

The Role of Agency Partnerships in Collaborative Watershed Groups: Lessons from the Pacific Northwest Experience

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Abstract Collaborative watershed group experiences reveal commonalities in their approaches to facilitate decentralized and inclusive watershed planning and management in the United States, and increasingly around the world. Although watershed groups are widely recognized in the United States for positive accomplishments across local, state, and regional scales, the role of government agencies as watershed group partners often remains ambiguous and inconsistent. This paper details results of a survey used to determine the status of Pacific Northwest (PNW) watershed group-agency partnerships relative to planning and management. Specific inquiry was directed toward: (1) the role of technical information flow; and (2) watershed group needs. Mail surveys were administered to 304 watershed group participants in Idaho, Oregon, and

Washington. Sixty-nine percent of the surveys were completed and returned. Based on the collected survey data, PNW watershed groups rely heavily on agency officials for technical watershed information. Respondents perceive support of state government to be the highest relative to federal agencies, local governments, and university Extension offices. However, evidence from the survey suggests that partnerships are underutilized across all agencies and organizations concurrently vested in watershed planning and management in the PNW. Sustained operational funding, increased group participation, and baseline watershed data are the most pressing needs of PNW watershed groups and present a significant opportunity for expanding watershed group-agency partnerships.

Keywords Collaborative watershed groups · Watershed management · Watershed planning · Agency partnerships

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Introduction

Watershed groups are commonly recognized as a tool to foster effective planning and management of water resources in watersheds fragmented by complex jurisdictional boundaries (Barham 2001; Kenney 1997; Marsh 2002; NRC 1999). A robust literature exists detailing the history (Kenney 1999), structure (Clark et al. 2005; Moore and Koontz 2003), measures of success (Chaffin et al. 2012), and challenges (Margerum and Whitall 2004) of watershed group initiatives, particularly within the United States. A more specific literature has emerged investigating intersection of agencies engaged in watershed management and planning and collaborative watershed groups. This manuscript contributes to this latter body of literature by further exploring watershed group-agency partnerships in

terms of information flow, needs, and opportunities. To address the role of agencies as watershed group partners (and vice versa), we present an analysis of selected questions from a 2009 mail survey instrument sent to 304 watershed group participants in the Pacific Northwest (PNW) region of the United States. Due to their statutory and administrative relevance in PNW watershed management, we highlight the roles of the United States Environmental Protection Agency (EPA), the USDA Natural Resources Conservation Service (NRCS), and state governments (ID, OR, and WA, including diffuse state agencies involved in watershed management and planning) as collaborative watershed group partners. We also evaluate the role of land-grant universities and university Extension offices (herein abbreviated simply as ‘Extension’), as these institutions are well positioned to be a conduit of technical information and other resources for local and regional watershed groups.

The Watershed Group Movement

As an outgrowth of multiple and overlapping state and federal watershed policy initiatives during the 1990s, watershed groups (a.k.a. watershed initiatives, partnerships, councils, and/or management units) are generally seen as organizations of individual stakeholders, each representing specific interests within a watershed (Kenney 1997, 1999, 2001; Marsh 2002; NRC 1999; USEPA 1996; Viessman and Feather 2006). Representative stakeholders range from land-management agency officials to local landowners. Watershed groups ideally include individuals representing all major governmental jurisdictions (often including regulators) within the watershed, as well as agricultural and forestry interests, other major industry interests, environmental non-profits, and educational institutions (Koehler and Koontz 2007; Moore and Koontz 2003). Many watershed groups emerged in the 1990s to help guide management with the goal to infuse substantive community input into traditional top-down watershed decision-making by municipal, county, state, or federal agencies, especially in situations where watershed boundaries did not easily align with any jurisdictional boundary (Carr et al. 1998; Wondolleck and Yaffee 2000). At the same time, grassroots environmental groups were emerging across the United States with a goal of increasing citizen involvement in resource protection and stewardship, often at the watershed scale (Yaffee et al. 1996). These two forces, combined with a substantial investment in financial and logistical capacities from the EPA, catalyzed the modern participatory watershed movement (USEPA 1996). Although most contemporary watershed groups generally serve in an advisory role and lack any formal legal authority over the physical management of watershed

issues, they often wield significant political power that can be used to leverage disparate agency efforts or influence local government decision-making processes (Leach and Pelkey 2001; Leach et al. 2002).

Research on watershed groups to date has focused primarily on defining group structure (Clark et al. 2005; Floress et al. 2009; Koehler and Koontz 2007) in an attempt to link structure with measures of success, including measures of perceived success (Chaffin et al. 2012; Dakins et al. 2005). Other research approaches have included self-reported watershed group accomplishments (Bidwell and Ryan 2006; Moore and Koontz 2003; Smolko et al. 2002) such as the completion of TMDLs for impaired water bodies (Borisova et al. 2012; Hoorbeek et al. 2013). Subsequent questions of whether current funding, resources, and partnerships are sufficient as well as what further support watershed groups require to achieve biophysical goals, have not been adequately addressed within previous research.

