The Application of Network and Learning Organization Models to Improve Ecosystems Management: Monroe 2020 Case Study

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Ecosystems management can be viewed as an explicit attempt to build and manage interorganizational networks. A review of environmental management literature, however, reveals very little use of network organization models. For environmental professionals who encounter diverse stakeholders in their practice, this article offers a conceptual framework and case study that demonstrate the utility of approaching ecosystems as networks. Virtual network and learning organization models, combined with holographic (systems) thinking and generative learning paradigms, help explain how collaboration among multiple stakeholders in ecosystems management can work. The case of "Monroe 2020," the process for generating and implementing the comprehensive plan for Monroe County, Pennsylvania, provides a real-life illustration. The Monroe 2020 plan focuses on environmental quality and community economic goals, melded with resolution of long-standing conflict and commitment to a shared vision of the County's future. It emerged through a deliberate effort to build a broad-based, long-term constituency and tools for implementation. Monroe 2020 as plan and process represents a practical, mutually reinforcing alignment of natural ecosystems management and management of the built environment for human settlement. By fostering better understanding of how to create and manage effective collaborative partnerships, the ideas expressed here can contribute significantly to improved ecosystems management.

Environmental Practice 5:119–133 (2003)

To be effective, ecosystems management needs not only institutional support in the form of environmental legislation but also a broad-based, long-term constituency. It can benefit from planning that is mindful of the needs of the human community as well as nature. In this regard, models from the field of organizational theory and practical approaches for involving stakeholders hold much value for environmental practice.

This article demonstrates the utility of integrating institutional models of a *network organization* along with a *virtual Web organization* and elements of the *learning organization* to enhance understanding of the nature and challenges of collaboration and generative learning among diverse ecosystems management stakeholders. Environmental professionals can use this conceptual framework to guide changing institutional arrangements and coordinate the systematic development of a cohesive interorganizational network of numerous stakeholders engaged in ecosystems management.

The following discussion provides an overview of what is meant by regarding ecosystems management as an interorganizational network, a virtual Web organization, and a learning organization. These models, which come from outside the traditional bodies of environmental and ecosystems literature, are offered both as means of increasing the conceptual vocabulary and heightening the awareness of environmental professionals who manage complex ecosystems comprised of multiple stakeholders. The "Monroe 2020"[1] case study illustrates key dimensions of this paradigm for ecosystems management.

The interorganizational network among stakeholders in ecosystems management is a superordinate entity, a strategic partnership or alliance. A number of researchers have referred to network phenomena in public administration since as early as 1978, in terms of issue networks (e.g., Heclo, 1978), imple-

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https://doi.org/10.1017/S1466046603031077 Published online by Cambridge University Press

mentation structures (e.g., Hjern and Porter, 1981; Trist, 1983), interorganizational policy systems (e.g., Milward and Wamsley, 1982), advocacy coalitions (e.g., Sabatier and Jenkins-Smith, 1993), policy formation and implementation (e.g., Agranoff, 1996; Bressers, O'Toole, and Richardson, 1995; Mandell, 1990; Marin and Mayntz, 1991; O'Toole, 1997; Rainey and Milward, 1983), and self-governing institutional arrangements (e.g., Ostrom, Gardner, and Walker, 1994). Most of these interorganizational network constructs share similarities with ecosystems management and collaborative decision making. Indeed, many environmental or land use planning initiatives in the United States utilize some form of collaborative decision making (Imperial, 1999); see, for example, Dewitt (1994), Howes and Dewitt (1998), and Selin and Chavez (1995). However, a review of recent environmental and ecosystems management literature indicates very little explicit use of network and learning organizational models in the context of ecosystems management. This article brings together significant elements of the interorganizational network framework with virtual and learning organization models.

The "virtual organization" concept was first used by Moshowitz (1986). Since then there have been many definitions to describe this new form of network organization (Goldman and Nagel, 1993; Hardwick et al., 1996; Upton and McAfee, 1996). The "virtual Web" concept has been adapted from Franke's work (1999) with computer networks and entrepreneurship as a means to a better understanding of the dimensions of an ecosystems management network. While not an actual organizational entity, the virtual Web is a dynamic sort of network among ecosystems management stakeholders. The virtual Web is created when a pool of independent stakeholders agree, in principle, to form an alliance or partnership and collaborate around the management of ecosystem resources. Thus, although it does not exist as a physical entity, the virtual Web is the superordinate institutional framework, or hub, of the stakeholder organizations that have come together in an ecosystem-based collaborative partnership.

Ecosystems management theory and organizational learning theory have an important objective in common: to achieve a generative state in the system or organization, as opposed to a mere survival of the system or organization. Achieving a state of generative learning requires a new paradigm of consensus building through collaboration among stakeholders. According to Senge (1990), "In an increasingly dynamic, interdependent, and unpredictable world, it is simply no longer possible for anyone to 'figure it all out at the top.' The old model, 'the top thinks and the local acts,' must now give way to integrating thinking and acting at all levels." The partnerships that form to address ecosystem problems cannot achieve their goals by using mechanical, linear forms of thinking that assume there is a convergent problem with a right answer. These partnerships must intentionally become a learning organization that effectively incorporates holographic (systems) thinking, collaborative learning, and consensus-based decision making in order to deal with complex, divergent problems for which there are no simple answers.

The Monroe 2020 case study illustrates how multiple stakeholders can form an interorganizational network that becomes a *virtual learning organization*. Drawing on a case of county comprehensive planning to illustrate ideas about ecosystems management might at first appear curious because the two seem to operate in different spheres: human settlements and the natural environment. As a practical matter, however, they are inextricably linked. Land use management in the United States is a matter of regulatory authority conferred by state governments to localities. The boundaries of these political divisions rarely coincide with those of nature's ecosystems. Yet, management of community land use—*where* to build and where *not* to build, *how* to build and perhaps *when* to build—is critical to ecosystems management.

In Monroe County, Pennsylvania, the interests of community and natural environment preservation converged to a significant extent. Land use mismanagement was undermining the ecosystems management efforts. The interests of many diverse stakeholders contributed to this untenable situation. These stakeholders needed to be fully engaged in the situation in order to change it. Creating what turned out to be a learning organization network has led to continuing and increasingly effective arrangements for managing this complex ecosystem.

Background on Monroe County

Monroe County, Pennsylvania, where the New York–New Jersey Metropolitan Region reaches across the Delaware River, is about 80 miles (120 kilometers) from downtown New York City via Interstate 80. The Pocono Mountains, host to a long-established vacation resort industry, are in the heart of the County. Issues of settlement and growing human activity here at the exurban fringe of the metropolitan "commutershed"[2] are juxtaposed with issues of managing watershed features—and, indeed, virtually all features—of this very sensitive natural environment.

At least two reasonably well-crafted plans for Monroe County, prepared in 1981 and the early 1990s by County Planning staff and the business community, respectively, were largely ig-

nored by the 20 independent townships and boroughs that cover the County's 608 square miles. In Pennsylvania, county government is relatively weak in relation to the municipalities, where power to regulate land development resides. Monroe's local jurisdictions resented the idea of any county-imposed constraints on their authority. Typically, they shrugged off attempts by the County and/or abutting municipalities to influence their decisions by facts, impact assessments, or advice. Preferring to go their own way, they continued to permit developments inconsistent with Monroe County's plans and best practices for environmental protection.

