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***Ethnoecology of Eider Farmers in Iceland*
Typology of a Multiform Experience**



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Résumé

Les fermiers d'Eider en Islande gèrent presque l'intégralité de la population nicheuse d'Eider à duvet, pour en récolter le fameux duvet d'Eider, produit très rare et utilisé pour remplir les meilleurs édredons. L'exploitation des colonies d'eiders se fait cependant sans impact sur leur cycle biologique, mais au contraire exige de le favoriser, afin que les eiders reviennent d'une année sur l'autre. Cette étude se base sur 20 entretiens semi-directifs, renforcés par une immersion dans le monde des fermiers d'Eider, afin d'expliquer cette relation remarquable au travers d'une approche ethnoécologique. Étant pionnière sur le sujet, elle a abordé de manière prospective le terrain, en couvrant autant que possible la diversité existant parmi les différentes fermes. À partir des données récoltées, une typologie a été proposée afin de montrer d'où vient la diversité de l'activité et comment elle se construit. Les facteurs fondamentaux retenus relèvent de la densité des nids, de l'accessibilité de la colonie, des infrastructures et de l'organisation sociale des fermiers, ainsi que des pressions écologiques exercées par des prédateurs terrestres et une riche communauté d'oiseaux. La relation Homme-Eider ainsi que les savoirs locaux qui découlent de cette activité sont restitués aux travers des multiples témoignages récoltés. Il en ressort que les savoirs des fermiers sont clairement variables selon les expériences vécues. Ces savoirs sont tous centrés autour de la nidification, qui en particulier la femelle, et recouvrent le choix du site de nidification et les comportements des eiders, ainsi que les interactions écologiques des espèces animales auxquelles les fermes sont confrontées.

Mots-clés : ethnoécologie, fermier d'Eider, Islande, savoirs écologiques locaux, *Somateria mollissima*

Abstract

The Eider farmers in Iceland manage nearly the whole population of the Common eider in order to collect the famous eiderdown, which is recognized as the best down for quilts and duvets. Eiderdown collection has not shown any impact on their biological cycle. In the contrary, Eider farmers support their reproduction to insure that the females will return the following year. This study is based on 20 semi-directive interviews, reinforced with a personal involvement in the world of Eider farmers in Iceland., in order to investigate this remarkable relationship through an ethnoecological approach. As of being a pioneer on that subject, a prospective approach was designed, covering as much as possible the diversity of Eider farming. A typology is suggested from the data collected, in order to explain the diversity observed and how it was created. The fundamental factors identified were: nest density, colony accessibility, infrastructure and social organization of Eider farmers, as well ecological pressure from land predators and the avian community. The Man-Eider relationship, as well as the local knowledge coming with Eider farming were illustrated through testimonies of Eider farmers. Those knowledge are all centered around breeding, which is mostly concerning only the female. Depending on the experience of the farmer, local knowledge could cover nest-site selection or behaviors of eiders, as well as ecological interaction between every animals they are brought to deal with.

Keywords : ethnoecology, Eider farmers, Iceland, local ecological knowledge, *Somateria mollissima*

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Glossary : Icelandic terms

Æðarbliki : male eider

Æðarkolla / kolla : female eider

Æðarvarp : eider colony

Hlunnindi : « natural benefits»

Hlunnindajörð : « natural benefits» farm

Dúnleit : down «search»

Dúntekja : down collection

Tína dúnn : picking down

Skjól : shelter

Svartbakur : Greater black-backed gull

Skúmur : Great skua

Minkur : American mink

Æðarfugl : Common eider

Kría : Arctic stern

Hettumáfur : Black-headed gull

Rjúpa : Ptarmigan

Kjóí : Arctic skua

Vargur: « bad predator»

Mýri : marsh

Þari : a type of seaweed

Veturliði : male eider in winter plumage

Sumariði : male eider in summer plumage

Introduction

The Common eider (*Somateria mollissima*) is a duck known for the incredible characteristics of its nest down (Bédard et al., 2008). It is the largest duck species in the Northern hemisphere weighting up to 2 kg, and has a circumpolar range in the Arctic. It is a species of importance by its large numbers (between 3 and 4 millions estimated in 2012, Waltho & Coulson, 2015), for the northern ecosystems as well as human populations. In most of their range, common eiders are hunted for their meat, as well as for their skin in a few Inuit communities (Nakashima, 2002), and their eggs represent also an important food resource. Eiderdown is collected in most countries where it breeds to a different extent (Greenland, Canada, Iceland, Finland, Norway, Russia), and is the basic material used for the most expensive quilts in the world (Bédard et al, 2008).

Many eider populations are migratory, but the eider population breeding in Iceland is resident, and will spend the winter along the coasts. Although the term of “eider farming” is used, the Common eider is still a wild species in Iceland. The eiderdown is molted off the female’s breast to create a brood patch allowing it to give away warmth to the eggs, and is used as additional material to cushion the nest. It is exclusively this “bowl” of down that will be collected, without doing any harm to the animal.

The eider farmer’s practices will also protect the colony against the visit of humans or predators, as well as try to attract eiders in more secluded and dense colonies (Skarphéðinsson, 1996).

The large majority of the eider population in Iceland is managed by these eider farmers, who will directly benefit from it. Taking care of eider colonies is in Iceland both a tradition and an industry, and their protection has been legalized in order to support the activity. The eider farmers are de facto the managers of the species in Iceland, where eider numbers are outstanding: 730 000 individuals estimated in 2012, which equals a fifth of the world’s population (Waltho & Coulson, 2015). The eiders there are also more exploited for their down than in other parts of its range, the proportion of Icelandic eiderdown being 70% of the global production (Bédard et al., 2008).

Because of its ecological and economical importance, the Common eider has been the subject of many scientific surveys in Iceland, and eider farmers find important that their population is monitored on a national scale (Carlsen & Johannesdottir, 2015). In 2006, the Snæfellsnes Research Center was created within the University of Iceland. It has since then conducted research in ecology mostly, in particular on marine birds and the Common eider. Many publications have documented

the eider colonies from an ecological perspective, with the collaboration of eider farmers that provided long-term nests-counts (Jónsson et al., 2013, 2015).

Eider farmers have indeed a privileged access to their eider colony: they visit it, watch over it all through the nesting season, manage it and collect the down. By being very close to the nesting birds and working with them every year on the same place, they can accumulate experiences over long periods of time, reinforced by knowledges transmitted over the generations. Such knowledges can be referred to as “local knowledges”, have received a lot of attention in recent years from the academic fields assessing environmental issues.

Ethnoecology seeks to investigate local knowledges through an interdisciplinary approach in order to understand fully the relationship between a community and its environment. An ethnoecological study of eider farmers could bring a new light for the scientific community on the biology of the Common eider, and would also represent a very interesting work for documenting and preserving the Icelandic cultural heritage.

Being aware of the potential of knowledge within eider farmers and interested by my approach, the Snæfellsnes Research Center hosted my final year project aiming to understand the local knowledges of eider farmers in an ethnoecological perspective.

This paper presents the results of my survey through the suggestion of a typology of eider farming. This method aims to highlight the structural dimensions within the activity, and how they will create a considerable diversity of human experience. The typology will be illustrated, discussed and reinforced in order to explain the relationship between eider farmers and their environment at a fine scale as well as while trying to cover its full range in Iceland. The local knowledge coming within eider farming will be illustrated by testimonies inserted and put in perspective along the corpus.

I. Approach and Methods

1. Origin of the project

I discovered ethnoecology and the Local Ecological Knowledge approach during my Master degree (Environment, Dynamics, Territories, Societies), and was particularly interested by these two interdisciplinary fields that bring together human and natural sciences.

In order to finalize my master while taking the most of my own experience, I had the idea of creating an interdisciplinary project on the very particular subject of eider farming in Iceland. I had indeed previously been trained in environmental sciences, with a specialization in bird biology, and had already spent five months in Iceland in 2013.

A strong motivation for an ethnoecological fieldwork in the arctic coupled with this privileged access to Iceland's environment and society brought me to engage fully in making it my final year project. Prospecting the French and Icelandic academic communities quickly brought up interest, and I was able to find two scholars that agreed to supervise my work: Jón Einar Jónsson, director of the Snaefellsnes Research Center, from the University of Iceland, and Douglas Nakashima, program director of LINKS (Local and Indigenous Knowledge systems) at the UNESCO.

Jón Einar Jónsson is conducting ecology research and surveys on marine birds, and is the Icelandic reference in Common eider biology. He had worked closely with eider farmers for his own research, and was straight away interested by my approach.

Douglas Nakashima is a collaborating teacher of my degree, and had himself conducted research on Indigenous Knowledge of the Common eider in an Inuit community (Hudson Bay, Canada). As a specialist in the same academic field, and personally interested in human-eider relationships, he agreed to supervise my work on this project.

2. Theoretical approach

Knowledge systems from local populations have been widely documented by the western field of ethnosciences, and present a big potential in social and economic development (Antweiler, 1998). A large panel of terms has been used to name these knowledges: indigenous, local, traditional, people's... depending on what characterizes the community and the cultural process at the origin of the knowledge.

All these knowledge systems are often structured on their own coherent system, which makes it often hard to grasp from knowledge holders of different culture. However, traditional communities

have in general a tighter relationship to their environment than modernized societies, and have been able to gather experience over multi-generational periods, thus bringing a very promising long-term approach to the understanding of ecological processes.

The Local Ecological Knowledge interdisciplinary approach relies on research fields such as environmental anthropology and ethnoecology, which allows the holistic understanding of the knowledge investigated. As defined by Gerique (2006), ethnoecology integrates tools from biology, linguistics, anthropology, economy, etc... It aims to understand the knowledge within its context, through the study of the whole relationship between the community and its environment.

While the literature about eider farming in Iceland is quite proficient, it is for the most part in Icelandic, with the few documents in English being mostly short advertisements. A huge work, usually referred to by eider farmers as “The Bible of eider farming”, that goes by the title: *Æðarfugl og Æðarraekt á Íslandi* (The Eider and eider farming in Iceland) has been edited (Jónsson, 2001). It covers a large range of interesting topics: eider biology, traditional and modern down cleaning, predator impacts and control, as well as a few stories from eider farmers themselves.

However, being written in Icelandic, it did not allow me to build a strong understanding of eider farming by itself. It did though illustrate how wide and diverse the world of eider farming is. This diversity has also been assessed quantitatively through a questionnaire set up to compare the eider farmers of Norway and Iceland (Carlsen & Johannesdóttir, 2014). It was able to show that the strong diversity in many different dimensions (practices, part of income, property rights and size of the colony) was well represented. There seemed to be no predominant type of eider farming, but rather a wide variety all over the country.

Therefore, a comprehensive understanding of eider farming at the scale of the whole country needed to cover its diversity, and the project was consequently designed as a prospective ethnoecological approach. Its objectives were to comprehend the whole system of eider farming in Iceland within its diversity, and to characterize from this analysis the knowledge of eider farmers.

This approach brought in consequence the following research questions: who are the eider farmers and what do they do? What is the relationship between humans and eiders? Where does the documented diversity come from? What kind of collaboration would be possible between eider farmers and fundamental ecology research?

3. Data collecting

The fieldwork consisted of semi-directive interviews with eider farmers, aiming to cover the diversity of eider farming in Iceland. Semi-directive interview is a very common tool in qualitative human sciences approach. Its use has had very good feedback by Local Ecological Knowledge studies focusing on the Common eider in Canada, within Inuit communities (Nakashima, 1988, 1991) as well as local hunters (Chaffey, 2003). Another article on beluga whales in Alaska has been written solely to describe the relevance of semi-directive interviews (Huttington, 1998).

Semi-directive interviews consist of an open conversation in order to let the interviewee approach the subject with its own perspective. The investigator is left to determine if the exchange has drifted away from relevant information, and in that case has to redirect the interviewee towards a more suitable topic. This allows the interviewee to fully express his experience and knowledge and therefore give the opportunity to really understand his point of view. This method is also obviously particularly efficient in a prospective approach, where the research aims to discover new aspects of a subject.

The questions used to address the topics became more precise (and relevant) as the fieldwork progressed. The approach while conducting the interviews was mostly the same, however as is customary with semi-directive interviews, the goal was to take the most out of each farmer's particular experience rather than have them answer a previously determined list on exactly the same topics.



Figure 1: Approximative location of my interviewee's colonies

The data collected through my fieldwork would be summarized as :

- _20 transcript of semi-directive interviews of eider farmers (see Table 1)
- _visit of a few mainland and island colonies
- _global immersion and participating observation

Choosing the interviewees was done according to different factors. The project had to cover a geographic, social and technical diversity. However, the first factor was mostly facilitated contacts:

common acquaintance, neighbor, recommendation, contact with the laboratory or a closely cooperating down-cleaning company... It is then within this range of contacts that I selected my interviews in order to meet the project's design.

4. Limits and biases

My level in Icelandic was not good enough to conduct interviews in that language. English is however commonly spoken in Iceland, with only a part of the older generation that is not really able to use it. By requesting the help of a relative or a neighbor, I was able to interview a few non-English-speaking farmers. While the fieldwork did bring up extremely rich interviews, it still appeared that any further studies following the same approach would benefit greatly from having complete mastery of the Icelandic language.

The objective of covering the diversity of practices and situations was met quite well. The North-West of Iceland was overrepresented, because of my location, but in a proportional way to the actual distribution of eider colonies. Mainland colonies however seemed to be slightly underrepresented, and they deserve to be investigated further.

It is also important to remember that with 20 interviews against nearly 400 eider colonies, it is quite likely that some types of farm might have been not sampled by the survey.

