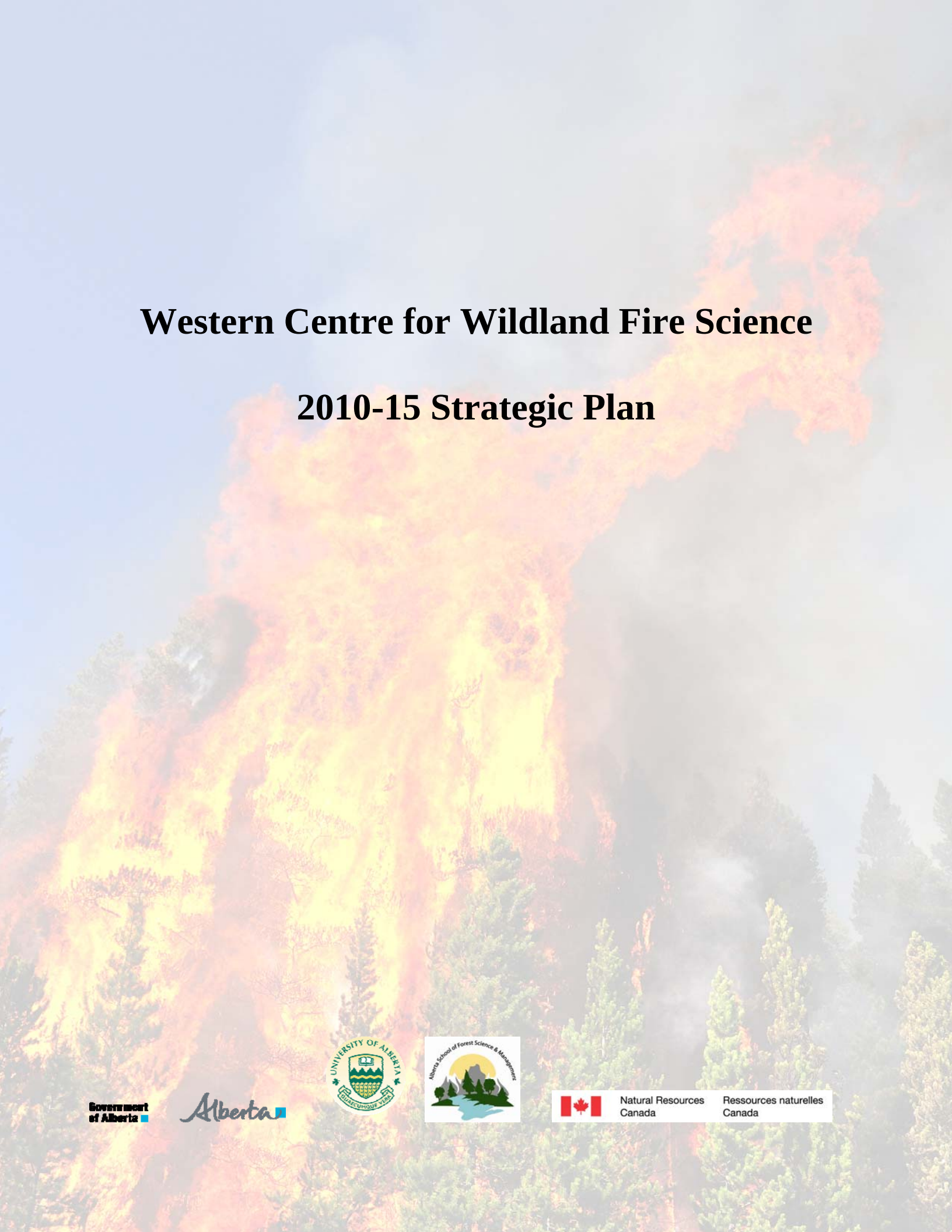
Western Centre for Wildland Fire Science

2010-15 Strategic Plan



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1. Executive Summary

As a result of strong interest to establish a wildland fire research centre at the University of Alberta (UA) in partnership with Alberta Sustainable Resource Development (ASRD), University of Alberta School of Forest Science and Management, and the Canadian Forest Service (CFS) represented by the Northern Forestry Centre, a Memorandum of Understanding was signed by these initiating partners on June 30, 2009 to establish a Western Centre for Wildland Fire Science (hereafter referred to as WCWFS or the Centre). This Centre will be an international leader in wildland fire science, contributing to shape fire management in Canada and around the world. To attain this vision, this plan provides strategic direction for managing and conducting wildland fire research and education at the Centre. This innovative partnership recognizes the opportunities to address priority research needs by creating a fire science hub that links ASRD and CFS with researchers at the UA and other Canadian and international research institutions. There are four strategic directions: education, science, scientific applications and communications, and partnerships and collaboration. The theme of excellence threads through the strategic direction to ensure the development of science informed policies, practices and decision support tools. Teaching and mentoring the next generation of scientists and practitioners will allow Canada to maintain its position as a world leader in fire management. This plan includes a governance model that integrates an Executive Committee and Wildland Fire Science Advisory Committee with the Centre. The Executive Committee provides strategic direction and guidance. The Advisory Committee helps to identify current and emerging issues and research needs, identify priorities and review operating plans for approval by the Executive Committee. Implementing quantifiable performance measures are an essential component of this strategic plan.

2. Background

The strategic plan sets out a vision for managing and conducting wildland fire research and education at the proposed Western Centre for Wildland Fire Science (WCWFS) over the next five years. It provides the strategic direction to ensure the highest standard of science and education is maintained thereby allowing Canadians to continue to benefit from knowledge-based policies in wildland fire management.

This plan has been prepared for individuals and organizations with an interest in wildland fire science in Canada. This includes managers, academia and scientists within Alberta Sustainable Resource Development (ASRD), University of Alberta (UA), Canadian Forest Service (CFS), and many other science partners and clients within Canada and internationally, such as those in other government agencies, academia, other research institutions, the private sector, and non-government organizations (NGO).

