PROJECT REPORT

Picking Priorities

An analysis of the gaps and needs in continuous learning opportunities accessible to British Columbia natural resource sector professionals and practitioners and recommendations regarding future Forum collaborations

FORREX Forum for Research and Extension in Natural Resources

BC Ministry of Forests and Range
Forest Investment Account–
Forest Science Program

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EXECUTIVE SUMMARY

Picking Priorities analyzes the British Columbia Natural Resource Sector Continuous Learning Opportunities Inventory, which provides a comprehensive overview of the natural resource sector programs and courses offered by British Columbia's post secondary institutions and private sector providers. Picking Priorities identifies gaps and opportunities that members of the Natural Resource Sector Continuous Learning Forum can and would be wise to work on in the future so it can fulfill its mission, which is to "ensure that natural resource practitioners throughout British Columbia have access to a highly effective system of continuing education that provides timely, relevant, and affordable quality learning opportunities."

After analyzing and evaluating natural resource sector programs and courses offered by the post secondary institutions and private sector providers of British Columbia, Picking Priorities concludes that the biggest challenge facing natural resource sector professionals and practitioners is access to continuous learning opportunities. The need is most acute for mid-career professionals, especially those who are geographically dispersed. Online options are advanced as a possible solution to the access challenges mid-career professionals confront.

In picking their strategic priorities, Forum members are encouraged to focus their efforts on collaborative projects which concentrate on:

- Co-ordinated, joint delivery of existing offerings
- improved e-learning capacity
- repurposing and redeploying existing course components
- co-development and co-delivery of leadership/management offerings

Picking Priorities argues that an integrated cross-disciplinary continuous learning system for professionals and practitioners working in British Columbia's natural resource sectors is required to ensure competent management of British Columbia's natural resource sector and wise, long-term sustainable stewardship of them.

1. INTRODUCTION

Sustainable management of natural resources has become an issue of increasing importance over the years[1]. In British Columbia (BC), sustainable environmental management is a priority, both within the public and private sectors. At the same time, though, environmental sustainability goals must be balanced with economic and social goals. Within BC, there is growing recognition that integrated triple bottom line[2] management and policy approaches are needed[3].

To successfully and sustainably balance social, economic, and ecological imperatives, competent, forward-thinking professionals and practitioners are essential. Unfortunately, the current demographics-driven exodus of seasoned professionals combined with young people's disinterest in pursuing traditional natural resource sector careers is precipitating labour shortages and knowledge management gaps. British Columbia is making concerted efforts to address these labour and experience shortages, and the resulting risks they pose. For example, the Provincial Forest Extension Program aims to bolster the use of scientific, experiential, and indigenous knowledge, improve the public's confidence and trust in the ability of government and industry to manage the province's natural resources and ecological goods and services, and ensure BC is a global leader in environmental management and sustainable stewardship.

The natural resources sector "brain drain" and impending talent shortages led FORREX, a charitable organization founded in 1998 and dedicated to helping people develop science and knowledge-based solutions to complex natural resource management challenges, to foster the development of the Natural Resource Sector Continuous Learning Forum. The Forum, which coalesced in 2006, is a collaborative organization comprised of public and private post-secondary education and workplace training providers, resource sector employers,

[1] Examples go back to Rachel Carson's *Silent Spring* (1962) and the United Nations-initiated World Commission on Environment and Development, which published its findings in *Our Common Future* (1987). More recent examples can be found in the work of the Intergovernmental Panel on Climate Change, which, between 1999 and 2007, published four climate change assessment reports and four final scenarios, and the 2006 documentary *An Inconvenient Truth* by Al Gore.

[2] Triple bottom line (TBL or 3BL) approaches entail balancing environmental, economic, and social imperatives. Triple bottom line accounting means expanding traditional economics-only assessment mental models and decision/policy making approaches. It means creating new frameworks that also take into account long-term ecological concerns and sustainability as well as social or quality of life indicators. Restated, TBL entails balancing "People, the Planet, and Profits" (From Dale, Ann. 2001. At the edge: Sustainable development in the 21st century. UBC Press, Vancouver, BC and http://en.wikipedia.org/wiki/Triple_bottom_line).

