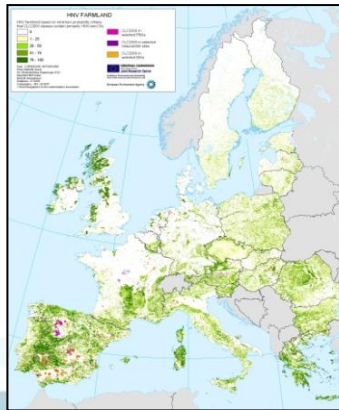




Valuing the benefits of the Marine Strategy Framework Directive

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Components of the PhD

- Literature Review (MSFD)
- Benefit Transfer (BT) for marine ecosystem service values
- Choice Experiment (CE)
- Examine spatial preferences for marine ecosystems



Valuing benefits of the MSFD

- The Marine Strategy Framework Directive (MSFD) was introduced into EU law in 2008
- The MSFD aims for all EU member states to protect or restore their marine and coastal waters to “good environmental status” (GES) by 2020
- The first EU directive to be based on the “ecosystem based approach” (Long, 2011)
- There is provision for overlap between the MSFD and the WFD



Valuing benefits of the MSFD

- Articles 8, 13 and 14 require that economic analysis and cost benefit analysis be undertaken on MSFD measures.
- Many of the benefits of the MSFD are either indirect or are non-use benefits.
- Only stated preference methods can value non-use value.
- We are using choice modelling (CM) (Adamowicz et al., 1994) to estimate the value of the benefits generated by the MSFD



Valuing benefits of the MSFD

- Under the MSFD, GES is measured by 11 indicators
 - Biological diversity
 - Invasive species
 - Sustainable fisheries
 - Well functioning ecosystem and food webs
 - Eutrophication
 - Benthic integrity
 - Marine litter
 - Marine produce is safe to eat
 - Underwater noise and energy
 - Hydrographical conditions
 - Marine pollution



Valuing Irish marine zone using BT

- Many of the marine and coastal ecosystems (MCEs) in the coastal zone provide services which may not be valued by the market – so called non-market goods and services (Barbier et al., 2011)
- The TEEB framework used to identify marine ECGs (TEEB, 2010)
 - supportive services,
 - provisioning services,
 - regulating services,
 - habitat services
 - cultural and amenity services



Valuing Irish coastal zone using BT

- An alternative to the primary valuation methods is Benefit Transfer.
- Benefit transfer is a process of valuing a non-market good or service of a policy site by using values estimated for similar non-market services at another study site and applying these values to the policy site (Brouwer, 2000)
- Build on previous work to estimate values for marine EGS in Ireland. - Hynes, S., Norton, D., and Hanley, N. (2012) *“Adjusting for Cultural Differences in International Benefit Transfer”*, Environmental and Resource Economics



MSFD Choice Experiment

- Choose population to sample
- Choose attributes and levels
- Design choice sets
- Survey
- Econometric analysis
- Policy simulations



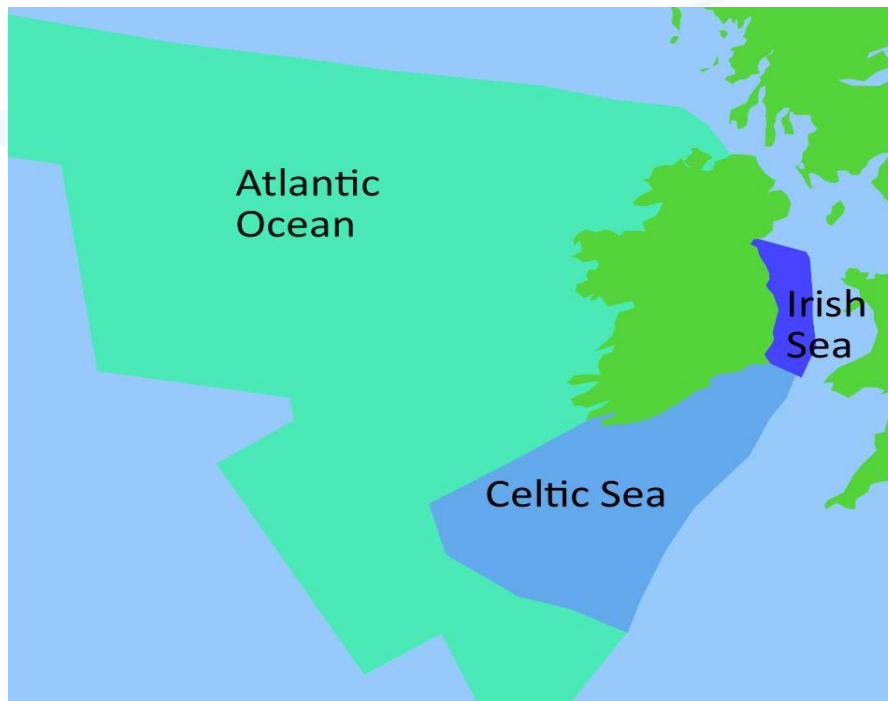
MSFD Choice Experiment

- Used the attributes of the MSFD GES to generate the attributes
 - Biodiversity and Healthy Marine Ecosystem
 - Biological diversity
 - Well functioning ecosystem and food webs
 - Non- native species
 - Pollution levels in sea
 - Marine litter
 - Eutrophication
 - Marine pollution
 - Sustainable fisheries
 - Sustainable fisheries
 - Marine produce is safe to eat
 - Physical Impacts to the Sea
 - Underwater noise and energy
 - Hydrographical conditions
 - Benthic integrity
 - Area
 - Price



