Collaboration for Environmental Evidence

Systematic Review No. 74

WORKING TITLE:
IS SYSTEMATIC CONSERVATION PLANNING AN EFFECTIVE APPROACH FOR DESIGNING AND IMPLEMENTING AREAS FOR BIODIVERSITY CONSERVATION?

Review Protocol

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Cover Sheet

Title	**Working title:** *Is systematic conservation planning an effective approach for designing and implementing areas for biodiversity conservation?*
Systematic review	**N$^{o.}$***74*
Reviewer(s)	*Madeleine C Bottrill, Robert L Pressey*
Date draft protocol published on website	*3-June-2009*
Date final protocol published on website	*12-January-2010*
Date of most recent amendment	*7 Jan 2009*
Date of most recent SUBSTANTIVE amendment	*3 Dec 2009*
Details of most recent changes	*Second draft of protocol*
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Sources of support	*Northcote Graduate scholarship (MB).* *Applied Environmental Decision Analysis (AEDA)(MB)* *James Cook University (RLP)*
Conflicts of interest	*There are no conflicts of interest*

1. Background

Over the last two decades, the field of systematic conservation planning (SCP), the process of locating and managing conservation areas with explicit objectives (Margules & Pressey 2000) has expanded rapidly. It has influenced conservation priorities by international organisations (Groves et al. 2002; Sanderson et al. 2002), guided policy decisions by government agencies (Airame et al. 2003; Pressey et al. 2009), and resulted in hundreds of publications in the academic literature. In particular, considerable advances have been made in approaches to spatial prioritisation. To a lesser extent, the resulting plans have guided conservation actions on the ground (Knight et al. 2006). Despite substantial financial investment in developing frameworks for planning, refining of decision support tools and application of management activities, there has been limited evaluation of the benefits (or costs) of investing in large-scale planning exercises. Several prominent success stories have demonstrated real conservation gains from planning processes (Fernandes et al. 2005; Finkel 1998; Raynor et al. 2001), but to date there has been no comprehensive assessment or retrospective reporting on the merits of conservation planning.

Conservation planning has evolved considerably since its earliest applications (Kirkpatrick 1983) to be inclusive of both expert assessments and interactive software applications, with a growing recognition of the interdisciplinary processes required to negotiate networks of conservation areas (Cowling & Wilhelm-Rechmann 2007). Systematic conservation planning is characterised by setting of explicit objectives which guide decisions about the spatial and temporal distribution of conservation areas (Margules & Pressey 2000). Beyond integration of data and objectives in a planning framework, there are few standards or guidelines on what works, and what does not work, in the design, implementation or management of a conservation plan.

Healthy debate has accompanied the progress of conservation planning (see Brooks et al. 2004; Higgins et al. 2004; Pressey 2004 for discussion on data types for planning), but two closely related issues stand as persistent challenges to the relevance of existing approaches to systematic planning. The first pertains to the gap between research and implementation of conservation actions (Knight et al. 2008; Prendergast et al. 1999); the second to the capacity of conservation plans to address real-world challenges (Whitten et al. 2001). These issues stem from a number of limitations which are perceived to constrain the effectiveness of conservation planning:

- poor understanding of the principles defining effective planning (Salafsky et al. 2002; Knight et al. 2006a);
- a general historical failure of planning frameworks (e.g., Margules & Pressey 2000; Groves et al. 2002) to account adequately for conservation activities beyond spatial prioritisation, and to portray conservation planning processes as linear (Knight et al. 2006a); although progress in addressing these issues has been made in recent frameworks (Cowling & Pressey 2003; Pressey & Bottrill 2009);
- a general failure of spatial prioritisations to prioritise actions rather than simply to identify areas (Knight & Cowling 2007; Wilson et al. 2007);

- insufficient attention paid to documenting both successful and unsuccessful conservation planning experiences (Ehrenfeld 2000; Maddock & Benn 2000; Jepson et al. 2002; Knight 2006; Knight et al. 2006b),
- underestimating the socio-economic opportunities and constraints that shape implementation (Knight & Cowling 2007);
- simplifying the complexity of socio-economic conditions (Meijaard 2008);
- promoting "grand designs" which ignore contextual and historical trajectories (Sayer et al. 2008), and generally distracting from the business of doing conservation (Whitten et al. 2001).

To be relevant, conservation planning needs to address these criticisms and provide evidence that investment in planning is worth the cost and effort. Through our literature review we hope to identify and define these limitations more clearly for our final review so as to establish a benchmark for measuring effectiveness.

A definition of an "effective" SCP initiative is yet to be fully identified. In general, effectiveness is often defined as whether a conservation plan led to implementation of conservation actions. Fundamentally, perceptions of effectiveness have tended to relate to whether plans led to avoidance of loss of biodiversity and/or other natural values that would have been compromised without planning (Pressey & Taffs 2001). Other definitions might also be applicable. This review aims to investigate the perceptions and expectations of those involved in planning, both developers and end-users, about what constitutes effectiveness among systematic plans. Using this definition as a benchmark, we then hope to establish the extent to which existing efforts have achieved this ambition.

