# Mentorship, knowledge transmission and female professionals in Canadian water research and policy

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## Abstract

We face multiple water challenges: droughts, floods, crumbling infrastructure and disappearing natural hydrosystems. Technological interventions will help but these challenges also require social solutions and good governance. Identifying and implementing both technical and social solutions demands a resilient water research and policy community (WRPC). The WRPC must include diverse perspectives as the challenges increase in intensity, frequency and scope and as decision processes accelerate. Will the WRPC be able to effectively address this evolving water context? Possibly, but we argue that the WRPC's effectiveness will be partially determined by its ability to respond to impending demographic changes and the erosion of valuable knowledge resources. Generating stronger social ties between water professionals from different generations is critical to transfer these knowledge resources. Mentorship has been recognized for both its individual benefits and its organizational benefits, yet it has been under-explored within the WRPC. Using a qualitative analysis of a Canadian case and focusing on a female professional sub-population, we argue that mentorship has significant potential to develop and sustain intergenerational ties and knowledge resource transmission within a WRPC. Our findings suggest that long-term mentorship investments will directly contribute to the WRPC's resilience and its ability to effectively address water challenges.

*Keywords:* Canada; Demographics; Governance; Knowledge; Mentorship; Professionals; Water; Women

## 1. Introduction

A scan of the Canadian and international media reveals multiple water challenges: droughts and floods, crumbling infrastructure undermining urban water systems and natural hydrosystems disappearing through mismanagement. Technological research and interventions will address some aspects but remedying these water challenges must also include social solutions, including viable governance

arrangements and responsive policies. To explore, identify and eventually implement social solutions to our shared water challenges, a resilient water research and policy community (WRPC) is needed. This 'community' includes engineers, technicians, biologists, planners, economists, as well as scholars conducting physical or social research, and politicians, public servants and civil society activists generating ideas, policies, strategies and plans. This WRPC also requires diverse and knowledgeable perspectives to address challenges which are increasing in intensity, frequency and scope, whilst decision-making processes are accelerating (Blomquist, 2009).

Will the WRPC effectively anticipate, examine and respond to this evolving water context? We think so, but argue here that the WRPC's effectiveness will be determined partially by the ability to anticipate and respond to impending demographic changes. These changes include subsequent labor force retirements and, consequently, the erosion of the WRPC's valuable knowledge resources. Further, while additional formal education for new professionals, including advanced graduate degrees, have been beneficial, these degrees will not be sufficient to address the WRPC's potential loss of significant knowledge resources possible through community-wide retirements. We argue that generating stronger social ties between water professionals of different generations – using mentorship tools – will be critical to transfer the WRPC's knowledge resources.

Mentorship, i.e., a relationship between individuals to transfer skills and knowledge within specific settings, has been recognized for the benefits it brings to individual growth and advancement (Kram & Isabella, 1985; Jacobi, 1991; Lindley, 2005; Suedkamp-Wells *et al.*, 2005; Allen & Eby, 2007; Egan & Song, 2007; Bozeman & Feeney, 2008). Mentoring has also been seen to positively contribute to organizations by: (1) identifying and supporting future leaders; (2) increasing participation; (3) improving recruitment and retention; (4) fostering organizational learning through the sharing and creation of tacit knowledge; and (5) improving organizational culture and productivity (Singh *et al.*, 2002). Yet mentoring has been under-explored within the international WRPC. We argue, using the Canadian case, that mentorship has significant potential to develop and maintain strong social ties within a WRPC. We also propose that long-term mentorship investments will directly contribute to the WRPC's resilience and its ability to effectively address the water challenges identified above.

## 2. Rationale

### 2.1. A redefinition of the Canadian water research and policy community

To explore these globally applicable ideas about knowledge management and mentorship, we focused on the Canadian WRPC as an in-depth case. To be specific, our interest is in female professionals working on research and policy, not on the research or polices per se. Canada was an appropriate case because of three interrelated factors currently recognized within the WRPC:

- First, the Canadian water context is evolving rapidly. Extreme events, such as rural droughts and urban flooding, are becoming more frequent while the demand for clean water is increasing (deLoë & Plummer, 2010). In response, water management strategies, policy and governance will need to adapt quickly and possibly radically (deLoë *et al.*, 2001; Government of Canada, 2004; Bakker, 2006; Lacey *et al.*, 2006).

- Second, effective water management must be capable of responding to the evolving conditions. Any governance framework will need to incorporate multiple viewpoints – i.e., diverse knowledge sources – as water decisions are developed and implemented at the ecosystem and watershed levels (deLoë & Kreutzwiser, 2006). Across technical and social disciplines, knowledge diversity across perspectives, experiences and skills will allow better responses to dynamic physical and policy contexts (Biswas, 2008; Mostert et al., 2008). Different perspectives will also help to produce more creative and comprehensive problem solving (Woolley et al., 2010) and may result in policies that are more successful and easily implemented (Blomquist, 2009). But to achieve this diversity and depth, appropriate human resources must be available to benefit from accumulated knowledge and expertise.
- Third, combined with inadequate recruitment and knowledge retention, impending retirements will erode the Canadian WRPC's capacity to respond to the factors outlined above. Detailed studies from the United States, Australia and Canada have shown that the water sector is top-heavy with most managers and senior personnel being 50 years old, or older (Ladson & Austin, 2009; ECO Canada, 2010). Impending retirements and human resource shortages will impinge upon operations and integrity (Lacey et al., 2006; McNabb et al., 2006; Barrett, 2008; Ladson & Austin, 2009; ECO Canada, 2010). In the next two decades, with 'Baby Boomers' retiring en masse, we can antici-pate similar problems in water research and policy professions (MacKenzie & Dryburgh, 2003; Schellenberg, 2004; Barrett, 2008; Manning et al., 2008; Freek, 2010).

