
Toward a Policy Paradigm of the Wildlife Sciences

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All wildlife professionals, whether aware of the fact or not, are fundamentally influenced by and participate in the policy process. A lack of recognition and understanding of the role and impact of policy in wildlife management by the "typical" wildlife professional can result in a relative powerlessness in most policy situations and, in effect, an inability to control one's professional destiny. The complexities of contemporary wildlife management and the current threats to wildlife conservation are simply too great to permit this degree of professional inattention to continue. If the field of wildlife science is to contribute fully and adequately to the critical societal decisions affecting the future abundance and well-being of our nation's fauna and flora, then it seems essential that young wildlife professionals be sufficiently educated in the complexities, subtleties and techniques of the policy process. This article represents a step toward increased understanding of policy in the wildlife sciences.

Policy, most simply defined, "is a broad strategic statement of intent to accomplish aims" (Brewer and deLeon 1983:30). Policies are solutions formulated to solve problems and, of course, must be successfully implemented. In practice, few policies are precisely, explicitly, or rationally formulated, but instead are often implicit and emergent in the initial "definition" and evolution of the policy "problem" and in efforts to identify a solution (Dery 1984). Numerous reasons account for this lack of policy clarity and some are examined in this article. For the present, we offer a second definition of policy as "a specific course of action designed to achieve a desired outcome." Our fundamental premise is that, through a better understanding of the policy process, wildlife professionals can develop a far greater capacity to affect its successful emergence and implementation.

In 1983-84, we conducted a survey of wildlife curricula in American universities. Our survey regrettably revealed

that policy is generally not a significant part of professional education. Romesberg (1981) suggested that wildlife professionals need to understand and apply science as an explicit process, a philosophy and epistemology to increase reliable knowledge as a basis for management. Our investigations of "policy" have led us to conclude that an explicit understanding of the policy process is basic to the work of wildlife conservation, its science, management, administration and public service responsibilities. Understanding the policy process can improve professional effectiveness in an increasingly complex world and can enhance a sense of professional pride. We view policy as both process and product and regard having a useful policy paradigm, or model, as fundamentally important to successful wildlife management and conservation. Wildlife professionals—technicians, researchers, managers, administrators or educators—are all enmeshed in the web of the policy process and both affect its expression and are continuously affected by its outcomes.

In this article, we will endeavor to: (1) introduce a wildlife policy paradigm intended to promote a broad understanding of the policy process, its dynamic nature and its products; (2) examine the concept of policy and explore some definitions and meanings; and (3) offer some ideas regarding a university curriculum in wildlife policy. We recognize that a policy paradigm described in its full richness and complexity is beyond the scope of this effort. Our goal is to offer initial comments in the spirit of constructive inquiry and in the hope that they may stimulate needed discussion about the policy dimension of wildlife conservation. We both contributed equally to this article.

A WILDLIFE POLICY PARADIGM

A paradigm is an integrated model of understanding used to organize thought and action. Cartesian science, for example, is a basic paradigm of modern wildlife manage-

ment (Kuhn 1972, Romesburg 1981). What follows is a brief introduction to a policy paradigm. Perhaps the most appropriate point of departure is to ask: "What is policy?" Policy is a difficult word to define precisely. As Brewer and deLeon (1983:6) observed: "Policy is a word with many interpretations and interpreters." Recognizing this, we can say that policy is a special type of decision-making in which choices are formulated about a broad course of action to be pursued.

Policy aims can be explicitly stated. However, many specific, subsequent decisions are often required to implement policies and, typically, these are made within the policy's broad guidelines. The 1973 Endangered Species Act (ESA), as amended, for example, represents a national policy on species endangerment and extinction (Bean 1983). Despite ESA's precisely declared aims, the broadly stated objectives of the act and the peculiarities of each species' conservation problems have resulted in varying interpretations and redefinitions of ESA policy (Yaffee 1982). In this stream of decision-making and implementation, the original intent of ESA has been significantly modified and its policy, as a consequence, fundamentally altered. In some cases, ESA has become so modified through a process of negotiated and politicized decision-making that some conservationists even question whether ESA policy still remains the "safety net" against extinction it was intended to be (Carr 1986:7).

