

WEBINAR AND
MEMBER MEETING

UNLOCKING DATA FOR INNOVATIVE OUTDOOR RECREATION INSIGHTS

TUES 30TH JANUARY 2024

WEBINAR 11:00-12:15
MEMBER MEETING
12:15-13:00



STARTING
SOON



Outdoor Recreation Network



During the webinar, please mute your mic and turn off your camera to help with bandwidth.



This Webinar is being recorded and will be made available online following the event.

Welcome to our webinar

'Unlocking Data for Innovative Outdoor Recreation Insights'

Pippa Langford

ORN Co-Chair

Principal Specialist Recreation and Access

Natural England



Housekeeping



During the webinar presentations please mute your mic and turn off your camera to help with bandwidth. Mute notifications to avoid the 'ping' noises.



This event is being recorded and will be made available online following the event. If you do not wish to appear on screen at any point, please keep your camera turned off.



Please make comments and ask questions using the 'Chat Pane' function.

If you are not a member, please leave the session after the webinar presentations and before the member meeting starts unless you have been told otherwise.

Running Order

Time	Activity	Lead
11:00 – 11:05	Welcome and Introduction	Pippa Langford (ORN Co-Chair)
11:05 – 11:30	Using ‘Big Data’ to Understand Where People Go	Joshi Chaitanya (Senior Data Scientist, ONS) Tim Ashelford (Data Lead, Defra)
11:30 – 11:35	Information on ORN Conference and the inaugural ORN Awards	
11:30 – 11:55	Quantifying the health benefits of outdoor recreation for the UK	Harry Davies (Natural Capital Team, ONS)
11:55 – 12:00	Webinar Close	Pippa Langford (ORN Co-Chair)
12:00 – 12:45	Member Meeting (members stay on) <ul style="list-style-type: none"> • Q&A with speakers • Conference outline and call for contributions • Member Updates 	Pippa Langford (ORN Co-Chair)

Measuring people's engagement with Nature using data science methods



Tim Ashelford, Chaitanya Joshi
Jamie Elliott, James Kenyon

 Office for
National Statistics



Department
for Environment
Food & Rural Affairs

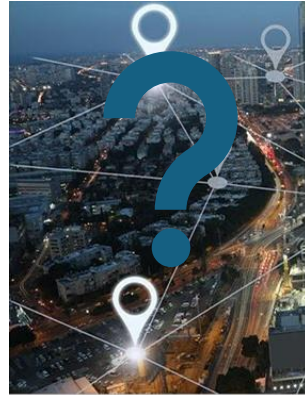
Policy & Delivery Background

- Defra Environmental Improvement Plan (January 23) recognises importance of spending time in nature, new -15 minutes' walk of a green or blue space commitment.
 - [New Statistic in Development on access to greenspace will be released 12 March](#)
 - Feedback Welcome
- Natural England's purpose -conserve and enhance the natural environment and promote access to the countryside and open spaces and encourage open-air recreation
- New trails/investment work, Natural England
 - King Charles III England Coast Path, 2,700 miles
 - Designating Wainwright's coast to coast route across the north of England as a National Trail.
- Working with land managers/owners
 - Provision of safe and appropriate public access in as many woodlands as possible as set out in the England Trees Action Plan.
 - Environmental Land Management (ELM) allowing long term permissive access for recreation and contributing to the rural economy.



Evidence / data on visits to natural spaces

Mobile phone data



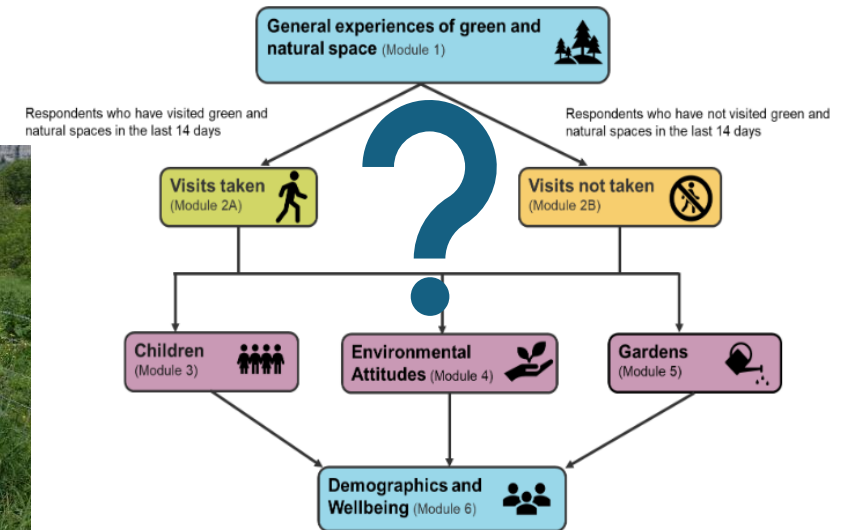
STRAVA | METRO



Automated people counters



Natural England's People and Nature Survey



Data Science perspective

- ❖ Good quality (big) data is increasingly seen as a useful tool for decision making
- ❖ Non-traditional big data sources and advanced machine learning modelling techniques are becoming increasingly popular to bridge the gaps in our understanding
- ❖ Inferences in a data landscape with highly interrelated influences can be a challenge

Two step approach:

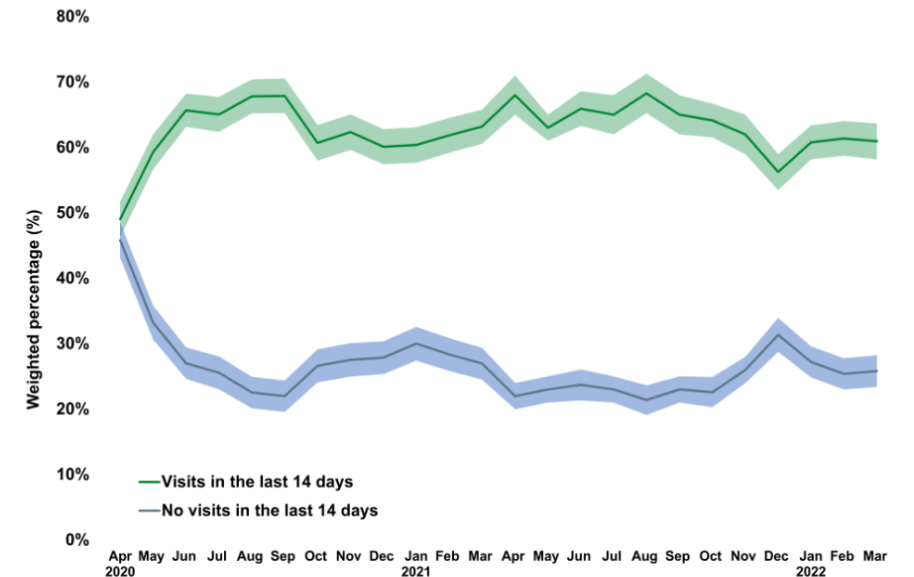
- 1. Better data and insights to improve our understanding of people's engagement with nature.**
- 2. Model to estimate visitation counts.**

Impact

- *Development of a novel experimental indicator to aid DEFRA and its partners and produce more granular and timely statistics.*
- *Better understanding of visitor patterns will inform local planning and prioritisation, help manage protected sites and [landscapes](#); improve monitoring of the use of [National Trails](#), farmland and accessible woodland; help planning and evaluating the use of the new [England Coastal Path](#) and [Green Infrastructure](#).*

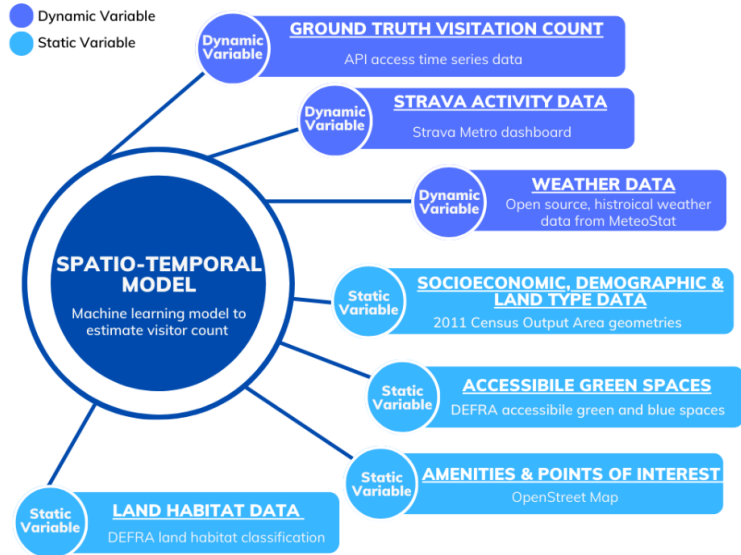


Figure 1: The proportion of adults in England (weighted percentage) visiting a green and natural space in the last 14 days. In March, 61% of adults in England said that they had spent time outside in green and natural spaces in comparison to 26% who had not.

