

International Association of Impact Assessment
Vancouver, BC

Evaluating and Communicating Impact Significance in EIA: A Fuzzy Set Approach to Articulating Stakeholder Perspectives

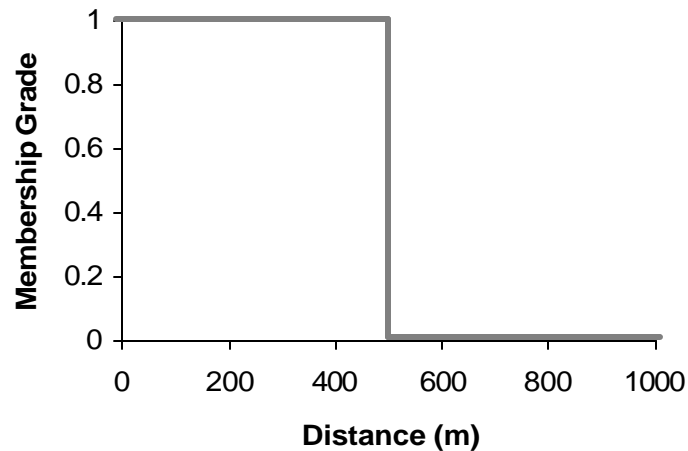
Dr Graham Wood
Impacts Assessment Unit
gjwood@brookes.ac.uk

April 26 - 29th, 2004

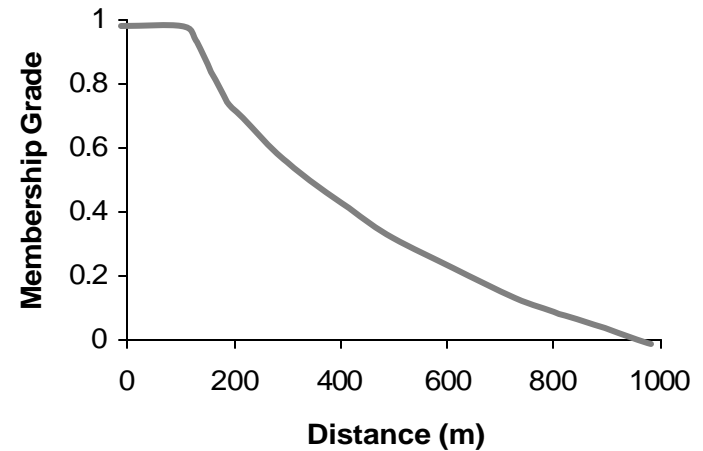
“Significant Environmental Effects” in EIA

- Critical importance of concept of “significance”
- Complex and changing nature through EIA process
- Technical appraisal + value judgements - EIA as ‘science’ and ‘art’
- Limited research to date
- Fuzzy set theory and impact significance

Fuzzy vs Crisp Sets: Hypothetical Membership Function - “Near”



