

On the location choice of the Polish fishing fleet

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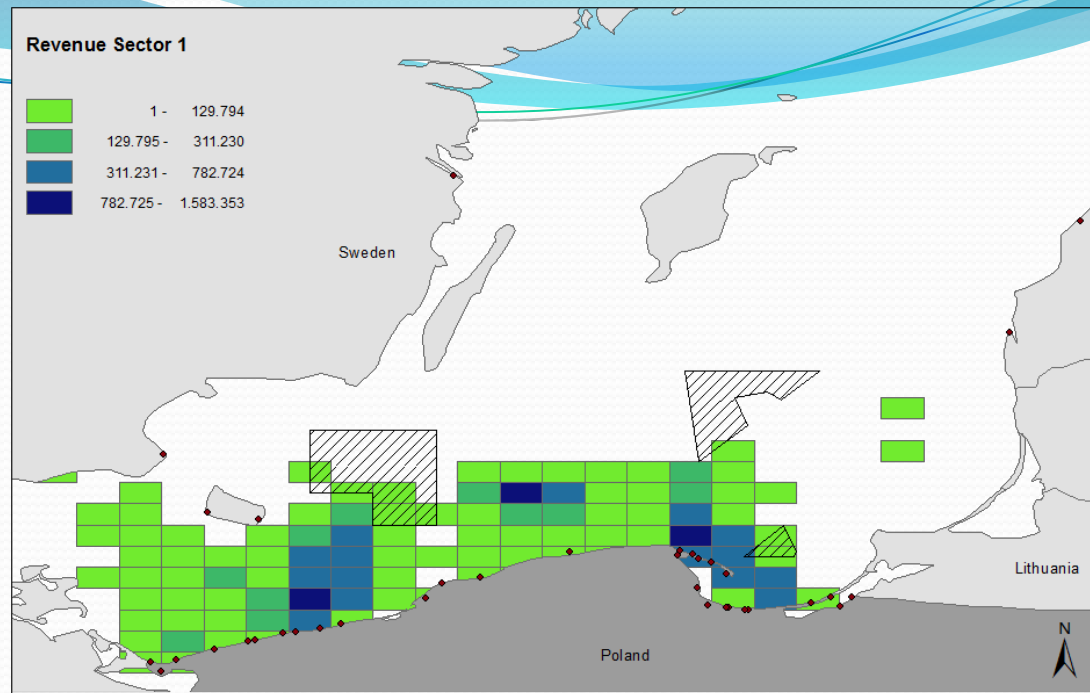


Research Question

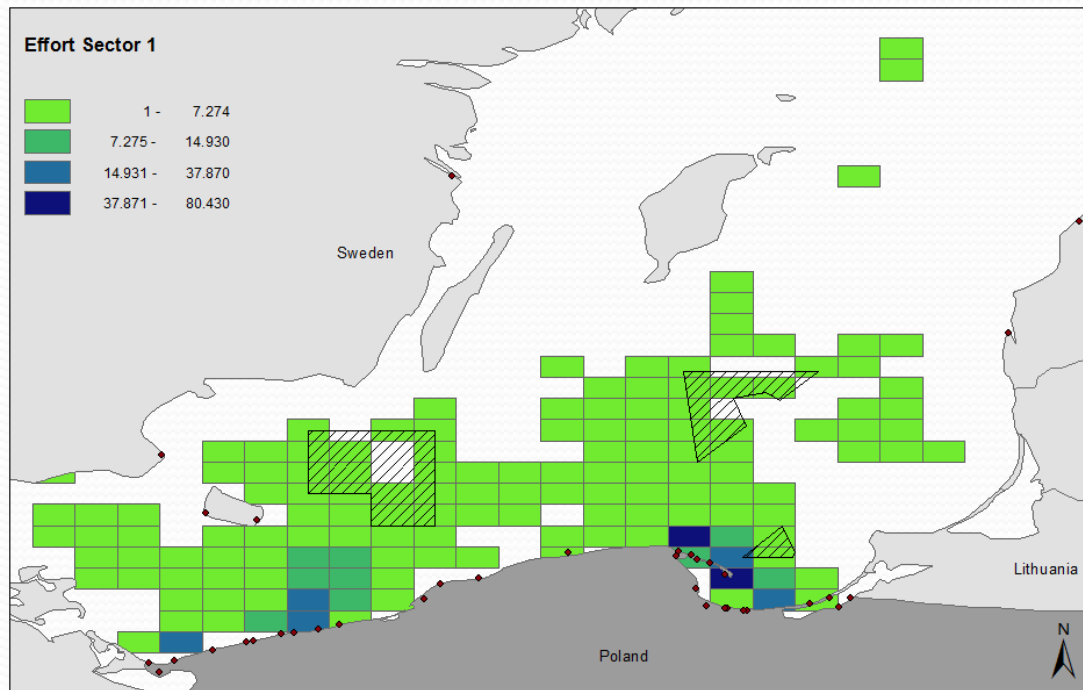
- Who is choosing which harvest site to fish?
- Choice depends on:
 - capital,
 - effort,
 - distance,
 - past experience of harvest at the site and harvest itself,
 - unobserved seasonal variability (monthly), and
 - spatial dependency

