Constructing Parish-level Data and RSD-level Data on Transport Infrastructure in England and Wales 1851-1911

Max Satchell, Robert J. Bennett, Dan Bogart and Leigh Shaw-Taylor

aems2@cam.ac.uk   rjb7@cam.ac.uk   dbogart@uci.edu   lmws2@cam.ac.uk

University of Cambridge, Cambridge Group for the History of Population and Social Structure, Downing Place, Cambridge, CB2 3EN, UK.

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Comments are welcomed on this paper: contact the authors as above.

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1. Introduction

The development of transport infrastructure was a key change influencing and interacting with the development of the British economy over the nineteenth century. New infrastructure had profound impacts on every walk of life, but was critical for business development. The aim of this paper is to construct a database of the infrastructure at continuous parish and Registration Sub-District level that can be used to assess interactions with changes in the location and structure of business proprietors in England and Wales as part of the ESRC-supported project ES/M010953 'Drivers of Entrepreneurship and Small Businesses'.

The paper documents how the database was constructed to capture the key changes in the rail, waterway and road systems at each Census time point 1851-1911 for England and Wales. The database is defined at the level of specific spatial units that relate to the units used for the Population Census. These spatial units then allow data on entrepreneurs (or other information that other users may wish to use) to be analysed within the same units on a uniform geographical basis. Much of the original spatial data is available as continuous raster information which does not require spatial units; and it is accepted that imposing a spatial structure on these data has disadvantages. But the advantage of a spatial structure is that it allows ready analysis of infrastructure in conjunction with other data that is only available at the level of specific spatial units (or is only available at this time before fuller individual geocoding of other data is made available).

The spatial units used are at the level of the census parish and the Registration Sub-District. The census parish was the smallest unit generally available in the published Census, and is the smallest unit for which much other information is usually available for nineteenth century Britain.

The parish level can be aggregated up to other Census units, or to other larger scale units if required. As well as some analysis at parish level, much of the research for the Entrepreneurship Project is undertaken as the level of Registration Sub-Districts (RSDs) because this often combines residential location (which is known from the Census) and the business location of an entrepreneur (which is not recorded in the Census unless it is the same as the residence) (see WP 1). The RSD GIS data was produced by Joe Day for the *Atlas of Victorian Fertility Decline* Project using GIS files deriving from Satchell et al. (2016):[1] see the Acknowledgements section at end of this paper for all data file sources.

Much of the original transport data used in this paper was created by a research project at the Cambridge Group for the History of Population and Social Structure (Campop): *Transport, urbanization and economic development in England and Wales c.1670-1911* led by Leigh Shaw-Taylor (PI) and Dan Bogart (Co-I), funded by the Leverhulme Trust and the National Science Foundation.[2] The aim of this project was to capture within a GIS the improvements in transport infrastructure over a longer period: c.1680-1911.[3] These GIS databases include data on railways, navigable rivers, canals, ports, turnpike roads, and first class roads in 1911. Some of these GIS datasets are snapshots of the transport network for a single year, other are dynamic in providing annual data for a number of years. In addition to this major starting point for transport data, the ESRC entrepreneurship project funded new GIS work on coasts, and additional GIS work on the Campop transport project data for navigable waterways and ports prior to the main desired output which was allocating transport data to parish-level and RSD units.

Section 2 of this paper outlines the aims of the database construction and methodology in more detail. Section 3 outlines how each dataset was derived and coded as a parish-level database: respectively for ports, turnpikes, first class roads, railway lines, railway stations, waterways

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[1]   Day, J.D. Registration sub-district boundaries for England and Wales 1851-1911 (2016). This dataset was created by the 'Atlas of Victorian Fertility Decline' project (PI: A.M. Reid) with funding from the ESRC (ES/L015463/1). The Day dataset has been created using Satchell, M., Kitson, P.M.K., Newton, G.H., Shaw-Taylor, L., and Wrigley E.A., 1851 England and Wales census parishes, townships and places (2016) available at: https://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html. The Satchell *et al* dataset is an enhanced version of Burton, N, Westwood J., and Carter P., GIS of the ancient parishes of England and Wales, 1500-1850. Colchester, Essex: UK Data Archive (May 2004), SN 4828, which is a GIS version of Kain, R.J.P., and Oliver, R.R., Historic parishes of England and Wales: An electronic map of boundaries before 1850 with a gazetteer and metadata. Colchester, Essex: UK Data Archive, May, 2001. SN 4348.

[2] Leverhulme Trust Grant (RPG-2013-093). 'Transport, Urbanization and Economic Development c.1680-1911': L. Shaw-Taylor, PI. E.A Wrigley and Dan Bogart (UC Irvine) Co-Is. National Science Foundation Grant (**SES**-1260699). 'Modelling the Transport Revolution and the Industrial Revolution in England': Dan Bogart PI; Higher Education Impact Fund Grant. 'Cambridge e-Resources for teaching economic history and historical economic geography in secondary schools ': L. Shaw-Taylor PI.

[3] https://www.campop.geog.cam.ac.uk/research/projects/transport/

(canals, navigable rivers, etc.), and coasts. Section 4 summarises the final database structure. Section 5 summarises the RSD transport datasets which were created in the same way as the parish datasets.

2. General Aims and methodology

The central aim of this paper is to document how parish and RSD level transport codes were generated. They derive from calculating the intersection between, and proximity of, the Campop Continuous Parish (ConParID) (explained below) and RSD GIS shapefiles with the principal transport infrastructure GIS datasets created or enhanced by the Campop Transport Project. This was undertaken in a series of stages as outline below, and covers England and Wales only.

2.1 Preparation of ConparIDs

The primary output of the research undertaken in this paper is a set of transport data at continuous parish level, based on Campop Continuous Parish GIS shapefiles for 1851-1891 and 1901-1911 in I-CeM. These are referred to as ConparID shapefiles. The ConparIDs are aggregations of parish units that provide an identical geographical coverage, thus avoiding any spatial discontinuities in boundaries over time, following the method developed by Wrigley (2011).[4] Many parishes stay the same, but some have to be aggregated into larger units over time because of substantive change to their boundaries and constituent populations in the wake of boundary reform legislation of 1876, 1879, 1882, 1894 and 1895. These continuous units then provide a comparable set of spatial units, whereas using the original parishes in each case would lead to varying spatial coverage. The administrative changes have a complex history, and the creation of continuous units was a complex task discussed by Satchell et al.[5] The longer the period covered

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[4] Wrigley, E.A. (2011) *The Early English Censuses*. Oxford: Oxford University Press.

[5] M. Satchell, G. Newton, E.A. Wrigley, K. Schürer, C. Roughey, M. Anderson, L. Shaw-Taylor, 'Continuous Parish Units of England, Wales and Scotland 1851-1891 shapefile' (2013). A description of the dataset can be found in M. Satchell, 'Continuous Parish Units of England, Wales and Scotland 1851-1891 GIS shapefile documentation' (2017) available at: https://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html; M. Satchell, G. Newton, E.A. Wrigley, K. Schürer, C. Roughey, M. Anderson, L. Shaw-Taylor, 'Continuous Parish Units of England, Wales and Scotland 1901-1911 shapefile' (2013). A description of the dataset can be found in M. Satchell, 'Continuous Parish Units of England, Wales and Scotland 1901-1911 GIS shapefile documentation' (2018) available at: https://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html. The Continuous Parish Units datasets have been created using Satchell, M., Kitson, P.M.K., Newton, G.H., Shaw-Taylor, L., and Wrigley E.A., '1851 England and Wales census parishes, townships and places shapefile' (2016). A description of the dataset can be found in M. Satchell, '1851 England and Wales census parishes, townships and places: documentation' (2016):

ESRC project ES/M010953: WP 16: Satchell et al.: **Parish-level transport data 1851-1911,** Cambridge University.

by a continuous unit the more units will generally need to be aggregated as a result of the longer period of administrative reforms that have taken place, which undermines the aim of having a fine scale of spatial resolution. For England and Wales this becomes a particularly problematic from the 1890s as major reforms of parish boundaries occurred, mainly to cope with major urban change. Many historic urban parishes were subdivided, aggregated with others in more rural areas, and new parishes created. In addition many other parishes underwent more modest boundary change. Because of the extensive changes for the 1890s, a comparable series of units up to that time gives more and smaller ConparIDs. Because of these issues, two sets of ConparIDs shapefiles for 1851-1891 and 1901-1911 are used; the 1901-1911 period gives a smaller number of units, some of which are significantly aggregated especially in London and other major urban areas.

Before the spatial analysis could begin it was necessary to determine how the Continuous Parish units were to be treated for transport coding. This required a number of decisions. First, two polygons in the Campop files which lacked a ConparIDs in the 1851-91 and 1901-1911 datasets were deleted from the analysis.