[3] An example is the five overarching "Great Goals" established by the BC government to guide its policy making and governance decisions. To achieve its objective of making BC "the best place on Earth to raise a family; to live and play; to work, invest, and get ahead," the province undertook to 1) make BC the best educated, most literate jurisdiction on the continent, 2) lead the world in sustainable environmental management, with the best air and water quality, and the best fisheries management, bar none, 3) create more jobs per capita than anywhere else in Canada, (4) lead the way in North America in healthy living and physical fitness, and 5) build the best system of support in Canada for persons with disabilities, special needs, children at risk, and seniors.

professional associations (foresters, engineers, biologists, and agrologists), and government agencies. The Forum's mission is to "ensure that natural resource practitioners throughout British Columbia have access to a highly effective system of continuing education that provides timely, relevant, and affordable quality learning opportunities."

In developing their strategic priorities, Forum members identified the lack of an integrated natural resource sector continuous learning "system" as one of the biggest near- and long-term challenges to economic prosperity and the long-term sustainable stewardship of BC's natural resources[4]. As a consequence, Forum members decided in 2007 to focus their efforts on providing:

- sound, accessible information about current and emerging needs and priorities
- access to information and advocacy for relevant, credible, and affordable quality learning opportunities
- an efficient framework for collaboration between primary stakeholders

In mapping the scope of their concerns and resulting goals, Forum members agreed that in the 21st century "knowledge economy," training and education efforts should not focus only on young adults starting their careers. Instead, the Forum made a conscious decision to emphasize and support continuous lifelong learning[5]. As illustrated in Figure 1, Forum members recognized that immediately after entry-level credentials are earned, professional development is required (to maintain professional credentials in good standing). Soon after, career advancement learning and, increasingly, recurrent waves of career change re-training are required. In short, Forum members recognized that the constant change and unpredictability that characterize the 21st century make continuous learning essential—not only to the success of professionals and practitioners, but also to the ability of public and private sector agencies and communities to simultaneously use natural resources for economic and social benefits while still sustainably stewarding them for future generations.

Before undertaking specific projects aimed at accomplishing the Forum's three strategic objectives, Forum members decided they first needed to document the delivery capacity and programming available to BC's natural resource professionals and practitioners[6]. In 2008, the BC Ministry of Forests and Range completed a comprehensive inventory of the natural

[4] Gorley, A, and C. Gorley. 2007. Developing solutions for continuing education capacity for forest sector professionals in British Columbia. FORREX Project Report. Available at http://www.forrex.org/events/sfmceworkshop/docs/CE_Workshop_Rpt.pdf

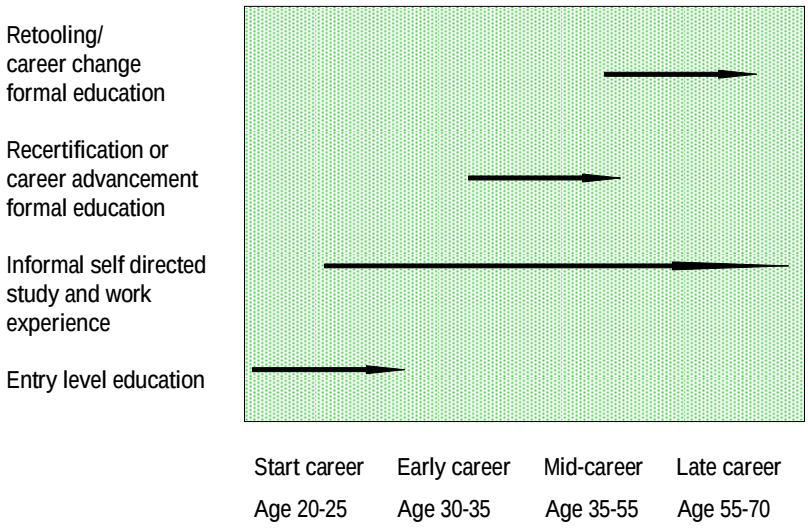
Gorley et al. 2008. Improving access to continuing education for British Columbia's natural resource practitioners: A natural resources continuing education strategy: 2007–2012. FORREX. Available at http://nrceforum.forrex.org/docs/Strategy_March_2008.pdf