This plan strongly reflects and contributes to the Canadian Wildland Fire Strategy (CWFS)[1] mandate towards:

- Resilient communities and an empowered public;
- Healthy and productive forest ecosystems; and
- Modern business practices.

The plan also respects the jurisdictional priorities established internally by each of the partners.

The CWFS presents opportunities to revitalize wildland fire science and technology programs through partnership and collaboration. Over 80 years of forest fire research in Canada has produced many research products successfully adapted by fire management agencies to manage and protect Canadian forest resources and communities. However, there continues to be a need and demand to provide more science-informed policies and practices that address wildland fire risk, public safety and the management of sustainable, healthy forest ecosystems. Canadian fire research programs need to continue to evolve and build collaborations with interdisciplinary initiatives to address emerging issues such as climate change, risk, public safety, socio-economic impact of fire, and improved decision support systems. To contribute to the CWFS mandate, this strategy presents an outline of some of the opportunities with respect to science, education, and technology thereby providing the foundation for the Western Centre for Wildland Fire Science.

Wildland fires create myriad economic, environmental and social impacts. Knowledge of both short and long-term impacts of wildland fire is essential for effective risk assessment, policy formulation and wildland fire management. In Canada, forest fires pose a serious threat to rural communities, valuable timber assets, property and infrastructure, biodiversity, clean air and water, cultural heritage, and the health and safety of Canadians. Equally, fire is an important natural disturbance in many of Canada's forest ecosystems, particularly the boreal forests. Thus, sustainable management of fire-dependent ecosystems requires both minimizing the socioeconomic impacts of fire while maximizing its

[1] Canadian Wildland Fire Strategy: A vision for an innovative and integrated approach to managing the risks, Canadian Council of Forest Ministers (2005).

ecological benefits. More specifically, fire is a necessary and vital component in maintaining healthy and productive ecosystems, but the significant negative impact of wildland fire on the health and safety of Canadians, the availability of natural resources and CO_2 emissions must be minimized.

Over the past three decades, an average of 8,600 wildland fires occurred in Canada which burned an average of approximately 2.5 million hectares of forested land annually (Taylor *et al*. 2006). The risk to property and community safety will continue to grow as forested areas become more populated (i.e. increase in wildland-urban interface areas), and the amount of infrastructure increases in these areas. Flannigan *et al*. (2005)[2] projected an increase in area burnt in Canada by 74-118 percent by the end of this century in a 3 x CO_2 climate change scenario. This projected increase will have significant economic, environmental and social impacts on Canadians and their environment.

Economic, environmental and social impacts of wildland fire management in Canada affect the public sector economy with expenditures in excess of 500 – 600 million dollars annually (Taylor *et al*. 2006)[3]. These fires consume forest and wooded vegetation and can either be beneficial or detrimental to wildlife habitat, ecosystem health, recreation and tourism, water quality and supply, and property values; all which depend on a forested landscape. Wildland fire management involves decision making at various stages including prevention, preparedness, detection, response and recovery. Science and technology goods and services have an important role in the decision-making process by providing science-based evidence for the agencies who are engaged in a range of wildland fire activities. The process of providing and using scientific knowledge is resource intensive and involves challenging tasks.

Thus, there is a strong interest to establish a wildland fire research centre (*Western Centre for Wildland Fire Science* - WCWFS) at the University of Alberta sponsored and in partnership by Alberta Sustainable Resource Development (ASRD), University of Alberta School of Forest Science and Management (UA) and the Canadian Forest Service (CFS) of Natural Resources Canada. To this end, the three initiating partners have signed a Memorandum of Understanding (June 30, 2009) that will provide guidance for the development of this Strategic Plan and the creation of the Western Centre for Wildland Fire Science.

The vision of the WCWFS as stated in the Memorandum of Understanding is:

"The Western Centre for Widland Fire Science will be an international leader in wildland fire science, contributing to shape fire management in Canada and around the world."

[2] Fannigan, M.D.; Logan, K.A.; Amiro, B.D.; Skinner, W.R.; Stocks, J.S. 2005. Future area burned in Canada. Climate Change **72**:1-16.

[3] Taylor, S.W.; Stennes, B.; Wang, S.; Taudin-Chabot, P. 2006 Integrating Canadian Wildland Fire Management Policy and Institutions: Sustaining Natural Resources, Communities and Ecosystems. *In* K.G. Hirsch and P. Fuglem, Technical Coordinators, Canadian Wildland Fire Strategy: background syntheses, analyses, and perspectives. Canadian Council of Forest Ministers, Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta, Canada.

3. The Initiating Partners' Strategic Fit

3.1. Alberta Sustainable Resource Development

The mission statement for ASRD refers to the application of leading practices in management, science and stewardship to attain a balanced and responsible use of Alberta's natural resources. The creation of a fire science centre of excellence based at the University of Alberta will help to deliver this mission.

Goal 3 in the Government of Alberta 2009-12 Strategic Business Plan states that the high quality of Alberta's environment will be sustained. To achieve this goal, the efforts of ASRD to conserve biological biodiversity and enable sound management of Alberta's natural resources requires the application of science-informed fire management practices, particularly in the fields of fire behaviour, fire effects, prescribed burning and fuel management.

Goal 7 in the Government of Alberta 2009-12 Strategic Business Plan states that Alberta will be a safe place to live, work and raise families. Goal three of ASRD's 2009-12 Business Plan links to this government goal by stating that Alberta's forests and landscapes will be managed to control wildfire, and to sustain healthy ecosystems and support healthy communities.

ASRD's Science Committee maintains a research prospectus that serves to provide awareness of the department's information needs and influence the science community's agenda. This committee also provides guidance in the formulation of proposals that address the department's Key Result Areas (KRAs). This is important because ASRD supports and engages research providers to address its science needs through collaboration and partnerships and by funding research to help shape policy, inform decisions and develop best practices.