Our inclination is that quantitative and qualitative data on the effectiveness of systematic conservation planning are rarely explicitly reported (Prendergast et al 1999; Knight et al. 2008). There are a number of obstacles to evaluating outcomes from planning, in particular the long time horizons for effects to be seen, the fact that monitoring of planning objectives is often inadequate, a lack of control areas to compare outcomes in the absence of plans, few accounts of implementation in the peer-reviewed literature (Knight et al. 2008), and a general lack of reporting of outcomes in accessible documentation.

Established approaches to evaluating impacts of activities, applied frequently in the public sector, measure program effectiveness by assessing goals, but can also address the adequacy of strategies (e.g., conservation planning) to meet the needs of users (e.g., government officials, NGO staff and members of community groups) (Owen 2006). Simply qualifying success of conservation plans as whether goals were met by conservation designs on maps fails to confront issues around implementation. It also fails to weigh up the expectations of what plans might achieve and have achieved and potentially underestimates the unintended benefits (or costs) of outcomes. This review takes a holistic view of the whole process of planning which includes framework design, data inputs, delivery of outputs – the products generated by the planning process (e.g., a schedule of conservation actions) and outcomes – the change brought about by planning to ecological features (e.g., species, habitats and surrogates

for ecological processes) but also human and social capitals (e.g., capacity, leadership, ownership) within a planning region. We hope therefore that the review will provide evidence not only on what works or does not work, but on the reasons for success or failure.

2. Objective of the Review

To evaluate the effectiveness of systematic conservation planning as an approach for locating, designing and managing areas for conservation.

2.1 Primary question

Is systematic conservation planning an effective approach for locating, designing and implementing areas for conservation of biodiversity?

Table 1. Definitions of components of the systematic review questions

Subject	Intervention	Comparators	Outcomes
Geographic region of conservation interest at either a local or regional scale (e.g., the scale at which conservation actions are operational). Includes but not exclusive to ecoregions, landscapes, corridors, networks, administrative areas, districts	Systematic conservation planning	Desirable. Measures of counterfactuals (e.g., what would happen in the absence of planning) will be difficult to identify. Instead, the review will compare outcomes from systematic plans against other types of plans (e.g., ad hoc). See 3.2.2 for more details.	Any reported change in condition of natural, financial, human or social capital, or institutions or instruments. Review will focus on effect size of a short list of outcome measures. See 3.2.3 for more details.

2.2 Secondary question *(if applicable)*

As there has been very limited evaluation of systematic conservation planning to date, a number of preliminary questions need to be addressed in order to refine the systematic review. Information from these initial questions will better define the components of the review (Table 1).

- What are the expectations of those involved in conservation planning?
- Do expectations differ between different planners (e.g., developers and end-users) of conservation planning?
- What defines an "effective" planning process?
- What defines a "systematic" planning process versus other types of processes?

- What outputs and outcomes are likely to emerge from a planning process?
- Which outcomes are most closely aligned to planners' perceptions of overall effectiveness?

The findings of these questions will enable us to refine the scope of the systematic review, in particular how effectiveness is defined, which outcome measure(s) to assess, and how to define comparators. Following further refinement, the systematic review will hope to investigate the following questions:

- What types of evidence are reported on planning outputs and outcomes in available documents?
- What implicit or unintended benefits (and costs) emerge from plans?
- What factors influence the effectiveness of conservation plans?
- Are systematic plans more effective than other types of plans?

3. Methods

3.1 Search strategy

As highlighted by other reviews of conservation planning, evaluation and reporting of outcomes from planning processes is not likely to be well-documented in either the published or grey literature. We therefore have constructed a mixed method approach to identify plans (i.e., studies) and evidence on effectiveness of conservation planning (Table 2).

Table 2. A mixed method approach for gathering evidence on the effectiveness of conservation planning.

Type of search strategy	**Purpose**	**Output(s)**
3.1.1 Literature-based search	To collect evidence on effectiveness of SCP from published and unpublished sources; To identify organisations and relevant people involved in developing and implementing conservation plans	• Candidate list of studies • Organisations involved in planning • People involved in planning
3.1.2 Organisation-based search	To collect evidence on effectiveness of SCP from published and unpublished sources; To identify organisations and relevant people involved in developing and implementing conservation plans	• Candidate list of studies • Organisations involved in planning • People involved in planning
3.1.3 Semi-	To query a representative sample	• Definition(s) of SCP

structured interviews	of people (and their respective organisations) about perceptions of SCP effectiveness; To refine study inclusion criteria based on responses of interview participants; To collect evidence on effectiveness of SCP from qualitative responses of interview participants	effectiveness • Expectations of planning • Frequency and importance of different outcomes from SCP • Candidate list of studies
3.1.4 Web-based questionnaire	To query a representative sample of people (and their respective organisations) about perceptions of SCP effectiveness;	• Evidence on effectiveness based on participant responses • Additional studies

Our search strategy consists of two main components – a literature-based approach and also an organisation-based approach.

