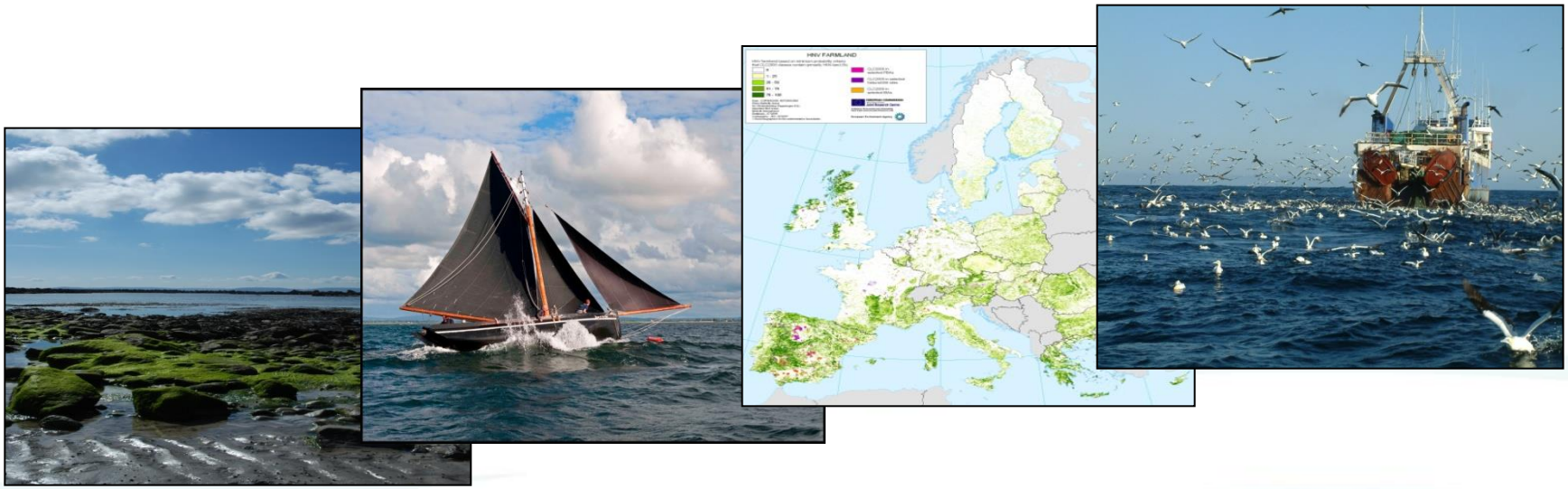
Estimating the value of sea angling recreation in Ireland

Stephen Hynes



Beaufort meeting, 2015

Overview

- Marine Ecosystem Service Benefits
- Policy issues relevant to sea-angling
- Survey and Data
- The Travel Cost Model (TCM) method of estimation is used to put a value on the demand for sea angling in Ireland.
  - What characteristics are driving demand for sea angling?
  - What value is retained by the anglers in the form of consumer surplus?

Ecosystem Services

- Common International Classification of Ecosystem Services (CICES) (Haines-Young and Potschin, 2010)
- Loss of ecosystems affect the economy, communities and development opportunities
- If no estimates for marine ecosystem services then will not be considered in Cost Benefit Analysis of Policy

CICES Framework		
Section	**Division**	**VIBES Examples**
Provisioning	Nutrition	Capture fisheries, aquaculture
	Materials	Seaweed, genetic material
Regulation & Maintenance	Mediation of waste	Wastewater treatment
	Mediation of flows	Storm and flood protection, erosion control
	Maintenance of physical, chemical, biological conditions	Habitat protection, carbon sequestration, disease control
Cultural	Physical and intellectual interactions	Recreation, aesthetic views, education, science, heritage
	Spiritual, symbolic and other interactions	Symbolic, religious, existence, bequest values

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Policy Relevance of Sea Angling

- Debate surrounding resource allocation between commercial fisheries and recreational anglers in Ireland
- Certain wild stocks are known to be in serious decline

- Invasive Species
- Significant economic contribution in rural areas
- Tourism Marketing Strategy

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The Travel Cost Model

- The model describes the demand for recreation of a person during a season (12 months)
- The quantity demanded is the number of visits
- The price is the cost per visit

$$r = f(tc_r)$$

r = number of visits during a season

tc_r = cost of a visit

Those who lives close to a site have a lower cost per visit. They should visit the site more often than someone who lives further away.

