Killer whales *(Orcinus orca)* in Faroese waters

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ABSTRACT

Information on catches, distribution and behaviour of killer whales in the waters around the Faroe Islands is collated and discussed. Sources of data include official catch records, sightings data from research and fisheries vessels, as well as opportunistic sightings by the local population. New information for this area is presented on fisheries interaction with killer whales, and on the diet and feeding strategies of the species.

INTRODUCTION

In the Faroes (Fig. 1) the killer whale has at least four names which refer to its appearance and behaviour: mast whale *(Mastrarhvalur),* bow-white whale *(Bóghvítuhvalur),* eider whale *(Æðuhvalur)* and killer whale *(Rovhvalur)*. The occurrence of killer whales in and near Faroese waters was documented by Degerbøl (1940) and Dánjalsson á Ryggi (1960). The former mentioned that the Faroese killer whale was considered a distinct species, *Orca eschrichtii* Steenstrup (for discussions see Lütken 1887; Grieg 1906), apparently distinguishable by variations in the white ventral pigmentation and by skull dimensions. This opinion is now discredited, however, and there is no evidence to support recognition of more than one species, *Orcinus orca*, in the North Atlantic, or elsewhere (Perrin 1982; Anon. 1987).

The purpose of this paper is to present recent information from a variety of sources on the distribution, seasonality, abundance and exploitation of killer whales in Faroese waters.

MATERIALS AND METHODS

Information was gathered from: 1) records of catches from 1960 until 1986, after which the whale was protected by law; 2) observations made aboard the whaling vessel "Hvítaklettur" during scientific observation cruises July – September 1981–84 and 1987; 3) observations from ship- and shore-based fishermen and other non-scientists 1950–1987; 4) anecdotal accounts concerning killer whale behaviour; and 5) observation records submitted in response to television broadcast of a short film on killer whales, first shown in April 1987. The film introduced killer whales, showed their sexual dimorphism and behaviour and explained the aim of this research programme. The public was invited to participate by forwarding information, photographs and any other material to the Museum of Natural History, Tórshavn.

RESULTS AND DISCUSSION

Sightings

The quality and reliability of the sightings data from different sources varies. The most reliable records are from the "Hvítaklettur" (Appendix 1). Although on average only one or two persons onboard in 1981–84 were experienced in whale sightings, the survey in 1987 was a fully-staffed line-transect survey (Sigurjónsson *et al.* in press), properly exe-

