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COOPERATIVE WATERSHED MANAGEMENT AND RESEARCH: THE CASE OF THE HENRY'S FORK WATERSHED COUNCIL

ABSTRACT

Grassroots watershed management, or what has been labeled "watershed democracy," is taking hold throughout the western U.S. Of central importance to grassroots watershed management is the shift away from a fragmented, piecemeal approach to environmental problem solving toward a more holistic approach that more closely matches the biophysical realities encountered on the ground. The holistic world view, however, is concerned with more than just ecology. It seeks to meld ecology with economics and the needs of community in pursuit of symbiotic sustainability. Success thus requires substantial cooperation among not only private and public stakeholders, but also the many government agencies with legal jurisdiction over western water and land. In short, the new approach places a premium on cooperative scientific research and cooperative management of ecosystems. I examined how grassroots watershed management arrangements facilitate cooperative scientific research and cooperative management of watersheds using the case of the Henry's Fork Watershed Council (HFWC), an initiative located in east central Idaho. The HFWC facilitates cooperation by maintaining a focus on what everyone has in common, directly sponsoring cooperative programs and research important to watershed management and health, creating a unified, integrated community-based network, transforming individuals' world views, creating incentives for cooperation through the promise of win-win outcomes, and providing a "one-stop-shopping" forum for communication, integration, and coordination of agency management efforts related to the watershed.

Key words: cooperation, watershed management, holistic, natural resources, community building, grassroots, networks, trust, communication, incentives.

INTRODUCTION

Across the western United States, a growing number of people with stakes in the debate over natural resource use are tired of fighting among themselves to the detriment of their communities and are upset with the limitations of the top-down, fragmented natural resources management regime. These same citizens also fear the negative effects of increased development pressures (encroaching urbanization) for both the environment and the character of their communities and

view existing natural resources and public land institutions as remote and unaccountable. In search of better governance performance and enhanced accountability to a broader array of interests, citizens, government regulators, small businesses, environmentalists, commodity interests, and others are now creating and choosing alternative institutions for governing public lands and natural resources (Johnson 1993, John 1994, Dagget 1995, Jones 1996, Marston 1997, Snow 1997, Weber 2000).

At the forefront of this movement toward alternative institutions is grassroots watershed management, or what Daniel Kemmis (1999) has labeled

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"watershed democracy." Grassroots watershed management involves a dramatic shift in organization and control of public bureaucracies responsible for managing the interaction between society and nature. Instead of centralized hierarchy, government experts in control, specialized agencies, and layer upon layer of written rules and procedures, grassroots watershed management is premised on decentralized governance, shared power among public and private actors, cooperative, consensus-based decision processes, holistic missions (environment, economy, and community), results-oriented management, and broad civic participation. Found largely in rural areas traditionally dependent on nature's bounty such as Willapa Bay (Washington), the Malpai Borderlands (New Mexico, Arizona), the Henry's Fork watershed (Idaho), the Blackfoot River Valley (Montana), and the Applegate Valley (Oregon), grassroots watershed management efforts now involve hundreds of communities, primarily in the western U. S. (Kemmis 1990, Dagget 1995, Haeuber 1996, Rice *et al.* 1996, Yaffee *et al.* 1996, Arrandale 1997, Little 1997, Rieke and Kenney 1997, Rolle 1997, Snow 1997, Weber 2000).

Of central importance to grassroots watershed management is the shift away from a fragmented, piecemeal approach to environmental problem solving toward a more holistic approach that more closely matches the biophysical realities encountered on the ground (Haeuber 1996). The holistic world view, however, is concerned with more than just ecology. It seeks to meld ecology with economics and the needs of communities in pursuit of symbiotic sustainability (Snow 1997). Success thus requires substantial cooperation among not only private and public stakeholders, but also the many government agencies with legal

jurisdiction over western water and land. In short, the new approach places a premium on cooperative scientific research and cooperative management of watersheds (John 1994, Knopman 1996, Chertow and Esty 1997). Although the new movement has garnered widespread support, skeptics voice a myriad of concerns, whether in terms of the effectiveness of cooperative management efforts (Moe 1994), as an abdication of government responsibility and "New Age wishful thinking" (Coggins 1998), or as nothing more than an ingenious cover for the self-interested machinations of industry, who will use such proceedings to impose the values of economic growth and efficiency and to rid themselves of the burdens of national environmental laws (Amy 1987, McCloskey 1996, Van Kirk and Griffin 1997, Kenney 2000).

The purpose of this article is to explore how grassroots watershed management arrangements facilitate cooperative scientific research and cooperative management of watersheds. I examined this question from the perspective of the Henry's Fork Watershed Council (HFWC), a grassroots watershed management initiative located in east-central Idaho. The analysis starts with a brief description of the HFWC and its general operating dynamic. The main body of the article investigates how the HFWC promotes cooperative research and management. Central to cooperation are

- maintaining a focus on what everyone has in common,
- the direct sponsorship of cooperative programs and research important to watershed management and health,
- the creation of a unified, integrated community-based network,
- the transformation of individuals' world views,
- the creation of incentives for cooperation through the promise of win-win outcomes, and

- the relationship between information sharing, innovation, and customized solutions.