3.2. University of Alberta

The University of Alberta is the third largest university in Canada with 37,000 students and 3,200 academic staff across 5 campuses. The School of Forest Science and Management is focused on understanding and managing landscapes and the associated resources. They are unique in the range and depth of interdisciplinary interests and skills. They have strong connections with land and natural resource managers, and are active partners in numerous research networks and organizations. Field work is essential to teaching, research, and community service activities undertaken by the school (and the associated Department of Renewable Resources and Department of Rural Economy). Masters and Ph.D. graduate programs are offered in conservation biology, forest biology and management, forest economics, protected areas and wildlife management, and wildlife ecology & management.

President Indira Samarasekera plans to position the University as one of the top 20 in the world by 2020. Significant progress has already been made towards this goal. Establishing and building a Western Centre for Wildland Fire Science is aligned with the University of Alberta's pursuit of developing world class excellence in research.

The University of Alberta Strategic Plan has several core objectives including: building on existing research strengths; partnering in innovative ways with government and industry; expanding interdisciplinary links; maximizing the benefits of research through technology transfer; and,

expanding the graduate and undergraduate programs. Each of these core objectives can be met by the establishment of a Western Centre for Wildland Fire Science. It will build on the existing strengths within the Department of Renewable Resources, the Department of Rural Economy and thus the Alberta School of Forest Science and Management. It will continue to provide the expertise required to introduce forestry and environmental science students to the concepts of wildland fire science.

The Centre will allow the Province to build on the existing expertise and infrastructure at the University and the Canadian Forest Service in applied research and technology transfer. Current partnerships between UA, ASRD and CFS have laid the groundwork for future innovative partnerships in forest fire science. By attracting a wide range of expertise within the research opportunities suggested, the Centre's program will enhance interdisciplinary links within the University and with researchers outside the University. As the Centre grows, so will the student base that it attracts – both at the undergraduate and graduate level.

3.3. Canadian Forest Service – Northern Forestry Centre

The Canadian Forest Service (CFS) is a science-based policy organization within Natural Resources Canada, a Government of Canada department that helps shape the important contributions of the natural resources sector to the Canadian economy, society and environment. The mission of the Canadian Forest Service is to promote the sustainable development of Canada's forests and competitiveness of the Canadian forest sector.

The Northern Forestry Centre (NoFC) is one of five CFS research centres located across Canada. The centre has over 75 core research employees and conducts studies in areas such as forest ecology, impacts of global climate change, insects and diseases, forest health, biotechnology, landscape analysis, forest economics, social sciences, fire management systems and behaviour, and forestry practices which contribute to national CFS priorities.

CFS wildland fire science and technology activities provide science-based information and technology that fire management jurisdictions will use to make informed decisions and policies concerning wildland fires. Their research addresses key objectives and science gaps identified by the intergovernmental wildland fire management community that developed the CWFS. A modernized Canadian Forest Fire Danger Rating System (CFFDRS) is currently being developed that is capable of integrating changes in climate and forest types into prediction of fire occurrence, behaviour and severity. The project will assess changes in fire regimes and impacts on forest health, the wildland urban interface (WUI), smoke emissions and fire-insect disturbance, and on future forest management. Knowledge of climate change effects on wildland fire will improve estimates of future fire occurrence and area burned and provides baseline information to Canada's forest carbon budget model and emissions inventories. The Canadian Wildland Fire Information System (CWFIS) will be enhanced, providing current, operationally relevant information on wildland fires in Canada. Information on wildland fire mitigation options will be developed based on societal values and expectations.

Wildland fire science at NoFC is linked in a matrix-system to the CWFS, the Wildfire Management project under the CFS's key intended outcome focussed on forest disturbances, and to specific research and collaborative initiatives at other CFS Forestry Centres and the University of Toronto (Fire Management Systems Laboratory.

4. Opportunities

The Canadian Forest Service and Alberta Sustainable Resource Development have been forging national and international collaborations for many years. Collaboration is at the heart of innovation and the development of new technologies and best practices. Fire researchers and practitioners recognize that deeper collaborations are more important than ever. It is the research model being adopted around the world. Fire managers need science-based decision support tools to address emerging issues and trends, but no one fire management agency or research group has the capacity and capability to resolve complex fire management issues that ultimately affect all Canadians. Building bridges and capacity are the keys to finding science solutions for common problems.

The WCWFS will be the fire science hub linking Alberta SRD, and CFS with fire researchers not only at the University of Alberta but around the world. This Centre will allow for the implementation of a network approach to drive fire research excellence, innovation, and education. Once the WCWFS is established future partnerships will be sought with an expanded range of other agencies (e.g. Alberta Tourism, Parks and Recreation, Alberta Environment, FP Innovations, Foothills Research Institute, Environment Canada, British Columbia Ministry of Forests and Range, Parks Canada, Saskatchewan Environment, Yukon Wildland Fire Management, Northwest Territories Environment and Natural Resources, and others).

At the Climate Change and Fire Management Research Strategy Forum held February 17 – 19, 2009 in Victoria, B. C., participants from across Canada identified areas of research where new knowledge is needed to enable the development of practical fire management applications. These research priorities were incorporated into three broad themes: “Adapting wildland fire management”, “Balancing management options” and, “Putting science into practice for community resilience”.

The Canadian Wildland Fire Strategy identifies emerging issues, challenges, and risks. This important and ambitious strategy focuses on four main initiatives:

- Public awareness campaign about the role of wildland fire and the associated risks;
- Canadian FireSmart initiatives with activities that empower individuals and communities to directly reduce the risk from wildfire;
- Improved preparedness and response capability;
- Innovation that includes the development and application of new science and technology in support of early warning systems, better predictive models, and the increased use of prescribed fire.

