

## **Evolution of Capacity Strengthening: insights from the Canadian Community of Practice in Ecosystem Approaches to Health**

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(2008-present, [www.copeh-canada.org](http://www.copeh-canada.org), listed in Acknowledgements).*

**Abstract:**

*We describe a Community of Practice focused on capacity strengthening across higher education institutions in the complex field of ecosystem approaches to health. Incubated through the co-design of a Canada-wide intensive face-to-face course, the Community of Practice generated a teaching manual with flexible formats to extend our reach to other academic faculty and practitioners. We describe how the development of collaborations (process) has been dynamically linked with learning about ecosystem approaches to health (content domain) in ways congruent with the field's complexity. We argue that cross-university, grounded Communities of Practice are particularly appropriate for transdisciplinary educational initiatives tackling the daunting socio-ecological problems, and the associated health and sustainability challenges, currently facing humanity.*

**Key Words:**

communities of practice, emergent practices, collaborative learning, collaborative relationships, ecohealth, transdisciplinarity, professional development.

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## Introduction

Intentional Communities of Practice (CoP) have been an explicit feature of higher education for almost two decades (Malcolm & Zukas, 2000), including efforts to assist new teachers (Viskovic, 2006) and provide development opportunities to existing faculty (Sherer et al., 2003). Wenger and colleagues (2002) set out three components of communities of practice: domain (common areas in which we work), community (who is working together), and practice (the kinds of activities we do together). Beyond sharing experiences, CoPs have enabled and supported interest in the situated and participatory nature of faculty-researcher learning, in addition to such learning for their students. In their introduction to a special issue of this journal, Cassidy and Gurm (2016) proposed the term transformative CoP, to reflect the role of CoPs in transforming higher education and adult education practices.

Our domain, ecosystem approaches to health (or ecohealth), responds to the need for more systemic framing and approaches to complex health challenges emerging at the human–environment interface (Webb et al., 2010). An emphasis on "Ecosystem approaches" has expanded since early use associated with a 1978 Great Lakes Research Advisory Board report to the International Joint Commission focused on managing water resources as part of ecosystems (Waltner-Toews et al, 2008; Webb et al 2010). Researchers working with Canada's International Development Research Centre (IDRC) coined the term "ecohealth," expanding environmental health framings and taking up the opportunity provided by sustainable development discourses, to link the latter with the health of humans, animal and plant species, and the ecosystems of which they are part (Cole et al., 2006). With IDRC support, ecohealth research multiplied globally and a journal *EcoHealth* was founded in 2004; a marker of recognition of the new field, which has continued to develop (Saint-Charles et al., 2014). Capacity-strengthening initiatives were developed concomitantly in order to assist students, practitioners and researchers grappling with emerging transdisciplinary, participatory processes addressing complex socio-ecological problems in transformative ways. Although many were initiated in low and middle-income countries (e.g., Orozco & Cole, 2008; Waltner-Toews, 2009; Parkes et al., 2009), some educational efforts were championed in high-income countries (e.g., a supplement in the first volume of *EcoHealth* edited by Howard & Rapport, 2004).

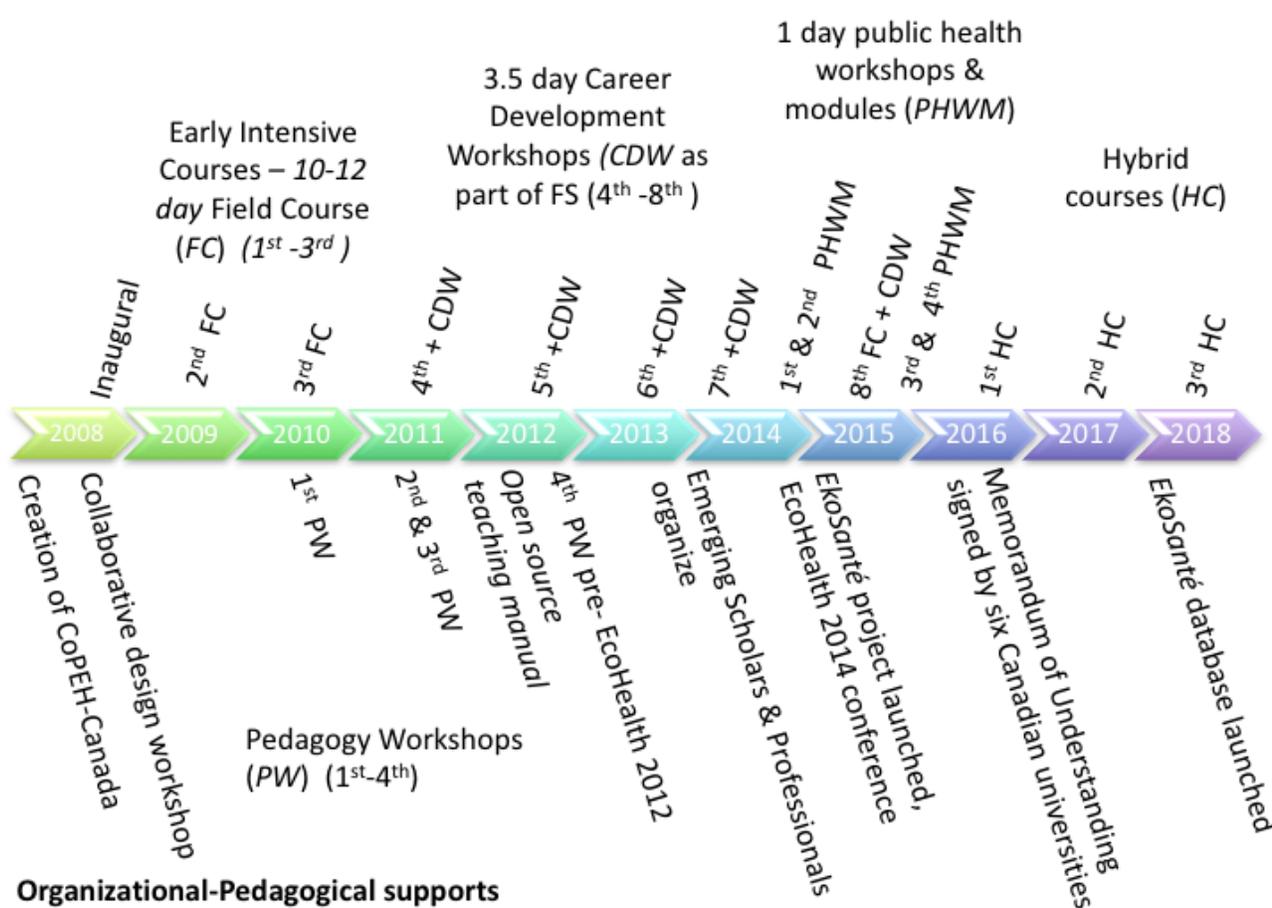
Communities of Practice in Ecosystem Approaches to Health (CoPEHs) grew out of the desire among researchers, teachers and practitioners to share knowledge and experiences about the emerging field and to provide explicit support for networking, collaboration and capacity-strengthening across multiple regions (Parkes et al., 2012). A characteristic of CoPEHs has been a reciprocal dynamic between *process* and *content* in the emergence of different kinds of educational initiatives: a relationship we explore throughout the paper. Collaboration, learning and exchange (process) in ecosystem approaches to health (content) have been linked in order to stimulate the kinds of socio-ecological transformations required both in Canada and globally. This paper draws upon experiences as faculty-instructor-facilitators (teaching team members) in 'teaching ecohealth' through diverse, emergent initiatives that have been supported by an evolving CoPEH.