METHODS

I drew upon original interview data to develop this analysis, as well as primary HFWC documents, notes from two HFWC meetings, the Eastern Idaho Watershed Conference (October 1999), and the secondary literature related to the HFWC and the grassroots ecosystem management movement. Twenty-seven interviews were conducted with active participants in the HFWC between August 1998 and July 1999. Names were selected from the 200-plus participant roster used for distributing meeting minutes and otherwise notifying active participants of HFWC activities and meetings. Potential interviewees were then grouped into 11 categories: co-facilitation team, federal-level administrative managers, state-level administrative managers, local-level administrative managers, environmentalists/conservationists, recreation interests, commodity interests (split into four subgroups of agriculture/irrigation, ranching, timber, and local development interests), unaffiliated citizens, state-level elected officials, local-level elected officials, and independent scientists. At least one representative, and in some cases two or three from each category were interviewed. In the particular case of commodity interests, at least one interview was conducted within each of the four subcategories.

The interviews were semistructured, but open-ended, requiring from 40 minutes to two hours to complete. Several interviewees were contacted again to clarify technical matters or to clarify and gather further details on the operations and processes of the HFWC. Whereas all interviewees are listed in the public meeting records of the HFWC, the pledge of anonymity

was nevertheless essential to secure several of the interviews, and hence was applied to all interviews. The interviewees occupied positions that required repeated interaction with other community members. Some expressed concern about how their participation in a scholarly study of the HFWC might affect these ongoing relationships. To speak frankly about the process—what works well, what does not—several interviewees requested anonymity as a means of neutralizing any potentially harmful comments. Washington State law also requires anonymity as part of the human subject review process and rules that govern interview-based research. All such interviews are cited in the text as “anonymous interview(s).”

THE HENRY'S FORK WATERSHED COUNCIL

The HFWC is an intermediary institution designed to reconnect society to existing government institutions for the sake of improving the governance of the watershed. It was officially chartered as a watershed council by the state of Idaho in 1994. The HFWC seeks to give citizens a direct stake in the coordination and administration of policy using a collaborative, consensus-based decision forum, and therefore asks government agencies to share power by relinquishing a certain amount of control but not legal authority. The HFWC pursues an integrated, comprehensive approach to watershed issues, both through an emphasis on watershed management and a tripartite mission focus on environment, economy, and community. Because it is chartered as a strictly advisory body, the HFWC necessarily relies on negotiation, broad-based representation of interests, self-generated information regarding watershed conditions, and persuasion (rather than mandates and coercion) to shape watershed policy-

making and problem solving. The HFWC's formal mission statement sets forth three broad goals and four related major duties (Table 1, Johnson 1995).

For the first five years, official meetings of the HFWC were held once a month using an all-day format. Starting in the fall of 1998, however, these meetings were changed to a bi-monthly schedule on the consent of participants. Meetings typically draw 40-60 people. They start with the co-facilitators, Jan Brown and Dale Swenson, reminding participants of the ground rules for participation and deliberation. They remind participants about such things as the importance of civility, respect for others' views, and prohibition of personal attacks. Thirty minutes of community building ensues, in which anyone can speak on any issue. During this time participants often communicate personal stories or voice concerns on matters relevant to the community. These preliminary activities are designed to focus attention on everyone's connection to place by emphasizing common ground and a shared sense of community. Action proposals, which can come from anyone, including outside organizations, are then entertained. The HFWC splits into three committees—agency roundtable, citizens group, and

technical team—to deliberate and assess the validity of proposals. All participants have the right to speak and, in fact, are expected to contribute, if for no other reason than to signal their (dis)agreement with others' positions. The HFWC then reconvenes as one body, committee reports and recommendations are made, and further discussion ensues as to which projects will be implemented. Decisions are guided by the Watershed Integrity Review and Evaluation (WIRE) process, which is designed to establish whether a proposal reflects a total watershed perspective, relies on credible scientific data, emphasizes watershed sustainability, addresses social and cultural concerns, and respects existing law and agency mandates, among other things (Appendix A). Successful proposals must have the support of a consensus, which is defined as "general agreement," rather than unanimity. In many cases, once a proposal garners consensus support a subcommittee is formed for implementation purposes, e.g., Cutthroat Trout subcommittee, Water Quality subcommittee, and Sheridan Creek subcommittee. Watershed Council meetings end with another half-hour community-building exercise. Minutes also were taken at each meeting and provided to

Table 1. *Goals and duties of the Henry's Fork Watershed Council (Johnson 1995).*

HFWC Goals

- to serve as a grassroots, community forum which uses a non-adversarial, consensus-based approach to problem-solving
- to better appreciate the complex watershed relationships in the basin, to restore and enhance watershed resources where needed, and to maintain a sustainable watershed resource base for future generations
- to respectfully cooperate and coordinate with one another and abide by federal, state, and local laws and regulations

HFWC Duties

- to cooperate in resource studies and planning that transcends jurisdictional boundaries
 - to review, critique, and prioritize proposed watershed projects
 - to identify and coordinate funding for research, planning, and implementation and long-term monitoring programs
 - to serve as an educational resource for the Legislature and the general public on the HFWC's progress
-

participants in advance of the next meeting.

Committee work and other informal behind-the-scene discussions take place in the interim period between meetings, yet the rule is that interim efforts are focused on implementation and enforcement of collective decisions. No new work can be started until after full HFWC approval, even in matters seemingly as inconsequential as the co-facilitators sending out a letter using HFWC letterhead (i.e., it is not an official position until after consensus is reached).

MAINTAINING A FOCUS ON WHAT EVERYONE HAS IN COMMON

The HFWC spends a lot of time and effort focusing on "the ties that bind, rather than those that divide" (anonymous interview 5 August 1998a). In its efforts to build community and improve the management of the watershed, the HFWC emphasizes what participants have in common—residence in the same "place" or, at minimum, job responsibilities that tie them to the watershed, and commitment to the HFWC's holistic mission and watershed management approach. Taken together, these elements help to facilitate cooperation.