As a result, massive acreage was converted from scenic farmland and forested mountainside into housing developments. Dependence on individual wells and septic systems forced the sprawling large-lot residential subdivision patterns, increasingly visible on the once-wooded hillsides. View-obstructing commercial strip growth and billboards continued to fill in remaining scenic stretches. Long lines of commuters traveling to and from metropolitan area jobs—interspersed with Monroe-bound second home, seasonal vacation, and weekend recreational day-trip visitor traffic—increasingly filled the arterial roads. School population burgeoned, confronting every municipality with the need for steep jumps in taxes to pay for new classrooms, transportation, teachers, and other essential services.

Although the townships and boroughs wanted new nonresidential development to help relieve the tax burden on residential properties and farms, they faced many difficulties. Opposition came from ex-urbanites seeking to buffer their mountain retreats or bucolic farmhouse views. Resort operators, equally desirous of preserving scenic vistas, were also concerned about competing for labor with higher-paying new industry. Residents were anxious about congestion and the hazards of increased truck traffic on rural roads where their children's school buses also traveled. Large portions of the County were quite inaccessible and, thus, unattractive for many employment-generating, tax-paying land uses. Incompatible zoning patterns at municipal borders hampered development of sites that *were* accessible and otherwise suitable, but that happened to straddle those boundaries. State legislation imposed requirements that impeded collaborative planning by municipalities. Clearly, the "same old, same old" in land use management was not working. Something different, a sustainable solution, was needed.

In 1993, Monroe County invited Professor Carl Steinitz's landscape architecture students at the Harvard Graduate School of Design to study alternative development patterns for the County.[3] When the students presented their scenarios in December 1993 (Steinitz et al., 1994)—with corresponding fiscal and environmental implications—many Monroe citizens were impressed by the handsome, richly colored maps and computer-generated graphics. But that was that. The audience did not know what to make of the alternatives. The following year, the County Commissioners tried another approach they thought might spark some action, by addressing the municipalities' fiscal sensitivities. They engaged consultants from the Rutgers University faculty to prepare studies for Monroe County as a whole and for each of its 20 independent localities, showing the fiscal impact of different types of new development (Burchell Listokin & Associates, 1994). The Burchell Listokin conclusions were dramatic, and their report thick with numbers and tables. A few County leaders got their message, but still there was no significant positive response from the municipal jurisdictions.

Then in 1995, the County Commissioners and Planning Commission sought proposals from consultants to prepare a new comprehensive plan for the County. They selected the team of Rivkin Associates, a firm recognized for resolving environment–development conflicts, successful public outreach, and technical assistance, together with Roger K. Lewis, FAIA, a University of Maryland professor of architecture and urban design, known for his regular column on urban design in the *Washington Post* and his graphics communications skills. That set the scene for Monroe 2020. The consultants were to work with the County Planning Director to organize and facilitate the outreach effort and supplement, as well as assist, in-house staff in research and preparation of a new comprehensive plan for Monroe County. Later, the Commissioners rounded out the consultant team, adding Bloss Associates, a landscape architecture firm, whose principal, Gary D. Bloss, offered a combination of professional background, intimate knowledge of Monroe County, and expertise in Geographic Information Systems (GIS). His skills were essential to environmental planning, to managing the process of building a GIS for Monroe County from the ground up (i.e., from recommending software and hardware to training in-house staff to use GIS and adapt available data for the new system), and to bringing this new tool into play as Monroe 2020 progressed.

Monroe 2020 is the comprehensive planning effort conducted in the years 1996–99 to guide land use management, and the title of the plan itself that was published in paper, CD-ROM, and Web site[4] form (Monroe County, Pennsylvania, 1999). Monroe 2020 also refers to the program of follow-on implementation and monitoring. Its evolution offers useful insights into the development and workings of the network of collaborative partnerships representing the County's multiple stakeholders. These stakeholder groups range from local public

and private interests to county, state, interstate, federal government, and nongovernment entities.

The Multiple Stakeholders of Monroe 2020

Local private and institutional interests included farm owners, County residents (long-timers and suburbanite newcomers), builders and real estate brokers, commuters and businesses of all sizes, professional and community service organizations, local institutions (e.g., religious, health, Northampton Community College, and East Stroudsburg University), business interest groups (e.g., Pocono Mountains Vacation Bureau and Pocono Mountains Chamber of Commerce), and public interest groups (e.g., watershed management entities, League of Women Voters, local conservation or recreation advocacy groups, and concerned taxpayer groups). Twenty local governments, planning commissions, or boards, and four school districts participated in the working task forces, almost all of them having contributed financially to the planning work. The bulk of the planning funds, however, came from Monroe County and the Commonwealth of Pennsylvania. The Monroe County Planning Commission and staff, the County Commissioners, and the County departments responsible for providing certain services and carrying out governmental functions were key actors in the process. In addition, special purpose authorities such as the Industrial Development Authority and Railroad Authority (created to study and organize the re-introduction of rail service on the main line linking Monroe with points west, e.g., the Great Lakes, and with New Jersey and New York to the east) were also involved.

State-level stakeholders included the Center for Rural Pennsylvania; an arm of the General Assembly (Commonwealth Legislature); Pennsylvania Departments of Transportation, Environmental Protection, Natural Resources, and Community Development; elected representatives from Monroe County's state legislative districts and, eventually, the legislature itself, as well as the Governor's Task Force on the Environment.

Federal stakeholders included the United States Environmental Protection Agency (USEPA),[5] which funded the 1993 study by the Harvard Graduate School of Design landscape architecture studio out of interest in preserving biodiversity and saving the "last great places," as well as concern about the spreading low-density residential commuter subdivisions; the United States Department of Interior National Park Service, which manages the Delaware Water Gap National Recreation Area; the United States Department of Agriculture Soil Conservation Service (local representative); and one of the County's major employers, a United States Department of Defense installation, which local interests have long fought to retain. Yet another stakeholder was the Delaware River Basin Commission, which has water quality and supply responsibilities under an interstate compact.

The Application of Network and Virtual Learning Organization Models to the Monroe 2020 Case Study

The development of Monroe 2020, discussed through the following sections of this article, illustrates the explanatory power of applying network and virtual learning organization models to ecosystems management. Each section is introduced by a theoretical perspective (denoted *in italics*), and is accompanied by an illustration from the Monroe 2020 case study.

Formation of a Constituency

> *During the early development of an ecosystems management network, someone is needed to develop "interspecies connections," to create "DNA" for this new superordinate, collaborative entity. Strategies are needed to identify and respond to varying motivations and attitudes on the part of businesses, governments, and residents. The key players need to be identified and determinations made about when they should enter the network in relation to one another. The challenge is to create a virtual learning organization, virtual (as defined by* Webster's Dictionary*) in the sense of "in effect" but not "actually or expressly as such." Without a hierarchical decision-making structure, stakeholders in this new entity need to learn to collaborate and build consensus around a very clear mission (Manring, Rivkin, and Rivkin, 2002).*

The clear mission of Monroe 2020 was to create a plan that would direct the County toward a brighter future than current trends promised. It would have to be a plan that the stakeholders—public and private sector alike—could support, accept, abide by, implement, and respect as a guide for their decisions. If the fate of this plan was to be different from that of its predecessors, it would need a constituency to advocate and support it through its intended life span, to ensure that implementation tools would be available and used, and to monitor performance and make "mid-course corrections" as necessary. Thus the new management entity needed to have an outlook and longevity to match the plan. If stakeholders such as the municipal governments felt earlier plans were imposed from outside, this time they would have a hand in making the plan themselves from the very outset.

