



Photo: LADR Landscape Architects

3.2 THE ROLE OF PROFESSIONAL ASSOCIATIONS IN DISASTER RISK REDUCTION

June 2022

[DRRPathways.ca](https://www.drrpathways.ca)



CO-CREATING NEW KNOWLEDGE
FOR UNDERSTANDING RISK AND
RESILIENCE IN BC

This article is part of the Resilience Pathways Report. The report has the following objectives: a) to share knowledge about existing practices and recent advances in understanding and managing disaster and climate risk in BC, including some information on relevant federal programs, and b) to provide insights on gaps and recommendations that will help build pathways to resilience in BC.

This article belongs to *Chapter 3 Climate and Disaster Risk Management: Enabling Action*. To read all articles in the report, see DRRPathways.ca.

The Resilience Pathways Report is a project of Natural Resources Canada.

3.2

THE ROLE OF PROFESSIONAL ASSOCIATIONS IN DISASTER RISK REDUCTION

BY:

Harshan Radhakrishnan, P.Eng.,
Professional Associations
Adaptation Working Group

Bev Windjack, MBCSLA,
Professional Associations
Adaptation Working Group

CONTRIBUTORS:

Deborah Carlson, LLP

Donna Rodman, MBCSLA

Nelson Lee, P.Eng.

Paul Nuttall, RPF

Peter Mitchell, P.Eng.

Robin Cox, PhD

Tom Llewellyn, AIBC, MBCSLA

EDITORS:

Sahar Safaie, Sage On Earth
Consulting

Shana Johnstone, Uncover
Editorial + Design

ROLE OF PROFESSIONAL ASSOCIATIONS

DESCRIPTION

Professional regulatory bodies and associations (referred to jointly as professional associations) govern the activities of their registrants and members with requirements for professional status and professional development, codes of conduct and ethics, standards of practice, and other guidelines, oversight, and disciplinary processes. Governance that sets and maintains standards of practice and training, including rigorous accountability for one's decisions and work, is what separates professionals from non-professionals. In an increasingly specialized world, with ever-more limited resources for government agencies, decision makers in the public, private, and not-for-profit sector increasingly look to professionals, such as foresters, biologists, agrologists, engineers, geoscientists, architects, lawyers, landscape architects, and planners to provide critical information and support for decision making about a wide range of issues. The influence of professional associations is far-reaching and well placed to play a

complementary role to government as a distinct part of civil society.

It is the combination of disciplines, their independent and collective responsibility to community and public trust, and their frequent role in translating government regulation and policy into practice that make the impact of professional associations—both effective and potential—so important. Their professional (and often legislated) governance and collective expertise in a wide range of sectors provides the communities in which they live and work with expert knowledge and accountability.

Professional associations govern professional interactions with the social, natural, and built environment, making them well positioned as leaders and key advisors in disaster and climate risk management. They are nonpartisan, facilitate innovation, communication, and connection, and have a professional responsibility to ensure their members have access to and are working with current knowledge around the full continuum of risk, resilience, and recovery. Associations stimulate action from within their membership, contribute to public education and awareness, and can play a vital role in providing communities with expertise founded on established standards and accountability, ensuring community expectations of good practice and social purpose are met.

Professional associations embrace diverse types of trusted experts, creating the potential for rich dialogue around hypotheses, new

and implemented ideas, and ongoing research. Collectively, professionals play critical roles in ex-ante and ex-post measures. By supporting integration of risk-informed planning and design to avoid creation of new risk or reduce existing risk, as well as supporting emergency preparedness and response, professionals play a key role in reducing potential impacts of various hazards to local infrastructure, watersheds, housing, and economies. They are the ones *doing the “building”* in “building back better,” implementing nature-based solutions, and decarbonizing buildings and industrial processes (Figure 1).