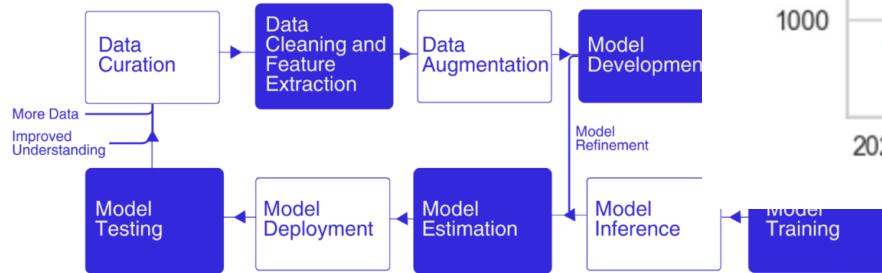


Machine learning model

CONCEPTUAL MODEL: USE OF NATURAL SPACES



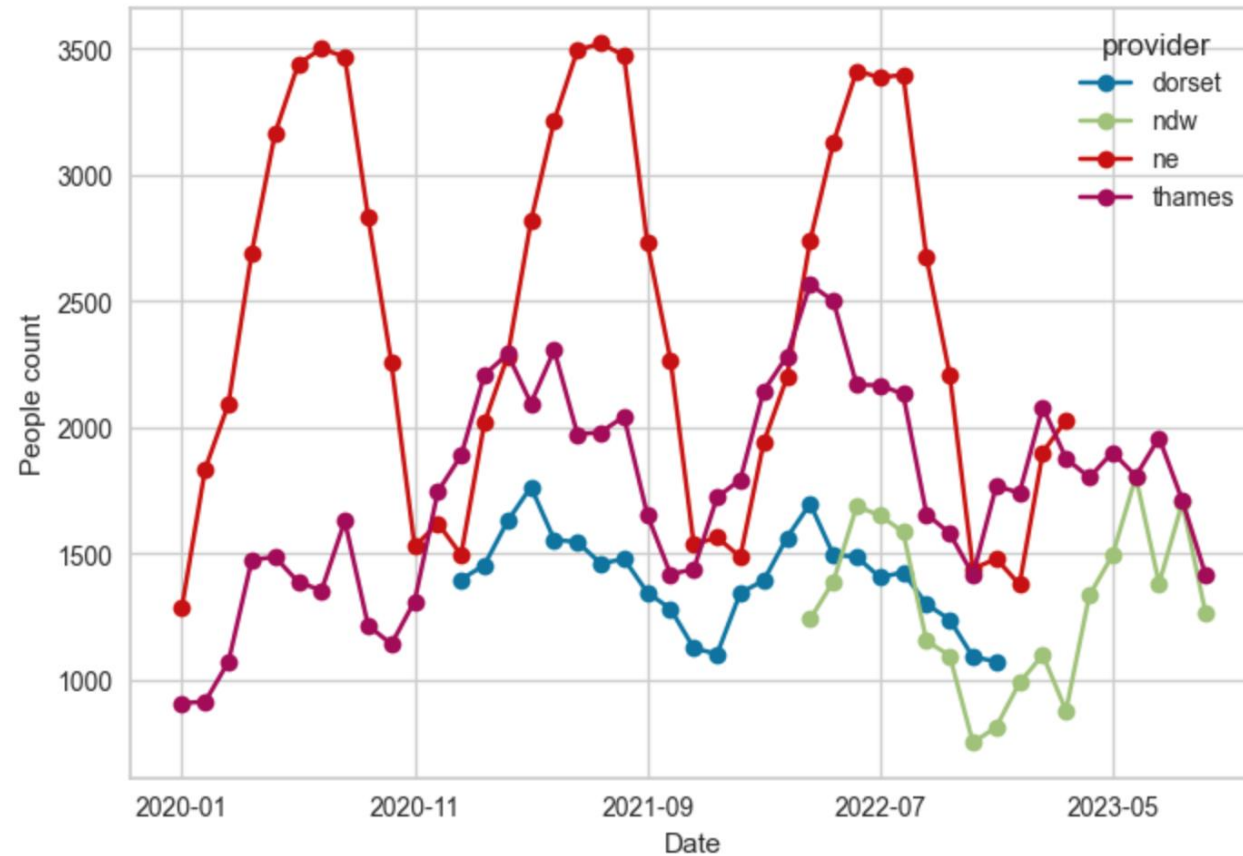
Iterative Machine Learning Cycle



People Counter Locations



Open source freely available datasets such as Strava Metro data to produce



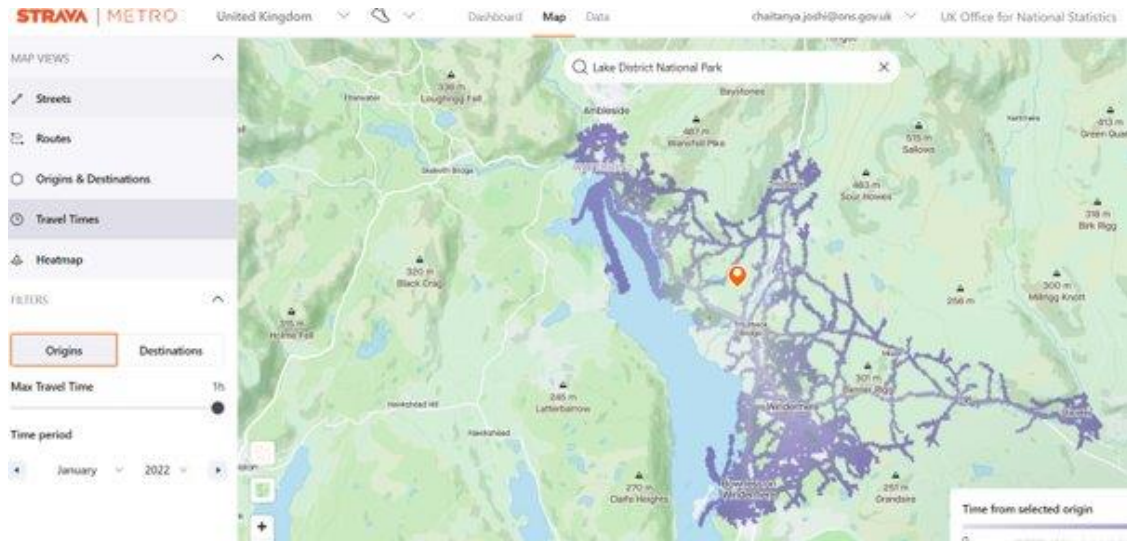
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Strava Metro data



- ❑ Outputs useful for a range of policy questions
- ❑ Accessible Green and Blue spaces
- ❑ Corresponding Health outcomes
- ❑ Urban planning- air quality monitoring

Model features

Static Variable

ACCESSIBLE GREEN SPACES

DEFRA accessible green and blue spaces

- The amount of accessible woodland space within each buffer zone

Dynamic Variable

STRAVA ACTIVITY DATA

Strava Metro dashboard

- Total_trip_count- the total number of journeys made on the strava edge

Static Variable

AMENITIES & POINTS OF INTEREST

OpenStreet Map

- Points of interest features taken from OSM to represent the number of pubs, parking spaces, hotels and other features

Static Variable

LAND HABITAT DATA

DEFRA land habitat classification

- The proportion of area in the buffer zone that represents Grassland, woodland, wetland

Static Variable

SOCIOECONOMIC, DEMOGRAPHIC & LAND TYPE DATA

2011 Census Output Area geometries

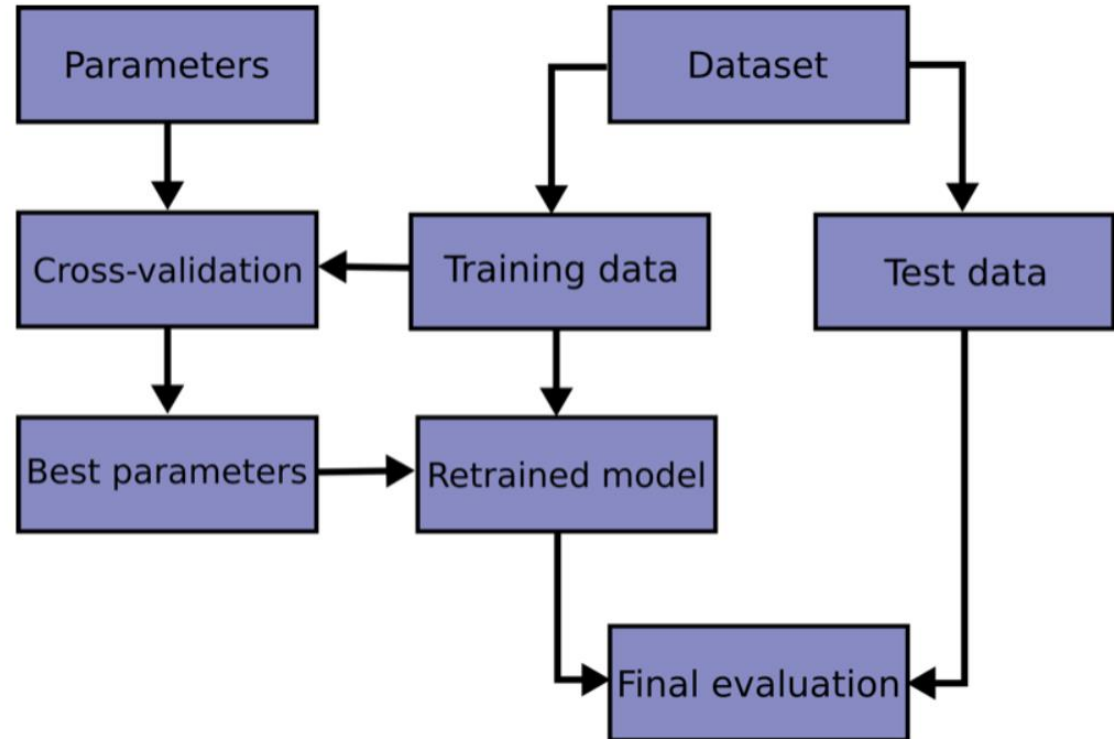
- The proportion of area in the buffer zone that represents urban and rural land types

