THE GREATER YELLOWSTONE POLICY DEBATE: WHAT IS THE POLICY PROBLEM?

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Abstract: *Yellowstone National Park and the surrounding mountainous region comprise the Greater Yellowstone Ecosystem (GYE), a 19 million acre area that is one of the few relatively intact ecosystems in the lower 48 states. Conservationists believe that continuation of present land management practices in the region will disrupt the ecological integrity of the GYE. Many authors have identified and described these threats, but none have attempted to synthesize a coherent definition of the policy problem. We discuss the implicit problem definitions that have emerged from the ongoing dynamic debate. They fall into three general categories: 1) a scientific definition, 2) an economic definition, and 3) a bureaucratic definition. We analyze the perceived problem in the GYE, initiating a process of contextual problem definition. This process produces a general picture of the policy problem, which suggests a strategy for even better understanding and policy design. We propose several intervention points at which substantive, on-the-ground improvements in the management of the GYE are possible.*

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I. Overview of Greater Yellowstone

Surging geysers, abundant wildlife, and awe-inspiring landscapes are Yellowstone National Park (YNP), a source of national pride since its founding in 1872. The family pilgrimage to the park, with the requisite visit to Old Faithful, and perhaps a roadside bear sighting, are strong themes in the American identity. Yellowstone symbolizes many powerful things to Americans: our natural heritage, the foresight of great leaders, and the prosperity that has allowed us to set aside such marvelous areas, leaving them undeveloped — a gift to posterity and to nature itself.

Mounting evidence suggests that this beloved symbol may not be as secure as we would like to believe (see Clark and Harvey, 1988). Many believe that national self-congratulation for saving Yellowstone for future generations might be premature and largely unwarranted. The park and surrounding public lands are under many threats. Many of its natural marvels are threatened with degradation or destruction (see Glick *et al.* 1991a). Development of geothermal energy sources outside the park could irreparably damage Yellowstone's celebrated geysers. Grizzly bears — the park's "flagship animals" — that rely on ranges extending across YNP's boundaries are losing vital habitat to logging, home-building, and livestock grazing.

This is old news. Many authors have already identified the various threats to the region, debated their significance, and discussed chances of responding successfully. Some people have proposed different solutions, ranging from improvements in management of specific resources to ambitious region-wide changes. What few authors have done, however, is to synthesize these various threats and obstacles to action into a unified, coherent definition of the policy problem in the Yellowstone region. The lack of a unified view of the problem is

itself one of the greatest obstacles to protecting the region's ecological integrity (Clark *et al.*, 1991:414).

In this paper, we outline a process for synthesizing just such a problem definition in the Yellowstone region. First, we present a broad portrayal of the policy problem in Greater Yellowstone. Second, we discuss problem definition, contextuality, and their implications for policy research and analysis. Third, we identify and summarize the icons of the ongoing debate, terming these the "dominant definitions" of the policy problem. Fourth, incorporating these problem definitions with our own observations on the policy problem, we initiate a process of "contextual problem definition. Fifth, we propose several "action alternatives" that might move us toward the larger goal for the Greater Yellowstone Ecosystem — maintaining ecological integrity. It is not our intention to analyze every resource conservation issue in the region, nor to undertake an exhaustive study of the internal dynamics of each management agency.

A Map

Yellowstone National Park is a seemingly vast wilderness with rare geological features and plentiful wildlife. Taking in the panorama of the park from atop Mount Washburn, one also sees that Yellowstone is actually the centerpiece of an even larger wild area. No skyscrapers or colossal power plants loom on the horizon — only majestic mountain ranges (the Teton, Beartooth, Absaroka, Gallatin, and Madison ranges), verdant forests, and yawning canyons. One realizes that the region holds more ecological riches than the road atlas map could ever suggest. This is the Greater Yellowstone Ecosystem (GYE) — a 19 million acre mountainous region centered around the Yellowstone plateau. It

lies in northwestern Wyoming, southwestern Montana, and southeastern Idaho. It includes seven national forests, two national parks, and three federal wildlife refuges — a veritable cornucopia of federal lands. Clark and Minta (1994:10) describe the region as "that block of contiguous forested mountains and undeveloped prairies and basins surrounding YNP that comprises the richest, most nearly intact complex of wildlife and wilderness in the lower 48 states."

The riches of the GYE, however sumptuous they may seem, are not superfluous or expendable. The health of YNP is a reflection of, and is dependent upon, the health of the larger ecosystem (Varley, 1988:219). This ecosystem is home to a wide array of species, from pronghorn antelope, elk, mule deer, and bighorn sheep, to rare or threatened species like trumpeter swans and grizzly bears. It contains a variety of different biotic communities, "ranging from alpine tundra to shrub-grassland and from dry upland sagebrush scrub to bottomland riparian shrub and forest lands" (Patten, 1991:405). These species and communities are all critical to the health of the GYE, and are all sensitive to human disturbance.

Since, according to some researchers, up to 80 percent of the GYE is not formally protected as national parks or wilderness areas, most of the ecosystem stands a good chance of experiencing some degree of development and disturbance (Berger, 1991:354). Can YNP survive, ecologically speaking, if most of the GYE is significantly altered through development over coming years? Today YNP itself may provide little haven from the impacts of development, as is illustrated by numerous, well-publicized cases in which visitor accommodations have received higher priority than wildlife habitat needs.

Various threats and perceived management failures have focused national attention on the GYE in recent years, as is evidenced by congressionally mandated hearings and studies (Congressional Research Service, 1986), well-publicized

attempts by federal agencies to set forth a "vision" for the region (Greater Yellowstone Coordinating Committee, 1990), and coverage in The *Washington Post*, the *New York Times*, and other national publications (Egan, 1989; Lancaster, 1991; Wood, 1991). Conservation groups have embarked on projects to, variously, "protect this unique ecosystem" (Alliance for Wild Rockies, 1992), or to "better plan for the well-being of the region" (Glick *et al.*, 1991b:10). An expansive *Blueprint for the Future* of the GYE "articulates a vision for the future and recommends solid, immediate action to reach that future" (Harting and Glick, 1994:1). While this latest effort has yet to be tested, previous attempts at securing the GYE have made little progress.

The policy problem of conserving the GYE has broad significance for land management and resource conservation issues at large. Many authors have noted that the GYE is the "preeminent laboratory" (Lewis, 1993:3) for the concept of "ecosystem management." This concept has various interpretations, and has yet to manifest itself in particular management techniques or strategies (Clark and Minta, 1994; McMillion, 1994; Keiter, 1994; Grumbine, 1994). Solutions to the GYE policy problem will help to bring the idea of ecosystem management into sharper focus.

There are numerous reasons for the shortcomings of past efforts to adequately and equitably protect the future of the GYE. A logical starting point for an explanation of these reasons is the lack of a working definition of the policy problem. "Ecosystem management" may well be the solution, but what is the problem? Although not wholly sufficient, adequate problem definition is a necessary condition for designing an effective solution, set of solutions, or a problem -solving strategy. As yet, no one involved in this precedent-setting national policy debate seems to have explicitly undertaken this crucial task, although many people and organizations have contributed to such a definition.

Perhaps with a close examination of the problems it seeks to remedy in the GYE, the concept of ecosystem management may be clarified and developed. We will briefly discuss problem definition, and what it should accomplish.

The Problem Definition Task

It is always more effective to accurately define a problem before attempting to solve it. Indeed, successful problem solving without an adequate working problem definition is rare and largely attributable to singular intuitive abilities and sheer luck. Before examining the policy problem in the GYE, we first discuss and examine the concept of "problems" and "problem definition," as background to the GYE policy debate.

Problem definition is not some imponderable divination performed only by academicians and professional policy specialists. It is something we all engage in daily, ranging from common sense spot judgments to more in-depth matters. One good example of everyday *de facto* problem definition is the diagnostic work performed by any conscientious auto mechanic. A customer brings in his Ford, complaining that it is idling roughly, and lacks power. Any action the mechanic takes is bound to be costly in terms of time and the customer's money, so she wants to isolate the actual cause of the performance problem and deal with it directly. There may be more than one faulty part; perhaps the car needs new spark plug wires, but a defective fuel pump may not be delivering enough fuel to the carburetor as well. Thus, replacing the former may be useless without also replacing the latter, and vice-versa. Without understanding the total problem, partial solutions may have no appreciable effect.

To continue with this example, the mechanic must make a realistic appraisal of the level of performance one can expect from this particular car. Is it old,

poorly maintained, or a bad model to begin with? Or does the customer insist on keeping the repair bill unreasonably low? Working through this maze of complexity, uncertainty, and constraints, the mechanic makes a decision as to what the actual problem is and how she may go about solving it. In contrast, a "shade tree" mechanic with a few screwdrivers and wrenches might have simply started toying with every possible gadget under the hood — maybe solving the problem, but possibly exacerbating it for lack of a clear problem definition. Problem definition is more than mere problem identification or description. At its functional level, it is a diagnostic process that isolates the causes of the problem, and illuminates a range of realistic solutions. In the policy process, however, problem definition becomes much more complicated than this example suggests.