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In BC, a number of regulatory bodies and professional associations have the responsibility for self-regulating their respective professions and protecting

the public interest within the scope of their professions. In February 2021, the regulatory bodies for agrologists, applied biologists, applied science technologists and technicians, engineers and geoscientists, and forest professionals transitioned to operating under the new *Professional Governance Act (PGA)* (SBC 2018, c 47), a consolidated framework that

sets consistent governance structures and standards for self-regulated professions¹ including a clear directive for the regulatory bodies it governs to “serve and protect the public interest with respect to the exercise of the profession, professional governance, and the conduct of registrants in the registrants’ regulated practice; and to exercise its power and discharge its



Figure 1: Professionals play a key role in reducing potential impacts of various hazards to local infrastructure, watersheds, housing, and economies; they design and approve built projects (Photo: LADR Landscape Architects).

responsibilities in the public interest.”² The PGA also establishes a statutory Office of the Superintendent of Professional Governance (OSPG) in the Ministry of the Attorney General, responsible for administering the PGA and for ensuring that best practices for professional governance are implemented. While the PGA does not specifically address responsibility for action in the areas of disaster and climate risk, with their legislated responsibility to protect the public interest and maintain professional standards in their areas of practice, professional associations have the responsibility to promote and enhance the ability of their registrants to respond and adapt to changes in practice environments, advances in technology, and other emerging issues.

ALIGNMENT WITH THE SENDAI FRAMEWORK

In BC, most professional associations include upholding public health, safety, and welfare in their Act or mandate; this aligns with the Sendai Framework which advocates for “the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.”³

Professional associations are mentioned in the Sendai Framework under “non-state stakeholders,” with a critical role in managing disaster risk aligned with the “whole

of society” approach, which the framework promotes. Professional associations accept responsibility for their expert role and agency in promoting sustainable development. They strengthen action at a local level through partnerships among industry and institutions, the private sector, and civil society, including mobilizing volunteers aligned with the Sendai Framework’s four priorities for action.

UNDERSTANDING AND REDUCING RISK

RISK REDUCTION PRACTICE AND CAPABILITIES

For many decades, the professional associations have played a role in risk management and have responded to past events—directly as associations, and indirectly through association members and registrants. They continue to play an active role in climate and disaster risk management through a wide range of programs and activities. Professional associations do not have a mandate to collect information around post-disaster damage and loss. However, some associations provide guidance and training so registrants can carry out assessments in a post-disaster scenario. More commonly, professional responses to post-disaster damage and loss are documented and shared through a wide range of media.

PROFESSIONAL PRACTICE GUIDELINES

The guidelines developed by professional associations are discipline oriented. Examples are:

- At the time of writing, Engineers and Geoscientists BC (EGBC) is working on revising Professional Practice Guidelines on Landslide Assessments and Dam Safety Reviews. For the list of current professional practice guidelines and practice advisories from EGBC, visit www.egbc.ca/guidelines.
- EGBC in collaboration with BC Ministry of Transportation and Infrastructure created *Developing Climate Change-Resilient Designs for Highway Infrastructure in British Columbia*.⁴
- Association of BC Forest Professionals, College of Applied Biology, and EGBC coauthored *Legislated Riparian Assessments in BC*.⁵
- EGBC, in collaboration with UBC Civil Engineering Department, and commissioned by the Ministry of Education, developed *Seismic Retrofit Guidelines*⁶ for the seismic assessment and retrofit of existing school buildings.

PRACTICE RESOURCES

Practice resources are developed by professional associations in collaboration with external stakeholders and partners including (and not limited to) all orders of government, non-governmental

organizations and standards development organizations. Examples are:

- EGBC worked with the National Research Council on the *National Guide on Urban-Wildland Interface Fires*, and the Coastal flood risk assessment guidelines for building and infrastructure design: supporting flood resilience on Canada's coasts.^{7,8}
- BC's Professional Associations Adaptation Working Group was consulted for *Low Carbon Resilience: Best Practices for Professionals*,⁹ published by the Adaptation to Climate Change Team at Simon Fraser University.

CONTINUING EDUCATION AND TRAINING

Another very important function of professional associations that can be effectively leveraged to support risk management in society is their provision of continuing education and training. Additionally, many associations have developed or are developing climate-specific policies and a range of micro-credential requirements for their membership (Figure 2).

Assessments, for example, often require professionals to have micro-qualifications or advanced learning for additional competency. Flood hazard assessment reports must be prepared by a "Qualified Professional" who, for this purpose, is defined as a professional engineer or geoscientist



Figure 2: Professionals must pursue continuing education to stay current with knowledge and practice (Photo: LADR Landscape Architects).

with experience or training in geotechnical study and geohazard assessment, or in geotechnical engineering, or a person in a class prescribed by the minister under subsection 7 of the PGA. To meet the provisions of the Riparian Areas Regulation, riparian area assessments must be completed by a "Qualified Environmental Professional" who, for this purpose, is defined as an individual registered under the PGA.