Pearce, C. and S. Stearns-Smith. 2006. Towards a forest stewardship learning strategy for the BC Ministry of Forests and Range. BC Ministry of Forests & Range, Internal Report.

[5] Gorley and Gorley, 2007; Gorley et al. 2008.

[6] Gorley et al., 2008

Figure 1. Lifelong Learning Continuum



*From Hollstedt, C. 2006. Continuing education for forest sector professionals: Pursuing a co-operative solution. FORREX internal report. http://nrceforum.forrex.org/Briefing.pdf

resource sector continuous learning opportunities offered by BC post secondary institutions, private providers, and professional associations[7]. The inventory provides an overview of traditional entry-level and career-starting training and education opportunities including undergraduate and graduate degrees, certificates and diplomas offered by BC universities, colleges and technical schools. The inventory documents mid-career advancement-oriented and credential maintenance professional development as well as career change re-training opportunities offered by public and private sector providers. In addition, the report highlights online learning options.

2. ANALYSIS

Completion of the BC Natural Resource Sector Continuous Learning Opportunities Inventory makes it possible to achieve a second Forum goal—an analysis of the education and training programs and courses offered in BC. Analyzing the natural resource sector programs and courses offered by BC's post secondary institutions and private sector providers is key to identifying gaps and the associated opportunities that Forum members can work on in the future.

[7] Carter, J. 2008. An inventory of natural resources Sector Continuous Learning Opportunities in British Columbia. Internal report. BC Ministry of Forests and Range, Internal Report. Available at http://www.for.gov.bc.ca/ftp/hfp/external/!publish/Inventory/

The following natural resource sector continuous learning inventory analysis first provides broad observations of the kinds of education and training programs and courses offered throughout BC. The analysis identifies patterns and trends as well as traditions and assumptions. It assesses whether and how well current offerings meet the needs of the present and the future.

Second, this analysis identifies the gaps that Forum members may decide need to be filled. It asks whether current offerings constitute or could serve as the foundation for the construction of an integrated cross-disciplinary continuous learning system for professionals and practitioners working in BC's natural resource sectors.

This analysis will help Forum members to further refine their strategic plan and priorities. It will enable them to decide which areas and initiatives in which they would be wisest to invest their effort and resources. It will help them make choices in an informed, strategic manner. The final section of this analysis presents perspectives Forum members may wish to consider when they pick their priorities.

2.1 Observations

In surveying natural resource sector continuous learning opportunities available to BC professionals and practitioners, the observation made by Pearce and Stearns-Smith[8] that BC's education and training offerings look like a "patchwork" rings true. From a 30 000 foot perspective, BC's natural resource sector learning opportunities resemble the multi-coloured fields one sees when flying over the Canadian Prairies.

The Natural Resource Sector Continuous Learning Opportunities Inventory reveals that BC boasts an amazingly large number and variety of natural sciences, engineering, and related programs and courses. Young, aspiring natural resource sector professionals have a vast array of options from which to choose.

The vast majority (over 95%) of BC's natural resource sector programs and courses are provided by public post-secondary institutions. Private sector providers account for a very small proportion of the learning opportunities available to natural resource sector professionals and practitioners. (It should also be noted that not all courses listed actually run.)

