



Social-ecological resilience and planning: an interdisciplinary exploration

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ABSTRACT

Despite considerable expansion in the scope and function of the state in the developed world with respect to environmental protection since the 1970s, the world's biological diversity and ecosystem services continue to deteriorate. Finding ways to better govern human-nature relations in cities is an important part of addressing this deterioration. The aim of this thesis is to explore the potential of social-ecological resilience to inform urban governance in theory and practice, through a focus on strategic spatial planning. Strategic spatial planning is an established urban governance policy tool that articulates government policy regarding land use and development around metropolitan regions. Social-ecological resilience is a field of research focused on how linked social-ecological systems can be governed in face of disturbance whilst maintaining the capacity for adaptation, learning and transformation. In recent years resilience has become an increasingly important urban policy discourse and much hope is placed in its potential to improve urban governance. However, there is an acknowledged gap between social-ecological resilience as an ideal and the ability to govern towards it in practice. At the time this doctoral research commenced there had been no engagement with social-ecological resilience in the planning theory literature and minimal engagement by empirical planning research. It is to this gap the thesis contributes.

The thesis consists of five papers that together address three overarching questions: (1) What issues and insights does social-ecological resilience raise for planning theory? (2) What issues and insights does social-ecological resilience raise for strategic spatial planning practice? and (3) What issues and insights does strategic spatial planning practice raise for social-ecological resilience? Methods consistent with interpretive policy analysis, including qualitative interviews, ethnographic observation, participatory observation and document analysis, were used to carry out case studies of strategic spatial planning practice in Melbourne and Stockholm.

Social-ecological resilience scholarship offers planning theory a partly new way of understanding complex, dynamic, non-linear human-nature relations with a specific focus on the materiality of the ecological condition. This is relevant to calls by planning theorists for more attention to matters of substance, in particular ecological processes. With respect to practice, planners see significant potential for social-ecological resilience to critically inform strategic spatial planning. This potential includes the framing of problems, tools for analysis and synthesis and identification and implementation of governance options. There are also however, lessons for social-ecological resilience scholarship that emerge from the detailed empirical case studies of how strategic spatial planning practice deals with some of the underlying assumptions of social-ecological resilience. In urban systems, the state plays a significant role in the governance of ecosystem services. This research suggests that attention to the politics of the everyday activities of administrators, elected officials, planning officials, conservationists and citizens operating within the so-called 'mangle of practice' is critical to explaining the gap between the ideal of governing for urban resilience, and what happens in practice.

Key words: social-ecological resilience, strategic spatial planning, urban governance, ecosystem services, Melbourne, Stockholm

LIST OF PAPERS

This thesis is based on the following five appended papers, which are referred to in the text by their Roman numerals.

PAPER I

Wilkinson C (2011) Strategic Navigation: in search of an adaptive mode of strategic spatial planning practice, *Town Planning Review* 82(5):595-613.

PAPER II

Wilkinson C, Porter L and Colding J (2010) Metropolitan planning and resilience thinking: a practitioner's perspective, *Critical Planning* 17:25-44.

PAPER III

Wilkinson C (2012) Social-ecological resilience: insights and issues for planning theory, *Planning Theory* 11(2):148-169.

PAPER IV

Wilkinson C and Wagenaar H (*in revision*) Enacting resilience: a performative account of governing for urban resilience, *Urban Studies*.

PAPER V

Wilkinson C, Saarne T, Peterson G and Colding J (*in revision*) Strategic spatial planning and the ecosystem services concept: an historical exploration, *Ecology and Society*.

OTHER PUBLICATIONS BY THE AUTHOR

Wilkinson C (2012a) Urban resilience – what does it mean in planning practice? *Planning Theory and Practice* 13(2):319-324.

Wilkinson C (2012b) Beyond Blueprints? Complexity theory as a prospective influence for metropolitan planning. In: G. de Roo, J. Hillier and J. van Wezemael (eds) *Complexity and the Planning of the Built Environment*. Surrey: Ashgate.

Balducci A, Boelens L, Hillier J, Nyseth T and Wilkinson C (2011) Strategic Spatial Planning in Uncertainty: theory and exploratory practice, *Town Planning Review* 82(5):481-501.

Wilkinson C (2009) *Review of the Draft Stockholm Region RUFS 2010, WORKING PAPER 1:2009*, Office of Regional Planning and Urban Transportation, Stockholm.

Sarkissian W, Hoffer N, Shore Y, Vajda S and Wilkinson C (2008) *Kitchen Table Sustainability – practical recipes for community engagement with sustainability*. London: Earthscan.

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1 INTRODUCTION

Since the 1970s there has been a radical transformation in the scope and function of the state in the developed world with respect to environmental protection (Duit 2012). The emerging and variously called green state (Dryzek et al 2003, Ekersley 2004), environmental state (Meadowcroft 2005) or ecostate (Duit 2012) is one where the state “accepts far-ranging responsibilities for counteracting the effect of the market’s externalization of ecological costs and which has developed an extensive set of institutions and policies to work towards this end” (Duit 2012:135). Despite this, almost two thirds of ecosystem services examined in the Millennium Ecosystem Assessment (including fresh water, air and water purification, and the regulation of local and regional climate) were found to be “degraded or used unsustainably” (MA 2005:1) and biodiversity continues to be rapidly lost with species becoming extinct at a rate “not seen since the last global mass-extinction event” (Rockström *et al.* 2009:473). The majority of the world population lives in cities and urban populations are large consumers of ecosystem services (Folke 1997, McGranahan *et al.* 2005, Grimm *et al.* 2008) and the primary source of global environmental impacts (Bai 2007). Finding ways to better govern human-nature relations in urban systems is thus paramount. This thesis explores the potential of social-ecological resilience to inform urban governance in theory and practice.

Social-ecological resilience is the capacity of linked social-ecological systems to handle disturbance whilst maintaining the capacity for adaptation, learning and transformation (Folke *et al.* 2010). It has its origins in systems ecology (Holling 1973) and fundamentally challenges approaches to natural resources management based on assumptions of equilibrium, stability and predictability (Holling 1978). Instead social-ecological resilience is based on assumptions of non-linear dynamics of change in complex, linked social-ecological systems (Folke 2006). Cross-scale coordination, adaptive management/co-management and learning are central to efforts to govern for social-ecological resilience (Gunderson and Holling 2002, Walker *et al.* 2009).

A social-ecological resilience approach is advocated as a relatively new way of conceptualizing change in and governance of linked social-ecological systems that may provide insights into how biodiversity and ecosystem service degradation and loss can be halted. This is of interest for planning theory and practice given the increasing general recognition of the critical importance of ecological considerations for urban studies (Davoudi and Mehmood *eds.* 2010; Evans, 2011; Murdoch, 2006) (*Paper III*). More specifically, the question has been asked what would it take to ‘think planning again’ (Swyngedouw, 2010:313) in ways that acknowledge the contingency, unpredictability and inevitability of ecological processes? (*Paper III*). In this respect there is a strong *a priori* case for cross-pollination between the fields of social-ecological resilience and planning in particular. Both disciplines are fundamentally concerned with human-nature relations, directly related to practice domains (natural resource management and urban governance, respectively), concerned with cross-scale spatial dynamics in complex systems and share a normative interest in sustainability (*Paper II*).