The local "place" is the Henry's Fork watershed. Located in eastern Idaho and nestled up against Yellowstone and Grand Teton National Parks, the 1.7 million-acre Henry's Fork watershed, with 3000 miles of streams and irrigation canals, boasts mild summers and difficult winters in which temperatures may dip 30-40 °F below zero (Van Kirk and Benjamin this issue). The signature of the Henry's Fork area, however, is its view: "the [eastern] horizon is interrupted by the glistening massif of the Grand Teton, rising from the high plain and stabbing the heavens

like an unsheathed stiletto. It is a disorienting sight, looming over this landscape of well-tilled farms and meandering creeks" (Durning 1996). Within the watershed, economic activity centers on agricultural commodities (seed potatoes, wheat), ranching, timber production, and outdoor recreation and tourism, e.g., hunting, fishing, camping, boating, skiing, snowmobiling. Given that the health of the rural communities and the economy of the Henry's Fork watershed are dependent on nature and its resources, everyone experiences a common, direct connection to the natural landscape; it is inescapable. In turn, the "strong attachment to place" leads many community members to "agree to put their interests, ... and [their] sense of duty to represent ... a particular perspective, ... aside in the interest of the collective and [the] ecosystem" (Sturtevant and Lange 1995). Moreover, keeping efforts locally focused facilitates cooperation and agreement between diverse interests. "[A]bstraction equals death for partnership, but once you ... talk about a definable piece of land, you can get beyond philosophy ... you can agree on what is acceptable and what is not" (Shiple 1995). In short, the basic ingredients required for the practices of cooperation and community based on the politics of place are in abundance (Kemmis 1990).

Participants in the HFWC are committed to a holistic "environment, economy, and community" mission and a holistic, integrated approach to managing the watershed. The holistic emphasis implies cooperation by starting with the assumptions that everything is connected together and that failure to deal with the whole will result in spillover and reverberation effects common to traditional specialized and single-medium (air, water, land) approaches. In other words, solving a problem on one plot of ground or for one policy area may

actually create worse problems elsewhere (reverberation), or merely shift the problem to another parcel of land, waterway, or medium (spillover). Delineation of the management area by a biophysical or ecological principle—the watershed—accepts that success will require cooperation among public land managers and private landowners within the watershed. The tripartite mission suggests that a balance among policy values is needed. Rather than promote zero-sum economy-over-environment outcomes, for example, decisions should consider and seek to accommodate environmental and social impacts along with concerns related to the economy.

The ideological and management components of the HFWC, which encourage cooperation, are complemented by the HFWC's institutional structure and processes. By definition the collaborative, non-hierarchical, open access design, when combined with direct participation by citizens, accepts that defining problems and crafting solutions are the job of a broad variety of individuals, organizations, and agencies. Working things out cooperatively, therefore, becomes a necessity. Moreover, the combination of joint deliberation and negotiation (rather than administrative fiat), committee forums (technical, citizens, agency roundtable), and repeat interaction (multiple meetings) help facilitate the bargaining necessary to cooperative solutions. The consensus decision rule employed by the HFWC ensures that final solutions must be grounded in cooperation because objections by a few are enough to stop a proposal from going forward.

There also is balance in the selection of the two chief facilitators. Jan Brown leads the Henry's Fork Foundation (HFF), a conservation organization interested in protecting and preserving the watershed, especially the world famous fisheries of the area, and Dale

Swenson represents the Fremont-Madison Irrigation District (FMID), which controls water rights for 1700 farms in the watershed. More important perhaps than the fact that each represents a major stakeholder in the watershed, are the leadership qualities each brings to bear on the mission and operating dynamic of the HFWC. Each is clearly committed to the holistic environment, economy, and community mission as well as the collaborative process and watershed management approach. As another member of the HFWC notes: "Jan and Dale believe in balance rather than an environment over economy approach or vice versa" (anonymous interviews 5 August 1998a, 6 August 1998b, 10 August 1998c, 11 August 1998b). Equally important, the personal credibility of the co-facilitators helps them to communicate the perceived value of the HFWC design and processes to others. Each has earned a reputation for integrity, honesty, always treating others with respect, and having a clear commitment to and stake in the watershed (they are community members, not outsiders) (anonymous interviews 5 August 1998a, 6 August 1998b, 7 August 1998b, 10 August 1998a, 11 August 1998a, 11 August 1998b, 18 November 1998).

SPONSORING COOPERATIVE PROGRAMS AND RESEARCH IMPORTANT TO WATERSHED MANAGEMENT AND HEALTH

Wherever mission and goal compatibility exists between the HFWC and government agencies, the HFWC can and does sponsor cooperative programs and research important to watershed management and health. In this case, cooperation extends the effectiveness of existing government agencies by providing additional resources—financial, human, political, informational—that are then used to

achieve agency missions and goals. For example, HFWC has aided Fremont County officials in their attempts to control noxious weeds by coordinating volunteer weed-pull efforts and furnishing \$1,000 in funding during 1998 and 1999. Further, the HFWC has been integrally involved in road rehabilitation efforts throughout the watershed. It has assisted the U. S. Forest Service (USFS) in repairing roads to minimize erosion and has helped Fremont County to adjust road levels and design and place culverts along Sheridan Creek to better accommodate high water flows in the spring. In addition, the HFWC provided matching funds to help the USFS protect and enhance pond habitat along North Leigh Creek for the boreal western toad (*Bufo boreas boreas*) and spotted frog (*Rana pretiosa*), two species identified as sensitive by state and federal agencies (Fremont County Herald-Chronicle 1995b, anonymous interview 9 November 1999).

