

INLAND NAVIGATION IN ENGLAND AND WALES BEFORE 1348: GIS DATABASE

GENERAL GUIDE

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ABSTRACT

Inland Navigation in England and Wales before 1348: GIS Database maps the rivers and canals of medieval England and Wales that are known to have been navigated by various forms of water transport, bringing together evidence from documentary sources, the archaeological record and place-name information. It provides a digital resource for investigating the extent and character of medieval inland navigation on a national scale.

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INTRODUCTION

River and canal navigation was of fundamental importance to travel and transportation of goods during the Middle Ages (e.g. Blair 2007a, Pelteret 2009). Research into Crown administrative records of the movement of bulk goods in the fourteenth century has shown that overland transport was on average twice as expensive as riverine transport (Masschaele 1993). The advantages navigation offered had profound implications for economic and urban development. Nearly all large internationally important fairs in medieval England were located by a navigable river (Moore 1985). In the early fourteenth century just one-fifth of English boroughs were located immediately by a known navigated river, but these accounted for over half of the assessed urban wealth in the 1334 lay subsidy (for full discussion of the historiography and the economic landscape context of medieval inland navigation, see Oksanen 2017).

Documentary and archaeological material have traditionally formed the evidential core for inland navigation; here, these are complemented and expanded by place-name evidence. Onomastic scholarship has demonstrated that historical place-names reflected the relationships and interactions that people had with their surrounding landscape, and a wide-ranging class of name-elements relate to the experience and physical reality of travel (Cole 2007, Cole 2013, Hooke 1981). By mapping medieval place-names relating to river traffic (such as *ēa-tūn* and *hȳð*, see below) the possible extent of navigable waterways is considerably enlarged beyond what other sources would allow. The ancient river courses have been recovered where possible from historical maps and administrative boundary and remote sensing data, such as LiDAR and satellite imagery.

Unlike previous national-scale historical surveys (e.g. Edwards 1987, Langdon 2013, Caffyn 2010) this database combines two principles: on the one hand it brings together all known direct evidence for inland navigation without favouring one type of source over another; on the other it does not rely, as the sole source for navigability, on secondary-level interpretation such as the possible relationship of the overland road network with shipping routes. Its aim is first and foremost to provide a baseline map based on a critical assessment of primary sources on medieval navigation for the purposes of analysis and research.

HISTORIOGRAPHICAL SUMMARY

This database draws from substantial primary source research that has been conducted by previous projects. The first comprehensive, large-scale study of medieval inland navigation was carried out by Jim Edwards for his PhD dissertation *The Transport System of Medieval England and Wales - A*

Geographical Synthesis (Edwards 1987). Edwards based his research on in-depth reading of the English royal administrative material on river traffic contained in the Calendars of State Rolls 1219–1441, including Charter, Patent, Close, Fine, Liberate, Chancery and Memoranda Rolls, along with Chancery Warrants and Inquisitions Miscellaneous. An article summation of the results, which also considered the overland road network, was published together with P.B. Hindle (Edwards & Hindle, 1993).

Edwards and Hindle's conclusion about the extent of navigated waterways was, however, criticised by John Langdon (Langdon 1993) in his study based on the Purveyance Accounts 1294–1348, which recorded the acquisition and transport of goods (e.g. grain) by the royal administration. Langdon noted that many of the instances that Edwards and Hindle had used to track navigation consisted of reports of obstructed and therefore unnavigable waterways. Such reports might be taken as indicators of desire to open a route for navigation, but do not in themselves constitute direct proof that navigation took place. From his Purveyance Account evidence Langdon constructed a much more restricted map of known inland navigation.

Yet even disregarding reports of obstructions, it is incontestable that navigation took place during the Middle Ages outside the stricter limits imposed by Langdon. A possible explanation is that silting and the proliferation of man-made obstructions (mills, fishing weirs, etc) caused a considerable decline in the navigable extent of the river network over the course of the late thirteenth and fourteenth centuries, until bulk transport was only possible approximately within a network corresponding to Langdon's evidence in those areas he surveyed (Jones 2000).

