proves a successful mitigation strategy in the offshore; however, even if studies show that blade painting is not effective as a mitigation measure, any Irish studies would still add to the scientific community’s understanding of offshore wind mitigation and put Ireland at the forefront of important conversations around biodiversity impacts and mitigation for offshore wind. We believe that blade painting is a low-cost win-win

situation for future offshore wind projects within Ireland and would still advocate for this as a potential mitigation strategy worthy of testing within our waters.

Secondly, we believe that the evidence shown in this submission of the Dundalk Bay greater marine area, including the Oriel project area, supporting a large number of seabirds and other birds highlights the need for mitigation measures to be required in order to lessen the impacts of the development on birds. Radar or camera assisted shutdowns have been used in other windfarms [24] and are widely available to developers. In fact, Oriel mentions that '*technologies under consideration include automated avian radar, thermal/infrared and high-resolution camera systems, and real-time detection/identification algorithms*'; however, it is not a requirement and there currently is no legal requirement that Oriel use any of this technology to monitor and mitigate their impacts to birds during operation. As mentioned above, Oriel only commits to a '*review of requirement for on-turbine detection systems to improve understanding of risks to migrating birds and to inform adaptive management*', but we believe that both a review and the use of appropriate on-turbine detection systems, as determined by that review, should be a legal requirement of any consents given.

It is important to note that there is no one-size-fits-all approach to bird mitigation of windfarms and '*the best mitigation option may involve a combination of more than one measure, adapted to the specificities of each site, wind farm, and target species*' [25]. Given the evidence of the importance and high use of this marine area by seabirds and other birds who use the marine (including divers, seaducks and migrating Brent Geese (*Branta bernicla hrota*)), we believe there should be more details or requirements of Oriel to address and mitigate their impacts if the development is given approval. Also, all mitigation strategies mentioned above only address the impacts of collision to birds, but do not address displacement impacts to birds or work for all species that can be impacted by offshore wind developments like Oriel. Improper placement of offshore windfarms in sensitive areas where impacts to birds are high cannot be addressed solely by mitigation measures, which is why proper marine spatial planning that avoids these environmentally sensitive areas is key. Since the Phase I offshore windfarms did not undergo any environmental constraints mapping ahead of site selection, like areas being identified under the Designated Marine Area Plans (DMAPs), and as we are still undergoing an offshore wind sensitivity mapping project with BirdLife International to identify areas of low, medium and high risk to birds from offshore wind, we do not know how impactful Oriel's offshore windfarm placement may be to birds.

Conclusion

We would like to acknowledge and thank Oriel for its commitment to the ongoing BirdWatch Ireland monitoring programme, which we are undertaking with contributions from four windfarms including Oriel, which they mention in the Response to Submissions report and also reiterate that they are '*committed to contributing to and participating in*' this work. This work is crucial in

understanding the baseline populations and movements of seabirds within the Irish Sea both before, during, and after the construction of offshore windfarms so impacts to populations and species can be accurately assessed and responded to in a timely manner. This work also highlights the need for continued and expanded research into birds within the Irish Sea, including outer Dundalk Bay and the Oriel project area, ahead of any offshore windfarm construction in order to better understand the potential impact of these projects on birds and other biodiversity. While we will never have all of the data we would like about Ireland's marine environment ahead of the construction of offshore wind, this is not a valid excuse to place offshore wind developments before doing the due diligence of collecting necessary information and data ahead of decisions and construction of offshore wind developments.

Throughout the Oriel ornithology chapters and addendums, there was an over-reliance on their own data, a lack of inclusion of other sources of data and knowledge on the movements and use of marine space by birds, and no further surveys were undertaken in response to various bird concerns that arose from the original EIAR in the addendums that were presented with the Further Information Requested process. While their surveys and models add to the knowledge base of birds in the wider Dundalk Bay marine space, other surveys and knowledge from local experts are needed to create a more comprehensive and complete picture of birds within this space to accurately assess the potential impact of this development. The data we presented, from our own IBA work to government's ObSERVE surveys and collaborative projects such as the MarPAMM work done with Hi Def, show that the Oriel project area and the wider Dundalk Bay marine space is of particular importance to marine birds and there may be stronger potential impacts from the Oriel offshore wind development than is currently reported. We believe that further research and surveying is needed before it can be concluded that the impacts from the Oriel offshore windfarm development will be minimal and the project is given consent. We also believe that any consents given to the project should include a proper mitigation plan and concrete requirements for further study to understand and address any impacts the project may have to birds appropriately and quickly.

From our review of the additional information provided, and the significant gaps remaining, we believe that this wind farm project could have significant adverse impacts on seabird species associated with a range of SPAs and other sensitive marine birds such as divers and sea ducks. BirdWatch Ireland is fully supportive of the development of offshore wind, but we rue the lack of preparedness of government to fund the necessary studies on prey species and to understand species interactions in the marine environment ahead of these large offshore developments. It is undermining the urgent need to roll out offshore wind to tackle climate breakdown which is also affecting wild birds.

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