The HFWC also has financed key portions of the Henry's Fork Springs Research in cooperation with Utah State University, the Idaho National Engineering and Environmental Laboratory (INEEL), and a number of other federal and state entities (Benjamin this issue). In a typical winter, water flows are low out of Island Park reservoir into the Box Canyon and Harriman Park sections of the Henry's Fork River, two of the primary river sections that give the Henry's Fork its reputation as a world-class rainbow trout (*Oncorhynchus mykiss*) fishery. Instead of the historical average natural winter flow rate of 450 cubic feet per second (cfs), the FMID and U.S. Bureau of Reclamation historically have limited winter releases to 200 cfs or less (Benjamin and Van Kirk 1999). The low flows exert a negative effect on the long-term health and survivability of rainbow trout (Mitro 1999). As a result, the HFWC

would like to see higher winter flows to better protect the fishery, yet without infringing on the ability of irrigators to call on their water rights during the summer growing season. Success at managing these competing goals requires a flow regime that incorporates a better understanding of sources of water flows as well as rates and timing of flows into the reservoir. The springs research project was designed to clarify where Island Park reservoir water originates by quantitatively specifying the relationships among snowmelt, groundwater, and surface flows, as well as the amount that each source contributes to the reservoir pool. To the extent that the research succeeds and a reliable source-flow model is developed, FMID has expressed a willingness to delay the annual full reservoir pool fill-date target from 1 April to May or June, thereby allowing the release of "extra" water from the reservoir during the winter to more closely mimic pre-dam flows if the model indicates it can be done without harming required summer flows to farmers (anonymous interviews 6 August 1998b, 11 August 1998b, 21 October 1999).

In addition, the HFWC is supporting proactive efforts to address the issue of declining stocks of Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*). Through the Cutthroat Trout subcommittee, the HFWC is comprehensively mapping existing fish populations, restoring habitat, and transplanting genetically compatible Yellowstone cutthroat trout into viable habitat. The goal is to stabilize and promote native Yellowstone cutthroat trout populations as well as to forestall or mitigate the potential listing of Yellowstone cutthroat trout under the federal Endangered Species Act (ESA).

A key element of this work involves the Native Trout Inventory Project. The USFS, although required by law to map

Yellowstone cutthroat trout populations on public lands, was unable to conduct the mandated review for lack of funds and personnel. The HFF, together with the USFS, approached the HFWC seeking support for a proposal designed to inventory native Yellowstone cutthroat trout. The HFWC provided initial seed money for the project, the HFF provided the field crews, and the USFS provided a truck and a supervisor to coordinate the project. The inventory project surveyed almost 800 miles of stream in the Henry's Fork watershed, including stream reaches on the Targhee National Forest. In the Henry's Fork watershed (including Fall River), Yellowstone cutthroat trout were present in 20 of 138 stream reaches surveyed and isolated from nonnatives in eight of these reaches. This represented occupancy in 17 percent of their historic range. In the Teton drainage alone, Yellowstone cutthroat trout were present in 35 of 48 streams surveyed and were the only trout present in five of these. This represented occupancy in 89 percent of all fish-bearing habitat, all of it within the historic range of the subspecies (Jaeger *et al.* this issue).

The Sheridan Creek stream restoration project is the first major cooperative attempt to actively pursue the HFWC goal to identify, target, and reestablish the connectivity of tributary streams in the watershed. Connectivity is about making sure that tributary streams, such as Sheridan Creek, are physically connected (in terms of fish migration) to the Henry's Fork itself or to major lakes and reservoirs. Started in 1995, the specific goals of the Sheridan Creek project are to restore the stream to its historical channel(s) and restore a natural flow regime, restore habitat in the river and along the streambank (substrate, vegetative cover), improve water quality (water temperature especially), and reconnect the natural stream channel to Island Park reservoir

so that migrating fish can again access traditional spawning grounds above the lake (Gregory 1997).

Key to the project are the redesign and rebuilding of 10 different water diversion structures and the drilling of wells away from the streambank as an alternative source of water for cattle, which will lead to less erosion and damage to streambanks and greater opportunity for native vegetation to flourish. By providing critical funding (through a successful HFWC-initiated EPA Section 319 grant), coordinating the resources of the many public and private stakeholders with some form of jurisdiction over or interest in the stream, administering the Environmental Protection Agency (EPA) grant, and providing a deliberative forum for forging agreement over the restoration plan among the many federal, state and private stakeholders, the HFWC demonstrates the broad benefits of a community-based collaborative approach to managing watershed resources. The environment benefits, as do irrigators with control over water rights. The new diversion structures help the FMID monitor streamflows with greater accuracy, while ranchers in the immediate vicinity receive consistent delivery of their own water rights and subsidized reconstruction of their largely non-functional water diversion structures. Several FMID board members are also excited about the prospect of restoring healthy fish runs to Sheridan Creek; they recall "how good the fishing used to be when [they] were young."

The HFWC also endorsed a consensus agreement between Buffalo Hydro, Inc., Idaho Department of Fish and Game (IDFG), USFS, U.S. Fish and Wildlife Service, HFF, and others to add a fish ladder to Buffalo River Dam. The ladder reconnects the upper reaches of the Buffalo River, which had been closed to fish migration since 1938, to the larger Henry's Fork system.