The County Commissioners firmly believed that developing a comprehensive plan would be the best hope of securing much of what most stakeholders desired for the future of

Monroe County. Yet they also understood that the stakeholders—public sector and private—would have to reach the conclusion themselves that coming together to create a County plan would be in their own best interests. Further, Monroe County realized that some incentives would be needed to improve the chances of constructive participation by crucial partners, the municipalities. The Monroe 2020 process was designed as such an incentive. Other incentives that emerged during the process were building the GIS and making it available to the municipalities; training township and borough staff to use GIS; offering County technical assistance to the municipal jurisdictions in open space planning; and establishing the fund for municipal land acquisition in accordance with those local open space preservation plans.

A Systems View

> *For effective ecosystems management, a "systems" view of the setting must be created for fully addressing the multiple issues associated with the evolving situation. The evolving systems-level appreciation will be more complex than the pre-existing views and assumptions held by any of the individual stakeholders (Manring, Rivkin, and Rivkin, 2002).*

To prepare for Monroe 2020, the consultant team undertook an intensive eight-month diagnosis. They reviewed and distilled critical content from the various studies (e.g., the Harvard students' alternative futures ideas and the fiscal impact analyses) that had not been widely distributed among the general public, nor well understood. The team reviewed local (municipal and county) plans, budgets, and development control ordinances, as well as state legislation. They read all available documents and studies containing information with bearing on the County's demographic and economic trends, economic development efforts and practices, environment, water quality and quantity monitoring and management, biodiversity, "brownfields," transportation planning, etc. Through interviews, the consultants learned what the various stakeholders felt about what was happening or not happening in the County, where their respective interests lay, what each perceived it would take to bring about change, and where there might be pitfalls. Other pieces of information and insights were gathered about earlier countywide collaborative efforts that had been successful and why (e.g., raising funds for expansion of the hospital, libraries, and support of a nature education center, and registration of private farms in a special state agricultural conservation program), as well as efforts that had proved less effective. In this phase, the team became acquainted with the leadership structure and sought to identify the most promising ways of reaching the principal interest groups in the County to involve them in the planning process.

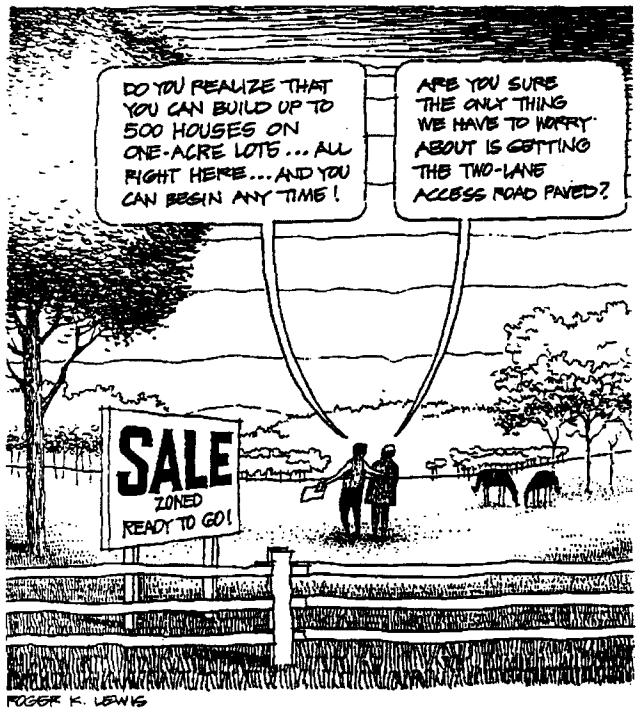

Figure 1. Cartoon by Roger K. Lewis from *Monroe County Environmental Alert* (Rivkin, Rivkin, and Lewis, 1996a).

At first, the local newspaper chided the County Commissioners for undertaking "yet another study" (after the Harvard work and the fiscal impact reports). This was not another study, the Commissioners argued. Rather, they had commissioned this new group of consultants to translate the earlier studies for the public. This drew further editorial taunts. Eventually, however, broad public support and the practical nature of emerging proposals attracted favorable attention from the newspapers and cable television.

At the end of this groundwork phase, the consultant team prepared two short, pointed reports for wide distribution (Rivkin, Rivkin, and Lewis, 1996a,b). These were frank, plainly written in jargon-free English, and illustrated with cartoons by Roger Lewis (see Figure 1) that reinforced with gentle humor the respective themes and over-arching message about the need to forge a new vision for the County's future. These reports became the basis for the task force work, community forums, and media coverage.

The County Commissioners convened a leadership forum of several dozen countywide leaders who had received the two reports. One purpose of the forum was to verify that the consultants had "gotten it right," i.e., presented an accurate picture. In effect, this was an endorsement signifying agreement about both the facts and the most critical issues at the heart of

the County's problems. A second purpose was to sharpen the focus of subsequent planning work. The several dozen attendees were divided into breakout groups where consensus coalesced around four broad categories of concerns: (1) land and water resources, (2) economic development and fiscal balance, (3) community character and community life, and (4) public facilities, infrastructure, and services.

Social Construction of the Conceptual Space for Collaborative Planning

> *The conceptual space for collaborative planning does not exist until the participants co-create their processes. Together, the stakeholders must engage in a continuous learning process as they co-create a systems view in a conceptual space that did not exist until they joined to develop their collaboration processes (Manring, Rivkin, and Rivkin, 2002).*

The Monroe 2020 leadership forum had accomplished the task of streamlining and focusing the planning effort. The next step was to create a vision of how the County *could be* and how its citizens wanted it to function and *not* to function. How to organize the work, however, posed a challenge. Working separately with 20 different jurisdictions was so unwieldy a prospect as to be out of the question. Dealing with the County as a whole would gloss over significantly different conditions from one part of the County to another. Moreover, it might raise the dreaded specter of top-down manipulation by the County. The way municipalities were organized into four school districts, however, presented a fine solution. The school districts' geography offered logical links and shared interests among their respective municipal groupings. These common interests were very important since the schools absorb far and away the largest share of local tax revenue and Commonwealth subsidies. Moreover, the school districts are, in effect, a form of tax-base sharing. No matter where nonresidential development occurs within a given municipal grouping, most of the taxes it generates go to the school district for the benefit of all the students enrolled there. Thus, the heaviest pressure on townships to compete for tax base, observed in many areas, is lessened, and it becomes somewhat easier to arrange land uses more or less according to the most appropriate and environmentally benign locations.

A perennial problem in long range comprehensive planning and ecosystems management is that the time frame for implementation extends beyond the terms of office of any specific group of elected officials. In order to keep on track it is necessary to build a citizen constituency whose interests transcend this limitation and continue well into the future. While the purpose of the consultants' two reports was to inform and sound a wake-up call, now it was necessary to stimulate interest within the County to become actively involved in the process of making a plan for the future.

