Who's in and why? A typology of stakeholder analysis methods for natural resource management

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ABSTRACT

Stakeholder analysis means many things to different people. Various methods and approaches have been developed in different fields for different purposes, leading to confusion over the concept and practice of stakeholder analysis. This paper asks how and why stakeholder analysis should be conducted for participatory natural resource management research. This is achieved by reviewing the development of stakeholder analysis in business management, development and natural resource management. The normative and instrumental theoretical basis for stakeholder analysis is discussed, and a stakeholder analysis typology is proposed. This consists of methods for: i) identifying stakeholders; ii) differentiating between and categorising stakeholders; and iii) investigating relationships between stakeholders. The range of methods that can be used to carry out each type of analysis is reviewed. These methods and approaches are then illustrated through a series of case studies funded through the Rural Economy and Land Use (RELU) programme. These case studies show the wide range of participatory and non-participatory methods that can be used, and discuss some of the challenges and limitations of existing methods for stakeholder analysis. The case studies also propose new tools and combinations of methods that can more effectively identify and categorise stakeholders and help understand their inter-relationships.

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1. Introduction

Public participation is becoming increasingly embedded in national and international environmental policy, as decision-makers recognise the need to understand who is affected by the decisions and actions they take, and who has the power to influence their outcome, i.e. the *stakeholders* (as defined by Freeman, 1984). Although this is a vital first step in any participatory exercise, stakeholders are often identified and selected on an *ad hoc* basis. This has the potential to marginalise important groups, bias results and jeopardise long-term viability and support for the process. For this reason, interest is growing in a collection of methods that can be used for "stakeholder analysis". We define stakeholder analysis as a process that: i) defines aspects of a social and natural phenomenon affected by a decision or action; ii) identifies

individuals, groups and organisations who are affected by or can affect those parts of the phenomenon (this may include non-human and non-living entities and future generations); and iii) prioritises these individuals and groups for involvement in the decision-making process.

Stakeholder analysis has become increasingly popular with a wide range of organisations in many different fields, and it is now used by policy-makers, regulators, governmental and non-governmental organisations, businesses and the media (Friedman and Miles, 2006). Approaches to stakeholder analysis have changed as tools have been progressively adapted from business management for use in policy, development and natural resource management. It is perhaps this variety of different approaches that has given rise to widespread confusion over what is really meant by stakeholder analysis (Donaldson and Preston, 1995; Stoney and Winstanley, 2001). Weyer (1996) described it as a "slippery creature", "used by different people to mean widely different things". Donaldson and Preston (1995) put this confusion down to a "muddling of theoretical bases and objectives". This may partly be due to the long period of

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time over which these approaches have developed in parallel fields. It may also be due to the continued attempt to aggregate different methods and approaches under the single banner of stakeholder analysis. In an attempt to make sense of this confusion, Section 2 of this paper defines stakeholders and stakeholder analysis, and shows how the concept has evolved in different fields.

Although a broad range of methods have been developed or adapted for stakeholder analysis in these different disciplines, there is little information regarding how, when and why they are effective. This paper therefore aims to provide an analysis of the history and development of stakeholder analysis and a disaggregation of the theoretical bases upon which it is founded. It seeks to illustrate how much of the contemporary critique and debate over appropriate methods is a reflection of the diverse reasons why stakeholder analysis is used. This debate includes many questions about stakeholder representation, legitimacy, participation, power, and knowledge – essentially "who's in, and why?" For example, how can diverse stakeholders be adequately represented? How can the relative interest and influence of different stakeholders be taken into account? And if stakeholders are defined by the issues that are being investigated, then who defines these issues?

The paper is organised as follows: Section 2 describes the origins of stakeholder analyses in literature. Section 3 discusses methods for stakeholder analysis that are common within research on natural resource management. Section 4 presents four different research projects from across the UK Research Councils' Rural Economy and Land Use programme[1] that apply stakeholder analysis. The last section presents conclusions on the use of stakeholder analysis within natural resource management.

2. Origins and justification for stakeholder analysis

2.1. Who or what are stakeholders?

There is a difference of opinion over who or what exactly stakeholders are. Many recent definitions of stakeholders build on Freeman's (1984) seminal work on stakeholder theory that distinguished between those who affect or are affected by a decision or action (sometimes referred to as active and passive stakeholders in the natural resources stakeholder literature; Grimble and Wellard, 1997). However, the concept of stakeholders predates Freeman's work (Rowley, 1997). According to Ramírez (1999) the word "stakeholder" originates from the seventeenth century, where it was used to describe a third party entrusted with the stakes of a bet. Schilling (2000) argues that Follett (1918), writing in the business management literature, makes explicit much of what Freeman (1984) proposed several decades later.

Some stakeholder theories propose a narrower and more instrumental definition of stakeholders as those groups or individuals "without whose support the organisation would cease to exist" (Bowie, 1988: 112), whilst other definitions propose a broader and more normative view of stakeholders as "any naturally occurring entity that is affected by organisational performance". This may include living and non-living entities, or even mental-emotional constructs, such as respect for past generations or the wellbeing of future generations (Starik, 1995;

Hubacek and Mauerhofer, 2008). Similarly, Checkland (1981) suggests that whoever owns a problem should be a co-owner of the process to solve it. Working on environmental pollution, Coase (1960) defined stakeholders as polluters and victims. Polluters could affect change (in this case creating pollution) and the victims were those who were affected. Victims could be directly or indirectly affected, leading to the identification of a wide range of stakeholders.

The debate in literature on the definition of stakeholders is in part due to the problem of defining what constitutes a legitimate stake. Freeman and Miles (2002) suggest that much of the literature makes implicit assumptions about the legitimacy of stakeholders without explaining the difference between legitimate and illegitimate stakeholders. For example, in the business management literature, Friedman (1962) argues that the only duty of business managers is to maximise profits for stockholders, and concluded therefore that there are no legitimate stakeholders other than stockholders. Stakeholder analysis opposes this position by providing a diverse range of criteria that justify the involvement of other individuals and groups. These range from those based on notions of who or what affects or is affected by an organisation's activity (Freeman, 1984; Starik, 1995), to those based on theories of national capital investment (Schlossberger, 1994), externalities (Freeman, 1994), and property rights (Donaldson and Preston, 1995). Frooman (1999) dismisses the need for stakeholders to establish legitimacy over an organisation, since "the appropriateness of the stakeholder's claim may not matter nearly as much as the ability of the stakeholder to affect the direction of the firm". Friedman and Miles (2006) concede that this is a valid point, but nevertheless suggest that legitimacy is an important basis of influence and that clarity is therefore still needed on what constitutes a legitimate and rightful stake.

2.2. The development of stakeholder analysis

In business management, the growing realisation that stakeholders could affect the success of a firm led naturally to the development of approaches to analyse stakeholders, in order to understand their interests and influence, and how these could support or threaten the performance of the firm (Brugha and Varvasovsky, 2000). As such, the business management community primarily used stakeholder analysis to mobilise, neutralise or defeat stakeholders, to meet the strategic objectives of firms. However within policy, development, and natural resource management, stakeholder analysis was increasingly seen as an approach that could empower marginal stakeholders to influence decision-making processes. Although this broadened the role of stakeholder analysis, enriching its theoretical basis and analytical methods, it also increased the complexity and difficulty of such research, since many additional conflicting and diverse agendas had now to be considered.

Policy analysts have long attempted to understand how information, institutions, decisions and power shape policy agendas for interest groups in social networks. In policy research, stakeholder analysis has been seen as a way of generating information on the "relevant actors" to understand their behaviour, interests, agendas, and influence on decision-making processes (Brugha and Varvasovsky, 2000). Increasingly, the views of civil society groups have also been solicited and there is growing appreciation of the importance of "political will". In political science, stakeholder research is used to work more effectively with stakeholders, facilitate transparent implementation of decisions or objectives, understand the policy context, and assess the feasibility of future policy options (Brugha and Varvasovsky, 2000).

The application of stakeholder analysis in development and the natural resources management literature (sometimes referred to as "diversity analysis", e.g., Pain, 2004) has partly been stimulated by projects that did not adequately understand stakeholder dynamics and failed as a result. In these fields, stakeholder analysis has focussed on understanding power dynamics and enhancing the transparency and equity of decision-making in development projects. For example, Lindenberg and Crosby (1981) suggested making an inventory of those who could have a role in decision-making, gauging their importance through their level of influence and their interest for a particular outcome, mapping the relationships between the actors, and understanding their potential for developing alliances. The "4Rs" tool analyses how people relate to one another over natural resource use by splitting stakeholder roles into rights, responsibilities and revenues (benefits), and then assessing the relationship between these roles (Tekwe and Percy, 2001; Salam and Noguchi, 2006). Stakeholder analysis in development and natural resource management projects has often focussed on inclusivity, being used to empower marginal groups, such as women, those without access to well-established social networks, the under-privileged, or the socially disadvantaged, and those who are not easily accessible, because for example they live far away from main roads (Johnson et al., 2004). In the absence of stakeholder analysis, there is a danger that particularly powerful and well connected stakeholders can have a greater influence on decision-making outcomes than more marginalised groups; a problem that is especially acute in development projects (Chambers, 1994, 1997). Having said this, depending on the underlying agenda of those convening the process, stakeholder analysis can be abused to empower or marginalise certain groups. In these disciplines, stakeholder analysis has developed in parallel with and been enriched by the development of participatory methods for project design and planning, for example, through rapid and participatory appraisal, action research, social forestry, and land-use planning (Grimble and Wellard, 1997).

Much of the business management literature provides a relatively static approach to stakeholder analysis, and fails to consider that stakeholders, organisations, interventions and issues can interact and change over time (Frooman, 1999; Friedman and Miles, 2002; Rowley and Moldoveanu, 2003). In contrast, participatory natural resource management and development literature advocates on-going and evolving involvement of stakeholders beyond stakeholder analysis, at every stage of the project cycle (Fraser et al., 2006; Stringer et al., 2006). In this way, the dynamic nature of stakeholder needs, priorities and interests can be captured throughout the duration of the project and beyond.