Second, and more serious and complex issue, was multipart polygons. These arise from the administrative history of the period. For various historical reasons, a parish could have a detached part elsewhere, usually within the boundary of a neighbouring parish but sometimes at considerable distance. These detached sections form part of the part of the *1851 England and Wales census parishes, townships and places shapefile* (hereafter EWCP) from which the Continuous parish GIS was assembled. As a consequence, some ConPar units end up as 'multipart' polygons. These are polygonal units represented by a single line of attribute data in the shapefile's table but whose spatial polygonal data occupies two or more distinct and discrete locations. Multipart polygons cause problems for spatial analysis because the principal settlement is usually within the largest polygon and the smaller detached polygons can lie a considerable distance away. ConPar1851-1891 ID 057 represents an extreme example as it consists of polygons that lie 18 miles apart from each other. A centroid generated from such a multipart polygon will lie well beyond the principal settlement, and in neither polygon part, leading to

https://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html. The Satchell *et al* dataset is an enhanced version of Burton, N, Westwood J., and Carter P., GIS of the ancient parishes of England and Wales, 1500-1850. Colchester, Essex: UK Data Archive (May 2004), SN 4828, which is a GIS version of Kain, R.J.P., and Oliver, R.R., Historic parishes of England and Wales: An electronic map of boundaries before 1850 with a gazetteer and metadata. Colchester, Essex: UK Data Archive, May, 2001. SN 4348.

distorted spatial data. A substantial minority of the ConPar GIS are multipart polygons. Of the 12,719 unique ConPar units for 1851-1891, 1,354 (10.64%) of them are represented by two or more polygons. Of the 11,525 unique ConPar units for 1901-1911, 1,218 (10.56%) of them are represented by two or more polygons. A decision was made to select the largest polygons of the ConPars and run all intersection and proximity analyses on them. This represents an 'imperfect fix'. Some of the excluded polygons derived from instances where a Conpar unit consisted of two polygons only because it was subdivided by a tidal river channel. This is exacerbated by the Campop ConparIDs deriving from a shapefile digitised to the upper tidal limit of the coastline making some sections of coastline very indented. Given more time and resources it would be possible to re-incorporate some of these excluded estuarine polygons into the analysis. However, it is important not to overstate these problems. For the 1901-1911 ConParID dataset the problem of estuarine or coastal multipart polygons on the coast, led to the deletion of only 93 polygons and only 14 of which were over 1000 acres in area.

In addition to problems caused by multipart polygons, the shapes of polygons themselves can occasionally cause issues. Because the transport coding is intended to work for distances using a defined parish centroid, this can result in anomalies. Where a polygon has a particularly irregular shape, for example, an 'L' shape, it is possible for its centroid to lie outside the polygon. To guard against this the 'INSIDE' option in the dialog box of the Feature to Point tool of ArcMap 10.4 was checked (i.e. the point_location parameter is set to INSIDE). This ensured that for each ConPar polygon the centroid point used to generate data will always be inside its parent polygon. The RSD polygons were more straightforward to use. The RSD shapefiles were used for analysis exactly the same as the CONPAR shapefiles with the exception of the issue of multipart polygons. Multipart polygons were not a significant problem for the RSD datasets because the RSDs are generally much larger. This meant that the RSD polygons could be used without further editing. In passing it should be noted that as a census unit the RSDs of England and Wales are fairly disaggregated, with 2009-2190 units for each census year from 1851 to 1911. However the RSDs were based on poor law unions and were designed to combine where possible urban and rural settlements so they not only conflate physical regions but they mix urban and rural as well. Quantifying the relationship between towns and RSDs is helpful in thinking about the spatial relationships between the transport data, the extent of urban land, and the typical size of the unit of analysis. Of the 2009 RSDs extant in 1911, 1198 either are encompassed by or intersect with the outline of a town or city. In most areas they are large and predominantly non-urban having a mean size of 14,460.1 acres. They are a bit smaller than the RSDs which do not intersect with

towns. These have a mean size of 25,598.9 acres. Sixty-one RSDs (61) are wholly encompassed by the built-up area of a town or city. These RSDs are very small having a mean size of 484 acres. Given the sheer size of most RSDs it is to be expected that they will have a far greater degree of intersection with nearly all modes of transport infrastructure than the great majority of CONPAR units which are far smaller.

2.2 Creating the Transport Data Intersection and Proximity Data

All GIS work was done using the ESRI ArcMap 10.4 software. First, a query was run which indicated all those ConPar and RSD polygons which intersected with the transport dataset in question using the "Select by location" dialog box with the spatial selection method for target features set to "intersect source layer feature". If they did, this was indicated by a 'Y' in the Intersect column of the ConPar and RSD GIS table. If they did not intersect, this was indicated by 'N' in the Intersect column of the tables. The results of this exercise were then exported as a series of dbf (dbaseIV) tables. All files were exported as dbf files as there may be line slippage if tables are exported in a text file format from ArcMap 10.4.

The second set of queries concerned the Euclidean (straight line) distance from the polygon centroid of each largest ConPar polygon and RSD polygon to the nearest element of the transport dataset in question. This query was executed using the 'Near tool' of ArcToolbox (ArcToolbox/ Analysis Tools/ Proximity/ Near). This exercise led to the generation of a distance column in metres. No attempt was made to control for effects of straight line distance anomalies, such as straight line transport distances going over obstacles, such as arms of the sea, lakes, rivers without bridges etc. In most instances, which columns in the output data contain what data will be obvious, but this has been detailed table by table in this paper. Checks were then carried out on all the datasets to confirm all data was present, that output tables have the correct number of rows, and that their field names are those in this document. This should eliminate most common type of errors. For the ports dataset it has also been checked that the total number of ports which intersect with ConPar polygons is the same as the number of ports in the original datasets. Further post-construction checks have been carried, but other users should be aware that there may remain some data anomalies that should be corrected when they are discovered.

3. The Datasets

3.1 Ports

For the needs of the Entrepreneurship Project the main element that required is location of a port, and distance of each ConParID parish and RSD to that port. Data classifying ports and information of their size and volume of shipping is being added as a separate exercise. The ports data is derived from a GIS of point data for ports.[6] The location of ports and their distances to each ConPar parish and RSD is generated from the intersection ports' with ConPar and RSD polygons. Distance data for ConPar units and RSDs was generated where they lay within a putative "close direct catchment" area in terms of their likely interaction with business proprietorship. Distance to a port as a more general logistics issue for transport of goods and passengers was not the focus of this coding. Rather the focus is on the immediate catchment of a port where a business would be directly related to port labour markets and entrepreneurship on a daily basis, particularly where most proprietors would live and their port-related business might be located. Clearly this misses some more distant port effects at greater distances, particularly for the largest ports, but it creates a distance measure of the most likely main effects of port will occur.

Using this approach, ConparIDs and RSDs whose centroids lay within 10 miles of a port were calculated, and the port's name was preserved in the attribute data for later classification. This was done using the Point Distance tool in ArcToolbox (ArcToolbox/ Analysis Tools/ Proximity/ Point Distance). The port GIS derives from HistoricalPorts_20170825 shapefile kindly supplied by Eduard Alvarez which consists of 506 ports. However two issues had to be dealt with before presence/absence and 10 mile proximity data could be generated. First, the original dataset consists of 506 *British* ports so it was necessary to remove from the dataset those which lay beyond a distance of ten miles from England and Wales. This generated a dataset of 395 ports. Second, some of the English and Welsh ports point data actually lay outside ConPar largest polygons and RSDs datasets. In most instances this was due to small discrepancies (300 metres or less) between the location of the port point and the c.1830 coastline of the ConPar largest

polygons and RSDs datasets. In these instances the port point co-ordinates were programmatically shifted to the nearest part of the ConPar largest polygons dataset. The remaining discrepancies arose because the port lay within smaller deleted polygons of multi-polygon ConPar units. Most of these ports were landing places on small islands. In these instances, the ports were deleted. This left 392 ports on which the analysis was conducted for 1851-1891 ConPar dataset and 386 ports for the 1901-1911 ConPar dataset. The 392 ports were used for the RSD datasets. It should also be noted that the Alvarez et al dataset represents all known ports in England and Wales from the date of 1565 to the present so that a wide range of ports are included, some of which may be defunct by the 1851-1911 period. In the future it would be good if the ports were further classified in terms of date, if further analysis were to be attempted. The ports data falls into four groups for the ConPar output and 14 groups for the RSD output:

CONPAR output:

Ports/ Presence/Absence of Ports from Largest ConPar polygons

PortsConPar1851_1891_presenceabsenceports_NumberPortsperConParpolygon.dbf

Field	Format	Description
OID		Object ID
ConPar1851	Double	ConPar1851-1891 Largest Polygon ID
Port	Text	The intersection of ConPar1851-1891 largest polygon with a port is indicated by "Y". ConPar1851-1891 largest polygons which do not intersect with a port are indicated by a "N"
PortNo	Long Integer	Number of ports per ConPar1851-1891 largest polygon.

PortsConPar1901_1911_presenceabsenceports_NumberPortsperConParpolygon.dbf

Field	Format	Description
OID		Object ID
Conparid	Double	ConPar1901-1891 Largest Polygon ID
Port	Text	The intersection of ConPar1901-1911 largest polygon with a port is indicated by "Y". ConPar1901-1911 largest polygons which do not intersect with a port are indicated by a "N"
PortNo	Long Integer	Number of ports per ConPar1901-1911 largest polygon.

Ports/ Distance of Each Port to Largest ConPar Polygon Centroids Within 10 miles

FinalPorts27082017_DistanceEachPorttoAllLargestPolygonConParCentroids1851_1891_10MileRadius.dbf

Field	Format	Description
OID		Object ID
Name	Text	Name of port
ConPar1851	double	ConPar1901-1911 Largest Polygon Centroid ID
PortCPDist	double	Distance (metres) between port points GIS and ConPar1901-1911 Largest Polygon Centroid if the latter is within 10 miles of the former

FinalPorts27082017_DistanceEachPorttoAllLargestPolygonConParCentroids1851_1911_10MileRadius.dbf

Field	Format	Description
OID		Object ID
Name	Text	Name of port
Conparid	double	ConPar1901-1911 Largest Polygon Centroid ID
PortCPDist	double	Distance (metres) between port points GIS and ConPar1901-1911 Largest Polygon Centroid if the latter is within 10 miles of the former

RSD Output

Ports/ Presence/Absence of Ports and Number of Ports per RSD

PortsRSDs1851presenceabsenceports_NumberPortsperRSD

Field	Format	Description
OID		Object ID
CEN_1851	Double	1851 RSD ID
Port	Text	The intersection of RSD polygon with a port is indicated by "Y". RSD polygons which do not intersect with a port are indicated by a "N"
PortNo	Long Integer	Number of ports per RSD.