Over the past decade there has been a marked increase in engagement with the concept of urban resilience (see Figure 1). However, within this rapidly growing field there has been significantly less engagement with social-ecological resilience *per se* (see *Paper III* for expansion of this point). At the time this doctoral research commenced there had been no engagement with social-ecological resilience in the planning theory literature and minimal engagement by empirical planning research. It is to this gap that this thesis seeks to contribute. The importance of addressing this gap has only become more important throughout the duration of the doctoral research. Resilience has become an increasingly important urban policy discourse and has been taken up by international, national and local urban initiatives at a rapid pace (Evans 2011). AESOP (Association of European Schools of Planning) hosted its first ‘Resilient Cities’ symposium in 2010 in Stockholm and now has a dedicated thematic working group. ICLEI (Local Governments for Sustainability) will host the 3rd Resilient Cities Global Forum in 2012. The concept of resilience is increasingly informing organizational goals, priorities for urban research funding calls, urban policy and broader sustainability initiatives. The report of the United Nations Secretary General’s high-level panel on global sustainability even titled their 2012 report, “Resilience People Resilient Planet – A future worth choosing”. Amidst this flurry of activity, this thesis contributes in a very timely manner to our understanding of the interdisciplinary engagement between social-ecological resilience and planning.

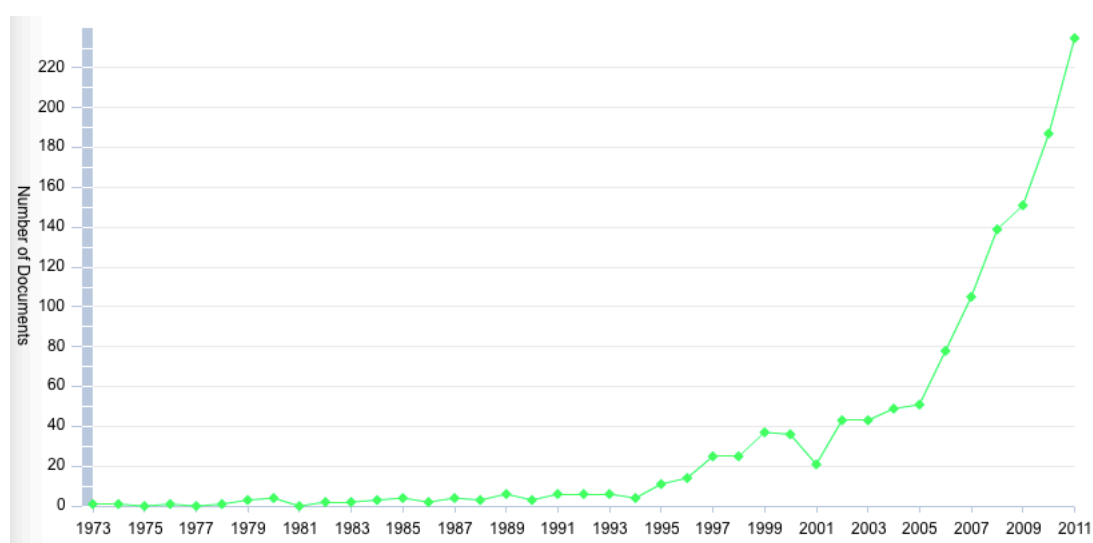


Figure 1. Rapid growth in Urban Resilience scholarship

(Number of articles containing the following search terms in the title, abstract or keywords: ‘urban OR cities AND resilience OR resilient’. Generated using Sciverse Scopus. Note that if the search term ‘planning’ is included then totals nearly double.)

1.1 Scope of the thesis

The aim of this thesis is *to explore the relevance of social-ecological resilience for planning theory and practice*. The thesis is an interdisciplinary exploration in so far as it brings these two fields into communication. As one of the first attempts to do so, it can by no means be comprehensive. On the contrary, this interdisciplinary exploration has been necessarily selective. The theoretical ambitions of the thesis are limited to

exploring the issues and insights social-ecological resilience raise for planning theory. This is not to say that planning theory does not raise interesting insights for social-ecological resilience, but it has not been the primary focus of this thesis. The empirical ambitions of the thesis are to examine the way strategic spatial planning practice, as one means of urban governance, can critically inform and be critically informed by social-ecological resilience scholarship.

The three overarching research questions that guided this thesis are thus as follows:

- 1) What issues and insights does social-ecological resilience raise for planning theory?
- 2) What issues and insights does social-ecological resilience raise for strategic spatial planning practice?
- 3) What issues and insights does strategic spatial planning practice raise for social-ecological resilience?

1.2 Structure of the thesis and focus of the appended papers

This thesis has two parts. The first part provides an overview of the theoretical, analytical and methodological framework upon which the thesis is based as well as a synthesis of findings. It is structured into five chapters: introduction (Chapter 1), research design (Chapter 2), results (Chapter 3), discussion (Chapter 4), and conclusion (Chapter 5). The second part of the thesis appends the five papers that together address the aim and overarching research questions of this thesis. These are introduced briefly below. A more thorough explanation of the rationale for the foci of each paper as well as the methods used is outlined in Section 2 (Research Design). Results are not included here but are summarized in Chapter 3. Table 1 (below) illustrates which papers contribute to which research questions. It should be noted that the papers are included in the order they were produced.

Paper I presents a case study from Melbourne, Australia, where strategic spatial planners attempted to implement a more adaptive approach to strategic spatial planning. They termed this approach ‘strategic navigation’. This paper shows from a practice perspective some of the challenges and opportunities for more adaptive urban governance in a context of rapid change, complexity and relationality.

Paper II provides a planning practitioner’s perspective on how social-ecological resilience can inform strategic spatial planning. It draws on an intensive workshop with senior strategic planners from Glasgow, Stockholm and Melbourne who were introduced to social-ecological resilience in the context of their own strategic planning work.

Paper III is a theoretical paper that explores what, if any, new conceptual ground social-ecological resilience offers planning theory, and more broadly what issues social-ecological resilience raises for further scholarship by planning theorists.

Paper IV examines how some of the underlying assumptions of social-ecological resilience are dealt with in practice through case study analysis of how protection of biodiversity was negotiated in response to Melbourne’s most recent metropolitan planning initiative that was subject to a strategic environmental impact assessment.

Paper V examines how an ecosystem services approach has been taken into account historically in strategic spatial plans through comparative case study analysis of strategic spatial plans in Melbourne and Stockholm, 1929-2010.

Table 1. *Relationship of research papers to research questions*

PAPERS	RESEARCH QUESTIONS		
	What issues and insights does social-ecological resilience raise for planning theory?	What issues and insights does social-ecological resilience raise for strategic spatial planning practice?	What issues and insights does strategic spatial planning practice raise for social-ecological resilience?
Paper I - Strategic Navigation: in search of an adaptive mode of strategic spatial planning practice			X
Paper II - Metropolitan planning and resilience thinking: a practitioner's perspective		X	X
Paper III - Social-ecological resilience: insights and issues for planning theory	X		
Paper IV - Enacting resilience: a performative account of governing for urban resilience		X	X
Paper V - Strategic spatial planning and the ecosystem services concept: an historical exploration		X	X

2 RESEARCH DESIGN

The empirical aim of this doctoral thesis has been pursued through interpretive policy analysis (Yanow 2000, Hajer and Wagenaar 2003, Bevir and Rhodes 2006, Wagenaar 2011) as it enables a deeply contextualized practice perspective to be brought to bear on exploring the relevance of social-ecological resilience for planning practice and vice versa. This section will first provide a brief theoretical background for each of the three overarching analytical foci – spatial planning, social-ecological resilience and practice. It will then introduce and explain how interpretive policy analysis has informed this research before providing an overview of the specific analytical focus and methods used for each paper.

2.1 Analytical framework for an interdisciplinary exploration

In 1971, only two years before writing his seminal paper on resilience, Holling co-authored a paper titled 'Ecology and Planning' in the *Journal of the American Planning Association* (Holling and Goldberg 1971). The purpose of this paper was to demonstrate the "remarkable similarities" between the concerns of ecologists and planners and the characteristics of ecologies and cities. This thesis extends Holling and Goldberg's (1971) inquiry by engaging planning with social-ecological resilience scholarship more broadly.