Building, Managing, and Maintaining an Interorganizational Network

> *Ecosystems management can be seen as an explicit attempt to build, manage, and maintain interorganizational networks, in other words, to develop an institutional ecosystem. Viewed from this perspective, the implicit goal is to "improve resource management by changing institutional arrangements and improving coordination between the organizations (public, private, and nonprofit) that comprise interorganizational networks" (Imperial, 1999).*

The Monroe County Commissioners appointed more than 100 citizens as members to five working task forces, one for each group of municipalities that constitute a school district and a fifth for countywide issues of the economy and the environment. The task force members represented County institutions, school districts, appointed municipal planning bodies and elected supervisors, the business community, the vacation industry, environmental and other public interest groups, the major watershed conservation organization, industrial development and transportation agencies, utilities, developers, recreation advocates, and general civic leadership.

As convener of the task forces, the Commissioners also named chairs and co-chairs for each task force, called an initial "kickoff" meeting where each determined its own regular monthly meeting date, and provided for support of the task force work by County Planning Commission staff and consultants. In addition, the County sponsored a daylong training session, conducted by community outreach consultants, for the task force chairs and co-chairs. The training session provided them with advice and tools (e.g., sample attendance sign-in sheets and newsletter formats) and engaged them in exercises that simulated issue resolution challenges they might face. Equally or even more important, the session fostered a collegial relationship among the individuals who were going to be working in parallel tasks.

Permeability Around Original Stakeholder Boundaries and Evolution of a Collaborative Network Without Predefined Institutional Roles

> *Ecosystems management requires the softening of stakeholders' organizational boundaries around their perceptual territory. Boundary permeability enables members to become more open to exploring the possibilities of advantage in joint action (Manring, Rivkin, and Rivkin, 2002).*

In one of the Monroe 2020 task force meetings, an elected municipal official related that he, as much as anyone, had been against establishing a joint police force with a neigh-

boring jurisdiction. But once the scheme was arranged and implemented, all parties concerned were delighted with the results. Both communities were able to save money and to enjoy much better police service than they had before when they had relied on the limited coverage provided by the state troopers alone. Indeed, another new joint venture was under way, this one for water supply. The official's testimony was one of the turning points in deliberations of that particular task force. It was so persuasive that the task force members for that area who were elected Township Supervisors became forceful advocates at the state Municipal League conferences—for both the planning process itself and for revising state ordinances to remove barriers to joint planning.

> *The ecosystems management entity becomes a dynamic network of stakeholder organizations, i.e., a temporary alliance among strategic stakeholders (Miles and Snow, 1986). Each independent stakeholder organization collaborates on specific projects or opportunities. While it exists, this network is a "highly decentralized and densely integrated social system that maximizes mutual influence and communication" (Bovasso, 1992) in the spirit of collaboration. Collaboration is defined as a "co-operative relationship among organizations that relies on neither market nor hierarchical mechanisms of control" (Phillips, Lawrence, and Hardy, 2000). This definition is important for ecosystems management where collaborative activities lie outside market structures, i.e., negotiations are governed by an alternative to the price mechanism. Similarly, there is no formal hierarchical structure of relations associated with ecosystems management: ". . . collaboration involves the negotiation of roles and responsibilities in a context where no legitimate authority sufficient to manage the situation is recognized" (Phillips, Lawrence, and Hardy, 2000). The stakeholder organizations remain "relatively autonomous and must be convinced to act even though there is no legitimate authority that can demand co-operation" (Phillips, Lawrence, and Hardy, 2000).*

Each task force group squared off internally. Leadership shifted from time to time as issues affected some of the individuals' interests or utilized their expertise more than others. For example, two townships in the Pleasant Valley area had no zoning. These were mostly rural/agricultural areas where there was a fundamental resistance among the polity to instituting this form of development control. Yet citizens turned up at the task force meetings to press for consideration of setting and impacts (environmental, traffic, school bus safety, etc.) in such decisions as one on a proposed industrial re-use for a warehouse-type structure on a nicely landscaped site, formerly used to store the archives of a major Pennsylvania-based industry. These residents clearly wanted some sort of protection.

An elected supervisor from one of those two no-zoning townships, who served on an areawide task force, recognized that development regulation based on environmental impacts (broadly defined) offered an avenue that is both practical and potentially effective. He became one of the strongest advocates for development of the County's GIS, looking to it to help rationalize and fortify environmentally sound local decision making in the face of traditional influences. Eventually his township did enact a relevant ordinance. In fact, the desire of citizens *is* legitimate authority for action by elected officials, provided such action fits within the framework of the law.

The open, informal forum of the task force sessions offered a setting and a context free of the usually polarized debate over specific local cases, where some of these residents (in this instance, young mothers) felt comfortable confronting their officials for the first time. The presence of elected and appointed officials from neighboring jurisdictions, either as task force members or observers, also contributed to the constructive exchange of ideas and the growing sense of shared concerns fostered in the task force sessions.

It is important to note that while participants in Monroe 2020 were bound by their respective and varied stakeholder roles outside (frameworks of law, organizational or business interests, budgetary responsibilities, etc.), they were free within the task forces to explore different ways of thinking about issues. Then they could go back to their respective groups to weigh the pros and cons of change. On occasion, individuals expressed enthusiasm for new marketing ideas inspired by the deliberations (e.g., starting a riding school and horse-boarding facility on the family farm in light of information on growing interest in ecotourism, trail-riding, etc.).

The Ecosystems Management Network as a Virtual Web and the Advantages of "Virtualness" as a Conceptual Infrastructure

> *The virtual Web (Franke, 1999) is a dynamic sort of network—the superordinate institutional framework, or hub, among ecosystems management stakeholders. Shared learning made possible through the virtual Web creates a conceptual infrastructure for addressing ecosystems management issues with built-in requirements for disclosure, accountability, and reconciliation. The concept of virtualness, as developed by Venkatraman and Henderson (1996) and applied to ecosystems management, means that the ecosystems management network consistently obtains and coordinates critical competencies by designing value-adding processes and governance mechanisms, involving both external stakeholders and the internal constituencies of the network, and creates integrated solutions to complex ecosystems management projects. The links in a virtual Web that connect the stakeholder organizations in various combinations are far more profuse and omni-directional than in other types of organizations. The links continue to grow and develop as communication pathways increase and trust strengthens.*

https://doi.org/10.1017/S1466046603031077 Published online by Cambridge University Press

The Monroe 2020 task force work was the focal point of stakeholders that came together in the geographically-based partnership. That the task force boundaries did not coincide precisely with specific watersheds did not matter very much, because the watershed management people were represented on the task forces and thus were part of the network in their own right.

The task forces fostered an informal relationship among Township Supervisors and Planning Commissioners and their counterparts from neighboring jurisdictions. These officials could discuss their various approaches to similar problems, offer ideas, ask the consultants for advice or examples of solutions tried elsewhere, and gain perspective on issues they faced at home. This helped them overcome the oversimplified yes-or-no thinking that tends to occur in decisions on specific development proposals. When they expanded their thinking to include the more complex interrelationships and impacts involved, and the variety of options available to them, they were able to make better decisions.

