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**CONVERGENT
EVOLUTION IN
THE INTEREST OF
INTEGRATIVE PROBLEM
SOLVING:**

Connecting the Policy Sciences and
Interdisciplinary Studies

by

Richard L. Wallace

Professor of Environmental Studies, Ursinus College
and

Susan G. Clark

Joseph F. Cullman Adjunct Professor of Wildlife Ecology and Policy
Sciences

School of Forestry & Environmental Studies, Yale University

Abstract: The contemporary fields of interdisciplinary studies and the policy sciences have evolved over similar intellectual paths and timelines, beginning in the early 20th century. Both have their roots in professional efforts—within and outside the academy—to address numerous, growing, and complex problems that face humanity. The policy sciences’ approach to integration via interdisciplinarity serves the civic and public processes of community and decision making that address these problems, while at the same time respecting the individual human being. This goal explicitly

seeks dignity for all individuals in healthy environments. The policy sciences offer a framework and an intellectual toolbox with a fundamental set of operations to achieve integration via interdisciplinarity in the interests of problem solving. This framework guides interdisciplinarity in practical, teachable, and learnable terms, the history of which mirrors the evolution of interdisciplinary studies. A review of the policy sciences in the context of interdisciplinary studies emphasizes their shared heritage and raises important questions about how isolated communities of scholars and practitioners with a convergent evolution might collaborate to promote greater achievement of their common goals.

Keywords: interdisciplinary studies, interdisciplinarity, integration, policy sciences, problem solving.

Interdisciplinary studies (IDS) and the policy sciences are two areas of inquiry and practice that have a great deal in common, but have seldom crossed intellectual paths, either in the literature or in the self-identification of their respective practitioners. In this article we hope to describe their common heritage and standpoint and their convergent evolution. We do so in the hopes of creating linkages between IDS and policy sciences upon which future intellectual and practical relationships may be built. We believe building such relationships is a means of creating greater intellectual and professional capacity—in essence, strength in numbers—represented by the alliance of two separate but similarly-oriented professional communities.

Policy scientists are analysts “whose skills of integration of knowledge and contextual mapping can contribute intelligence to decision makers, enhancing the likelihood of attaining desired outcomes” (Pielke, 2004a, p. 216). We write this article as policy scientists whose careers have tracked closely with the goals, history, and methods of IDS. Our careers in teaching and research have been diverse, with much of our work concerned with the governance and conservation of wildlife and ecosystems and, over the past several years, with the structure and function of higher education and its influence on interdisciplinarity. We have taught at all levels of the academy, though one of us (Richard L. Wallace) has forged a career in the undergraduate liberal arts, while the other (Susan G. Clark) has worked primarily in a graduate school of a large research university. Collectively, our academic and non-academic experience spans 75 years and includes federal government service, the foundation and direction of 501(C)3 organizations, and much else, including research and applied work in more than 15 nations on every continent except Antarctica. Throughout it all, we have hewed to the goals of interdisciplinarity as elucidated by the policy sciences framework, and—as we were fortunate to discover—in keeping

with the main tenets of IDS.

In this article, using a combination of personal experience and analysis of the literature in both policy sciences and IDS, we hope to demonstrate the shared vision of our respective communities. To do so, we will provide a brief introduction to the policy sciences, give examples of recent trends in policy sciences literature and practice that reflect the principles and goals of IDS, explore the common heritage of the policy sciences and IDS, identify some of the obstacles to the widespread comprehension and application of integration and interdisciplinarity (as they pertain to both policy sciences and IDS), and discuss what the policy sciences and IDS communities might usefully offer one another, intellectually and practically.

An Introduction to Policy Sciences

The policy sciences provide a distinct integrative framework¹ for understanding and analyzing complex social problems. The framework represents a configurative method with which to make sense of complexity that is presented in fragmentary form by standard disciplinary approaches to problem solving (Brunner & Willard, 2003; Lasswell, 1971a). As an area of theory and practice, the policy sciences have been in active use since the early 20th century. The foundational literature by Harold Lasswell, Myres McDougal, and their colleagues dates from 1930 to 1992. (Lasswell, a political psychologist who coined the term “policy sciences” as a distinct area of policy analysis, died in 1978; McDougal, a legal scholar whose work in the policy sciences as part of the New Haven School of legal theory is known as “policy-oriented jurisprudence,” died in 1998.) The application of policy sciences to pedagogy and other professional practice has been ongoing since the field’s inception, with shifts in its foci as participants in the scholarly and professional communities have changed. In the jurisprudence community, the principal area of focus has long been human rights. In the

¹ We follow Ostrom (2011:8) in her definition of frameworks as “the most general forms of theoretical analysis. Frameworks identify the elements and general relationships among these elements that one needs to consider for . . . analysis and they organize diagnostic and prescriptive inquiry. Frameworks provide a metatheoretical language that can be used to compare theories. They attempt to identify the universal elements that any theory relevant to the same kind of phenomena needs to include. . . Thus, the elements contained in a framework help analysts generate the questions that need to be addressed when they conduct analysis.” This definition, we believe, follows general use of the term in IDS (e.g., Newell, 2013; Huutoniemi, Klein, Brun, & Hukkinen, 2010; Klein, 2010).

policy analysis community, the past two decades have seen a substantial growth in the number of policy scientists involved in climate change and public health—areas of scholarship and practice that are interdisciplinary and integrative in ways familiar to the IDS community.

The policy sciences framework we introduce briefly here offers an analytic, empirical approach, a set of concepts, and a vocabulary to help people solve problems through the integration of knowledge and action (Brunner, 2006; Clark, 2002; see Figure 1). The policy sciences grew out of a multidisciplinary effort within the social sciences, based initially at the University of Chicago and later at the Social Science Research Council (SSRC), to develop theories and methods of integrating insights from multiple disciplines in the interest of understanding and addressing complex social problems (Fisher, 1993; Ross, 1991; Wirth, 1937; Worcester, 2001). The University of Chicago and SSRC developments were themselves an outgrowth of earlier efforts that dated to at least the middle of the 19th century. These included early conceptualizations of interdisciplinarity in the natural sciences, including the U.S. National Academy of Sciences (Cochrane, 1978), and social sciences, as in the American Social Science Association, which predated the formation of the modern social science disciplines in U.S. higher education, and was perhaps the first American organization to promote integrative problem-oriented inquiry with a normative bent (Haskell, 1977).