Dynamic Variable

WEATHER DATA

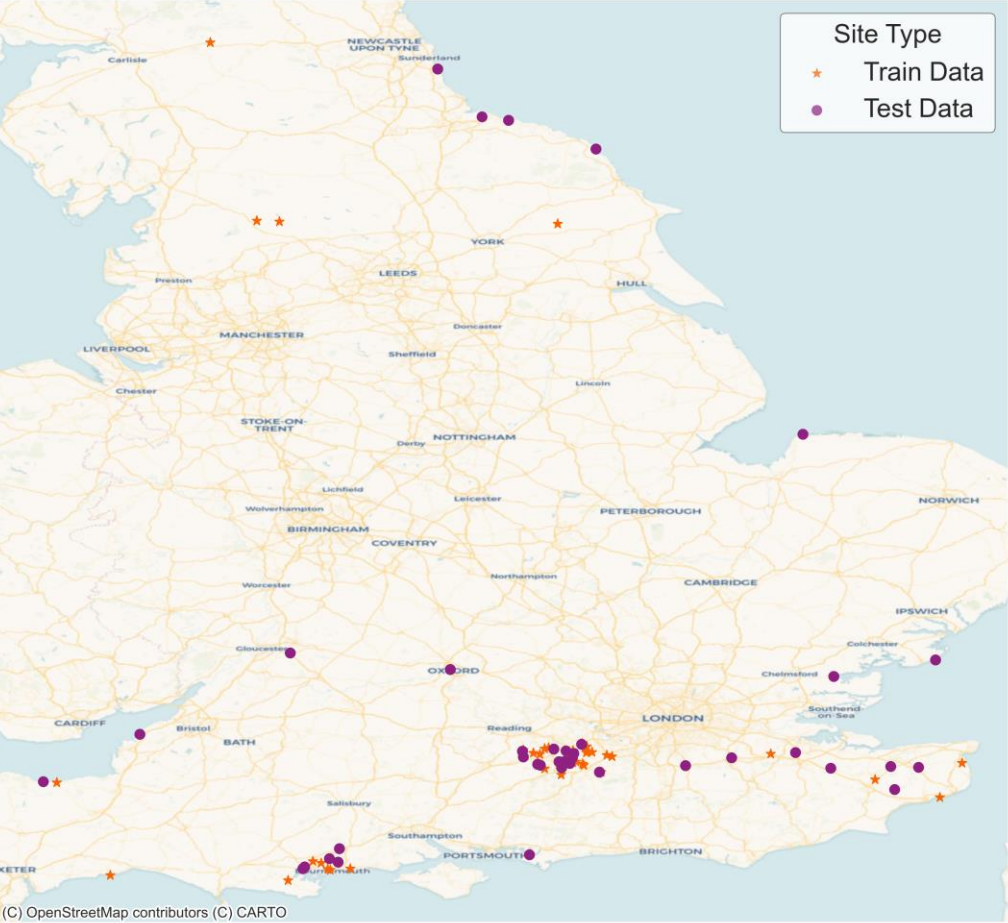
Open source, historical weather data from MeteoStat

- The average temperature on each day

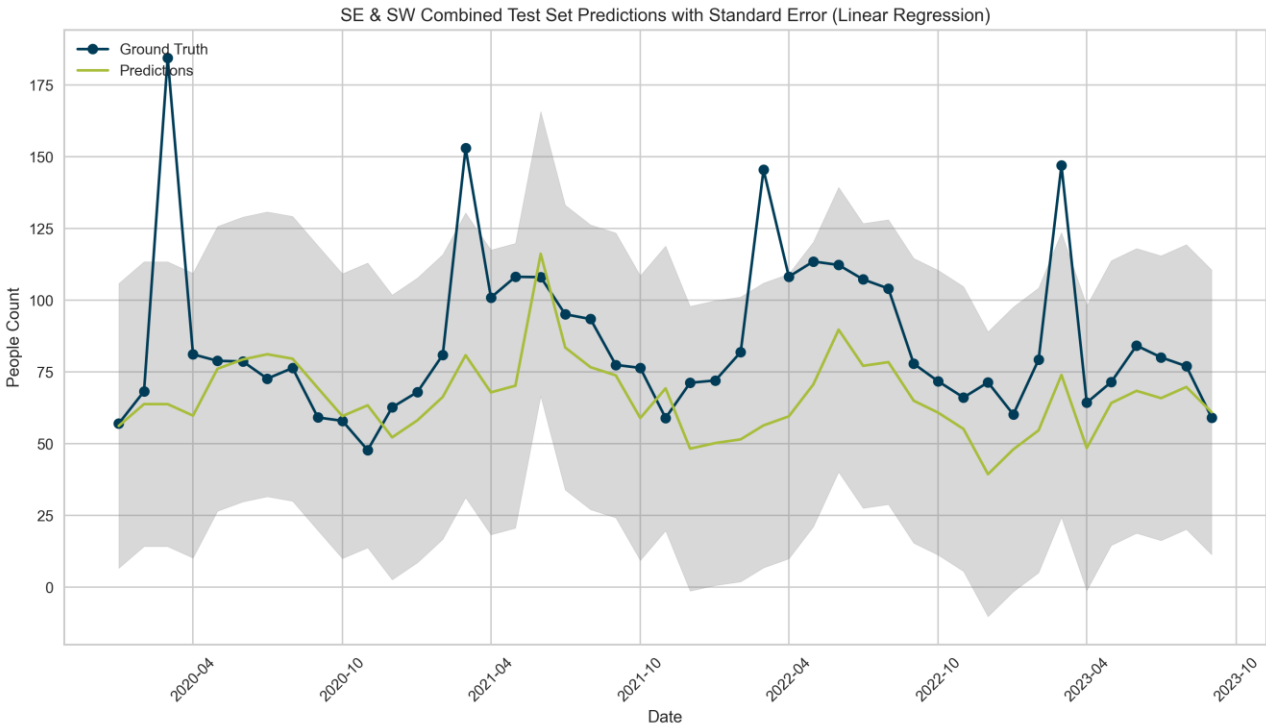
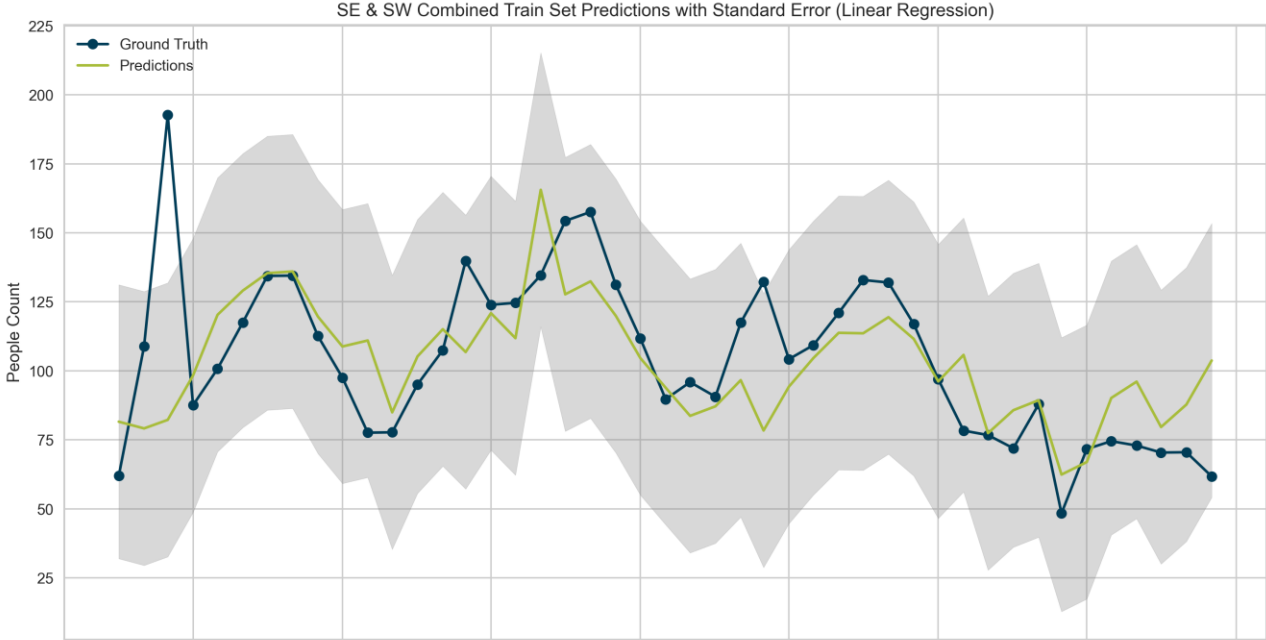


