

# FUTURES RESEARCH: A NEGLECTED DIMENSION IN ENVIRONMENTAL POLICY AND PLANNING

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**Abstract.** The need for strategic foresight in an increasingly complex and rapidly changing world poses a formidable challenge to environmental planners and policy makers. This paper introduces futures research as an under used but fruitful set of approaches to addressing this challenge. Futures research is a transdisciplinary social science that uses a wide range of methods to explore possible, plausible, and preferable futures with the goal of anticipating and preparing for those futures. The historical context for environmental futures is briefly reviewed, an overview of futures research as a distinct field of study is presented, and several of the main methods of futures studies are described.

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## INTRODUCTION

Futures research is a transdisciplinary field of inquiry that uses a variety of distinctive methods to explore alternative futures. This paper introduces futures research as an underused but fruitful set of approaches to the formidable challenge of anticipating change in a complex and rapidly changing world. Futurists have developed important insights into the nature of change, perspectives for thinking creatively and deeply about the future, and an array of methods for exploring alternative futures. Futures research has the potential to enrich environmental and natural resource planning and policy with a cross-fertilization of new ideas and approaches. The next section describes the historical context for environmental futures. An overview of futures research as a distinct field of study follows. A final section describes several of the main methods developed and employed by futurists.

## The Historical Context for Environmental Futures

Conservationists, environmentalists, and environmental professionals have always been motivated by a strong concern for future generations and by visions of sustainable—or more often unsustainable—ecological and social futures. This orientation toward the future dates back to the beginnings of the Progressive Era conservation movement of the late 19th and early 20th

centuries. The welfare of future generations was the root concern of George Perkins Marsh's monumental 1864 book "Man and Nature" (Lowenthal 2001), which has been called "the fountainhead of the conservation movement" in the United States (Mumford 1931: 35). In the 1960s, the modern environmental movement was spurred by an urgent desire to avoid the dystopian ecological future reflected in the title of Rachel Carson's "Silent Spring" (1962). The seminal Brundtland Commission report, "Our Common Future," sparked a worldwide and ongoing discussion about sustainable development, defined as ". . . development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Economic Development 1987: 43). Visions of environmental futures that have motivated generations of environmental stakeholders have often been dominated by neo-Malthusian warnings of environmental degradation, natural resource scarcity, food shortages, and overpopulation (e.g., Brown 1954, Meadows et al. 1972, Sears 1935), although other visions have portrayed a much brighter view of environmental futures (e.g., Glesinger 1949, Lomborg 2001, Simon 1981).

The pervasive orientation toward the future in conservation thinking has been institutionalized in environmental protection and natural resource management agencies over the past century, beginning with the founding legislation and mission statements of these agencies. For example, the "Organic Act" that created the U.S. National Park Service in 1916 states that the purpose of the National Parks is to ". . . conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (National Park Service Organic Act, 16 U.S.C.1., 1916). The mission of the U.S. Forest Service is to ". . . sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations" (U.S. Department of Agriculture, Forest Service 2008). Numerous additional

examples of future-oriented missions could be given for national, state, and local environmental agencies around the world, as well as for nongovernmental environmental organizations and environmental policy think tanks.

Environmental agencies and organizations have often struggled to fulfill these future-oriented missions, however. Environmental agencies and scientists have devoted substantial effort to forecasting, but this work has been plagued by a host of shortcomings and the track record has been poor at best (Pilkey and Pilkey-Jarvis 2007, Sarewitz et al. 2000, Sherden 1998). Ecological forecasts are filled with irreducible uncertainties due to drivers beyond the scope of ecology (e.g., climate change, demographic change, and management interventions), unknown feedbacks in coupled social-ecological systems, and unpredictable human actions (Carpenter 2002). The complex interactions of people and ecosystems ensure that ecological forecasts are highly uncertain. Experience in the social sciences confirms that predictions of social phenomena are also notably inaccurate. Sociologist Seymour Martin Lipset reviewed the accuracy of forecasts in economics, demography, sociology, and political science, and concluded, “Social scientists are good historians. They are able to understand the processes in what has already happened. But they have not been good forecasters” (Lipset 1983: 157). Even the latest generation of economic forecasting models (Dynamic Stochastic General Equilibrium models), the product of a decade of intense research, fail dismally at forecasting basic economic variables, although they perform no worse than other economic forecasting methods (Edge and Gurkaynak 2010).