A few definitions of policy may facilitate an understanding of the policy process. In one sense, wildlife policy "may be broadly defined as what state, federal and private wildlife management agencies and organizations do for or to wildlife in the name of the 'public interest'" (Clark 1986a:11). This definition recognizes that both process and product are integral components of policy and that the organizational context is a major influence. A second explication of policy suggests:

"Policy is a proposed course of action of a person, group or government within a given environment providing obstacles and opportunities which the policy was proposed to utilize and overcome in an effort to reach a goal or realize an objective or purpose. Policy is necessarily an abstraction, therefore, to be approached through aggregative or summing analytic procedures. It is a pattern of behavior rather than separate discreet acts which constitute policy" (Tober 1983:142).

This definition emphasizes the emergent nature of policy as a dynamic social process and the aggregate interactions that produce it.

A slightly different definition, emphasizing other aspects of the policy process is offered by Etheredge (1985:141):

"Policy derives from an enterprise larger than analytical reasoning, a choice of interpretations, and a personal point of view. As in the solution set of simultaneous equations, a policy is a joint expression of who one is, what the important values and purposes are conceived to be, who others are, and what role is imagined for (them)."

This definition stresses the psychological, sociological and organizational dimensions of the policy process. It underscores the process as more than a simple rational problem recognition and implementation of solutions. On the contrary, the process is regarded as extraordinarily complex, subtle and interactive, although these properties vary from case to case. Recognition of this complexity led Brewer and deLeon (1983:1) to begin their book, *The Foundations of Policy Analysis*, with the rhetorical question: "Does anyone know what is going on?"

Another perspective on wildlife policy is offered by Witter and Sheriff (1987:262):

"Incorporation of public values into wildlife policy is a never-ending process of monitoring public participation and expectations and then blending this information with biological data, fiscal constraints, legislative climate, legal limits of agency action and management philosophy of the agency's governing board. The process sounds like one that is complex and lengthy and involves many characteristics; and so it can be, particularly with wildlife issues that pit special interest groups against one another."

This perspective emphasizes the external environment of agencies, particularly the role of the public, special interest groups, legislatures and other organizations, but also recognizes the influence of the agency's internal environment and management philosophy (see Warwick 1975).

It varies somewhat with this view of policy:

"The public policy process does not function according to the analyst's model in which a problem is identified, alternate solutions proposed, necessary data amassed, solutions compared with respect to a set of criteria and the optimal solution identified and implemented. Rather, problems only are identified as the policy process plays itself out; risk and uncertainty are pervasive; a universal evaluative scale does not exist. Competition . . . in the policy process based on critical information and analytical expertise collapse into a competition among perspectives identified by groups to establish their own legitimacy and to detract from that of their opposition's lack of scientific objectivity and accountability" (Tober 1984:122).

This definition recognizes the "political" nature of the policy process, with competition and conflict fundamental

to its own formulation, articulation and implementation. It also stresses the emergent and subjective character of the policy process. This political dynamic is similar to that described by Dana and Fairfax (1980:xiii):

Policy "is a series of negotiated settlements resulting from the interaction among competing interest groups, among competing regions and among agencies competing for the support, interest, and attention of the public."

These various definitions of public policy identify some common themes and collectively capture the essence of the policy dynamic. Each definition underscores a view of policy formulation and implementation as basically an evolving, often nonrational, and nonlinear process, which seldom uses a scientifically defined problem as its starting point. The "evolutionary" view of the policy process is well summarized by Brewer and deLeon (1983:2-3):

"The concept of 'evolving' is essential. As there are many ways to perceive problems, so there are various ways to overcome them, many of which are not immediately clear; many will depend on special imagination for their formulation and innovation for their implementation. Events, furthermore, are neither static nor isolated. Simply being aware of a problem and trying to understand it can affect the field of view and alter the substance of the problem itself."

In short, wildlife policy is rarely a simple set of rationally derived guidelines outlining the broad goals which agencies and organizations should faithfully implement in solving wildlife problems. Policy is equally a nonrational and subjective process as limits of information are encountered, selective interpretations of existing data occur, imbedded values exercise their influence, biased preferences surface and ideological allegiances are revealed. However, the interplay of these sometimes subtle variables may be "invisible" to many participants of a policy dialogue. Policy formulation and implementation is, thus, as much a social and political as a scientific process. The relative influence of these psychological, sociological, political and scientific variables will, of course, vary from situation to situation.

