

THE CALIFORNIA WATERSHED MOVEMENT: SCIENCE AND THE POLITICS OF PLACE¹

DRAFT

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ABSTRACT

California's watersheds supply water for drinking, recreation, industry and farming and at the same time provide critical habitat for a wide variety of animal species. Conceptually, a watershed is any sloping surface that sheds water, such as a creek, lake, slough or estuary. In California, rapid population growth in watersheds has led to increased conflict between human users of natural resources, dramatic loss of native diversity, and general decline in the health of ecosystems. California ranks second in the country in the number of listed endangered and threatened aquatic species.

With information from survey respondents on their views, beliefs, and perceptions about nature, technology, science and political issues, this essay explores California watershed-based organizations and their activities. We describe the primary sources of the watershed-based movement in the state, the many facets of “institutionalization” of watershed activity, the diversity of the movement, and the values and role of science in watershed organization and activity. We find that institutionalization is influenced by the presence of public land ownership within the watershed, the human population and location of the watershed, the age of the watershed group, and the presence or absence of listed endangered species. Our analysis shows that the bulk of watershed organizations are located in northern California and along the coast. Most watershed groups are located in urban settings with relatively high population density. Those areas without watershed-based organizations appear to have slightly poorer overall water quality and fewer aquatic species at risk. There is a fairly strong association between the number of endangered species within a watershed and the extent of watershed group activity. We find that one primary reason activists are involved in watershed-based activities is their residential

rootedness. Watershed activism can be broadly understood as a type of place-based activism. It combines science with place-based sensibility.

BACKGROUND

A watershed is any sloping surface that sheds water.² Watersheds provide water for human consumption and use and critical habitat for a wide variety of animal and plant species. In California, rapid population growth has led to conflict between human uses of natural resources and the needs of aquatic biodiversity.³ California ranks second in the number of aquatic species that are listed as endangered and threatened in the United States.⁴

Watersheds include a range of ecological communities that transcend political, economic and administrative boundaries or jurisdictions. Political and administrative institutions (both private and public) have not evolved along the same lines as watershed ecosystems. In California, a rough indicator of this mismatch is the fact there are 58 California counties and 153 hydrological cataloging units—watersheds—as identified by the US Geological Survey.⁵ The average California county includes portions of six different watersheds. Of all 153 California watersheds, few lie inside a single county. A watershed-based approach to planning and

² The Webster's NEW COLLEGIATE DICTIONARY defines a watershed as “the whole region or area contributing to the supply of a river or lake; a drainage area.” Watersheds are hydrologic entities, whose existence is in principle independent of biota, soil or culture.

³ R. NOSS, U.S. DEPARTMENT OF INTERIOR, ENDANGERED ECOSYSTEMS OF THE UNITED STATES: A PRELIMINARY ASSESSMENT OF LOSS AND DEGRADATION. BIOLOGICAL REPORT 28. (1995)

⁴ F.W. Allendorf, *Conservation Biology of Fishes*, 2 CONSERVATION BIOLOGY 145 (1988); Willa Nehlson, J.E. Williams, and J.A. Lichatowich., *Pacific Salmon at the Crossroad: Stocks at Risk from California, Oregon, Idaho, and Washington*, FISHERIES, Mar.-Apr. 1991. The official California listing of endangered and threatened animals is contained in California Code of Regulations 14 CCR 670.5; endangered plants are 14 CCR 670.2. The federal government list of animals is in the Federal Register 50 CFR 17.11; for plants see 50 CFR 17.12.

⁵ We also refer to these as “detailed hydrological units” to note that they are the smallest units. The cataloging units are nested within accounting units, sub-regions and regions. Most of California is within one hydrological “region” but that divides into 10 major bioregions. A cataloging unit is a geographic area representing part of all of a surface drainage basin, a combination of drainage basins, or a distinct hydrologic feature. Further data and description are readily available online from the U.S. Geological Survey: <http://water.usgs.gov/GIS/huc.html>; UNITED STATES. GEOLOGICAL SURVEY. STATE HYDROLOGICAL UNIT MAPS. [RESTON, VA.] : DEPARTMENT. OF THE INTERIOR, GEOLOGICAL SURVEY, (1978). HYDROLOGIC INVESTIGATIONS ATLAS. WASHINGTON, D.C. : U.S. GEOLOGICAL SURVEY (1954)

management, therefore, involves an acknowledgement that political jurisdictions are mismatched with the spatial hierarchy of aquatic ecosystems.⁶

Past and present development of California's water resources has affected virtually every watershed in the state.⁷ From a satellite image, southern California's urban core appears a pale pink, the color of concrete from space. There are miles upon miles of shopping malls linked in a series of superhighways and electronic corridors. The riparian corridors are also pink. It is readily apparent in the landscapes of the world-cities of Los Angeles and San Francisco, that suburbanization, and agricultural and industrial development remain the key problems facing California's watersheds.⁸

Traversing the Los Angeles Basin citizens scarcely recognize any natural rivers or creeks. Like most metropolitan cities, LA is subdivided by freeways, theme parks, shopping centers, industrial and residential developments. The Los Angeles River is approximately 51 miles of mixed riparian habitat and pavement, a condition that dates from the 1930s.⁹ There are 51 dams in the LA River watershed. The river enters San Pedro Bay at Queensway Bay in the southeastern corner of the City of Long Beach. Virtually the entire river has been channelized and paved. In the early 1950s, the sociologist William Whyte in an article for *Fortune* magazine described the urbanization of southern California as "urban sprawl."¹⁰ Urban sprawl and suburbanization continue to threaten human communities and ecosystems.¹¹ In the Los Angeles

⁶ R.B.Keiter. *Beyond the Boundary line: Ecosystems and law on the public domain*. Paper Presented at "A New Era for the Western Public Lands, Conference at Natural Resources Law Center, University of Colorado, Boulder, 19 (Sept, 1993); , R.E .Grubmine.*What is Ecosystem Management?* 8 CONSERVATION BIOLOGY: 29(1997)

⁷ MICHAEL VINCENT MCGINNIS AND JOHN T. WOOLLEY, EXECUTIVE REPORT. OCEAN AND COASTAL POLICY CENTER UNIVERSITY OF CALIFORNIA, SANTA BARBARA, CHANGING CALIFORNIA: FROM WASTESHEDS TO HEALTHY WATERSHEDS,.. (MAY 2000).

⁸ J. CALTHORPE. THE NEXT AMERICAN METROPOLIS: ECOLOGY, COMMUNITY, AND THE AMERICAN DREAM (1993).

⁹ Mike Davis. *How Eden Lost Its Garden: A Political History of the LA Landscape*. 6 CAPITALISM NATURE SOCIALISM 4, 1 (1995). See also DAVIS, ECOLOGY OF FEAR (1998).

¹⁰ W. Whyte, *Urban Sprawl*, FORTUNE 57 (January 1958) at 302.

¹¹ Davis. supra note 10.

Basin, there is very little “wild” nature left--or for that matter public space. By 1959, only 3% of coastal Los Angeles could be considered “wild.”¹² By 1995, 1% of LA coastal habitats remained wild while 84% of the landscape was urbanized.¹³ Pollutants flow through the watersheds of the basin. The watersheds of southern California are “wastesheds.”¹⁴

Watershed Connections

Against this history of urbanization, there arose in the 1980s a new and loosely-linked movement focusing on watersheds. The movement was encouraged in many ways by national and state-level government agencies, many of which differed in their objectives. The movement was often frustrated by the fragmentation at local government levels.

Throughout California today the watershed movement is both widespread and diverse. This movement includes private property owners seeking to fend-off greater regulation from higher levels of government and committed conservationists and restorationists seeking to protect aquatic species and habitats.¹⁵ The movement also includes governmental agencies and non-government organizations. The participants share a fundamental core idea—they recognize that they inhabit a distinctive place with a specific set of hydrological connections to other places.¹⁶ They have come, to some degree, to think and act in accordance to the boundaries of a watershed.¹⁷ This requires a sense of place and community—a “watershed consciousness.”¹⁸

¹² Id. at 27.

¹³ Id. at 27.

¹⁴ M.V. McGinnis, *Wasteshed*, 9 CAPITALISM NATURE SOCIALISM 1, 9 (1998).

¹⁵ See generally M.V. McGinnis, ed. BIOREGIONALISM (1999); S.M. BORN AND K.D. GENSKOW. EXPLORING THE WATERSHED APPROACH: CRITICAL DIMENSIONS OF STATE-LOCAL PARTNERSHIPS. THE FOUR CORNERS WATERSHED INNOVATORS INITIATIVE FINAL REPORT. RIVER NETWORK, PORTLAND, OREGON (1999); McGinnis et al., *supra* note 8; McGinnis, Woolley and Gamman, *Bioregional Conflict Resolution: Rebuilding Community in Watershed Planning and Organizing*, 24 ENVIRONMENTAL MANAGEMENT 1 (1999); C.W. Thomas. *Linking Public Agencies with Community-based Watershed Organizations: Lessons from California* 27 POLICY STUDIES JOURNAL 3 (1999); CALIFORNIA WATERSHED MANAGEMENT FORUMS 1999-2000. FINAL REPORT-DRAFT. PREPARED BY S. SOMMARSTROM. (OCTOBER 2000).

¹⁶ M.V. McGinnis, *Making the Watershed Connection*, 27 POLICY STUDIES JOURNAL 3 (1999) AT 497.

¹⁷ “To become more intimate with the salmon, creek and river.” F. HOUSE, TOTEM SALMON (1999).

¹⁸ Gary Snyder, *Coming into the Watershed*. WILD EARTH 65 (SPECIAL ISSUE: THE WILDLANDS PROJECT) (1993).

There is both unity and variety in the watershed movement. Activists include environmentalists engaged in familiar efforts to protect biodiversity and to promote preservation and restoration. An example is the Friends of the Los Angeles River (FoLAR), founded in 1986 by Lewis MacAdams. Membership is open to anyone, irrespective of land-ownership, profession or place of residence. FoLAR's goal is to protect and restore the last remaining natural portions of the river, and increasing public awareness of the river. Their mission statement is "to revitalize and protect the LA River and its tributaries, a living urban system through creative planning, education and innovative watershed management".¹⁹ FoLAR is one of the oldest citizen's organizations in southern California devoted to ecological restoration.

Another example of a relatively well-known and long-lived southern California watershed restoration group is the The Friends of the Ballona Wetlands. Friends of Ballona Wetlands was founded in 1978 by a group of six concerned citizens, including Ruth Lansford.²⁰ Ballona wetlands have been reduced to 188 protected acres, which constitutes the largest area of this habitat type in LA County. The battles between development interests (such as Dream Works proposed entertainment complex), investment bankers, and the needs of the animals and plants that depend on the Ballona wetland ecosystems have yet to end. Nor has it ended in other places, such as the Bolsa Chica Wetlands.

At the opposite extreme, in terms of urbanization, is the watershed movement in the Mattole River Basin.²¹ For almost thirty years, the inhabitants of the Mattole Valley have worked together to restore a balance between human activities and watershed ecology. Activists

¹⁹ Bettina Boxall. *For LA River, A Vision Beyond the Concrete*. LOS ANGELES TIMES 7 (October 29, 1989): The FoLAR web site is : <http://www.folar.org/about.html>

²⁰ Friends of Ballona Wetlands website is http://ballonafriends.org/who_we_are.htm; for media coverage see, Nancy Hill-Holtzman, , *Foes of Playa Vista Project Become its Friends*. LOS ANGELES TIMES 1 (OCTOBER 21, 1990),.

²¹ F. House, supra note 17.

have taught the reciprocal relation between human beings, salmon and the watershed. It is not simply a matter of observing the spawning salmon, or noting the geography of the place, or gathering scientific information for a particular place or region. Rather, as the bioregional activist Freeman House puts it, this is a process of "making community."²²

In the Mattole, watershed activism is a means of incorporating the landscape and river into the human experience and in the shared stories of place. The Mattole Restoration Council (MRC) includes a number of citizen groups and organizations that are working to remove roads, restore forests, and restore wild salmon runs. Its members combine knowledge of the river with activism, and social partnership with ecological awareness of the coastal range. Their activism ranges from development of an educational curriculum suitable for public instruction to didactic theater, such as Human Nature's *Queen Salmon*.^{23, 24}

The activists of the MRC suggest that ultimately the "watershed connection" can be much more than just a sense of attachment to place.²⁵ In this view, the watershed is part of what we are, and it can become what we wish to protect and defend. Watershed activism and organization can be a way of becoming "placed." Each place is experienced differently. Place-based initiation begins with knowledge of the needs of wild salmon or the sources of contamination within in watershed. As Freeman House notes, "Salmon had taught us that we live in watersheds, and the concept was no longer an abstraction. Every person lives in one, and almost anybody, urban or rural, can see a ridgeline or watercourse somewhere in the course of

²² Id. Freeman House is a co-founder of the Salmon Support Group and the Mattole Restoration Council (MRC).