All task force meetings were regularly scheduled (e.g., first Monday or fourth Thursday each month), open to the public, publicized in advance, and recorded. Most of these meetings were at night, although the countywide task force members chose to meet in the morning. Attendance was consistently good, as task force members were motivated to have their say in the subjects under discussion. Interested citizens who came to observe were welcomed, introduced, and invited to comment. Members of the media (press, radio, local cable television, and even high-school journalists) were regularly invited to attend. They did from time to time, especially when milestones were reached, such as the presentation of draft reports, or for major public forums on the visions output of areawide and countywide task forces.

The structure of the task force process had much to do with its short-term and ultimate success. Every meeting had an agenda distributed in advance. Many, if not most, agendas were sent out accompanied by issue papers, which each task force member was committed to reading and discussing. Each session had a note taker, and coherent summaries were distributed shortly afterward for comment.

More important still, the entire three-year process was directed toward substantive milestones in creating the comprehensive plan. The first milestone was to establish consensus within each task force on a series of goals and short-term actions for implementing the goals. Taken together, these constituted the vision for Monroe 2020. The goals were structured around the four subjects that had been identified in the first public leadership forums and well publicized throughout the County and among its municipalities: land and water resources; economic development and fiscal balance; community character and community life; and public facilities, infrastructure, and services. Recommendations for implementing actions were directed toward the County, municipalities, private sector, etc. After several months of task force review, these draft concepts and recommendations were distilled in short, simply written, and well-illustrated (see Figure 2) wide distribution reports from each of the task forces and printed in hundreds of copies.[6] These reports were made available in the County libraries and other public places. They were also sent out to citizens who asked to be on a Monroe 2020 mailing list, and to the communications media.

Additional information for the general public took a number of forms. For example, the Planning Commission staff prepared an exhibit on Monroe 2020 for the Chamber of Commerce's annual government "Expo," where citizens could come to learn what their government had been doing and was planning to do. One of the consultants, together with an elected supervisor active in her area's task force and the County Planning Director, took part in a cable television feature on Monroe 2020. Task force members, consultants, and/or County Planning staff also addressed meetings of local service groups and professional associations.

The public forums on the areawide and countywide goals and actions statements were scheduled with considerable lead time, and well publicized. Hundreds of County residents attended and expressed their thoughts. The task forces revised their recommendations based on this input. The County Commissioners and many of the individual municipalities formally endorsed the combined task force visions around which the comprehensive plan would be framed for the County as a whole and for each of the four school district areas. This structure was maintained through subsequent phases of the planning process as it moved into progressively detailed subjects that ranged from population and employment projections and economic development options, to alternative land use patterns and the explicit final policies of the comprehensive plan and its implementing mechanisms.

Dynamic is a good word to describe the network as it developed, structure and schedule notwithstanding. At one of the public forums on an areawide task force's goals and actions report, held in the district high-school auditorium, audience comments revealed a strong feeling among many citizens about need for recreational facilities for residents (as distinguished from the ample resort facilities available to registered guests). There was equally strong feeling about conserving "view-sheds" and open space. An astute County Commis-

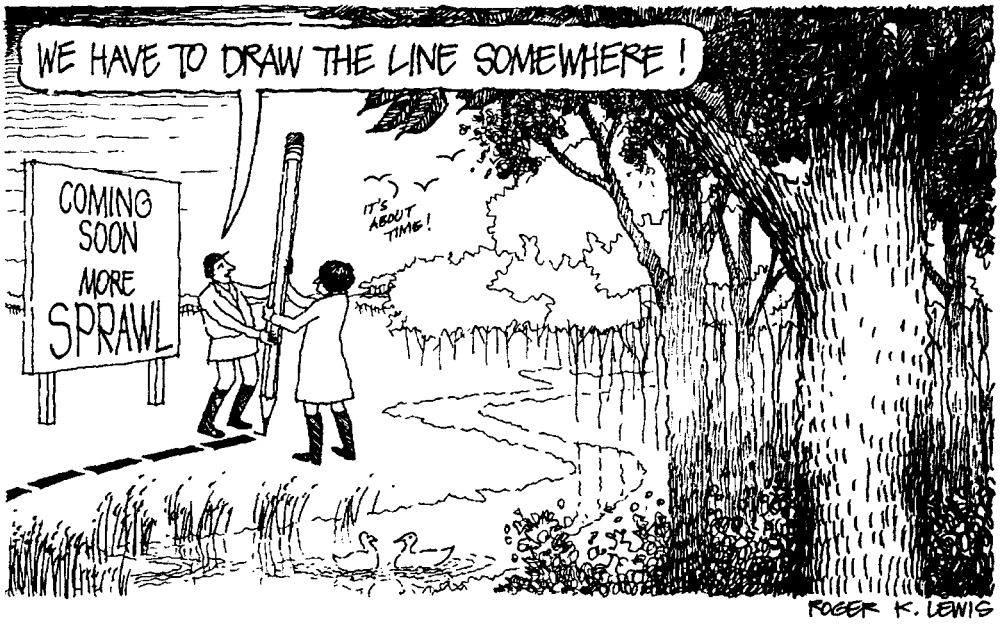

Figure 2. Cartoon by Roger K. Lewis from a task force *Goals and Actions* report. Source: Rivkin Associates, illustration prepared for the Monroe County, Pennsylvania, areawide task forces' *Proposed Goals and Short-Term Actions* reports, August 1997.

sioner seized the moment by asking for an informal show of hands to indicate willingness to pay $25–$30 additional taxes annually per household to create a fund for public acquisition of open space. The response—by folks who had been complaining about being "taxed to the max" was hugely favorable. This was one of the most significant turning points in the entire Monroe 2020 process. Planning began immediately thereafter for a bond issue referendum to create a $25 million open space fund. Survey research was conducted to gauge public support for various applications of the money that would be generated if the referendum passed.

As the election approached, antagonism arose over control of the fund between an environmental faction that favored an all-wilderness priority and others willing to include some land acquisition for public recreation. To focus attention on marshalling support for the referendum, Monroe 2020 arranged for John Keene, a University of Pennsylvania planning professor and attorney nationally respected as a legal expert in this field, to come for an evening presentation on balancing open space management strategies with the Monroe 2020 vision. His presentation, full of success stories from other places in Pennsylvania and beyond, offered encouragement and instilled confidence among many attendees that problems could be resolved. Refreshments contributed a social aspect to the event, where opportunities for informal face-to-face conversation restored a sense of community goodwill, if not full resolution of the issues. The referendum passed, creating a very important implementation tool for the Monroe 2020 plan.

The funds generated by the passage of the referendum are supporting, among other objectives, a program of grants to municipalities for open space planning (with technical assistance from the County Planning Commission staff), site selection, and eventually, actual projects. The County Commissioners appointed a countywide open space planning group (which included some members from Monroe 2020 task forces) to determine policy and priorities for allocating land acquisition money and developing the countywide Open Space Plan. Their work continued well beyond completion and adoption of the Monroe 2020 comprehensive plan. The Open Space Plan was adopted and published in mid-2001 with the County-funded assistance of the landscape architecture consultant who had set up the GIS system and trained Planning Commission staff to manage it. The lead planning consultants also maintained continuity by reviewing materials and advising on opportunities and problems that arose.