Wildlife specialists not only help to carry out policies, but also help to create them, very often unknowingly through their collective actions. Agencies and organizations typically possess inherent policy preferences that serve as broad guidelines for understanding and action. These imbedded perspectives subtly shape professional views, including perceptions on how problems are identified and defined and how solutions are formulated (Kerr 1984, Douglas 1986, Latour 1987). March and Simon (1958) developed the "bounded rationality" model to explain these organizational, cultural and design constraints

to policy-making. These institutional boundaries for thinking and acting emphasize that few policies are scientifically and explicitly written or codified. Policy is just as often formulated out of the evolving policy setting as problems, solutions and implementations are identified, defined and redefined as being appropriate and legitimate.

ROLE OF POLICY

Two views can be taken about the role of policy: societal and professional. At a societal level, the policy process functions as a public service, allowing socially and politically desired outcomes to emerge. The policy process, in this sense, operates as a procedure to determine what values and goals are important and to define the nature of the "public good." Policy formulation can thus assist our democratic system by offering a means for pursuing consensus on complex, value-laden questions through a process of dynamic interaction. The major societal constituencies influencing wildlife policy are identified in Figure 1. (See page 10.) Through the interaction of these entities, basic values and preferred outcomes are blended in a stream of information and political exchange (Lindblom 1980). Political elements include the exercise of persuasion, education and influence, on the one hand, and the crass use of power and coercive authority, on the other. The unfolding policy process ideally provides sufficient opportunity for all interests to express themselves fairly and equitably. But because the policy process also includes a considerable degree of influence brokering and the expression of power, its outcomes are often a consequence of competition and conflict.

The policy process at the societal level can result in legislation and regulatory standards (e.g., ESA). Legislation, however, is only one means of expressing societal policy. Another way is through the incremental, ad hoc actions of governmental agencies. For policy to be put into effect, programs must be established, staffed, funded and administered. These bureaucratic procedures translate into policies being redefined, reformulated and altered through implementation by mid-level and on-the-ground decision-makers and professionals. This sometimes results in policy shifts and even some interesting policy contradictions. For example, the federal government carries out policies directed at eliminating prairie dogs (*Cynomys* spp.) in many areas while, on the other hand, it seeks to ensure the survival of another species, the endangered black-footed ferret (*Mustela nigripes*), which depends on prairie dogs for its existence. Policies can be and sometimes are inconsistent, contradictory and irrational, as well as occasionally well-founded, comprehensive and successful.

At a professional level, wildlife specialists with a clearer and more explicit understanding of the policy process are

in a stronger position to affect conservation policy than professionals who lack this knowledge. As Romm (1984:15) remarked: "Professionalism in resource policy is the capacity to represent effectively collective values that surmount those of specialized interests and temporary concerns in the midst of conflict, to guide resolutions and to formulate its instruments and to implement the consequences in a manner that is effective, publicly informative and accountable." A wildlife professional with policy knowledge and skills should be more adaptive to the policy dynamic than wildlifers who lack these resources. Romm (1984:15) reiterated this view when he suggested that wildlife professionals need education which enables them to operate as much in the public arena "as in the forest, field and stream."

Unfortunately, traditionally trained wildlifers typically lack an understanding of the policy process. As a consequence, they are often forced to participate in policy dynamics while ill-equipped to do so, both conceptually and technically. The wildlife professional who, in contrast, possesses policy knowledge and skills can often find he has the "capacity to improve a situation by understanding its historical background and contemporary dynamics and by applying strategies with a conceptual basis for predicting and assessing their long-term consequences" (Romm 1984:17). The reality, however, is that because understanding policy requires the knowledge of many disci-

plines traditionally excluded from conventional wildlife curricula, most wildlife professionals are typically deficient, limited and too rigid in their ability to deal with complex policy problems (see Schon 1971).

A MODEL OF THE POLICY PROCESS

Policy scientists have devised various models of the policy process. It would, therefore, be redundant for wildlife professionals to formulate models of their own. Specific factors unique to wildlife conservation can be added to these generic policy models. The following discussion draws on one existing policy model and interjects specifics relevant to the wildlife arena.