Background

1. Spatial variation of revenues and efforts, e.g. demersal sector

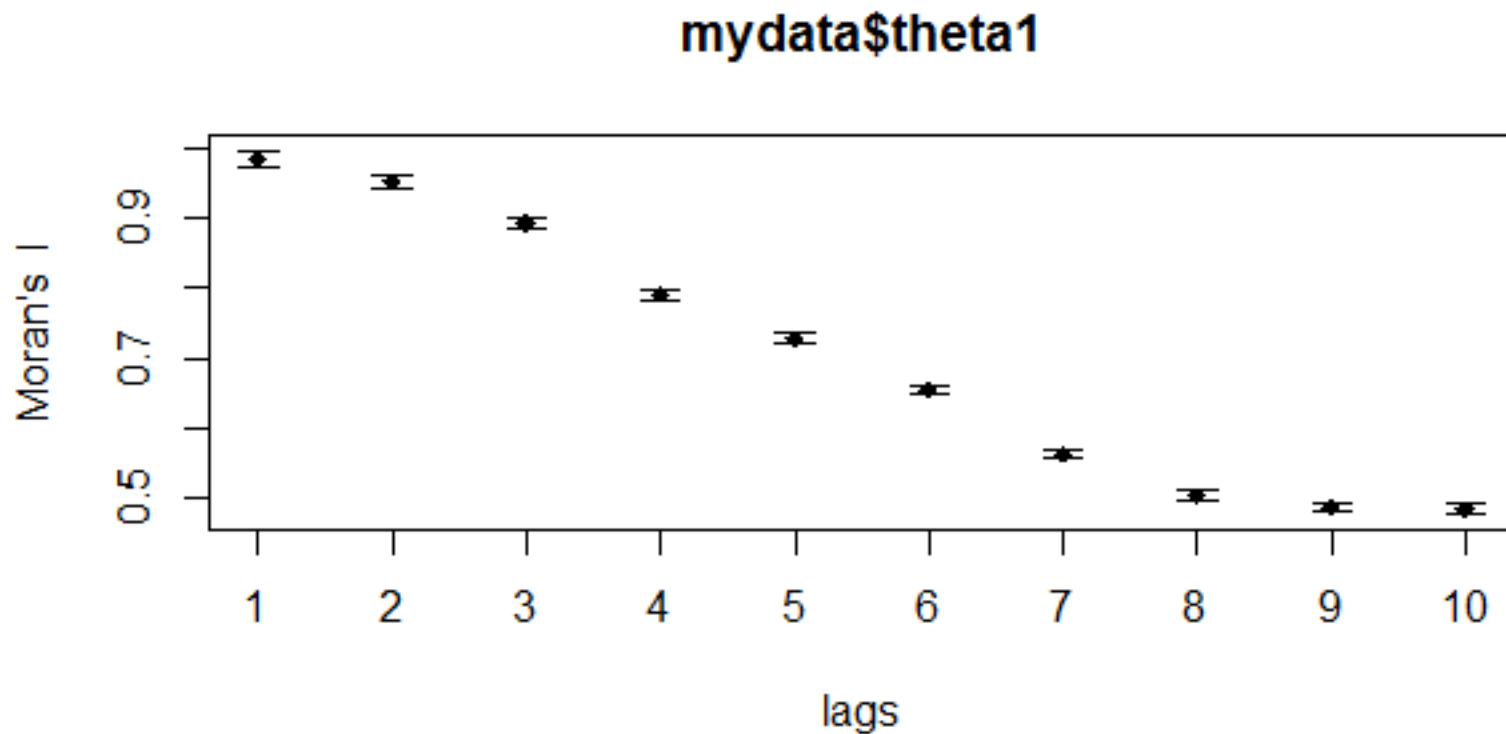


2. Local clustering of outputs & inputs



Background

- Moran's I of efficiency by sector



Method

- Standard approach: MNL or Nested logit to calculate a RUM/ EPM
- Spatial clustering of observation leads to the violation of the assumption of i.i.e (see Anselin 2010) → biased estimates
- SARprobit model calculated with the help of a Bayesian approach (MCMC estimator)