3.1.1 Literature-based searches

The databases we will use are: ISI Web of Knowledge; Conserve Online; Nature Serve; Google; All the Web and University of Queensland library catalogue.

Search terms we will use are as follows:

(*Subject search terms*)	**AND**	(*Intervention search terms*)
Ecoregion		Systematic conservation planning
Bioregion		Conservation plan
Landscape		Conservation assessment
Seascape		Conservation action
Corridor		Land use planning
Protected Area		Spatial planning
Catchment		Conservation zoning
Administrative area		Conservation planning
		Ecological network
		Systematic conservation plan
		Area selection
		Conservation evaluation
		Spatial prioritisation
		Spatial prioritization
		Environmental planning

These terms will be searched for only in English language documents inclusive of journal papers, book chapters and unpublished reports and reviews. For the web searches, the first 100 results of each of the searches will be considered. We will also search the bibliographies of relevant books, reviews and articles identified in the search to look for additional studies of relevance referenced by other studies.

3.1.2 Organisation-based searches

Many plans are not likely to be published in the peer-reviewed literature and it is likely than only successful plans will be described in reports (Knight et al. 2008). An additional search for studies based on organisations that are involved in conservation planning will supplement the literature-based search and provide a more representative sample of planning documents.

Information on organisations involved in conservation planning will be sourced from the IUCN list of members and also from databases of those organisations downloading conservation planning software (e.g., Marxan, C-Plan and Zonation). Websites of organisations will be searched for relevant studies. In addition, staff or relevant people working for organisations and involved in planning will be added to a list of potential interview and questionnaire participants.

The results of the organisation-based search will be combined with the literature-based search to build a database of conservation plans and studies, alongside a list of people involved in conservation planning.

3.1.3 Semi-structured interviews

One of our assumptions, based on results from past reviews of planning, is that there will be limited reporting or evaluation of outcomes from planning in published or unpublished literature, in particular of failed plans. We will therefore conduct two further strategies for collecting evidence: semi-structured interviews and questionnaires. These approaches will serve two main purposes. Firstly, the interviews will assist us in refining the inclusion criteria of our systematic review (e.g., outcome measures and comparators). Secondly, both interviews and questionnaires will collect further evidence on the extent of outcomes generated by planning.

Through the search strategy, we will compile a list of conservation plans and planners involved in the development and management of these processes. We will conduct a series of semi-structured interviews of a representative sample of the full list of planners. Depending on the number of individuals identified, we hope to interview up to 5% of all planners. Interview participants will be randomly selected from the database. The sample will be stratified by three criteria: type of planner (e.g., developer, end-user), organisational affiliation (e.g., NGO, government or academic) and also region (e.g., North and Central America, Asia or Africa).

The interviews will be used to extract information not readily available in published or unpublished literature. This qualitative approach will be used to generate knowledge about planners' attitudes and perceptions about the effectiveness of plans. In particular, the interviews will focus on the following aspects:

- Expectations of planning
- Definitions of "effective" planning
- Characteristics of "systematic" planning versus other types of planning
- Intended outcomes produced by plans
- Unintended outcomes
- Relative importance and frequency of different outcomes
- Alignment between specific outcomes and perceptions of plan effectiveness
- Perceptions about the costs and benefits of planning

- Frequency and extent of reporting and evaluation in conservation planning

A draft interview script is included in Appendix 1. The interviews will provide us with a clearer definition of how effectiveness is defined by planners. In addition, we will be able to identify a comprehensive list of outcomes (see Section 3.2.3) and the relative importance and frequency of different outcomes. Understanding both of these aspects is essential for identifying appropriate outcomes (i.e., most frequently cited) so as to assess effect size (e.g., how much more ecologically representative is a systematic plan?) between different studies.

Due to the global scope of this review, most interviews will take place over the telephone or Skype. All interviews will be conducted in English; therefore we will only be able to interview participants with reasonable English conversational skills. We are investigating the possibility of translating questionnaires into Spanish and French versions.

In concordance with the University of Queensland's policy on research ethics, we will apply for ethical approval of the questionnaire and interview designs prior to conducting any surveys. This will be done through the UQ School of Integrative Systems ethics committee. For more information, see details at www.uq.edu.au/research/services/human.

3.1.4 Survey questionnaire

Given constraints on time and capacity, we will only be able to interview a subset of planners about their experiences. An internet-based questionnaire will enable us to query a much greater number of individuals specifically about outcomes from plans. The interview process will identify the occurrence, frequency and importance of different outcomes measures. Through the search strategy, we will identify plans with people who were involved in developing and implementing those plans. The responses of the questionnaire aim to complement the studies collected in the search strategy.