"The phase model" of Brewer and deLeon (1983) describes the stages which policies and programs typically pass through over time and is invaluable for understanding wildlife policy process. The Brewer and deLeon model recognizes that policy is seldom divisible into neat stages, but nevertheless it provides an important basis for comprehending the policy process. Their model recognizes six phases: Initiation, estimation, selection, implementation, evaluation and termination.

The *initiation* phase is that in which the problem is first apprehended. It may be followed by a brief period of ini-

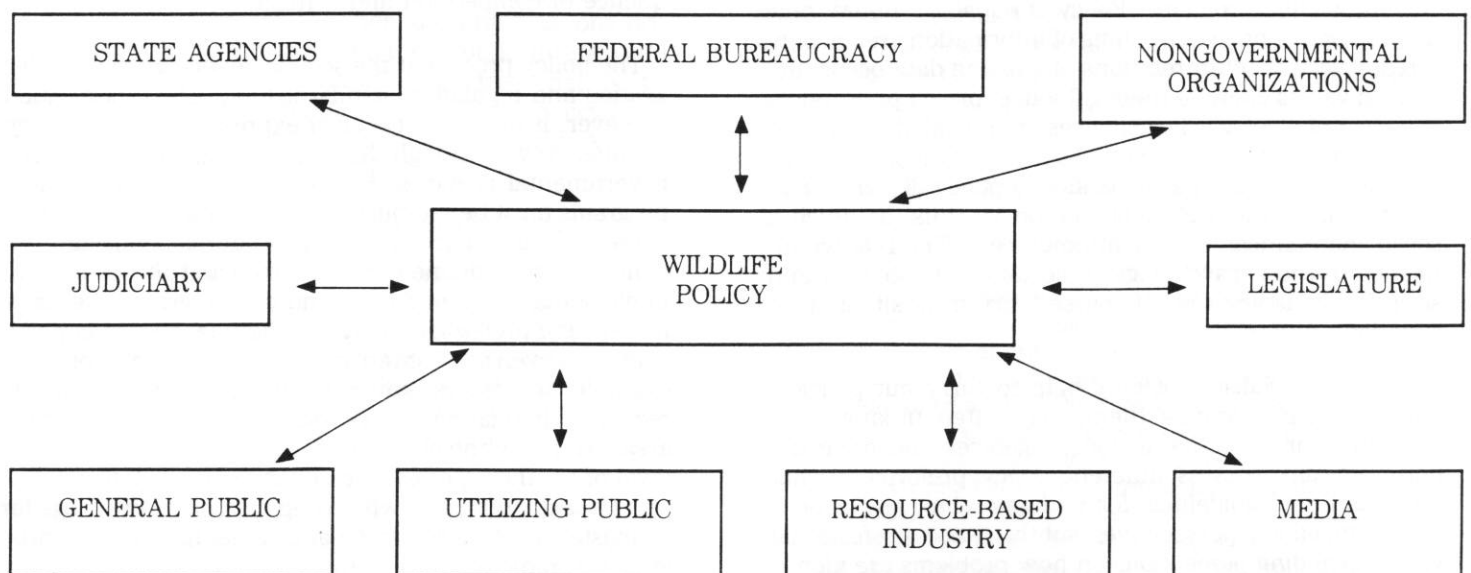


Figure 1. The major interests involved in shaping wildlife policy.

tial exploration. This exploration helps to define the problem more precisely, evaluate its importance and determine whether it merits attention and resources. Initiation is typically innovative, conceptual and outlining.

The *estimation* phase includes an examination of costs, benefits and risks associated with alternative definitions and responses to the policy problem. In this phase, the range of policy options is narrowed.

Selection requires decisions and is, thus, the most political of the policy phases. Decisions are often as much a consequence of nonrational and ideological factors as a result of technical calculations and estimations. Perceptions of risk and uncertainty are paramount in this decision-making phase.

Implementation involves a defined course of action that may or may not bear a close resemblance to the well-ordered policy recommendations. Implementation can possess its own rules, participants, methods and procedures. The organizational context is extremely important as the organization's internal reward and incentive system can support, modify or undermine the explicitly intended policy.