But why does recruitment remain a problem? Multiple explanations suggest that public sector demo-graphics, inadequate planning for leadership transitions in the public sector and a lack of interest among university graduates are to blame (Lacey et al., 2006; Blankenship et al., 2008; CIWR, 2009). It has also been suggested that there may be two fundamental disconnects for incoming professionals. The first dis-connect may be between their socio–ecological values in contrast to the organization's focus on purely technical solutions. A second possible disconnect may be between their personal priorities (e.g., parent-hood), set career trajectories (e.g., a tenure-clock for academics, the 'partner-clock' in law firms, or advancement up a salary scale) and expectations (e.g., dedicated employees do not leave the office before 8 pm) that limit career advancement (RPPC, 2000; Turton et al., 2001; Tortajada, 2003; ECO Canada, 2010). Diminished knowledge retention has also been identified as a problem for organizations (Mårtensson, 2000). Many water utilities lack programs to retain the valuable knowledge held by experi-enced professionals and then to transmit the knowledge to incoming professionals (Blankenship et al., 2008; Manning et al., 2008). Previous research has indicated that this gap, when combined with retire-ments, could result in a significant and permanent loss of institutional and experiential knowledge (Wolfe, 2008, 2009). Anecdotally, the authors have observed – but not quantified – that their successful female peers and colleagues are leaving water research and policy. Yet we are told as university students and new professionals that our industry has great opportunities and is also 'gender-neutral'. So why are all these capable and ambitious female colleagues leaving, and taking their hard-won water knowledge and experience with them?

The confluence of these factors means that Canada faces a serious and emerging challenge to its water resources management. Unless recruitment and knowledge retention are improved, Canada will be less able to anticipate, respond and resolve challenges within a rapidly evolving water context. We argue that there must be greater inclusion of long-term, comprehensive mentorship at all levels and stages within the Canadian WRPC. Through mentorship there will be greater availability of, and sustained access to,

diverse experiential knowledge. While it is not possible to prove with this study, we extrapolate that through other studies, evidence will show that availability and access to diverse experiential knowledge will substantially strengthen the overall quality of Canadian water management and governance over the long term.

## 2.2. Mentorship matters

By examining mentorship in the WRPC, we explore not only conventional questions about the benefits, challenges and appropriate structures, but also deeper issues about attitudes towards knowledge, professional relationships and personal compromises within what remains a largely male-dominated profession. For example, by using a qualitative approach and allowing participants to set the discussion priorities (as outlined in Section 3 below) we are able to unpack questions about gender, organizational and cultural expectations, career satisfaction, equity, power and ambition.

These additional questions are important because establishing viable mentorship relationships can be complicated. Mentorship is inherently informal and no meaningful relationship develops on command. Rather, it grows from complex, intangible interpersonal attractions, even if a formal program initially connected the individuals (Schor, 1997; Bozeman & Feeney, 2007; Ingram et al., 2009). Two major types of mentoring are psychosocial and professional (or vocational) mentoring (Kram, 1983). Psychosocial mentoring focuses internally on the protégé's personal growth. It provides friendship and counselling. Career advancement may be secondary to emotional well-being (Tharenou, 2005). Vocational mentoring, by contrast, 'entails mentors sponsoring their protégés for advancement, coaching them, providing challenging assignments and protecting them and making them visible in organizations' (Tharenou, 2005: 77). In these ways, professional or vocational mentoring focuses on establishing a protégé's legitimacy, identity and socialization within a professional community (Ingram et al., 2009).

In both mentoring relationships, different skills and knowledge can be invested, thus increasing trust, reciprocity, higher levels of career satisfaction and organizational commitment (Fagenson, 1989; Siebert et al., 2001; Egan & Song, 2007). There can be greater financial compensation and advancement as well (Dreher & Ash, 1990; Whitely et al., 1991). Research has found that, in mentorship relationships, female protégés could more readily access social professional networks and hierarchies from which they would otherwise have been excluded (Fort, 1995; Schor, 1997; Tharenou, 2005). Access to these networks can facilitate career progression as protégées build alliances (Bozeman & Feeney, 2007). Some results suggest that women's mentorship benefits are essential to a woman's career (Ragins, 1989; Fort, 1995; DeWall, 2006; Ingram et al., 2009).

