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► **To cite this version:**

David Pierre Milesi-Gaches. Feathered diplomacy: when birds become main factors of research design and geography on Vigur Island. *Rivista Italiana di Ornitologia*, 2024, 94 (1), pp.43. 10.4081/rio.2024.715 . hal-04556809

HAL Id: hal-04556809

<https://hal.science/hal-04556809>

Submitted on 23 Apr 2024

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Feathered diplomacy: when birds become main factors of research design and geography on Vigur Island

David Pierre Milesi-Gaches

Abstract - Vigur Island, situated in Iceland's Westfjords, is renowned for its diverse avian species, such as Atlantic Puffins and Black Guillemots, and its marine inhabitants including Harbour and Grey Seals. Despite its openness to tourism, the island is a subject of ongoing conservation efforts. This opinion paper argues for a more holistic approach to research on the island, highlighting the complex interplay between human activity and the island's ecosystem. It critiques the current, often narrow, research methodologies that fail to fully account for the intricate relationships between species and their environment. The paper calls for a re-evaluation of habitat classification to incorporate the significant impact of avian populations and stresses the importance of adhering to Icelandic laws that mandate minimal disturbance to wildlife. With seasonal closures and careful management practices like eiderdown collection, Vigur Island serves as a model for balancing human interests with ecological integrity. This opinion advocates for adaptable, comprehensive research strategies that, while illustrated through the case of Vigur, should be applied universally, urging scientists to embrace broader perspectives in environmental studies globally.

Keywords: birds, methodology, ecology, zoology, tourism.

Riassunto - La diplomazia delle piume: quando gli uccelli diventano i fattori principali della progettazione della ricerca e della geografia sull'isola di Vigur.

L'isola di Vigur, situata nei fiordi occidentali dell'Islanda, è rinomata per le sue diverse specie di uccelli, come i pulcinella di mare atlantici e i gabbiani tridattili, e per mammiferi marini, incluse le foche comuni e le foche grigie. Nonostante sia aperta al turismo, l'isola è oggetto di continui sforzi di conservazione. Questo articolo presenta le opinioni dell'autore, il quale sostiene la necessità di un approccio più olistico alla ricerca sull'isola, evidenziando la complessa interazione tra l'attività umana e l'ecosistema dell'isola stessa. Critica le attuali metodologie di ricerca, spesso ristrette, che non riescono a tenere pienamente conto delle intricate relazioni tra le specie e il loro ambiente. L'autore chiede una rivalutazione della classificazione degli habitat per incorporare l'importante impatto delle popolazioni di uccelli e sottolinea l'importanza di aderire alle leggi islandesi che impongono un disturbo minimo alla fauna selvatica. Con chiusure sta-

gionali e pratiche di gestione attenta come la raccolta del piumino di edredone, l'isola di Vigur funge da modello per bilanciare gli interessi umani con l'integrità ecologica. Questa opinione propugna strategie di ricerca adattabili e onnicomprensive che, come illustrate nel caso di Vigur, dovrebbero essere applicate universalmente, esortando gli scienziati ad abbracciare prospettive più ampie negli studi ambientali a livello globale.

Parole chiave: uccelli, metodologia, ecologia, zoologia, turismo.

Positioned just to the south of the Arctic Circle, Vigur Island stands out as a renowned destination for tourists in the Westfjords region of Iceland. This captivating spot is distinguished for hosting a variety of notable avian species, including the Atlantic Puffin *Fratercula arctica*, the Black Guillemot *Cepphus grylle*, and the Common Eider *Somateria mollissima* (Vigur Island, 2021). Noteworthy is Vigur Island's significant Puffin population of approximately 100,000 individuals, documented by Hansen in 2019. The island also serves as a habitat for a significant colony of around 1,400 Black Guillemots and serves as nesting grounds for Arctic Terns *Sterna paradisaea* (Milesi-Gaches & Lhériaux, 2022).

Vigur's allure extends to marine life, with Harbour Seals *Phoca vitulina* and Grey Seals *Halichoerus grypus* often resting near the shore during low tide. In addition to its fauna, Vigur Island holds historical maritime significance, featuring one of Iceland's oldest windmills and other heritage artefacts. Notably, the island has maintained a longstanding tradition of managing wild Eider farming, with approximately 5,000 breeding pairs (Vigur Island, 2021).