²³ M.V. McGinnis, *Rewilding Imagination: Mimesis and Ecological Restoration*, 17 *ECOLOGICAL RESTORATION* 219 (WINTER 1999) and *Rewilding Imagination*, *AMERICAN THEATRE* 23 (SEPTEMBER 1999).

²⁴ McGinnis, House and W.R. Jordan III, *Bioregional Restoration: Re-establishing an ecology of shared identity*, in MCGINNIS (ED) *BIOREGIONALISM*, supra note 15.

²⁵ S. MILLS, *IN SERVICE OF THE WILD: RESTORING AND REINHABITING DAMAGED LAND* (1995) AT 150.

his or her daily life.²⁶ Making the watershed connection requires understanding where your water comes from, the importance of the soil and sediment, and where your waste goes.

Intermediate between focused restoration groups like FoLAR and Friends of Ballona and the intensive, “bioregional lifestyle” of the Mattole inhabitants, are a range of organizations linked in social networks. Networks combine many diverse organizations with the promise of developing a shared vision of the watershed. For example, the Redwood Community Action Agency of the Watershed Information Network (WIN) in Humboldt County is a social network of diverse watershed-oriented groups and activities.²⁷ WIN does not advocate a particular position. Rather, WIN’s goal is to unify the voices of the bioregion by providing a safe place for diversity. WIN focuses on vocational issues, such as training, building collaborative decision-making, providing expertise, scientific information and a neutral public forum for negotiation and collaboration. WIN formed around the value of the process of restoration; this remains the network’s common purpose and shared vision.

The New Regionalism

Watershed-based activism has developed in a new but ambiguous era in federalism and intergovernmental relations since 1980. This era has brought a rearrangement of responsibilities along more decentralized and regionalized lines. As we review briefly below, the agencies involved had a variety of goals and objectives. There was a desire to promote a regional view that made sense from a biological perspective, and there was simultaneously a desire to promote a more efficient, consensual mode of decision-making that was prone to litigious conflict.²⁸

²⁶ House supra note 17 at 157.

²⁷ McGinnis, Woolley and Gamman., supra note 15. Basic background information is located at <http://www.rcaa.org/nrs/projects/win.html>. The activities of the WIN can be tracked at: <http://www.rcaa.org/nrs/calendar.html>

²⁸ Craig W. Thomas, *Linking Public Agencies with Community-Based Watershed Organizations: Lessons from California*, 27 POLICY STUDIES JOURNAL 3:544 (1999); and Douglas S. Kenney, *Historical and Sociopolitical Context of the Western Watersheds Movement*, 35 JOURNAL OF THE AMERICAN WATER RESOURCES ASSOCIATION

The deep roots of this new regionalism are found in the early vision of governance proposed by John Wesley Powell.²⁹ In 1878, Powell urged Congress to create a system of governance in the new states of the semi-Arid West that was based on watershed boundaries rather than the more conventional straight-line political boundaries of the present. For Powell, the watershed was the ideal medium for a new form of regional self-governance. But Powell's vision fell on deaf ears.

Powell's vision of watershed-based governance has taken on new meaning in an era of decentralization and regionalization. Over one hundred years later, in July 1998, the Western Water Policy Review Advisory Commission, released a landmark report, *Water in the West: The Challenge for the Next Century*.³⁰ This report is perhaps the most far-sighted federal study of Western water since Powell's proposal. The Commission proposes a new government structure that reflects hydrologic, social, collaborative, legal and political "realities" of a watershed.

The move toward a watershed-based approach was also part of a larger federal initiative to focus on an ecosystem-based approach to protect biodiversity that began early in the first Clinton-Gore Administration.³¹ In addition, the federal government supported regional and

3:493 (1999). Generally on the emphasis on consensus-based processes see Cary Coglianese, *Assessing Consensus: The Promise and Performance of Negotiated Rulemaking* 46 DUKE LAW JOURNAL 1255-1349 (1997).

²⁹ Powell, *Institutions for Arid Lands*, 40 THE CENTURY AT 111 (1890). The importance of the work of Powell is described by WALLACE E STEGNER. THE AMERICAN WEST AS LIVING SPACE. (1987) :

³⁰ Created by Western Water Policy Review Act of 1992 (P.L. 102-575, Title XXX) 43 USC, Chapter 12 ; The Commission is composed of twenty-two members and was chartered by the Secretary of the Interior on September 15, 1995. WATER IN THE WEST is the final report of the Commission and may be located online at <http://www.den.doi.gov/wwprac/reports/final.htm>

³¹ AL GORE, FROM RED TAPE TO RESULTS: CREATING A GOVERNMENT THAT WORKS BETTER AND COSTS LESS. REPORT OF THE NATIONAL PERFORMANCE REVIEW. (SEPT. 7 1993). WHITE HOUSE OFFICE ON ENVIRONMENTAL POLICY. MEMORANDUM: QUESTIONS AND ANSWERS ON THE INTERAGENCY ECOSYSTEM MANAGEMENT INITIATIVE 1994. BUREAU OF LAND MANAGEMENT. US DEPARTMENT OF THE INTERIOR. ECOSYSTEM MANAGEMENT IN THE BLM: FROM CONCEPT TO COMMITMENT (1994); U.S. FOREST SERVICE. A NATIONAL FRAMEWORK, ECOSYSTEM MANAGEMENT: FOUR FUNDAMENTAL PRINCIPLES GUIDE THE IMPLEMENTATION OF ECOSYSTEM MANAGEMENT. DEPARTMENT OF AGRICULTURE. (1994); ENVIRONMENTAL PROTECTION AGENCY. THE NEW GENERATION OF ENVIRONMENTAL PROTECTION: A SUMMARY OF EPA'S FIVE YEAR STRATEGIC PLAN. (1994); U.S. DEPARTMENT OF DEFENSE. MEMORANDUM ON DEPARTMENT OF DEFENSE ECOSYSTEM MANAGEMENT PRINCIPLES. WASHINGTON, D.C. (1994); W.A MORRESSEY. ECOSYSTEM MANAGEMENT: FEDERAL SECTOR ACTIVITIES. CONGRESSIONAL RESEARCH SERVICE REPORT. APRIL, 19 (1994); Moote et al., 1994; US Department of Interior,

place-based planning in several ways, including: the US EPA Clean Water Act grants,³² special Congressional fisheries restoration programs, (e.g., the funding of 11 watershed coordinators to *For the Sake of the Salmon* since 1996),³³ the Monterey Bay National Marine Sanctuary's water quality program with local watershed groups,³⁴ the US Forest Service's Jobs-In-The-Woods Program for counties impacted by the listing of the spotted owl, among others.³⁵ The US Department of Commerce also published Kier's *Watershed Restoration: A Guide for Citizen Involvement in California*.³⁶

California government has also encouraged watershed organization and planning.³⁷ The Coordinated Resource Management and Planning (CRMP) process was developed by California over 40 years ago, and is used by approximately 45 active groups. CRMP is a "resource planning, problem-solving and management process that allows for direct participation of everyone concerned with natural resource management in a given planning area."³⁸

Fish and Wildlife Service. *An Ecosystem Approach to Fish and Wildlife Conservation: AN APPROACH TO MORE EFFECTIVELY CONSERVE THE NATION'S BIODIVERSITY*. MARCH, (1994); Christensen et al. 1995; U.S. FISH AND WILDLIFE SERVICE. 1995. *AN ECOSYSTEM APPROACH TO FISH AND WILDLIFE CONSERVATION* (1995).

³² The Clean Water Act of 1972, 33 U.S.C., Chapter 26 - includes a variety program of funding to states and localities for clean water infrastructure needs and research. The grants program is described at US EPA, *CATALOG OF FEDERAL FUNDING SOURCES FOR WATERSHED PROTECTION*, OFFICE OF WATER, WASHINGTON, DC (1997); US EPA, *WATERSHED PROTECTION: A STATEWIDE APPROACH* (EPA841-R-95-004), OFFICE OF WATER, WASHINGTON, DC (1995).

³³ 16 USCS § 777 (2001)

³⁴ MONTEREY BAY NATIONAL MARINE SANCTUARY.. *ECOSYSTEM OBSERVATIONS: MBNMS ANNUAL REPORT 2000*. 19 (MARCH 2001), 19.

³⁵ US FISH AND WILDLIFE SERVICE.. *NORTHWEST FOREST PLAN 'JOB-IN-THE-WOODS' PROGRAM GUIDANCE*. REGION 1. NORTH PACIFIC COAST AND KLAMATH CENTRAL/PACIFIC COAST ECOREGIONS; (JULY 3,2000).

³⁶ WILLIAM M KIER. . *WATERSHED RESTORATION: A GUIDE FOR CITIZEN INVOLVEMENT IN CALIFORNIA*. U.S. DEPT. OF COMMERCE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, COASTAL OCEAN OFFICE, SERIES TITLE: NOAA COASTAL OCEAN PROGRAM DECISION ANALYSIS SERIES ; NO. 8. (DECEMBER 1995.)

³⁷ More detail on state government activity is found in California Watershed Management Forum, supra note 17 Forum website is located: <http://www.watershed.org/forums/ForumsToC.htm>. Also see: DE WITT JOHN CIVIC ENVIRONMENTALISM: ALTERNATIVES TO REGULATION IN STATES AND COMMUNITIES 1994; R.Haeuber. *Setting the Environmental Policy Agenda: The Case of Ecosystem Management*. 36 NATURAL RESOURCES JOURNAL 28 (WINTER, 1996); S.L.Yaffee, *Ecosystem Management in Practice: The Importance of Human Institutions*. ECOLOGICAL APPLICATIONS, 6,724-727.1996.

³⁸ CRMP Handbook Prepared by the California Coordinated Resource Management and Planning Technical Advisory Council (1996) <http://ceres.ca.gov/cacrmphandbook.html>.

During the 1990s, California Governor Pete Wilson did relatively little to initiate a formal state watershed-based program despite the listings of several aquatic species as threatened or endangered. Nonetheless, Governor Wilson's Executive Order of (July 31) 1997 stated "The State seeks to encourage and support community based watershed efforts" and proclaimed that "State activities in watershed protection and enhancement shall, to the maximum extent feasible, be based on coordination of existing state and local authorities, support of community based and voluntary landowner efforts, and other actions as required to preclude federal intervention in the management of California's anadromous fish species."³⁹ Wilson's Executive Order was in part a response to petitions filed with the National Marine Fisheries Service to require listing as endangered the Coho (1996,1997), Steelhead (1997) and Chinook Salmon (1998).⁴⁰ Without administrative support or formal enabling legislation, the Executive Order has had little impact on state biodiversity conservation policy.

The State has funded and assisted a number of watershed organizations. The State Water Resources Control Board's Watershed Management Initiative, the Watershed Protection and Restoration Council's 1998 plan, and the 1999 Watershed Principles adopted by the California Biodiversity Council emphasize and encourage the development of watershed organization.^{41 42 43} During the 1990s, the California Biodiversity Council – an informal group

³⁹ Executive Order W-159-97. This executive order established a Cabinet-level Watershed Protection and Restoration Council which is charged with developing a California Watershed Protection Program. The Council's main objective is to oversee the "coordination of State activities related to watershed protection and enhancement, including the conservation and restoration of anadromous salmonids". WPRC's December Report.