The issue of billboards highlights another variation on the theme of the network in flux as the network responds to windows of opportunity or obstacles. Huge numbers of scenery-obscuring billboards and tasteless billboard images were among the negative features of Monroe County's portion of the Poconos mentioned by a travel writer in a major East Coast newspaper. The article may have been instrumental in the Chamber of Commerce's sponsorship of a project to develop guidelines for roadside outdoor advertising and business signs on private property.[7] Meanwhile, members from several of the areawide task forces, together with the Pennsylvania Department of Transportation Regional Office

https://doi.org/10.1017/S1466046603031077 Published online by Cambridge University Press

director (who served on the countywide task force), organized a Monroe 2020 subcommittee to address issues of ugliness "hot spots" and billboards. Jacqueline Hakim, an employee of the Monroe County Health Department, became so interested in this issue that she undertook on her own to secure a list, from the state highway department, of all the outdoor signs installed with permits. She made an inventory of all signs, noting which were without permits, which were not in conformance with the conditions of their permits, etc. The database she assembled and field-checked provided the task force subcommittee on signage the information needed to address the issues systematically and devise solutions, including arranging for the County to make a formal request that the State of Pennsylvania enforce its existing right-of-way regulations.

Multiple Leaders and the "Spiral of Trust"

> *Networks are leaderful, not leaderless (Lipnack and Stamps, 1997). Each person and stakeholder has something unique to contribute. With more than one leader, the network as a whole has greater resilience. Furthermore, according to Senge (1990), "In an increasingly dynamic, interdependent, and unpredictable world, it is simply no longer possible for anyone to 'figure it all out at the top.'" As the "spiral of trust" (Franke, 1999) evolves, commitment to the partnership offers a forum of stability and heightened motivation for all collaborating organizations.*

The creation of a "leaderful" network was accomplished by design. There was never a time when individual participants or participating entities in Monroe 2020 considered that leaving the process would better serve their interests or the interests of the groups they represented. Leadership tended to shift from one individual to another as different issues came under discussion and different areas of expertise came into play. This phenomenon intensified the area task forces' engagement with their respective tasks. As the virtual network became a conscious, intentional learning community, it was no longer possible for anyone to direct it all from the top. To the consternation of the County Commissioners, as well as certain task force members, there was no "top."

It would be misleading, however, to imply that, once started, the Monroe 2020 process gained and sustained momentum entirely on its own. Although the network for Monroe 2020 had no actual head, it did have change agents, and the role of change agents should not be underestimated. Throughout, Monroe County Planning Commission staff and consultants provided substantive continuity. At various times, the Township and Borough Supervisors and County Commissioners, as well as leading business people and environmentalists, also functioned as change agents, coaches, trainers, facilitators, or technical resources.

Beyond getting the network going, the County Commissioners provided funding for administrative support by the County Planning Commission staff, such as notifying task force members and the public of meetings, record keeping, and reproduction and distribution of notes on the task force proceedings. They prodded when they perceived progress was beginning to lag. Even so, they themselves were responsible for a certain amount of foot-dragging on occasion. They were at their best when their acute political antennae sensed that the time was ripe to seize opportunities such as initiating the bond issue referendum to fund acquisition of open space and recreation land, and urging the County's representatives in the Pennsylvania legislature to introduce bills to facilitate collaborative planning among localities and address issues of equitable taxation.

The consultants, too, were available throughout the process to advise the County Planning Commission staff and the task forces on agendas, provide information on how other counties operating under the same state rules and regulations as Monroe County handled similar issues, facilitate meetings, and help each task force compose its goals and recommendations for short-term and long-term implementing actions. They advised Planning staff on strategy and tactics for overcoming emergent problems, performed research, developed projections of population and employment growth, and interpreted the implications of their findings for land absorption. They helped formulate and draft material for an ongoing public information program, participated in presentations for the media and community groups, and ultimately assembled the comprehensive plan document.

There is a certain rhythm to processes like Monroe 2020. Periodically, the work is intense, but the participants cannot sustain such intensity without intermission. Continuity is bound to lag at times. Windows of opportunity for progress open unexpectedly; similarly, obstacles arise. Nor is it to be expected that all necessary information and useful resources inherently reside in the network or its component organizational entities. This is so especially when individual citizens who sit on appointed small-community planning commissions are involved. Although there are exceptions, these participants do not normally have the budget, time, or technical skills to do research and analysis that may be relevant or necessary.

The Ecosystems Management Network as a Learning Organization

> *In order to manage the complexity of an ecosystem effectively, the network of stakeholders must achieve a state of generativity as a*

learning organization, as opposed to mere survival. "The old model, 'the top thinks and the local acts,' must now give way to integrating thinking and acting at all levels" (Senge, 1990). The partnerships that form to address ecosystems management problems cannot achieve their goals by using mechanical, linear forms of thinking that assume there is a convergent problem with a right answer. These partnerships must effectively use collaboration and consensus building to deal with divergent problems for which there are no simple answers.

In the progression of Monroe County's type of planning process, the roles of both County and consultants, dominant in the beginning, gradually diminish in favor of the networked entities that take on more and more of the work as they gain strength and experience. The change agents stand by to intervene as needed. Eventually the consultants withdraw altogether, but the government has continuing responsibility and roles. In Monroe County, the County Planning Commission staff, as always intended, remains part of the stakeholder ensemble, taking the lead from time to time as necessary or artful.

The goals and actions statements of the four areawide task forces reflect the varying conditions and priorities as expressed by their respective memberships. Each group developed the broad themes in a manner that fit the area within its purview.

As the area- and issue-focused groups progressed in their work, they came increasingly to operate as a dynamic network of stakeholders working together in a spirit of collaboration as described above. That the County Commissioners and members of the countywide task force leadership and the smaller Monroe 2020 executive committee persisted in using language such as "getting the municipalities to buy into" the plan, even as the four areawide task forces and various special-issue subcommittees enthusiastically took on lives of their own, reflected some discomfort at not always being in a position to call the shots.

As Monroe 2020 planning moved through its course, each step was built upon the consensus forged in the preceding step. At every stage, the logical connections were clearly recognized and understood. Alternative development patterns and policies in the comprehensive plan were clearly and directly grounded in the consensus on goals and actions. They were related to other County policies and plans for closely related functions such as transportation, water supply, and sewage disposal.

By the time a draft section of the plan was published, it contained no surprises, for its contents had already been "learned," well aired, and discussed in the task forces, with attendant public information. Learning and assimilation of learning take time and, in this case, the stakeholders had already had that opportunity. They did not have to start learning and thinking through the implications for their respective interests after a scheme or schemes were presented to them fully formed. The effectiveness of this approach is an argument in favor of involving stakeholders all along the way. This approach to planning is neither unique nor particularly new, but it merits wider application by land use planners and environmental practitioners alike. An "ivory tower" process for planning and for environmental analysis that leaves public outreach and input to the end, after studies and proposals are fully developed is, unfortunately, all too frequently pursued.