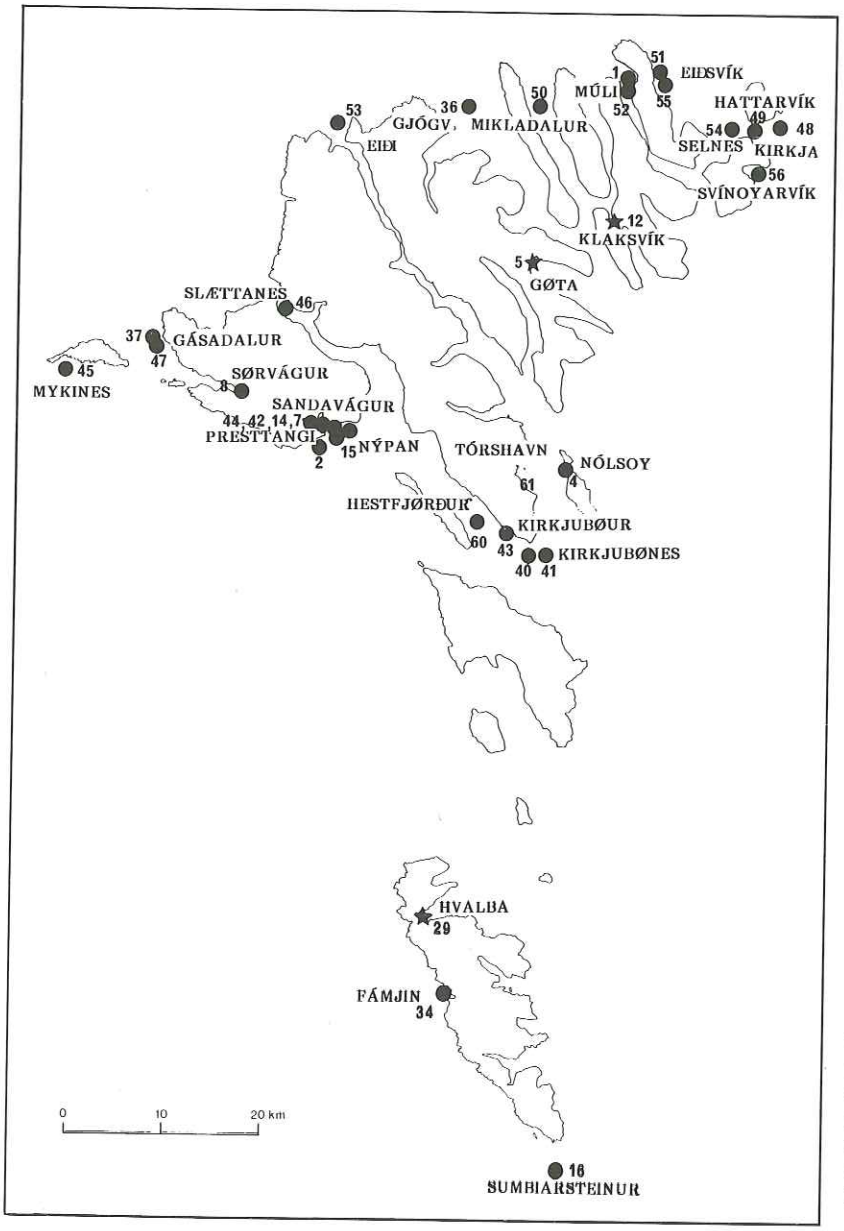

Fig. 1. Map of the Faroes showing place names referred to in the text, locations of killer whale catches 1960–1987 (stars) and coastal sightings and strandings (black dots) from 1950 through August 1987. Observation numbers refer to Appendix 1.

cuted according to design described by Cooke (1987). During this cruise the vessel made an average of 10 knots and observers maintained watch 13 to 17 hours daily, depending on latitude and month and resultant hours of daylight. Observers' eye level was just over 6 m. Binoculars were not routinely used throughout for searching but were employed to confirm visual contacts. Killer whale sightings from this and other concurrent North-Atlantic sightings cruises are treated quantitatively by Gunnlaugsson and Sigurjónsson (in press) and Sigurjónsson *et al.* (1988 – this volume).

All sightings data suffer from some sources

of bias, although the criteria used during the cruise in 1987 are better defined than those used in 1981–1984. Overall, sightings were seasonal, reflecting only the timing of the cruises and periods of optimal weather. There are no comparable data from winter months. Pelagic observations reported to us (Appendix 1) are random and often opportunistic. These and the coastal sightings (Appendix 1), are subject to the vagaries of seasons of fisheries activity, local enthusiasm for whale watching and variations in sightings effort, geography and season. It is thus impossible to obtain any reliable measure of effort for any activity except for the 1987 sightings cruise.

Catches

The catch data are from official records. The whales were driven ahead of fishing boats, stranded in the shallows and then killed in exactly the same manner as are pilot whales *(Globicephala melaena)* (Dánjal P. Nordberg, grindeforman in Hvalba, pers. comm.). All killer whale catches have been opportunistic where only whales venturing close inshore under favourable conditions have been driven and beached. The carcases were flensed of meat and blubber, but most of the viscera and all of the skeleton were left. The teeth were sometimes removed.

There are records of three recent drives (Fig. 1, stars): 22 whales at Gøta on 24 April 1960; 31 whales at Klaksvík on 19 June 1978; and 11 whales at Hvalba on 18 July 1983. Skeletons of three of the animals taken at Klaksvík are displayed in Tórshavn (one whale of 6 m in length) and at Bremerhaven Nordseemuseum (two whales).

Distribution and seasonality

The Faroese coastal sightings and catches (1950 through 1987) all occured in the area bounded by latitudes 61° 25′ N and 62° 25′ N, and longitudes 6° 10′ W and 7° 40′ W (Fig. 1). For some years many killer whales were reported around the Faroe Islands, but it is not known how often they appear in Faroese waters. Apart from spring 1987, the only period for which there is verification that there were many killer whales in the northern part of the Faroes is the 1950's. The residents of Sandavágur (Fig. 1) report that they see killer whales every year during the *grind* (pilot whale) "season" (i.e. July to September). The seasonality of these reports may merely reflect extra vigilance in anticipation of the *grind* and, hence, increased observations and reports of cetaceans other than pilot whales.