Pacific Northwest Watershed Groups

Despite the widespread appearance of collaborative watershed groups in response to a synergy of grassroots natural resource management combined with federal initiatives, it can be argued that the most robust regional set of collaborative watershed groups hails from the US PNW (Chaffin et al. 2012). Oregon is considered to have the longest-standing, unilaterally established set of watershed groups in the US (Bidwell and Ryan 2006; Dakins et al. 2005; Hibbard and Lurie 2006; Lurie and Hibbard 2008; Margerum and Whittall 2004). This status is a result of early state legislation (1987) that created a funding mechanism for the creation of collaborative watershed management groups. Subsequent legislation, funds, and reorganization eventually culminated in The Oregon Plan, a statewide initiative to integrate watershed planning with endangered salmon recovery efforts and provide state support (OWEB 2009).

The Washington state legislature responded similarly in 1998 by officially organizing the state into 62 Water Resource Inventory Areas (WRIAs) and making funds available for the inception of watershed groups as *planning units*. Washington watershed groups were then eligible for continued state funding through predetermined watershed planning phases including plan drafting, plan approval, and plan implementation. The Washington Department of Ecology (WADOE) provides this funding (and other competitive grants) as well as subsequent administrative, operations, and logistical support to Washington watershed groups (WADOE 2009). Washington planning units, while not as heavily researched as Oregon watershed councils, have been the subject of surveys, cases studies, and subsequent papers (Leach et al. 2002; Smolko et al. 2002).

Watershed groups in Idaho have distinctly different foundations from groups in Washington and Oregon, but share similar structure as stakeholder groups convened for watershed planning. State affiliated watershed groups in Idaho are classified as either watershed advisory groups (WAGs) or basin advisory groups (BAGs). Idaho's WAGs and BAGs were created specifically to integrate watershed stakeholders into the process of drafting total maximum daily load (TMDL) requirements for each limited stream segment and water body in the state in accordance with the Clean Water Act and subsequent litigation (Public Law 92-500). Each BAG is responsible for appointing and overseeing several WAGs, whereas WAG responsibilities include drafting TMDLs for streams and water bodies within a watershed boundary. The state code defines the membership of each group as representatives for major interest groups within each basin or watershed including: state, county, and municipal governments, agriculture, timber, recreation, environmental interests, industry, and tribal governments as applicable (Idaho Code 39-3613:16). Idaho WAGs and BAGs were initiated in the late 1990s and have been actively assisting the Idaho Department of Environmental Quality (IDEQ) in drafting TMDL requirements since. Unlike Oregon and Washington groups, Idaho WAGs and BAGs lack base funding for staff, planning, and the implementation of projects (IDEQ 2009).

Taken as a whole, Idaho, Oregon, and Washington present three distinct sets of watershed groups with a varied, yet similar history and structure. These similarities present a unique opportunity to better understand the role of agencies as watershed group partners through a direct comparison across state lines as well as regional generalizations potentially applicable to other US and world geographies (Benson et al. 2013).

Previous Research on Watershed Group-Agency Partnerships

Previous research has identified the importance public-private partnerships for supporting watershed group goals and objectives (Floress et al. 2009; Genskow 2009; Hardy 2010; Koontz et al. 2004). Particularly, state agencies are often recognized as watershed group catalysts throughout the peer-reviewed literature (Clark 2001; Genskow 2009; Lane and McDonald 2005). Lane and McDonald (2005) found that state "planning capacity" needs to be retained in watershed groups in order to facilitate and maintain diverse group membership and provide for authority on a higher level (which also facilitates watershed group legitimacy). Clear statements of authority or "potential authority" are an instrumental element of support that state agency partners can provide to increase the efficacy of watershed groups (Genskow 2009). In addition, Koontz et al. (2004)

found that agency partners can play a pivotal role in assisting watershed groups by defining issues or problems, using resources efficiently, and managing the watershed group organization. However, Hardy (2010) found that agencies not only help with, but often have a heavy influence on watershed group issue definition, and as a result, have been accused of molding watershed group missions and goals to match agencies directives. Further, the lack of diversity in agency partnerships or internal disagreements regarding the role of agency partners may render watershed groups ineffective and potentially dysfunctional (Floress et al. 2009).

A critical connection between watershed groups and agencies is the flow of data and information. Technical information or data based on biophysical watershed research and monitoring is necessary to make decisions about watershed management, particularly with regard to targeted restoration efforts or water quality improvement projects often taken up by watershed groups (Allen and Kilvington 2005). In a study of Australian watershed groups, Curtis et al. (2005) found that the provision of adequate data and technical information could help groups identify investment priorities (projects), improve communication among watershed users, pursue appropriate and effective policy strategies, and monitor and evaluate goals for watershed improvement over time. However, most watershed groups lack the funding and capacity to generate the biophysical data required to achieve such aims. This function is often part of an agency's mission; local, state, and federal agencies operating within the watershed may collect or house relevant biophysical data about the watershed (Koontz and Johnson 2004; Leach et al. 2002). But the availability of technical information from agencies can be fragmented, and thus not readily available to watershed groups (Allen and Kilvington 2005). Data collected by different agencies may be held in different databases, not complete or compatible, subject to interagency conflicts or data sharing restrictions, and rarely interpreted for audiences such as watershed groups that may lack the necessary expertise to understand and use the data effectively (Burroughs 1999; Szaro et al. 1998). In some cases, watershed groups may not be aware of the existence of potentially useful data and technical watershed information held by agencies (McNie 2007). Therefore, an explicit investigation of information needs and information flow between agencies and watershed groups can be instructive for further defining existing and potential partnerships.

