

## Practice Standards

### **Agricultural Marketing and Sales**

Agrologists who practice within the *Agricultural Marketing and Sales* PA (AM&S) are professionals with specialized education, knowledge, skills, and work experience that provide advice and service related to agricultural inputs for the production of food and related products. These professionals work within a wide and highly specialized network to deliver products and services which is marketed to the agri-food sector. These products provide value to producers (e.g. farmers, ranchers, horticulturalists, agroforesters, etc.) and society in the form of increased production and enhanced food quality while meeting environmental standards. AM&S Agrologists may also provide services such as marketing of crops and livestock, thereby enhancing producers' farm margin/profitability.

Agrologists in the *AM&S* PA work closely with consulting Agrologists and producers to determine the best products, (e.g., crop and livestock input products, equipment, and technology) that support the goals of the enterprise. These people provide up-to-date relevant information to the producer on the benefits of their product line(s) to enhance the profitability of agricultural operations. Agrologists working within the *AM&S* PA are an intermediary between the company selling the product and the farm, they must know the working details of the product, features and benefits of the product, as well as the company's marketing plan in order to support the product for distributors and manufacturers of the inputs. The AM&S practitioner working with producers on marketing crops and livestock must be aware of changing market conditions, prices, delivery options to provide the client with timely relevant information.

Marketing and sales representatives develop a close relationship with producers. This is accomplished through the flow of product information between the producer and the sales representative. Communication and discussion around the present agricultural situation, other competing products trends and issues combined with the past experience of the product is critical to the success of each party. Market intelligence is gained from many sources to deliver quality and credible information to the producer and back to the company. This information is critical to agricultural supply companies as it outlines the potential sales and prospects for the products being sold.

The professionals practicing within the *AM&S* PA do work within a varied, complex and diverse set of circumstances throughout the year. First, they must be familiar with and understand the current state of the agricultural sector and second integrate their product with the objectives of the producer. The *AM&S* Agrologists work closely with a consulting Agrologist with expertise in the Crop Production, Livestock Production, and/or Rangeland and Pasture Management PAs to determine how best to meet the producer's needs given their current operational situation.

These individuals must have both technical and interpersonal skills to work within a wide cross Section of participants in the industry at many scales, from large holdings to small farmers, researchers, scientists, government regulators, extension specialists, marketing specialists, managers, supervisors and the general public. The person working in this PA must be a strong communicator with highly developed oral, written and analytical skills.

### **Agricultural and Natural Resource Economics**

The Agricultural and Natural Resource Economics (ANRE) practice area is a multidisciplinary and integrated approach to the study of economics and its interconnection with the environment and agriculture. Natural resource economics is focused on managing resources such as land, water, air, and soils and emphasizes the importance of sustainability. Agricultural economics considers land usage, food distribution networks, agricultural markets, finance, and enterprise management, and

maximizing profits. Economic evaluation of agricultural production systems and natural resources involves examining cash flow, inputs/outputs, profitability, efficiency, public policies, externalities, public goods, and long-term viability.

The primary objective of an ANRE Agrologist is to support efficient use of agricultural and natural resources, including maximize profitability in agriculture while ensuring natural resources are maintained to the benefit of society. Practitioners aim to facilitate the management of businesses through roles such as consulting, advising, financing, marketing, and supply. While some Agrologists in this PA work with governments to establish and set policies, others identify or create financial products to address the capital and resource needs of their clients. Practitioners focus on the value of agriculture and agricultural goods such as crops, livestock, or machinery and consider possible value losses (i.e. damages and loss of use). ANRE Agrologists investigate how the environment, natural resources and agricultural lands are managed to ensure long-term productivity of both the agricultural land base and the ecosystem services that land, air and water resources provide to society. They identify profitable lending opportunities, develop and evaluate business plans, review finances, and assess the production capabilities of businesses. Practitioners aim to connect competing elements such as supply chains and trade with their clients' production outcomes.

The Agricultural and Natural Resource Economics PA of Agrology specializes in economics, business and finance. However, economics is fundamental to all aspects of Agrology, and is, therefore, an integral part of every practice area. ANRE Agrologists consult with, or provide advice to, Agrologists in the Agricultural Marketing and Sales PA, Crop Production PA, Livestock Production PA, Rural Development and Support PA, and Environmental Impact Assessment PA, among many others. Outside of Agrology, ANRE Agrologists work closely with, and many times are, licensed Professional Appraisers (P.App.). Agrologists consult and work jointly with Chartered Professional Accountants (CPA's), Chartered Business Valuator's (CBV's), and Professional Lawyers to produce the required information and documentation for their clients.