Despite the shortcomings of traditional approaches to social and ecological forecasting, the need for environmental foresight has increased in recent decades as the pace of change has accelerated and the frequency of surprise has increased. The Millennium Ecosystem Assessment (2005: 1) concluded that “over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fiber, and fuel.” Surprises are increasing along with the expanding scale of human impacts (Gunderson and Folke 2008). Hibbard et al.

(2007) refer to the period following World War II as the “Great Acceleration,” a time of significant increase in the scope, scale, and intensity of impacts on the social-ecological system. Global indicators of the Great Acceleration discussed by Hibbard and colleagues include rapid growth in human populations, atmospheric carbon dioxide concentrations, average global temperatures, use of nitrogenous fertilizers, percentage of marine fisheries fully exploited, and species extinctions. Add to these changes the rapid pace of technological change with the potential for sweeping environmental effects—such as genetic engineering and nanotechnologies—and it is clear that the need for environmental foresight has never been greater (Olson and Rejeski 2005).

## AN OVERVIEW OF FUTURES RESEARCH<sup>1</sup>

Futures research, also called futures studies, futures, and strategic foresight, has been defined as a “methodological-based form of inquiry into alternative futures in terms of what is possible, probable, and/or preferable with the goal of anticipating and possibly influencing those futures” (Kubik 2009: x). Bell (1997) further characterizes futures research as a transdisciplinary social science and an “action science” with an orientation to informing decisionmaking and action. Futures research is distinct from strategic planning, although there is a symbiosis and a widely recognized link between these two fields (Cole 2001). Both futures research and planning may identify preferable futures in terms of vision and goals. But where planning involves the development of a specific course of action to achieve stated goals, futures research provides a broader and longer-term perspective, explores a range of alternative futures, and provides essential context for planners’ and policy makers’ more specific concerns.

A central principle of futures research is the importance of exploring and preparing for multiple plausible futures, not just the one considered most likely, because the future is fundamentally uncertain (Bishop et al. 2007). As futurist Herman Kahn stated, “The most likely future isn’t” (1982: 82). In other words, even what is considered the most likely future is a low-probability

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<sup>1</sup>This section draws from Bengston et al. (2012).

event given the complex nature of social-ecological systems and the frequency of discontinuous change and surprise. The most disruptive type of discontinuous change involves events of low probability but high impact, which futurists often refer to as “wild cards” (Cornish 2004, Petersen 1997). Rather than attempting to predict the most likely future—the goal of traditional scientific forecasting—the goal of futures research is to explore a range of possible and plausible alternative futures, in addition to the most probable future or baseline forecast (Bishop 1998, Cornish 2004). The frequency of discontinuous change makes it vitally important that we think broadly about the future, to minimize the risk of being surprised and unprepared.

The origins of futures research are sometimes traced back to a long tradition of utopian writings exploring preferred futures, beginning with the publication of Thomas More’s “Utopia” in 1516. Bell (1997), Strathern (2007), and others have examined the early roots and many diverse strands of futures research, which reveal the deep human need—rooted in survival—to anticipate and influence the future course of events. In the modern era, futures research is sometimes traced to the 1901 publication of H.G. Wells’ “Anticipations of the Reaction of Mechanical and Scientific Progress upon Human Life and Thought,” which proposed a science of the future (Wager 1991). In 1932, Wells discussed the need for “professors of foresight” and university departments of foresight to anticipate and prepare for the future (Wells 1987). Not until the post-World War II era, however, did futures research begin to take shape as a distinct field of study. Work on the future of military technology was carried out in the 1950s by RAND Corporation, a think tank that grew out of early operations research and systems analysis. RAND served as a training ground for many early futurists, including Herman Kahn, one of the pioneers of scenario analysis, and Olaf Helmer, who helped develop the Delphi method. The Defense Advanced Research Projects Agency—one of many U.S. Department of Defense units that include futures research—was established in 1958 as a response to a “wild card” event: the Soviet Union’s launching of Sputnik.