PortsRSDs1861presenceabsenceports_NumberPortsperRSD

Field	Format	Description
OID		Object ID
CEN_1861	Double	1861 RSD ID
Port	Text	The intersection of RSD polygon with a port is indicated by "Y". RSD polygons which do not intersect with a port are indicated by a "N"
PortNo	Long Integer	Number of ports per RSD.

PortsRSDs1871presenceabsenceports_NumberPortsperRSD

Field	Format	Description
OID		Object ID
CEN_1871	Double	1871 RSD ID
Port	Text	The intersection of RSD polygon with a port is indicated by "Y". RSD polygons which do not intersect with a port are indicated by a "N"
PortNo	Long Integer	Number of ports per RSD.

PortsRSDs1881presenceabsenceports_NumberPortsperRSD

Field	Format	Description
OID		Object ID
CEN_1881	Double	1881 RSD ID
Port	Text	The intersection of RSD polygon with a port is indicated by "Y". RSD polygons which do not intersect with a port are indicated by a "N"
PortNo	Long Integer	Number of ports per RSD.

PortsRSDs1891presenceabsenceports_NumberPortsperRSD

Field	Format	Description
OID		Object ID
CEN_1891	Double	1891 RSD ID
Port	Text	The intersection of RSD polygon with a port is indicated by "Y". RSD polygons which do not intersect with a port are indicated by a "N"
PortNo	Long Integer	Number of ports per RSD.

PortsRSDs1901presenceabsenceports_NumberPortsperRSD

Field	Format	Description
OID		Object ID
CEN_1901	Double	1901 RSD ID
Port	Text	The intersection of RSD polygon with a port is indicated by "Y". RSD polygons which do not intersect with a port are indicated by a "N"
PortNo	Long Integer	Number of ports per RSD.

PortsRSDs1911presenceabsenceports_NumberPortsperRSD

Field	Format	Description
OID		Object ID
CEN_1911	Double	1911 RSD ID
Port	Text	The intersection of RSD polygon with a port is indicated by "Y". RSD polygons which do not intersect with a port are indicated by a "N"
PortNo	Long Integer	Number of ports per RSD.

Ports/ Distance of Each Port to RSD Centroids Within 10 miles

Ports_DistanceEachPortto1851RSDCentroidsWithin10miles.dbf

Field	Format	Description
OID		Object ID
CEN_1851	double	1851 RSD centroid ID
NEAR_DIST	double	Distance (metres) between port points GIS and RSD centroid if the latter is 10 miles or less of the former. RSD centroids further than 10 miles from the nearest port are indicated by "-1"
Name	text	Name of port (if any)

Ports_DistanceEachPortto1861RSDCentroidsWithin10miles.dbf

Field	Format	Description
OID		Object ID
CEN_1861	double	1861 RSD centroid ID
NEAR_DIST	double	Distance (metres) between port points GIS and RSD centroid if the latter is 10 miles or less of the former. RSD centroids further than 10 miles from the nearest port are indicated by "-1"
Name	text	Name of port (if any)

Ports_DistanceEachPortto1871RSDCentroidsWithin10miles.dbf

Field	Format	Description
OID		Object ID
CEN_1871	Double	1871 RSD centroid ID
NEAR_DIST	Double	Distance (metres) between port points GIS and RSD centroid if the latter is 10 miles or less of the former. RSD centroids further than 10 miles from the nearest port are indicated by "-1"
Name	Text	Name of port (if any)

Ports_DistanceEachPortto1881RSDCentroidsWithin10miles.dbf

Field	Format	Description
OID		Object ID
CEN_1881	double	1881 RSD centroid ID
NEAR_DIST	double	Distance (metres) between port points GIS and RSD centroid if the latter is 10 miles or less of the former. RSD centroids further than 10 miles from the nearest port are indicated by "-1"
Name	text	Name of port (if any)

Ports_DistanceEachPortto1891RSDCentroidsWithin10miles.dbf

Field	Format	Description
OID		Object ID
CEN_1891	double	1891 RSD centroid ID
NEAR_DIST	double	Distance (metres) between port points GIS and RSD centroid if the latter is 10 miles or less of the former. RSD centroids further than 10 miles from the nearest port are indicated by "-1"
Name	text	Name of port (if any)

Ports_DistanceEachPortto1901RSDCentroidsWithin10miles.dbf

Field	Format	Description
OID		Object ID
CEN_1901	double	1901 RSD centroid ID
NEAR_DIST	double	Distance (metres) between port points GIS and RSD centroid if the latter is 10 miles or less of the former. RSD centroids further than 10 miles from the nearest port are indicated by "-1"
Name	text	Name of port (if any)

Ports_DistanceEachPortto1911RSDCentroidsWithin10miles.dbf

Field	Format	Description
OID		Object ID
CEN_1911	double	1911 RSD centroid ID
NEAR_DIST	double	Distance (metres) between port points GIS and RSD centroid if the latter is 10 miles or less of the former. RSD centroids further than 10 miles from the nearest port are indicated by "-1"
Name	text	Name of port (if any)

3.2 Turnpikes

The turnpike GIS used here represents the extent of the turnpike network in 1851. A handful of turnpike trusts added new sections of road between 1852 and 1890, while at the same time turnpike roads were taken over by other administrations (dis-turnpiked) with the last trust being wound up in 1895. The value of the turnpike data is as a baseline for the start of the 1851 period of analysis. These data are derived from Rosevear et al. (2017).[7] To keep the data simple, the small

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sections of later turnpikes have not been included in the analysis because in each instance the ConPar units with the new section of road had a pre-existing section of turnpike within them. Also it would have been necessary to generate time slices of the turnpike network for each census year which logically would have to exclude roads dis-turnpiked after 1851 as well. In its current state the data for dis-turnpiking after c.1880 is inadequate to generate the requisite turnpike GIS for 1881 and 1891. But since dis-turnpiking was only partially related to traffic flows, it is not an essential element for subsequent analysis. What the turnpike data provide is a baseline of the main road system in 1851. The turnpikes data fall into four groups for the ConPar output and 14 groups for the RSD output:

ConPar Data

Turnpikes/ ConPar Largest Polygons Presence Absence of Turnpikes

TurnpikeConPar1851_1891largestpolygon_PresenceAbsenceTurnpikes.dbf

Field	Format	Description
OID		Object
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
Intersect	Text	Intersection of the ConPar1851_1891largestpolygon with the turnpikes GIS indicated by "Y". Non-intersection by "N"

TurnpikeConPar1901_1911largestpolygon_PresenceAbsenceTurnpikes.dbf

Field	Format	Description
OID		Object
Conparid	Double	ID of ConPar1901_1911largestpolygon
Intersect	Text	Intersection of the ConPar1901_1911largestpolygon with the turnpikes GIS indicated by "Y". Non-intersection by "N"

Turnpikes/ ConPar Largest Polygon Centroids Distance to Nearest Turnpike

TurnpikeConPar1951_1891largestpolygoncentroid_DistanceToNearestTurnpike.dbf

Field	Format	Description
OID		Object
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
NEAR_DIST	Text	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest turnpike

TurnpikeConPar1901_1911largestpolygoncentroid_DistanceToNearestTurnpike.dbf

Field	Format	Description
OID		Object
Conparid	Double	ID of ConPar1901_1911largestpolygon
NEAR_DIST	Text	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest turnpike

RSD Data

Turnpikes/ RSD Polygons Presence/ Absence of Turnpikes

1851RSDsPresenceAbsenceTurnpikes.dbf

Field	Format	Description
OID		Object ID
CEN_1851	Double	1851RSD ID
Intersect	Text	Intersection of RSD polygon with the turnpikes GIS indicated by "Y". Non-intersection by "N"

1861RSDsPresenceAbsenceTurnpikes.dbf

Field	Format	Description
OID		Object ID
CEN_1861	Double	1861RSD ID
Intersect	Text	Intersection of RSD polygon with the turnpikes GIS indicated by "Y". Non-intersection by "N"

1871RSDsPresenceAbsenceTurnpikes.dbf

Field	Format	Description
OID		Object ID
CEN_1871	Double	1871RSD ID
Intersect	Text	Intersection of RSD polygon with the turnpikes GIS indicated by "Y". Non-intersection by "N"

1881RSDsPresenceAbsenceTurnpikes.dbf

Field	Format	Description
OID		Object ID
CEN_1881	Double	1881RSD ID
Intersect	Text	Intersection of RSD polygon with the turnpikes GIS indicated by "Y". Non-intersection by "N"

1891RSDsPresenceAbsenceTurnpikes.dbf

Field	Format	Description
OID		Object ID
CEN_1891	Double	1891RSD ID
Intersect	Text	Intersection of RSD polygon with the turnpikes GIS indicated by "Y". Non-intersection by "N"

1901RSDsPresenceAbsenceTurnpikes.dbf

Field	Format	Description
OID		Object ID
CEN_1901	Double	1901RSD ID
Intersect	Text	Intersection of RSD polygon with the turnpikes GIS indicated by "Y". Non-intersection by "N"

1911RSDsPresenceAbsenceTurnpikes.dbf

Field	Format	Description
OID		Object ID
CEN_1911	Double	1911RSD ID
Intersect	Text	Intersection of RSD polygon with the turnpikes GIS indicated by "Y". Non-intersection by "N"

Turnpikes/ RSD Polygon Centroids Distance to Nearest Turnpikes

RSD1851centroids_DistanceToNearestTurnpike.dbf

Field	Format	Description
OID		Object ID
CEN_1851	Double	1851 RSD ID
NEAR_DIST	Text	Distance (metres) from RSD centroid to nearest turnpike