### **Assessment, Remediation and Management of Contaminated Land**

The Contaminated Lands - Assessment, Remediation and Management practice area involves activities related to identifying, assessing, managing and remediating contaminants found within environmental media to facilitate the return of a site to a desired end land use. It is a multidiscipline area of practice that includes recognizing, sampling and delineating contaminated environmental media and developing site management plans. Practitioner activities may include recommending and implementing appropriate remediation strategies and technologies based on site and contaminant characteristics, exposure pathways and risk management that consider both human and ecological health. Competent practitioners are fully conversant with relevant legislation, standards, directives and guidelines and provide ethical recommendations to their clients based upon sound scientific principles.

This PA does not include Land Reclamation. Land reclamation is the stabilization, contouring, maintenance, conditioning, reconstruction or revegetation of the land surface to a state that permanently renders the land with a capability equivalent to its pre-disturbed state or for an alternate designated land use. Whether reclamation is required on contaminated lands after remediation or risk management is dependent upon the desired land use. Land reclamation is required for all mandatory activities defined in the Environmental Protection and Enhancement Act (EPEA) and in areas where the final land use requires a soil growth media for revegetation. The main activities, outlined below, involved in this PA include:

- Understanding Drivers and Planning
- Phase 1 Environmental Site Assessments (ESA)
- Phase 2 ESA

- Remediation
- Risk Assessment
- Exposure Control (Risk Management)
- Validation and Closure

### **Biophysical Classification and Evaluation**

The Biophysical Classification and Evaluation (BC&E) practice area involves the investigation and integration of biophysical resources (terrain, water, soil, vegetation) and their properties, including identifying, classifying, analyzing, mapping, evaluating and interpreting, and developing biophysical resource descriptions, maps and reports. The BC&E practice area demands practitioners have specific knowledge required to investigate terrain, water, soil, and vegetation resources. Understanding, planning, and managing land resources and their integration with the surrounding environment is a fundamental part of Agrology in Alberta, as landscapes touch all aspects of the profession. Land is a critical factor to all areas of Agrology; therefore, needs to be part of the thinking, analysis, and decision-making of all Agrologists.

In northern latitudes, including Alberta, the earth's surface, including the terrain (landforms), soil, and vegetation reflect how natural systems developed over the past 10,000 years. Landforms are the result of glacial and post-glacial activities (erosion and deposition), and the materials deposited by glaciers, lakes, and rivers. Soils have developed within these substrate materials and reflect the interaction of climate, water, and the nature of these glacial and non-glacial materials (texture, coarse fragment content, chemistry, etc.) over time. The vegetation communities we see today result from the interaction of landform processes, soil formation, water availability and distribution, natural and human-induced changes (e.g., timber harvesting, fire, disease, agricultural cultivation, urban development, etc.), climate, and time.

The Agrologist conducting biophysical inventories must develop a conceptual landscape model that integrates the various land components in a spatial context (e.g., terrain, water, soils, and vegetation). Understanding the spatial controls on the distribution of natural resources and their interaction within a three-dimensional landscape is critical (Figure 1). Terrain and water directly affect soil development and distribution, which in turn influence vegetation communities found in a landscape area. Vegetation, in turn, affects ongoing soil development processes and plays a vital role in influencing hydrologic processes. Thus, inventories of terrain, soils, vegetation, and water are mutually dependent. A soil inventory that does not consider terrain and water has limited use and is prone to errors. Likewise, a vegetation inventory that does not consider terrain, water, and soils will be of limited use. Therefore, an integrated approach to biophysical inventories is essential if the inventory is to provide information necessary for evaluation, interpretation, and decision-making for various land-use types.

### **Crop Production**

The Crop Production practice area involves a multidisciplinary and integrated approach to managing land producing agricultural crops to ensure the long-term sustainability of our food production systems. This involves understanding and applying principles of agronomic best management practices, farm business management and economics, and environmental quality management. Practitioners make decisions that operate over a variety of time scales from immediate problem solving related to seasonal crop performance, to multi-year crop rotation planning. The practice area occurs within a rapidly evolving industry that demands practitioners stay current with new research, technologies and regulations. Practitioners provide validation of new information and play an important role in extending that information to producers by providing advice and receiving feedback on effectiveness of crop production strategies and recommendations. Practitioners may be involved in several specific crop production activities that include nutrient

management; insect, weed and disease management; crop rotation development and implementation; soil conservation; water quality management; harvest management and grain storage; and, technology and equipment management. Practitioners may also be involved directly or indirectly in crop breeding and applied research trials to assist in varietal selection for specified geographic regions.