Model training and outputs

Train and Test set Counter Locations

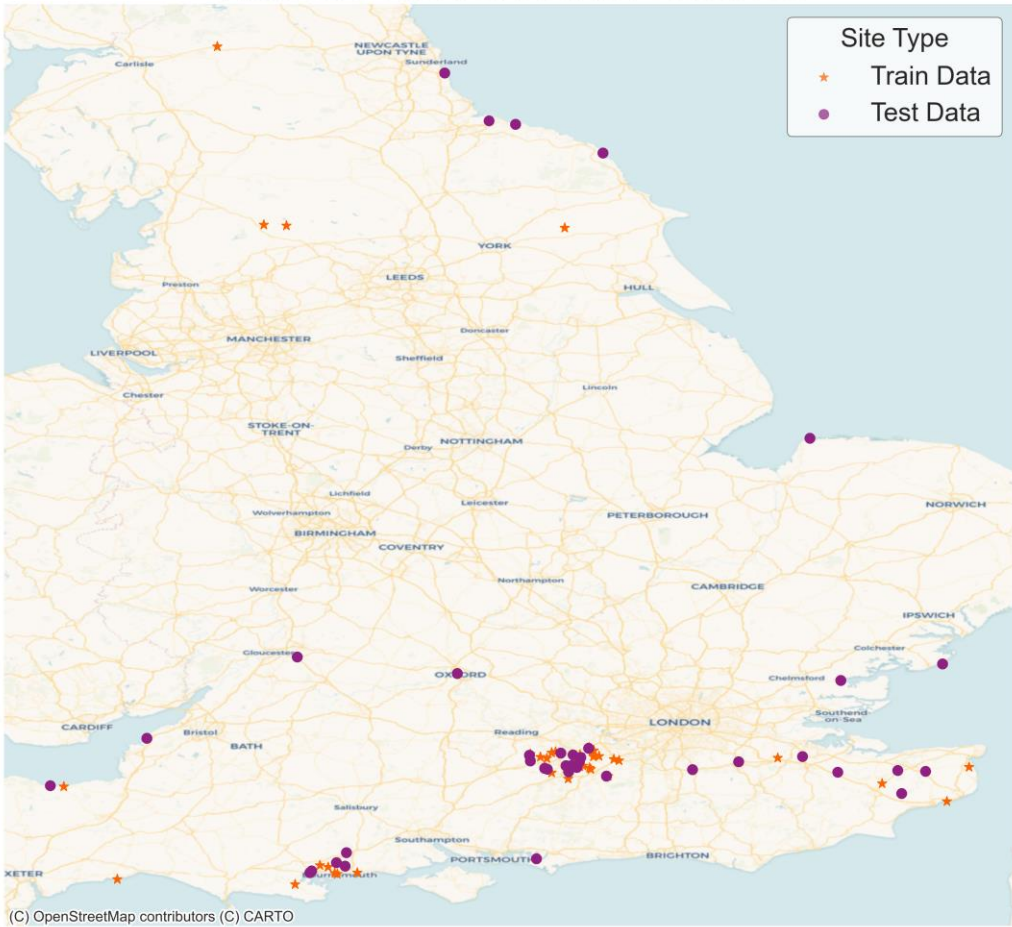


Linear model

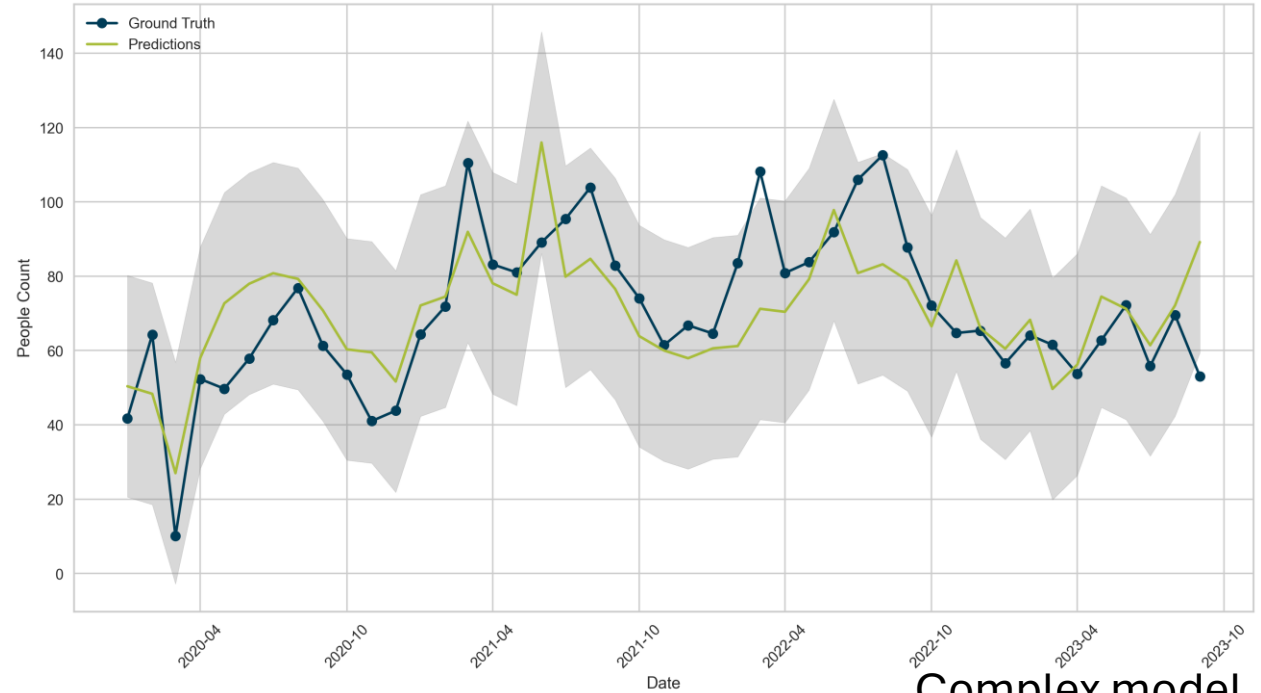


Model training and outputs

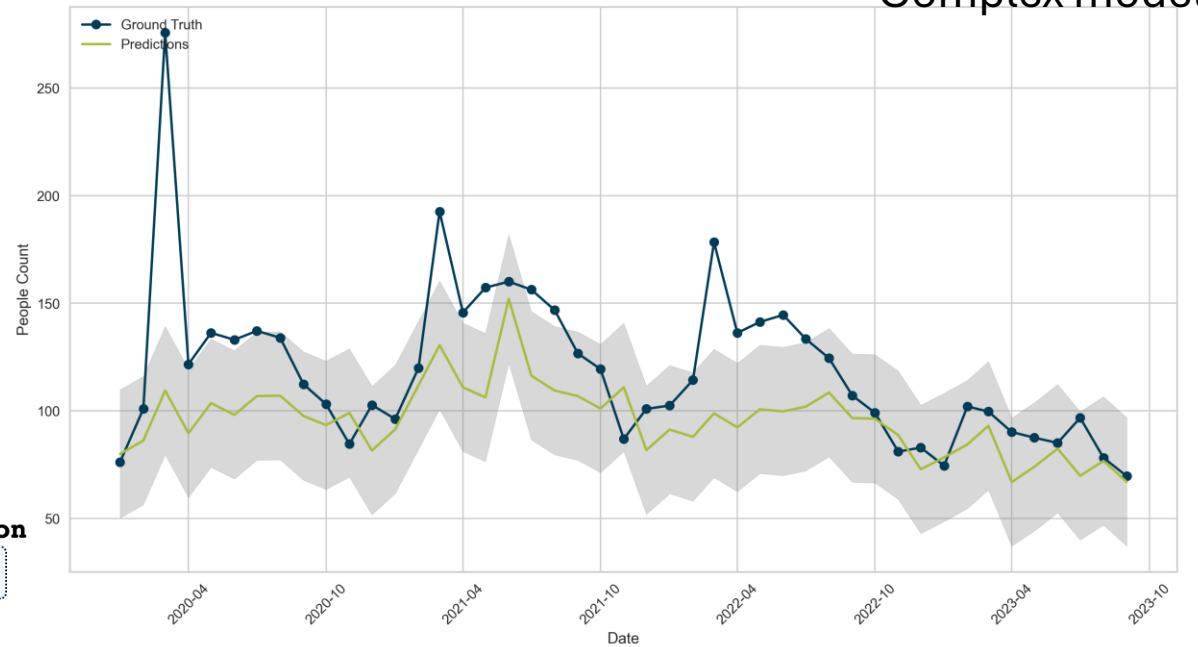
Train and Test set Counter Locations



SE & SW Combined Train Set Predictions with Standard Error



Complex model