But a review of watershed group literature suggests that the flow of watershed data and technical information is not simply one-way, from agencies to watershed groups (Burroughs 1999). Watershed groups as a participatory endeavor often collect a significant amount of informal data from watershed users such as local landowners that may be of

significant value to agencies working in the watershed (Curtis et al. 2005; Koontz and Johnson 2004). To complicate matters, both formal and informal information flow are subject to political constraints—competing capitals associated with different perceptions and values (Schiff et al. 1997). For example, some agencies may be reluctant to share technical watershed information fearing misrepresentation or misuse by organizations over which they have little future control (Allen and Kilvington 2005). On the other hand, there can be internal disagreements within a watershed group about the interpretation and best use of data and technical information provided by an agency. Watershed groups must confront these realities in order to navigate relevant policy solutions and pursue watershed improvements. Allen and Kilvington (2005) suggest that agency-watershed group partnerships generate the trust and confidence necessary to allow both sides collaboratively address data needs. Agency-watershed group partnerships have the potential to reconcile supply and demand of information collaboratively in an attempt to utilize limited financial resources more effectively toward watershed group goals, agency missions, and hopefully, watershed health. The decisive metric, however, is whether or not watershed data and information (originating from either agencies or watershed groups) is used to affect decision-making, alter choice, enable the achievement of desired watershed outcomes (McNie 2007).

This manuscript seeks to add to these discussions by pursuing the following research questions: (1) what is the relationship between watershed-agency partnerships, the flow of technical watershed information, and the unmet needs of PNW watershed groups; and (2) how do PNW watershed groups characterize existing partnerships between agencies engaged in watershed management and planning, specifically the EPA, NRCS, Extension, and state governments?

Methods

The primary mode of data collection for this study consisted of a mail survey administered to participants in watershed groups across the PNW. A comprehensive list of PNW watershed groups was identified through publically available Internet resources, state agencies, and via phone and E-mail contacts. We then developed a survey design to sample three individuals from each watershed group across the three-state region to compensate for basic differences in group structure and varying perceptions among respondent position within the groups. Survey administrators made initial contact with a liaison at each watershed group to facilitate a three-tiered sampling framework developed to assist watershed group liaisons and researchers with the selection of additional survey respondents. The sampling

criteria for each watershed group surveyed included: (1) a government contact or agency lead representing the watershed group (state, federal, or local level); (2) an individual serving in a leadership role within the watershed group (president, secretary, treasurer, executive director, coordinator, etc.); and (3) a systematically selected member-at-large from the watershed group. However, this sampling protocol was not applicable to all PNW watershed groups due to factors such as group inactivity, restructuring status, low membership, and/or unwillingness to participate in the survey. Since the initial survey protocol could not be implemented in every case, our secondary protocol to define survey respondents consisted of snowball sampling of watershed group members initiated by the watershed group liaison (Miles and Huberman 1994; Patton 2001; Tennoe et al. 2010). Watershed group members are essentially a “rare” population and therefore, an appropriate method such as snowball sampling was necessary to identify and select survey respondents (Salganik and Heckathorn 2004).

Survey administrators mailed surveys using a three-step modified Tailored Design Method for mailed surveys (Dillman et al. 2008). Each selected PNW watershed group participant ($n = 304$), received a mailed survey packet (step 1) which included: (1) an introductory letter explaining the purpose of the survey research, introducing the principal investigators, and certification of approval of the survey by the University of Idaho Institutional Review Board (IRB); (2) the survey instrument; and (3) a pre-paid, business-reply envelope to return the completed survey.

Each identified watershed group member received an initial survey packet (step 1, above). Two weeks later, potential respondents received a follow-up postcard reminder (step 2), and a subsequent full survey mailing (step 3) was sent four weeks later to those who had not yet responded. As a means to minimize non-response bias, we conducted follow-up phone calls and E-mails to encourage watershed group members to complete and return the survey instrument. Of the 304 surveys initially mailed, respondents completed and returned 211, yielding a 69 % response rate across the region with rates of 83, 58, and 71 % in Idaho, Oregon, and Washington, respectively. The survey questions evaluated in this manuscript are displayed in Table 1.

