

Coastal geomorphology and culture in the spatiality of whaling in the Faroe Islands

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This paper explores the suggested relationship between the physical structure of beaches in the Faroe Islands and the spatial history and regulation of the grindadráp – the traditional method of whaling practised by the Faroese in which entire pods of whales are driven ashore by collective effort. Using coastal survey methods, this research shows a lack of strong correlation between beach morphology and the practice and regulation of whaling, except in the case of dramatic near-shore bathymetric features. The gap between these data points can best be filled through cultural-historical analysis, which informs our understanding of the dynamics behind the spatiality of Faroese whaling and whale conservation efforts.

Key words: Faroe Islands, whaling, coastal geomorphology, culture, mixed methods

Introduction

Inhabitants of the Faroe Islands – a semi-autonomous, archipelagic dependency of Denmark in the North Atlantic – hunt whales and dolphins for food using a method known as drive-style whaling (or in some older literature as a drive fishery; e.g. Mitchell 1975). Relying upon over 300 years of historical whaling data, and integrating new coastal geomorphological and socio-cultural research, this paper investigates physical, cultural and historical factors that have influenced where within the bays, beaches and fjords of the Faroe Islands these whale drives have historically occurred, and where they are permitted to occur by Faroese law today.

Since at least the time of Marsh (1864), and with antecedents shown to have existed in ancient scholarship (Glacken 1967), geographers have been interested in the complex interplay and relationships of power between humans and their physical environments. The recent criticism of several instances in which ‘neo-environmental determinism’ has been asserted (e.g. Sluyter 2003; Judkins *et al.* 2008; Radcliffe *et al.* 2010) serve as reminders that the pendulum continues to swing to and fro with respect to the deterministic authority assigned to the natural environment within both the academy and the popular press. Because of this longstanding and, in some ways, ongoing assumption of causal status in thinking about the role of the physical environment in relation to human activity, it is important to constantly review cases in which struc-

tures, activities and cultural systems are said to have been determined by some physical aspect of the local environment and to acknowledge the uncertainty, complexity and interrelatedness of physical and social systems in such cases (Brown 2004). This paper investigates one such complex case.

Here I explore the spatiality of an activity, Faroese drive-style whaling, which is controlled by the local government in order to effect conservation of a resource: the whales themselves. The primary mode of conservation in this case is the spatial restriction of whaling activities to certain designated beaches. In both the relevant academic literature and in statements from the Faroese government itself, the physical environment – primarily exhibited through beach morphology – is viewed as an independent variable around which Faroese society fashions its rules, norms and structures with regard to whaling.

By decree of the Faroese government, only certain beaches are approved as being ‘suitable’ for whaling activities and driving whales onto any other beach is forbidden. This spatial limitation ostensibly serves the purpose of increasing the success rate of whale drives, owing to its restriction of the activity to beaches that the government has declared to be more suitable and thus, presumably, more likely to lead to whaling success.

The governmental restriction of whaling to certain Faroese beaches also serves a conservation agenda. It is in the interest of the Faroese government and public alike for

whaling in the Faroe Islands to be a sustainable operation. Since whaling is conducted on a largely noncommercial basis – that is, the meat and blubber are distributed to the public without charge – there is little economic incentive for overharvesting. However, excessive takes have occurred historically (Fielding 2010). Because the spaces in which whaling can be conducted are limited, the activity falls under the jurisdiction and measure of the Faroese government, which occasionally exercises its authority to disallow an impending whale drive if conditions are not favourable or if the food that would result is not needed. Whale drives on non-approved beaches have rarely occurred in modern times. Those that do occur are punished with confiscation of the resulting food products and fines levied against the participants.

Drawing upon data acquired through a variety of physical and cultural research methods, this paper examines the roles and relative importance of both the physical environment and various cultural and historical factors in the establishment of conservation norms in the Faroese practice of drive-style whaling.