In support of the Canadian Wildland Fire Strategy, the Canadian Forest Service has identified the following six outputs within their fire research program:

- Expansion of the Canadian Wildland Fire Information System;
- An assessment of wildland fire impacts on the Canadian forest and wildland-urban interface;
- An enhanced Canadian Forest Fire Danger Rating System;
- Development of options for wildland fire hazard mitigation;
- Strategic coordination of wildland fire science and management in Canada;
- An understanding of the effects of climate change on wildland fire.

A 2009 environmental scan of wildland fire science and technology in Canada[4] completed by the Canadian Forest Service suggests that a shift may be occurring in the priority issues and concerns of fire management agencies since the Canadian Wildland Fire Strategy was completed. While FireSmart remains an important initiative because of an expansion of wildland-urban interface areas, fire managers are becoming more concerned about increasing fire behaviour, forest disturbances (e.g. mountain pine beetle) increasing fuel hazards, and suppression resourcing demand needs. Climate change has become a stronger issue specifically related to the future risks and the uncertainty about its impacts on fire regimes and fire events. Social and political pressures continue to cause concern, particularly the increasing fire management costs in an environment of diminishing resources. The scale and efficacy of fuel management needs to be addressed, and smoke and its health impacts are emerging issues within a carbon constraining world.

The Canadian Interagency Forest Fire Centre (CIFFC) Fire Science and Technology Community of Practice (FSTCoP) Strategic Plan[5] for the period 2009-2014 identifies six strategic priorities based on the CIFFC Strategic Plan, the Canadian Wildland Fire Strategy and FSTCoP meetings and workshops. Two of the strategic priorities; network building, and emerging issues identification, are important priorities that will help to support the WCWFS. The FSTCoP supports building bridges within the fire science community and strives to communicate to the larger research community what national research gaps need to be addressed. The WCWFS has the opportunity to dialog with the FSTCoP and review what they consider as the emerging issues that will challenge fire management agencies.

In 2009, Alberta SRD completed a Strategic Plan for Wildland Fire Management in Alberta[6]. This plan identifies the need to adjust current suppression cultures and policies, while recognizing the need to maintain healthy forest ecosystems and air sheds. Three of the five strategic directions address the need for the following initiatives:

- Development of a resource utilization process;
- Establishment of a Centre of Excellence for Wildland Fire Management;
- Development of a wildland fire management assessment and planning process.

Alberta SRD's fire research priorities are aimed to help achieve these initiatives and support the mission of the Wildfire Management Branch. The following research priorities represent areas of focus where SRD believes research will help to address the challenges that its wildfire management program faces in the future:

- Wildland-urban interface and research to support the outcome of having FireSmart communities, including an understanding of how fires spread and the efficacy of fuel treatments;
- Cost-effective suppression tactics and research to support this outcome including the development of models to evaluate the cost effectiveness of suppression tactics;
- Research to improve fire weather and fire behaviour forecasting, and to manage smoke events;

[4] Gould, J. 2009. Canadian Wildland Fire Science & Technology: Trends, Innovations & Initiatives. PowerPoint presentation to CIFFC Directors Meeting, November 5, 2009. Edmonton, AB.

[5] CIFFC Fire Science and Technology Community of Practice. 2009. Strategic Plan 2009 – 2014. 15 p.

[6] Wildfire Management Branch. 2009. 2009 – 2012 Strategic Plan for Wildland Fire Management in Alberta. 51 p.

- Management of wildfires and prescribed burns in the east slopes and research to address increasing issues such as water and air quality, and mitigation of potential large fire events;
- Research to better understand and manage risks to water resources from fuel management strategies, prescribed fire and wildfire.

5. Mission and Objectives

This Strategic Plan sets out the following mission for the WCWFS:

> To provide excellence in wildland fire research, education, and knowledge and technology transfer for the development of innovative policies, practices and decision support tools while teaching and mentoring generations of scientists and practitioners.

The essential character of the WCWFS is research and education. That is, the WCWFS will focus on delivering high-quality knowledge and education to enhance wildland fire management, public awareness and safety, and to help promote healthy and productive ecosystems. The WCWFS will also promote the development and implementation of modern and effective business practices by fire management agencies.

Therefore, the objectives of the core research and education program for the WCWFS will be to:

- Ensure that Canadian wildland fire science research continues to contribute to government priorities, and provides support for decision making, and the development of policies, regulations, and best practices;
- Create opportunities for greater integration of science within Canada and improve collaboration with national and international partners;
- Ensure wildland fire science educational (undergraduate and graduate levels) opportunities continue to be available, and;
- Promote the highest standard of scientific and education excellence to help wildland fire agencies (forestry, natural resource and park agencies) to deliver on its program policy and services responsibilities.

This strategic plan supports and complements the more detailed operational plans that will be developed by the Centre to guide operations and specific initiatives.

6. Guiding Principles

The WCWFS – like other research and educational institutions – should operate on four key principles:

6.1. Alignment

Under this principle, the Centre activities will be designed to undertake the advancement of the Canadian Wildland Fire Strategy and the broader priorities or strategic goals of the partners as represented on the Executive Committee.

6.2. Linkages

The principle of linkages requires that the WCWFS build strong and sustained collaborative relationships to foster better integration of science and education across a range of stakeholders. It involves working with researchers and academia within Canada and internationally in universities, government science agencies, industry, granting councils and funding programs. It means finding ways to work more efficiently together through co-location of facilities, shared financial resources, training opportunities, adjunct professorship and international cooperative agreements. In addition, it means maintaining effective relationships between science and those who need and will use the outputs of the Centre, including but not limited to: policy makers, practitioners, community groups and the general public by communicating and developing knowledge and tools that can be easily understood and used.

6.3. Excellence

The Centre will produce the highest quality, leading edge scientific knowledge and education relevant to support sound policies, effective best practices and informed decision making in wildland fire management. The Centre will demonstrate transparency and openness in how it conducts its scientific activities, adhering to scientific principles and continuing to use proven quality assurance methods such as international standards, peer review and expert advice. The Centre in association with its University partners will inspire excellence in teaching and learning. Fostering teaching excellence and innovation is a core value of the University of Alberta.