Stakeholder analysis is also used to understand the diverse range of potentially conflicting stakeholder interests (Friedman and Miles, 2006, 2004; Prell et al., 2007). Because of this, the process of stakeholder analysis may in fact exacerbate and generate conflict (ODA, 1995). In some cases, hidden agendas or covert interests may also skew the analysis (ODA, 1995) and Gass et al. (1997) have expressed concern over the question of research objectivity, since those undertaking the analysis do so from a particular perspective or with particular outcomes in mind. Other potential problems include the perceived lack of knowledge, skills, or resources to conduct stakeholder analysis, concerns over what the analysis will reveal, fears that the analyses may be destabilising or manipulative; and ethical concerns about representing the views of other people (Bryson et al., 2002; Fraser and Hubacek, 2007).

It is partly for these reasons that stakeholder analysis is frequently overlooked, yet a systematic, critical, and sensitive approach to stakeholder analysis is clearly essential. Only by understanding who has a stake in an initiative, and through understanding the nature of their claims and inter-relationships with each other, can the appropriate stakeholders be effectively involved in environmental decision-making.

2.3. Normative versus instrumental approaches to stakeholder analysis

There have been numerous attempts to classify the different approaches to stakeholder analysis (e.g. Donaldson and Preston, 1995; Friedman and Miles, 2006). Perhaps the most significant difference is between normative and instrumental approaches. A third approach, descriptive stakeholder analysis, is rarely conducted for its own sake, since it has no purpose beyond describing the relationship between a particular phenomenon and its stakeholders (Donaldson and Preston, 1995). However, since normative and instrumental analyses require an understanding of the current state of affairs, descriptive analyses are in effect a necessary precursor to normative and instrumental analyses.

Normative approaches have been advocated increasingly as stakeholder analysis has been adopted in policy, development and natural resource management circles, emphasising the legitimacy of stakeholder involvement and empowerment in decision-making processes. In this context, stakeholder analysis has been used to legitimise the decisions that are made, through the involvement of key and/or representative figures (e.g. Donaldson and Preston, 1995). Others have suggested that normative stakeholder theory needs to identify who decision-makers are morally responsible to in their legal and institutional context (Boatright, 1994; Hendry, 2001; Friedman and Miles, 2006). Drawing on the deliberative democracy literature (Elster, 1998), it can be argued that people have a right to participate in the management of their environment.

Several normative stakeholder theories are influenced by Habermas' theory on communicative action (Habermas, 1984, 1987). Habermas distinguishes "communicative rationality" (people seeking to reach shared understanding and cooperate to solve a common problem on the basis of discussion and consensus), as opposed to "instrumental rationality" (where the goal is to 'control' by changing reality), or "strategic rationality" (where the goal is to 'win' by making strategic moves) (Jonker and Foster, 2002; Röling, 1996). The soft systems methodology (Checkland, 1999) agrees with Habermas, as this approach features stakeholders who recognize that they face a common problem which cannot be solved by 'hard system thinking',[2] and subsequently negotiate their conflicting goals and different perspectives in order to agree collectively on action (Checkland, 1999; Röling, 1996). Natural resource management typically deals with conflicting interests of various stakeholders since they use the same resources for different purposes. It is therefore important to understand the different perspectives of the actors involved. For this reason, in the development and natural resource management literature it is often argued that sustainable management of natural resources requires a soft system, i.e. a space or platform that facilitates a learning among stakeholders by sharing, and intersubjectively validating, their understanding of the situation in order to reach consensus (Röling and Jiggins, 1997; Rist et al., 2006). Stakeholder analysis in itself does not create this platform for negotiation, but can be used as a tool to contribute to this negotiation or learning between

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[2] Hard systems thinking assumes that real systems exist, independently from the human observer, and one can therefore model existing systems. Soft systems differ from hard systems in two ways: 1) they are guided by reasons rather than driven by causes; 2) they do not have assumed goals but instead attempt to come to shared system goals (Röling, 1997).

stakeholders. In this way, stakeholder analysis can facilitate a "constructivist" approach to stakeholder participation, which recognizes multiple perspectives of the 'truth', where 'reality' is socially constructed.

Instrumental stakeholder research is more pragmatic, and largely devoted to understanding how organisations, projects and policy-makers can identify, explain, and manage the behaviour of stakeholders to achieve desired outcomes. In the business management literature, instrumental approaches have sought to understand and influence stakeholders in a variety of ways. For example, Freeman (1984) argued that stakeholder analysis could improve the strategic management and thus the performance of an organisation. In the development and natural resource management literature, stakeholder analysis has been used instrumentally to overcome obstacles to the adoption of new technologies, adapt technologies to relevant user groups, or to disseminate the same technologies in different ways to different groups (Johnson et al., 2004). It has been argued that stakeholder analysis can enable information and perspectives to be sought from a far wider range of sources, providing a more robust knowledge base from which to build development or natural resource management initiatives (Olsson et al., 2004; Berkes, 1999; Woodhill and Röling, 1998). This may be particularly pertinent when consensually agreed targets need to be reached (e.g. Arheimer et al., 2004) or when the relevant information is sparsely or unevenly distributed between different groups (Geurts and Mayer, 1996). It may also be particularly important for identifying existing conflicts between stakeholders, to ensure that these are not exacerbated by future work.

Finally, it should be noted that normative justifications for stakeholder analysis may lead to instrumental outcomes. The normative basis suggests that stakeholders *should* be involved in decision-making processes and thus feel some level of ownership of these processes. By doing this, stakeholder analysis may serve instrumental ends if it leads to the transformation of relationships and the development of trust and understanding between participants. Although this may not necessarily lead to changes in attitudes and behaviour, it may enable diverse groups of potentially conflicting stakeholders to appreciate the legitimacy of each other's

views and see new ways of working together (Mathews, 1994; Forester, 1999).

3. Stakeholder analysis methods in natural resource management research

3.1. A typology of stakeholder analysis methods

While the discussion above helps to rationalise the theoretical basis for stakeholder analysis, both normative and instrumental approaches have been applied in different disciplines and contexts using a wide variety of methods (Fig. 1). These can be categorised as methods used for: i) identifying stakeholders (Section 3.2); ii) differentiating between and categorising stakeholders (Section 3.3); and iii) investigating relationships between stakeholders (Section 3.4). Table 1 provides a summary description of each of the methods covered in the typology, including details of the resources required, level of stakeholder participation, and their strengths and weaknesses. Whilst some methods may be used for more than one purpose – for example, Social Network Analysis is primarily used to investigate relationships between stakeholders, but can also be used to categorise them – most are generally used for one of the purposes identified above.

Each of the research methods in this typology may be used either with or without the active participation of stakeholders. Where there is considerable documentary evidence or where analysts have an intimate knowledge of the individuals and groups with a stake in the phenomenon under investigation (e.g. an organisation, intervention, or issue), the stakeholder analysis can be conducted without the active participation of the stakeholders themselves. However, active participation may be needed if it is unclear which issues are most pertinent to the investigation, or if there is incomplete knowledge on the population from which the stakeholders could be drawn. The level of participation in stakeholder analysis can also vary considerably from passive consultation, where stakeholders simply provide information for the analysis, to active engagement where there is a two-way exchange of information between stakeholders and analysts as equal
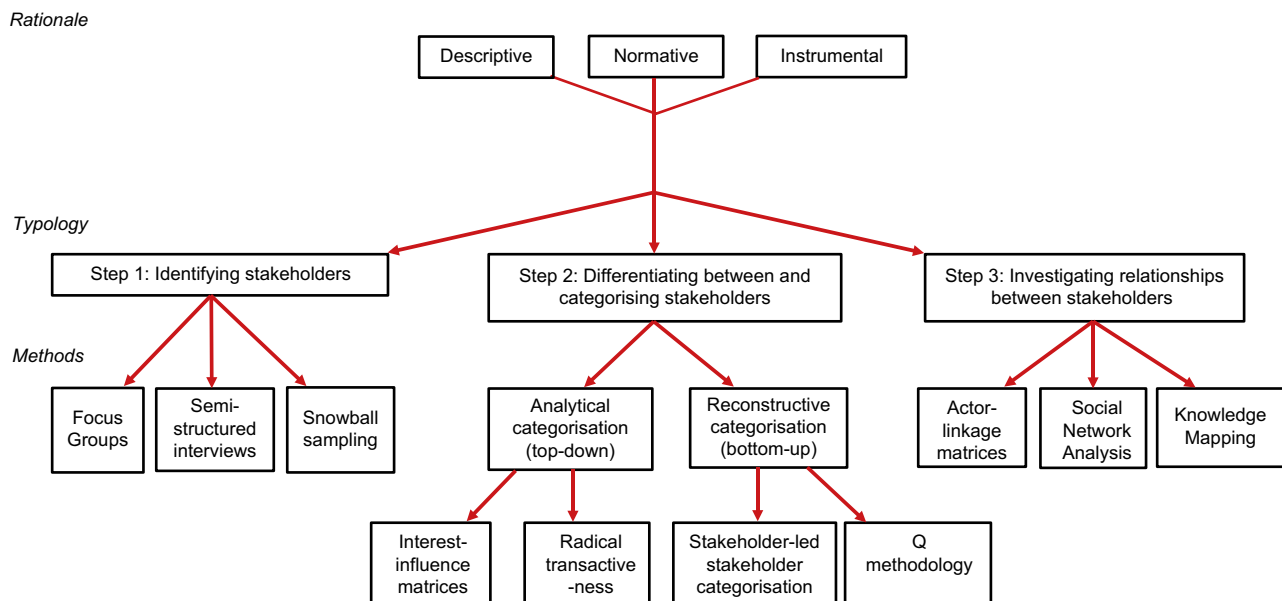

Fig. 1. Schematic representation of rationale, typology and methods for stakeholder analysis.

Table 1
Resources required, level of stakeholder participation, strengths and weaknesses of each of the methods identified in the typology.