Although the Federal Energy Regulatory Commission (FERC) did not mandate a fish ladder when it relicensed the dam in 1994 (citing insufficient research), data produced by the HFF and IDFG, both key players in the HFWC, indicated that Buffalo Hydro's dam was blocking fish access to critical spawning and rearing habitat above the dam. Successful spawning in the Buffalo River could provide between 32,000 and 63,000 rainbow recruits (juvenile trout) and, eventually, up to 4,400 rainbow trout 16 inches or longer on an annual basis (Van Kirk and Giese 1999, Van Kirk and Beesley 1999). In the end, not only was a state-of-the-art underwater monitoring system installed to identify, measure, and count fish at the ladder, the entire cost of the ladder (estimated at \$13,000) "was completely underwritten by Buffalo Hydro, Inc. on a voluntary basis." The cooperation on the Buffalo River extends beyond the successful completion of the fish ladder in 1996. The HFF and IDFG also have agreed to review data produced by the monitoring system, count trout redds, install traps to assess juvenile recruitment success, and compare creel census data to assess catch and harvest rates for the Buffalo River and the Box Canyon of the Henry's Fork (Brown 1996).

CREATING A UNIFIED, INTEGRATED COMMUNITY-BASED NETWORK

The HFWC is on its way to creating what some have called an essential component of a place-based community—a dense set of networks that can be called upon for communication, informal decision-making, and action (Moseley 1999, Priester and Kent 1999). Instead of a series of individual, separate organizations and networks representing narrow, often self-

contained segments of the population and focusing on particular facets of complex, cross-cutting problems, the new dynamic connects the various individual organizations and networks together to produce a more unified, integrated, community-based network. The unified, integrated character of the network, and its central focus on an environment, economy, and community mission, signifies the enhanced willingness on the part of participants to consider the needs of the broader community. The transformation is analogous to the difference between the weakness and fragmentation evident in a shattered piece of glass and a multi-colored, multi-shaped mosaic that has been welded together to form a stronger, more integrated whole. In short, the new network strengthens the capacity of the community to act collectively by easing communication, facilitating the creation of informal decision-making institutions to complement existing formalized arrangements, and engendering action to solve watershed problems. It suggests that networks can be a much stronger vehicle for coordinated action, especially when the complexity of watershed problems means that no one hierarchy can resolve the problem by itself. A HFWC participant puts it this way:

"the relationships with ... all of these other folks have resulted in the creation of networks within the community that simply did not exist before. When something comes up now, people are more prone to ask, 'Well, who could help with that?' rather than arguing about jurisdiction and responsibility. It is not like the more traditional linear kind of thinking anymore, it's about networks. These relationships/networks create a new kind of problem-solving skill based on connecting community members together. The

connectedness of the network creates a critical mass of people focused on problems common to the watershed. It creates new opportunities for passing on information and solving problems. That's what happened with a rancher who was struggling to maintain his water diversion structures on his land above Island Park Reservoir. He contacted the HFWC, he had heard about our other efforts in the watershed [e.g., the Sheridan Creek restoration project]. We knew right away that here was a rancher trying to do the right thing, fix his structures, conserve water, and, by extension, help the environment. But we also knew that he did not have the financial wherewithal to do it alone. We said, 'Here's a community member who needs help and what a great opportunity to build another bridge to the ranching community. And it turned out that the Council, through an Idaho Fish and Game grant, could help' (anonymous interview 11 August 1998b).

In another case, the HFWC helped a rancher on Targhee Creek (Diamond D Ranch) find funding to upgrade his canvas and plywood water diversion structure. The HFWC also alerted him to the possibility of installing a more environmentally friendly, bioengineered solution for the same amount of money as a traditional structural (concrete) solution. The Targhee Creek rancher had originally worked with the federal Natural Resources Conservation Service (NRCS) to fix the diversion structure and allow cutthroat trout access to previously blocked upstream spawning areas. The NRCS suggested a concrete diversion structure that would also include a fish ladder but was unable to find cost-sharing money in its budget to facilitate construction. The ranch owner then approached the HFWC for funding assistance, in part because they had

been instrumental in funding a prior project to improve stream habitat on his land. The HFWC demurred, however, given the fact that it had already invested a substantial sum in the earlier project and its concern that HFWC moneys be spent on projects throughout the watershed.

Yet, rather than simply saying no and wishing him luck, the HFWC helped the rancher solve the funding puzzle. Dale Swenson, co-facilitator of the HFWC and Executive Director of the FMID, made the rancher aware of a non-traditional funding source for his project—a USBR program that provided a 50-50 cost share for projects improving water management. At the same time, some HFWC members, as well as the rancher, were concerned that the placement and design (concrete) of the diversion structure—on a tight bend in the stream—risked failure during high water conditions, and subsequent, potentially long-term damage to adjoining riparian areas. Wanting, at minimum, to give the landowner a choice of different solutions, and at best, to seize the opportunity for employing and demonstrating the benefits of a more environmentally friendly solution, the HFWC used bioengineering techniques to design a new solution for the same cost (\$18,000). Large boulders placed at several intervals along the affected length of Targhee Creek would allow for water diversion and the gradual dissipation of streamflow energy (slowed water flow) in a series of steps (dropoffs). The "slowed" flow would minimize streambank erosion and sediment flows, while simultaneously facilitating fish migration. In the end, USBR funded the rancher's request and the rancher chose the bioengineered solution (anonymous interviews 10 August 1998a, 13 August 1998a, 27 October 1999a, 27 October 1999b).