The Problem with Problem Definitions

> Definition of the policy problem is important because further research — and policy recommendations, decisions, and actions — are misguided and probably futile if the policy problem is misdefined in the first place (Brunner, 1992:1).

As numerous authors (e.g., Schön, 1979; Dery, 1984; Stone, 1988) point out, the concept of problem definition implies a great deal about "problems" themselves. Dery (1984:xi) contends that the idea of defining a problem, rather than identifying, discovering, or describing a problem, "suggests a constructionist (rather than an objectivist) view; that is, problems do not exist 'out there'; they are not objective entities in their own right." Schön (1979:261) agrees: "Problems are not given. They are constructed by human beings in their attempts to make sense of complex and troubling situations." We do not define problems in the same way that a chemist might define a covalent bond; rather, by "imposing certain frames of reference on reality," we might perceive an unsatisfactory state in which experience and expectations do not match one another (Dery, 1984:4).

People do not always share the same expectations and experiences, so a problem for one person may not be so for another — hence the observation that problems are not "out there," like black holes or humpback whales. "Problem definition is a matter of representation because there is no objective description of a situation; there can only be portrayals of people's experiences and interpretations" (Stone, 1988:106).

How does this subjectivity influence policy research? These attributes mean that policy problems cannot be evaluated without reference to their "existence" as problems, and the reasons said existence may be in dispute. That is, who stands to lose or gain by acknowledging a problem or by defining it in a certain way (Stone, 1988:25, 183)? People generally, notes Stone (1988:116) "*represent* the world in such a way as to make themselves, their skills, and their favorite course of action necessary." "Real world" problems do not exist independently of their sociocultural and political context.

Context, then, is obviously an integral part of problems and problem definition. Examining contexts has long been an important — and often overlooked — part of addressing social issues. Wildavsky (1971:139) says of contexts:

> [T]he context in which the issue occurs not only helps determine the decision-maker's perception of the facts and values but also the way in which he seeks out, receives, and evaluates this information.

Evaluation of the context of an issue is thus an important step in defining the total problem. It can reveal why a seemingly simple matter cannot be easily resolved. It exposes the situation's inherent constraints, and might reveal opportunities for "improvement" of the "problem." Policy analysts should be aware of their own context as well as the context of actors directly involved in the issue at hand. The analyst must be aware of how her goals, values, and experiences as an individual form her own "frame of reference on reality," and

thus how they influence her definition of and search for solutions to the problem.

In sum, analysts ought to engage in "contextual problem definition." This is not a novel concept. Both contextuality and problem definition receive extensive treatment in the policy literature. Lasswell (1971), Torgerson (1985), and Majone (1989), among others, explicitly call for analysis and evaluation that develops a "conception of the whole [that] is disciplined, refined, and revised in light of concrete evidence which is continuously sought out" (Togerson, 1985:245). This standpoint can be read to promote a problem definition process that treats the "on-the-ground" problem and its policy context as the policy problem.

Rein and White (1977), Schön (1979), Dery (1984), Stone (1988), and Brunner (1992) have all discussed various points about the importance, process, and role of problem definition. Weiss (1989) in particular takes a comprehensive approach, assigning three different roles to problem definition. First, there is the rather obvious "analytical" task of systematically examining a problem to generate insight and understanding. Second, there is an advocacy role for problem definition, in that problem definition can help design political strategies and promote particular causes. Third, problem definitions are themselves important policy outcomes. A problem definition as outcome "legitimates some strands of political argument, mobilizes some participants, and invites people to see public issues differently" (Weiss, 1989:118).

Contextual problem definition takes into account that these three roles are being simultaneously played out in any policy debate. Problem definitions that serve analytical or strategic functions, emerge as policy outcomes, or play some combination of these roles, are part of the larger policy context that must be defined. From a contextual standpoint, constructing an adequate "analytical"

problem definition includes an examination of the competing interests in a policy debate and the problem definitions they set forth.

Policy debates are carried out in terms of competing problem definitions (Stone, 1988). Thus, competing definitions are, in a certain sense, the unit of qualitative analysis for examining the policy debate and context. Focusing on these definitions provides the analyst with multiple perspectives on the technical aspects of the policy problem. Also, this approach provides an opportunity to examine the analytical adequacy of various groups' problem definitions, as well as their strategic effectiveness. Comparing analytical adequacy (how factually accurate is the definition?) with its strategic effectiveness (how much political support is it gathering?) can generate insight about the broader policy arena and the public's perception of the issue. Some definitions that are demonstrably analytically inadequate nevertheless enjoy broad public acceptance and strategic success.

Contextual problem definition itself plays each of the three roles that Weiss articulates. The process analytically describes the policy debate while actively participating in it. Weiss (1989:114) notes that "[p]roblem definitions must accommodate political realities, but they also help to create those realities." Serving the democratic, enlightenment function of policy research (Lasswell, 1971), the self-evaluative policy researcher should be explicitly aware of this situation. The researcher, as a participant in and observer of the policy process, should strive to provide competing sides in a policy debate better technical knowledge, a better understanding of each other, and a better understanding of the larger debate. At the same time, following Heintz and Jenkins-Smith (1988), the researcher should use an improved understanding of the policy context to choose the most effective role to play in the debate.

Contextual problem definition is something of an "umbrella" problem definition that subsumes other problem definitions and the larger policy debate as subjects of inquiry. Again, this is not a novel concept. Rather, contextual problem definition is a different label for established analytical techniques; this label is significant in that it focuses these analytical techniques in a distinct way. It does not require new methods, nor are there specific methods for how to proceed (Dery, 1984). Rein and White (1977:262-263) note that the process "has traditionally been the part least well codified in the canons of methodology and 'normal science.' There is, in fact, no orderly or prescribed way to do it." Useful information and points of view about particular policy problems are where one finds them: the mass media, legislative documents, agency plans, relevant academic journals, and with various governmental and non-governmental actors in the arena of the policy problem. The literature we cite throughout this paper on the GYE policy problem also provides some insight into our own techniques of problem definition.

Defining Public Policy Problems

A reasonably comprehensive and accurate problem definition has numerous characteristics and functions. First and foremost, it recognizes that there are numerous dimensions to every problem. Many problems superficially appear to be mere technical matters, when in fact they include layer upon layer of contextual complexity. Majone (1989:118) states that "because the context in which public policy is made includes values, norms, perceptions, and ideologies, technical considerations are insufficient as criteria of choice."

This sort of complexity exists in the case of the GYE. "The problem" on the ground may be various threats to the ecosystem, such as habitat fragmentation via logging and roadbuilding. "The solution" may be to mandate preservation of

the region's "ecological integrity" and to prohibit things that conflict with that stated aim. But how? Such a limited problem definition is not particularly useful for several reasons: 1) it contains vague goals, 2) it does not address obstacles that would most surely defeat a solution, and 3) it does not set forth evaluative criteria, to mention only three concerns. Calling for "coordination" or "ecosystem management" without adequately addressing any intervening variables is rather like telling the Wright Brothers that supersonic flight is merely a matter of going faster than the speed of sound. When a problem is only very generally defined, possible solutions will likewise be broad, undetailed, and not very helpful.

A contextual problem definition should acknowledge and address all the various dimensions of the overall problem. What are the key dimensions? How important is each dimension's influence? Does an individual element have a monolithic character or does it have both positive and negative effects on the problem? One must consider also that the various facets of the problem might interact with one another in unexpected ways. Disaggregating the total problem often reveals opportunities to advance a satisfactory solution (Brewer and deLeon, 1983). By explicitly considering all of these dimensions, the problem definition process accounts for the key obstacles to successfully dealing with a policy problem. By comprehensively identifying and evaluating obstacles, one can begin to realistically design a solution that will effectively solve the actual on-the-ground problem. This is a major function of problem definition: it circumscribes the search for policy solutions.

II. Dominant Problem Definitions in the Greater Yellowstone Region

Many authors have tackled the issue of the GYE's precarious ecological integrity. They have identified numerous threats to the ecosystem, problems with the region's public land management agencies, and the activities of certain political forces. They have also proposed various solutions to the dilemma of preserving or managing the GYE successfully. Through these efforts, most authors have, at least implicitly, set forth a problem definition. Many of these definitions are not systematically-derived "maps" of policy problems, but are instead what Stone (1988:106) terms "strategic representations." These are problem definitions that are constructed "not just for beauty's sake or for insight's sake" (Stone, 1988:6). As Stone (1988:106) points out:

> Problems are defined in politics to accomplish political goals — to mobilize support for one side in a conflict. To define an issue is to make an assertion about what is at stake and who is affected, and therefore, to define interests and the constitution of alliances.

In this section, we will discuss the implicit problem definitions that have emerged from a wide range of sources concerned with the GYE. It is important to recognize these definitions and to work from them to assess what aspects of the problem have been adequately covered, overlooked, or inaccurately evaluated in the past.