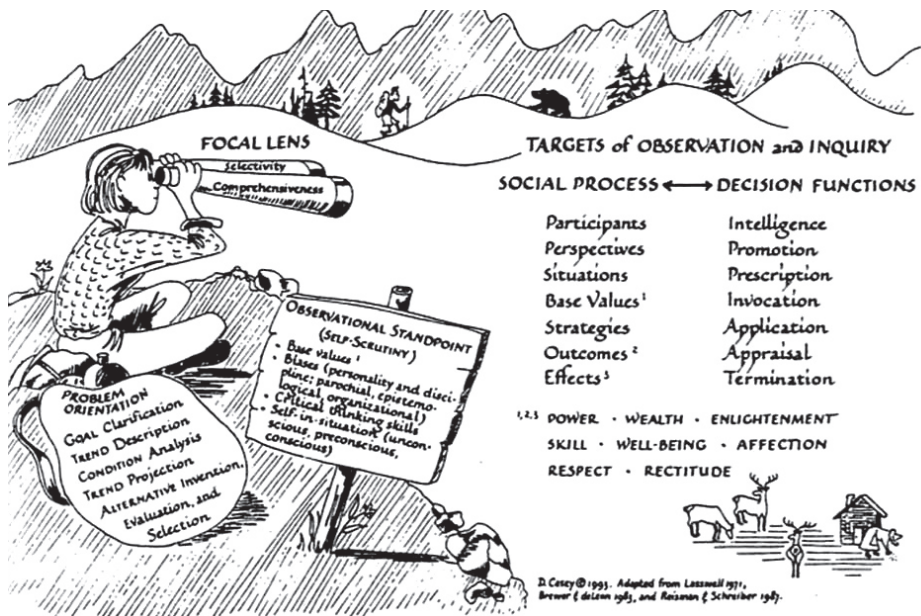


Figure 1. A representation of the interdisciplinary framework showing the major researchable categories that characterize human interaction with the environment (nature) and resources (see Lasswell, 1970; Clark, 2002).

Even with such precedent as a backdrop, the SSRC's efforts to create and implement a theoretical and methodological framework to promote integration ultimately failed. This was due to an apparent lack of will among the principal participants to contest the dominant disciplinary paradigms of the day, which were then well on their way to solidifying in the modern forms with which we are familiar (Wirth, 1940). In short, SSRC's principals feared that their efforts to promote integrative theories and methods would appear "radical" in the face of then-developing disciplinary norms (Fisher, 1993). In this way, the SSRC's efforts actually demonstrated an early failure of multidisciplinary, illustrating lessons elucidated later in the IDS community, including Newell and Klein's point that multidisciplinary approaches "leave underlying assumptions unexamined" (1996, p. 404) and Klein's definition of multidisciplinary as an approach in which "the status quo is not interrogated" (2010, p. 181). SSRC appears to have hoped to achieve integration without pushing beyond these intellectual and professional boundaries—i.e., without upsetting the disciplinary status quo.

Harold Lasswell, seemingly alone among the participants in the SSRC's efforts, remained untroubled by the fears of disciplinary backlash, and devoted most of the rest of his career to developing the framework we now call the policy sciences. His work was expressly normative, reinforcing John Dewey's (1931, 1939) views on the benefits of values in the use and application of science, and also pragmatic, in the sense that it proposed a method of inquiry that was contextual, reflective, and problem-oriented. Finally, in his development of the policy sciences framework, Lasswell also provided an emphatic affirmative response to several mid-century analyses of higher education (and the societal pressures that influence it) that explicitly advocated integrative and problem-oriented social inquiry (e.g., Hopkins, 1937; Lynd, 1948).

Lasswell's career was one of contrasts, as he was at once perceived as a leader among American social scientists (becoming president of the American Political Science Association in 1956) and as an iconoclast devoted to integrative theory and method meant to transform the confines of traditional disciplinary science (Auer, 2006; Brunner, 2008; Farr et al., 2006). Throughout his career, he married his desire to integrate science and values with his efforts to organize knowledge and refine methods "for the broader purposes of democracy in a world threatened by ignorance, force, and totalitarian ideologies" (Farr et al., 2008, p. 22). Lasswell's life's work was the integration of morals, science, and policy in the interests of human dignity for all people (Brunner, 2008).

Although he never became as well-known as some of the scholars who openly acknowledged his influence (including Nobel Prize winners

Herbert Simon and Elinor Ostrom), Lasswell's work presaged approaches to integrative problem solving that many disciplines and "meta-disciplines" use today, including those we mention above and discuss in greater detail below. The intellectual tools that Lasswell developed to facilitate implementation of his framework are "the most influential part of his legacy" (Auer 2006, p. 541). Lasswell's work and influence remain timely, given the number, size, and diversity of problems that humanity faces, and the need to integrate diverse areas of knowledge and practice to address what Biermann, Campe, and Jacob describe as the urgent need to "transition to more sustainable paths for the human enterprise" (2004, p. iii). In the face of these challenges over more than half a century, policy scientists have adopted what Repko (2012, p.4) classifies (and advocates) as an "integrationist interdisciplinarian" approach to problem solving, one in which interdisciplinarity is the means to achieve the goal of integration. It is on this foundation that we policy scientists seek to implement Lasswell's framework in our efforts to address complex problems. Those efforts begin with what have come to be known as the "mapping" tools of the policy sciences or, colloquially, the "toolbox."

The policy sciences toolbox represents the components of an analytic framework that rests on foundational principles abstracted and distilled from human experience—including disciplinary expertise and personal and professional experience that cannot be so easily categorized. The framework and its toolbox serve as a stable frame of reference that helps researchers and problem solvers to understand, diagnose, and resolve complex problems towards the overarching goal of promoting human dignity (Cantegreil, 2008; Clark et al., 2011a & 2011b; Mattson & Clark, 2011; Nagan, 2013; Van Doren & Roederer, 2012; Wiessner, 2010). The policy sciences' pragmatism—a result of its careful and deliberative development, wide application, and reflective practice—responds to concerns about the subjectivity of interdisciplinarity in its application to social problems—for example, Klein's (2001) question about how (and whether) interdisciplinarians can authoritatively identify pattern in complexity. The policy sciences propose one configurative framework for doing so, in a manner that complements, perhaps even illustrates, IDS theory as elucidated by Newell (2001a, 2001b, 2013), and responds to the "drivers of interdisciplinarity" mapped by Repko (2012, pp. 32-66). In fact, much as Repko (2012) presents a "map" of the landscape of interdisciplinarity, the policy sciences present a set of mapping tools to realize interdisciplinarity in practice that are meant to be methodologically applicable in any context.

The five basic intellectual tools of the policy sciences are (1) problem orientation, (2) contextual mapping of social and decision processes, (3) use of multiple methods, (4) clarification of standpoint and perspectives, and (5)

elucidation in context of common interest goals (Clark, 2002; Lasswell, 1971b; Lasswell & McDougal, 1992). These tools, while useful in isolation, were designed to be used in concert with one another, to provide a comprehensive approach that utilizes interdisciplinarity as a means to achieve integrative problem solving.