$$y^* = (I_n - \rho W)^{-1} X \beta + (I_n - \rho W)^{-1} \varepsilon$$

$\varepsilon \sim N(0, I_n)$

LeSage/Pace 2009, ch 10.1

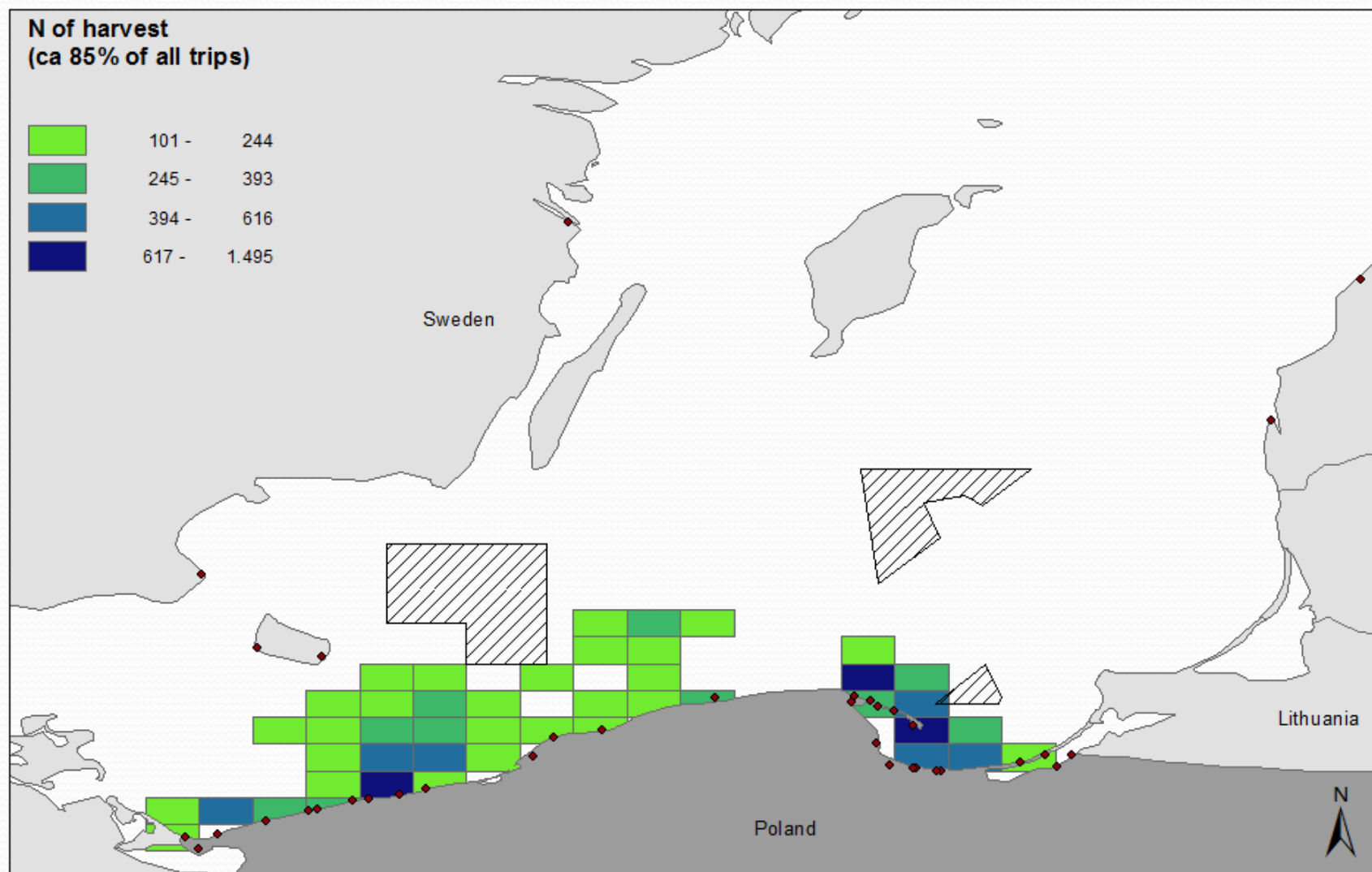
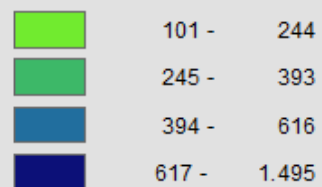
Data