The questionnaire survey will consist of primarily closed-ended questions, using Likert scales. A draft script of the questionnaire is outlined in Appendix 2 and will be adapted based on responses from our initial round of interviews. The questionnaire will include the following main components.

1. Profile of participant
    a. Type of planner (e.g., developer, end-user)
    b. Affiliation
2. Characteristics of the plan
    a. Scale (e.g., local, regional, national, transboundary)
    b. Geographic location of plan
    c. Environmental realm
    d. Governance system(s) of planning region
    e. Developing agency(ies)
    f. Implementing agency(ies)
    g. Budget
    h. Institutional capacity
3. Characteristics of planning approach

    a. Presence or absence of certain components or processes
4. Status of the plan
    a. How far did it go?
5. Overall impact of plan's effectiveness
    a. Perception of participant
6. Perceived benefits and costs of the process
7. Measure of achievement of frequent and important outcomes

An online survey tool, such as Survey Monkey (www.surveymonkey.com), will be used to disseminate the questions to participants. A web-based approach is preferable to postal mail-outs due to the global distribution of participants.

3.2 Study inclusion criteria

For inclusion in the literature review, selection criteria will be based on a sequential assessment by first scanning document titles, followed by reading the abstract of articles with relevant titles, followed by reading the full-text of articles with relevant titles and abstracts. Studies will be deemed relevant based on the presence of the desired subject, intervention and outcome elements as listed below. Repeatability of the article selection process will be determined through sampling the literature database (or subset thereof) by two investigators (MCB and RLP) working independently. The congruence of study selection by the investigators will be assessed by kappa analysis.

3.2.1 Relevant subject(s)

Conservation plans have been developed and applied to diverse contexts across multiple scales. This review focuses upon geographic areas of conservation interest at local and regional scales. These scales are chosen because they are at, or can be easily translated to, the level at which conservation actions are applied. Our review will exclude stand-alone sites and instead aim to focus on plans that identify networks of areas. Definitions of local and regional scale conservation extents include, but are not limited to:

- Ecoregions
- Land -, sea- or island-scapes
- Regions
- Bioregions
- Some national boundaries
- Corridors
- Networks of protected areas
- Catchments
- Ecological Networks
- Administrative Areas
- Local government areas (e.g. shires, counties, cities)
- Protected Areas
- Conservation Areas

Conservation action at these scales acknowledges that particular biodiversity features and threatening processes have to be addressed across areas that individual site-scale efforts alone cannot deal with. This contrasts with global or continental planning

exercises that typically use very large areas (e.g. whole countries or half-degree grids) that can only be tenuously related to units of implementation.

3.2.2 Types of intervention

There is a diversity of conservation planning processes of varying complexity applied to different environments and contexts (Redford et al. 2003). For inclusion in our review, we will include all interventions which fit the following definition of a conservation plan, based on criteria described in Margules & Pressey 2000:

- A decision-making process which uses spatial data to identify conservation areas;
- Explicitly stated goals related to the conservation or restoration of biodiversity and other natural values; and/or the sustainable use of natural resources; and/or the maintenance of ecosystem services;
- A stated objective of guiding implementation of conservation actions
- Conducted between 1990 and 2006.

As counterfactuals are very difficult to identify in planning, we aim to develop a measure of how "systematic" a planning process is to investigate the overall effect of systematic planning versus more *ad hoc* planning. This will be accomplished through assessing how each plan considers particular characteristics (e.g., involvement of stakeholders) based on the specific stages of conservation planning (Pressey & Bottrill 2009). Each study might then be rated against each of these characteristics. Correspondence to different criteria related to the extent of systematic-ness will be identified and mapped on an ordination plot to display the varying degrees of systematic-ness among studies.

3.2.3 Types of outcomes

The first part of our review aims to identify the diversity of outputs and outcomes that are desired, achieved and actually reported by conservation plans. These might be qualitative (e.g., improved relationship with stakeholders) or quantitative (e.g., 22% increase in threatened ecosystems under protection). We have begun to build a list of potential first-order outcomes and second-order outcomes (Table 3). First-order outcomes ultimately contribute to the primary goal of the plan, i.e., biodiversity conservation. These outcomes directly relate to the purpose of planning and overall perceptions of effectiveness. Second-order outcomes are processes that facilitate implementation and/or sustainability of the plan, and thereby increase the likelihood of achieving first-order outcomes. Second-order might also contribute to other future planning processes, such as improved databases relevant to generations of plans. The relative value and frequency of each type of outcome will be assessed from responses within the interviews.