6.4. Knowledge Exchange

Technology transfer and communicating research findings are critical to keep the partners, collaborators, public, and the co-researchers informed about how the wildland fire science goods and services can be applied to make a difference on the ground. Credible scientific information that helps the stakeholders make informed decisions is the Centre's main product. As the Centre disseminates information, it will solicit feedback on its relevance and then adapt as needed (Figure 1).

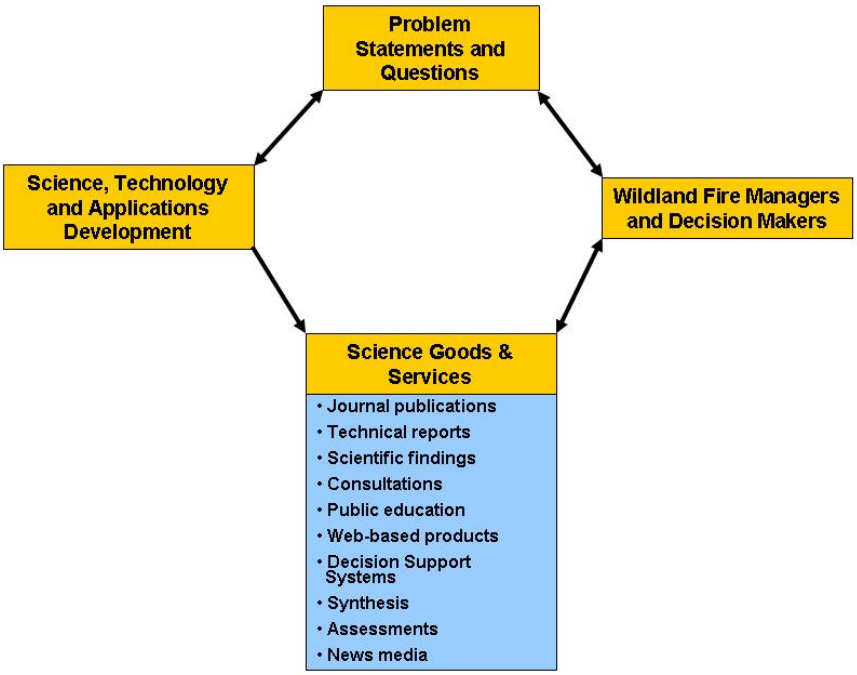

Figure 1. Knowledge exchange flowchart for the Western Centre for Wildland Fire Science

7. Strategic Directions

Building on the understanding of the current and emerging challenges and opportunities to wildland fire science and technology, this section of the plan outlines four long-term directions to guide the Centre and its partners as they work together towards the vision of developing education, science and technology needed for wildland fire management and safety of Canadians from wildland fire.

The strategic directions are a guidepost to help the Centre governance, scientific and education resources, and activities the coming years. For each of the strategic direction, the strategic plan identifies a goal, provides a brief rational and proposed areas where the Western Centre for Wildland Fire Science should focus. The strategic directions are:

Strategic Direction 1: Education

Build wildland fire management and science capability and extension of science knowledge in Canada.

Goal: Expand the graduate and undergraduate program in wildland science, technology and management.

Rational: Canada must develop highly qualified personnel (HQP) with the capacity to understand, utilize and further develop research that flows from the Centre. The Centre will be committed to expand the graduate and undergraduate program

inline with the researchers who serve as effective instructors and mentors for an increased number of highly qualified graduates. The university will take leadership role in defining and strengthening the links and overlaps between teaching and research.

Area of focus:

- Provide proposed post graduate projects and scholarships
- Develop a knowledge based centre of excellence for national and international wildland fire education and research

Measurable outcomes:

- Number of post graduate students by 2015
- New undergraduate and post graduate courses in wildland fire science and management and increase enrolment
- Increase Canada's capacity and capability in wildland fire science and management knowledge and skills
- Visiting research fellows to the Centre
- Educational merit awards

Strategic Direction 2: Science

Goal: Advance the physical, ecological, social and economic sciences in wildland fire.

Rational: Wildland fire is an important process on the Canadian forest landscape. We must understand the fundamentals of this process to project the future role of fire and to help managers mitigate, prepare and manage wildland fire. Today we manage more wildland fire than ever as fire seasons lengthen, fire behaviour intensifies, and the wildland-urban interface expands. At the same time, limited resources and increasing demand for national resources, suppression strategies focus more on strategic protection than full perimeter control. In addition there is a need to allow more prescribed and wildland fires to burn for ecological benefits. To effectively use fire as a management tool to achieve land management objectives while protecting values-at-risks, managers need to understand the consequences of fire management decision on a full suite of resource and social values. Whether the challenge is damaging fires, threatening communities or use of fire to maintain healthy ecosystems, the solutions to today's major wildland fire issues require integrated and multidisciplinary approaches. We can no longer treat smoke emissions, climate change, biodiversity and wildland-urban interface issues independently because we know that the physics, chemistry, biological and social aspects of these issues interact. The research carried out under this goal will develop the information and knowledge needed to support improved wildland fire management, planning, prevention and appropriate response by Canada's wildland fire management agencies.

Area of focus:

- Physical fire science to advance the fundamental understanding of fire behaviour, fire weather, fuel management impacts, and climate change impacts to improve fire weather and fire behaviour forecasting, risk assessments and the prediction of effects from prescribed fire and wildland fire;
- Develop a better understanding of the biophysical aspects of fire and the interactions of other natural disturbances and ecological processes to sustain healthy and productive forest ecosystems, and thereby allow for adapting wildland fire management and balancing management options; and
- To provide a better understanding on the social and economic impacts and risks of alternative wildland fire and fuel management strategies.