- Logbook data of the Polish Fleet 2012 – trip level
- Sectors:
 - 1 – demersal trawl (OTB & PTB)
 - 2 – pelagic trawl (OTM & PTM)
 - 3 – gillnets (GNS)
 - 4 – all other
- Harvested species:
 - Cod
 - Flounder
 - Herring
 - Sprat
 - Others
- Vessel characteristics (length, tonnage, HP)
- Predominant fishing areas → Travel distance (port-centroid-port)
- Fishing hours
- Data omits small vessels (below 10m) which are subject to different regulations and vessels which fish less than 12 hours in demersal or pelagic trawl

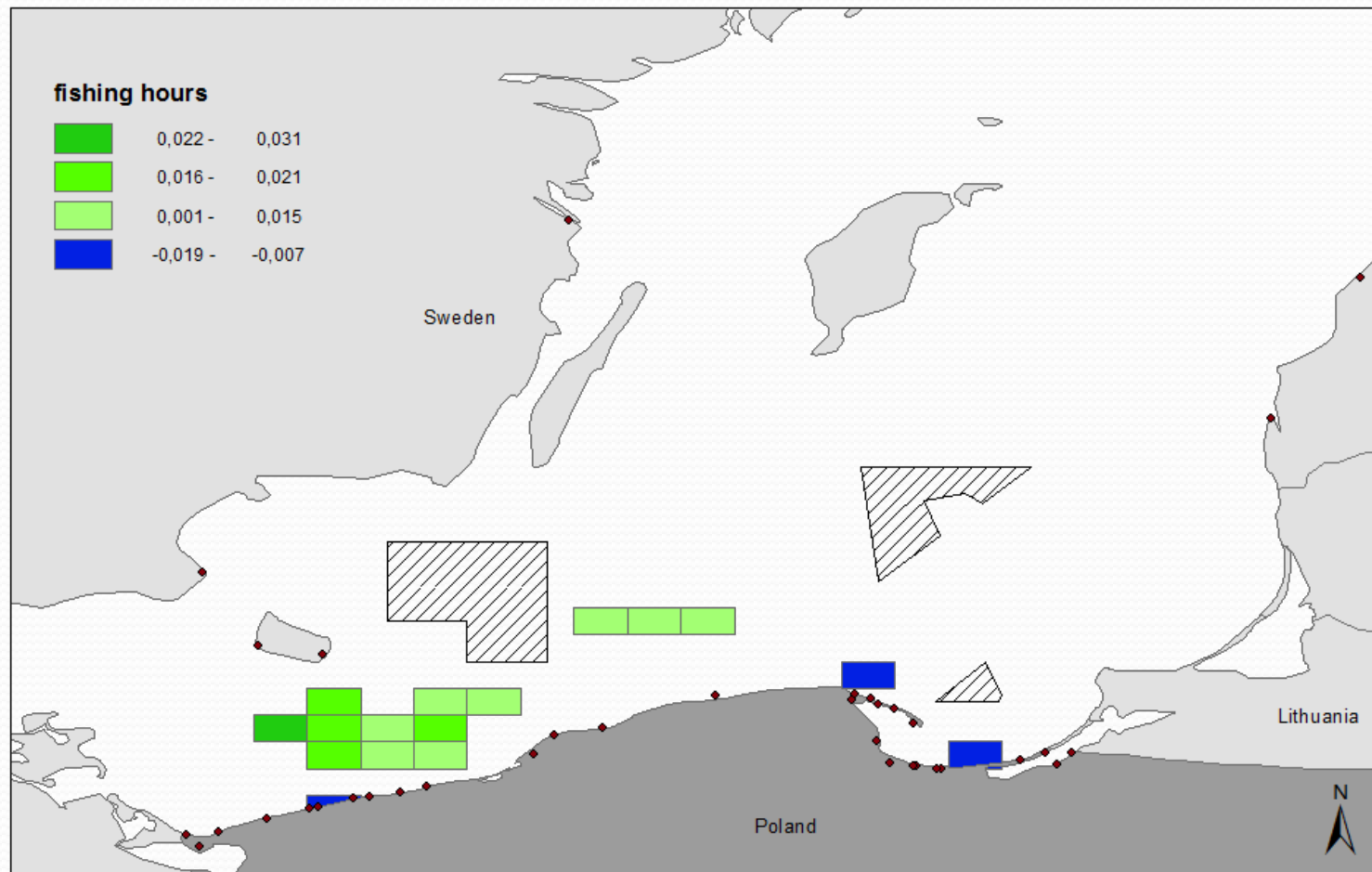
Estimation

	Variables	
y	area_1 – area_45	Dummy variable for area fished predominantly; >100 obs. (ca. 85% of all trips)
Input C(X_{ij})		
i1	fishing_h	Fishing time, i.e. effective effort in h
i2	length	Vessel characteristic in m
i3	tdistance	Total distance travelled between fishing grounds on a given trip (based on point to point data) in km
i4	past_h	Time spend fishing in the same area in the same month last year
i5	past_h_short	Time spend fishing in the same area during the previous trip
Harvest H(X_{ij})		
h1	h_c	Harvest of cod (in t)
h2	h_f	Harvest of flounder (in t)
h3	h_h	Harvest of herring (in t)
h4	h_s	Harvest of sprat (in t)
h5	h_a	Harvest of others (in t)
Sector	1-4	Demersal, pelagic, drift, others
month	YES	
N	17047	