## Context

CoPEH-Canada, the Canadian Community of Practice in Ecosystem Approaches to Health (CoPEH-Canada, 2008) brought together a pan-Canadian consortium of researchers and practitioners across three regions or 'nodes': the Québec, Atlantique,

Acadie Node; the Ontario Node; and the Western Canada Node (<http://www.copeh-canada.org/en.html>). These nodes respond to different regional and linguistic (French and English) realities of Canada. As CoPEH-Canada evolved, we came to describe ourselves as an “adaptive community of scholars and practitioners dedicated to the understanding, teaching and application of ecosystem approaches to address current challenges to a healthy and sustainable global future.” (See [www.copeh-canada.org](http://www.copeh-canada.org)). CoPEH-Canada seeks new ways to respond to challenges and dilemmas at the interface of health, environment and society that have been inadequately addressed using traditional, academic and international development approaches. Among the numerous ways in which CoPEH-Canada has engaged over its first decade, a particular focus has been on the iterative generation of a range of educational initiatives (see Figure 1, top half), building upon each other and supported by different organizational initiatives (see Figure 1, bottom half) and funders (see Acknowledgements).

**Educational initiatives**



**Figure 1. Timeline of Educational Initiatives and Organizational Activities Supported by the Canadian Community of Practice of Ecosystem approaches to Health (CoPEH-Canada) 2008-2018.**

**Abbreviations: CDW, career development workshops; FS, field schools; HC, hybrid courses; PW, pedagogy workshops; PHWM, public health workshops & modules.**

Several of the initiatives depicted in Figure 1 have been described in reports to funders (Webb et al., 2012; Parkes & Reschny, 2015; Saint-Charles et al., 2017). Ongoing research and evaluation has been a consistent stream of activity throughout, particularly

for the named authors who have been part of a CoPEH-Canada research-evaluation team, resulting in an earlier paper which focused on collaborative learning among trainee participants in our first three field courses (Parkes et al., 2016). Former trainees have led papers on their and other's experiences both within the academy and in Canadian and international CoPEHs (Feagan et al., 2014; Feagan, 2018; Oestreicher et al., 2018). In this paper, we take a broad look at CoPEH-Canada's first decade of educational initiatives from the stance of reflective scholar-practitioners, engaged in multi- to transdisciplinary educational practices (Miller-Young, 2016). As in other multi-faceted, extra-organizational communities of practice, our perspectives have been shaped by a myriad of community, university, practitioner and trainee colleagues, partially reflected in the Acknowledgements. This paper traces one arc of development, whereby foundational field courses informed a subsequent range of educational initiatives, including workshops, teaching modules, a multi-site hybrid course, and other emergent endeavours. In our recounting here, we describe the cycles of learning, practice, adaptation and additional learning involved in this arc, and reflect upon these cycles in a later section (Reciprocal Relations of Content and Process below).

### ***Developing and Delivering Early Field Courses***

Collaborative curriculum design (Stewart et al., 2016) among a core group of faculty, trainees and staff from multiple universities and disciplines began in 2008. For each iteration of the course we met face-to-face twice to develop teaching material that provided students with content associated with the emerging field of ecosystem approaches to health while also facilitating collective dynamics that promoted collaborative learning and exchange. In its inaugural efforts, the CoPEH-Canada team was challenged with this dual purpose of designing *content* that furthered the domain of ecohealth while also attending to *processes* of collaborative work.

The annual collective design and delivery of a 10-12-day ecohealth intensive course provided a timely opportunity for the teaching team to clarify their orientation and priorities for ecohealth research and practice, and to synthesize these in terms of negotiated pedagogical approaches. These efforts came to be seen as a central form of CoPEH-Canada's shared *practice*, similar to the collaborative, curricular change process in a university athletics program described by Yeo and five colleagues (2016). However, rather than a relatively stable disciplinary group with an educational developer, our community had to draw together independent, and previously unconnected, colleagues, some with experiences of initiating ecohealth-related courses internationally and a few at their own universities. Reflecting on the work of Viskovic (2006) who described teachers learning about teaching informally and experientially in particular institutional settings, we see the development of the field course curriculum and its revision as providing impetus for collaborative learning and capacity building among individuals (learning by engaging in and contributing to the design and delivery of the field course). It was also among the CoPEH-Canada 'community' that lessons were learned which refined practices and informed generations of new members. For example, hard collective work was required to shift away from a content-heavy curriculum, toward a design with substantial outdoor activities (hence use of the term 'field course') and with adequate space for reflection and process-oriented learning.

One expression of commitment to learning from our evolving practice was the conduct of a research and evaluation process that ran alongside the course implementation (see also Parkes et al., 2016). This consisted primarily of on-line, short-term surveys (STS) of

the teaching team and students shortly after each field course as well as medium-term surveys and interviews (MTSI). Here we identify ways in which early field course experiences and important insights from faculty or teaching team members offered foundational lessons on both content and process.

Reflections on course development highlighted ways in which members the teaching team were active learners, expanding their own understandings of ecohealth:

The course provided both practical experience (including tools) and an enlarged theoretical basis for my understanding of and approach to ecosystem health. The course design phase led to new relationships with interdisciplinary colleagues and entirely new fields [...] where tools and concepts provided a valuable extension of the skills and approaches long included in my practice. [STS 2008]

The course also provided a context for members of the teaching team to see benefits of a CoP to support their own research and scholarly practices:

[The course] gave a safe place to discuss and reflect on my research. ... Being in a university where there is not a core ecohealth group and being surrounded by people who are very specialized and not inclined to transdisciplinarity and participation, the creation of a community of practice, the inclusion in a team of people who want to move forward and do research that changes the way we think is very stimulating and breaks isolation. [STS 2008]

Explicit efforts to develop creative aspects of the course were noted, with application that extended to collaborative work:

I was very struck by the myriad of ways in which the aesthetic learning setting AND the integration of creativity seemed to be instrumental in facilitating learning, trust, relationship building and fun during the course. I know this intuitively and have experienced it in other settings, but the impact was very obvious to me throughout the course, and directly expressed to me in my interaction with other participants. One person said something like - the creative aspect of the course helped open her eyes to the connections between ideas in ways that she has never experienced before, and may not have been open to otherwise. [STS 2010]

Some responding teaching team members discussed how interactions with other researchers from other disciplines pushed them toward new ways of thinking:

I was able to learn both in response to what others were saying or doing during the course and during interactions with others during the course. What I took away is that many minds are greater than one mind. Many minds learning together can make one person's mind stretch in unfamiliar directions and allow it to think about things he or she never would have thought before. [STS 2009]

At the heart of my learning about collaboration is the experience of working with others so that the whole is more than the sum of its parts. This means that I get to learn, think and act in ways with others that would not have been possible on my own. This helps me to better understand my contributions to work individually and in a team, but also reinforces why and how I am likely to want to find ways to work with others to deal with complex problems. [STS 2009]

Some remarked on the emotionally charged nature of their experience in particular session.