Association of BC Forest Professionals (ABCFP) created initiatives and partnerships around wildfires in BC. In 2019, ABCFP and BC Wildfire Service collaborated to develop and deliver training for forest professionals and others. In 2020, ABCFP hosted webinars on "Wildland Forest Fire and Fuel Management Stakeholder Engagement," and "Integrating Fire Behavior Principles in Prescribing Fuel Treatments," and the association also

expanded wildfire-related practice areas to better reflect emerging areas of professional practice. ABCFP is currently engaged with UBC and BC Adaptation Learning Network initiatives to develop wildfire risk mitigation and related courseware and predictive tools for forest professionals.

COLLABORATION AND VOLUNTEERISM

Knowledge exchange within and between associations is increasing and new collaborations are continually being formed, such as risk-related committees, advisory groups, and task forces, to focus on the delivery of knowledge to members within professional associations. These activities can collectively contribute to the public's ongoing trust in professional associations and in professional associations' ability to deliver.

For example, the BC Professional Associations Adaptation Working Group (PAAWG), initiated by West Coast Environmental Law (WCEL) and formally established in 2015 by the provincial Climate Action Secretariat, has thirteen members (professional associations or organizations). When PAAWG became part of the BC Regional Adaptation Collaborative work undertaken by the Fraser Basin Council (FBC), FBC became the chair. One of PAAWG's positive outcomes is the *Joint Statement on Professional Leadership in a Changing Climate*,¹⁰ adopted in 2016 by ABCFP, Association of Professional Biology, College of Applied Biology, Planning Institute of BC, and the BC Society of Landscape Architects.

In another example of collaboration, EGBC and BC Housing together have established a list of professional engineers with availability to respond to earthquakes and other natural disasters.

STRATEGIC FRAMEWORKS AND KNOWLEDGE MANAGEMENT

As professional liability for professional associations and their registrants increases, so too does the demand for accessible evidence-based knowledge around risk management. In response, professional associations are acting to address and reduce both their risk to exposure and the risk to society by increasing risk management and climate knowledge delivery to their membership, often through platforms open to the public. The speed at

which they act is, in part, dependent on their capacity as many professional associations rely on member volunteers to do this work. Examples are:

- BC Adaptation Learning Network, established in 2019 through the support of several BC universities and professional associations, created a *Climate Adaptation Competency Framework*¹¹ to ensure those working in climate adaptation have expertise and abilities to perform climate adaptation job functions.
- BC Institute of Agrologists hosts a publicly accessible webpage that provides up-to-date links to educational resources around natural resource management.
- Both the BC Society of Landscape Architects (BCSLA) and EGBC have open climate portals on their websites; the BCSLA site is curated and includes nearly 1,000 resources. EGBC has released a *Climate Change Action Plan*¹² that provides a structured and proactive approach to support its registrants with managing climate impacts and reducing emissions in professional practice.

While some associations' knowledge platforms are open, communication to the public is largely the responsibility of the public sector and, to a lesser extent, private sector practitioners.

Professional associations also use their internal strategic frameworks to advance climate and risk management

practice. Examples are:

- Writing "preparing for climate change" position papers that outline the association's position on disaster risk reduction, sustainability, and their plan and expectations for moving forward through the collective work of their members.
- Encouraging members to educate themselves about UNDRIP, the Truth and Reconciliation Commission, Indigenous Knowledge and culturally sacred spaces, and to commit and contribute to reconciliation.
- Establishing professional performance standards or guidelines that include risk-based approaches or updating existing standards to include risk-based approaches. Although these guidelines and advisories may have limited applicability in the world of unpredictable and ever-changing risks, they are typically developed in collaboration with multiple stakeholders and, therefore, the guidance developed is relevant and broadly applicable to multiple professional groups and situations.
- Architectural Institute of BC, in coordination with BC Housing, EGBC, and the Justice Institute of British Columbia, created a framework for their respective organizations to participate in post-disaster building assessments.