VotingRegressor

Linear Regression **Bayesian Ridge** **Kernel Ridge**

Ridge Regression

Lasso Regression

LinearRegression

BayesianRidge

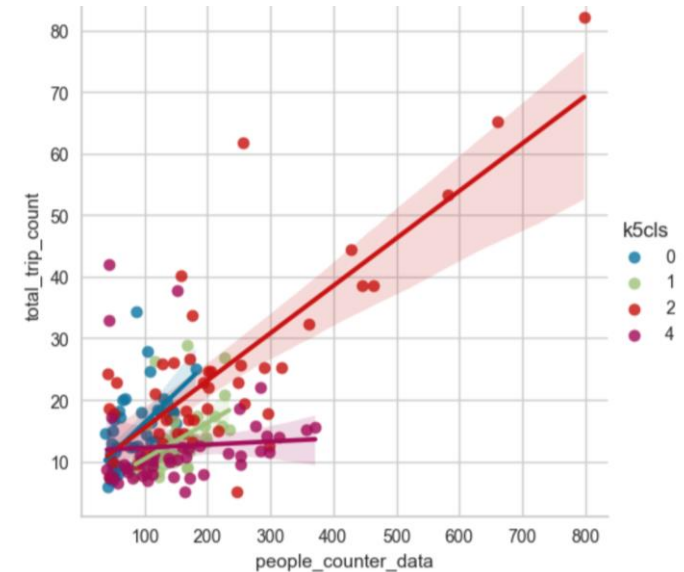
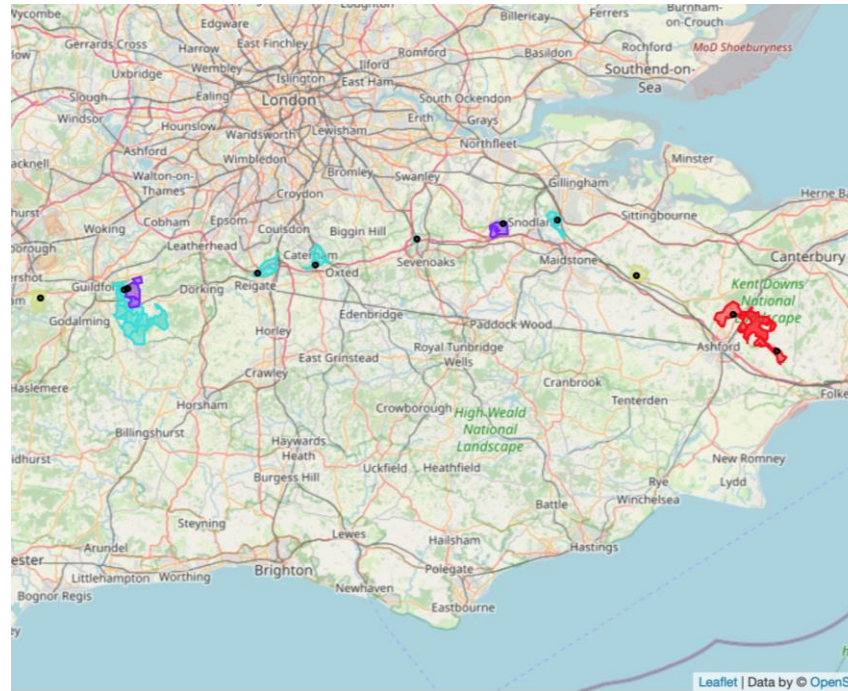
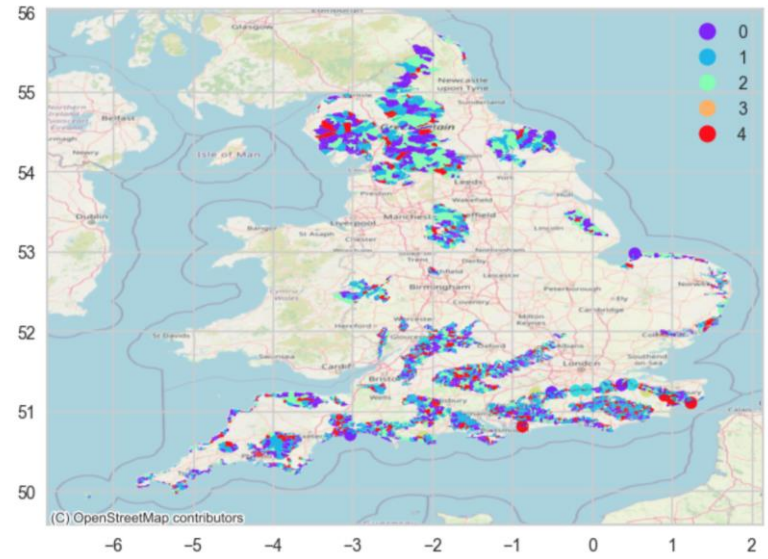
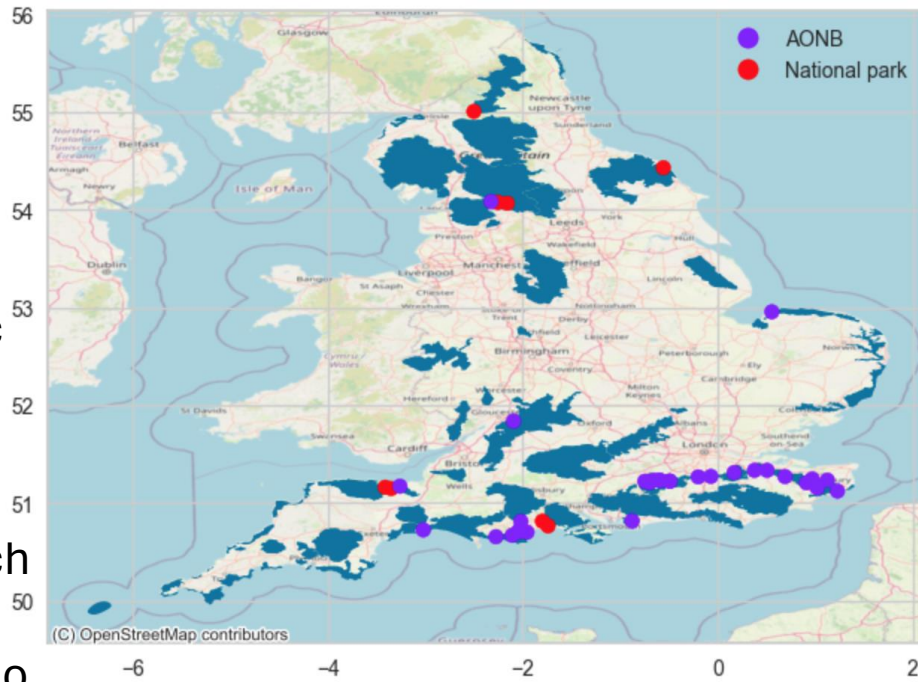
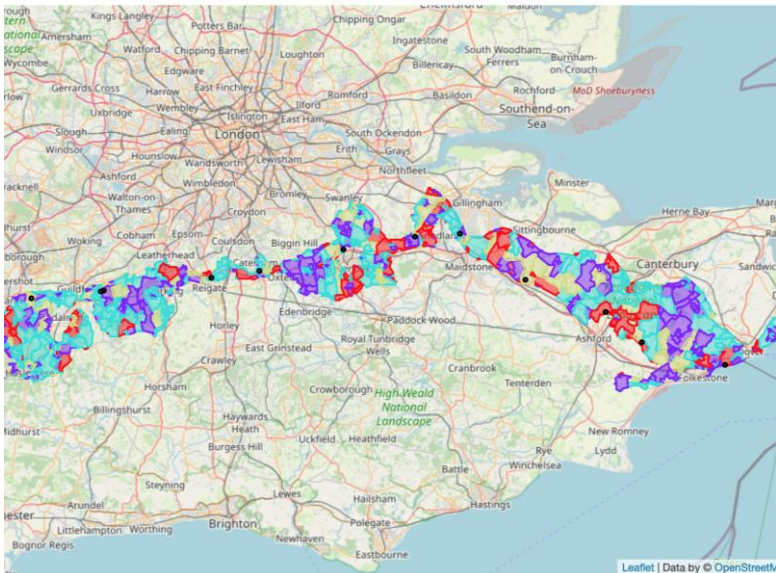
KernelRidge