RSD1861centroids_DistanceToNearestTurnpike.dbf

Field	Format	Description
OID		Object ID
CEN_1861	Double	1861 RSD ID
NEAR_DIST	Text	Distance (metres) from RSD centroid to nearest turnpike

RSD1871centroids_DistanceToNearestTurnpike.dbf

Field	Format	Description
OID		Object ID
CEN_1871	Double	1871 RSD ID
NEAR_DIST	Text	Distance (metres) from RSD centroid to nearest turnpike

RSD1881centroids_DistanceToNearestTurnpike.dbf

Field	Format	Description
OID		Object ID
CEN_1881	Double	1881 RSD ID
NEAR_DIST	Text	Distance (metres) from RSD centroid to nearest turnpike

RSD1891centroids_DistanceToNearestTurnpike.dbf

Field	Format	Description
OID		Object ID
CEN_1891	Double	1891 RSD ID
NEAR_DIST	Text	Distance (metres) from RSD centroid to nearest turnpike

RSD1901centroids_DistanceToNearestTurnpike.dbf

Field	Format	Description
OID		Object ID
CEN_1901	Double	1901 RSD ID
NEAR_DIST	Text	Distance (metres) from RSD centroid to nearest turnpike

RSD1911centroids_DistanceToNearestTurnpike.dbf

Field	Format	Description
OID		Object ID
CEN_1911	Double	1911 RSD ID
NEAR_DIST	Text	Distance (metres) from RSD centroid to nearest turnpike

3.3 First Class Roads

These roads data derive from a GIS shapefile created as part of the Urbanization and Transport Project - M. Satchell, et al. (2018).[8] They represent first class roads as mapped by the Ordnance Survey 1: 63,360 third edition series. This was surveyed between 1890 and 1914, with the majority of the surveying being done in the first decade of the twentieth century. This provides a valid dataset for the *c*.1911 date since, with the exception of some new roads to railway stations, the network of first class roads did not change a great deal in this period. It should be remembered that the classification by the Ordnance Survey of roads as "first class" was usually indicative of public trunk roads with a metalled surface traffic sufficient for "fast traffic" - carriages and light carts could traverse them at a trot - but it was not in itself an indicator of the *volume* of traffic. The Ordnance Survey only began to publish road classifications based on traffic data following the traffic census of 1922.[9] The *c*. 1911 first class roads data falls into four groups for the ConPar output and 14 groups for the RSD output:

ConPar Data

First Class Roads/ RSD ConPar Largest Polygons Presence/Absence 1st Class Roads

Roads1stClass1911ConPar1851_1891largestpolygon_PresenceAbsence1stclassroads

Field	Format	Description
OID		Object
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
Intersect	Text	Intersection of the ConPar1851_1891largestpolygon with the Roads 1st Class 1911 GIS indicated by "Y". Non-intersection by "N"

Roads1stClass1911ConPar1901_1911largestpolygon_PresenceAbsence1stclassroads

Field	Format	Description
OID		Object
Conparid	Double	ID of ConPar1901_1891largestpolygon
Intersect	Text	Intersection of the ConPar1901_1891largestpolygon with the Roads 1st Class 1911 GIS indicated by "Y". Non-intersection by "N"

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[8] M. Satchell, A. Rosevear, B. Küçükbaşlar, E. Alvarez, D. Bogart, L. Shaw-Taylor, 'First class roads of England and Wales c. 1911' (2017). A description of the dataset can be found in M. Satchell, 'First class roads of England and Wales c. 1911' GIS shapefile documentation' (2018) available at:
http://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html.
[9] Y. Hodson, 'Coloured Roads on Ordnance Survey First Edition 1:2500 Plans and One-Inch Maps 1897-1935, and the Rights of Way Disclaimer', *The Cartographic Journal*, 42 (2005), 85-110; R. Oliver, 'The One-Inch Revision Instructions of 1896', *Sheetlines*, 66 (2003), 11-25: p. 16; Ministry of Transport, *Traffic Census (Road Traffic Census 1922) Report Including tables of statistics of traffic Recorded on Class I roads in Great Britain during August 1922* (HMSO, 1924)

First Class Roads/ ConPar Largest Polygon Centroids Distance to Nearest First Class Road

Roads1stClass1911ConPar1851_1891largestpolygoncentroid_DistancetoNearest1stClassRoad

Field	Format	Description
OID		Object ID
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
NEAR_DIST	Text	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1911 1st class road

Roads1stClass1911ConPar1901_1911largestpolygoncentroid_DistancetoNearest1stClassRoad

Field	Format	Description
OID		Object ID
Conparid	Double	ID of ConPar1901_1911largestpolygon
NEAR_DIST	Text	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1911 1st class road

RSD data

First Class Roads/ RSD Polygons Presence/Absence of First Class Roads

RSDs1851PresenceAbsence1stclassroads.dbf

Field	Format	Description
OID		Object
CEN_1851	Double	ID of 1851 RSD
Intersect	Text	Intersection of 1851 RSDs with the Roads 1st Class 1911 GIS indicated by "Y". Non-intersection by "N"

RSDs1861PresenceAbsence1stclassroads.dbf

Field	Format	Description
OID		Object
CEN_1861	Double	ID of 1861 RSD
Intersect	Text	Intersection of 1861 RSDs with the Roads 1st Class 1911 GIS indicated by "Y". Non-intersection by "N"

RSDs1871PresenceAbsence1stclassroads.dbf

Field	Format	Description
OID		Object
CEN_1871	Double	ID of 1871 RSD
Intersect	Text	Intersection of 1871 RSDs with the Roads 1st Class 1911 GIS indicated by "Y". Non-intersection by "N"

RSDs1881PresenceAbsence1stclassroads.dbf

Field	Format	Description
OID		Object
CEN_1881	Double	ID of 1881 RSD
Intersect	Text	Intersection of 1881 RSDs with the Roads 1st Class 1911 GIS indicated by "Y". Non-intersection by "N"

RSDs1891PresenceAbsence1stclassroads.dbf

Field	Format	Description
OID		Object
CEN_1891	Double	ID of 1891 RSD
Intersect	Text	Intersection of 1891 RSDs with the Roads 1st Class 1911 GIS indicated by "Y". Non-intersection by "N"

RSDs1901PresenceAbsence1stclassroads.dbf

Field	Format	Description
OID		Object
CEN_1901	Double	ID of 1901 RSD
Intersect	Text	Intersection of 1901 RSDs with the Roads 1st Class 1911 GIS indicated by "Y". Non-intersection by "N"

RSDs1911PresenceAbsence1stclassroads.dbf

Field	Format	Description
OID		Object
CEN_1911	Double	ID of 1911 RSD
Intersect	Text	Intersection of 1911 RSDs with the Roads 1st Class 1911 GIS indicated by "Y". Non-intersection by "N"

First Class Roads/ RSD Centroids Distance to Nearest First Class Roads

RSD1851centroids_DistanceToNearest1stclassroads.dbf

Field	Format	Description
OID		Object ID
CEN_1851	Double	ID of 1851 CEN
NEAR_DIST	Text	Distance (metres) from 1851 RSD centroid to nearest 1911 1st class road

RSD1861centroids_DistanceToNearest1stclassroads.dbf

Field	Format	Description
OID		Object ID
CEN_1861	Double	ID of 1861 CEN
NEAR_DIST	Text	Distance (metres) from 1861 RSD centroid to nearest 1911 1st class road

RSD1871centroids_DistanceToNearest1stclassroads.dbf

Field	Format	Description
OID		Object ID
CEN_1871	Double	ID of 1871 CEN
NEAR_DIST	Text	Distance (metres) from 1871 RSD centroid to nearest 1911 1st class road

RSD1881centroids_DistanceToNearest1stclassroads.dbf

Field	Format	Description
OID		Object ID
CEN_1881	Double	ID of 1881 CEN
NEAR_DIST	Text	Distance (metres) from 1881 RSD centroid to nearest 1911 1st class road

RSD1891centroids_DistanceToNearest1stclassroads.dbf

Field	Format	Description
OID		Object ID
CEN_1891	Double	ID of 1891 CEN
NEAR_DIST	Text	Distance (metres) from 1891 RSD centroid to nearest 1911 1st class road

RSD1901centroids_DistanceToNearest1stclassroads.dbf

Field	Format	Description
OID		Object ID
CEN_1901	Double	ID of 1901 CEN
NEAR_DIST	Text	Distance (metres) from 1901 RSD centroid to nearest 1911 1st class road

RSD1911centroids_DistanceToNearest1stclassroads.dbf

Field	Format	Description
OID		Object ID
CEN_1911	Double	ID of 1911 CEN
NEAR_DIST	Text	Distance (metres) from 1911 RSD centroid to nearest 1911 1st class road

3.4 Railway Data

The dataset for railway lines and stations was created from Marti-Henneberg et al. (2017).[10] It includes all public overland lines but not the London Underground. If a line or station closes in a census year, it is excluded from the data for that year even though it could have closed after the taking of the census. Likewise, if a line opens in a census year, it is included in the data for that year, even though it could have opened after the taking of the census. Unlike all the other transport datasets, the rail GIS covers all of Britain not just England and Wales. This creates minor issues in the proximity data for a few ConPar polygons near the English-Scottish border. The lines are all those in use for passenger services, and will generally exclude purely private, industrial or mining railway lines, as well as private halts or sidings. For the purposes of the datasets developed here the coding defines the presence or absence of a railway *line* in a parish or on its boundary, and the distance to the nearest line from the parish centroid. Separately another set of data is generated for the presence or absence of a railway *station* in a parish or on its boundary, and the distance to the nearest station from the parish centroid. The rail lines data falls into four groups for the ConPar output and 14 groups for the RSD output and the rail stations data falls into four groups for the ConPar output and 14 groups for the RSD output