**N of harvest
(ca 85% of all trips)**

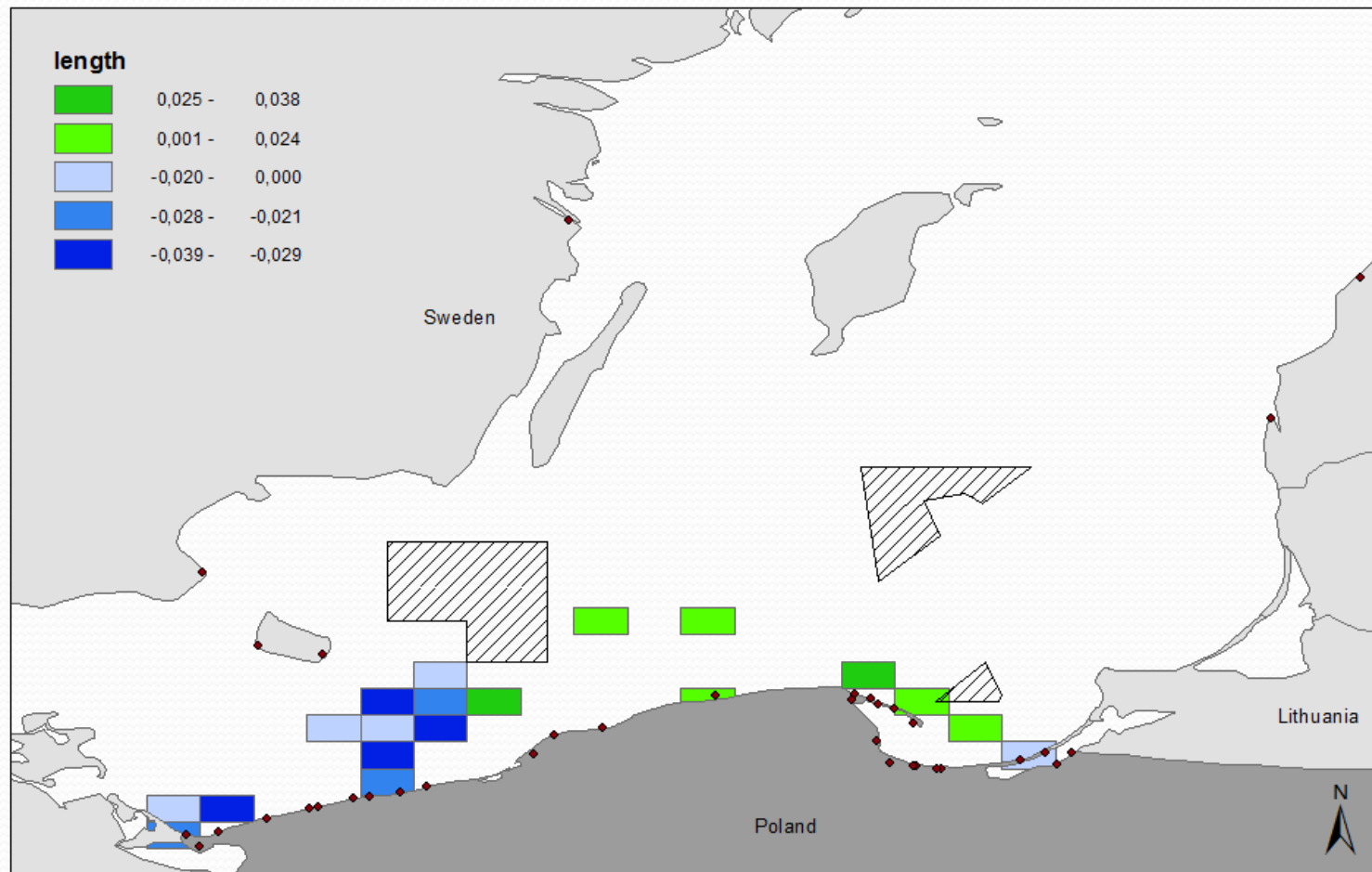


Results