Ridge

Lasso

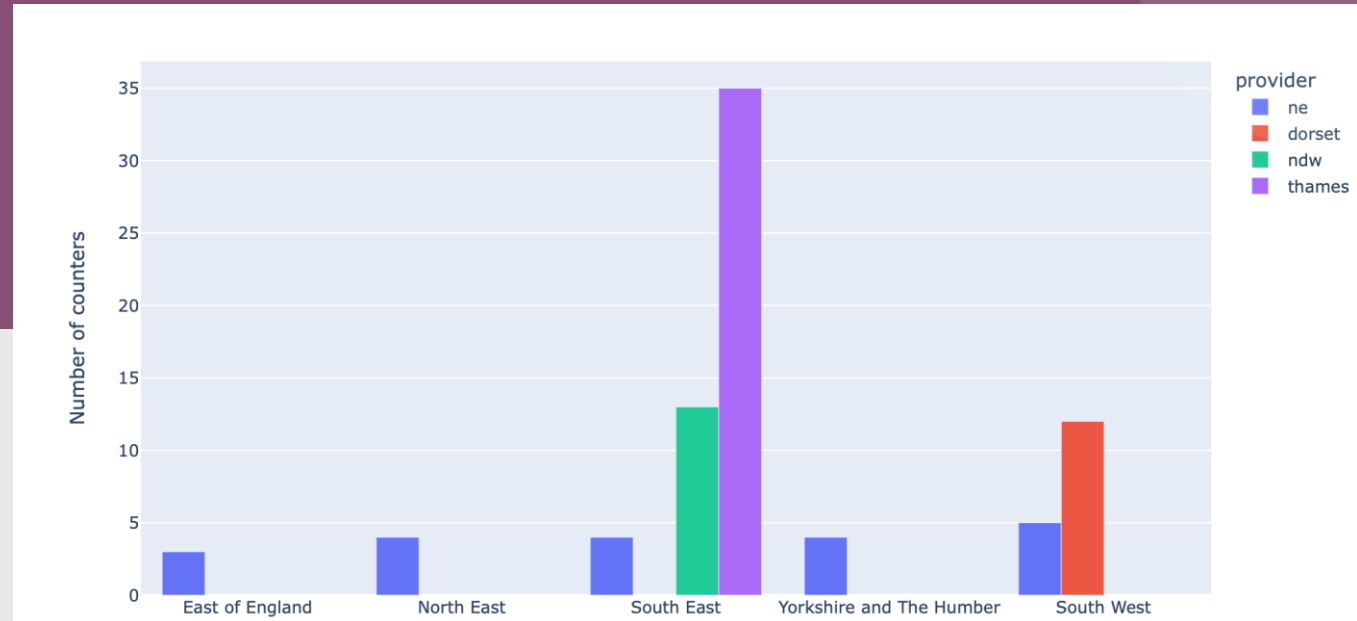
Protected landscapes-producing estimates bespoke geographies

- Clustering based on socioeconomic demographic features
- Find similar areas within protected landscapes
- Investigating visitation counts in each cluster
- ‘Extrapolate’ findings to areas with no monitoring stations.



Outlook

- Machine learning data science approach has yielded promising results.
- Model performance crucially depends on the quality and coverage of training data.
- Regional estimates focused on South East and South West.
- Experimental outputs can be potentially validated with independent datasets.
- No information on Visitors attributes.
- Reproducible code and a technical write-up will be published (April 2024).



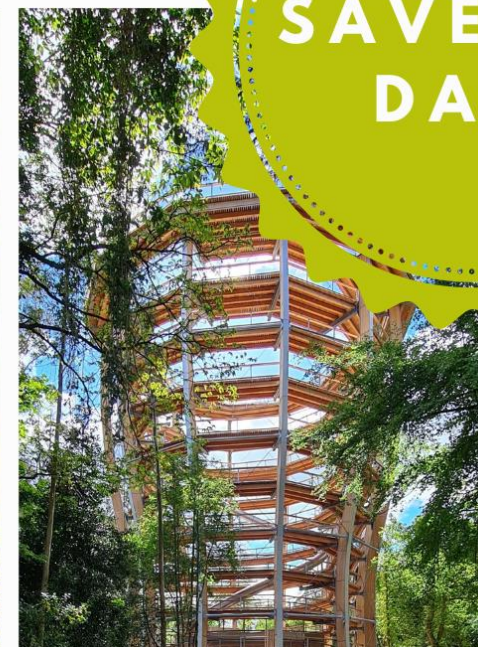
ORN Conference 'Navigating Outdoor Recreation with Insights'



ORN CONFERENCE 2024
NAVIGATING OUTDOOR
RECREATION WITH
INSIGHTS

GLENDALOUGH,
CO. WICKLOW,
IRELAND

APRIL 10-12 2024





Day 1: Navigating the future with data-driven confidence

Glendalough Hotel

Minister's Opening remarks

National Mapping Data Insights

Get Ireland Active

GreenspaceNI Map

Green Infrastructure Map

Other updates

Using data insights to plan the future

Population projection modelling

Climate change modelling

Data insights from 'above' and 'below'

Accessing and Making Use of BIG 'data'

Insights from the ground: the role of forums and committees

Quick-fire presentations on using data to:

- Protect and enhance our environment
- Calculate the impact on communities and local economies
- Understand and shape visitor behaviour
- Measure the impact on health and wellbeing
- Address the needs of people with a disability and low mobility

(followed by breakout sessions)

Optional outdoor activities (led by local NPWS Rangers)

Inaugural ORN Awards Ceremony and Conference Dinner

*There will be coach pick-up and drop-off points for conference delegates to take you to and from the village of Glendalough – these will likely be **Dublin City Centre**, **Dublin Port**, and **Dublin International Airport**. This service will generously be provided by Fáilte Ireland.

Day 2: Data-driven tourism destinations and place shaping

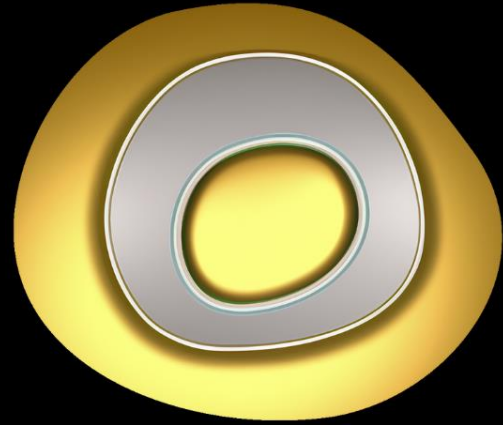
'Beyond the Trees' Avondale

*Conference delegation split into groups

Group A: Data-driven tourism destinations	Group B: Journey Through and Above the Forest
<ul style="list-style-type: none"> • Beyond the Trees: How data informed the transformation of Coillte's Avondale site • Profile and importance of the outdoor activity visitor to Ireland • Insights on the sustainable and regenerative tourism potential of Blueways • Updates from members/participants 	<p>Weave your way along the walkway exploring trees, from top to bottom. Rise up through the magnificent viewing tower to emerge high above the forest floor (38m!) and enjoy 360° panoramic views of Wicklow, before you whizz your way back to earth on the gigantic spiral slide, or take a more leisurely journey, down the gently sloping boardwalk.</p>
Group A: Journey Through and Above the Forest	Group B: Data-driven place shaping
<p>Weave your way along the walkway exploring trees, from top to bottom. Rise up through the magnificent viewing tower to emerge high above the forest floor (38m!) and enjoy 360° panoramic views of Wicklow, before you whizz your way back to earth on the gigantic spiral slide, or take a more leisurely journey, down the gently sloping boardwalk.</p>	<ul style="list-style-type: none"> • Beyond the Trees: How data informed the transformation of Coillte's Avondale site • Designing the right trails to meet users' needs – and the benefit to local communities • Systems and methodologies to track visitor numbers and measure impact on identified sites where over-crowding is a current or potential issue • Updates from members/participants

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Inaugural ORN Awards



Outdoor
Recreation

Network

2024 AWARDS
NOMINATIONS
NOW OPEN

SUBMIT YOUR APPLICATIONS FOR THE FOLLOWING 6 CATEGORIES
BEFORE 10TH MARCH 2024

Inaugural ORN Awards



AWARD CATEGORIES:

- Best practice for accessibility and inclusion
- Best example for tackling climate change
- Best example of Sustainable outdoor recreation related tourism and visitor management
- Best project for improving greenspace and green infrastructure
- Best contribution towards Transforming nature connection
- Best example of research making an impact

Quantifying health benefits from recreation in natural capital accounts

Harry Davies & Nirav Nayee

Natural Capital

19 February 2024



Beyond GDP

“The Beyond GDP initiative is about developing indicators that are as clear and appealing as GDP, but more inclusive of environmental and social aspects of progress.”

Economic capital

Social capital

Natural capital

Human capital

Natural Capital

“Natural capital accounting estimates the current value of natural wealth and what it could provide for future generations”

**Provisioning
services**

**Regulating
services**

**Cultural
services**

Our existing cultural services

Recreation & Tourism

spend incurred to travel to, and during, visit to nature.
(parking fees, transport costs, vehicle running costs and admissions)



House prices

additional expenditure on houses that are near to green and blue spaces (free trips to nature), and value added to houses with a view of green and/or blue space

Health benefits from recreation?

Spending time
in nature



Improved health
and wellbeing

energy ↑

stress ↓

anxiety ↓

depression ↓



Spending time in nature

Multinomial
logistic
regression

Engagement with
nature survey

120 minutes in
nature per week?