The *evaluation* phase is based on judgments regarding past actions and is, therefore, retrospective. Questions concerning policy effectiveness, efficiency and equity are often raised and examined.

Finally, *termination* involves the decision to eliminate or adjust policies, programs and organizations based on notions of function, relevancy, necessity and redundancy. Termination is poorly understood, both conceptually and intellectually, and is seldom easy to accomplish, as organizations and individuals often possess a vested interest in a program or policy's continuation (Westrum and Samaha 1984). As Brewer and deLeon (1983) note, this model is most useful as its interactive possibilities are explored, both in practice and hypothetically. Their book describes the six policy phases in their full richness and detail. This policy model provides an effective tool for identifying various factors associated with the emergence, development and evolution of wildlife policy.

We have also identified four systems of variables that typically influence the formulation and implementation of wildlife policy. These include biophysical, valuational, authority/property and institutional/decision-making variables (Table 1).

Table 1

Major Variable Sets in the Wildlife Policy Process	
<p style="text-align: center;">Biophysical</p> <ul style="list-style-type: none"> Abundance/scarcity Fragility, reproductive strategy Ecosystem function/trophic level Resource partitioning Prey/predator relations Interspecific competition Sentient capacity, size Morphology Phylogeny/evolutionary relation 	<p style="text-align: center;">Valuational</p> <ul style="list-style-type: none"> Kellert typology: naturalistic, ecologicistic, humanistic, moralistic, scientific, aesthetic, utilitarian, dominionistic, neutralistic, negativistic, theistic Symbolic, e.g., size, intelligence, locomotion, morphology, cultural/historical Economic & material worth
<p style="text-align: center;">Authority/Property</p> <ul style="list-style-type: none"> Property rights Proprietary privileges Distributional rights Exploitation access and control Common property rights Private property rights Public trust responsibilities Fugitivity of species 	<p style="text-align: center;">Institutional Decision-Making</p> <ul style="list-style-type: none"> Regulatory agencies, legislatures Courts, private nonprofit groups For-profit constituency groups Appropriations process Legislative oversight and review Intergovernmental relations International jurisdictions Scientific expertise Communication-information control Public access and review National security interests Management style, administrative politics, organizational dynamics

Biophysical variables include physical and biological factors that set limits on the availability, condition and utility of wildlife for human benefit and consumption. Some biophysical factors are: species abundance, fragility, vulnerability to change, reproductive strategy, population dynamics, behavioral patterns, community relationships, morphology, phylogeny, sentient capacity, etc. Generally speaking, the greater the degree of uncertainty associated with these biophysical factors, the more likely wildlife policy is to be determined by social, economic and political forces.

Valuational variables refer to the worth, importance and significance of wildlife to people and society. This worth can sometimes be measured in economic units, although it often finds expression in non-economic social, cultural and psychological terms. Whereas valuations of wildlife do change, they are generally stable, hierarchically organized and predictable across individuals and time. As a consequence, wildlife values tend to function as fundamental assumptions regarding the presumed worth, benefit and importance of species to people and society.

One framework for identifying a range of basic wildlife values is Kellert's (1980) typology of attitudes toward ani-

mals. (Table 2). A different kind of wildlife value is the *symbolic* meaning or importance of wildlife to people and society. Symbolic significance can be expressed in simple species preference terms (e.g., like or dislike of particular wildlife), or in the more complicated uses of animals in myth, legend and ritual. The symbolic importance of wildlife typically is culturally determined and linked to such species attributes as size, presumed intelligence, sentient capacity, historical experience, morphology, predatory characteristics, threat to human health and property, mode of locomotion, etc. (Kellert 1983, 1985, 1987).