Measurable outcomes:

- Audit of knowledge assets and technology produced and disseminated;
- Demonstrate excellent science according to recognized international measure of scientific excellence (3 and 5 year science review);
- Change in how fire management agencies conduct their business;
- Change in public awareness and understanding of the issues and needs.

Strategic Direction 3: Scientific Applications and Communications

Goal: Package, promote and deliver scientific information so that our stakeholders can understand it and use it affectivity.

Rational: Technology transfer and communicating research findings are critical to keeping partners, co-operators, and the public, as well as the science community, informed about how our research outputs can be applied to improve operational practices. Credible scientific information provides our stakeholders science-base knowledge for policy and informed decision making. The disseminated science information needs to be tailored into practical products for a range of audiences and solicit feedbacks on its relevance and adapt as needed.

Area of focus:

- Knowledge application - prediction tools, techniques for adaptive management, resource monitoring, quantitative tools and technology that address the consequences of alternative wildland management strategies;
- Knowledge integration - risk and trade-off analysis, methods to assist regional, provincial and national wildland fire planning process; and
- Knowledge delivery - peer reviewed publications and reports, refined communications technology transfer tools.

Measurable outcomes:

- Peer-reviewed publications and reports;
- Participation in workshops, national and international conferences (including invited speaker);
- Participation in the CIFFC National Fire Management Conversations;

- Training and extension programs;
- Software, decision support systems adopted by stakeholders; and,
- Change in public awareness, understanding and behaviour (i.e. actions).

Strategic Direction 4: Partnerships and Collaboration

Goal: Develop productive partnership to support improved capacity and investment of wildland fire science and technology.

Rational: Partnership and collaboration will ensure greater efficiencies in research investment, reduced duplication of effort, more effective application of Canada's wildland fire research capability against the Canadian Wildland Fire Strategy.

Area of focus:

- Build on existing partnerships;
- Broker new partnerships.

Measurable outcomes:

- Number and financial leverage of new partners; and
- Better coordination of existing capacity in critical areas.

8. Implementation of the Plan

8.1 Leadership and Governance

Governance

A schematic diagram of the governance model for the Centre is shown in Figure 2. The Executive Committee will provide overall governance and strategic direction for the Wildland Fire Science Advisory Committee and the Centre. The Wildland Fire Science Advisory Committee (WFSAC) coordinates and identifies fire science research priorities, and endorses the work plans for the Centre. This committee also identifies the need for and coordinates specific research outcomes, including workshops and conferences.

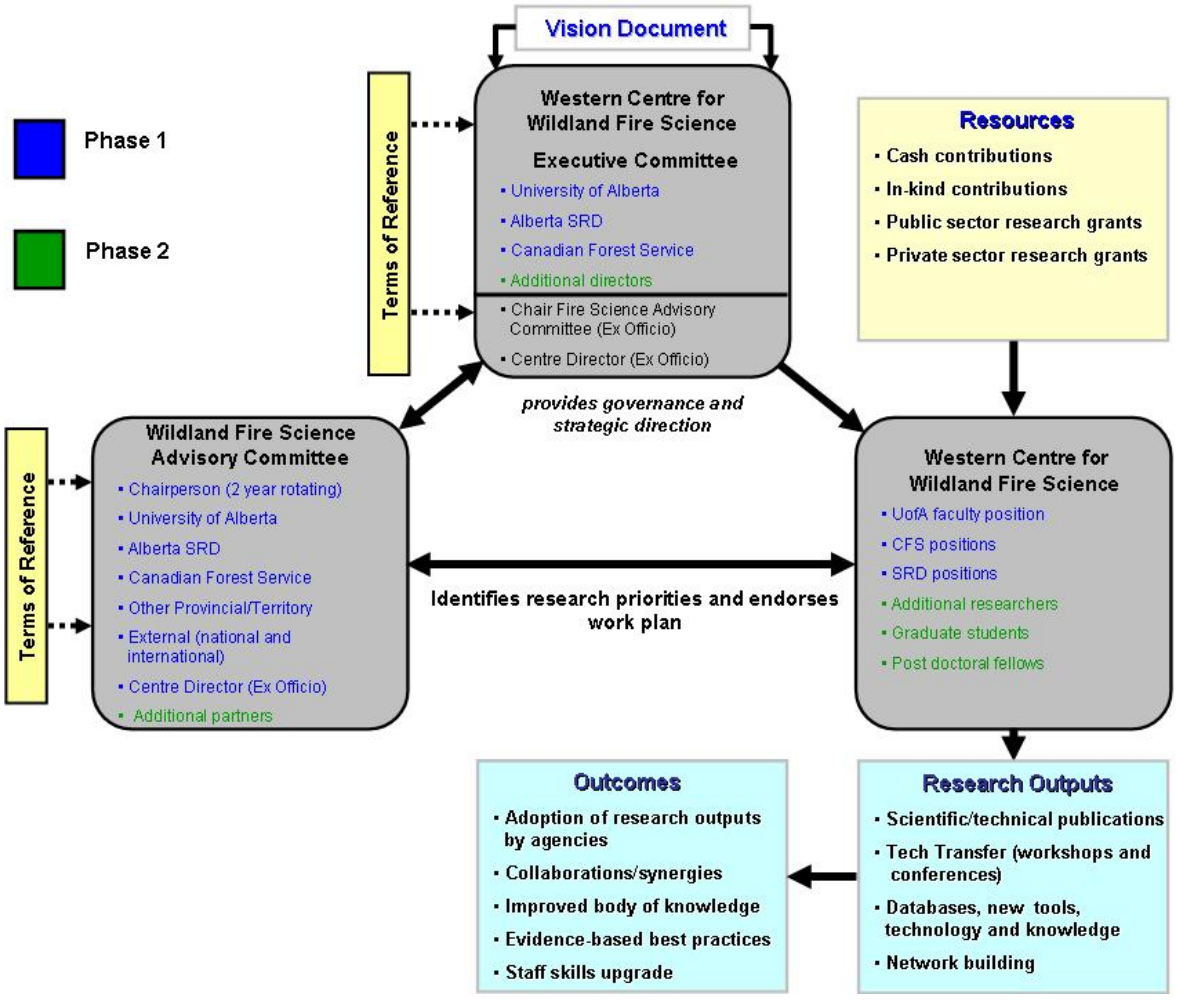

Figure 2. Schematic for Governance of Western Centre for Wildland Fire Science.