The Crop Production practice area can be grouped into four focus areas which vary by crop type: annual crops, perennial crops, agroforestry and horticulture. Annual crop management focuses on cereals, oilseeds, pulses and special crops (e.g., sugar beets) and annual forages while perennial crop management focuses on perennial forage as hay and fodder for animal feed and for forage seed production. Please refer to the Rangeland and Pasture Management Practice Standard for management of perennial forages in a pasture grazing system. Agroforestry focuses on tree management and the production of wood and fiber in a woodlot setting as opposed to large forest management areas. Horticulture focuses on production of fruit and vegetables along with ornamental species of plants.

### **Environmental Monitoring**

The Environmental Monitoring practice area of the Agrology profession focuses on evaluating environmental media and conditions while working toward compliance of human activities with environmental standards and guidelines.

Professional Agrologists and Registered Technologists in Agrology bring their knowledge of environmental media (soils, vegetation, water, and air) and the interaction of these to the practice of environmental monitoring. The work conducted by Agrologists involves managing and monitoring the effect of industrial activities to minimize environmental impacts. This includes the development and implementation of scientifically defensible processes and protocols for evaluating environmental media to establish conditions prior to, during and after development.

Agrologists provide interpretation of data from, and direction to, projects to derive mitigation strategies and suggest appropriate courses of action for various types of development. The work involves safely collecting and handling representative samples; preparation of environmental data (e.g. soils, vegetation, water, air); data analysis and interpretation; accurate field reporting and field supervision, final report preparation, and defence of data in regulatory regimes or public forums.

The work involved in the Environmental Monitoring practice area consists primarily of the following core activities:

- Baseline Establishment
- Construction Monitoring
- Operations Monitoring
- Post-operations Monitoring
- Regulatory Review and Enforcement, and
- Other Monitoring

The work involved in these activities is often closely linked to but not limited to environmental legislation and operational approvals for several types of commercial and industrial developments. Agrologists who work within this practice area play a vital role in fulfilling the environmental monitoring requirements of development approvals as well as ensuring environmental protection plans are being followed. Agrologists may work for consulting companies, industry firms, government regulatory agencies (provincial, federal, municipal), non-governmental agencies, public organizations, private citizens (e.g. farmers or ranchers) or educational and research institutions.

### **Greenhouse Gas Assessment and Management (Agricultural)**

This Greenhouse Gas Assessment and Management practice area involves a number of scientific disciplines related to documenting and assessing sources and sinks of greenhouse gases for cropping systems. Some member activities include evaluating farm gate greenhouse gas sources and sinks; development of sampling plans to monitor and verify success of C-sequestration in agricultural and non-agricultural soils; evaluation of wetland sources and sinks; devising of management strategies to reduce greenhouse gas emissions; ISO 16064-3 audit principles; evidence relevant for the “Quantification Protocol for Conservation Cropping” (CCP) as well as development and implementation of the 4R Plan for the “Quantification Protocol for Nitrous Oxide Emissions Reduction” (NERP). The work involved in GGAM can be grouped into eight categories which include

- Legislation, Regulation and Associated Technical Guidance
- Protocol Awareness
- Compliance data collection and management
- Work with a verification team
- Field Assessment Skills
- Analyze and interpret field and laboratory data
- Communications/Problem Solving
- Report writing

### **Land Conservation and Management**

Land conservation and management requires an integrated system-based approach that strives to meet environmental, social, and economic needs of current generations while sustaining the land, water and natural resources in a manner that does not compromise future generations. A key principle of this practice area is land stewardship with a focus on conservation. This requires an understanding of our lands, the natural resources, ecological processes and ecosystem services they provide and the cumulative effects of past, present and foreseeable future activities. Land conservation and management involves setting sustainable outcomes, planning and making decisions to achieve these outcomes, monitoring and assessing the results of these decisions and using adaptive management approaches to achieve outcomes. It recognizes the interdependence and interaction of all system parts. Land management approaches must assess whether land management decisions are achieving desired outcomes, while also being agile and responsive to changing economic, environmental and social conditions.