This thesis is first and foremost an interdisciplinary research project that explores the relevance of social-ecological resilience for planning, in theory and practice. Two of the three overarching analytical foci are obviously thus planning and social-ecological resilience. Both of these are large fields of scholarship in and of themselves and thus decisions were taken how to narrow down the scope of the research. The third overarching analytical focus is practice. Each of these will now be briefly introduced.

Spatial planning

The empirical research of this thesis focuses specifically on spatial planning. A formal definition of spatial planning is provided by the Torremolinos Charter (CEMAT 1983) as follows,

"Regional/spatial planning gives geographical expression to the economic, social, cultural and ecological policies of society. It is at the same time a scientific discipline, an administrative technique and a policy developed as an interdisciplinary and comprehensive approach directed towards a balanced regional development and the physical organisation of space according to an overall strategy" (CEMAT 1983:5).

This definition is indicative of scientific conceptualisations of planning as a "technique" for professional experts to "administer" physical space in "balanced" development. More than two decades on, Patsy Healey, Professor Emeritus in planning, and author of many articles and books on spatial planning writes that it involves "encouraging the emergence of particular development trajectories" (Healey 2008:8). Healey's description signifies a sea-change in the purpose and rationale of spatial planning away from a "traditional, positivist approach that sought to ensure and achieve specified goals and end-states in a given plan time-line" (Balducci *et al.* 2011:483).

In contemporary planning literature, the broad mission of contemporary spatial planning has been described as "stewardship of the future wellbeing of the planet – comprising humans, nonhumans and their natural and constructed environments" (Hillier 2010:2). Healey (2007) explains that spatial planning is,

"a governance practice that has evolved to address the difficulties created by the complex co-locations of activities and their relations and the impacts these co-locations generate across space-time. It is a practice that is not merely concerned with managing existing relations but with imagining and opening up future potentialities for improving the conditions of daily life existence and enrichment for humans in their coexistence with each other and the rest of the animate and inanimate world".

This research focuses specifically on processes of strategic spatial planning including the preparation of strategic spatial plans and associated processes of implementation. The descriptor “strategic” is used to distinguish the primary interest of this research in strategic spatial planning processes rather than the development approval process *per se* (albeit recognizing that the development approval process is used as one means of achievement of strategic spatial planning objectives). The two cities in primary focus through case study analysis are Melbourne (Australia) and Stockholm (Sweden). In Australia strategic spatial planning is usually called “metropolitan planning” (Searle and Bunker 2010) and strategic spatial plans are called “metropolitan plans”. In Sweden the terms used are translated as “regional development planning” and “regional development plans” respectively. Throughout the thesis these terms are used interchangeably although “strategic spatial planning” is used most frequently.

Social-ecological resilience

Given the minimal interdisciplinary interaction to date, this research focuses on exploring the relevance of some of the broad foundational concepts of social-ecological resilience for strategic spatial planning practice. The underlying assumptions of social-ecological resilience explored include: that social-ecological systems are linked, that linked social-ecological systems are complex adaptive systems, that attention to the (bio-)regional scale and cross-scale interactions is crucial, and that building adaptive capacity and pursuing adaptive management/co-management and/or adaptive governance is central to governance efforts (Cash *et al.* 2006, Gunderson and Holling *eds.* 2002, Brunner 2005, Folke *et al.* 2003, Folke *et al.* 2005, Boyd and Folke *eds.* 2011). *Paper III* as well as the theoretical sections of *Papers II* and *IV* provide a thorough theoretical overview of each of these. These underlying foundational aspects of social-ecological resilience are used both in exploring theoretical research questions (*Paper III*) and empirical research questions (*Papers II, IV*).

In addition, given its extensive use in the social-ecological resilience literature, the concept of *ecosystem services* is also explored. An ecosystem services approach identifies the services biodiversity provides for human benefit (Daily 1997, MA 2005) (see *Paper V* for a history of the development of the ecosystem services concept). The concept of ecosystem services has been increasingly taken up in policy discourse and the academic literature following the Millennium Ecosystem Assessment (MA 2005). An ecosystem services approach has been identified of potential value for planning (Niemelä *et al.* 2010, Colding 2011) albeit little empirical work has been undertaken. How strategic spatial plans have addressed ecosystem services is thus the focus of *Paper V*.

Practice

Research questions two and three are both concerned with practice. The focus in the empirical papers has thus been what happens when policy makers (in this case strategic spatial planners) attempt to govern linked social-ecological systems in practice. There are many different theoretical and philosophical approaches to practice (Wagenaar and Cook 2003). This thesis has been most strongly influenced by perspectives on science and social practice which focus on the interpenetration of the human and the material in the way we act on, and understand, the world (Pickering 1995) and temporal emergence (Pickering 1995, Rouse 1996, Pickering and Guzik 2008, Wagenaar 2012). As Wagenaar (2012:91) explains,

“The world we inhabit is a world of becoming; open-ended and indeterminate. In their dealings with an open-ended world human beings have a fundamental forward looking perspective in that they, as adaptive, problem-solving creatures, are continuously engaged in grasping the incompleteness of our current situation and our accounts of it, and trying to overcome it.”

A significant implication of this performative approach to practice is that capturing agency is an ongoing process of what Pickering (1995) calls “resistance” and “accommodation”. In this sense *resistance* “denotes the failure to achieve an intended capture of agency in practice” and *accommodation* is “an active human strategy of response to resistance” (Pickering 1995:22). In the midst of an emergent reality, only temporary stabilisations are possible. This is why Pickering (1995) calls the everyday art of policy-making, the ‘mangle of practice’. Such an approach provides a performative account of governance in so far as it pays attention to the interpenetration of the human and nonhuman in everyday policy practice. *Paper IV* provides a more thorough theoretical background on practice and a performative account of governance.

This approach to practice was used (particularly in *Paper IV*) at least in part because it was hoped the apparent general sympathies with a social-ecological resilience approach would facilitate interdisciplinary communication. Both recognize that the human and the ecological are linked, the world is emergent, and processes of ongoing feedback (here called “resistance” and “accommodation”) are central to efforts to govern. The nuances of both accounts are obviously different, in some cases significantly. Rather than being a limitation, however, this provides an opportunity for deeper theorizing of how practice is dealt with in social-ecological resilience scholarship.

2.2 Interpretive policy analysis

The question has been asked, “why has policy science failed to generate a significant body of knowledge capable of playing a significant role in solving the pressing social and economic problems that confront modern urban-industrial societies?” (Fischer 2003:209). Interpretive analysis adherents argue that the answer, at least in part, can be attributed to the well documented limitations of a positivist approach to policy analysis (Fischer 2003, Hajer and Wagenaar 2003). Interpretive policy analysis is part of a broader post-positivist research tradition that emerged to a significant degree as a reaction to a positivist theory of knowledge and associated methods adopted by the physical and natural sciences and carried over into the social sciences (Fischer 2003:212).

Interpretive policy analysis focuses on “meanings that shape actions and institutions, and the ways in which they do so” (Bevir and Rhodes 2003:130). Meanings are not differentiated from actions but “form holistic webs that constitute actions and practices” (Bevir and Rhodes 2006:3). For this reason explaining something in an interpretive manner requires having regard to the context in which action is situated (Wagenaar 2011:23). This context is established through empirical work that relies on qualitative research methods including qualitative interviews, ethnographic observation, participatory observation, document analysis and so on. In this respect interpretive approaches have much in common with bottom-up forms of social inquiry (Bang and Sorensen 1999 in Bevir and Rhodes 2006:3).