Nearly all reported coastal sightings were made during spring/summer. Whilst there is no measure of observer effort, daylength is longer in these months, and local fishing activity increases with good weather and visibility at sea. Therefore, apparent peaks in abundance of killer whales in spring/summer are likely to be the result of increased effort due to greater opportunities.

The pelagic sightings near the Faroes are shown in Figure 2. They are distributed within the sea area bounded by latitudes 59° 30′ N and 65° 30′ N, and longitudes 0° 40′ W and 8° W, although there is a single record from 60 naut. miles east of Iceland at approximately 65° 25′ N, 11° W. (Other records from further afield are listed in Appendix 1 but not shown in Figure 2). Like the coastal sightings, the pelagic sightings are mainly from summer months.

The only winter observations on distribution of killer whales come from the mackerel fleet, which operates from the end of October to the end of February, approximately between latitudes 59° and 60° 30′ N and longitudes 4° and 8° W. Although there can be no measure of effort applicable to these data, because of the variable conditions under which they were collected, one might reasonably assume that if killer whales were in coastal waters of the Faroes in winter in appreciable numbers, some would be seen. Thus, the apparent absence in coastal waters in winter suggests that the killer whales may well be offshore, and that the area of the mackerel fishing may be a winter ground.

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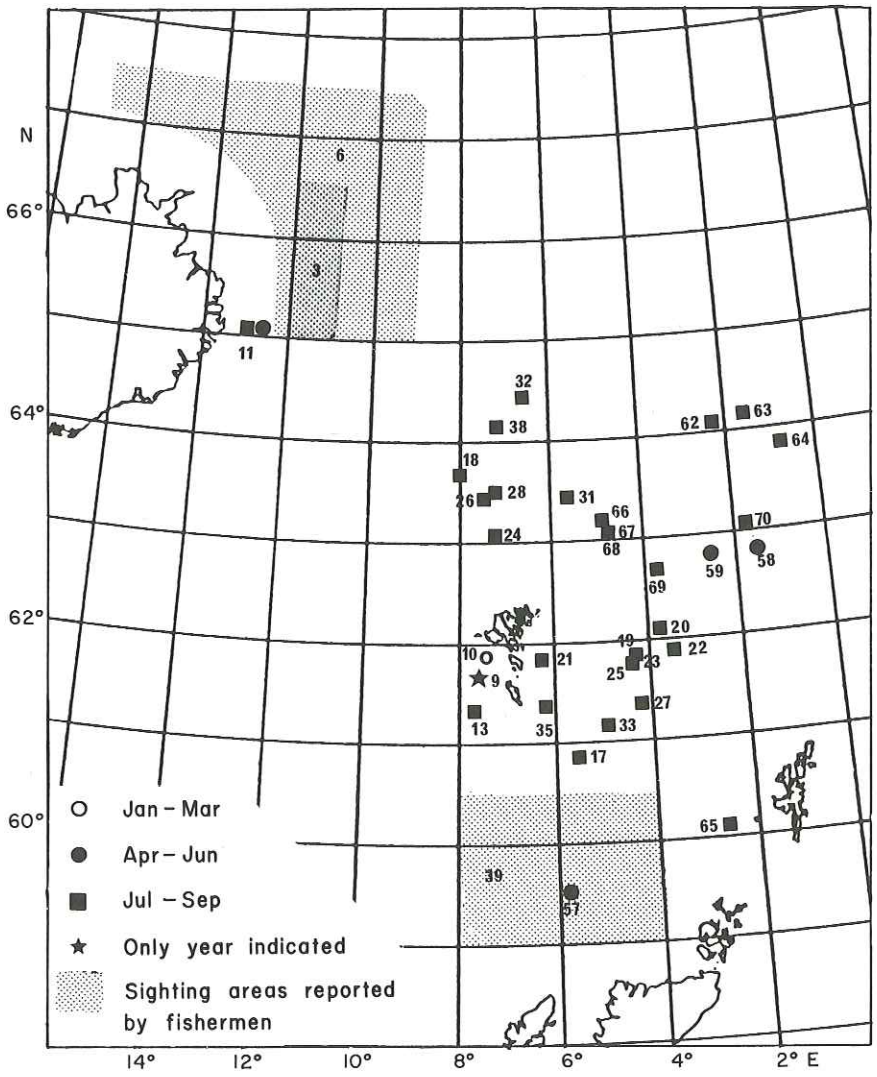

Fig. 2. Pelagic sightings from 1981–84, 1986 and 1987 by quarter-years. Observations numbered as in Appendix 1.