The use of the word “comprehensive” in describing the policy sciences may raise hackles if misperceived as a dismissal of other approaches to the analysis of complex problems (see, e.g., Auer, 2006). Regardless of whether scholars agree on whether comprehensiveness is attainable, it is clear that it is both a desirable goal (in the context of our efforts to grapple with complex problems) and one that is a direct response to a century of intentional fragmentation and specialization of knowledge and practice within and outside of the academy. These trends and the comprehensivist response are well recognized by both the IDS and policy sciences communities (e.g., Auer, 2006; Boix Mansilla, 2006; Brunner, 2007; Cantegreil, 2008; Clark, 2002; Lasswell, 1971a, 1971b; Lasswell & McDougal, 1992; Newell 2001a, 2013; Repko, 2006, 2012; Wiessner, 2010).

In the following passages, we very briefly introduce the policy sciences toolbox and its constituent operations.

Problem Orientation

Problem orientation is a method for determining and undertaking procedural (and substantial) rationality by “mapping” the content of a subject to be addressed. It begins by selecting and defining a problem or other context, and then involves five interactive operations relative to the problem definition, each of which contains one or two questions (Clark 2002, after Lasswell, 1971 and Lasswell & McDougal, 1992):

- *Clarify goals*: What are we trying to accomplish with regard to the problem?
- *Map trends*: What has happened to date relative to the problem? To what extent have past and recent events approximated goals?
- *Identify conditioning factors*: What factors have caused the observed trends?
- *Make projections*: If nothing is done to mitigate the trends and conditions, what is likely to happen in the future relative to the goal? If alternatives are implemented, what will happen?
- *Develop and evaluate alternatives*: What can be done to mitigate the trends and conditions and achieve the goals?

In the policy sciences' canon, problem definition implies an interdisciplinary approach towards the goal of integrative problem solving. In our problem-oriented pedagogy and practice, for example, we have long characterized problems (somewhat anthropomorphically) as teaching us which disciplinary knowledge and methods it will be necessary to integrate in order to understand and address the problem at hand (Clark & Wallace, 2012; Wallace & Clark, 1999). This understanding of the role of problems in interdisciplinary thought and action is central to the policy sciences framework. It is the method that most directly reflects the history of problem-oriented interdisciplinarity briefly recounted above, and well represents more recent high-profile calls for problem-oriented inquiry (e.g., National Academies, 2005; Norgaard & Baer, 2005; Pfirman, 2003; Policansky, 1999; Rhoten & Parker, 2004). As is well understood in both the policy sciences and IDS communities, problems do not adhere to the structures of knowledge and method in higher education, and interdisciplinary approaches are meant to create new structures that "fill gaps...created by inattention from the disciplines" (Repko, 2012, p.35). Problem orientation is one means of providing structure to knowledge and method to facilitate interdisciplinarity, and of making the best use of essential disciplinary contributions, toward the goal of integrative problem solving.

The following two operations call for mapping, respectively, the social context in which problems are addressed and the decision making processes that participants pursue in addressing problems.

Social Process Mapping

Social process mapping requires examining the role of people in interaction with one another, the environment, and institutions, as well as the outcomes and effects of these interactions. Muth and Bolland (1983; after Lasswell, 1970) and Clark (2002) succinctly list the categories of social process that, as with problem orientation above, imply questions necessary to identify their content:

- *Participants* are the individuals, groups, organizations, or institutions that participate in a problem arena. Questions that facilitate analysis of the social process include: Who is participating? Whom would you like to see participate? Who is demanding to participate? Who is being excluded?
- *Perspectives* are participants' expectations, beliefs, demands, preferences, and interests. Questions include: What do participants or

potential participants want from their involvement in the problem, in terms of values and resources? What assumptions and paradigms of thought and practice do they bring to the problem orientation? Which paradigms are missing (but desirable) in the social process – i.e., which would you like to see among participants?

- *Situations* are the places and times when participants interact and the channels of communication they use. Questions include: When and where do participants interact? In what situations would you like to see them interact? How are the situations created (e.g., are they mandated by law, imposed by institutional structures, self-selected by participants, etc.)?
- *Base values* are the resources or capabilities that participants bring to the social process. Questions include: Which values (i.e., skill, knowledge, respect, rectitude, wealth, power, affection, well-being) do participants use in their efforts to achieve their goals or to address the problem? Which values exist among participants, but are not being well used by participants in addressing the problem? What values would you like to see participants use to address the problem?
- *Strategies* are the methods participants use to manage their base values—in other words, the actions and behaviors that participants engage to apply, share, defend, impose, maximize, or otherwise use the values at their disposal. Questions include: What strategies do participants employ in their efforts to address the problem or achieve their goals? What strategies would you like to see used by participants in pursuit of problem solving? Given that different participants bring different value strengths, what is the best way to integrate the available value resources into a workable problem solving strategy? Do participants choose strategies in order to influence other participants' base values?
- *Outcomes* are the benefits that participants attempt to achieve through their strategies. Outcomes also refer to the ways in which values are shaped, shared, or redistributed in participants' interactions in the social process. Questions include: What problem-oriented outcomes are achieved in the ongoing interactions among participants? Are values shaped and shared in the interests of solving the problem at hand, or in the interests of protecting individual participants' values? Who gets which value resources (e.g., respect, knowledge, well-being, etc.)? Is anyone deprived of values due to others' strategies? Is there a preferred distribution of values among participants, given the problem being addressed and the situations in which participants are interacting?
- *Effects* are the long-term consequences of participants' actions or the implications of the outcomes that occur, both individually and

pertaining to the problem. Questions include: What are the long-term effects of outcomes on the distribution and sharing of values among participants—in other words, are participants likely to work together more effectively, or less, in the context of the problem at hand? Have participants' behaviors or interactions changed, and if so, how? Is problem solving more or less likely to be facilitated by the social process?

Mapping the social process requires interdisciplinary thinking, and understanding how to manage the social process requires the ability to integrate multiple perspectives and values into a problem-oriented strategy. Academic contexts provide a familiar illustration of this, as the social process of higher education—that is, the shaping and sharing of values in college and university settings—is largely determined and influenced by the academy's disciplinary structure. As both policy scientists and practitioners of IDS know, operating effectively in academic social processes requires sensitivity to disciplinary biases and the influence of those biases on interdisciplinarity, especially when promoting integrative strategies that might seem threatening to disciplinary norms (Henry, 2005; Jacobs, 2013; Rodgers, Booth, & Eveline, 2003; Trowler, Saunders, & Bamber, 2012). Tension between disciplinary and interdisciplinary structures creates anxiety (Crease, 2012), but a strong understanding of the complexities of the academic social process—and the ability to maneuver within it—can help to reduce this anxiety by providing tools to facilitate productive collaboration or, at least, an ability to predict or even avoid stressful interactions (Auer, 2003; Brunner & Willard, 2003; Clark, Steen-Adams, Pfirman, & Wallace, 2011).