The stakeholder meeting in Hamilton was a pinnacle for me. There was a palpable transfer of power from academics (and students in academia) to the general group, to many more voices. It had a passion and real-ness that was unmatched in any other part of the course, for me. [STS 2009]

CoPEH-Canada members have challenged the research, practice and education system in their own field and department. They give me the desire to continue in research and to put forward distinctive approaches that better answer to the needs of communities despite the difficulty. Each time, I really enjoy the philosophy sessions which always take me on a slippery slope where my mind did not dare to venture!!!" [STS 2009, translated from French]

While others found solace.

The course continues to inspire hope in spite of the bleak future it looks like we're facing. The fact that some people are thinking as I think and that the students are so enthusiastic is a great solace. [STS 2009]

Course planning and implementation, as well as subsequent CoPEH-Canada interactions, provided opportunities for solidifying networks and relationships within the emerging CoP. Interview reflections (MTSI) and critical assessments of course content consistently demonstrated that the ability to establish significant connections and engage in discourse surrounding shared values was a highly regarded aspect of course participation and CoPEH-Canada membership. Relationships within the CoP were described using supportive terms such as: solidarity, mutual respect, and community spirit:

I feel that a community spirit is all the more important. I think also that relationships are the cornerstone of research and how individuals behave can make or break a collaboration. [STS 2008]

Commitment to, and enthusiasm for, the emerging CoP was demonstrated by reoccurrence of affective themes – also described by McAlister (2016) in relation to the creative nature of communities of practice. Teaching team members of the CoP identified feelings of motivation and encouragement from their membership and often described wanting to increase their level of involvement within the CoP as a result.

The folks I have met have expanded my intellectual and personal horizons into new areas of knowledge and skills. I have also gotten to know new communities in depth (Hamilton, Montreal, Guelph) and new community actors (NGO's, academic institutions, governments, civil society, etc.) in much greater depth and have learned and applied new knowledge (network analysis, animal necropsies, philosophical analysis, etc.). [MTSI 2008]

Surveys and interview responses following the foundational field courses suggested that other benefits of the interpersonal relationships developed during the courses were increased knowledge translation, professional development and personal growth. Enjoyment of interactions with other CoPEH-Canada members (including course participants) was demonstrated in comments regarding the CoP as a source of inspiration and a foundation for support and mentorship.

### **Workshopping Evolving Pedagogy into an Open Source Teaching Manual**

Over the years of field courses, the materials and course experiences evolved through processes of feedback, including short-terms surveys, medium-term surveys and

interviews as well as active reflections among the team. The field courses also benefitted from the different styles and characteristics of the course when hosted in different locations by different CoPEH-Canada nodes (Vancouver, BC 2008; Guelph, ON, 2009; Montreal, QC, 2010). Whereas the 2008 course was characterized by didactic, power-point supported presentations complemented by field activities, over 2010 and 2011 the course evolved to include a highly experiential series of exercises or workshops intended to guide participants (process) in discovering the frameworks, processes and tools of ecohealth (content) together. Pleased with the evolution of our teaching techniques, encouraged by improving participant feedback on the short-term surveys and recognizing the innovative nature of the interactive sessions we had designed, we decided to collect our emerging materials into a common resource. Producing a CoPEH-Canada teaching manual was felt to be an important way to surface and share the collective experiences around both content and process that had arisen in the first three years (2008-2010). The manual idea was championed by the late Bruce Hunter, a veterinarian and wildlife pathobiologist from the University of Guelph, who was fervently committed to capacity strengthening in ecosystem approaches to health of all species.

Drawing on Bruce's enthusiasm, experience and knowledge, we pooled and committed resources and personnel time to design and conduct a series of pedagogical workshops (see bottom half of Figure 1). CoPEH-Canada members jointly developed a plan, submitted grant applications, conducted a needs assessment, and set out a module template. The first workshop pulled together a small group of people to write a first draft of six topic modules (e.g., Social networks, Complexity, Gender, Health) highlighting the content of ecohealth and three cross-cutting modules (e.g., Rich picture maps, writing a case study, participatory research) more focused on tools and process. For module development, small groups of teaching team members worked together for short periods of time to put on paper the techniques we had been using over the past three years. Groups then quickly presented their work, often through a shortened version of the actual exercise, to the others. Ample time for feedback was provided. Subsequently, small groups reconvened to integrate new feedback into the module. After the workshop, one person was responsible for collecting the modules and editing them into a similar format.

In the second and third workshops, these drafts were presented to ever widening groups of teaching team members, trainees and alumni of the course, and international practitioner-educators for additional inputs. In particular, in November 2011, we brought together colleagues engaged in ecohealth teaching across CoPEHs, knowledge networks and institutions from different continents and regions to discuss their experiences in capacity strengthening. Feedback from these global experiences was crucial to the final revisions of the teaching manual modules over the following months.

In 2012, we published the English and French versions of our teaching manual, and, later on, an abbreviated Spanish version under a Creative Commons licenses. Co-authorship of the modules and broad co-authorship of the overall manual aimed to reflect the multiple contributions made (McCullagh et al. 2012). However, we recognized that the static nature of the teaching manual did not adequately represent the dynamic process involved in revisiting and modifying teaching of the modules annually. In 2015, we applied for a small grant from the International Association of Ecology and Health for easier access to modules of the teaching manual on a new website (see <http://www.copeh-canada.org/en/teaching-manual.html>). This web page features the teaching manual content as html and the original PDF. It also links content to relevant video materials and

invites users to comment on the material. We are currently in the process of finalizing three new modules and investigating how to render a more dynamic space to accommodate future developments including flexible formats.

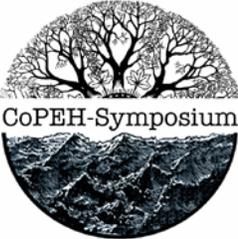
### ***Adapting into Flexible Formats***

Informed by insights from ongoing field courses, and the consolidation of experience in the teaching manual, CoPEH-Canada members continued to evolve their practice to a flexible array of formats. As depicted in Figure 1, these included Career Development Workshops (CDW), Public Health Workshops and Modules (PHWM), and Hybrid Courses (HC). We describe the evolution of these educational activities and some lessons here.