Of course, most programs and courses are offered by educational institutions located in major urban centres such as Metro Vancouver, Victoria, Kamloops, Kelowna, and Prince George. Regional colleges and technical institutes offer a substantial number and variety of practical, applied training programs designed to equip students to work in natural resource sector fields such as forestry, mining, oil and gas, and agriculture. They also offer university transfer programs.

[8] Pearce and Stearns-Smith, 2006.

The ease with which students can transfer from one BC or out-of-province post-secondary institution to another is improving. Most colleges offer associate degrees, which guarantee the transferability of 60 credits towards an Arts or Science degree offered by a BC university. Many colleges and some technical institutes offer "block transfers" of one or two years worth of course credits towards other institutions' specific degree programs[9]. A number of colleges and some technical schools offer "bridging" programs designed to ensure students gain all the prerequisites and credits needed to successfully enter demanding technical programs such as engineering.

One interesting pattern that emerges from the inventory concerns north–south and urban–rural variations in program and course offerings. Southern, big-city post-secondary institutions tend to offer more courses and programs leading to white collar professional careers—and more continuous learning opportunities. In contrast, smaller northern institutions tend to offer more job-specific technical programs and courses designed to equip students to work out in the field. Broadly speaking, there appears to be a south–north/urban–rural divide between theory and practice, which *may* influence graduates' interest in continuous learning and their access to education. Additionally, institutions tend to offer programs related to the resource sectors that are active in their region. For example, oil and gas programs are offered up north, not down south. Agriculture programs are offered primarily in south–central regions. This may reflect industry support provided to learners and providers.

The concentration of institutions in the southwestern corner of the province is especially pronounced and potentially problematic when it comes to specialized and graduate-level studies. The dearth of senior-level learning opportunities in rural and northern BC represents a challenge to both learners and employers. Students that move south to pursue graduate studies often find more enticing career opportunities in larger centres and so, stay south.

From a quantitative perspective, suggestions that the natural resource sector may be under-served[10] do not ring true. Opportunities abound. Qualitative aspects are, however, a concern. While it is true that the successive disbandment or closure of the Silviculture Institute of British Columbia, Forest Management Institute of British Columbia, and BC Forestry Continuing Studies Network left gaps in the availability of forestry training, several new natural resource sector programs have come on stream in the intervening years. For example, BC has a number of new programs in horticulture, aquaculture, biotechnology, animal welfare, GIS, forest ecology, natural resource management, integrated pest management, conservation, water treatment, outdoor recreation, adventure studies, and integrated science. Most new programs, however, require full-time attendance, meaning they are not truly accessible to many professionals and practitioners.

With regards to new programs, the most striking trend is their nomenclature and their underlying philosophy. Within the natural resource sector, there is a noticeable shift away

[9] Details are available at http://www.bctransferguide.ca/help/index.cfm

[10] Nexus Consortium Inc. 2007. An Evaluation of the British Columbia Provincial Forest Extension Program. Available at http://www.cortex.ca/fia-fsp/d-PFEPEvaluationRprt-30May07.pdf

from traditional discipline-specific programs to integrated multi-disciplinary environmental management offerings. BC providers offer an array of programs in environmental studies; environmental engineering; environmental design and planning; ecosystem science; and natural resource management, planning, and protection. These emerging fields of study reflect changing public priorities—and changing student interests and values.

The vast majority of learning opportunities available to people interested in careers in BC's natural resource sector are traditional "bums-in-seats" or "face-to-face" programs and courses. Most programs take several months or years of full-time study to complete, although a few institutions (like the British Columbia Institute of Technology and Thompson Rivers University) offer part-time programs. These traditional learning opportunities meet the needs of young, geographically mobile students who can afford to study full-time, but not mid-career professionals and practitioners.

Globalization, the shift from a resource-based to a knowledge economy, and other unpredictable 21st century trends are precipitating new educational needs. No longer is it the case that professionals and practitioners can get "an education for life." Due to the rapid rate of change, people are expected to make multiple career changes[11]. In addition, the trend towards professional reliance and mandatory continuing education is intensifying the criticality of highlights how critical continuous learning is. To be competent and competitive, natural resource sector professionals and practitioners must continually improve their knowledge, skills, and approach.