Mentorship debates have focused on the most effective sources, types and the most influential pairing compositions, i.e., homogeneous or heterogeneous pairings by sex or gender (Sosik & Godshalk, 2000; Tharenou, 2005). In other words, it is not clear whether a female protégé benefits more from a male or female mentor. Much depends on how one delineates 'benefit' and methodological discrepancies make it difficult to establish meaningful comparisons between studies and across sectors (Scandura & Ragins, 1993; Burke & McKeen, 1997; Sosik & Godshalk, 2000; Tharenou, 2005; Allen & Eby, 2007; Ugrin et al., 2008). Longitudinal studies are necessary (Weinberg & Lankau, 2011). Since varying contexts may elicit vastly different outcomes, a mentorship analysis specific to the Canadian WRPC is essential. A methodology to undertake this task is outlined below.

# 3. Methodology

## 3.1. General approach and design

To explore mentorship's potential influence on female professionals operating within a WRPC, we compared two Canadian data sets. Our methodology was based on a data collection methodology reviewed and accepted by our University's Human Research Ethics protocol to ensure confidentiality and anonymity. In the results presented in Section 4, participants' identities and locations are treated confidentially. Their responses are cited only as Participant One (P1) through to Thirteen (P13), and occasionally by their professional category.

The first set emerged from essays written by female water researchers, visionaries, policy makers and advocates. Participants were female individuals pursuing or having completed an undergraduate university education, coming from a range of occupations and organizations, all related in some way to water resources. The essays reflected their personal and career mentorship experiences. Participants were informed of the intention to use their essays to help answer the research questions about mentorship and what factors influenced their contributions to water research and policy. We used a qualitative, open-ended approach to data collection, with content guidelines that were intentionally broad, to allow participants flexibility in expression and interpretation. Participants defined their own perspectives, prioritize the issues most important to them and to set the explicit boundaries for what they were comfortable contributing to the study. They were never asked for information about topics of gender identity/sexuality or work-place discrimination.

The second data set was based on case assessments of three national-level student and young professional (SYP) programs, their existing mentorship programs and key informant interviews. The Canadian Water Resources Association (CWRA) and the Canadian Water Network (CWN) have built water-related mentorship and young professional programs. The Walter and Duncan Gordon Foundation (WDGF), through its water policy granting and fellowship activities, supports an informal mentorship-networking program.

The essay data were then compared to the water organizations' mentorship structures and knowledge management mechanisms. The two data sets allowed us to evaluate the mentorship strategies' efficacy and responsiveness to future WRPC labor demands. We then assessed whether these organizational structures and mentorship objectives addressed the Canadian WRPC demographic changes and the knowledge management factors.

*3.1.1. Participants' essays.*   Drawing from our professional networks, we used targeted invitations that were sent via electronic mail to female participants from across Canada. The participants were then sub-categorized by their professional affiliations and their career stages. The categories used could broadly be defined as: visionaries (established professionals recognized as experts in their water field), policy makers (recognized civil servants at all levels of government and career stages), new researchers (individuals who were either students or non-tenured academics), established researchers (with tenure) and advocates (the broadest category, including individuals who held positions within the non-governmental community or private sector at all career stages).

In the invitation, potential participants were asked to write open-ended essays around general themes concerning their experiences with water, their professional histories, including their goals and opportunities, mentorship experiences, and issues of balance, priorities and responsibilities. Once the essays were received, qualitative content analysis (described in Hsieh & Shannon, 2005) was used to analyze them. An inductive

process was applied to identify themes from the essays collected, as described in the literature (e.g., Bryman *et al.*, 2009). Three thematic indicators were used in the thematic coding and assessment:

1. mentorship source and type (i.e., authority or peer, informal or formal);
2. mentorship composition (i.e., homogeneous, heterogeneous);
3. mentorship influence (i.e., personal and professional decisions and trajectory).

The hard copy essays were hand-coded according to these three themes and then organized within an Excel spreadsheet. The coded, electronic data were then re-checked against the hardcopy essays for accuracy of both transcription and context. Data in each of the three themes were then compared across all the participants, within the professional sub-categories and across career stages. We specifically sought information about response frequency, diction (e.g., intensity of emotion and word choice). This method allowed a robust comparison of the priorities and ideas across the participant categories as well as the intensity with which certain ideas or options are held. The results are presented in Section 4 and discussed in Section 5.

*3.1.2. SYP and mentorship programs in Canadian water organizations.*   The second data set was three case assessments of the CWRA, the CWN and the WDGF. We looked specifically at how these organizations addressed knowledge management and demographic change. We also compared the organizations' SYP and mentorship programs to the first data set. We built case descriptions using: (1) the parent organization's mandate and history; and (2) the SYP/mentorship program's rationale, design, mandate and fit within the parent organization. Preliminary data were collected from the organizations' websites, followed by semi-structured telephone interviews with individuals in each organization[1] to deepen and extend the assessment. This was followed by two semi-structured interviews, with McFadzen at the CWN and Morris at the WDGF, to deepen and extend the assessment. The second author of this paper, who was also the national coordinator for the CWRA program, submitted information regarding CWRA. Each interviewee was sent a list of prescribed questions ahead of their telephone interview. Interviews lasted approximately 30 min each. In the interviews, we focused on the program's creation, whether or not the mentorship concept and activities were formally recognized, how the program recruited and whether it retained members over time and across life-career stages.