Furthermore, as the project was designed to be prospective, many extremely interesting leads were identified but could not be fully investigated. A much bigger amount of time and energy would have been necessary to exhaustively cover all these subjects, and that was not possible in this study.

I will also point out that on a few occasions, a one-hour-only interview could be a bit too short. Most of my interviews were able to last for nearly two hours, and some particularly talkative eider farmers were also able to cover all interesting topics in a shorter time. However, if I had to prepare a new set of interviews, I would make sure that the interviewees were to have an extended time to talk.

Many interesting subjects were brought to light, that could not be all intensively studied. However it is mostly due to the prospective approach of the project rather than the slight irregularity mentioned before.

Table 1: Characteristics of the interviewees

Letter code and gender (m/f) of eider farmer (tr: with interpreter)	Area	Age	Other activity	Colony type
A m tr	Breiðafjörður	~70	Retired	Archipelago
B m tr C f	Breiðafjörður	~60 ~60	Retired sheep farmer Retired nurse	Few islands
D f E f	North	~50 96	Economist Retired teacher	Mainland
F m	West Fjords	~30	Pasteur	Mainland
G f	North	~40	Sheep farmer	Mainland
H f	North	~60	Retired	Mainland
I m	Breiðafjörður	~50	Taxidermist	Archipelago
J m	West Fjord	~80	Retired teacher	Mainland
K f	North	~70	Retired	Island
L f M m	North	~40 ~40	Horse farmers	Mainland
N m	East	~50	classified	Island
O f	Breiðafjörður	~40	Secretary and shop keeper	Few islands
P f	Breiðafjörður	~60	Retired	Few islands
Q f	Breiðafjörður	~30	Tourism industry	Islands to mainland
R m S m	West Fjords	~50 17	Museum Student	Island
T m	Breiðafjörður	~70	Retired sheep farmer	Few islands
U f	Breiðafjörður	~50	Sheep farmer	Few islands
V f W m	Breiðafjörður	~50 ~50	Various activities	Islands to mainland
X m	East	~30	Tourism industry	Mainland
Y f	South	~50	Law teacher	River island

5. Results

The results of the study will be presented in three chapters, all from an ethnoecological perspective.

A first chapter will lay the context and the origin of eider farming, and will suggest a few useful concepts.

A typology of eider farming will then be suggested to show how the diversity influences the experience of eider farmers.

A third chapter will finally cover another socio-ecological dimension that could not be included in the typology, but of fundamental importance: the many other bird species that often nest along eiders.

The data being analyzed and discussed all along the chapters, a very short discussion will put them in perspective.

Quotes will be presented in their original form, in English, with a given translation of the few Icelandic words, in order to keep the authenticity of each testimony.

II. Concepts and context

The Human-Eider relationship in Iceland is absolutely remarkable, and it is difficult to approach it with regular concepts: is it a domesticated or wild population? An activity included in agriculture or just gathering?

A part of the answer can be given by an ethnological approach. For Icelanders, collecting eiderdown is part of a category which is specific to Icelandic culture: the « natural benefits ».

We will first present the Icelandic environment, before defining a few key concepts in order to understand better this Human-Nature relationship.

1. The Icelandic coastal environment

Iceland is an island country located between the Arctic and Atlantic oceans. It is the least densely populated country of Europe, with an area of approximately 100 000 km². Only the lowlands and coast are inhabited, as the interior is too hostile (Fig. 2). Iceland is indeed: “economically and traditionally dependent of marine resources” (Petersen et al., 1998), with a very long coastline (ranked 25th in the world while its area ranks 108th,

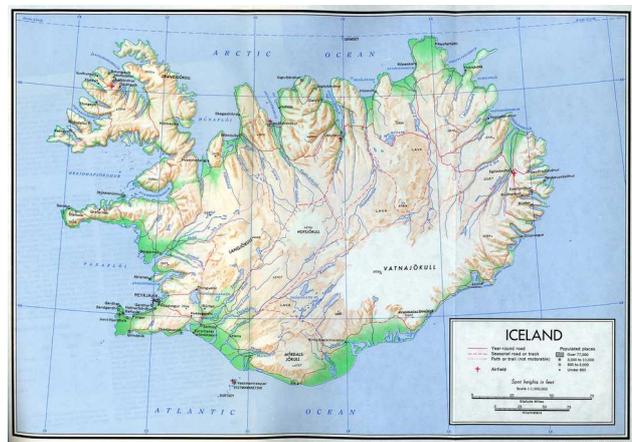


Figure 2: Only lower areas (here in green) are inhabited (map : cia.gov)

Source : cia.gov). Being just below the Arctic circle, the climate of Iceland is characterized by mostly two seasons, winter and summer, although the effect of oceanic currents brings a much milder climate than what could be expected in a country at such a latitude. An important dimension of the Icelandic summer is the considerable amount of life that fills the place. Many migratory bird species arrive one after another in large numbers and will start nesting everywhere, according to each preference (except at the center of the country, which is not exploitable for birds or humans). Those birds are quite important culturally, as they represented a food resource in the old days, and still do catch the attention of Icelanders: their arrival is even announced in national newspapers (Fig. 3). A complete list of frequently nesting bird species in Iceland is available in appendix 1.

The Common eider is not a migratory bird in Iceland, although it is migratory in some other locations of its range (Waltho & Coulson, 2015). It will winter along the coast and start breeding in the spring, between May and June, with some great variation between locations and individuals concerning the starting date of laying eggs. The Common eider has a unique legal status, and has been the first species to be protected in Iceland, because of the importance of eider colonies. While the eggs were at first the major wealth coming from eiders, the nest down started to be much more valuable during the 17th century (Petersen, 1997) and has remained the desired natural resource since then. Harvesting eggs is registered in the law: eider farmers are allowed to collect them as long as they leave three eggs in each nest. The species is also protected through legislation on their colonies, with special rights given to the eider farmers to neutralize any threatening species for the eider. Those rights can be upgraded through registering the colony as *friðlýst æðarvarp*, which will limit human access during breeding (Regluglerðasafn, reglugerd.is).

Krían er komin



Fyrstu kriurnar sástu á landinu í gær, síðastas vetrardag. mbl.is/Omar Óskarsson

Figure 3: "The Arctic tern has come" (mbl.is)



Figure 4: A Common eider couple. The male is in black and white, while the female has a concealed brown pattern

It is also quite important to understand that the nesting is only done by the females, as the males do not lay on eggs or take part in raising the ducklings, and it is clearly the female that is the center of interest of eider farmers.

« Æðarbliki¹, he is... he is doing nothing. he is just... beautiful to look, yes. And yes, that's it. » H f

1 : Male eider

2. Living of « natural benefits » (*Hlunnindi*)

The Icelandic coastal environment can be locally extremely rich with available natural resources which could represent a big part, if not all, of the income of the historic inhabitants. The people lived on scattered farms, along the coast or even on islands. Icelanders refer to all these resources with the word *hlunnindi*, and farms that were the most proficient with such resources were called *hlunnindajörð* :

« S m : *Especially in the old days because, you know, hlunnindi... the eider colony, you know, and the puffin², and also the fish around. It's very short to the fishing grounds. Hlunnindi, in some cases it is you know, if you own a land or a property, and for instance there is a lake that has fish in it, that's a hlunnindi. Something on which you could live of, or something like that, from the nature. I would describe it that way.*

R m : *There is a lot of drift wood in the north coast of Iceland. It's drift wood that comes from Siberia, goes through the North pole two times before it lands here. And all the birds cliffs that's hlunnindi. We don't have any bird cliff in our island. We only have the puffin. »*

The *Hlunnindi* concept, that we will translate by “natural benefits”, will cover all resources coming from the environment, that are not fundamentally depending on human action to exist: birds and their eggs, fish in lakes, river and sea, timber or driftwood, as well as the eiderdown that came along eider eggs:

« *They always took a little of eggs. Because we did eat the eggs then. My mother used them in baking. If it was four or more, then she took one. From each. And usually they took one or two, maybe more. If it was two or three, they didn't take it, but if there were four or more, they took one. » P f*

However, this word also has another meaning in a contemporary context, in a different and parallel use:

« *Usually in the old days and even today, when we talk about a farm, that is called hlunnindajörð, hlunninda farm, then we are meaning that it gives something back. It gives you money in the pocket or it gives you something back... [...] Hlunnindi... we use that word also to tell that, yeah, if you have a job... it's like benefits... when you have a job and you have good benefits, that would be the most similar word, I think, in*

2 : *Fratercula arctica*

English. Because it was a good thing, in the old days, to have a hlunnindajörð. That would give you eggs and eiderdown, meat from the sheep. And safe, good grass, and that would be referred to as hlunnindi. But if we use that word today, we would say that hlunnindi was a part of our job benefits like... I get a free phone from my job, and a computer, and... stuff like that. » O f

Some traditional farms were therefore based on a balance of cattle (cows, sheep, pigs...) and such natural benefits. All resources that are part of agriculture, where human action is mandatory, are not part of *hlunnindi*. However, as the previous testimony mentioned it, the grass available in large quantity on some islands is the consequence of marine bird's feces. The hay harvested there is in itself a natural resource that the domestic cattle can feed on. In a similar way, sheep could also feed on dry seaweed beached on the shore:

« This farmland, that my mother was born in, it's like a hlunnindajörð, they had driftwood to keep them warm, they had fish in the sea, they had trout in the lakes, they had eggs and birds to eat, and they had maybe one or two cows then and some sheep, and the sheep were walking outside the winter, eating by the coast line, the þari (type d'algue), you know, so they just opened out during the winter... the houses and the sheep went out and ate the þari and so on.[...] Hlunnindi is something that the land gives you, that you can use. You take it and use it and... not too much of course but we use it... we eat the egg from the kria³ and æðarfugl⁴, like they did, and eat the birds...and there were rjúpa⁵... rjúpa is a christmas dinner today, but in the old time that was just another meat they got in winter. » D f



Figure 5: Guillemots nest in large numbers in bird cliffs

The previous testimony also brings up the question of managing those resources. The Icelanders are indeed aware that their harvest have an impact, and that the resources are not endless. Even today, owners of such land would often decide by themselves not to harvest populations going

3 : Arctic tern (*Sterna paradisaea*)

4 : Common eider

5 : Ptarmigan (*Lagopus muta*)

through difficult times. This farmer was for instance answering about if he would hunt puffins on his island:

« No, not very much. I did.. but about four years ago, they couldn't bring up chicks, because there was something happening in the sea. So they laid egg, the chick came, and they'd die. That happened for three or four years, but now, they are.... the chicks are pulling through, so... so it's gradually... and the old people say that, like this, has happened, on and often. It's like it goes up like that, you know. It's like... the situation of the sea and you know... nobody knows. » N m

In some cases, the richness of these lands was so remarkable that local idioms of absolute exaggeration were created to describe them:

« They used to say, in our countryside, that we did not have much to do for a living. We could lay down by the lake... and a trout would come to your mouth, and if you would stand up, then a bird would, too. » E f

And as well:

« Like they said, there is a chunk of butter on every straw. They said that. » R m

Although there are some “natural benefits” coming from the terrestrial ecosystem, it is mostly the marine and coastal environments that will create most of it: the largest bird cliffs (Figure 5) can gather millions of individuals, and it is not exceptional that a medium-sized island would host many thousands puffins.



Figure 6: Checking a goose egg against the sun

The eggs of many marine birds are collected: every single interviewee seemed to have his own preferences. For instance, one recommended the Arctic tern, another Oyster-catcher (*Haematopus ostralegus*), or the Greylag goose (*Anser anser*) and even the Greater black-backed gull (*Larus marinus*). Not every eider farmers would collect their own eider eggs, and it is even unthinkable for some. However, the farmers that taste eider eggs on a regular basis seem to find them particularly delicious. However, eggs from Lesser black-backed gulls (*Larus fuscus*) are said to be disgusting.

A traditional technique actually exists in order to collect only the fresh eggs, where the embryo has not developed much, and which are the best to eat. I was able to observe many ways to do it, but all seemed to give satisfaction. It consists of looking at the egg against the sun, through a dark tunnel formed with the hands (Figure 6): the light will come through the egg and reveal any dark embryo inside. This technique is very similar to the candling method commonly used by biologists, who use a flashlight and a tube.

Another way was identified, in the case of a very regularly visited colony:

« When the bird had made three eggs, they made a cross on the three eggs and then if they got some more eggs on the nest and then they pick that, the extra eggs. And ate them. » D f

That way, it was possible to collect the freshest eggs, while leaving the first three to develop.

3. The eider farm: a colony and its management

The concept of colony is often used to talk about birds nesting in high density: it does not refer to a physical object, but to the presence of eiders. Colonies can cover lands of different sizes, but usually range from a few hundred meters to a few kilometers.

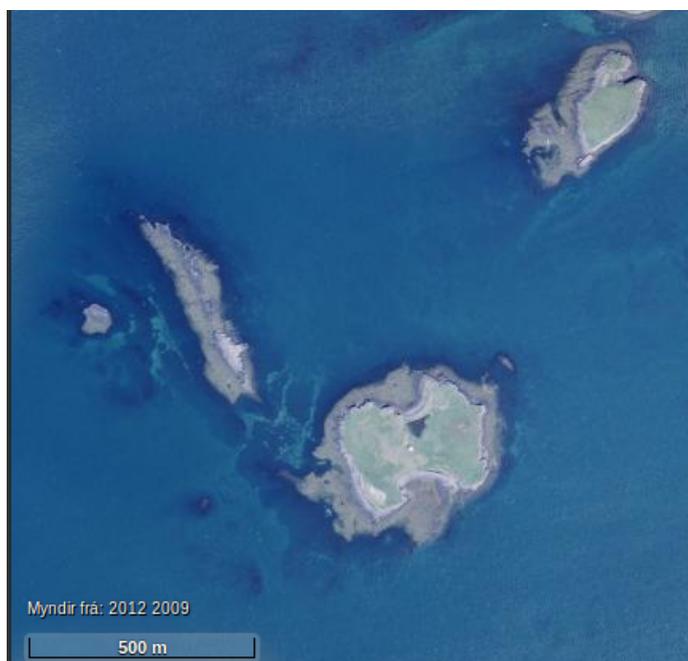


Figure 7: The island farm of Séllatur includes three islands

Eider farmers will be the humans in charge of managing a colony, which includes in particular the collection of the down. They themselves use the word colony (*æðarvarp*) to refer to their eider population. However, it is important to understand that the colony of an eider farmer is not based on an ecological factor, but on the property division of the land.