### ***Career Development Workshops***

Members of CoPEH-Canada had often been approached by practitioners and faculty members who were interested in learning more about ecohealth but who couldn't take leave from their work for the entire duration of the field course. We therefore reconfigured the course to begin with the basics of ecosystem approaches to health in the first three days. We offered the first, three-day career development workshop format in 2011, in conjunction with the field course. We sought to include sufficient material to engage practitioners in environmental fields, social sciences, animal health and community health, as well as higher education colleagues from diverse disciplines, while enriching the experience of graduate students and others who completed the full eleven days. The career development workshops incorporated several of the key modules we had developed, combined with field trips to relevant locations in the city where the course was delivered, for example, the St. Lawrence River in the Montreal version (see Table 1, following page).

**Table 1. 3.5 Day Career Development Workshop Schedule – Montreal 2015**

	Wednesday June 3	Thursday June 4	Friday June 5	Saturday June 6	Sunday June 7
8:00					 <p>CoPEH-Symposium</p> <p>Full-day Symposium Optional for Workshop Participants Required of Field school participants</p>
8:30		(8:30-9:00) Logistics			
9:00		(9:00-10:30) Negotiating Health	(8:30-10:30) Bus to Lachine Canal and visit	(9:00-10:00) Principals of EH	
9:30				(10:00-11:00) Participatory Research	
10:00		(10:30-3:00) Walk in Old Port : Environmental issues of Saint Lawrence Lunch-provided	(10:30-11:30) Tour of Parc des rapides	Pause	
10:30			(11:30-12:30) First Nations and ecohealth	(11:30-12:30) Transdisciplinarity	
11:00			(12:30-1) Lunch-provided	(12:30-2:00) Lunch and posters	
11:30			(1:00-2:30) Resilience and complexity		
12:00			(2:30-3:30) Social Networks	(2:00-3:30) Power and equity	
12:30			(3:30-5:15) Ecohealth and Thematic Stations		
1:00			(4:00-5:00) Poster Work	(3:30-5:00) Posters	
1:30		(5:00-6:00) Intro Field School + Debrief Day 1	(5:15- 7:00) Travel to Griffontown Optional - evening event at Griffintown	(5:00-6:00) Closing ceremony and Cake	
2:00	(2:00-4:00) Course Registration desk				
2:30		(3:00-4:00) Gender		(6:30) Opening of CoPEH-Symposium	
3:00					
3:30					
4:00					
4:30					
5:00	(5:00-6:00) Ice-breaker/Meet & greet				
5:30					
6:00	(6:00) Launch (includes hors d'oeuvres)				
6:30					
7:00					

### **One-Day Public Health Workshops and Modules**

We remained concerned about how few public health practitioners were adequately trained to identify, communicate and manage the multiple determinants of health in an integrated and understandable manner that reflects health and wellbeing as intimately linked with both the social and ecological world. This particular need led CoPEH-Canada members to seek funding for a new project, titled “Linking public health, ecosystems and equity through ecohealth training and capacity building” (2013-2015). We targeted adaptation of our 3.5 day workshop model to a series of even shorter workshops for practitioners held in conjunction with provincial and national public health association meetings (Parkes and Reschny, 2015) and run as one-day Public Health Workshops in Montreal, Richmond, Québec City and Toronto (see Figure 1, PHWM 1-4, and descriptions below). Being part of a CoP gave us the organizational support to engage in such continuing education, beyond the university environment. Workshop participants provided feedback through evaluation at the end of each of the workshops.

During 2014, a one-day workshop design was developed and piloted in Montreal, QC in advance of the EcoHealth 2014 conference and adapted to Richmond, BC prior to the Public Health Association of BC conference. Both workshops focused on “Talking Upstream” to explore connections between ecosystem approaches to health and public health competencies in a specific location (EcoHealth in Action Webalogue Series, 2014). Following participant introductions and sharing of key concepts, the remainder of the day brought together content and process dynamics in three phases: a “Walk and Talk Upstream” session (three hours of place-based site visits in Green Alleyways and the Port of Montreal, and Terra Nova, Britannia Historic Site, Bath Slough in Richmond), followed by a “Talking the Walk” (Reflecting on site-visits and connecting ‘upstream’ to ecohealth & public health competencies), and, finally, “Walking the Talk” (integrating ideas into everyday practice) going forward in practitioners’ regular work.

Several CoPEH-Canada members (teaching team members and alumni) participated in both workshops as facilitators. In Montreal, the workshop was designed with a working group also attending the EcoHealth 2014 conference. In Richmond, the workshop was planned with participation from a range of local partners from the City of Richmond (planning and economic development, and historic sites) and from the Emily Carr Institute in relation to the public arts initiative.

The activities were found to be a stimulating way to encourage learning about new contexts, and to create space and processes for reflection and observation on complex health, ecological and social issues, even within the constraints of a one-day workshop. As noted by feedback from one participant:

It’s not so much about the specific place, but taking the time to intentionally be in any place to observe, reflect and collectively make sense of what we are experiencing. [PHWM1, Montreal]

The themes of experience place and location were reinforced by one of the 18 participants in the Richmond workshop, who noted the experience of...:

Being outside...seeing about how principles applied in the physical landscape rather than just in abstract thought. [PHWM2, Richmond]

Connections between course content (upstream is a place) and the field-trips were noted by participants liked:

The upstream analogy - by literally having us go upstream in the field trip. That exploration (physically through the city) was truly invaluable. [PHWM1, Montreal]

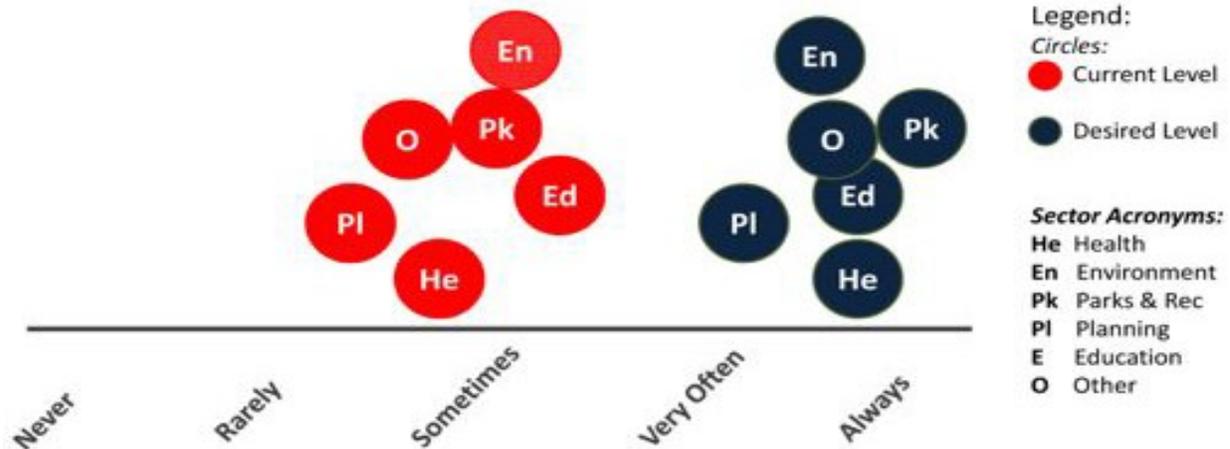
In 2015, two other workshops were designed for delivery prior to provincial Public Health conferences in Québec and Ontario (Figure 1, upper half). Feedback on the “Pouvoir et savoir travailler ensemble pour des milieux de vie en santé” [Being able to and knowing how to work together for healthy environments] workshop at the Journées Annuelles de Santé Publique [Annual Public Health Days] in Québec city (Anonymous, 2015) from 7 responding/30 participating practitioners expressed agreement that they experienced improvement in their skills and ability to “negotiate health” in a transdisciplinary context in such a way that a definition of health common to all stakeholders emerged (Anonymous, 2015). In the words (translated from French) of one participant:

I appreciated the role-playing game: it can be difficult to put oneself in the place of our collaborators, but by so doing, it helps us better argue our case. [PHWM3, Québec City]

Participants also agreed that their skills improved in elaborating a strategy to mobilize the identified stakeholders. As one participant noted (translated from French):

The exercise in which we drew a portrait of our surrounding stakeholder network was very meaningful and I intend to share this practice with my colleagues soon. [PHWM3, Québec City]

The Ontario Public Health Conference 2015 EcoHealth Workshop attracted a diverse group of 84 practitioners: from the environment sector, from planning, from health, from education (primarily higher), from parks & recreation and from other sectors. A first round of group work indicated “both an interest in and work to be done to better integrate a broad, holistic view of the relationships among the environment, society and human health and wellbeing into the policies of a wide range of sectors (Morrison and Barrett, 2015, p 9, reproduced as Figure 2). Participants provided examples of ecohealth integration into various policy arenas, and then discussed directions to move the concepts of ecohealth into practice. Among the latter were evidence (“reasonable science, not absolute proof, but enough for ‘applied science’”, *ibid* p 15), good stories (“for ‘myth busting’ purposes...[to] help inform the development of a shared suite of values”, p 16), and inter-sectoral education of decision makers (p 17). Active collaboration with Ontario node members of CoPEH-Canada has continued, enriched by the experiences of both other academic attendees and diverse practitioners. A first round of group work indicated “both an interest in and work to be done to better integrate a broad, holistic view of the relationships among the environment, society and human health and wellbeing into the policies of a wide range of sectors” (Morrison and Barrett, 2015, p 9, reproduced as Figure 2)



**Figure 2. Level of Integration of Ecohealth Thinking in Selected Policy Arenas – participants at EcoHealth Ontario Workshop on “Realizing the Health Benefits of Green Spaces in a Changing World” at The Ontario Public Health Convention, Toronto, ON. Source: Morrison and Barrett (2015)**

The experience with each of the one-day workshops informed the refinement of new modules to add to the online teaching resources. The Public Health Workshop Modules have undergone a similar process of peer-review by both CoPEH-Canada faculty and alumni who are emerging scholars and professionals. Peer-review was expanded to include like-minded colleagues in our different institutions and internationally. Such extension of collaboration, with co-learning of new content and wider relationships, has been facilitated by the CoPEH-Canada. Such extension of collaboration, with co-learning of new content and wider relationships, has been facilitated by the CoPEH-Canada, with resulting modules and materials distributed on our website.

### **Hybrid Courses**

In 2015, CoPEH-Canada completed its 8<sup>th</sup> field course, and re-assessed future options for ongoing graduate-level courses. Facing reductions in funding for graduate level capacity-strengthening, concerned about the expense (financial and carbon footprint) of bringing pan-Canadian colleagues together for face-to-face activities, and wanting more agile options, we revisited our field course format. This was informed by CoPEH-Canada’s range of experience with flexible formats, new content and different time frames. We decided to develop a hybrid (virtual and face-to-face), cross site (at multiple universities simultaneously) model of course delivery, building on examples pioneered by university colleagues in different fields (Wagner et al., 2012; Knowlton et al. 2014) (see Figure 1, upper half, Hybrid courses).

We opted for an open source learning management system (<https://canvas.instructure.com/>), in which synchronous webinars across sites could be embedded, along with face-to-face sessions at each university including field trips organized in the surrounding watersheds of each of the three universities. Each university has its own course syllabus, approval process, and course codes to respond to faculty and school of graduate studies’ requirements. This hybrid course has now been taught three times (2016, 2017, 2018), each time with active input from three different universities involved in CoPEH-Canada (see <http://www.copeh->

[canada.org/en/key-areas/training-and-capacity-building/course.html](http://canada.org/en/key-areas/training-and-capacity-building/course.html)) with feedback gathered through an online survey conducted with all teachers and students approximately 6 weeks after each course (pending for 2018).

We chose “Universities in their Watersheds” as a shared, guiding theme for all three hybrid courses, given its adaptability to different ecoregions and contexts. In the first year, feedback from faculty, teaching assistants and student or professional participants highlighted the challenges involved with the technological aspects of the course - “Having to search for information over many folders/files in two online sites. This required a lot of extra time and I risked cognitive confusion.” Feedback improved with residual criticism of the integration of different platforms factoring into the design of the 2018 hybrid course.

Alongside these challenges, evaluation data showed evident appreciation of different types of interaction within the course - across disciplines and among the teaching team and the students;

Our class had a variety of students from different disciplines and backgrounds which made discussions more interesting and informative. We also had some great guest speakers and on our field trips were able to meet and interact with experts in the field of interest. [2016 trainee]

This continued across institutions during webinars and cross-site assignments;

I highly recommend this pedagogy because in a way it contributes to the ecohealth big picture-collaborative environment. So the use of cross-site collaboration, many tools and activities helped with understanding how ecohealth works and exposed challenges in getting things done collaboratively too. [2016 trainee]

As well as between concepts and application through combined webinars and field trips in each location.

The field trips...we were able to see and understand the ecohealth perspectives we were reading about and connect it on our walking tour. [2016 trainee]

As instructors, we thoroughly enjoyed the impressive diversity groups of trainees’ take on universities in their watersheds – their location, their cultures in relation to ecohealth approaches, the extent to which they considered sustainability concerns, and the directions they indicated required follow-up in order to become more engaged in their ecoregions in ways conducive to health and well-being. As the hybrid course model has progressed, learning and exchange among the cross-site teaching team and collaborative planning and evaluation processes have continued to create an environment that values learning for both student and teaching team members.

