



ALBERTA INSTITUTE
OF AGROLOGISTS

2018

Rangeland and Pasture Management Practice Standard



Approved by AIA Competence
Committee
March 2018

Preface

This practice standard is part of the continuing effort by the Alberta Institute of Agrologists (AIA) to meet its mandate as outlined in the *Agrology Profession Act*. The *Act* specifies that the Institute must establish, maintain and enforce standards of practice as part of the profession's obligation to protect the public in matters related to agrology.

This document was created by the AIA with direction from a Practice Area Expert Committee (PAEC) consisting of four regulated members of the AIA. Members were selected for their expertise and long-standing practice in rangeland and pasture management.

This practice standard is the basis upon which practice reviews will be conducted by the AIA. This document will assist members in ensuring that their professional practice meets the standards for knowledge, work experience, skills and performance required for professionals practicing in rangeland and pasture management.

This document will be reviewed on a periodic basis to ensure it is up to date with current standards and state of knowledge for the practice area.

Acknowledgments

The AIA wishes to acknowledge the following people for their contribution to this practice standard as members of the Practice Area Expert Committee for the *Rangeland and Pasture Management* practice area:

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The Alberta Institute of Agrologists wishes to thank the members of the AIA who reviewed the draft documents and provided feedback to the PAEC. The AIA would like to acknowledge the following people for their review of the first draft of the practice standard and for providing valuable feedback:

Michael Alexander (P.Ag.)	Alberta Environment and Parks
Gerry Ehlert (P.Ag.)	Alberta Environment and Parks
Tracy Kupchenko (P.Ag.)	Alberta Energy Regulator
Grant Lastiwka (P.Ag.)	Alberta Agriculture and Forestry

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Acronyms

PA	Practice Area
PAEC	Practice Area Expert Committee

1. INTRODUCTION

This practice standard applies to regulated members of the Alberta Institute of Agrologists (AIA) who practice or intend to practice in the "*Rangeland and Pasture Management*" practice area (PA). It defines expectations and outlines requirements regarding professional practice within this area. Documentation of these requirements provides necessary assurance to the public that AIA has specific requirements for professional practice. This practice standard provides members a benchmark upon which to assess their practice and identify potential learning needs in their continuing competence program.

This practice standard is based on the premise that rangeland and pasture management are multidisciplinary activities. Practitioners are expected to understand the limit of their knowledge, skills and experience and seek expertise of other professionals where necessary.

This practice standard forms the basis for implementation of a practice review protocol for this PA. Members working within this PA will be able to request a review of their professional practice based on this practice standard. Such a review will provide valuable feedback to members for areas of improvement.

1.1. Objectives

The objectives of this practice standard include the following:

- To identify and define the knowledge, skills, experience and performance requirements for professional practice within the PA;
- To provide documentation of the requirements indicated above so regulated members of AIA may assess their practice against this standard and thereby identify learning needs to ensure they meet the standard;
- To provide a standard against which a member's professional practice may be reviewed by AIA to assist the member in identifying areas of their practice that may need improvement;
- To provide a mechanism whereby AIA can demonstrate that members within the profession are managed in a manner which protects the interests of the public in matters related to rangeland and pasture management.

1.2. Definitions

Competence: The ability to perform certain tasks in one's professional practice based on educational training, skills and work experience in a manner that meets performance objectives as defined in a practice standard.

Core Knowledge Area: A general area of knowledge consisting of one or more specialized subject matter areas that is required for practicing within a PA.

Direct Supervision: Guidance provided by a competent professional who accepts responsibility for work conducted by a less experienced professional.

Experience: Knowledge, practical wisdom or skills gained from observation and doing.

Performance: The exercise of knowledge in a professional practice that demonstrates the required ethical conduct and wise judgment as specified within a practice standard.

Practice Area: A unique functional area of professional practice within the agrology profession that requires specialized knowledge, based on education, work experience and skill sets.

Practice Area Expert Committee: A committee of experts who have demonstrated through their professional practice that they have a comprehensive understanding of the requirements for professional practice in a PA.

Practice Review: A process whereby a peer review panel examines a regulated member's professional practice against a practice standard, with the intent of providing input on practice improvement.

Practice Standard: A document that outlines the requirements and expectations for professional practice within a PA.

Professional Practice: The competent and ethical provision of specialized knowledge, recommendations and assessments based on educational training, work experience and skill sets while being accountable to peers as a regulated member of a professional regulatory organization.

Regulated Member: A member in good standing with the Alberta Institute of Agrologists who holds one of the following designations: PAg, RTAg, AIT or ATT.

Skill: An ability developed over multiple years of work experience.

Subject Matter Area: A specialized area of knowledge such as soil chemistry, plant physiology or hydrology required for professional practice within a PA.

2. SCOPE OF THE PRACTICE AREA

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

These activities vary in the type and depth of knowledge and level of experience required to be proficient in each activity and therefore practitioners may be involved in one or more of these activities depending on their knowledge, experience and skill sets.

2.1 Land Management Drivers

Drivers influencing land management decisions are varied and depend upon several factors including regulatory considerations, land ownership (e.g., public vs. private land), multiple end land use targets, and stakeholder considerations. Understanding drivers is essential to developing feasible management objectives that address overall desired outcomes. These desired outcomes reflect the relative balance between ecologic and agronomic priorities for both rangeland and pasture land management strategies.

2.2 Biophysical Inventory

One of the key activities within the PA involves conducting biophysical inventories to characterize the resource and overall land health. This work is foundational to development of land management plans. Biophysical inventory involves understanding sampling methods for data gathering at various spatial scales, from the individual plants and soils to the broader landscape scale. A knowledge of plant morphology and taxonomy; plant and community ecology; soil genesis and classification; nutrient cycling and soil fertility (pasture); and landscape stratification and ecology are necessary to be able to conduct biophysical inventories.