Table 3. A selection of potential outcomes for measuring among conservation planning studies. Outcomes have been classified into 1st order outcomes, those outcomes that directly relate to primary purpose of systematic planning, and 2nd order outcomes, those outcomes that facilitate or contribute to implementation of conservation outcomes

Type of outcome	Example	1st order	2nd order
Natural capital	New information about ecological systems		*
	Condition of biodiversity features	*	
	Reduction in threats	*	
Financial capital	New information about financial systems		*
	Reduced corruption		*
	More efficient operations		*
	More cost-effective areas	*	
	Leverage additional funding		*
Human capital	Personal learning applied in future plans		*
	Competence in a new technology		*
	Raising expectations about proportions of regions needed to achieve conservation objectives		*
	New information about human systems		*
	Improved attitudes or behaviour towards biodiversity and/or conservation	*	
	Avoidance by developers or resource users of areas of interests to NGOs (changing thinking)		*
	Moving measures of effectiveness beyond direct implementation		*
	Burnout of involved stakeholders		*
Social	New information about social systems		*
	Institutional learning	*	*
	Improved leadership		*
	Collaborative projects with partner organisations		*
Instruments/Institutions	Devolved control of decision making to implementing agency		*
	Land use or development legislation and/or planning	*	
	Operational implementation strategy		*
	Leverage with government or other partners		*
	Protected area network expanded	*	
	Social learning institution(s) established		*

Our search strategy hopes to identify to what extent these outcomes are reported by planners, and if so, how they are measured. The systematic review aims to focus on measuring the effectiveness of plans in achieving the different first and second

outcomes defined through the questionnaire responses. The responses from interviews will be used to determine which are the most appropriate to focus upon, both in terms of relative importance and availability of information within studies.

3.2.4 Types of study

Studies will be identified by a two-pronged approach: a literature-based and an organisation-based search strategy. All documents will be assessed and categorised based on the type of information they contain. These will be inclusive of published and unpublished peer-reviewed articles, reviews, book chapters, internal reports and external evaluations. In addition, studies will be also identified through people who are involved or were involved in the planning process.

3.3 Potential effect modifiers and reasons for heterogeneity

This review is global in scope and therefore we aim to combine information from plans and studies conducted across a wide range of contexts and environments. While recognising variation in local conditions, our review hopes to identify general trends among plans, irrespective of these differences. The independent variables which are likely to represent heterogeneity relate to the geographic context (e.g., subject) within which the plan is applied, and also the type of intervention used (e.g., structure and composition of the planning framework applied).

Region of conservation interest (subject)

- Environmental context (e.g., freshwater, marine and terrestrial)
- Socio-economic context (e.g., incomes, patterns of threats)
- Political context (e.g. governance)
- Inherent distribution of biodiversity (e.g. narrow endemism, environmental gradients)

Systematic conservation planning (intervention)

- Planning approach
- Data availability and state of knowledge about systems
- Budget and other resources
- Institutional capacity

3.4 Study quality assessment

The primary researchers (MCB and RLP) will together determine which studies fulfil the selection criteria for inclusion in the study. The accepted studies will then be categorised based on the type of information they contain on specific outcome measures. Internal and external validity of studies will then be assessed against a list of *a priori* criteria.

Categorisation of information available from studies

Does the study match the inclusion criteria?
No – reject
Yes – accept
Does study contain quantitative data on specific outcome measures?
No – Qualitative – does the study contain specific examples?

No – theory paper (read and check references)
Yes – Is the information anecdotal?
Yes – anecdotal evidence*
No – descriptive or case study *
Yes – Does the study have comparators?
Yes – Meta-analysis I – random effects model using Hedges D
No – Can data be used in other statistical analyses?
Yes – Meta-analysis II
No – treat as descriptive or case study *

Studies meeting our criteria will be assessed for validity, reliability and applicability in order to evaluate the relative value of studies against each other. Study quality assessment will take into account the following internal and external validity factors where relevant (developed from critical appraisal for healthcare from www.phru.nhs.uk). We will further develop our a priori checklist following results of the interviews and literature review.

Study quality assessment *a priori* checklist

1. Clear question or aim
    a. Explicitly related to measurement of outcome(s) from planning process;
2. Study design – selection of comparators
    a. Before/after/control areas vs. planned areas; unaffected stakeholders v. affected stakeholders;
    b. Before planning vs. after planning;
    c. Existing reserves (business as usual) vs. proposed planning areas;
    d. Post-hoc assessment
3. Sampling and selection of planning areas and/or participants
4. Methodology and accuracy of data used for measurement
5. Biases
    a. Areas/participants are representative
6. Confounding factors (e.g., change in legislation, market forces)
    a. Establish that change is as a result of plan
7. Accuracy of information (e.g., explicit data, expert opinion)
8. Applicability of results
    a. Outcome measured is frequently cited among other conservation plans;
    b. Outcome measured is highly valued among other conservation plans.