The case data set was coded and compared against the essay data. The results of this process represent a detailed, qualitative assessment of both individual and organizational mentorship priorities and knowledge management in the Canadian WRPC.

# 4. Results

## 4.1. Essay response rates and results

We found strong interest in the participant recruitment method and topic viability. Thirteen of 23 people submitted essays in response to our request, with representation from western and central

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[1] Tim Morris, Freshwater Resources Protection Program Officer (WDGF); Stacey McFadzen, Communications and Event Planning Specialist (CWN); Seanna Davidson, Mentorship Coordinator (CWRA).

Canada and Quebec. Of the 10 invitations that did not generate an essay, five people responded to the invitation and indicated that they were willing, but unable, to submit essays. Their non-submission explanations included professionally imposed constraints (one person) and impending professional deadlines (two people). Two people agreed to send essays but did not. Five people did not respond to the invitation or to a subsequent query to confirm invitation receipt.

Of the 13 final participants, there was not an equal distribution among the policy makers, new and established researchers and advocate categories. For example, with the New Researchers, we received a 100% return rate while none of our Established Researchers responded to the invitation. Participants' essays averaged 2,300 words. Twelve of the 13 participants indicated that they had found it difficult to write the essays and required multiple deadline extensions of up to 8 months.

*4.1.1. Mentorship sources and type.* In the early parts of their careers, participants indicated that multiple authority figures and colleagues had mentored them in the form of encouragement and exposure to new ideas or opportunities. These authority figures were usually academics: high school teachers (P11), professors and academic supervisors (P12), as well as employers and parents. The mentorship varied in formality and duration. For one participant, career mentorship came as a book given as a gift from a professor 'because [they] knew I had a fledgling passion (P3)'. This represented encouragement to pursue a new study area. Other mentorship relationships were longer term and evolved over the duration of participants' studies. P2 wrote that her graduate experience included 'an amazing network of people who would take the time to listen to your ideas, to mentor and encourage new ideas and collaboration'. P10 indicated that she received 'constant encouragement … [and] … fortuitous exchanges' from her professors. Participants' opinions on what constituted a 'good' mentor were very similar. Mentors' characteristics included: 'being inspiring, forward-thinking' (P4); and caring, supportive and a second family (P13). Additionally, mentors treated their mentorship recipients with respect and trust, while being 'well organized, enthusiastic, and consistent in their dealings with others' (P12). In these early study stages, protégées were often recipients of inspirational mentorship of either heterogeneous or homogenous pairings that offered new ideas and opportunities.

As women aged and began to consider mixing motherhood and professional identities, mentorship preferences shifted for some participants from inspirational mentorship to psychosocial mentorship. Motherhood and the need for 'work–life balance' were frequent essay themes mentioned in 12 of the 13 submissions. A motherhood 'identity', along with new opportunities and associated responsibilities, were referenced as turning points in participants' careers and their perspectives about their future trajectories. Motherhood created an increased interest in homogeneous female mentoring: a female protégé pairing that offered psychosocial mentorship, particularly amongst professional women who had children. P6 wrote, 'now that I have a child, I do wonder if I missed out on the opportunity to learn from other women who might have helped me prepare for the juggling act of a professional mother'. Other participants indicated that they wanted to be motivated by other women who had successfully balanced their careers with children, or learn what compromises were necessary to do so. While all professionals struggle with the compromises and time constraints that parenthood imposes, implicit to the participants' responses was that women – not men – who had lived this experience would provide the most effective psychosocial mentoring.

All participants, with or without children, recognized the 'ongoing struggle (P10)' to achieve a work–life balance. Another wondered how to create a professional life that could 'adapt and grow along with

our own (personal) journeys' (P4). One policy maker, not yet a mother, indicated that she foresaw future challenges in balancing the various aspects of her life. She wrote, 'I'm trying to renovate an old house, start a family, volunteer, work and live life. Maintaining ties to the water realm is something that I perceive will be more of a challenge over time' (P3).

Participants' emotional reactions to this work–life balance dilemma varied. One reflected, 'in order to be happy, healthy and successful, I try to balance the three priorities in my life: me, my family and my work' (P11). Another was optimistic and wrote that 'generations of women have pushed the boundaries in different ways and I will do the same…I will encourage life and work balance and discourage feelings of inadequacy and guilt' (P2). P6 wrote of her feelings of grief and guilt:

*'Being a parent has caused much inner conflict and challenges in my work life: not enough time… feeling overwhelmed by workload and torn between guilt over not getting work done or leaving my son in childcare … [and] the seemingly split personality between being a mother and a researcher.'*

The responses to perceived challenges also varied. Pragmatic assessments included the 'big issue' of quality childcare and the contributions of a supportive spouse, allowing for 'travel, scheduling and workload requirements' (P12). Others wrote of significant family events, such as their parents' declining health, as turning points in their careers and family priorities. One researcher decided to re-prioritize her goals and trajectory by working 'only part-time' (P6). A policy maker requested a demotion from an Acting Manager assignment – even though it was 'exciting and challenging…all-consuming' (P11) – so that she could restore a healthier work–life balance and spend time with her new husband and four step-children. Another policy maker recognized that her career path and goals would need to 'get more focused' and that she would need to eventually contend with the compromises associated with the 'impacts…of a growing family, deeper roots, etc.' (P3).