2.3 Analysis, Evaluation and Interpretation

Analysis, evaluation and interpretation of rangeland and pasture condition follows collection of inventory data necessary to inform management decisions. Evaluation and interpretation of data collected during biophysical inventories requires a knowledge of landscape ecology; plant ecology; agronomy; plant growth responses to environmental variables; soil-plant interactions; animal behavior and ecology; and beneficial management practices so that appropriate management plans and carrying capacities can be determined. Analysis, evaluation and interpretation need to consider experience and knowledge of land owners to understand results, trends and long-term goals.

2.4 Integrated Management Planning

An integrated land system perspective is necessary to properly assess land health and productivity in relation to desired land uses. Management plans and desired carrying capacities must be based on an integrated understanding of plant-soil-animal interactions within the broader landscape scale while considering social, regulatory and economic variables that drive land management decisions. Once a management plan has been implemented, monitoring of key

variables must occur to assess whether management objectives are being met while allowing for ongoing adaptive and dynamic management over time.

2.5 Knowledge Transfer

Rangeland and pasture management practitioners play a vital role in interpreting and communicating scientific knowledge in support of sustainable and regenerative land management strategies. Communicating land management approaches requires that the practitioner is skilled in engaging and dialoging with various stakeholders. Practitioners may be involved in one or more of extension, education or outreach.

2.6 Development of Policies and Standards

Some practitioners within the PA are involved in development of land management policy and standards. Areas of policy and standard development related to rangeland and pasture management include, but are not limited to resource management and conservation (e.g., grazing lease management); biodiversity conservation; habitat for species at risk; water resource management; identification of beneficial management practices; meeting regulatory requirements (e.g., reclamation, weeds); and other valued ecosystem services.

2.7 Forage Agronomy

Practitioners that have a focus on forage production within a grazing system, both in their development and in providing recommendations and guidelines for their planting, growth and use, require a sound and comprehensive foundation in agronomy. The University of California-Davis defines agronomy as “the application of science and technology from the fields of biology, chemistry, economics, ecology, soil science, water science, pest management and genetics to the improvement and management of the major food crops of the world. Agronomy considers the entire range of influences on crop production, including climate and adaptation, soil, water and water availability, plant genetics, the properties of the soil and how the soil interacts with the growing vegetation; what nutrients the vegetation needs; the ways that plants grow and develop; and how best to control weeds, insects, fungi, and other pests. Non-biological considerations such as economic requirements and consumer and farmer behavior also inform agronomic practices, as do environmental constraints.”

3. KNOWLEDGE REQUIREMENTS

Knowledge requirements are technical or scientific areas of knowledge that are important for a practitioner to be functional within the PA and are strongly associated with a member’s educational background and training. These requirements include core knowledge areas that consist of one or more subject matter areas that are foundational to the PA. The specification of subject matter areas within each required core knowledge area provides assurance that members working within a PA are aware of the knowledge required to provide professional services within the PA. Members are required to assess their knowledge against the core knowledge requirements; recognize the limits of their expertise; and seek direction and guidance from qualified professionals in areas where their own knowledge may be lacking.

3.1 Core Knowledge Areas

Several core knowledge areas have been identified as being foundational to practice within the PA (Table 1). These core knowledge areas include vegetation; soils; animals; water; landscape interpretation; ecology; and socioeconomics. The rationale for each of these core knowledge areas follows below.

3.1.1 Vegetation

Perennial plants convert sunlight into biomass, cover and protect the soil, cycle water and nutrients and provide forage and habitat for rangeland and pasture animals. A knowledge of perennial plant growth, resource partitioning between roots and stems, and forage quality is required. Plants are varied in growth form (grasses, forbs, shrubs, trees), regional distribution, economic value, and the provision of ecologic goods and services. Practitioners need a solid background in plant identification to classify plants and enable informed management. In addition, practitioners need an understanding of weeds and invasiveness of non-native species.

3.1.2 Soils

Soil is the primary building block on which all production and ecological systems are sustained. Soil classification and fertility are fundamental knowledge for this PA. Ecological and economic production from land is dependent on healthy and sustainable soils. A knowledge of soils is required to understand landscape ecology as well as production and ecological capabilities and limitations of rangeland and pasture management systems.

3.1.3 Animals

Wildlife and livestock are often the economic harvest from rangelands and/or pastures and maintain ecological function. Wildlife and wildlife habitat are also valued by society at large, and that value goes beyond their economic or recreational value. A knowledge of livestock and wildlife and their interactions, their economic and ecological roles and impacts, whether highly visible or obscure, is critical to this practice area. It is also important to have knowledge about animals and their interaction with the landscape and vegetation. Important concepts include animal carrying capacity, animal behavior, functional niche, grazing capacity and management tools available to influence animal grazing patterns and distribution as well as the integration of wildlife habitat use and ecological roles.

3.1.4 Water

Water is the foundation of all life. Rangelands and pasture production is limited or enhanced by soil water. Well managed rangelands and pasture capture, store and act as filters to purify water as well as provide for its safe release for downstream users. A knowledge of water and its relationship to production and ecological parameters is required for this PA. Water moves between land dispositions; decisions on one land area have impacts on others.

3.1.5 Landscape Interpretation

Rangelands and pastures are extensive land management systems that often cross ecologic and production boundaries. A knowledge of the interactions of soil, plants, and animals at the landscape scale is important for optimal management of rangelands and pasture systems.

3.1.6 Ecology

Soil, plants and animals are the building blocks of ecological systems. Ecology, both individual (autecology) and community (synecology), is the dynamic interaction between the various trophic levels that make up rangelands and pastures. Practitioners in this PA must understand the interactions; they must understand the ecology of rangeland and pasture systems to achieve multi-generational management objectives and sustainable and/or regenerative outcomes; and understand the human component of ecology.