Method	Description	Resources	Strengths	Weaknesses
Focus groups	A small group brainstorm stakeholders, their interests, influence and other attributes, and categorise them	High quality facilitation; room hire; food and drink; facilitation materials e.g. flip-chart paper and post-its	Rapid and hence cost-effective; adaptable; possible to reach group consensus over stakeholder categories; particularly useful for generating data on complex issues that *require* discussion to develop understanding.	Less structured than some alternatives so requires effective facilitation for good results
Semi-structured interviews	Interviews with a cross-section of stakeholders to check/ supplement focus group data	Interview time; transport between interviews; voice recorder	Useful for in-depth insights to stakeholder relationships and to triangulate data collected in focus groups	Time-consuming and hence costly; difficult to reach consensus over stakeholder categories
Snow-ball sampling	Individuals from initial stakeholder categories are interviewed, identifying new stakeholder categories and contacts	As above: successive respondents in each stakeholder category are identified during interviews	Easy to secure interviews without data protection issues; fewer interviews declined	Sample may be biased by the social networks of the first individual in the snow-ball sample
Interest–Influence matrices	Stakeholders are placed on a matrix according to their relative interest and influence	Can be done within focus group setting (see above), or individually by stakeholder during interviews (see above) or by researcher / practitioner	Possible to prioritise stakeholders for inclusion; makes power dynamics explicit	Prioritisation may marginalise certain groups; assumes stakeholder categories based on interest–influence are relevant
Stakeholder-led stakeholder categorisation	Stakeholders themselves categorise stakeholders into categories which they have created	Same as semi-structured interviews	Stakeholder categories are based on perceptions of stakeholders	Different stakeholders may be placed in the same categories by different respondents, making categories meaningless
Q methodology	Stakeholders sort statements drawn from a concourse according to how much they agree with them, anlaysis allows social discourses to be identified	Materials for statement sorting; interview time; transport between interviews	Different social discourses surrounding an issue can be identified and individuals can be categorised according to their 'fit' within these discourses	Does not identify all possible discourses, only the ones exhibited by the interviewed stakeholders
Actor-linkage matrices	Stakeholders are tabulated in a two-dimensional matrix and their relationships described using codes	Can be done within focus group setting (see above), or individually by stakeholders during interviews (see above) or by researcher/ practitioner	Relatively easy, requiring few resources	Can become confusing and difficult to use if many linkages are described
Social Network Analysis	Used to identify the network of stakeholders and measuring relational ties between stakeholders through use of structured interview/ questionnaire	Interviewer, questionnaire, training in the approach and analyses, time, software	Gain insight into the boundary of stakeholder network; the structure of the network; identifies influential stakeholders and peripheral stakeholders	Time-consuming; questionnaire is a bit tedious for respondents; need specialist in the method.
Knowledge mapping	Used in conjunction with SNA; involves semi-structured interviews to identify interactions and knowledges	Same as semi-structured interviews	Identifies stakeholders that would work well together as well as those with power balances	Knowledge needs may still not be met due to differences in the types of knowledge held and needed by different stakeholders.
Radical transactiveness	Snow-ball sampling to identify fringe stakeholders; development of strategies to address their concerns	Training in the approach, time	Identifies stakeholders and issues that might otherwise be missed and minimizes risks to future of project	Time-consuming and hence costly

partners, so that stakeholders can help to direct research aims and objectives (*c.f.* Rowe and Frewer, 2000).

3.2. Methods for identifying stakeholders and their stakes

Much of the stakeholder analysis literature has presumed that stakeholders are self-evident and self-construed, and has focused on categorising pre-identified stakeholders to understand their interests and relationships. However, before this can be done, it is necessary to identify who holds a stake in the phenomenon under investigation. This in itself necessitates a clear understanding of the issue under investigation so that the boundaries of the social and ecological phenomenon can be established. From this clarification, a number of methods can then be used to identify the relevant stakeholders.

Identifying stakeholders is usually an iterative process, during which additional stakeholders are added as the analysis continues, for example, using expert opinion, focus groups, semi-structured interviews, snow-ball sampling, or a combination of these. If the boundaries of the phenomenon itself are clearly defined, then stakeholders can be relatively easily identified. However, there is a risk that some stakeholders may be accidently omitted and as a consequence not all relevant stakeholders of the phenomenon may be identified (Clarkson, 1995). On the other hand, it is often not possible to include all stakeholders and a line must be drawn at some point, based on well-founded criteria established by the research analyst (Clarke and Clegg, 1998). These may include for example, geographical criteria like the boundary of a National Park or demographic criteria such as nationality or age, depending on the focus of the analysis.

Each stakeholder involved in the analysis supposedly has a stake in the phenomenon under investigation. Nevertheless, a key problem lies in deciding whether the phenomenon under investigation should dictate which stakeholders are involved, or whether

it should be the other way around. This problem is rarely considered in stakeholder analyses, possibly due to the difficult dialectic between identifying stakeholders and identifying which aspect of an organisation's activities, which intervention, or which issue to focus on. However, without knowing the issue, it is difficult to know which stakeholders should be involved in identifying the focus (Dougill et al., 2006; Prell et al., 2008, in press). As a result, the focus is typically identified in a top-down manner by the team leading the stakeholder analysis and may therefore reflect their interests and biases, which might not reflect the interests of stakeholders (Clarkson, 1995; Varvasovszky and Brugha, 2000). To address this, Dougill et al. (2006) and Prell et al. (2008, in press) proposed an iterative process comprising scoping interviews, focus groups, and follow-up interviews to identify the organisations, interventions, or issues under investigation, and hence to identify the stakeholders (see Section 4.1 for details). Chevalier and Buckles (2008) lists a range of other ways to identify stakeholders, including[3]: identification by experts or other stakeholders; by self-selection (in response to advertisements or announcements); through written records or census data which may provide information to categorise by age, gender, religion and residence; through oral or written accounts of major events (identifying the people who were involved); or using a checklist of likely stakeholder categories. Once sorted into groups (e.g. using card-sorting techniques described below), Chevalier and Buckles (2008) recommends placing stakeholders in a "rainbow diagram" that classifies them according to the degree they can affect or be affected by a problem or action (Fig. 2).

Who is included and who is omitted may depend on the method used for identifying stakeholders and purpose of the stakeholder analysis. This is important, as it affects "who and what really counts" (Mitchell et al., 1997). Bryson et al. (2002) argues that an inclusive view of stakeholders is important in the interests of social justice, since the "nominally powerless" must be given a voice. Lewis (1991), on ethical grounds proposes that it is sensible to at least start with an inclusive perspective and at a practical level pluralism is also important, since the capacity for a policy, plan, or project to meet its objectives may depend on including all the appropriate stakeholders (Bryson and Bromily, 1993; Tuchman, 1984). In broad terms, if the main concern of the stakeholder analysis is the equal distribution of the costs and benefits of a project (e.g. in project planning and implementation), all stakeholders may need to be included (Grimble et al., 1995). When the main interest is the effectiveness of a project or organisation (e.g. in a management context), only those stakeholders who are most likely to affect the functioning of the project or organisation given their interests, resources, and influence are normally included (Grimble et al., 1995). In both cases, the stakeholder analysis can be improved by differentiating between and categorising stakeholders. A range of methods have been developed for doing this, and these will be considered in the next section.

3.3. Methods for differentiating between and categorising stakeholders

Methods to characterise and classify stakeholders tend to follow two broad approaches: i) top-down "analytical categorisations" and; ii) bottom-up "reconstructive methods" (Dryzek and Berejikian, 1993).
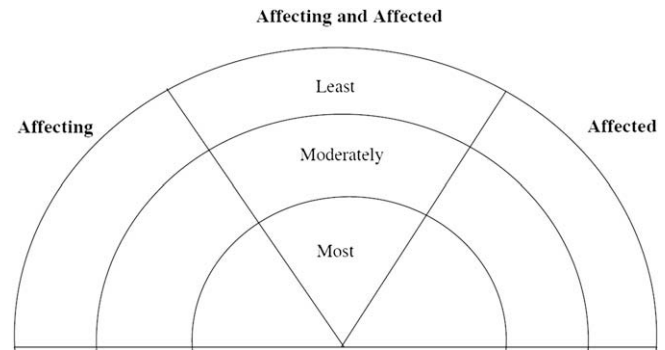

Fig. 2. Rainbow diagram for classifying stakeholders according to the degree they can affect or be affected by a problem or action (from: Chevalier and Buckles, 2008).

3.3.1. Analytical categorisations

Analytical categorisations are a set of methods in which classification of stakeholders is carried out by those conducting the analysis based on their observations of the phenomenon in question and 'embedded in some theoretical perspective on how a system functions' (Hare and Pahl-Wostl, 2002, p. 50). Examples of analytical categorisations include those using levels of interest and influence (Lindenberg and Crosby, 1981), cooperation and competition (Freeman, 1984), cooperation and threat (Savage et al., 1991), and urgency, legitimacy, and influence (Mitchell et al., 1997). Such analyses typically make use of matrices or Venn diagrams (e.g. Bianchi and Kossoudji, 2001; Salam and Noguchi, 2006) and are popular with users in policy and development fields (Bryson et al., 2002; ODA, 1995; Eden and Ackermann, 1998).

One popular method used interest and influence to classify stakeholders into "Key players, "Context setters", "Subjects" and "Crowd" (e.g. Eden and Ackermann, 1998; De Lopez, 2001). This can then help to specify how stakeholders might be engaged, for example, for instrumental ends. Key players for example are stakeholders who should to be actively groomed, because they have high interest in and influence over a particular phenomenon. Context setters are highly influential, but have little interest. Because of this, they may be a significant risk, and should be monitored and managed. Subjects have high interest but low influence and although by definition they are supportive, they lack the capacity for impact, although they may become influential by forming alliances with other stakeholders. These are often the marginal stakeholders that development projects seek to empower (Section 2.2). The "Crowd" are stakeholders who have little interest in or influence over desired outcomes and there is little need to consider them in much detail or to engage with them. Interest and influence typically change over time and the impact of such change can be considered. For example, stakeholders may form alliances to either promote or defeat a particular outcome and a stakeholder analysis can be used to identify where such alliances are likely to arise. The analytical power of categorisation approaches can be improved by adding further attributes to the stakeholders. Patterns in these attributes can then be considered in terms of the categorisation factors. For example, stakeholders located in an interest and influence matrix could also be labelled as "supportive" or "unsupportive". This could be visually represented to determine whether there are any clusters of supportive or unsupportive stakeholders and if so, the implications considered in the context of interest and influence. Any number of stakeholder attributes can be included in this way and the resulting patterns examined and the implications assessed.

