Core Competencies for Successful Watershed Management Practitioners

Abstract

We surveyed participants from three watershed leadership education programs to identify competencies critical to successful watershed management. Participants rated 26 competency areas identified from literature and watershed education curricula for extent of criticality and listed additional competencies needed for successful watershed management. On the basis of those ratings and listings, we propose that competency in the following areas is required: establishing and maintaining partnerships/collaborating, outreach and communication, project and organizational management, landowner interaction/interpersonal skills, facilitative leadership, and, possibly, developing and maintaining a vision for the future. Our findings have implications for designing professional development activities and developing position descriptions for hiring watershed leaders.

Keywords: watershed management, core competencies, professional development, water quality, lakes

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Introduction

Watershed management has emerged as a major component of improving water resources and addressing nonpoint source pollution (Leach & Pelkey, 2001). Watershed management combines science, technology, and human dimensions with the goal of empowering people to address environmental, social, and economic issues (Meeker, Tate, Czapar, & Vaughan, 2005). When it is effective, watershed management has multiple benefits (Lant, 1999; Meeker et al., 2005).

Watershed management requires leaders knowledgeable and skilled in a variety of competencies, including building partnerships, designing programs, assessing progress, and evaluating the process (Wolfson et al., 2015). Imperial (2005) found that leadership, staffing, recruitment, personnel management, budgeting, contracting, and grants management were all important for effective watershed management. In another study, water resource managers emphasized the need for interdisciplinary skills along with subject matter skills to be successful at watershed management work (Bourget, 2006). Similarly, Lee (2005) stated that collaboration and coordination among representatives of different geographical areas was essential to successful water resources management.

Existing research on collaborative watershed management has largely focused on the group or the process itself as the unit of analysis, rather than the individual practitioner. One can infer core competencies (the basic knowledge and skill sets that contribute to excellence in programs [Seevers, Graham, & Conklin, 2007]) required by watershed leaders on the basis of existing research, but more study is needed to determine which competencies matter most to watershed leaders and how competencies actually translate into professional success. As watershed management has been advancing for at least two decades, a growing cadre of professionals in the field has formed. Representatives from Extension programs have developed relationships with many of these watershed management professionals, in part through watershed academies (Wolfson et al., 2015). Engaging with participants in these Extension programs is a way to learn directly from these practitioners about what competencies they feel are most critical to their success.

The purpose of our study was to determine core competencies that are the most fundamental to successful collaborative watershed management work, from the point of view of experienced watershed practitioners. Developers of educational programs and others can consider these core competencies when determining critical topics to address in various undertakings and when endeavoring to improve understanding of the multidisciplinary range of skills needed to be effective in watershed management.

Methods

We surveyed participants who had taken part from 2006 through 2013 in three watershed leadership education programs developed and offered by Extension at The Ohio State, Michigan State, and Purdue Universities. The primary goals of these programs are to build the capacity of watershed leaders and promote professional development. Participants of the three programs have traditionally included watershed coordinators, water resource professionals, volunteers, county health department staff, planning agency staff, and university faculty and students. Respondents had an average of 8 years of water resource management experience.

We used a descriptive cross-sectional survey design for the study and collected both quantitative and qualitative data. Watershed management Extension specialists and an evaluator from the collaborating universities reviewed the questionnaire to ensure that questions were related to the purpose of the study. We also pilot tested the questionnaire with two watershed leaders and suitably modified it on the basis of their input.

To identify the extent to which competencies are critical to watershed management work, we created a list of 26 competency areas gleaned from a review of the literature and a content review of the three education programs. We used a 4-point Likert-type scale ranging from 1 (*not at all critical*) to 4 (*very critical*). A mean score of 3.0 or above was considered critical to respondents' work as watershed leaders. Instructions to respondents for completing the ratings for the items were as follows: "Imagine you are mentoring a new watershed/lakes leader; the items you rank highest should be items you think are most fundamental to their success, based on your experience." We also provided sufficient space on the survey so that participants could list any competencies they

thought were missing from the list.

In addition, to identify the competencies most beneficial to watershed management, we asked respondents to list and describe up to five competencies that have proved to be the most beneficial to them and/or have made the biggest difference for them in their roles in water resources management. We analyzed data using SPSS NVivo 10 software.