A key distinction of interpretive policy analysis is that it focuses on the interpretations made by policy makers and in this respect “the work of analysis is to interpret those interpretations” (Freeman 2012). The analyst starts by carefully recording the “concrete behaviors of concrete actors” which can manifest in many different ways including through interviews, observed activities, written statements, stories, research notes, or descriptions of artifacts (Wagenaar 2011:21). This data is then used to inform interpretations by the analyst in an inductive process of sense-making. This process involves the following,

“Through a painstaking and systematic process of imaginative induction, we transform our crude, earlier observations/interpretations into better, higher-order, more enduring interpretations that somehow capture the meaning of what has transpired. By continually confronting our initial observations (understood here as interpretations of interpretations) with further and more divergent observations and explanations, we hope to arrive at an interpretation that makes what was initially opaque, in the final analysis (more) senseful.” (Wagenaar 2011:22)

Whilst interpretive analysis assumes that the “general is folded into the particular” (Wagenaar 2011:21) this by no means implies results are generalizable. Indeed, the intention of interpretive policy analysis is reflective rather than directive or prescriptive and in this respect can assist policy makers’ self-awareness of “what they do and what they might do differently” (Freeman 2012). Put another way interpretive policy analysis seeks insights, not answers (Bevir and Rhodes 2006). Interpretive analysis has been used in *Papers I, II, IV and V* to generate reflective insights on various aspects of strategic spatial planning processes drawing on interviews, observation (of inter-departmental meetings, public meetings, ecological field surveys, and stakeholder events) and document analysis.

Grounded theory, as a “key heuristic strategy” of interpretive policy analysis (Wagenaar 2011), has informed both the analytical foci of the papers in this thesis and the analytical strategies used to conduct the research. Grounded theory is an inductive research strategy founded in the late 1960s by Barney Glaser and Anselm Strauss (Glaser and Strauss 1967). It provides “systematic inductive guidelines for collecting and analyzing data to build middle-ground theoretical frameworks that explain the collected data” (Charmaz 2000:509). One of its central tenets is that data collection, data analysis and theory development should progress in parallel, always informing one another throughout the duration of the research. Grounded theory employs several analytic strategies to achieve this including coding, memoing and integrative work (Glaser and Strauss 1967, Bryant and Charmaz *eds.* 2007). These analytic strategies have been used to varying degrees in *Papers I, II, IV and V*. For example, during the empirical research for *Paper IV*, written notes were taken during qualitative interviews alongside audio recordings. Initial tentative insights that emerged, even during the interviews, were recorded in my research journal under the title of “memo” amidst my record of what was being said. Later, during the process of transcribing interviews, additional memos were also made at the point in the transcript where the insight was generated. Initial key analytical categories (Strauss and Corbin 1998) were generated and subsequently refined through the extensive process of transcription as well as document analysis. The computer program Atlas.ti, which specifically supports interpretive and grounded theory approaches was used to manage some of the data after being purchased in early 2011. All these analytic

strategies provided a more systematic way to trace the emergence of research insights relevant to the research questions.

An additional tenet of grounded theory is the call to let the data speak and avoid preconceived notions. This has been critiqued on the basis that it is virtually impossible to approach a research topic without any preconceived notions (Bryant and Charmaz *eds.* 2007). More recent approaches to grounded theory acknowledge this recognising that “understanding isn’t built up from data; rather, it results from the researcher struggling to understand the meaning of the data and, especially, how they relate to the researcher’s questions and preliminary understandings” (Wagenaar 2011:261). This thesis adopts a reflexive approach to grounded theory (Bryant and Charmaz *eds.* 2007) and recognises that data collection does not start with the commencement of the empirical research *per se* but is informed also by my decade long involvement in Melbourne’s strategic spatial planning, my employment as the only planning scholar at the Stockholm Resilience Centre, and my prior engagement with a broad planning, environmental, complexity and governance literature.

2.3 Paper overview – analytical focus and methods

Interpretive policy analysis always involves an “interpretation of something”. (Wagenaar 2011:9). Consistent with a grounded theory approach, the logic for the interpretive policy analysis focus for the respective papers emerged through the process of research as described below. The specific methods employed are addressed in detail in each paper. These are not repeated here but are summarized in Table 2. As can be seen *Papers I, II, IV and V* draw on different forms of case study analysis and use methods consistent with interpretive policy analysis. These methods include qualitative interviews, ethnographic observation, participatory observation and document analysis.

Paper I is concerned with how strategic spatial planning and planners pursue more adaptive modes of governance through spatial planning practice. It draws on case study research from Melbourne and processes surrounding efforts to implement *Melbourne 2030: planning for sustainable development*. I was directly involved in this process and making sense of this strategic spatial planning episode was the first task embarked on in my doctoral research. This case is not explicitly informed by social-ecological resilience *per se*. However, its central focus on what it means to be more adaptable in spatial planning practice is critically relevant as building adaptive capacity is also central to governing for social-ecological resilience. In this respect it provides useful insights into some of the challenges and opportunities in practice for more adaptive policy processes.

The interpretive policy analysis focus of *Paper II* is how strategic spatial planners reflect on the relevance of social-ecological resilience for their practice. The intention here was to introduce senior planners to the foundational concepts of resilience thinking as well as the analytical, methodological and governance frames offered. Consistent with an interpretive policy analysis approach, this empirical research deliberately attends “to the interpretations policy makers themselves ma(de)” (Freeman 2012) of the relevance of social-ecological resilience in the context of their own strategic spatial planning practice.

In the process of writing *Paper II* it became apparent that there had been no engagement with social-ecological resilience in the planning theory literature. *Paper III* makes the first scholarly effort to explicitly address this gap. The paper is a task of translation (one of three tasks of planning theory identified by Friedman 2008) in so far as it seeks to “to translate concepts and knowledges generated in other fields into our own domain, and to render them accessible and useful for planning and its practices” (Friedman 2008:248). Consistent with the desire to deal with foundational concepts, the following three key underlying assumptions of social-ecological resilience are used to structure the paper, namely that social-ecological systems are linked, that linked social-ecological systems are complex adaptive systems and that adaptive capacity is crucial to governing for resilience. Three questions are explored for each assumption: How does social-ecological resilience conceptualize this? How does planning theory conceptualize this? What resulting issues for planning theory are raised?

Paper IV picks up the empirical thread of the research again. Whereas Paper II gathered senior spatial planners together in Glasgow to learn about and reflect on the relevance of social-ecological resilience for their practice, Paper IV dives into a real case of strategic planning practice from Melbourne, Australia. The interpretive policy analysis focus here is how do spatial planners govern for urban resilience amidst the mangle of everyday practice (Pickering 1995). I have long been interested in how spatial planning engages with complexity and uncertainty in practice (Balducci et al 2010, Wilkinson *in press*, *Paper II*). This paper extends this interest by exploring how natural temperate grasslands and the Golden Sun Moth were taken into consideration through a strategic environment impact assessment process catalyzed by Melbourne’s proposed strategic plan for urban development. If, as social-ecological resilience scholarship assumes, social-ecological systems are linked complex adaptive systems, how does strategic spatial planning deal with this in practice. Furthermore, how does a performative account of governing for urban resilience inform social-ecological resilience scholarship.

Finally, *Paper V* attends to a query that emerged early in my time at the Stockholm Resilience Centre, but took the longest to address. In the social-ecological resilience discourse (both formal through scientific publication, as well as informal through conversations amongst scholars at seminars and conferences), the concept of “ecosystem services” is ever present. Within the social-ecological resilience field, an ecosystem services approach is considered novel. However, from my experience as a spatial planner I recognized many aspects of the approach in the way strategic spatial plans frame human-nature relations. I wanted to explore this empirically, to address how ecosystem services as a foundational concept, related to the practice of strategic spatial planning. This was pursued through document analysis of Melbourne and Stockholm’s strategic spatial plans, 1929-2010.