For environmental management and development work, one of the main drawbacks of such analytical categorisation is that it tends

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[3] For a range of additional techniques, see http://www.sas2.net/index.php?page=actors.

to identify the 'usual suspects' and there is a danger that this may lead to the under-representation of marginalised or powerless groups (Calton and Kurland, 1996; Grimble and Chan, 1995; Mac-Arthur, 1997). Whilst this can lead to the concerns of vulnerable stakeholders being ignored, such groups may form alliances to affect significant change when they disagree with or feel threatened by the phenomenon under investigation. In both cases, it is important to include them. In addition, these methods are often used in the absence of direct stakeholder participation in the analysis and therefore may reflect the biases of the researchers rather than the perceptions of the stakeholders themselves, leading to questions about the legitimacy based on these categorisations. An alternative approach known as "radical transactiveness" (Hart and Sharma, 2004) reverses this, focussing instead on opening two-way dialogue with stakeholders who would otherwise be considered peripheral. This typically includes those who are remote, weak, poor, uninterested, isolated, or non-legitimate, but whose views may be disruptive. Hart and Sharma (2004) argue that this enables powerful and fringe stakeholders to influence each other and avoid potentially disruptive relationships in the future. They recognise that such fringe stakeholders may hold knowledge and perspectives that can help anticipate potential future natural resource problems and identify innovative opportunities for future management.

3.3.2. Reconstructive categorisations

In response to these limitations, more bottom-up, 'reconstructive methods' (Dryzek and Berejikian, 1993) have been developed, which allow categorisations and parameters to be defined by the stakeholders themselves, so that the analysis reflects their concerns more closely (Hare and Pahl-Wostl, 2002).

For example, Hare and Pahl-Wostl (2002) applied a card-sorting method used in experimental psychology in their stakeholder-led stakeholder categorisation process for a sustainable water management project. Each stakeholder was asked to sort cards listing all the stakeholders in a city water system into groups according to their own criteria. It was used as a way of 'identify(ing) the structure of groupings and interactions between stakeholders' from the stakeholders' perspectives so that the models developed during the research would reflect the understanding of the stakeholders themselves.

An alternative, less direct method, also drawn from psychology but widely used in political science alongside discourse analysis, is Q methodology. Discourse analysis identifies the ways in which people think and talk about an issue and in particular the shared perceptions and common ground between individuals. Q methodology is then employed to group individuals into 'social discourses' based on these shared perceptions and commonalities (Barry and Proops, 1999). Q methodology has been used in environmental policy research, where analysis of conflicting knowledge claims might lead to more effective policy solutions (Ockwell, 2008). In both the card-sorting method and Q methodology the categorisation of stakeholders is based on an empirical analysis of stakeholder perceptions rather than on theoretical perspectives (Barry and Proops, 1999).

While card sorting and Q methodology can involve a large number of stakeholders, the difficulty of engaging meaningfully with them means that in many cases, not everyone identified as a stakeholder can be involved in all aspects of the process. This leads inevitably to a need to identify a sub-set of stakeholders whose views are representative of the larger stakeholder group (Prell et al., 2008, in press). If such stakeholder-led research methods are to be used, then greater flexibility in research and policy interventions is necessary. By defining their own categories, stakeholders make the analysis relevant to their own concerns and

circumstances. This may shift the original focus of research, which could lead to novel output, but might equally be distracting.

Finally, Strategic Perspectives Analysis (Dale and Lane, 1994) uses interviews or workshops with stakeholders to identify and compare the goals of different groups, and the perceived opportunities and constraints they have to reach their goals. In this way (often using repeat interviews), categories of stakeholders who share similar goals can be identified. The information collected during this process may also be a useful to negotiations between conflicting groups. This approach is similar to conflict mapping (Cornelius and Faire, 1989), which focuses on needs rather than stated positions or goals.

3.4. Methods for investigating stakeholder relationships

Finally, there are a collection of methods that have been developed to investigate the relationships that exist between stakeholders (as individuals and groups) in the context of a particular phenomenon. There are three principal methods that have been used to analyse stakeholder relationships: i) Actor-linkage matrices ii) Social Network Analysis provides insights into patterns of communication, trust and influence between actors in social networks, and; iii) Knowledge Mapping analyses the content of information between these actors.

3.4.1. Actor-linkage matrices

A commonly used means of describing stakeholder interrelations is through actor-linkage matrices (Biggs and Matsaert, 1999; ODA, 1995). These require stakeholders to be listed in the rows and columns of a table creating a grid so that the interrelations between them can be described, using key words. One popular method for example is to determine whether the relationships between each stakeholder are of conflict, complementary, or cooperation. The advantage of this approach is its simplicity of use and flexibility. As actor-linkage matrices require no more than pen and paper, they have been particular valuable in development, where due to resource limitations, research may need to be conducted without the use of computers.

3.4.2. Social Network Analysis (SNA)

Similar to actor-linkage matrices, Social Network Analysis makes use of matrices to organize data on the relational ties linking stakeholders together. Rather than using key words in the matrix cells, SNA uses numbers to represent i) the presence/absence of a tie; ii) the relative strength of the tie. Each matrix represents a unique relation, for example, communication; friendship; advice; conflict; trust, etc. Data is typically gathered through structured interview, questionnaire, or observation (Wasserman and Faust, 1994). Thus, SNA captures not only different kinds of relations (both positive and negative), but also the strength of those relational ties, and records this information in quantitative form that makes it easy for summarization and analysis. Analysis of these matrices uncovers the structure of the stakeholder network, thus identifying which stakeholders are more central; which are marginal; and how stakeholders cluster together.

In natural resources management, Social Network Analysis (SNA) can be used to help identify stakeholders, ensure key groups are not marginalised, identify conflict between stakeholders, and select representatives based on the way that the network is structured. Such information is especially important in natural resources management initiatives that seek to influence the behaviour of stakeholders through key influential individuals (c.f. Rogers, 1995; Prell, et al., 2008, in press). Both the social network and resource management literature discuss how networks influence individuals and groups. Research on the strength of ties

between individuals, for example, shows that "strong" ties produce different outcomes to "weak" ties. Strong ties (as defined by Granovetter, 1973) are based on a combination of characteristics, such as intimacy, emotional intensity, time, and reciprocity. The higher a tie scores on each of these characteristics, the stronger the tie. There are several advantages of strong ties for natural resources management. Stakeholders who share strong ties are more likely to influence one another, and thus, creating strong ties among diverse stakeholders can enhance mutual learning, and the sharing of resources and advice (Newman and Dale, 2005; Crona and Bodin, 2006; Newman and Dale, 2007). However, the benefits of strong ties may be countered by the redundancy of information that typically runs through them.

In contrast, diverse information and new ideas have been shown to travel best through weak ties. Research has shown that weak ties tend to exist between dissimilar individuals, and as such, offer stakeholders access to diverse pools of information and resources by bridging otherwise disconnected segments of the network. Within the context of natural resource management, weak ties that link diverse individuals and groups together and bridge disconnected segments of a network can make it more resilient and adaptive to environmental change. A potential drawback to weak ties, however, is that they are easy to break. In addition, individuals sharing weak ties may lack the trust and understanding that is needed for meaningful dialogue over environmental issues (Granovetter, 1973; Burt, 1992, 2000, 2001; Newman and Dale, 2005). By quantifying the extent to which stakeholders trust one another, SNA can identify problematic relationships, and when supplemented with qualitative data, can be used to identify the nature of conflicts between individuals and groups. It may be possible to identify specific individuals who are widely perceived by others in the network to be untrustworthy. This information can be used to select stakeholders to work together who are likely to trust one another, and may help avoid exacerbating conflicts between stakeholders (see Section 4.4 for an illustration).

Closely related to this is the way in which various stakeholder attributes influence which ties are established within a network. Homophily, where similar individuals are attracted to each another and thus choose to intensify their interaction, is well-documented in social networks (Friedkin, 1998; Ruef et al., 2004; Skvoretz et al., 2004). Stakeholders who are similar to one another are better able to communicate tacit, complex information, because there is a better level of understanding between them. However, homophily can also be problematic, because successful natural resource management projects require different views and opinions to be recognised and discussed (Crona and Bodin, 2006; Newman and Dale, 2007). In such situations, it may be beneficial to increase the diversity of stakeholders engaged in the project.

A further concept of importance in the natural resource management literature is centralisation. A highly centralised network is characterised by relatively few individuals holding the majority of ties with other individuals in the network. Although centralised networks are helpful for the initial phase of forming groups and building support for collective action (Olsson et al., 2004; Crona and Bodin, 2006), research suggests that centralised networks are also a disadvantage for long-term planning and problem solving. Long-term goals in fact require a more decentralised structure, where there are more ties, both weak and strong, between all the stakeholders (Crona and Bodin, 2006).

3.4.3. Knowledge mapping

Knowledge mapping is an increasingly important tool within businesses and organisations, particularly in terms of fostering improved innovation and competitive advantage (Cole, 1998).

Knowledge mapping evolved from organisational charts, which were tools for control and planning. However, in order to successfully manage a natural resource system that is subject to numerous changes, responses, and feedbacks from various sectors of society (or in the case of business, a system that is subject to both internal and external changes), more flexible approaches are needed in order to enhance communication and facilitate learning. Businesses have responded to this need by emphasising the importance of knowledge management, within which knowledge mapping can play a useful role (Nissen and Levitt, 2004). To date however, it has been little applied to the natural resource management context, the exception being work on agricultural networks and technology transfer (e.g. see FAO, 1995).

