Finding the right spot: recreational sea anglers location choice in the UK

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OVERVIEW

Recreational sea angling is a high participation sport, with significant impact on the UK economy as well as on some fish stocks, little is know about sea anglers utility, making policy and management a challenge. This study examines the location choice for UK shore anglers based on a random utility model. Using data from a diary panel which encompasses data on fishing location and catch for shore anglers in 2016, we calculate the **Willingness-to-Pay (WTP)** of shore anglers for catch quality based on travel distance.

DATA

The **Sea Angling Diary Panel in 2016** (http://www.seaangling.org) data were restricted to shore anglers, resulting in the location & catch from **3,336** trips supplied by **261** diarists of varying avidity (angling frequency).
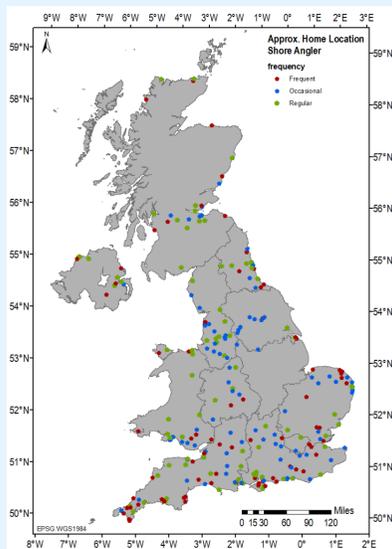

Fig. 1: Approx. Home Locations Diarist 2016

Alternative locations are taken from the **Diary Panel** AND the website 'britishseafishing.co.uk' [**BSF**], which recommends places for sea angling as well as describes the expected catch.

Catch diversity is measured as **1-Herfindahl-Hirschman Index (HHI)** based on the number of species caught or to be expected at the location. No-catch is zero.

Site quality is approximated by habitat maps (*Source*: UKSeaMap 2016) as well as bathymetric depth (*Source*: GEBCO 2014).

To measure the **congestion effects,** distance to public transport, parking spaces or pubs are included (*Source*: OpenStreetMap.org).
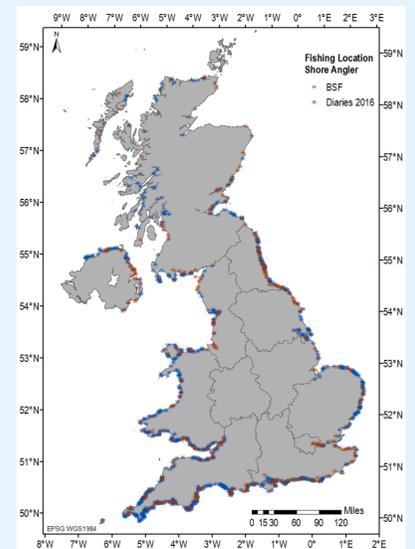

Fig. 2: Fishing Locations Shore Angling

METHOD

Step 1: Restrict the Alternatives

Each trip is matched with all possible alternative locations based on diary data and BSF for the same location type (i.e. shore or pier/harbor/promenade) → ca. 3 Mio observation to filter for the most likeliest alternative.

Multi-level mixed effect logit:

$$Logit[PR(Y = 1|X = x_{it})] = u_i + \alpha + \beta X$$

With i = 1,...,n denotes the individual diarist, t=1,...,T the observations, u_i the random effect for cluster i , and X the explanatory variables: species length, HHI & travel distance.

Cutoff-threshold based on **Youden's J-statistic** (ROC-curve): 6-208 alternatives per location choice (trip)

Step 2: The Location Choice

Mixed logit:

$$U_{ij} = \beta'_i x_{ij} + \varepsilon_{ij}$$

Hence, the utility of diarist i is created by choice between J alternatives based on the explanatory variables X:

- **Site quality**: bathymetric depth, habitat (e.g. sand, rock, seabed)
- **Congestion effects**: distance to public transport, pubs, parking
- **Catch quality by season**: main species (e.g. bass, cod, dogfish)
- **Random coefficients**: catch diversity (HHI) & catch size (mean-variance standardized)

RESULTS

Location choice explained by:

- **Overall:** avoidance of congestion areas; close to home location, diversity of catch
- **Frequent shore anglers:** distance to congestion areas, <u>proximity to parking</u>, close to home location, diversity of catch
- **Regular shore anglers:** distance to congestion areas, <u>proximity to pubs</u>, close to home location, diversity of catch
- **Occasional shore anglers:** <u>shallow waters</u>, <u>close to congestion areas</u>, close to home location, diversity of catch

Distribution of random coefficient

- **Species diversity:** (+) 85.4% overall; 91.5% frequent; 72.1% regular; 74% occasional
- **Catch size (standardized):** (-) 61.5% overall; 50.8% frequent; 75.9% regular; 52.3% occasional

WTP (in £)

	Overall	Frequent	Regular	Occasional
Species diversity (+1 percent to catch another species)	6.16 [5.32; 7.00]	5.92 [4.97; 6.88]	2.86 [1.37,4.37]	5.30 [3.87,6.72]
Catch size (+1 unit above mean)	-0.30 [-0.18;-0.42]	-0.03 [-0.17;0.12]	-1.11 [-1.68;-0.55]	-0.06 [-0.21;0.08]

Tab 1: Average WTP [min; max] based on travel distance (i.e. 0.06 £/km) – one way

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