3.1.7 Socioeconomics

Rangelands and pastures produce economic value that is direct and consumptive in nature while at the same time providing a vast array of ecological goods and services that provide value to a broader society. Practitioners must understand both direct and indirect economic values of the products from rangelands and pastures and the potential impact of externalities on sustainability (e.g., cumulative effects of industrial development and other uses). An understanding of both the

present and future social and cultural context is critical to the sustainable management of the land.

Each of the core knowledge areas listed above consist of one or more subject matter areas. Subject matter areas consist of both required subject matters and recommended subject matters. Required subject matters represent the minimum credible knowledge required for the given core knowledge area. These subject matters are mandatory for members who wish to provide professional advice or services related to the core knowledge area.

Recommended subject matters represent knowledge that is not mandatory but provides increased depth of knowledge related to the core knowledge area. These subject matters are highly recommended and have been identified to provide members with direction for their continuing competence program.

The subject matters within each core knowledge area represent areas of study equivalent to a three-credit course in a post-secondary educational institution. Subject matter knowledge is normally obtained through educational training in a degree or diploma program; however, knowledge in certain subject matter areas may be obtained via industry courses, work experience self-study and mentorship. To assure the public that practitioners have acquired knowledge via work experience, self-study or mentorship, knowledge needs to be validated through a challenge exam process implemented by the AIA.

It is the responsibility of members to review Table 1, conduct self-assessments and identify how their knowledge and expertise aligns with the required subject matters. Members who do not meet a required subject matter within a core knowledge related to their professional practice, will be required to address the deficiency before practicing unsupervised in relation to that core knowledge area. In such situations, members will be required to do one of the following:

1. Seek Advice and Direction: Members lacking specific knowledge in required subject matters must recognize the limits of their expertise and seek advice and direction from a qualified professional.
2. Complete Challenge Exam(s): To validate that subject matter knowledge has been gained through work experience, self-study or industry courses, a member will be required to either (i) write a professional practice examination supplied by the AIA; or, (ii) to appear before a panel of peers to complete an oral examination supplied by the AIA.
3. Pursue Formal Education and Training: Obtain credit in a formal course from an appropriate educational institution or from an industry course approved by the AIA. Such courses must have an adjudicated examination to document knowledge attained.

Table 1. Core knowledge areas, required subject matter areas and recommended subject matter areas for the practice area

Core Knowledge Area	Required Subject Matter Areas	Recommended Subject Matter Areas
Vegetation	<ul style="list-style-type: none"> • Plant Identification (native and tame) • Invasive Species and Weeds 	<ul style="list-style-type: none"> • Plant Physiology • Disease and Pest Management • Plant-Animal Interactions

Soils	<ul style="list-style-type: none"> • Soil Genesis and Classification • Soil Fertility* 	<ul style="list-style-type: none"> • Soil Physics • Soil Chemistry • Soil Biology • Landform and Geomorphology
Animals	<ul style="list-style-type: none"> • Range/Pasture Livestock Production • Wildlife Ecology and Habitat** 	<ul style="list-style-type: none"> • Animal Physiology • Ruminant Nutrition
Water	<ul style="list-style-type: none"> • Hydrology** • Soil Water Management* 	<ul style="list-style-type: none"> • Soil Physics • Watershed Management • Wetlands and Riparian Areas
Landscape Interpretation	<ul style="list-style-type: none"> • Forage and Pasture Management* • Rangeland Management** 	<ul style="list-style-type: none"> • Remote Sensing / Aerial Photo Interpretation • GIS
Ecology	<ul style="list-style-type: none"> • Rangeland/Pasture Ecology 	<ul style="list-style-type: none"> • Ecophysiology • Plant Ecology • Disturbance Ecology • Restoration Ecology • Riparian Ecosystems • Fire Ecology and Management • Landscape Ecology • Forest Ecology
Socioeconomics	<ul style="list-style-type: none"> • Economics • Legislation/Policy 	<ul style="list-style-type: none"> • Land Management Policy • Environmental Policy • Cost-Benefit Analysis • Production Economics • Natural Resource Economics • Federal and Provincial Legislation • Conflict Resolution • Sociology

**Subject is required for members working in tame pasture management and recommended for members working in rangeland management.*

***Subject is required for members working in rangeland management and recommended for members working in tame pasture management.*

Knowledge of a subject matter area may be based on an individual course or be part of multiple courses. For example, knowledge in hydrology may be obtained via a hydrology course or through portions of other courses such as soil physics, soil and water conservation, or watershed management courses.

4. WORK EXPERIENCE

Work experience represents a source of knowledge that is gained through professional practice rather than through educational training. Such experience facilitates development of skill sets and attaining of knowledge needed to be competent within one’s practice. Development of these skill sets and knowledge takes time working in an environment where feedback is available to hone one’s skills and experiential knowledge.

Three levels of work experience are recognized within this practice standard. These include:

- a) Junior Level (0 to < 3 years) – The junior level of experience coincides with entry level personnel who have recently graduated from an appropriate educational program or have recently begun offering professional services in the PA. This work experience is conducted under direct supervision by a qualified practitioner within the PA. Practitioners at the junior level are considered to have insufficient experience to provide unsupervised professional services.
- b) Intermediate level (3 to < 10 years) – The intermediate practitioner no longer requires direct supervision and has developed the necessary skills and obtained the necessary experiential knowledge to take responsibility for their work.
- c) Senior level (≥ 10 years) – Senior level practitioners are those that have at least 10 years of work experience and generally provide supervision to intermediate and junior staff. They are often recognized as knowledge experts by their peers.

Members will strive to ensure that they have sufficient work experience to conduct the work and accept responsibility for the work they do. The time frames indicated in Table 2 are provided for guidance. Individual career progression and work experience may vary from these time frames.

Table 2. Typical years of work experience and examples of job duties and responsibilities.