When used in conjunction with SNA, knowledge mapping may provide an important method for: i) extending the "who knows who" of SNA by providing a visual representation of "who knows what" (Wexler, 2001) that captures the knowledge of different stakeholders across time, people and locations (Nissen and Levitt, 2004); ii) identifying the dominant flows of knowledge (Eppler, 2001); iii) identifying knowledge bottlenecks and areas of latent knowledge; iv) locating and explaining knowledge seepage, for example through the migration or loss of key stakeholder groups or individuals; v) assisting individuals within the system to understand the other types of knowledge of different individuals and groups within the system, and; vi) helping researchers to group stakeholders more effectively in order to promote learning. By mapping linkages in a knowledge system, information exchange mechanisms can be identified and evaluated, providing an overview of power and control of the linkages and highlighting whose interests are being met (FAO, 1995).

It may be possible to use knowledge maps in conjunction with SNA to address the question of whose agenda is being met, by identifying stakeholders who are particularly knowledgeable about a specific issue and determining how their knowledge is being used and by whom. For example, although knowledge maps might indicate that a substantial proportion of stakeholders within the network are "knowledgeable", SNA might indicate that there are few pathways through which that knowledge can be distributed across the wider stakeholder network. Conversely, knowledge needs might become apparent from other stakeholders in the knowledge map and researchers could then structure focus groups to bring together knowledgeable stakeholders with those needing this knowledge. This is an important step towards fostering effective collaboration and social learning, a well as innovation (Ramírez, 1997) providing a means by which latent knowledge can be released within the appropriate social network. Used in this way, knowledge mapping is a novel method within stakeholder analysis, which can aid the development and diffusion of knowledge within socio-ecological systems.

4. Applying stakeholder analysis: experience from the RELU programme

The previous sections of the paper have examined the history and theory of stakeholder analysis in the context of business management, policy, development, and natural resources management. They have also examined which methods have been used in three critical steps of stakeholder analysis, identifying stakeholders and their stakes, differentiating between and categorising stakeholders, and methods for investigating stakeholder relationships. The following section of the paper uses four case study projects from the UK Rural Economy and Land Use Programme (RELU) that all use stakeholder analysis, to discuss how the analysis was applied in each, what problems arose, and how these problems were overcome.

First, the RELU-Birds case study is used to clarify and illustrate some of the basic theoretical concepts and critically evaluate the use of interest and influence as a means of categorising stakeholders. RELU-Floodplains considers how interest–influence matrices can be used to analyse changes in the composition of stakeholders associated with a phenomenon over time. RELU-Deer Management goes beyond this to qualitatively explore stakeholder interrelations through their common interests in deer management. RELU-Sustainable Uplands characterizes stakeholder relationships more quantitatively, in the context of a qualitative stakeholder identification and categorisation.

The following sections describe how stakeholder analysis has been applied in each of these projects, illustrating the rationale behind their choice of methods to conduct different types of stakeholder analysis, according to the typology described in Fig. 1.

4.1. Reviewing some basic theory: the development of a framework for evaluating interest and influence on RELU-birds

The RELU-Birds project, Evaluating the Options for Combining Economically, Socially and Ecologically Sustainable Agriculture (2006–2009), aims to understand and predict how farmers make management decisions on arable farms and how this affects farmland bird populations, which have declined dramatically since the 1970s. Within this, the stakeholder analysis seeks to identify individuals and groups with "interest" in and "influence" over farmland bird populations (see discussion about using interest and influence to categorise stakeholders in Section 3.3.1) in order to provide a research context for the project and future recommendations. A non-participatory approach was used, the justification

for this being based partly on resource limitations, and partly because farmland birds in the UK are well-researched, and evidence of the interest and influence of stakeholders is available in scientific papers, the electronic media, and through key informants (see discussion of participatory and non-participatory stakeholder analysis in Section 3.1 and the levels of participation usually involved in different stakeholder analysis methods in Table 1).

Stakeholders were initially identified, using a focus group with researchers, to ask which individuals and groups had interest in and influence over farmland bird populations in the UK. In recognition of the fact that stakeholder analyses are iterative, a "stakeholder analysis tool" was developed to facilitate the analysis (Fig. 3). This allowed stakeholders to be classified in an "interest–influence" matrix, which displayed their attributes and inter-relationships. The tool was subsequently used to map stakeholder interest and influence with key informants from the research, policy, and farming sectors. Through this iterative process, a final analysis based on peer-reviewed literature, electronic media and key informant interviews was established.

However, development of a framework for evaluating interest and influence within the stakeholder analysis tool raised significant difficulties, since in the stakeholder literature, there is little guidance on how these can be assessed or measured. For example, most discussions on "interest" focus on defining what constitutes a legitimate "stake" in the affairs of other individuals or groups (see Section 2.1 for a discussion of what makes a legitimate stake). Legitimacy was here seen in terms of entitlement to the flow of benefits from land as defined by property rights (Donaldson and Preston, 1995). The ecosystems framework was then used to identify and classify stakeholders according to their interest in the
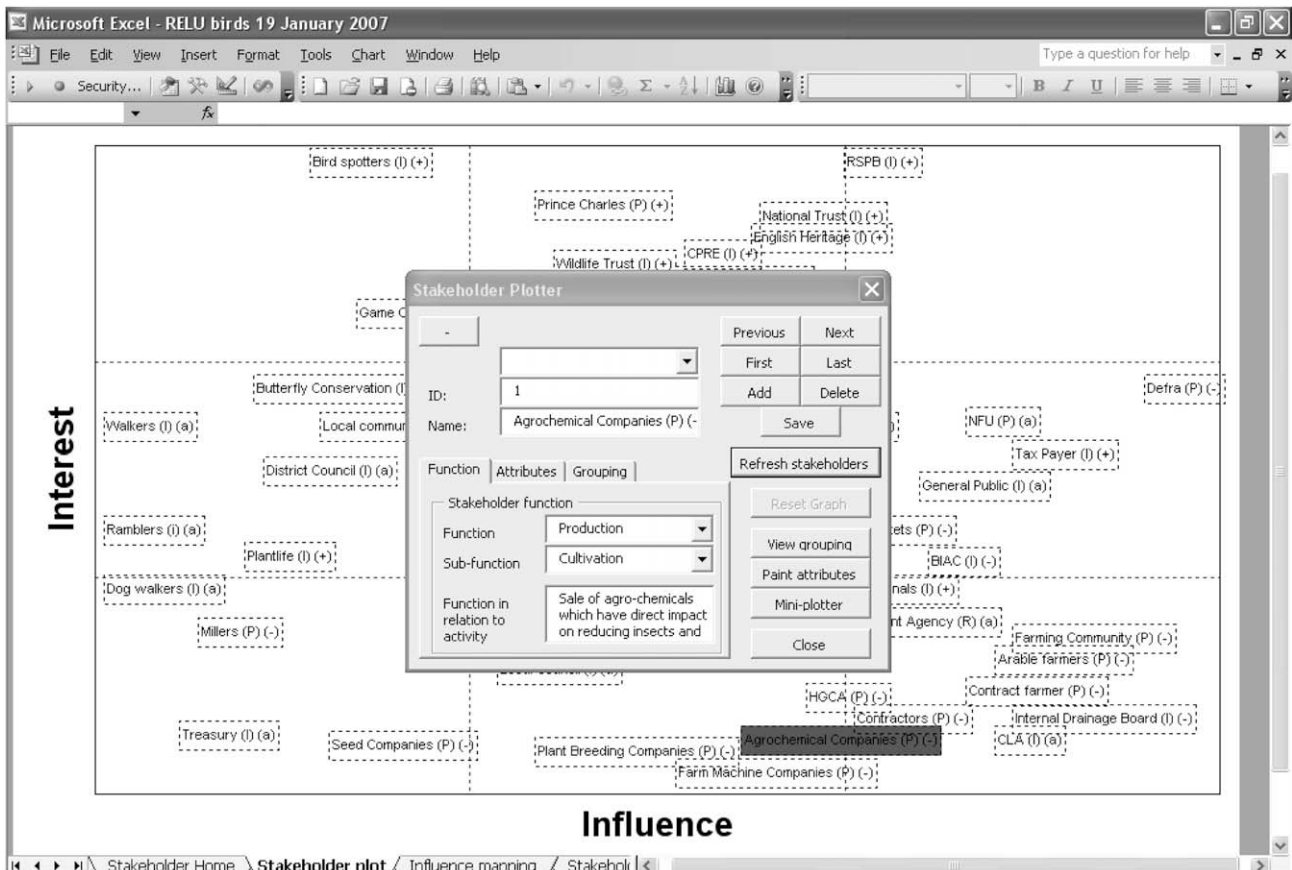

Fig. 3. A screenshot of the Stakeholder Analysis Tool developed to aid the stakeholder analysis.
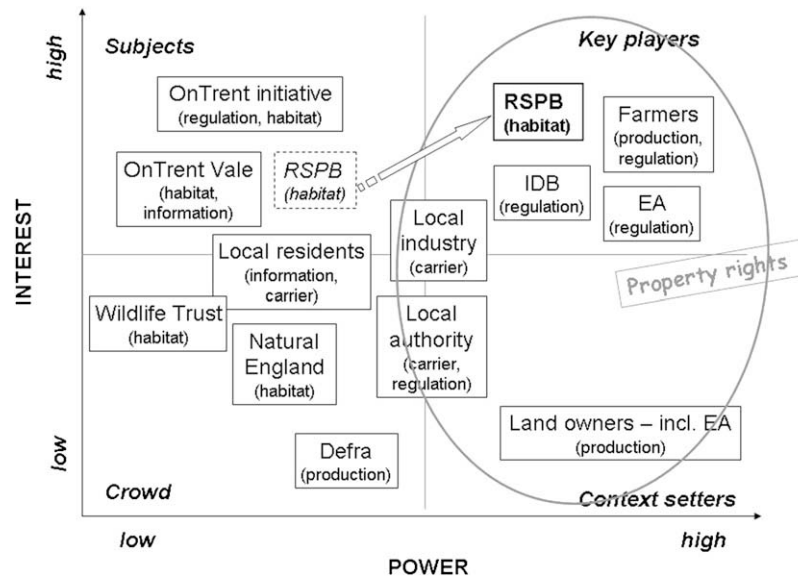
Fig. 4. Interest–influence matrix for Integrated Management of Floodplains RELU Project showing stakeholders with property rights.

goods and services provided by the regulating, production, habitat, carrier, and information functions of agricultural land (de Groot et al., 2002, 2006).