HAZARD AND RISK DATA AND INFORMATION

Disaster and climate risk information is primarily a component of continuing education that professional associations provide through knowledge sharing and resource delivery; individual associations' approaches vary somewhat. EGBC provides one example—it has an EGBC Disaster Recovery Hub (internal to operations) and integrates disaster and climate risk information to develop professional practice guidelines and training for its registrants.

Professionals with agency can use the knowledge and resources, in whole or in part, as a basis for revising and creating new policy around economics, planning, development, disaster risk mitigation, and disaster response. This, in turn, impacts all aspects of development, including land acquisition, financing, schematic design, approvals, construction, and occupancy, and ultimately influences our connection with nature, relationship with community, food and clean water security, and health; in short—our sustainability (Figure 3).

Members of professional associations use data produced by all levels of government, NGOs, and academic institutions as well as data created through their own work; they benefit greatly from open-source educational material posted to academic and research websites. It is often open-source material and member- or

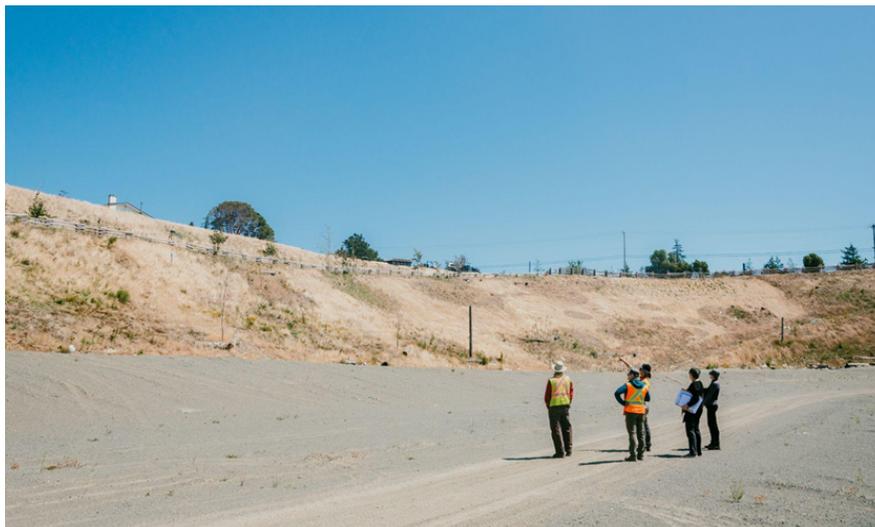


Figure 3: The knowledge professionals learn allows them to create new policy that affects all aspects of land development (Photo: LADR Landscape Architects).

colleague-produced work that is posted by professional associations on the web and social media, newsletters, and magazines.

Professional associations mostly use open-access information on climate and disasters. The sources include but are not limited to:

- [Action on Climate Team](#)
- [Prairie Climate Centre](#)
- [Adaptation Learning Network](#)
- [Natural Resources Canada Climate Change Adaption Platform](#)
- [Climate Data Canada](#)
- [Fraser Basin Council Retooling for Climate Change](#)
- [International Panel on Climate Change](#)
- [Preparing Our Home - Sharing Circles](#)
- [Aboriginal Housing Management Association](#)

GAPS

To fully understand climate and disaster risk and what professionals can do in managing the risk, a body of knowledge is required. This knowledge needs to be transdisciplinary, interprofessional, cross-cutting, and accessible; it needs to include Indigenous Knowledge and nature-based solutions. In this instance, accessibility includes use of a common language because community wellbeing, design, and scientific vernaculars may not be interchangeable, and if the exchange of knowledge is not clear, much may be lost in translation. The knowledge must address scale and all facets of disaster risk, including but not limited to: health, culture, economics, livelihood, food security, clean water and air, infrastructure, structure, and environment. A common repository of knowledge to hold information about hazards, risks, and responses would be useful, as would a compilation

of model bylaws and policies to address these risks. Access to data, information, and methods that are paid for with the public funds should be available to all professionals for use and to build on.

There is a huge demand from professionals for resources and guidance to support nature-based approaches to disaster risk reduction (DRR), especially resources to obtain the detailed and often extensive baseline information that is necessary for nature-based methodologies. Professionals are constrained in the approaches they can recommend by their minimal capacity to obtain data relevant for specific sites in the context of project-based work. Gathering baseline and monitoring

data on a regional and sub-regional level relevant for ecosystems is critical.