For instance, an eider farmer can own a few islands, more or less close together, within a bigger number of neighboring islands (Figure 7). In a same way, the coastline can be an uninterrupted succession

of colonies, but owned by different farmers. Every eider farmer will have his own techniques and habits, and since the eider population that he will have to manage do not exactly fit with the

ecological concept of “eider colony”, it would be interesting to use a new concept, the “eider farm”, that would be closer of the object approached by an eider farmer perspective.

The eider farm is based on the land unified within a property. It is actually the lands of the Icelandic farm, the *jörð*. These lands will be managed by a common governance, and will undergo similar or at least consistent practices within the farm.

The eider farm is therefore made of the eiders, the property/landscape, the humans and their activities: its dynamics can only be explained through all of these factors. The environmental context will also have to be integrated in order to fully understand how an eider farm works.

Since the property is at the basis of land management, it is important to understand what kind of ownership situations can be found. This aspect has been quantitatively assessed through a questionnaire (Carlsen & Jóhanesdóttir, 2014), and we will try to elaborate on them. An eider farm can be the property of one or many people, or of a private or public institution. Its management can be delegated, if the owner cannot take care of it, in the case of a rented property, or often on community owned land. Farms can be owned by many relatives, but it is quite often that the property would be reunited within one active farmer family.

Concerning the landscape of the property in itself, there is no particular characterization. There will however always be an access to the sea, either directly or indirectly, for instance through a coastal lake or a river. This access will moreover have to be through a smooth slope:

« Because, they, themselves, they walk, to find the nest. They walk on the earth, yeah. And we think they do that, because they want to know which way they have to bring the young ones to the water again. So they walk... they don't fly, and sit down and nest. They hike all the way from the coast, from the lake or from the sea. To find the place they want to have. » D f

While most of the colonies are right by the coastline, some nests can be found up to many kilometers upstream of rivers (Jónsson, 2001). Eiders will however be able to nest within any landscape, be it moorlands, beaches, rocks or marshes.

4. The eiderdown industry

Eider farming as it exists today cannot be understood without approaching the industry which comes along it. Eiderdown has indeed a luxury status, and it is easily explainable by its extraordinary capacities: a remarkable cohesion helping for an optimized filling and elasticity and a resilience giving it multi-decennial lifespan, as well as a faculty to evacuate body moisture.

Furthermore, its scarcity also comes into account: Iceland provides 70% of the world's production with only 3000 kilograms per year (Bédard et al., 2008).

Eiderdown quilts and duvets are sold for around five to ten thousand euros, and about a kilo of down is used to make each. Such prices are quite outstanding compared to other types of down (the best goose down would usually be about a couple hundred euros a kilo). However, the down must be processed after the collection. It is indeed full of undesirable materials that need to be removed. While eider farming is still following traditional practices, down cleaning has been



Figure 8: Some down is left to dry inside after the harvest

modernized through the design of machines able to process down faster and in larger quantities for less manual work. Eider farmers dry the down either in the sun or with a heating device and manually shake it. This initial processing removes much debris and dirt. Shaking the down will then quickly remove most of the biggest dirt.



Figure 9: The first rotating machine shakes the down to remove the dried dirt

The first step of cleaning is having the down go through high temperatures for a long time. While it is now done in huge ovens (approximately 8 hours at 120°C), it was done in the old days in big pots over the fire, that had to be stirred. The down then has to be strongly shaken, and dirt falls off very easily once dried off (Fig. 9). A rotating machine has now taken over the traditional technique that consisted in beating the down against thin ropes stretched in a large wooden frame.

Some impurities are however not removed, feathers in particular. They are indeed very light and adhere to the down. A second rotating machine has been designed to remove these feathers, by

compressing the down against a thin wire mesh that will catch the feathers shaft and thus remove the feathers.

Not all the feathers will be cleared by this last machine, and a final treatment of hand-picking is necessary to obtain the purest down possible (Fig. 10). This last step is of course the most tiresome, and a full 8h work day will only process between one and two kilograms of down, depending on the cleaner's experience.



Figure 10: The hardest part : hand-picking feathers

This cleaning work is not done by every eider farmer, as the machinery is quite an expensive investment. Only a limited number of farmers or traders have acquired such equipment, and they can process the down from other eider farmers for a fee. Most of the cleaned down is just exported from Iceland as a raw material, while a few eider farmers will go to the extent of making quilts and sell them themselves.

5. The modernization of the Icelandic society in the 20th century

The natural resources that were traditionally harvested along with eiderdown have also changed of status with the modernization of Iceland. While they were a strong economic advantage in the old days, most of the *hlunnindajörð* were left, often because of how isolated they were. The bay of Breiðafjörður, with innumerable islands, was nearly fully inhabited, before roads on land replaced boats as the main mode of transport. Today, only one of its nearly 3000 islands is still occupied all year round: Flatey, which is served by a ferry crossing the bay on a daily basis.

Those natural resources are however not completely neglected, and each one of them has found a new status among the new socio-economical landscape. Seabird eggs are still more or less harvested for private consumption, or are sold on local markets. One of the interviewees owned an island hosting a large colony of puffins, and their hunt supplied the market of puffin meat at a national scale. Driftwood, that used to be an important supply of material and fuel, is now mostly used for artistic creations.

Concerning the eiderdown, while the practices of eider farming were not modernized through technical innovation, it is possible that some changes affected it during the 20th century. While this study did not focus on that aspect, a few points bring up this question.

The number of colonies managed by eider farmers was estimated at about 200 in 1913 (Petersen, 1997), to get to nearly 400 today: the situation is definitely different from one hundred years ago.

The desertion of the islands has completely changed their occupation compared to what it was sixty years ago. Today, their owner would usually be the first generation to inherit these islands, with a few of them having been raised on it, and who are particularly attached to them:

« It was on the first part of the 19th century that our family came to Sellátur for the first time. And it has been in the family since : my grandmother, grandfather, and father. My mother was brought there, she was born in 1910... She loved the island and all her family and her siblings also loved it very much... it's beautiful... have you been there ? »

P f

Those islands have become mostly a place to spend holidays, with a summer house, and it of course affects the dynamic of the colony:

« He says that when the people left, stopped staying there.... the nests closest to the house, the birds went away, so there is no longer any close colony to the house and the farm, so they are more far away from the houses, but in the old days there were nests close to the people. » A m (interpret O f)

In a whole different perspective, many of the mainland farms investigated did not exist before the beginning of the 20th century:

« It has started in 1914. so it's like right a hundred years old. And it's completely built up by hand. Or by the humans, because there were not any colony here. In 1914, then Steini granddad walked past three nests, by the sea. Out here, on the way to the light house. And at that time, they used to eat all sort of birds eggs. But he thought about... let's not take the eggs and leave the birds come up, and try to nurse or do things which the bird would like to. Like take care that the fox didn't come, and the wrong birds » G f

Another testimony raises additional point on the growth of a mainland colony:

“The mother of the older farmer here, she started with one duck. There always was a few ducks and she always made nests and a little bit.... and then... in 2000. the farmer stopped having sheep, or just few sheep, and could watch it better and make

more nests, and do more. Then it grew away fast. And he... just lived on this, many years... he didn't do anything else.” M m

Stopping an activity in order to dedicate oneself to eider farming has been reported a few times during the survey. This could have happened because of pension plans, but also because of increased market price for eiderdown. It seems indeed that not so long ago, some eider farmers did not realize that their down was a valuable luxury product, and that traders bought it for a much lower price than today:

« My mother, she was always just happy if somebody bought the down. You know it was kind of like she didn't really grasp the... in fact... the exclusiveness of the product she was handling. But of course that has its explanation, because there have been... depressions... how do you say... sale has gone up and down, through the years, and sometimes maybe for some years there was no request for down and then, you would be of course happy when somebody came. So... I experienced like she is, always relieved, each year, that somebody pays her.. You know, wants to buy the down. And I think maybe that should change a little bit. » Y f

Furthermore, eider eggs are not collected anymore in most farms, while it was a very important part of the resource back in time. Since eider farming was much more profitable thanks to the down, the eggs lost their status of “food” for many farmers. One of them reported that when she told some local farmers that she would eat the eggs, as it was done at her parents place in the North-West, she saw their face “crumple”.

Therefore, as it was not well assessed in this study, the impacts of the modernization of the Icelandic society on eider farming should be investigated much further.

III. The diversity of eider farms through a typology

The use of a typology is a classic method in human sciences. It consists of suggesting a hypothetical classification, based on consistent observations, that highlights important dimensions. It will be used here to elucidate what has created the diversity of eider farms in Iceland.

This typology will be based on all relevant data collected in this study with its limits: we have seen that with a sample of only 20 farms, it is likely that some types have not been covered, that could have changed the conclusions made.

We will first elaborate on the two criteria selected to precise their consequences, before presenting the typology in a schematic form. We will then see in more details how these factors can be fundamental for eider farming, before concluding on recurrent types and the existence of poles within the typology.

1. An activity defined by its constraints

We will first begin with describing the two criteria selected: the vulnerability of the colony to terrestrial mammals, as well as the accessibility of the nests for the farmer.

Those two factors are highly complex, and will be explained in details before the typology is presented.

a) Vulnerability to mammals

The first very important criterion is the vulnerability of the colony to mammal predators, and in particular the Arctic fox (*Vulpes lagopus*). It is indeed the only native terrestrial mammal of Iceland, and is considered as the main predator of the Common eider there (Hersteinsson, 1989).



Figure 11: An Arctic fox during summer

While not all eider farmers are affected by this problem, those who have to protect it know that the fox is an important threat for the colony, as it will strongly affect the eiders:

« When the fox comes, the æðarkolla⁶ is very afraid. And she might leave for the ... lake or the sea ... leave the eggs and not come again. She is afraid. And if the fox comes, in just one night, the colony can be destroyed over one night if nobody is watching » H f

6: Female eider

When the Arctic fox comes to an eider colony, it is mostly interested in the eggs, although it is able to kill the female : « *They dig a hole, put an egg down, and hide it. And take the next one, and try to get the adult bird in the beginning* » (I m). The fox will therefore reduce the reproduction output of the colony, as well as spoil the predated nests. Another effect that is well known by eider farmers, is the desertion of colonies visited by the fox:

« And this friend of us, on the other side of the fjord... his colony is... decreasing. It's getting smaller and smaller every year because he has no time. He has cows, accommodates tourists.. and sheep and he has no time to watch it all the time, he has a lot of foxes, so... it's going down » L f

It even seems possible that an abandoned mainland colony could completely disappear:

« That's an interesting thing about eider farming, because, it's actually... it's a farming you can do, where you work together with a wild bird. But the wild bird can't survive alone. In all the farms where people have moved to Reykjavik, where nobody is here, the colony is dying. It doesn't take more than four years, something like that. Definitely finished » G f

It is indeed important to take care of a colony, in order to insure that it will last, by protecting it from the fox. Watching by with a gun is commonly done, but there are also complementary methods that help to reduce fox pressure. A first technique is simply to use fences:

« And ... the fox fence is actually some fishing net. We put it out on the sheep fences. And then we take it off again, like, after two months. Because it's very hard for the fence, because of the wind. Makes the poles loose. So... there's quite a big work about that also. » G f



Figure 12: Fox fences and driftwood

For some eider farmers, having humans walk by the colony, or even better, dogs, can be enough to deter the fox:

« My daughter, she is walking all night, here and up to the road, walking with the dog, they have always done this and the fox never came. There is a big fox problem further away. But we are so lucky, here near the town. There are not so many foxes around here. » L f

However, these methods cannot insure a complete security of the colony, which always have an access through the shore, and every mainland eider farmer will be ready to take action if a fox were to enter his colony.

Watching over a colony is however a hard task, and might need to spend all nights outside during the nesting season. The amount of time invested is so great that many eider farmers like to compare the income from the down and the time spent:

« If I put this down on paper, I'm spending all these hours on this, and how much money do I get each hour, I would be getting so little each hour that it'd totally not be worth it. But... it is worth it because it's... it's nice, you know, it's a good experience » F m

Eiderdown can represent an important part of the income of some farms, but did not go over 50% of total income concerning the farmers interviewed in this survey.

As we could see, the Arctic fox is a structural problem for a mainland colony, that will not affect most islands where the eider farming work will be completely different. There are still many islands accessible to the fox which are close to the coast, either because of the sea leaving far enough at low tide, or because of the sea ice during winter.

However, eider farming diversity cannot be summarized just as an opposition between mainland and island situations. There are clearly in-between stages, with colonies that are not as vulnerable to the fox. This can be found in islands that are only lightly accessible to the fox, for example at low tide or because of the sea ice in winter:

« And my husband told me that there is a fox there. That they need to go and check out. Because if there are, a male and a female that's not a good thing, if they get – if they start a family – yeah if they start a family, that could be very difficult to handle. And you... if there is a fox usually we see it when we are looking for the nest, because there is a big radius around where the fox lives, with nothing. No life. And you can almost not hear... hear, you don't hear birds, for.. yeah it's a very big radius around. And then we know something is going on [...] The harvest can go.. pfff, very much down, if you have the fox, so it's very important to get him. » O f

Furthermore, there is also the case of scattered mainland colonies, a situation that is completely different from dense continental colonies. That case is quite common in other part of the world, as it is harder for a predator to find a lone nest, (Waltho & Coulson, 2015) but it is quite rare in Iceland.

