BC INSTITUTE OF AGROLOGISTS
Cultivating Natural Resource Professionals

THE PROFESSION OF AGROLOGY, 2022

A summary of the history, development, accreditation, registration pathways, practice areas, regulated practices & reserved practices of the profession of agrology within the province of British Columbia as of September 1st, 2022.

JP Ellson B.A., Hon.Cert., L.L.B.

DISCLAIMER: At the time of publication of this document on its website, BCIA remains in discussions with the other professions regulated under the Professional Governance Act, respecting the breadth of reserved practice for the professions of agrology and applied biology. As such, this document may be amended in part, with notice of such amendments to be published on the BCIA website.

Questions? For further information (including but not limited to assistance in determining which professional regulator has jurisdiction over a certain activity), Registrants, Applicants, and members of the public are encouraged to contact BCIA at the following address or one of the other respective Regulators under the jurisdiction of the Professional Governance Act.

BC Institute of Agrologists
110 - 2800 Bryn Maur Rd, Victoria, BC, V9B 3T4
BCIA.COM | 250-380-9292 | 1 (877) 855-9291

BC INSTITUTE OF AGROLOGISTS
Cultivating Natural Resource Professionals
75TH ANNIVERSARY

TABLE of CONTENTS

Our Story

Agrology is a regulated profession in British Columbia. The British Columbia Institute of Agrologists (BCIA) is the self-governing regulator of registered Agrologists in British Columbia. By applying stringent accreditation procedures, mandatory professional development, and conduct standards, including rigorous complaint and discipline procedures, BCIA and its Registrants protect the public interest in the province's agricultural, environmental, and natural resource sectors.

Shortly after the First World War, a group of scientists working in Canadian agriculture came together to form the Canadian Society of Technical Agriculturalists (CSTA). In 1945, the organization's name was changed to the Agricultural Institute of Canada (AIC). As the *British North America Act* gave full power of formation, recognition, and control of all professional groups to provincial legislatures, AIC could not gain legal professional status for all its Registrants on a national basis.

Consequently, in April 1947, the government of British Columbia enacted the *Agrologists Act*, creating the British Columbia Institute of Agrologists ("BCIA"). As it is today, the original role of BCIA was to protect the public interest by governing the professional conduct of its Registrants.

In 2003, a new *Agrologists Act* [SBC 2003 Ch.13] (the *"2003 Act"*) was brought into force. Agrology, once almost solely concerned with agriculture, was more broadly defined in the *Act* as: *"... using agricultural and natural sciences and agricultural and resource economics, including collecting or analyzing data or carrying out research or assessments, to design, evaluate, advise on, direct or otherwise provide professional support to ..."*

A. *'the cultivation, production, improvement, processing, or marketing of aquatic or terrestrial plants or animals, or*
B. *the classification, management, use, conservation, protection, restoration, reclamation, or enhancement of aquatic or terrestrial ecosystems that are affected by, sustain or have the potential to support the cultivation or production of aquatic or terrestrial plants or animals.'*

Our Story continued

The 2003 *Act* clearly stated that the purpose of BCIA was to protect the public interest and not to represent its Registrants except in conjunction with the protection of that interest. The 2003 *Act* was part of a general policy of the government to place greater reliance on the self-regulating professions for policing professional behaviour and maintaining professional standards. This policy is generally known as the professional reliance model, which was the focus of a significant review by the Government of British Columbia in 2017-2018.

In May 2018, that review, officially known as the *"The Final Report of the Review of Professional Reliance in Natural Resource Decision-Making"* and commonly referred to as *The Professional Reliance Review* contained more than 100 recommendations for changes and improvements within the professional reliance model utilized by the provincial government. In response, the government concentrated on implementing the first two recommendations, which eventually resulted in the establishment of the *Office of the Superintendent of Professional Governance* "OSPG" and the enactment of *The Professional Governance Act (S.B.C. 2018, c-47),* ("PGA").

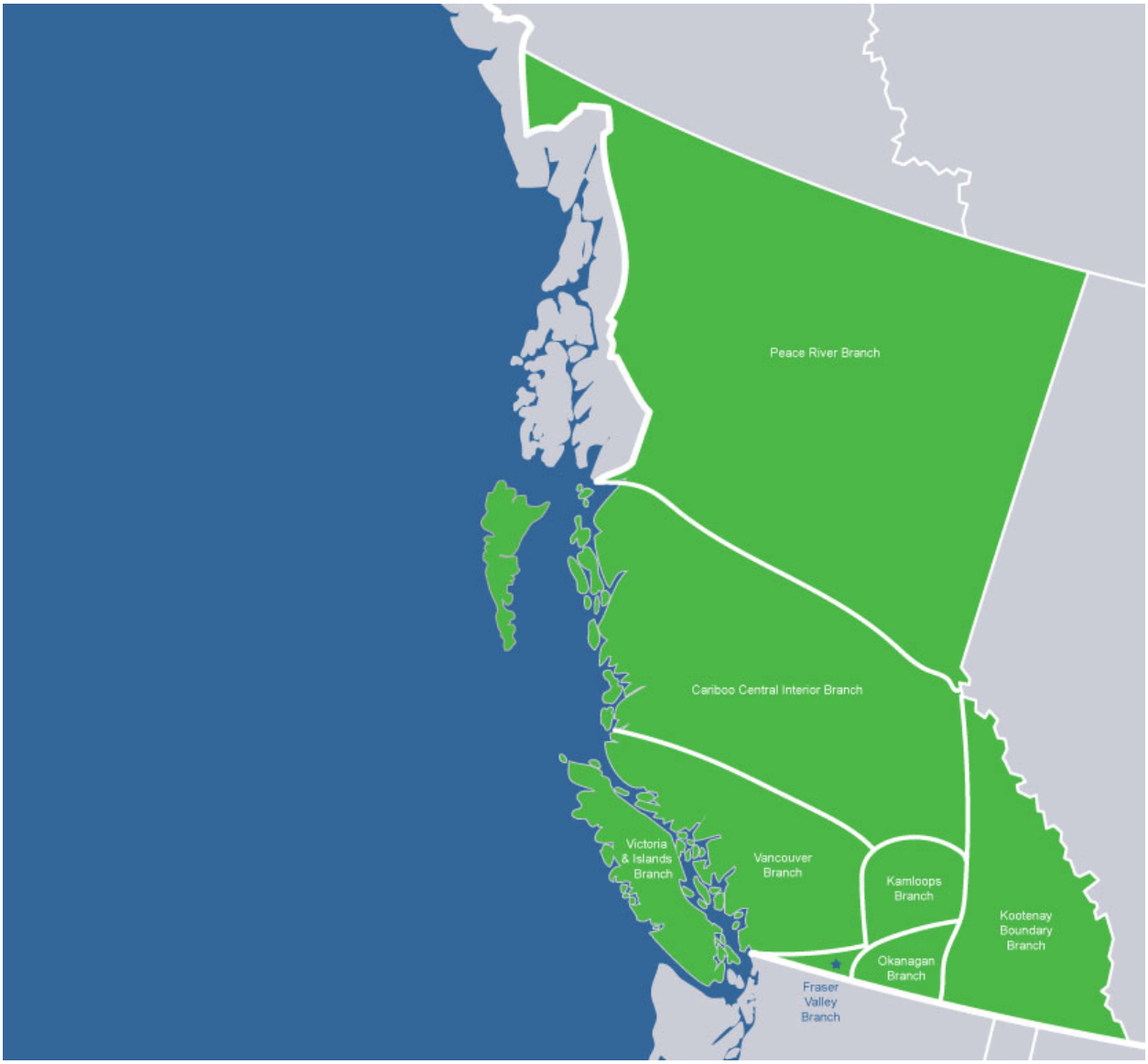
The PGA was transformative with respect to the manner by which self-regulating professions are to operate within the province. Section 22(1) provides unequivocally that it is the general duty of a regulatory body at all times to

A. Serve and protect the public interest with respect to the exercise of a profession, professional governance, and the conduct of Registrants in the Registrants' regulated practice, and
B. Exercise its powers and discharge its responsibilities in the public interest.

The PGA also clarified the definition of the practice of agrology and provided, for the first time, that certain advice and services provided by Agrologists would be reserved, meaning that those services could only be provided by Agrologists. Any person who was not a Registrant of BCIA and provided any of those services would be in breach of the PGA and thus subject to prosecution for unauthorized practice. This publication is intended to outline the parameters of that reserved practice, thereby allowing both laypersons and Registrants to understand the profession more clearly.