### ***Expanding Reach***

Members of CoPEH-Canada have continued to build on past experiences and to develop flexible formats for fostering capacity strengthening in conjunction with research and practice in ecosystem approaches to health. One example, an IDRC funded project known as *EkoSanté*, fostered collaboration, learning and critical reflections between CoPEH-Canada and CoPEH-LAC (Latin America & the Caribbean) and is briefly

illustrated here (see <http://www.ekosante.org> also Brisbois et al 2017). Intensive workshops and training initiatives for next-generation researchers and practitioners were an integral component of this project. Sixteen fellowships, 13 internship awards, 15 dialogue workshops awards, 31 travel awards and eight small professional development awards were granted over the four years of the EkoSanté project (Saint-Charles et al. 2017). Further, the way the fellowships and awards program was built reflects the expertise and experience gained by both CoPEH-LAC and CoPEH-Canada's history of past capacity strengthening activities. More than just "giving money to students to study," (Saint-Charles et al., 2017: 19) all fellowships and awards offered opportunities for learning, networking and mentoring. EkoSanté also supported the development of an online course in Spanish for Pan American Health Organization staff. Six modules, reflecting both content and process, were developed by members of different nodes in Latin America as well as Canada. Modules were classified as "ways of thinking" (Ecosystems as foundational for health, Social Equity, and Gender), "ways of relating" (Participation and Transdisciplinarity) and "ways of doing" (Research-to-Action) ) and will be supported by the 2018 launch of a database of researchers from across the EkoSanté collaboration, and beyond, including CoPEH-Canada (see: <http://www.ekosante.org> and Figure 1).

CoPEH-Canada members' individual and collective involvement in the described educational initiatives informed their participation in several broader developments. In June 2011, CoPEH-Canada convened a workshop on Ecohealth in Canada (Parkes & Saint-Charles, 2011) attended by a suite of public and environmental health researchers and educators, in which professional development and capacity strengthening were a key area of work. Yearly involvement in pre-conference workshops at Canadian Public Health Association (CPHA) meetings and active roles in writing the association's discussion paper on Addressing the Ecological Determinants of Health (CPHA, 2015), meant that the latter included recommendations on education and training. Two key pillars of the latter were: expanding the concept of public health ethics to include ecocentric as well as anthropocentric perspectives, intergenerational equity, and environmental justice; and understanding and addressing the ecological determinants of health. This work has been taken up by the Ecological Determinants Group on Education (Parkes et al. 2018 & EDGE 2018) which has examined competencies, curricula, and continuing professional development in conjunction with members of schools of public health from across Canada. EDGE (2018) also specifically aims to "Enhance practice through creation of spaces (e.g., creation of a community of practice) for collective deepening of education & training practice (content and pedagogy) for those ready to move beyond minimum standards," recognizing that pedagogy-andragogy needs to be transforming in order to shift from the Anthropocene to the Symbiocene (Albrecht, 2015).

As activity in the ecohealth field has increased, and more researchers and funding opportunities have presented themselves to members, CoPEH-Canada as an organization decided that, rather than driving these initiatives, a more important role was to step back and be supportive of the diverse initiatives inspired by its experience. The importance of transformative approaches to capacity strengthening in graduate training, community-engaged research and practice among members of the university, and in networks of organizations grappling with resilient responses to ecosystem

change has recently been woven into the Environment, Community and Health Observatory Network (Kutzner et al., 2017, <http://echonetwerk-reseaeuecho.ca/>). The suite of other framings of humans and other species, in particular, and global bioregions, in general, has mushroomed with initiatives that include one health, planetary health, and other partly parallel and partly intermeshed activities internationally (Lerner & Berg 2017; Buse et al., 2018; Oestreicher et al 2018). As ecosystem approaches to health and related approaches become more mainstream, an important question for CoPEH-Canada is: how might we encourage an ongoing emphasis on both *content* related to specific topic areas in ecosystem approaches to health as well as *processes* of collaboration and building of relationships explicit in our work?

**Reciprocal Relationships of Content and Process**

Throughout the arc of activities developing and teaching ecosystem approaches to health, we noted an important reciprocal – and nested – dynamic between process and ecohealth content within CoPEH-Canada (see Figure 3).



**Figure 3: Nested, reciprocal relationships of collaborative processes & content learning: Insights from the evolution of CoPEH-Canada. Licensed under Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0). Legend: Green- nested activities (lighter within darker); Red – process dynamics & relationships between activities; Blue – content dynamics, regarding concepts and contexts.**

Figure 3 presents a preliminary framework that depicts the interrelationships among individual learning in relation to educational activities, to the collaborative dynamics within specific ecohealth projects and, more broadly, to the dynamic that occurred at the level of the CoP which engaged with consolidating, expanding and strengthening capacity in the field of ecohealth. Figure 3 depicts the importance of reciprocity between “knowing” (ecohealth content and concepts) and “relating” (collaborative dynamics) which have particular, contextual resonance for research, education and practice in ecosystem approaches to health. The emphasis on nested-ness is congruent with a range of literature that emphasizes connections and feedback across scales and levels of interaction (Waltner-Toews et al., 2008; Allen et al., 2014; Berbés-Blázquez et al., 2014; Parkes and Horwitz, 2016).

The reciprocal relationships of content and process depicted in Figure 3, first identified during early iterations of the course, have continued to develop throughout the subsequent iterations of CoPEH-Canada capacity strengthening, recognizing some overlap with the reciprocity between domain (content) and practice (processes). We have come to better understand the nested dynamics of collaborative learning, including ways in which co-constructing our understanding of ecosystem approaches to human health is linked with collaborative relationships within our intentional CoP. Through rotating locations for the intensive field course, designing and supporting workshops in different locations, and then in the hybrid, cross-institutional version of the course, ecohealth concepts have been explored in different watershed, ecoregional and university contexts. Such exploration deepened our student’s (Parkes et al., 2016) and the teaching team’s understanding of ecosystem approaches to health. These cycles of learning have also been transformative to our worldviews, approaches to research in the field of ecohealth, and ways of thinking about capacity strengthening. These sets of process and content relationships have been dynamically interlinked throughout CoPEH-Canada’s history. They have also informed how our community of practice has been able to continue to develop with an emphasis on being an “adaptive community of scholars and practitioners” as we navigate different phases of funding and projects (see Acknowledgements) and multiple perspectives, initiatives and tensions across the community (Feagan, 2018).

### **Implications for Communities of Practice in Higher Education**

Our experience as CoPEH-Canada members engaged in capacity strengthening in ecosystem approaches to health has very much been a journey. This resonates with Miller-Young’s (2016) reflection on her journey towards scholarship of teaching and learning through three very different multi-disciplinary CoPs, though arguably CoPEH-Canada exhibited greater initial intentionality than she describes. We could not have made this learning journey without each other, both the named authors of this paper and the broader membership of CoPEH-Canada noted in the acknowledgements. In an experience similar to that described by Yeo and colleagues: “developing a community of practice amongst colleagues, enhancing their appreciation of one another as professional practitioners, is essential to supporting the process of curricular change, since such a change requires complex new learning for faculty members” (Yeo et al., 2016).

However, unlike curricular change within a university programme our experience has, from the outset, been across different universities and organizations with whom members of those universities worked, undertook research, or engaged professionally. Given the challenges which multi-disciplinary research and teaching can pose within academia, cross-institutional collaboration among like-minded faculty and trainees in an intentional CoP was necessary for both the *practice* of course/module development and for the development of concepts and approaches in the emerging field of ecohealth, its *domain*. The affective attachments (both tense and harmonious) which developed in this *community* (the 3<sup>rd</sup> component in Wenger and colleagues' (2002) triad) were key to working through collaborative relationships among teaching team members, emerging scholars and professionals who have developed and participated in training activities, and those colleagues to whom we have reached out and worked with during the activities.