Even if a fox comes to the colony, it will not be able to find many nests, and will not make so many eiders flee. In one farm, the fox indeed did not represent such a big problem:

« We have foxes, always, foxes in our environment, in one corner of our land, there is a fox home, and it's always a fox there and they always go and hunt it but the fox just eats some eggs, maybe kills a little bit, but not so much. » D f

The Arctic fox is not the only terrestrial predator in Iceland anymore. The American mink (*Neovison vison*) has been imported in order to be bred for its fur in the first half of the 20th century:

« There was a mink farm here in Stykkisholmur, In 1938-39, they started here. And then the mink started to escape. Got into the wild. And it's easy to get from land up to Brokey, so... and a lot of food to eat. » A m (interpreter O f)

The mink itself is just as dangerous for the eiders as the fox. It is also known for its habit to kill much more than what it needs to feed itself:

« It was a female without any pups... we collected some of the (dead) eider ducklings, in the beginning, because there was so many... and I took a picture of them. It was .. six hundred and nineteen » I m

Furthermore, it will scare eiders like the fox, and prevent them from going back to their colony. This is particularly true with islands, where farmers can not always be aware that a mink is in their colony:

« If you don't keep the population of the mink down, then it's very... very... few birds that are nesting there. Sometimes it's happened that the eider doesn't come to the land, to .. in the eider colony. They are just swimming up there, and don't come up. And I tell them (the farmers) to look for the mink. And then it's a mink in a den in the colony, in the middle of the colony... They (the eiders) don't go up when they see the mink always running around, so... If you take the mink they pfft, come and lay egg very quickly » I m

The mink is indeed a real problem for eider farmers. However, their activity is not structured against it as it is for the fox. The mink forages over a smaller territory, and will be less likely to “attack” a colony. What is important is to make sure that there is no mink settled in the colony before the eiders come:

« Always in April before the ducks come in, a guy comes, a farmer we know, with a mink dog, and looks everywhere. » L f

Traps are often used to neutralize minks, but dogs specially trained to hunt mink are also used a lot. Not many people own mink dogs, and they will usually help other eider farmers. At some point, minks were found in huge numbers:



Figure 13: American mink (source : commons.wikimedia.org)

« We went out with them in Brokey in 1991, and we got over... we had five days, and we got 225 minks there. In five days. 79 mink for one day, it's a record here in Iceland. And the next day we got 40 and third day we got 53 or something like that. » I m

Today mink figures are much lower. In this very same farm, it is only a few individuals every year that are caught by the farmers. In another farm in the north of Iceland, a similar conclusion was made:

« When the mink first come to Iceland, it was the biggest problem. Because... the count of them exploded... that's so many years ago, so I think the mink today, has learn to live as a wild animal here. So it's not hunting more than it's eating today. Which he has done first. He was hunting and hunting and... we found all dead fishes laying everywhere. This not as much as we used to. And also I think I have heard of some disease, that have been going into the mink, so it has kept it down. » G f

That way, the mink does not have a similar impact on eider farmers: it needs a supplementary effort prior to the nesting, instead of demanding a constant night watch. It will also affect many islands that are not too far away from the shore.

b) Access to the nest and visits

This criterion is much more subtle as it is multi-factorial, with physical and human aspects. It will mostly be expressed through the eider nests density and the accessibility of the colony.

The result of difference in nest density is well illustrated by the terms used by eider farmers themselves. In the cases where eiders are scattered and hard to find, the farmers will use the word *dúnleit*, that literally means “down search”, while talking about the harvest. This term will never be used in farms where nests are dense and easy to find. Then the expression *tína dúnn* or *dúntekja*

will be used. *Tína* is used for picking flowers, mushrooms or berries, it seems to literally mean “pick”: « *I think you would use that phrase about something there is a lot of. Like berries...* » (O f).

Dúntekja would mean « down collection » : , and can thus also refer to the quantity of down harvested: « *Dúntekja is when you have picked the down.* » (N m).

This difference in the term used exists only because of the density of eiders, either because they are scattered over a big area, or between many islands.

As a consequence, for some farmers, the question of finding the nests will rise. The female eiders have indeed a very discreet feather pattern, and often nest in sheltered places that are not visible from far away. This situation can be found in many islands of the Breiðafjörður bay, where the nests are scattered:

« You have to walk... sometimes you walk for ten, fifteen minutes and don't find the nest. And then one, with another one. But then you maybe walk again, for ten minutes and find another. So it's more scattered around. And we have to search for it all. But when the bird has left, you can often see the eiderdown, if it's very dry, and the weather is good, then it just goes out of the nest and you have to pick it up. You don't take it from the nest, it's scattered all around. Because maybe, there has not been a bird there for a few days. » O f

Not only the nests are scattered, they are also well hidden. They will be visible from only a short distance, and it is important to look for them in the right place:

« A m (interpreter : O f talking about him) : He knows exactly where they are. He usually goes where he thinks there is most of them. And lets the other walk where is less.

Question: But do you know because it was the same.. the year before, or because you see that it looks good for the eider.

*A m (interpreter O f): Both. Often he knows that there were a few... maybe two three nests... yeah, very often in similar places. And they are less on the hills but more in the *mýri*⁷. But then in the smaller islands they are all over the place. But maybe not... down by the sea. They are more up. Not the bottom, not up, but in the middle. Around the hills, a lot, in the slopes. Often when the hills meets the *mýri*. There is often some there. »*

7 : marsh

A mainland colony can also be very hard to harvest, particularly if it is scattered. However, as the access to the land in itself is very easy, it is possible to go locate the nest prior to the collection:

« You start to hike when they have started to make the nest. Because then they fly off straight away when you are coming. But when they are getting very near to hatching, then it just sits there, and you can nearly walk on them before they move. And then you can't find the nest. But when you have a small island, you just hike the whole island, that's not a problem because you won't have lost anything. But this is such a big area, so you have to hike all over to find the nest because it's so hard. So that's why we go first and hike over everything and put a sign on it » D f

Another problematic aspect that lowers the accessibility of the nests is of course the sea. At the same time, it prevents foxes, minks and humans to access it. Icelanders have always been working with the sea, and it is not unusual for them to own a small boat. However, not every islands is just as accessible:

« But it's very difficult to get to the island. There's this... you know, the sea can get very rough, you know, and there is the current, it's very, hard. And... few times I have been nearly drowned on the way so.... and once, rescued, you know. so... you must take care. » N m

Furthermore, some eider farms are made of a large number of islands, which makes it even more difficult: each island has to be visited, and navigating between them can be very dangerous:

« He knows all the ways around the islands. It's very dangerous and there is also the difference with Sellátur, there are no straumur - current ? - Yeah. The current in and out, it's so strong in there, in Brokey and the islands there. So it depends also on... when the tide is high and low, which islands we go to first and where we begin and, we have to be able to get home . » A m (interpret O f)

Additionally, some islands are particularly far from the coast, as it is the case in the many islands of Vestureyjar in Breiðafjörður. The farmers there have to spend a long time on the islands, in order to access every islands of the farm:

« It's more difficult out there when we have to go to some 260 islands, and you have to be on a boat, and there is a lot of people so we have three boats. We have to go between the islands, makes some three groups, normally. And we... it takes us, if we are so many people (up to 40), that... and it takes maybe five days to collect, if we have a good weather and .. in the islands you can get weather that, for one two three four five six

seven days or whatever, makes it not possible to go out and collect because we don't want to disturb the eider on the nest when it's raining and windy and all together. It's okay if it's a little wind, and sunny and warm weather. So... it can be difficult to.. collect out there, except if you are lucky with the weather. » I m

This testimony reminds us of the ever-changing Icelandic weather. While the actual work could be done in only one week, the bad weather does not allow them to visit the eiders at all time. In fact, no eider farmer would disturb his eiders in a bad weather, as such disturbance could bring the eider to abandon its nest:

« It's no good when you go when there is wind... the bird go and the cooling of the eggs is much more today, because the wind is blowing.[...] When we take the down, we always do it on a sunny day, and not very windy. That's to... reduce the egg cooling down as much as possible. Of course it's not good when she goes away » G f

Farmers managing an archipelago far from the coast will have to stay still during bad weather, waiting for better conditions to come, as they would not be able to do daily visits from the mainland.

c) Schematisation of the typology

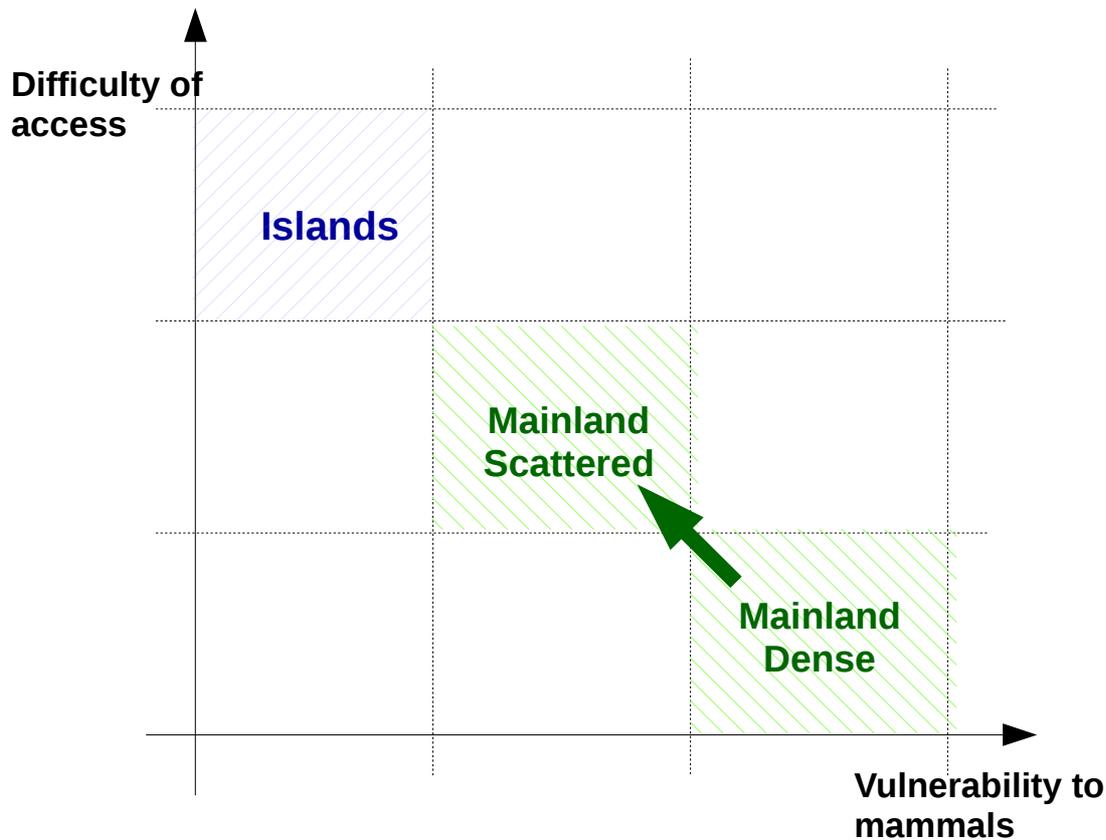


Figure 14: Effect of density and nest access

The first graph (Fig. 14) shows the consequences of the density of a colony, while locating the mainland colonies in the typology. When density of eider nests lowers, it is more difficult for terrestrial predators to find the nests, but this applies to eider farmers as well. As a consequence, we can see one criterion rising while the other lowers in a shifting transition. If this transition continues, it will bring us to island colonies, where the nests are out of reach of terrestrial animals. This brings to the next graph (Fig. 15), that shows us how humans manage to access these nests.

As we can see, most islands are free from terrestrial predators, but not all of them. However the accessibility for eider farmers is very variable and depends on human infrastructure as well as physical/geographic factors.

It was indeed explained previously that sailing to an island is not always easy. Furthermore, a farm can also include a large number of islands, and the farmer will lose a lot of time to get to each one of them, in the same way as when the nests are scattered over a big area.

However, humans are able to change the situation with for example a faster boat, or by living on the island itself. Each new and better infrastructure will lower the level of difficulty of access to the nests.