The history and practice of Faroese whaling

Drive-style whaling in the Faroe Islands involves the coordinated efforts of whalers in dozens of boats to surround and drive a pod of whales or dolphins into a bay where the cetaceans beach themselves or become stranded in the shallow water. Whalers on shore, carrying traditional whaling knives – artistically fashioned local implements that have been called ‘the pilot whale hunt’s most distinguished piece of equipment [and] one of the foremost Faroese contributions to Nordic artistic craftsmanship’ (Joensen 2009, 113) – then wade out to the stranded cetaceans and slaughter them, either by exsanguination or by breaking the spinal cord. The entire process is known in Faroese as the grindadráp (pronounced GRINNED-ah-drop) and has been described in detail, along with its economic and cultural significance, in anthropological and ethnographic literature spanning several centuries (e.g. Debes 1676; Grossman 1896; Williamson 1948; Joensen 1976 2009; Wylie 1981; Sanderson 1992; Fielding 2010; Kerins 2010).

The grindadráp has a long history in the Faroe Islands, possibly dating to the ninth-century arrival of Norse settlers (Wylie 1981; Thorsteinsson 1986; Sanderson 1992), though the oldest recorded whale drive occurred in 1587 (Joensen 2009). Continuous annual whaling records chronicle the number of whales killed, date and location of each grindadráp from 1709 to the present, providing over 300 years of data for spatial and temporal analysis (Bloch *et al.* 1990). This vast, detailed history of Faroese whaling has been called by one scholar ‘surely . . . one of the longest runs of whaling statistics available anywhere in the world’ (Mitchell 1975, 77).

The species most commonly caught in the grindadráp is the long-finned pilot whale (*Globicephala melas*), although other cetacean species such as the Atlantic white-sided dolphin (*Lagenorhynchus acutus*), white-beaked dolphin (*Lagenorhynchus albirostris*), bottlenose dolphin (*Tursiops truncatus*) and Risso’s dolphin (*Grampus griseus*) are occasionally taken by this method as well. The grindadráp is regulated by Faroese law (Petersen and Mortensen 1998), but does not fall under the jurisdiction of the International Whaling Commission (IWC), owing to the absence of the targeted species from the list of cetaceans to which the 1986 IWC moratorium applies (Gambell 1993; Gillespie 2001). According to an adviser on Faroese matters at the Danish Ministry of Foreign Affairs, the government of Denmark defers all decisions on whaling policy to the Faroese Home Rule government (Árni Ólafsson personal communication).

Coastal geomorphology and the approval of whaling bays

Part of the law that regulates the grindadráp restricts the activity to only bays and beaches approved by the Faroese government (Faroe Islands 2001). Throughout the 17 inhabited islands of the Faroes, there are 22 approved hvalvágir, or whaling bays, distributed among seven of the islands. One bay, Gøta, has two separate approved whaling beaches, bringing the total number of beaches upon which whales may be driven to 23. Using as a starting point those bays that had traditionally seen the most whaling activity, the Faroese government created the list of officially sanctioned whaling bays in 1832 (Joensen 2009). Since this time the list has been updated periodically by the removal of bays whose physical structures have changed – either by natural or anthropogenic processes – and the addition of bays that have been shown to be suitable for whaling. By and large, the list of bays that are currently approved for whaling represents those bays in which whaling has most often occurred historically, even before the government-approved list was created.

According to leading researchers into the grindadráp, ‘there is a clear correlation between the effective whaling bay sites and seabed topography’ (Bloch and Joensen 2001, 63). Specifically, ‘a good whale bay should have a sandy shoreline inclining evenly upwards’ (Joensen 2009, 101). Additionally, an otherwise suitable beach can be excluded from the list of approved whaling bays by the presence of a marbakki – a Scandinavian bathymetric term for a ‘sharp and sudden shelving close inshore’ (Young 1985, 377). The marbakki, also defined as ‘the point where the sea bottom drops to deeper water’ (Thorsteinsson 2008, 92), can reflect the driven whales’ echolocation signals, alerting them to the approaching land and often causing the pod

to turn back, dive or disperse (Bloch and Joensen 2001; Joensen 2009). By comparison, beaches from which the marbakki is absent may allow the echolocation signals to continue forward, mimicking the effect of deep water and offering no indication to the landward-driven whales that the water is rapidly shallowing.

The research presented here provides an empirical investigation into the ‘clear correlation’ (Bloch and Joensen 2001, 63) between a beach’s topography and its approval status for the grindadráp by analysing the results of shoreline profile surveys on a selection of approved and non-approved beaches, while integrating historical data on the spatiality of whaling in the Faroe Islands since 1709. It expands upon this human–environment connection by examining some of the social and political influences on the approval of whaling bays. By means of this multifaceted analysis, I shed light on Faroese environmental knowledge systems while examining the interconnections between traditional geographies of artisanal food production and the changing physical, social and political environments of the North Atlantic.