For purposes of this paper, our description of these definitions has been sharpened somewhat. Our intention is to illuminate the "set-pieces" of the ongoing debate, so that we can evaluate their usefulness for purposes of recommending prescriptive policy. This exercise will outline the state of the policy debate in the region and will reveal opportunities to move ahead in resolving the ongoing dispute over the region's future. In the subsequent "Closer Look" section of the paper, we will explicate these opportunities and propose specific action alternatives. The dominant portrayals of the problem in the GYE can best be characterized as: 1) scientific, 2) economic, and 3) bureaucratic

definitions. Various actors in the GYE policy debate use one or more of these definitions in varying degrees of detail to explain the problem and promote agendas or particular solutions. It is important to note that the GYE policy debate is not centered around any specific "GYE policy" proposal, although such proposals are now taking shape (Harting and Glick, 1994). Lacking a single focal point, the debate ranges over several smaller policy issues, the idea of developing a comprehensive "GYE policy," and the broader concept of ecosystem management. We refer to the multiple foci of the policy debate collectively, then, as an "ecosystem policy."

Definition 1: The Problem is Scientific

The scientific definition holds that, either in the agencies particularly, or throughout the scientific community, the current state of knowledge is not equal to the challenge of describing and "managing" the GYE. Both factions typically see the problem either as a deficiency in the science branches of the U.S. Forest Service (FS) and the National Park Service (NPS), or as an inadequacy in all the disciplines relevant to managing wildlands and multiple use areas.

Opponents: Inadequate Knowledge Prohibits Policy Changes

Some opponents of an ecosystem policy (e.g., Chase, 1991a) use the scientific definition as an argument against action, asserting that further protection would be premature, costly, and ineffective. Chase (1992:D16) champions this view, noting that while an agency like the U.S. Geological Survey has over 1,000 scientists, the whole of the NPS has fewer than 100. He goes on to say that most are undereducated. Although "restoring critical vegetation, rescuing endangered species, and reviving ecologic [sic.] balance are highly desirable, the Park Service lacks the expertise to accomplish these goals" (Chase, 1991a:36). Other opponents

similarly disparage scientists' ability to define and manage ecosystems. Some, such as the Wyoming Heritage Foundation's Bill Schilling, reject the ecosystem concept out of hand. "We find the argument [that YNP is dependent on a larger ecosystem] to be specious, undocumented, and emotionally charged," Schilling told a *Time* magazine reporter (Witteman, 1989:97).

Still others are suspicious of the idea of a hands-off management style for YNP and surrounding wildlands, known as "natural regulation." Such misgivings have been evident during certain high-profile events, such as the 1988 fires and their aftermath. When YNP administrators elected to treat some of the natural fires as an ecosystem process and let them burn unchecked, Wyoming Senator Malcom Wallop (R) denounced the decision as "absurd" (Matthiessen, 1988:43). Wallop's counterpart, Senator Alan Simpson (R-WY), expressed similar sentiments when he demanded the resignation of NPS director William Penn Mott for not suppressing and containing the fires (Matthiessen, 1988:43). Also, the 1988 fires burned a sizable portion of YNP's northern elk range, leading to fears of massive die-offs during the winter. YNP administrators lamented the ensuing bad press when they announced that there would be no supplemental feeding for the herds. Park superintendent Robert Barbee commented that "nobody wants feeding except for the uneducated public, and the media can fan the sentiment, just like the fires: First They Burn Down All the Forests, Now They're Starving Elk!" (quoted in Matthiessen, 1988:43). Public suspicion about the competence and motives of land managers in the region seems to run high.

Proponents: Better Science Should be Part of Larger Reforms

The scientific definition is more often propounded by advocates of better protection for the GYE, who cite this aspect of the problem as a cause of poor management decisions (Freemuth, 1989:280). The NPS itself is singled out for a

good deal of criticism. A recent report by the National Research Council (NRC), titled *Science and the National Parks*, identifies inadequacies in the "monitoring of actual conditions . . . [and] documentation of the direct and indirect impacts of human activity on park resources" (NRC, 1992:60). The report cites fundamental problems in the whole of the NPS that impede both research and use of scientific research in management decisions:

> [T]he real problems in the NPS research program are not at the level of individual projects. Instead, they are more fundamental, rooted in the culture of the NPS and in the structure and support it gives to research (NRC, 1992:60).

The NRC report goes on to note pervasive problems in general areas such as organizational structure, personnel, and budgeting. Goldstein (1992:184) charges that the NPS's research staff is generally undertrained and incapable of handling complicated ecosystem research.

The FS's science does not receive as much direct criticism as the NPS, perhaps because the agency's mission and history emphasize commodities extraction — thereby lowering overall expectations for its scientific components. Nevertheless, critics abound. DeBonis (1991:88) notes that the 1976 National Forest Management Act (NFMA), requiring the FS "to continuously monitor and carry out research in the national forests to ensure their health," is largely ignored, especially when it might conflict with extraction goals. The subsequent lack of up-to-date information makes it "impossible to manage for biodiversity or guarantee healthy forests" (Debonis, 1991:88). The FS is also seen as deficient in research for its management of wilderness areas, a condition that sparked a congressional investigation in 1989 (General Accounting Office [GAO], 1989:2). A GAO report to the House Subcommittee on National Parks and Public Lands found that the FS "has not periodically inventoried conditions in many of its wilderness areas, [and thus] does not know whether conditions are improving or getting worse" (GAO, 1989:4).

Finally, many critics emphasize the overall inability of the scientific community to answer even basic questions about ecosystems and their "management." Goldstein (1992:185) admonishes that "without baseline knowledge of ecosystem components, as well as the capacity to use this information," the ability to manage for sustained ecological processes will not improve. Keiter (1991:9) notes that a working knowledge of the GYE is "beyond the bounds of current knowledge." Keiter and Boyce (1991:401, 402) identify several gaps in basic knowledge and research about the GYE. They cite a need for further research on plant and animal communities, fire ecology, riparian zones, and the impacts of various development and recreation activities on species and biotic communities.

Definition 2: Protection of the GYE is an Economic Question

The economic definition has two aspects, each of which is characteristic of opponents and proponents, respectively, of an ecosystem policy for the GYE. First, there is the argument advanced by opponents that an ecosystem policy will intolerably and ineluctably harm Greater Yellowstone's economy. The second version of the economic definition is argued as a refutation of these claims by opponents. This version, which is more of a feasibility argument than a definition, holds that the region's economy actually depends on maintaining the naturalness of the GYE.

Opponents of an Ecosystem Policy: More Protection is too Costly

There have been several noteworthy occurrences in which opponents of an ecosystem policy in the GYE have actively advanced their own economic definition of the policy problem. One of the more salient and heated incidents regarded the "Vision" exercise undertaken by the Greater Yellowstone

Coordinating Committee (GYCC), an *ad hoc* group of FS and NPS planners (Lichtman and Clark, In Press). The planning exercise culminated in the "Vision for the Future" document, which was originally a 74-page statement of principles and goals intended to guide comprehensive management for the GYE (GYCC, 1990:1-6). This document sounded the alarm for commodity interests. Never had the threat of federal land "lock-ups" seemed more imminent. Groups like the Mountain States Legal Foundation (MSLF) denounced "Vision" and its authors. MSLF president William Perry Pendley (1991:65), said that the GYCC had "violated federal law," and that they were out to ruin the Western economy with "irresponsible and asinine" plans like "Vision." Other "Vision" opponents accused the GYCC of "cultural genocide" (in Goldstein, 1992:185). In the end, "conservative western lawmakers and representatives of commodity industries" ground "Vision" down to 10 pages of business-as-usual platitudes (Kenworthy, 1992:A17).

Another good example of such intervention is opposition to the slated reintroduction of the gray wolf to the GYE. Pursuant to ESA compliance, Congress has called for reintroduction of the wolf to the GYE. Conservative Western politicians and traditional economic interests in the region have hindered efforts to comply with this directive. Arguing that a 100-wolf reintroduction goal was too high and largely unfounded, Senator Simpson (R-WY) warned that too many wolves would cause "the dramatic decline of big game populations to the point where the number of hunting licenses would have to be reduced and tourism would be imperiled" (Neal, 1992:B1). Senator Wallop (R-WY), took a more indirect approach to expressing his displeasure with wolf recovery. Wallop (Hackett, 1992:A1, A10) successfully removed the NPS's share of wolf recovery funding ($148,000) from the Senate's Interior Department appropriations bill for the 1993 fiscal year. Franklin Rigler (quoted in Suro,

1990:4) who ranches in Montana's Paradise Valley north of YNP, puts his view of reintroduction succinctly: "Wolves, wilderness, and welfare, that's all there's going to be in this state if this thing goes through."

Proponents: Extractive Industries Undermine the True Economy

All of this opposition is in spite of detailed reports which document the economic value of preserving the GYE and bringing back wolves. Recent studies provide evidence that traditional commodities extraction no longer plays the economic role it did in most areas of the West, especially in the Yellowstone region (Rasker *et al.*, 1992; Power, 1991). The second economic definition of the problem employs this information as a refutation of the claims of the traditional extractive interests.