The stakeholder literature does even less to provide an explanation of "influence". In the social psychology literature, influence is described as the "process of affecting the thoughts, behaviour, and feelings of another" and "the capacity for influence is dependent on power" (Nelson and Quick, 1994). There are many theoretical descriptions of power that operate at different social scales and it is surprising that stakeholder theories have not drawn more from these. Only Mitchell et al. (1997) have proposed use of the concepts provided by Etzioni (1964), who suggested that power could be coercive, utilitarian, and normative. Here, the analysis developed by Galbraith (1983) was used. This proposes that there are three instruments of power: condign, compensatory, and conditioning power, and three sources of power: personality, property, and organisation.

Condign power gains influence through emotional, financial, and physical threats and punishment. Compensatory power works through symbolic, financial and material rewards, such as salaries, bribes, or gifts of land. Conditioning power works through manipulation of belief, for example, through peer groups, cultural norms, education, advertising, or propaganda. These instruments of power are accessed through various sources, including personality/ leadership (which provides access through charisma, physical strength, mental intelligence or charm), wealth or organisation. However, access to such instruments and sources of power does not in itself equate to influence, since stakeholders may choose not to use them.

From an iterative application of this conceptual framework (Table 1) and tool (Fig. 3) with key informants, and through use of evidence in peer-reviewed literature and the electronic media, a graphical representation of the stakeholders was developed in an interest–influence grid (Fig. 4; see Section 3.3.1 for an introduction and discussion about technique). A benefit of this visual representation was the possibility of finding patterns in the distribution of various stakeholder attributes in the interest–influence matrix. For example, stakeholders with production interests were generally more influential than those with habitat interests, since production interests have been heavily supported by British and EU policy, especially the CAP.

As well as helping explain how current stakeholder interests and influence have led to the current decline in farmland bird populations, the stakeholder analysis provided guidance on how stakeholders, institutions, and policies could be engaged to halt and reverse the decline of farmland birds. This decline has been linked to agricultural intensification, and a rearrangement of stakeholder interests and influence are needed if this is to be reversed. Fundamentally, this necessitates a realignment of property rights and entitlement to the flow of benefits from agricultural land, a process that is occurring in a variety of ways. Stakeholders such as the RSPB or the Wildlife Trust, with broader ecosystem interests for example, have formed alliances of power to make their interests felt through measures to protect biodiversity and the environment, such as the Birds Directive (79/409/EEC), the Wildlife and Countryside Act (1981), and the Habitats Directive (92/43/EEC). More recently, CAP payments have been made dependent on cross-compliance and Defra now holds a Public Service Agreement to reverse the decline of farmland birds by 2020.[4] However, it is worth noting that the balance of power between different stakeholders, and their entitlement to property rights, is in a state of dynamic tension and shifts may occur with increasing rapidity, as the demand for competing ecosystem goods and services grows.

4.2. Identifying and categorising dynamic stakeholders on RELU-floodplains

The RELU-floodplains project, Integrated Floodplain Management, seeks to determine the scope for achieving the multiple objectives of agricultural production, biodiversity and landscape management, flood risk management and support to the rural economy in floodplain areas in England. It explores how water regime management, namely the control of flooding and ground water levels, can be used to achieve outcomes which serve a range of stakeholder interests. The project makes explicit links between ecosystem functions and stakeholder interests (de Groot, 2006), evident for example between: production functions and farmers; regulation functions and flood risk managers; habitat functions and biodiversity managers; carrier functions and floodplain residents;

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[4] http://www.defra.gov.uk/rural/pdfs/ruraldelivery/chapter2.pdf.

and cultural functions and local authorities managing public access to the countryside.

The floodplain study sites for this project were initially defended against flooding and artificially drained during the 1960s and 1970s as part of programmes of public support to farming and food production. At that time, agricultural production was synonymous with the public good, and Government agencies, such as the Ministry of Agriculture, Fisheries and Food, used 'permissive powers' (i.e. empowered to intervene if appropriate but without any obligation) and public funds for this purpose. More recently, however, priorities in floodplains have moved away from agricultural primacy to a more diverse set of non-production oriented functions and related interests, such as flood regulation and habitat management. These changes in priority reflect a redistribution of stakeholder interest and influences and, in turn, changes in property rights that determine entitlement to flows of ecosystem benefits from floodplains (Table 2).

The floodplain case demonstrates how stakeholder analysis can be used to explain the role of property rights in natural resource management, and the underlying tensions that arise when new and strengthening interests cannot exert influence because of limited entitlement. Indeed, property rights are not absolute, but rather conditional on and derived from social preferences that change over time (Tawney, 1948; Bromley and Hodge, 1990). The property rights embodied in agricultural tenure, for example, reflect a primacy given to production. Some agricultural entitlements have been attenuated in recent years by environmental regulation, with and without compensation to farmers.

These issues are being played out on the Beckingham Marshes, an agricultural floodplain along the River Trent opposite to the town Gainsborough, and one of the eight case studies being considered. Semi-structured interviews with the main stakeholders provided insights of changes in the land and water management over time in response to changing policy drivers and the motivation of key stakeholders, notably the hydrological regulator (the Environment Agency and its predecessors), farmers, and, more recently, environmental interest groups. Prior to 1939, the Marsh was down to wet grass and woodland, mostly willow. Some arable farming occurred during the WWII period. In the 1960s and 1970s, successive improvements were made to flood defences and drainage systems that provided enhancements for agricultural production with flood storage for the 1 in 10 year flood event to help protect the adjacent urban area.

The majority of the Marsh has been held in public ownership by the Environment Agency and its predecessors, reflecting the dominant interest of flood regulation. Farmer occupiers have life-long tenancy rights and derive benefits of flood protection to the design standard, paying land drainage fees to the Internal Drainage Board for services rendered. Thus for three decades the main interests have focussed on regulation functions (floodwater storage and drainage) and production functions (agriculture), with limited attention given to other ecosystem functions and services. In the

last 10 years, however, declining profitability of conventional farming, increased importance given to nature conservation in floodplains, and the availability of agri-environment options for wet grassland, have promoted broader based interests in sites such as Beckingham Marshes.

Information on the stakeholders was mainly collected through semi-structured interviews for this case study, but the stakeholders had no active involvement in constructing the interest–influence matrix which might have revealed less obvious dynamics or conflicts in addition. Table 3 gives an overview of the current interests in ecosystem uses of some stakeholders in the Beckingham Marshes. Mapping stakeholders on an influence and interest matrix shows that in the past stakeholders interested in regulation and production functions were key players, holding property rights bestowed through land-ownership (Fig. 4; see Section 3.3.1 for more about technique). More recently, however, stakeholders with interests in habitat and information functions are exerting influence through strategic liaisons with key players with formal entitlement to land, including influence on agri-environment programmes for floodplain wetlands. RSPB, for example, has pursued its interest by acquiring an agricultural tenancy with the Environment Agency for the purpose of wetland creation on 90 ha, qualifying for agri-environment payments in the process. As more and diverse stakeholders seek entitlements to serve their interests, conflicts arise and stakeholders begin to bargain in order to achieve desired outcomes, often involving multiple ecosystem services.

The stakeholder analysis was applied instrumentally here to reveal the interests and influence of the stakeholders, in order to understand synergies and conflicts between the stakeholders and their demand for the ecosystem functions and services delivered by rural floodplains. Interest and power are not static, and as stakeholders change position (e.g. the RSPB), tensions arise when key players have conflicting interests.

4.3. Exploring stakeholder relationships qualitatively on RELU-Deer management

The RELU-Deer Management project, Collaborative Frameworks in Land Management (2006–2009), aims to investigate the process of collaboration in natural resource management via a case study of wild deer in Britain. Wild deer present a complex natural resource management issue and have the potential to affect increasing numbers of actors across the contemporary British landscape. It is widely accepted that the number and distribution of deer in the landscape have been increasing in recent decades and are now at their highest level, perhaps for centuries. Deer are a highly valued economic and cultural resource and whilst the impact of wild deer upon agriculture and forestry (through their browsing, trampling and other behaviours) have been acknowledged for some time, contemporary social phenomena – such as increasing fragmentation of land-ownership, increased attention to nature and its conservation, increased demand for mobility and transport, and

Table 2
The framework of analysis developed to evaluate the different dimensions of stakeholder "interest" and "influence".

	Interest					Influence					
	Ecosystem function					Instruments of power			Sources of influence		
	Regulation	Production	Habitat	Information	Carrier	Condign	Compensatory	Conditioning	Personality	Property	Organisation
Arable farmers		+++					+++			+++	
Bird spotters			+++				+			+	
Butterfly conservation			+				+				+
RSPB			+++					+++			+++
etc.											

Note: high (+++), moderate (++), low (+), or insignificant () level of interest, access to source of power, or use of instrument of power to influence.

Table 3
Stakeholders' interests in ecosystem functions and uses in the Beckingham Marshes.