Executive Committee

In Phase 1, the members of the Executive Committee represent the initiating partners (UA, ASRD, and NoFC) that have contributed significant funding and/or support-in-kind to the Centre. The Chairperson of the Wildland Fire Science Advisory Committee and the Centre Director are Ex Officio members of the Executive Committee. The Executive Committee membership includes:

1. Executive Director, Wildfire Management Branch, Forestry Division, Alberta Sustainable Resource Development.
2. Director, School of Forest Science and Management and Chair - Department of Renewable Resources, Faculty of Agricultural, Life and Environmental Sciences, University of Alberta.
3. Director General, Northern Forestry Centre, Canadian Forest Service, Natural Resources Canada.

4. Chairperson, Wildland Fire Science Advisory Committee (Ex Officio Member).
5. Director, Western Centre for Wildland Fire Science (Ex Officio Member).

It is envisioned that the Executive Committee could increase to accommodate two additional members during Phase 2.

The Executive Committee will provide strategic direction and guidance, approve the annual work plans and budgets and make appointments as required including the Directorship of the Centre. The governance of the Executive Committee will be described in a Terms of Reference.

Scientific Advisory Committee

The Executive Committee will appoint the members of the Scientific Advisory Committee. Phase 1 members of the Centre will include:

1. Scientific member of the School of Forest Science and Management, UA
2. ASRD appointment
3. NoFC appointment
4. National wildland fire scientist
5. International wildland fire scientist
6. WCWFS Director (Ex Officio Member)

During Phase 2, membership could be extended to include participation from FP Innovations FERIC, Foothills Research Institute, Alberta Tourism, Parks and Recreation, Parks Canada and an external scientific (international).

The Scientific Advisory Committee will meet twice annually to review the progress of the program and provide support to the Centre. This committee will recommend the proposed work plan by presentation to the Executive Committee each year in April. This presentation will also include an end of year summary.

8.2 Building Capacity

School of Forest Science and Management Research and Educational Team

At the UA, building capacity is critical to its involvement in the partnership. Currently, one semi-retired Full Professor represents the educational arm of the team, teaching one undergraduate course in fire management (FOR340). There is no research or graduate-level teaching directed specifically to wildland fire science and management. However, research and teaching in the areas of forest management, climate change, landscape modeling, GIS applications, social science, natural resource economics, and natural disturbance ecology exist, and offer complimentary capability and expertise to wildland fire science and management.

A tenure track position as an Assistant Professor in Wildland Fire Science and Management was appointed in November 2009 as the first step towards building the research and teaching capacity required at the University of Alberta. As the partnership builds and additional funds become available, additional faculty positions may be staffed to support the WCWFS. The research team at the WCWFS will be strengthened through secondments of CFS researchers and SRD fire scientists and assignments of adjunct professorships. This will further enhance the research and teaching capacity at the Centre. Together, this team is the key to the expansion of the graduate and undergraduate programs serving as effective instructors and mentors for an increased number of highly qualified graduates.

The Team will be further enhanced through collaborations with existing UA and CFS researchers. For example, Dr. Fangliang He, a Canada Research Chair in Biodiversity and Landscape Modeling, and Dr. Nadir Erbilgin, a Canada Research Chair in Forest Entomology, have complimentary research programs in ecosystem modeling and natural disturbance ecology, respectively. The opportunities for collaboration at UA extend beyond the School of Forest Science and management. Mark Ackerman, Faculty Service Officer in Mechanical Engineering, has conducted extensive research to evaluate the protective qualities of fire resistant clothing and firefighter emergency shelters. Mark has established strong partnerships with both Alberta SRD and FP Innovations FERIC Wildland Fire Operations Research Group. Dr. Arturo Sanchez-Azofeifa, in the Department of Earth and Atmospheric Sciences has collaborated with Alberta SRD on a number of projects requiring remote sensing technology, and in the Department of Mathematical and Statistical Sciences, Dr. Thomas Hillen, with support from Alberta SRD, is leading a project on forest fire spread modeling.

NoFC Research Team

The research capacity at NoFC consists of over 12 researchers with expertise in environmental sciences (forestry, natural resource management, atmospheric and weather sciences, statistical analysis and modelling, remote sensing); information technology (GIS applications, data base management, computing science, web and software development); and social fire sciences (social science, human behaviour, natural resource economics). The diversity of human perspectives and scientific and technical capabilities allows the NoFC to offer:

- Stable, well trained and experienced staff;
- Expertise and experience in interdisciplinary, multiple-scale research;
- Flexibility and creativity to develop and build an array of wildland fire science and technology programs;
- Unparalleled archive of long-term, national-wide and regional data bases;
- Extensive network of collaborators, research users and supporters, including access to fire researchers in the other four centres across Canada; and
- Quick deployment of resources to address immediate and long-term questions.

The wealth of expertise on wildland fire science and technology enables staff at NoFC to:

- Deliver integrated research solutions and services to Canada’s forestry, national parks, and other government agencies related to wildland fire management.
- Provide environmental and social benefits in the form of scientific information to governments on wildland fire management.

- Assemble multi-disciplinary teams to identify needs and provide research and solutions that deliver maximum benefits to the community, the government forest, environment and/or natural resources departments, and Parks Canada.
- Link with research groups in provincial agencies, universities and international organisations in the United States, Australia, New Zealand, Asia and Europe.