Methods

Shoreline profiles

The goal of my surveying Faroese beaches was only to resolve the gross topography and not to monitor small-scale changes over time. Therefore I applied simple, cost-effective methods to this study. Using two 1.5-metre ranging poles, a Suunto analog clinometer and a 50-metre tape, I surveyed the profiles of 26 Faroese beaches: 15 that are approved for whaling and 11 that are not approved (Figure 1, Table 1). More advanced survey equipment such as a total station was not available in the Faroe Islands, nor was it necessary for my purposes. I chose a sample of beaches that covered a large geographical area, representing all seven of the islands with approved whaling bays. Non-approved beaches were chosen based upon accessibility, lack of harbour development and, in some cases, their status as formerly approved whaling beaches. With the help of local volunteer field assistants, I surveyed each beach starting at the back berm, proceeded past the waterline and continued into the water to a point as deep as we were able to go safely, wearing



Figure 1 The Faroe Islands, with surveyed beaches marked

Table 1 Sites, whaling records since 1709, and results of beach profile surveys

Name of bay	Approved for whaling?	Number of grindadráp: 1709–2011	Per cent of grindadráp: 1709–2011	Slope (m)	Smoothness (r^2)	Marbakki present?
Miðvágur	yes	265	14.20%	-0.02	0.91	no
Klaksvík	yes	223	11.95%	-0.06	0.57	no
Hvalvík	yes	185	9.91%	0.00	0.02	no
Hvalba	yes	137	7.34%	-0.02	0.37	no
Tórshavn	yes	121	6.48%	-0.01	0.89	no
Hvannasund	yes	92	4.93%	-0.04	0.88	no
Sandur	yes	51	2.73%	-0.03	0.47	no
Fámjin	yes	46	2.47%	-0.03	0.43	no
Húsavík	yes	39	2.09%	-0.01	0.07	no
Fuglafjørður	yes	28	1.50%	0.00	0.07	no
Leynar	yes	27	1.45%	-0.35	0.67	no
Bøur	yes	25	1.34%	-0.11	0.87	no
Sandavágur	yes	16	0.86%	-0.05	0.22	no
Sandvík	no	13	0.70%	-0.03	1.00	no
Øravík	yes	10	0.54%	-0.05	0.94	no
Sørvágur	no	6	0.32%	-0.01	0.78	yes
Borðoyarvík	no	3	0.16%	-0.14	0.56	partial
Saksun	no	3	0.16%	-0.03	0.65	partial
Tjørnuvík	yes	3	0.16%	0.00	0.06	no
Haraldssund	no	2	0.11%	-0.08	0.96	yes
Lamba	no	1	0.05%	-0.06	0.58	no
Sumba	no	1	0.05%	-0.10	0.97	no
Arnafjørður	no	0	–	-0.07	0.87	yes
Ðalvík	no	0	–	-0.12	0.87	no
Hósvík	no	0	–	-0.02	0.06	yes
Kaldbak	no	0	–	-0.05	0.85	yes

chest-waders or drysuits. Measuring intervals were not set prior to beginning the surveys, but were determined on an ad hoc basis as we encountered topographical features that we determined to warrant recording. For most beaches we conducted three survey lines perpendicular to the waterline (e.g. Plate 1); for very small beaches we conducted only two. We timed the surveys to coincide as closely as possible with low tide so we could progress further into the water before it became too deep.

In most cases, we were unable to proceed to the point of the marbakki, if present, owing to the depth of the water. However, longtime residents of a village are generally aware of whether their particular bay has a marbakki and people associated with the grindadráp in an official capacity are aware of the presence of these features in many bays. Through interviews and discussions with both residents and experts (especially Ólavur Sjúrdarberg, president of *Grindamannafelagið*, or Faroese Pilot Whalers Association), I have been able to compile a reasonably complete list of those bays within my study in which marbakki are present (Table 1).

In addition to recording our measurements, I also made notes about the beaches' structure and terrain above the waterline – important characteristics because at least half

of the whalers involved in a grindadráp (those with the knives) spend a good deal of the time onshore and beaches that are exceptionally rocky or steep would present a safety hazard even before these shore-based whalers entered the water.