Simply stated, managing continuous change requires continuous learning. But—BC's natural resource sector professionals and practitioners do not have access to continuous learning opportunities.

With very few exceptions, nearly all of BC's natural resource sector learning opportunities are predicated on the assumption that learners are interested in and able to attend traditional, full-time, "face-to-face" programs. This may work for *some* young adults launching their *first* career, but it doesn't work for learners who, owing to life circumstances or choices, can't afford to "warm a seat" for a year or more. And, it definitely doesn't work for mid-career learners. For most of them, so-called learning opportunities represent a long list of big, insurmountable accessibility challenges[12]. Mid-career professionals and practitioners cannot take prolonged periods of time off work. They cannot ignore financial and family responsibilities. They cannot relocate. They cannot afford to spend the time and money required to travel to centres where courses are offered[13]. For many working professionals and practitioners, it is exceptionally difficult to continue learning.

[11] Some analysts estimate that today's young adults will have upwards of 30 career changes.

[12] Ease of access emerged as a barrier to learning in Pearce and Stearns-Smith's 2006 report *Towards a Forest Stewardship Learning Strategy for the BC Ministry of Forests and Range.*

[13] The current economic downturn is curtailing travel budgets. In addition, there is mounting pressure to move towards more carbon neutral, "green learning" alternatives.

In sum, current offerings do not adequately meet the needs of the present and the future. Analysis of BC's natural resources sector education and training "patchwork" reveals some holes or gaps that need to be filled. Herein lies opportunity.

2.2 Gaps and Needs

Analysis of the BC Natural Resource Sector Continuous Learning Opportunities Inventory reveals that people seeking entry-level credentials to launch their first career, as depicted in Figure 1, are well served. Options are varied and abundant. Points of access are geographically dispersed. Transfers from one institution to another are easy. Opportunities for senior-level, specialized study and research are available, provided learners have the means to pursue them.

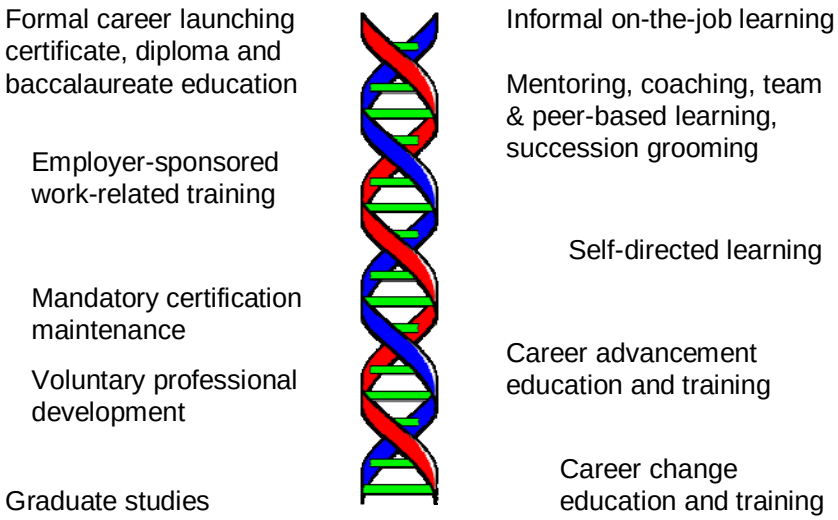
What analysis also reveals is that even though BC boasts an impressive number and range of education and training programs and courses for natural resource sector professionals and practitioners, there are qualitative shortcomings. Most of these concerns centre on issues related to accessibility. The problem is that learning opportunities are not always offered at the right time, at the right place, on the right topic, or in the right format.