3.5 Data extraction strategy

A survey protocol, or codebook, will be designed to extract data from relevant studies (Appendix 3). Relevance and study quality of studies will be assessed and recorded before data extraction takes place. It is expected that included studies are likely to be case studies and expert opinion from responses from questionnaire. The researchers are unaware at present of any controlled experiments conducted for systematic planning. Where data are available for meta-analysis from case studies, data will be preferentially extracted as:

1) Before-after-control-intervention (BACI) data

2) Control/Intervention data
3) Before/After data
4) Post-hoc quantitative data
5) Qualitative data by hard evidence
6) Qualitative data by supported opinion
7) Qualitative data by opinion
8) Other data

For each study containing data, study characteristics and reasons for heterogeneity will be recorded (where known).

3.6 Data synthesis and presentation

Data synthesis methods will be determined by data available. In the first instance, data on outcomes will be grouped according to type of 1st order outcome measure, then 2nd order outcomes and then according to quality of evidence presented for each outcome. Statistical analyses of data will be undertaken if sufficient studies are obtained for any particular outcome measure. We are currently unaware of any BACI studies relating to systematic conservation planning so we are unlikely to be able to conduct any random effect modelling. If insufficient studies are obtained to allow meta-analysis, qualitative analysis of evidence may be undertaken.

We are interested firstly in the extent and quality of evidence on outcomes related to measuring the effectiveness of conservation plans. If data are sufficient to demonstrate a statistically significant effect for one or more outcome measures, we hope to investigate this further by examining relationships (e.g., by regression analysis or similar) between effectiveness and characteristics of the plan and planning region.

4. Potential Conflicts of Interest and Sources of Support

The research is supported by a Northcote Graduate Scholarship awarded to MCB, Applied Environmental Decision Analysis (MCB) and James Cook University (RLP). There are no potential conflicts of interest declared.

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Appendix 1. Draft interview script

DOES SYSTEMATIC CONSERVATION PLANNING WORK?

Recording file number _____

Date _____

Interviewee _____

Organisation _____

Job title _____

This study is focused on exploring the effectiveness of conservation planning. In this study, we aim to take a critical and comprehensive look at the value of conservation planning as an approach to designing and implementing conservation areas. We welcome a diversity of opinions and perspectives to contribute to this discourse.

The purpose of this interview is to gather information about planners' expectations of the planning process, how success in conservation planning is defined and outcomes that have emerged from plans you have been involved in. The interview is made up of two main parts.

The interview will take up to an hour. Would you be willing for me to contact you with follow up questions if there is information we are unable to cover in the time allocated for the interview?

In addition, we will be disseminating a web-based questionnaire to collect evidence of outcomes from specific planning exercises. Would your organisation and colleagues be willing to participate?

1 PARTICIPANT ROLE IN PLANNING

1.1 How did you first become involved in using conservation planning?

1.2 In what capacity have you mainly been involved in planning?

.....Developer

.....End-user

.....Technical support

.....Stakeholder representative

.....Other

1.3 What stages of the planning process are you most involved in?

.....Plan inception

.....Stakeholder negotiation

.....Data collection and analysis

.....Target setting

.....Design of new conservation areas

.....Implementation of conservation actions

.....Monitoring and evaluation of outcomes

1.4 How many planning processes have you been involved in?

.....1 plan

.....Less than 5 plans

.....Less than 10 plans

.....More than 10 plans

1.5 What environmental contexts have you planned for?

.....Terrestrial

.....Marine

.....Freshwater

.....Land-sea

.....Undefined

1.6 Where have you planned? *If many plans, prompt for regional focus*.

<List country locations>

2 PURPOSE OF PLANNING

2.1 Based on your experiences, what do you think is the primary purpose of conservation planning? What goals is the use of planning ultimately hoping to achieve?

2.2 What are your expectations of what conservation planning can achieve?

2.3 Do you have (or have you encountered) any negative expectations associated with planning?

2.4 Is it better to plan first, then apply actions, or simply proceed without planning?

3 DEFINING "SYSTEMATIC" CONSERVATION PLANNING

In their seminal 2000 review published in Nature, Chris Margules and Bob Pressey describe systematic conservation planning as a structured decision making process used to support the location, design and management of conservation areas – areas which safeguard biodiversity and other natural values from threats. We are interested in this study about investigating the value of taking a systematic approach, and if such an approach is more beneficial than other types of approaches to conservation planning.

3.1 What characteristics do you think define a "systematic" planning approach?

3.2 What distinguishes a systematic approach from other types of approaches? *Give examples*

3.3 Do you think that systematic planning produces benefits over and above planning without the key elements of systematic methods?

3.4 Do you think that systematic conservation planning has disadvantages compared to planning without the key elements of systematic methods?

4 WHAT CONSTITUTES AN EFFECTIVE PLAN?

4.1 How would you define an "*effective*" conservation plan? What constitutes success in planning?

4.2 What are the key variables that you would use to quantitatively (or qualitatively) measure effectiveness? Can you provide a specific planning process as an example?

