



# Valuing the non-market benefits of the WFD implementation in Ireland

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# Why value water quality

- WFD advocates using economic analysis to help guide decision making
- Article 4 – Allows water quality targets to be extended if there are ‘disproportionate costs’. This is generally thought to mean where costs exceed benefits.
- Article 9 – Requires recovery of costs of water services including environmental and resource costs.





# Valuing water quality

- Most of the benefits of achieving good ecological status are non-market benefits.
- A variety of valuation methods are used which sometimes use a water ladder (Hime et al., 2009) to identify the benefits.
- Additionally in Ireland, unlike in other countries there are no specific water charges for domestic households which is often used as a payment mechanism.

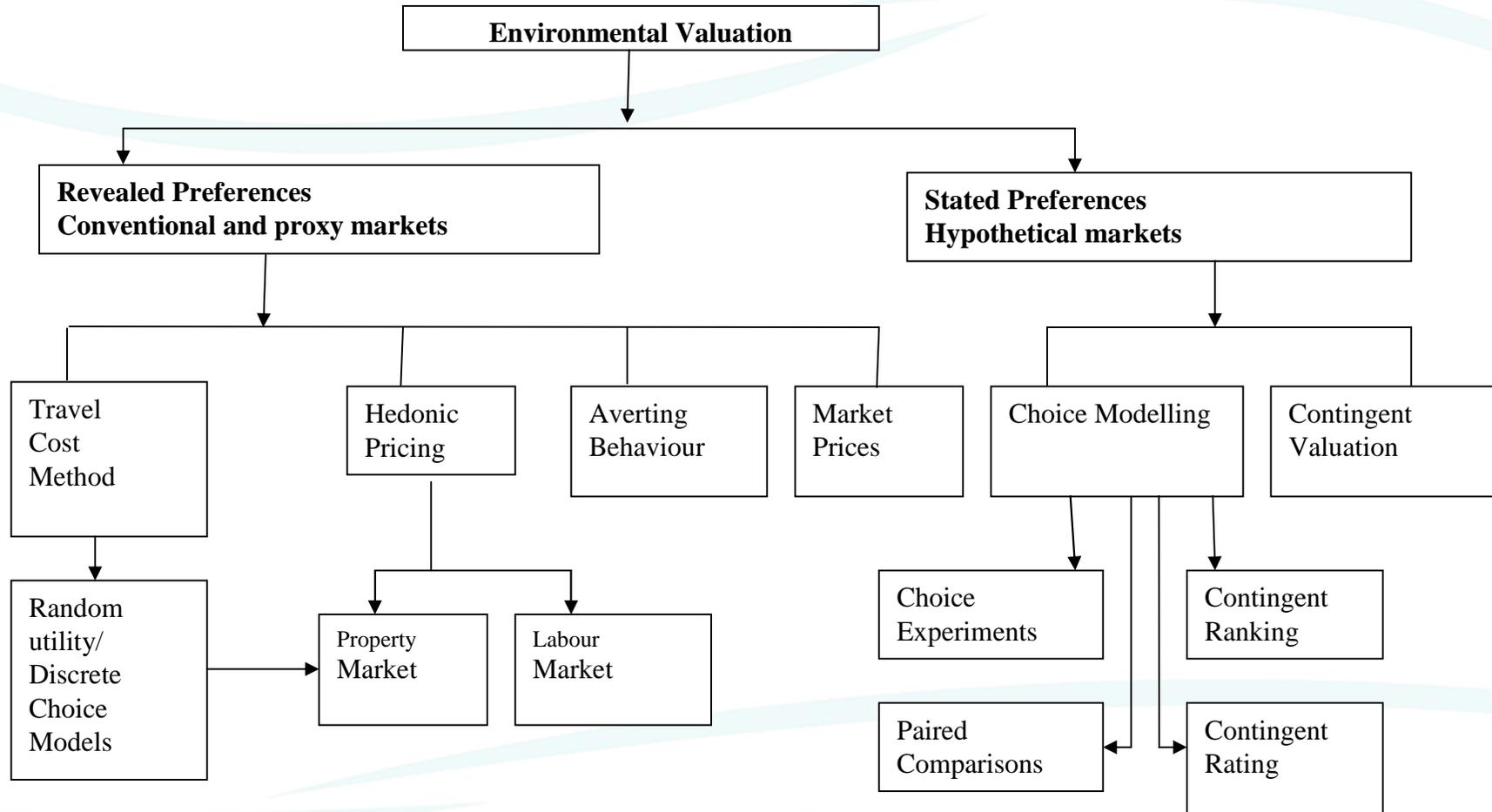


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# Environmental Valuation Methods





# Benefit Transfer

- An alternative to the primary valuation methods described above 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.