Level of Experience	Examples of Typical Job Duties	Key Responsibilities
Junior (typically < 3 years)	<ul style="list-style-type: none"> • Conducting biophysical inventory and assessment • Learning basic craft of characterizing and rating land • Learning to understand and communicate with landowners, farmers, ranchers and other clientele • Learning to understand land management drivers • Learning how to interpret data • Developing field skills • Conducting literature search 	<ul style="list-style-type: none"> • Assist with field work, data collection, entry and some reporting. • Supervised and mentored/coached by an intermediate or senior practitioner
Intermediate (typically 3 to 10 years)	<ul style="list-style-type: none"> • Increased role in “Analysis, Evaluation and Interpretation” and “Integrated Management Planning” activities (see Sections 2.3 and 2.4). • Writing management plans • Renewing grazing leases and/or negotiating contracts • Some integrated management planning 	<ul style="list-style-type: none"> • Responsible for organizing field work and ensuring data quality • Management planning and regulatory compliance • Unsupervised field work.

	<ul style="list-style-type: none"> • Conducting field work unsupervised • Mentoring/training junior • Working with senior to report recommendations and results 	<ul style="list-style-type: none"> • Professional sign-off as required
Senior (typically > 10 years)	<ul style="list-style-type: none"> • Tool, technology and/or policy development • Planning and management; generally, less field work (with exceptions) • Training and mentoring juniors and intermediates • Field work as required depending on client requirements 	<ul style="list-style-type: none"> • Responsible for professional sign-off as required. • Overall personnel, program and budget management and supervision

4.1 Skill Set Requirements

Certain skill sets and capabilities enhance proficiency within a given PA. Application of scientific or technical knowledge requires skill sets which are identified within this practice standard. Skill sets are essential to functioning effectively within the PA and are generally developed during work experience, mentoring and/or gained through professional development courses.

Table 3. Skill sets relevant to the practice area

Skill Sets	Description
Well-developed public speaking, presentation and extension skills	Rangeland and pasture professionals perform a critical role in effectively translating and communicating scientific knowledge to a variety of user communities.
Negotiation, mediation, consensus building and conflict resolution	These skills are necessary for dealing with resolution of land resource conflicts and challenges.
Relationship building with clients, stakeholders and regulators	This skill set relates to establishing and maintaining relationships and communications with clients, stakeholders and regulators. Communication is essential to ensure that land management drivers are accounted for, and incorporated into, management objectives and client, stakeholder and regulator expectations are addressed. It is important to foster and maintain collaborative partnerships with colleagues, clients, stakeholders, government agencies and regulators.
Coaching and mentoring skills	This skill set includes solution-focused coaching methods and guiding others to achieve their goals.
Regulatory understanding and application	It is important to understand the legal framework, including legislation, standards, guidelines, policies, codes of practice, beneficial management practices, and standard operating procedures that establish the regulatory context for rangeland and pasture management. Supplementary codes of practice and

	management guides, recovery plans and other associated documents which guide stewardship are also critical.
Planning and management	This skill set is required to ensure all stakeholders' expectations are addressed within the context of sustainable or regenerative approaches which balance economic returns with long term productivity and ecosystem function. It includes proposal and budget preparation, revenue and cost tracking, development and implementation of a management and/or project plan, ongoing assessment of alignment with plans and objectives; change and cost management; project integration and completion.
Geographic information systems and spatial data analysis.	Rangelands and pastures are complex bio-geo-climatic landscapes requiring spatial analysis tools to capture and integrate many resource attributes.
Sampling, data collection, data management, validation and storage	This skill set is required to ensure data meets quality standards by using documented sampling, analytical, and data management protocols to ensure data are credible and defensible.
Documentation and reporting	Documentation of rationale for decisions made and conclusions drawn is a key requirement of professionalism. Clearly expressing results and professional opinions based on supporting data in an appropriate format and appropriate refereed literature is an important skill for the practitioner.
Ethical practice	Members adhere to the Code of Ethics for the profession as they make recommendations to their clients. The Code of Ethics states, " <i>The Profession of Agrology demands integrity, competence and objectivity in the conduct of its members while fulfilling their professional responsibilities to the public, the employer or client, the profession and other members.</i> " (See Appendix B)

5. PERFORMANCE REQUIREMENTS

This practice standard not only identifies educational, work experience and skill set requirements for competent practice but also defines the performance expected of regulated members participating in the PA, in addition to the General Practice Standard that applies to all AIA members (see Appendix 1).

The following performance requirements outline the expectations of the professional practicing within the *Rangeland and Pasture Management* PA. Failure to comply with these expectations may be considered as constituting unprofessional conduct under the *Agrology Profession Act*.

Regulated members stay current with rangeland and pasture management research, legislation, directives, guidelines, industry standards and other reference documentation related to rangeland and pasture management.

Regulated members:

- regularly review the currency of documentation and reference material used to support their practice and obtain most current versions when available.
- attend and provide presentations at workshops and updates related to rangeland and pasture management including provincial and international rangeland and pasture conferences (e.g. Society for Range Management, Alberta Forage Industry Network, Canadian Forage Industry Network, Cows and Fish, Foothills Restoration Forum, Prairie Conservation Forum, Alberta Environment and Parks; Canadian Forage and Grassland Association; Forage Applied Research Associations).
- communicate with regulators, research scientists, educators and other practitioners to ensure they remain current with current rangeland and pasture management knowledge and trends as well as know and understand the legislative requirements they work within.

Regulated members understand the limits of their knowledge, skills and experience and seek the expertise of other professionals where necessary.

Regulated members:

- make appropriate scientific, technical, practical and logistical decisions based on their education and experiential knowledge in rangeland and pasture management.
- apply their skills and use sound judgement in an ethical manner.
- seek advice and input from other professionals when their expertise is insufficient to make competent decisions and recommendations.
- do not conduct rangeland and pasture management work that is beyond their expertise and work experience level unless they conduct the work under the direct supervision of a qualified regulated professional.