In today's fast-changing, globalized world, access to immediately useful learning options is required. To ensure they are competent and competitive, professionals and practitioners need to be able to access information *and* insightful analysis concerning recent changes—and emerging trends. In surveying the natural resource sector learning opportunities available in BC, the biggest gap appears to be the paucity of continuous learning alternatives available to working professionals and practitioners. This deficiency poses a risk, not only to professionals who are responsible for maintaining their competencies and credentials, but also to all other citizens depending on them to wisely steward BC's natural resources.

Looking ahead, it's clear that BC's natural resource sector professionals and practitioners need convenient "anywhere, anytime" access to short, timely, topical, relevant, applicable courses, workshops, and other learning options that will enable them to manage the province's natural resources sustainably. They need easy access to voluntary and mandatory professional development courses. They need access to intensive, but high quality career advancement and career change learning opportunities.

BC's natural resource sector professionals and practitioners need continuous access to continuous learning. They need multiple portals of access. As illustrated in Figure 2, learning can take many zigzagging paths. In the 21st century, professionals and practitioners will, of necessity, need to access continuous learning through many different doorways. They will need to be able to learn at the right time, at the right place, on the right topic, and in the right format.

Figure 2. The Lifelong Learning Journey



Access to continuous learning opportunities is essential to the future of BC and the stewardship of its natural resource sectors. Yet, BC universities, colleges, technical institutes, and private sector education and training providers offer only a smattering of short (1 to 5 day) workshops and field schools. Exacerbating matters, many of these offerings provide only practical, entry-level training. Very few senior-level science and/or management continuous learning courses are offered. In addition, most continuing education courses require traditional "bum-in-seat" attendance. Very few internet-based courses and programs are offered, except by a small handful of public post-secondary institutions[14].

Online offerings, ranging from one-hour webinars to blended, multi-year graduate level programs, have the ability to fill some of the gaps and needs that exist within BC's natural resource sector learning system. Not only can web-based options address many of the access challenges confronting natural resource sector professionals and practitioners, they also have the potential to build bridges across disciplinary silos and jurisdictions.

In addition to improved access to natural sciences learning opportunities, there is growing recognition that natural resource sector professionals and practitioners need more opportunities to take more Arts courses and learn more "soft skills." To make wise decisions

[14] TRU-Open Learning, Royal Roads, BCIT, UNBC, and UBC are the dominant providers of online courses and programs of interest to natural resource sector professionals and practitioners. SFU, UVIC, VIU, and other public post-secondary institutions possess e-learning expertise, but currently do not offer many online course and programs for natural resource sector professionals and practitioners.

regarding increasingly complex choices, natural resource sector professionals and practitioners need to learn more about leadership, teamwork, conflict management, supervision, governance, consultation and consensus building, project management, and other people-centred topics[15].

Filling the gaps and needs identified by the analysis of the BC Natural Resource Sector Continuous Learning Opportunities Inventory is an essential prerequisite to the development of truly continuous learning system for BC's natural resource sector professionals and practitioners. It is also a prerequisite to the creation of an integrated interdisciplinary continuous learning system capable of ensuring that "natural resource (professionals and) practitioners throughout British Columbia have access to a highly effective system of continuing education that provides timely, relevant, and affordable quality learning opportunities."

3. PERSPECTIVES TO PONDER

As members of the Forum look forward and plan for the future, it is clear that their priorities must be wisely and strategically chosen—especially given the degree of economic and ecological uncertainty marking the close of the first decade of the 21st century. As ever, opportunities come hidden within challenging circumstances. Forum members have an opportunity to play a leadership role in influencing how BC and its natural resource sectors weather the current storm and prepare for the future.

Despite the rapid rate of social and economic change, uncertainties regarding climate change and its impacts, and concern regarding the exodus of experienced natural resource sector professionals, slumping commodity prices and other challenges, BC natural resources, and the need to manage them responsibly, will remain constant. Flexibility and resiliency are essential. Competency in those two domains, by definition, necessitates continuous learning.

