



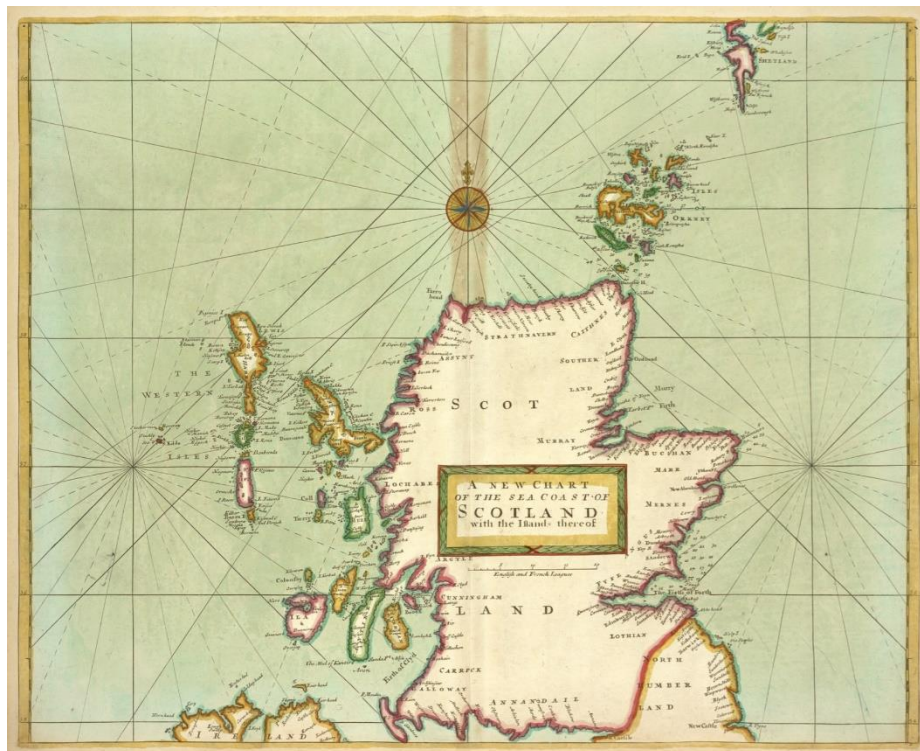
Norfish Dataset 04

Scottish Herring Fishery

1466–1790

Supporting Documentation

John Nicholls, Poul Holm



*“A new chart of the sea coast of Scotland with the Island thereof”
(Thornton 1702-1706)*



Scottish Herring Fishery 1466–1790

Summary

Dataset Title: Scottish Herring Fishery 1466–1790
Norfish Case Study: Scottish Herring Fishery 1466–1790
Large Marine Ecosystem: 22: North Sea
Subject: Catches, herring, domestic consumption, export, Scotland
1466-1790

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Extent: 323 records

Keywords: Herring catches; Norfish; Scotland, domestic consumption,
export figures

Citations:

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Sources and Chronology

The Scottish Herring Fishery was based largely in the North Sea along the Scottish coastline but included elements from the Atlantic waters on the west coast of Scotland as well. Some fishing may have occurred in the northern parts of the Irish Sea as well. While the fishery was on a comparatively small scale when compared with the industrial giants of the Flemish and Dutch fisheries, it was nevertheless a large feature of the Scottish fishing effort and accounted for important exports as well as domestic provision of nutrition. Salmon and cod fishing were also important aspects of the overall fishing effort, but herring was arguably the most important fish export

The Scottish Herring Fishery data incorporates exports from various Scottish ports during the period 1466 to 1599. The data are extracted from Martin Rorke's, 'Scottish Export Data' which was the basis of his PhD thesis (2001). More detailed information about the database may be found in Vol. II, Appendix 2 of the thesis. The database includes many categories of export commodities, including herring, cod and salmon exports, but only herring fish are the subject of this dataset. Missing values were extrapolated and trended using the Capacity Trend Method (Nicholls et al. 2020).

Pre-1600 values

The export values for the various herring fishing ports were extracted and normalised with missing values incorporated, and care was taken to ensure that stipulated zero values were maintained where relevant. Apart from the period 1585-1589, values are largely available for reasonable figures to be derived. All the data have some level of capacity trend applied as there are many missing data points, but the resulting trends are deemed to be reasonable overall. This gave rise to a complete series covering the period to 1599. However, domestic consumption values had to be included in order to determine a complete picture of the overall fishery. Demographic data was obtained to provide a reasonable estimate of annual fluctuations. Tyson (2001, p.487-489) outlines populations for the period:

“The population of Scotland in this period is unknown. The first reliable information in 1755 shows the inhabitants of Scotland as 1,265,380. Best estimates put the Scottish population for earlier periods in the High Middle Ages between 500,000 and 1,000,000 people, growing from a low point to a high point.”