Survey responses were entered and coded in Microsoft Excel for anonymity and analysis. The closed-ended responses (multiple-choices) were then analyzed at two levels using SAS (2008) statistical software: (1) a frequency analysis, and (2) contingency tables. We report access to and source of technical information by PNW watershed groups across the region as a whole using the frequencies, and use the cross-tabulations to evaluate whether perceived support of watershed partners varied

Table 1 The survey questions used to evaluate PNW watershed group needs, information sources, and agency partnerships in the 2009 survey sent to 304 watershed group participants in Idaho, Oregon, and Washington

1. Please rate how successful you feel your Watershed Group is (or has been) at accomplishing its intended mission and objectives.
 - Very successful
 - Somewhat successful
 - Neither successful or unsuccessful
 - Somewhat unsuccessful
 - Very unsuccessful
 - Decline to answer
2. Does your Watershed Group have access to adequate amounts of unbiased, technical information regarding water quantity and quality measurements in the watershed you serve?
 - Yes, we have access to all the unbiased, technical information we need
 - No, we lack access to necessary unbiased, technical information
3. Has the presence of unbiased, technical information helped your Watershed Group accomplish goals and objectives?
 - Yes
 - No
4. Has the lack of unbiased, technical information hindered or delayed your Watershed Group's accomplishment of goals and objectives?
 - Yes
 - No
5. What would be your Watershed Group's preferred method of receiving additional unbiased, technical information? (Check ALL that apply)
 - Presentation by unbiased official/scientist responsible for the technical information
 - Email
 - Physical reports
 - Internet database
 - Other _____
6. If your Watershed Group utilizes unbiased, technical information, what is the main source of information?
 - Local agency representatives
 - Local databases (County/Conservation Districts)
 - Universities or Extension professionals
 - Private research
 - Internet research
 - Internet databases (such as USGS, USEPA, etc.)
 - Other source _____
 - We do not utilize unbiased, technical information
7. What is your Watershed Group's major unmet need? (Please use the space provided below to describe)
8. If you had to grade the amount of support your Watershed Group receives from the following organizations, what grade would you administer? (For each group, please check the ONE that best applies)

Grade	A	B	C	D	F	Incomplete	N/A
EPA	<input type="radio"/>						
State government	<input type="radio"/>						
County government	<input type="radio"/>						
NRCS	<input type="radio"/>						
Soil & Water Conservation Districts	<input type="radio"/>						
Extension or Universities	<input type="radio"/>						
Private organizations and non-profits	<input type="radio"/>						
Local University or Extension representation	<input type="radio"/>						

among state, community size, or perceived level of success. We used χ^2 to test statistical significance ($P < 0.05$) and marginal significance ($0.05 < P < 0.10$).

A single open-ended (written answer) survey question was also analyzed (see Table 1, question 7). Written answers to this question were recorded in Microsoft Excel and a subsequent content analysis was performed on the responses to determine themes relative to the data (Weber 1990). While some themes were deductively applied to the data from relevant literature and research objectives, others

were inductively illuminated during content analysis (Berg 2011; Patton 2001). We assigned codes for the appearance of up to three different themes within each written response (Coffey and Atkinson 1996). Coding was completed by the primary author and reviewed by co-authors in order to maintain consistency throughout the process. Three themes or codes were identified from the open-ended survey question analyzed, and we subsequently ranked codes as primary, secondary, and tertiary in order of frequency and salience. The thematic coding process consisted of a simple

Table 2 The effects of access to adequate amounts of technical watershed information on accomplishment of PNW watershed group missions and goals based on the 2009 survey of PNW watershed group participants

	%
Percentage of watershed group participants <i>with access</i> to adequate amounts of technical watershed information	70.2
Percentage of the above participants who felt access to adequate amounts of technical info <i>helped accomplish missions & goals</i>	90.9
Percentage of the above participants who felt access to adequate amounts of technical info <i>did not help accomplish missions & goals</i>	9.1
Percentage of watershed group participants <i>without access</i> to adequate amounts of technical watershed information	29.8
Percentage of the above participants who felt the <i>lack of technical information hindered the achievement of group missions & goals</i>	45.3
Percentage of the above participants who felt the <i>lack of technical information did not hinder the achievement of group missions & goals</i>	54.7

$n = 194$

indexing and frequency analysis of specific, tangible watershed groups needs (Coffey and Atkinson 1996).

Results and Discussion

One of our hypotheses prior to conducting this research was that the flow of technical watershed information from agencies to watershed groups largely defined existing agency-watershed group relationships. This hypothesis rests on the assumption that unbiased, technical watershed information¹ is necessary for watershed groups to adequately conduct a host of activities such as water quality monitoring, habitat assessment, and water conservation planning. In addition, watershed group acceptance and trust of technical information is vital for successful use of this information (Smith and Gilden 2002). Without adequate amounts of trusted information, watershed groups would lack the necessary knowledge and skills to plan for and achieve long-term watershed enhancement. Therefore, first determining the availability and accessibility of technical watershed information was a key objective of the 2009 survey of PNW watershed group participants.

Over two-thirds of PNW survey respondents affirmed that their watershed group had access to adequate amounts

¹ In our survey instrument we used the phrase “unbiased, technical watershed information” to an attempt to inquire about data and information that was scientifically derived (“unbiased”) and ecological or physical in nature (“technical”) and used to achieve specific outcomes such as monitoring programs, restoration projects, or water quality improvements.

