



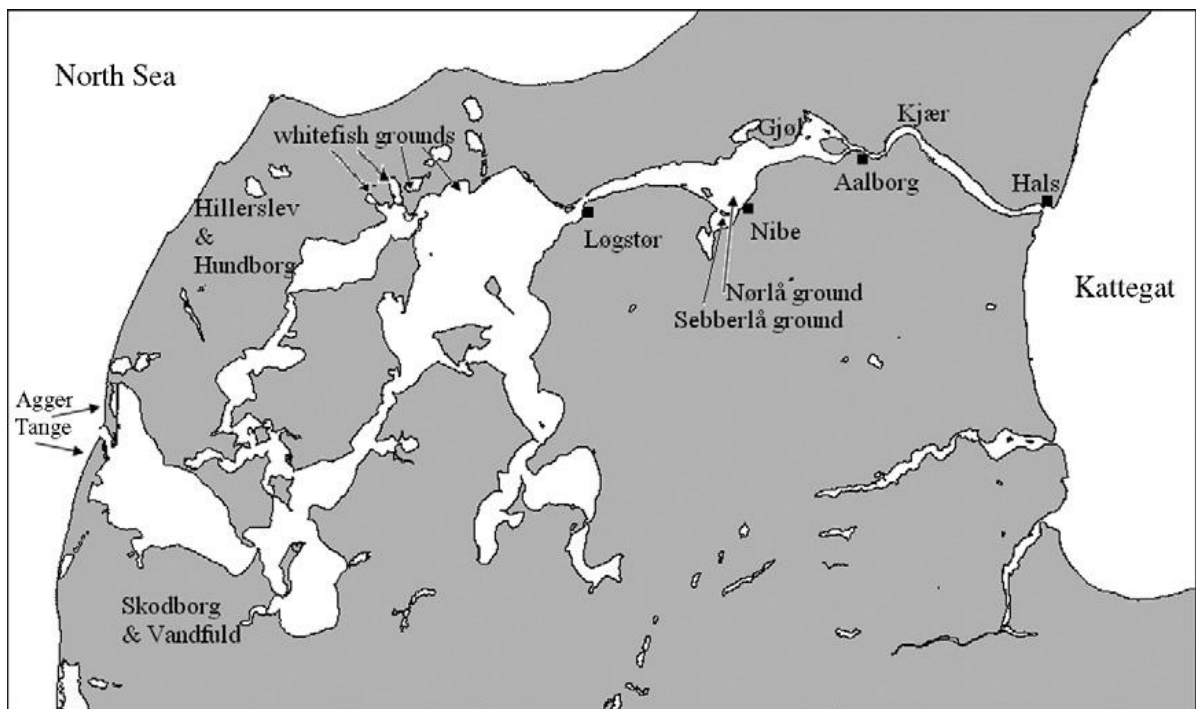
Norfish Dataset 11

Danish Limfjord Herring Fishery

1518-1835

Supporting Documentation

Poul Holm, John Nicholls



Map of present day Limfjorden, with the breached Agger Tange in the west. Until 1825 the only entrance to the Limfjorden was from Kattegat at the town of Hals.

(Poulsen, Holm, McKenzie 2007)



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Summary

Dataset Title:	Danish Limfjord Herring Fishery 1518 - 1835
Norfish Case Study:	Danish Limfjord Herring Fishery 1518 - 1835
Large Marine Ecosystem:	22: North Sea; 23: Baltic Sea
Subject:	Catches, Herring, North Sea, Baltic Sea, Danish Limfjord, 1518 - 1835
Author:	Poul Holm, John Nicholls Norfish Project Centre for Environmental Humanities Trinity College Dublin
Data Provider:	Poul Holm Norfish Project Centre for Environmental History Trinity College Dublin
Data Editor:	John Nicholls Norfish Project Centre for Environmental History Trinity College Dublin
Extent:	318 records
Keywords:	North Sea and Baltic Sea Herring catches; Norfish; Danish Limfjord Fishery
Citations:	<p>a. The dataset: please cite as follows Holm, P and Nicholls, J. 2020. Norfish: Danish Limfjord Herring Fishery 1518 - 1835. Dublin: TCD</p> <p>b. Supporting documentation: please cite as follows Holm, P and Nicholls, J. 2020. Norfish Supporting Documentation: Danish Limfjord Herring Fishery 1518 - 1835. Dublin: TCD</p>