The University of Wisconsin–Extension Institutional Review Board approved the study, and University of Wisconsin–Extension conducted the study. We sent email invitations and the online survey to all 453 eligible participants. Four email addresses were invalid, and an additional four people opted out of the survey, leaving an accessible sample size of 445. We sent three reminders at 1-week intervals to nonrespondents. Overall, 117 surveys were returned, yielding a response rate of 26%. Participants included mainly watershed leaders and some stream and lake management leaders, but we use the term *watershed* in reference to watershed, stream, and lake leaders through the rest of the article.

Results

Demographic Profile of Respondents

About two-thirds of the respondents worked for a government or county office (67%), followed by nongovernmental or private organizations (22%) and universities (6%). The remaining 5% included general public, farmers, and those self-employed. Respondents had about 5 years of water resources management experience prior to attending the education programs, and approximately 3 years of experience after participating. A great majority (78%) reported working in water resources management at the time of the survey.

Rating of Competency Areas Identified from Literature/Program Curricula

Eighteen of the 26 listed competency areas were rated as critical (M 3.0) (Table 1).

Table 1.
Participant Ratings of Criticality for Competency Areas Rated as Critical
(Mean   3.0) for Watershed Management Work

	Criticality						
	Not at all critical	Somewhat critical	Critical	Very critical			
Competency area	f (%)	f (%)	f (%)	f (%)	M	SD	n
Partnerships/collaboration	0 (0%)	7 (6%)	33 (29%)	74 (65%)	3.59	0.61	114
Outreach and communication	0 (0%)	8 (7%)	37 (33%)	68 (60%)	3.53	0.63	113
Project management	0 (0%)	12 (11%)	34	65 (58%)	3.48	0.69	111

			(31%)				
Landowner interaction/interpersonal skills	3 (3%)	11 (10%)	31 (27%)	68 (60%)	3.45	0.78	113
Best management practices	2 (2%)	14 (12%)	43 (38%)	54 (48%)	3.32	0.76	113
Building professional networks	1 (1%)	16 (14%)	43 (38%)	53 (47%)	3.31	0.74	113
Strategic planning	1 (1%)	16 (14%)	45 (39%)	52 (46%)	3.30	0.74	114
Water quality criteria	0 (0%)	22 (19%)	38 (33%)	54 (48%)	3.28	0.77	114
Working with boards and volunteers	2 (2%)	13 (11%)	51 (45%)	47 (42%)	3.27	0.73	113
State regulations	2 (2%)	19 (17%)	44 (40%)	46 (41%)	3.21	0.79	111
Program design and implementation	1 (1%)	16 (14%)	55 (49%)	41 (36%)	3.20	0.71	113
Conservation programs	2 (2%)	19 (17%)	55 (48%)	37 (33%)	3.12	0.75	113
Ecological monitoring	3 (3%)	25 (22%)	44 (39%)	41 (36%)	3.09	0.83	113
Hydrology/stream processes	3 (3%)	25 (22%)	45 (39%)	41 (36%)	3.09	0.83	114
Local ordinances	4 (4%)	26 (23%)	40 (35%)	43 (38%)	3.08	0.87	113
Facilitation	5 (4%)	19 (17%)	53 (47%)	37 (32%)	3.07	0.82	114
Storm water regulations	6 (5%)	26 (23%)	35 (31%)	46 (41%)	3.07	0.92	113
Land use policies	4 (4%)	23 (21%)	52 (46%)	33 (29%)	3.02	0.81	112

About 60% or more of the respondents rated partnerships/collaborations, outreach and communication, project management, and landowner interaction/interpersonal skills as very critical to their watershed management work. Between 46% and 48% of respondents rated knowledge of best management practices, building professional networks, water quality criteria, and strategic planning as very critical to their work.

For the highest rated competency area, partnerships/collaboration, respondents described a wide range of types of partners and collaborators with which they were engaged at the time of the study, including boards,

landowners, and government agencies. In providing examples of ways in which partnerships and collaborations are fundamental to success of watershed work, respondents noted that they are useful for

- reducing duplication of efforts,

- amplifying one's own efforts,

- saving time and money, and

- maximizing impact and obtaining needed expertise.