Function	Use	Value	Stakeholders
Production	Agricultural production (incl. bio-fuel crops)	Economic gains from crop and livestock production	Farmers, Defra
Regulation	Flood water storage, drainage	Avoided damage due to flooding	EA-FRM, IDB, farmers, local industry, RSPB
Habitat	Enhancement wet habitats for breeding waders	Contribution to UK BAP targets	RSPB, OnTrent Initiative, Nottingham Wildlife Trust, local residents
Carrier	Transport, industrial site and settlements	Living space and revenues local industry	Local residents, local industry, farmers, local authority
Information	Amenity and landscape	Open space and public access	RSPB, local residents, local authority

heightened concern for animal welfare – now combine with these growing populations to broaden and increase the range of ways in which people and deer interact. Deer can be highly mobile, moving across the landscape, crossing ownership and jurisdictional boundaries, interacting variously with an increasingly large number of actors. Within this contemporary scenario, those who 'have a stake' in relation to wild deer are numerous and widespread, certainly beyond those actors traditionally involved directly in deer management. Collaboration between these many stakeholders, both old and new, is seemingly essential for effective action. Here 'collaboration' refers, essentially, to joint-working between stakeholders – a conceptualisation advanced in Gray's (1985: 912) seminal work which defined collaboration as a 'pooling of appreciations and/or tangible resources ... by two or more stakeholders to solve a set of problems that neither can solve individually.' The term is commonly used in parallel with, or in place of, several others such as co-management and participation (Borrini-Feyerabend et al., 2007).

This project has employed primarily qualitative methods, particularly semi-structured interviewing, to complete its stakeholder analysis. Interviewing is a core research method used across all social sciences and should be considered as a 'conversation ... in which one person has the role of researcher' (Gray, 2004: 213). In a semi-structured interview the researcher is guided by a pre-set interview protocol (or 'schedule' – a set of questions or a simple list of subjects for discussion), but does so flexibly, allowing the interviewee to respond in the order and manner of their choosing. Questions can be asked and answered in or out of sequence, and furthermore, semi-structured interviewing allows the researcher to ask additional questions that occur to them during the interview but which may not be on the protocol. Semi-structured interviews are most useful where the researcher seeks information regarding a specific, defined phenomenon (such as an event or document) or some aspect thereof, and can produce reasonably focused (hence comparable) data, but with significant depth or 'richness'.

Within this project's semi-structured interviewing, open questions focused upon key issues relating to deer, collaboration, and information flow from an organisational point of view. Some quantitative methods, such as simple network analysis (Section 3.4.2) and Likert scale questioning, have also featured in the process. For example, interviewees were asked to rank organisational influence over deer-related issues. Similar to Chevalier and Buckles's (2008) "rainbow diagram (Section 3.2), a 'target' diagram was used to obtain interviewees' perceptions of organisational interest in deer and shared interests. Conceptually, deer were at the centre of the 'target' surrounded by concentric rings representing the 'core' and 'periphery' around them and their management. Respondents were asked to note how much interest an organisation had in deer by placing them either within the 'core' or 'periphery', and, by placing organisations close together, indicate the 'closeness' of their interests. This proved to be a difficult task for several interviewees as these interests and relationships, upon close consideration, proved complex. A stakeholder database

populated by a content analysis of published policy and position statements is also under development. This is designed to provide a basis for comparison and categorisation, along with being a useful tool for the stakeholders themselves.

Within this project, stakeholder analysis has multiple objectives. Initially it has been used to identify the breadth of actors with a 'stake' in relation to wild deer (i.e. the 'stakeholders'). Deer management can sometimes be narrowly constructed – dominated by traditional groups, approaches and epistemologies – and only a few actors deemed legitimate or able to able act. A long-established legislative framework, combined with centuries of tradition and practice, ties the management of wild deer very closely to land-ownership and management. Primarily, this is because with land-ownership comes the right to kill, or authorise others to kill, deer. These 'core' actors were the logical starting point for our analysis, but in order to move beyond this group, towards Freeman's definition (1984), the project team refocused the issue and debate on the 'impacts' that deer have upon society. This essentially allowed us to ask those at the 'core', as part of the semi-structured interviews, to identify additional actors who affect or are affected by deer, without challenging the legitimised institutions of direct management. This process directly identified more than sixty organisations as stakeholders. From this we were able to attempt to engage another round of, more peripheral, stakeholders. Thus, like the Sustainable Uplands case study, our stakeholder analysis adopted an iterative approach.

The primary objective of our stakeholder analysis has been instrumental, investigating existing and potential collaborative relationships between stakeholders, and the barriers to and drivers of these relationships. As has been noted, the collaborative process is the primary target of the research and through the stakeholder analysis, we have been able to gauge the closeness and extent of existing collaboration, its objectives and basis. We are able to identify which actors are currently considered key to the collaborative effort and why. Some are important financial supporters, other possess essential knowledge, whilst others still may have already recognised appropriate linkages, shared interests and made efficiencies upon which further collaboration may be built. This then allows us to consider which stakeholders are bypassed and how their collaboration may benefit other stakeholders, along with how such input may affect existing management objectives.

4.4. Exploring stakeholder relationships quantitatively on RELU-Sustainable Uplands

The RELU-Sustainable Uplands project (2004–2009) was designed to combine knowledge from local stakeholders, policymakers and social and natural scientists to anticipate, monitor and sustainably manage rural change in UK uplands. The project combines experience and ideas from local people with insights from natural and social science to develop options for people to adapt in each of three upland study sites (Peak District National Park, Nidderdale Area of Outstanding National Beauty in the

Yorkshire Dales, and Galloway in southern Scotland), and identify ways policy-makers can support adaptation (for detailed context, see Prell et al., 2007).

Stakeholder analysis in this project was primarily instrumental, to achieve the short-term goals of the project which relied heavily on stakeholder involvement, and to achieve the long-term goal of developing sustainable land management and policy options to adapt to future change in uplands. A range of participatory methods were used to conduct a stakeholder analysis that cut across all three distinctions identified in our typology (Section 2.3) by identifying stakeholders, categorising them and investigating the relationships between individuals and groups in the stakeholder network.

An iterative approach was taken to the stakeholder analysis, using focus groups, combined with semi-structured interviews, follow-up phone interviews with original focus group participants, and SNA (see Sections 3.2 and 3.4.2 for a more detailed discussion of these techniques). A focus group was conducted initially with members of a stakeholder organisation that had been involved in the project from the beginning (the Moors for the Future partnership), and two key stakeholder organisations they had identified (the National Trust and Peak District National Park Authority). To avoid bias arising from initial group composition (the organisations present were not able to represent all stakeholder interests), focus group data were triangulated through semi-structured interviews with eight stakeholders identified during the focus group to represent different land management perspectives. The aim of the focus group and subsequent interviews was to evaluate and adapt the proposed aims of the project in order to ensure it was focussing on relevant issues and subsequently to identify and categorise stakeholders. This led to the suggestion that the project should focus more strongly on a single issue in order to achieve its aims within the time available. There was near unanimous agreement that heather burning was the most pressing land management issue due to the Government's ongoing and highly contentious review of the Heather and Grass Burning Code. By filling in a table to evaluate each category of stakeholder in turn, this led to the following outcomes: i) a list of stakeholders and their stakes in upland management (we identified over 200 relevant stakeholder organisations); ii) a list of eight stakeholder categories; iii) information about how these categories of stakeholder related to one another; and iv) the most effective ways for researchers to gain their support and active involvement in the research (Table 4).

Although Stakeholder-Derived Stakeholder Categorisation (Hare and Pahl-Wostl, 2002) was attempted (Section 3.3.2), there was so much overlap between the membership of different categories that the results were meaningless (all stakeholders were represented under more than one category and many were represented under numerous categories, depending upon who did the categorisation). Categorisation was therefore done in the focus group and refined through subsequent interviews and follow-up phone interviews with focus group participants (to discuss proposed changes to their original categorisation) until consensus was reached. The stakeholder categories that were identified included: water companies;

recreational groups; agriculture; conservationists; grouse moor interests (owners/managers and gamekeepers); tourism-related enterprises; foresters; and statutory bodies. Initial interviewees from each stakeholder category were identified as part of this process and (following a snow-ball sampling approach) these people contacted others to see if they were interested in taking part in the research. In this way it was possible to conduct interviews with individuals from each stakeholder category to ensure that a cross-section of all relevant stakeholders had been included in the research. This approach also enhanced the likelihood that stakeholders would agree to be interviewed, as compared with "cold calling".

During a further eighty interviews in the Peak District National Park, stakeholders were asked about their relationships with other stakeholders in the study area. These interviews were the basis for a Social Network Analysis (Section 3.4.2). This revealed the various roles individuals played, and identified the more peripheral stakeholders. It was also possible to identify individuals who were widely perceived to be untrustworthy by others in the network. Additional information about one such individual led the researchers to de-select him from focus groups to avoid creating conflict with some stakeholders and biasing other stakeholders who would be afraid to express their opinions in his presence. Categories of stakeholder were then targeted on the basis of this information for inclusion in the research process to reduce bias, strengthen the legitimacy of the sample group, and include a variety of knowledges relevant to the research process. Towards this end, the network of stakeholders was analysed on the basis of who communicated with whom on land management issues. This analysis resulted in locating which stakeholders shared the same position (and thus role) within a network. In particular, individuals were seen as 'structurally equivalent' if they had the same ties to and from the same individuals in the network (Wasserman and Faust, 1994). This information was then used to categorise stakeholders into structurally similar groups. In this case study, this information was used to ensure maximum representation from across the stakeholder network, in a small working group. Combined with information about stakeholder categories and stakeholder centrality, it was possible to ensure that stakeholders chosen for involvement in the project came from different stakeholder categories, acted as brokers and held unique positions within the network, e.g. positions that represented one of the structurally similar groups.

Stakeholder analysis in this project provided a basis for engaging a representative cross-section of stakeholders on issues that were often highly contentious. Due to existing conflicts between certain stakeholder groups, fair representation was essential. The depth and breadth of representation was valued by stakeholders using the research. For example, the civil servant co-ordinating the Heather & Grass Burning Code consultation stated:

"I have found the study very useful – in itself it's an excellent snapshot of opinion, with a less 'formal' response from the

Table 4
Extendable stakeholder interest–influence table with example data for one stakeholder.