For a detailed analysis of Scottish herring exports for this period, Rorke’s (2005) paper provides information and corroboration. From this basis a demographic series was determined and established along with the typical consumption per capita for the Scottish population. An annual consumption figure of **4.64 Kg** per person was accepted based on two primary factors. Firstly, typical domestic fish consumption was derived from the Danish annual fish consumption figure of 25.5 Kg per person per annum which may be a reasonable comparison. Secondly, the proportion of this figure that related to herring consumption had to be extracted when cod and salmon consumption were factored. Cod was typically cheaper and more accessible for local consumption, but herring was also a major element in the fishing industry, while salmon was regarded as a prime resource and was favoured when available and affordable. Herring was accepted as being 2 times more than salmon and four times less than cod in terms of biomass consumed by the population. A ratio of cod:herring:salmon of 8:2:1 was therefore taken.

Post 1599 values

From 1580 until 1660, Michell (1977) provides a decadal series that provides rounded figures for Scottish landings. These figures offer a trend, but they do not reflect a detailed expression of actual landings when compared with Rorke’s (2001) export data. The 1580-1590 sequence from Michell indicates a decadal annual value of 900 metric tonnes, but actual values from Rorke (2001) depict a large variation between c. 800 metric tonnes and c. 6,000 metric tonnes which is deemed to be the more accurate.

Nevertheless, the decadal trend values may be compared alongside projected export values (adjusted to include domestic consumption). The outcome of this comparison highlights that extrapolated figures based on a Capacity Trend Method analysis (Nicholls et al. 2020) may provide a more accurate overall annual series. The Capacity Trend is based on a benchmark of the Irish Herring Fisheries series (Norfish Irish Herring Fishery 1520-1790).

The figures from 1661 are based on those provided by Hitzbleck (1971) which concludes in 1780. This series is similarly compared against the trend of the Irish herring dataset (Norfish Irish Herring Fishery 1520-1790). Figures after 1780 are trended with Irish values (Ibid.) which provides figures for a similar fishery in terms of scale, coverage and volume.

Conclusion 1790

The trended values were followed until 1790. Europe-wide events in the aftermath of the French Revolution of 1789 impacted the global economy leading to major upheavals and changes in trade and related activities. In both physical terms (disruption to shipping, volatile trading markets, lack of safety due to warfare, etc.) and literal recording of activities (loss of records, failure to produce records, inaccurate recording systems due to regime administrative changes, etc.) there is little clear information to be gleaned until the cessation of hostilities of the Napoleonic period after 1812. Not until several years after a final peace was achieved following the 1815 war between France and other European countries (UK, Prussia, Netherlands, Belgium) did an economic and administrative system fully settle and fisheries were again reported with some level of accuracy.

Conversion Factors

The original export values (Rorke 2001) were given in barrels of herring. Barrels of herring are given as 32 gallons in early modern measures:

"There is also a measure called Salmon Butt of 84 gallons : so the Barrell of Salmon 42 Gallons, the halfe 21. The Herring Barrel is 32 Gallons, and the Eele Barrell 42 Gallons, and the halfe and Firken of both these must hold accordingly ; the Soape Barrell 32 Gallons."

(Malynes 1622, p.50)

The derived conversion rate is as follows:

- 1 barrel of herring = 32 gallons (Imperial)
- 1 barrel of herring = 326.4 litres (metric)
- 3.064 barrels of herring per tonne (metric)

According to the FAO (Food and Agriculture Organization of the United Nations), the modern measurement for a Scottish barrel of herring does not vary greatly from that of the 17th century source:

"Statutory obligation to make barrels in Scotland to a prescribed size was removed in 1963, and herring barrels can now be of any size: it is likely however that barrels of the following size will continue to be used for some time:

- 1 herring barrel = 26 $\frac{2}{3}$ gallons
- $\frac{1}{2}$ herring barrel = 13 $\frac{1}{3}$ gallons"

(Waterman 2001)

Figures in this dataset have had domestic consumption added based on population figures. Tyson (2001, pp.487-489) provides demographic data as follows:

Population of Scotland

- Early to mid-medieval period c.1,000,000
- Late medieval period c. 500,000 (due to plague and infant mortality)
- 1500 = 500,000
- 1600 = 800,000
- 1755 = 1,265,380 (first national census conducted)

Pairing this data with a per capita annual consumption of 25.5 Kg of fish (based on comparable Danish consumption figures), a reasonable domestic consumption figure may be derived. As indicated earlier, when a ratio of 1:2:8 (salmon:herring:cod) is adopted, overall consumption can be considered and the relative portion of herring calculated. The resulting herring annual consumption is reckoned to be around **4.64 Kg** per capita.