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Sources and Chronology

The Limfjord herring fishery is anomalous due to the unique nature of the changing topography that has forged uniquely inland sea waters in the Jutland Peninsula. Until a breach at Agger Tange in 1825, affording access to the North Sea, the only access was to the east via the Kattegat. The breach enabled salt water to penetrate the Limfjord which had previously been brackish. It may be argued that despite the obvious, radical changes to the salinity, hydrography and nutrient levels that the breach caused, herring fishing was impacted prior to this event by a combination of fishing methods and the destruction of spawning grounds (Bo Poulsen 2010, p.3). The decline and collapse of the Limfjord fishery may be attributed to “commercial fishing activity [that] greatly impaired herring reproduction - through damage inflicted by gear on eggs and spawning habitats, the capture of immature herring, and the overexploitation of adults” (Ibid.)

The dataset provided here is effectively an update of and addition to earlier findings and estimates of the scale of the fishery, indicating a substantial upwards assessment of landings in the second half of the 17th century. Additional customs records (Blomberg 1932) and one year of *kongekøb* in 1518 provide greater clarity and accuracy to be applied to the work previously undertaken by Gert Poulsen and Per Christensen (1990) and provides a vista of an important industry that spanned several centuries during the early modern period and into the modern era. Archival records and manuscripts aided in providing revised figures that informed the data series.

Based on available records and research, the focus is on two distinct geographic regions in the Limfjord which are merged to provide a composite understanding of the scale and extent of the herring fishery. National and international trade of the Limfjord herring is primarily documented by records from the major port of Aalborg, while the fishery in the important mid-Limfjord region is documented in archives of the small town of Nibe (situated to the west of Aalborg).

Kongekøb (Nibe)

In the late Middle Ages, there was an apparent large herring fishery according to written accounts; this is underpinned by the purchase by the King of Denmark of a saltery (for curing and drying herring) and an expressed right to buy herring from fishers from Nibe in this period. In the first half of the 17th century, the *kongekøb* accounts document the purchases by the King's salter in Nibe. The Royal Saltery was obliged to pay the market price based on the values of the previous day (Christensen 1977, p.64; Gert Poulsen 1990, p.249)

By checking the Royal account books, some level of approximation may be derived of the extent of the herring fishery. These accounts were maintained consistently in a uniform manner year-on-year enabling a guide to the scale of the fishery. However, they do not by themselves provide information about the size of the fishery. To provide a viable time series of estimated catch data we proceed by making assumptions along the logic of Bo Poulsen (2005). We know that the King's salter by the *kongekøb* was the privileged buyer of herring on two days of the week; fishing was carried out on six days of the week, excluding Sundays. The region was central to the most important fishing grounds in the Limfjord and provided a stable and consistent fishery. Since at least the 17th century substantial investment in the Nibe fishery indicates the consistent approach to maintaining the fishing industry. Reports in the 1820s indicate that about a third of all exports of salted herring originated from Nibe, and the region probably was as important earlier. Furthermore, while the *kongekøb* accounts only cover the spring fishery, we know that the autumn fishery in later years was of much less importance; roughly three times as much herring was salted in the spring than in the autumn season (G. Begtrup 1810, p.382.).

Annual catch values in the first half of the seventeenth century likely did not exceed 2,000 metric tonnes and may have been substantially lower for much of the period. The entire period suffered from poor output in terms of herring catches; for several years there are no numbers available at all, possibly signalling zero or close to zero catches as the Royal Saltery became inactive due to lack of herring (Poulsen 2005; Christensen 1977, p.61-63).

Conversions of the Royal account figures into annual catch in metric tonnes, applying the variables discussed, are addressed in the Conversion rates and Calculations section of this document.

In 1771 the town sheriff of Nibe, Johan Ludvig Lübecker answered several questions posed by the royal financial counsellor, Oeder. According to his report, in Nibe, annual production was between 300 and 400 hundred lasts of salted herring, 100,000 ol (unit of 80 fish) of dried herring, and 10,000 smoked herring; all figures included local consumption and exports (RA. Rtk. 235.186). One last equated 12 barrels indicating that between 3,600 and 4,800 barrels of salted herring were produced (Poulsen 2005).