In addition, the extensive networking spawned by the HFWC

means that institutions and decision-makers formerly inaccessible to many in the community, or were accessible only after "quite a bit of bitching and moaning or legal action,... are now only a phone call away because of the trust that networking has created" (anonymous interview 19 July 1999a). Members of the HFWC point to Harriman State Park as a prime example. When first approached about getting involved with the HFWC and cooperating to manage resources that either were in the Park or affected the Park, park managers were "reluctant to jump in with both feet." Now, however, they are very enthusiastic about the HFWC's collaborative format because they believe it has helped them more effectively manage Park resources, whether concerning trumpeter swans (Van Kirk and Martin this issue, Shea and Drewien 1999), riparian restoration along the Henry's Fork, or simply taking care of upstream problems such that the Park itself experiences fewer resource problems (anonymous interviews 11 August 1998a, 11 August 1998b).

A second example involves an informal decision-making institution to govern water releases from Island Park Reservoir. The FMID controls water releases and prioritizes them according to water rights claims by downstream irrigators. Yet, beginning in 1998, FMID has shown a willingness to be more flexible by releasing additional water to benefit the environment, e.g., to combat dangerously high water temperatures for fish, at the request of Jan Brown, a co-facilitator of the HFWC. There are limits to this arrangement—there must be "extra" water in the river. Thus FMID is unlikely to be very flexible during low water years. But HFWC members cannot imagine the institutional change without the years of working together and the creation of new relationships and trust among segments of the community who

traditionally never had a reason to communicate with each other (except through lawyers), much less cooperate for the sake of the environment (anonymous interviews 5 August 1998a, 6 August 1998b, Fremont County Herald-Chronicle 1995a).

Although it is still too early to know if the Yellowstone cutthroat trout and Sheridan Creek restoration projects are going to produce the expected results, one clear measure of success is that other stakeholders are impressed enough to seek out the HFWC for support and leadership for similar projects. The IDFG modeled their Island Park Reservoir Tributaries project after the Sheridan Creek example, wrote a grant on behalf of the HFWC, and successfully tapped \$45,000 of Idaho state money to fund the tributaries project. The vote of confidence in the HFF and the HFWC extends even further—IDFG asked the HFF to administer the grant on behalf of the HFWC. Moreover, individual ranchers in the area to be covered by the grant have contacted the HFWC, offered to participate, and made the HFWC aware of additional USBR funding for water conservation that will expand the original scope of the tributaries program. The IDFG also liked the HFWC-USFS Yellowstone cutthroat trout work enough that "they came to the Council and asked for moral support" for their attempts to start their own Yellowstone cutthroat trout recovery program in the upper Thurmon Creek drainage (anonymous interview 11 August 1998b).

CHANGING THE WORLD VIEWS OF INDIVIDUALS

The HFWC is in the process of building institutions that govern, or at minimum have substantial effect on citizens' behavior, decisions, and outlook towards others and their community. The new institutions are

responsible for creating new relationships, fostering a greater degree of trust among citizens, and cultivating a heightened sense of collective purpose in the watershed that is centered on the tripartite environment, economy, and community mission. In short, individuals' world views are being transformed with respect to how they view their neighbors and government, their preferences for policy, and their role in natural resource management.

The HFWC focus on deliberation and cooperation with others on projects providing community-wide benefits creates new, constructive working relationships with others. According to one participant, this is "absolutely critical to building trust within the community.... To the extent that we investigate and cooperatively pursue projects that help all watershed residents gain something, trust will follow." Another finds that "[t]he one-on-one interaction helps us to see each other as individuals, as decent human beings who care about their families, their neighborhoods, rather than as caricatures or adversaries that go by the name of 'farmer' or ... 'developer' or 'environmentalist.' The trust that comes from working together helps us learn to communicate more openly and honestly with each other." A citizen who has been involved from the start interprets the change in attitudes as follows:

"Five years ago when the Council began, people were so cold to each other. It makes me happy to see how much trust has developed among us and how warm, friendly, and comfortable we are with each other now" (November 1998 HFWC meeting).

One of the founding members of the HFWC goes so far as to argue that the increase in trust extends to existing government institutions. "When I helped to get the Council started, I had very little respect for state and federal

agencies. Now, after having the opportunity to work so closely with agency people over the last five years, I see them in an entirely different and positive light" (anonymous interview 17 November 1998). Others agree: "Not only am I thankful for how the HFWC helps people like me learn more about their place, its resources and the connections between the two, [the HFWC] gives me unfiltered, direct information from government resource managers. This is so much better than getting it through the press or only from the publications and colleagues of my [single-issue] environmental [advocacy] group" (anonymous interview 10 August 1998c).

There also is anecdotal evidence that at least some participants are now more willing to think of their own individual/personal situations as connected to, or an extension of, the larger whole (rather than viewing issues and preferred outcomes from a more narrow, self-interested perspective). When asked whether participation in the HFWC has led them to give greater weight to how proposed actions will affect the world outside of the watershed community, fully one-third (9 of 27) of those interviewed said yes. Interestingly, about 37 percent of those interviewed claimed the willingness to consider the effect of proposed HFWC decisions on the outside world as a starting point, i.e., the institutional dynamic matched or reinforced their original position. When asked whether participation has led them to give greater weight to the benefits of proposed actions for the watershed community, 40 percent answered yes, while almost 50 percent claimed community-mindedness as an original position.