Despite its private status, Vigur Island remains open to visitors and attracts tourists, photographers, and nature enthusiasts from around the world, primarily between June and September. With an average of 100 to 200 daily tourists arriving through multiple boat trips, the island's owners actively encourage various research projects, especially regarding the potential impact of tourism on the local wildlife. Developing research projects on Vigur Island since 2021, I have subscribed to post-positivist and holistic approaches. Consequently, I view myself, along with fellow researchers, as tourists. It is crucial for all of us to acknowledge the potential impacts and biases our activities may exert on the island's biodiversity.

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Received for publication: 12 August 2023

Accepted for publication: 15 January 2024

Online publication: 22 April 2024

Vigur's habitats can easily lead to misidentifications, especially when planning fieldwork. At first glance, it may resemble a traditional coastal environment, but its unique features defy standard classifications. Over centuries, Atlantic Puffins (*Fratercula arctica*) have significantly altered the island's landscape, creating a complex network of burrows and galleries. What might initially be perceived as a mere field is a terrain marked by these subterranean structures. This complexity makes mobility on Vigur challenging; a complete tour around the island can take over four hours, despite its modest dimensions of 2 km in length and 400 m in width.

Similarly, Vigur annually hosts a colony of Arctic terns, nesting across the island's breadth (Milesi-Gaches & Lhériau, 2022). As a result, venturing beyond the housing area necessitates traversing the terns' nesting grounds (Fig. 3). In accordance with Walsh *et al.* (1995) disturbances to Arctic terns should be limited to 20 minutes. Considering that tourism coincides with the nesting season, any research activities conducted on Vigur Island are likely to impact the terns.

Birds have profound influence on the habitat and living conditions on Vigur Island. In a broader context, the presence of over 120,000 birds significantly contributes to a substantial ground fertilisation rate, among other effects. As a result, any shifts in bird populations on Vigur Island could potentially lead to alterations in the habitat's structure and coverage.

In 2016, Náttúrufræðistofnunar Íslands published a comprehensive document outlining the methodology employed to map Iceland's habitats. This classification methodology draws from both the European Nature Information System (EUNIS) and specific Icelandic habitat definitions, with numerous adaptations made to accommodate unique Icelandic circumstances, including, for example, significant bird colonies (Ottósson *et al.*, 2016). Therefore, I advocate for similar initiatives on a local scale, specifically aimed at aiding owners and managers of natural areas. Furthermore, I advocate for the incorporation of habitat users when their activities exert a substantial impact on the ecosystem, as is the case with birds in Vigur. However, such approaches would require a yearly monitoring of all the included bird populations, since colonies' area and shape might be subject to changes.

Consequently, basing the island's geographical classification solely on geological attributes, elevation, location names, or habitat types (Fig. 1A) is inadequate. Although birds reach Vigur Island for only a limited duration each year, their presence, and the imperative to safeguard their environment reshape human interactions with the island. This transformation naturally extends to research activities, which can influence birds and, reciprocally, be influenced by them (Tab. 1). Accordingly, I propose that habitat classification should encompass at least Arctic terns and Atlantic puffins (Fig. 1B), and eventually consider additional parameters such as orientation and the

Tab. 1 - Symbiotic relationships: birds' influence on Vigur Island, research projects, and bidirectional avian research impact. / Relazioni simbiotiche: l'influenza degli uccelli sull'isola di Vigur, i progetti di ricerca e l'impatto bidirezionale della ricerca ornitologica.

	Modification to the island	Potential impact to researchers	Potential impact of research activities
All bird species	- Fertilisation	- Contamination risk	- Diminished fertilisation potential
Atlantic puffins	- Create holes and galleries	- Develop poorly walkable areas - Safety issues	- Stress to birds due to human presence - Potential reduction in incubation time - Increased energy expenditure
Arctic terns	- Slow movement passage - Restricted access to specific areas	- Risk of researcher injury - Time-limited research in nesting zones - Designated no-go zones for nesting sites - Disturbance during bird attacks (e.g., bird counts)	- Stress to birds due to human presence - Potential reduction in incubation time - Increased energy expenditure - Risk of injuries during attacks
Common eiders	- Slow movement passage - Restricted access to specific areas	- Slowed research activities - Distraction while avoiding nest stamping - Designated no-go zones for nesting sites	- Stress to birds due to human presence - Potential reduction in incubation time - Increased exposure to predators - Increased energy expenditure - Risk of female death due to starvation
Black guillemots	- Restricted access to specific areas by nesting in anthropogenic features (e.g., shed, storage, terrasse, etc.)	- Inhibited extended fieldwork close to nests	- Stress to birds due to human presence - Potential reduction in incubation time - Increased energy expenditure
Northern fulmars	- Restricted access to specific areas by nesting in cliffs	- Risk of researcher injury - Designated no-go zones for nesting sites (cliffs)	- Stress to birds due to human presence - Potential reduction in incubation time - Increased energy expenditure - Risk of injury while attacking