Aalborg

The trade accounts of Aalborg are preserved in some years from 1667 onwards until the final disappearance of the Limfjord herring stock in 1835. In addition to archival documents, Olrik (1773) published selected accounts of some years now lost. Blomberg (1933) published the accounts for the period 1667-1669. The 18th century customs accounts have

largely been lost apart from the published excerpts by Olrik. Christensen (1977) and G. Poulsen & Christensen (1990) provide figures for the 18th century based on the Aalborg city accounts.

Aalborg had the sole privilege of exports from the Limfjord area and the accounts therefore represent a near full picture of all inland and export trade of salted herring. The accounts only have patchy reference to the trade of dried herring which was mainly used for domestic consumption. Poulsen (2005) observes that 19th century observations indicate that the ratio of salted vs. dried herring was about 1:1.65. We have used this ratio to assess total landings in previous centuries.

Conversion rates and Calculations

Output of processed herring included salted, dry-salted, smoked and dried, as well untreated catches of fresh fish; further unused or poorer parts were boiled and distilled into train oil. The following figures and rates are used in the process of converting to an annual catch in metric tonnes:

1 Danish barrel of salted herring = 108.21 litres (gutted and cured herring that was approximately the equivalent of 100 kilograms of round fish)	(Thestrup 1991, p.29)
1 last = 12 barrels	(Poulsen 2005)
1 barrel dried herring = 16.6 ol (spring, smaller herring) 1 barrel dried herring = 13.3 ol (autumn, larger herring) 1 barrel dried herring = 15.8 ol (annually adjusted: $16.6 \cdot 3 + 15.5$)/4)	(Begtrup 1810, p.382)
Ratio between salted herring and rest of the herring is 1:1.67 ($110,000 \text{ ol} / 15.8 = 6,973 \text{ barrels}$ – from 1771 report) ¹	(Poulsen 2005)
Ratio between Royal Saltery Nibe and annual metric catch is 1:1.98 (Annual catch, 1600-1665, tonnes (c) = x (figures of royal saltery in Nibe) * 3 (rest of the week) * 1.33 (autumn catch) * 3 (rest of the Limfjord) * 1.65 (herring, not salted for export) * 0.1 (conversion to metric tonnes), therefore c (catch) = x * 1.98)	(Poulsen 2005)

¹ The given ratio may be corroborated based on available figures in the first half of the 19th century. From given numbers of vessels (kåg) and weights provided, a ratio of **1:1.62** is derived – very similar to the earlier figure for 1771 (Poulsen 2005; KB. Collin. Krøyer, p.45; KB. Beck.Add.314a-b.fol.; RA. Rtk. 2426.215. Letter of 12 June 1830.).



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Other Processes

The marine species information that informs the dataset is obtained from the World Register of Marine Species which validates common species names, scientific names and sources (WoRMS 2020).

The Metadata system underpinning the dataset is based on Darwin Core which provides static formulations of all data fields as outlined in the Data Fields section of this document (OBIS 2017; 2020).

Data Fields

Darwin Core Field Name	Description
occurrenceID	A globally unique “per record” identifier based upon the concatenated institutionCode, collectionCode, catlogNumber and ID fields. (TCD _Norfish_DenLimHolNicHer_1)
type	Description of data series type. (Dataset)
modified	Most recent date the data was modified; ISO 8601 metric date/time standards apply. (2021-02-08)
license	Data licensing conditions that apply. (http://creativecommons.org/licenses/by/4.0/legalcode)
bibliographicCitation	Author citation for the dataset. (Holm, P and Nicholls, J. 2021. Norfish: Danish Limfjord Herring Fishery 1468-1599. Dublin: TCD.)
references	Denotes the link where more detailed information about the dataset is held. (http://www.vliz.be/imis?module=project&proid=5064)
institutionCode	Identifies the institution which owns the data - Trinity College Dublin. (TCD)
collectionCode	Code of the project or research group. (Norfish)
datasetName	Name of the dataset. (Danish Limfjord Herring Fishery 1518-1835)
basisOfRecord	Specifies the nature of the observed or researched specimens or data. (HumanObservation)
dataGeneralizations	Source data that informs the provenance of the data. (Sources: Christensen, H. 1977. Ni tværsnit af Nibes historie, Nibe kommune. p.60f.)
catalogNumber	Identifier of the data within the institution and project – “Den” refers to Danish, “Lim” refers to Limfjord, “Hol”