Finally, the HFWC engages in outreach to the surrounding community to expose people to the idea that cooperation is critical to successful watershed management and long-term

community health. From the HFWC perspective, cooperation can help to build community, improve the ecological health of the watershed, and benefit the economy—all at the same time. The ultimate aim of outreach efforts is to make citizens more amenable to cooperation and to encourage them to become better individual stewards of the watershed. Outreach efforts remind citizens to adopt a different mindset when it comes to natural resources management, namely that management is the responsibility of everyone, rather than being the sole responsibility of “official” natural resource agencies. Examples of outreach include public field trips to examine conditions in various parts of the watershed, bi-monthly public meetings, financial support for the Ashton visitor’s center, and political outreach to people from outside the immediate geographic community (Weber 1999).

CREATING INCENTIVES FOR COOPERATION THROUGH WIN-WIN OUTCOMES

“To achieve [our] goals, [we] learned that [we] needed to help others achieve their goals. The old way is a win-lose conflict, more for me, less for you. The new way is cooperation, a win-win deal, where there is more for everyone.”

—Dan Daggett, Keynote address to 1995 HFWC Annual State of the Watershed Conference.

HFWC participants pursue cooperation not only because it can benefit nature or the community as a whole, but because they see it as better able to provide private benefits for individuals as part of the same bargain. The potential for gaining individual benefits through the HFWC incentivizes participation and consensus agreement on decisions. It also is crucial for

convincing private landowners to voluntarily adopt and support different, more environmentally beneficial land, water, and livestock management practices. Cooperative efforts to identify and restore Yellowstone cutthroat trout populations, for example, fit here. Cooperation intends to create community-wide benefits by bringing back fish native to the area, staving off the new ESA-mandated constraints on landowner decision-making, and mitigating restrictions on angling if Yellowstone cutthroat trout are listed under the ESA (anonymous interviews 6 August 1998a, 17 November 1998, HFWC Newsletter 1999). Endangered Species Act constraints especially would hamper the decision-making freedom of those with property adjacent to lakes and streams and those in agriculture dependent on irrigation water for their livelihood. More restrictive fishing regulations also would directly and negatively affect those involved with the region’s robust fishing-related economy (Moscow-Pullman Daily News 1999).

Another example involves livestock management practices on the Diamond D Ranch. To the detriment of Targhee Creek’s riparian zone and water quality, the rancher had always allowed his cattle to graze at will and to access the creek for watering purposes. However, in cooperation with the HFWC and in exchange for a partial subsidy totaling \$10,000, the rancher made significant changes to his cattle management practices. He agreed to fence off key parts of the stream, install a watering trough with a float-controlled inflow valve to match water supply with actual demand, and adopt a different, more environmentally benign grazing practice known as “hub” grazing. Hub grazing involves portable New Zealand-style fencing (electric, single wire) in combination with corral fencing and numerous gates that restrict cattle to a particular section of range

and channel them toward the new watering troughs (the hub) rather than the stream. After foraging on the same range for an appropriate amount of time, the portable fencing is moved in clockwise fashion around the watering trough hub to encompass a new section of range, while still maintaining the same watering hub. The net result was a 70 percent savings in water usage, a healthier riparian zone, and cleaner water (anonymous interviews 11 August 1998b, 7 August 1999a, 27 October 1999b).

A final example includes the willingness of Roger Ferguson, one of the major landowners and beneficiaries of the Sheridan Creek stream restoration project, to "be a hero by being the single largest cash donor [\$40,000] ... to make sure [the Sheridan Creek stream restoration project] happened, even though he was under no obligation to do so" (anonymous interview 11 August 1998b).

INFORMATION SHARING, INNOVATION, AND CUSTOMIZED SOLUTIONS

The HFWC provides a "one-stop-shopping" forum for communication, integration, and coordination of agency management efforts related to the watershed. This forum increases the potential for maximizing scarce resources by lessening the chance for counterproductive and redundant management initiatives and lowers transaction costs of gathering information. Taken together with the fact that the HFWC employs an iterative, ongoing discussion format, it also creates opportunities for resource coordination and problem-solving that otherwise would not occur without the shared information/dialogue and creation of working relationships among the various parties. Information sharing creates opportunities for development of a more robust set of

policy choices and implementation mechanisms; the added information permits participants to discover innovative solutions to environmental problems that otherwise are beyond their reach (Weber 1998).

The HFWC also creates "new" information and, in some cases, possesses more detailed and comprehensive information about resource conditions than the agencies responsible for environmental management. The additional, watershed specific information can help agency decision-makers make better decisions that are more likely to "fit" the actual on-the-ground conditions of the watershed, hence improve the likelihood of sustainability. For example, the Idaho Division of Environmental Quality (IDEQ) has extremely limited information regarding the water quality of the water bodies in the region, especially in areas surrounded by private lands, yet is mandated by court action to classify streams according to Total Maximum Daily Load (TMDL) standards. The limited nature of the data means that, in most cases, IDEQ will set standards for major water bodies that automatically apply to adjoining tributaries. The HFWC fears this will lead to many water bodies being misclassified to the detriment of the resource and that the standards and ensuing management efforts will not fit the stream in question because they will either be too stringent or not stringent enough. Because the HFWC is the official state-chartered watershed advisory group (WAG) for the Henry's Fork area, it is expected to give advice on water quality and habitat health issues directly connected to water quality to IDEQ and others. Pursuant to this expectation, the HFWC created the Water Quality Subcommittee (WQS), on which any HFWC participant can serve. The subcommittee's purpose is to make sure that when agencies make decisions they

are informed with the best possible data. Toward this end the WQS has assisted IDEQ with the upper HF and Teton River subbasin assessments, using riparian habitat assessments completed by HFF and integrating USFS, BLM, and other agency data into a single document. The more comprehensive data essentially challenges IDEQ to come up with a classification scheme that more accurately captures the true diversity of stream conditions in the watershed.