Authority and Property variables represent those rights and privileges regulating peoples' access to and control and exploitation of wildlife. On a hypothetical continuum of authority/property relations, one end is represented by the "common property" situation wherein a species is, in a sense, owned by "everybody and therefore nobody" (Hardin 1968). This situation is often associated with the "tragedy of the commons," in which demand for a species exceeds its replacement capacity in part because people have an incentive to overexploit it because of a pervasive fear that one must consume as rapidly as possible or others will reap the remaining reward. The other extreme of the authority/property continuum occurs when control

Table 2

A Framework for Identifying Basic Wildlife Values (Kellert 1980)	
Naturalistic:	Primary interest in and affection for wildlife and the outdoors.
Ecologistic:	Primary concern for the environment as a system, for interrelationships between wildlife species and natural habitats.
Humanistic:	Primary interest in and strong affection for individual animals, principally pets. Regarding wildlife, focus on large attractive animals with strong anthropomorphic associations.
Moralistic:	Primary concern for the right and wrong treatment of animals, with strong opposition to exploitation of or cruelty toward animals.
Scientistic:	Primary interest in the physical attributes and biological functioning of animals.
Aesthetic:	Primary interest in the artistic and symbolic characteristics of animals.
Utilitarian:	Primary concern for the practical and material value of animals or their habitats.
Dominionistic:	Primary interest in the mastery and control of animals, typically in sporting situations.
Negativistic:	Primary orientation an active avoidance of animals because of dislike or fear.
Neutralistic:	Primary concern a passive avoidance of animals because of indifference or lack of interest.

of wildlife is vested entirely in the power and ownership of a single or small group of individuals who monopolize access or consumptive rights to the desired wildlife. Complicating the authority/property relationship is a tendency for many wildlife species to be "fugitive" in the sense of moving freely across human property and boundary lines.

Institutional and decision-making variables include the formally prescribed regulations governing the use, allocation and management of wildlife. The formal institutional and decision-making context includes government agencies, legislatures and courts. They also include a variety of non-governmental organizations and diverse public interest groups.

The functioning of regulatory agencies depends on a variety of factors, including their own internal organizational dynamics—management orthodoxy, leadership patterns, rules, roles and regulations (Warwick 1975). Regulatory agencies are also influenced by external patterns of vested interest, sources of revenue, constituency support and various allied and adversary relationships, all of which lead to bureaucratic "politics" in the policy process (Clarke and McCool 1985).

The legislature influences agencies by passing laws, appropriating funds and providing oversight and review. The courts, in turn, offer interpretive judgments and a system of precedents modifying agency behavior and the presumed power of law. Both the legislature and courts are affected by the same factors cited above as influencing agency behavior.

The role of non-governmental organizations and citizen interest groups is especially evident in the wildlife policy process as entities exercise enormous influence on regulatory agencies, state and federal legislatures and the courts (Culhane 1981). This influence has resulted in the passage of laws, significant litigation, varying appropriations to regulatory agencies, education of the general public and the election of government officials. All of these institutional and decision-making factors significantly influence the course of wildlife policy.

CONSTRAINTS ON THE POLICY PROCESS

For policy to address problems successfully, the problems must be recognized in a timely fashion, must be understood and must be defined in such a manner that remedial measures can be taken (Lasswell 1971). This sequence, however, rarely occurs. Many factors act as restrictions on or barriers to understanding policy problems, solutions and appropriate methods for putting the policies into effect. The constraints include cognitive, technical and organizational variables and are especially evident

when problems are complex or poorly understood and exceed human abilities to comprehend them.

Policy problems including large spatial and temporal scales, for example, are particularly difficult to contain and resolve (e.g., loss of global biological diversity). When people are confronted with complex policy problems, a common practice is to redefine the poorly understood, larger problem into smaller, more easily comprehended problem segments (Dery 1985). A solution to the smaller problem segments then is assumed to be a sufficient resolution of the overall complex problem—an often erroneous assumption.

Many constraints on policy are widely recognized, while others are more subtle and not fully appreciated. Problem-settings may be insufficiently understood as a basis for defining a problem and implementing a solution. The problem may not be amenable to rational or technical settlement because it really involves a question of values, a not unusual situation in many wildlife policy controversies.

No answers may exist for some policy problems. They may require novel and creative solutions and these are often resisted by risk-averse individuals and bureaucratic agencies, especially those inclined to be tradition-bound, rigid and control-oriented (Arygris and Schon 1978, Westrum and Samaha 1984). New remedies require time for adequate formulation and implementation, or for feedback checks to monitor and measure their potential success or failure. If errors are detected in the proposed solution, they may be politically costly, as well as technically incorrigible, so it may be safer simply to do nothing. Feedback from the problem-setting may be ignored or feedback loops kept open so corrective learning is impossible.