Stakeholder	Interest/Stake	Influence over land use	Likely perception of project and way to approach	Key relationships with other stakeholders	Initial/Key contact names
Organisation X	Highly interested in upland conservation, water and agriculture	"The key" – have a statutory say in any management decision on Sites of Special Scientific Interest (SSSIs)	Likely to be positive – contact via email with project information in first instance and arrange meeting with team leader	Work closely with DEFRA and other government organisations but sometimes come into conflict with land managers over management of SSSIs	Name 1 (Team leader); Name 2; Name 3; email addresses

individuals reported on, which gives it an open dimension that is sometimes difficult to capture with a formal consultation document, and also a depth of response which reveals a lot about how people feel – which is one of the benefits of a social science (almost ethnographic) approach, I would say. You get a sense of lived experience that is very vivid."

The next step in this project will be to use knowledge mapping to investigate the content of the information flows between stakeholders and identify knowledge brokers who can play key roles during and after the life of the project.

5. Synthesis and conclusions

These case studies have shown the wide range of participatory and non-participatory methods that can be used for stakeholder analysis. They have highlighted some of the challenges and limitations of existing approaches and proposed some new tools and combinations of methods that can more effectively identify and categorise stakeholders and help understand their inter-relationships. Although the rationale for using stakeholder analysis in each case study was primarily instrumental, all the projects used stakeholder analysis to represent the interests of diverse stakeholder communities. As such, they each shared the normative goal of legitimising the findings and decisions that arose from the necessarily small sample sizes required for in-depth qualitative research.

All of the case studies identified and categorised stakeholders, and a range of methods were used to identify stakeholders and the focal phenomenon, around which the analysis was based. Categorisations ranged from quantitative approaches (RELU-Birds) and card sorting (RELU-Sustainable Uplands), to more qualitative methods based on interest–influence matrices (RELU-Floodplains). Interest–influence matrices successfully and rapidly categorised stakeholders in each of the case studies where this was used. However, if these categories are to be used as a basis for future sampling, further work may be required to ensure that a sample of organisations or individuals from each category would represent the overall stakeholder population. For example, to construct a stratified snow-ball sample, RELU-Sustainable Uplands used functional categories suggested by stakeholders, describing the principle ways in which stakeholders related to the upland landscape. The RELU-Sustainable Uplands project used an extendable table that considered the interest and influence of each stakeholder more qualitatively, alongside information about stakeholder relationships and suggestions about how best to get each stakeholder group involved (Table 4). Although interest–influence matrices provide quantitative information about the relative interest and influence of different stakeholders, this information is subjective, contains many hidden assumptions that are not captured in the process of positioning stakeholders on the matrix, and as such have limited replicability. By capturing qualitative information about why different stakeholders have a particular interest (and specifically what this interest is), and why certain stakeholders have more influence than others (and in what contexts), the information gathered is likely to be more useful and replicable. Such tables can be extended with a variety of additional questions, and as such are more flexible than interest–influence matrices, providing users with the capacity to adapt the tool to case-specific needs.

The case studies took two contrasting approaches to study stakeholder relationships. RELU-Deer Management took a qualitative approach, using a target diagram to arrange organisations in relation to their relative interests in deer management. Organisations in close proximity to each other shared similar interests, and those closest to the centre of the diagram shared greater interest in

deer management than those at the periphery. In contrast, Sustainable Uplands used a more quantitative approach, exploring the nature of stakeholder interactions using Social Network Analysis (SNA). The qualitative approach used in RELU-Deer Management provided sufficient evidence to categorise stakeholders, and prioritise core stakeholders who principally affected or were affected by deer, for initial involvement in the project. Although considerably more time-consuming and costly, SNA enabled RELU-Sustainable Uplands to accurately identify specific influential individuals and marginalised groups for inclusion in small-group work with the project.

The extent to which stakeholder analysis was conducted in a participatory manner differed between the case studies. Participatory approaches to stakeholder analysis can be costly in terms of researcher and stakeholder time. However they have the capacity to build trust and relationships, and uncover potential biases. Stakeholder participation in the case studies met varying success. For example, stakeholder-derived stakeholder categorisation in RELU-Sustainable Uplands failed to adequately distinguish distinct categories due to the wide range of perceptions about how each stakeholder could be classified. However, a simpler participatory approach yielded useful categories, and stakeholder involvement in the analysis of social network data brought significant gains. Specifically, the literature on natural resource management suggested certain social network concepts that could be important for identifying particularly influential stakeholders. This led to an initial stakeholder selection that was based on analyses of centrality, strong and weak ties. On the basis of feedback from stakeholders who reviewed this selection, data was re-analysed using an alternative approach ("structural equivalence") to identify how stakeholders could perform structurally similar functions within their social network. In doing so, a different sub-group of participants were selected who represented different 'structurally similar' categories in the network.

Recommendations from this paper are summarised in Fig. 5 which simplifies and summarises three phases and six steps through which a stakeholder analysis might typically proceed. Stakeholder analyses need to start out by understanding the context in which they are to be conducted (phase 1). Many stakeholder analyses have a clearly defined focus from the outset, for example when identifying who should be involved in a specific policy or decision-making process. In such cases, the first phase identified in Fig. 5 is not necessary. However, where not already evident, it is essential to establish a clear focus with clear system boundaries for the stakeholder analysis (steps 1 and 2). Only in such a specific context is it possible to determine those who are affected or can affect decisions relating to the issues under investigation (phase 2, step 1). Yet, participatory approaches to stakeholder analysis require the involvement of stakeholders in the identification of foci and boundaries, necessitating an iterative approach (the feedback between the first and second phase of the model in Fig. 5). Where the investigating team already have a thorough knowledge of the focal phenomenon, participation in the stakeholder analysis may not be necessary. Indeed, there are many examples of non-participatory approaches to stakeholder analysis in the literature (e.g. Clarkson, 1995; Mitchell et al., 1997; Frooman, 1999).

There are numerous methods available for categorising stakeholders (step 4) and understanding their inter-relationships (step 5) (Table 1). Choice of methods will depend on the purpose of the stakeholder analysis, and the skills and resources of the investigating team. Methods range from the highly technical that rely on specialist computer software (e.g. Social Network Analysis) to methods that can be used easily and rapidly with little technical expertise or resources (e.g. interest–influence matrices and actor-linkage matrices). Although the less technical methods often offer
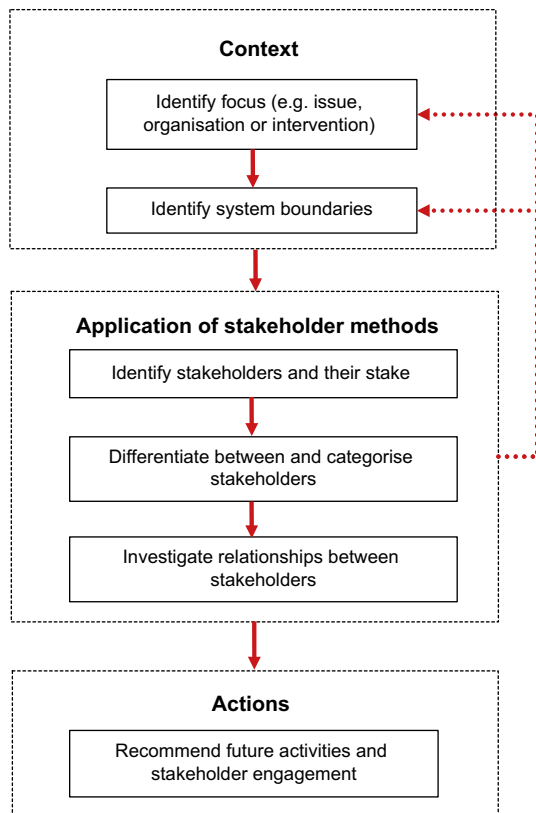
Fig. 5. Schematic representation of key methodological steps necessary for stakeholder analysis.

need both interest and the power to influence what happens. Whether they have a direct interest or not, those who hold this power must necessarily be considered stakeholders as well. Stakeholder analysis asks who these interested parties are, who has the power to influence what happens, how these parties interact, and based on this information, how they might be able to work more effectively together. The word "stakeholder" can be used as a metaphor to illustrate this summary. Imagine a group of people putting up a tent (the phenomenon of interest) on a hill-side, each with a different kind of peg or stake (metal ones, different coloured plastic ones, wooden ones, angled ones etc.). Each person is holding a different stake (their interest), and trying to drive their points home as they push their stakes into the ground. But stakeholders who have mallets have the power to drive their points home more effectively than others. Working alone, the tent might take on the shape determined by the guy-ropes secured by the mallet-holders, and is likely to collapse in the first wind. But knowing who they are working with, the mallet-holders can work together to position their stakes so the tent stays up. They may even be able to help some of the other stakeholders who do not have mallets to secure their stakes. By working together in this way, it is far more likely that the tent will withstand the storm.

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less precision, this may be deemed acceptable given the purpose of the analysis. The more technical methods are usually the domain of researchers, whereas those using participatory methods for non-research purposes rarely have time or resources to do anything more than a very rudimentary stakeholder analysis, most commonly using interest–influence matrices (Diana Pound, pers. comm.). Finally, we take the normative stance that stakeholder analysis can lead to the design of strategies and processes that more effectively represent and involve stakeholders in environmental decision-making processes (step 6). However, we recognise that this is a simplification, and it is important to emphasise the feedbacks between stakeholder analysis methods, as well as between the analysis of stakeholders and their context. For example, the Sustainable Uplands project used an investigation of stakeholder relationships (using Social Network Analysis) to further differentiate between and categorise groups from which stakeholders were selected.

Future stakeholder analysis research needs to investigate the potential for combining existing methods to derive more useful results. For example, results from Social Network Analysis may be enriched by understanding more about the content of information flows between stakeholders, enabling more sophisticated categorisation and providing information about who may be important "knowledge brokers" to prioritise for involvement in participatory processes. In a world where many practitioners lack time to consider using stakeholder analysis, there is also a need to develop tools that can streamline stakeholder analysis methods, making them more widely and easily accessible.

Those who are affected by the outcomes of an environmental management decision are likely to have an interest, and hence hold a stake, in what happens. However, to affect change, stakeholders

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