Agrologists working in this practice area develop, lead or support land and natural resource decisions within integrated systems guided by various overarching policies and legislative tools. These Agrologists rely not only on their own technical knowledge and expertise, but also on the knowledge and expertise of other professionals within and outside the practice area, or even the Agrology profession (e.g., professional foresters, biologists, and engineers, etc.). This practice area requires collaboration and the ability to communicate effectively in order to synthesize and systematically interpret information correctly for decision-making purposes.

This practice area is complex as stakeholders and the public may expect this systems approach to resolve conflicts, and ensure understanding, transparency and inclusiveness of those affected. This complexity recognizes that our lands are used for more than one purpose, some uses being compatible with others, some not. Ongoing relationship building is fundamental to working in this practice area. As such, practitioners require strong communication, mediation and conflict resolution skills to present clear and concise technical information tailored to those affected (e.g., landowners, municipalities, indigenous peoples, resource managers, general public, other

professionals etc.). These skills are also important in order to collect and analyze scientific and traditional knowledge, create shared understanding of issues, provide options to address them, and recognize diverse expectations. This creates transparency in both the process and rationale used in making land use decisions.

Agrologists working within this PA may be involved in one or more core activities. These core activities may overlap with other Practice Areas. These core activities include,

- Applied Research;
- Legislation;
- Policy and Programs;
- Land Evaluation and Assessment;
- Planning;
- Implementation; and,
- Monitoring and Adaptive Management.

### **Land Reclamation**

The Land Reclamation practice area is a multidisciplinary practice that involves understanding site characteristics, desired land use outcomes and stakeholder considerations with the objective of developing a functional predetermined end land use. Land reclamation involves developing and implementing a reclamation plan that considers and integrates logistical, management and biophysical considerations. Execution of a reclamation plan may include site contouring for landscape drainage and stability; soil replacement and/or treatment; revegetation; weed and herbivore management; and contractor supervision and management. Reclamation monitoring provides feedback so that appropriate adaptive site management activities can be implemented. Detailed site assessments are required for verification that reclamation objectives have been met when site closure is required. Land reclamation practitioners are knowledgeable of relevant regulatory requirements and provide competent and ethical recommendations to stakeholders based on sound scientific principles, experience and economic considerations.

Land reclamation may be required on lands that have been subjected to various disturbances that may include contamination. The Land Reclamation practice area does not include activities related to assessment, management and remediation of contaminated land (e.g. Phase 1 Environmental Site Assessment, Phase 2 Environmental Site Assessment, Remediation, Risk Assessment and Risk Management). Where land disturbance has included contamination, land reclamation usually follows the completion of remedial activities.

The work involved in land reclamation can be grouped into four main categories which include:

- Understanding drivers and project planning.
- Project execution.
- Monitoring.
- Verification.

### **Livestock Production**

Agrologists with the Livestock Production PA provide professional advice to producers, government, industry and other organizations on the appropriate management of livestock to produce food, fiber and other value-added products. The sustainability of the livestock production industry is at the forefront of the work these Agrologists perform with focus and leadership on animal performance, health and welfare, environmental stewardship and protection, food quantity and quality, and economic profitability. Livestock Production Agrologists must be knowledgeable of emerging technologies related to genomics, data analytics, remote sensing and smart/precision farming. In order to integrate these innovative technologies into a sustainable production system, Livestock Production Agrologists are continuously upgrading their training and skillsets.

Agrologists within the Livestock Production PA work closely with the Veterinary Medicine

profession when it comes to animal health and welfare (within the realm of disease and pathology); and, with the Engineering profession with respect to identifying, developing and constructing the infrastructure needs of an animal production enterprise. Livestock Production Agrologists also may confer with Agrologists working within the Crop Production and Rangeland and Pasture Management PA's to ensure the feed or forage meets the ingredient, nutrition, quality and quantity requirements of the animal. Livestock Production Agrologists similarly may work alongside Agrologists in the Food Development and Processing and Regulatory Support PA's to address product quality issues, food safety, novel food (meat) development, traceability and import/export standards. In addition, Agrologists within the Livestock Production PA may consult with Agrologists working within the Water Resources Planning and Management PA, Land Conservation and Management PA and the Biosystems, Biosolids, Compost and Manure Management PA to ensure land is conserved and water quality and quantity needs are met as well as addressing any environmental quality issues that may arise related to manure and waste management associated with livestock production.