Data analysis

After surveying the selected beaches, I compiled a database of the profiles and created (x,y) coordinate graphs for each (e.g. Figure 2). To facilitate the isolation of each beach's offshore portion, I normalised the data for each survey line by setting the origin (0,0) to represent the waterline. Additionally, to get a sense of the average structure of each beach across its breadth, I aggregated the seaward data points, creating a scatter of points from all three (or two) survey lines in the fourth quadrant of each graph. Because the waterline had been chosen as the origin, coordinate pairs to the seaward side always have positive x-values and generally have negative y-values, indicating that they are beyond the waterline and below sea level. Exceptions exist, as in the cases of bars and other rises under water that occasionally break the surface, yielding positive y-values. Data collected landward of the waterline was used only to augment the



Plate 1 The beach at Leynar, with overlay showing three survey lines

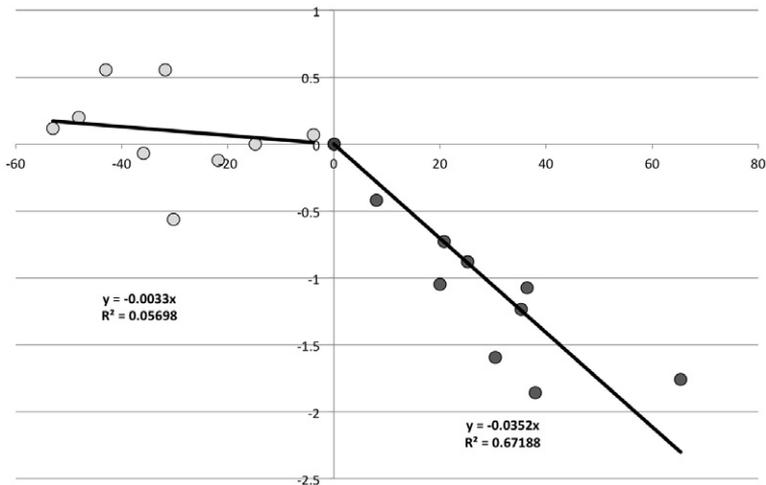


Figure 2 Graph showing data points and trend lines for a sample beach (Leynar). Markers to the left of the origin are on shore; those to the right of the origin are underwater. Trend line formulae ($y = mx$, where m indicates the slope) and r^2 values are shown. Note vertical exaggeration

observational data on beach terrain, not in the statistical analysis of beach profiles since the underwater beach structure would clearly be more important to the suitability of a beach for drive-style whaling.

Arguably, the most important physical characteristics of a Faroese beach with regard to its selection for whaling are the slope and smoothness of the terrain. Very steep beaches would reflect the whales' echolocation signals and very rough, undulating beaches would prove hazardous to the wading, knife-wielding whalers. To measure these criteria, I created trend lines for each beach graph, approximating the seaward data points. Calculating the slope of these trend lines yielded the average slope (m) for the near shore underwater bathymetry. An m -value close to zero indicates a very gradual slope. Higher absolute values for m indicate steeper slopes. Calculating the r^2 values for both trend lines shows how well the lines approximate the actual data. An r^2 value of 1.00 is an exact fit; values less than 1.00 indicate progressively worse fits. An r^2 value near 1.00 indicates very little variation between the trend line and the data that it approximates, thus a high degree of smoothness in the terrain represented by the data. The ideal whaling beach, in terms of slope and smoothness alone, would have an m -value near zero and an r^2 value near 1.00.

Qualitative methods

In addition to the beach survey data described above, the author has made annual visits to the Faroe Islands since 2005, collecting cultural data through such methods as archival research, interviews and participant observation. The understanding of Faroese history and contemporary culture gleaned through these methods serves to fill in the gaps that will become apparent below in the attempt to resolve the beach profile data with the spatiality of the historical Faroese whaling records.

Results

Table 1 presents the results of the beach profile surveys. Beaches are listed in order of their historical significance as whaling beaches – the beach with the most grindadráp since 1709, Miðvágur, listed first, and four beaches that have never seen a grindadráp listed last.