Subsequent studies have corrected and added to the known extent of inland navigation in England and Wales from documentary and archaeological sources (notably Bond 2007, Caffyn 2010), with in-depth surveys enabling a close reconstruction of historical landscapes regionally (e.g. *The Fenland Project*). New digital resources, such as the pan-European Harbour Research Environment database on datable ship and boat wrecks along rivers, extend our understanding of the use and capacity of inland waterways (Kröger 2018). The work done by Ann Cole, however, has broken the most new ground in terms of harnessing an entire category of evidence to bring new light on the subject at the national scale. Her survey of medieval place-names related to river traffic – landing places or settlement names related to keeping waterways open – has considerably extended our knowledge of the scope of historical navigation (Cole 2007, Cole 2013).

The author is grateful for the help of Dr Eleanor Rye, who has as part of the research for the *Travel & Communication in Anglo-Saxon England* project revised and edited Cole's material on river traffic from Old English charter boundaries and place-names attested before c. 1200. This evidence on the distribution of inland landing-places and riverine settlements yields important

information on the historic use of rivers, and has been incorporated as part of this database.

The overall picture that emerges from a critical review of the assembled sources is more sympathetic to that of Edwards than of Langdon in terms of its total geographical scope. A core observation of Langdon – that effective *bulk* transport was restricted to a narrower set of waterways – is however both difficult to dislodge and a reasonable interpretation of the material. River traffic of even limited scope can be expected to have been important to local communities (Blair 2007b), but there will have been a difference in the economic opportunities presented by the potential for large-scale movement of goods. A database collecting together different categories of sources must therefore acknowledge and distinguish the quality and character of the preserved evidence.

This database was first discussed in Oksanen 2017, with an accompanying image of the routes mapped at that time and an analysis of their economic and commercial context. Research since the publication of the article has resulted in amendments to the database at the level of individual routes. In terms of the total length of navigable routes this amounts to a change of some 5 percent, mostly through the addition of new river sections or canals. This has enhanced our knowledge of local transport routes, but has not resulted in a significant impact to the overall picture or analysis.

THE DATABASE OF INLAND NAVIGATION

Datasets: The database is organised into the following datasets:

direct_evidence Contains a polyline datasets of all those waterways for which there is direct documentary or archaeological evidence of navigation. In order to differentiate waterways that we know from record evidence were capable of carrying a significant level of bulk transport, all polyline segments have been marked in the attribute table 'Class' field as either *direct_evidence* or *known_bulk*.

Waterways in the *known_bulk* subclass include all routes indicated in Langdon's study of the Purveyance Accounts 1294–1348 (Langdon 1993, 2007). However, Langdon's study does not cover the west coast or the north-east. Evidence for the scope of bulk transport capacity for these areas is taken from miscellaneous toll records on foreign trade, and from lists of staple ports and ports named in requisition orders for ships with a capacity of 40 or 50 tuns (0.96 kilolitres) between 1313 and 1353. The same sources are also used as evidence of bulk transport routes over a handful of new waterways within Langdon's survey area. This creates a fully national picture of bulk transport routes covering England and Wales (Oksanen 2017). All other segments are simply marked as *direct_evidence*.

indirect_evidence Most medieval place-names originated as descriptions of landscape features and settlements, and place-names preserving descriptions of landing places or the improvement or maintenance of navigable watercourses are an additional source of evidence for navigability. This is a robust class of material for medieval navigation, but because of the problems in dating the actual use of waterways for navigation this information has been collected into a separate polyline dataset of (temporally) indirect evidence, also incorporating other important material that is difficult to locate chronologically. In this dataset, Cole's material on river traffic from Old English charter boundaries and place-names attested before c. 1250 was revised and edited, with the following place-name elements used as evidence for navigability: Old English (OE) *ēa-tūn* 'river-settlement' and its Old Norse (ON) equivalent *á-tún*, perhaps associated with keeping a watercourse open for navigation, OE *lād* where used in the sense 'artificial watercourse', and OE *hȳð* and ON *stǫð* both meaning 'landing-place' (though some instances of the latter may also simply mean 'river bank', and must be evaluated on a case-by-case basis) (Cole 2007, Cole 2013).