Female water professionals at all ages are well aware of the challenges they face in balancing both professional and personal expectations. How the ideas about mentorship sources and a shared rationale of work–life balance influence knowledge management, long-term labor retention and Canadian water research and decision-making are explored below.

*4.1.2. Mentorship composition.* The essays provided no consensus as to whether mentorship composition should be homogeneous or heterogeneous gender pairings. Some participants indicated that their female peers were important but only as informal mentorship sources. P3 discussed how she found 'comfort in how many of my peers working in the field are women [because] I see them making a great contribution to Canadian water policy issues'. P11 indicated that learning from 'strong female role models', whom she saw as well represented in the senior management of the Ontario provincial government, was an important source of stimulation.

Other participants indicated that they felt they had missed opportunities to be mentored by women. P12 recalled that during her childhood:

*'Although some women I knew worked outside of the home, very few had a profession. As a result, as a child I wouldn't say that I had any real women as mentors in terms of career opportunities… [Women mentors] would have been very helpful, both in terms of career opportunities but also in considerations of family and children.'*

Participants indicated that their friendships with female co-workers were 'more enduring' and 'deeper' (P11). Female mentors provided examples of being in 'careers in which you aspire, giving examples of how to handle family and work issues…[and helping to clarify] what I want from my career, and in my dealings with family and workplace issues' (P12).

But participants also mentioned many male mentors who provided 'simple support and encouragement' through roles as academic teachers, advisors or employers (P6). The participants' ambiguity over whether a heterogeneous or homogenous gender pairing in mentorship is more beneficial reflects the ongoing debate within the literature. This debate includes recent research indicating that it is not mentorship that most benefits young female professionals but sponsorship by male mentors (Hewlett *et al.*, 2010). Participants' responses also reaffirm explicit societal expectations that the Canadian water policy and research community – as a group of professionals – is 'genderless' or gender-neutral. This is despite a perception or observations by some participants that the male to female ratio at a table is 'not always in equal numbers or with similar age distributions' (P9).

Overall, participants observed that mentorship composition was less important than having a shared vision, interests and values between the mentor and protégé (P13). P6, reflecting on her engineering role models at the beginning of her career, said:

> 'I don't know that I would have considered [male colleagues] as 'Mentors'…I don't think I ever really sensed that we shared a common vision… I can't actually recall a single colleague…whose ambition was to preserve the health of water ecosystems, or for that matter to even care about the environment or water in a meaningful way. This left me feeling lost, uninspired and disillusioned.'

P12 observed that the best mentorship relationships were between pairs from similar countries, cultures and research fields; she concluded that the 'matching of personalities and, as in any relationship, friendship and respect are of utmost importance' (P12). While our data found little consensus on mentorship composition, the availability of mentors for women or the most effective strategies to address the work–life balance challenge for professionals, there was an indication that shared values and visions were important.

*4.1.3. Mentorship influence.*   Participants were unanimous about mentorship benefits at all career and life stages. Mentors were considered 'critical to making the transition from the classroom to the field' (P8). They helped to build an individual's confidence (P12) and were able to unlock 'a world of academic passion and opportunity, along with a realization that other adherents of faith had similar interests' (P10). Conversations with mentors, and the opportunities that mentors made available, shaped decisions and were considered essential for future success (P6, P13).

As a result, participants indicated that they were deeply committed to the mentorship process, themselves providing both informal and formal mentorship investments. A policy maker (P3) wrote that she spends the 'majority of my free time with people talking and working on the subject [of water]'. In conversations with her colleagues, she shares 'news and job information as we look to expand our influence and ideas. We get each other to engage in events and activities' (P3). A senior policy maker also focused on supporting women in the water field: 'I see myself with an important role. Given my age and mid-career status, I really want to support those around me to find good jobs and be engaged' (P3). Other participants wrote of encouraging and engaging others, particularly young children and new

professionals, to pursue their passions (P3; P4; P5; P11), to 'foster respect for different ways of knowing' (P13), and to better connect ecosystems and human rights priorities (P9).

Given the detailed responses from the individual participants – their opinions on mentorship necessity, availability, composition and value – we found it useful to compare individuals' responses with organizational structures. Below, we present the program assessments of the three SYP and mentorship programs, followed by our assessment of the two data sets, comparing the possible source, composition and influence of mentorship within the Canadian WRPC.

### 4.2. Canadian SYP and mentorship programs

In this section, we detail the SYP and mentorship program profiles of three Canadian water organizations. By examining the profiles of the parent organizations as well as those of the SYP programs, it is possible to interpret to what degree the value of SYP programs and mentoring is recognized by the parent organizations. The characteristics of each mentorship program are outlined in Table 1.