Table 2. *Analytical focus and methods for each Paper*

PAPERS	ANALYTICAL FOCUS	METHODS
Paper I - Strategic Navigation: in search of an adaptive mode of strategic spatial planning practice	How do strategic spatial planners pursue more adaptable modes of strategic spatial planning practice?	Case study, qualitative interviews, auto-ethnographic field notes and reflection, document analysis
Paper II - Metropolitan planning and resilience thinking: a practitioner's perspective	How do strategic spatial planning practitioners perceive social-ecological resilience vis-à-vis their own practice?	Participatory workshop Participant observation Focus group discussion
Paper III - Social-ecological resilience: insights and issues for planning theory	What issues and insights does social-ecological resilience raise for planning theory?	Literature review
Paper IV - Enacting resilience: a performative account of governing for urban resilience	How are the underlying assumptions of social-ecological resilience dealt with in strategic spatial planning practice?	Case study, qualitative interviews, ethnographic observation, document analysis
Paper V - Strategic spatial planning and the ecosystem services concept: an historical exploration	How is the concept of ecosystem services dealt with historically in strategic spatial plans?	Comparative case study, historical document analysis

3 RESULTS

3.1 Paper I

How do strategic spatial planners pursue more adaptable modes of strategic spatial planning practice?

Paper I provides a practice perspective on how a strategic spatial planning department attempted to operationalize a more adaptable mode of strategic spatial planning practice (that they called Strategic Navigation). The paper shows that a more adaptable mode is desirable not only to be able to strategically navigate complex drivers of change (including demographic, environmental or economic) but to deal with emergent policy effects in complex urban systems. A case is examined where the Strategy Development Division responsible for Melbourne's strategic spatial planning attempts to build capacity for strategic adaptability through their Business Planning processes. The paper shows just how difficult it was to do this, even in a situation where adaptability was an explicit underlying principle of the spatial plan, *Melbourne 2030: planning for sustainable development*. Operationalisation of a more adaptive mode of strategic spatial planning involved,

“a reconceptualisation of the role of strategic planning; a codification of the subsequent organisational implications through the draft business planning process, including different priorities with respect to the knowledge and relationships, tools and practices that planners rely on to inform their situated judgement; and the identification and informal pursuit of leverageable strategies as a way to enact adaptability.” (*Paper I*)

To reconceptualise the role of strategic planning, the metaphor of strategic navigation was adopted. This captured the need to be responsive to complex conditions and multiple feedbacks whilst maintaining course, much like sailing a yacht. The key here was the need to get away from the assumption that once finalized and publicly released, strategic plans can be uncontentionously and systematically implemented. Rather strategic planning is an ongoing process and to embrace this in practice, in face of emergent policy effects, has significant organizational implications. This paper shows that an approach to planning that prioritises strategic adaptive capacity will be more reliant on the real-time judgements made by planning practitioners. These so-called “situated judgements” (Forester 1999, Healey 2008) depend on improved quality and speed of sense-making. This means that the diversity of relationships and knowledges drawn on needs to be increased and as well as the pace at which these inputs are processed. This in turn requires different allocation of resources and skills. An example is given of how adaptability is put into practice through the successful pursuit of “alignment of infrastructure investment” as a leverageable strategy for *Melbourne 2030* implementation.

3.2 Paper II

How do strategic spatial planning practitioners perceive social-ecological resilience vis-à-vis their own practice?

Paper II shows that strategic spatial planning policy practitioners are interested in social-ecological resilience as it:

- provides new language and metaphors for the dynamics of change in complex systems,
- provides new tools and methods for analysis and synthesis, and
- confronts modes of governance based on assumptions of predictability and controllability.

Social-ecological resilience draws on complexity theory to frame the way systems are conceptualized and analysed. Complexity theory has provided the “appropriate language” (Capra 2005:36), powerful metaphors (Thrift 1999) and tools (Stengers 2004) for dealing with nonlinear systems (Wilkinson 2012b). Complexity theory has also travelled across disciplines and from academia to popular consumption. Planning practitioners see a similar potential in social-ecological resilience as an approach, especially where human-nature interactions and their spatial consequences are in focus. Engaging with social-ecological resilience gave them ideas for different ways to frame various strategic planning processes with stakeholders and politicians. It highlighted gaps in formal analysis (see Table 1, *Paper II*) and suggested different ways of acting. Planning has been conceptualized as the “framing of problems” or “organizing attention to possibilities” and the challenge of “how analysts organize attention (as) the central political problem of their practice” (Forester 1989:19). What this workshop confirmed was that senior planners see potential in incorporating social-ecological resilience ideas into their practice.

However alongside the opportunities social-ecological resilience presents, senior planners also raised several matters of caution from a practice perspective, as follows:

- the emphasis on systems analysis is data heavy and not always possible in resource and time constrained practice settings,
- given how important situated judgment is to the practice of strategic planning, intuitive knowledge based on experience working in the system is often sufficient,
- translation of social-ecological resilience concepts to the spatial planning practice domain is not straight forward and terms, concepts and case studies can often be opaque without significant effort.

Finally *Paper II* suggests that the adoption of a social-ecological resilience approach by planning practitioners by no means guarantees a more ecological approach to planning outcomes as there is a tendency without strong facilitation for ecological matters to be overlooked in the context of dominant social, economic and technical matters in urban systems.

3.3 Paper III

What issues and insights does social-ecological resilience raise for planning theory?

Paper III takes as its starting point three key underlying assumptions of social-ecological resilience and explores how planning theory relates to these. The first of these assumptions is that *social-ecological systems are linked*. An unexpected finding of this Paper was that whilst the planning discipline generally has paid significant attention to human-nature relations and their spatial implications (eg. Owens and Cowell 2002, Rydin 2010), planning theory *per se* has not. There is in fact very little planning theory literature that directly engages substantive social-ecological issues as a focus. The exceptions are generally isolated articles including ones that address environmental ethics (Beatley 1989, Jacobs 1995) and political ecology (Harrill 1999, Swyngedouw 2010).

The second assumption explored is that *linked social-ecological systems are complex adaptive systems*. Planning has applied complexity tools to the analysis of urban systems (eg. Allen 1997, Batty and Longly 1994, deRoo and Silva 2010) but has engaged only to a limited degree with the implications of complexity theory for planning theory (eg. Portugali 2008). There are other philosophical traditions within planning theory that share a relational, dynamic and non-linear conceptualization of change, but which give more explicit attention to the location of power, including policy economy and post-structural planning theory approaches (*Paper III*). However, few of these deal explicitly with linked social-ecological systems. In this respect social-ecological resilience offers significant potential for planning theory.

Governance, including the normative goal in social-ecological resilience to generate adaptive capacity within linked social-ecological systems, is the third assumption addressed. *Paper III* finds that social-ecological resilience shares some common interests with approaches to governance that have been discussed in planning theory including collaborative planning and post-structural planning theory. Whereas, in planning theory these various approaches to governance have been exposed to robust critique, this stands in stark contrast to social-ecological resilience scholarship where this critique is only now beginning to emerge.