⁴⁰ Coho listings became effective in December 1996 (Central California Coast) and June 1997 (Southern Oregon/Northern California Coasts The NMFS proposed listing in March, 1998 West Coast Steelhead and final listing and protection went to effect in March of 1999, The NMFS proposed listings for four Chinook ESU's in March 1998 of seven chinook ESUs. Four of those ESUs were listed in March 1999. The remaining three ESU's were approved in September 1999. See Endangered and Threatened Species; Final Rule Governing Take of 14 Threatened Salmon and Steelhead Evolutionary Significant Units (ESUs), Federal Register vol. 65, N 132, (July 10, 2000) and Final Rule: Endangered and Threatened Species; Threatened Status for One Steelhead Evolutionary Significant Unit in California, Federal Register Vol.65, No110,(June 7, 2000), .

⁴¹ These activities are described in the summary of California Watershed Management Forum #2, "Expectations of Governance", November 15, 1999 held at UC, Davis.

made up of representatives from federal, state and nongovernmental representatives – agreed that a watershed-based approach was needed to begin to deal with the decline in state’s biological diversity. Senate Bill 271 (Thompson, 1997) established funding for the Salmon and Steelhead Trout Restoration Account which in turn provides funds (\$43 million) for watershed restoration and planning activity.⁴⁴ Statewide watershed-oriented legislation has been introduced by Assemblyman Dickerson, which includes a broad vision of what a statewide framework in California would look like.⁴⁵ The Secretary of the California Resources Agency, Mary Nichols, has asked for the formation of a statewide California Biodiversity Council Watershed Work Group (in March 1999).⁴⁶

One of the most important state programs has been the California Coastal Conservancy, which has funded a number of watershed-oriented planning activities and studies including the Garcia River Watershed Advisory Group, the Navarro River Advisory Group, the Smith River Citizen’s Advisory Group, and the failed Santa Ynez Watershed Enhancement Effort.

Overall, California government remains one of the few state governments in the West without a formal watershed-based program. As a result, the watershed movement in California is primarily not a reflection of any particular level of government or a product of an agency

⁴² For an overview of the Watershed Management Initiative see State Water Resources Control Board and the Regional Water Quality Control Board.2000. “Watershed Management Initiative”.

⁴³ The California Biodiversity Council was established in 1991 to promote cooperation and coordination by various environmental agencies at the federal, state and local levels. The CBC is listed as a special program under the California Resources Agency. See Watershed Management Council.2001. “California Watershed Management Forums: Final Report”_For a description of the Watershed Principles adopted by the CBC SEE CALIFORNIA BIODIVERSITY WATERSHED WORK GROUP. BEST FUNDING PRACTICES FOR WATERSHED MANAGEMENT: AN ANALYSIS AND RECOMMENDATIONS. SEPTEMBER 20, 2000.

⁴⁴ Senate Bill 271 was filed with the Secretary of State on August 18, 1997 is now: Chapter 293, (1997).

⁴⁵ AB730 introduced by Dickerson in February of 1999 would require the “Secretary of the State Resources Agency to carry out a watershed management and rehabilitation program to provide for the restoration of watersheds in the state” (text, AB 730). The bill requires the Legislature to annually appropriate funding for restoration projects. Bill died pursuant to Art.IV, Sec 10(c) of the Constitution.

⁴⁶ The California Biodiversity Council created the Watershed Work Group in March of 1999. The WWG’s primary goal is to facilitate watershed restoration and coordinate the funding and support of local projects, of primary importance is consulting local watershed groups on writing successful funding proposals.

program. The apparent vibrancy and diversity of the watershed movement in California makes it especially appropriate for independent study.

OUR STUDY OF CALIFORNIA WATERSHED ORGANIZATIONS

This is the first comparative study of California's diverse watershed organizations that draws on survey data. Despite the increasing activities described above, there remains a paucity of information on watershed organizations and their activity in California. This essay analyzes data from a survey questionnaire that was sent to members of watershed organizations in 1998 and 1999. We integrate those data with watershed-level data drawn from EPA sources, to develop an initial overview of California watershed organizations.

Identifying Watershed Organizations

Identification of groups and their active members proceeded in stages. We first consulted references, and then contacted the groups by both U.S. mail and telephone. In *Watershed Restoration: A Guide for Citizen Involvement in California*, William Kier and associates published a list of 163 watershed groups and organizations active in California in 1995. Through attempts to locate missing groups and to confirm contact information, we also identified a number of significant groups that had not been included in Kier's inventory. We supplemented group and contact information from two later lists of watershed groups—the California Watershed Project Inventory (CWPI) and a list prepared by "For the Sake of Salmon." By the time of our study in 1998, the CWPI listing was quite extensive with over 395 entries. The "For the Sake of Salmon" list includes 153 watershed groups in California with substantial overlap with Kier's inventory.

The identification process suggested:

- Loss of groups and turnover of representatives was high. For example, by the time of our survey in 1998, we attempted to contact Kier's list of organizations by U.S. mail of which 8% had no "deliverable addresses". Of the remaining listings, a large number of groups had changed addresses or contact people (e.g. executive director).
- The number of watershed groups increased substantially over the 3 years since Kier's inventory. Even after dropping entries from the CWPI inventory, it was unquestionably the case that the number of groups increased almost 100 percent, despite the simultaneous extinction of several dozen organizations since Kier's study. Furthermore, since our survey, the Davis inventory has grown to a reported 660 groups as of early 2000. Thus, even if the proportion of defunct groups remains around 10 percent, this progression represents a tremendous expansion of watershed activity in a very short period of time.

Thus, as the watershed movement has gained prominence and visibility, so too has the number of organizations voluntarily identifying themselves as a watershed group. There is an extreme degree of organizational fluidity in the movement. Watershed activism is dynamic, and involves substantial change in groups and in membership. Water organization includes a number of social alliances, networks and cross-linkages. While this is probably true of almost every significant social or political movement, we must not lose site of the fact that our research involves a snapshot of a changing "movement."

Study Sample

Our initial study sample included 463 individuals who, we believed, belonged to 193 different watershed groups.⁴⁷ These groups in turn, were drawn from 70 California watersheds (USGS "cataloging units"). Our responses involved 217 individuals in 98 watershed groups from 45 different watersheds (for response rates of .47, .51, and .64 respectively). Fully 20

percent of our respondents informed us that they were involved primarily in a watershed group different from the one through which we located them. The median respondent claimed membership in 2 watershed groups.

Our sample is broadly representative of the relevant underlying populations. There are 153 USGS watersheds or "cataloging units" in California, of which 124 (or 81 percent) have at least one self-identified watershed group (according to the U.S. EPA "Adopt-A-Watershed").⁴⁸ By late 1999, this EPA database included 595 activist organizations within these 124 watersheds.⁴⁹ At the watershed level, the number of groups in our sample and in the EPA watershed listing correlate at .81. The number of groups responding and the number surveyed correlate at .73.⁵⁰

Using data at the watershed level, we contrast in Table 1 characteristics of watersheds in our sample and those not represented in our sample but which appear to have citizen group activity as of 1999 (see Table 1).

[Table 1 about here]

The 54 watersheds that *do* have citizen groups but that are *not* represented in our sample have substantially fewer citizen groups (only 2.8 on average vs. 6.3 in the sample). Thus our sample watersheds include most of the watershed groups. The omitted watersheds appear to score slightly worse on the EPA's index of overall watershed conditions but, interestingly, also

⁴⁷ Some further observations on the reliability of the sample are included in an appendix.

⁴⁸ Excluded as "watershed groups" are listings of Wildlife Refuges and National Forests.

⁴⁹ Again, excluding 62 wildlife refuges and National Forest organizations.

⁵⁰ This correlation excludes one watershed, the Big-Navarro-Garcia, which included 13 groups in our sample but of which only 1 responded. This outlying case reduces the overall correlation to .54. The Big Navarro-Garcia is on the northern California coast just west of the towns of Willit and Ukiah. The groups surveyed included: Addison Valley Watershed Association; Albion River Protective Association; Anderson Valley Land Trust; Coast Action Group; Ocean Sanctuary of Sierra Club Mendocino Lake Group; Friends of the Garcia River; Friends of the Navarro Watershed; Mendocino Environmental Center; Mendocino Watershed Service; Redwood Coast Watershed Alliance; Albion River Watershed Protection Assn.; Friends of Schooner Gulch; Big River Watershed Alliance. We do not know why response rates were so peculiarly low for this particular watershed.

have fewer identified aquatic species at risk.⁵¹ The omitted watersheds are more rural with less “impervious” (hard-covered or paved) landscapes. There are 29 California watersheds with no apparent watershed group activity at all. Watersheds without citizen group activity have substantially poorer watershed quality index values but many fewer aquatic species at risk. They have low population density and are very rural with very low proportions of hard-covered land

There were similar differences between watersheds in the sample with at least one respondent and those with no respondent. The non-response watersheds had less watershed group activity, poorer watershed quality, slightly fewer aquatic species at risk. They were more rural with less ground area covered by impervious surfaces. In short, our sample probably underrepresents groups in the most rural settings where there is less watershed group activity. Our pattern of response accurately identifies one of the most important “mobilizing” factors for watershed group activism--the presence of endangered species. This is described in more detail below.

General Characteristics of Watershed Groups

Watershed groups in California are, as a generalization, located where the people are. The largest third of watersheds by population include 57 percent of the EPA watershed groups, 60 percent of our sample, and 62 percent of our respondents. The largest half of watersheds by population includes 74 percent of all watershed groups, 75 percent of our sample, and 69 percent of our respondents.

Geographically, the largest numbers of watershed groups are in coastal Northern California, in major metropolitan areas, and in areas known for their natural beauty. However, a number of low-population watersheds have large numbers of groups relative to their population.

⁵¹ The Index of Watershed Indicators used for this study was based on 14 separate indicators of water quality and threats to water quality (e.g., population and pollution pressures). Information about the current construction of the

Relative to the population size, the truly high rates of watershed organization are not in the population centers of the coast, but in the relatively rural watersheds of northern California and the Sierra.⁵²

At the bivariate level, there is no association at all between the EPA's index of watershed quality for a watershed and the number of groups in the watershed.⁵³ That is, poor overall water quality and observed threats to water quality do not seem to be the drivers behind watershed activism.

One might imagine that rapid population growth would provoke a conservationist reaction that might show up as support for environmental activities such as those promoted by watershed groups. However, the number of watershed groups is not associated with the recent percentage change in population. Moreover, even when we look at the density of group organization (number of groups per 10000 population), there is essentially no correlation with change in population.

In summary, the geographical distribution of watershed groups does not appear to be a response to social change (as indicated by dramatic shifts in population percentage) or to objective differences in indicators of water quality. Watershed groups are located: (a) where people are; (b) where attractive physical features are to be found; and (c) where more aquatic species appear to be at risk.

GROUP AGE, ENDANGERED SPECIES, AND PROPERTY INTERESTS

We were interested in learning about the ability of watershed organizations to integrate scientific information effectively in managing watersheds. We hypothesized that three factors would be especially key to the performance of these groups: the degree of institutionalization of

index can be found at www.epa.gov/surf3

⁵² Maps illustrating these points are available from the authors on request.

the organization (measured initially by group age and activities); the extent of external regulatory threat (proxied by the existence of some or many listed endangered species); and the nature of the interests involved in the watershed (proxied by the proportion of public land in the watershed). Let us now look briefly at each of these factors at a descriptive level.

Group Age

We have reports on the year of founding for 91 groups. The median year of founding was 1987, and the founding year ranged from 1965 to 1997. Thus approximately half of the groups we surveyed had been founded in the preceding 10 years.⁵⁴ This is consistent with the apparently high rate of expansion of watershed-related activity noted above. However, if watershed group activity had really doubled from 1994-2000, as suggested by the expansion of the CWPI, we would have expected to see an even higher proportion of groups founded in the recent period. Part of the explanation for the apparent discrepancy is that many long-lived general environmental groups have only recently come to identify themselves as watershed groups.⁵⁵

Endangered Species

There is significant variation in the number of endangered species in California watersheds. The EPA reports an index value for the number of aquatic and wetland species at risk at the watershed level. An index value of 0 indicates 1 species at risk; an index value of 2

⁵³ This is true even dropping the two watersheds with extremely large numbers of reported groups.

⁵⁴ This conclusion is almost identical to the one arrived at independently by Cook 1998 in a separate study of watershed groups in California.