The livestock industry continues to undergo increased scrutiny from the general public and special interest groups opposed to animal agriculture. Agrologists play a key role in educating the public regarding the state of the livestock industry and the practices that have been implemented to ensure animal health and welfare meet societal expectations. All Livestock Production Agrologists are involved in public education to one degree or another. They educate the public or those involved in agriculture either informally through conversations and other interactions or formally by teaching animal science and conducting or managing research within an institutional setting in Alberta, Canada or internationally. Each year these institutions graduate animal scientists and technologists who become the next generation of livestock production specialists.

Agrologists are at the front line of adapting academic research and finding ways to implement and transfer new technologies to an ever-changing industry. The development of new technologies in the livestock industry is rapidly increasing the technical requirements for Agrologists to assess the benefits and consequences of implementing these technologies. Practitioners within the Livestock Production PA participate in a variety of core activities within the PA. These activities include animal health and welfare; nutrition and feeding; genetics and breeding; economics and markets; product quality and safety; regulatory and codes of practice, environmental management and infrastructure development.

### **Management**

Management is a process of effectively achieving organizational objectives through the efficient use of resources in a changing work environment and marketplace. It employs a set of time-proven principles in the functions of planning, organizing, leading and evaluating. Effective management applies these principles in utilizing physical, financial, human and informational resources efficiently and effectively to achieve organizational goals and social/environmental outcomes. Agrologists provide management leadership in life sciences, environment, agriculture and food. Members involved in the Management practice area are responsible for ensuring that economic, social and environmental outcomes are consistent with organizational objectives as well as professional and ethical objectives of the agrology profession. Competent management is critical and will involve both analytical and soft skills.

Management is accomplished by managers who decide on, coordinate and allocate resources with work activities so that they are completed efficiently and effectively with and through other people. Managers in the profession of agrology play a vital part of providing direction and guidance to the practice of Agrology. They also play a key role in shaping a professional's career and determining what and how work is to be conducted. A manager is responsible to work

with and through people to coordinate their work activities to accomplish organizational goals. Ultimately, the responsibility and accountability for a team's performance falls on the shoulders of the manager. Managers generally are involved in five management functions: planning, organizing, leading, evaluating and developing people to accomplish objectives. Members working within the Management practice area of the Agrology profession generally are involved in one or more of the following components of management,

- Strategic
- Operational
- Human Resources
- Technical
- Project
- Marketing and Sales
- Advocacy and Public Relations

### **Rangeland and Pasture Management**

Rangeland and pasture management is an integrated and multidisciplinary PA based on ecological, agronomic, and socio-economic principles to manage rangeland and pastures in a sustainable or regenerative manner. Rangelands are areas of naturalized vegetation that support herbivores, and are managed for multiple uses and or values. Rangeland is a type of land not suitable for cultivation of intense agricultural production, having inherent restrictions such as soil moisture, soil nutrients, soil temperature, soil texture, topography, etc., that limit productive capabilities. Rangeland can be grassland, shrubland, or forest, native or introduced species, and can be of value to society for production or ecological reasons. Pasture land is similar to rangeland, but with fewer production restrictions. By the nature of the land itself, pasture tends to be used more for perennial forage production in a grazing system.

The effects and outcomes of management decisions in this PA are assessed over a long-term time horizon that spans multiple decades. This PA focuses on land that supports perennial vegetation used within a grazing system (i.e., rangeland plant communities, forest, tame pasture) rather than cropped land used for production of annual or perennial forage for hay, fodder and seed production. Please refer to the *Crop Development Practice Standard* regarding hay, fodder and forage seed production.

Rangeland management strives to maintain biodiversity and ecological integrity of the landscape while ensuring support for environmental goods and services, including, but not limited to livestock grazing, watershed protection, carbon capture, wildlife habitat and recreation. Pasture management focuses on achieving agronomic productivity of tame forages while ensuring long-term health of the land. To be functioning at a high ecological state of productivity both rangeland and pastures need to be managed so underlying energy, mineral and water cycles are functioning at a high level of effectiveness.

Practitioners within this PA may have expertise in plant and community ecology, landscape ecology, vegetation, soils, water, wildlife, livestock and agronomy. The multidisciplinary nature of the PA requires interaction among various specialists to assess, interpret and manage land systems and includes dialogue with landowners and leaseholders to learn from their experience. In addition, landscapes and agricultural operations may commonly include rangelands, agronomic pastures, hay and crops and thus requires interaction with many stakeholders on a variety of issues.