In summary, *Paper III* concludes that social-ecological resilience scholarship has the potential to contribute to addressing concerns of planning theorists that matters of substance, including our ecological condition, have been overlooked. As the paper states,

“Social-ecological resilience is worth more attention by planning theorists in a context where over two decades of effort on governing for sustainability hasn’t in any substantive ways stopped the decline in ecosystem services. It is the way social-ecological resilience frames the challenges facing linked social-ecological systems that holds interest for much-needed planning theory scholarship that places this as a central concern. How can more attention be paid to substantive matters, such as matters of ecology, in ways that sufficiently recognize the materiality of human–nature relations as well as sufficiently theorize the causes and potential sources for sustainable transformation? This is not a new challenge, but one to which I suggest social-ecological resilience can contribute.” (*Paper III*)

With its origins in systems ecology and emerging interest in the inter-disciplinary examination of the governance of linked social-ecological systems, social-ecological resilience offers a field of scholarship of particular relevance for planning theory at a time when global ecological challenges require urgent attention. However, further interdisciplinary engagement must be critical to overcome some of the de-politicising tendencies in a social-ecological resilience approach (*Paper III*).

3.4 Paper IV

How are the underlying assumptions of social-ecological resilience dealt with in strategic spatial planning practice?

Paper IV is concerned with what it means to govern for resilience in practice in urban settings. The paper is based on detailed empirical research of how the critically endangered ecological community of the Natural Temperate Grassland of the Victorian Volcanic Plain (the grasslands) and the Golden Sun Moth (*Synemon plana*) are taken into account through a strategic environmental assessment required in response to urban and transport infrastructure expansion outlined in the most recent strategic spatial plan for Melbourne. The central claim of the paper is that a performative account of governing for resilience in urban settings helps to understand the apparent gap “between the advocacy of social-ecological resilience in the scientific literature on the one hand, and the demonstrated capacity to govern for resilience in practice on the other” (*Paper IV*). A performative account addresses the messy, chaotic, emergent character of policy development and implementation processes – the so-called “the mangle of practice” (Pickering 1995). *Paper IV* shows how this “mangle of practice” affects the capacity to govern consistent with some of the foundational underlying assumptions of social-ecological resilience, namely that social-ecological systems are linked, and that attention must be paid to the (bio-) regional scale and cross-scale coordination. Paper IV finds that in the case of the Melbourne strategic environmental assessment:

- Knowledge of *linked social-ecological systems* is performed through policy processes in many diverse ways. This performance is critically influenced by past failures and successes (“resistances” and “accommodations” to use Pickering’s terminology) as well as acting on the situation at hand.

- Being able to assess environmental impact at a *(bio-)regional scale* required appropriate legislative provisions, political will and, importantly, the capacity to govern the grasslands at that scale. Governability of the grasslands at the (bio-) regional scale required the “extension of numerous policy technologies in innovative ways by experienced policy officers using considerable practical judgement in the midst of an intensive and highly political policy process” (*Paper IV*). These policy technologies included, listings of ecological communities, modeling of those ecological communities, policy principles, metrics and markets for native vegetation.
- Some of the practical challenges of *cross-scale coordination* are illustrated by the attempt to devise and implement a policy framework sensitive to both the (bio-) regional scale and the local scale. It is shown that in urban settings a key tension arises between allowing for the inherent uncertainties about ecological communities and individual species and the demand for sufficient certainty for long term investment in urban development and infrastructure.

With respect to practice then, *Paper IV* suggests that governance consistent with social-ecological resilience has the potential to emerge through the everyday “mangle of practice” (Pickering 2005) in response to social-ecological feedback inherent to everyday policy processes.

3.5 Paper V

How is the concept of ecosystem services dealt with historically in strategic spatial plans?

The concept of ecosystem services (ES) has been identified as of potential interest for planning and it is claimed that if an ES approach to planning was taken sustainable development could be achieved (Niemelä *et al.* 2010, Colding 2011). This paper contributes to addressing the gap in knowledge about the extent to which an ES approach is already taken in planning in substance, if not by name. This paper examines the extent to which strategic spatial plans in Melbourne and Stockholm between 1929-2010 take an ES approach. The paper examines the following questions: What ES are taken into account in strategic spatial plans, which ones are not considered, and what insights does use of the comprehensive ES framework enable? Do strategic spatial plans frame relations between humans and ecosystems consistent with an ES approach? How are discussions regarding valuation of ES framed in strategic spatial plans?

With respect to the detailed content analysis, *Paper V* finds that:

- despite considerable variation in which ES were addressed across the plans, there is a strikingly similar pattern in the total numbers of ES addressed over time in both cities,
- around two thirds of ES are addressed at least once in at least one plan for both Melbourne and Stockholm although the ES addressed and not addressed by each city are substantially different,
- there is little continuity in attention to ES over time in either city,

- there is considerable variation between the two cities in the attention given to the different ES categories with Stockholm paying more attention to Supporting Services and Melbourne paying more attention to Regulating Services,
- most of the strategic spatial plans address human-nature relations and generally frame these in a way consistent with an ES approach, recognizing human dependency on nature,
- the strategic spatial plans are a significant means to articulate policy positions regarding trade-offs between ES with respect to land-use conflicts timescale mismatch.

Paper V identifies several broader implications for ES practice and research. The ES framework is shown to be a useful policy analysis tool that can expose the specific way in which ecosystem related matters are or are not addressed in the strategic spatial plans. The time-scale mismatch revealed by the lack of continuity of attention over time to ES in strategic spatial plans demonstrates the importance of *longitudinal studies* of the kind reported here. This type of analysis has the potential to inform better understanding of the link between policy frameworks and on ground outcomes. It can also inform broader debates surrounding critique that an ES approach oversimplifies human-nature relations (Norgaard 2010) or will lead to the commodification of nature (Kosoy and Corbera 2009, Robertson 2004 and 2006). Our historical analysis shows that, even in the absence of a formalized ES approach, both these tendencies are evident in the way human-nature relations have been framed in strategic spatial plans. Finally, we argue that further development of systematic ES assessment tools by ecologists would benefit from more detailed, ethnographic understanding of how ES trade-offs are currently made through decision processes.

4 DISCUSSION

This section provides a synthesis and discussion of the major findings of this doctoral research in relation to the three overarching research questions. Where relevant future research agendas are identified.

4.1 Research Question 1

What issues and insights does social-ecological resilience raise for planning theory?

Planning theorists have been calling for more attention to matters of substance alongside matters of process (Ness and Saglie 2000, Campbell 2006, Fincher and Iveson 2008). Of particular relevance for this thesis is the call by planning theorists to “think planning again” in ways that acknowledge the contingency, unpredictability and inevitability of ecological processes (Swyngedouw 2010:313). Despite human–nature relations and their spatiality being central to planning practice, planning theory *pe se* hasn’t paid significant or sustained attention to the ecological dimension (*Paper III*). Engagement by planning theory with the field of social-ecological resilience is therefore very timely given the significant global ecological challenges that require urgent attention.

Paper III provides the first attempt in the planning literature to critically explore the relevance of the field of social-ecological resilience for planning theory and illustrates areas for potential insights. Some of these include:

- the way it places dynamic, non-linear changes in focus - “assuming change and explaining stability, instead of assuming stability and explaining change” (van der Leeuw 2000) – and fundamentally challenges lingering legacies of positivist approaches to natural resource management and planning,
- its focus on building capacity for adaptive and transformative change in linked social-ecological complex systems subject to ongoing change,
- how cross-scale interactions reverberate across social-ecological systems in unpredictable ways, reducing with inequitable consequences the resilience of ecosystem services on which societies depend.

As social-ecological resilience is increasingly translated into the planning field, clarity around the manner in which it is being used is important. *Paper III* argues that,

“taking on board the broad conceptual power of resilience as a metaphor without working through the implications of the ecological message contained therein is a lost opportunity that planning theorists cannot afford if it is to contribute to improved urban governance at a time of ecological crisis”.