⁵⁵ To test this notion, we analyzed 215 “new” additions (in the portion of the alphabet A-F) to the UC Davis list between the inception of our research in 1997 and early 2000. Our analysis suggests that 56 percent of those new groups are not focused exclusively or primarily on issues of watershed restoration and management—although their interests may include watershed quality in a general way. For purposes of this particular analysis, we treated as clearly a “watershed” group any group that includes the word “watershed” in its name, or that includes a specific “water” feature (a bay, river, creek, wetland) in its name. We fully recognize that a creek is not a watershed, nor is a river, a bay or a wetland. General environmental groups without a distinctively watershed focus include, for

indicates 2-5 species at risk; and an index value of 3 indicates more than 5 species at risk.

Together with EPA data on the numbers of watershed groups per watershed, we can get a good initial view of the correlation between group activity and endangered species. The basic results are reported in Table 2.

[Table 2 about here]

We can see from Table 2 that there appears to be a fairly strong association between the number of species at risk and the extent of watershed group activation. In the watersheds with more than 5 species at risk, there is a dramatic increase in the number of watershed groups. This relationship holds true in a statistical model even controlling for population size, which we showed above is a strong correlate of the number of watershed groups.⁵⁶

These findings are consistent with the notion that the external stress of threatened government regulation—which mounts with the numbers of species at risk—spurs the formation of watershed groups. It is also consistent with the idea that watershed activists are themselves spurred to action precisely because of the species at risk, rather than because of government regulation per se. We discuss this issue further below.

Property Interests

The fundamental idea is that government would naturally be a bigger player in those watersheds where it controls a larger share of the land. Private interests will matter more when land use emphasizes recreation and agriculture. We do not have objective indicators of the share of public land at the watershed level. Where public land ownership is dominant, the challenges confronted in watershed management will be very different from settings where private land ownership is dominant. Where public land ownership is very low, the absence of government as

example, land trusts, the Audubon Society, California Native Plant Society, general citizen action groups (e.g., Center for Economic Conversion, Cloverdale Tomorrow, Citizens for Goleta Valley).

a land-holding stakeholder may also affect not only processes of negotiation but also the focus and breadth of watershed group activities.

Respondents were asked whether there was public parkland in the watershed and they were also asked to estimate the proportion of “public land” in the watershed. Seventy-four percent of groups report that there is some kind of public parkland in their watershed. Thirty-five percent (of all groups) report a national park, 55 percent a state park, and 50 percent a city or local park. Respondents were explicitly directed not to include “national forests” in their response concerning parklands.

As a representation of all California watersheds,⁵⁷ these percentages seem implausibly large. There are only 23 national monuments, recreation areas, historic sites, national seashores, and national parks in the state of California. Most of them are sufficiently compact that they involve only a single watershed. Obviously, of the 124 California watersheds with watershed groups, it is unlikely that 43 of them involve national parks. However, it is plausible that 35 percent of the respondent watersheds (or 16 watersheds) involve national parks or monuments. As we have already pointed out, watershed groups are disproportionately concentrated in especially scenic areas such as those near national parks and monuments. Further, it is almost certain, although we cannot demonstrate this from our survey data, that people often, and correctly, think of “their watershed” as being more extensive than the small USGS “cataloging unit” definition of a watershed. After all, the federal units aggregate to larger and larger watersheds—so in that sense, many respondents might reasonably think that a national park is in “their” watershed because they have a larger area in mind.

⁵⁶ The regression model is not reported here, but results are available on request.

⁵⁷ Here, as throughout, we refer to “hydrological cataloging units,” the most detailed USGS specification of a watershed.

Whatever may be the case, the key point is this: Relative to the actual number of national parks in watersheds, our sample clearly overrepresents claims that a park is in the watershed. This actually supports the notion that people are motivated to become actively involved in environmental protection precisely because they feel connected to some particular highly valued component of the ecosystem, such as the presence of wild salmon.

We also asked respondents to estimate the percentage of public land in the watershed including public parks, national forests, wilderness areas, and so forth. Our responses ranged from 0 to 100 percent with the median percentage put at 31 percent, and the average at 39 percent. We have not been able to find data that would allow us to assess the accuracy of these numbers at the watershed level. At the *county* level, we know that publicly owned timberland ranges between 0 and 56 percent of total county acreage⁵⁸ (with the highest shares in Plumas and Sierra Counties⁵⁹). The mean public percentage is 14 percent for those counties with measurable timberlands. Much public land is not timberland. For example, Santa Barbara County contains only around 1000 acres of timberlands, none of it public, but the US Forest Service controls 30 percent of the land in Santa Barbara County. National Forests comprise 20.7 percent of the state acreage overall. Since there are only 58 counties in California and 153 watersheds, and many of those rather compact, the reported ranges for percentage of public land ownership by survey respondents are, while perhaps somewhat inflated, still quite reasonable.

GROUP INSTITUTIONALIZATION

To what degree are these groups institutionalized—that is, to what extent have they established an independent organizational base distinct from the personal efforts of a single entrepreneur? And how is that institutionalization related to age, public land, and endangered

⁵⁸ Data Source: USDA Forest Service/Pacific Northwest Research Station; data are available online at <http://www.nass.usda.gov/ca/bul/902farms.htm>.

species? Any successful organization builds a base of active members who are willing to contribute time and resources to the organization's goals. If this happens with watershed groups, then with luck and persistence, after many years, watershed organizations can successfully build partnerships and alliances that support, protect and restore the health of the watershed community.

Respondents were asked to indicate whether their group had a series of elements that characterize established organizations. These were:

- An office separate from members' residences;
- A telephone number used exclusively by the organization;
- Regularly scheduled meetings;
- A formal leadership structure;
- A program for recruiting new members;
- Membership dues;
- A newsletter; and
- Tax-exempt status.

Together we take these as indicators of institutionalization. We examine them both separately and together in a simple additive index where one point is awarded for each feature the organization has (scores range from zero to 9; with a mean of 5.1 and a standard deviation of 2.43).

Summary results for all groups are reported in the right-most column of Table 3. There we see that groups overwhelmingly (80 to 90 percent) reported that they have regular meetings and formal leadership. Slightly less common (71 percent overall) are a newsletter and membership dues. However, the hallmarks of separate, independent organizational existence, —

⁵⁹ Plumas County touches on 7 watersheds; Sierra involves 4.

a separate phone, an office, and tax-exempt status—are shared by only about half of the groups in the study.

[table 3 about here]

Group Age

One naturally supposes that groups that survive longer achieve a higher level of institutionalization. This is borne out by our data. Age makes a difference for institutionalization, *except* with respect to having regular meetings. To be a group at all means having regular meetings. Usually (68 percent of the time for the youngest groups), being a group means having a formal leadership structure. Viewed in terms of the magnitude of difference between the youngest and oldest groups, we find the greatest disparity in two areas: membership dues—only 38 percent of the youngest groups had dues, while all of the oldest reported having dues--and membership recruitment programs –only 19 percent of young groups did recruitment, but 68 of the oldest groups did. The next largest effects of age on institutionalization involved gaining tax-exempt status. Only 40 percent of the youngest group had tax-exempt status, but 81 percent of the oldest cohort had tax-exempt status.

As we can see in the top portion of Table 3, groups differ in interesting ways depending on their age. The age divisions were picked for convenience in order to assure reasonably equivalent numbers of organizations in each category. Group size increases steadily—indeed dramatically—with age, from a median size of 38 in younger groups to 700 in the older groups. However, it is strikingly the case that command of financial resources does not vary with age. Younger groups have budgets just as large as the older groups. The older groups are much more like mass-membership organizations than are the younger groups. This may be an aging effect—

it may take time to build a large membership base, but, as we think is probably the case, this may also be due to a cohort effect--the younger groups may truly be different.

Government was much more likely to have played an important role in creating the younger groups. Government helped create 33 percent of the youngest groups but only 4 percent of the oldest. Similarly, younger groups were much more likely to have formal representation from business, government, *and* environmental organizations. Indeed, over 70 percent of the younger groups had representation from all three groups (business, government and environmentalists). But this was true of only 21 percent of the oldest groups. The older groups are much more characteristically cause-based environmental groups while the newer groups are, as we shall see further, oriented toward negotiation, priority-setting, and regulation avoidance more than older groups.

Endangered Species

We have seen that the frequency of group organization in a watershed is closely linked to the number of species at risk in the watershed. While species extinction may motivate activism, does that translate into group institutionalization? We present some basic data bearing on this question in Table 4.

[Table 4 about here]

As would be expected from the EPA data on groups and species at risk, overwhelmingly our survey respondents report that their watershed includes an endangered species. In most cases, watershed group institutionalization increases as respondents recognize the presence of an endangered species in the watershed. The differences are generally not very large and approach statistical significance in only two instances--having membership dues and having tax-exempt status.

We cannot at this point rule out the possibility that causality, if any, works such that more institutionalized groups produce a greater awareness of an endangered species. The alternative, that awareness of endangered species motivates activists into creating stronger organizations, is our basic expectation. Both effects could be present.

Property Interests

Table 5 shows the relationship between the level of institutionalization and the proportion of public land estimated by the average member of the respondent groups. To be sure about the impact of different degrees of public land ownership, we compute the percent of groups having a particular institutional characteristic both for rather large proportions public (more than 60 percent of watershed land), for intermediate proportions (between 20 and 60 percent) *and* for rather small proportions (less than 20 percent of watershed land).

[Table 5 about here]

The data in Table 5 show that watershed group institutionalization does *not* strongly or consistently correlate with the share of public land ownership in the watershed. In only two cases (formal membership status and regularly scheduled meetings) does the relationships approach statistical significance. In one case, a higher public land ownership share is associated with *lower* rates of institutionalization (membership dues, but this is not statistically significant). There is a suggestion that the effect of public land ownership on institutionalization may be curvilinear in a few instances (especially membership status, regular meetings, membership dues, and a program for recruiting members.⁶⁰

By and large, the evidence here does not support the notion that there is a particularly strong or consistent relationship between public land ownership and the degree of

⁶⁰ We have tested this directly in binary logit models for each institutional feature using a common curvilinear specification for public land share ($B_{pubpct} + B_{pubpct}^2$).

institutionalization of watershed groups. This is not troublesome since our expectation at the outset of the research was that public land percentage related more to an expected pressure for rapid action in restoration projects with more compromise than would otherwise have been forthcoming.⁶¹

WATERSHED GROUP ACTIVITY

Group Age

We have seen evidence that older groups are more fully institutionalized, but it could still be the case that the younger groups are distinctive in ways beyond institutionalization. We have already noted that younger groups are different in terms of their formal membership composition (much more likely to include business and government representatives) and the rate at which government played a significant role in creating the group.

As is apparent in Figures 3 and 4, group age is strongly associated with some activities of groups and not others. In particular, organizationally demanding activities such as lobbying the legislature or using the courts and litigation process are more common among older watershed organizations (see Figure 3). Older groups are also more likely to report that they actually “preserved habitat” or “cleaned up the river. . . “And, finally, older groups are significantly more likely to report that they facilitated a compromise between diverse interests and users. .

[Figure 3 and 4 about here]

In some other activities, however, it appears that age does not make a significant difference (see Figure 4). There is no difference between young and old groups in rates of use of best available scientific information, use of consultants, effort at setting priorities for future watershed policy, and watershed restoration. Young groups actually report higher rates of

⁶¹ In a multivariate statistical model, not reported here but available on request, we confirmed that institutionalization is strongly related to group age but not to the presence of an endangered species or to the public

involvement with efforts to avoid imposition of more stringent federal and state regulation, and respecting private property rights.

Thus, what emerges is additional evidence that there are differences between younger and older groups. Younger groups appear to be smaller, more focused on avoiding imposition of regulation, more likely to have been government-organized, and far more likely to include business and government representatives as members. They are less likely to be involved in preservation and restoration of habitat. The youngest groups are the most explicitly identified as “watershed” groups.⁶² The oldest groups are more like traditional environmental groups.⁶³

Endangered Species

Does the presence of endangered species in the watershed affect the activities of watershed groups? We know that the *existence* of groups is linked to endangered species, but their *degree of institutionalization* is not. Table 6 reports the percentage of groups engaging in different activities according to whether or not the respondents perceived the presence of a listed endangered species in the watershed.

[table 6 about here]

Recall that the presence of an endangered species signals a context of threatened regulatory action. Thus, such a threat might lead to a greater readiness to compromise and to a concern for taking active remedial steps to restore or preserve the watershed. Interestingly, these are largely *not* the associations we find. If the endangered species represents an external

land ownership share.