heads_navigation Contains a point-data dataset locating all heads of navigation for the above polyline datasets, containing further comments, chronological information on last known instances of navigation before 1348, and scholarly references.

pn_river_traffic Contains a point-data dataset of place-names related to inland navigation, derived from county place-name surveys or Anglo-Saxon charter boundaries (Cole 2007, Cole 2013). Unlike in the rest of the database, only place-names attested by c. 1200 are included in this dataset.

Sources: The database primarily records two types of evidence: direct documentary or archaeological attestations on navigation along a waterway, or place-names indicating the same. Archaeological boat finds (see Kröger, 2018; Lanting 1998; McGrail 1978) have been used with caution, and only when they the character or the archaeological context of the wreck indicates length-wise travel and transport along the waterway, as opposed to very local use such as fishing. River obstruction reports (except in the rare cases where these specifically state that a waterway was previously open for navigation), or speculative navigation based on the spatial relationship of a river to major building activity or the presence of possible but undocumented transshipment points (e.g. points where major roads cross a river) are not included. Medieval navigation canals (distinguished from drainage-specific projects) attested by documentary evidence, place-names or landscape surveys are included, but only if it has been possible to map their course reasonably securely. This database therefore seeks to present a pared-down, minimalist picture of known navigation, without seeking to fit it into interpretative models drawing from known road transport or economic activity. Acknowledging that owing to the paucity of sources the full totality of the navigated medieval waterway network

is undoubtedly impossible to ever reconstruct, the function of the database is to ground the topic with a secure starting point of attested routes.

Chronology: The chronological scope of the database extends from approximately the eleventh century to the arrival of the Black Death in England in 1348. Late medieval navigation is therefore not included and not discussed here, although recent research of the Early Modern evidence has produced an independent set of comparative evidence (Satchell *et al* forthcoming).

It must be emphasised that the database does not present a snapshot of the extent of inland navigation in any point in time. Its extent will have varied across time as natural processes and human modifications changed the character of individual sections. Rather, it collects together all direct evidence for navigation for the Central Middle Ages. Owing to the nature of the administrative sources the emphasis is on recorded activity in the late thirteenth and the first half of the fourteenth centuries. This is particularly relevant for the *known_bulk* dataset, which is directly reliant on late thirteenth to mid-fourteenth-century sources for estimating transport capacity. It should moreover be noted that the place-name evidence may potentially record navigation that took place in the Early Middle Ages but had ceased by the Central Middle Ages (Cole 2013, especially pp. 57-61 on the chronology of place-name attestations).

Mapping: Data on navigated waterways is collected into two vector polyline shapefiles, and two vector point data files given both in shapefile and either TXT or CVS format. Base mapping was taken from Ordnance Survey VectorMap District (2014) raster maps. Historical river courses were recovered from historical parish (Satchell *et al.* 2017) or county (Brookes forthcoming) boundaries, historical Ordnance Survey maps, Environment Agency LiDAR data, historical and landscape surveys, and Google Map aerial imagery (see under References, below). In a small number of instances, the physical course was not recoverable and was estimated from landscape context.

Finally, the database describes waterway courses downriver from the furthest known head of navigation. It should be borne in mind that at various times intervening obstacles may have prevented direct access from that point to the sea.

DATASETS

direct_evidence.shp

Summary description: Direct historical or archaeological evidence, such as documentary mentions shipping and travel, archaeological finds of ship transport, and canal construction. Differentiates between all known waterways and those known to be used for bulk transport.