Our Story continued

BCIA maintains 8 Branches throughout the province, as shown on the map below:



Our Story continued

BCIA is governed by a Board of Directors ("Board"), which, in accordance with the PGA, consists of 7 Registrant Directors elected by the Registrants of the BCIA from 3 different Regional Electoral Districts, four lay Directors, and the immediate Past President of BCIA in a non-voting capacity. The Board exists to implement the mandate of the organization in accordance with the current Strategic Plan. The Board guides the organization and ensures the integrity, objectivity, and expertise of its Registrants, by

- ensuring compliance with the PGA;
- empowering BCIA's committees;
- maintaining professional standards of conduct;
- adhering to a certification process that includes educational standards and professional development;
- application and promotion of scientific principles;
- communication with Registrants, Districts, and Branches;
- facilitation of informed discussion and decision-making;
- cooperation with other regulators and agrology-related associations.

Upon the enactment of the PGA, Council approved new BCIA Bylaws, which incorporated any changes and additions required by the PGA. The Bylaws guide BCIA forward as the profession of agrology upholds its protection of the public interest and assists in the responsible development of British Columbia's natural resources and environmental sectors.

The Practice of Agrology

The defining characteristic that separates any professional governed under the PGA (and other professional governance legislation within the province of BC) is their special knowledge and experience in its application that comprise their expertise to ensure that the advice and services they provide are protective of the public interest. This knowledge can only be gained through an academic program at an accredited university in Canada or equivalent education or training institute. Professional experience and expertise are gained in the specific application of these knowledge areas to the perspectives of the practice of agrology, such as through an articling period supervised and guided by a suitable mentor.

It should be noted that, at times, knowledge areas may be shared by other professionals. The application of that knowledge may be applied to very different purposes. For example, both agrologists and engineers may share knowledge in soil physics, but the application of that knowledge by an agrologist is for a purpose within the practice of agrology, such as ensuring the availability of moisture for plant growth, whereas the engineer may be using the same or very similar knowledge to assess potential soil cohesion for structural purposes. **As such, knowledge areas are NOT reserved practice areas but instead refer to foundational knowledge that may be common to more than one profession.**

The Practice of Agrology

There are two definitions in the *Agrologists Regulation* enacted in 2021 pursuant to the PGA (the "Regulation"), which together define the parameters of the reserved practice of the profession. The first is the definition of *regulated practice*, which is colloquially referred to by many as the "definition of agrology."

That definition provides as follows:

"practice of agrology," subject to subsection (2), means the provision of any of the following advice or services:

1. (a) advice or services that

    (i) are based on agricultural or natural sciences or agricultural or resource economics, and

    (ii) relate to

    A. cultivation, production, improvement, processing, marketing or management of aquatic or terrestrial plants or animals,
    B. classification, management, use, conservation, protection or enhancement of aquatic, terrestrial or atmospheric ecosystems that are affected by, sustain or have the potential to sustain the cultivation or production of aquatic or terrestrial plants or animals, or
    C. restoration, reclamation or remediation of aquatic, terrestrial or atmospheric ecosystems;

    (b) advice or services that are ancillary to those described in paragraph (a).

2. The practice of agrology does not include the provision of advice or services within the reserved practice of a Registrant of another regulatory body.

The Practice of Agrology continued

This definition is an evolution of the 2003 definition in that it clearly confirms the inclusion of environmental sciences within the profession. It must be stressed that any person can provide advice and services within this definition of Regulated practice **without** being a Registrant of BCIA.

A significant restriction, however, is that a person cannot present themselves as having one of the professional agrology designations protected by the *Regulation* unless they are actually a Registrant of BCIA.

The second definition is that of ***reserved practice***, which in actuality, is a subset of the regulated practice of the profession.

The *Regulation* provides:

(1) the practice of agrology described in paragraph (a) (ii) of the definition of "practice of agrology" is a reserved practice that may only be carried out by or under the supervision of a Registrant if the practice relates to providing advice or another service that, having regard to the protective purposes, requires the experience or technical knowledge of an Agrologist.

(2) In the case of advice or services described in paragraph (a) (ii) (C) of the definition of "practice of agrology", the reserved practice is limited to the advice or services relating to the state or quality of soil, water or air, for an agrology purpose.

Protective purposes, as used in the above definition, is itself defined as follows:

"Protective purposes" means the safety, health, and welfare of the public, including the protection of the environment and the promotion of health and safety in the workplace."

"Agrology purpose," as used in the definition above, is understood to mean that the advice or service must be within the regulated practice of agrology.

The Practice of Agrology continued

Restrictions on the Reserved Practice of Agrology

It must be stressed that there are four significant legislative restrictions that limit the scope of the definition of the reserved practice of agrology. The first is that the practice of agrology does **NOT** include *"a normal farm practice, as defined in the Farm Practices Protection (Right to Farm) Act, by a person on the person's own land."*

The second restriction is that the reserved activities conducted in accordance with *"Restoration, reclamation or remediation of aquatic, terrestrial or atmospheric ecosystems are "limited to the advice or services relating to the state or quality of soil, water or air, for an agrology purpose."*

The third restriction is that "The practice of agrology does **NOT** include the provision of advice or services within the reserved practice of a Registrant of another regulatory body" (emphasis added). Prior to September 1st, 2022, only the Registrants of Engineers and Geoscientists BC ("EGBC") and the Association of British Columbia Forest Professionals ("ABCFP") have reserved practice that falls within this restriction. After September 1st, other bodies such as, but not limited to, BCIA and the College of Applied Biologists have reserved practice, each of which must be defined in accordance with this restriction.

The fourth restriction, as outlined in Section 55 of the PGA, is that other legislative enactments of the Government of British Columbia can authorize persons other than Registrants under the PGA to conduct specific work. An example of this is Contaminated Sites Approved Professionals (CSAPs), qualified professionals appointed to the Roster of Approved Professionals under Section 42 of the Environmental Management Act to review environmental certification applications made under that Act and the Contaminated Sites Regulation. Another example is the Riparian Areas Protection Regulation which lists multiple professional designations as being qualified to practice in that area. Simply stated: **Only** Registrants of BCIA can provide advice or services within the reserved practice of the profession except for those activities that are within the existing reserved practice of another profession regulated or are performed by persons exclusively on their own land.

Regulated Designations & Scopes of Practice

Being a Registrant with a designation carries responsibility, authority, and recognition. Regulated agrology professionals in British Columbia use a title (also known as a designation) as outlined below:

- **An Articling Agrologist (AAg)** must meet mandatory education requirements and be approved for registration by the Credentials Committee. Upon successful completion of the Articling Program, the AAg is eligible to become a PAg.
- **A Professional Agrologist (PAg)** has already completed the Articling Program and has at least two years of agrology-related work experience after their first eligible degree. A PAg can use their professional seal on documents.
- **An Articling Technical Agrologist (ATAg)** must meet mandatory education requirements and be approved for registration by the Credentials Committee. Upon successful completion of the Articling Program, the ATAg is eligible to become a TAg.
- **A Technical Agrologist (TAg)** has completed the Articling Program and has at least two years of agrology-related work experience after their first eligible diploma, applied degree, or degree. A TAg can use their professional seal on documents.
- **A Limited License Agrologist (LLAg)** must have at least the equivalent of 5 years of work experience in a specific agrology area of practice and can only provide the specific advice and services as listed in their respective license.

The PAg and TAg designations are both authorized to sign professional work, provided it is in their areas of specialization. The LLAg designation is authorized to sign professional work but only within the stipulated activities listed in the respective limited license.

Regulated Designations & Scopes of Practice

Restricted Scope of Practice For (Articling) Technical Agrologists

(Articling) Technical Agrologists may practice independently (i.e., without Professional Agrologist supervision) with a restricted scope of practice. The limited scope of practice allows the technical Agrologist to collect data, operate equipment, and make recommendations to other professionals; however, it prevents them from advising, interpreting, or recommending situations which may present a risk to the public. The functions of a Technical Agrologist are more narrowly defined and typically more focused on technical parameters, guidelines, and protocols. The responsibilities of a Professional Agrologist generally are broader and have a full-scale understanding of the project.