⁶² Examples from our study would include: Eel River Watershed Improvement Group; Citizens for Responsible Forest Management; Clear Creek Conservancy; Jacoby Creek Watershed Workgroup; Lower Klamath River Restoration Partnership; Arana Gulch Coastal Watershed Council; Sanfransquito Creek Coordinated Resource Management and Planning Project; Friends of Mill Valley Watershed; Dry Creek Conservancy; Pilarcitos Creek Restoration Fund; Waterways Restoration Institute; Quincy Library Group; Spring-Run Chinook Salmon Workshop; Redwood Community Action Agency.

regulatory threat, it is noteworthy that the presence of that threat is *not* associated (at conventional levels of statistical significance) with avoiding regulation, cleaning the watershed, or preserving habitat (although all these relationships do have the “correct sign”).⁶⁴

We find the expected relationship in the case of “restoring the watershed” and “facilitating cooperation.” However, most of the activities that correlated with presence of an endangered species are not related to the condition of the watershed but to social relationships such as lobbying the legislature, interacting with the media, educating the public and respecting property rights.

Property Interests

Our expectation was that as the proportion of public land in the watershed increased, it would prove easier to reach agreement on watershed restoration and management. This would reflect the higher weight of public stakeholders, their additional resource base, and their greater direct responsibility for ecological resources.

Entries in Table 7 report the relationship between survey respondent estimates of the share of public land in the watersheds and various activities of watershed groups. On the whole, the results summarized in Table 7 are consistent with expectations. There are a number of significant correlations between public land share and activities of the watershed groups. All of these correlations involve the social side of group activities, not the direct work of conservation and restoration. Thus, public land share is correlated with facilitating compromise, lobbying the legislature, interacting effectively with the media, identifying priorities for the future, and using the best available scientific information.

⁶³ Examples would include: League to Save Lake Tahoe; Friends of Point Sal; Trout Unlimited of California; California Trout; North Coast Environmental Center; Redwood Coast Watershed Alliance; Amigos de Bolsa Chica; Bolsa Chica Foundation; Bolsa Chica Land Trust; Friends of Ballona Wetlands; League for Coastal Protection.

⁶⁴ Of course, in most cases the watershed *does* have an endangered species, so there is not a great deal of variance.

[table 7 about here]

Of special interest is the evidence in several instances that there are nonlinearities in the relationship of public land to the practice of various activities.⁶⁵ We think that at very high levels of public land ownership there is a drop-off in activity precisely because the land is already mostly managed by public entities. At moderate levels of public land ownership, we believe that government plays a critical role in encouraging many watershed group activities, and that the presence of substantial public land signals the presence of attractive physical features that stimulates watershed group activity. At the lowest levels of public land ownership we expect that there is a corresponding decline in the magnitude and extensiveness of government role in encouraging watershed group activities.

A PROFILE OF WATERSHED ACTIVISTS

Geographical Rootedness

One of the characteristics that defines our respondents, something that may be at the heart of watershed activism, is a geographical rootedness that shows up as a relatively low rates of mobility. Watershed activists are well-educated, high-income, and generally very politically active. The median has 17 years of education (over three-fourths have a college degree); their median annual household income is \$45,000-60,000; 92 percent engage in political activity beyond simple voting participation.⁶⁶ Given these personal characteristics, watershed activists are surprisingly stable in terms of geographical mobility.

⁶⁵Multivariate analysis supports this conclusion and results are available upon request.

⁶⁶ The income range for the median is roughly the third quintile from the bottom in population terms—that is, it is well above average. Out of 8 possible different kinds of political acts the average watershed activist engaged in 5. These statistics are almost identical to the rates observed for activists in an entirely different realm; see M. Kent Jennings and Ellen Ann Andersen. *Support for Confrontational Tactics Among AIDS Activists: A Study of Intra-Movement Divisions*. 40 AMERICAN JOURNAL OF POLITICAL SCIENCE 311 (May 1996):

In the population as a whole, 1995-96, of people with a bachelor's degree and an income of \$50,000-\$55,000, 5.5 percent moved from one county of residence to another in the previous year.⁶⁷ For people residing in western states, aged 35-44 with a graduate or professional degree, 5.2 percent moved from one county of residence to another in the previous year.⁶⁸ However, only 1.4% of our respondents had lived in their current county for less than one year. In the General Social Survey (GSS) for the period 1983-87, about 9 percent of respondents report living in their community for less than one year, and the median respondent reports having lived in the same community for between 16 and 17 years.⁶⁹ Because the GSS median respondent has a much lower education and income than does our sample, we would normally expect lower rates of mobility for that population than for our well-educated and affluent respondent group.⁷⁰ However, our median respondent has lived in the same county for 20 years (the mean is 22 years). In short, watershed groups activists are distinctively rooted in particular places. This may generally characterize people who become active leaders in place-based politics.

Values that Unify Activists

Ecocentrism or the “new environmental paradigm” is a world view premised on an attachment to ecological values and a commitment to valuing nature for its own sake rather than

⁶⁷ US., CENSUS BUREAU, CURRENT POPULATION REPORTS, P20-497 - Geographical Mobility: March 1995 to March 1996 (Detailed Tables) (Tables revised 01-29-98), Table 17, General Mobility of Persons 25 Years and Over, by Educational Attainment and Income.” This is online at <http://www.census.gov/prod/3/97pubs/p20-497u.pdf>.

⁶⁸ Ibid., table 5, General Mobility of Persons 25 Years and Over By Region, Age and Educational Attainment.

⁶⁹ In the 1998 American National Election Study national sample survey, 8.3 percent of respondents reported living in the present city for one year or less. The median was between 17 and 18 years. Sapiro, V. and Rosenstone, S. J., The American National Election Survey 1998 Post-Election Survey; ICPSR 2684, University of Michigan; <http://www.icpsr.umich.edu/cgi-bin/archive2.prl?num=2684&path=ICPSR>; General Social Survey is most easily tapped online at the Interuniversity Consortium for Political and Social Research (ICPSR) at the University of Michigan, at <http://www.icpsr.umich.edu/GSS/>. The variable used here is "livecom." The survey question was "How long have you lived in the city, town or community where you live now?" The most recent date for this question is the 1983-87 period. For print overview see FLORIS W. WOOD, ED AN AMERICAN PROFILE : OPINIONS AND BEHAVIOR, 1972-1989 : OPINION RESULTS ON 300 HIGH-INTEREST ISSUES, Detroit : Gale Research, c1990. xxxix, 1065 p; 29 cm.

⁷⁰ Jennings and Anderson found the median “number of years in present city” for their activist population, with overall demographics very similar to this sample to be 19 years.

merely for nature use value or recreational value.⁷¹ Ecocentric orientations have been shown to be an important part of the development of ecosystem-based management and planning, and an essential value orientation consistent with the conservation, preservation and restoration of nature.⁷²

The survey revealed broad areas of consensus among activists that are substantially ecocentric. Respondents evaluated a battery of statements modeled after items used in prior research. They were asked to indicate their degree of agreement with each statement.⁷³

We present in table 8 the eleven statements that respondents agreed with most and those they disagreed with most. The mean responses reported are the average of all responses on a 7-point scale (where 1 = strongly agree and 7 = strongly disagree). These statements reveal clearly the ecocentric thinking among watershed activists taken as a group. The strongest mean response of agreement, 1.37, was for the statement “Nature has other than economic value.” This is a very direct expression of ecocentric views. The strongest disagreement, a 6.6 on the 7-point scale, was for the statement, “Natural resources should be used for the benefit of the present generation.” This is the "flipped" version of the more familiar ecocentric expression, which also happens to have elicited the second highest level of agreement in this survey, "natural resources should be preserved for the benefit of future generations."

[table 8 about here]

One final point about these “consensus” statements: There were many statements in the survey about science, the adequacy of scientific knowledge and the use of science in watershed

⁷¹ , M.E. OLSEN, D.G. LODWICK, AND R.E. DUNLAP. VIEWING THE WORLD ECOLOGICALLY. (1992)

⁷² Yaffee (1999)1996?

⁷³ We used 7-point Likert scales. These give respondents the opportunity to indicate that they strongly agree, agree, somewhat agree, are neutral, somewhat disagree, disagree or strongly disagree. As is standard with this kind of research, questions were designed so that the "valence" of statements alternated randomly so that "agree" is not always the "ecocentric" direction.

activities. This was a major question in the research project, and is discussed further below.

None of those statements about science, knowledge, and the role of scientists elicited the degree of consensus among respondents that we see with the statements in table 8. The statements that elicit agreement are expressions of general values about our relationship to the environment and our responsibility for it. They are not about the state of our knowledge and the means to action.

Views that Divide Activists

The nine statements/values that most divide our respondents are summarized in table 9.⁷⁴ These deal with areas of rights, process, and means to achieve specified ends. We see that within the overarching ecocentrism that unifies watershed activists there are major disagreements. Several of these disagreements relate to resolving tradeoffs—what is it worth to save the environment? Are we justified to take “whatever means necessary?” Do we have to sacrifice political rights? Can we infringe on property rights without providing full compensation? One point of contention is at the heart of the watershed enterprise—whether preservation and restoration efforts can be separated. There is disagreement about the appropriate role of markets in supplying people’s needs. There is strong disagreement about whether opponents on watershed issues are motivated by self-interest.⁷⁵

[table 9 about here]

Of particular interest, however, are the statements that touch on science. Two of the most contentious questions involve science. The first involves whether there are formal channels for scientists to communicate with the watershed organization. Respondents disagree heartily on

⁷⁴ These statements were selected on two criteria: the standard deviation was in the top quartile of all respondent ratings of all statements and the mean response was within the range 3.5 – 4.5. This range narrowly bounds the “neutral” response category. Thus, we select statements that reflected the greatest measured symmetrical disagreement.

⁷⁵ The correlates of agreement and disagreement with these statements are complex and beyond the scope of this essay. One of the few consistent observations is that as years of county residence increased, there was more

this issue with about equal proportions tending to agree and disagree.⁷⁶ The second involves the critical baseline question of adequacy of knowledge relative to action. Respondents disagree among themselves about whether we know enough to manage watershed ecosystems responsibly.⁷⁷ Forty-six percent agree (or somewhat agree) that we know enough; 44 percent disagree, maintaining that we do not know enough. The irony of this is that both groups believe good science supports their views. Of those who agree that we know enough, 88 percent think good science supports their view. Of those who disagree, 77 percent think that good science supports their view.

Further Divisions Among Activists: Localism and the New Watershed Activism

Our survey questionnaire asked respondents to tell us, in their own words, how they became involved in the watershed organization. Almost all of the responses could be placed in one of four categories. In the simplest terms we identified whether the involvement: was related to career or job; arose because the respondent was asked to participate; reflected an abstract interest in watershed/bioregional management issues; or arose from a direct personal involvement in a local policy problem.⁷⁸ We discovered that there are interesting patterns that differentiate these sets of respondents.

tendency to take a “conservative” position—opposed to greater egalitarianism; supporting property rights; and perceiving opposition to arise out of self-interest.

⁷⁶ The degree of agreement is positively correlated with the degree of watershed group institutionalization, as would be expected.

⁷⁷ Exploring the differences between these groups is beyond the scope of this essay. We do know that respondents who express doubt about the general adequacy of our scientific knowledge are consistent in expressing the view that there are deficiencies in specific areas of knowledge—knowledge about pollution by toxic chemicals and pollution by organic wastes are particularly strongly correlated. Those who think their watershed health is currently excellent or good with respect to pollution by toxic chemicals are more likely to express the view that current scientific knowledge is adequate for watershed management. We also know that there is in general a significant correlation between assessments of watershed health and assessments of the adequacy of current data: those who believe that watershed health is poor or very poor with respect to particular aspects of watershed performance are much more likely to also believe that currently available data are inadequate with respect to that aspect.