If slope and smoothness were the only factors in a beach being effective – and thus, usually approved – for whaling, one would expect to see a gradual decline in the suitability of these two data progressing down the list from the most effective beach to the least. Or, perhaps, one would expect to find a defined break in the trends of slope and smoothness between approved and non-approved beaches. In fact neither of these scenarios is the case. Figure 3 shows the surveyed beaches, in order of whaling effectiveness, as columns and the slope data as a line.

Figure 4 is similar, but its line represents the smoothness data rather than slope. Far from the gradual sloping away from the ideal m and r^2 values of zero and one, respectively, the connections between slope, smoothness and whaling beach effectiveness can only be described as random. It is perhaps worth noting that if Leynar were excluded from the list of analysed beaches, the trendline associated with beach slope data would gradually decrease in the direction of decreasing whaling beach effectiveness. However, it is difficult to justify excluding any approved whaling beach, let alone Leynar, which on average has seen a grindadráp every 11 years since 1709.

The presence or absence of a marbakki is decidedly more important than the slope or smoothness in the determination of a beach's suitability for drive-style whaling. All 15 of the approved beaches that were surveyed are beaches from which the marbakki is absent. Of the 11 non-approved beaches that were surveyed, seven feature at least a partial marbakki. Several of those beaches that are not approved, yet do not feature a marbakki, were described by local informants as 'too rocky', 'too sandy' or, cryptically, 'very much special'.

While the marbakki may be useful as a determinant of a beach's whaling effectiveness, it would appear that the general shape of the beach – measured in its slope and smoothness – plays little role in its selection or whaling success. A marbakki may render a beach wholly unsuitable, but it seems that social and historical factors can influence the continued inclusion of even an otherwise poorly-suited beach on the government's approval list, as is discussed below.

Discussion

While a marbakki may serve as an automatic disqualifier, the results of this research indicate that a beach's slope and smoothness alone do little to affect its selection as a whaling beach in the Faroe Islands. From these two data alone, one would assume Sandvík to be the most effective whaling beach in the entire archipelago as its m -value is close to zero and its r^2 value, to my level of precision, is 1.00. Despite this apparent suitability, Sandvík is not even approved for whaling, though there have been 13 successful – though perhaps illicit – grindadráp there since 1709.

Why, then, are the approved beaches approved, if not for their especially suitable seabed topography? A related question asks why those historically effective beaches – whether approved or not – have been so effective, if their measurements of slope and smoothness are not markedly different from the less effective beaches? Indeed, why were certain beaches with especially greater slopes (e.g. Leynar and Bøur) and/or low smoothness (e.g. Hvalvík, Húsavík and Fuglafjørður) ever approved for whaling in the first place, if indeed there is a 'clear