Outside the academy, social process is even messier because there are often no well-ordered disciplinary categories into which participants may be placed. This makes mastery of interdisciplinary thought about the complexity of the social process all the more important—although luckily it is often more common due to the lack of artificial disciplinary boundaries around problems (such as are so often the norm in higher education). There are numerous examples of the application of social process mapping to interdisciplinary contexts outside of higher education (e.g., Adler & Lynch, 2013; Clark & Slocombe, 2011; Del Campo & Clark, 2009; Edwards & Gibeau, 2013; Roman, Lynch, & Dominey-Howes, 2011; Saberi, 2012; Veland, Bischoff-Mattson, Lynch, Johnson, & Joachim, 2014; Wallace, 2003).

Decision Process Analysis

Methods for allocating and using resources in problem solving are determined through a decision making process. The policy sciences “decision process” model proposes seven functions in which participants engage in order to achieve individual and collective goals and work within the social process to orient and respond to problems (Clark, 2002; Mattson, Karl, & Clark, 2014; Reisman & Willard, 2011; Sloane, 2009). The functions of the decision process begin in iterative fashion, but are not strictly linear, as multiple functions feed back to one another. The seven functions, and associated expository questions (adapted from Clark, 2002, after Lasswell & McDougal, 1992), are:

- Planning (*intelligence*): the gathering, processing, and disseminating of information (i.e., planning) for decision making. Questions include: How did the issue or problem originate? Is information being collected for all relevant components of the problem and from all affected participants? Whose interests are favored by the initial problem definition? What information has contributed or should contribute to the problem orientation? To whom is information being communicated?
- Debate (*promotion*): adding intensity to the dissemination of information, selecting among and advocating for particular perspectives on the problem or decision. Questions include: Is all the information about the problem available to all participants? Which participants are advocating which courses of action? How are participants’ perspectives or biases affecting the communication of information and advocacy of decisions?
- Setting rules (*prescription*): stabilizing expectations through norms, setting rules, legislating. Questions include: What prescriptive rules have decision makers set to follow planning and promotion? Are prescriptions consistent with planning and promotion? Are they consistent with the problem orientation? Do they equitably represent the collective interests of the participants, or do they represent the interests of only a few? Are chosen prescriptions binding (i.e., formal) or informal?
- Initial implementation (*invocation*): making the prescribed choice more concrete, i.e., implementing and policing norms, rules, expectations. Questions include: Is implementation consistent with prescription? Is the choice of involved participants logical? Who will be responsible for enforcement? Are the necessary resources available?
- Final implementation (*application*): further adaptive implementation

of the prescription, i.e., adjudication, evolution of implementation in response to circumstances. Questions include: How will disputes be resolved? Is accountability for implementation consistent as time passes and experience accrues? Is resource availability being maintained?

- Monitoring and evaluation (*appraisal*): conducting appraisals of decision making according to initial objectives, holding participants (including oneself) accountable for actions taken, i.e., assigning or taking responsibility for successes and failures. Questions include: Is the program monitored and evaluated regularly? How is evaluation carried out—are all functions of the decision process successfully evaluated? Who evaluates the evaluators? Are the results of evaluation used to improve earlier functions of the decision process? Who is and who is not served by the evaluation?
- Ending or transition (*termination*): establishing and implementing an ending to the decision making process, i.e., canceling a prescription and dealing with the claims of those who acted in good faith under it. Questions include: Who is responsible for termination or transition? Who is served or harmed by ending the program? How should termination be carried out to best serve the problem and community of participants?

In a problem-oriented context, analyzing decision processes involves the same interdisciplinary lens as social process mapping. In the policy sciences framework, decisions about problems are made by participants in the social process. Thus, decision making in the context of complex problems will feature interdisciplinary characteristics and demand integrative solutions, just as the result of a problem-oriented analysis does. The functions of the decision process provide the analytical tools necessary (as with the social process functions) to make sense of the complexity of behavior and information in interdisciplinary decision making. Ideally, if the analyst's skills are sufficient, decision process analysis provides another vector by which to integrate knowledge and skills (or theory and methods) in the interests of complex problem solving. Policy scientists have been using these decision process functions for decades (e.g., Lasswell, 1956) and continue to apply them in contemporary interdisciplinary contexts (e.g., Adler & Lynch, 2013; Clark, 2009; Clark, Lee, Freeman, & Clark, 2008; Sager, 2007; Sloane, 2009; Tryhorn & Lynch, 2009; Wallace & Semmens, 2010).

Multiple Methods

The policy sciences' concept of "multiple methods" is a synonym for procedural or methodological interdisciplinarity. The idea of multiple methods in the policy sciences is to recognize that, as with interdisciplinary methods in the interest of integrative problem solving, it is necessary to mobilize any method that might be helpful. This view seems obvious now, due to its wide philosophical acceptance and broad reflection in the literature (Szostak, 2004). Its birth in the policy sciences lexicon, however, dates from Lasswell's earliest efforts to delineate the explicit norms and practices of the policy sciences framework (Lasswell, 1935 & 1948; Lasswell & Lerner, 1951)—efforts that coincided with and followed the efforts (and subsequent failures) of the SSRC to promote interdisciplinarity (in which Lasswell participated before setting out on his own work). The sequence followed by SSRC—recognition of the centrality of the disciplines, followed by the struggle to establish interdisciplinary method, helped to cement Lasswell's belief that

the most fruitful policy science idea is...that all the resources of our expanding social science need to be directed toward the basic conflicts in our civilization which are so vividly disclosed by the application of scientific method to the study of personality and culture. (1951, p. 8)

From this problem-oriented normative initiation, the policy sciences attempted to develop an intellectual rationality of interdisciplinary content and procedure—the toolbox—to serve problem solving. The goal was to remain unbiased towards (and thus not limited by) one or another set of disciplinary methods. And although Lasswell's initial forays into interdisciplinarity were from his perspective as a social scientist, he recognized the requisite breadth of a problem-oriented approach as including any methods necessary to respond to the problem (Lasswell, 1970, 1971b). This closely reflects the position later adopted by IDS, and characterized by Repko as "the interdisciplinary position on methods" in which

there are many methods, each with different strengths and weaknesses, and [in which] no one method or overall approach should be privileged over any other in interdisciplinary work. *Interdisciplinarians should not be bound by the theory-method combinations that disciplinarians find convenient.* This view follows from the belief that each discipline relevant to a problem has

something to contribute to producing an integrative understanding of the problem. (2012, p. 207, emphasis in original)

This is the position adopted by all policy scientists (as reflected in the many citations given above) as we strive to implement the framework in the context of complex 21st century problems. In addition, Lasswell (1951) attended to the debate on the relationship between quantitative and qualitative methods in a manner similar to Repko's (2012) acknowledgement that the debate is based on a false dichotomy of methodological supremacy. Indeed, IDS and the policy sciences are in near-total agreement about the egalitarian nature of the relationship between problem solving and the disciplines, supported by a basic understanding of the role that problems play in identifying the disciplinary knowledge and methods needed to address them.