Rasker *et al.* (1992) and Power (1991) have both produced detailed reports to demonstrate that "working to protect the integrity of this ecosystem will also protect the long-term viability of the human economy" (Alper, 1992:685). Retirement income, services, and self-employment have upstaged extractive industries as the economic mainstay in the GYE (Alper, 1992:685). Rasker *et al.* (1992:4) found that total jobs have increased by 68 percent, and total personal income has nearly doubled since 1969. However, most of this growth in income and employment was <u>not</u> related to the agricultural sector or extractive industries. Ninety-six percent of the new jobs created between 1969 and 1989 — and 89 percent of the increase in labor income — were in construction, utilities, wholesale trade, federal employment, transportation, and services (Rasker *et al.*, 1992:4). These changes are especially evident in the economic impact of the region's seven national forests. Jobs related directly and indirectly to resource extraction on these forests account for only five percent of the region's total employment. Recreation is by far the most important economic activity on the

national forests, generating between 76 percent (Targhee N.F.) and 99 percent (Custer N.F.) of the direct jobs on the region's Forest Service holdings (Rasker *et al.*, 1992:15).

Non-labor sources of income (retirement benefits, investment dividends) now account for almost 35 percent of total income in the region (Rasker *et al.*, 1992:11). This sort of income is not tied to a particular place, leaving its recipients free to settle where they choose. Because of its environmental amenities — clean air, abundant wildlife, scenery, and the availability of a true wilderness experience — these people are often choosing to settle in the GYE (Power, 1991:396). Power (1991:396) notes that "while the GY economy was losing almost $80 million per year in wage and salary income, it was gaining $240 million in nonlabor income." These findings indicate that commodity interests and their demands on the region's resources run counter to the future of the GYE's economy. "The natural assets that can play a major role in the creation of a more diversified, stable economy in the region . . . are being jeopardized" by the continued prevalence of extractive industries on public lands (Rasker *et al.*, 1992:17). Recreation and continued relocation of retirees and businesses to the GYE are dependent on the maintenance of the region's "amenity values" (Rasker *et al.*, 1992:14).

Definition 3: The Problem is Bureaucratic

The bureaucratic problem definition maintains that the agencies — particularly the NPS and the FS — are so fraught with organizational pathologies that they could potentially derail any otherwise plausible ecosystem policy initiatives. Criticisms along this line range from mild, generalized laments to focused indictments. Some authors merely point out areas that could stand improvement; others call for a complete change of management. For example,

Berger (quoted in Alper, 1992:686) believes that protecting the GYE will require placing the entire region under the control of a single agency "that ignores political boundaries in favor of ecological limits." As with the other two definitions, variants of the bureaucratic definition are advanced by both opponents and supporters of region-wide ecologically-sound management.

Opponents: The Agencies are Incapable of Ecosystem Management

Opponents of ecosystem management believe that the federal agencies are so inept, and their potential for reform so low, that giving them more discretionary control over the GYE will lead to thoroughly unsatisfactory results for all concerned —a Soviet *oblast* in the Rockies, as it were. Chase (1991b:A13) lambasts tentative reform efforts in the FS:

> Long dedicated to sustainable development of forest resources, [the FS] is now tilting toward protectionism. But while breaking with the past, it has no clear vision of the future. The result is confusion that will be bad for both wildlife and people.

To most opponents, conservation policy reforms portend inept management to no good end. In wolf reintroduction, regional stockgrowers fear a web of bureaucratic red tape in dealing with problem wolves. As Idaho rancher Brad Little (quoted in Skow, 1989:13) puts it: "It's not wolves we're afraid of, it's wolf managers." Senator Simpson likewise refuses to soften his stance against wolf reintroduction, because he has little faith in the agencies' ability to control wolves and implement a satisfactory compensation fund to ranchers who lose livestock to wolves (Suro, 1990).

Proponents: Agency Reforms are Necessary and Possible

Supporters see bureaucratic reforms as indispensable for an ecosystem policy for the GYE. Some authors focus on the lack of coordination between agencies. Berger (1992:356-357) said that "[t]he mixing of agency mandates has resulted in

massive confusion and conflicts related to both wildlife and ecosystem management." Others (NRC, 1992) note problems within the agencies themselves. These agencies are impeded by vague mandates to balance often-conflicting demands.

The high-profile Fishing Bridge case in YNP is an apt illustration of these competing demands. The Fishing Bridge area, which lies just north of Yellowstone Lake, is highly popular with both grizzly bears and campers. Many grizzlies have had to be killed or otherwise "managed" at Fishing Bridge in the interest of visitor safety. The impact of such actions on the grizzly population is obvious. Between 1943 and 1959, nearly 50 percent of all lethal "control actions" against YNP grizzlies occurred in the Fishing Bridge area (NPS 1988:3). Between 1977 and 1986, 23 percent of all grizzly control actions in the park took place at Fishing Bridge — by far the highest of any area in YNP (NPS 1988:137). Pursuant to the Endangered Species Act, the NPS planned to remove most camping facilities at Fishing Bridge, and to restore the area to high quality grizzly habitat. Budgetary shortfalls in the NPS (about $5 million), political pressure, and a lack of compelling scientific evidence have set back grizzly habitat restoration in the area by at least one year already (Thuermer, 1992:15A; Freemuth, 1989:280).

The FS must similarly try to balance and address competing demands, such as timber cutting, grazing, recreation, and mining. "Multiple use" is written into its mission, and laws like the NFMA require the FS to conserve biodiversity in addition to providing raw commodities. Political pressure from commodities interests and regional lawmakers often causes the agency to place undue emphasis on commodities extraction, to the relative neglect of other formally-mandated considerations (Yaffee, 1994). Also, budgetary constraints imposed by congress often make it impossible for the FS to balance uses. "The majority of

Forest Service wilderness managers told GAO that funding for wilderness management was inadequate" (GAO, 1989:3).

Interagency groups like the Interagency Grizzly Bear Committee (IGBC) are consequently subject to a number of influences besides scientific data, which seldom provides unambiguous direction anyway. The IGBC is composed of land managers who must consider the full extent of their missions, the demands of their constituents and supervisors, and, at least subconsciously, the influence of their own peculiar agency subcultures (e.g., intra-agency prestige based on commodities output).

One point made clear by this definition is that the agencies are not single-mindedly dedicated to science, but are instead creatures of politics and culture as well. Keiter (1994:324) states that "resource allocation decisions cannot be divorced from underlying value-based considerations, including related political, economic, social, and aesthetic judgments." All three definitions intimate this complexity. The cases used to illustrate each express the complexity of the issues in the GYE, and demonstrate the inadequacy of a partial definition of the policy problem. A contextual problem definition will require sensitivity to the scientific, economic, and bureaucratic aspects of the whole perceived "problem."

III. A Closer Look: Analysis of these Three Definitions

In this section, we critically examine the dominant definitions of the GYE problem. Are the identified obstacles to a solution truly insoluble? Would a more thorough examination of these components of the problem reveal possible intervention points or areas of possible improvement? What really stands in the way of maintaining Greater Yellowstone's ecological integrity? We briefly re-examine the three dominant definitions and their interactions in a critical,

contextual manner, with the objective in mind of developing a more useful, accurate, and relatively comprehensive problem definition.

Scientific Deficiencies: What do we Need to Know to Conserve the GYE?

The scientific definition of the policy problem holds that there is insufficient baseline data, and perhaps little potential to improve on this situation in the foreseeable future. Rather than compiling a long list of individual aspects of science that need improvement in the GYE, we favor approaching the scientific component of the problem with a basic question: What do we need to know to protect the ecological integrity of the GYE? More specifically, what are the features of this natural system, and what sorts of activities threaten them? Answers to these two questions must be tempered with practical expectations. FS biologist Jack Ward Thomas, now head of his agency, warns that "ecosystems are not only more complex than we think, they are more complex than we can think" (quoted in Glick, 1993:4).

More and better research will not provide clear answers to GYE conservation problems. Even if it could, it is unlikely that the information would be translated directly into policy. As Varley (1993:131), YNP's chief of research, points out, "[t]he bureaucratic and political process by which research is incorporated into management is as complex as the ecosystem process itself." Keiter (1994:300) concurs, stating that "ecosystem management policy will ultimately be forged in a political setting, where human interests have always been a driving concern."

However, many scientific positivists do not share this view of the role of research in setting GYE policy. Their belief that better science is necessary and sufficient for better management has impaired the theoretical development of the ecosystem conservation concept throughout the conservation community.

Grumbine (1992:12) notes that latent positivism in the ecosystem management movement

> has spawned a narrowly conceived form of scientific ecosystem management that continues to advocate value-free science, control by professional experts, and centralized decision making with little input from citizens.

Such an approach is unlikely to gain much political support or even effectively address long-standing conservation problems. Its lack of attention to human economic considerations raises suspicion among economic interests, who see ecosystem management as a stalking horse to move them off the public lands. Indeed, the more extreme proposals for ecosystem management clearly pose a grave threat to traditional public lands uses. From a scientific standpoint, this approach is untenable because of the impossibility of devising an adequate predictive model of the ecosystem. Even if scientists could construct such a model, there would be great difficulty in ascertaining what such a model would look like, given the many constantly changing standards of adequacy.