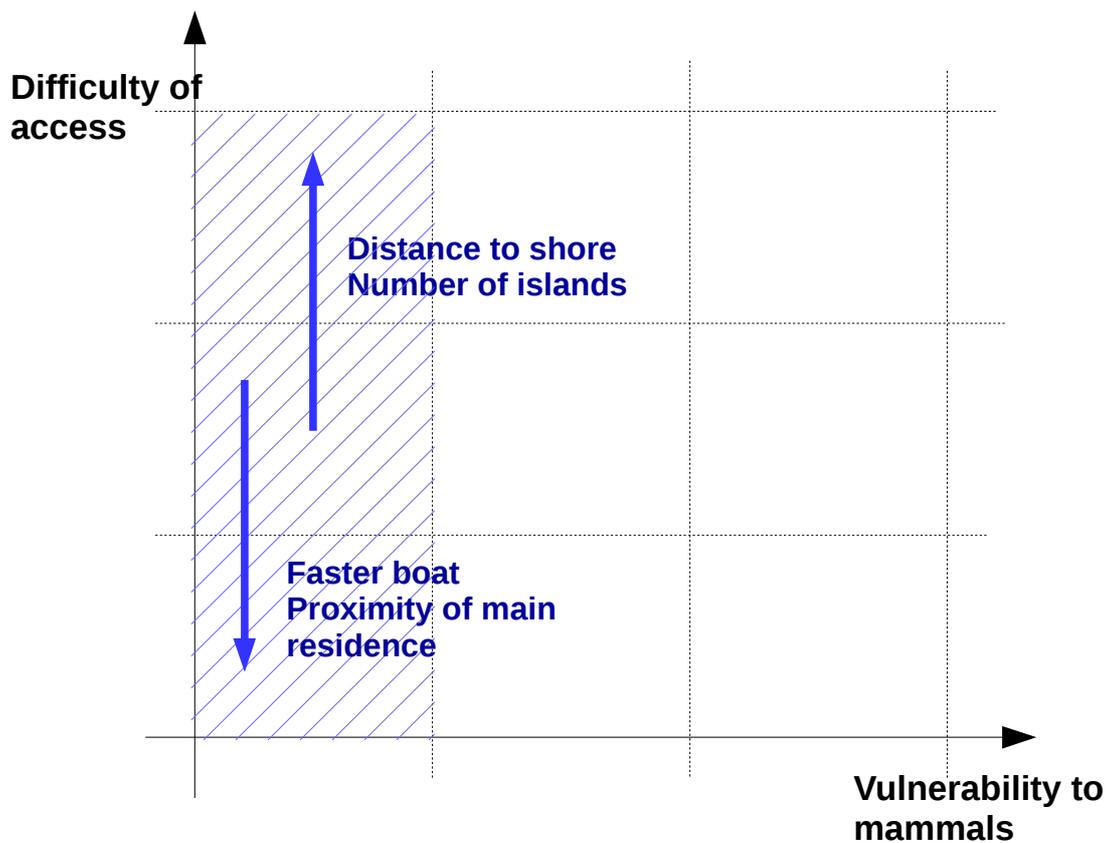


Figure 15: Accessing islands

Archipelago farms need for example to include a secondary residence, a house to accommodate the farmers. This will allow them to make quick visits to each islands, and without it the farm would not be exploitable. At last the third graph (Fig. 16) shows how the different possible landscapes fit into the typology, as well as the range of foxes and minks. Islands on a lake are quite commonly used as colonies in Iceland, but are quite vulnerable to the mink:

« Well, before, the colony was mostly in the... small islands in the lakes, you know, but when the mink came then the eider went around everywhere. It's both in the mainland and also in the small islands in the lake » D f

This situation is quite particular: the eiders left their usual place in the island to spread into a large mainland area.

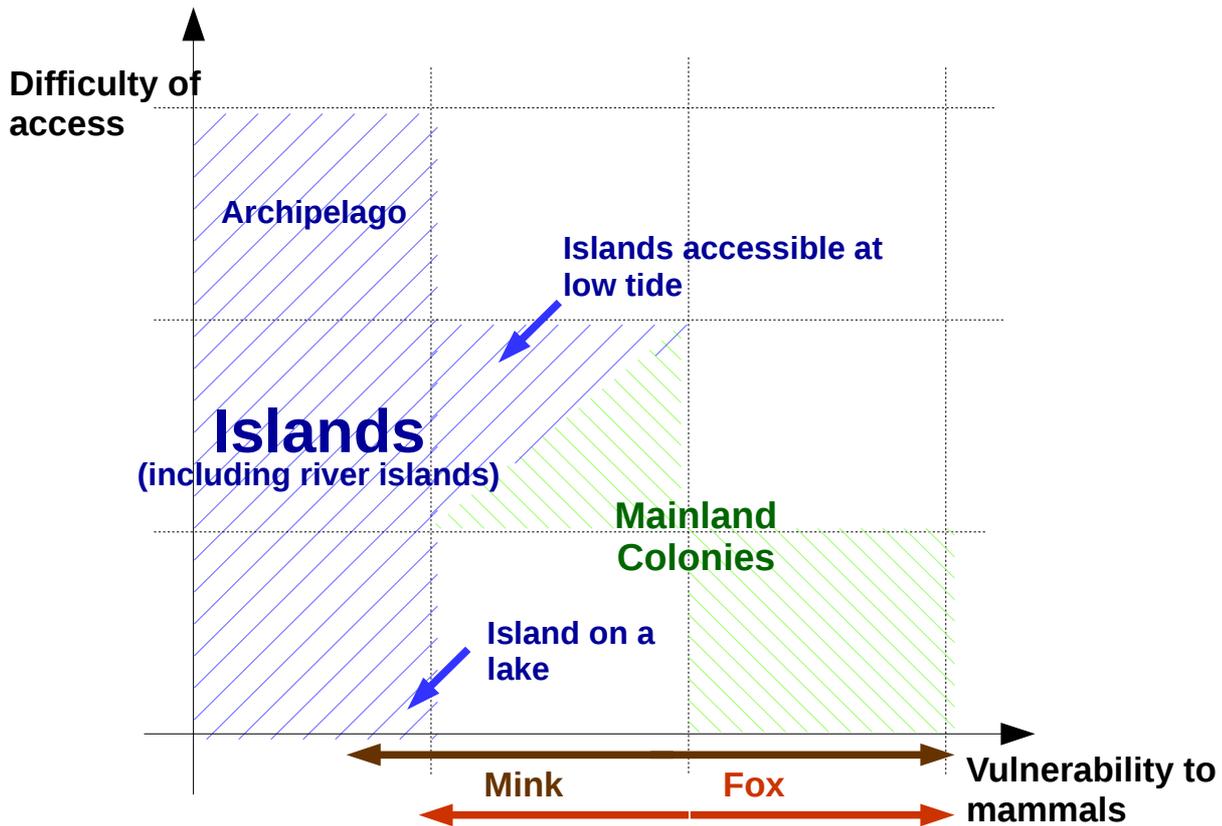


Figure 16: Different landscapes and vulnerabilities to mammals

It is still important to remember that some colonies will cover many types of landscapes: some farms have a colony on an island on a lake, but within a dense mainland colony located on its shores. In such a case, the farm will be considered as a mainland one, as it will impose its constraints.

2. Collecting the down

A clear consequence of this typology is that the accessibility constraints will define collecting strategies in the situations where they are the strongest. We have seen that in the extreme case of an archipelago the eider farmers can only go once to each nest, as the effort made to visit every single islands would not really be worth to go all over it a second time.

« And Brokey is here, and that's a very big area, that we have to... walk there. It takes a lot more time. In Selláttur we go at least two or three times over, on the land. But here we only go once. Yeah, very late in June. Because it takes us about a week or so to go over the whole area. And we are often, from five, six and to maybe 20 people, in Brokey. » O f

Collecting the down is even more difficult where the nests are scattered, and makes the harvest much more time demanding.

However, where the colony is more accessible, collecting the down can be made with lesser constraints. This freedom has left room for many strategies to appear, and three of them have been identified: taking the down once the ducklings are gone, taking the down bits by bits, or taking the down at once and replace it with hay while the eggs are still there.

The first approach seems to be the most traditional. It is also the most respectful one for the eiders, both female and ducklings, as they never have to be disturbed. It seems to still be done by some eider farmers, but this study mostly found farmers that had recently switched from this method to another: taking all the down during late incubation and put hay instead in the nest.

« When I was a little girl, my father, just took the down once. After the kolla left the nest. He just waited and then he picked the down. But now, we take the eiderdown before (the kolla leaves the nest). All the people who have an eider colony in Iceland today are taking the eiderdown before the young hatch. When we expect the first ones are coming, we pick up the eggs, take the down, and we put hay, and eggs again. It's okay. » H f

Indeed, waiting for each nest to hatch makes the collection difficult, as eiders will start at different times within the same colony (up to many weeks). Furthermore, once the eiders have left the nest, the down might be dispersed by gulls and blown away by the wind, and it is important to come and harvest it quickly:

« We only realized the last few years... that we could take the down and put hay instead. Well, before we thought that you should... you had to wait ! Until the eider was gone, to take the down. I have spent weeks... perhaps two or three weeks... going to see if one eider had finally left away ! [...] Life is much easier now. » K f



Figure 17 : The eggs are given a nice layer of grass, although the down looks much better

The method based on picking down many times on each nest seems to be quite traditional too, particularly in western Iceland. It allows the farmers to express their respect to the birds, as they can always leave some down in the nest:

« We start collecting the down maybe in the end of May, for the first time. And it takes about two days to cover the whole island. And we try to go every week. And to go to each nest for about three or four times. With a week apart, and we always, just take only a little bit of the down. We always leave that much, so she can cover the eggs when she leaves the nest. She leaves the nest maybe once a day.[...] Some people do that... only go once, to each nest, to take all the down... we don't like that. » R m

This method allows to collect easily the cleanest down, as the one at the bottom is much more dirty and packed, and thus this method will make the cleaning process easier.

There is however no clear general agreement on the efficiency of these techniques. The opinion of an eider farmer collecting the down at once in a large archipelago is that many factors are to be taken into account:

« We think we have not seen less eiderdown from each nest than from the farmers that goes three times from the nest. Even though we only take it once. [...] It might be better to go more often, if the weather is bad. If it's raining, then you get better down if you go more often. But if it lays in the nest and it's raining, maybe for a few days then it's probably not as good to go only once. » A m (interpreter O f)

Furthermore, a different aspect is brought up by farmers that replace the down with hay: there is indeed the fact that the female is fasting for a whole month and loses a lot of energy every times she has to flee her nest. Some eider farmers are therefore afraid to exhaust them if they come too often:

«L f : Did you see the film, two or three days ago. I don't get this, I don't know... I saw that in Vigur, they take... and many people do it... they take a little bit of down, three times. I don't get why it's better because he has to stand up three times, the duck, and ... you take a little bit so the down is not as warm. And then again a little bit, so it's less warm. Why is this better than taking all.. and put much hay for a good nest.

M m : And for the bird, it takes a lot of energy to stand up and go away and come back you know. I don't think... I think what we are doing is the best for the bird, you know. Just once.

L f : I don't know... I couldn't do it three times, so much work.... »

We can see in the last sentence that many factors can be considered in choosing the strategy. This farm was run by horse farmers that took two month of break from their main job to dedicate themselves to eider farming. That way, they were able to achieve all the work on the farm by themselves, while most eider farmers get help for the down picking.

The only interviewee of the study that would still take the down only after the departure of the eiders is quite particular. Being quite new to the activity (he had to start managing one 8 years ago), he chose the way that satisfied him the most !

“I really like to just wait until they are like gone. Because, well I tried it first, you know, to come and take... but they were just like... I didn't really like it. It was just... disturbing the bird and he was just shitting all over, this was so messy and smelly... so I just like to keep a close eye on them... wait until they go and then I just grab the nest. I, I think it's like ... it really kind of looks a lot better, you know... I'm really proud to tell the Japanese that I'm doing that. I'm not disturbing the bird, I just wait until they go and then I take it so... So it's like a very good relationship we have... yeah but of course, at the end of June, if there is like.. a few nests left... I can't be spending a lot of time on that so... and if the weather is good I just, go, like take them off, put some nice clean straw, and just take the nest.” F m

We can see here that the determining factor might have been this characteristic of female eiders: they most of the time leave very smelly feces on the eggs when they are flushed off their nest. This would deter the predators, and their smell is the result of the fasting the female undergoes during the whole nesting (McDougall & Milne, 1978).

Concerning all these differences, one possible hypothesis is as follows: these different strategies are not only transmitted culturally, but might be caused by a different perception of eider stress. Here is the testimony of an eider farmer comparing a dense island to a mainland farm:

« In... the north-east at my grandfather's you just picked... a small amount. You didn't take everything. Because it was so... because you'd attend it often, you know, and the ducks, they knew you and... but here on this island, the ducks are not used to people so... it's very delicate you know, that's the difference. Because... at my grandfather, the ducks, like, knew that people was okay. But here, people are a kind of foes, and they are scared of people. That's because... they are mostly left alone. » N m

Eiders in regularly visited colonies seem to be more used to humans. Consequently, if farmers try to visit their colony as little as possible, they might get a stronger fleeing and stress reaction from

eiders. On the contrary, those who are used to regularly visit their colony will not find it a problem as eiders won't be too scared. This dimension of habituation can be observed by most eider farmers:

« Steini's dad he used to drive around right in the area, so they are used to people traffic, in some way. » G f

Habituation to gunshots can also be done:

« We cannot start shooting here [...] We start over there for one week, ten days, and then... we start to walk closer without shooting, just letting them know we are here and, then we start shooting here» M m

In conclusion, some eider farms have to design their collection process according to these accessibility constraints, while the accessible farms have more freedom and will choose according to cultural or local ecological factors.