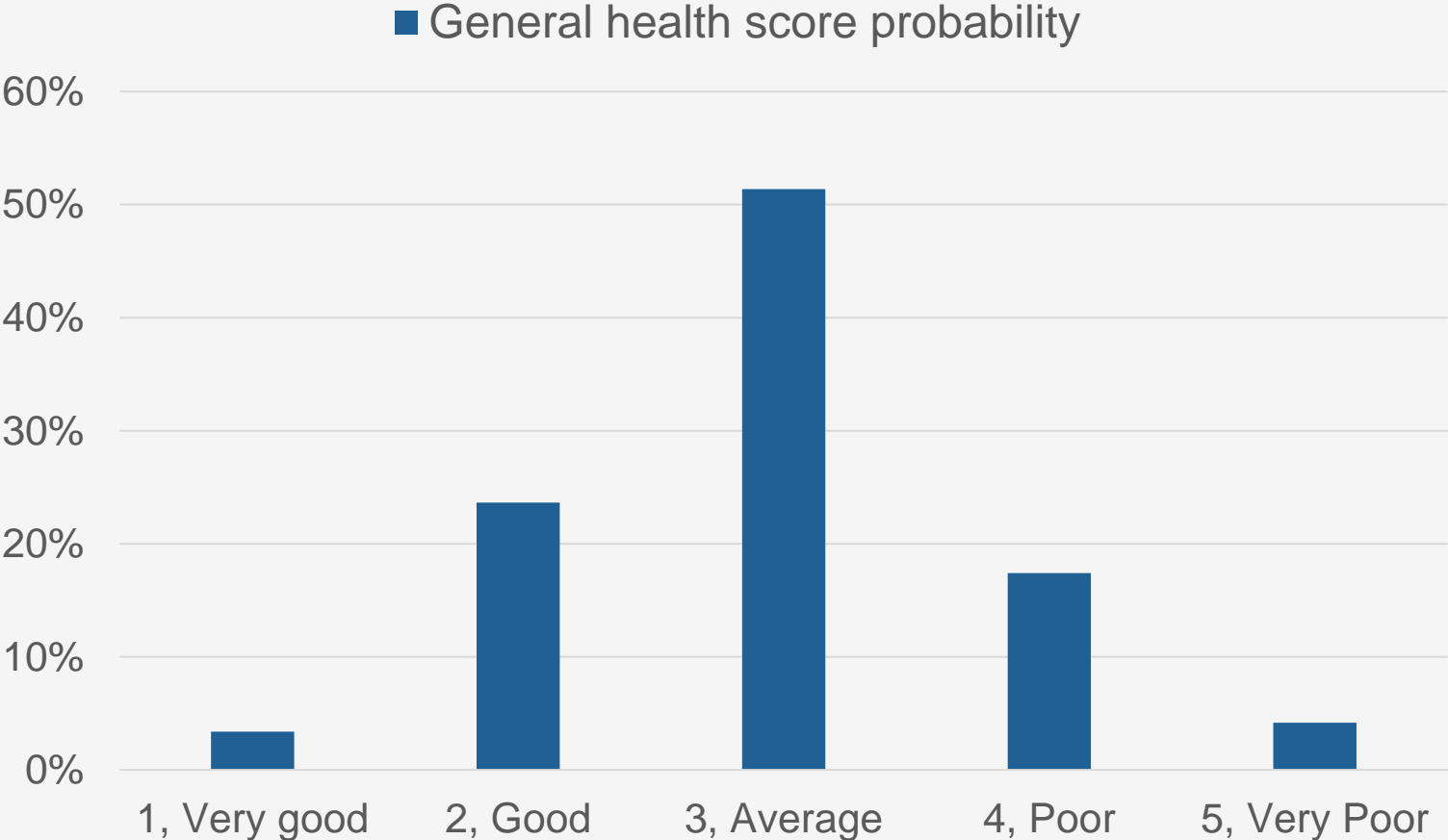
Yes

No

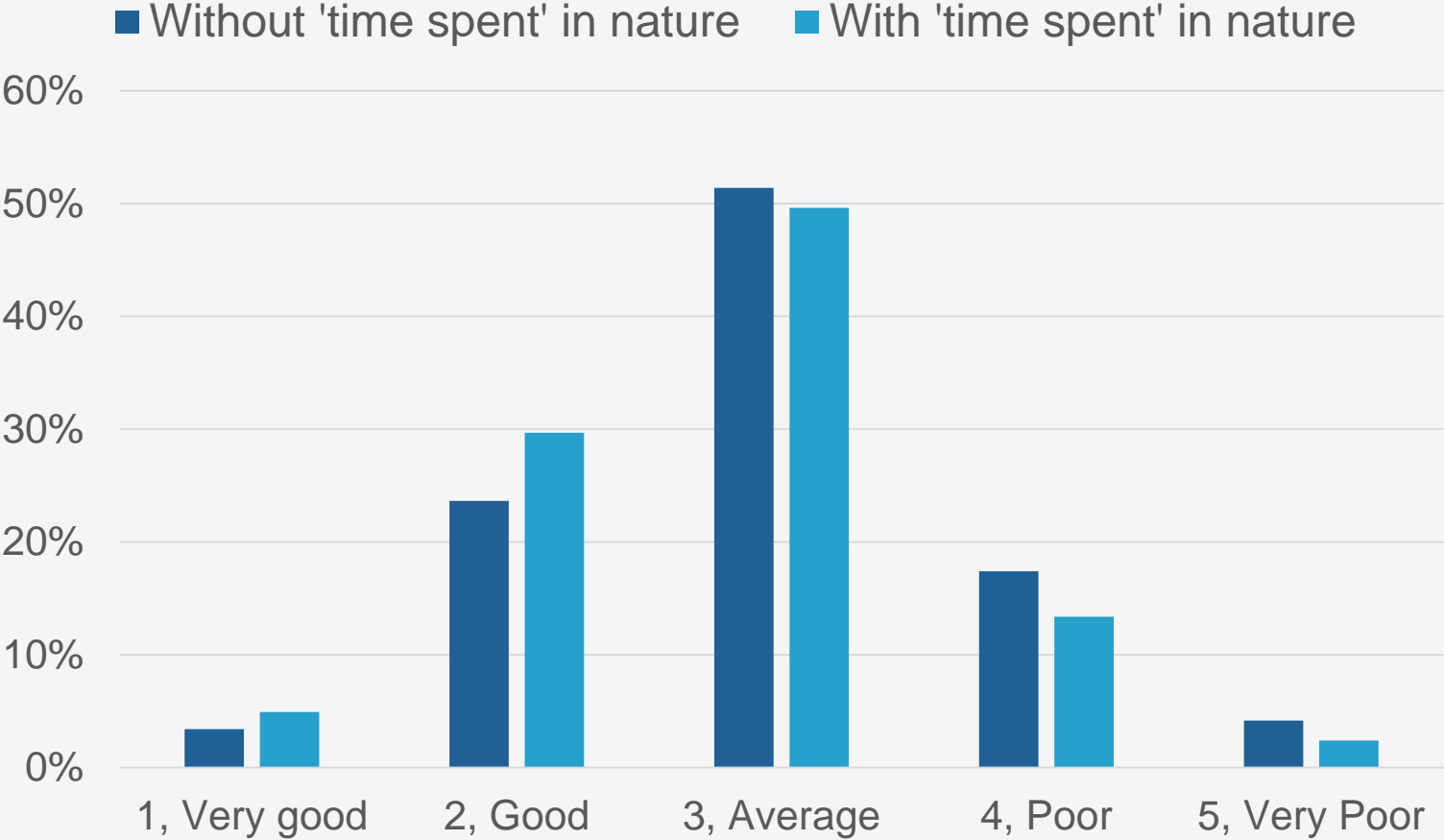
Higher self-reported
general health

Lower self-reported
general health

Regression: modelled probability



Regression: modelled probability



Quality-adjusted life year (QALY)

“A measure of the state of health of a person in which the benefits, in terms of length of life, are adjusted to reflect the quality of life.”