The watershed approach also demands a higher degree of cooperation and integration from a broad variety of different knowledge sources. It accepts that real world problems typically do not fit neatly into the singular domains of traditional scientific disciplines, nor are they amenable to analysis excluding social impacts. From this perspective, whereas "natural and hard sciences are the key to unlocking natural resource problems, they don't come with the necessary instructions regarding how to apply them in human settings" (anonymous interview 13 August 1998a). Thus, social science is valued along with physical/natural sciences, e.g., silviculture, biology, ecology, and chemistry, and technical professional advice, e.g., engineering. Non-technical, community-based folk knowledge is valued as well. Folk knowledge is the individual and collective expertise of those community members most familiar with a particular problem and the capacities of the watershed in question, whether it be the history of watershed drainage patterns, the resilience of and changes in particular forest systems over time, recollections of conditions promoting the health of riparian areas and fisheries, or stored memories regarding what works and what does not when it comes to managing natural resources. Participants, including government agency representatives, expect that

tapping a broader array of knowledge sources will enhance the effectiveness of governance regimes for rural, natural resource-dependent economies by bringing "new," qualitatively different knowledge to the table (Ostrom and Schlager 1997). A member of a federal bureaucracy explains: "the HFWC increases our direct contact with citizens, ... it is a bridge builder that helps us explain our decisions in a give-and-take format, and pass along new information about developments in the watershed, ... [It] also serves as a refreshing ... forum for new ideas and potential solutions" (anonymous interview 17 November 1998). A good example involves a decision by Harriman State Park officials to employ, for the first time, a bioengineering solution as part of stream restoration at a Sheridan Creek diversion. The choice of a non-traditional solution came about only after HFWC participants hired a private consultant to develop an alternative to the original NRCS diversion design, then communicated the possibility of bioengineering to Park officials (anonymous interview 27 October 1999b). NRCS engineers ultimately offered their own alternative design. The question remains whether the agency would have done this on its own in the absence of the competing bioengineering design.

Moreover, the HFWC framework encourages cooperative, interdisciplinary, watershed-specific peer review as a supplement to professional "disciplinary" or "inside the agency" peer review by facilitating "support and consultation" networks of specialists that cut across agency boundaries. The new relationships promote information sharing and problem solving, while simultaneously offering a "social-professional" support network that can increase employee effectiveness. Agency experts report that they can now call on specialists in other agencies or organizations, either

in their own field or others with in-depth, watershed-specific knowledge. The working familiarity with watershed-specific conditions and issues is often of more value to their problem-solving efforts than if they had to rely solely on a similar array of experts inside their own agency, but without the watershed-specific knowledge (anonymous interviews 5 August 1998b, 7 August 1998b, 11 August 1998a, 21 July 1999).

CONCLUSION

The Henry's Fork Watershed Council, by its structure, operating dynamic, and approach to resource management, facilitates cooperative scientific research and cooperative management of the watershed. The HFWC sustains a focus on what participants have in common—residence in the same "place" and commitment to the same holistic mission and watershed management approach. There is direct sponsorship of cooperative programs and research important to watershed management and health. A unified, integrated community-based network strengthens the capacity of the community to act collectively by easing communication, facilitating the creation of informal decision-making institutions to complement existing formalized arrangements, and engendering cooperative action to solve watershed problems. The HFWC also is transforming the way that participants and other citizens view their neighbors and government, their preferences for policy, and their role in natural resource management. Not only is there greater trust and a heightened sense of collective purpose among participants, the successes of the HFWC suggest that there are now more people who are more receptive to, and willing to engage in, cooperative approaches to management and science. At the same time, the dynamic of the HFWC

recognizes that some people will approach cooperation through the lens of self-interest; they are willing to cooperate and help the HFWC achieve their tripartite mission of environment, economy, and community, but it is the promise of individual benefits that motivates cooperation. Moreover, information sharing and the production of new information are critical for helping participants discover innovative new "win-win" solutions and the common ground essential to cooperation. In short, the HFWC, and the other cooperative efforts like it throughout the West, may be the first steps toward a set of governing institutions that capitalize on cooperation, "the quality that most characterizes and preserves" the West and that gives the West its best "chance to create a society to match its scenery" (Stegner 1969).

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APPENDIX A

Watershed Integrity Review and Evaluation (WIRE) Criteria

1. **Watershed Perspective:** Does the project employ or reflect a total watershed perspective?
2. **Credibility:** Is the project based upon credible research or scientific data?
3. **Problem and Solution:** Does the project clearly identify the resource problems and propose workable solutions that consider the relevant resources?
4. **Water Supply:** Does the project demonstrate an understanding of water supply?
5. **Project Management:** Does project management employ accepted or innovative practices, set realistic time frames for their implementation and employ an effective monitoring plan?
6. **Sustainability:** Does the project emphasize sustainable ecosystems?
7. **Social and Cultural:** Does the project sufficiently address the watershed's social and cultural concerns?
8. **Economy:** Does the project promote economic diversity within the watershed and help sustain a healthy economic base?
9. **Cooperation and Coordination:** Does the project maximize cooperation among all parties and demonstrate sufficient coordination among appropriate groups or agencies?
10. **Legality:** Is the project lawful and respectful of agencies' legal responsibilities?

Projects receiving endorsement of the Council through the WIRE process may seek assistance, political support or interagency cooperation in their implementation. An annual "State of the Watershed" Conference is held each fall to monitor the progress of Council-endorsed projects and to present research and monitoring results.