3. Social implications: three opposed cases within the typology

Eider farming will therefore represent very different experiences for every farmer. We will now review three completely different social aspects: a first approach on the down harvest, followed by a specific case of mainland farmers fighting the fox, and a very particular inhabited island: Vigur.

a) The nice time of collection

First of all, a quite persistent aspect of eider farming could be called “the collection party”, although none of the interviewees did present it that way. In some island-farms in Breiðafjörður bay, which are made of numerous islands, a much bigger amount of workforce is needed to find all the nests. Family and friends will then come together to collect the down:

“I always look forward to the weekend in Brokey. And I think all of us do, because, even though you're working from early in the morning until the evening, you get a different kind of energy, from the nature, yeah. [...] You are kind of cut out from the modern life... going there to the country and with the birds and the sheep and we love it. It's really nice. And even though the weather is not good, we are all together, the family... and sitting together, we play cards in the evenings, and yeah... Eat good food. It's really nice. So we... all of us love to go there.” O f

We can see that the harvest has a special place in these eider farmers lives: it is a social event, as well as a way to go back to their roots in this traditional way of life. For many eider farmers, this period of time does not even give them an income. It is the pleasure to participate that drives them:

« For twenty one day we don't get paid from anything you know. Anyway, all the eider down that we get, from there, all the money we get, goes just into the island. We fix the house or something like that. We don't get paid for it. So it pays himself, the eiderdown pays everything. The food for the people. We get a lot of people to come there, without any money to pay to do this work. Everybody like this, to be outside and so. » I m

In that way, eider farming is not a profession for them, but rather some intense holiday season dedicated to a collective hobby. We can also find this “pleasure” dimension in smaller farms, although they might not include a holiday stay:

“So mostly it's me and one of my friend, she is living here. She always wants to go. She has a contract with my father, that she could go to the islands anytime. And it's always about four or five of us that go to the colony” U f

Down collecting can also represent an important instruction for the younger generation:

« The child usually when they are small they just go with you, and they don't go alone and pick the nest, but they learn how to take eggs up carefully and put them aside, not to break it. And how you take, take the eider poop off, yeah... you use the grass to wipe it off and take the down... Put some grass underneath, the eggs back carefully in, and then the grass on top and so... They learn it very early, and... and I think it's a privilege to grow up ... so close to the nature. Yeah, I think so. And respecting... also. You learn a lot of respect for all the birds and life. And often the children they find... sometimes you find a dead duckling or dead bird and... the children they... and when I was a child we did it also : we took the bird and we buried it and put a cross on it. We had that, a funeral. Well that's a part learning about life and death I guess. And also when you see the stronger birds eating the eggs and picking up the ducklings sometimes yeah... So that... it's a big thing to learn. » O f

Theses testimonies show how important the social dimension of down harvesting is for eider farmers. While it is indeed the incredible price of eiderdown that allows eider farmers to finance this outdoor activity, eider farming here seems to be more of a holiday than a job.

b) The eider farmers of the Grand General Council in the West Fjords

A very interesting social interaction around eider farming that I came across during my study was the Grand General Council in the West Fjords. It gathers neighboring eider farmers around Dýrafjordur, who guards their colony against the Arctic fox during the whole season. What is particular with these people is the peculiar habits and rituals they have developed: they gather at the

end of each watch in the morning, to share about their night, and recite one poem written during the watch.

This association has been followed by a visual anthropologist, Haukur Sigurðsson (2012) who made the film *Skolliales* about them along with his thesis in Visual anthropology. They have invented a full protocol, as well as diplomas, all around the watch for the fox, and more than 3000 poems have been thoroughly collected and archived by their leader, Valdimar H. Gislason, who hosts the Grand General Council meetings. Those gatherings are an occasion to meet around coffee and pancakes, and to exchange about the night watch. This exchange is materialized with the poem that each watcher reads out loud.

I had the privilege of sharing a watch with Valdimar, although without attending a meeting as it was too late in June, and will share the poem he wrote that night.

Í Geir Jóni áðan galt við hátt
glumdi í fjallasalnum.
Lítt mun stoða að leita um sátt
uns liggur hann í valnum.
V.H.G.
17.06.16

From Geir Jon, a loud call came
echoing in the mountain hall.
He will not be our friend
until we see him fall

Translation: Magnús Sigurðsson and Gilles Chen
09.08.16

Geir Jón (Geir Jóni in dative form) is the name given to one particular fox. Geir Jón is actually the name of a very well known policeman in Iceland, known for his outstanding height and size. Baptizing a fox this way allows grasping his features, and shows that these farmers give a certain respect to the fox, by giving him a human name. Each one of the fox, who are usually easy to recognize for these experienced hunters, receive a name that are used in conversation and poems.

The first two verses give the atmosphere of the watch: we are at the bottom of a deep fjord, with mountains all around us. We heard the fox three times this night, coming from the top of the closest mountain. The fox call is a piercing repeated bark, that can be heard from very far away, especially in



Figure 18: Valdimar with the trophy of Kusi : his picture and footprints

the peaceful atmosphere of the night. The second part allows us to understand an aspect of the relationship of the farmer with the fox: he is thinking about being friend with the fox, but he knows that is impossible. The last verse is quite particular: this turn of phrase is a classic historical one. Valnum can refer, (it is in the dative definite form), to a battlefield after the fight: it includes the brave warriors fallen in war. This shows even more that the fox has a status close to a human, and at least the one of a rival to be respected. It also shows a very romantic vision, if not epic, of these night watches.

Those poems represent a very interesting and unique entry to the world of eider farmers, and deserve to be investigated much further⁸.

A particularly famous fox was Kusi: more than a hundred poems were written about him, and it took « 18 men with nearly 30 weapons over two years to catch him » (Sigurðsson, 2012).

This relationship with the fox is quite particular, but not unique in Iceland. There are indeed a few famous example of fox hunters writing poetry books, inspired by their relationship to nature. However, the majority of farmers, of eider or sheep, which are the other resource threatened by the fox, will have a much more radical approach, and will see the fox as a pest to be fought.

c) Vigur island

We will now present a particular case that is not very much represented, but very interesting nonetheless. The island of Vigur is sort of a “natural benefits farm” that adapted quite well to the modern world:

« There are about three, you know... businesses : it's the eider picking, the puffin and you know, the tourist thing. » Sm

This island was an incredible *hlunnindajörð*, and was called the « green pearl» of the fjord, because of the productivity of the grass that covers it compared to the mountains of the impressive fjord complex surrounding it.



Figure 19: Ragnheiður Baldursdóttir was raised on Vigur

8 : In appendix 2 are compiled eight of Valdimar's poems in their original form, the previous included, along with a literal translation in English by Magnús Sigurðsson and a personal version.

Today, this island is still inhabited thanks to two very rich natural resources: a puffin colony « 18 000 puffins, it's a very big puffin colony » (R m), as well as an impressive eider colony :

« I know one year, it was probably in about 1973 or 4, it went up to 84 kilos. So it can... this is a lot. 84x60 is about 5000 nests. It's about 60 nests to get one kilo. There's no guarantee how much it will be every year. » R m



Figure 20: Baldur Björnsson

The number of nests was more around 3000 the previous year (2015) and these two resources, which are harvested at the end of spring, financed the human life on the island, along with the tourism. Those tourists come for the biodiversity of the island, its amazing panoramic view as well as the historical heritage of this traditional island farm. The down collection is done by the members of the family that acquired the property of their father, as well as one of their children, the only one interested by eider: « you know, I'm a bit weird, wanting to learn this. » (S m). It is traditionally done in many

times, with picking only a part of the down every week in each nest.

4. Different experiences

a) Results of the typology

We have seen how the diversity of eider farming was created, and to what extent it could affect eider farmers. The following graph (Fig. 22) put back in perspective the different identified types on the two axes of constraints.

As we mentioned it before, eider farmers can be grouped into “collectors” who invest a lot to reach the nests, as opposed to the others who have a much stronger accessibility. “Collectors” will be organized around their travels, while the latter will be free to define their approach. Through that perspective, we could say that eider farming on accessible islands is closer to eider farming in mainland colonies than eider farming in the least accessible islands.

Amongst the “collectors” are two subgroups: “searchers”, whose challenge is to find eiders scattered over a large area, be it on one piece of land or amongst hundreds of islands. Then the small category of “sailors” relate to when colonies are far away from a their residence, but dense: one day trip from the mainland is enough to cover the whole area.

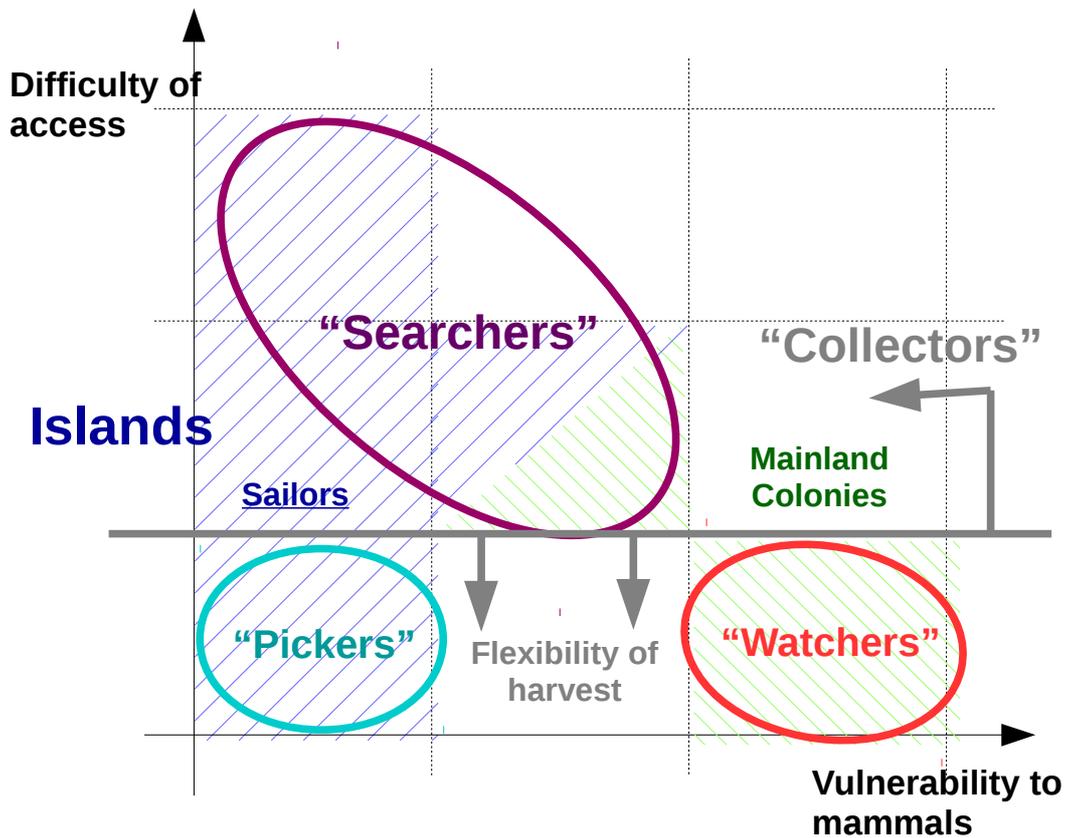


Figure 21: Types of farms depending on the two chosen factors

As for high accessibility farms, the presence of the arctic fox will of course completely change the experience of the mainland eider farmers, which brings the type “watchers” as opposed to “pickers”, who have only to go pick the down.

b) Associated knowledges

Different time and energy investments induce variable, localized experiences and knowledges, as it was illustrated by the previous testimonies.

For example, the “searchers” will have a lot of interesting information concerning eider distribution with a group of islands, or at a smaller scale, in their nest site selection. Conversely, farmers having a very dense colony will assess less this dimension, as for them, the eiders will just nest all over their land.

While nest site selection in less human-affected environments is a particularly interesting subject for fundamental ecology, another striking aspect is found especially in farmers with dense and accessible colonies, who will have a lot of knowledge about the behavior of eiders. Such behaviors can come from the interaction between the farmer and the duck when the former visits the nest:

« They probably communicate with the sound, I think so. And, they show affection to their little ducklings so... we have seen that ! Yeah... When you come to the nest and you want to pick up the down, usually the bird... if you talk to the bird, I often do that, use a soothing voice. When you approach the nest and the bird is laying there and if you use a calm voice then the bird just... you can almost pat it on the nest, sometimes you can touch it on the nest. If you talk calmly to the bird, you don't scare it off. But if it get scared, then it poops in the nest.[...] I was actually asking my husband if he did this also. Usually he is not at the same spot as I am. But he just.... he doesn't like this. But I.. think that if I speak to them in a softer voice, they don't poop in the nest as much. » O f

The husband mentioned in the previous testimony actually grew up within a farm where eiders are very scattered, and it seems that he did not develop the same sensibility to exchanging with eiders. Having been with them for the last visit of Sellátur island, where the down is picked over a few visits, I noticed that the husband liked more to walk across the island looking for eiders than taking care of a nest, task that he would leave to his wife if she was around.

Another technique was reported to calm eiders, this time without speaking:

« It's you.... say the same thing as the male. Similar, as the male. Or the bird. So you are just saying, the voice he uses. So the calm thing, and you need to... that's so so funny. You need to be exactly calm, in your voice, so it works. If there is a little bit of stress, or if the bird feels that you are hurrying it, it will shit. [...] If I use this, in roundabout 80% or 90% of times, of... times I use it, it works and the bird doesn't shit. Usually just stand up, walk a little bit off, and sit down and wait. » Q m



Figure 22: "This one is always angry" (S m)

The aspect of stress is quite important for eider farmers, and is a significant dimension of the management of a dense colony. Visiting a colony will indeed make the females flee, as well as the ducklings if they have already hatched:

« You actually see, if the eggs are only a little bit broken, with perhaps one hole in it, you can do everything and she just wait somewhere, and go back when you are finished

with the nest. And then that's completely different, how she behave, in a situation like that. But when there are babies, she ... is of course more stressed about going away, and then she very often go a very little bit away, and you do the nest, and you put a lot of hay... on the top of the babies. Not a lot but like, if it's not, then they just go out, but if they feel like as when the mom are on the top, then they stay down. And then when you are finished you watch the mom when she comes back, she very often come back doing "popopopopo". And that's just like "bling!" by the babies : they go all up from the nest and follow the mom and then she starts going down to the lake. But she wouldn't do it if all the babies were wet. Only if somebody is dry. » G f

Some eider farmers even say that they understand the eiders:

« I think I know when they are at ease. And I think I know when they are stressed. I hear that. And I think I know when they are confused, or irritable. But... the sound is maybe similar... but the frequency, and... the volume... and the length, you see, varies. And also, you know, the... the eider has a special... special... language with the ducklings. To call them. Of course. » N m

Furthermore, many eider farmers like to say that they recognize some females, that come back every year to the same nest. Although they do not use markings to prove it, it seems that it's thanks to their behavior than some of them can be recognized:

« My mother told be the same eider had been there, from when she was a child and until she was middle-aged or something. It was the same bird, she was very sure about it. She didn't mark it or anything, she just knew her and she was very... tame... she could pat her and... and she said " I saw her get older", the feathers get grey when she gets older, she said. She gave her a name, even. She said she waited every year until she was there. "Oh well, she is back, then it's okay". Then she was happy. And then suddenly she stopped coming. And then said, many years, there were not any other bird, eider bird, that came in the same place... usually it happens. They go into, not always in the same. They do it sometimes but not always. But this one did, for two or three decades, three or four decades maybe... » P f

The next testimony mentions as well this ability to recognize individuals from the behavior, but brings up a new aspect:

« Some farmers... eider farmers they... they... look at some birds as persons because they know they can spot them out, you know, and they know their special behaviors... because they are all, you know. Like individuals, like me and you. » N m

The existence of personalities of eiders has been reported by eider farmers many times, but would often concern the individuals closer to the houses. The study was not able to elaborate much on this dimension and will leave future research to investigate it further.