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	refers to Holm, “Nic” refers to Nicholls, “Her” refers to Herring. (DenLimtHolNicHer)
occurrenceRemarks	Comments about the occurrence record. (NA.)
recordedBy	Researchers who recorded the data. (Poul Holm John Nicholls)
organismQuantity	Quantity of fish represented in the record shown in Kg live weight. (1503876)
organismQuantityType	organismQuantity unit of measurement. (biomass in kilograms (kg))
occurrenceStatus	Stipulates the physical presence or absence of animals relating to the record. (present)
eventDate	Actual date and time at which an occurrence was recorded. ISO 8601 metric date/time standards apply. (1520)
year	Year taken from the eventDate field. (1520)
locationID	Marine Region unique identifier. (http://marineregions.org/mrgid/2374)
locality	Local name for the overall location or region. (Denmark, Kattegat)
locationAccordingTo	MRGID location identifier based on the marineregions.org/mrgid system. (MRGID)
locationRemarks	Description of location identifier. (Kattegat herring fishing ports)
decimalLatitude	Latitude shown in decimal notation based on the WGS 84 (EPSG:4326) geodetic datum standard. (56.34319764)
decimalLongitude	Latitude shown in decimal notation based on the WGS 84 (EPSG:4326) geodetic datum standard. (11.30411887)



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coordinateUncertaintyInMeters	The smallest circle (radius) in metres from the ground zero point depicted by the decimalLatitude and decimalLongitude fields. In this instance, “219607” depicts a radius of 219.607 Km.
georeferenceRemarks	Remarks indicating the geographic area identified – Large Marine Ecosystems are used. (22: North Sea; 23: Baltic Sea)
scientificNameID	The WoRMS LSID associated with the scientificName, based on the Marine Species database. (urn:lsid:marinespecies.org: taxname:126417)
scientificName	Scientific name of the animal based upon the vernacularName. (Clupea harengus)
kingdom	Together with taxonRank assists in determining broader animal characteristics for darwinCore search engines. (Animalia)
taxonRank	Together with kingdom assists in determining broader animal characteristics for darwinCore search engines. (species)
scientificNameAuthorship	Based on the scientificNameID field and discoverable through the WoRMS database. (Linnaeus, 1758)
vernacularName	Literal common name applied to the animal involved. In this case, all values are sild – the Danish common name for herring
identificationRemarks	General remarks about the identification of the species. (Common name for herring is sild.)
conversion	Conversion factor applied to derive catchMT. (1 Danish barrel of salted herring = 108.21 litres; 1 last = 12 barrels; 1 barrel dried herring = 15.8 ol; Ratio between salted herring and rest of the herring is 1:1.67; Ratio between Royal Saltery Nibe and annual metric catch is 1:1.98)



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catchMTAalborg Catch in metric tonnes recorded at Aalborg based on exports and local consumption, converted from dried herring to liveweight.
(499)

catchBarrelsSpringNibe Catch in barrels reported at Nibe during the Spring season.
(528)

catchMT Derived metric tonnes value based on the calculated fields as shown in the conversion field, or as shown in the codes field.

trafficLight Traffic Light coding system denotes level of certainty, and/or level of accuracy that can be described for each record; see Appendix 1 for details.

codes Explanation codes that highlight the process for each record; see Appendix 2 for details.

Bibliography

Note: Where citations do not appear in the text, they are nevertheless referenced in the dataset.

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Appendix 1

Traffic Light System

Traffic Light	
green	Reliable Quantitative Data
amber	Reliable Data with some calculated or estimated values included
red	Only calculated values based on extrapolation and trending

Appendix 2

Codes

Codes	Explanation
a	Given values extracted from archival sources with minimal conversions
b	Assumed minimum values
c	Calculated trend value based on last given and next given points.