A body of knowledge is required . . . [that is] transdisciplinary, interprofessional, cross-cutting, and accessible . . . Access to data, information, and methods that are paid for with the public funds should be available to all professionals for use and to build on.

Climate change adaptation and DRR have evolved separately as areas of research, policy, and practice, and there are differences in terminology, values, and interests between the two. There are very few practice resources that integrate these concepts to accelerate progress on enhancing resilience.

There is a recognized disconnect between professional associations (and, by extension, their members) and Indigenous Peoples, and between these two groups together and the rest of society. Additionally, Indigenous representation within professional associations is low. Professional associations can attempt to address the disconnect with society through outreach, but there

APPLICATION OF THE SEISMIC RETROFIT GUIDELINES TO EXISTING LOW-RISE BUILDING STOCK IN BC

In 2019, the Building and Safety Standards Branch (BSSB) of the Office of Housing and Construction Standards in the Ministry of Municipal Affairs and Housing discussed with EGBC the initiative they were undertaking to develop a building code for existing buildings that would address seismic performance. BSSB was interested in considering if the *Seismic Retrofit Guidelines (SRG)* developed for the seismic assessment and retrofit for existing school buildings could be expanded for application to various types of existing low-rise building stock (three storeys or less) in BC.

The *Seismic Retrofit Guidelines Expansion Project – Low Rise Buildings* was dovetailed with the development of *SRG2020* for existing school buildings by using the same technical methodology:

- Performance-based damage prediction: performance-based earthquake damage prediction that embraces a wide range in earthquake damage (minor damage to total damage)
- High-performance tools: user-friendly access to this analytical database by practitioners through use of a rapid parametric selection process.
- Guidelines: 12 comprehensive manuals fully detail the technical procedures and the technical background for the *Seismic Retrofit Guidelines*. Technical questions on the guidelines are answered by the EGBC Technical Review Board (TRB).

In addition, The National Research Council and Natural Resources Canada were involved in the development of *SRG2020 – Low Rise Buildings* and the *Seismic Performance Analyzer* in order to provide an independent assessment of a mature performance-based methodology. The intent of *SRG2020 – Low Rise Buildings* is to identify common minimum evaluation and mitigation measures for the seismic performance of existing buildings.

is no clear process for such action, and it would be incomplete without interprofessional and Indigenous Peoples' collaboration. The lack of collaboration and understanding of how associations and all Indigenous people can benefit from addressing DRR cooperatively is a significant worry as, regardless of their expertise, no one group has the knowledge or capacity to effectively address the complexities of disaster risk management on their own, and building relationships takes time. DRR is a wicked problem.

There is a recognized disconnect between professional associations (and, by extension, their members) and Indigenous Peoples. . . . Additionally, Indigenous representation within professional associations is low.

Funding is insufficient for all aspects of DRR: trying new techniques and options at all scales; enabling access to climate and DRR info; doing educational outreach; undertaking discipline/interdisciplinary/Indigenous-based DRR research; preparing action-specific guidelines, and more.

Businesses' role in DRR is largely overlooked despite being impacted

by, and contributing to, the effects of DRR. Firms providing professional services are starting to be regulated under the PGA. There are three pillars to the regulation of firms: ethics, continuing professional development, and quality management. While the process of regulation enables meeting requirements of the PGA and the bylaws, more work needs to be done to understand the full extent of the role that firms could have in relation to DRR.

OPPORTUNITY

RECOMMENDATIONS

In addition to Table 1 below, it is important to mention here a list of challenges and tasks that PAAWGⁱ members identified, in 2016, to assist interprofessional collaboration. Tackling the list might be a timely first step:

- Create a shared vocabulary for communicating risk broadly, cross-disciplinary communication, and developing a business case for adaptation action; create a process to support development of a shared vocabulary.
- Communicate climate action as a professional obligation and to empower professionals.
- Integrate climate and DRR skills into professional practice areas.
- Create shared and experiential learning opportunities and case studies to support building on successes and learning from failures.
- Increase the effectiveness of existing tools: disseminate existing tools and learning resources more widely and evaluate uptake of existing tools; develop memorandums of understanding between professional associations to share knowledge and provide access to the data and tools behind individual associations' website login (or locate knowledge on an open-source platform).
- Provide every professional with ongoing continuing professional development (CPD) and beyond-introductory climate adaptation/DRR knowledge.
- Check on use of guidelines (enforcement); if guidelines are not in place, develop them.
- Identify basic climate change impacts and DRR courses required for association registration or, if the professional is already registered, for CPD (like an ethics course).
- Create and use effective surveys to assess member awareness and involvement.
- Recruit mentors; potentially share mentors between associations.