'Crisp' set



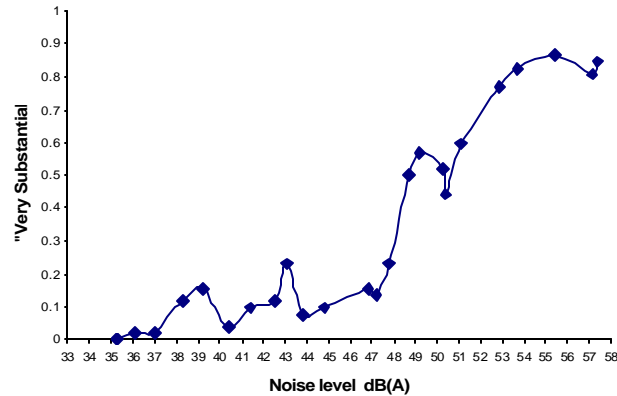
'Fuzzy' set

Fuzzy Sets and Significant Effects

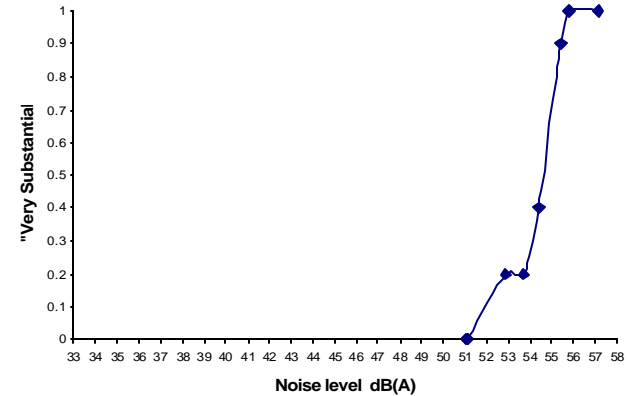
- Apply fuzzy set theory to determine membership functions associated with linguistic variables used to evaluate and communicate the significance of environmental effects in EIA
- Construct membership functions for expert and community definitions of significance
- Live case studies e.g. Morris Fen Wind farm

Fuzzy Set “Very Substantial”

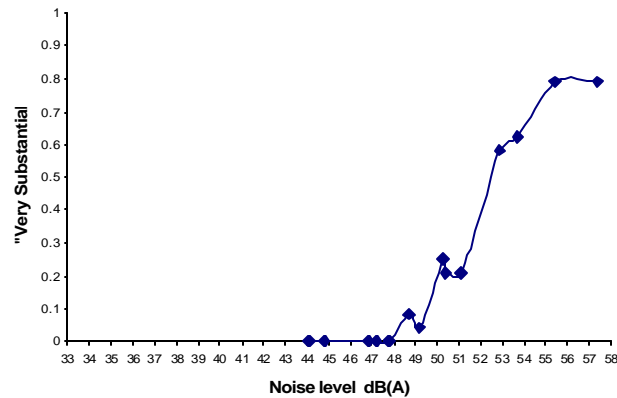
Thorney Residents



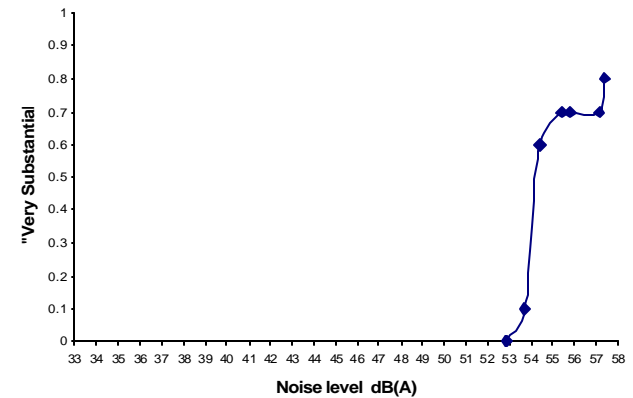
Council for the Protection of Rural England