The reciprocal relationships depicted in Figure 3 prompt reflection on the mechanisms that communities of practice might use either across departments or faculties within institutions (as per Miller-Young 2016) or across higher education institutions. A greater understanding of the mechanisms by which communities of practice work internally and engage externally would be valuable to better grasp the potential of CoPs to respond to the collaborative and educational demands of the increasingly complex set of problems that we face in Canada and globally (Buse et al., 2018). In particular, communities of practice grounded in higher education institutions seem particularly appropriate for the development of multi- and transdisciplinary research, education and community engagement, tackling the daunting socio-ecological problems, and the associated health and sustainability challenges, currently facing humanity.

## References

- Albrecht, G.A. (2015). Exiting the Anthropocene and Entering the Symbiocene. In *Minding Nature* 9.2. Retrieved from <https://glennaalbrecht.wordpress.com/2015/12/17/exiting-the-anthropocene-and-entering-the-symbiocene-via-sumbiocracy-symbiomimicry-and-sumbiophilia/>
- Allen, C.R., Angeler, D.G., Garmestani, A.S. et al. (2014). Panarchy: theory and application. *Ecosystems* 17(4): 578-589 <https://doi.org/10.1007/s10021-013-9744-2>
- Anonymous. *Rapport d'évaluation sur la satisfaction des participants aux 18es Journées Annuelles de Santé Publique tenues à Québec du 24 au 26 Novembre 2014*. 23 Février 2015. 115-6 & 122
- Berbés-Blázquez, M., Oestreicher, J.S., Mertens, F., Saint-Charles, J. (2014). Ecohealth and resilience thinking: a dialog from experiences in research and practice. *Ecology and Society* 19(2): 24. Retrieved from <https://doi.org/10.5751/ES-06264-190224>
- Buse, C., Oestreicher, J., Ellis, N., Partrick, R., Brisbois, B., Jenkins, A., McKellar, K., Kingsley, J., Gislason, M., Galway, L., McFarlane, R., Walker, J., Frumkin, H., & Parkes, M. (2018). A public health guide to field developments linking ecosystems, environmental and health in the Anthropocene. *Journal of Epidemiology & Community Health (Online)*, 1–6. doi:10.1136/jech-2017-210082
- Brisbois, B.W., Bourgos Delgado, A., Barraza, D., Betancourt, O., Cole, D., Gislason, M., Mertens, F., Parkes, M. & Saint-Charles, J. (2017). Ecosystem approaches to health and

- knowledge-to-action: towards a political ecology of applied health-environment knowledge. *Journal of Political Ecology*. Vol 24, p. 692-715
- Canadian Public Health Association (CPHA) (Ed.). (2015). *Global Change and Public Health: Addressing the Ecological Determinants of Health*. CPHA Discussion Paper. Ottawa: Canadian Public Health Association. Retrieved from [http://www.cpha.ca/uploads/policy/edh-discussion\\_e.pdf](http://www.cpha.ca/uploads/policy/edh-discussion_e.pdf)
- Cassidy, A., Gurm, B. (2016) Transformative Communities of Practice. *Transformative Dialogues: teaching and learning eJournal*, 9(1), 1-2
- Cole, D.C., Crissman, C., Orozco, A.F. (2006). Canada's International Development Research Centre's Eco-Health projects with Latin Americans: Origins, development and challenges. *Can J Public Health* November-December 97(6), 14-18
- CoPEH-Canada (2008). *A Canadian Community of Practice in Ecosystem Approaches to Health, with an Ecohealth Training and Awards Program: Executive Summary*. Available Online at [http://www.copeh-canada.org/upload/files/COPEH-Can\\_ExecSummary.pdf](http://www.copeh-canada.org/upload/files/COPEH-Can_ExecSummary.pdf)
- EcoHealth in Action Webalogue Series. (2014). *Walking the Talk: place, public health, resource use and global change and a holiday roundtable*. December 17<sup>th</sup>, 2014. Webalogue recording available online at <https://ecohealthkta.net/webalogues/>
- EDGE (2018). Ecological Determinants Group on Education (EDGE). <https://www.cpha.ca/EDGE>
- Feagan, M., Koné, B., Brou, N., Houenou, Y.A., Kouassi, E., Spiegel, J. (2014) Confrontation avec le contexte disciplinaire institutionnalisé : réflexion critique des approches écosystémiques de la santé sur la base des expériences des jeunes chercheurs au Canada, en Afrique occidentale et centrale et en Amérique centrale. *Vertigo - la revue électronique en sciences de l'environnement*, Hors-série 19 août 2014, connection on 28 July 2018. Retrieved from <http://journals.openedition.org/vertigo/14963>  
DOI : 10.4000/vertigo.14963
- Feagan, M.L. (2018). Fostering the next generation of sustainability leadership: Graduate student experiences with ecohealth communities of practice. *International Journal of Sustainability in Higher Education*, 19(4), 681-698, <https://doi.org/10.1108/IJSHE-11-2016-0202>
- Howard, J., & Rapport, D. (2004). Ecosystem Health in Professional Education: The Path Ahead. *EcoHealth*, 1, S3–S7. Retrieved from <http://www.springerlink.com/index/10.1007/s10393-004-0108-4>
- Kutzner, D., Vinegar, M., Parkes, M.W. (2017). *ECHO Launch Event Meeting Report*. Environment, Community, Health Observatory (ECHO) Network and Northern Health, Prince George, BC. Available at: <https://ecohealthkta.net/health-resource-development/echo/> or <https://echonetwork-reseaeuecho.ca/>
- Knowlton, J. L., Halvorsen, K. E., Handler, R. M., & O'Rourke, M. (2014). Teaching interdisciplinary sustainability science teamwork skills to graduate students using in-person and web-based interactions. *Sustainability*, 6(12), 9428-9440
- Lerner, H. and Berg, C. (2017) A comparison of three holistic approaches to health: one health, ecohealth, and planetary health. *Frontiers in Veterinary Science* 4, article 163, 1-7. doi: 10.3389/fvets.2017.00163
- Malcolm, J. and Zukas, M. (2000). Becoming an educator: Communities of practice in higher education. In: McNay I.E. (eds.) *Higher Education and its Communities*. Buckingham: SRHE and Open University Press, 51-64
- McAlister, M. (2016) The creative nature of communities of practice. *Transformative Dialogues: teaching and learning eJournal*, 9(2), 1-7