ⁱ PAAWG exists for the purpose of interdisciplinary collaboration among, primarily, professional associations focused on natural resources.

Table 1: Recommendations

Recommendation ¹³	Description of Impact	Priority Level	Capabilities Needed
1. Develop a collaborative community of practice amongst professional associations, and between professional associations and Indigenous Peoples.	Creates a venue for interdisciplinary collaboration, knowledge sharing, and a repository for shared resources and case studies (exemplars).	Critical	Non-volunteer to facilitate discussion, training, etc.; knowledgeable participants; Indigenous participation may need separate funding.
2. Develop guidelines for the relevant professionals on nature-based solutions for climate change adaptation, disaster risk management, and resilience.	Empowers action at various scales, costs, and levels of effort; opportunity for immediate action and outreach.	Critical	Funding and technical expertise for research and development.
3. Make the connection between climate adaptation and disaster risk reduction with GHG emissions reduction more explicit in guidelines and strategic frameworks of professional associations.	Enables strategic planning around “build-back-better” and maximizes co-benefits that reduce disaster risks and emissions.	Critical	Funding for outreach; leadership.
4. Create policies or guidelines to ensure disaster and climate risk management is incorporated into rezoning and development-related applications.	Helps protect the public and brings DRR expertise to rezoning and development approval processes.	Critical	A coordinated public-private sector effort; change to development approval policies (possibly legislation).
5. Provide open-source access to all disaster and climate risk management projects, research, and strategic planning that are paid for from public funds.	Reduces cost and speeds up risk data and DRR knowledge sharing by building on work already completed.	Recommended	A managed repository and jurisdictional willingness (this could be at the provincial level, extend across several provinces, or be national).

THE CHALLENGE

In addition to the above-mentioned gaps and recommendations, there are three complex challenges that stand out:

1. What legal liability does a professional take on, and for what period, when they become involved in DRR? Public sector requests for professional liability insurance coverage are often out of

step with the level of risk inherent in a project.

2. In a DRR project, how is the professional's responsibility to have “current” knowledge measured, and who does the evaluation?
3. Professionals work for a variety of clients, including climate change skeptics and those who acknowledge climate change but are unwilling to engage in risk

reduction efforts, usually due to cost. Without appropriate policies, regulations, and standards, knowledgeable professionals face the ethical dilemma and professional dilemma of interacting with a client that refuses to incorporate disaster and climate risk management measures into the project.

RESOURCES

1. Website geared to professionals in BC, who work at the front line of climate adaptation, to integrate adaptation competencies into their professional practice through education, training, and networking:

Adaptation Learning Network. "Inspiring Climate Action." Accessed March 3, 2022. <https://adaptationlearningnetwork.com/>

2. Geared to Engineers and Geoscientists in BC, these professional practice guidelines establish the expectations and obligations of professional practice in relation to specific professional activities:

Engineers and Geoscientists BC. "Professional Practice Guidelines." Accessed March 3, 2022. <https://www.egbc.ca/app/Practice-Resources/Individual-Practice/Guidelines-Advisories>

3. Guidance for resource professionals developed collaboratively by the College of Applied Biology and the Association of BC Forest Professionals, focused on stewardship of species at risk in BC:

College of Applied Biology. *Managing Species at Risk in BC*. 2009. Accessed March 3, 2022. <https://www.cab-bc.org/file-download/guidance-resource-professionals-managing-species-risk-bc>

4. Independent report on the Professional Reliance Review to inform efforts to strengthen professional reliance in the natural resources sector:

Haddock, Mark. *Professional Reliance Review*. 2018. Accessed March 3, 2022. https://professionalgovernancebc.ca/app/uploads/sites/498/2019/05/Professional_Reliance_Review_Final_Report.pdf

5. BC guide designed to assist local government elected officials and staff, including planners, engineers, chief administrative officers, financial officers and others, to plan and act in ways that will make their communities more resilient to the impacts of climate change:

West Coast Environmental Law. "Preparing for Climate Change – An Implementation Guide for Local Governments in BC." 2012. Accessed March 3, 2022. <https://www.toolkit.bc.ca/Resource/Preparing-Climate-Change-Implementation-Guide-Local-Governments-British-Columbia>

6. Several titles about urban design and sustainability:

Calkins, Meg. *The Sustainable Sites Handbook – A complete Guide to the Principles, Strategies and Best Practices for Sustainable Landscapes*. John Wiley & Sons, Ltd., 2012.