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[10] Martí-Henneberg, J., Satchell, M., You, X., Shaw-Taylor, L., Wrigley E.A., 'England Wales and Scotland rail lines shapefile' (2017). This dataset was created thanks to generous funding from the ESRC (LCAG/080 RG43990), the Spanish Ministry of Science and Education (SEJ2007-64812), the Anglo-Catalan Society and the Leverhulme Trust (RPG-2013-093). This is an enhanced version of Martí-Henneberg, J., Tapiador, F., Satchell, M., Shaw-Taylor, L., and Wrigley, E.A., 'Railway Lines of England and Wales 1807-1994 dynamic GIS shapefile' (2008).
The Martí-Henneberg *et al* dataset is a GIS digitisation of the rail lines in M.H. Cobb, *The Railways of Great Britain, a Historical Atlas at the scale of 1 inch to 1 mile*, 2 vols., (Shepperton, Ian Allan Publishing, 2005). A description of the dataset can be found in Satchell, M, 'England, Wales and Scotland Rail Lines GIS shapefile documentation' (2017) available at: http://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html
 Martí-Henneberg, J., Satchell, M., You, X., Shaw-Taylor, L., Wrigley E.A., 'England, Wales and Scotland railway stations 1807-1994 shapefile' (2017). This dataset was created thanks to generous funding from the ESRC (LCAG/080 RG43990), the Spanish Ministry of Science and Education (SEJ2007-64812), the Anglo-Catalan Society and the Leverhulme Trust (RPG-2013-093). A description of the dataset can be found in Satchell, M, 'England, Wales and Scotland Railway Stations 1807-1994 GIS shapefile documentation' (2017) available at: http://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html
The Martí-Henneberg *et al* dataset was generated from Martí-Henneberg, J., Satchell, M., You, X., Shaw-Taylor, L., 'Railway Stations of England and Wales 1807-1994 dynamic GIS shapefile' (2017). This is an enhanced version of Martí-Henneberg, J., Tapiador, F., Satchell, M., Shaw-Taylor, L., and Wrigley, E.A., 'Railway Stations of England and Wales 1807-1994 dynamic GIS shapefile' (2008). The Martí-Henneberg *et al* dataset is a GIS digitisation of the rail stations in M.H. Cobb, The Railways of Great Britain. A Historical Atlas at the scale of 1 inch to 1 mile, 2 vols. (Shepperton, Ian Allan Publishing, edn 2005).

ConPar Data

Rail Lines/ Largest ConPar Polygons Presence/ Absence of Railway Lines

Raillines_ConPar1851_1891_LargestPolygons_PresenceOrAbsence_AllCensusYears.dbf

Field	Format	Description
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
1851_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1851 rail lines GIS indicated by "Y". Non-intersection by "N"
1861_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1861 rail lines GIS indicated by "Y". Non-intersection by "N"
1871_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1871 rail lines GIS indicated by "Y". Non-intersection by "N"
1881_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1881 rail lines GIS indicated by "Y". Non-intersection by "N"
1891_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1891 rail lines GIS indicated by "Y". Non-intersection by "N"
1901	Text	Intersection of the ConPar1851_1891largestpolygon with the 1901 rail lines GIS indicated by "Y". Non-intersection by "N"
1911_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1911 rail lines GIS indicated by "Y". Non-intersection by "N"

Raillines_ConPar1901_1911_LargestPolygons_PresenceOrAbsence_AllCensusYears.dbf

Field	Format	Description
Conparid	Double	ID of ConPar1901_1911largestpolygon
1851_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1851 rail lines GIS indicated by "Y". Non-intersection by "N"
1861_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1861 rail lines GIS indicated by "Y". Non-intersection by "N"
1871_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1871 rail lines GIS indicated by "Y". Non-intersection by "N"
1881_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1881 rail lines GIS indicated by "Y". Non-intersection by "N"
1891_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1891 rail lines GIS indicated by "Y". Non-intersection by "N"
1901	Text	Intersection of the ConPar1901_1911largestpolygon with the 1901 rail lines GIS indicated by "Y". Non-intersection by "N"
1911_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1911 rail lines GIS indicated by "Y". Non-intersection by "N"

Rail lines/ Largest ConPar Polygon Centroids Distance to Nearest Rail Line

Raillines1851_1891_LargestPolygonsCentroids_DistancetoNearestRailline_AllCensusYears.dbf

Field	Format	Description
OID		Object ID
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
1851_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1851 rail line
1861_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1861 rail line
1871_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1871 rail line
1881_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1881 rail line
1891_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1891 rail line
1901	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1901 rail line
1911_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1911 rail line

Raillines1901_1911_LargestPolygonsCentroids_DistancetoNearestRailline_AllCensusYears.dbf

Field	Format	Description
OID		Object ID
Conparid	Double	ID of ConPar1901_1911largestpolygon
1851_	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1851 rail line
1861_	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1861 rail line
1871_	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1871 rail line
1881_	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1881 rail line
1891_	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1891 rail line
1901	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1901 rail line
1911_	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1911 rail line

RSD Data

Rail Lines/ RSD Polygons Presence/Absence of Rail Lines

RSDs1851PresenceAbsenceRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1851	Double	ID of 1851 RSD
Intersect	Text	Intersection of 1851 RSDs with the 1851 Rail Lines GIS indicated by "Y". Non-intersection by "N"

RSDs1861PresenceAbsenceRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1861	Double	ID of 1861 RSD
Intersect	Text	Intersection of 1861 RSDs with the 1861 Rail Lines GIS indicated by "Y". Non-intersection by "N"

RSDs1871PresenceAbsenceRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1871	Double	ID of 1871 RSD
Intersect	Text	Intersection of 1871 RSDs with the 1871 Rail Lines GIS indicated by "Y". Non-intersection by "N"

RSDs1881PresenceAbsenceRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1881	Double	ID of 1881 RSD
Intersect	Text	Intersection of 1881 RSDs with the 1881 Rail Lines GIS indicated by "Y". Non-intersection by "N"

RSDs1891PresenceAbsenceRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1891	Double	ID of 1891 RSD
Intersect	Text	Intersection of 1891 RSDs with the 1891 Rail Lines GIS indicated by "Y". Non-intersection by "N"

RSDs1901PresenceAbsenceRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1901	Double	ID of 1901 RSD
Intersect	Text	Intersection of 1901 RSDs with the 1901 Rail Lines GIS indicated by "Y". Non-intersection by "N"

RSDs1911PresenceAbsenceRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1911	Double	ID of 1911 RSD
Intersect	Text	Intersection of 1911 RSDs with the 1911 Rail Lines GIS indicated by "Y". Non-intersection by "N"

Rail_Lines/ RSD Polygons Centroids Distance to Nearest Rail_Lines

RSD1851centroids_DistanceToNearestRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1851	Double	ID of 1851 RSD
NEAR_DIST	Double	Distance (metres) from 1851 RSD centroid to nearest rail line

RSD1861centroids_DistanceToNearestRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1861	Double	ID of 1861 RSD
NEAR_DIST	Double	Distance (metres) from 1861 RSD centroid to nearest rail line

RSD1871centroids_DistanceToNearestRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1871	Double	ID of 1871 RSD
NEAR_DIST	Double	Distance (metres) from 1871 RSD centroid to nearest rail line

RSD1881centroids_DistanceToNearestRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1881	Double	ID of 1881 RSD
NEAR_DIST	Double	Distance (metres) from 1881 RSD centroid to nearest rail line

RSD1891centroids_DistanceToNearestRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1891	Double	ID of 1891 RSD
NEAR_DIST	Double	Distance (metres) from 1891 RSD centroid to nearest rail line

RSD1901centroids_DistanceToNearestRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1901	Double	ID of 1901 RSD
NEAR_DIST	Double	Distance (metres) from 1901 RSD centroid to nearest rail line

RSD1911centroids_DistanceToNearestRail_Lines.dbf

Field	Format	Description
OID		Object ID
CEN_1911	Double	ID of 1911 RSD
NEAR_DIST	Double	Distance (metres) from 1911 RSD centroid to nearest rail line

ConPar Data

Rail Stations/ ConPar Largest Polygons Presence/Absence of Rail Stations

Railstations_ConPar1851_1891_LargestPolygons_PresenceOrAbsence_AllCensusYears.dbf

Field	Format	Description
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
1851_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1851 rail stations GIS indicated by "Y". Non-intersection by "N"
1861_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1861 rail stations GIS indicated by "Y". Non-intersection by "N"
1871_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1871 rail stations GIS indicated by "Y". Non-intersection by "N"
1881_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1881 rail stations GIS indicated by "Y". Non-intersection by "N"
1891_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1891 rail stations GIS indicated by "Y". Non-intersection by "N"
1901	Text	Intersection of the ConPar1851_1891largestpolygon with the 1901 rail stations GIS indicated by "Y". Non-intersection by "N"

| 1911_ | Text | Intersection of the ConPar1851_1891largestpolygon with the 1911 rail stations GIS indicated by "Y". Non-intersection by "N" |

Railstations_ConPar1901_1911_LargestPolygons_PresenceOrAbsence_AllCensusYears.dbf

Field	Format	Description
Conparid	Double	ID of ConPar1901_1911largestpolygon
1851_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1851 rail stations GIS indicated by "Y". Non-intersection by "N"
1861_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1861 rail stations GIS indicated by "Y". Non-intersection by "N"
1871_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1871 rail stations GIS indicated by "Y". Non-intersection by "N"
1881_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1881 rail stations GIS indicated by "Y". Non-intersection by "N"
1891_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1891 rail stations GIS indicated by "Y". Non-intersection by "N"
1901	Text	Intersection of the ConPar1901_1911largestpolygon with the 1901 rail stations GIS indicated by "Y". Non-intersection by "N"
1911_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1911 rail stations GIS indicated by "Y". Non-intersection by "N"