- McCullagh, S., Hunter, B., Houle, K., Massey, C., Waltner-Toews, D., Lemire, M., Morrison, K. (Eds.). (2012). Ecosystem approaches to health teaching manual. *Canadian Community of Practice in Ecosystem Approaches to Health*. Retrieved from <http://www.copeh-canada.org/en/teaching-manual.html> but will move to Training Resources at <http://www.copeh-canada.org/en/training-resources.html>
- Miller-Young, J. (2016) How did I get here? Reflections on Learning from Multidisciplinary Communities of Practice. *Transformative Dialogues: teaching and learning eJournal*, 9(1), 1-5
- Morrison, K. and Barrett, S. on behalf of EcoHealth Ontario. (2015). *Realizing the Health Benefits of Green Spaces in a Changing World*. Report on Workshop at The Ontario Public Health Convention Mar 24, Toronto, ON.
- Oestreicher, J.S., Buse, C., Brisbois, B., Patrick, R., Jenkins, A., Kingsley, J., Tevora, R., Fatorelli, L. (2018). Where ecosystems, people and health meet: Academic traditions and emerging fields for research and practice. *Sustabilidade em Debate*, 9(1), 45-65. DOI: 10.18472/SustDeb.v9n1.2018.28258. Retrieved from <http://periodicos.unb.br/index.php/sust/article/view/28258/20762>
- Orozco, F., Cole, D.C (2008). Development of transdisciplinarity among students placed with a sustainability for health research project. *EcoHealth December 5(4)*, 491-503
- Parkes, M.W., Surette C., Skinner S., Aalhus M., Gislason M., Kutzner D., Hallstrom L. (2017). Introducing the Environment, Community, Health Observatory (ECHO) Network—Strengthening intersectoral capacity to understand and respond to health impacts of resource development. *Ecohealth in Action Webalogue Series*. May 25, 2017. Retrieved from <https://ecohealthkta.net/webalogues/>
- Parkes, M.W., Charron, D, Sanchez, A. (2012). Better Together: Field-building Networks at the Frontiers of Ecohealth Research. In: Charron D, editor. Chapter 21 in: *Ecohealth Research in Practice: Innovative Applications of an Ecosystem Approach to Health: Insight and Innovation. International Development 1*. New York, NY, USA Springer/ International Development Research Centre, Ottawa, Canada, DOI 10.1007/978-1-4614-0517-7\_21, pp 231-252
- Parkes, M., and Horwitz, P. (2016). Ecology and ecosystems as foundational for health. In H. Frumkin (Ed.), *Environmental Health: From Global to Local*, (3rd ed., pp. 27 - 58). Wiley.
- Parkes M.W., Poland, B (Lead Authors); Allison S, Cole, D., Culbert I., de Leeuw S., Gislason M., Hancock T., Howard C., Koropeski, J., La Prairie, A., Greenwood, M., Papadopoulos, A., Naeem, A., Waheed, F. (Contributing Authors). (EDGE or Ecological Determinants Group on Education) (2018) *Ecological Determinants of Health in Public Health Education in Canada: A Scan of Needs, Challenges and Assets*. Ottawa, ON: Canadian Public Health Association. Retrieved from <https://www.cpha.ca/EDGE>
- Parkes, M.W. and Reschny, J. (2015) *Linking Public Health, Ecosystems and Equity through Ecohealth Training and Capacity Building, 2012-2015*. Final Report to Public Health Agency of Canada. Dec 31. Unpublished
- Parkes, M.W. and Saint-Charles, J. (2011). *Ecohealth in Canada: Leveraging The Potential of a Population & Public Health Research Milestone*. June 22, 2011, Université du Québec à Montréal, Montréal. Unpublished Executive Summary Report. 10 pp
- Parkes, M.W., Saint-Charles, J., Cole, D.C., Gislason, M., Hicks, E., Le Bourdais, C., McKellar, K., St-Cyr Bouchard, M., & Canadian Community of Practice in Ecosystem Approaches to Health Team. (2016) Collaborative teaching and learning: Experiences from a short, intensive field course on ecosystems, health and society. Higher Education

- Research and Development Published online Dec 9.  
<http://dx.doi.org/10.1080/07294360.2016.1263937> 16 pp
- Parkes, M., Spiegel, J., Breilh, J., Cabarcas, F., Huish, R., & Yassi, A. (2009). Promoting the health of marginalized populations in Ecuador through international collaboration and educational innovations. *Bulletin of the World Health Organisation*, 87, 312–319, DOI:10.2471/BLT.07.045393.
- Saint-Charles, J., Webb, J., Sanchez, A., Mallee, H., van Wendel de Joode, B., Nguyen-Viet, H. (2014) Ecohealth as a field: looking forward. *Ecohealth* 11(3):300-7. doi: 10.1007/s10393-014-0930-2.
- Saint-Charles, J., Webb, J., and Barraza, D. (2017). Final technical report. Pan-American Partnership for the strengthening of research, policy and practice at the intersection of health, ecosystems and society / Asociación panamericana para la investigación, las políticas integrativas en salud, medio ambiente y sociedad, Centre de recherches pour le développement international (CRDI). (unpublished)
- Sherer, P.D., Shea, T.P., Kristensen, E. (2003). Online communities of practice: a catalyst for faculty development. *Innovative Higher Education*, 27(3), 183-194
- Stewart, M.K., Cohn, J., Whithaus, C. (2016) Collaborative course design and communities of practice: strategies for adaptable course shells in hybrid and online writing. *Transformative Dialogues: teaching and learning eJournal*, 9(1), 1-20
- Viskovic, A. (2006) Becoming a tertiary teacher: learning in communities of practice. *Higher Education Research & Development*, 25(4), 323-339, DOI: 10.1080/07294360600947285
- Wagner, H. H., Murphy, M. A., Holderegger, R., & Waits, L. (2012). Developing an interdisciplinary, distributed graduate course for twenty-first century scientists. *BioScience*, 62(2), 182-188.
- Waltner-Toews, D. (2009). Ecohealth: A Primer for Veterinarians. *Canadian Veterinary Journal*, 50(5), 519–521. Retrieved from <http://pubmedcentralcanada.ca/ptpicrender.fcgi?aid=1368352&blobtype=html&lang=en-ca>
- Waltner-Toews, D., Kay, J. J., & Lister, N.-M. E. (2008). *The Ecosystem Approach: Complexity, Uncertainty, and Managing for Sustainability*. New York: Columbia University Press.
- Webb, J.C., Mergler, D., Parkes, M.W., Saint-Charles, J., Spiegel, J., Waltner-Toews, D., Woollard, R.F. (2010). Tools for thoughtful action: The role of ecosystem approaches to health in enhancing public health. *Canadian Journal of Public Health*, 101(6), 439-441
- Webb, J. Saint-Charles, J., Parkes, M., Morrison, K. et Lemire, M. (2012). Final Technical Report: A Canadian Community of Practice in Ecosystem Approaches to Health. Centre de recherches pour le développement international (CRDI), 54 pages et annexes. (unpublished)
- Wenger, E., McDermott, R. A., & Snyder, W. (2002). *Cultivating communities of practice: A guide to managing knowledge*. Boston, MA: Harvard Business School Press.
- Yeo, M., Lafave, M., Westbrook, K., Valdez, D., Eubank, B., McAllistar, J. (2016) Curricular change: deepening professional community. *Transformative Dialogues: teaching and learning eJournal*, 9(1), 1-12