*4.2.1. Canadian Water Resources Association (CWRA).*   The national CWRA originated with the Western Canada Reclamation Association's focus on water development, control and use. It now has a diverse professional membership from across sectors. Its goal is to promote effective water management through publication of the *Canadian Water Resources Journal*, scholarly reports and its annual conference. Its governance structure includes an Executive Director, a national board and provincial chapters.

The CWRA mentorship program evolved informally from a conversation between the Students and Young Professionals (SYP) group and the CWRA's National Executive and Board. Stronger ties between the SYP and established professionals were seen to promote cross-generational dialogue and organizational strength. The SYP's proposed mentorship program was endorsed at the 2006 Annual Board Meeting. The mentorship program specifically addresses three of CWRA's strategic goals: (1) improved communications among water resources professionals; (2) an increased profile for the organization; and (3) effective management and development of the association. Simultaneously, the SYP aimed to strengthen students' and young professionals' capacity through four goals: networking, knowledge sharing, building SYP membership and building CWRA membership.

In 2007, the program launch had 30 mentorship connections. But because students and young professional volunteers ran the mentorship program, contribution fatigue was a significant problem. In 2009, when the mentorship relationships stalled or declined, the SYP hired a salaried program coordinator. The coordinator's[2] responsibilities were to restart the mentorship program, as only a few of the 30 mentorship connections were still active. In addition, the coordinator initiated direct communication between the groups by posing a question to stimulate discussion as needed. In 2010 the program was re-launched with 25 new mentorship relationships and peaked at 40 mentoring relationships.

*4.2.2. The Canadian Water Network.*   Established in 2001, the CWN is one of Canada's Networks of Centres of Excellence (NCE) programs. The CWN was designed to create partnerships and to facilitate cross-sectoral communication related to clean water provision. It is a federally funded program in collaboration with industries, universities, provincial and local governments and other agencies, and its

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[2] Authors' disclosure: Davidson has been the CWRA's mentorship coordinator since September 2009.

Table 1. Mentorship in select Canadian water organizations.

| Organization | CWRA | CWN | WDGF |
|---|---|---|---|
| Initiated by | Student and young professional | Board | Organization (program officer) |
| Mentorship type | Psychosocial through organized program | Both psychosocial and professional through informal relationships and formal education | Psychosocial informal relationships |
| Member retention | Not a strategic activity | Not a strategic activity | Not a strategic activity |
| Support mentoring on work–life balance | Not specifically required, but may take place | Not specifically required, but may take place | Minor evidence of support |

purpose is to develop research projects and initiatives that address current and emerging Canadian water issues. The Board of Directors holds executive authority and is composed of industrial, governmental, non-governmental and academic members, and community leaders. The CWN also has multiple committees, including a Students and Young Professionals committee.

The Network did not officially recognize the importance of students and young professionals until the 2003–2004 annual report. The Directors anticipated a significant need for innovation in Canadian water issues. As a result, the CWN Student Committee was constituted in 2004, extended to include young professionals and then recognized as the Student and Young Professionals Committee (SYPC) in 2005.

Under the SYPC umbrella, any student or young professional engaged with water issues, and with less than 5 years of professional experience, is eligible for membership. The SYPC draws elected representatives and a volunteer base from across Canada. Until 2010, the SYPC representatives were elected annually. Representatives are now elected on a 2-year cycle.

The SYPC's mandate is to increase SYP awareness of and involvement in the CWN. It has four goals: (1) build and sustain CWN's network of students and young professionals; (2) increase the employability and quality of new and emerging research and water managers; (3) expand perspectives in the water management and research community; and (4) facilitate broader outreach and education initiatives. To achieve these goals, SYPC volunteers organize courses, workshops, internships and exchange opportunities for its Canadian members. Similar to the CWRA's mentorship program, the CWN's SYPC supports the development of a more diverse and highly skilled WRPC (McFadzen, 2010).

Because a CWN goal is to develop opportunities related to safe water research, the creation of an SYPC for members fits with its parent organization. An SYPC representative acts as a liaison between the younger members and the CWN Directors. Since establishing the SYPC, the CWN has also created other partnerships with young professionals. For example, it contributed to the Waterlution Water Innovation Lab (2010), a workshop series dedicated to developing the next water leaders and decision-makers.

*4.2.3. Walter and Duncan Gordon Foundation (WDGF).*    The WDGF, with its Water Fellowship and Mentorship program, is an independent grant-making organization focused on the development of effective Canadian public policies. As a non-governmental organization (NGO) the WDGF is not framed by the membership drive and intellectual conventions of a professional organization. Nor is it dependent on federal financial resources or a focus on research or professional development. Thus it is permitted to contribute how and when its Board prefers. For example, the WDGF's former Freshwater Resources Protection Program promoted three aspects of Canadian freshwater protection: sustainable watershed

governance, groundwater conservation and transboundary water security. The WDGF Board saw the water policy community as largely dominated by senior executives and believed that investing in 'new blood', i.e., emerging researchers, would be an important contribution to the community (Lucas, 2010).