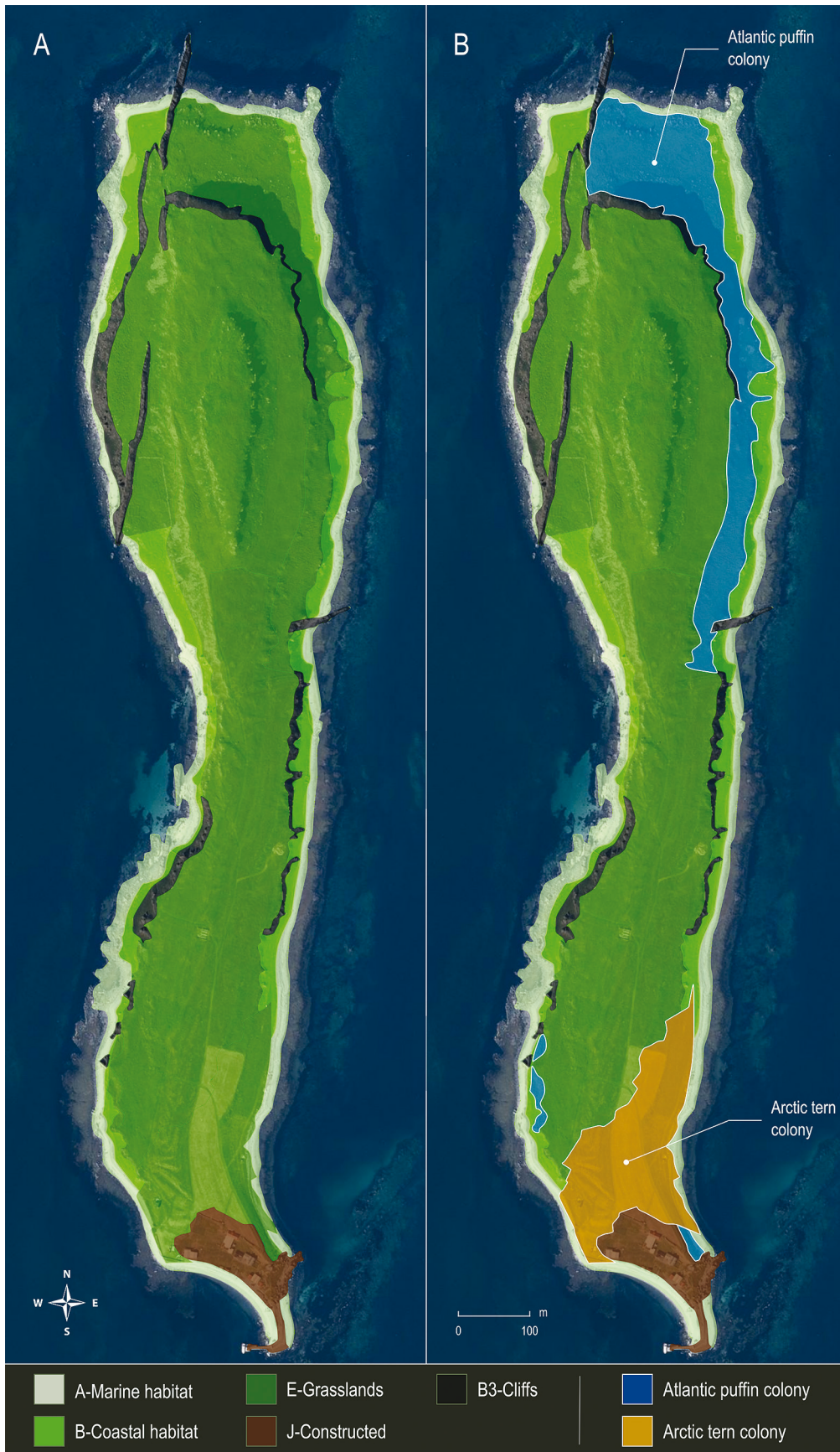


Fig. 1 - A) Habitats of Vigur Island. B) Habitats of Vigur Island, featuring Arctic tern and Atlantic puffin colonies. (Basemap: Loftmyndir ehf). / A) Habitat dell'isola di Vigur. B) Habitat dell'isola di Vigur, con colonie di sterne artiche e pulcinella di mare atlantica. (Mappa di base: Loftmyndir ehf).

presence of distinct features (e.g., rock shelters or rare plant species). This approach is especially relevant in the context of studying flora, where such features might hold particular significance.