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Environmental Protection Agency



Socio-Economic Marine Research Unit



# Benefit Transfer

- Three main types of benefits transfer
- Unit value transfer
  - Unadjusted unit value transfer
  - Adjusted unit value transfer
- Value function transfer
- Meta-analysis



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# Benefit Transfer

- Advantages
  - Quicker methodology than primary valuation studies
  - Cheaper
- Disadvantages
  - Transfer errors
    - Value function transfer is thought to be more robust leading to fewer errors (Pearce et al., 1994) but empirically this is not always the case (Brouwer, 2000, Rosenberger and Stanley, 2006)



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# Benefit Transfer for WFD in Ireland

- Estimated a unit value transfer for Ireland
- The unit value transfer is based on implementation of the WFD in Ireland at water management unit (WMU) level. This is done by valuing the change in water body status to at least good status and does not represent the total economic value.



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# Benefit Transfer for WFD in Ireland

- A database was set up and values associated with water quality within Europe were used.
- 52 studies with 301 values were collected
- However for this BT exercise only 5 studies were used to estimate change in water status (Georgiou et al., 2000, Hanley et al., 2006, Bateman et al., 2009, Del Saz-Salazar et al., 2009, Martin-Ortega & Berbel, 2010)



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# Benefit Transfer for WFD in Ireland

- The values used were to estimate a change from bad, poor and moderate status to at least good status

Change in status	Value 2010 Euros (S.D.) WTP per household per year
Moderate to At Least Good status	31.77 (20.7)
Poor to at Least Good status	38.98 (20.8)
Bad to at Least Good status	66.46 (45.6)

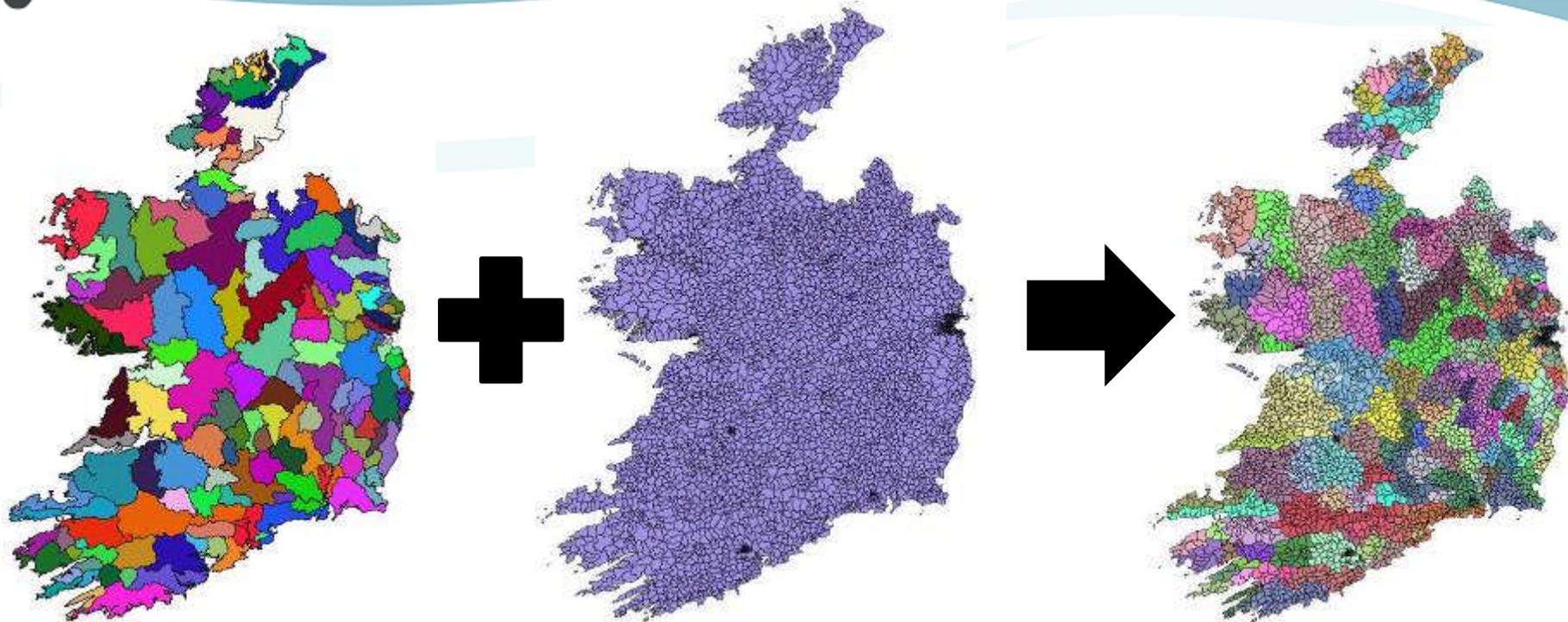


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# Benefit Transfer for WFD in Ireland