4.3 "*Effectiveness of conservation planning has often been defined by the extent of plan implementation*". Do you know of plans that have not been implemented but have produced positive outcomes?

4.4 What do you think constitutes failure in conservation planning? Prompt for an example if appropriate.

5 OUTCOMES FROM PLANNING

5.1 Can you discuss what outcomes arose from plans that you were involved in? *Define outcomes versus outputs.*

We have constructed a list of possible outcomes based by reviewing the literature, experiences of past planning process and discussion with experts. [Refer to table that would have been sent ahead of time to participant].

5.2 Are there any outcomes which we might add? Does this relate to a process that you have been directly involved in?

5.3 Among the listed outcomes, which do you think are the most important in relation to achieving your goals?

5.4 Among these outcomes, which are most frequently aspired to by conservation planners?

5.5 Which outcomes are most often achieved by plans?

5.6 Were there any negative outcomes that occurred as a result of a project you were involved in? *Prompt with an example, e.g., burnout of stakeholders involved in lengthy negotiation processes.*

5.7 Using an example from your own experience, can you discuss what might happen to biodiversity features in the absence of planning? *Prompt participant to consider what would happen if status quo or existing reserve system persisted (e.g., the counterfactual).*

5.8 Do you believe that outcomes from plans you've been involved in have met your expectations of what planning should achieve? *Prompt for examples from their experiences.*

6 COSTS AND BENEFITS OF PLANNING

6.1 "*Investment in planning decreases the resources available for conservation action*." Is there a "*reasonable*" level of funds or time that should be dedicated to planning at the expense of conservation action? Can you provide an example of when you might have faced this trade-off in planning versus action?

6.2 What do you think are the main costs associated with planning? *Prompt to indicate that this includes, but is not limited to, financial costs*

6.3 What benefits have been produced from plans you've been involved in? For whom or what?

6.4 Do you think that the benefits of planning justify the costs? Why or why not?

7 REPORTING AND EVALUATION

7.1 How have outcomes or progress been measured in planning processes you've been involved in?

7.2 What factors have enabled (or prevented) reporting of outcomes?

7.3 Was evaluation required by the organisation funding the planning process?

Appendix 2. Draft questionnaire outline

The format and content of the questionnaire will be informed by findings from a literature review and responses from interviews. The following draft outlines some of the main concepts and topics that the questionnaire intends to cover.

Questionnaire approach
The questionnaire aims to gather quantitative and qualitative data on the outcomes of systematic conservation plans from a large number of respondents. Sampling of participants intends to capture the diversity and distribution of organisations and individuals actively developing and applying conservation planning across multiple socio-economic and environments worldwide. The questionnaire will be distributed through an online survey tool, such as Survey Monkey: www.surveymonkey.com. To maximise the number of responses, the questionnaire aims to take less than 15 minutes. The questionnaire instrument will be piloted with a variety of different planners before being widely disseminated.

Introduction
- About the study
- Glossary of key terms
- About the researchers
- Role of participant
- Confidentiality
- Informed consent (tick box)

1. Profile of participant
1.1. Type of planner (e.g., developer, end-user)
1.2. Affiliation name and location
1.3. Years of experience in planning
1.4. Geographic region of interest
1.5. Environmental realm

2. Plan (study) overview
2.1. Scale (e.g., local, regional, national, transboundary)
2.2. Geographic location of plan
2.3. Extent
2.4. Environmental realm
2.5. Governance system(s) of planning region
2.6. Developing agency(ies)
2.7. Implementing agency(ies)
2.8. Budget
2.9. Institutional capacity
2.10. Constraints on conservation planning
2.11. Opportunities for conservation planning (e.g., political impetus)
2.12. Impetus for plan

3. Characteristics of planning approach
3.1. Checklist of characteristics corresponding to stages and steps of conservation planning

4. **Status of plan**
   4.1. How far did it go?

5. **Overall impact of conservation plan**
   5.1. Perception of participant
   5.2. Value for effort

6. **Outcomes**
   6.1. Open question
   6.2. Checklist of first and second order outcomes
   6.3. Rate importance of outcomes
   6.4. Measure of outcomes (generate questions based on answers from table)

7. **End of questionnaire**
   - Feedback to participant (optional)
   - Enter prize draw
   - Comments or questions for researchers

Appendix 3. Codebook (draft)

1. STUDY OVERVIEW

1.1. Study type

Peer-reviewed journal article
Book or book section
Internal report
External report or evaluation
Conference proceedings
Presentation
Media article
Interview response
Questionnaire response
Undefined

1.2. Study purpose

Descriptive, account or case study
Plan evaluation
Review of planning outcomes
Practical guidelines
Account for funding
Theoretical, position paper or review
Opinion
Semi-structured interview
Questionnaire response
Undefined

1.3. **Author affiliation:** what type of organization is the author affiliated with (three boxes for multiple authors)

Academic
Bilateral agency
Community group
Indigenous group
Industry
Inter-government organisation
Multilateral agency
National government
State government
Local government
NGO – International
NGO – National
NGO – Regional
Consultant

1.4. **Author role:** how is the author(s) involved in conservation planning?