By investing effort and resources into building an integrated, interdisciplinary continuous learning system, Forum members can model long-term, future-oriented leadership. They can focus on investing in economic, environmental, and social sustainability. Forum members not only have an opportunity to influence the future, but also a responsibility. The fortunes and future of BC's natural resource sectors and the economic, social, and ecological goods and services they provide depend on Forum members' ability to work smartly and collaboratively.

Given that time, money, and other resources are expected to remain tight, it is important for Forum members to thoughtfully choose which activities they wish to undertake. Analysis of the BC Natural Resource Sector Continuous Learning Opportunities Inventory demonstrates that traditional "face-to-face," career-launching education and training needs are already being amply fulfilled by public, post-secondary institutions' certificate, diploma, and baccalaureate

[15] The adage that "forestry isn't about trees, it's about people" sums up the importance of possessing both technical and scientific skills and soft skills. Both the Forum and natural resource sector employers have identified management skills as a critical gap needing attention.

programs. Given the limited number of learning options that are truly accessible to working professionals, it would only make sense for Forum members to work towards enhancing learning opportunities for them. It would be strategically smart for Forum members to invest their efforts in filling identified gaps with continuous learning initiatives that meet the current and future learning needs of natural resource sector professionals and practitioners.

To remain competent and competitive, natural resource sector professionals and practitioners need continuous access to continuous learning. As illustrated in Figure 2, the most critical continuous learning gaps—and opportunities for impact—fall into two broad categories:

1. **Formal learning.** Examples include:
    - Voluntary professional development
    - Mandatory certification maintenance
    - Career advancement education and training
    - Career change education and training

2. **Informal learning.** Examples include:
    - On-the-job learning
    - Peer and team-based learning
    - Mentoring and coaching
    - Self-directed learning

E-learning holds considerable promise. Online courses, podcasts, webinars, video-conferences, live chats, and even video games can be used to impart and share information and ideas in new interactive ways. New web-based learning options are enabling learners to surmount time and distance barriers. For example, new tools and technologies allow a forester in Smithers, a petroleum geologist in Fort St. John, a wildlife biologist in Clearwater, an agrologist in Cranbook, a wind energy engineer in Port Hardy, and an archaeologist in Masset to work together on a policy analysis assignment for an online course in environmental law. Increasingly, new Web 2.0 tools will make it even easier for learners (and staff) to share their ideas and stay connected.

E-learning has changed considerably over the past 10 years. It has finally evolved to the state that it is becoming affordable and sufficiently engaging to sustain the interest of tired working professionals. For both Millennium workers (born 1980-2000) and mid-career professionals, online options have many advantages to recommend them. In cases where e-learning isn't a perfect fit, blended learning[16] is a viable alternative.

Analysis and evaluation of the BC Natural Resource Sector Continuous Learning Opportunities Inventory suggests possible priorities on which Forum members may choose to concentrate their efforts. Given current circumstances, projects aimed at quickly harvesting low-hanging fruit and generating quick wins are advised.

[16] Blended offerings combine "face-to-face" and online instruction and activities. Increasingly, it is being adopted by progressive, post-secondary institutions.

Future initiatives could involve:

- Co-ordinated, joint delivery of existing offerings
- improved e-learning capacity
- repurposing and redeploying existing course components
- co-development and co-delivery of leadership/management offerings

No matter which priorities Forum members conclude are most worth pursuing, it will be important for them to act strategically and in unison. If Forum members hope to leverage future funding for additional projects, it will be important to demonstrate their ability to work collaboratively and deliver continuous learning alternatives, both effectively and efficiently. But, most of all, it will be important to provide truly accessible continuous learning options that meet the current and future needs of BC's natural resource sector professionals and practitioners. Astute, collaborative choices will be essential to the creation of an integrated cross-disciplinary continuous learning system that meets the current and future needs of professionals and practitioners working in BC's natural resource sector.