Scopes of Practice for Agrology Registrants

Activities	Professional Agrologists (PAg)	Articling Agrologists (AAg)	Technical Agrologists (TAg)	Articling Technical Agrologists (ATAg)	Limited License Agrologists (LLAg)
Collect Data	Yes	Yes	Yes	Yes	Yes
Operate Equipment	Yes	Yes	Yes	Yes	Yes
Data Entry	Yes	Yes	Yes	Yes	In Licensed Area
Data Analysis	Yes	Under the supervision of a PAg	Yes	Under the supervision of a PAg or TAg	In Licensed Area
Report Writing	Yes	Yes	Yes	Yes	In Licensed Area

Activities	Professional Agrologists (PAg)	Articling Agrologists (AAg)	Technical Agrologists (TAg)	Articling Technical Agrologists (ATAg)	Limited License Agrologists (LLAg)
Recommendations	Yes	Under the supervision of a PAg	Yes	Under the supervision of a PAg or TAg	In Licensed Area
Interpretive Analysis	Yes	Under the supervision of a PAg	Under the supervision of a PAg	Under the supervision of a PAg	In Licensed Area, under the supervision of a PAg
Developing Experimental Design or Protocol	Yes	Under the supervision of a PAg	Under the supervision of a PAg	Under the supervision of a PAg	In Licensed Area, under the supervision of a PAg
Preparing Interpretive reports outside established parameters, protocols, and guidelines	Yes	Under the supervision of a PAg	Under the supervision of a PAg	Under the supervision of a PAg	In Licensed Area, under the supervision of a PAg
Preparing Interpretive reports inside established parameters, protocols, and guidelines	Yes	Yes	Yes	Yes	In Licensed Area

Pathways to Registration

The following grid, in a very brief manner, indicates minimum requirements for each of the BCIA's Registrant categories. Below the grid are more specifics as to the pathways for each of the professional designations. The Limited License Agrologist (LLAg) is a new category of registration implemented as of September 1st, 2022. An applicant will be granted the highest level of professional designation that the applicant is qualified for.

Practicing Registrant Categories	Education & Agrology Work Experience
Articling Agrologist (AAg)	• Bachelor's Degree with courses in accordance with National Education Guidelines and work experience post-graduation • Amount of work experience determines the length of articling term • Must complete the Articling Program to advance to PAg
Professional Agrologist (PAg)	• Bachelor's Degree & completion of Articling Program • Expedited Program allows for immediate PAg admission with 15+ years of work experience.
Articling Technical Agrologist (ATAg)	• Diploma, applied degree, or degree and contents of the courses and work experience post-graduation • Amount of work experience determines the length of articling term • Must complete the Articling Program to advance to TAg
Technical Agrologist (TAg)	• Diploma, applied degree, or degree & completion of Articling Program • Expedited program allows for immediate TAg admission with 15+ years of work experience
Limited License Agrologist (LLAg)	• Greater than or equal to 5 years of work experience, will consider a combination of post-secondary education and work experience to meet the 5-year equivalent requirement.

Pathways of Entry

Professional Agrologist (PAg)

Pathway 1	Pathway 2
Minimum of a Bachelor's Degree With Up to 15 Years Work Experience 1. Education Assessment with Comprehensive Course Review 2. Work Experience Assessment and Assignment of Articling term • Up to 6 Years Work Experience – 2-year articling term • Up to 15 Years Work Experience – 1-year articling term 3. Practice Areas Assessment 4. Registration as an Articling Agrologist (AAg) 5. Completion of 'Articling Program' to advance to PAg status	**Minimum of a Bachelor's Degree & 15+ Years of Work Experience** 1. Education Assessment with Comprehensive Course Review 2. Work Experience Assessment 3. Practice Areas Assessment 4. Registration as a Professional Agrologist (PAg) 5. Completion of mandatory 'Duties and Responsibilities' as set out under the Expedited Admission Program

Pathways of Entry

Technical Agrologist (TAg)

Pathway 1	Pathway 2
Minimum of a Diploma, Applied Science or Bachelor's Degree With Up to 15 Years Work Experience 1. Education Assessment with Comprehensive Course Review 2. Work Experience Assessment and Assignment of Articling term • Up to 6 Years Work Experience – 2-year articling term • Up to 15 Years Work Experience – 1-year articling term 3. Practice Areas Assessment 4. Registration as an Articling Technical Agrologist (ATAg) 5. Completion of 'Articling Program' to advance to TAg status	**Minimum of a Diploma, Applied Science or Bachelor's Degree & 15+ Years of Work Experience** 1. Education Assessment with Comprehensive Course Review 2. Work Experience Assessment 3. Practice Areas Assessment 4. Registration as a Technical Agrologist (TAg) 5. Completion of mandatory 'Duties and Responsibilities' as set out under the Expedited Admission Program

Pathways of Entry

Limited License Agrologist (LLAg)

Pathway 1	Pathway 2
Some Post-Secondary Education But Without a Degree or Diploma and Less Than 5 Years' Work Experience 1. Education Assessment with Comprehensive Course Review 2. Work Experience Assessment 3. Practice Areas Assessment – in a limited area 4. Registration as a Limited License Agrologist (LLAg) 5. Completion of Mandatory Requirements • Ethics Training • Indigenous Awareness Training • Minimum PD Requirements • Other Duties and Responsibilities as assigned by BCIA	**Equal or Greater Than 5 Years' Work Experience Without Education (Degree/Diploma)** 1. Education Assessment 2. Work Experience Assessment 3. Practice Areas Assessment – in a limited area 4. Registration as a Limited License Agrologist (LLAg) 5. Completion of Mandatory Requirements • Ethics Training • Indigenous Awareness Training • Minimum PD Requirements • Other Duties and Responsibilities as assigned by BCIA

Interplay between Regulated Professionals

At times, Registrants of different regulated professions may find themselves working together, in collaboration, or alongside each other, as part of the same project, enterprise, or in some other capacity. Their practices and the activities they engage in during their provision of advice and services as professionals may relate to each other in three different ways:

Overlap of Practice

Is work by two or more Registrants that have the same objective and advice/services, same competencies (knowledge, skills, and abilities) to perform the tasks but with the Registrants governed by different regulators. Overlaps of reserved practice are not allowed unless the specific overlaps are legislatively authorized.

Alignment of Practice

Professionals are in alignment when they provide advice or services using similar competencies and technical knowledge but with a different objective and are governed by different regulators. An example, as outlined above, is that Agrologists and engineers may share knowledge in soil physics. However, applying that knowledge by an Agrologist includes ensuring the availability for plant growth. In contrast, the engineer may use similar knowledge to assess potential soil cohesion for structural purposes.

Intersecting Practice

Occurs when professionals work in compliment to each other toward the completion of a task or a project but provide different advice and services, have different competencies (knowledge, skills, and abilities), and are governed by different regulators.

Practice Areas 2022

Registrants of professional regulatory bodies define themselves by the specific expertise they provide in the advice and services they render. Historically, Registrants of BCIA self-identified as being qualified and competent to provide advice and services in up to 3 of 38 distinct practice areas across six different practice sectors.

The advent of reserved practice for the profession of agrology required the definition of 'practice area' to be updated to

'A unique functional area of professional practice within the agrology profession that for protective purposes requires specialized knowledge, based on education, work experience, and skill sets. If the activities are performed for protective purposes as defined within the Agrologists Regulation that work is within the reserved practice of the profession.'

This new definition facilitated a significant rationalization and update of the existing areas into 12 areas across five different practice sectors. A Registrant is now allowed to self-declare in as many areas as the Registrant is qualified for and competent in.

Practice Areas 2022, continued

Summary Chart of Practice Areas, Reserved Practice, Interactions, and Alignments Between Regulated Professions

Per the five updated practice sector definitions, the 12 practice areas within the definition of agrology within British Columbia after September 1st, 2022 are stipulated in the following charts and are further defined below.