Standpoint Awareness

The framework's constituent parts, as we have so far described them, provide a set of tools by which practitioners can practice interdisciplinarity towards the goal of integrative problem solving. However, they remain idealistic conceptions of a toolbox until personalized and contextualized. The policy sciences framework makes explicit the need for self-awareness by practitioners in social and decision processes. This approach requires clarification of each participant's standpoint—that is, how practitioners (e.g., researchers or problem solvers) see themselves in the context of social and decision processes and in relation to problems (Clark, 2002; Lasswell & McDougal, 1976; Reisman & Schreiber, 1987; Van Doren & Roederer, 2012).

Standpoint personalizes interdisciplinarity. Policy scientists should be explicit and reflective about their knowledge *of* the contexts in which they participate—asking “What do I know about the problem or decision or social process?” But, equally, policy scientists are expected to reflect upon—and learn from—their own self-awareness in contributions of knowledge and method *in* the contexts in which they participate. This combination of knowledge *of* and reflective experience *in* is the hallmark of policy sciences' professionalism (Clark, 2002). Further, the application of policy sciences tools to complex problems that are themselves highly dynamic (such as public health, climate change, and human rights) is best supported by a paradigm of practice that demands epistemological self-reflection as an accepted part of professional practice (Brunner, 2006). This is the same expectation that Klein (1990, p. 214 & 1996, p. 183) and Repko (2012, pp. 119-120) elucidate regarding IDS, and one that many policy scientists follow and advocate in

order to maintain a strong understanding of the relationship between self and subject while pursuing integrative analysis (Adler, McEvoy, Chhetri, & Kruk, 2012; Enserink, Koppenjan, & Mayer, 2011; Lynch, Tryhorn, & Abramson, 2008; Pelletier, Porter, Aarons, Wuehler, & Neufeld, 2013; Van Doren & Roederer, 2012; Wallace & Semmens, 2010).

The Common Interest

As we have described, policy sciences' approach to interdisciplinarity developed out of a desire to integrate disciplinary knowledge and skills in the interest of real-world problem solving. The context in which Lasswell and his colleagues made their early efforts was deeply informed by times of strife. Lasswell was a teenager during World War I, wrote the first of his many books and articles delineating policy sciences methods during the inter-war period, and was deeply influenced by World War II in his later, formative works refining his "configurative methods" of interdisciplinarity (Lasswell & Kaplan, 1950). It was in this conflict-rich context that the policy sciences developed the normative bent that contemporary scholars and practitioners continue to demonstrate today. To policy scientists, this is represented by the postulation of common interest goals in the context of complex problems such as climate change, public health, and human rights. The policy sciences' normative foundation is human dignity and the promotion of a socially and ecologically sustainable society (Clark & Mattson, 2011; Mattson & Clark, 2011). Policy scientists' approach to interdisciplinarity evolved out of the understanding that a common interest among people exists when value resources (e.g., respect, knowledge, well-being, etc.) are widely shared and supported by most people in a community. In turn, the problems that policy scientists aim to address through interdisciplinary approaches arise from (and are defined by) the common interests that are at stake when people interact within social groupings—from families to the community level to the national and international level—and are impeded in sustaining those interests. Policy scientists emphasize that common interests begin with individuals, emerge through social interactions, and are formalized by institutions. Finding, securing, and sustaining common interests among large groups concerning complex problems is challenging under the best of circumstances. When perspectives, behaviors, and even institutions are at odds, the skill set required of problem solvers must transcend the standard disciplinary approaches to knowledge and method in efforts to devise realistic alternatives to what are so often considered wicked problems. This is what policy scientists do with their tools, our use of which reflects a belief in the importance of integrationist interdisciplinarity in the problem solving arena.

The Shared Challenges of Policy Sciences and Interdisciplinary Studies

When policy scientists use the toolbox in practice, we often do so implicitly. As professionals working in problem-oriented contexts, our colleagues in academia, government, non-governmental organizations, and elsewhere in the public and private spheres typically do not want lessons on the rhetoric of the policy sciences—they just want to work toward solving the problems at hand. This is acceptable from the policy scientist's perspective, of course, because the tools work as a foundation for professional practice, and professionals who are not trained in policy sciences still understand the concepts of social or decision processes, or methods for orienting to problems, or lessons about standpoint and the common interest. It is much the same for interdisciplinarians: Most practitioners intuitively understand the need for interdisciplinarity in a problem-oriented context. That understanding is often accompanied by a sense of the appeal of strategies that are greater than the sum of their parts—i.e., that are integrative. But the problem with relying (or over-relying) on implicit approaches is that they are insufficient to build community around specific areas of theory and method. Both IDS and the policy sciences communities appear to share these circumstantial shortcomings, despite decades of theory development and application. Klein's recent observations about the academic community apply equally to IDS (as they were intended) and policy sciences in both academic and other professional contexts:

Publications and conference presentations proliferate across the academic sphere, amplified by calls for new approaches to research and education from professional associations, science policy bodies, and other organizations. Yet, efforts are scattered, resulting in shortfalls of wisdom and practice. Some groups interact, but too many efforts have been isolated. Their collective existence affirms the importance and prominence of integrative applied research. Yet, groups are often small, marginal or, even when achieving a threshold point of size and strength, unaware of new developments in other organizations and networks. As a result, resources are under-utilized, cross-fertilizations foreshortened and progress in establishing an identifiable field stalled by fragmentation and marginalization. (2013, p. 427)

These circumstances hinder our communities' ability to develop the necessary social capital to respond effectively to the higher-order challenges

we face. Too often, despite our and others' success in applying policy sciences in practice, we find that methodological discussions can get bogged down in debates about epistemology, definitions, communication, and classifications of knowledge and methods. Worse still are the existential questions raised by the absence of what seem to be core foundational concepts from prominent intellectual discourse. Newell (2013b) raises an example of this in his critique of the Association of American Colleges and Universities report to the U.S. Department of Education entitled *A Crucible Moment: College Learning and Democracy's Future* (National Task Force, 2012). Relating his experience promoting IDS at one of the national meetings held during the development of the report, Newell states that "a few participants were excited, but for most it just didn't compute. I suspect that's partly because interdisciplinary education is so far removed from their personal experience that they cannot imagine it" (2013b, p. 199). The same circumstances apply to the policy sciences. In the broader field of policy analysis, into which policy sciences are typically lumped by those who know little of the framework, the development of new theory is so highly valued in the incentive and reward structures of highly academic policy-analytic fields that much of the past century's worth of intellectual development goes unmentioned and uncited in purportedly broad reviews. It takes little searching to uncover new reviews that look only at relatively recent literature to the exclusion of the foundational work on which it is based (e.g., Daigneault, 2014; Petridou, 2014). Worse is the appearance of critiques of the policy sciences leveled on the basis of the most superficial explorations of the existing literature (e.g., DePuis & Biesbroek, 2013). This dogmatic phenomenon of quickness-to-criticize combined with an absence of meaningful intellectual exploration is apparent in the literature critical of the policy sciences and reflects an unfortunate intellectual weakness in the larger policy analytic community (Auer, 2006; Eulau & Zlomke, 1999). It is also a phenomenon that the policy sciences have in common with IDS, inasmuch as the literature critical of interdisciplinarity shares many of the dogmatic traits evident in critiques of the policy sciences, and there are countless examples in the literature of efforts to reinvent the interdisciplinary wheel (many of which have been discussed and cited in this journal, and which we will not revisit here).