The development of futures research accelerated during the turbulent 1960s and 1970s. Many futures organizations were founded at this time, including the U.S.-based World Future Society in 1966 and the more international World Futures Studies Federation in 1967. Best-selling futures books such as “Future Shock” (Toffler 1970), “Limits to Growth” (Meadows et al. 1972), and “Megatrends” (Naisbitt 1982) captured the public’s imagination and elevated popular awareness of futures research.

In recent decades, futures research has developed into a well-established transdisciplinary field. Numerous academic and popular futures journals have appeared, including Foresight, Futures, Futures Research Quarterly, Futuribles (in French), Futurics, Journal of Futures Studies, On the Horizon, The Futurist, Technological Forecasting and Social Change, and World Future Review. Many business journals regularly publish futures research, such as International Journal of Forecasting, Long Range Planning, and Strategic Management Journal. Academic futures programs have also developed around the world, and the World Futures Studies Federation has compiled a list of the various tertiary futures educational programs, including graduate programs in futures studies and programs that incorporate futures studies, as well as single units, short courses, and online futures studies courses (World Futures Studies Federation 2012). The World Future Society’s annual conference currently attracts about 1,000 attendees, and its “Futurist Directory” lists nearly 1,400 people professionally involved in the study of the future (World Future Society 2000). A major global futures research effort, the Millennium Project (Millennium Project 2012), was initiated in 1992 by the Smithsonian Institution, The Futures Group International, and the United Nations University. The Millennium Project is now an independent, non-profit futures research think tank with nodes in 40 countries around the world, and it produces an annual “State of the Future” report as well as many special studies.

Within futures research, a variety of distinct traditions have developed since the 1960s. Futurists hold many different views of what futures research is and how the

study of the future should be approached (Inayatullah 1996). Gidley et al. (2009) identify five traditions, which they label predictive-empirical, critical-postmodern, cultural-interpretive, prospective-action (or participatory futures), and integrative-holistic. A detailed discussion of these traditions or other proposed typologies of futures research is beyond the scope of this paper, but each can generate useful insights depending on the decision context. Multiple traditions are often employed in futures research as a strategy for dealing with fundamental uncertainties.

In sum, futures research is now a mature field of study with a considerable body of literature, many specialized journals, professional organizations, and distinct methods and perspectives for studying possible, plausible, and preferable futures. The majority of futures research nonetheless remains invisible to the scholarly community and the public because it takes place in military units, intelligence agencies, and corporations around the world and is hence proprietary or confidential. In nearly all major corporations, applied futures research is quietly carried out either by a dedicated futures group or, more often, under rubrics such as strategic and long-range planning, technological forecasting, strategy development, and horizon scanning. Limited versions of this research are sometimes published (e.g., Chief of Force Development 2010, Central Intelligence Agency 2000, Royal Dutch/Shell Group 2005), but most is closely guarded and unpublished. Thus, due to the proprietary or confidential nature of most futures research, the published literature is the tip of a much larger iceberg (Bell 1997).

## **FUTURES RESEARCH METHODS**

As a transdisciplinary field of inquiry, futures research embraces methodological pluralism, the philosophy of science that claims multiple disciplinary approaches, frameworks of analysis, and ways of knowing are required to understand complex systems or phenomena (Norgaard 1989). Consequently, futurists have developed a wide range of methods and borrowed or adapted methods from many fields. A comprehensive futures project usually involves multiple methods to address different dimensions of the problem. Several leading futurists

have provided comprehensive reviews of futures research methods (e.g., Bell 1997, Fowles 1978, Glenn and Gordon 2009, Helmer 1983). This section briefly reviews several of the main methods used in futures research: scanning, visioning, the Delphi method, and scenarios.

Scanning, also called horizon scanning or environmental scanning, refers to a wide range of processes for identifying and understanding significant emerging trends in the external environment of an organization (e.g., a government agency, corporation, or non-governmental organization) or an area of interest (e.g., biological diversity, wildfire, or ecosystem services). Ideally, scanning serves as an early warning system to identify potential threats and opportunities. The goal is to find early indications of future developments that may be important. Gordon and Glenn (2009: 4) characterize scanning as “the central input to futures research” because the emerging trends identified through scanning are often used in other futures research methods. Scanning was first used extensively during World War II and has long been standard practice in business as well as many government agencies (Cornish 2004). The digital age has transformed scanning and there are now hundreds of approaches tailored to specific decisionmaking contexts, all of which involve identifying and classifying trends or potential trends into categories. A key element of effective scanning systems is feedback from management to the scanning team, so the system can “learn” to produce the most germane information and improve performance (Gordon and Glenn 2009).