Regulated members clearly understand their role within the practice area

Regulated members:

- clearly understand their role in rangeland and pasture management, represent themselves as such and do not exceed the boundaries of that role.
- only accept responsibility for another professional's work when confident that the professional has completed the work in a competent and ethical manner.

Regulated members clearly understand the project's scope and terms of reference and ensure alignment with the execution of a project management plan.

Regulated members:

- document and understand the objectives, scope and deliverables, and work within the terms of reference, legislative framework or client contract.
- use a consistent and thorough process for management and evaluation.
- regularly review the management plan to determine changes needed in a dynamic system for ensuring alignment with goals, objectives, regulatory requirements and changing environmental and economic conditions.
- regularly engage with clients, stakeholders and employer regarding the scope and land management objectives and adapt and document any changes as required.

Regulated members make decisions and recommendations based on refereed science and established professional and common-sense practice.

Regulated members:

- understand that one management approach is not applicable to all situations.

- exercise caution when promoting extraordinary improvements in livestock stocking rate, increased carbon sequestration, ecological improvements, etc. due to intensive management systems or industrial amendments.
- strive to balance production with ecology and maintain practice and/or recommendations within a reasonable deviation from established norms.
- use established tools and processes to successfully provide recommendations.

Regulated members review the requirements of this practice standard and address any practice deficiencies through their ongoing continuing competence program.

Regulated members:

- conduct self-assessments based on the education, work experience, skill set and performance requirements indicated within this practice standard.
- review their self-assessment with a senior qualified professional.
- identify any deficiencies and develop a plan to address them.
- regularly participate in the AIA continuing competence program as required by the *Agrology Profession Act*.

6. RECOMMENDED READING MATERIAL

The following is a list of some recommended reading material relevant to the Rangeland and Pasture Management PA in Alberta. It is not intended to be an exhaustive list.

Books and Journals:

Alberta Agriculture and Forestry. Weeds of the Prairies. Agdex 640-4
Bedunah D.J. and R.E. Sosebee (eds.) Wildland Plants: Physiological Ecology and Developmental Morphology. Society for Range Management, Denver.
Branson, F.A., G.F. Gifford, K.G. Renard, and R.F. Hadley. 1981. Rangeland Hydrology. Kendall/Hunt, Toronto.
Burrill L.C, S.A Dewey, D.W. Cudney, B.E. Nelson and T.D. Whitson 2005. Weeds of the West. Washington State University Extension Publication.
Fire Ecology: United States and Southern Canada. 1982. Henry A. Wright and Arthur W. Bailey. John Wiley and Sons, New York Available online at: https://books.google.ca/books?id=H7NWDSNcGVkC&pg=PR9&lpg=PR9&dq=fire+ecology+bailey+wright&source=bl&ots=vrDj8BrMzp&sig=zbqIW1r5cZrVFNv0IAB4MfLZWql&hl=en&sa=X&ved=0ahUKEwjarKnPIMfSAhUSwGMKHSMkCvsQ6AEIUTAH#v=onepage&q=fire%20ecology%20bailey%20wright&f=false .
Flora of Alberta. 1983. E.H. Moss (Author) and John Packer (Editor), University of Toronto Press.
Holechek, J.L.: Pieper, R.D; Herbel, C.H. 2010. Range management. Principles and practices. Prentice Hall. 542 pages.

Society for Range Management: Journal of Rangeland Ecology and Management. https://www.journals.elsevier.com/rangeland-ecology-and-management/
Society for Range Management: Rangelands Publication. https://www.journals.elsevier.com/rangelands/
Soil Classification Working Group. 1998. The Canadian System of Soil Classification, 3rd ed. Agriculture and Agri-Food Canada Publication 1646, 187 pp. ISBN 0-660-17404-9
Stubbendieck J.L, S.L. Hatch and L.M. Landholt 2004. North American Wildland Plants: A Field Guide. University of Nebraska Publication. 6 th edition.
Valentine, J.F. 1989. Range Development and Improvements. Brigham Young University Press, Provo, Utah.

Websites (Management Guides, Organizations):

Agriculture and Forestry http://www.agric.gov.ab.ca/app21/rtw/index.jsp
Agriculture and Forestry Agro-Climatic Information Service: http://agriculture.alberta.ca/acis/
Alberta Agriculture and Forestry Website: Alberta Soil Information Centre and Soil Viewer: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sag6903
Alberta Environment and Parks – Rangeland Resource Stewardship Section: http://aep.alberta.ca/lands-forests/grazing-range-management/default.aspx <ul style="list-style-type: none"> a) Grazing Lease Stewardship Code of Practice b) Range Health Assessment c) Range Plant Community Guides and Stocking Rates d) Rangeland Stewardship <ul style="list-style-type: none"> • e.g. Beneficial Grazing Management Practises for Sage Grouse and Ecology of Silver Sagebrush in Southeastern Alberta
Alberta Environment and Parks – Fish and Wildlife: http://aep.alberta.ca/fish-wildlife/default.aspx <ul style="list-style-type: none"> • Species at Risk Information: http://aep.alberta.ca/fish-wildlife/species-at-risk/default.aspx • Wildlife Land Use Guidelines including Wildlife Guidelines for Alberta Solar Energy projects (October 2016) and the Wildlife Directive for Wind Energy (January 2017) http://aep.alberta.ca/fish-wildlife/wildlife-land-use-guidelines/default.aspx
Alberta Forage Industry Network http://www.albertaforages.ca/
Alberta's Wetland Policy link: http://aep.alberta.ca/water/programs-and-services/wetlands/alberta-wetland-policy-implementation.aspx