Rail Stations/ Largest ConPar Polygons Centroids Distance to Nearest Rail Station

Railstations1851_1891_LargestPolygonsCentroids_DistancetoNearestRailstation_AllCensusYears.dbf

Field	Format	Description
OID		Object ID
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
1851_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1851 rail station
1861_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1861 rail station
1871_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1871 rail station
1881_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1881 rail station
1891_	Double	Distance (metres) from ConPar1851_1891largestpolygon

		centroid to nearest 1891 rail station
1901	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1901 rail station
1911_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1911 rail station

Railstations1901_1911_LargestPolygonsCentroids_DistancetoNearestRailstation_AllCensusYears.dbf

Field	Format	Description
OID		Object ID
Conparid	Double	ID of ConPar1901_1911largestpolygon
_1851	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1851 rail station
_1861	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1861 rail station
_1871	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1871 rail station
_1881	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1881 rail station
_1891	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1891 rail station
_1901	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1901 rail station
_1911	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1911 rail station

RSD data

Rail Stations/ RSDs Presence/Absence of Rail Stations

RSDs1851PresenceAbsenceRailStations.dbf

Field	Format	Description
OID		Object ID
CEN_1851	Double	ID of 1851 RSD
Intersect	Text	Intersection of 1851 RSDs with the 1851 Rail Stations GIS indicated by "Y". Non-intersection by "N"

RSDs1861PresenceAbsenceRailStations.dbf

Field	Format	Description
OID		Object ID
CEN_1861	Double	ID of 1861 RSD
Intersect	Text	Intersection of 1861 RSDs with the 1861 Rail Stations GIS indicated by "Y". Non-intersection by "N"

RSDs1871PresenceAbsenceRailStations.dbf

Field	Format	Description
OID		Object ID
CEN_1871	Double	ID of 1871 RSD
Intersect	Text	Intersection of 1871 RSDs with the 1871 Rail Stations GIS indicated by "Y". Non-intersection by "N"

RSDs1881PresenceAbsenceRailStations.dbf

Field	Format	Description
OID		Object ID
CEN_1881	Double	ID of 1881 RSD
Intersect	Text	Intersection of 1881 RSDs with the 1881 Rail Stations GIS indicated by "Y". Non-intersection by "N"

RSDs1891PresenceAbsenceRailStations.dbf

Field	Format	Description
OID		Object ID
CEN_1891	Double	ID of 1891 RSD
Intersect	Text	Intersection of 1891 RSDs with the 1891 Rail Stations GIS indicated by "Y". Non-intersection by "N"

RSDs1901PresenceAbsenceRailStations.dbf

Field	Format	Description
OID		Object ID
CEN_1901	Double	ID of 1901 RSD
Intersect	Text	Intersection of 1901 RSDs with the 1901 Rail Stations GIS indicated by "Y". Non-intersection by "N"

RSDs1911PresenceAbsenceRailStations.dbf

Field	Format	Description
OID		Object ID
CEN_1911	Double	ID of 1911 RSD
Intersect	Text	Intersection of 1911 RSDs with the 1911 Rail Stations GIS indicated by "Y". Non-intersection by "N"

Rail Stations/ RSD Centroids Distance to Nearest Rail Stations

RSD1851CentroidsDistancetoNearestStation.dbf

Field	Format	Description
OID		Object ID
CEN_1851	Double	ID of 1851 RSD
NEAR_DIST	Double	Distance (metres) from 1851 RSD centroid to nearest rail station

RSD1861CentroidsDistancetoNearestStation.dbf

Field	Format	Description
OID		Object ID
CEN_1861	Double	ID of 1861 RSD
NEAR_DIST	Double	Distance (metres) from 1861 RSD centroid to nearest rail station

RSD1871CentroidsDistancetoNearestStation.dbf

Field	Format	Description
OID		Object ID
CEN_1871	Double	ID of 1871 RSD
NEAR_DIST	Double	Distance (metres) from 1871 RSD centroid to nearest rail station

RSD1881CentroidsDistancetoNearestStation.dbf

Field	Format	Description
OID		Object ID
CEN_1881	Double	ID of 1881 RSD
NEAR_DIST	Double	Distance (metres) from 1881 RSD centroid to nearest rail station

RSD1891CentroidsDistancetoNearestStation.dbf

Field	Format	Description
OID		Object ID
CEN_1891	Double	ID of 1891 RSD
NEAR_DIST	Double	Distance (metres) from 1891 RSD centroid to nearest rail station

RSD1901CentroidsDistancetoNearestStation.dbf

Field	Format	Description
OID		Object ID
CEN_1901	Double	ID of 1901 RSD
NEAR_DIST	Double	Distance (metres) from 1901 RSD centroid to nearest rail station

RSD1911CentroidsDistancetoNearestStation.dbf

Field	Format	Description
OID		Object ID
CEN_1911	Double	ID of 1911 RSD
NEAR_DIST	Double	Distance (metres) from 1911 RSD centroid to nearest rail station

3.5 Waterways

The datasets described below derive from a series of waterways GIS generated to show the extent of the network at each census year from 1851 to 1911.[11] It is important to note that each waterways GIS represents only the navigable waterways that were in use in that year. The waterways geo-database is structured so that once a river or canal ceases to have commercial traffic at a particular date the waterway is removed from the GIS for that year. However, the dating is more complicated than this. Waterways, unlike railways, suffer a degree of fuzziness concerning their closure / disuse dates. Uncertainties concerning when particular waterways ceased to be used, especially some tidal rivers, means in some instances only a date range is possible e.g. 1900-1910. The GIS data as used here is termed "optimistic" i.e. when the date of a waterway going out of use or being closed can only be represented by a range of dates the latest possible date of use - the most optimistic scenario - is taken into account for creating the GIS. For a case, such as a waterway ceasing to have commercial traffic sometime between 1900-10 the date used to generate the GIS would be the optimistic one i.e. 1910 not 1900. It should be emphasised that date ranges rather than single years are less of a problem for the period 1851-1911 because, with the exception of some rural canals, most navigable waterways remained in use even in 1911.

The waterways data is derived from multiple sources: The major navigable rivers were digitised from geo-rectified scans of the Ordnance Survey 1:10560 first edition (surveyed 1840-1890). Richard Dean's 1:536,448 scale *Inland Navigation. A Historical Waterways Map of England and Wales was used as a visual guide* as a visual guide to locate other historical waterways on the

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[11] Satchell, M., Shaw-Taylor, L., Wrigley E.A., 'England and Wales navigable waterways dynamic GIS shapefile 1600-1948' (2017). This dataset was created with generous funding from the ESRC (LCAG/080 RG43990) and the Leverhulme Trust (JJAG/078 RG51665; RPG2013-093). A description of the dataset can be found in Satchell, M., 'England and Wales Waterways 1600-1948 dynamic GIS shapefile documentation' (2017) available at: http://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html

Ordnance Survey first edition 1:10,560 map series scans and the waterways were digitised directly from this map series in most instances. For the small number of waterways which had disappeared before their locality had been surveyed by the Ordnance Survey 1:10560 series, earlier mapping was used, of which sheets 1-90 of the Ordnance Survey 1: 63,360 Old Series (surveyed 1789-c.1840) were the most important.

In terms of attribute data emphasis was primarily on establishing as far as possible when each section of the waterway was open and in commercial use. In addition to this information was systematically collected on the type of waterway, and the types of vessel which used it and if this changed over time. The primary source for this exercise was the regional volumes by Charles Hadfield and his collaborators.[12] In addition to Hadfield, extensive use was made of T.S. Willan, *River Navigation in England 1600-1750* (1936), the *Royal Commission on Canals and Waterways*, BPP, 11 vols, (1906-1911) and H. de Salis, *Bradshaw's Canals and Navigable Rivers of England and Wales* (1904). Where available secondary studies of particular regions and individual waterways were also consulted.

The tidal rivers part of the waterways dataset is frequently associated with two other transport datasets: ports and coasts. Future analysis of these three datasets must take into account the potential overlap between them. The waterways GIS does include the status of the watercourse as freshwater or tidal as an attribute, which would be useful for investigating the overlap, but this attribute needs checking and further attention. The standard queries of containment within a ConPar or RSD unit and the proximity of ConPars and RSDs to the nearest navigable waterways were executed. The waterways data falls into four groups for the ConPar output and fourteen groups for the RSD output:

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[12] The *Canals of the British Isles* series by Charles Hadfield *et al*, 11 volumes (1967-1985).