None of these considerations should suggest that we take a dim, medieval view of science and its role in protecting wildlands. On the contrary, we are optimistic about new developments in science, and about the potential for science to help guide effective and foresightful management of places like the GYE. The emergence of the field of conservation biology in the past decade is particularly encouraging. Grumbine (1992:29) describes this new discipline in *Ghost Bears: Exploring the Biodiversity Crisis*:

> Conservation biology is the science that studies biodiversity and the dynamics of extinction. Much of this work focuses on how genes, species, ecosystems, and landscapes interact, and how human activities affect changes in ecosystem components, patterns, and processes.

Soulé (1985:727) describes conservation biology as an "applied science" which is "synthetic, eclectic, multidisciplinary, and crisis oriented." He notes (1985:728) that the new discipline draws from a plurality of fields, ranging from forestry and wildlife biology to "historical biogeography," "ecophilosophy," public policy, and

economics. Temple (1992:160) reports that "[c]ommunication and collaboration [between conservation biology and] other disciplines is expanding steadily." We are greatly encouraged by the emergence of this dynamic new field of study, especially by its recognition of the irrelevance of traditional academic compartmentalizations.

Taking these developments into account, there are practicable ways to move forward with ecosystem management without full scientific understanding, which will never come about anyway. Brunner (1992:8) correctly observes that "[i]n the face of profound ambiguities and uncertainties, good policy is experimental and self-correcting on the basis of experience." Soulé (1985:727) concurs, noting that "in crisis disciplines [like conservation biology], one must act before knowing all the facts. Tolerating uncertainty is often necessary." Applying this approach to practical matters like population viability analysis, Ruggiero *et al.* (1994:371) outline a "practical framework" for projecting the ecological consequences of land management activities. They note that complex modeling procedures often demand data and analytical resources that managers lack. Absent more expedient methods for assessing ecological consequences, management actions might proceed with virtually no consideration for ecosystem components and processes. A more accessible process for evaluating impacts would promote well-informed decisions within the land management context.

These approaches, if they are judiciously applied and refined on the basis of experience, could improve future science, management, and policy in the GYE, and lead to long-term conservation of critical ecosystem processes and features. The crucial idea for researchers and managers alike is to design and implement flexible, resilient policies based on what we know now. Browne and Wildavsky (1984:227) encourage managers to view program implementation as a "mutually

adaptive" process that involves an effort to "generate and learn from policy relevant feedback." Implementation is mutually adaptive when managers adjust policies based on how the implementing environment responds to the policy, and how the policy responds to the environment. Extensive knowledge of either cannot be generated in advance, so experimentation and careful observation are necessary (Browne and Wildavsky, 1984). Striving for perfect predictive knowledge prior to implementation is futile and will eternally delay action. Adopting a feedback sensitive, mutually-adaptive approach to management programs in the GYE — for both improving extant management activities and in designing new policies — will generate far more knowledge and far greater results than a policy of "more research."

A contextual problem definition should, however, illuminate the need to improve certain aspects of research as well as management. Several information deficiencies — some structural, some substantive — must receive attention. First, we need to focus on tracking trends in key ecosystem dimensions. As a practical matter, delineating the ecosystem would be a valuable first step. Its size is a basic point of contention:

> In 1980, a report by biologist John Craighead put the size of the 'greater Yellowstone ecosystem' at five million acres. This year the Greater Yellowstone Coordinating Committee . . . expanded it to almost 12 million acres, and the Greater Yellowstone Coalition, an environmental group, put it at 18 million acres (Chase, 1991b:36).

Fortunately, there are a number of ways to accurately describe the crucial features of the GYE, and thus to bound it spatially. Clark *et al.* (1991:413) note that the GYE is "generally defined by its geology, climate, physiography, and plant and animal communities, which distinguish it from the surrounding plains." Marston and Anderson (1991:339) state that many of the GYE's distinct features in topography, vegetation, geomorphology, and hydrology begin at an elevation of 7000 feet; this elevation contour, plus several ecologically-important lower areas could serve as

a rough boundary for the ecosystem. Wilkinson (1992:175) recounts several ways to define the GYE; one could define it as the range of the Yellowstone grizzly, or by its bald eagle populations, or by its major watersheds. Keiter (1989:936) states that "the multidimensional nature of the ecosystem precludes any meaningful single-dimension definition, and its dynamic, evolutionary character makes it difficult to draw definitive ecological boundaries of lasting significance."

The second task is to establish what significant trends or changes are to be tracked within the ecosystem and outside the system. One way to express this is to select "endpoints" for "risk assessment;" these must be clearly defined and must be socially and biologically relevant (Suter, 1990). Managers can determine trends or changes in these endpoints historically over the past few decades or longer, and then extrapolate them into the future. In turn, appropriate management and policy action can be taken to ensure the GYE's integrity.

Tracking trends serves several purposes. It allows us to establish standards on key measures by evaluating what we regarded as acceptable in the past. Analyzing historical trends also gives us an idea of how much variation we can expect on a regular basis. Ongoing tracking of these trends can then alert us to the early stages of major changes in certain ecosystem features. Over time, careful and consistent monitoring would permit informed speculation about causality and improve the accuracy of short-term forecasts. To scientifically establish causes of trends as a necessary condition may be unnecessary as well as costly and time consuming. Moreover, requisite precision may never be obtained in the time frame of management relevance. With well-designed monitoring structures and extensive trends data, however, the marginal cost of speculating and developing causal theories would be fairly low.

However, we must reiterate, simply tracking trends would be much more efficient than determining the factors actually causing those trends. And for the

public and policymakers, it may not be necessary for them to have full scientific understanding before taking helpful action. In the face of incomplete knowledge of conditioning factors, small-scale, low-cost experiments could be undertaken and the outcomes monitored. Managers would learn a great deal from such experimentation; at the same time, they could achieve progress towards ecosystem management and wildlands conservation without total scientific understanding.

Establishing Policy: Hurdles to Designing and Implementing Solutions

In this section, we examine the economic and bureaucratic definitions of the policy problem. It would appear that obstacles identified in the economic and bureaucratic definitions pose the biggest threat to effective action, especially if one takes an adaptive/learning approach to dealing with scientific uncertainty in the GYE, as we advocate above. However, it is again necessary to acknowledge and confront the complex interplay of all three definitions. The approach to dealing with scientific questions in the GYE will likely be set by the dominant agencies, the FS and the NPS. These agencies, as we have seen, are often heavily influenced by politically powerful traditional economic interests. Thus, any new approach to research in the GYE may be seen as a threat to the status quo, and could encounter heavy opposition.

Economic Opponents: Riding Off into the Sunset?

The economic problem definition advanced by opponents of an ecosystem policy states that the GYE cannot have more protection — which would putatively entail "locking up" public lands resources — because the regional and national economy will suffer. Many people outside the GYE accept the arguments of these economic interests, acquiescing to an "exploitative extractive industry in terms of

its own self-serving myth" (Wolf, 1989:116). This nation-wide nostalgia for the "Western way of life" is one of the most powerful weapons of the opponents of an ecosystem policy in the GYE. So far, they have used this weapon successfully. Power (1991:396) notes that

> one particular group of economic actors has successfully defined the economy as synonymous with its own commercial activities and has defined local economic well-being as something that only these businesses primarily produce.

These actors, with their strong political connections, have generally prevailed in maintaining their favored policies. They have also been somewhat successful in chilling the climate for reform of GYE management. Louisa Willcox (quoted in Kenworthy, 1992:A17) of the Greater Yellowstone Coalition (GYC) says that YNP's administration "is scared to death" when it comes to fighting development within or outside Yellowstone: "We [GYC] are making the case for the park that the park for political reasons is unwilling to do." YNP superintendent Robert Barbee (quoted in Kenworthy, 1992:A17) disagrees somewhat with Willcox's characterization, but does concede that he must act within the bounds of what is "prudent and politically possible." The failures of numerous conservation initiatives have exhausted the personal energy and enthusiasm of numerous actors both inside and outside the agencies. Agency members who have attempted innovation and substantive reform have been "hammered" and "traumatized" (Anonymous resource managers, personal communication).

The compelling economic data presented by Rasker *et al.* (1992) and Power (1991) appear to contradict the assumptions on which this power dynamic is based. Current policies that encourage and subsidize extractive industries on the GYE's federal lands are "undermining the region's long-term supply of natural capital and foreclosing economic opportunities for future generations" (Rasker *et al.* 1992:i-ii). Such policies include below-cost timber sales, royalty-free mining claims, and incentives to land managers for engaging in resource extraction

(Goldstein, 1992:185). Rasker *et al.* (1992:iv) urge a "redirection" of federal dollars "to support positive economic trends." Such a change in incentives is vital to changing actual land management decisions in the GYE. Bringing about on-the-ground changes will require careful attention to both the internal characteristics and the external environment of the land management agencies.