The WDGF's Water Fellows program (2004–2009) supported graduate-level research that could be integrated into policy and decision-making. It sponsored four annual fellowships for graduate students (masters and doctorate-level) from Canadian universities[3]. Five subsequent cohorts were funded until the program's termination. The Fellowship objectives were to: (1) support emerging water leadership; (2) build capacity in Canadian NGOs by establishing a mentoring relationship between students and established policy leaders; and (3) promote more effective links between academic research and public policy. Within this arrangement, the Fellows were required to work in partnership with a non-governmental organization and with a designated Fellowship advisor. Their tasks were to research and develop a policy report that extended from their graduate research.

The Fellowship program management adapted to the Fellows' different obligations, ensuring that all would have equal opportunity to participate. For example, following a discussion between a female Fellow and the Program Officer (Lucas), the WDGF implemented a CND$1000 childcare grant for male and female recipients. This grant was intended to offset associated childcare costs (travel, research and supplementary childcare expenses) associated with the WDGF Fellowship. While the cost impli-cations were minimal – only one Fellow requested the subsidy between 2006 and 2009 – the WDGF and Board 'acted swiftly' because it was recognized as 'an important precedent and message to other fellowship and grant programs' (Lucas, 2010). With such flexibility and support for early-career researchers and their families, the program met one of WDGF's goals of strengthening public policy by integrating academic research with innovative public policies.

Mentorship was also recognized as integral to the WDGF Fellows program. Mentorship took place on two levels. First, a direct, formal mentor–mentee relationship was established between a Fellow and the NGO partnership advisor. Second, informal mentoring relationships arose from the Fellows' partici-pation in retreats and workshops designed to foster peer learning, networking and collaboration. Since all Fellows (2004–2009) had been invited to attend these events, the informal mentoring tended to cross sectors and professional levels. Maintaining this active alumni community was one way the WDGF supported the professional retention of its Fellows. The WDGF also invited 'emerging water leaders', i.e., young professionals involved with the WDGF but who were not Fellows, to its events. This mix of young professionals – academic Fellows and their peers working in applied settings – helped to address communication issues among water professionals with diverse interests.

The WDGF did not accept any new Fellows in the 2010 granting cycle. This was based on the priority of keeping numbers low – there are only 20 Fellows in total – to allow for highly effective programming and to avoid saturating a small water policy community (Morris, 2010).

## 5. Discussion

The essays and the organizations' data were compared against the indicators of mentorship source, composition and influence. Mentorship source here includes a full range of interactions, including

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[3] Authors' disclosure: Wolfe was a WDGF Water Fellow in 2006–7.

informal and formal relationships and structures. Composition includes homogeneous or heterogeneous gender pairings. Influence focuses on personal and professional decisions and trajectory. These comparisons and findings are presented below.

### 5.1. Mentorship source

The essays indicated that most mentoring occurred during early academic and professional training. Participants wrote that, in their experiences, influential mentorship tended to be informal. They also demonstrated that small acts had a significant and lasting impact on protégés. There was limited discussion of Mentors' roles generating access to professional networks. But participants emphasized the benefits of psychosocial mentorship as received through encouragement, inspiration and exposure to new ideas and Mentors' willingness to treat protégées with respect. There was disagreement on whether there was sufficient opportunity for formal mentorship and, hence, skill development and knowledge exchange. Mid- to late-career mentorship was not indicated as being available to, or at least recognized by, the participants.

Similarly, our review of water sector mentorship programs suggests that there has been some recognition of the need for, and the benefits associated with, mentorship for primarily emerging professionals. But even these programs vary dramatically in their scope. It is not yet clear how mentorship programs can most effectively connect protégés and mentors. For example, the CWRA mentorship program was the most formal or structured in this study. It makes direct connections and ongoing interventions between protégées and mentors through the national coordinator. The CWN's program focuses specifically on skills and professional development through networking events and seminars. But because the CWN's student chapters are self-organized by graduate student volunteers, this model creates instability, uncertainty, fluctuating event cycles and a lack of a long-term SYP vision (McFadzen, 2010).

The WDGF is more closely aligned to the mentorship characteristics as described and prioritized in participants' essays. The WDGF program represents a hybrid between the CWRA and CWN professional and formal structures and the psychosocial support identified as necessary in the essays. The WDGF Fellows program develops the professional capacity of young researchers and also supports peer learning and networking through their Fellows' retreats, seeking specifically to keep the group of Fellows small in order to engage them in meaningful dialogue on a personal level (Morris, 2010).

### 5.2. Mentorship composition

The essay data did not resolve the question of which mentorship composition – homogeneous or heterogeneous pairings according to sex – was the most effective or influential in women's career trajectories. Some participants wrote that they preferred women role models leading by example. This was particularly true during early motherhood, as an actual or anticipated role, when both emotional and practical mentorship was considered essential. For other participants, homogeneous pairings were less important than the alignment of values, priorities and compatible personalities between mentors and protégées. The compatibility theme was expressed in all participants' essays indicating that Mentors' characteristics should include provision for support, encouragement and inspiration. The essays indicated that mentors provided more psychosocial type mentoring regardless of pairing composition.