ConPar Data

<u>**Waterways/ Largest ConPar Polygons Presence/Absence of Navigable Waterways**</u>

WaterwaysConPar1851_1891largestpolygon_PresenceAbsenceWaterways_AllCensusYears.dbf

Field	Format	Description
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
1851_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1851 waterways GIS indicated by "Y". Non-intersection by "N"
1861_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1861 waterways GIS indicated by "Y". Non-intersection by "N"
1871_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1871 waterways GIS indicated by "Y". Non-intersection by "N"
1881_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1881 waterways GIS indicated by "Y". Non-intersection by "N"
1891_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1891 waterways GIS indicated by "Y". Non-intersection by "N"
1901	Text	Intersection of the ConPar1851_1891largestpolygon with the 1901 waterways GIS indicated by "Y". Non-intersection by "N"
1911_	Text	Intersection of the ConPar1851_1891largestpolygon with the 1911 waterways GIS indicated by "Y". Non-intersection by "N"

WaterwaysConPar1901_1911
largestpolygon_PresenceAbsenceWaterways_AllCensusYears.dbf

Field	Format	Description
conparid	Double	ID of ConPar1901_1911largestpolygon
1851_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1851 waterways GIS indicated by "Y". Non-intersection by "N"
1861_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1861 waterways GIS indicated by "Y". Non-intersection by "N"
1871_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1871 waterways GIS indicated by "Y". Non-intersection by "N"
1881_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1881 waterways GIS indicated by "Y". Non-intersection by "N"
1891_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1891 waterways GIS indicated by "Y". Non-intersection by "N"
1901	Text	Intersection of the ConPar1901_1911largestpolygon with the 1901 waterways GIS indicated by "Y". Non-intersection by "N"
1911_	Text	Intersection of the ConPar1901_1911largestpolygon with the 1911 waterways GIS indicated by "Y". Non-intersection by "N"

Waterways/ Largest ConPar Polygons Centroids Distance to Nearest Navigable Waterway

Waterways_ConPar1851_1891_LargestPolygonsCentroids_DistancetoNearestWaterway_AllCensusYears.dbf

Field	Format	Description
OID		Object ID
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
1851	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1851 waterway
1861	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1861 waterway
1871	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1871 waterway
1881	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1881 waterway
1891	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1891 waterway
1901	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1901 waterway
1911	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest 1911 waterway

Waterways_ConPar1901_1911_LargestPolygonsCentroids_DistancetoNearestWaterway_AllCensusYears.dbf

Field	Format	Description
OID		Object ID
conparid	Double	ID of ConPar1901_1911largestpolygon
_1851	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1851 waterway
_1861	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1861 waterway
_1871	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1871 waterway
_1881	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1881 waterway
_1891	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1891 waterway
_1901	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1901 waterway
_1911	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest 1911 waterway

RSD data

Waterways/ RSDs Presence/Absence of Navigable Waterways

RSDs1851PresenceAbsenceWaterways.dbf

Field	Format	Description
OID		Object ID
CEN_1851	Double	ID of 1851 RSD
Intersect	Text	Intersection of 1851 RSDs with the Waterways 1851 GIS indicated by "Y". Non-intersection by "N"

RSDs1861PresenceAbsenceWaterways.dbf

Field	Format	Description
OID		Object ID
CEN_1861	Double	ID of 1861 RSD
Intersect	Text	Intersection of 1861 RSDs with the Waterways 1851 GIS indicated by "Y". Non-intersection by "N"

RSDs1871PresenceAbsenceWaterways.dbf

Field	Format	Description
OID		Object ID
CEN_1871	Double	ID of 1871 RSD
Intersect	Text	Intersection of 1871 RSDs with the Waterways 1851 GIS indicated by "Y". Non-intersection by "N"

RSDs1881PresenceAbsenceWaterways.dbf

Field	Format	Description
OID		Object ID
CEN_1881	Double	ID of 1881 RSD
Intersect	Text	Intersection of 1881 RSDs with the Waterways 1851 GIS indicated by "Y". Non-intersection by "N"

RSDs1891PresenceAbsenceWaterways.dbf

Field	Format	Description
OID		Object ID
CEN_1891	Double	ID of 1891 RSD
Intersect	Text	Intersection of 1891 RSDs with the Waterways 1851 GIS indicated by "Y". Non-intersection by "N"

RSDs1901PresenceAbsenceWaterways.dbf

Field	Format	Description
OID		Object ID
CEN_1901	Double	ID of 1901 RSD
Intersect	Text	Intersection of 1901 RSDs with the Waterways 1851 GIS indicated by "Y". Non-intersection by "N"

RSDs1911PresenceAbsenceWaterways.dbf

Field	Format	Description
OID		Object ID
CEN_1911	Double	ID of 1911 RSD
Intersect	Text	Intersection of 1911 RSDs with the Waterways 1851 GIS indicated by "Y". Non-intersection by "N"

Waterways/ RSDs Centroids Distance to Nearest Navigable Waterway

RSD1851centroids_DistancetoNearestWaterways.dbf

Field	Format	Description
OID		Object ID
CEN1851	Double	ID of 1851 RSD
NEAR_DIST	Double	Distance (metres) from 1851 RSD centroid to nearest 1851 waterway

RSD1861centroids_DistancetoNearestWaterways.dbf

Field	Format	Description
OID		Object ID
CEN1861	Double	ID of 1861 RSD
NEAR_DIST	Double	Distance (metres) from 1861 RSD centroid to nearest 1861 waterway

RSD1871centroids_DistancetoNearestWaterways.dbf

Field	Format	Description
OID		Object ID
CEN1871	Double	ID of 1871 RSD
NEAR_DIST	Double	Distance (metres) from 1871 RSD centroid to nearest 1871 waterway

RSD1881centroids_DistancetoNearestWaterways.dbf

Field	Format	Description
OID		Object ID
CEN1881	Double	ID of 1881 RSD
NEAR_DIST	Double	Distance (metres) from 1881 RSD centroid to nearest 1881 waterway

RSD1891centroids_DistancetoNearestWaterways.dbf

Field	Format	Description
OID		Object ID
CEN1891	Double	ID of 1891 RSD
NEAR_DIST	Double	Distance (metres) from 1891 RSD centroid to nearest 1891 waterway

RSD1901centroids_DistancetoNearestWaterways.dbf

Field	Format	Description
OID		Object ID
CEN1901	Double	ID of 1901 RSD
NEAR_DIST	Double	Distance (metres) from 1901 RSD centroid to nearest 1901 waterway

RSD1911centroids_DistancetoNearestWaterways.dbf

Field	Format	Description
OID		Object ID
CEN1911	Double	ID of 1911 RSD
NEAR_DIST	Double	Distance (metres) from 1911 RSD centroid to nearest 1911 waterway

3.6 Coasts

This dataset was created by taking the existing EWCP parish shapefile merging its constituent polygons into a single complex polygon, converting this into a polyline format and then deleting the section that represents the land border between Scotland and England. EWCP derives from the Adobe Illustrator files generated by Kain and Oliver (2001) for a dataset of Historic Parishes of England and Wales. They 'attempted to depict the coastline as it was in the early nineteenth

century'.[13] Since their primary map source was at a relatively coarse scale at 1: 63,360, there is inevitably a degree of imprecision in this dataset. Changes due to erosion, deposition and relative land and sea level changes from c. 1800-1911 can be regarded as minor. The scale of land reclamation after 1800, of which the mouth of the Nene is the best known example, significantly exacerbates the level of imprecision, but in only a handful of places. The coastal data consists of four files for the ConPar output and 14 files for the RSD output:

ConPar data

Coast/ ConPar largest polygons presence or absence of coast

CoastConPar1851_1891largestpolygon_PresenceAbsenceCoast.dbf

Field	Format	Description
OID		Object
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
intersect	Text	Intersection of the ConPar1851_1891largestpolygon with the coast GIS indicated by "Y". Non-intersection by "N"

CoastConPar1901_1911largestpolygon_PresenceAbsenceCoast

Field	Format	Description
OID		Object
conparid	Double	ID of ConPar1901_1911largestpolygon
intersect	Text	Intersection of the ConPar1901_1911largestpolygon with the coast GIS indicated by "Y". Non-intersection by "N"

Coast/ ConPar largest polygons centroids distance to nearest coast

CoastConPar1851_1891_LargestPolygonsCentroids_DistancetoNearestCoast.dbf

Field	Format	Description
OID		Object ID
ConPar1851	Double	ID of ConPar1851_1891largestpolygon
1851_	Double	Distance (metres) from ConPar1851_1891largestpolygon centroid to nearest coast

CoastConPar1901_1911_LargestPolygonsCentroids_DistancetoNearestCoast.dbf

Field	Format	Description
OID		Object ID
ConPar1851	Double	ID of ConPar1901_1911largestpolygon
1851_	Double	Distance (metres) from ConPar1901_1911largestpolygon centroid to nearest coast

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[13] Kain, R. and Oliver, R. R. (2001) *The Historic Parishes of England and Wales. An electronic map of Boundaries before 1850 with a Gazetteer and Metadata* (Colchester), 29.

RSD Data

Coast/ RSDs Presence/Absence of Coast

RSDs1851PresenceAbsenceCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1851	Double	ID of 1851 RSD
Intersect	Text	Intersection of 1851 RSDs with the Coast 1851 GIS indicated by "Y". Non-intersection by "N"

RSDs1861PresenceAbsenceCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1861	Double	ID of 1861 RSD
Intersect	Text	Intersection of 1861 RSDs with the Coast 1861-1911 GIS indicated by "Y". Non-intersection by "N"

RSDs1871PresenceAbsenceCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1871	Double	ID of 1871 RSD
Intersect	Text	Intersection of 1871 RSDs with the Coast 1861-1911 GIS indicated by "Y". Non-intersection by "N"

RSDs1881PresenceAbsenceCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1881	Double	ID of 1881 RSD
Intersect	Text	Intersection of 1881 RSDs with the Coast 1861-1911 GIS indicated by "Y". Non-intersection by "N"

RSDs1891PresenceAbsenceCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1851	Double	ID of 1891 RSD
Intersect	Text	Intersection of 1891 RSDs with the Coast 1861-1911 GIS indicated by "Y". Non-intersection by "N"

RSDs1901PresenceAbsenceCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1901	Double	ID of 1901 RSD
Intersect	Text	Intersection of 1901 RSDs with the Coast 1861-1911 GIS indicated by "Y". Non-intersection by "N"

RSDs1911PresenceAbsenceCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1911	Double	ID of 1911 RSD
Intersect	Text	Intersection of 1911 RSDs with the Coast 1861-1911 GIS indicated by "Y". Non-intersection by "N"