<p>Cows and Fish Program: http://cowsandfish.org/</p> <ul style="list-style-type: none"> • Recovery Strategy Guides for Various Natural Subregions http://www.foothillsrestorationforum.ca/recovery-strategies/ • Riparian and Wetland Classification http://cowsandfish.org/publications/technical.html • Riparian Areas and Management http://cowsandfish.org/publications/management.html
<p>Foothills Restoration Forum – Information Portal : http://www.foothillsrestorationforum.ca/</p> <ul style="list-style-type: none"> • Recovery Strategies • Research and Technical Reports
<p>Foragebeef.ca – Technical information for the Forage Beef Industry http://www.foragebeef.ca/app33/foragebeef/index_body.jsp</p>
<p>MULTISAR - Partnering with Landowners to Conserve Species at Risk: http://multisar.ca/</p> <ul style="list-style-type: none"> • At Home on the Range (http://multisar.ca/wp-content/uploads/2015/12/At-Home-on-the-Range-WEB-version2.pdf)
<p>Prairie Conservation Forum - Multi-stakeholder forum with key publications, resources and literature related to grassland conservation and management http://www.albertapcf.org/</p>

Legislation:

<p>Queen’s Printer Legislation online: www.qp.alberta.ca/</p> <ul style="list-style-type: none"> • <i>Alberta Land Stewardship Act</i> • <i>South Saskatchewan Regional Plan,</i> • <i>Public Lands Act</i> • <i>Public Lands Administration Regulation</i> • <i>Weeds Act</i> • <i>Soil Conservation Act</i> • <i>Agricultural Operation Practices Act</i> • <i>Agricultural Operations, Part 2 Matters Regulation</i> • <i>Water Act</i> • <i>Forests Act</i> • <i>Forests and Prairie Protection Act</i>
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7. SUMMARY

This document describes the knowledge requirements, work experience, skill set and performance expectations for professional practice within the *Rangeland and Pasture Management* PA for the Agrology profession. It provides direction to members of the Alberta Institute of Agrologists who are practicing or who wish to practice within this PA to ensure they are qualified to conduct work in this area.

Members practicing within this PA are required to review this document and assess their knowledge, work experience, skill sets and performance against the requirements and expectations herein. Where deficiencies are noted it is expected that members will develop a plan to address these deficiencies through their individual continuing competence programs. Members are expected to understand the limits of their own knowledge and expertise and seek additional advice and professional support as required.

This practice standard will be one of the tools the Institute will use in conducting practice reviews or investigating a complaint about a member. It is the responsibility of the member to be aware of the contents of this practice standard.

APPENDIX A

The following General Practice Standard applies to all registered members of the AIA. This General Practice Standard is to be adhered to as well as this detailed practice standard for the *Rangeland and Pasture Management PA*.

General Practice Standard for All Registered Members of the Alberta Institute of Agrologists

The General Practice Standard applies to all registered members of the Alberta Institute of Agrologists. The purpose of the document is to describe the duties and responsibilities that are incumbent upon each member of the profession. It is the responsibility of each registered member to conduct themselves in accordance with these standards. Registered members will be measured against these standards by the Institute, the public, employers, clients and colleagues. The Standard describes the values of the Institute and the profession, and the expectation for each registered member.

Professional Responsibility

Each registered member of the Alberta Institute of Agrologists (AIA) is required to uphold the standards and reputation of the agrology profession and professional principles.

Indicators

The registered member has a duty to protect the public and to conduct his or her work with an appropriate standard of care.

Standard of care

Standard of care is the legal duty to exercise the watchfulness, attention, caution and prudence that a reasonable professional in the same circumstances would exercise. If a professional's actions do not meet this standard the professional may be found negligent or to have committed unprofessional conduct.

The registered member is personally responsible and accountable for ensuring that his or her agrology practice and conduct meet the requirements of the practice area(s), practice standards, current legislation, regulations and policy.

The registered member will practice with honesty, integrity and respect, and comply with the AIA's Code of Ethics.

The registered member will sign or co-sign a report only if he or she is willing to accept full responsibility for the contents of the report.

The registered member may delegate portions of the work to competent practitioners under the registered member's direct supervision. The registered member will accept responsibility for that work and provide additional quality assurance/quality control to

determine the sufficiency of that work. Registered members will not sign any document for which they will not take full responsibility for the contents of the document.

The registered member will hold the public interest paramount and endeavour to put service above gain and excellence above quantity.

Competency

The registered member will practice only in an area(s) where the member has demonstrated competence.

Indicators

The registered member will only practice unsupervised in the practice area(s) where the member's education, skills, and experience fulfill the practice area qualifications and the registered member believes he or she is competent. If a registered member's education, skills, and experience do not meet the requirements of the practice area, the member will practice *only* under the direct supervision of a qualified, registered professional who is competent to do the work and who will give appropriate direction to the registered member.

The registered member, if called upon by the profession, a judicial review or a court ordered request, must be able to clearly demonstrate the knowledge and skillsets gained to enable them to practice in any practice area(s) in which the member deems himself or herself competent to practice.

The registered member will undertake continuing professional development (CPD) with the majority of the CPD hours directly relevant to his or her practice area(s). The registered member commits to reporting his or her CPD activities on the member profile as activities are completed.

The registered member will continually update his or her scientific and standard industry practice knowledge related to the member's practice area(s).

The registered member will demonstrate critical thinking when planning, implementing and evaluating all aspects of the work and making any recommendations as a professional.

The registered member is able to show his or her reasoning in reaching decisions through accurate and clearly written documentation.

The registered member will advise the AIA of any changes to his or her practice area(s), particularly when a new practice area is chosen. The registered member will specify the knowledge and skills that have been acquired to support work in the new practice area.

Provision of Service to the Public, a Client or an Employer

The registered member will promote the qualified, competent and ethical professional role and accountability of agrologists to the public, other professionals, and themselves.

Indicators

The registered member will prepare accurate, concise and clearly written reports and correspondence that are appropriate for the intended audience.