Problems with the Agencies

The bureaucratic definition of the problem holds that the organizational pathologies of the federal agencies are the major obstacle to effective protection of the GYE. The agencies themselves could stand a good deal of improvement, but, as numerous incidents illustrate, politically-powerful interest groups often totally preclude any sort of reform. Therefore, any effort to deal with bureaucratic problems in the GYE must be sensitive to the broader context in which most of the agencies operate.

Improving the Clmate for Reform. The Greater Yellowstone political scene can be conceptualized as a classic "iron triangle:" a nearly impenetrable arrangement in which interest groups prevail upon federal legislators to make sure that the agencies do their bidding. In the GYE, the iron triangle consists of logging, mining, and grazing interests acting through legislators like Senators Alan Simpson (R-WY) and Larry Craig (R-ID) to ensure that federal land managers give resource extraction top priority. These Western legislators have revealed their role in this process on several occasions recently. The iron triangle was visible in the demise of the "Vision" document — an uproar on the part of influential interests brought denunciations and quick "corrective" actions from numerous Western lawmakers. It was also apparent in the removal of regional forester John Mumma from his post in the FS's North Central regional office.

Mumma had cut back logging in accordance with several environmental laws. However, powerful western Senators and the Bush administration saw to it that Mumma would be given a choice between early retirement or a forced transfer to Washington, D.C. On 2 September, 1991, Mumma chose the latter (Egan, 1991).

Part of the strength of this triangle has been the aforementioned myth of the Western economy being tied so closely to resource extraction. Until recently, no one has been able to advance much of an argument against these interests and counter their influence on the political process. As noted above by Power (1991:396), this confederation has long portrayed itself as the sole source of economic sustenance in the region. Romantic notions and a lack of contradictory evidence allowed this coalition to remain unchallenged, making the traditional interests practically unassailable. Political intervention like that in the Mumma incident thus seemed defensible and necessary to maintaining the western way of life.

Also vital to the strength of this iron triangle has been the lack of an effective "advocacy coalition" (Sabatier and Jenkins-Smith, 1993) lobbying <u>for</u> an ecosystem policy in the GYE. The authors of the "Vision" document, for instance, have reported that major conservation groups expressed very little interest in the process, perhaps missing a rare opportunity for progress toward reform (Barbee *et al.*, 1991). In our view, this is symptomatic of a general malaise among conservation groups; they could plot a much more productive course of action. Sabatier and Jenkins-Smith (1993) provide an "advocacy coalition framework" that, in part, is helpful in understanding the role of advocacy in policy change. Examining the GYE policy debate through their lens, one can note several areas where conservation groups are falling short. Specifically, many groups have not forged effective advocacy coalitions either within the conservation community itself or with groups outside the conservation movement. An as-yet inchoate

coalition of conservation groups and economic concerns that depend on the GYE's non-extractive amenities could be a powerful force.

Also, many groups do very little "policy-oriented learning," which Jenkins-Smith and Sabatier (1993: 42) describe as "relatively enduring alterations of thought or behavioral intentions that result from experience and which are concerned with the attainment or revision" of basic goals and substantive knowledge of the policy arena. There are many reasons for this lack of learning in the GYE: ambiguous feedback from goal-seeking behavior, poorly articulated goals, and a polarized environment with a high level of conflict are among these reasons. A lack of understanding of policy instruments and policy change leads, in turn, to an under-appreciation of the need to form relatively broad-based advocacy coalitions.

The work of many conservation groups is absolutely vital, however, and has been instrumental in forming our own understanding of the policy problem (e.g., the Wilderness Society's economic studies, the GYC's *Profile*, the Nature Conservancy's natural areas inventories). The GYC in particular has pursued innovative and effective tactics, such as developing diverse grassroots support, and forging alliances with economic interests in the region. Other groups, such as the Sonoran Institute and the Wilderness Society, have worked with regional economic actors to devise ecologically-sensitive development activities; thus helping to conserve ecological integrity and economic viability while avoiding litigation and acrimony. In an excellent example of adaptability, the Bozeman-based Predator Project, a self-described "watchdog group" (T. Skeele, personal communication), has entered into a cooperative venture with sheep ranchers to produce and market "predator friendly" wool (Wilkinson, 1994:2B).

The old iron triangle in the region is anachronistic and is open to challenges. Barring secession of Western states or other fundamental changes in

government, the regional political dynamic will likely evolve into a more fluid and open "subsystem" of competing advocacy coalitions (Sabatier and Jenkins-Smith, 1993). This evolution seems a natural progression, given the history of western public lands issues. For decades, extractive industries on the public lands enjoyed strong support and very little opposition (Keiter, 1994). Now, shifts in demographics, values and attitudes, and changes in the national economy have eroded this support. New "constituencies" for the public lands, such as amenities-based and "footloose" businesses, recreationalists, and conservationists, have developed and are only now becoming a major force in public lands policy.

In the absence of coalition-building efforts by conservationists, the emerging economic powers in the region may be the sole influence in the new power/policy dynamic. It is important to keep in mind that even amenities-based economic growth could potentially destroy the GYE if it does not occur in an environmentally sound manner. Already, uncontrolled growth is destroying ecologically important riparian habitat throughout the GYE. Critical winter range and movement corridors for wildlife are being parceled up and fenced off as subdivisions. Human communities, in addition to biotic communities, suffer from these trends. Smith (1993:5) of the GYC points out that "amenities-based" growth at current levels places tremendous burdens on public services like utilities, schools, and law enforcement. Montana Senator Conrad Burns (quoted in Egan, 1993:A9) sees cultural consequences as well, as agricultural uses of land decline: "The West is under siege right now . . . We'll be left selling 20-acre ranchettes to fancy-pants Easterners."

Agency Reforms. To what end could this new coalition use its influence? We indicated earlier that this hypothetical alliance could advocate changes in the

legislative guidelines for public lands management: ending below-cost timber sales, royalty-free mineral patents, and incentives to managers to encourage resource extraction. Also, there are several ways to improve the agencies themselves. While it is not within the scope of this paper to set forth a detailed course of reform for the agencies of the GYE, it is possible to point out foci for such reform efforts. O'Toole (1988), National Research Council (1992), Grumbine (1992), and Yaffee (1994) all provide specific suggestions for reform of land management agencies.

There is considerable literature on organizational effectiveness. The disciplines of public administration, organizational behavior, and organizational psychology all have made contributions toward improving bureaucracies. Policies or agency-initiated reforms could integrate the contributions of these disciplines into a program for improving the overall effectiveness of the GYE's federal agencies. Clark and Minta (1994:62) note that many authors have suggested specific improvements in the agencies' "ability to adapt and learn" (e.g., Clark *et al.*, 1991).

Clark and Westrum (1989:664) address ways to improve endangered species recovery programs, but note that "there are a large number of common elements among endangered species cases and conservation programs in general." They discuss issues such as staffing recovery project teams, and striving for a reasonably complete representation of agencies in such "task-oriented" organizations (Clark and Westrum, 1989:665). An effective organization

> would be well matched to its task, its structure being appropriate for its function. [I]t should be properly staffed, led, and buffered from its political environment. [I]t should process information well and learn rapidly from its own mistakes . . . To be highly effective, . . . both biological and organization and management concerns need simultaneous professional attention (Clark and Westrum, 1989:664, 669).

Although it is possible to identify areas where improvements in the agencies are feasible, it is also important to keep in mind the extant political dynamics in the

GYE. Many policymakers and their favored constituencies have a major stake in maintaining the status quo. That the agencies focus on adherence to procedures (e.g., forest planning) without much attention to management outcomes is an acceptable situation to extractive interests. The opposition to the "Vision" and Mumma's attempts to curtail timber cutting demonstrates that any deviation from procedures will be punished under the current system of influence and politics. One resource manager in the region notes that these constraints give agency members a strong incentive to focus solely on procedural compliance. It is the only area in which they are allowed to "excel" (Anonymous resource managers, personal communication). Wilson (1989:131) notes that this problem is widespread in agencies: "...managers have a strong incentive to worry more about constraints than tasks, which means to worry more about processes than outcomes."

What Does our Analysis Suggest?

The problem in the GYE — abstract and acontextual — seems scientific: What is the GYE? What are its key features? How sensitive are they? What activities are incompatible with the long-term health of the ecosystem? Our purpose, however, is to engage in contextual problem definition. This process requires sustained and careful attention to the larger issue. Our analysis here is only a baseline effort at understanding the problem. We cannot produce a tidy "sound bite" problem definition, because the perceived "GYE problem" is made up of multiple site-specific problems that are not amenable to generalized analysis. We can, though, portray the larger policy problem through the following discussion.

If one conceptualizes the overall GYE policy problem, taking a long view of the entire context, one might see it as an onion: a central, on-the-ground problem at the heart of the matter, with hierarchical layers of contextual

problems surrounding it. The central question in this debate does appear scientific: how do we manage our wild areas in light of all the demands and encroachments civilization makes upon them? This central question is surrounded by several layers. First, there are the agencies who manage these areas. The problems in this layer are transmitted to the scientific aspects of the overall problem. Some of the agency problems are endemic, but many of it problems come from the layer that surrounds it.