Coast/ RSD Centroids Distance to Nearest Coast

RSD1851CentroidsDistancetoNearestCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1851	Double	ID of 1851 RSD
NEAR_DIST	Double	Distance (metres) from 1851 RSD centroid to nearest coast

RSD1861CentroidsDistancetoNearestCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1861	Double	ID of 1861 RSD
NEAR_DIST	Double	Distance (metres) from 1861 RSD centroid to nearest coast

RSD1871CentroidsDistancetoNearestCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1871	Double	ID of 1871 RSD
NEAR_DIST	Double	Distance (metres) from 1871 RSD centroid to nearest coast

RSD1881CentroidsDistancetoNearestCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1881	Double	ID of 1881 RSD
NEAR_DIST	Double	Distance (metres) from 1881 RSD centroid to nearest coast

RSD1891CentroidsDistancetoNearestCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1891	Double	ID of 1891 RSD
NEAR_DIST	Double	Distance (metres) from 1891 RSD centroid to nearest coast

RSD1901CentroidsDistancetoNearestCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1901	Double	ID of 1901 RSD
NEAR_DIST	Double	Distance (metres) from 1901 RSD centroid to nearest coast

RSD1911CentroidsDistancetoNearestCoast.dbf

Field	Format	Description
OID		Object ID
CEN_1911	Double	ID of 1911 RSD
NEAR_DIST	Double	Distance (metres) from 1911 RSD centroid to nearest coast

Most of the original transport data used was created as part of Leverhulme Trust Grant (RPG-2013-093). *Transport, Urbanization and Economic Development c.1670-1911*: L. Shaw-Taylor, PI, E.A Wrigley and Dan Bogart (UC Irvine) Co-Is; National Science Foundation Grant (**SES**-1260699) *Modelling the Transport Revolution and the Industrial Revolution in England'* Dan Bogart PI; Higher Education Impact Fund Grant: *Cambridge e-Resources for teaching economic history and historical economic geography in secondary schools*: L. Shaw-Taylor PI:

https://www.campop.geog.cam.ac.uk/research/projects/transport/

Port location GIS files were derived from Alvarez, E, Dunn, O., Bogart, D., Satchell, M., Shaw-Taylor, L., *Ports of England and Wales, 1680-1911 shapefile* (2017). This dataset was created with funding from the Leverhulme Trust (RPG-2013-093) and the NSF (SES-1260699. A description of the dataset can be found in Bogart, D and Satchell, M., 'Ports of England and Wales, 1650-1911 GIS shapefile documentation' (2017) available at:

http://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html

Turnpike data derive from Rosevear, A., Satchell, M., Bogart, D., Shaw Taylor, L., Aidt, T. and Leon, G., 'Turnpike roads of England and Wales, 1667-1892 dynamic GIS shapefile' (2017). This dataset was created with funding from the Leverhulme Trust (RPG-2013-093), the NSF (SES-1260699), and the British Academy (SG121870). A description of the dataset can be found in Bogart, D, Rosevear, A. and Satchell, M., 'Turnpike roads of England and Wales 1667-1892 dynamic GIS shapefile documentation' (2018) available at:

http://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html

First class road data derives from M. Satchell, A. Rosevear, B. Küçükbaşlar, E. Alvarez, D. Bogart, L. Shaw-Taylor, 'First class roads of England and Wales c. 1911' (2017). A description of the dataset can be found in M. Satchell, 'First class roads of England and Wales c. 1911' GIS shapefile documentation' (2018) available at:

http://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html.

Railways data derives from Martí-Henneberg, J., Satchell, M., You, X., Shaw-Taylor, L., Wrigley E.A., 'England Wales and Scotland rail lines shapefile' (2017). This dataset was created thanks to generous funding from the ESRC (LCAG/080 RG43990), the Spanish Ministry of Science and Education (SEJ2007-64812), the Anglo-Catalan Society and the Leverhulme Trust (RPG-2013-093). This is an enhanced version of Martí-Henneberg, J., Tapiador, F., Satchell, M., Shaw-Taylor, L., and Wrigley, E.A., 'Railway Lines of England and Wales 1807-1994 dynamic GIS shapefile' (2008). The Martí-Henneberg *et al* dataset is a GIS digitisation of the rail lines in M.H. Cobb, *The Railways of Great Britain, a Historical Atlas at the scale of 1 inch to 1 mile*, 2 vols., (Shepperton, Ian Allan Publishing, 2005). A description of the dataset can be found in Satchell, M, 'England, Wales and Scotland Rail Lines GIS shapefile documentation' (2017) available at:

http://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html.

Martí-Henneberg, J., Satchell, M., You, X., Shaw-Taylor, L., Wrigley E.A., 'England, Wales and Scotland railway stations 1807-1994 shapefile' (2017). This dataset was created thanks to generous funding from the ESRC (LCAG/080 RG43990), the Spanish Ministry of Science and Education (SEJ2007-64812), the Anglo-Catalan Society and the Leverhulme Trust (RPG-2013-093). A description of the dataset can be found in Satchell, M, 'England, Wales and Scotland Railway Stations 1807-1994 GIS shapefile documentation' (2017) available at:

http://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html The

Martí-Henneberg *et al* dataset was generated from Martí-Henneberg, J., Satchell, M., You, X., Shaw-Taylor, L., 'Railway Stations of England and Wales 1807-1994 dynamic GIS shapefile' (2017). This is an enhanced version of Martí-Henneberg, J., Tapiador, F., Satchell, M., Shaw-Taylor, L., and Wrigley, E.A., 'Railway Stations of England and Wales 1807-1994 dynamic GIS shapefile' (2008). The Martí-Henneberg *et al* dataset is a GIS digitisation of the rail stations in M.H. Cobb, *The Railways of Great Britain. A Historical Atlas at the scale of 1 inch to 1 mile*, 2 vols. (Shepperton, Ian Allan Publishing, edn 2005).

Waterways data derive from Satchell, M., Shaw-Taylor, L., Wrigley E.A., 'England and Wales navigable waterways dynamic GIS shapefile 1600-1948' (2017). This dataset was created with generous funding from the ESRC (LCAG/080 RG43990) and the Leverhulme Trust (JJAG/078 RG51665; RPG2013-093). The primary source for this was *The Canals of the British Isles* series by Charles Hadfield et al, 11 volumes (1967-1985). A description of the dataset can be found in Satchell, M., 'England and Wales Waterways 1600-1948 dynamic GIS shapefile documentation' (2017) available at:

http://www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.ht ml

The coastline data derive from files created R. Kain and Oliver, R. R. (2001) *The Historic Parishes of England and Wales. An electronic map of Boundaries before 1850 with a Gazetteer and Metadata* (Colchester), 29.

Other Working Papers:

Working paper series: ESRC project ES/M010953: *'Drivers of Entrepreneurship and Small Business'*, University of Cambridge, Department of Geography and Cambridge Group for the History of Population and Social Structure.

WP 1: Bennett, Robert J., Smith Harry J., van Lieshout, Carry, and Newton, Gill (2017) *Drivers of Entrepreneurship and Small Businesses: Project overview and database design.* https://doi.org/10.17863/CAM.9508

WP 2: Bennett, Robert J., Smith Harry J. and van Lieshout, Carry (2017) *Employers and the self-employed in the censuses 1851-1911: The census as a source for identifying entrepreneurs, business numbers and size distribution.* https://doi.org/10.17863/CAM.9640

WP 3: van Lieshout, Carry, Bennett, Robert J., Smith, Harry J. and Newton, Gill (2017) *Identifying businesses and entrepreneurs in the Censuses 1851-1881.* https://doi.org/10.17863/CAM.9639

WP 4: Smith, Harry J., Bennett, Robert J., and van Lieshout, Carry (2017) *Extracting entrepreneurs from the Censuses, 1891-1911.* https://doi.org/10.17863/CAM.9638

WP 5: Bennett, Robert J., Smith Harry J., van Lieshout, Carry, and Newton, Gill (2017) *Business sectors, occupations and aggregations of census data 1851-1911.* https://doi.org/10.17863/CAM.9874
Data download of classification file: https://doi.org/10.17863/CAM.9874

WP 6: Smith, Harry J. and Bennett, Robert J. (2017) *Urban-Rural Classification using Census data, 1851-1911.* https://doi.org/10.17863/CAM.15763

WP 7: Smith, Harry, Bennett, Robert J., and Radicic, Dragana (2017) *Classification of towns in 1891 using factor analysis.* https://doi.org/10.17863/CAM.15767

WP 8: Bennett, Robert J., Smith, Harry, and Radicic, Dragana (2017) *Classification of occupations for economically active: Factor analysis of Registration Sub-Districts (RSDs) in 1891.* https://doi.org/10.17863/CAM.15764

WP 9: Bennett, Robert, J., Montebruno, Piero, Smith, Harry, and van Lieshout, Carry (2018) *Reconstructing entrepreneurship and business numbers for censuses 1851-81.*

WP 10: Bennett, Robert, J., Smith, Harry and Radicic, Dragana (2018) *Classification of environments of entrepreneurship: Factor analysis of Registration Sub-Districts (RSDs) in 1891.* https://doi.org/10.17863/CAM.26386

WP 11: Montebruno, Piero (2018) *Adjustment Weights 1891-1911: Weights to adjust entrepreneur numbers for non-response and misallocation bias in Censuses 1891-1911.* https://doi.org/10.17863/CAM.26378
Adjustment weights: https://doi.org/10.17863/CAM.26376

WP 12: van Lieshout, Carry, Day, Joseph, Montebruno, Piero and Bennett Robert J. (2018) *Extraction of data on Entrepreneurs from the 1871 Census to supplement I-CeM.* https://doi.org/10.17863/CAM.27488

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