Under Icelandic law, individuals are obligated to treat the natural environment with respect and exercise the utmost care to prevent damage (Alþingi, 60/2013). The law also provides detailed regulations concerning birds, with a particular focus on nesting birds (Alþingi, 64/1994). This includes restrictions on making loud noises and hunting near bird cliffs, and mandates that permission is required for specific activities, such as research that could disturb the natural behaviour of studied species or the marking of wild birds. In the case of private property like Vigur Island, research activities require the explicit consent of the owners. Depending on the research methodology, further authorisation might be required from Náttúrufræðistofnunar Íslands, the regulatory body overseeing permits. Such undertakings must place paramount importance on minimising potential impacts, and whenever feasible, should be deferred until after nesting cycles. For instance, any research involving the island's flora within the Arctic tern colony (Fig. 2) should refrain from execution while the birds are actively nesting. Similarly, geological fieldwork should avoid areas adjacent to nesting fulmars on cliffs. Moreover, meticulous consideration must be given to coordinating fieldwork with the island's tourism schedule. Engaging in fieldwork after busy tourist days could result in disturbances that exceed the tolerable limits of the Arctic tern. Furthermore, it is evident that non-invasive methodologies should be prioritised over invasive ones. This approach aligns with ethical and ecological principles, ensuring that research activities minimise disruption to the island's delicate ecosystem.

The consideration of indirect impacts is also imperative. Over three years of behavioural studies on both harbour and grey seals, I encountered numerous adaptations

in the methodologies I employed. Initial observations highlighted the windmill's suitability as an observation point for monitoring seal behaviour and assessing the repercussions of tourism on pinnipeds. Due to its elevated position, the windmill affords a comprehensive view of the entire hauling area, encompassing the North and South remote rocks. It also serves as an ideal vantage point for tracking the arrival, approach, and docking of boats, enabling the evaluation of tourism-related effects, including those stemming from boat activity and tour group initiation. However, a noteworthy challenge emerged in the form of a breeding pair of Black Guillemots nesting within the windmill premises annually (Fig. 3), disrupting the seamless execution of extended seal observations without necessitating movement between spots. Regrettably, these guillemots also establish nests in proximity to other observation points. Despite their accustomed familiarity with human presence, certain guillemots remain wary of venturing to and from their nests in the presence of people, potentially inducing stress and reducing incubation duration. Additionally, the vicinity of the windmill hosts a resting site for Atlantic Puffins, affording tourists the opportunity to approach these birds closely without causing them to take flight. Consequently, conducting seal observations mandates a meticulous consideration of both the concurrent impacts of tourism and the nesting bird populations. Moreover, transitioning from one observation point to another can potentially alert the seals, thereby engendering an indirect impact of the study on both the birds and the pinnipeds.

Researchers must also consider Vigur Island's predominant activity of Eiderdown farming. During the first two weeks of June, eider down is systematically collected across designated sections of Vigur Island. When approaching a nest, the farmer carefully lifts the incubating duck – if it hasn't already flown away – temporarily moves the eggs aside and collects the down. The down



Fig. 2 - While moving towards the northern part of Vigur Island, one person inadvertently triggers a defensive reaction within the Arctic tern colony. / Mentre si sposta verso la parte settentrionale dell'isola di Vigur, una persona inavvertitamente scatena una reazione difensiva all'interno della colonia di sterne artiche.



Fig. 3 - Windmill periphery: tourism impact to seal monitoring also hindered by nesting black guillemots and puffin lookout area (not represented on the photo). / Periferia del mulino a vento: impatto turistico sul monitoraggio delle foche, ostacolato anche dalla nidificazione delle urie nere e dall'area di avvistamento delle pulcinella di mare (non rappresentata nella foto).

is promptly replaced with hay, and the eggs are returned to their original position. To minimize disturbance to the birds, down collection is avoided on windy or rainy days. While further processing of the down, such as drying and cleaning, takes place throughout the summer, these activities are conducted away from the nesting sites and have no impact on research activities. The omission of eider ducks in Figure 1 is attributed to the fact that they nest across all habitats on the island from May to early July. Various research endeavours, including bird population monitoring, have the potential to induce unwarranted disruptions. Although utilising pre-incubation time could yield more precise population estimates, conducting bird counts throughout Vigur Island while ducks are nesting and terns are resting after their extensive migration (Egevang *et al.*, 2010) would result in disturbances that outweigh the value of obtaining a population figure. Comparable counts can be conducted later in the summer, specifically in July. From 2021 to 2023, black guillemots *Cephus grylle*, Eurasian oystercatchers *Haematopus ostralegus*, great cormorants *Phalacrocorax carbo*, and northern fulmars *Fulmarus glacialis* were surveyed on Vigur. The counts were conducted by walking around the island, specifically after the incubation period of the eider ducks (Milesi-Gaches & Lhéria, 2022). While these counts may lack absolute precision owing to hidden incubating birds, particularly black guillemots, counting during the incubation time still allows relative comparisons over time.