This next layer is the economic/political stratum of the problem. It exerts control over the agencies, thus transmitting demands and values through to the nucleus of the problem. O'Connell (1992:140) contends that these two layers dominate the policy landscape: "Attempts to enact additional legislation tailored to recent revelations in conservation biology and biodiversity have failed, not because of poor science but because" of entrenched political opposition and bureaucratic shortcomings. An ill-defined fourth level also exists — the cultural aspects of the problem, whose ambivalent values and characteristics are transmitted by political and economic choice through the political layer, on to the agencies, culminating in land management decisions. This progressive influence is apparent in many management policies in the GYE, where cultural values determine the degree of human encroachment to be tolerated — a degree that is often higher than science indicates is acceptable for conservation of the resource. Ideally, science would also transmit information to the cultural layer, helping to clarify and refine values. A key task of policy research is to analytically "peel away" these layers until we reach the central problem.

This "peeling" process becomes evident in our analysis of the dominant definitions. As we have noted, the economic realities of the GYE have changed in the last two decades. These changes could potentially affect the political dynamics of the region as well. If conservationists and those who stand to lose

economically from the degradation of the GYE would organize into an effective advocacy coalition, they would stand a good chance of effecting changes in policies, and changes in the overall structure of the GYE's land management agencies. Then, ecologically and economically sustainable values and demands would be transmitted through the agency layer of the problem to the actual management of the ecosystem. Strengthening an alliance between these groups may be problematic, though. It is likely that some of the "amenities-based" economic interests in the region realize that business-as-usual is not in their best interest. However, cultural similarities and affinities with the traditional groups — as well as cultural rifts with the conservation groups — keep them from entering such coalitions. There is a certain stigma to taking the same side as the environmental "carpetbaggers," even when the position makes sense.

Gaining influence in the political arena of the GYE requires that these groups show themselves to be representing "legitimate" interests: those that will maintain the economy, culture, and natural values of the region. A major aspect of this "credentialing" process is in persuasively demonstrating the actual makeup of the region's economy. Only by wielding influence — preferably through a broad plurality of interests, rather than through a well-funded minority — can better resource management policies be "assigned to the policy agenda through the political process" (Dery, 1984:5). Influence will determine "whose reality is to be attended to;" that is, whose definition of the problem will actually be addressed by policies (Dery, 1984:5).

As we have been advocating, participants in the policy process should be well aware of all phases and aspects of policymaking. It is important to realize that, once a particular problem definition does receive attention from policymakers, the ability of any single interest to successfully advocate specific policies drops off significantly. Nownes (1991:11) advances the "agenda/alternative distinction" as

an explanation of what happens to an issue after it reaches the public policy agenda:

> Agenda items are usually broad in scope, and are often highly visible issues. Alternatives on the other hand are specific policy proposals that address agenda items. . . . what is necessary to get an issue on the agenda (widespread attention) can lead to loss of control (by the agenda setter) over alternatives.

Nownes and other authors assert that a coalition composed of a broad range of interests is often necessary to add an issue to the policy agenda, but also increases the number and diversity of demands for policies directed at the issue. Policymakers are thus unlikely to choose the specific policy advocated by any one group, choosing instead to address a plurality of sometimes competing claims. Hence, the loss of control by individual interests (Nownes, 1991).

These observations lead us to some important points about agenda-setting and policymaking for the GYE. First, agenda-setting and policy advocacy should be well-integrated activities. The issue/problem that advocates are trying to place on the policy agenda should be well-defined, and intelligible, feasible action-alternatives should be included in the problem definition. Second, the overall problem in the GYE should be segmented into smaller, more tractable problems. Smaller, more specific problems will keep the number of directly-involved interests fairly small, and will keep the range of possible solutions narrow. Thus, advocates will retain a degree of control over selection of alternatives. This recommendation may seem at odds with our discussion of comprehensive and systematic problem definition. It is not. A comprehensive definition of "the" policy problem in the GYE indicates that the political climate, as well as the capacity for change at the bureaucratic level, make the design and implementation of some sort of "ecosystem policy" highly problematic.

To return briefly to our car repair example, ecosystem managers differ from the auto mechanic in several important ways. First, the mechanic is working

with a discrete, clearly defined problem area (one car), and has proven and dependable techniques for diagnosing and solving problems. Ecosystem managers do not face a similar situation. The ecosystem is hard to define, and means of detecting and correcting problems are not well developed. Second, the mechanic creates little controversy by noting that a problem exists with a car. Expectations and performance standards for an automobile are fairly uniform (setting aside for the moment fuel economy and air quality debates). Ecosystem managers confront numerous valuational and perceptual differences in setting "performance standards" for the GYE. Some, as the "Vision" incident indicates, are vilified and threatened for making a case that standards are not being met.

Third, the mechanic can expect rapid and unambiguous feedback after taking action. Ecosystem components, on the other hand, may not show results for years, and causality is not clear at all. Fourth, and perhaps most important for structuring a search for alternatives, mechanics do not have a gallery of critics watching their every move, waiting to wield a panoply of sanctions should their actions be unsatisfactory. Indeed, many mechanics do not permit the customer to watch their work. Ecosystem managers on the other hand, are under the scrutiny of supervisors, politicians, the media, interest groups, and the broader public. This range of actors holds diverse, often conflicting values and expectations, and they have numerous means of control over the agencies should their interests be harmed or expectations go unmet. Bad press, congressional hearings, budget cuts, and more direct actions are all threats to ecosystem managers. The costs are clear and present, while the rewards of attempts at ecosystem-based management are not (Wilson, 1989:131; Keiter, 1994:318, 320).

Clearly, then, problem definition in an issue like management of the GYE must take into account what is technically achievable and politically feasible — constraints that do not loom large for an auto mechanic. Meeting these

requirements leads to a certain type of action alternative. We will discuss the sort of action alternatives and specific issues we have in mind in the next section.

IV. New Directions

When we finally arrive at analyzing the scientific core of the problem, one thing becomes clear: "ecosystem management" will still devolve to strategies on particular resource management issues. This point is made clear in the dominant definitions of the overall problem. Each definition of the problem is supported and illustrated by "snapshots" of perceived management shortcomings in the GYE. Each of these cases is a unique collection of site-specific characteristics, management styles, and personalities — making extrapolation of general rules and application of comprehensive policies highly problematic. Simon (1983) contends that this "factoring" or segmented way of understanding is how humans naturally understand the world. Acknowledging this situation is key in understanding the GYE policy problem, in designing solutions, and in articulating and applying the concept of ecosystem management.

We advocate developing responsive and flexible management structures that can deal with the peculiar aspects of these individual resource issues. Hopefully, each of these issues will be considered in a cross-jurisdictional, region-wide manner, recognizing the ecosystem and eliminating conflicting management strategies. Due to inherent limitations on human abilities to deal with complicated problems, we believe that management will still focus on discrete resource issues even if an ecosystem-wide management policy is implemented. At this stage, the likelihood of radically different policies for the GYE seems small, though, due to the political context and various obstacles within the management agencies, individually and collectively. With or without a

comprehensive ecosystem policy, then, it will be necessary to devise better management policies for these specific resource issues. Thus, we propose a program of discrete pilot projects for improving on-the-ground conditions in the GYE.

Pilot projects have several advantages. First, they are politically less-threatening than ambitious attempts to set policy for the entire region. Opponents of the "Vision" were able to portray it as a land-grab, an attempt by the federal agencies to extend their control over the region. Similar objections will continue to haunt wilderness bills and other efforts to protect vast regions. Smaller scale projects will limit the scope of conflict (Nownes, 1991) and provide opportunities for meaningful and effective citizen participation (Kathlene and Martin, 1991). Second, successful pilot projects for improving specific areas or specific resource management issues in the GYE will improve on-the-ground conditions regardless of whether they are part of a larger ecosystem protection act. Therefore, working to design and implement pilot projects for the region will still realize some progress in the event that attempts to change management throughout the ecosystem fail.

Third, pilot projects will be a learning experience for resource managers. They may be able to experiment with new cooperative management techniques and establish protocols for joint decision-making, information sharing, and management responsibility. Perhaps they will develop management models that could be replicated throughout the ecosystem. As noted in Harting and Glick's (1994:145) *Blueprint*,

> ecosystem management plans regarded as set in stone are doomed to failure. Management must be adaptive, applying new ideas and principles as more knowledge is gained, allowing for the continuous fine-tuning of these programs and strategies.