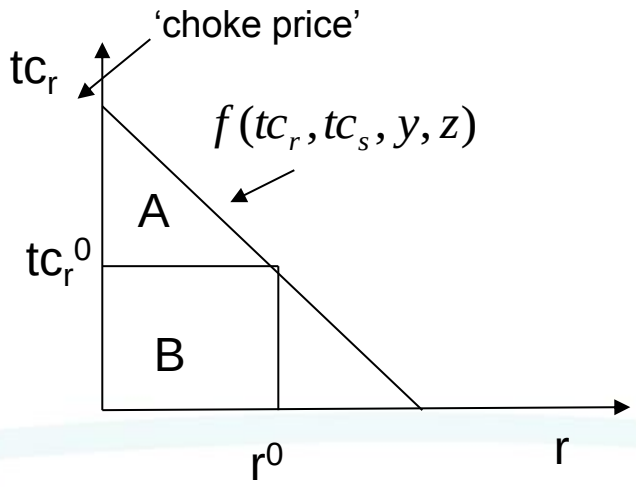
What determines the number of visits

- Other elements, such as age, income, experience, availability of substitute sites may also affect the number of visits:

$$r = f(tc_r, tc_s, y, z) \quad , \quad r = \beta_{tc_r} tc_r + \beta_{tc_s} tc_s + \beta_y y + \beta_z \mathbf{z}$$

B = total trip cost
A+B = Willingness to pay
A = consumer surplus (access value)

The 'choke price' is the minimum price at which the number of trips falls to zero.



The consumer surplus is equal to:

$$\Delta w = \int_{tc_r^0}^{tc_r^{choke}} f(tc_r, tc_s, y, \mathbf{z}) dtc_r$$

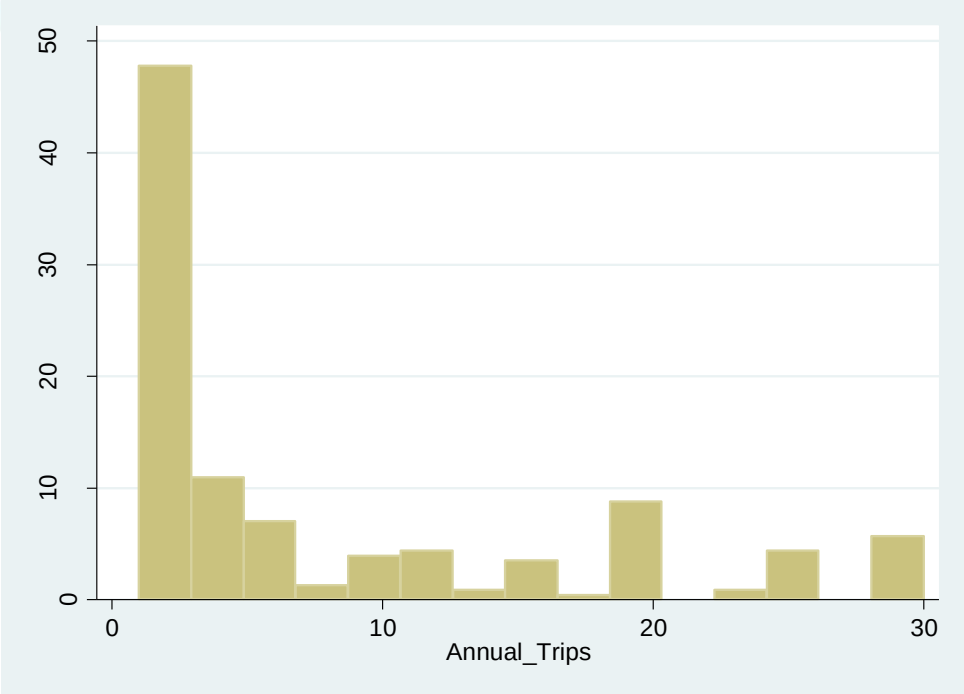
On-site Sample

Sampling Issues to be considered

- Count nature of data
- Truncation
- Endogenous Stratification
- Poisson vs Negative Binomial