Practitioners may be involved in one or more core activities within the PA. These core activities include,

- Land management drivers;
- Biophysical inventory;



- Analysis, evaluation and interpretation;
- Integrated management planning;
- Knowledge transfer;
- Development of policy and standards; and
- Forage agronomy

### **Rural Development and Support**

Rural development is an important economic and social concept that spans countries across the globe. It is based on the need to help rural communities, farmers, ranchers and business adapt and change in a dynamic and competitive world. Rural areas may lack specific and certain supports, services and programs that are needed for a fully functioning rural society. These supports can include access to rural broadband (high speed internet), necessary infrastructure (e.g., roads, utilities, etc.), farm safety, education, health care and many other community needs. Rural development and support Agrologists attempt to bridge this gap by providing new knowledge, best practice and other innovative ideas to rural communities, investors, producers and the private and public sectors. These ideas are assessed, tested, piloted and implemented where feasible. Projects may be created from a local proponent champion or from a higher level of program driven intervention. Technology and other changes are driving competition and returns, and rural Alberta is not immune to this trend. Therefore, Rural development and support Agrologists need to provide a flow of quality information for rural areas.

Agrologists who practice within the *Rural Development and Support* PA are professionals with specialized education, knowledge, skills, and work experience who focus on the rural communities of Alberta. “Rural” can be defined as all of Alberta except for the seven major urban centres of Calgary, Edmonton, Fort McMurray, Grande Prairie, Lethbridge, Medicine Hat, and Red Deer. “Development” refers to planning and initiation of rural programs, while “support” refers to ongoing availability of resources to ensure project or program success. Agrologists’ goals are to help achieve economic growth, sustainability and resiliency of rural communities. They provide professional advice to producers, social enterprise, developers and investors, and help build leadership capacity in rural jurisdictions. Rural development and support Agrologists use a multidisciplinary approach for rural advancement, while attempting to close the gap in economic opportunity and services among urban and rural communities.

Agrologists within this Practice Area play many professional roles in the process of assessing, planning and creating solutions needed for rural communities. Agrologists may interface with developers, target groups, private sector suppliers, social enterprises, societies, consultants, post-secondary institutions, policy/program developers and regulators---all within one project or program focus. Because rural development and support Agrologists take a wholistic approach to their work, they must be aware of their limitations and understand, where appropriate, to seek help from other Professional Agrologists with specific science-based backgrounds.

Agrologists in this practice area must also rely on professional advice from many other professions involved in rural development projects, including but not limited to: bankers, biologists, architects, engineers, lawyers and veterinarians. There may also be an opportunity and need to access expert professional help in certain human health topics such as water quality, livestock disease control, human nutrition, disease management (functional foods, nutraceuticals), farm-based digital tools (automation, sensors, software) and other emerging topics.

Rural development and support can include a breadth of goals, however within this practice area its focus is on the biophysical uses of the land, and associated aspects of advisory, knowledge, and rural capacity building activities. The key pillars for success within the *Rural Development and Support* PA are: Community Assessment and Project Planning; Capacity Building; Economic Development; Rural Community Solutions; and Extension.

### **Water Resources Planning and Management**

Understanding, planning and managing water resources and its integration with the surrounding environment is a fundamental part of Agrology in Alberta as water resources touch all aspects of the profession. There is not an area of Agrology where water is not a critical factor and therefore needs to be part of the thinking and decision-making of all Agrologists. Agrologists traditionally have focused on agricultural land use and its importance to agricultural production and this continues to be a major focus of Agrologists working in this practice area. In addition, the expertise of Agrologists is valuable to sustainable water resource management in a variety of other land use practices and may participate in flood forecasting, climatology, channel morphology, water quality, environmental flows, water approvals, etc.

Those Agrologists who work directly with water resources play a vital role in safeguarding both water quality and water quantity for all Albertans. As stewards of water resources, Agrologists play important roles in advising and educating users of this valuable resource. Agrologists working in this PA may be found working for government, industry, consulting, non-governmental and non-profit organizations. The common thread among these professionals is overseeing the wise use of water for the many competing uses of this resource, and understanding the potential impacts from, or interactions with or among, the diversity of land uses in Alberta.