Group Size

In coastal sightings, the whales were seen as singletons and in groups of up to 15, but most groups contained fewer than 6 whales.

Pelagic sightings involved variable numbers, from singletons to more than 50 whales. However, groups reportedly most often contained about 10 to 20 whales, rather more than the coastal groups. One record (Appendix 1) colourfully reported 2,000 to 6,000 whales "spread over an area four times bigger than a football ground." This may represent a multi-species aggregation which included some killer whales. Such multi-species assemblages have been observed off South Africa, with killer and sperm *(Physeter catodon)* whales and Risso's dolphins *(Grampus griseus)* swimming together (Lockyer, unpublished data). Indeed, some observations detailed in Appendix 1 demonstrate that killer whales frequently mix with pilot whales in Faroese waters, sometimes without incident.

At such time, the two species may be feeding on a common food source.

Similar findings on group size as in the present study have been reported for other areas of the North Atlantic by Evans (1988 – this volume), Hammond and Lockyer (1988 – this volume), Lyrholm *et al.* (1987), Sigurjónsson (in press), Sigurjónsson *et al.* (1988 – this volume) and Øien (1988 – this volume). The observation off the Faroes of several thousands killer whales cannot be discounted because of a report by Braham and Dahlheim (1982) of 2,500 killer whales in Alaskan waters. Reports of hundreds of animals have been given by Christensen (1978), Sigurjónsson (in press) and Dudok van Heel (1986) off Norway and Iceland. The offshore and pelagic sightings from sea-going vessels and fisheries during spring and winter indicate there are sometimes large aggregations of killer whales associated with fish and other prey.

Most records report no size or relative age of whales seen, although a few report sightings of calves or crude measures of size of adults or juveniles. However, none detail an accurate size range and sex composition, although we deduce that "large" killer whales, from presence of large dorsal fins and length in excess of 5 m, constitute the most reliable identifications. The smaller sizes could be juveniles of either sex and/or adult females. Calf size may only be an indication of the smallest whales present in a group, although calf sightings which come from the "Hvítaklettur" records, made in summer, are believed to be reliable.

Killer whales clearly occur frequently both close inshore and in the pelagic waters around the Faroe Islands. The overall distribution of killer whale sightings links with those reported by Hammond and Lockyer (1988 – this volume) and Evans (1988 – this volume) for waters north of Scotland. There appears to be a continuum of whales from Scotland, up around the Shetland and Orkney Islands to around the Faroes. The distribution of whales relative to depth contours demonstrates that killer whales are located in areas of all water depths to at least 3,000 m.

Behaviour

Some observations were accompanied by descriptions of social interactions, feeding or interactions with fishery operations.

Social interactions. One incident reported involving epimeletic behaviour occurred during a feeding foray, as detailed below, when one of a group of four killer whales manoeuvering themselves onto a skerry to catch eiders *(Somateria molissima)* became stuck fast. It was freed by the action of the other three whales, which created sufficient wave movement to help wash their companion off the rocks. Another incident reportedly occurred during a halibut *(Hippoglossus hippoglossus)* fishing operation around 1970. A small killer whale became entangled in a line. When the fishermen were unable to disentangle the whale after drawing it close alongside, a large killer whale approached the small whale and managed to free it from the line. The two whales swam away together.

This epimeletic behaviour is similar to accounts given by Sigurjónsson (in press) in which females have "stood by" their offspring when net-entrapment has occurred in purse-seines. Haug and Sandnes (1982) and Øritsland and Christensen (1982) have documented a mass stranding of killer whales which apparently resulted when the lead male swam ashore, became beached and then was followed by 14 other members of the herd.

Observed "aggression" has been directed towards other species, not towards other killer whales. One example cited as aggression occurred during the 1950's and involved a fisherman using baited hooked lines to fish for halibut from a small motorboat. A killer whale repeatedly took bait off the hooks, and once all the bait had gone, attempted to lift the boat out of the water. Soon thereafter, the whale leapt clear of the water and landed astern of the small craft. The fisherman promptly made straight for land.