Many bureaucratic agencies erect obstacles to learning that cause information failures (Etheredge 1985, Clark 1986b). One such obstacle is the ideological preferences of an agency (e.g., federal vs. states' rights) that are so deeply imbedded in its culture that constructive debate and examination of alternatives are stifled or blocked. Another obstacle can occur when decision-makers are so insulated from the details of a problem that "groupthink" results in premature closure of exploration about what the problem really is and how best to resolve it. In such cases, the agency may prematurely seize upon a "solution" that corresponds to its ingrained ideological preferences, but has little to do with actually remedying the problem itself.

Other obstacles may include wishful or fearful thinking. Failure to understand the predispositions and biases of individuals and organizations can be obstructive. Policy meeting can be ritualized or not sufficiently problem-oriented. Policy-makers can fail to accept legitimate and

constructive criticism. They can also be preoccupied with power, influence and control, rather than with legitimately meeting the issue at hand. Finally, unknowns and surprises are not unusual. These and other factors all operate as serious constraints upon or barriers to effective policy prescription and implementation.

WILDLIFE POLICY EDUCATION

We wish to conclude this article by considering how wildlife policy might be taught at the university level. Romm (1984) remarked that formal policy education is essential for resource managers. We concur that university educators with practical field experience have a responsibility to design academic programs which meet the real needs of practicing wildlife professionals. The extent to which our discipline currently meets these requirements is debatable. We are discouraged by the findings of our 1983-1984 survey of university curricula that policy is not yet a subject of important concern to wildlife educators.

Two contrasting educational approaches for teaching wildlife policy can be identified. At one extreme, some wildlife educators advocate training in "heritage, structure, code and norms so that professionals can maintain their traditional identities against the tempest of social whim" (Romm 1984:15). We call this a "maintenance" philosophy of policy education. It appears from our 1983-1984 survey that most wildlife programs use this approach. This maintenance perspective emphasizes policy as a rational process and stresses a review of major federal and state legislation. But this pedagogical approach rarely provides students with an awareness of the complexity, organizational dynamics and political and social matrix in which wildlife policy is typically negotiated. As we described, these subtle and complicated factors often influence policy outcomes and the means to achieve them. An approach to policy education as a simple rational process often overemphasizes an economic cost/benefit analysis method of finding a single "right" course of action. This kind of orientation tends to exaggerate the importance of maintaining traditional "norms" and to reinforce a view of the policy-and decision-maker as invariably "correct." It may also encourage a naive perception of policy as little more than technical planning—a mere sub-discipline of modern wildlife management. Such an interpretation, in our opinion, is erroneous and unrealistic.

A contrasting view of wildlife policy instruction advocates more liberal education, which can reduce the isolation of students by exposing them to many diverse views and philosophies they might otherwise miss. This can build social ability and understanding (Romm 1984). We call this a "policy process" educational philosophy. Our bias obviously is towards this type of policy instruction.

We believe the goal of wildlife policy education should be to have students gain not only a traditional sense of professional identity, but also a strong perspective of themselves as wildlife conservationists in a dynamic, complex and competitive world. Policy should be taught as a social process full of opportunities, rather than as a planning exercise limited to technical and procedural constraints and formulae. Students should learn about policy as a broad sociopolitical dynamic, not as a narrow set of technical restraints to planning and management. Policy education should prepare students to learn rapidly from experiences and to reduce the time necessary for maturation and development as effective professionals. This philosophy of policy education aims to teach students how to learn about learning (Schon 1983). It requires a mutually reinforcing interaction of theory and experience. As Romm (1984:17) remarks: "If we teach how to learn about policy, we transmit the essence of our strength."

If the two philosophies of wildlife policy education outlined here could be blended in order to capitalize on the strength of each, students would be able to achieve a better conceptual and technical competence in the increasingly complicated world of contemporary wildlife conservation. Students equipped with this combination of concepts, knowledge and skills could be more effective at negotiating and balancing the various competitive demands on wildlife existing in our modern industrial society, without sacrificing the hard-won achievements of traditional wildlife management.