Ruptures in the Virtual Value Chain

The purpose of a learning organization (an ecosystems management network) is to be generative, i.e., creative in finding systemic solutions that satisfy various stakeholder interests. The process depends on the abilities of the people who comprise the network to build a shared vision that transcends their separate organizational boundaries and fosters genuine commitment to the conceptual infrastructure supporting the systemic perspective. However, there is the potential for setbacks in the creation of an ecosystems management network. An individual or stakeholder organization(s) may become a force for resistance and seek to break the virtual value chain (Franke, 1999) that has been established through processes of consensual decision making, i.e., it/they may disrupt the processes of coordination and integration of stakeholder contributions and responses to internal and external opportunities.

A disappointing aspect of the Monroe 2020 experience concerned the Industrial Development Authority. The director of the Authority argued for establishing a place where he could offer industries money-saving services, tax subsidies, and other incentives to invest in the County—a place where they would be free to do as they pleased on, and to, the land without disagreeable regulations concerning impacts on such matters as community appearance or water resources.

In the views of the task forces, however, economic development was a public objective broader than investment in manufacturing industry alone. For example, one of the newer types of employment-generating businesses in the area was a computer software company. Another was a high-grade crafts workshop turning out original pieces of jewelry and other items marketed nationwide; yet another was an internationally noted musician whose masters classes attracted clarinetists and composers from around the world to study and perform. These enterprises built on Monroe County's excellent quality of life and environment, as well as accessibility to both New York and Philadelphia area audiences for sophisticated crafts, arts, and entertainment. Indeed, Monroe 2020 proposed that the Authority's name be changed from

"industrial development" to "economic development" to reflect the broader charge. In addition, the Authority was advised to turn its attention and efforts to more environmentally benign enterprises, recognizing that in today's economic environment, serious investors with long-term interest in the community where they might establish their companies are concerned with commitment of the community to sustaining its desirable qualities.

Although initially there seemed to be receptivity to these ideas, later behavior of the Authority evidenced serious recidivism. The Authority tried to get through a development plan for the new County-owned business park that violated County guidelines for environmental protection, impact mitigation, sparing of sensitive features, landscaping, etc. They were stopped in their tracks. Clearly, despite participation in Monroe 2020, some of that group either didn't "get it" or got it and lost it. Even board members who had been supportive during the course of Monroe 2020 planning (e.g., writing letters to the editor and exercising leadership in the community at large) failed to exert their influence in the Industrial Development Authority to preserve the "virtual value chain" that embraced economic development in the service of excellent quality of life and protection of the environment.

A Changed Culture of Decision Making Derived from Holographic Thinking

> *Despite the resistant voice of the Industrial Development Authority, overall, the collaborative and consensus-building processes of Monroe 2020 were very successful in enabling stakeholders to overcome the primacy of their initial positions in order to create a new conceptual infrastructure. This conceptual infrastructure is analogous to holographic thinking (Senge, 1990). If a hologram (a three-dimensional image created by interacting light sources) is divided, each part, however small, shows the whole image intact. Likewise, when a group of people shares a vision for an ecosystems management network, each person sees an individual picture of the network at its best. Each shares responsibility for the whole, not just for one piece. But the component pieces of the hologram are not identical. Each represents the whole image from a different point of view. Furthermore, when the pieces of a hologram are combined, something interesting happens: "The image becomes more intense, more lifelike. When more people come to share a vision, the vision becomes more real in the sense of a mental reality that people can truly imagine achieving. They are now partners, co-creators" (Senge, 1990).*

The GIS is a significant aid to "holographic decision making" (see Figure 3). Besides having critical value for data management and analysis at the County level, the GIS has placed environmental information at the disposal of the general public via the Monroe 2020 Web site and inexpensive CDs. Access to the GIS information enables citizens to take informed positions on environmental considerations that should enter into the decisions of their elected officials. With such information available to the public, local officials can ill afford to ignore it. GIS has also played an important role in development of the Open Space Plan completed in late 2001. Mon-

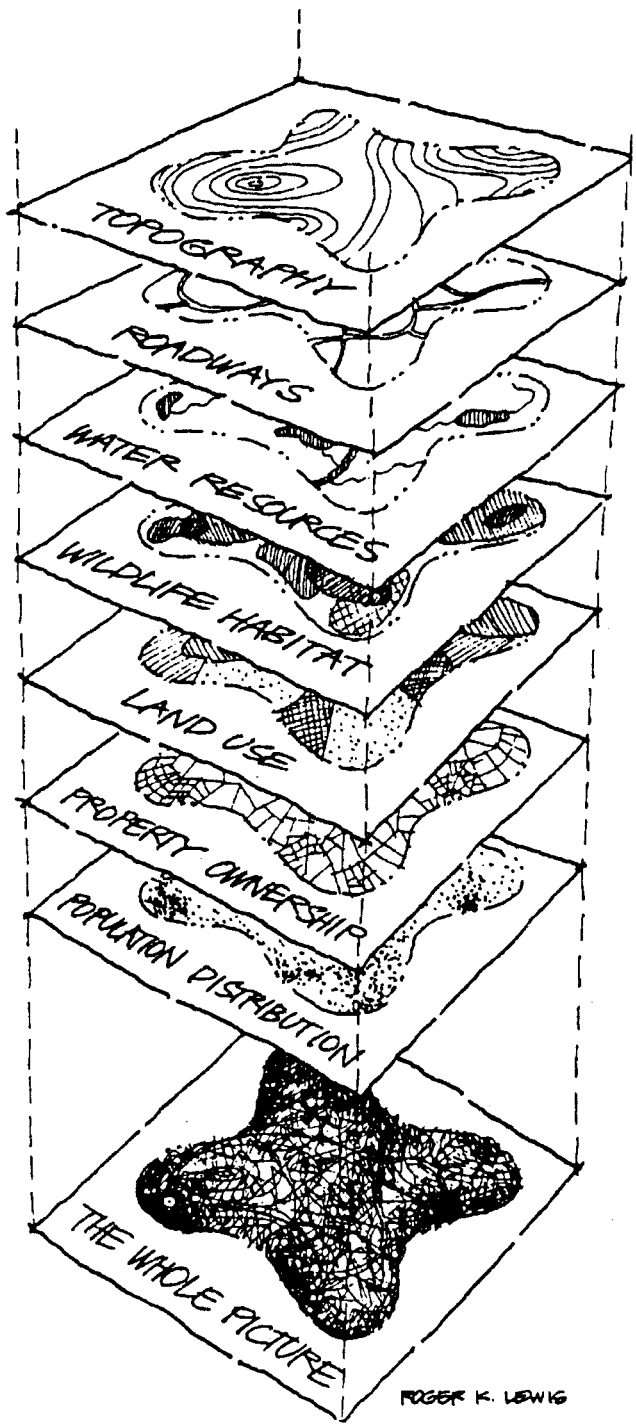

Figure 3. Diagram by Roger K. Lewis illustrating what a Geographic Information System (GIS) is (Rivkin, Rivkin, and Lewis, 1996a).

https://doi.org/10.1017/S1466046603031077 Published online by Cambridge University Press

roe County's GIS took more time and money to build and bring into constructive use than originally anticipated. To some extent, it took longer than necessary because of delays at top County levels, possibly because of the need to resolve interdepartmental issues of budget or influence. Now that the GIS has been made available to the township and borough governments, however, 15 of 20 have invested in the computer hardware and software to use it, have sent staff for training by the County's GIS personnel, and are actively taking advantage of the GIS. Even County departments outside the Planning Commission—the Assessor's Office, Voter Registration, Emergency Services, and the Control Center, for example—are increasingly putting this tool to use for their own missions.