Sector	Practice Areas	Reserved Practice of Agrology	Interaction or Alignment with Other Regulated Professions
Economics	1. Agricultural & Resource Economics Growing & Production	1. Yes	1. No
Growing & Production	2. Crop Development, Production, and Management 3. Livestock Development, Production and Management 4. Rangeland and Grazing Management 5. Agroforestry	2. Yes 3., 4., & 5. Certain, but not all Activities	2. No 3. Yes: Veterinarians 4. Yes: Foresters, Applied Biology Professionals and Veterinarians 5. Yes: Foresters and Applied Biology Professionals
Processing	6. Food and Agricultural Products Development and Processing 7. Waste Management, Bio-renewables, and Bioprocessing	6. & 7. Certain, but not all Activities	6. Yes: Engineers 7. Yes: Engineers and Applied Biology Professionals, dependent on the type of waste

Sector	Practice Areas	Reserved Practice of Agrology	Interaction or Alignment with Other Regulated Professions
Land & Water Resources	8. Land Evaluation, Classification, Mapping, Conservation, and Management 9. Water Resources Planning and Management	8. & 9. Certain, but not all Activities	8: Engineers, Geoscientists, Foresters, and Applied Biology Professionals 9: Engineers, and Applied Biology Professionals
Environmental Resources	10. Protection and Management of Environmental Resources 11. Land Reclamation and Restoration 12. Invasive Species and Pest Management	10., 11. & 12. Certain, but not all Activities	10 & 11. Yes: Engineers, Geoscientists, Foresters, Applied Biology Professionals, ASTTBC Technicians, and Technologists; dependent upon the specific type of resources being protected or managed 12. Yes: Applied Biology Professionals

Extensive review and definition of these areas of practice can be found in the BCIA publication “Areas of Practice" which can be found on the BCIA website and should be read in conjunction with this publication. That said, given the complex interaction between the different professions engaged in the natural resources sector within British Columbia, examples of real-life interactions are probably the most straightforward method by which the actual activities within agrology’s reserved practice can be understood.

Below are specific examples of from actual projects that regulated professionals under the Professional Governance Act (PGA) may be engaged in to provide their advice and services. These examples are for discussion and not to define the entire scope of practice for agrology or any of the other professions in this document.

Practice Areas 2022, continued

Chart of Interactions between PGA Regulated Professionals in Actual Projects

(Underlined content within this chart is hyperlinked.)

Example Scenarios	Interactions and Alignments	Page References
Highway Improvement Design Build	Applied Biology Professionals, Foresters, ASTTBC Technologists and Technicians	Pg 24 Pg 25
Grower Business Expansion	Applied Biology Professionals, Engineers	Pg 27
Environmental Assessment on a linear infrastructure development that crosses public forest and rangelands and water crossings	Foresters, Engineers, Geoscientists, Applied Biology Professionals	Pg 27
Wetland management in the Agricultural Land Reserve	Applied Biology Professionals	Pg 28
Nutrient Management Plans	Engineers	Pg 30
Agroforestry	Foresters	Pg 35-41
Southern Interior Silvopasture Pilot	Foresters, Applied Biology Professionals	Pg 35
Cariboo Silvopasture Planning Pilot	Foresters	Pg 38
Alley Cropping	Foresters, Engineers	Pg 40-41
Fuel Tanker Truck Spill, Environmental Investigation and Remediation	ASTTBC Technologists and Technicians Applied Biology Professionals Engineers Geoscientists	Pg 44 Pg 45 Pg 46-47 Pg 47
Former Landfill Site, Environmental Investigation and Remediation	ASTTBC Technologists and Technicians Applied Biology Professionals Engineers Geoscientists	Pg 50-51 Pg 51 Pg 52 Pg 53

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Highway Improvement Design Build

A typical design/build for a major transportation linear corridor can have a capital cost of over $100 Million with a project duration of more than 4-5 years: the first year typically resulting in the design while the remaining years for construction and post-construction activities. The following roles define brief activities throughout both the design and construction phases.

An Agrologist's role is to manage and sign off on aspects of contaminated site investigations, remediation, and monitoring task throughout the project. There are often alignments and interactions with other professionals especially those authorized under the BC Contaminated Sites Regulations and other statutes and regulations. Typically at the design stages, it is incumbent for all previous and relevant studies to be reviewed and updated to reflect current soil, water, and vapour quality standards.

Depending on project ownership requirements, the PAg can direct any applications for legal instruments to be obtained (e.g., Determination, Approval in Principle, or Certificate of Compliance). The PAg may also prepare plans to guide the constructor with the required steps to handle and manage any encountered contamination and direct the disposition of the media (i.e., to a designated permitted landfill, temporarily stored, and retested onsite to determine ultimate disposition, and/or to be redistributed on site according to beneficial reuse authorizations), or for monitoring and signing off on construction water discharge to sanitary to storm systems during construction and post-construction periods. PAgs' professional role is critical for the protection of the public, the safety of construction workers, and the environment and fiscal responsibilities.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Highway Improvement Design Build, continued

An applied biology professional's perspective could be primarily for fish and wildlife salvages, arranging and securing environmental permits throughout the duration of the project. Their responsibilities can also include environmental monitoring, ensuring fish and fish habitat and water quality follow permitted guidelines, and, if certified, prescribing and overseeing the sediment and erosion control aspects during construction. These would be protective measures for the environment and fiscal responsibilities, especially if a regulatory fine (e.g., HADD or equivalent charge) were levied by the government/regulating body.

A forester's professional role would be to identify the values and feasibility of forestry clearing to allow for highway construction (typically with expanded lanes and widening of the alignment). In addition, the RPF could be needed to develop prescriptions for woody debris use incorporated into any the bioengineering design for the project and/or the protection of nearby forestry resources/assets that may be negatively impacted by the materials/design, if in the event of collapse or failure of the structure, or to the health of surrounding forest ecosystem. This would be primarily a protective measure to the environment, safety and financials, and assets.

An applied science and certified technician's professional role would be to develop, maintain, and audit the Project Quality Management System (QMS) and Environmental Management System (EMS) responsibilities throughout the duration of the project. This role can be expanded to sediment and erosion control functions and duties if certified in that field. ASCT's role is critical to ensure the project is delivered to acceptable standards resulting in the protection of the environment, the public, the construction costs/and assets, and the safety of construction workers and drivers during and post-construction.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Highway Improvement Design Build, continued

An engineer's professional role includes the completion and stamping of engineering design drawings if required by the proponent or regulator, which is generally if grounds, pre-existing and new infrastructure are at risk of destabilizing or failing. The PEng. role (which can vary dependent on the scope of engineering practice required for the specific project such as structural, civil, geotechnical, etc.) as owner's engineer or constructor's design/build engineer team would be project management and signing off on engineer of record drawings throughout the duration of the construction. The PEng. role would be particularly relevant for the protection of the construction workers safety, public users, the environment, and the public interest.

Grower Business Expansion

In this example, extracted from real-life situations, an agricultural producer wishes to expand their operation by bringing an adjacent piece of land into production. In doing so, they engage the services of a professional Agrologist and other professionals as required:

An Agrologist must only provide professional services reflecting appropriate expertise and training; must first determine if the intended development of the new crop area will impact the environment beyond what is allowable and be suitable for growing the desired crops on the site. The Agrologist would need to analyze the following to be included in their recommendations:

- Soil/rooting needs - Some crops are shallow rooted, and some are deeper rooted. Soils on specific sites may contain certain accumulations of salts that may be detrimental to production.
- The soil profile must be understood to allow for crop production as well as necessary drainage and irrigation planning. This can be important as groundwater from irrigation may move and impact other neighbouring sites. The Agrologist must also understand the nutrient requirements for each crop based on what the soil may supply.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Grower Business Expansion, continued

- Climate requirements for the intended crops. Some crops have requirements for a minimum number of frost-free days or are intolerant of certain temperature extremes.
- Water requirements/sources of available water. Water, a mainstay of plant growth, is a key factor. Agrologists must understand and be aware of the limitations of water sources with respect to volume, quality, and time available with respect to crop needs. New restrictions on wells and water access in BC may require applications prior to the commencement of the project.
- Mechanical requirements for dealing with the crop. The Agrologist must have the expertise to determine if soil type and slope may impact the type of equipment used on the new acres.
- Suggest specific species/genotypes/ cultivars best suited to the site. An Agrologist can recommend the best plant material suited.
- An Agrologist must be aware of potential slope stability issues. Improper cutting, sloping, and developing land can result in landslides, potentially damaging neighbouring property.
- An Agrologist must be aware of environmental needs such as riparian setbacks and urban interfaces. Cropping practices, light contamination, visual limitations, and light limitations for the crop all must be taken into account.
- They may also develop integrated pest management plans that would suit the neighbouring crops as well as the new plantings. Are the neighbouring properties using organic principles and/or special pest control practices that must be included in their recommendation.
- Lastly, as the Farm Building Code is enacted in many jurisdictions, the Agrologist may be retained to assist in building placement, retention of agricultural lands, and commentary on the size and capacity of certain buildings related to owned or leased lands.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Grower Business Expansion, continued

An applied biology professional may be required to identify species at risk, raptor nesting sites, or impacts on wild fish habitats.