Key to Attribute Table

FID	ESRI object unique ID number
Shape	Geometry type of feature [polyline]
Id	Unique identifier
Name	Name of the waterway
Course	Describing the sources from which the waterway course was derived. Most waterways are divided into multiple polyline segments as the source of information on the course varies along the length of the navigated route. See the list of abbreviations under References in the <i>General Guide</i> .
Head_N	The head of furthest known navigation on the waterway by navigation class. Either a place-name or the name of another waterway.
Notes	Supplementary notes on the waterway or waterway segment.
Length	Length of the waterway segment in metres.
Class	The class into which the waterway segment falls navigationally: <i>known_bulk</i> for waterways attested in the Purveyance accounts as bulk shipment routes or located downstream of major harbour sites in the first half of the fourteenth century; <i>direct_evidence</i> for all other waterways for which there is direct historical or archaeological evidence datable to c. 1000–1348; <i>indirect_evidence</i> for navigation attested by medieval place-names or on a case-by-case basis by evidence the interpretation of which is not straightforward.

indirect_evidence.shp

Summary description: principally extending the potential scope of navigation by the inclusion of place-name data pertaining to river traffic. These have been gathered into a dataset separate from *direct_evidence.shp* since the period of actual navigation cannot be directly retrieved from place-names, and in some cases may reflect activity during the Early rather than the Central Middle Ages. A number of pre-modern navigable waterways or uncertain date, or where the written or archaeological evidence strongly but not beyond all doubt suggests navigation, are also included with commentary.

Key to Attribute Table

FID	ESRI object unique ID number
Shape	Geometry type of feature [polyline]
Id	Unique identifier
Name	Name of the waterway
Course	Describing the sources from which the waterway course was derived. Most waterways are divided into multiple polyline segments as the source of information on the course varies along the length of the navigated route. See the list of abbreviations under References in the <i>General Guide</i> .
Head_N	The head of furthest known navigation on the waterway by navigation class. Either a place-name or the name of another waterway.
Notes	Supplementary notes on the waterway or waterway segment.
Length	Length of the waterway segment in metres.
Class	The class into which the waterway segment falls navigationally: <i>known_bulk</i> for waterways attested in the Purveyance accounts as bulk shipment routes or located downstream of major harbour sites in the first half of the fourteenth century; <i>direct_evidence</i> for all other waterways for which there is direct historical or archaeological evidence datable to c. 1000–1348; <i>indirect_evidence</i> for navigation attested by medieval place-names or on a case-by-case basis by evidence the interpretation of which is not straightforward.

heads_of_navigation.csv / heads_of_navigation.shp

Summary description: locating all heads of navigation for all polyline shapefiles, with the latest dates of pre-1348 navigation if known, with commentary and references.

Key to Attribute Table

FID	ESRI object unique ID number. Shapefile only
Shape	Geometry type of feature [point]. Shapefile only
Waterway	Name of the waterway
Head_Navi	The head of furthest navigation on the waterway. Either a settlement place-name or the name of another waterway.
Class	Divides the head of navigation of the waterway into three categories depending on the nature of the source material. DE: navigation known from <i>direct evidence</i> IE: <i>indirect evidence</i> KB: the waterway was a <i>known bulk</i> transport route May fall into two categories (e.g. DE, KB).
Last_Date	Last date the waterway was used for transport before 1348. If in continuous use past 1348 then this is indicated as 'post-1348'. If navigable in the Middle Ages but precise dates unknown, then 'unknown'. If information on navigation comes exclusively from medieval place-name data, then 'PN'.
Notes	Supplementary comments.
Obstruct	Information on obstructions on the waterway. Predominantly from the late thirteenth or first half of the fourteenth centuries.
References	Reference to primary or secondary sources. See <i>General Guide</i> for a bibliography and a list of abbreviations.
Easting	British National Grid easting or X coordinate
Northing	British National Grid northing or Y coordinate
Grid_Ref	British National Grid reference

pn_river_traffic.txt / pn_river_traffic.shp

Summary description: locating all sites of inland navigation from place-names and Old English charter bounds attested before *c.* 1200, with commentary and references. Like other datasets this dataset is given as a shapefile. But unlike the others it is not also given as a CSV file but as a tab delimited Unicode text file, in order to preserved special characters in Old English words such as *hȳð*. Not all GIS and other programs may be able to display special characters.