In general, most killer whale groups have appeared cohesive, and reports have implied a fair degree of co-operation among group members. One such example (detailed below

under feeding) comes from a report of two killer whales attacking a fin whale *(Balaenoptera physalus)*.

Food and feeding behavior. Several reports record the capture and consumption of eiders, e.g. the one mentioned above. Others include: notes on a stranded killer whale which was found to have eaten 7 seals, eiders, kittiwakes *(Rissa tridactyla)*, guillemots *(Uria aalge)* and puffins *(Fratercula arctica)*; an account of three killer whales of similar size trying to catch eiders off Gásadalur (the whales were seen striking the birds with their flippers and then eating them); an account from Gásadalur of 11–14 killer whales consuming all the birds sitting on the water; and a report that the appearance of four killer whales off Svínoyarvík caused the eiders to retreat ashore from the sea. In this last instance, the whales were able to capture and eat some of the birds by successfully beaching themselves temporarily.

There also are reports from the Faroes of killer whales attacking and eating other cetaceans. One tells of a harbour porpoise *(Phocoena phocoena)* being attacked and eaten by a large killer whale just outside Tórshavn. Another describes how killer whales attacked a fin whale, one whale on each side, for over half an hour. Several mention killer whales following and/or mixing with pilot whales. In one such case, a pilot whale drive during 1984 in Fámjin was disrupted when a group of fewer than 10 killer whales attacked; many of the pilot whales were mortally injured. In another instance, when no attack occurred, about 50 killer whales reportedly were "hunting" a school of about 200 pilot whales off Sandavágur. The pilot whales apparently swam very close to the shoreline and were thereby able to escape detection by the killer whales.

Seals, as noted earlier, are also taken for food, and one report tells of a killer whale leaping onto some flat skerries outside Sørvágsfjørður to catch grey seals *(Halichoerus grypus)* as well as eiders. After taking the prey, the whale rolled back into the water.

Despite these reports of predation on various species, the main food of killer whales off the Faroes is probably fish, as evidenced by numerous fisheries interactions (see below). From these observations of feeding and interactions with fisheries, we conclude that the killer whale has a catholic diet, with an element of opportunism in feeding habits. Elsewhere in the northeastern North Atlantic, its diet consists largely of fish, such as herring *(Clupea harengus)* off Norway and Iceland (Sæmundsson 1939; Jonsgård and Lyshoel 1970; Christensen 1982; Sigurjónsson in press), and halibut off Norway (Christensen 1982). Predation on large balaenopterid cetaceans has been previously reported by Tarpy (1979), where the victim was a blue whale *(Balaenoptera musculus)*. Seals and porpoise have been reported as prey in waters around Norway and Denmark (Eschricht 1862; Collett 1912) and seals in waters around Scotland (Evans 1980). The consumption of birds has been previously reported in European waters by Collett (1912) and Gunnarsson (1986), particularly with reference to eiders.

Fisheries interactions. Reports from the fisheries concern mainly the halibut, herring and mackerel *(Scomber scombrus)* operations. The reports do not always relate directly to Faroese waters; some come from Faroese fishermen operating in waters off Iceland and Greenland. One report from Sandavágur tells of a small (ca 3 m) killer whale taking the bait off a halibut line without detriment. Others are not so benign.

In the 1960's, killer whales were an intense nuisance to herring operations, usually conducted during June to September on the grounds north of Faroes, at about latitude 65° N (Fig. 2, No. 6). Whales were seen every day, tearing nets and eating the netted fish. When the nets were drawn over the gunwale, some herring were lost to the sea, where they were taken by waiting whales. Similar stories have been reported by herring fishermen working in the Jan Mayen area. In both cases, fishermen tried to scare the whales by firing rifles and throwing dynamite, but the whales

soon learned to remain outside firing range. Similar tales of interference and retaliation have been reported for the Greenland halibut *(Reinhardtius hippoglossoides)* and halibut fisheries. Killer whales followed halibut vessels off Iceland, and learned to take halibut off hooked lines, removing only the body and leaving behind the head which contained the hook (Fig. 2, No. 3).