If the site is treed, a forester may be required to identify tree species that may have commercial value prior to clearing

An Agrologist or engineer may be needed to design the cut and fill for the site preparation prior to cropping and vehicular access to the site needs to be determined.

An Agrologist will be needed to design the irrigation/pump system for the site.

Environmental Assessment on a linear infrastructure development that crosses public forest and rangelands and water crossings

An Agrologist's objective is to provide advice and services such as assessing and managing soil quality and agricultural cultivation for the project area. PAgs complete soil surveys for linear infrastructure on non-agricultural lands. They collect samples to measure physical and chemical properties like bulk density, AWSC pH, etc. These measurements are useful for agriculture, forestry, construction, engineering design, and baseline condition assessment.

- A forestry professional's objective is to provide advice and services such as assessing and managing the timber resources (e.g., harvesting and forest revegetation).
- An engineering professional's objective is to provide advice and services such as the development design (e.g., highways, bridges) and managing the design implementation.
- A geoscience professional objective is to provide advice and services such as assessing and managing slope stability.
- An applied biology professional's objective is to develop an environmental management plan as it relates to the conservation and protection of wild terrestrial or aquatic species.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Wetland management in the Agricultural Land Reserve

An Agrologist's objective is to provide expertise on soil and water requirements for crops and livestock sustainability and productivity; especially the required subsurface soil drain depth and spacing.

An applied biology professional's objective is to manage and mitigate impacts on the receiving environment (wetlands) for conservation and protection of wild species (amphibians, fish, waterfowl) such as advice and services, including

1. Assessments of baseline water quality related to impacts on wild species; Assessments of wild species composition (fish, aquatic invertebrates, waterfowl); Reviewing assessments to make recommendations for non-commercial vegetation requirements for sustaining identified wildlife species;
2. Providing recommendations to regulatory decision-makers for best management practices, policies, or regulations as it relates to the conservation and protection of wild species.

Nutrient Management Plans

Nutrient Management Plans (NMPs) are technical documents used to help farmers efficiently meet their production objectives and protect the environment, including water quality. Plans provide balanced recommendations for farmers on which nutrient sources to apply and what rates they should be applied at. Specifically, those who prepare NMPs are responsible for

- preparing NMPs that include informed recommendations for the environmentally responsible use of nutrients in crop production;
- ensuring that all recommendations they provide are in line with all relevant regulations;
- considering all nutrient sources available to the crop, including nutrients in the soil and nutrients applied to and removed from a field in the NMP; and

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Nutrient Management Plans, continued

- designing the NMP to:
    - minimize the risk of nitrogen and phosphorus loss from an agricultural field to the environment
    - reduce excess soil nutrient levels over time, and
    - target an agronomic nitrogen balance of zero

In preparing an NMP, a PAg would be responsible for the following, acting under their area of practice:

- Collecting representative soil, plant, and manure samples for laboratory analysis;
- Collecting information about a farm's management practices, such as manure application, cropping practices, irrigation practices, manure and compost handling, manure and compost storage;
- Collecting information about a farm's soil and landscape features, such as soil texture, soil drainage, or watercourses;
- Collecting and analyzing farm records, such as crop yields, manure or compost generation, or crop quality;
- Preparing an NMP that manages the farm's agronomic and crop removal balance while meeting regulatory requirements for the agronomic N balance and crop P2O5 removal balance and has recommendations for;
    - cropping systems
    - nutrient application rate, the timing of application, placement, and source to allow for efficient crop production
    - managing the farm's overall manure balance
    - setbacks and other recommendations to protect water quality
    - keeping records related to nutrient management
    - meeting regulatory requirements

Additionally, an RTAg may have similar duties as described above, but may not be able to fully endorse an NMP under the *Professional Governance Act* or BCIA regulations.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Nutrient Management Plans, continued

When solid or liquid storage systems for manure or other nutrient sources are elements of an NMP, the design, maintenance, or evaluation of these systems/structures is typically handled by a PEng.

Agroforestry

Definitions of agroforestry in use in British Columbia follow North American conventions, the context of which are the integration of agronomic principles, practices, and production with both forestry and conservation management approaches and can be found at the following:

USDA National Agroforestry Center: Agroforestry Practices | USDA National Agroforestry Center

Association for Temperate Agroforestry: What is agroforestry? (aftaweb.org)

Definitions

Agroforestry is a land management approach comprised of five systems involving the intentional, integrated production of crops and/or livestock with trees (or shrubs). It blends agriculture, silviculture, and conservation practices in the same land-use system and is intentional, integrated, interactive, and intensive. Section 10(a) of the Agricultural Land Reserve Use Regulation [B.C. Reg 190/2021] defines agroforestry as *"deliberately retaining, introducing and mixing trees or other plants in crop or animal production systems to provide an economic return...."* Thus, throughout this document, the term agroforestry is used in that context and is not meant to imply or refer to the practice of forestry.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Agroforestry

The five agroforestry systems commonly used in temperate agroforestry include alley cropping, agricultural riparian buffers, forest farming/food forests, windbreaks/vegetative buffers, and silvopasture.

- **Alley cropping:** Agricultural/horticultural crop cultivation between single or multiple rows of trees or shrubs spaced to allow close to the full sun between the rows. Trees might include valuable hardwood veneer or lumber species; fruit, nut, or other specialty crop trees/shrubs; or desirable softwood species for fiber production. Examples: Hawthorne intercropped with a variety of medicinal plants in the Arrow Lakes area. Black walnut intercropped with a variety of alternate crops in the Okanagan.
- **Agricultural riparian buffers:** Plantings along water bodies for protection and enhancement of aquatic and riparian resources, which can be managed to include trees and shrubs that produce a harvestable crop along with conservation benefits, without impairing proper functioning conditions.
- **Forest farming / Food forests:** Cultivation/management of typically higher-value crops under the protection of a managed tree canopy, but can also involve non-wood products from the trees themselves in addition to longer-term fiber/timber objectives. Forest farming does not encompass the wild harvest of understory plants and plant products. Management is an essential element of forest farming/food forests, e.g., morel harvest after a wildfire would not be considered forest farming. This approach to crop production intentionally uses both vertical space and the interactions of the plants and the microclimate created. Examples: Christmas trees intercropped with pumpkins; and tree syrup production (birch, big leaf maple).

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Agroforestry, continued

- **Shelterbelts / Vegetative buffers** encompass a range of single and multi-row linear planting types. Tree and shrub plantings are designed to provide environmental goods and services and economic and social benefits. Benefits might include enhanced crop production (e.g., via shelterbelts for microclimate modification), reduced soil erosion (wind interception), protection of people and livestock (e.g., yard site or livestock buffers for summer shade or reduced winter heat losses), lateral light interception (e.g., from greenhouses), dust and odour mitigation, interception of pesticide drift (vegetativebuffers.pdf (gov.bc.ca)) and water conservation.
- **Silvopasture** is the intentional combination of trees, forages, and livestock managed as an integrated practice on the same land unit. These systems are intensively managed for forage, livestock, and forest products. Silvopastures can be created by introducing or augmenting existing forages in treed systems or by introducing trees into pasture systems. Silvopastures are differentiated from conventional forest grazing in the province via the level of management inputs, management intensity, and purposeful integration design. Examples might include sheep among Christmas trees for competition management, or beef cattle managed to graze fine fuels in the understory for wildfire risk reduction.