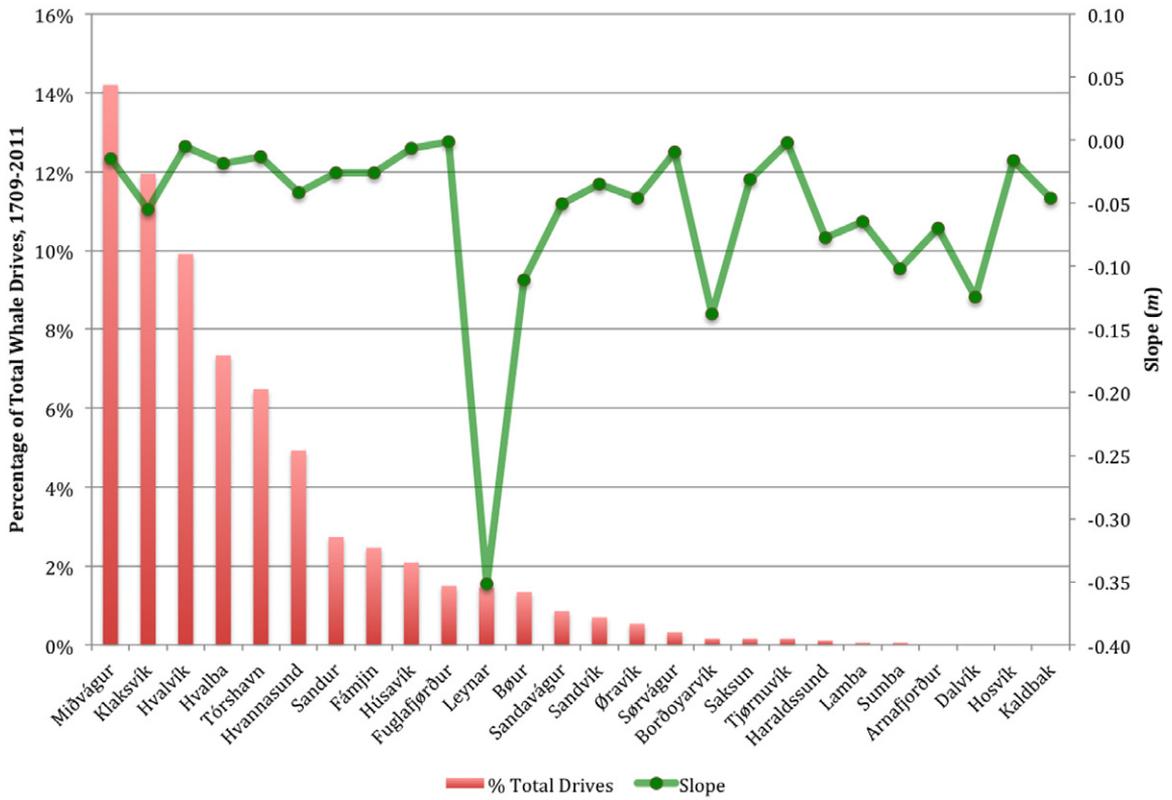


Figure 3 Historical whaling effectiveness (columns) and measured slope (line) of surveyed Faroese beaches

correlation between the effective whaling bay sites and seabed topography' (Bloch and Joensen 2001, 63)?

Beach structure is dynamic and – owing to erosion, deposition, shifting currents, dramatic storm events and anthropogenic changes over the past three centuries – many beaches that were once more suitable for whaling may now be less suitable. While the approval process is designed to address these changes and adjust the list of approved beaches accordingly, it is often laden with inertia: residents of villages on whaling bays are loathe to give up their bays' approval status despite the ever-worsening suitability or the encroachment of shoreline and nearshore development. As a result, for example, Klaksvík, where the shoreline has been so developed with marinas, boathouses, slips, and piers as to make grindadráp very difficult to conduct there, maintains its status as an approved whaling bay owing to the influence of its relatively large population – second only to the Faroese capital, Tórshavn, in size. According to Ólavur Sjúrdarberg (personal communication), president of the Pilot Whalers' Association, Klaksvík will probably be the next Faroese bay to lose its approval status, with the nearby bay of Borðoyarvík being added to the list in its place. Such a tradeoff seems to be the only way that the

influential residents of Klaksvík would countenance their bay being removed from the list, although with its marbakki and muddy bottom conditions, Borðoyarvík is not likely to be as successful a whaling bay as Klaksvík has been.

The most recent bay to be added to the list of approved whaling bays was Tjørnuvík. Older residents of that village remembered a single whale having been driven ashore – unauthorised – on their beach in 1934. Additionally, Tjørnuvík residents have occasionally awoken to find that a pod of pilot whales stranded on the beach without having been driven in by whalers (Wylie and Margolin 1981). These memories led to the popular opinion that grindadráp could be practical in Tjørnuvík. Residents successfully petitioned the government to add their beach to the approval list at the beginning of 2007. Soon after its approval, Tjørnuvík was the site of two grindadráp, one each in March and August of 2007, totaling 143 whales.

Bays can also be added to the list if they are made suitable through engineering projects that reshape the beach and the underwater topography. These landscape-altering projects are rare – only larger municipalities can afford them – and usually involve only the mechanical