Attribute	Choice A	Choice B	Choice C (Status Quo)
Biodiversity and Healthy Marine Ecosystem	Biodiversity increases <i>(more abundance and diversity of fish, sea mammals and birds)</i>	Biodiversity maintained at current levels <i>(no change)</i>	Biodiversity Decreases <i>(less abundance and diversity of fish, sea mammals and birds)</i>
Non-native species	Irish waters are virtually free of non-native species <i>(Ecosystem unaltered)</i>	No new non-native species but existing non-native species remain <i>(Ecosystem altered by 5%)</i>	New non-native species invade Irish waters in addition to existing non-native species <i>(Ecosystem altered by 20%)</i>
Sustainable fisheries	Healthy fish stock <i>(stocks sustainable, no contaminant in fish and other seafood)</i>	Healthy but Non-sustainable fish stock <i>(stock is over-fished but no contaminants present in fish and other seafood)</i>	Unhealthy fish stock <i>(stock over-fished and unsafe levels of contaminants present in fish and other seafood)</i>
Pollution levels in sea	Decrease <i>(Concentration of pollutants decrease)</i>	No change <i>(Concentration of pollutants unchanged)</i>	Increase <i>(Concentration of pollutants increase)</i>
Physical Impacts to the Sea	Small Impact <i>(minor impact on the sea bed and marine ecosystems)</i>	Moderate Impact <i>(limited damage to the physical sea bed and marine ecosystems)</i>	Large Impact <i>(wide scale damage to the sea bed and marine ecosystems)</i>
Marine Areas	Atlantic Ocean	Celtic Sea	All Irish Waters
Amount you have to pay	€70	€20	€0

Map showing Irish Marine Waters



Marine waters around Ireland

Spatial effects of valuing marine environment



- Limited studies on the effect of distance decay (Hanley et al. 2003, Bateman & Langford 1997) even though the spatial effects of aggregation can be quite large (up to 600%) (Bateman et al., 2006)
- This study will investigate the distance decay effect using GIS data generated from our survey.
- Additionally, the part-whole bias will be examined using spatial attributes in the CE.



Valuing benefits of the MSFD

- Attitudinal questions based on Potts et al. (2011) will be included.
- This will allow BT of the values generated in this CE to be adjusted for cultural values alongside income as per Hynes et al. (2012)
- Additionally, we will investigate respondent willingness to contribute time rather than monetary amounts towards achieving GES in the Irish marine zone.



Results from Pilot Study

- Population (n=56), Male – 46%, Female – 54%

AGE	%
18-24	12.5
25-34	19.6
35-44	17.8
45-54	17.8
55-64	14.3
65+	17.8

EDUC	%
Primary	17.8
Secondary	53.6
Tertiary	28.6



Results from Pilot Study

- Asked people if considered where they lived was located within the coastal zone
- Yes 30% - Mean distance – 9.2km (4.7km)
- Range was 1 – 80km (8km)
- No 70% - Mean distance – 57.6km
- Range was 24 – 160km
- Average for population was 42.9km



Results from Pilot Study

- Activities and Trips – Yes - 71% (Mean 59.6)

Activity	% Partic	Trips
FISHING FROM SHORE	3.5	16
FISHING AT SEA	1.7	12
SWIMMING	25	31
WIND SURFING	1.7	1
DIVING	1.7	1
SEA KAYAKING	0	
SAILING	0	
SNORKELLING	0	

Activity	% Partic	Trips
BIRD WATCHING AT COAST OR SEA	3.5	2
WALKING ALONG COAST	70	24
OTHER BOATING	0	
SURFING	3.5	4
KITE SURFING	0	
GATHERING SEAWEED	1.7	1
OTHER	8.9	80



Results from Pilot Study

- Asked people “Do you think that changes to the marine environment affect you personally?”
- No effect on me – 52%
- Some effect on me – 45%
- Major effect on me – 3%



Conditional Logit Model Results

<u>Attribute</u>	<u>Coefficient</u>	<u>S.D.</u>	<u>P> Z </u>
Bio No Change	0.30**	0.15	0.05
Bio Increase	0.18	0.37	0.62
Invasive No Change	0.11	0.17	0.51
Invasive Free	0.35*	0.19	0.06
Non sustainable fish	1.05***	0.18	0.00
Healthy fish	1.01***	0.19	0.00
Pollution decrease	-0.70***	0.17	0.00
Pollution no change	-0.07	0.15	0.64
Phys Low Imp	-0.47***	0.17	0.01
Phys Mod Imp	0.08	0.16	0.63
Irish Sea	-0.65***	0.20	0.00
Celtic Sea	-0.46**	0.19	0.02
Atlantic Ocean	-0.63***	0.20	0.00
Price	-0.03***	0.01	0.00



Rationale for this Study

- Is a much needed valuation study on the benefits of the MSFD – will also contribute to initial ESA required under the Directive
- Contribute to the literature on value of the marine environment (Beaumont et al., 2008, McVittie and Moran, 2010)
- Contribute to identifying and aggregating the beneficiaries of marine ecosystem values using spatial methods.



Thank you for your attention
Any questions or ideas or comments?