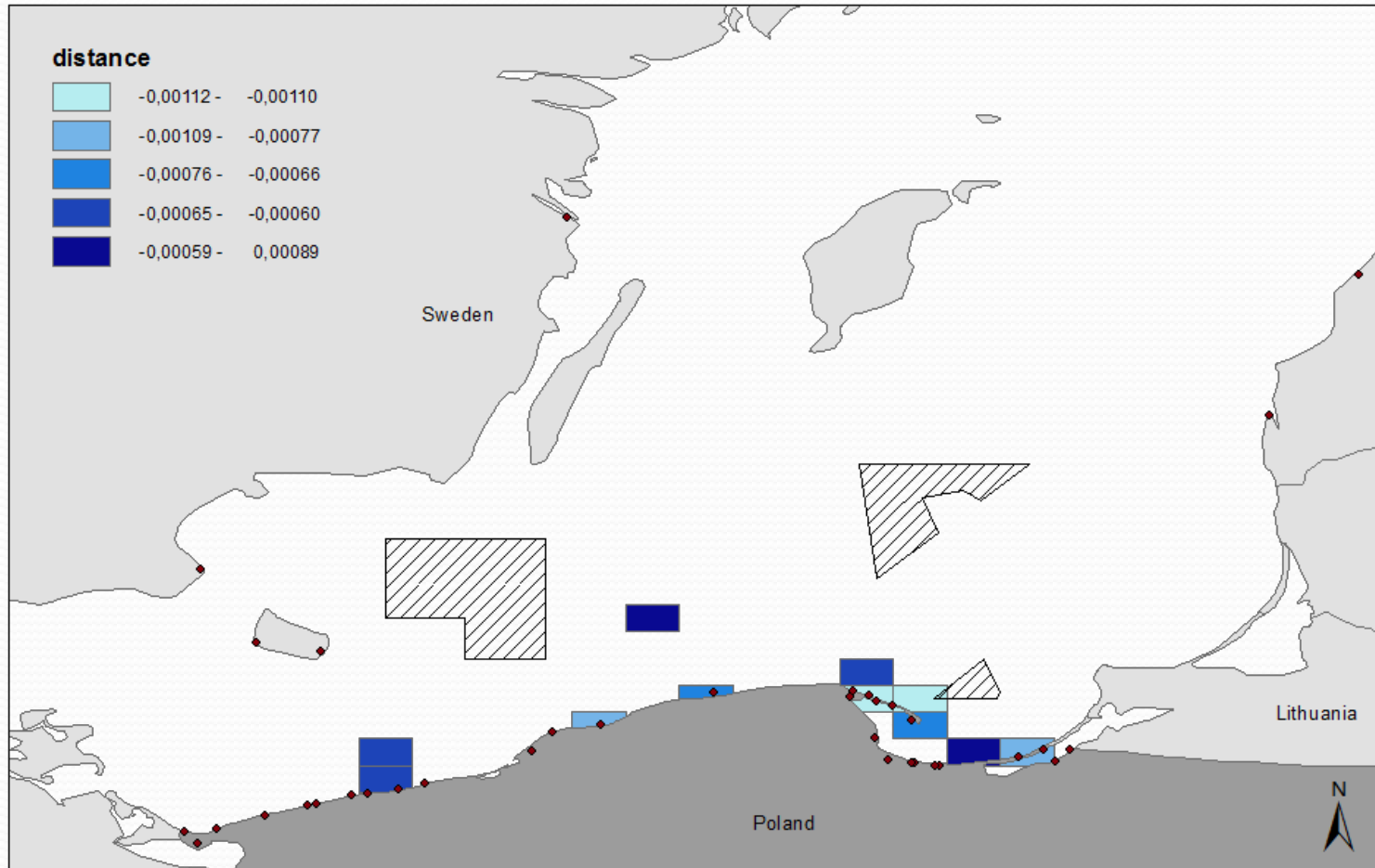
16 areas with coefficient significant at least at the 0.1 level