Crowland Residents

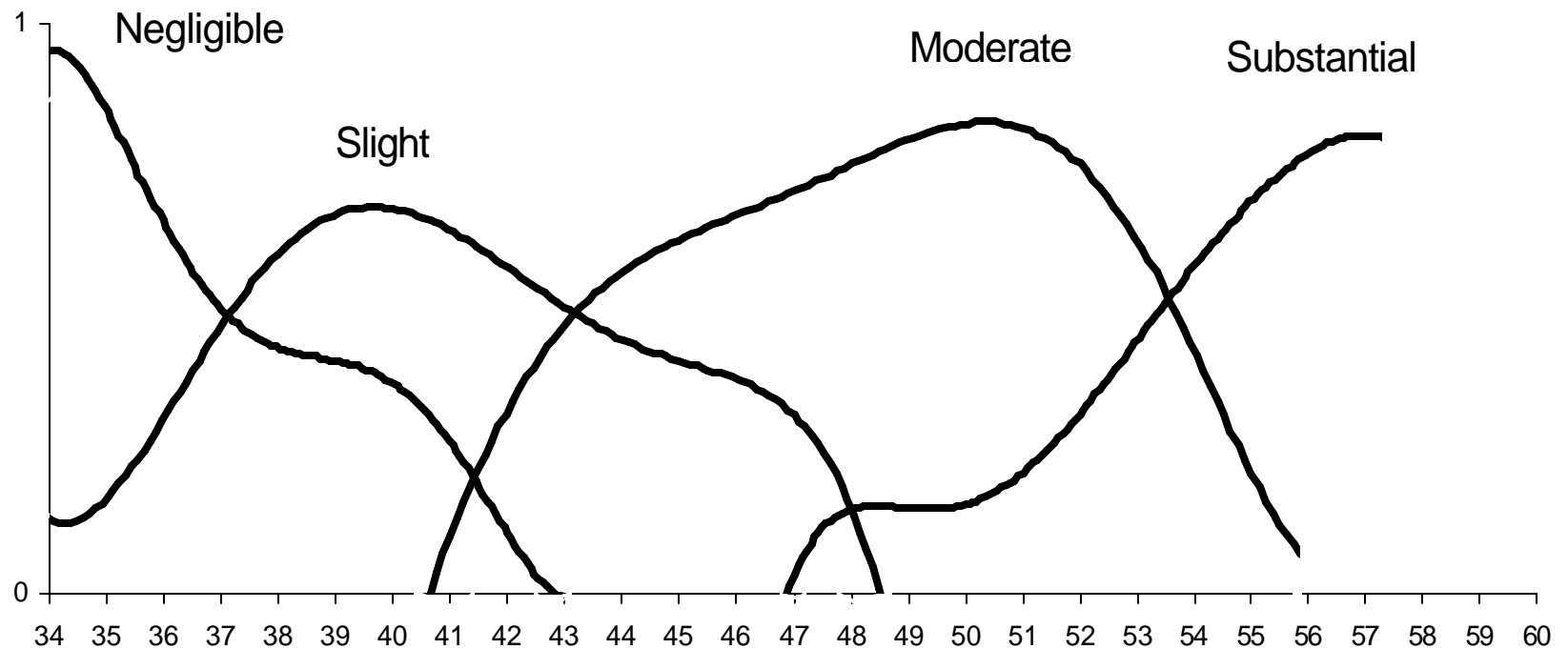


Noise Consultant

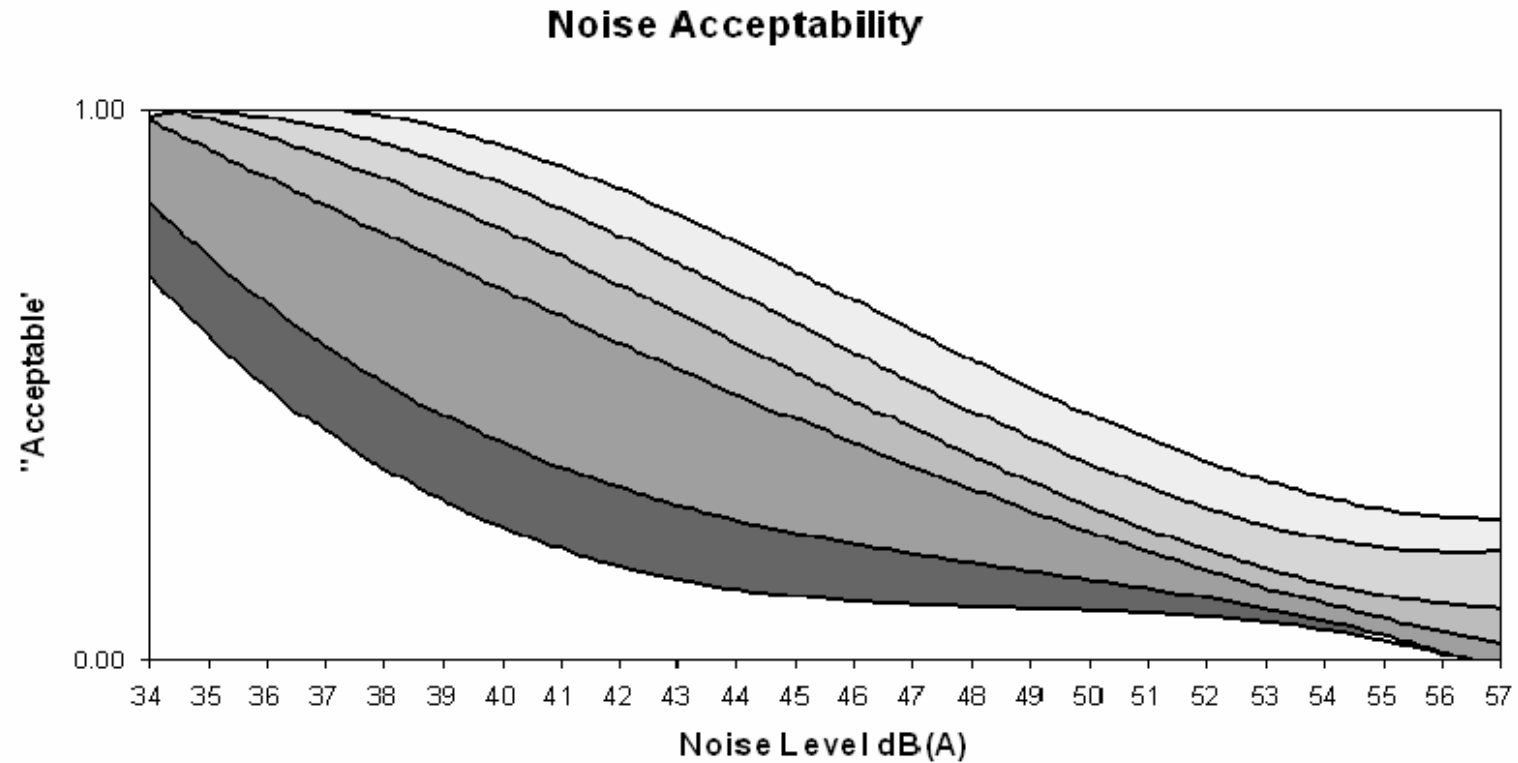


Impact Significance Membership Functions

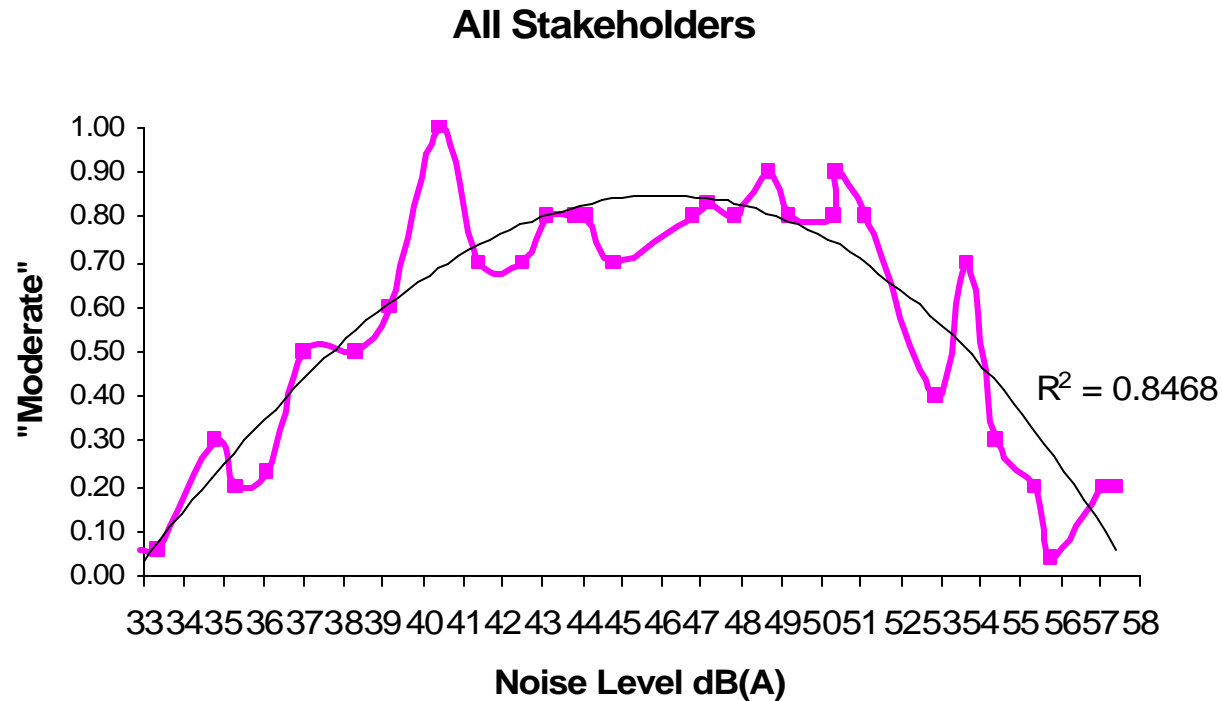
Developer: Windprospect Ltd



Fuzzy Set Gradients



Fuzzy Logic Operators: Union for “Moderate”







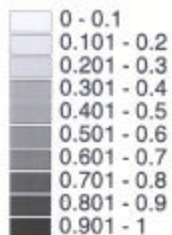
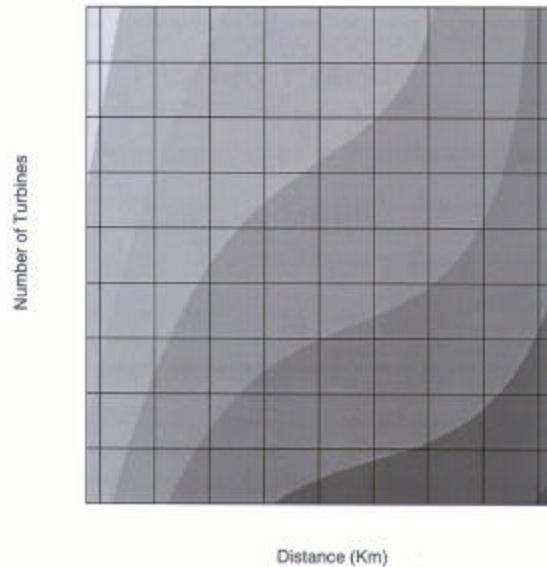




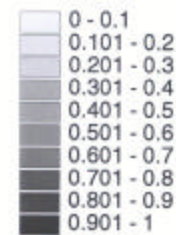