The NoFC's and other CFS centres' partnerships with universities will build upon and strengthen its research capacity through collaboration, minimisation of duplication and the creation of a great platform for increasing the adoption of this plan's strategic direction in fire science . At present, four NoFC fire scientists are affiliated as Adjunct Professors or Honorary Research Fellows and have active research projects at the University of Alberta. In support of this Strategic Plan NoFC will seek to build on its existing capacity and partnership in the Centre to address Canada's foremost wildland fire issues with the intent of embedding a scientist at the Centre.

ASRD Wildfire Management Team

The Forestry Division within the Alberta Department of Sustainable Resource Development manages and protects Alberta's forest resource through the effective and efficient management of wildfires and prescribed fires. The Wildfire Management Branch within the Forestry Division is responsible for the prevention, detection and suppression of wildfire and application of prescribed fire using science and best practices.

Alberta SRD is building organizational capacity by addressing recruitment and retention challenges, strengthening partnerships, and pursuing new collaborative opportunities. In Alberta, the goal of attaining a balanced, integrated and innovative approach to managing fire will require the application of evidence-based best practices and the use of defendable decision support systems.

There is also a desire to have more highly qualified personnel (HQP) working within the Division to meet the new challenges confronting all fire and forest management agencies across Canada. There are 8 staff with MSc degrees and 10 staff with PhD degrees in the Forestry Division, but most of these HQPs (over 80%) are within the Forest Management Branch.

The increased complexity of managing more wildfires within a changing environment, and with diminishing resources, necessitates an adjustment of the current suppression culture and policy. Fire management agencies throughout the world recognize they are entering a new era of fire management. This shift in management must be grounded in sound science.

The strength of the Wildfire Management Branch is the breadth of knowledge and experience of its dedicated staff. Alberta has also been a quick adopter and leader of new science and technology and has lead several national initiatives including the development of the Canadian wildland fire growth simulation model. These strengths allow the Branch to develop strong partnerships with researchers within the WCWFS. A high average fire load, active prescribed fire program and a supporting infrastructure position the Branch to offer opportunities and in-kind support for fire researchers to help find science based solutions to address operational fire management challenges.

Graduate and Post Doctoral Scholarships

Supporting growth in the capability and capacity of the wildland fire science and technology is done largely through awards, scholarships and fellowships to enable further education. The WCWFS will seek funding of post graduate scholarships through two main Canadian federal granting agencies – the Natural Sciences and Engineering Research Council of Canada, and the Social Sciences and Humanities Research Council of Canada. Funding of post graduate scholarships will also be sought from the appropriate research and innovation corporation under the Alberta Research and Innovation Authority.

8.3 Application for Official Affiliated Centre status

Establishing a centre of excellence in fire science is the goal of this initiative. An Affiliate Centre at the University of Alberta will be the focal point of an ever expanding network of world-class research by attracting researchers in this area. It will expand the training capacity of students to meet the province's requirement for growth, and provide candidates for employment with in the forest sector.

To this end, working closely with the Provost's Office, a formal application to the Board of Governors at the University will be submitted for a Western Centre for Wildland Fire Science. The affiliation agreement will ensure best practice in the management of university and partner interests; provide clarity of roles and responsibilities; show an understanding of the opportunity and risk, taking appropriate steps to mitigate significant risks; and demonstrate consultation with appropriate units (university and partners).

This proposal shall contain the following critical elements:

- Definition of legal status of Centre
- Governance structure and reporting
- Provisions for any employment issues
- Provisions for the ownership and use of space
- Provisions regarding purchase, ownership and use of equipment
- Definition of the monetary and financial reporting
- Intellectual property agreements
- Definition of the arrangements for insurance and associated liabilities
- Provision for the termination of the Centre

The submission of the formal application will be the combined effort of the three initiating partners as represented by the Advisory Committee and endorsed by the Board of Directors.

9. Measuring Progress

Performance measures are an essential component of strategic plans. In the context of the WCWFS strategic plan, performance measures will be a tool to monitor progress, inform future editions of this plan and operational plans, and ensure a process of continuous improvement within the Centre and its

partners. Performance measures will be used to promote the success of the WCWFS and its partnership, by demonstrating its achievements in a measureable and unbiased manner.

The progress reports, comprehensive reviews and other performance measures for the WCWFS will be based on the three guiding principles: alignment, linkages and excellence.

The WCWFS will consider the following types of questions in monitoring its progress to implement the strategic plan via operating plans with respect to the principle of *alignment*:

- Does the Centre's science contribute to the Canadian Wildland Fire Strategy and the broader strategic goals and research priorities of the partners?
- Is the Centre's strategic plan and operating plan effectively adapting to emerging research priorities?
- Does the Centre's science contribute to the individual partner's business plans and goals?

The following type of questions will be applied in monitoring the WCWFS's progress to implement the strategic plan via operating plans with respect to the principle of *linkage*:

- Does the Centre collaborate effectively with other universities, research providers, and fire management agencies to deliver the wildland fire science for Canadian needs?
- Is there an effective feedback loop between the Centre's operational plans and the advisory and executive committees?
- Do the Centre's activities have a direct linkage to the partner's?

Finally, the Centre will consider the following type of question in monitoring progress to implement the strategic plan via operating plans with respect to the principle of *excellence*:

- Is the Centre performing excellence in science and education according to recognised international measures of scientific excellence?
- Does the Centre have adequate mechanisms in place to solicit external advice on the excellence and relevance of its education and science?

Executive Committee
Approval Page

Bruce Mayer
Assistant Deputy Minister
Forestry Division
Alberta Sustainable Resource Development

_____ _____

Signature Date

Tim Sheldan
Director General
Northern Forestry Centre
Canadian Forest Service
Natural Resources Canada

_____ _____

Signature Date

John Spence
Director
Alberta School of Forest Science and Management
Faculty of Agricultural, Life and Environmental Sciences
University of Alberta

_____ _____

Signature Date

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