The Generative Learning Process

> *By nature of its very essence, an ecosystems management network of stakeholders, such as in the case of Monroe 2020, provides the diversity of perspectives necessary for divergent, generative learning, which is about creating, rather than adapting. Generative learning is a double-loop, self-questioning mode (Argyris and Schon, 1978). While the starting point for ecosystems management stakeholders would be their own organizations' goals, norms, assumptions, and behaviors, through the collaborative processes of the virtual Web, generative learning results in new ways of looking at the situation and producing systemic solutions that transcend individual stakeholder boundaries and views. This is the product of network learning—the capacity to think together. In fact, consensus building through collaboration could be called the core technology of an ecosystems management network. An ecosystems management network seeks consensus around a systems view, a holographic image that reflects the primacy of the whole (Manring, Rivkin, and Rivkin, 2002).*

In June 1999, when the Monroe 2020 plan came up for public hearing and adoption by the County Commissioners, the task force members advocated for its adoption. It passed without a word of opposition. It was formally endorsed by 17 of the 20 municipalities and all the school districts, as well as numerous county and regional agencies. The three municipalities that withheld endorsement were either so tiny and fully developed (Delaware Water Gap), or were covered by state-owned lands to such a major extent, that they perceived very little of the plan content as really relevant to them.

Newsletters and periodic monitoring reports inserted into the local newspaper keep the plan and evidence of its implementation progress before the public eye. The Monroe 2020 plan itself, the process through which it was developed, the leadership of County Commissioners and the County Planning Commission, the Monroe 2020 Web site, and the GIS have won professional, regional, and state awards. Designs for the first "green" subdivision have been approved and are awaiting imminent start of construction. Examples of new joint municipal planning activities are proliferating.

The groups formed by the municipalities to help prepare their local plans for open space acquisition and recreational development have been evolving into more general environmental advisory bodies. County Planning Commission staff members are working to develop a system of indicators for monitoring and gauging implementation of the Monroe 2020 comprehensive plan.

Conclusion

This article has sought to provide environmental professionals with a useful paradigm, based on network and virtual learning organization models, that fosters collaborative, generative learning. The article illustrates how this framework can be used very intentionally to heighten perceptual awareness of the dimensions and requirements of virtual learning networks of stakeholders who are engaged in collaborative, holographic (systems) thinking and consensus-based decision making about ecosystems management. The case study presented here is particularly well suited to illustrate this paradigm.

Monroe 2020 describes an approach that is akin to ideas about collaborative planning, sustainable communities, and the USEPA's community-based environmental protection program. Although it includes elements or pieces of elements present in these schemes, it fuses them with a somewhat different perspective. Monroe 2020 differs from the community-based environmental protection program in that it grew out of what Monroe County citizens wanted to achieve, rather than specific environmental objectives *spelled out by USEPA*. Further, USEPA's approach focuses on environmental education in the sense of *imparting information,* i.e., *teaching*. The construct presented in this article focuses on the community as a *learning* organization. *Learning* is meant to be understood in its broadest sense here, i.e., as not only the absorption of facts and analysis, but as understanding; assimilation; association with related principles, actions, and behaviors in the local context; and application in a constructive manner. This kind of learning is gradual. It takes time. It involves negotiations, it calls for a very great deal of communication (Meyerson and Banfield, 1955), and it demands respect for the human community, political process, and the participating learners.

The Monroe 2020 case departs from conventional planning practice, and also from common environmental practice, in a number of significant respects. For example, steps in a tra-

ditional planning process start with information-gathering and analysis, enumeration of goals and objectives, and development of alternative means to these ends, and proceed through evaluation of the alternatives, detailed elaboration of the preferred course of action and, at the end, the outlining of implementation measures. The Monroe 2020 process, by contrast, began with a focus on implementation, i.e., evaluation of why implementation of previous planning efforts had failed, the range and scope of tools available for implementation, and how power to use those tools (including voluntary action) was shared in the community. Experience with the Harvard students and Rutgers faculty studies demonstrated that information alone did not move this community to constructive action. What *did* lead to action was the prospect of resolving major controversies related to the citizens' highest-priority, immediate concerns: rising property taxes, demand for public infrastructure and services (particularly education), encroaching ugliness, and environment versus development standoffs.

Another departure from conventional planning practice—and environmental practice, as well—was reaching out to the public and inviting citizens to "have their say" from the very beginning, as opposed to seeking public comment *after* studies were developed in detail and dense with facts and figures. In the literature of planning and of environmental conflict resolution, ideas about this sort of approach to stakeholder involvement are not new (Meyerson and Banfield, 1955; Rivkin, 1977). They have just not been adopted widely in practice. Both planning and ecosystems management would greatly benefit if they were applied. However, as Monroe 2020 also demonstrates, to work effectively—and with integrity—within the virtual learning network paradigm, environmental professionals must themselves have the flexibility to design and conduct a process expressly tailored for the circumstances of any given community.

Notes

1. "Monroe 2020" denotes looking forward toward a 20-year horizon, and hints at 20–20 vision. This name is the title of the process that generated the comprehensive plan and its implementation tools. It is incorporated in the title of the comprehensive plan and also refers to the continuing implementation program.

2. A *commutershed* is the wide area from which the massive regional employment centers draw workers. It is, thus, a source of labor, much as a watershed is the source of water that drains into a river or river system.

3. This project was under the sponsorship of the United States Environmental Protection Agency (USEPA) Region 3, the Monroe County Commissioners, the Monroe County Conservation District, the Monroe County Planning Commission, and the United States Department of Agriculture, Forest Service, Pacific Northwest Research Station, with major funding from USEPA and Monroe County.

4. http://www.monroe2020.org.

5. Monroe County is currently working under a new USEPA grant to develop indicators for measuring the local and regional impact of community-based environmental protection projects.

6. East Stroudsburg Area Task Force, August 1997, *Proposed Goals and Short-Term Actions,* Monroe County Planning Commission; Pleasant Valley Area Task Force, August 1997, *Proposed Goals and Short-Term Actions,* Monroe County Planning Commission; Pocono Mountain Area Task Force, August 1997, *Proposed Goals and Short-Term Actions,* Monroe County Planning Commission; and Stroudsburg Area Task Force, August 1997, *Proposed Goals and Short-Term Actions,* Monroe County Planning Commission. These documents can be viewed on the Web site at http://www.monroe2020.org.

7. The Monroe 2020 consultants brought examples of view protection plans and implementing measures such as those enacted for Portland, Oregon; Federal Scenic Highway regulations; materials from the organization Scenic America, identifying over two dozen tourist destination areas with stringent billboard controls; and even ordinances from other Pennsylvania communities that not only ban these signs but have gone so far as to remove those already in place when the regulations were enacted. These efforts notwithstanding, the outdoor advertising lobby in Pennsylvania is strong, and the Chamber of Commerce wished to address this matter in its own way. Their effort resulted in some advice for improving the appearance of signs, but might be considered, overall, a timid gesture.

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Submitted June 28, 2002; revised January 20, 2003; accepted January 29, 2003.