Table 3 Technical information sources used by PNW watershed groups based on responses to the 2009 survey of PNW watershed group participants

Technical information source	Percent cited as major source
Local agency representatives	73.9
Local databases (county/conservation districts)	31.3
Universities or extension professionals	22.8
Private research	20.9
Internet databases (such as USGS, USEPA, etc.)	27.5
Other sources	20.9

$n = 211$

of technical watershed information (Table 2). Additionally, respondents indicated that the availability of technical watershed information helped groups accomplish missions and goals. These findings reinforce the perceived relevance of unbiased, technical information in the watershed group process, and further indicate that watershed groups generally trust the information they receive. Of the 29.8 % of respondents citing a lack of access to technical watershed information, almost half indicated that the lack of this information hindered their group’s accomplishment of goals and objectives.

Based on the collected survey data, most PNW watershed groups receive technical watershed information through local agency representatives including local personnel representing federal, state, county, municipal, or tribal interests (Table 3). Examples of local agency representation are state-employed watershed coordinators, soil and water conservation district (SWCD) staff, and NRCS agents. In addition, survey respondents overwhelmingly indicated their preference for receiving technical information through “presentation by unbiased official/scientist responsible for the technical information” (Table 4). Often, local agency representatives are responsible for the monitoring reports published and delivered to watershed groups for use in watershed planning. Presentations by agency representatives that include skilled facilitation and interpretation of technical watershed information can increase the “usefulness” of information [usefulness of information is defined as salient, credible, and legitimate by McNie (2007)] for watershed groups. However, relying upon agency officials for technical watershed information, combined with a preference for receiving information directly from the official or scientist responsible for the data, may also indicate that PNW watershed groups are complacent with their sources of information. Some watershed groups may also be unwilling or unable to seek new sources of technical watershed information, thereby

Table 4 Method of receiving additional technical information preferred by watershed group members based on responses to the 2009 survey of PNW watershed group participants

Method of receiving technical watershed information	Percent cited as a preferred method of receiving technical information
Presentation by unbiased official or scientist	80.1
Email documents	41.7
Physical reports	55.9
Internet database	51.7

$n = 211$

creating a dependence on agencies or agency staff for necessary technical information. The lack of multiple mechanisms for obtaining technical watershed information may promote unchecked homogeneity in watershed group planning and execution of activities potentially leading to undesirable outcomes or wasteful resource use.

But this may also signal an opportunity. Watershed groups appear to have an underlying trust for information provided by local agencies and prefer to receive watershed information from them. Agencies wishing to clarify the watershed group-agency relationship could take advantage of this opportunity to engage watershed groups with technical watershed information as both a communicator and expert interpreter. Further, agencies could leverage watershed group resources such as an active volunteer base to accomplish mutually beneficial objectives such as monitoring, watershed education, and physical watershed rehabilitation projects.

Watershed Group-Agency Partnerships

Agency support of, and active involvement in watershed groups has been shown to foster successful watershed groups (Clark 2001; Genskow 2009; Moore and Koontz 2003; Lane and McDonald 2005; Leach and Pelkey 2001; Leach et al. 2002). Specifically, in a study of unilaterally formed watershed groups in Wisconsin, Genskow (2009) found that agency participants were vital to collaborative watershed group success because they provided a structure that was lacking in locally initiated, grassroots groups. State government personnel were able to provide groups with crucial process and administrative support, facilitation, and start-up funding (Genskow 2009). Wondolleck and Ryan (1999) articulated similar roles for agencies in collaborative natural resource planning and management process as they described agencies as wearing three hats: leader, partner, and facilitator. Despite this, Bidwell and Ryan (2006) claim that watershed groups with deep ties to a specific agency are no more than an extension of that

agency's watershed mission and directive. They call into question the collaborative legitimacy of watershed group activities under heavy agency support or facilitation (Bidwell and Ryan 2006). If true, due to the nature of their genesis, many watershed groups in the PNW may be assessed as less bottom-up, decentralized planning groups, and more top-down agency directed groups with a diverse caucus of stakeholders.

However, based on a review of the literature in conjunction with the research presented here, we feel that agencies and watershed groups in the PNW are more likely to find a natural partnership based on the mutual goals of protecting watershed health as well as their respective needs and the resources necessary to address those needs. In their discussion of agency roles in collaborative natural resource management processes, Wondolleck and Ryan (1999) refer to an agency partner as one "who shares a problem, interest, or opportunity in common with other individuals or groups" (123). The question remains, not *if* watershed groups and agencies are natural partners, but instead, *what do these partnerships look like?* Can the diversity of agencies involved in watershed management (often with redundant objectives and overlapping resources) partner with watershed groups simultaneously to the benefit of the watershed?

In an effort to address this question and to further investigate the depth and dynamics of PNW watershed group-agency partnerships, we asked survey respondents to rate the level of support they received from specific agencies that have a role in regional watershed management (question 8, Table 1). A familiar A—F "report card" scale was provided for survey respondents to rate the level of perceived support their group received from each listed agency. This method created a familiar, qualitative measure of respondents' perceptions of agency support. Based on the known involvement of agencies in PNW watershed groups, respondents were asked to provide perceptions of four agencies: EPA, NRCS, Extension, and state government(s).