⁷⁸ More precisely, the categories were defined as follows: (a) Involvement is linked to employment, a career, or political ambition (“*hired*”). For example, “I was hired to be executive director.” (b) Involvement linked to being recruited with no special reference to impacts occurring in some specific location or place or to personal

The largest single category of respondents, 29.5 percent of all, were motivated by their involvement in a specific local policy problem.⁷⁹ This group, perhaps not surprisingly, had lived a very long time in one county—23 years for the median (compared to a median of 19 years for everybody else). They were among the *least* likely to self-identify as ideological “liberals.” They were somewhat less involved than other respondents in watershed activities—they are members of fewer groups on average and tend to put in fewer hours per week than many activists.⁸⁰ These are very politically active people who are also likely more likely than others to be members of some other kind of interest group. They are the most likely group to express concern about preservation. These are the least likely to report internal disagreement in their groups, and their groups are of about average age for watershed groups. These are issue specialists, motivated especially by concerns for particular problems facing their communities; their concerns appear to be consensually shared among their group members.

The next largest category of response, with 27 percent, includes activists motivated by their general, abstract involvement with watershed and bioregional management issues. These individuals are heavily involved in watershed groups (members in 2.4 groups on average compared to 2.0 for everybody else). They are by far the most likely to think there is an endangered species in the watershed (88 percent of this group think so as opposed to only 78 percent of all others). They are among the most likely to self-identify as “liberals.” These activists are more likely than most to express strong views about the value of preserving and respecting nature. For example, these activists were significantly more likely than the rest of the

commitment to issues (“*recruited*”). Example: “A friend asked me to join.” (c) Involvement is linked to ideology, general principles or general interest (“*interest*”). Example: “I am concerned about management of wetlands.” (d) Involvement is linked to specific incidents or conflicts (“*local*”). Example: “There was a controversy over a flood control project in my neighborhood.”

⁷⁹ The analysis excludes the five percent of respondents who declined to answer the question.

⁸⁰ On average 1.9 group memberships vs. 2.3 for others; 10.9 hours per week vs. 14.8 for others.

sample to agree that private property rights should be sacrificed to protect an endangered species. These are, like the locally involved activists, very politically active and likely to be involved in other interest groups. They are also somewhat less likely to report internal disagreement in their groups, and their groups are the least likely to include business representatives as members (only 57 percent). These groups are moderate in size (median size is 150) and somewhat older than average (median founding date is 1983). This group most closely resembles the popular stereotype of environmental activists--motivated by general ideological views and concern about biodiversity.

Those who participate because they were asked to do so ("recruited") are a relatively small group (only 19 percent of respondents) and interestingly distinctive. They are the least involved in watershed group activities (only about 8 hours per week vs nearly 15 for everybody else). They are also the least likely to think there is an endangered species in the watershed (only 71 percent think so). They are less likely than other activists to be involved in other kinds of interest groups. Surprisingly, they are the *most* likely to report that they hold leadership positions in watershed groups—78 percent vs 69 percent leaders for everybody else). They are particularly likely to express an interest in avoiding regulation, reaching compromise, and using the courts. They are least likely to express a concern for preservation. These activists are ideologically quite liberal and *least* likely of all four groups to identify themselves as a scientist. They report neither unusual agreement nor disagreement inside their groups--which are larger than average (350 members) and older than average (1983). These seem to be individuals attracted in part by the challenge of leading an established group with the goal of resolving conflicts and reaching compromises.

Finally, some 24 percent of respondents told us their watershed involvement was linked in some way to their career or employment. Not surprisingly, these people put in the highest number of hours per week (19) but were also the least likely to report holding leadership positions in their watershed groups—65 percent vs 73 percent for others. They had lived the shortest time in the county (only 17 years). They were the least likely to self-identify as being liberal, and the most likely to self-identify as being a scientist. They were the least-politically active segment in the survey. They were also *disagreed* most with ecocentric or “pro-nature” views, *and* with the view that private property rights should be sacrificed to protect endangered species. At the same time, they were no more likely than any others to express strong faith in science or technology. They are more likely than others to report internal disagreements within their groups, and they are the mostly likely of these four groups to report that business representatives are formal members of their groups (77 percent vs. 60 percent). They work in the smallest (45 members) and the youngest groups (1989). These respondents appear to be the “managers” of the “new” watershed movement—technically trained, professionally committed, involved in small but broadly-comprised, stakeholder groups relatively recently formed.

Summary

Watershed activists share much in common. They tend to be particularly rooted in specific places; they are liberal, unusually well-educated; high-income; and very politically active. In general, watershed activists strongly endorse views that have been called "ecocentric."

However, along with these general tendencies we see interesting and important differences. There are significant differences about the importance of protecting property rights , and there are important differences in judgment about the adequacy of knowledge for watershed management.

Just as we previously were able to suggest differences among watershed groups related to group age and institutionalization, we have seen here related differences tied to the personal motivations and attitudes of activists. We have identified four kinds of reasons given by activists for their involvement--concern about policy problems that touch them directly, commitment in principle to abstract concerns relating to watershed management; a willingness to respond to a request to participate; and participation as part of a career or employment activity. Activists who give different ones of these reasons tend to participate in groups that differ in important ways and to have differences in attitudes and values. In particular, activists engaged as part of a career or employment activity tend to be in groups that are smaller, younger, with more formal representation of business, and more perceived internal conflict--the profile of the "new" watershed organization.

SCIENCE IN THE WATERSHED MOVEMENT

Like almost all significant policy problems, the challenges confronting watershed organizations are inherently trans-scientific: policy choices present a tangled mixture of scientific facts and social values. In a trans-scientific enterprise, it is almost never possible, although often desired, to reduce important issues to mere technical calculation. Disputes about burdens of proof, values, politics, and other qualitative features are always influential. More often than not, watershed management requires decisions based on limited, perhaps inadequate, information. Such circumstances seem particularly likely to provoke decisions that are based on the basic value commitments and interests of participants.

One of the most important issues for this research is to explore how scientific research is acquired and utilized by watershed groups. We are also interested to know how often members of these watershed groups consider themselves to be "scientists" and how that self-identification

relates--if at all--to their attitudes about watershed issues and concerns. In particular, are the values and commitments of non-scientists different in any important ways from those of the scientists? How is science "situated" in the intensely localized context of the watershed?⁸¹

Exposure to Scientific Information

Our survey responses give us some interesting information about the reported rates of exposure to scientific information among watershed groups and watershed activists.

Respondents were asked about their subscriptions to scientific journals, their rates of reading scientific articles and how many scientists they had talked to in the past six months on issues of direct relevance to the watershed. In the questions the term "scientist" was left undefined. The responses, reported here in Table 10, suggest a relatively high degree of exposure to scientific information--even allowing for some overstatement on the part of respondents. These data certainly do not describe a group of activists who to scientific information or who find it irrelevant or uncongenial to their mission.

[table 10 about here]

Well over half of watershed activists subscribe to scientific journals. The median respondent receives two subscriptions. Eighty-four percent have read a scientific article dealing with an issue of direct relevance to the watershed in the past six months--and the median respondent reports reading eight such articles. The median respondent has talked to five scientists about issues related to the watershed in the past six months. This demonstrates substantial access to and interest in science.

⁸¹ Donna Haraway, *Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective* 14 FEMINIST STUDIES 575-599 (1988). Haraway describes an understanding science that is analogous to different mechanisms of perception (vision) in which a specific visual system may be a valid representation but it is not the only visual system. Thus the representation or knowledge is contested and "situated" in particular contexts or system for generating vision.

Because we do not have good comparison data for activists in other policy arenas, it is hard to put the numbers in Table 10 into a meaningful comparative context. However there is a notion in the literature on environmentalism that there is a cohort of activists who are driven purely by emotional or valuative attachments to “nature” and that these activists are intrinsically hostile to the instrumental, technocratic approach of science. While this may characterize some environmental activists, it does not appear to characterize watershed group activists.

Self-Identified Scientists

Thirty-seven percent of our individual respondents report that they consider themselves to be “scientists.” Fifty-one percent of all respondents received their highest degree in natural sciences or engineering. Of those respondents with degrees in natural sciences or engineering, 60 percent classified themselves as “scientists.” They account for 83 percent of the self-identified scientists in the sample. Self-identified scientists have a full year more education on average than non-scientists (17.6 vs. 16.5, a statistically significant difference). Seventy-seven percent of self-identified scientists have subscriptions to scientific journals, versus only forty percent of non-scientists. More important, there is almost no difference between scientists and non-scientists in the rate at which respondents report having read at least one scientific article in the past six months.

In terms of the kinds of group characteristics examined above--group age, institutionalization, public land share, and presence of endangered species--self-identified scientists are not very different from the rest of the sample. Scientists are marginally more involved in *younger* groups (median founding year of 1989 for scientists vs. 1986 for others). They are more likely to be in groups in watersheds with a *lower percentage of public land ownership* (34.6 percent for scientists vs. 49.1 percent for others). Scientists are just as likely as

non-scientists to be in watersheds with endangered species (80 percent for both groups). They are likely to be in *smaller* groups (median size of 50 for scientists vs. 500 for others).

Thus, self-identified scientists appear to be somewhat more likely to be in the kind of newer, smaller groups that were created more deliberately to deal with watershed issues (as opposed to general environmental concerns).

There are some other interesting points about self-identified scientists: They are *less likely* to hold a leadership position their group than are others (63 percent leaders for scientists vs. 75 percent for others). Scientists put in *more hours* per week in the watershed organization.

In terms of the activities of watershed groups, scientists are no more likely to be in groups that engage in the activities that we categorized as referring to the management of the watershed itself (as opposed to social relationships surrounding the watershed). This comparison is presented in Table 11. The only difference that approaches statistical significance involves “preserved habitat” in which scientists are *less* likely than non-scientists to be in groups with such involvements. In short, scientists do not appear to populate particular kinds of groups with distinctive activity profiles.

[table 11 about here]

Overall, the most striking fact about the self-identified scientists is how similar they are to non-scientists in the survey. In almost every comparison we have examined--involving political attitudes (liberalism), values (ecocentrism, illiberalism, egalitarianism, etc.), thermometer scale ratings of public officials, measures of information, rates of political participation, views of the adequacy of current information on the watershed, views of research priorities for the watershed, etc. etc.--*self-identified scientists are no different from the rest of the sample of watershed group activists.*

Doubt that Science can Solve Watershed Problems

We used the responses to attitude questions to construct an index of faith in science to solve watershed problems. This index, which we called the *scifaith index* reflects average agreement with the following statements: (1) Technology can eventually solve most restoration problems; (2) People can manage, manipulate and repair the environment just as a mechanic can repair a machine; (3) I have an abiding faith in science and technology to restore our watershed.⁸² The observed values for the index range from 1 to 7 where a 7 indicates “strong disagreement” (median = mean = 5; std dev. = 1.2).

Our question is whether self-identified scientists have a higher score on the *scifaith index* than do other respondents. The surprising answer to this is “no.” Scientists scored 5.1 (std. dev. = 1.28) on the 7-point scale where as non-scientists scored a 4.9 (std dev = 1.19). A score of 5 on the individual scales indicates “somewhat disagree.” Thus, neither scientists nor non-scientists have especially high faith in science to solve watershed problems, and scientists are, if anything, slightly less confident about science than are non-scientists.

Information Sources for the Watershed Activists

Of particular importance with respect to the role of science in the watershed is the question of the information sources used by watershed activists. We asked respondents to tell us “how often you turn to each of the following sources for useful information about the condition of your watershed.” They were then asked to indicate whether they consult eight different sources of information “often, sometimes, or never.” This provides us with a three-point coding scheme in which 1 = “often” and 3 = “never.” The results are reported in Table 12.

[table 12 about here]

⁸² These variables have a Cronbach's alpha of .71. This is a measure of scale coherence that ranges from 0 – 1.

There are two particularly striking results in Table 12. First, the most frequently consulted source for scientists *and* non-scientists is “knowledgeable local citizens.” Moreover, knowledgeable local citizens are consulted *more* frequently by scientists than by non-scientists, and no scientists say that they “never” consult knowledgeable local citizens.

Second, scientific journals are far down the list in terms of the frequency of consultation by watershed activists, *both* for scientists and non-scientists. This is true despite the fact that so much consultation of scientists is reported in the same questionnaire.⁸³ Scientists rank scientific journals significantly more highly as a source of information than do non-scientists, however. Despite the obviously high regard for scientific information among this group of activists, standard scientific journals are not an important source of information about the specific details of local environments.

The fact that scientific journals are not a big source of detailed local information is not a surprise. After all, much, perhaps most, science is focused on issues that illuminate general theoretical problems rather than merely documenting conditions in a specified region. It is thus perhaps not too surprising that our respondents do not rank local college and university faculties as particularly useful sources of information either.