The registered member will communicate clearly and respectfully with a variety of people, including his or her employer, colleagues, clients, members of the public and regulators.

The registered member will advise the client if the work is outside of his or her practice area(s) and if the member will be unable to fulfil the terms of reference for the work.

The registered member will make a referral to seek advice, and enter into collaborations with other professionals in situations which require expertise that extend beyond the member's competence.

The registered member will avoid situations where a conflict of interest exists or where the duties and loyalty owed by a member to one party likely will be, is, has been, or perceived to be, in conflict with the duties or loyalties the member owes to another party.

The registered member will extend public knowledge of their area of expertise whether it is in agriculture, the environment, food sciences or life sciences, and promote factual and accurate statements on matters regarding these areas.

Stewardship

The registered member will advocate and practice good stewardship of all agricultural and environmental resources based on sound scientific principles.

Indicators

A registered member will consider monetary issues, social values, rational application of sound science, lesson of valid experiences, economic impacts to the geographic region, and impacts on future generations when conducting his or her work.

A registered member will inform the client or employer of any action planned or undertaken by the client or employer that he or she believes is detrimental to good stewardship or in breach of known legislation, regulations or policies.

Safety

The registered member understands his or her obligation for promoting public and worker safety and considers the health of the environment, health of the consumer, industrial safety, construction safety and the general operational safety of projects.

Indicators

A registered member will demonstrate concern for the immediate and long-term direct effects of agricultural and environmental practices on the safety of workers by being aware of, and evaluating risks.

A registered member will balance the claims of producers and needs and wants of a consuming public against the potentially competing claims for safety of the environment and the interests of individuals and businesses affected by their proximity to agricultural operations. The registered member is aware that the public expects and demands a safe supply of food, not only for current use but also for future generations.

APPENDIX B

CODE OF ETHICS

“The Profession of Agrology demands integrity, competence and objectivity in the conduct of its members while fulfilling their professional responsibilities to the public, the employer or client, the profession and other members.”

Members should be aware of any other laws and responsibilities in regard to other business and voluntary activities which may impact their ethical conduct.

Guidelines to the Ethical Responsibilities of Agrologists

The purpose of the following guideline is to clarify the intent of the Code of Ethics and the understanding of the nature of the professional obligations that arise out of the document. Throughout, it is recognized that membership is a right granted by the public to the regulated member (member) to practice Agrology in such a way that the public interest is served. It is also understood that, just as the individual member has an obligation to conduct business in an ethical and competent manner, colleagues and the Institute share the moral responsibility of protecting their Agrologists and the field of agrology against any unfounded and unjust criticisms.

1) Among the regulated member’s professional obligations to the public are the responsibilities:

a) To practice only in those practice areas where the member’s training, ability, and experience make him/her professionally qualified.

The public has given a right to the Professional with the trust and expectation that those activities are undertaken with competence. A member will not make misleading statements regarding his/her qualifications. A member will actively pursue professional knowledge upgrading specific to their practice area(s) in order to remain competent in his/her field of expertise. A member will make referrals to seek advice, and enter into collaborations with other professionals in situations which require expertise that extend beyond the individual member’s competence.

b) To express a professional opinion only when it is founded on adequate knowledge and experience, and where the member has an understanding of the situation and context in which this opinion is being offered.

Members must clearly distinguish among facts, assumptions and opinions in their preparation of reports and professional statements. Professional opinions should be clearly stated and should include clear indications of the constraints that apply to the opinion, and the relevant qualifying circumstances, facts and assumptions.

Members should exercise care that work they conduct cannot in any way be seen to support or make possible any morally suspect or illegal purposes. In the extreme, this caution might cause a member to refrain from association with enterprises or individuals whose objectives and probity are subject to questions.

Members who act as expert witnesses and provide opinion evidence for the purpose of litigation should not take a partisan position. Agrologists must provide evidence as impartial experts and must not do so as advocates of their client or employer. While acting as an expert witness, a member’s role is to assist the judge/jury/panel with technical matters which are beyond the expertise of the tribunal.

c) To advocate and practice good stewardship of all agricultural and environmental resources based on sound scientific principles(s).

Stewardship requires making complex choices based on a variety of relevant but not necessarily compatible factors. Good stewards must consider, but not necessarily be limited to: monetary matters, social values, the rational application of sound science, the lessons of valid experience, impacts on the economic health of the community at large, and the impacts on future generations. Because of the position of public trust, a member's duty is to uphold professional principles above and beyond the demands of employment.

Conflict may arise between a member's duty to uphold professional principles and the duty to serve the needs of an employer or a client. Members must distinguish between the role they play as Agrologists and the role management plays. Managers have prerogatives and privilege for making decisions based on a wider range of constraints than those that might be appropriate for an Agrologist. The member must not confuse the role of providing others with information upon which to base a decision with the role of being responsible for making the decision him or herself.

If a member believes there is a serious conflict between the requirements of employment and a member's professional principles, a member should inform/or consult the Registrar or any other appropriate persons about the conflict. Members may seek advice and support for the position from the Institute.

d) To extend public knowledge of agriculture and the environment and to promote truthful and accurate statements on sustainable agricultural systems and environmental matters.

Members should strive to develop appropriate involvement with schools, agencies and organizations insofar as such outreach activities can help ensure the dissemination and discovery of sound and appropriate agricultural environment knowledge. Members should attempt to correct misleading or erroneous statements on agricultural matters whenever and wherever such statements are encountered.

e) To have proper regard for the safety of others in all work.

Members must understand their obligation for promoting safety. Members should consider the impact the exercise of their professional duties will have upon the health of the environment, industrial safety, and health of the consumer, construction safety and the general operational safety of completed projects. Members must demonstrate concern for the immediate and long-term direct effects of agricultural and environmental practices on the safety of workers by being aware of and evaluating risks.