PNW watershed groups perceive the EPA as not supportive of their activities, missions, and objectives (Table 5). When compared with a measure of perceived PNW watershed group success (Chaffin et al. 2012), poor or incomplete support from the EPA is significantly correlated with "unsuccessful" groups. Washington respondents perceive the EPA as least supportive of their watershed groups, with Idaho and Oregon reporting only slightly better perceptions. Support from the EPA also ranks the lowest among respondents from large PNW communities (>100,000 residents). This might be explained by an increased demand on EPA personnel time in large urban settings, where increased regulatory work is generally expected. The regulatory aspect of the EPA may also explain low ratings of support among watershed group

Table 5 Evaluation of EPA support of their watershed group by watershed group respondents using an A through F grading scale based on the factors of perceived success, state, and community size

	A or B	C or D	F/Incomplete/NA
	Percentage of respondents in each category below and associated letter grade		
Perceived watershed group success (<i>P</i> value = 0.067 ^a)			
Very successful	24.3	35.7	40.0
Somewhat successful	13.3	40.0	46.7
Unsuccessful	4.2	29.2	66.7
State (<i>P</i> value = 0.0001 ^{***})			
Idaho	34.8	37.0	28.2
Oregon	16.4	43.6	40.0
Washington	7.1	31.7	61.2
Community size (<i>P</i> value = 0.10 ^a)			
Greater than 100 k residents	7.3	26.8	65.9
Between 100 and 25 k residents	18.8	45.3	35.9
Between 25 and 7 k residents	22.6	35.5	41.9
Less than 7 k residents	18.0	34.0	48.0

n = 181

p* < 0.05; *p* < 0.01; ****p* < 0.001

^a Marginally significant (.05 < *p* ≤ .10)

participants. Margerum (2001) found that agencies with narrow focus (such as the regulatory focus of the EPA), by definition, cannot take part in the “holistic approach” that often defines collaborative watershed management. Agency personnel in this situation have a difficult time negotiating multiple roles—often seen by the agency official as conflicting—such as regulator vs. partner or even facilitator (Margerum 2001; Wondolleck and Ryan 1999).

Similar to perceptions of EPA support, survey respondents who rated their watershed group as “unsuccessful” were also more likely to rate the NRCS as providing poor or incomplete support for their watershed group (Table 6). However, respondents who saw their watershed group as “successful” were more likely to grade NRCS support of their watershed group with either an “A” or “B”. More interesting however, is the relationship that links state (ID, OR, or WA) with NRCS support of watershed groups in the PNW. Survey respondents from Washington watershed groups generally view NRCS support as poor or incomplete, while groups from Oregon and Idaho have distinctly higher views of NRCS support. Although a federal agency (US Department of Agriculture), the NRCS is divided into both state and local offices. Hence, it is possible that NRCS leadership or differences in NRCS state office directives across the region may account for differing levels of support for each state’s watershed groups. However, this distinction may also lie in the proportion of watershed groups

Table 6 Evaluation of USDA-NRCS support of their watershed group by watershed group respondents using an A through F grading scale based on the factors of perceived success, state, and community size

	A or B	C or D	F/Incomplete/NA
	Percentage of respondents in each category below and associated letter grade		
Perceived watershed group success (<i>P</i> value = 0.0317*)			
Very successful	39.1	30.4	30.4
Somewhat successful	38.8	30.6	30.6
Unsuccessful	8.7	30.4	60.9
State (<i>P</i> value < 0.0001 ^{***})			
Idaho	60.0	24.4	15.6
Oregon	43.4	34.0	22.6
Washington	16.1	32.1	51.9
Community size (<i>P</i> value = 0.089 ^b)			
Greater than 100 k residents	15.8	34.2	50.0
Between 100 and 25 k residents	39.4	26.2	34.4
Between 25 and 7 k residents	43.3	36.7	20.0
Less than 7 k residents	40.0	30.0	30.0

n = 177

p* < 0.05; *p* < 0.01; ****p* < 0.001

^a Marginally significant

in each state focused on urban vs. rural watershed issues—the later more likely to engage NRCS support. Respondents from communities with populations less than 100,000 have a higher perception of NRCS support for watershed groups. By nature of the agency mission, the NRCS works with landowners with large tracts of agricultural land in predominately rural settings. Consequently, it is not surprising that survey respondents from less populated communities have a higher perception of support from the NRCS.

Survey respondents from rural communities (<7,000 residents) also show a higher perception of university Extension program support for PNW watershed groups than respondents from larger communities (Table 7). The pattern observed in a cross-tabulation of perceived Extension support of watershed groups and community size of survey respondents is a good representation of expected values based on the location of Extension personnel in the region, that is, Extension agents are often more visible as a resource in smaller communities. Similar to the EPA and USDA-NRCS, Washington respondents viewed Extension as providing poor or incomplete support to watershed groups. Poor or incomplete support from university Extension was also correlated with respondents self-identifying their group as “unsuccessful.”