Post-Modernism and the Watershed Movement

This population of activists is not divided about the notion of science and the importance of scientific knowledge as a basis for action. By the same token, few other dividing lines seem to coincide with greater or lesser involvement of scientists. The exception to this involves the

⁸³ And for those interested in the technicalities of questionnaire design, the factual questions about frequency of consultation with scientists and extent of reading of scientific articles occurred prior to the question about sources of useful information. If there were a “priming bias” in the question order, it would have been to prime positive reports about science and scientists. In fact, despite this bias, if any, exactly the opposite occurred. It should be noted that the kind of respondent group we have here--highly educated and extremely well-informed on the subject at hand--is not a group one would expect to be particularly vulnerable to priming effects.

subset of organizations we have identified as the “new watershed organizations”—recent in origin, small in membership, broadly incorporating all stakeholders (especially including business and government). These organizations are somewhat more likely to employ scientifically trained staff.

Moreover, we find that there are few major value-based differences between scientists and non-scientists in our survey responses. Scientists who are members of watershed organizations *do not* express more confidence in science than non-scientists. A scientific background or being exposed to scientific information *does not* affect an individual’s perceptions of the performance of the organization and its ability to restore the watershed. Scientists who are members of watershed organizations *are not* likely to express more certainty than non-scientists about the overall condition of the health of the watershed. Finally, scientists have a strong belief in the importance of local knowledge in watershed organization and management.

In these respects, the watershed movement as a whole has a strikingly “postmodern” quality. Postmoderns are very interested in the issue of "boundaries," their "social construction" (often, perhaps usually, in the service of some interest), and the vulnerability of boundaries to "transgressing" or "trespassing." Boundary issues are ubiquitous and central to the watershed project. Where, *really*, is “the watershed” located? Over what time-scale is the watershed relatively fixed? How large a drainage basin should we consider? Which species are central to our concerns? Are we focused primarily on those whose ecology is contained within a specific watershed definition? What of those species that move in and out of the watershed boundaries? What of other biological and physical factors that surpass watershed boundaries and yet which affect conditions within the watershed? The inherent ambiguity of the definition of a "watershed" encourages misunderstanding about the topic and conflict over scope.

In the context of the watershed movement, the watershed is as much a social construct as it is a hydrologic unit. The question of science and knowledge as it relates to watershed initiatives also has a postmodern resonance. The perceived adequacy of science varies tremendously from place to place. Within particular watersheds, activists equally committed to the idea of scientific knowledge disagree on the adequacy of current knowledge. Traditional formal sources of scientific knowledge are not the first and most sought-after sources of information about conditions in a specific watershed. Useful knowledge is found not in formal scientific sources or even from "scientists," but from local citizens.

In watershed management, it appears that science truly is "situated" within a particular local context and the vision arising from the experience of groups of activists. Our findings about science, use of information, and sources of activism in the watershed movement, resonate with Donna Haraway's notion of "situated knowledge" and her argument for "epistemologies of location."⁸⁴ Building on Haraway, Schlosberg has analyzed the environmental justice movement. Schlosberg identifies three central claims within the concept of situated knowledge: 1) knowledge and experience is situated, 2) multiple visions and values are accepted within a particular context and situation, and 3) there are a multiplicity of experiences of truth.⁸⁵ Among watershed activism, we also have found evidence of such situated knowledge.

Concluding Thoughts: Diversity and Conflict within the Watershed Movement.

The watershed has become a metaphor for the key physical and social boundaries that affect our lives. The watershed movement has been propelled by several currents that fortuitously coincided in the early 1980s--a desire to reduce litigation; a desire to focus attention on meaningful and relevant bioregional concepts that could receive a focal attention rivaling

⁸⁴ HARAWAY *supra* at note 81.

those of established and often bioregionally irrelevant political and administrative jurisdictions; a desire to find a way to devolve decisions from central levels to peripheral locations where appropriately specific policy could be defined; a desire by locally powerful interests to seize control of issues in ways that they could control and influence.

The watershed movement embraces a diverse set of organizations and interests ranging from traditional environmental groups, to local development interests; to bureaucrats at all levels of government. All of these have found something to seize onto in the watershed idea.

Thus, with very few exceptions, the watershed movement is not "one thing" or a coherent set of ideas. The exception is that for everyone, the idea of a watershed involves a reference to a particular place or region. Whatever the definition of those boundaries, it implicates specific sets of interests, communities, and plant and animal species. The watershed idea implies a human connection with a place and region, a river or creek. Activists in the watershed movement also generally strongly embrace sets of values that have been called "ecocentric." These are ideas that nature is valuable in and of itself and must be protected and preserved for the future.

Beyond this, however, the watershed movement embodies a variety of ideas and motives. There are a variety of motives and goals that propel participation and membership in watershed organizations. Watershed organization and social networking requires the hard work of organization and the challenge of patient negotiation between diverse interests and values. In most cases, when we "make the watershed connection" it will not be a warm moment of sharing so much as a sober working out of trade-offs.

⁸⁵ D. SCHLOSBERG, ENVIRONMENTAL JUSTICE AND THE NEW PLURALISM: THE CHALLENGE OF DIFFERENCE FOR ENVIRONMENTALISM (1999) 57-64

Appendix: Reliability of Survey Responses

One of the goals of the survey was to gather basic descriptive information on watershed groups. Survey respondents were asked a series of questions about their groups and their activities. This is a standard research strategy used to study interest groups and organizations. In many cases, we have multiple respondents from a single group. Our results show that there is considerable agreement among respondents from any particular group--indeed far more than would be expected by chance. We are much more confident about basic factual information about group activities, size, and age than about evaluative information having to do with the quality of group performance. Among all groups with more than one respondent, the median level of agreement on a set of factual questions was over 80 percent. On 10 out of 13 activities evaluated, multi-group respondents agreed with each other more than 75 percent of the time on average.⁸⁶ Factual information about the groups appears to be far more reliable--in terms of eliciting high rates of agreements among respondents--than is information evaluating group performance. However, there is still substantial evidence of disagreement, even about factual matters. Thus, whenever we have only a single respondent, our data suggest that these responses may involve errors on simple factual issues as much as 20 percent of the time. We present the factual information here with appropriate cautions where we think they are needed.

⁸⁶ A more detailed discussion of these issues is available at http://www.msi.ucsb.edu/msilinks/OCPC/PDFs/App_A.pdf

Table 1
 Comparison of All California Watersheds, the Study Survey Sample
 and the Survey Respondents

	Watersheds in EPA Index	Mean Index of Watershed Indicators (1=best, 6 worst)	Species at Risk in Watershed Mean Index (0 =1 species, 1 =2-5 species, 2= >5 species at risk)	Population Density 1990	Area of census block group within HUC with >25% imperviousness (a measure of urbanness)	Total N
All watersheds with at least one (EPA) watershed group	4.8	3.8	1.4	266.5	1.6	124
Watersheds in our sample	6.3	3.7	1.5	375.7	2.4	70
Not in sample but with at least one citizen group	2.8	4.1	1.2	124.8	.55	54
Watersheds with respondents	7.3	3.4	1.5	488.5	2.8	45
Watershed with no respondents	4.6	4.1	1.4	172.7	1.8	25
Watershed with no (EPA) watershed groups	0	4.4	.87	17.8	.24	90

Table 2 EPA Index of Species at Risk and the Number of Watershed Groups in Watershed

	Species at Risk Index			
	0	1	2	Missing Data
Number of watershed (proportion of total)	16(.10)	70(.46)	57(.37)	10(.06)
Average number of watershed groups in watersheds	1.1	2.7	6.7	.6
Total number of watershed groups in watersheds (proportion of total)	18(.03)	190(.32)	381(.64)	6(.01)

Table 3 Watershed Group Institutionalization and Organizational Age

Age	7 years or less	8-15 years	16 Years or More	Total
Number of Groups in Sample	27	36	28	91
Median Membership	38	77	700	100
Median Budget Category	\$10K-50K	\$10K-50K	\$10K-50K	\$10K-50K
"Government created" agreement score	5.1	5.83	6.7	
Proportion in which government played substantial role in starting the group	0.33	0.19	0.04	0.19
Proportion with formal members from:				
Business	0.85	0.68	0.48	0.65
State government	0.85	0.52	0.15	0.49
Local government	0.85	0.65	0.38	0.62
Environmental organizations	0.89	0.77	0.86	0.8
Business, government and enviros	0.74	0.44	0.21	0.46
Median percentage public land	30	33	32	31
Institutionalization:				
Member Recruitment Program	19	44	68	0.42
Tax Exempt	40	58	81	0.58
Newsletter	48	79	82	0.71
Dedicated Phone	44	32	68	0.48
Formal Leadership	68	82	89	0.81
Separate Office	58	41	70	0.55
Regular Meetings	92	91	86	0.89
Membership Dues	38	58	100	0.71

Table 4 Institutionalization and the Presence or Absence of Listed Endangered Species (Survey Responses)

Presence or Absence of Listed Endangered Species			
Institutional Characteristics	(A) Listed Endangered Species= Yes (N=77)	(B) Listed Endangered Species=No (N=14)	Difference (A-B)
An office separate from members' residences	58	36	22
A telephone number used exclusively by the organization	51	29	22
Formal membership status	66	57	9
Regularly scheduled meetings	88	92	-3
503 (c) (b) tax exempt status	63	36*	27
A newsletter	73	57	16
Membership dues	74	44*	30
A formal leadership structure	81	79	2
A program for recruiting new members	44	29	15

*Statistically significant difference between columns at .10

Table 5 Group Institutionalization and Proportion of Public Land in the Watershed

Institutional Characteristics	Proportion of Public Land in Watershed		
	Public Land Pct>60 percent (large)	Public Land Pct>30%,<=60	Public Land Pct<=20% (small)
An office separate from members' residences	59	54	43
A telephone number used exclusively by the organization	45	46	46
Formal membership status	73	80	57
Regularly scheduled meetings	95	100	83
503 (c) (b) tax exempt status	54	59	46
A newsletter	68	71	73
Membership dues	70	83	68
A formal leadership structure	85	80	77
A program for recruiting new members	46	52	38