Regardless of the weakness of criticisms of the policy sciences, there is no doubt that the policy sciences community has not promoted itself well. Lasswell, despite being viewed as heroic by his contemporaries and a smattering of later-generation scholars, was not skilled at promotion, and left a legacy (assessed by the frequency with which he is cited in the literature as well as the scope and influence of his graduate students and their progeny in promoting Lasswell's central framework) that has not increased in scope

or effect since his death (Eulau & Zlomke, 1999; Pielke, 2004a). None of this changes the belief of policy sciences practitioners in the efficacy of the framework or diminishes the successes of policy sciences in practice in the specific contexts reflected in the literature cited above and below. But it does present questions about the endurance and growth of the policy sciences community in the face of higher-order trends towards fragmentation in both academia and society (see, e.g., Muth, 2004; Pelletier, 2004; Pielke, 2004a, 2004b; Wallace, 2004). These questions are faced by both policy scientists and the IDS community.

The challenges that policy sciences and IDS share include many that are well identified in the IDS literature (in this forum and elsewhere) and reflect what policy scientists call “ordinary” and “constitutive” social and decision processes (Clark, 2002). Ordinary processes are largely structural or administrative and take place within existing institutional operations. Constitutive processes involve questions of epistemology and institutional norms and are typically much more difficult to address due to the challenges they present to the very fabric of the institutions in question. Ordinary challenges to interdisciplinarity are well elucidated (e.g., Carp, 2008; National Academies, 2004; Pfirman, 2011) and involve the sorts of impediments that policy scientists and other interdisciplinarians must face when seeking to explicitly engage our theory and methods. They include access to funding, limited publishing outlets, unresponsive or insensitive peer review processes, difficulties identifying pedagogical resources that reflect core theory and practice, time demands beyond normal (e.g., disciplinary) expectations, poor space allocation strategies, and a dearth of mentors. There are also challenges that bridge the ordinary to the constitutive. These include how to ensure strong leadership, structure and implement interdisciplinary hiring practices and promotion and tenure reviews, provide incentives and rewards that rival those provided for disciplinary work, and develop trust within all of these circumstances (Borrego & Newswander, 2011; Carp, 2008; Caruso & Rhoten, 2001; Glied, Bakken, Formicola, Gebbie, & Lason, 2007; Pfirman, 2011, Pfirman & Martin, 2010).

There are many constitutive concerns that have plagued interdisciplinarians over the decades, from existential and epistemological struggles to matters of conscience to the difficulties inherent in questioning the structure of society and its institutions of government and education. In keeping with an intellectual tradition of self-reflection and standpoint clarification, policy scientists attempt to maintain a focus on these higher-order concerns while conducting the more routine daily activities of their jobs and careers, despite the professional insecurities created by such intellectual and practical demands (Auer, 2003; Brown, 2003; Brunner &

Willard, 2003; Colburn, 2003; Duer, 2003; Gregory, 2003).

The IDS literature is replete with analyses and anecdotes of similar struggles, and Lyall (2013) describes well the institutional landscape that interdisciplinarians face in academia, addressing both ordinary (which she calls “second order”) and constitutive (“first order”) concerns that overlap considerably with the professional insecurities identified in analyses of policy sciences careers. Concerns at all scales are caused by conditions that have changed little in the decades since the establishment of the modern American university: the influence of the disciplines on bureaucratic and budgetary structures and the effect of “disciplinary hegemony” on attempts to formalize either the policy sciences or interdisciplinary studies within the academy (Auer, 2003; Brunner & Willard, 2003; Henry, 2005).

Accusations of disciplinary hegemony are not new. Henry (2005), writing in this journal, and others have cited Agger (1991) as the source for the term, but the phenomenon is well documented in the early literature describing the struggles of the Social Science Research Council mentioned above (e.g., Wirth, 1940), and of course debates over how to define and classify knowledge have been ongoing for millennia (see Trompf, 2011 for an excellent history in the context of interdisciplinarity). But in the past few decades, as IDS has evolved through the concerted efforts of its core scholars and practitioners, a more vociferous and broadly-cast emergence of disciplinary thought has occurred that ranges from reactionary (Jacobs, 2013) to circumspect and analytical (Becher & Trowler, 2001; Hyland, 2012; Trowler, Saunders, & Bamber, 2012; Trowler, 2013; Weidman, Twale, & Stein, 2001). Even fully within the community of interdisciplinarians, reactionary approaches to IDS continue to appear (e.g., Frodeman, 2014). The nature and tone of these responses to interdisciplinarity mirror many of the criticisms of the policy sciences published earlier (as mentioned above and appraised in Auer, 2006, and Eulau and Zlomke, 1999).

It is difficult to be at odds with the social and professional institutions in which we undertake our careers. For interdisciplinarians, as for policy scientists, facing chronic existential, epistemological, or ontological demands as part of daily professional life is vexing, and can cause “a kind of existential vertigo, a sense of groundlessness” (Welch, 2012, p. 123). This sense is exacerbated by larger questions faced by many of us who work in the academy, where questions about the meaning and purpose of higher education—and our role in it—have lost clarity in recent decades (Chopp, Frost, & Weiss, 2013; Deresiewicz, 2014; Diamond, 2006; Ginsburg, 2013; Mackler, 2009; Nussbaum, 2012; Roth, 2013). These circumstances, seen in aggregate, may help explain the increasing difficulty we face in maintaining integrity and perhaps even civility (Twale & De Luca, 2008). These are

heavy pressures to bear while remaining true to our beliefs and methods.

So what to do? In pursuing interdisciplinarity as problem-oriented policy scientists, we hope to avoid losing any further time to epistemological debates. We follow in the tradition of Lasswell, and thus agree with Newell (2001a, 2013) and Repko (2012) that interdisciplinarity is based on a disciplinary foundation. We sympathize with Szostak's (2007) view of the necessary symbiosis between the disciplines and interdisciplinarity, and agree with Repko, Newell, and Szostak (2012) that the best practices of interdisciplinarity (at least as policy scientists practice it) are problem-oriented. Policy scientists orient in this way for pragmatic reasons that stem directly from our deep concern about the complexity of the problems we are trying to address. At the risk of over-simplifying the arguments in the eyes of our more ontologically-minded colleagues, these reasons are that (1) the disciplines are the predominant structure of American higher education, which is the context in which we reside and from which we undertake much of our work, and (2) the problems we are trying to address—climate change, public health, human rights, and others of the highest order—simply will not wait for us to find the elusive common ground concerning definitions of knowledge and practice and their boundaries. While this may seem a strategy to avoid difficult discussions concerning the relationships between disciplinary, multidisciplinary, interdisciplinarity, and transdisciplinarity (among other approaches), those relationships have been well debated for years, and the urgency with which we wish to put interdisciplinarity to use is, we believe, not well served by engaging deeply in these discussions, much less the debates over whether interdisciplinarity has or has not been defined (e.g., Frodeman, 2011; Holbrook, 2012). As the IDS community knows better than most, it is very difficult to maneuver through the “noise” of constitutive or first order challenges while successfully attending to the day-to-day demands of our work. So, again: What to do?