In a study of Wisconsin watershed groups, Genskow (2009) found that the involvement of Wisconsin Cooperative

Table 7 Evaluation of Extension or University support of their watershed group by watershed group respondents using an A through F grading scale based on the factors of perceived success, state, and community size

	A or B	C or D	F/Incomplete/NA
	Percentage of respondents in each category below and associated letter grade		
Perceived watershed group success (P value = 0.0324*)			
Very successful	31.3	37.3	31.3
Somewhat successful	26.7	46.7	26.7
Unsuccessful	4.2	41.7	54.2
State (P value = 0.0002***)			
Idaho	15.5	46.7	37.8
Oregon	43.6	45.5	10.9
Washington	20.2	36.9	42.9
Community size (P value = 0.0077**)			
Greater than 100 k residents	19.5	36.6	43.9
Between 100 and 25 k residents	22.6	40.3	37.1
Between 25 and 7 k residents	22.6	67.7	9.7
Less than 7 k residents	38.0	32.0	30.0

n ranged from 181 to 184

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Extension personnel played a key role in successful watershed groups. The inherent skills of rural Extension educators combined with their access to academic resources make Extension personnel valuable members, facilitators, and partners for watershed groups (Genskow 2009). Why then, do PNW watershed group members view Extension support so poorly? Many Extension educators in the region are not involved with watershed groups, and it is probable that Extension programs of PNW land grant institutions have not prioritized the need for a commitment to their state's watershed groups. Extension educators who do participate may do so on their own time and at their own expense, unlike other agencies (e.g., WADOE and IDEQ) that provide funding, resources, or assigned time for personnel to participate in watershed groups (Margerum 2001). This fact alone may be enough for watershed groups to question or doubt university Extension's commitment as a partner.

Overall, state governments in Idaho, Oregon, and Washington are perceived as the most supportive agency partners based the survey of watershed group participants (Table 8). Although the term "state government" encompasses many state agencies including the state legislature, the overall perception of quality support from state governments was high in all three states. This finding could be predicted based on a historical analysis of watershed groups in the region. Initial watershed group capacity, including organic funding for a majority of watershed groups in the region, flowed from

Table 8 Evaluation of state government support of their watershed group by watershed group respondents using an A through F grading scale based on the factors of perceived success, state, and community size

	A or B	C or D	F/Incomplete/NA
	Percentage of respondents in each category below and associated letter grade		
Perceived watershed group success (P value = 0.0259*)			
Very successful	87.1	10.0	2.9
Somewhat successful	76.1	21.7	2.2
Unsuccessful	62.5	25.0	12.5

$n = 186$

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

state governments (Chaffin et al. 2012). Therefore, it is also not surprising that respondent's grading of state government was not significantly correlated with a specific state or community size.

State agencies are recognized as watershed group catalysts throughout the peer-reviewed literature (Clark 2001; Genskow 2009; Lane and McDonald 2005). Lane and McDonald (2005) found that state "planning capacity" needs to be retained in watershed groups in order to facilitate and maintain diverse group membership and provide for authority on a higher level (which also facilitates watershed group legitimacy). Clear statements of authority or "potential authority" are an instrumental element of support that state governments can provide to watershed groups (Genskow 2009). This support is apparent in the PNW and has led to a more successful, rooted set of watershed groups in the region.

The takeaway message from survey respondent perceptions of PNW agency support is this: agencies and agency personnel clearly visible to PNW watershed groups (e.g., NRCS in rural watersheds, state agencies) are perceived as more supportive. While validation of this perception necessitates further investigation, the perception itself represents a finding relevant to agencies wishing to: (1) clarify their role; (2) clarify the role of collaborative watershed groups in state-based watershed planning; and/or (3) foster more robust agency-watershed partnerships.

Major Unmet Needs of PNW Watershed Groups

To further explore the opportunity we recognize for expanding mutually beneficial partnerships between agencies and watershed groups, we analyzed hand written responses to a survey question asking, "What is your Watershed Group's major unmet need?" Over 86 % of respondents took the time to hand-write a response to this question, potentially indicating either (1) a high level of respondent engagement in the survey itself, or (2) that the specific question was very important to respondents. Due to the nature of the question and

Table 9 PNW watershed group needs based on coded themes and subthemes from an open-ended survey question in the 2009 survey of PNW watershed group participants

Theme	Subtheme	Percentage of total
Watershed group funding (47.6 %)	Funding for watershed projects	10.9
	Sustained, secure, or consistent base funding	10.9
	Funding for administration, organization, or staff	8.2
Watershed group support and participation (22.4 %)	General increase in watershed group interest and participation	5.5
	Increase in volunteer participation or community involvement	4.9
	Additional paid staff person(s)	3.3
Physical or information needs (17.4 %)	Access to technical, baseline data specific to watershed	8.7
	The creation of a watershed plan	2.2
	Additional outreach and education efforts	2.2
Watershed group needs specific to individual groups (12.6 %)	Completion of projects specific to a group's circumstances	7.7
	Group focus	1.6

$n = 183$

the space provided, answers to the question were generally short and provided either a single, major point or one-to-three equally weighted points. A simple content analysis of the written responses revealed four major categories (themes) of answers, with several subthemes further defining each theme (Table 9). As expected, *funding* constituted the largest theme of major unmet watershed group needs. Respondents consistently expressed the need to acquire funding for specific projects and activities related to watershed group plans, missions, or objectives. Respondents also articulated a fear that current funding would soon diminish, and it is therefore essential to find a sustained, secure form of base funding for watershed group administration. One watershed group member wrote the following:

“We have project funding but not operations funding. This makes our organization weak. We need things like a permanent office and funding coordinator/executive director in addition to project manager and office manager.”