Every year there have been up to several hundred killer whales associated with the mackerel fleet, the number of animals reflecting the fish abundance, as the killers only appear where the mackerel occurs in large shoals (Fig. 2, No. 39). The whales can be detected at distances of about 1,000–2,000 m on the ships' sonar operating at 15 kHz, but not on sonar operating at 165 kHz. Fishermen have learned to track the whales and thus locate mackerel. The mackerel are taken with purse-seine nets, and if whales are close by when the nets are full, they tear the nets to get to the fish, creating damage as well as frightening the fish. That fish are scared by the presence of killer whales is illustrated by an observation from Kirkjubønes in March 1987 when large concentrations of fish around a fishing boat disappeared (presumably not all eaten, if any) on arrival of a large (male) killer whale.

Disruption of fisheries seems common not only off the Faroes but has frequently been reported and acknowledged as a commercial threat off Iceland and Norway (Christensen 1978, 1982; Sigurjónsson 1984 and in press), because of the damage to nets and gear and local predation on fish. The reports of killer whales scaring fish away is also not new. For example, Rodrigues-Roda (1978) reported that killers tended to scare bluefin tuna *(Thunnus thynnus)* away from fishing boats off Spain.

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APPENDIX 1

Sightings of killer whales in the Faroe Islands, 1950 through summer 1987.

Record No.	*Date/hour*	*Position/ Village*	*Visibility*	*Whales Observed*	*Reference/ Source*
1.	1950's	Múli	Good	Many	Villagers
2.	1950's	Presttangi, Sandavágur		Many, disrupted halibut fishing	Fishermen
3.	1950's	65°–66°30′N, 11°–12°W		Many, disrupted Greenland halibut fishing	Fishermen
4.	May–June 1960 or 61	Nólsoy		2 ♂ + 1 ♀ stranded	Villagers
5.	24 04 60	Gøta		22 killed	Local sheriff
6.	End June–Sept. 1960–1968	65°–67°30′N, 9°–18°W		Many, disrupted herring fishing	Fishermen
7.	October 1967 or 68	Sandavágur		Ca. 50 seen	Villagers
8.	1967	Sørvágur		1 stranded	Villagers
9.	1971 or 72	61°50′N, 7°35′W		About 5 schools, each consisting of 5–10 whales	Fishermen
10.	Feb. or March 1972	61°57′N, 7°15′W		Ca. 6 whales seen	Fishermen
11.	May–Oct. 1977	65°N, 13°30′W		2.000–6.000, including whales of all sizes	Fishermen
12.	19 06 78	Klaksvík		31 killed	Local sheriff
13.	June–July 1979	61°33′N, 7°37′W		1 school	Fishermen
14.	1980	Sandavágur		1 seen	Villagers
15.	1980 or 81	near Nípan, Sandavágur		1 seen	Fisherman
16.	01 08 81	near Sumbiar-steinur		Ca. 10 seen	Fishermen
17.	21 07 81/2100	60°54′N, 5°46′W	Fair	Few seen	*Hvítaklettur*
18.	21 08 81/1610	63°46′N, 7°58′W		5–10 seen	*Hvítaklettur*
19.	27 08 81/0810	61°55′N, 4°12′W	Misty	Few seen	*Hvítaklettur*
20.	28 08 81/0700	62°10′N, 3°50′W	Fog	Few seen	*Hvítaklettur*
21.	18 09 82/1135	61°55′N, 6°12′W	Showers	Few seen	*Hvítaklettur*
22.	15 07 83/1240	61°58′N, 3°25′W	Poor	Some seen	*Hvítaklettur*
23.	11 08 83/1000	61°48′N, 4°15′W	Fair	2 schools seen	*Hvítaklettur*
24.	17 08 83/0800	63°02′N, 7°09′W	Fair	Some seen	*Hvítaklettur*

Appendix 1 (continued)