One coping mechanism policy scientists—like so many other professionals—employ is to remain focused on the ordinary (second order) or smaller-scale problems that do not require facing existential demands. It helps that policy scientists believe that we have integrative methods well in hand (e.g., Brunner, 2006; Clark & Wallace, 2012; Wiessner, 2010, 2014). And indeed, as we have intimated, the policy sciences framework has been used to guide research, problem solving, and policy interventions in diverse cases over many decades. In addition to the emblematic examples of climate, public health, and human rights, the most active arena of recent growth in the application of the policy sciences tools has been in cases of environmental and natural resource conservation and management (e.g., Ascher, 2007, 2009, 2010; Ascher, Steelman, & Healy, 2010; Auer, 2008a, 2008b, 2010;

Brunner et al., 2002, 2005; Cherney, 2011; Clark & Rutherford, 2014; Clark, Hohl, Picard, & Thomas, 2014; Clark, Lee, Freeman, & Clark, 2008; Clark & Wallace, 2012; Cromley, 2000; Mattson & Chambers, 2009; Rutherford, Gibeau, Clark, & Chamberlain, 2009; Steelman & DuMond, 2009; Steelman & Hess, 2009; Wallace, 2003; Wallace & Semmens, 2010). However, as a review of these citations demonstrates, the policy sciences framework has been used largely by individuals and small groups of close collaborators. As Klein notes, “the fragility and vulnerability of local projects and programs mirror [institutional problems] at the level of individuals and teams” (2013, p. 427). This is an illustration, perhaps, of why it is folly to believe that focusing on smaller-scale cases either allows one to avoid or enables one to address the constitutive (epistemological, existential, ontological) demands of professional practice. To escape such demands requires a desire to avoid them or failure to understand (or worse, self-deception about) their existence. We see this behavior, to varying degrees, in all of our professional communities. It is compounded by how small the policy sciences community is, even after so many years. As a result, the institutionalization of its efforts in universities, government programs, and nongovernmental work has not come close to achieving the scale or prominence of more fragmentary but better disseminated efforts at problem solving and analysis.

Adding to the complexity of problem solving—as policy scientists and interdisciplinarians—is the fact that we also participate in the environmental and conservation communities’ struggle with ordinary and constitutive challenges. This struggle results in public attempts (e.g., in the literature) to make sense of barriers to professional practice that practitioners of IDS and the policy sciences have been grappling with for decades. In the environmental and conservation literature, there is much reinvention of the wheel (at least as a policy scientist or IDS practitioner would perceive it), but there is also much insightful analysis of the intellectual challenges (e.g., Adams, 2007; Clark et al. 2011b; Evans, 2012; Fortuin & Bush, 2010; Fox et al., 2006; Gardner, 2013; Gibeau, 2012; Hicks, Fitzsimmons, & Polunin, 2010; Lélé & Norgaard, 2005; MacMynowski, 2007; Miller et al., 2008; Saylan & Blumstein, 2011; Schlottmann, 2012; Sievanen, Campbell, & Leslie, 2012; Trompf, 2011). Being part of the environmental and conservation community means that we participate in at least three professional communities, each of which is struggling with common problems, demonstrates its uniquely idiosyncratic functionality (and dysfunctionality) in doing so, and operates more or less in isolation from the others.

In the policy sciences community, we fear that we are witnessing a decline in social capital due to an inability or unwillingness to address the constitutive challenges that face us. If this is true, it will be difficult

to promote the institutional change necessary to grow our community, except on a small scale. The policy sciences community, we believe, may be moving away from the self-reflection that it once exhibited and that the IDS community appears to engage so well. If this is the case, with the passage of time the policy sciences community will become less well equipped to address the constitutive challenges that face it and that it was originally conceived to address.

Interdisciplinary Studies, Policy Sciences, and the Future

So how do we, as individuals and communities, move forward? Broadly, the challenges to interdisciplinarity are well elucidated and are similar to those facing the policy sciences: institutionalizing our knowledge, theory, and methods at a meaningful scale. Lasswell believed this was “indispensable to the growth of the policy sciences” (1971b, p. 112), but despite this admonition, institutionalization at any significant scale has been negligible. In the IDS community, methods for institutionalization are well elucidated but appear to lack unity, as is indicated by the many perspectives expounded by Bammer (2013), Frodeman (2014), Frodeman, Klein, and Mitcham (2010), Klein (2013), Lyall and Fletcher (2013), Newell (2010), Repko (2012), Szostak (2012, 2013), and others. There are certain precursors of successful institutionalization, including a clear elucidation of the meaning of the language and methods of interdisciplinarity, an integrative model for research and practice, a strong body of theory, a vibrant literature on successful practices, and a devoted community (Repko, 2012). But these criteria, even when met—as we believe they are by both IDS and the policy sciences—do not seem to add up to institutionalization *at scale*, at least not in the face of widespread disciplinary hegemony and fragmentation in the academy and beyond. The question remains, how do disparate communities of scholars and practitioners “scale up” to build upon our shared interests in institutionalizing interdisciplinarity and integrative problem solving? Or is scaling up beyond our reach, given current trends and conditions?

Perhaps for IDS and the policy sciences, the challenge of institutionalizing our common interests is an ordinary and not constitutive problem. Given how much we already have in common, it appears that we have few epistemological hurdles to clear to gain a shared understanding of goals and strategies. We should be able to work well together. If so, then what is left to do is making the best possible use of the resources we have at our disposal to forge bonds between our communities. These resources include people—specifically, members of the Society of Policy Scientists and Association for Interdisciplinary Studies and others who promote and

use our frameworks—and our respective journals and annual meetings. Of course, making use of these resources is easier said than done. Even as policy scientists of some standing², we nonetheless make no claims to speak for all of the members of that community. Leadership of the Society of Policy Scientists and its journal and meetings rotates regularly, and perspectives and resources come and go, with various effects on the social capital of the community and its influence on the world beyond its intellectual and professional boundaries. It seems to us that perhaps leadership and perspectives have been more consistent in the IDS community than among policy scientists. It is likely that the best we can do is to work deliberately to create connections between our communities in the forums we have available to us. This article is a step in that direction, with the desire to bridge our respective intellectual spaces and build upon the hopes espoused by Szostak as they apply to those spaces:

Here it is possible to discuss certain values inherent in the interdisciplinary approach but not always stressed within disciplines: open-mindedness, tolerance of different points of view, and pursuit of a conversation aimed at enhanced understanding rather than victory for one point of view. (2007, p. 2)

Finally, in addition to a desire to better institutionalize interdisciplinarity, it seems likely that policy scientists and practitioners of IDS share an interest in several proximate strategies for promoting our common goals. The best we may be able to do with these strategies, for the time being, is to continue to institute them on the small scales of our current operations while exploring them in a more collaborative manner, toward the goals of integrating policy sciences and IDS perspectives. Connecting IDS and the policy sciences through a shared exploration of strategies may help to build much-needed capacity for promoting and implementing interdisciplinarity and integrative problem solving.