Additionally, watershed managers described relying on their partners for assistance with funding, engineering, education, and data analysis. One respondent summed up the importance of partnerships in this way: "My whole job is working with partnerships" and "[partnering] broadens reach . . . the more agencies/parties involved, the more we are able to get done."

The second most highly rated competency area was outreach and communication, which respondents described as a fundamental part of their day-to-day work. Respondents mentioned the importance of being able to tailor their messages to various audiences and the need to be able to use a variety of means of communication and outreach, including newsletters, websites, social media, newspaper articles, and direct communications. One respondent emphasized the role communication plays by stating, "Outreach and education occurs every day. . . . If you're not getting the information out there, odds are good that no one will be actively searching you out because they didn't know the basic information was even out there to be found."

The third most highly rated competency area was project management. Many respondents mentioned the need to be able to coordinate multiple projects, track grant funds, and be transparent and realistic about what can be achieved.

The next most critical competency area was landowner interaction/interpersonal skills. Respondents mentioned that communicating with landowners was critical to addressing water quality problems. One respondent highlighted the way in which this competency relates to success on the ground, writing, "Implementation is all about relationships—if you are good at forming and maintaining those, you might actually convince someone to accept your cost-share money and change their management habits."

Eight of the 26 competency areas were rated as less critical ($M < 3.0$) by respondents (Table 2). Nevertheless, between 46% and 75% of respondents rated these competency areas as critical or very critical to their watershed management work.

Table 2.
Participant Ratings of Criticality for Competency Areas Rated as Less
Critical (Mean < 3.0) for Watershed Management Work

	Criticality		
Not at all critical	Somewhat critical	Critical	Very critical

Competency area	ƒ (%)	ƒ (%)	ƒ (%)	ƒ (%)	M	SD	n
Water policy	3 (3%)	26 (23%)	54 (48%)	30 (27%)	2.98	0.78	113
Conflict management	1 (1%)	36 (32%)	50 (44%)	26 (23%)	2.89	0.76	113
Target audience analysis	3 (3%)	29 (26%)	59 (52%)	22 (19%)	2.88	0.74	113
Negotiation	6 (5%)	33 (29%)	51 (45%)	23 (20%)	2.81	0.82	113
Fundraising	14 (12%)	44 (39%)	32 (28%)	24 (21%)	2.58	0.96	114
Load reduction modeling	13 (12%)	41 (36%)	40 (35%)	19 (17%)	2.58	0.90	113
Designing ecological studies	10 (9%)	51 (45%)	30 (27%)	22 (19%)	2.57	0.91	113
Restoration design	15 (13%)	42 (37%)	40 (35%)	16 (14%)	2.50	0.90	113

Competency Areas That Emerged from Respondent-Provided Lists (in Their Own Words)

To capture additional watershed management competencies, we included an open-ended question in the survey: "Please list up to five competencies (knowledge, skills, abilities, or behaviors) that have proven to be the most beneficial and/or made the biggest difference for you in your role in water resources management. Feel free to think broadly, for example including technical, inter-personal, and/or organizational strengths." Seventy-eight participants answered this question. The coded open-ended responses generated five thematic areas: (a) effective communication, (b) organizational and project management, (c) facilitative leadership, (d) vision, and (e) collaboration. Of the five areas, we had not identified organizational management, facilitative leadership, and vision as possible core competency areas through our review of literature and educational program curricula. The five thematic competency areas and supporting representative quotes from respondents are presented in Table 3.