In recent contributions to planning theory and practice, social-ecological resilience has been called “evolutionary resilience” (Davoudi 2012). Whilst in one sense this is a very reasonable descriptor to distinguish a clear break with an equilibrium view of resilience, care must be taken that the central social-ecological message of social-ecological resilience research is not lost in further interdisciplinary exploration with planning theory (and practice). This could perpetuate dominance of attention to matters of process in planning theory and ignore calls for more attention to matters of substance.

With its explicit focus on the interaction of social and ecological issues, social-ecological resilience scholarship, perhaps more than any other approach with origins in natural science, attempts to better engage with the social condition and human-nature relations. It is easy to critique social-ecological resilience for dealing inadequately with matters of power, politics and conflict (Evans 2011, Hornborg 2009, Lélé 1998, Nadasdy 2007). This is a critique acknowledged within both the social-ecological resilience and planning fields (*Paper III*). That this critique exists should not be a cause for planning theorists to dismiss the relevance of social-ecological resilience. On the contrary, given the rapid take up of resilience in the urban policy discourse, it makes it even more important for planning theory to more critically and thoroughly engage with social-ecological resilience and its implications for planning practice. This will not be a quick process. It will require careful patient engagement at the interdisciplinary interface. Encouragingly, there are a small, but growing number of publications that point to the potential for resilience to be a catalyst for radical change agendas (eg. Leach 2008, Brown 2010, Christopherson *et al.* 2010, Shaw 2012).

So to summarise, this thesis concludes that social-ecological resilience has much to offer planning theory and should not be, to borrow the words of John Friedmann, “unceremoniously forgotten” (Friedmann 2008:254).

4.2 Research Question 2

What issues and insights does social-ecological resilience raise for strategic spatial planning practice?

Social-ecological resilience is at once a scientific discipline, a conceptual frame, offers methods for analysis and synthesis and advocates particular modes of governance. We do not yet understand why resilience has so rapidly become an important part of the urban policy discourse. However *Paper II* provides some insight into where senior planning practitioners see potential, most significantly in its capacity to change the framing of attention to problems and possible solutions. This goes to the very heart of strategic spatial planning practice – how problems are framed (Forester 1989). Social-ecological resilience frames problems in particular ways that recognizes social and ecological systems as linked, linked social-ecological systems as complex adaptive systems and the pursuit of adaptive capacity as a priority for governance (*Paper II*). Social-ecological resilience provides tools for communication, analysis/synthesis and governance consistent with this framing. Philosopher of science, Isabelle Stengers explains,

Tools modify the ones who use them. To learn how to use a tool is to enter into a new relation with reality, both an aesthetic and practical new relation. I would say that those new tools put the ones who use them in a very interesting new practical position with regards to what they address. Indeed the problem is no longer simply how to explain; it includes the problem of what is to be explained. What are the good questions? (Stengers 2004:98)

What are the tools offered by social-ecological resilience and what questions do operationalisation of these in the field of spatial planning raise? Some of the tools explored in spatial planning practice for the purposes of this thesis include the ecosystem services concept (*Paper V*), the *Resilience Assessment Handbook* (RA 2007) and various heuristics including the adaptive cycle (Gunderson and Holling 2002), the concept of thresholds/tipping points, Folke *et al.*'s (2003) synthesis of the characteristics of adaptive capacity and a set of strategies for resilience published in *Paper III* and tested as part of the empirical work for *Paper II*. Exploring the relevance of these various tools and heuristics of social-ecological resilience for spatial planning practice brought different matters into focus. For example, *Paper II* shows how practitioners saw in resilience the potential for a radical change agenda for strategic spatial planning practice. In follow up research with local government strategic planners in Sweden, working through some of these heuristics raised questions about who pays for whose resilience (Wilkinson 2012). *Paper V*, in exploring the extent to which the ecosystem services concept has been taken into account in spatial plans, raises the important question of time-scale mismatch in the governance of ecological issues.

Exploration of the relevance of these tools for spatial planning practice also raises matters for future research effort. *Paper V* illustrates the importance of longitudinal studies of the governance of ecosystem services and highlights the need for more detailed ethnographic studies of how ecosystem services are currently governed in order to better inform the development of ecosystem service based decision-support tools. With respect to *Paper II*, the *Resilience Assessment Handbook* provides a unique combination of systems and narrative based participatory exercises and was relatively successful in generating shared understanding of linked social-ecological

systems from a resilience perspective. However as it is written for natural resource managers, further application of this in urban systems would benefit from a similar handbook targeted specifically for spatial planning. In particular, more empirical work is needed to better understand how the concept of interacting cross-scale social, economic and environmental thresholds relates to urban systems and to explore how conflicting tensions between desires to adapt and transform (or “bounce-back” and “bounce-forward” to use the terminology of Davoudi 2012 and Shaw 2012) can be negotiated in practice.

4.3 Research Question 3

What issues and insights does strategic spatial planning practice raise for social-ecological resilience?

Ecosystem services continue to decline at the same time as the pressures of urbanization increase. Much hope is placed in social-ecological resilience and an ecosystem services approach to provide better ways to address these challenges. Yet there is an acknowledged gap between social-ecological resilience as an ideal and the ability to govern towards it in practice. This thesis informs this gap by exploring how some of the foundational concepts of social-ecological resilience are dealt with in strategic spatial planning practice. This reveals several overarching issues and insights for social-ecological resilience.

The role of the state

This thesis started with the observation that in spite of a considerable expansion of the so-called ‘environmental state’ since the 1970s, our ecological condition continues to deteriorate. With its origins in systems ecology and local scale natural resource based studies and strong interest in informal institutions, social-ecological resilience scholarship has only recently begun to pay more attention to the role of the state (eg. Olsson *et al.* 2008). In the empirical cases examined, strategic spatial planning is an urban governance activity led by government and concerned with metropolitan scale cities. The role of the state in determining how linked social-ecological systems are governed is thus critical. *Paper I* shows how shifts to a more adaptive mode of strategic spatial planning are catalyzed by policy entrepreneurs through state-led processes and require considerable leadership, organizational and resource commitment by government departments to be implemented. In *Paper IV* the significance of the state is demonstrated in its capacity to progress policy agendas and facilitate the governability of linked social-ecological systems. The improved scientific data and modeling of the grasslands and Golden Sun Moth over several decades combined with the pragmatic ability to codify biodiversity into adaptive policy were essential. So was the legislative framework that required ecological communities to be protected and enabled a (bio-)regional scale strategic environmental assessment. Finally, *Paper V* shows how state-led strategic spatial plans are centrally concerned with governing human-nature relations across metropolitan regions and an important mechanism for framing the governance of ecosystem services.

This thesis shows then that for urban systems, the role of the state significantly affects the capacity to govern for social-ecological resilience. Future urban resilience

scholarship must therefore pay more attention to the role of the state, in particular the extensive and innovative policy technologies required to support governance consistent with some of the underlying assumptions of social-ecological resilience. The critical importance of these policy technologies (including ecological data and modeling, policy principles, metrics and ecosystem service markets) suggests this combined *techne* should be the focus of significant future research effort. Whilst this thesis has focused on strategic spatial planning, other aspects of planning more generally that could be examined from a social-ecological resilience perspective include legislative frameworks, urban designs, development approvals processes, environmental assessment processes and community engagement strategies.

The politics of practice

The need for social-ecological resilience scholarship to better address matters of politics, power and conflict is recognized (*Paper III*). This thesis shows some of the ways in which politics affects governing for urban resilience. In *Paper V* the variability and inconsistency in attention to ecosystem services over time is revealed. This is explained as strategic spatial plans are recognized in the planning literature as first and foremost political documents (Sandercock and Friedmann 2000). Depending on the politics of the time, different emphases are given to the framing of human-nature relations and which specific ecosystem services are addressed or not. Whilst it would be easy to critique the timescale mismatch identified in *Paper V* as a failure of governance, it is important to recognize that in both Melbourne and Stockholm strategic spatial plans are formally adopted by democratically elected regional or state governments. Addressing the identified timescale mismatch is therefore not necessarily a technocratic problem but part of a broader democratic governance challenge. How variability of political priorities over time affects the capacities to govern within ecological timeframes deserves more research attention.