Insights on the evolution of interdisciplinarity help to frame further steps. In his recent review of the state of the field in interdisciplinary theory, Newell states that

the primary locus of interdisciplinary activity and funding has shifted from teaching to research, from the undergraduate to

² Both authors are founding members of the Society of Policy Scientists. Richard L. Wallace is a current member and Susan G. Clark is a former member of the Society's executive council. Wallace is also a former associate editor of the Society's journal.

the graduate level, from the humanities and soft social sciences to the natural sciences and medicine (and, to a lesser extent, the hard social sciences), from an individual to a team activity (often geographically dispersed), and from the ivory tower to the real world. (2013, p. 35)

In our experience as policy scientists in environmental studies, we find these claims to be only partly true in our professional contexts. To wit: Pedagogy remains a primary locus of activity at both the undergraduate and graduate levels, and the focus remains in the social sciences and humanities more than in the natural sciences. (We judge by the appearance of sessions on interdisciplinary pedagogy on the agenda of every annual conference in both fields, as well as journal articles and content in other less-formal forums³.) This contrast between Newell's experience of interdisciplinarity generally (which we trust implicitly) and ours in the policy sciences and environmental studies provides insight into future areas of inquiry for IDS and the policy sciences⁴. Our two communities have similar experiences of the fundamental conditions of integrative interdisciplinarity that underlie their communities, despite having little direct engagement with one another. Therefore, it seems likely that much could be gained from a mutual exploration of our shared perspectives, especially given the contrasts that Newell identifies between our respective experiences and those of other interdisciplinarians. Understanding our perspectives on our shared intellectual and practical landscape is a critical step in building social capital. Building social capital is absolutely essential if we are to engage in institution-building in any meaningful way. Institution-building is necessary because of the urgency of the problems that we face and that require integrative strategies to address. IDS and the policy sciences community have spent decades, more than a century combined, honing such strategies. Both have made extraordinarily valuable contributions to the development and application of theory and method. But we do not seem to be gaining ground on the most pressing social trends and conditions either within or outside the academy—trends and conditions that underscore problems that require the interdisciplinary and integrative theory and method our communities have to offer. If we

³ Both authors are also involved in the leadership of the Association for Environmental Studies and Sciences (AEISS). Susan G. Clark is a former and Richard L. Wallace is a current member of the AEISS board of directors, and Wallace is a former member of the editorial board of the Association's journal.

⁴ And we hope for environmental studies, although that field has a much less coherent identity than either IDS or the policy sciences, something we are also working on (Clark et al., 2011a, 2011b; Proctor, Clark, Smith, & Wallace, 2013).

have been unable to make the headway we desire alone, then perhaps a coordinated effort will have greater impact.

As policy scientists, we are guided by the overriding goal of human dignity for all individuals. In practice, this means that we must make explicit in our interactions with others all shared, common, and special interests at play, and the relationships among them, while fending off the pressures of disciplinary hegemony, fragmentation, and much else that is familiar to the IDS community. The policy sciences framework gives us tools for working toward these goals, including:

- (1) the five analytical tasks of problem orientation, which are, in practical terms, about inventing, evaluating, and applying options to solve problems;
- (2) skills of observation of social and decision processes—that is, describing and analyzing situations and the people in them using various methods;
- (3) skills of management—that is, working with and influencing people, their perspectives, values, strategies, and desired outcomes in social and decision processes; and
- (4) technical skills, which may include all the theories, methods, and tools of the disciplines.

Our hopes in sharing this approach in *Issues in Interdisciplinary Studies* is to provide our “meta-perspective” (including self-awareness) and also attempt to demonstrate the communicative competence required for successful collaboration that results in interdisciplinarity and integration. We hope to create a culture of mutual respect and open analytic inquiry that promotes the necessary conditions for our communities to share this comprehensive standpoint. As well, we hope that beginning an exploration of the common interests of IDS and the policy sciences will help us to shape our (collective) future thinking, research, pedagogy, and other applications, as we attempt to be problem-oriented and contextual. Finally, sharing with the IDS community the vocabulary of the policy sciences, so as to mitigate the communicative problem that it can pose, helps us to bridge important qualitative distinctions and (we hope) facilitate collective self-awareness and reflection in the interest of sharing diverse perspectives and experience.

Finally, the nature of environmental and social problems that humankind faces, their extent, foreseeable consequences, and rapid growth, require that we engage efforts toward unity about genuine interdisciplinarity and integration. There are many forums within our control where these efforts should be taking place. Our respective communities have the opportunity and responsibility to lead the integration challenge that faces society.

We need interdisciplinarity and integration that are pragmatic and can be diffused through research and pedagogy in the academy and professional practice beyond. Our future may depend on our collective ability to deploy interdisciplinarity and integration to better effect than was possible in the last century, and to do so quickly.

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Biographical Notes: Richard L. Wallace is Professor of Environmental Studies at Ursinus College, where he founded the Environmental Studies Department in 2002, and teaches courses on interdisciplinarity and integrative problem solving, land and wildlife conservation, and food systems. He received his B.A. from the University of Vermont and an M.A. and Ph.D. from Yale University; all three degrees are in environmental studies. He currently maintains two research programs: a long-term assessment of marine mammal conservation under the U.S. Endangered Species Act and Marine Mammal Protection Act, and an appraisal of the history of and prospects for interdisciplinarity in the field of environmental studies. His work has been published in *Conservation Biology*, *Policy Sciences*, *Environmental Management*, *Journal of Environmental Studies and Sciences*, *Society & Natural Resources*, and many other forums. He may be contacted at rwallace@ursinus.edu

Susan G. Clark is the Joseph F. Cullman 3rd Professor (adjunct) of Wildlife Ecology and Policy Sciences in the School of Forestry & Environmental Studies and fellow in the Institution for Social and Policy Studies, Yale University. With diverse experience in the NGO community, in academia, and in the field, she focuses on professional interdisciplinary education and skill training for leadership, professionalism, and problem solving. Representative activities include koala conservation and management in Australia, a study on improving large carnivore conservation in the Rocky Mountains of the United States and Canada, and an analysis of large-scale ecosystem management and policy. She may be contacted at susan.g.clark@yale.edu

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