Developer
End-user
Donor

Undefined

1.5. Author location: country of association of author's affiliation
Country Name

1.6. Date: date of release or publication
Year of publication

1.7. Location of evidence
Published literature
Unpublished literature
Website
Interview
Questionnaire
Undefined

2. PLAN OVERVIEW

2.1. Case study name: the name the conservation plan is known by

2.2. Case study location
Country name
If transboundary, then list all countries covered by site

2.3. Geographic location
North and Central America
South America
Europe
Africa
Asia
Oceania

3. SUBJECT

3.1. Scale of plan
Local
National
Regional
Transboundary
Undefined

3.2. Environmental context
Terrestrial
Marine
Freshwater
Land-Sea
Undefined

3.3. Ecosystem type: select one of the ecoregions from the WWF website (http://www.worldwildlife.org) . If more than one ecoregion is represented, select the primary ecoregion. Three columns included for the most dominant three types.

Tropical & Subtropical Moist Broadleaf Forests
Tropical & Subtropical Dry Broadleaf Forests
Tropical & Subtropical Coniferous Forests
Temperate Broadleaf & Mixed Forests
Temperate Conifer Forests
Boreal Forests/Taiga
Tropical & Subtropical Grasslands, Savannas & Shrublands
Temperate Grasslands, Savannas & Shrublands
Flooded Grasslands & Savannas
Montane Grasslands & Shrublands
Tundra
Mediterranean Forests, Woodlands & Scrub
Deserts & Xeric Shrublands
Mangroves
Polar ice and seas
Temperate shelves and seas,
Temperate upwelling
Tropical upwelling
Tropical coral
Pelagic (trades and westerlies)
Abyssal
Hadal (ocean trench)
Undefined

3.4. Area of interest

Ecoregion
Bioregion
Landscape
Seascape
Corridor
Region
Catchment
Protected Area
Administrative area
District
Other <Open>
Undefined

3.5. Extent (km^2)

<Numeric>

3.6. Governance type

State/regional
National
Customary
Private (local)

Private (non-local)
Joint – specify joint land tenure arrangements as they arise in articles
Undefined

3.7. Use (Utilization types) – how are the resources within the planning region used (three boxes so that multiple uses can be recorded)

Grazing
Commercial agriculture
Subsistence agriculture
Natural product collection
Industry
Urban
Peri-urban
Tourism
Protected area or other conservation arrangement
Commercial fishing
Subsistence fishing
Undefined

3.8. Threats (refer to IUCN table of threats...tick all that apply)

3.9. Distribution of biodiversity

Narrow endemism
Environmental gradients

4. INTERVENTION

4.1. Type of intervention: name of planning approach or framework if recognised (e.g., land-use planning, WCS Living Landscapes approach)
<Open>

4.2. Conservation goal: the primary purpose of the conservation plan. (If there is more than one purpose, choose the primary one unless they are given equal weight, then choose mixed.)

Biodiversity persistence
Restoration
Ecosystem services
Sustainable use
Other (conservation)
Economic
Political
Mixed (Persistence/Restoration/Services)
Undefined

5. CONTEXT FOR PLANNING (Factors related to rationale for planning and the conditions under which planning occurs)*...to be developed further*

5.1. Data availability: (What is the knowledge of the system)

Low
Medium
High
Undefined

5.2. Knowledge of ecological systems
Low
Medium
High
Undefined

5.3. Knowledge of social systems
Low
Medium
High
Undefined

5.4. Budget for planning (excluding implementation) (in US$)
<Numeric value>

5.5. Institutional capacity
Low
Medium
High
Undefined

5.6. Duration of planning process (in years)
<Numeric value>

6. PLANNING PROCESS (Factors related to measuring the degree to which the approach to planning is systematic)....*to be developed further related to stages of conservation planning*

7. OUTPUTS *to be developed further*

7.1. Implementation
Complete
Partial
In progress
None

7.2. Outputs
Reported
Unreported

7.3. Type of outputs
Insert classification table (to be developed)

8. OUTCOMES *to be developed further*

8.1. Outcomes
Reported
Unreported

8.2. Type of reporting for each outcome (#1, #2...)
Quantitative
Qualitative – anecdotal
Qualitative – case study
Undefined

8.3. Types of outcomes
Adaptation of Table 3 from protocol

8.4. Number of citations by other plans
<Numeric value>

9. COMPARATORS

9.1. Comparators
Yes
No
Undefined

9.2. Type of comparators
<Open text>