Survey and Data

- On-site survey
  - 244 sea anglers interviewed at 16 sampling locations
  - Carried out over 9 month period
  - Both domestic and foreign anglers interviewed



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Summary Statistics

Variable	Mean	Std. Dev.
Number of days stayed on current trip	4.26	3.61
Travel cost per angling trip*	159	98
No. of Fishing Trips in Ireland last 12 months	7.83	9.2
Age	48.6	13.21
Social Class C1	0.48	0.5
Fishing from boat (%)	0.47	0.5
Targeting Bass (%)	0.32	0.47
Affiliated to Angling Club (%)	0.43	0.49
Number in group (aged 15+)	3.82	4.04
Gross Income/1000	39.66	22.98
Republic & Northern Irish (%)	0.52	0.5
Scottish, Welsh, English (%)	0.36	0.48

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Summary Statistics

Variable	Mean	Std. Dev.
Quality Ratings		
Quality of Angling Experience ranked as "Good" or "Very Good" (%)	0.79	0.41
Quality of Fish Stocks ranked as "Good" or "Very Good" (%)	0.51	0.5
Value for Money ranked as "Good" or "Very Good" (%)	0.73	0.44

Summary Annual Expenditure Patterns

Items of Expenditure per Angler (€)	Annual Expenditure		Expenditure last Trip	
	Mean	Std. Dev.	Mean	Std. Dev.
Tackle	521	732	55	159
Bait	148	238	22	43
Boat Hire	162	349	72	260
Guide Services	18	70	13	48
Food and Drink	404	740	189	351
Accommodation	247	434	226	495
Transport in Ireland (petrol, car hire, etc)	562	824	78	130
Other Expenses (Clothing, Retail, Competition Fees, etc)	304	438	46	73
Total Costs	2352	2475	690	989

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Estimation Results

Parameter	Generalised NB
Travel cost per trip	-0.004*** (0.001)
Invest	0.0003** (0.0001)
Age	0.010 (0.007)
Social Class C1	-0.385** (0.165)
Fishing from boat	-0.579** (0.268)
Targeting Bass	0.275 (0.200)
Affiliated to Angling Club	0.383** (0.172)
Number in group (aged 15+)	-0.061** (0.029)
Gross Income/1000	0.000 (0.004)
Republic & Northern Irish	2.250*** (0.424)
British	-0.781** (0.364)
Constant	-1.880 (1.219)
Ln (Alpha)	1.85*** (1.12)
Log Likelihood	-521.51
Likelihood Ratio (Wald for GNB model) χ^2 Statistic (12d.f.)	299.16

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Expected trips and benefit estimates

	Poisson	Negative Binomial	Truncated Negative Binomial	Generalised Negative Binomial
Predicted Trips	22.06	22.45	6.91	4.99
Consumer surplus per trip (€)	426	323	261	242
	(331, 598)	(220, 605)	(170, 554)	(157, 528)
Aggregate WTP (€ million)	1,635	1,371	367	254

- Aggregate willingness to pay is based on: predicted trips* population of sea anglers of 126,728*(CS per trip +average travel cost as specified in summary stats).
- CS is 60% of total WTP for on-site NB versus

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Conclusions

- High valued activity
- Large proportion of value retained in CS.
- Bass
  - €9 per kg approx. commercial landing value.
  - Estimated 30 – 44 tonnes recreational landings per year
  - Over 80% catch and release
- Tourism versus commercial fisheries multipliers (1.6 v 1.4)
  - IO model Ireland

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