The public expects and demands a safe supply of food, not only for current but also for future generations. Members must balance the claims of producers and consuming public against the potentially competing claims for safety of the environment and the interests of individuals and businesses affected by their proximity to agricultural operations.

2) A member's responsibility to the client or Employer is:

a) To act conscientiously and diligently in providing professional services.

Members should endeavour to put service above gain and excellence above quantity. If a member becomes aware of errors or omissions in his/her work, he/she must report the same to his/her client or employer, and immediately work to remedy such errors or omissions.

Expect as required by law, to maintain the confidentiality of client and employer information unless given the explicit consent of the client or employer.

b) A member should consider all information received from a client or employer as confidential unless such information is in the public domain.

Information obtained during and specific to a professional contract situation is confidential and must not be disclosed to others or used by the members outside that contracted situation without the consent of the client or employer. However, technical expertise gained by a member through work may be used in subsequent projects without consent from other parties.

c) To obtain a clear understanding of the client's or employer's objectives.

Members must clearly understand the objectives of the client or employer. Members must make inquiries regarding such objectives to ensure that professional services are provided in the context of complete and accurate information. It is recommended that all oral communication that is material to the delivery of professional services be confirmed in writing.

d) To inform the client or employer of any action planned or undertaken by the client or employer that a member believes is detrimental to good stewardship or in breach of known laws or regulations.

It is a member's duty to advise a client or employer of the consequence of questionable actions and inform the client or employer of the facts that lead the member's belief that the action is detrimental to good stewardship.

e) To refuse any assignment that creates a conflict of interest.

A conflict of interest exists where the duties and loyalty owed by a member to one party are, are likely to become, or to a reasonable, informed and objective observer would appear to be in conflict with the duties or loyalties the member owes to another party.

A member should not accept an assignment in which he/she has a personal or business interest unless that interest is disclosed and approved by the client or employer.

Where a member is in a position of providing professional services to more than one party with different interests in the same or related matter, the member must explain the significance of acting for more than one party to each of the affected clients or employer(s) (the parties) and obtain the written consent of the parties to continue working for more than one party. If any of the parties fail to give their consent the member must then determine whether it is possible to act on behalf of a subset of the parties without conflict. If conflict cannot be eliminated by acting only on behalf some of the parties, then the member should advise all the parties that he/she cannot continue to act for any of them in the matter that generates the conflict of interest.

Members must also advise the parties that no information received in connection with the common matter from the one can be treated as confidential so far as any of the other parties are concerned.

f) To not accept compensation from more than one employer or client for the same work, without the consent of all.

Members need to distinguish between the data or product, which becomes the property of the client; and the process or technical experience, which remains the property of the member.

3) The Agrologist's Responsibility to the Profession is:

a) To inspire confidence in Agrology by maintaining high standards in conduct and work.

A member must keep in mind that the work of an Agrologist is continuously open for public scrutiny and it is the responsibility of each individual to build and maintain a positive image of the field and the profession. Not only must a member perform his/her duties of employment to a high level of excellence, but the conduct of that member must also be of high standard.

b) To support activities for the advancement of the profession.

Members have an obligation to participate in the activities of the Institute (i.e., meetings, elections, holding office, mentoring) as the individual members situation and opportunities allow.

Members need to be constantly aware they are Agrologists and should, by their conduct, provide a positive image of the profession. Each member must be prepared to personally promote Agrology in personal contacts and communications, and to participate in specific promotional initiatives organized by the professional organizations.

c) Where a member believes another individual may be guilty of infamous or unprofessional conduct, negligence or breach of the Agrology Profession Act or bylaws:

to raise the matter with that individual and

if not resolved or if otherwise deemed necessary to inform the Registrar of the Institute in writing.

A member should ensure that the facts and understanding of the misconduct are correct. Consultation with a colleague or Registrar is encouraged if it may help clarify the issue. Members should make every effort to raise and resolve the issue in a candid and professional manner. Agrologists should note that only in exceptional circumstances is it inappropriate to raise such a matter with the other member if done courteously and politely.

d) To state clearly on whose behalf professional statements or opinions are made.

A professional opinion or statement prepared by an Agrologist is for a specific situation and set of circumstances. The content of a professional opinion should include the context in which it is made.

e) To sign and seal only those plans, reports, and other documents for which the members are professionally responsible and which were prepared by or under the direction of the member.

Members who affix their seal and/or signature assume responsibility for and understand the document. The responsible professional must have exercised sufficient control and association with the document so he/she can sign and seal the document based on personal knowledge. Members will not associate themselves with documents, reports or statements that misrepresent, distort or omit material facts. Members should familiarize themselves with information that details the procedures and protocols that are associated with the use and practice of sealing professional works.

4) A member's professional responsibility to other members is:

a) To abstain from undignified or misrepresentative public communication with or about members.

Conduct between members should be characterized by respect, courtesy, honesty, and good faith. Direct and honest criticism between professionals is acceptable and professional debate is encouraged when characterized by fairness and propriety.

Members should be courteous when criticizing the work of another member and be as careful with a colleague's reputation as they would be with their own. Members will advise another regulated member in advance if they are reviewing/critiquing the other's work for a specific project. An individual member will not make statements or representations on behalf of the Institute without prior authorization.

b) To give credit for professional work to whom credit is due.

Members should always acknowledge the work and contributions of others when directly using that work in whole or in part. Members should clearly understand and appreciate that the unpaid use of marketable processes and technology developed by another member could jeopardise that other member's livelihood.

Members will follow the rules and law of copyright. Members will secure releases for any data, process (es), and publication(s) obtained from written or electronic sources.

c) To share knowledge and experience with other members.

Each member has a duty to new members and to the future of the Institute to be available as a mentor for new members. Individual members should offer and seek out constructive professional discussion and debates with colleagues to maintain a vibrant and progressive profession.

Code of Ethics, Revised September, 2010