Figure 3. Activities Which Increase with Watershed Group Age

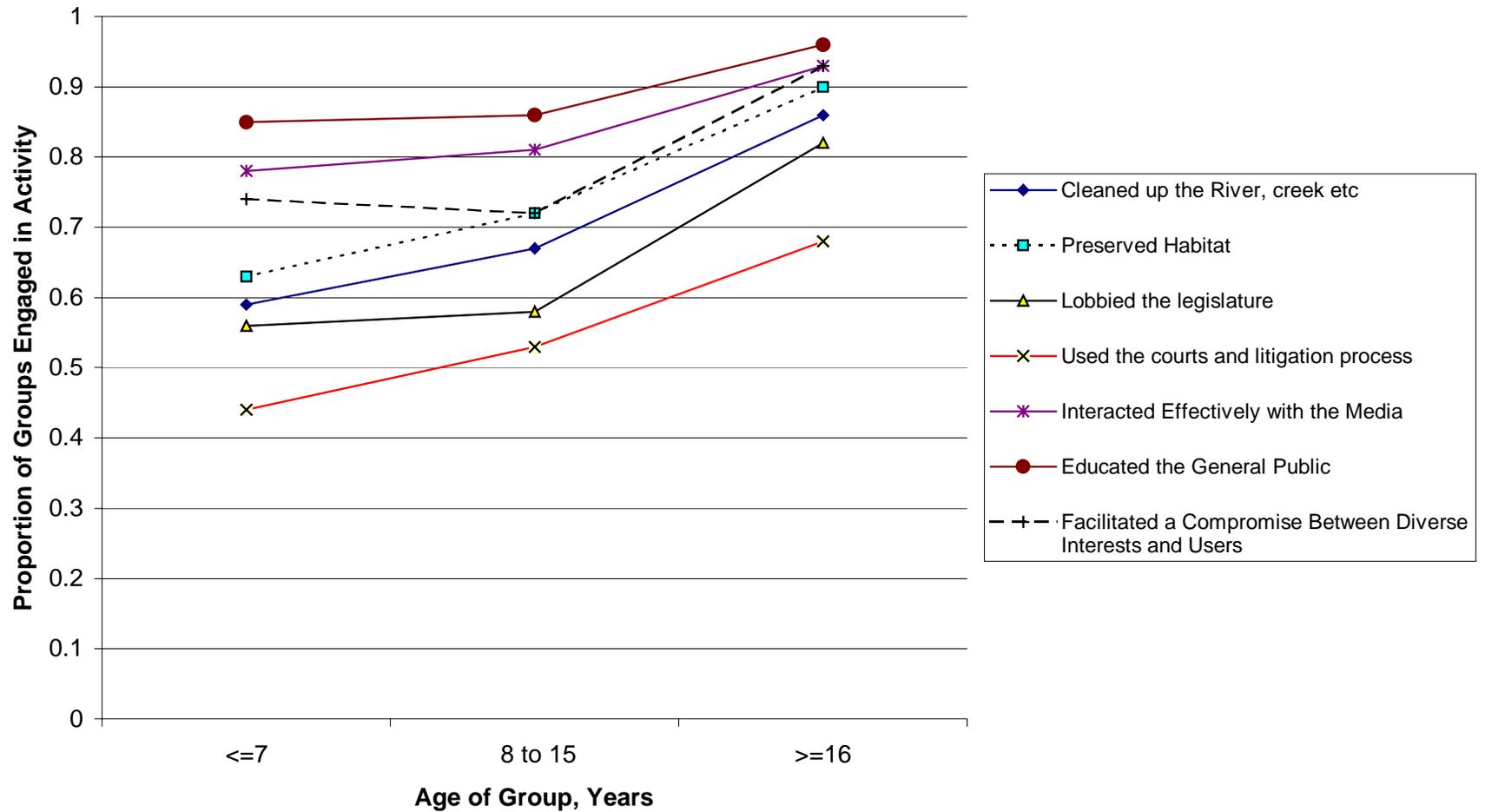


Figure 4. Activities For Which Watershed Group Age Is Unimportant or Ambiguous

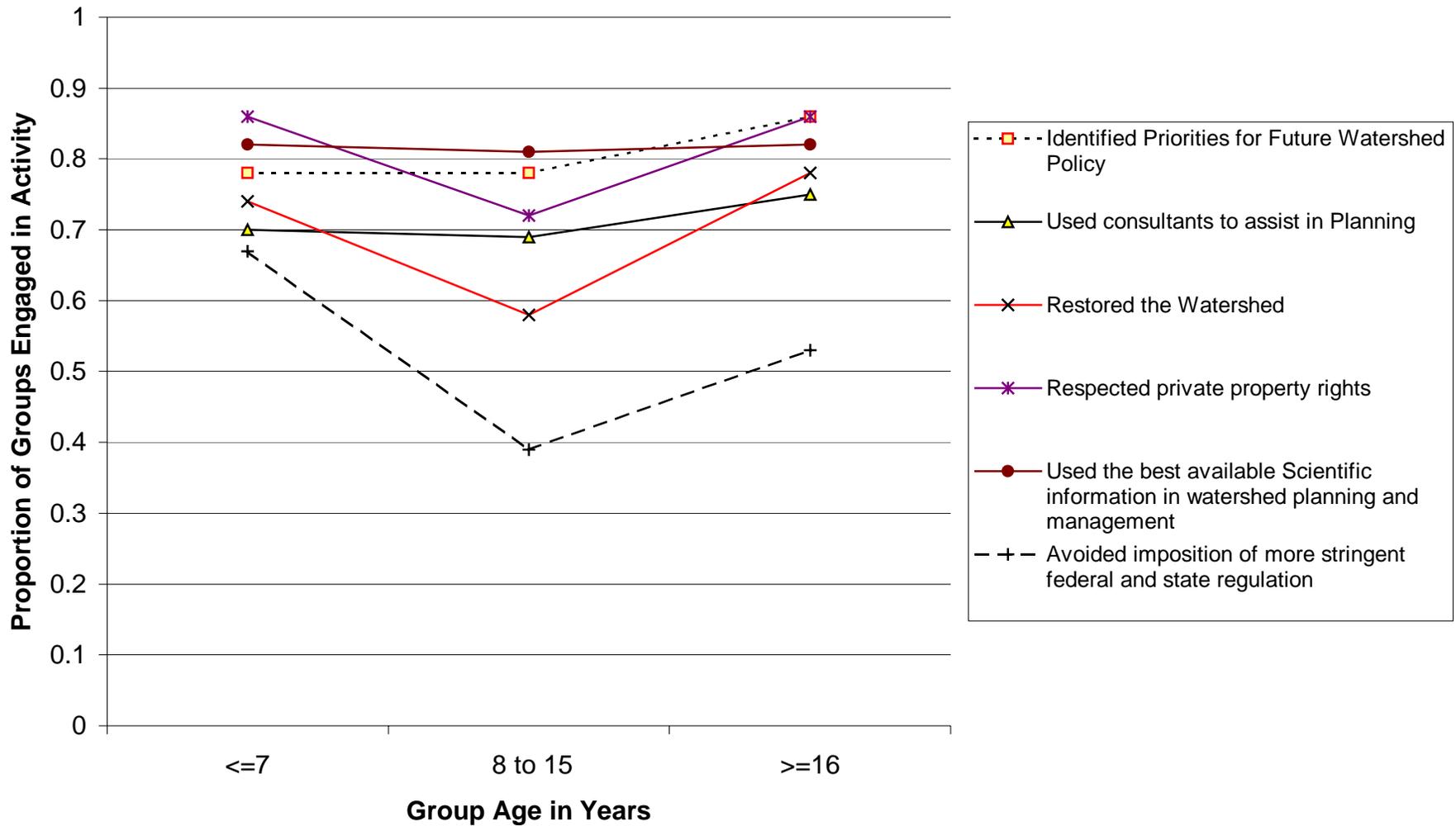


Table 6 Watershed Group Activity by Presence or Absence of Endangered Species

Activity	Presence or Absence of Species		Difference (A)-(B)
	(A) Endangered Species = "yes"	(B) Endangered Species ="No"	
Cleaned up the river, creek, wetland, slough or lake	73	53	20
Facilitated a compromise between diverse interests and users of the watershed	81*	53*	28*
Preserved Habitat	77	53	11
Respected Private Property Rights	83*	47*	36*
Used the best available scientific information in watershed planning and management	83	67	16
Used consultants to assist in planning	74	53	20
Used the courts and litigation process	56	40	16
Avoided imposition of more stringent federal and state regulation	53	40	13
Lobbied the legislature	68*	40*	28*
Restored the watershed	74*	47*	27*
Educated the general public in your area	91*	73*	18*
Interacted effectively with the media	88*	53*	35*
Identified priorities for future watershed policy	80	67	13

N=96; *=significant at .05 level.

Table 7 Public Land Ownership in Watershed and Activities of Watershed Groups

Public Land Ownership			
Activity	Public Land >60% (N=24)	Public Land <=60% and >20% (N=28)	Public Land <20% (N=31)
Cleaned up the river, creek, wetland, slough or lake	76	86	77
Facilitated a compromise between diverse interests and users of the watershed	93*	93*	68*
Preserved Habitat	81	89	68
Respected Private Property Rights	88	96	74
Used the best available scientific information in watershed planning and management	93*	93*	77*
Used consultants to assist in planning	79	89	77
Used the courts and litigation process	64	64	48
Avoided imposition of more stringent federal and state regulation	57	71	45
Lobbied the legislature	76*	82*	52*
Restored the watershed	83	89	68
Educated the general public in your area	95	96	87
Interacted effectively with the media	95*	96*	74*
Identified priorities for future watershed policy	90*	93*	71*

*Significant at .05 level.

Table 8. Ecocentrism in the Areas of Strong Agreement and Disagreement among Watershed Activists

Variable Name	Mean Response	Statements Activists <i>Strongly Agree</i> or <i>Agree With</i>:
<i>ecovalue</i>	<i>1.4</i>	<i>Nature has other than economic value</i>
<i>Future</i>	<i>1.5</i>	<i>Natural resources should be preserved for the benefit of future generations</i>
<i>ecointeg</i>	<i>1.8</i>	<i>Restoration should sustain the health and integrity of the ecological community</i>
<i>rights</i>	<i>1.8</i>	<i>Our civil rights include the right to have a voice in matters having to do with the environment</i>
<i>own_sake</i>	<i>2.0</i>	<i>Nature should be preserved for its own sake</i>
<i>ecopurp</i>	<i>2.0</i>	<i>Nature contains its own purpose which should be respected as a matter of ethical principle.</i>
<i>goodecon</i>	<i>2.0</i>	<i>Restoration is good economics as well as good science</i>
Variable Name	Mean Response	Statements Activists <i>Strongly Disagree</i> or <i>Disagree With</i>:
<i>antho</i>	<i>5.9</i>	<i>The environment should be changed to meet people's needs</i>
<i>overstated</i>	<i>5.7</i>	<i>Environmentalists have overstated the need to restore our environment</i>
<i>wilderness</i>	<i>6.5</i>	<i>There is plenty of wilderness out there and society does not need to be wasting its precious money “restoring” our land.</i>
<i>present</i>	<i>6.6</i>	<i>Natural resources should be used primarily for the benefit of the present generation</i>

Table 9. Statements Revealing the Greatest Division Among Watershed Activists

Variable name	Statement	Mean Response	Standard Deviation
<i>illib4</i>	We are morally obligated to resort to whatever means necessary in order to defend the earth from destruction.	3.51	1.85
<i>egal1</i>	The world would be a more peaceful place if its wealth were divided more equally among nations.	4.12	1.76
<i>illib1</i>	If we are to save the environment, we will have to give up the exercise of certain basic rights we now enjoy.	4.34	1.76
<i>compensate</i>	<i>It is unjust to interfere with the rights of property owners without fully compensating them for their losses.</i>	4.26	1.74
<i>scicomm</i>	<i>There are formal channels through which scientists communicate their findings to our watershed organization.</i>	3.61	1.67
<i>markets</i>	<i>Competitive markets are almost always the best way to supply people with the things they need.</i>	4.06	1.66
<i>presoresto</i>	<i>Preservation and restoration are inseparable.</i>	3.68	1.65
<i>selfinterest</i>	<i>Those who disagree with me on watershed issues are motivated largely by self-interest.</i>	3.87	1.65
<i>knownenough</i>	<i>We know enough about the current status of our local watershed ecosystem to manage it responsibly.</i>	4.11	1.63

**Table 10 Direct Exposure to Scientific Information
and Scientists on the Part of Watershed Group Participants**

	Watershed Participants			
	Averaged By Group	Individual Respondents	Non-scientists	Self-Identified scientists
Subscriptions to scientific journals	69%	54%	40%	77%
Number of journals received (median)	3	2	2	3
Report scientific articles read in the past 6 months dealing with issues of direct relevance to the watershed	83%	84%	83%	87%
Number of scientific articles read in past 6 months dealing with relevance to the watershed (median)	10	8	6	10
Number of scientists talked to in the past 6 months on issues of direct relevance to the watershed (median)	5	5	3	8

Table 11 Proportion of Scientists and Non-Scientists Reporting That Their Group Has Pursued a Goal or Strategy Active Management of the Watershed

	Scientists	Non-Scientists
Cleaned Watershed	57	57
Preserved Species	56	69*
Restored Habitat	60	53
Avoided Regulation	33	27

***Significant at .05**

**Table 12 Sources of Information Consulted about
the Watershed, Scientists vs. Non-scientists
(Mean Response, 1=Often, 3=Never)**

Scientists vs. Non-scientist				
Source	Non-Scientists Mean Score	Non-Scientists % Reporting “Often”/”Never”	Scientist Mean Score	Scientists % reporting “Often”/ “Never”
Knowledgeable local citizens	1.48	57/6	1.34*	66/0
Environmental groups	1.57	49/6	1.74	36/10
State government agencies	1.67	38/5	1.56	47/3
Faculty at near by colleges or universities	1.84	33/17	1.74	35/9
Federal government agencies	1.91	25/16	1.74	35/9
Scientific journals	2.17	10/27	1.84**	29/13
Local/regional newspapers	2.17	6/31	2.28	17/34
Interested corporations	2.47	15/53	2.32**	6/49

N varies by response category from 180 to 195;

*Statistically significant at .10, ** Statistically significant at .05 or better.