Operationally, agroforestry implementation might involve the design and establishment of one of the systems starting from a blank slate. However, it more commonly involves deliberate retention or introduction of trees or shrubs into existing agricultural production systems; or, deliberate introduction or enhancement of agricultural crops in closed forest settings.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Agroforestry, continued

The following two silvopasture examples highlight the baseline agriculture context of agroforestry applications, the roles of Agrologists in the projects, and briefly describe the roles of other professional bodies in BC specifically regulated under the *Professional Governance Act.*

Southern Interior Silvopasture Pilot

Two Crown land sites (52 ha and 24 ha) within a spring forested-grazing unit (range license) near Lake Country. Starting state of the two units were fully timbered sites. Overstories included Douglas-fir, hybrid white spruce, and subalpine fir. As can be the case with many agroforestry systems, the pilot involved extensive multi-disciplinary planning and implementation partnerships, including the BC Ministry of Agriculture, the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development, Agriculture and Agri-food Canada, the Regional District of the Central Okanagan, the District of Lake Country, the Okanagan Basin Water Board, Tolko Industries Ltd, Coldstream Ranch (2002) Ltd, the BC Cattlemen's' Association Farmland Riparian Interface Stewardship Program and private sector consultants (Legerwood Natural Resources Inc., and G.W. Powell, PAg). Grazing rights over both sites are set in a grazing license held by Coldstream Ranch. Timber harvesting rights and silviculture obligations are held by Tolko Industries Ltd. Treatments included: Low-density silvopasture (600 sph + seeded agronomic forages); medium-density silvopasture (1200 sph + seeded agronomic forages); conventional forest plantation control; and, forage-only control. The project engaged a consulting Agrologist/Forester to liaise and translate objectives, perspectives, and legislative/policy elements among agency Agrologists, the agriculture industry, and timber-industry foresters.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Agroforestry, continued

Agrologists

Eight Agrologists had professional roles in the project, with several having multiple professional roles. These roles included the following:

- Development of project proposals (directed to Agriculture and Agri-food Canada, BC Ministry of Agriculture, Okanagan Basin Water Board), including project design principles, potential locations, work plan development, and partner identification and engagement.
- Coordination of multiple partners and collaborators, including municipal, provincial and federal agencies, consulting professionals, agriculture, and forest industry.
- Liaison with industry and agency RPFs to collaboratively inform the development of prescriptions reflecting purposeful agricultural integration with timber/fiber production. Example elements of the arrived-at-site prescriptions included seedbed targets for forage seeding (mechanical site prep targets), riparian protection measures to limit cattle access to NCDs and streams (access resulting from timber harvest), planted tree densities, maximum and minimum stocking targets, and adjustments to minimum inter-tree distance to take better advantage of large obstacles.
- Development of forage seed mixes and seeding rates and cattle grazing schedule plans/adjustments.
- Experimental design (randomized complete block) and monitoring (plant community composition, forage productivity, rangeland riparian health assessments, livestock impact on seedlings, tree seedling growth). Cattle GPS collar data summarization, analysis, and interpretation.
- Tech transfer outlining/illustrating agroforestry, silvopasture, and the integrated planning and management process, and results to date. Authorship of presentations, technical reports, and factsheets; development of site tours and content; development of video shorts.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Southern Interior Silvopasture Pilot, continued

Foresters

Several foresters had professional roles in project implementation, including all elements of standard forestry practice when approaching harvest of a cutblock and reforestation obligations. Forester roles in the project included industry RPFs, agency RPFs and consulting RFPs.

- Site prescription development and liaison with PAgs to modify the prescription to reflect the integrated agriculture/forestry objectives of the project and the experimental design.
- Timber harvest planning, consultation, and execution.
- Reforestation and subsequent obligations (e.g., surveys).

Applied Biology Professionals

An applied biologist professional's involvement in a project such as this could involve habitat assessments for wildlife and/or fish and fish habitat depending on on-site location and site attributes or other environmental monitoring needs depending on the project objectives.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Cariboo Silvopasture Planning Pilot

Two private-land sites in the Cariboo at differing establishment stages. Both were located within an approximate hour travel time of Williams Lake. One was located in the Sub Boreal Spruce Biogeoclimatic zone in the Beaver Valley area (post-harvest, post-stand structure establishment stage) and one in the Interior Douglas Fir Biogeoclimatic zone in the 150 Mile area (harvest planning and pre-stand structure establishment stage).

The Beaver Valley site had been selectively logged on multiple occasions since the 1930s. The most recent timber harvesting occurred in 2004, which removed most of the mature trees. Residual mature trees and advanced regeneration were very patchy with respect to both size and species distributions. Grazing management is short-duration, high-intensity, and seasonally integrated with the pasture and hay lands of the ranch. Grazing is managed by a combination of both fixed and portable electric fences.

The IDF site occupied a portion of a larger ranch operation comprised of both deeded pasture and timbered areas. Existing Douglas-fir stands were generally uneven-aged and patchy in nature. Sections had been selectively logged/thinned in the 1960s. Cattle grazing of the ranch pasture areas was controlled by both fixed and portable electric fences to manipulate both grazing duration and location.

Both producers (ranchers) wished to develop their sites into silvopasture systems for the purposes of augmented grazing while maintaining some timber elements and values. Consulting Agrologists and a consulting forestry company worked with the producers and Ministry of Agriculture Agrologists to develop the site and implementation plans for the establishment of silvopasture demonstrations at each site.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Cariboo Silvopasture Planning Pilot, continued

Agrologists

Five Agrologists had professional roles in the project, including the following:

- Development of silvopasture project plans identifying specific activities and infrastructure required to create an operational demonstration at each site. Topic areas within the plans were inclusive of agri-enterprise objectives; desired outcomes, priorities, and timelines; site characterization; grazing/range management activities specific to each site; cost estimates associated with each activity; and monitoring suggestions.
- Project meetings/liaison with the landowners to identify long-term goals and operational circumstances of the ranches, including agricultural, environmental, and forestry-related objectives.
- Site reconnaissance and mapping, including vegetation surveys, soil assessments, and forage productivity assessments.
- Identification of management units/areas within the respective sites and development of seeding and grazing prescriptions.
- Development of forage economics assessment.
- Tech transfer: authorship of a factsheet Cariboo Silvopasture Demonstrations, Planning for Silvopasture Applications on Private Land; presentations and field tour participation communicating the integrated planning, analysis, and management process.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Cariboo Silvopasture Planning Pilot, continued

Foresters

Three professional foresters had roles within the scope of the project, including

- Project meetings/liaison with the landowners to identify long-term goals and operational circumstances of the ranches.
- Site reconnaissance, timber cruise, and stocking surveys to establish site conditions and estimate the total volume of merchantable timber and diameter class distribution of the mature site and volume and stocking of the harvested-over site.
- Development of potential cutting scenarios for the timbered site shaped by the desired agricultural values of the landowner and in liaison with the Agrologists.
- Development of potential harvest methods and estimate potential costs and revenues.
- Contributions to the final project reports specific to the forestry elements.
- Tech transfer: co-authorship of a factsheet Cariboo Silvopasture Demonstrations, Planning for Silvopasture Applications on Private Land; field tour participation communicating the integrated planning, analysis, and management process.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Alley Cropping

Operationally, agroforestry implementation might involve the design and establishment of one of the systems starting from a blank slate. However, it more commonly involves deliberate retention or introduction of trees or shrubs into existing agricultural production systems; or, deliberate introduction or enhancement of agricultural crops in closed forest settings.

The following alley cropping example highlights the baseline agriculture context of agroforestry applications, the roles of Agrologists in the projects, and briefly describes the roles of other professional bodies in BC specifically regulated under the *Professional Governance Act*.

Prior to the closure of the AAFC Kamloops Research Station, an alley cropping trial was established on-site to evaluate the impact of alley system design on the micro-environment (climate, soil), intercrop and tree performance, and water use efficiency, and the economics of establishment/production. Further objectives within the context of climate change adaptation included developing the site for demonstration and applied research, identifying and quantifying the benefits (and limitations) of the production system for the development of BMPs, and knowledge transfer for producers.

The site was established through the conversion of a mature/over-mature forage field to single and triple tree rows of black walnut, red oak, and Chinese chestnut, initially intercropped with timothy (targeting a horse hay market).

With the station closure, projects were disbanded; however, the planning, design, and establishment stages serve to illustrate Agrologist roles and collaboration with other professionals in alley-cropping agroforestry systems.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Alley Cropping, continued

Agrologists

Seven Agrologists had professional roles in the project, including the following:

- Development of project proposal (directed to an internal Agriculture and Agri-food Canada program) including project design principles, objectives, work plan development, budget and partner identification and engagement.
- Development of experimental design (split-plot, randomized complete block) and monitoring plan, including crop and tree variables, microclimate variables, and soil variables.
- Site characterization and mapping, including baseline soil sampling.
- Soil polygon interpretation.
- Liaison and collaboration with professional engineers relative to irrigation system design and installation.
- Liaison and collaboration with professional forester relative to timber attributes of hardwood selections.
- Development of: intercrop recommendations and rotations, irrigation schedules (crop and tree), fertilizer recommendations, weed management plans, and crop management and harvest plans.