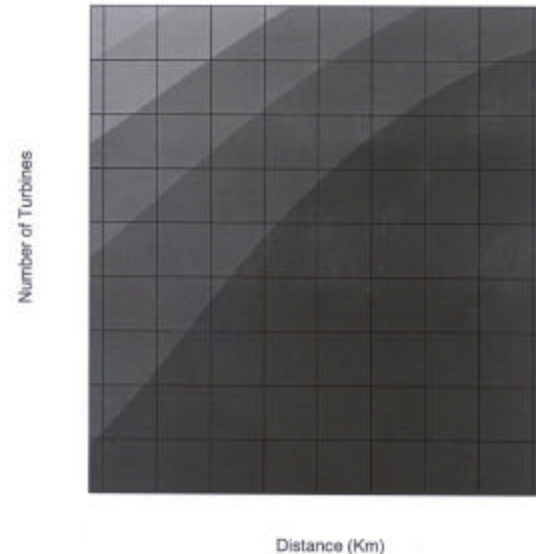


Fuzzy Set “Acceptable Change”

Thorney Public



Developer



Fuzzy Sets for Evaluating and Communicating Impact Significance: A Critique

- Move from instrumental to communicative rationality?
- EIA becomes a transactive planning tool
- Transparency, legitimacy, trust (?)
- Recognizes 'shades of grey' in boundaries between impact significance categories
- Empirically grounded and context specific

Fuzzy Sets for Evaluating and Communicating Impact Significance: A Critique

- Noise and landscape – “experiential” impacts. Membership functions for other impact areas?
- Membership functions capture values, but are not in themselves explanatory
- Treatment of individual impacts reinforces expert framing of issues?
- Resource intensive / abstract
- Developers reluctant to relinquish power