IV. Another socioecological dimension: the avian community

The previously suggested typology presents the different types of eider farms through Iceland, while explaining more precisely how this diversity is produced, through analyzing the main factors of influence.

However, the diversity in eider farming practices is far from being fully explained with only this typology. In fact, another very important dimension is the ecological pressure from other bird species, which will vary a lot among colonies. The answers of eider farmers will vary depending on cultural factors, and this whole phenomenon will bring a lot of diversity in the experiences lived through eider farming.

1. *Vargur* : the enemies

A concept commonly used by eider farmers, that has not been presented yet is *Vargur*.

Let us see first how eider farmers would explain it: « Vargur is a predator. We use that word for the mink, for the fox... seagull, kjói⁹, there are a lot of birds that... Vargur, yeah that's the bird that attacks the eider bird. Or does something harmful... » O f

Or:

« Vargur is bad things.. it's like the mink, or the fox or the birds, that eat the eggs. Vargur is something that is bad for the eider. Something that would steal from the eider... it's vargur. It could be one or all of these.... animals » D f



Figure 23: A Svartbakur grabs an eider duckling (source : commons.wikimedia.org)

Vargur covers every species identified as being a threat to eiders. The most commonly brought up are the Arctic fox, the American mink, the Common raven (*Corvus corax*), big species of gulls, especially the Great black-backed gull (*Larus marinus*), *svartbakur* in Icelandic (“black back”). The White-tailed eagle (*Haliaeetus albicilla*) has a particular status, as it is now protected, after a period of hunting. Some other species are reported to cause harm to eiders, as the Arctic skua (*Stercorarius*

9: Arctic skua

parasiticus), the Great skua (*Stercorarius skua*), the Gyr falcon (*Falco rusticolus*), or even the Black-headed gull (*Larus ridibundus*).



Figure 24: Eider egg predated by a skua just moments before

Vargur was quite hard to translate in English for eider farmers. The terms that have been used throughout the investigation as substitutes in English were : « *bad birds* » (F m), « *bad things* » (D f), « *wrong birds* » (G f), « *almost the enemy* » (O f), « *the bad ones* » (M m). This word is clearly pejorative, and shows that eider farmers take this matter personally, putting the predators in the “bad guys” side.

The use of such an expressive word shows clearly their position that can be explained by the

loss induced, but not only:

« If there's some eiders that are killed, it's more than just that you lose the money... but it's also that you feel bad in your heart. Because you really... it's like good birds, you know, gentle birds and they are very nice birds, beautiful birds... and if they get killed, it's just... it's your fault. You were somewhere sleeping or you were not paying attention. » F m

The basis of the work of eider farmers is to take care of the breeding success of their eiders, and seeing little eider ducklings being eaten by seagulls is a tough sight, made even worse by their photogenic looks.

« When there are some of the big seagulls, svartbakur, they are, they are like, yeah. Bad birds, really, they eat, eat a lot of the, of the young ones, the little ones. So hmm, I try to like keep them away as much as I possibly can. It's very hard for you to see it when the little ones are just swimming and, they (the gulls) are like swooping down and grabbing their lunch, up until they can actually like eat twenty or thirty a day... I'm not sure if it's true, but they... they can eat quite a lot » F m



Figure 25: Eider female and ducklings by their nest

A more graphic description shares the disarray of eider farmers:

A more graphic description shares the disarray of eider farmers:

« Sometimes, you know, the seagulls, are on the peak of the island, and they pick up a duckling by their foot... throw them into the air and open their mouth and it falls into it. Yeah... into the mouth. That's terrible. » N m

Every species known to attack the eider will be classified as *vargur*. However, it will not exactly bring the same views between eider farmers.

For example, the White-tailed eagle, who is today a protected species, is not welcomed the same way by all farmers:

« Also we have the White-tailed eagle. But he is protected, so we can't do anything about that. He has done really bad things, actually, to one of our islands » Q m

But also:

« Vargur, yeah, the other people call him vargur. We call him Eagle. He is a friend of us. [...]. Gulls or Ravens, that's vargur, from us. You see. The raven, if he came in the island, he'd be many together, and they eat and eat the eggs and they are terrible. The gull, he takes the youngsters when it's going from the nest to the sea.... they are not as bad as the raven. » C f

Furthermore, some eider farmers will not systematically shoot bird species that they call *vargur*. For some, they consider their relatively low impact is not worth shooting on them:

« We don't shoot... because of the peace in there... you don't like to disturb this peace, because the peace is so good there, and you feel it, you feel relaxed ... you know, it's so good to be there. And we are both like that. We love this place ! » C f

However, all eider farmers, even the less enthusiastic to neutralize animals, will take necessary action against a few unacceptable visits: foxes, minks, or the phenomenon of raven flocks, which will be explained in the following chapter.

2. Example of the Common raven

The Common raven is the biggest corvid, and the only present in Iceland, with a wingspan of 117 cm and weighting more than one kilogram in average. It breeds of course every year, a bit earlier than the eiders, which is a problem for eider farmers : *« his chicks are out from the eggs when the eiders starts laying theirs. So that's good food for the young ravens » (U f).*

Predation of eider nests by ravens is commonly observed by eider farmers, and they are seen as one of the main predators. Ravens are of course able to reach island colonies, but it will not affect every farm in the same way.

Local populations can be very different. For instance, this eider farm close to a town was under strong raven pressure because of human activities:

“Yeah we have this... place, especially this place. A big slaughterhouse, the white one there, is pumping out the blood into the sea. So the ravens and the other ones, the big white ones (seagulls) they... there is always coming a lot of meat and fat with blood into the sea, so they are really fat there. And... four kilometers away from here, there was a.. garbage dump... where all the garbage from the town came to one farm and it's just four kilometres away.” M m

The complexity of the ravens goes far more than this. Indeed, two different situations are known to eider farmers. The Raven can either be a territorial pair breeding on a nest, or a flock of younger birds. Those two situations will not affect eiders the same way, and apparently even interacts:

« R m: And the raven can be a problem, but he usually is not...

S m : he always goes for the eggs

R m : yeah he goes for the eggs. But usually there are always... there's a raven couple, that nests on the island, only two ravens, a couple, and they actually...

S m: they protect the island from the other ravens

R m : they protect, they defend the island, from the other ravens. If something happens to them... their nest is destroyed or so... they just go away and then everything fills up with ravens. Yeah. And then they are very hard to deal with, to shoot, because they are very smart. »



Figure 26: A Common raven visits an island full of eiders (Árni Ásgeirsson)

Numerous eider farmers maintain a raven nest on their farm for this reason, which has actually been independently assessed in scientific research (Avery et al, 1995). This knowledge seems to be ancient enough to have been integrated in tradition:

« Most of these farmers just take the young one from the ravens except one. And they are old and they believe in the old story that god help people who is helping the raven. It's an old story that ... they get paid for the good thing you do to the raven. » I m

The custom of keeping only one young in the nest allows minimizing food intake by ravens while conserving it. Without offspring, the couple would leave and stop defending the area. The visit of a flock of young is indeed a disastrous event, compared to the impact of a local pair:

«There are like, around most farms, there is... just a pair of ravens living there. And they should basically be left alone. Because they own the whole area. And it's just two birds and they very rarely do any damage. They just take a few eggs. And it's just so little that it doesn't matter, but ... sometimes the young ravens, they come in like, big flocks. And then... all hell breaks lose. And that can be a very big problem if they come like twenty or thirty together, it's like... a motorcycle gang. » F m

Some eider farmers however will not accept raven pairs, and destroy them systematically. In fact, the impact of such a pair could be very high:

« This is maybe not common, but it happened when I was on this farm... I thought it was a fox who was going to one colony there, because all the eggs were taken away. Every day. When I'd come in the day there was eiderdown in the nest but no egg. And unlike the next colony, whose (nests) were completely full (with eggs)... they had laid eggs on that colony. There were maybe two hundred eiders nesting in there normally, and we found maybe five nest with eggs. [...] So I went into the hunting house (at night).. And.. then, I saw a raven coming flying. And he went down, and started to walk between the nests. Then he sat down, and took all the hay... went between the nest, looking for eggs. Then I saw him taking one egg up, and he started to fly up, he was a little bit far away from me.. so I start shooting at him and it was too far away, but he fell down. But he could get all the way up to the top of the mountain there. It's very close to the mountain, close to the sea. So I went to the top there and to the nest and pff... it was like a car who is bringing eggs to the shop and had an accident. Because they were eggs all over. And both greylag goose eggs and oystercatcher eggs and fulmar eggs then eider eggs, all over. » I m

Furthermore, ravens are well-known for hiding eggs, and can thus steal many per visit to an eider colony.

« (The raven) would fly away and make a hole, put eggs inside, get the next one, hide it also, take the last one and bring it home. » I m

All in all, those two situations are clearly identified by eider farmers: one couple, or a flock of youngsters. The impact of those flocks is unanimously recognized, and described as « *terrible* », « *a disaster* », « *all hell breaks lose* » and always bring farmers to act against them. Concerning territorial pairs, they are sometimes tolerated or even supported, in particular against the other ravens, but eider farmers do not all agree on their impact. A few farmers have also described what seemed to be the worst for a colony: when a flock of raven follows an eagle:

« And where you have an eagle and the raven group, it's a problem. Then the eiders fly away, even if the eagle is not interested in... just maybe one eider. But when you have a group of raven following them, like you see, it's a big black cloud, following them, and they go down and pick all the eggs out... I cannot say they work together, anyway, like they use the eagle to scare away the eiders... so people doesn't like to have ...lot of farmer doesn't like to have eagle that are.. the young ones, who just sit there on some island and no eider like to come close. But it can happen in some places that you have eagle nesting on some island and it can be eider nesting around. So that's ... yeah some talk about problem with eagles when they have ravens around. » I m

We can see that ecological pressure is quite a complex matter, and we will approach another side of it, that has already been mentioned with gulls.

3. Managing the colonial birds

It is very important to remember that many other bird species can nest within or right by the eider colony. These species can also have an impact, which represent an important subject for the eider farmers. Although they cannot all spend the whole time on the colony, the eider farmers will know about the behavior of those species, and will sometimes bring up conclusions of their own, for instance on the weather:

« They are more aggressive with a lot of wind. When it's all calm there's always nothing. » L f

This observation concerning ravens came out as well from another farmer about seagulls, who thought that was because under bad weather, food resources from the sea were not available any more, and thus they would fall back on eider nests.

Eider farmers will also witness radical changes in population or appearance of a new species:

« We have one more bird that's new... that's.... skúmur (Great skua), yeah. It's starting to lay nest in Öxafjörður, and that's new. It was not before. Never before, but now it comes flying by the coast and it even eats æðarkollur (eiders females). » D f

The way these species are seen and handled will vary greatly between farms, and we will try to illustrate some more this important dimension of eider farming.

The seagulls form a group species that are particularly visible, numerous, and potentially problematic. Their impact on eiders has already been quite visible through the precedent testimonies: it is mostly predation of a large number of young eider ducklings. A scientific survey once noted a predation of eider ducklings up to 99% in a colony (Swennen, 1989).

While in some cases gulls represent the main threat for eider farmers, it can also happen that they wouldn't be considered as a problem, even in large numbers:

« So it's... there is a difference in colonies, if you can call it like that. And I think that the bird life is also different between Sellátur and Brokey. There, in Brokey there is a lot of the seagulls, svartbakur, and I'm not used to them. In Sellátur, the svartbakur is almost the enemy. But in Brokey it's just a part of the whole thing. Because there is a lot of it. In Brokey we start there a bit earlier, then we go and search for the seagull eggs. They are eaten and my husband's family had been selling the eggs for many years. Because there is a lot of that bird there. And they say that the seagull.. and that is very interesting for me to see the, what can I say, to see seagulls and the eider together, almost. [...] The svartbakur usually nests on top of the hills. And you can see that the grass gets very green very early on the spring because of they leave the droppings there. And the eider just goes, if the hill is like this, then the eider is in the outer perimeter, if you can say that. And it's almost like they, in some ways they get protection from the eagle, thanks to the seagulls. Because the seagulls get very protective for their nests. And maybe the eider gets some of that protection. Yeah. It's very interesting. But when we see the seagulls in Sellátur... when I was a child, my grandfather or some of the men usually just got a gun to try to shoot him down. So that's very different... You always learn something new. » O f

The first interesting dimension mentioned is that those farmers harvest the eggs of these gulls, *svartbakur*, “a delicacy”, and thus manage the population, but also find an importance in it. And considering their acknowledged protection on eiders, they became an acceptable species. Gulls are indeed particularly aggressive around their nesting ground and being one of the biggest bird, they attack just any other bird species. A scientific paper has even shown that gulls in an eider colony even repelled hooded crows (Götmark & Ahlung, 1988). However, concluding on a positive impact of the presence of seagulls is not shared by every eider farmer:

« Some farmer that I came to had ... black-backed gulls nesting in the same island as the eiders and they believed it would be good because... the black-backed gull scare away the raven... but they take a toll and sometimes it goes out of hand, if you can say so. They eat, like I said.. if it's not enough food then it just take whatever close by. » I m

In general, it is common that eider farmers destroy only the gull eggs that they will find in their colony: this is much easier than shooting the adults. Furthermore, like for the ravens, it will reduce the number of young to feed, and thus predation on eider ducklings.