Other Processes

The Capacity Trend Method was used to calculate values for years where no data was available. This process entails a trending process where a trend of annual data is applied between available points in order to determine a series that reflects general trends rather than a simple straight line. (Nicholls et al. 2020)

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

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

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_ScoNicHolHer_1) |
| type | Description of data series type. (Dataset) |
| modified | Most recent date the data was modified; ISO 8601 metric date/time standards apply. (2021-01-08) |
| license | Data licensing conditions that apply. (http://creativecommons.org/licenses/by/4.0/legalcode) |
| bibliographicCitation | Author citation for the dataset: (Nicholls, J and Holm, P. 2020. Norfish Scottish 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. (Scottish Herring Fishery 1466-1790) |
| basisOfRecord | Specifies the nature of the observed or researched specimens or data. (HumanObservation) |
| dataGeneralizations | Source data that informs the provenance of the data. (Sources: Rorke, Martin. 2001. Scottish Export Data. Raw data forming the basis of a PhD thesis: Scottish Overseas Trade, 1275/86-1597. Unpublished: |



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| | University of Edinburgh. http://www.bristol.ac.uk/Depts/History/////Maritime/Sources/2001phdrorke.html . University of Bristol.) |
| catalogNumber | Identifier of the data within the institution and project – “Sco” refers to Scottish, “Nic” refers to Nicholls, “Hol” refers to Holm, “Her” refers to Herring. (ScoNicHolHer,) |
| occurrenceRemarks | Comments about the occurrence record. (Rorke's figures indicate multiple occurrences of zero herring exported for many ports in particular years; all ports exported zero herring between 1583 and 1589) |
| recordedBy | Researchers who recorded the data. (Martin Rorke John Nicholls) |
| organismQuantity | Quantity of fish represented in the record shown in Kg live weight. (8285162) |
| 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/3252) |
| locality | Local name for the overall location or region. (Scotland) |
| locationAccordingTo | MRGID location identifier based on the marineregions.org/mrgid system. (MRGID) |
| locationRemarks | Description of location identifier. |



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| | |
|--------------------------------------|--|
| | (Scottish Coast) |
| decimalLatitude | Latitude shown in decimal notation based on the WGS 84 (EPSG:4326) geodetic datum standard. (57.75455) |
| decimalLongitude | Latitude shown in decimal notation based on the WGS 84 (EPSG:4326) geodetic datum standard. (-4.6903) |
| coordinateUncertaintyInMeters | The smallest circle (radius) in metres from the ground zero point depicted by the decimalLatitude and decimalLongitude fields. In this instance, “418697” depicts a radius of c. 419 Km. |
| georeferenceRemarks | Remarks indicating the geographic area identified – Large Marine Ecosystems are used. (22: North 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 sgadan |
| identificationRemarks | Remarks to assist in identifying the species. (Common name is sgadan in Scots Gaelic) |

| | |
|----------------------------|---|
| conversion | Conversion factors applied to derive catchMT. (3.064 barrels of herring per tonne (metric); Annual consumption per capita = 4.64 Kg) |
| exportMT | Weight in metric tonnes of exported herring. (39) |
| population | Population of Scotland based on available figures. (500000) |
| domesticConsumption | Consumption of herring per annum based on a per capita rate of 4.64 Kg. (2320) |
| 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. |

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Appendix 1

Traffic Light System

| Traffic Light | Explanation |
|---------------|---|
| green | Given values with minimal conversion |
| amber | Calculated values based on given information |
| red | Calculated values trended based on other fisheries or assumed |

Appendix 2

Codes

| Codes | Explanation |
|-------|---|
| a | Export figures converted from barrels to metric tonnes; Capacity Trend applied to fill missing data areas |
| b | Domestic consumption figures added; 4.64 Kg per capita per annum |
| c | Values given for decadal series; extrapolated and trended between decades using Capacity Trend (Irish Export figures) |
| d | Calculated values based on Irish Export trends (Capacity Trend) |
| e | Given values corroborated against Irish Export figures |
| f | Calculated values based on Irish Export trends (Capacity Trend) |