Funding took on different dimensions based on state. Idaho groups were more concerned with funding for watershed

projects, Oregon groups need funding for implementation of watershed plans and objectives, and Washington groups consistently cited the need for sustained base funding as their most pressing financial need.

Although cited less than half as much as funding, *support and participation* was the most varied category of need identified from the survey responses. Support and participation needs ranged from specific calls for increased agency participation to the need for leadership, trust, facilitation, or consensus among group members. One respondent commented on the difficulties of attracting volunteers based on geography:

“Interested volunteers [major unmet need]. Our watershed has no large river to connect people and communities, only small streams. It is difficult to find a demanding purpose that will engage interest. Streams are not as sexy as rivers are.”

Two respondents clearly articulated the need for increased participation from younger segments of the population:

- (1) “Seeing our way to sustained leadership as our founders look toward aging out.”
- (2) “Our aging board is seeking younger recruits.”

Support and participation needs are integral for sustaining PNW watershed groups regardless of group financial needs. Answers from this category should be reported to state governments and other agency partners seeking dynamic ways to modify or improve watershed group programming. For example, one respondent wrote:

“We would like to have information as to how other [groups] operate: fiscal, employee issue[s], insurance, etc.”

This suggests the need for enhanced organizational capacity—something that often hamstring watershed groups (Bonnell and Koontz 2007), but something agencies could provide at a relatively lower cost than watershed groups could seek on their own (Wondolleck and Ryan 1999). We suggest that state officials, federal agency partners, or university Extension educators involved in watershed groups could easily obtain, interpret, and communicate this type of information to watershed groups. Enhancing watershed group capacity by providing tools and information (not necessarily funding) may pay dividends to agencies looking to pursue projects that necessitate a volunteer base, or a trustworthy collaborative partner.

Conclusions

Clarifying the role of agencies in collaborative watershed groups continues to be a concern for both agency personnel

charged with local and regional watershed management as well as watershed groups continuing to build capacity and achieve stated missions and objectives. Through the analysis of selected responses to a 2009 survey of PNW watershed groups presented in this manuscript, the following has become apparent:

- Watershed groups by-and-large trust information provided by agency partners and prefer to receive information from these partners;
- Watershed groups perceive support from agencies who engage watershed groups and/or who are visible in their watershed;
- An opportunity exists for further engagement between watershed groups and agencies for mutually beneficial information flow, capacity building, and project completion

By compiling the qualitative responses to a question asking PNW watershed group members to grade specific agencies based on their support of watershed groups, weighted grades can be assigned to the four organizations specifically reviewed in this manuscript: EPA (C-); USDA-NRCS (B-); state government (A); and Extension (C-). While state governments constitute the most consistent support for watershed group programming in the PNW, the roles of EPA and Extension in regional watershed group programming may be undefined or unclear to both the organizations and the watershed groups. This ambiguity, combined with the reported needs of watershed groups (e.g., sustainable base funding, increased and varied participation, increased logistical capacity, and specific baseline data for watersheds), presents a distinct watershed group-agency partnership opportunity.

First, university Extension is underutilized by watershed groups. Extension agents are often well versed in community programming and group development and could lend valuable assistance to watershed groups attempting to increase participation by recruiting and retaining new volunteers. Geographically spaced Extension agents and central university faculty with Extension appointments should be called upon as interpreters of peer-reviewed literature (often not financially accessible to watershed groups) that can assist groups in generating capacity for growth, successful partnerships, and achieving missions and objectives. Second, the EPA and NRCS (and to some extent, Extension) have the resources to assist watershed groups with acquisition of specific technical information and baseline watershed data necessary to implement watershed plans or to complete watershed restoration projects despite agency regulatory function (and any corresponding watershed group perception).

Fostering these partnerships may be seen as the role of the agency—agencies were created for public resource

management and have federal resources to function in this role. However, based on a review of PNW agency-watershed group partnerships and the undeniable, but often fuzzy role of watershed groups in PNW watershed management, a shift in thinking about partnerships is necessary. Watershed groups should actively seek out partners among local agency officials and Extension educators. Watershed groups should clearly address their needs to the partners that are most able to assist in specific circumstances. No one partner will satisfy all unmet watershed group needs, and further, for watershed groups to survive in these uncertain fiscal times, they must become savvy partners among a diversity of agency interests.

While we acknowledge that there is not a single, specific role for agency involvement in collaborative watershed groups, and truly there may be many (Wondolleck and Ryan 1999), we hold that this research sheds light on improvements that could be pursued in existing relationships between watershed groups and specific agencies engaged in watershed planning and management. Answering the call of previous research for regional watershed group assessments (Clark et al. 2005), this analysis of watershed group-agency partnerships across the PNW region yields a useful starting point for comparative investigations in other regions of the US and potentially abroad. Future research should consider taking our work a step further to explore the relationship between watershed group-agency partnerships and changes in the biophysical characteristics of watershed such as improved water quality.

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