Key to Attribute Table

FID	ESRI object unique ID number. Shapefile only
Shape	Geometry type of feature [point]. Shapefile only
County	Historic (pre-1974) English county. For counties reorganised before 1974, county attributions follow those in the English Place-Name Survey volume or comparable reference work.
Headform	Modern form of place-name, or recorded form of a lost place-name or charter boundary clause landmark. Charter <i>hȳðs</i> are compiled primarily from Cole (2007), with additional names as indexed in LangScape.
LCR	'Locational Certainty Rating', an indication of the accuracy to which travel-related features can be located, based on a concept developed by Pantos (2001, 29). Levels of accuracy are indicated by the numbers 0–5, with 5 indicating the highest level of certainty. Accuracy levels are estimates, but the following is a guide to classifications: 5 – precise location, i.e. within <i>c.</i> 20m; 4 – close location, i.e. within <i>c.</i> 100m (from field-names or the convergence of archaeological or landscape features); 3 – location accurate to between 0.5 km and 1 km; 2 – location accurate to part of a parish, uncertainty of <i>c.</i> 1 km or more; 1 – location accurate to a civil parish (or equivalent); 0 – location to civil-parish level not possible.
Generic	Place-name element defining what the place named is (e.g. <i>hȳð</i> , <i>ēa-tūn</i>); in English language place-names, this is the final or only element in a place-name.
Element_1	Qualifying place-name element providing further information about the place named.
Diagnostic	Identifies the place-name element related to river traffic and gives its common form.
Transl	A translation of the place-name elements into Modern

	English.
Mupl_Etym	Indicates whether there is more than one possible etymology of the place-name.
Century	The century at which the place-name is first recorded. For attestations from Anglo-Saxon charters, this is the century from which the charter dates for charters thought to be genuine, and the century of suspected forgery (where known) or the century of the earliest copy for charters thought to be spurious. Decisions about charter authenticity were made using information available on the Electronic Sawyer (www.esawyer.org.uk).
Chrtr_Date	Real or purported date of an Anglo-Saxon charter (or later forgery); where charter survives only in a later copy, the date of the copy is given in parentheses.
Notes	Supplementary comments
References	Reference to primary or secondary sources. See <i>General Guide</i> for a bibliography and a list of abbreviations.
Easting	British National Grid easting or X coordinate
Northing	British National Grid northing or Y coordinate
Grid_Ref	British National Grid reference

METADATA

Project Metadata

ELEMENT	DESCRIPTION
Project Title	Inland Navigation in England and Wales before 1348: GIS Database
Description	A GIS database describing the extent of navigable rivers and canals in England and Wales from the eleventh century to the mid-fourteenth. The database consists of CSV point data files and ESRI polyline shapefiles that give the following information: a) navigable waterway courses, b) heads of navigation, c) place-name information related to waterway traffic.
Subject	Archaeology, cartography, communications, England, history, landing-places, map, Middle Ages, place-names, river, settlement, transport, travel, Wales
Coverage	England and Wales, MEDIEVAL, 1000–1350 CE
Creators	Eljas Oksanen
Publishers	Archaeological Data Service http://archaeologydataservice.ac.uk
Contributors	Eleanor Rye
Identifiers	--
Source	--
Dates	10th October 2018
Copyright	Eljas Oksanen
Relations	Important surveys of the evidence used include J. Edwards, 1987, <i>The Transport System of Medieval England and Wales – A Geographical Synthesis</i> ; J. Langdon, 1993, 'Inland water transport in Medieval England'; A. Cole 2007, 'The place-name evidence for water transport in Early Medieval England'; D.J.M. Caffyn, 2010, <i>River Transport 1189–1600</i> ; A. Cole, 2013, <i>The Place-name Evidence for a Routeway Network in Early Medieval England</i> . For full references see Bibliography in General Guide.
Language	English
Resource Type	Digital edition of primary source data
Format	CSV file, ESRI (ArcGIS 10.2) shapefile, pdf file, TXT file