£13,000
in 2008 prices



Regression: modelled probability

Health Score	Equivalent QALY	Without time spent in nature		With time spent in nature	
		Modelled Probability	Weighted QALY	Modelled Probability	Weighted QALY
Very poor	0.2	4.2%	0.008	2.4%	0.005
Poor	0.4	17.4%	0.070	13.4%	0.054
Average	0.6	51.4%	0.308	49.6%	0.298
Good	0.8	23.6%	0.189	29.7%	0.238
Very good	1.0	3.4%	0.034	4.9%	0.049
Predicted QALYs			0.609		0.644
Net benefit of nature					0.035

Individual health benefits

On average,

0.01995 QALYs | **£328** per person

applied to,

Yearly engagement with nature surveys

England

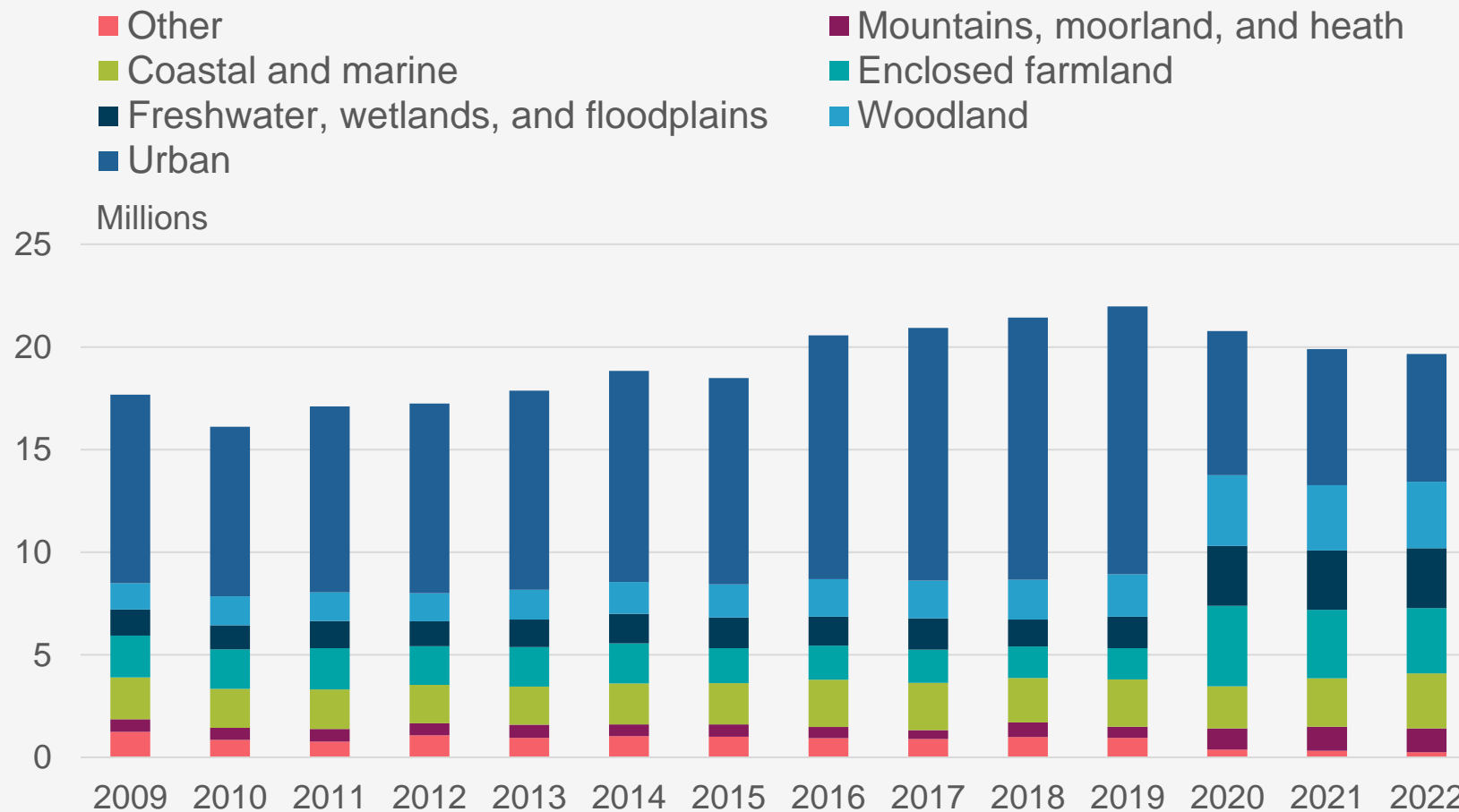
Wales

Scotland

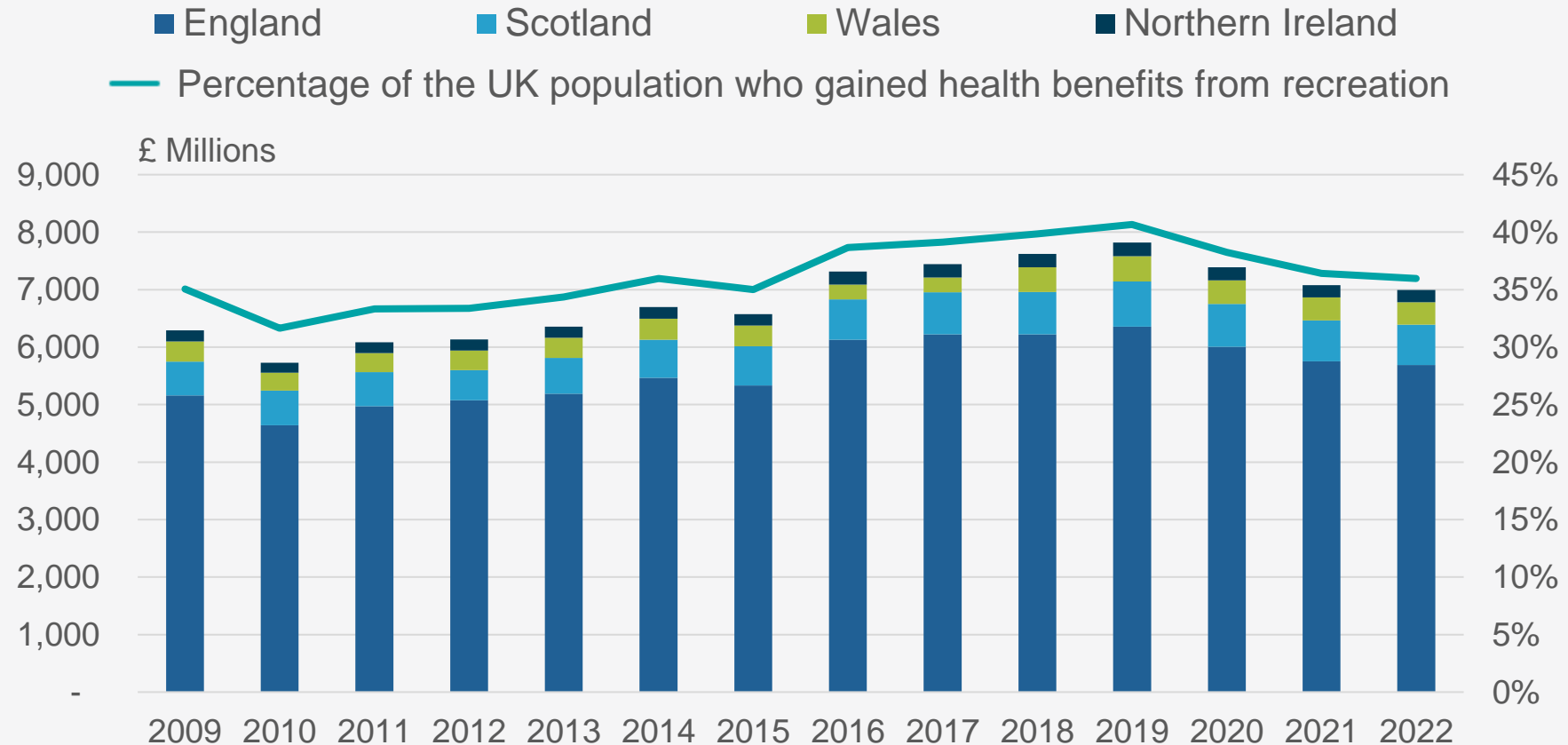
Northern Ireland

MENE, PANS, WORS, NSW, ScRS, SPANS, POMNI

Total number of people estimated to have gained health benefits from recreation, millions, UK, 2009 to 2022

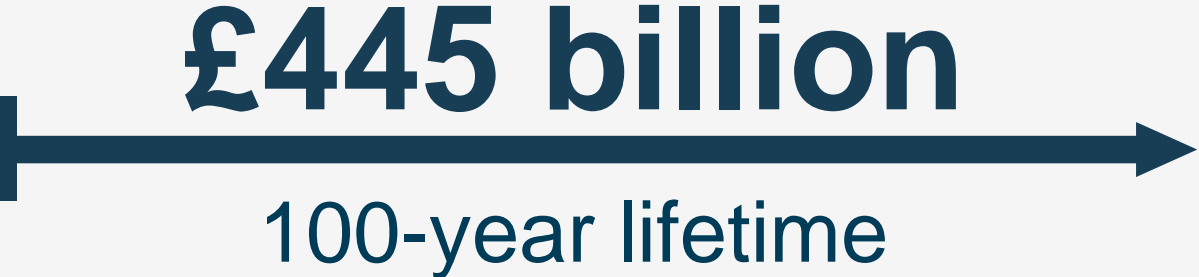


Annual value of health benefits from recreation, £ million (2022 prices), 2009 to 2022



Asset value

“Long-term potential (stock) of that resource to provide benefits to humans...”



Questions?

Natural.capital.team@ons.gov.uk

Feedback Form

ORN Unlocking Data for
Innovative Outdoor Recreation
Insights



Thank you for joining
Members welcome to stay on



Welcome to the Member Meeting

- Q&A with speakers
- Conference outline and call for contributions – booking to open next week
- ORN Awards – submissions open to members & conference participants
- Member Updates
- Next Member Meeting – Wednesday 10th April 19:30 – 22:00 in Glendalough Hotel for an informal dinner and information sharing.