At present, the owners of Vigur have implemented a series of mitigation measures to safeguard its wildlife. With the aim of optimising avian breeding success, Vigur Island undergoes a period of closure from the final days of May until mid-June. This interval not only affords inhabitants the time and opportunity to gather eiderdown but also provides all bird species with a vital recuperative period following migration, prior to the commencement of incubation (Fig. 4). Even a moderate level of disturbance during the territorial establishment phase can exert detrimental effects on birds, notably due to the presence of predators (Fontaine & Martin, 2006; Bötsch *et al.*, 2017).

In Vigur, human proximity to numerous wild species is exceptional. However, certain species, which were historically subjected to hunting, such as puffins, display a more cautious attitude toward humans, who in many contexts are still perceived as potential predators (Beale & Monaghan, 2004).

The island's temporary closure also results in a reduction in boat visits, a factor crucial to seals hauling in proximity to the pier. During late spring, when seals may have recently given birth, disturbances have the potential to prompt mothers to abandon their offspring who might die of starvation (Renouf *et al.*, 1983; Carney & Sydeman, 1999; Osinga *et al.*, 2012).

Consequently, I firmly support the decision from the owners to limit the activities and implement the island's closure from the end of May to mid-June. This straightforward and pragmatic measure holds the potential to yield significant positive outcomes for a multitude of species simultaneously. The responsibility lies with the owners to grant authorization for projects necessitating implementation during the pre-nesting, territory establishment, or incubation periods.

Given the island's notably dense biodiversity, particularly in terms of avian species, the conventional concept of 'ownership' in Vigur's context becomes intricate. Any intervention directed towards a specific bird species, the

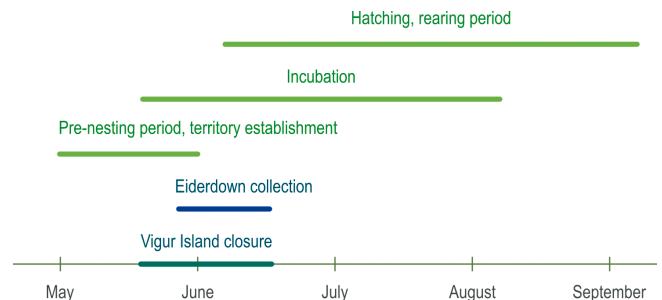


Fig. 4 - Spring and summer timeline in Vigur Island. / Primavera ed estate sull'isola di Vigur.

marine flora, or mammals reverberates not solely onto the targeted population but also onto the surrounding species and plants. Consequently, a comprehensive and post-positivist approach becomes indispensable when conducting work on Vigur Island. In this context, I propose an extension of fieldwork duration beyond the norm, accounting for potential adverse weather conditions, tourist activities, and challenges arising from the high species density.

To ensure a minimal impact, population monitoring should be scheduled subsequent to down collection, aligning with the departure of ducklings from their nests. Extensive or varied fieldwork encompassing the entire island or distinct zones should be meticulously planned ahead in the way to effectively distribute potential disturbances. And the colony of Arctic terns should be crossed only when necessary and different routes should be used when appropriate (Fig. 2). Furthermore, botanical activities should be deferred to August, coinciding with the conclusion of most birds' nesting periods.

Beneath the thought-provoking title of this discourse, I advocate for the scientific community to evaluate its methodologies and undertakings within the context rather than conventional frameworks. It is imperative to explore novel adaptable methods that align with local nuances. While this might introduce complexity and potentially influence regional and national monitoring strategies and methodologies, the adoption of a comprehensive and tailored approach holds the promise of furnishing more reliable and intricate data. The views and opinions expressed in this paper are solely mine and do not necessarily reflect the views of any institution or organisation, including Vigur Island.

Acknowledgements

I thank the landlords of Vigur Island, for letting me stay on their property during the fieldwork, and for their contribution to ecological and historical knowledge transmission about the island. I thank Alexandre Lhériaux-Nice, James Fletcher, Adrien Caron, Sophie Puchelle and Clément Savin for discussions and brainstorming on science and fieldwork in Vigur Island. And I thank Egill Bjarni Vikse Helgason for translating the Abstract from English to Icelandic for local communication purposes.

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