Foresters

One professional forester had a role within the scope of the project, including

- Input into the selection of hardwoods, tree characteristics, and management requirements for longer-term timber value.
- Sourcing of propagative material for the three hardwood species and liaison with the tree nursery.

Agrologists Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Alley Cropping, continued

Engineers

Two engineers had professional roles in the project, including the following:

- Irrigation system design, including elements and testing of new technologies related to energy efficiency and water use efficiency, upgrading of pumps and sand filters, etc.;
- Liaison with Agrologists specific to crop and tree water needs and scheduling (based on a modified orchard regime).

Fuel Tanker Truck Spill, Environmental Investigation and Remediation

The following is an example of environmental work specific to emergency response for a spill of gasoline and diesel fuels in a provincial park, followed by a detailed investigation of environmental quality, remediation of contamination, monitoring to confirm clean-up and application to the BC government for environmental certification. The spill resulted from a tanker truck rollover in a narrow stretch of highway adjacent to a salmon-bearing river. Approximately 42,000 L of gasoline and 700 L of diesel were released in the accident, the majority of which reached the aquatic receiving environment (i.e., the river). The end objective was to obtain a Certificate of Compliance from the Ministry of Environment and Climate Change Strategy (Ministry of Environment, a.k.a. ENV) under the provisions and requirements of the *Contaminated Sites Regulation and the Environmental Management Act.*

The example highlights the role of Agrologists in the project (which has spanned 11+ years), and briefly describes the roles of other professional bodies in BC specifically regulated under the *Professional Governance Act.*

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Fuel Tanker Truck Spill, Environmental Investigation, and Remediation, continued

Agrologists – nine individual Agrologists (juniors, intermediates, seniors, including one Contaminated Sites Approved Professional) had professional roles in this project, with several having multiple professional roles. These roles included the following:

- Coordination of multiple stakeholders, including municipal, provincial and federal departments, First Nations, and local community groups (e.g., fish hatchery) and residents, and development of a Terms of Reference for the spill response.
- Project management and coordination for initial spill response, including petroleum product recovery, soil remediation, and an initial spill response report to the Ministry of Environment.
- Ongoing participation as a member of a Stakeholder Advisory Group consisting of First Nations members, Ministry of Environment spill response and remediation officers, Department of Fisheries and Oceans officials, the Fish Hatchery coordinator, and client representatives.
- Co-development of a comprehensive sampling and analysis plan to assess fuel contamination impacts in environmental media.
- Directing the drilling of boreholes and installation of groundwater monitoring wells and detailed description (logging) of soil types and contamination observations.
- Collection of soil, groundwater, surface water, riverbed porewater, and sediment samples.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Fuel Tanker Truck Spill, Environmental Investigation, and Remediation, continued

- Interpretation of environmental chemistry data to assess compliance with provincial numerical standards and guidelines in soil, groundwater, surface water, sediment, vapour and tissue to support the development of a remediation plan for soil, groundwater and vapour media.
- Preparation of a remediation plan consisting of the design and installation of a soil vapour extraction remediation system, operation and maintenance of the remediation system, and ongoing monitoring of vapour quality. Authorship of soil vapour extraction system monitoring reports, with all reports submitted to the Ministry of Environment.
- Ongoing sample collection and monitoring of groundwater, riverbank water, surface water, and streambed porewater, and interpretation of results relative to provincial standards and guidelines to assess remediation progress.
- Design and implementation of a toxicity testing program (including field sample collection), interpretation of test results, and authorship of the toxicity test report.
- Authorship of reports describing and interpreting the results of the monitoring and sampling programs and provision of quarterly and semi-annual update reports to the Ministry of Environment and stakeholders.
- Co-authorship of a Human Health and Ecological Risk Assessment Report that assessed potential adverse effects of residual contaminants on human and ecological receptors after remediation.
- Senior review of the Detailed Site Investigation and Confirmation of Remediation Report to support environmental certification.
- Senior regulatory advice and liaison with Ministry of Environment officials, and preparation of Summary of Site Condition documents and draft Certificates of Compliance for review by the Ministry in support of environmental certification.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Fuel Tanker Truck Spill, Environmental Investigation, and Remediation, continued

The above activities were conducted in accordance with regulatory guidance documents, protocols, and field and laboratory procedures required by the Ministry of Environment for site investigation, remediation and compliance with numerical and risk-based standards of the *Contaminated Sites Regulation and the Environmental Management Act*.

ASTTBC Technologists and Technicians

Two individual technologists (one junior, one intermediate) had professional roles in this project; these roles were primarily the following:

- Routine water sampling, including monthly/quarterly/semi-annual/annual sampling of groundwater wells, surface water, and streambed porewater, and one drinking water well.
- General site monitoring of water levels and stream water quality parameters.
- Monitoring well decommissioning, including coordination and supervision of subcontractors.
- General project coordination and preparation of health and safety plans, subcontractor coordination, and fieldwork planning, incl. highway work permits

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Fuel Tanker Truck Spill, Environmental Investigation, and Remediation, continued

Applied Biology Professionals – four individual biologists (two juniors, two seniors) had professional roles in this project; these roles were primarily the following:

- Routine sample collection and monitoring of groundwater, riverbank water, surface water, and streambed porewater.
- Authorship of reports describing and interpreting the results of the monitoring and sampling programs and provision of quarterly and semi-annual update reports to the Ministry of Environment and stakeholders.
- Assessment of salmon egg and alevin health in river spawning beds in conjunction with the Department of Fisheries and Oceans and First Nations representatives.
- Field sample collection for toxicity testing, and review of the toxicity test report.
- Development of fish habitat restoration alternatives to partially offset impacts to the river resulting from the fuel spill, including a cost-benefit analysis of numerous restoration options and preliminary scoping and cost estimates for each restoration option.
- Stakeholder consultation and liaison with regulatory authorities regarding potential habitat restoration options, guest participation at Stakeholder Advisory Group meetings.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Fuel Tanker Truck Spill, Environmental Investigation, and Remediation, continued

Engineers – two individual engineers (one junior, one Contaminated Sites Approved Professional) had professional roles in this project; these roles were primarily the following:

- Coordination of multiple stakeholders, including municipal, provincial and federal departments, First Nations and local community groups (e.g., fish hatchery) and residents, and development of a Terms of Reference for the spill response.
- Participation as a member of a Stakeholder Advisory Group consisting of First Nations members, Ministry of Environment spill response and remediation officers, Department of Fisheries and Oceans officials, the Fish Hatchery coordinator, and client representatives.
- Project management of monitoring and remediation after initial spill response, client liaison.
- Co-development of a comprehensive sampling and analysis plan to assess fuel contamination impacts in environmental media. Ongoing sample collection and monitoring of groundwater, riverbank water, surface water, and streambed porewater.
- Interpretation of environmental chemistry data to assess compliance with provincial numerical standards and guidelines in soil, groundwater, surface water, sediment, and vapour.
- Authorship of reports describing and interpreting the results of the monitoring and sampling programs and provision of quarterly and semi-annual update reports to the Ministry of Environment and stakeholders.
- Senior review of remediation documents, including a remediation plan and remediation update report, design and installation of a soil vapour extraction remediation system, and soil vapour extraction system monitoring reports, with all reports submitted to the Ministry of Environment.
- Authorship of the Detailed Site Investigation and Confirmation of Remediation Report to support environmental certification.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Fuel Tanker Truck Spill, Environmental Investigation, and Remediation, continued

- Senior regulatory advice and liaison with Ministry of Environment officials, and preparation of Summary of Site Condition documents and draft Certificates of Compliance for review by the Ministry in support of environmental certification.