- GIS used to overlay 3409 DED's onto 151 WMUs to estimate relevant population (CSO, 2006)



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# Benefit Transfer for WFD in Ireland

- Foreign tourists coming to Ireland converted to resident equivalents using the formula below and distributed over DEDs using total houses in order to aggregate up to WMU level.

$$R_{eq} = \sum \left( Tourists_{Mkt_i} \times \frac{Tourist\ Days_{Mkt_i}}{365} \times \frac{DTE_{Mkt_i}}{DIE} \right)$$

- The numbers were divided by 2.3 to estimate equivalent household numbers.
- Increase was equivalent to 50,000 extra households



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# Benefit Transfer for WFD in Ireland

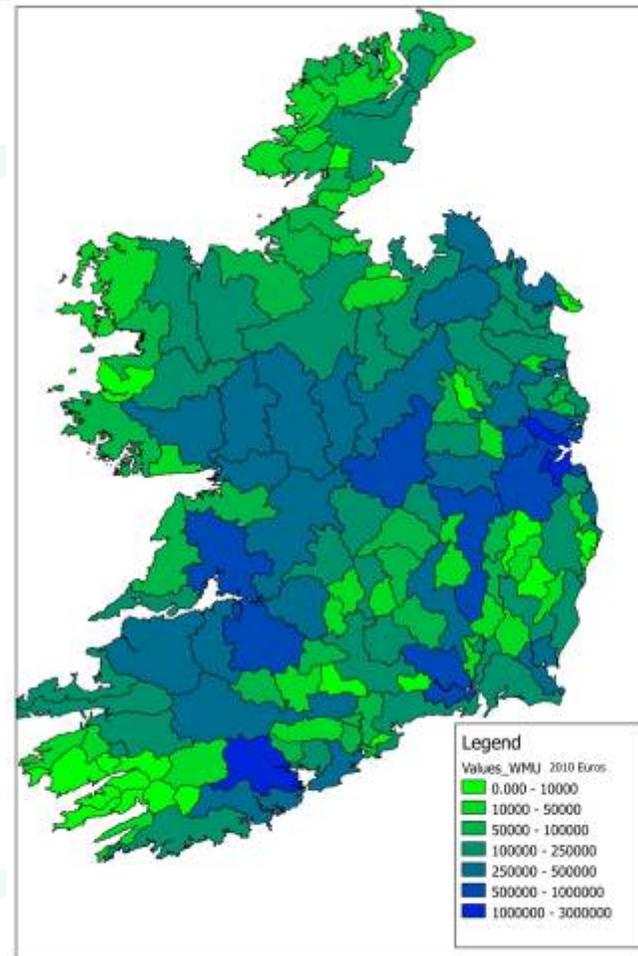
- The value of the change in water status was estimated by multiplying the total number of households (including resident equivalents) in each WMU by the water status weighted WTP per household;

$$\text{Value of Change}_{WMU_i} = (hh_{Irish} + hh_{Req})_{WMU_i} \times \sum (WTP_i \times \%WaterStatus_{i_{WMU_i}})$$



# Benefit Transfer for WFD in Ireland

- Total Value is estimated to be €30.6 million per year when all WMU values added up.



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# Benefit Transfer for WFD in Ireland

- The values range from €0 for two WMUs (Derry WMU and Tempelrainey WMU) to €2.8 million for the Tolka.
- Top 5 WMU in value for change in water status
  - Tolka WMU - €2.8 million
  - Lower Lee/Owenboy WMU - €1.5 million
  - Cammock WMU - €1,4 million
  - Dodder WMU - €1.2 million
  - Shanganagh WMU - €0.8 million



# Issues

- There is no WMU in Dublin city centre which accounts for 128,000 households
- Based on adjusted WTP per hh for nearby WMUs the value could range from €2.3 - €4.8 million.
- There are large standard deviations for the values used
- Tourist data was based on county level data and domestic tourists were omitted due to double – counting



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# Conclusion

- Benefit transfer on the change in water status associated with the implementation of the WFD is estimated to be €30.6 million per year and could be up to €35.4 million per year
- Results should be treated with caution and primary studies are best practice
- Results could be used to help rank WMUs values rather than being used directly in a cost-benefit analysis



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