General Metadata

ELEMENT	DESCRIPTION
Basic Information	Overall Project: <i>Travel & Communication in Anglo-Saxon England</i> project, UCL Institute of Archaeology. Lifecycle: completed archive. Language: English. Year Created: 2018. Description: Digital Database of medieval navigated rivers and canals in England and Wales. Archive Storage: Archaeology Data Service http://archaeologydataservice.ac.uk
Bibliographic Metadata	See <i>General Guide</i> for full bibliography
Resource Creators	Eljas Oksanen
Resource/Agency Identifiers	<i>Travel & Communication in Anglo-Saxon England</i> project, UCL Institute of Archaeology
Investigation Types	Research Design, Desk-based Assessment, Manual Data Entry
Site Description Information	--
Material Types	--
Cultural Terms	European Medieval
Temporal Coverage	1000–1350 CE
General Keywords	Archaeology, cartography, communications, England, history, landing-places, map, Middle Ages, place-names, river, settlement, transport, travel, Wales
Spatial Terms	England, Wales
Resource Provider	UCL Institute of Archaeology
Individual and Institutional Roles	Eljas Oksanen, e.i.oksanen@cantab.net , UCL Institute of Archaeology, Honorary Research Fellow

File-level Metadata

ELEMENT	DESCRIPTION
File name	polyline: direct_evidence.shp, indirect_evidence.shp point data: heads_of_navigation.csv, heads_of_navigation.shp, pn_river_traffic.txt, pn_river_traffic.shp pdf: general_guide.pdf, metadata.pdf
File format	CSV file, ESRI shapefile, pdf file, TXT file
Software used to create files	ESRI ArcGIS 10.2
Hardware used to create files	MacBook Air 2013
Operating System	OS X version 10.9.5
Date of creation/last update	10th October 2018
Processing History or Lineage	Original

REFERENCES

Abbreviations in Data Tables

CoCR	<i>Calendar of Close Rolls</i>
CoFR	<i>Calendar of Fine Rolls</i>
CoIM	<i>Calendar of Inquisitions Miscellaneous</i>
CoLR	<i>Calendar of Liberate Rolls</i>
CoPR	<i>Calendar of Patent Rolls</i>
County	Domesday county boundaries, by Brookes, S. (forthcoming), <i>Domesday Shires and Hundreds of England</i>
E-CIPM	<i>Inquisitions Post Mortem</i> , in the <i>Mapping the Medieval Countryside</i> electronic database at www.inquisitionspostmortem.ac.uk
Estimated	Estimated waterway course
EUS	Extensive Urban Survey maps, by town at archaeologydataservice.ac.uk/archives/view/EUS
Fenland	<i>The Fenland Project</i>
Lidar	LiDAR data, by UK Environment Agency, at data.gov.uk
OS	Ordnance Survey VectorMap District raster dataset (2014), at www.ordnancesurvey.co.uk
OS 1869	Ordnance Survey First Series one-inch map (1805–1869), at www.visionofbritain.org.uk/maps
OS 1948	Ordnance Survey of Great Britain New Popular Edition one-inch map (1945–48), at www.visionofbritain.org.uk/maps
Parish	Historical parish boundaries, by M. Satchel <i>et al.</i> 2017
p.n.	place-name
Satellite	Satellite and aerial photograph imagery, by Google Earth and Google Maps
Sawyer	The Electronic Sawyer. Online Catalogue of Anglo-Saxon Charters, at www.esawyer.org.uk

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