Given this perspective, what might a relevant and technically sound wildlife policy course include in the way of focus and curriculum? A desirable balance of instructional elements was identified by Romm (1984:17), and included:

1. The use of historic themes in resource policy formulation and execution as a basis for understanding current dynamics and future possibilities.
2. The use of issue projects that force students into contact with people of conflicting views and requires of them some strategy for conflict resolution.
3. The development of analytical concepts and techniques that sharpen interpretations and permit their generalization to a broad range of problems.
4. The development of capacities for written and oral communication . . . on policy issues for a diverse array of social groups.

This mix of instructional elements could produce abilities for practicing professionals that include a capacity "to improve a situation by understanding its historical back-

ground and contemporary dynamics and by applying strategies with a conceptual basis for predicting and assessing their long-term consequences" (Romm 1984:17).

Several years ago, we outlined a wildlife policy course and text that included this mixture of elements. It had a national and international focus. The course and text were divided into four major sections: introduction, process and context, issue areas and the future. The introductory section defined and outlined the policy process, tailoring it to the situation of contemporary wildlife conservation. In the description of the policy stage, we identified major organizational actors, activities and attributes of the wildlife policy arena. In the final introductory section, we traced the history of North American wildlife populations, habitats and conservation efforts and compared this with the global situation.

The second section, process and context, examined the wildlife profession and the policy process. It included a consideration of the role of the public, the agency and organizational setting, science, law and various land uses competing with wildlife in our modern world. Models of how public interest groups (e.g., Culhane 1981) and organizations (e.g., Warwick 1974) function and operate were reviewed with accompanying case materials.

The third section, issue areas, examined current wildlife conservation problems, including game vs. non-game management, endangered species, predator and rodent control, parks and protected areas and marine mammal conservation. In-depth consideration of these issues would allow students to analyze current problems for an understanding of the policy process.

The fourth and final section, the future, assessed the probable course of wildlife policy in the years ahead, focusing particularly on existing organizational structures and trends in wildlife abundance and related competitive land uses.

We believe case studies are particularly important for teaching and learning about the wildlife policy process (Clark 1986a,b). A case study "is the systematic recording of an event or series of events with the objective of learning from that event" (Taylor 1983:261). Case studies describe in detail actual or hypothetical situations and can illustrate the complexities and subtleties of the policy process. Through case study analysis, students can examine the combined analysis and judgment of others. Because case studies serve as models of both successful and ineffectual policies, students can prepare through them for the complex situations they will personally and professionally face in the future.

Four types of case studies are recognized, according to their complexity, detail and ease of analysis, including (Ronstadt 1980):

1. *Technical and problem-solving cases* which are short, fact-laden and well-ordered. The single "best" solution is sought on the basis of concise analysis.

2. *Short-structured vignettes* generally lacking one "best" solution, but oriented to a "better" or preferred outcome within the conceptual framework provided for analysis.

3. *Long, unstructured problem/opportunity identifying cases* in which both problems and solutions are unclear and do not permit a "best" case solution.

4. *Ground-breaking cases* in which new situations preclude using information from previous analyses and, therefore, necessitate innovative and novel solutions. Unfortunately, no case book currently exists for wildlife policy instruction.

CONCLUSIONS

Working effectively within the evolving dynamics of contemporary wildlife conservation and management requires an interdisciplinary policy perspective. Understanding the policy process necessitates a consideration of concepts and knowledge of many fields, including natural resources, wildlife science, psychology, sociology, organization and management, political science and even history and philosophy. Little exposure to this kind of knowledge, understanding and learning among most wildlife professionals has resulted in limited success in influencing both the policy process and its products. The educational approach advocated in this article could provide a basis for helping to remedy this educational omission in our profession.

We must strive for effectiveness, efficiency and equity in our wildlife policies. Effectiveness is the measure of our ability to produce intended results. Efficiency assesses our capacity to achieve these results in a timely and cost-effective manner. Equity represents the quality of our policies as fair, just and representative. Although meeting these goals is something of an ideal, only through a more explicit and comprehensive understanding of the policy process can we pursue these worthy objectives in a competent and adequate fashion. This article has sought to contribute to this understanding.

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