Great black-backed gulls are not the only species of gulls threatening the eiders, although it is easier for them, as the largest gull species. The Black-headed gull, *hettumáfur* in Icelandic, has been seen eating some eider eggs and ducklings, but is rarely mentioned as a problem:

« There is one more... you know hettumáfur, with a black head. And some people say, they told me I have to shoot them, then take their eggs as they are eating the young ones and the eggs. [...] But I don't shoot them, we don't shoot them. They are nesting, they have not started now but they are nesting on the other side of the fence, a lot of them, and I have never seen them do something to the eiders or the eggs, but when a raven come, or a big bird, they are very aggressive, and to the kjói, and they come and I like to have them here, cause they protect more than damage I think » L f

Greylag geese are also present:

« Six, seven, eight couples of geese or ten I don't know, there are a lot of them here. And they are.. when a raven come, or a big bird or something... they are attacking him, so it's good to have them. [...] Some people told me it's not good to have geese within the colony but I can't see why. » L f

The last two birds are not always appreciated by eider farmers, as their aggressiveness can be too much. A general agreement however is about the Arctic tern, every eider farmer likes it:

« There are some other birds who, you know, who can scare the falcon or the eagle. It's called the arctic tern. It's very small but they are very many, and they are very aggressive. If you go near their nest it just attacks you. And that frustrates the eagle, and falcon and it goes away. » S m

The Arctic tern is indeed very aggressive, and is not afraid to attack humans to scare them, or even hitting them sometimes. However, it doesn't seem that eiders themselves like it, or choose to nest near to them:

« ...not all of the eiders, because they can make a ... they scream, when they see something they don't like. But yeah... in the islands, we have like, two islands that have Arctic terns in it. And... we always have like, the same amount of eiders in it. » Q f

A personal observation allowed me to see that terns can also attack eiders, although they are peaceful and harmless. While it is very common to find a tern colony coming along and eider colony, it seems that they would choose the place rather for similar reasons: absence of predators and a direct easy access to the sea.

4. Tendencies from guarantee to optimization

The previous part was able to document the different positions of eider farmers as well as their actions towards the bird community, which is extremely rich with interspecific interactions.

a) Polarized approaches

It seems indeed that eider farmers tend towards two poles:

_a pole “guarantor”, that leaves most of the natural dynamics, in order to have less work. This pole seems more traditional. They will however always make sure that their colony is protected against the unacceptable: impacts of fox, mink or raven flocks.

« we don't like to have shotguns in the island, that's not good. But if it's necessary, we do. » C f

_a pole « optimizer », that aims to maximize the nesting success every year, through a heavier investment of work and energy:

« We are trying to kill as many of the big gulls as we can because when the young eiders come, they eat them, they take em all. There is a lot of big ones, here, too much. » M m

These poles are only tendencies, that will affect sometimes only a part of the eider farmers practices. For instance, even though they would want to do « *everything to protect the birds* » (L f), protecting the eiders may not be possible:

« I often think that if we would live by sea, we would have more opportunities to.... to watch the bird and maybe keep track of it, because there are so many dangers when.... right after the eggs hatches, they go to the sea. And there, we don't they are out of our property, so we can't protect them there. » Y f (river island colony)

And while there is always a little bit of an “optimizer” in every eider farmer, it is clear that some of them will completely follow this approach as opposed to the ones that will only do what needs only a little amount of energy. For example, concerning shooting predators on their island this eider farmer said:

« We don't because of the peace in there... you don't like to disturb this peace [...] But we have gulls in the island, and if we see its egg we put a little hole in it. Just to.... yeah destroy it. » C f

b) Optimizing the colony by changing the landscape

This optimization does not only exist through predator control. Many other practices exist, that are neither generalized nor fundamental. Some eider farmers maximize the eider reproduction by raising some ducklings, but this takes a lot of effort:

« It's a lot of work, and... if we would have here... two children, we could do it, and it would be the work for the children, but it's, you know, an awful lot of work to ... to grow them. But it's very simple to do it and.. and they grow twice as fast as in the nature, when you feed them. » M m



Figure 27: A few eider farmers raise some ducklings

Ducklings are taken before or after hatching. Like wild ones, they need to be brought to the sea and showed where to forage. They are also fed with industrial duck food, for a few weeks, before they start leaving by themselves. This work will also represent a big financial investment:

« We are buying, so much food for the eiders now, that it costs the same as the food for all the people that is working there. And we can be.... we are sometimes up to 40. » I m



Figure 28: Artificial shelters on an artificial island, on an artificial lake

studied more in order to fully understand it.

Such a hard work has to be done before the season, as it is not possible to work within a nesting colony, and therefore allow the farmer to invest himself more in eider farming.

“We would like to have the eider ducks to make nests in the small lands in the lakes as they did (40 years before). Because that is easier, and we get better quality, so we go in the spring, and the beginning of May, depending on how the weather is. And we clean the nest and put a dry hay inside. To try to have them to choose to be there, you know, when... and then we go just home again, to Reykjavik, and then we go again in beginning of June.” D f

In this farm, the strategy was to optimize as much as possible a few very accessible lake islets, in order to develop and perpetuate their populations, as the other parts of the colony were scattered and less accessible in the surrounding area.

A quite particular way of creating shelters is by using old tires:

“Maybe thirty years ago, we tried something that had been used in the West fjords, sometimes. They take the rubber from the wheel, of a car, and put it in the colony... so me and my husband thought that was a good idea and we got a lot of used rubber and put it there. But they didn't like it the eider there. They didn't use it. It was I think, four

five years, we let it lay down there... and one eider got... only one time we found an eider in those. So... well we took it away. Those birds didn't like it. Although I know very well in westfjords, they love it there. But I think it is because, on that place, particular place I know very well, Tálknafjörður... everything is very flat. So it was better for them there to go in. But in Sellátur they have so many places that it's nicer than to be in that rubbery” P f

This testimony brings up a very interesting perspective: depending on the place, eiders will not use artificial shelters the same way. Another farmer mentions as well the differences in taste, about “small houses”:

« We have a little bit on the island in the lake by our fields. And there small houses have been more popular than out there, where she likes more, just like, “skjól”, shelters. » G f

Here, a small and more densely populated island promoted shelters with a rood, while in the next area, the simplest shelters were favored.

Many other types of work that can be done, like putting up colored materials, objects making noise, like bells or a radio... Such ideas can come from observations:

« And... he also saw that the bird liked to place their nest besides some colored things which has been coming from the sea. So he thought, color might have some... attraction » G f

However, there is not really a global agreement on the efficiency of such methods, with some eider farmers completely rejecting them, and some suggesting even other theories:

« Some people say it doesn't matter what you do, the flags or stuff that you do. What just matters is that the ducks, eider ducks see something in... see somebody doing something... so they know they will be protected. I don't know. » L f

Therefore, changing the landscape of a colony is part of an optimizing approach. It is not possible everywhere: the least accessible colonies will not allow such intensive work on it. Furthermore, all these experiments made by eider farmers bring an interesting new perspective on nest-site selection of eiders.



Figure 29: Old tires are commonly used to create shelters

V. Discussion

1. An experience centered around breeding

This ethnoecological study has characterized the different experiences of eider farmers, as well as their related knowledges. These knowledges could cover both nest-site selection, through their distribution or their reaction to artificial landscape, as well as the behavior of eiders in their colonies or interactions between different species.

An easy and consistent conclusion is that the eider farmer experience is absolutely centered on the breeding season. It is indeed only at this period of the year that their interest is focused, as the species is taking care of itself during the other seasons. Hunter-gatherer human populations that rely on eiders as food resource all year long have developed very different knowledges. For example, an Inuit community of the Hudson Bay (Canada), had specific names of eiders for all the different stages of maturity or of their annual cycle (Nakashima, 1988).

During the survey, only one word was used in that way: *veturliði* is used to call the male in its winter plumage, and no particular names were found for the ducklings. It seems that although they do try to protect them from predators, eider farmers are not that interested in the young ones. They indeed know that most of them will die, and as we have seen before, they are not always able to see them on the sea.

The actual main question of eider farming is about making a colony last and thrive: how is it possible to make eiders come back ? A farmer gives us her opinion concerning the determining factor for that:

« That they would have had a nice year. The eggs... became youngsters and they went to the water alive. After that, I think, they don't think about it » K f

Farmers know indeed that the ducklings are very rarely raised by their own mother, as other females will come to help or even steal the ducklings.

« Often you see, three four five six seven, eiders, sitting around. And then you know that the one on this nest is having her babies. The eggs are opening. Those others, sitting around, they are waiting to help her. They are midwives. » K f

All in all, we can conclude that eider farmers are mostly a privileged source of knowledge on eider nesting.

2. The local experiences of eider farming could very well be part of a larger scale participatory survey

As we saw, each eider farmer manages his own colony. He will know its proper characteristics, and how to organize the harvest and the work around it. This knowledge will be applicable only to his colony, as they are consistent with the very local and complete socio-ecosystem.

It appeared during the interviews that eider farmers would often make particularly interesting and consistent observations and comments when they were able to compare their experiences in two different colonies. Indeed, a farmer having worked in only one farm will have assimilated the local dynamics as “normal”, and may find it difficult to put them into perspective. However, in fact, eider farmers love talking amongst themselves, and are always happy to meet with people from different area during the few seminars that are organized annually by eider farmers national or regional associations.

Concerning collaborative research, Chaffey (2003) writes that the best way to join local knowledge and scientific approaches is to make hypotheses that are relevant and interesting for the local knowledge holders, and to use both approaches to test and validate them through their different perspective. Indeed, most of eider farmers enjoy experimenting a lot, as it is shown by all the work they do to change the landscape of their colony, and it is clear that they would be happy to participate in scientific research that would bring them new knowledge relevant for eider farming.

At the beginning of this project, while I was working on defining its design and purpose, the question of how much down would a nest bring was brought up by my supervisor and a down-cleaning company. At that time, I was not able to grasp the reason why, nor understand how it could be assessed, but I realize now that it would a very interesting transdisciplinary subject.

Bédard et al. (2008) report that on average 7 g are obtained from one single nest, while the number that is usually suggested in Iceland is 16 g. However, eider farmers know this varies a lot with weather conditions. This subject would indeed be able to fuse together aspects from local knowledge having a strong tie with ecological dimensions together with scientific approaches.

3. An interesting Human-animal relationship to compare

The relationship between eider farmers and the ducks they are looking after is quite remarkable in the ethnoecological world. A few other examples present some surprising similarities, and it would be interesting to compare them. This relationship where a wild species is supported by a slight change in its environment also exists with some “bee-keepers” in Indonesia. These people

harvest the honey of wild colonies, that often settle on big trees. It is on the trees that the humans will be able to work, building up planks that optimizes the niche offered to the bees according to their experience.

One interesting aspect of these local bee-keepers is that they believe that swarms, that travel throughout the forest, sometimes come back to the precise same place after a few years, and that assumption was validated (Neuman et al, 2000 ; Paar et al, 2000). Other aspects, like the singing before the harvest, could help understand what kind of relationship is possible within cooperations between humans and wild animals.

Furthermore, there is another product that is harvested on wild animals without killing them, and which scarceness and incredible properties has also brought a luxury status. It is the wool from the Vicuña (*Vicugna vicugna*), a wild species of the Andes close to the alpacas. The quantity harvested is also very low, and it seems impossible to domesticate them as they are too stressful: they can only be wild or in very large parks that facilitate their capture. The task of catching and shearing them took place through a special festival during the Inca civilization. Today, although some local communities try to revive it, the Human-Vicuña relationship has changed a lot. Many environmental issues arise around the Vicuña conservation, which has been strongly impacted by European colonization (Lisung, 2008). It would definitely be very interesting to connect these two highly complex relationships between humans and large animals, that both exist for the creation of absolutely amazing products.

Conclusion

This study aiming to assess the diversity of eider farming was able to collect relevant data that allowed to suggest a typology. This approach explained the importance of different constraints, and how they define the social organization of eider farming. The complex aspect of the bird community management in eider colonies was approached independently, and brought up the existence of two poles in the eider farmers approaches.

The fundamental dimensions influencing eider farming can be summarized in: density of eider nests, accessibility of the colony, infrastructure and social organization of the farmers, bird community and terrestrial predators.

Eider farmers have therefore very diverse experiences and knowledge, which could be studied in many different ways. We can conclude that eider farming is completely integrated to its environment: it is biologically supporting the eider populations and brings ecological pressure and serious constraints.

Eider farming can represent very different social functions, and it is important to remember that it is first of all a great pleasure.

The study however raised just as much questions as it answered, and many aspects of eider farming are waiting to be investigated.

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