Because the surveyed organizations have not yet undertaken a mentorship source or composition assessment within their programs, it is difficult to make a direct comparison with the essays. However,

extrapolating from their structural and procedural evidence, we found that the CWRA coordinator made an effort to match the expressed needs and preferences of the protégées and mentors. This may include the designation of homogeneous or heterogeneous compositions, as well as attempting to match the perceived skill development and information needs expressed by the protégée. The CWN's SYP program does not focus on mentorship interactions but rather on formal knowledge transfers from within the water sector through professional events, peer learning and association with established researchers' projects. This approach implicitly acknowledges that current student researchers will be, potentially, Canada's research future.

Finally, the WDGF's mentorship program is the most laissez-faire of the three organizations surveyed. The WDGF approach to promote mentorship connections is through informal events such as dinners, annual mini-conferences for Foundation-supported researchers and through email introductions. There is an unstated expectation that former award holders will act as informal mentors for incoming fellows but this is not a requirement (Morris, 2010).

## 5.3. Mentorship influence

Informal mentoring was identified as an important role for female professionals within the WRPC. Participants wrote how influential discussions about the family and career can impact one's choices and wellbeing. Our data indicated that mentorship has been critical in providing information on options and strategies for women who want both a family and a career derived from their formal education. Participants also indicated that because of the mentorship they themselves received, they held a sense of obligation to mentor the career development of others. But the essays also identified a meaningful gap in water mentorship programming. While a number of participants commented on various mentorship activities and engagements, only three directly mentioned their participation in a formal mentorship program. This lack of opportunity is significant given that several participants argued for greater mentorship and engagement with mid-career and established water professionals.

This study did not assess the influence of mentorship on specific individuals within the CWRA, CWN or WDGF programs. However, from the structure of the programs, we could partially extrapolate its potential influence on the participating organizations. For example, the CWRA mentorship program is not explicitly designed to recruit members. But increasing SYP membership through the mentorship program does contribute to overall membership and conference participation. This membership growth supports the organization's strategic goal of increasing the organization's profile and development. Involvement or membership in the CWN'S SYP program requires no financial fees, or professional or scholarly affiliations. But most student members are affiliated as a result of federal funding supporting their research (McFadzen, 2010). Nor has the WDGF assessed the influence of their fellowship investments or their mentorship activities on individuals or on their organization. This gap represents a significant opportunity for future research from both a scholarly perspective – to assess the implications of mentorship on the water sector as a whole – and from a programmatic perspective to improve the viability and influence of existing programs.

## 6. Conclusions and recommendations

In this paper, we have proposed that diverse human resources are important for knowledge retention, more comprehensive problem solving and, ultimately, more successful policy construction, adoption

and implementation. The WRPC must attract and retain all its human resources, given the influence of impending demographic changes. Within the WRPC, low recruitment will erode institutional knowledge resources. Seasoned professionals are retiring and new voices and perspectives are surfacing and showing great potential, but the possible loss of acquired knowledge cannot be stemmed without an understanding of how to fully engage the new talent that is emerging with this demographic shift. Failure to do so will weaken the WRPC's ability to anticipate, study and respond to the evolving water context.

By comparing individual professionals' mentorship experiences with mentorship programs in three organizations, we found contradictions in the approach of the organizations and individuals' priorities. For example, our participants recounted their desire for what we termed 'inspirational mentorship' during their studies. In contrast, our young professional participants indicated that 'work–life balance' was an important factor and prioritized psychosocial mentorship. Unfortunately, only one organization acknowledged this need for psychosocial mentorship by young professionals attempting to balance parenthood with professional responsibilities. Some participants also indicated that they found mentorship from other women – while difficult to establish and sustain because of time constraints – highly valued and useful to navigate questions associated with work–life balance. The three organizations' SYP and mentorship programs did not indicate any consideration for this preference and mentorship need. Finally, our participants mentioned that the sources and types of mentorship that they needed varied over career stages and that mentorship opportunities are essential over the whole of a career's duration. The comparison of the three organizations and their mentorship program approaches suggest specific opportunities for Canadian water organizations to both refine and expand their mentorship programming in order to retain membership and strengthen the WRPC overall.

Given these results, we suggest a closer alignment between the focus of current mentoring programs and the needs identified by our essay participants. Career and life stages must be taken into account by programs, with a clear articulation of whether the protégé is seeking psychosocial or vocational mentorship and their preferred pairings. As it stands now, formal mentorship programs offered by the case organizations assume a rather haphazard, one-size-fits-all approach. In addition, greater focus should be allowed for vocational training that allows for transmission of knowledge between retiring professionals and young professionals. Efforts to consciously and directly transfer not only technical skills but also qualitative knowledge relating to the social aspects of water resources (such as water policy and governance) must be incorporated into mentorship programs.

Over the next decade, by complementing the informal mentorship that may spontaneously develop, these water organizations have an opportunity to directly influence knowledge transfer within the community. Additional research – drawing on longitudinal data from informal and formal mentorship relationships, as well as comparing male and female responses to mentorship experiences and priorities – will support this endeavor.

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