The primary roles of Agrologists within this PA fall under the general titles of assessment, planning, stewardship and education. Each of these roles comprise portions of specific core activities within the PA including (i) watershed condition (health) assessment; (ii) development of watershed management plans; (iii) management of sustainable water supplies for various uses including agriculture, domestic supply, recreation, environmental flow needs (e.g. fisheries and aquatic life, wildlife habitat, etc.); (iii) policy development and regulatory requirements; (iv) education and improvement of water literacy; (vi) applied research.

Agrologists working within the Water Resources Planning and Management PA may provide professional support to Agrologists who are lead professionals within the Wetland and Riparian Area PA and/or those leading work within the Environmental Monitoring PA. Some Agrologists may be specialists in Water Resources Planning and Management, Wetland and Riparian Areas and Environmental Monitoring PAs as there is significant overlap of knowledge and skills among these three PAs.

### **Wetland and Riparian Areas**

Wetland science, design, and engineering are interdisciplinary in nature but are necessarily brought together by the requirements of the Alberta Wetland Policy. Broad descriptions of each individual component of this *Practice Area* are provided here.

#### *Wetland Science*

Wetland science deals with the physical, chemical, and biological properties of wetland ecosystems. In the context of the Alberta Wetland Policy, the professional seeks to understand the functionality of wetlands and how human and natural activities influence a wetland's ecological condition.

#### *Wetland Design*

Wetland design is the *practice* of creating wetland systems that are as to near self-sustaining as possible, within the constraints and opportunities of its catchment and surrounding human and natural environments. The final design must combine considerations from a broad array of scientific and technical disciplines to devise a wetland system that meets desired outcomes. It is the fusion of creative and technical disciplines that distinguishes wetland engineering and design from wetland science.

### *Wetland Engineering*

The practice of engineering means reporting on, advising on, evaluating, designing, and preparing plans and specifications for or directing the construction, technical inspection, maintenance, or operation of engineered structures, works, or processes. For the purposes of this document, engineering refers to wetland engineering.

## **Practice Areas**

### **Biosystems, Biosolids, Compost and Manure Management**

This Practice Area involves disciplines such as biochemistry, microbiology, soil chemistry and fertility. Some member activities include management of various agricultural, industrial and municipal waste streams; development of land application plans of various waste products (i.e. manures, biosolids); monitoring and assessment of soil chemical, physical and biological properties; compost development and management; odor control; policy and program development. This Practice Area involves the undertaking of agricultural design and advising on the use of buildings, structures, machinery and equipment. In addition to this, the development, management and use of waste treatment and ecological systems also fall within this Practice Area.

### **Environmental Impact Assessment and Mitigation Planning**

This Practice Area is multi-disciplinary in nature and involves documenting baseline environmental conditions, assessment of potential project effects as well as cumulative effects on the environment. Recommendation of mitigation strategies to minimize or negate potential or cumulative effects is provided. Members involved in this Practice Area participate as part of large multi-disciplinary teams who provide expertise so that regulatory authorities can make informed approval decisions regarding proposed industrial developments. This Practice Area focuses on the development, implementation, management, monitoring and auditing of a systematic documented environmental protection system for a particular organization. It includes such activities as identifying potential environmental impacts related to an organization's day-to-day functions, development of goals and objectives for environmental protection, development of implementation strategies and training programs for staff. Compliance monitoring and auditing are also part of an environmental management system.

### **Food Development and Processing**

This Practice Area involves disciplines such as food biochemistry and microbiology, and processing chemistry. Some member activities include development and application of new technologies; the development of new and improved food products and processes; marketplace research and testing. This practice area focuses on the policies and regulatory frameworks that identify, analyze and manage the risks associated with the safety and security of our food supply systems. This includes assessment of food safety and security risk through the pre-harvest and pre-slaughter stage through processing, distribution and consumption stages.

### **Regulatory Support and Consultation**

This Practice Area is common to the Life Sciences, Environment, Agriculture and Food Sectors. The agrology profession operates within a regulatory environment and many members have expertise in legislation and regulatory requirements. Regulatory support for clients includes consultation in support of development applications and approvals required under legislation such as the Water Act, Environmental Protection and Enhancement Act, Agricultural Operations and Practices Act. Members may be involved in environmental impact assessments, pre-disturbance assessments, development of conservation and reclamation plans, reclamation certificate

acquisition, public hearings and open houses.