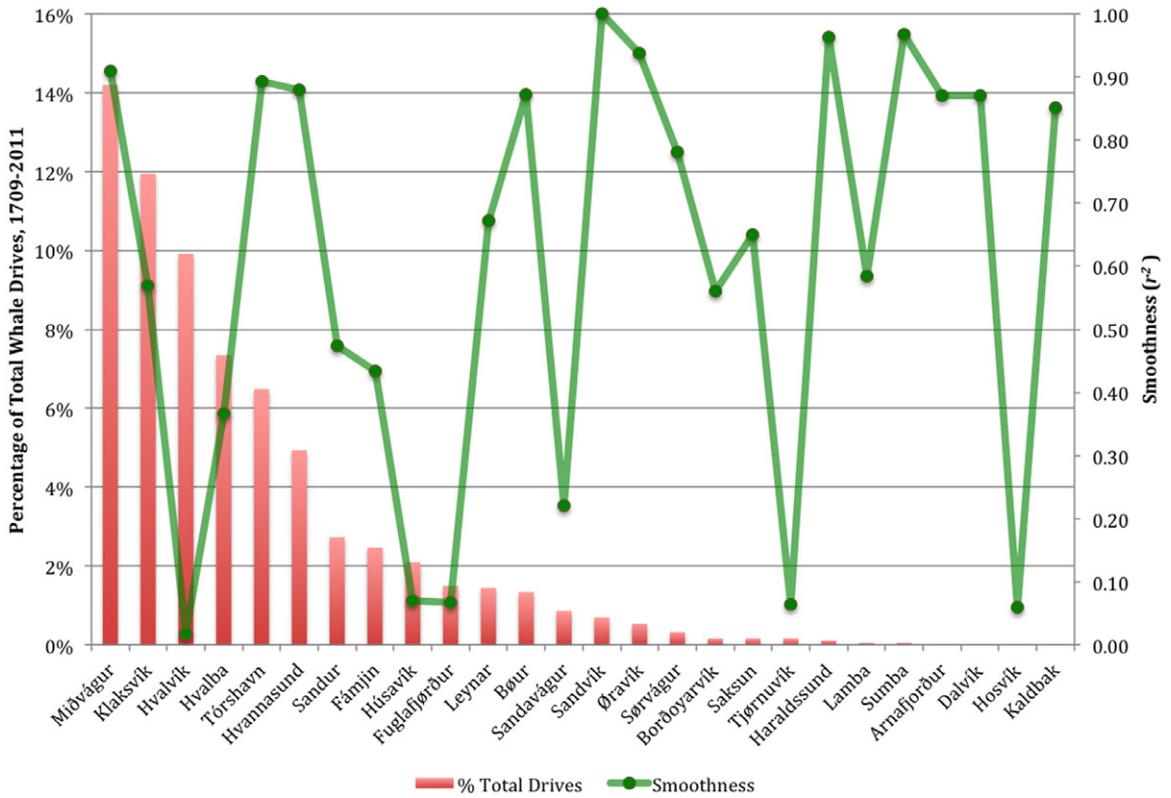


Figure 4 Historical whaling effectiveness (columns) and measured smoothness (line) of surveyed Faroese beaches

transport of sand onshore or the smoothing out of underwater features. The largest and costliest alteration to the landscape in the name of the grindadráp occurred in Vestmanna in 1992. Whales were formerly driven onto a natural, albeit rocky, beach at the back of the fjord. As the town grew, this area was developed into a harbour and fish processing facility. Rather than give up their status as a whaling bay, the local council of Vestmanna funded the creation of a wholly artificial beach on the seaward side of a rocky breakwater (Plate 2). This new beach has occasionally required nourishment with sand brought from the sea floor, but it has been the successful landing place for eight grindadráp since its creation.

Conclusion

The case of the Faroese whaling beaches provides a salient example of the complex interdependent relationship between human societies and the physical environment. The limitation of whaling to certain authorised bays is part of the larger system of regulation and distribution that results in the measured use of whales as a resource in the Faroe Islands. Grindadráp, by their nature, are community events. It takes a few dozen to several hundred

active participants to successfully drive and slaughter a pod of whales. By limiting the places where this activity is allowed to occur, the government legitimises whaling that is conducted on its terms, on its beaches. However, as this research has shown, the Faroese government is not fully sovereign in its selection of beaches to be approved. Rather, the cumulative effects of geomorphological and anthropogenic processes can at times necessitate an update to the list of beaches upon which whaling is allowed. While the majority of literature on the subject, and the explanations offered by the Faroese government, attribute a high degree of determinism to the physical structure of the beaches themselves, my research has shown that coastal morphology is only one factor in the spatiality of whaling in the Faroe Islands. While the physical environment can present a framework of beaches upon which drive-style whaling may be possible, cultural and historical factors such as Vestmanna's ability to finance the construction of an artificial beach, Klaksvík's cultural and economic influence as the Faroe Islands' 'second city' and Tjørnuvík's assertion of its own history as a whale-stranding beach are decidedly more influential in the development of the Faroese whaling and whale-conservation regime.



Plate 2 The artificial whaling beach at Vestmanna

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