Lenzholzer, Sandra. *Weather in the City – How Design Shapes the Urban Climate*. nai010 publishers, 2015.

Russ, Tom. *Sustainability and Design Ethics*. CRC Press, 2010.

ENDNOTES

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³ *Sendai Framework for Disaster Reduction 2015-30*, Annex II, Article II, para 16, accessed March 3, 2022, https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf

⁴ Engineers and Geoscientists BC, *Developing Climate Change-Resilient Designs for Highway Infrastructure in British Columbia*, 2020, accessed March 3, 2022, <https://www.egbc.ca/app/Practice-Resources/Individual-Practice/Guidelines-Advisories/Document/01525AMWYIOZIOHP3OLNFZR2JOX2GDLZ35/Developing%20Climate%20Change-Resilient%20Designs%20for%20Highway%20Infrastructure%20in%20British%20Columbia>

⁵ *Engineers and Geoscientists BC, Legislated Riparian Assessments in BC*, V1.1, accessed March 3, 2022, <https://www.egbc.ca/app/Practice-Resources/Individual-Practice/Guidelines-Advisories/Document/01525AMW4NQRDRN7RB5ZC3NLKDNXPXSX42V/Legislated%20Riparian%20Assessments%20in%20BC>

⁶ Engineers and Geoscientists BC, “Seismic Retrofit Guidance,” accessed March 3, 2022, <https://www.egbc.ca/Practice-Resources/Programs-Resources/Seismic-Retrofit-Guidance>

⁷ Natural Research Council Canada, *National Guide for Wildland-Urban Interface Fires*, 2021, accessed March 3, 2022, <https://doi.org/10.4224/40002647>

⁸ Natural Research Council Canada, *Coastal flood risk assessment guidelines for building and infrastructure design: supporting flood resilience on Canada’s coasts*, 2020, accessed March 3, 2022, <https://doi.org/10.4224/40002045>

⁹ Adaptation to Climate Change Team, *Low Carbon Resilience: Best Practices for Professionals*, 2018, accessed March 3, 2022, https://act-adapt.org/wp-content/uploads/2018/12/lcr_best_practices_final.pdf

¹⁰ College of Applied Biology, *Professional Leadership in a Changing Climate: Joint Statement*, accessed March 3, 2022, <https://www.cab-bc.org/file-download/joint-statement-climate-change>

¹¹ Adaptation Learning Network, *Climate Adaptation Competency Framework*, 2021, accessed March 3, 2022, https://adaptationlearningnetwork.com/sites/weadapt.org/files/aln-competencyframework_2021_1.pdf

¹² Engineers and Geoscientists BC, *Climate Change Action Plan*, 2021, accessed March 3, 2022, <https://www.egbc.ca/getmedia/50e4e26b-30ad-46c8-8ca1-f06428af65dc/Engineers-and-Geoscientists-BC-Climate-Change-Action-Plan.pdf.aspx> (download)

¹³ Informed by focused PAAWG discussion and gap analysis of professional development needs by the Adaptation Learning Network (ALN):

Adaptation Learning Network, *Climate Adaptation Professional Development Interests*, 2019, accessed March 2, 2022, https://adaptationlearningnetwork.com/sites/weadapt.org/files/aln-climate_adaptation_professional_development_interests-2019.pdf

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Recommended citation

Radhakrishnan, H., Windjack, B., The Role of Professional Associations in Disaster Risk Reduction, in Resilient Pathways Report: Co-creating new Knowledge for Understanding Risk and Resilience in BC; Safaie, S., Johnstone, S., Hastings, N.L., eds., Geological Survey of Canada, Open File 8910, 2022 p.269-281, <https://doi.org/10.4095/330539>