Results



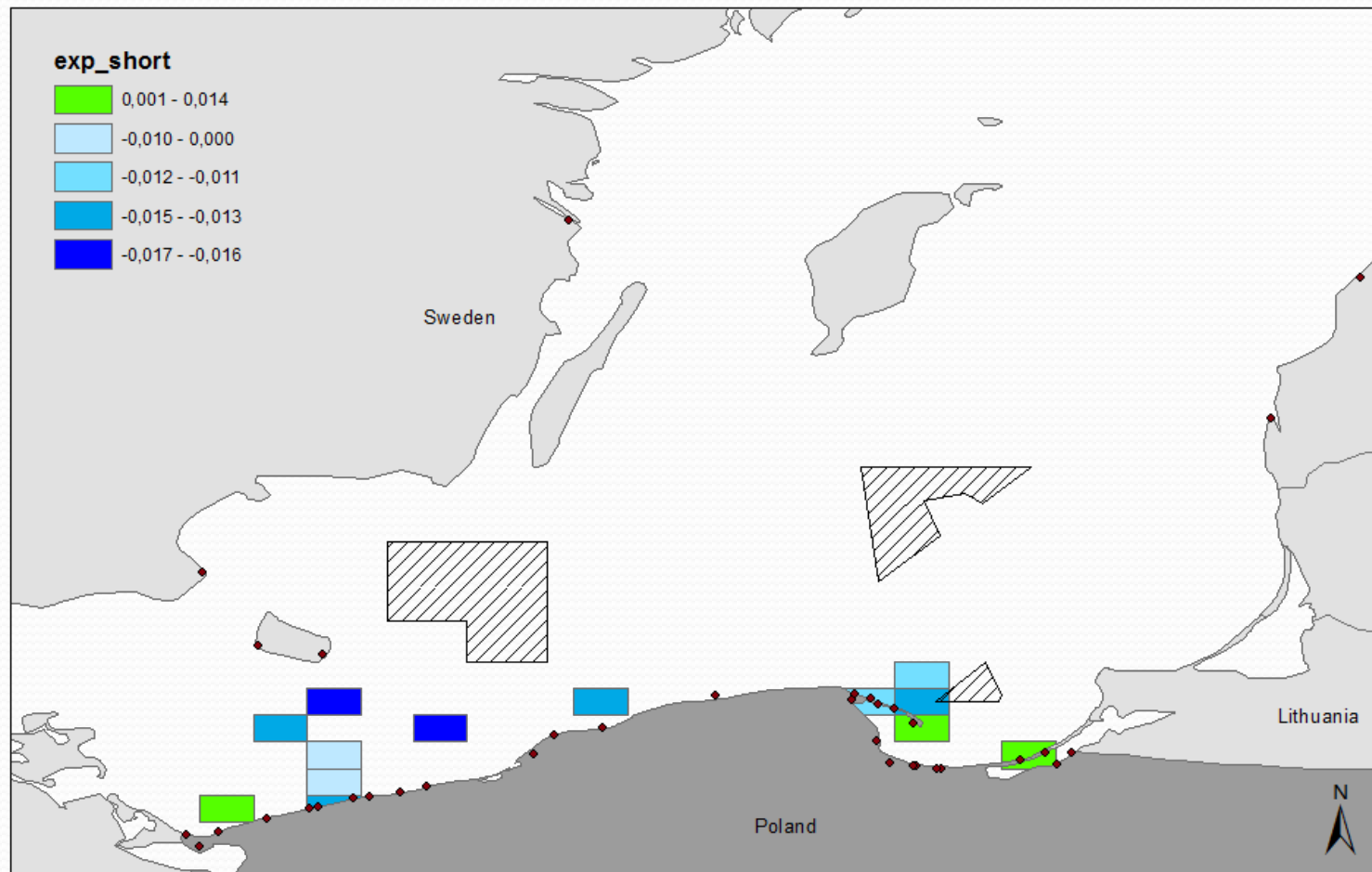
19 areas with coefficient significant at least at the 0.1 level