Geoscientists – two individual geoscientists (one intermediate, one senior) had professional roles in this project; these roles were primarily the following:

- Investigation/sampling of soil (incl. drill logs) and groundwater.
- Ongoing sample collection and monitoring of groundwater, riverbank water, surface water, and streambed porewater, and interpretation of results relative to provincial standards and guidelines to assess remediation progress.
- Authorship of a hydrogeologic (groundwater) assessment report and light non-aqueous phase liquid (i.e., liquid petroleum product) delineation and migration report.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Former Landfill Site, Environmental Investigation and Remediation

The following is an example of environmental work specific to investigation and remediation of contaminants in soil, groundwater and soil vapour at a former landfill site that operated in the 1950s-1970s that has since been largely redeveloped with municipal roadways, and commercial and institutional buildings. The site is the subject of an Approval in Principle (AiP) for a Remediation Plan issued by the BC Ministry of Environment and Climate Change Strategy (Ministry of Environment, a.k.a. ENV). Potential exposure to the landfill wastes via vapours impacted with petroleum hydrocarbon and solvent constituents, including dry cleaning fluids, and potential future use of groundwater as a drinking water source is driving the remediation efforts. Upper cap concentrations were exceeded in soil vapour, indicating the presence of high-risk conditions as defined by in a protocol issued under the *Environmental Management Act*. Work includes a detailed investigation of environmental quality, remediation of contamination (i.e., via risk assessment), and monitoring to confirm that humans are not exposed to vapour concentrations that exceed acceptable health risks in indoor and outdoor air, including parkade air. The end objective is to obtain a Certificate of Compliance from ENV under the provisions and requirements of the Contaminated Sites Regulation and the *Environmental Management Act.*

Agrologists – Eight individual Agrologists (juniors, intermediates, seniors, including two Contaminated Sites Approved Professionals had professional roles in this project, with several having multiple professional roles. These roles included the following:

- Coordination of multiple stakeholders, including land owners, property managers, and municipal and provincial government departments.
- Project management and communication, client and stakeholder liaison.
- Development of a Remediation Plan, including a detailed monitoring plan, in support of an application to ENV for an AiP.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Former Landfill Site, Environmental Investigation, and Remediation, continued

- Co-development of comprehensive sampling and analysis plans to delineate the extent of contamination in shallow soil, groundwater, surface water, and soil vapour.
- Directing the drilling of boreholes and installation of groundwater monitoring wells and detailed description of soil types and contamination observations.
- Collection of subsurface soil vapour, indoor air, outdoor air, and parkade air samples, and directing the analytical programs for all sampled media, including soil, groundwater, surface water, and vapour.
- General project coordination and preparation of health and safety plans, subcontractor coordination, and fieldwork planning.
- Interpretation of environmental chemistry data to assess compliance with provincial numerical standards in soil, groundwater, surface water, and vapour and to support the development of an updated remediation plan to address high-risk conditions in vapour media.
- Authorship of two human health risk assessment (HHRA) reports, with both reports submitted to ENV. One HHRA report was submitted in support of a Certificate of Compliance (CofC) application for a parcel within the AiP boundary, with the CofC subsequently issued by ENV.
- Ongoing sample collection and monitoring of groundwater and vapour media, interpretation of results relative to provincial standards and guidelines to assess high-risk conditions, and associated reporting, with reports submitted to ENV.
- Authorship of reports describing and interpreting the results of the monitoring and sampling programs and annual update reports to ENV.
- Senior review of the Detailed Site Investigation and Updated Remediation Report to support environmental certification.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Former Landfill Site, Environmental Investigation, and Remediation, continued

- Senior review of detailed evaluation of landfill methane gas generation, areas under landfill gas pressure, development of site-specific vapour attenuation factors and supporting technical documents, which were subsequently used in an HHRA submitted to ENV.
- Senior regulatory advice, liaison with ENV officials, and meetings with provincial regulatory officials and statutory decision-makers.

The above activities were conducted in accordance with regulatory guidance documents, protocols, and field and laboratory procedures required by ENV for site investigation, remediation, and compliance with numerical and risk-based standards of the *Contaminated Sites Regulation and the Environmental Management Act*.

ASTTBC Technologists and Technicians

Two individual technologists (one junior, one senior) had professional roles in this project; these roles were primarily the following:

- Directing the drilling of boreholes and installation of groundwater monitoring wells, and detailed description (logging) of soil types and contamination observations.
- Sampling of soil, groundwater, surface water, indoor air, outdoor air, and subsurface vapour.
- Coordination of multiple stakeholders, including land owners, property managers, and municipal and provincial government departments.
- Project management and communication, client and stakeholder liaison.
- Co-development of comprehensive sampling and analysis plans to delineate the extent of contamination in shallow soil, groundwater, surface water, and soil vapour, field program planning, and implementation.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Former Landfill Site, Environmental Investigation, and Remediation, continued

- Co-development of comprehensive sampling and analysis plans to delineate the extent of contamination in shallow soil, groundwater, surface water, and soil vapour, field program planning and implementation.
- Interpretation of environmental chemistry data to assess compliance with provincial numerical standards in soil, groundwater, surface water, and vapour and to support the development of an updated remediation plan to address high-risk conditions in vapour media, laboratory data quality assurance/quality control.
- Preparation of indoor air monitoring reports, annual monitoring reports, and summary reports that were submitted to ENV.
- General project coordination and preparation or senior review of health and safety plans, subcontractor coordination, and fieldwork planning, incl. road work permits.

Applied Biology Professionals – one individual biologist (intermediate) had a professional role in this project; this role primarily included the following:

- Routine sample collection and monitoring of surface water.
- Observation of and reporting on habitat conditions in a small creek.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Former Landfill Site, Environmental Investigation, and Remediation, continued

Engineers – Four individual engineers (two junior, two senior, including two Contaminated Sites Approved Professionals) had professional roles in this project; these roles were primarily the following:

- Authorship of a Remediation Plan, including a detailed monitoring plan, in support of an application to ENV for an AiP.
- Interpretation of environmental chemistry data to assess compliance with provincial numerical standards in soil, groundwater, surface water, and vapour and to support the development of an updated remediation plan.
- Directing the drilling of boreholes and installation of groundwater monitoring wells and detailed description (logging) of soil types and contamination observations.
- Collecting subsurface soil, indoor air, outdoor air, and parkade samples.
- Directing the analytical programs for all sampled media, including soil, groundwater, surface water, and vapour.
- Senior regulatory advice, liaison with Ministry of Environment officials, and meetings with provincial regulatory officials and statutory decision-makers.
- Authorship of an application submitted to ENV to obtain a decision on background groundwater quality, including senior hydrogeologic (groundwater) assessment and supporting reports.
- Co-authorship of an AiP Compliance report.

Agrologists' Interaction with other Professionals

Examples of Interactions between PGA Regulated Professionals in Actual Projects

Former Landfill Site, Environmental Investigation, and Remediation, continued

Geoscientists – three individual geoscientists (one junior, two senior, including one Contaminated Site Approved Professional) had professional roles in this project; these roles were primarily the following:

- Directing the drilling of boreholes and installation of groundwater monitoring wells, and detailed description of soil types and contamination observations.
- Collection of subsurface soil vapour, indoor air, outdoor air, and parkade air samples.
- Coordination of multiple stakeholders, including land owners, property managers, and municipal and provincial government departments.
- Directing project management and communication, client and stakeholder liaison.
- Senior regulatory advice, liaison with Ministry of Environment officials, and meetings with provincial regulatory officials and statutory decision-makers.
- Co-authorship of an AiP Compliance report.
- Interpretation of environmental chemistry data to assess compliance with provincial numerical standards in soil, groundwater, surface water, and vapour and to support the development of an updated remediation plan to address high-risk conditions in vapour media.
- Authorship and senior review of reports describing and interpreting the results of the monitoring and sampling programs and annual update reports to ENV.
- Authorship of the Detailed Site Investigation report and the Updated Remediation report to address high-risk conditions and support environmental certification.
- Detailed evaluation of landfill methane gas generation, areas under landfill gas pressure, development of site-specific vapour attenuation factors, and authorship of supporting technical documents subsequently submitted to ENV.

Other Resources

Office of the Superintendent of Professional Governance Resources and Others:

- Practice Rights (reserved practice)
- OSPG PowerPoint Presentation at the BCIA 2021 AGM
- Duties of Regulatory Bodies under the PGA
- OSPG 2020-2021 Annual Report
- OSPG Questions & Answers

Professional Governance Act Announcements:

- BC Cabinet Grants Reserved Practice Rights to Professional Agrologists, September 2021
- President's Special Report: Practice Rights Granted to Professional Agrologists, September 2021
- Regulated Practice and Title Rights, February 2021
- Full Enactment of the *Professional Governance Act*, February 2021
- Duty to Report under the *Professional Governance Ac*t, January 2021
- Practice Rights Update - *Professional Governance Act*, January 2021
- Indigenous Awareness Training Requirement, October 2020
- Visible Employer Information Required of Registrants, October 2020
- Lay Councillors Appointed as per *Professional Governance Act Requirements*, September 2020
- Update on the PGA and Regulated Practice Submission, July 2020