Record No.	Date/hour	Position/ Village	Visibility	Whales Observed	Reference/ Source
25.	22 08 83/0850	61°47′N, 4°12′W		17 mediumsized ad., feeding	D. A. McBrearty
26.	24 08 83/0905	63°28′N, 7°27′W	Fog	Some seen	*Hvítaklettur*
27.	31 08 83/1830	61°31′N, 4°10′W	Fair	Some seen	*Hvítaklettur*
28.	13 09 83/1720	63°29′N, 7°17′W	Poor	Some seen	*Hvítaklettur*
29.	1983	Hvalba		11 killed	Local sheriff
30.	07 07 84	67°12′N, 57°W		Fight between 2 killer whales and 1 fin whale	Fisherman
31.	13 08 84/1650	63°32′N, 5°46′W		Some seen	*Hvítaklettur*
32.	15 08 84	64°28′N, 6°38′W		Some seen	*Hvítaklettur*
33.	21 09 84/1325	61°16′N, 5°08′W		Some seen	*Hvítaklettur*
34.	1984	Fámjin		Seen <10	Villagers
35.	Summer 1984	61°30′N, 6°10′W		Ca. 10 seen	
36.	24 06 85	Gjógv		3–4 seen	A. Nørrevang
37.	27–30 03 86	Gásadalur		11–14 seen	Villagers
38.	12 08 86	64°13′N, 7°13′W		3 seen	*Magnus Heinasson*
39.	1975–87	59°–60°30′N, 4°–8°W		Many observed around mackerel fishing	Fisherman
40.	23 03 87	near Kirkjubønes		1 seen	Fisherman
41.	01 04 87	near Kirkjubønes		1 seen	Fisherman
42.	01 04 87/1000	Sandavágur		14 seen	Villagers
43.	01 04 87/1600	Kirkjubøur		4 seen	Villagers
44.	01 04 87/1900	Sandavágur		4 seen	Villagers
45.	04 04 87	Mykines		4 seen	Villagers
46.	05 04 87	Slettanes		3 seen	Fisherman
47.	14 04 87	Gásadalur		3 seen	Villagers
48.	17 04 87	Hattarvík		3 seen several times that week	Villagers
49.	17 04 87	Kirkja		5 seen	Villagers
50.	18 04 87	Mikladalur		3 seen	Villagers
51.	22–23 + 30 04 87	Near Eiðsvík		2–4 seen	Fishermen
52.	23 04 87	Múli		4 seen	Villagers
53.	26 04 87	North off Eiði		1 seen	Fisherman
54.	27 04 87	Near Selnes		2 seen	Fisherman
55.	30 04 87	Eiðsvík		3 seen	Fisherman
56.	15 05 87	Svínoyarvík		4 seen	Fishermen
57.	15 06 87	59°30′N, 5°57′W		10+ seen going NE including both large and small	Fisherman
58.	18 06 87/1335	62°49′N, 1°37′W	Poor	2, incl. ad. ♂	*Hvítaklettur*
59.	21 06 87/0842	62°40′N, 2°46′W	Good	19–24 seen, in 3 sub. groups: 1) 2 ad. ♀ + 1 calf 2) 1 ad. ♂ + 2ad. + 3 sub-ad. 3) 10–15, widely dispersed, including 1 calf	*Hvítaklettur*
60.	07 07 87/0730	Hestfjørður		5–6 groups seen 5–20 each containing killer and pilot whales	D. Bloch
61.	08 07 87	Tórshavn		1 ♂ killed and ate 1 porpoise	Campers
62.	21 07 87/0920	64°07′N, 2°06′W		7 seen, at least 2 adult ♂	*Hvidbjørnen* F. Danielsen et al.
63.	21 07 87/1010	64°12′N, 1°35′W		8 seen, at least 3 adult ♂	*Hvidbjørnen* F. Danielsen et al.
64.	22 07 87/1340	63°56′N, 00°50′W		10+ seen, 9 seen at same time	*Hvidbjørnen* F. Danielsen et al.
65.	31 07 87	60°16′N, 2°27′W		3+ seen, at least 1 adult ♂	*Hvidbjørnen* F. Danielsen et al.

Appendix 1 (continued)

Record No.	*Date/hour*	*Position/ Village*	*Visibility*	*Whales Observed*	*Reference/ Source*
66.	08 08 87/1830	63°10′N, 4°51′W	Good	15 seen, incl. 2 ad. ♂, 10 ♀ or sub. -ad. + 1 calf	*Hvítaklettur*
67.	08 08 87/2010	63°12′N, 4°50′W	Good	10, incl. 1 calf., seen	*Hvítaklettur*
68.	09 08 87/0819	63°00′N, 4°44′W	Poor	2 seen, incl. ad. ♂.	*Hvítaklettur*
69.	10 08 87/2120	62°46′N, 3°48′W		6 seen, at least 2 adult ♂	*Hvidbjørnen* F. Danielsen et al.
70.	11 08 87/1430	63°00′N, 1°51′W		15 seen, at least 2 adult ♂	*Norrøna* F. Danielsen et al.