Visioning or preferred futures methods involve identifying and choosing a preferred image of the future, a vital step in most comprehensive futures research projects (Hines and Bishop 2007). A vision is a compelling statement of the future that a group or organization wants to create based on shared deep values and purpose (Bezold 2009), or an idealized state that conveys the possibility of future attainment (Huber 1978). Images of the future are important because they enhance options and possibilities in the present (Slaughter 1995). “Future workshops” to create visions of preferred futures were organized and conducted in Europe by writer and futurist Robert Jungk beginning in

1962 (Jungk and Mullert 1987). While Jungk and others were conducting future workshops in Europe, Americans Edward Lindaman and Ronald Lippitt created a similar method called Preferred Futuring. Various forms of Preferred Futuring have been used by tens of thousands of organizations (Lippitt 1998).

The Delphi method, named after the Greek oracle at Delphi, is a futures research technique that solicits and structures the opinions of a panel of experts over multiple rounds to develop assessments of alternative futures (Kubik 2009). This method was developed at the RAND Corporation in the early 1950s in a study of the likely effects of nuclear war (Linstone and Turoff 1975). Early applications of this method were dominated by forecasting advancements in science and technology, following the lead of the classic Delphi study by Gordon and Helmer (1964). The Delphi method, in its many forms, has been applied in thousands of studies internationally for a wide range of purposes (Gordon 2007).

Scenario development and analysis is the most widely used futures research tool for helping decisionmakers think creatively about possible and plausible futures in the context of a world of great uncertainties. Glenn and The Futures Group International (2009: 2) define a scenario as "... a story with plausible cause and effect links that connects a future condition with the present, while illustrating key decisions, events, and consequences throughout the narrative." The output of scenario analysis is a set of stories or narratives about plausible futures. The stories are not predictions, but represent a range of plausible futures intended to help decisionmakers and other stakeholders build adaptive capacity to make their systems more resilient. The scenario method was developed by Herman Kahn and others at RAND Corporation and was first brought to public attention by the publication of Kahn's influential books (e.g., Kahn 1962, Kahn and Weiner 1967). Scenario analysis has been widely used for many decades in military and business planning (Bradfield et al. 2005). More than two dozen specific techniques for developing scenarios have been identified, and Bishop et al. (2007) discuss eight broad types of scenario development methods. Unlike other futures research

methods, scenario analysis has increasingly been applied to environmental issues. A growing number of large-scale environmental studies include or are based on scenario methods, such as the Intergovernmental Panel on Climate Change (IPCC) reports (Solomon et al. 2007), and the Millennium Ecosystem Assessment (Carpenter et al. 2005, Raskin 2005).

Many other futures research methods have been developed by futurists or adapted from other fields, each with unique advantages and disadvantages depending on the context. For example, the Millennium Project's "Futures Research Methodology—v.3.0" describes more than 30 individual methods, including the futures wheel, cross-impact analysis, technology sequence analysis, and relevance trees. Together, these methods constitute a diverse and powerful tool kit for examining alternative futures.

## CONCLUDING COMMENT

This paper has briefly introduced futures research as a vital but often overlooked dimension in environmental science and policy. Futures research explores a range of possible, plausible, and preferred futures, and examines their implications for planning, management, and policy. The methods of futures research have been widely and productively applied in business and military spheres over the past 50 years, yet are mostly unknown in environmental affairs, with the exception of the recent surge in the use of scenario analysis in global environmental assessments. These relatively recent applications of a core futures method are encouraging and have demonstrated the usefulness of futures research as an alternative to traditional forecasting methods in dealing with irreducible uncertainties and exploring alternative futures. Application of the full range of methods and perspectives of futures research to environmental policy, however, has been scattered and minimal. Consequently, futures research has contributed relatively little to environmental issues to date, despite the need to effectively explore alternative futures for sound policy and planning in a rapidly changing world. Futures research offers a valuable set of tools and perspectives, and has an important role in sustainability science and policy.

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