As well as being part of macro political agendas, strategic spatial planning is also affected by the micro-politics of practice. Strategic spatial planning is reliant on significant technical information and managerial organization. *Papers I, II and IV* show that the work of government departments to frame problems, analyse and synthesise information and put forward policy solutions is also political. For example, *Paper IV* shows: how the framing of linked social-ecological systems through the use of the ‘powerful maps’ influences outcomes, how the analysis and synthesis of data about the grasslands and the Golden Sun Moth enables them to be governed in particular ways, and how the writing of adaptive policy in the form of prescriptions navigate tension between the demand for certainty through the urban development process and inevitable uncertainty regarding the extent and location of species.

The importance of a politics of practice is not a new insight for planning scholarship but is of significant relevance for the development of a more critical perspective on governing for urban resilience. Fruitful avenues for future research include following processes where social-ecological resilience *per se* is proactively pursued by the state. This type of empirical example is currently substantially missing from the urban studies literature (although see Wilkinson 2012a) and this gap makes it difficult to determine how the politics of urban governance affects attempts to govern for social-ecological resilience.

The mangle of practice

The final insight that strategic spatial planning practice raises for social-ecological resilience scholarship regards what has been referred to throughout this thesis as the importance of a performative account of governing for urban resilience. There is a tendency in some social-ecological resilience research to make broad normative generalisations about how a resilience approach can improve governance in the anthropocene. This thesis demonstrates firstly that several aspects of a resilience approach to governance have been pursued through strategic planning processes for many years, if not decades (*Papers IV and V*). Secondly, it shows that to enact a resilience approach to urban governance in practice requires engaging in what Pickering (2005) calls the “mangle of practice”. This is more than blind muddling through but doesn’t either have to be a purely scientific and programmatic approach to adaptive management/co-management. Rather it involves an ongoing process of resistance and accommodation (Pickering 2005) engaged over many years by policy entrepreneurs constantly pursuing policy innovations and making situated judgements to progress the public policy agenda amidst the messiness of everyday practice. In the case of *Paper I*, we saw the efforts of members of the spatial planning department to put in place a more adaptive approach to urban governance (called Strategic Navigation) that could be more response to rapid changes. In *Paper IV*, we saw how attempts to enable the governability of the grasslands progressed over several decades and how the resulting policy technologies (including the modeling of the grasslands, the net gain principle, the habitat hectare metric and the offset market for native vegetation) were necessary to get agreement to the strategic environmental assessment.

This thesis illustrates how a performative account of spatial planning practice expands the possible opportunities for governing for social-ecological resilience beyond the concept’s use as a metaphor (Pickett *et al.* 2004), a measurement (Carpenter *et al.* 2001), a cognitive frame (Fischer *et al.* 2009), or a programmatic statement of adaptive management/co-management (Armitage *et al.* 2007). Rather, in urban settings there is significant opportunity to govern for social-ecological resilience through the everyday “mangle of practice”.

5 CONCLUSION

The aim of this doctoral research has been to explore the relevance of social-ecological resilience for planning theory and practice. It makes a novel contribution in several ways. First, it provides the first translation of social-ecological resilience for planning theory. Secondly, it explores what some of the underlying assumptions of social-ecological resilience mean for spatial planning practice. Thirdly, it reveals insights for social-ecological resilience scholarship from an engagement with spatial planning practice.

Interdisciplinary exploration between social-ecological resilience per se and planning is in its infancy. This thesis has demonstrated the benefits of detailed longitudinal and ethnographic empirical research and a focus on the role of the state in extending this inter-disciplinary engagement. Social-ecological resilience scholarship does not have its origins in urban settings. To translate this field of scholarship into urban settings

requires considerable effort if the nuances of different urban contexts are to be respected. This is important and urgent work and in many respects research effort already lags behind the rapid take up of resilience in the policy discourse. It is hoped that this thesis, by exploring the relevance of some of the foundational concepts of social-ecological resilience for planning theory and practice, provides a more solid foundation for future urban resilience research and practice.

SAMMANFATTNING PÅ SVENSKA

Trots att statens roll inom området miljöskydd har ökat sedan 70-talet, fortsätter förutsättningarna för jordens biologiska mångfald och ekosystemtjänster att försämrats. Att hitta bättre sätt att styra människors relation till naturen i våra städer utgör en viktig aspekt för att ta itu med denna problematik. Syftet med denna avhandling är att undersöka vilken potential social-ekologisk resiliens har för stadsförvaltningens teori och praktik, med fokus på strategisk fysisk planering. Strategisk fysisk planering är en etablerad förvaltningsform som lägger grunden för den politiska process som reglerar markanvändning och utveckling av stadsregioner. Social-ekologisk resiliens är ett forskningsområde som fokuserar på hur sammanlänkade sociala-ekologiska system förhåller sig till olika former av störning och som samtidigt bidrar till dessa systems förmåga till anpassning, lärande och förändring. Under senare år har resiliens blivit ett allt viktigare begrepp inom stadspolitiken med potential att förbättra förvaltningsprocessen. Det föreligger dock en kunskapslucka mellan social-ekologisk resiliens i teori och praktik. När den här doktorsavhandlingen påbörjades fanns inget skrivet om social-ekologisk resiliens i planeringsteorilitteraturen och få empiriska studier inom stadsplaneringens område. Den här avhandlingen önskar att överbrygga denna kunskapslucka.

Avhandlingen består av fem artiklar som tillsammans behandlar tre övergripande frågor: (1) Vilka frågor och teoretiska insikter bidrar social-ekologisk resiliens med till stadsplaneringens område? (2) Vilka praktiska frågor och insikter kan social-ekologisk resiliens ge upphov till inom strategisk fysisk planering? (3) På vilka sätt kan strategisk fysisk planering bidra till teoriutvecklingen av social-ekologisk resiliens? I enlighet med de metoder som används i tolkande politisk analys, baserar sig avhandlingsarbetet på kvalitativa intervjuer, etnografiska observationer, deltagande observation och dokumentanalys – metoder vilka har applicerats i fallstudier av strategisk fysisk planering i Melbourne och Stockholm.

Social-ekologisk resiliens erbjuder stadsplaneringen ett delvist nytt angreppssätt för att förstå komplexa, dynamiska, icke-linjära ”människa-natur” relationer med särskild inriktning på ekologiska förutsättningar. Detta är relevant då det svarar på en önskan bland planeringsteoretiker att ge mer uppmärksamhet åt frågor av mer substantiell karaktär, i synnerhet ekologiska processer. När det gäller praktik, ser planerare en betydande potential för att använda sig av social-ekologisk resiliens inom strategisk fysisk planering. Denna potential omfattar utformningen av problem, verktyg för analys och syntes samt identifiering och genomförande av styralternativ. Teoriutvecklingen av social-ekologisk resiliens gynnas i sin tur av insikter som kan dras från detaljerade empiriska fallstudier kring hur strategisk fysisk planering hanterar några av de underliggande antagandena för social-ekologisk resiliens. I urbana system spelar staten en viktig roll i hanteringen av ekosystemtjänster. Detta avhandlingsarbete visar att de dagliga handlingar som administratörer, förtroendevalda, planerare, naturvårdare och medborgare utför inom ramen för s.k. ”mangle of practice” är av avgörande betydelse för att förklara skillnaden mellan föreskrivna ideal för att uppnå urban resiliens och vad som faktiskt sker i praktiken.

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