Our proposal moves ahead with improving conditions in the GYE. We are not waiting around for a "silver bullet" policy for the region. We recognize that

putting our full energy into advocating some sort of region-wide policy is problematic in two important ways. First, an effective working coalition of conservationists and economic interests may never materialize, and a region-wide policy may never be enacted. Second, even if a region-wide policy mandating "coordination" or "ecosystem management" were enacted, successful implementation and satisfactory outcomes would still remain problematic. There is a risk in focusing exclusively on crafting legislation to "manage" the ecosystem: the legislation may become an end in itself, at least tacitly, distracting us from our true goal of improving on-the-ground conditions (Brunner, 1992). Far from abandoning the concept of the ecosystem for piecemeal reforms, we believe that a pilot project approach has an excellent chance of improving on-the-ground conditions in the GYE, with or without a region-wide policy. Three examples illustrate the potential effectiveness of such an approach: management of the Targhee National Forest, grizzly bear recovery policy, and reform of the structure of federal research in the region. These examples are only a start; they will not solve all of the GYE's problems, nor can we lay out comprehensive strategies for these particular issues here.

The Targhee National Forest

The Targhee National Forest, forming the western regions of the GYE, presents a special opportunity for conservationists. Ravaged by clearcuts and overgrazing, this abused, mismanaged area has become a symbol for the region's woes. Its vast clearcuts sharply marking the western boundary of YNP have generated nationwide media attention (the *New York Times*, *Washington Post*, and *Forbes* magazine, among others, have all printed aerial photographs of this stark boundary). Various management abuses have impacted a strange plurality of forest users. In 1983, a huge clearcut in the Big Springs summer home area on

the Targhee roused the ire of property-owners in the region (UPI, 1983). Similar resource abuses have followed. The Island Park district of the Targhee once boasted the longest bull elk hunt in the lower 48 states. Logging-related habitat loss and increased hunter access through logging roads has curtailed the hunt from 45 days to a short five-day "war" (Rasker *et al.*, 1992:7). The outfitting and guiding business has been decimated by these changes. Other economic interests have suffered from Targhee management practices. In 1990, Idaho Forest Industries invested over $250,000 in technical upgrades at its stud mill at St. Anthony, ID (UPI, 1990). Today, because of unsustainable timber harvests on the Targhee, the mill has been closed and dismantled (Englert, 1993:B1).

Targhee officials have similarly angered conservationists with their damaging clearcuts — which destroy habitat and cause erosion — and with their apparent lack of concern for grizzly bear habitat. Sheep grazing allotments and proposed timber sales have both occurred on areas on which grizzlies are supposed to receive first priority (Botka, 1983; UPI, 1989). In July, 1993, several conservation groups, led by the Sierra Club Legal Defense Fund, filed lawsuits against the Targhee for inadequate protection of grizzly habitat (Hackett, 1993:B1).The Targhee settled these suits in early 1994 by agreeing to end logging on 164,000 acres of grizzly habitat, along with obliterating or restricting a number of roads (Welch, 1994). Dissatisfaction with management on the Targhee is spread far and wide, which presents a good opportunity to forge alliances between disparate groups. Such cooperation is already occurring with the formation of a grass-roots coalition called the Targhee Timber Task Force, which includes timber industry representatives, conservation groups like GYC, and agency personnel from the FS and FWS (Welch, 1993: A10). Widespread discontent, representing a broad and diverse spectrum (conservation groups, lumber companies,

homeowners, outfitters), is important in putting pressure on policymakers and agency officials to improve management (Lasswell and Kaplan, 1950:241).

Grizzly Bear Recovery

The grizzly is a very important and highly controversial species in the GYE. The quintessential wilderness animal, the grizzly is one of the main reasons people venture to Yellowstone (Wright, 1992:111). The controversy over the bear stems from its recovery needs: how much habitat must we set aside for grizzlies, and how well-buffered from development and human encroachment must grizzly habitat be? Managers would answer these threshold questions with, "whatever is necessary for a recovered (healthy, self-perpetuating) population," but there is little agreement over where the recovery threshold itself is. Pete Petera, director of the Wyoming Game and Fish Department, recently stated that he "'feel[s] that our grizzly bear population is in excellent shape . . . Most of our data show that we have met our [bear recovery] objectives for the Yellowstone area'"(Loomis, 1992:A1). Meanwhile, Mark Shaffer, a wildlife researcher and vice-president of the Wilderness Society, predicts that "[w]hen Yellowstone National Park celebrates its bicentennial (in 2072), we're likely to not have any grizzlies there" under current management plans (GYC, 1992:4). Mattson and Reid (1991:368,369) state that "[t]he status of the Yellowstone grizzly bear population with respect to [demographic and genetic] thresholds is unknown. . . Optimism about the long-term viability of the Yellowstone grizzly bear population is not warranted."

Resolution of this dispute presents a major opportunity for improving conditions in the GYE. Because of the grizzly's habitat requirements, — large blocks of relatively pristine wilderness — meeting the grizzly's needs will net substantial protection for other species and ecosystem components. Also, improved grizzly recovery plans will have other benefits. First, improved grizzly

management as we envision it will necessitate treating the grizzly as a cross-jurisdictional management issue. Thus, interagency coordination will be strengthened in the process of designing an effective recovery plan. We are somewhat optimistic that such cooperative planning could feasibly occur, since interagency structures for dealing with grizzlies already exist (IGBC, IGBST); and since the *Grizzly Bear Recovery Plan* (USFWS, 1993:10) itself already refers to recovery areas as "grizzly bear ecosystems" — thus acknowledging that conventional administrative boundaries have little significance in the management of such a wide-ranging species.

Second, an improved recovery plan will have to strike a balance between biological requirements and social and political concerns. Achieving this balance will require efforts to determine the needs of the grizzly bear and the goals and values of all humans who are concerned with the GYE and endangered species generally (Primm, 1993). Researching both questions will uncover substantial information about the GYE as both an ecological entity and a social resource. Such information would be priceless in addressing other issues in the GYE and in other areas.

Ecosystem-Wide Research Reform

Clearly, management of an expansive region like the GYE will require adequate baseline knowledge of ecosystem components and processes, appropriate monitoring structures, and better intelligence tools all around. To this end, we propose a focused effort to improve scientific research throughout the GYE, with the goal in mind of generating more policy-relevant information and tracking the long-term conditions of the GYE (Clark *et al.*, 1991). Due to the obvious hostility toward cooperative efforts between the FS and NPS, such an effort might concentrate on assigning a different body (e.g., National Biological Survey,

National Science Foundation, National Research Council) to conduct research throughout the GYE. Such "independent" analysis has occurred in the past, but has been focused on particular issues, such as grizzly bear management and wilderness management (GAO, 1989). We advocate similar projects, only focused on various region-wide issues considered at the ecosystem level.

Conclusions

Here we should return to the question in our title: What is the policy problem? From our analysis, we would conclude that the problem is mainly "political." To dismiss the complexity of these issues with this vague, pejorative term is grossly inadequate, however. As Simon (1983:99,100) points out, our society overlooks many aspects of policy problems by

> labeling our political institutions in two different ways. On the days when we are happy with them, we call them democracy; on the days when we are unhappy with them, we call them politics. . . The activities we call "political" are simply another manifestation of the propensity of human beings to identify with personal goals and to attempt to realize these goals in a lawful manner.

Adequate problem definition to guide policymaking, then, cannot stop at complex variables that defy quantification or rigid mental constructs and discard these aspects as mere "politics." Varley (1993:132) provides a more detailed representation of the "political" problem in the GYE:

> the root obstacles to greater [interagency] coordination are not scientific; they are social, based on fundamental differences of beliefs among agencies and constituency groups over how much public lands should be used.

The complexity of these policy problems in the GYE makes clear the need for contextual problem definition. Working through the process of problem definition in turn illuminates the need for a particular type of problem-solving strategy that accounts for the contextual constraints

In our view, the relevant scientific questions about management of the GYE are not a major hurdle; they do not exceed the capacity of contemporary

researchers. These questions must be answered nonetheless. However, the degree to which useful research can be carried out and utilized is severely constrained by the current political dynamics of the GYE and the United States — dynamics that include ineffective advocacy *for* ecosystem conservation. To recount then, the problem in the GYE is, generally, a lack of: 1) technical experience in "ecosystem management," 2) the bureaucratic will to engage in such management, especially on a cross-jurisdictional basis, and 3) the requisite political support for this sort of research and management.

Any policy alternative that promises to solve the technical problems of GYE management must also successfully overcome the bureaucratic and socio-political obstacles. To that end, we have recommended small-scale experiments to simultaneously solve problems of technical feasibility and political viability. We realize that certain members of the conservation community will object to what seems like a piecemeal approach; some have characterized strategies that do not demand immediate protection for thousands of square miles as "sheer lunacy" (quoted in Stuebner, 1992:10). Our proposals stand a good chance of success. Moreover, they stand to generate new knowledge and flexible techniques in wildlands conservation. We see no need to legislate on every good idea that comes along.

Perhaps we have answered our original question; however, there is no one "best" definition out there. Defining a policy problem is, in our view, an inherently subjective activity. Moreover, we see problem definition as an iterative activity, especially when the arena is ambiguous and highly dynamic. So, our problem definition is heavily influenced by our own perspectives, values, and goals; as well as by the nebulous nature of this particular problem area. We expect that others would have different problem definitions, and hope that we have generated thought and debate on the issue. In turn, we also hope that such

debate will build on what we have said here so that the definition of the GYE policy problem can be sharpened and brought into focus.

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