Results



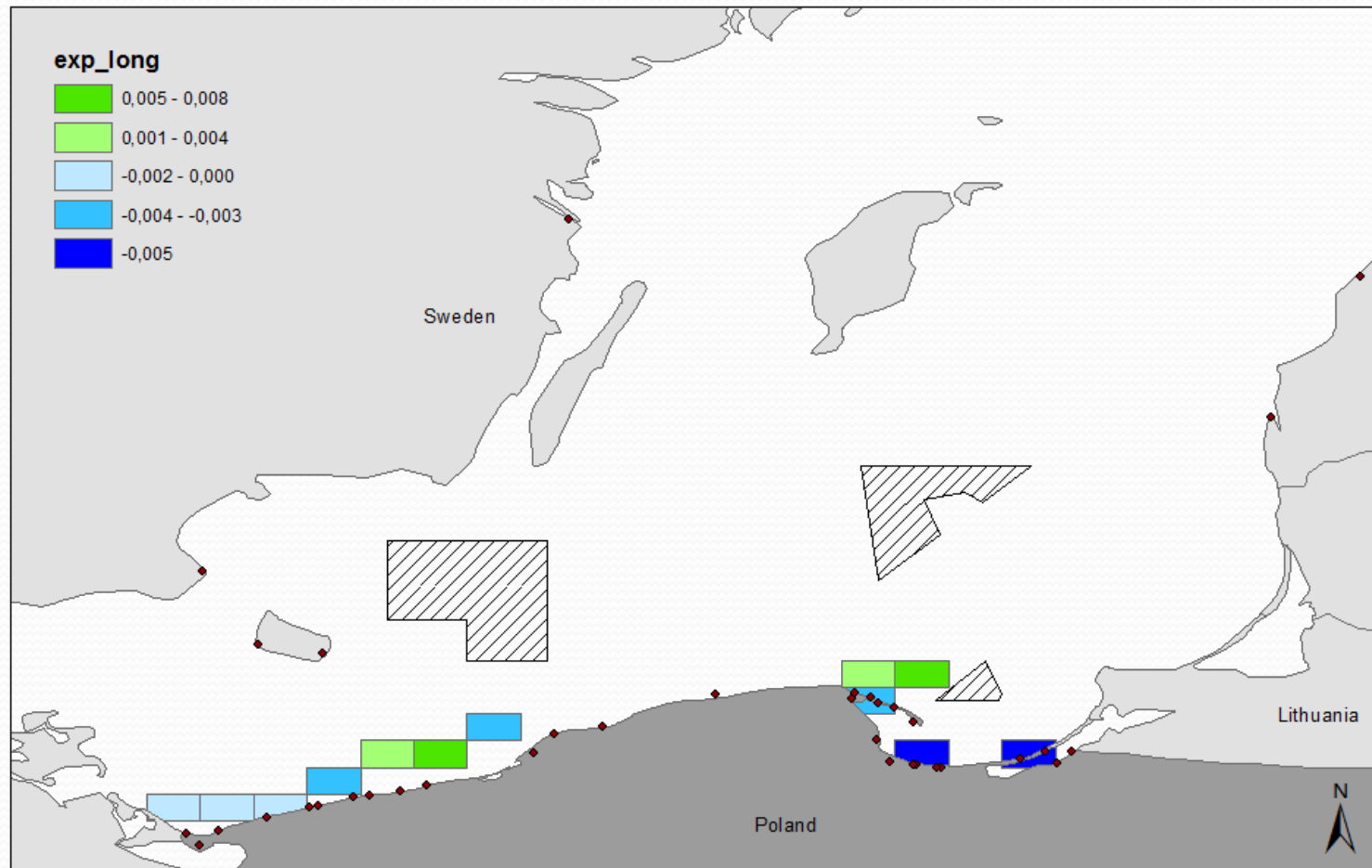
11 areas with coefficient significant at least at the 0.1 level

Results



13 areas with coefficient significant at least at the 0.1 level

Results



12 areas with coefficient significant at least at the 0.1 level

Results: area BS5

	Direct Effects	Indirect Effects	Total Effects
	MargEff (Std.Err)	MargEff (Std. Err)	MargEff (Std.Err)
fishing_h	-0.0004 (0.0003)	-0.0016 (0.0012)	-0.0021 (0.0015)
length	-0.0005 (0.0005)	-0.0018 (0.0018)	-0.0023 (0.0023)
distance	-0.0001** (0.0000)	-0.0002** (0.0001)	-0.0003** (0.0001)
exp_short	0.0011*** (0.0004)	0.0043*** (0.0014)	0.0054*** (0.0018)
exp_long	0.0000 (0.0001)	0.0001 (0.0003)	0.0001 (0.0003)
pelagic	0.0419***	0.1578***	0.1997***
...	(0.0079)	(0.0283)	(0.0360)

Results: area BS5

	SARProbit	Pprobit	Mlogit
	Total Eff (Std.Error)	Coeff (Std.Error)	Coeff (Std.Error)
fishing_h	-0.0021 (0.0015)	-0.0109 (0.0071)	-0.1165*** (0.0115)
length	-0.0023 (0.0023)	-0.0142	0.0813*** (0.0122)
distance	-0.0003** (0.0001)	-0.0097*** (0.0007)	-0.0535*** (0.0016)
exp_short	0.0054*** (0.0018)	0.0318*** (0.0056)	0.0985*** (0.0094)
exp_long	0.0001 (0.0003)	0.0108*** (0.0011)	0.0156*** (0.0018)
pelagic	0.1997*** (0.0360)	0.6457*** (0.0826)	0.9374*** (0.1181)
...			

Conclusion & Future Research

- Location choice dependent on region (spatial clustering) → biased estimates if not corrected

→ Spatial dependency vs. spatial heterogeneity

- Interaction-terms
- Time
- Multi-species fisheries
- Superstar-phenomena



Thank you for the attention