Table 3.
Competency Thematic Areas as Identified by Participants, with Supporting Quotes

Competency thematic area	Representative quotes
Effective communication	"Speaking to the people you are meeting with at the time and tailoring the message" "Good communication with the residents of the watershed" "Communication skills (everything from presentations to email)"
Organizational and project management	"Tracking projects and funds in a manner as to be accountable and transparent in your watershed/water resource management efforts" "Organizational skills—juggling and prioritizing"
Facilitative	"Being able to let *others have the idea* and then support them"

leadership	"Can lead a crew and delegate responsibilities"
	"Facilitation skills"
Vision	"An ability to set attainable and measurable goals for which continued progress can be shown to stakeholders (partners, the public, board members)"
	"Understanding the complete water resource, how it's all interconnected"
	"The ability to think outside the box to come up with creative and new solutions or approaches when conventional solutions and approaches are not working"
	"Understanding all sides of a problem (from the science/analysis side to the accused/problem causers side)"
	"Understanding the watershed as a puzzle: focus on detail but never lose sight of the whole"
Collaboration	"Maintaining and keeping open strong/trusting relationships with key organizations (drain commissioner, conservation district, local interest groups)"
	"Sharing—bringing in other expertise/collaborating with others"
	"Inter-personal—find positive contributors and keep them involved/limited time for negative voices"
	"Developing partnerships and professional networks"
	"Incorporating stakeholders in decision making"

Discussion and Conclusions

About half or more of the respondents rated each of the 26 competency areas as critical or very critical. Therefore, each competency area should be considered important for successful watershed management work. Some were rated more highly than others, and Tables 1 and 2 provide one way of interpreting the data: most critical (top 18) and less critical (19–26). Qualitative data reinforced the top four competency areas identified from the quantitative data (as shown in Table 1) in particular (the landowner interaction/interpersonal skills competency area, listed in Table 1, is related to the effective communication competency thematic area, listed in Table 3). The following three additional competency areas emerged from responses to the open-ended question: organizational management, facilitative leadership, and vision. Because of the limited number of responses to this question (78), it is not possible to assess how critical these emergent competency areas are relative to the

26 areas rated by all respondents, but this finding does suggest that further inquiry into these competency areas is warranted.

Results indicate that watershed managers need to be skilled in a diverse set of competencies, but a few appear to be essential components for success, including competence in establishing and maintaining partnerships/collaborating, outreach and communication, project and organizational management, landowner interaction/interpersonal skills, and facilitative leadership. On the basis of our survey results, we propose these as "core competencies" needed for successful watershed management work. Additionally, further research may confirm that the ability to develop and maintain a vision for the future is an essential competency.

Professional development planners can design more authentic learning activities by basing their programs on the proposed core competencies. For example, instructors could mix and match types of competencies (Figure 1). One learning activity, for instance, could involve a role-play and/or scenario where watershed professionals practice communicating to landowners about best management practices such as filter strips (e.g., taking land near a stream out of agricultural production and planting trees or other plants). Another could have them practice communicating water quality criteria/state regulations to board members and facilitating a strategic planning session based in part on those criteria.

Figure 1.
Broad Categories of Watershed Competencies

Science and Policy	Management	Leadership
Examples:	*Examples:*	*Examples:*
• Hydrology/stream processes	• Working with boards and volunteers	• Outreach and communication
• Best management practices	• Program development	• Creating a vision
• Water quality criteria/state regulations	• Project management	• Building partnerships and collaborating
• Local ordinances/land use policies	• Building a professional network	• Facilitating

The core competencies identified and described in this article are in line with the competencies identified by researchers as essential not only for watershed work but also more generally for successful education and facilitation work. Lee (2005) stated that collaboration and coordination among professionals were essential to successful water resources management. Harder, Place, and Scheer (2010) found that interpersonal, program planning, relationship-building, and evaluation skills were needed for successful Extension work. Similarly, Bernhardsson and Lattke (2011) stated that communication skills are important in adult education.

Organizations that offer educational programs aimed at increasing leadership capacity for collaborative watershed management may choose to focus their curricula on addressing the core competencies identified through our

study. The findings also could help with developing position descriptions for watershed coordinators and similar roles. The competencies could be used in employee assessments as means for evaluating effectiveness and identifying educational needs. Finally, the findings can help watershed leaders illustrate the complexity and multidisciplinary nature of their work in discussions with their colleagues, constituents, and funders.

Author Notes

Author Vikram Koundinya's affiliation has changed. He is now an evaluation specialist (assistant Cooperative Extension specialist) in the Department of Human Ecology and University of California Cooperative Extension at the University of California, Davis in Davis, California. Author Jenna Klink's position has changed. She is now interim director of program support services at University of Wisconsin–Extension.

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