

What's New in Rangeland Research? Highlights of projects funded through the Forest Investment Account – Forest Science Program

Healthy rangelands are vital to British Columbians. We appreciate them for recreation and aesthetic beauty, and we use them for ranching and forestry. Open grasslands cover less than 1% of the province but are home to more than 200 rare and endangered species. At the same time, pressures such as tree encroachment due to fire suppression, urban and rural development, recreation impacts, and invasive species threaten these already fragile ecosystems, many of which are still recovering from over-grazing dating back to the beginning of the 20th century. While we understand the roots of many of these threats, research is needed to ensure that long-term management plans continue to maintain and improve rangeland health.

To address this issue, the Forest Investment Account – Forest Science Program (FIA-FSP) provides funding for range-related research as part of its mandate to enable science-based sustainable management of British Columbia's forest resources. Rangeland issues fall under the FIA-FSP Sustainability Program Strategy, which organizes research priorities under four broad themes: 1) key management issues; 2) development of decision-support tools; 3) monitoring and indicators of sustainability; and 4) information to inform policies, regulations, and standards. Within these themes, the Sustainability Program Advisory Committee (SPAC) – the group of scientists and experts who advise the FIA-Forest Science Board on research priorities related to sustainability – has identified 80 focal points for research, many of which relate to rangeland issues. Each year, the SPAC reviews this list and selects a subset of topics to be eligible for funding through the annual call for proposals, and each year, some range-related topics are eligible for funding.

Reg Newman, Range Research Ecologist with the BC Ministry of Forests and Range in Kamloops, has received some of this funding. In one of his FIA-FSP funded projects, Newman investigated understory succession following restoration of ingrown grasslands on the eastern slopes of the Rocky Mountain Trench. Forest encroachment in the East Kootenay region of BC is a huge issue, with an estimated 1500 to 3000 hectares of open forest and grassland lost annually to encroachment. Of significance to ranchers, encroachment results in less desirable forage in the understory, as the dominant grasses change from bluebunch wheatgrass and rough fescue to pinegrass. While ecosystem restoration in the form of partial cutting and burning of these sites is ongoing, Newman's project represents the first attempt to determine whether restoration actually results in a return to the more desirable forage species. His research clearly shows an increase in understory plants following restoration, but most of the increase comes from more pinegrass. The take-home message? Current restoration treatments are not yet resulting in an increase in the more desirable forage species such as rough fescue and other bunchgrass. But all is not lost – it is likely that this conversion will happen if the open-stand conditions are maintained for long enough. As Newman states, "The key message to people conducting restoration in these ecosystems in BC is to prioritize those areas that already have some bunchgrass in the understory." Opening up these areas first should lead to a more rapid return to the more palatable forage species.

Newman also received FIA-FSP funding recently to compare and validate two approaches that are in use or proposed for use in BC for assessing rangeland health. Rangeland health – the degree to which the soil and the ecological processes of rangeland ecosystems are maintained – is assessed at intervals to ensure that grazing practices are sustainable. The BC Ministry of Forests and Range upland assessment method emphasizes soil/site stabilities and the Grassland Conservation Council method for fescue grasslands emphasizes the plant community. There has been some debate over the scientific validity of the two approaches, both of which rely on qualitative visual assessments. To investigate the two approaches, Newman and his team of researchers assessed twenty-eight rough fescue-dominated grasslands using both of the qualitative methods and quantitative measures, and compared the findings. The reassuring news is that both methods are scientifically valid: they usually agree with the quantitative measures and with one another. The only exception seems to be on high productivity sites, where the differing emphases of the two approaches results in some divergence in the scores. In his final report, Newman recommends some improvements to both methodologies, a critical step to ensure that grassland health is monitored using methodologies that are both cost effective and scientifically robust.

Monitoring grassland health is particularly important with the looming threat of climate change. Some climate change models predict as much as a 7°C increase in average annual temperature in grasslands, along with significant changes in precipitation patterns – changes that will alter grassland plant communities and may affect the productivity of grasslands. As Thompson Rivers University professor Lauch Fraser explains, “We know that if we manage grazing appropriately, healthy grasslands can be maintained. But climate change throws a monkey wrench into all of our long-term planning.” The FIA-FSP has recently provided Fraser with funding to study the interacting effects of grazing and global climate change on BC interior rangelands. In this project, Fraser is using open-top-chambers to increase ambient temperatures by approximately 3°C, and rain-shades to mimic predicted rainfall changes. Grazing is also being mimicked in some of these enclosures by hand-clipping the vegetation to a standardized stubble height. These treatments have been placed along an elevation gradient, to determine how different grassland types are affected by the interacting effects of temperature changes, precipitation changes, and grazing. As Fraser explains, “While climate change is predicted to increase the extent of our grasslands, we may find that high productivity grasslands become less productive, so there are obvious implications here for long-term management planning.” Fraser also notes the connection between climate change and non-native invasive species, which may be more likely to spread with the combined pressures of climate change and grazing.

The potential impacts of invasive species, especially with climate change, are of particular concern in grasslands, because they are home to so many rare and endangered species. Once invasives get established, they proliferate quickly, wreaking devastating impacts on native grasslands with corresponding effects on native animals that depend on grassland plants. To help focus research on this issue, in 2005 the SPAC commissioned Scott McNay of Wildlife Infometrics Inc. to conduct a problem analysis on the effects of invasive species on species-at-risk in British Columbia. As McNay explains, “Our problem analysis focused on the fact that invasive species are often a fundamental element in the management dilemma associated with recovering species-

at-risk, many of which are associated with grassland ecosystems." Diffuse knapweed is one of many noxious invasive plants that affect rangelands, where it has proven capable of overwhelming all native vegetation. Like many invasives, this plant produces chemicals that inhibit the growth of native plants. The resulting impacts on native forage species used by both livestock and native species are devastating, as are secondary impacts on species-at-risk such as the mormon metalmark, an endangered butterfly once widespread in BC's grasslands. The FIA-FSP is using this problem analysis to direct research and extension funding to help address knowledge gaps related to invasive species and species-at-risk. The full problem analysis is available at <http://www.forrex.org/publications/forrexseries/fs20.pdf>.

Under the Sustainability Program Strategy, range-related research topics continue to be a high priority for funding. For more information on research and extension strategies and applying for research funding, visit the FIA-FSP website: www.fia-fsp.ca. You can also search for specific project reports on the Ministry of Forests and Range website: <http://www.for.gov.bc.ca/hcp/fia/searchreports.htm>.

The Forest Investment Account's Forest Science Program (FIA-FSP) funds applied research and the extension of forest science results to meet the information needs and priorities of those who plan and manage British Columbia's public forest and rangelands. The 2008/09 Call for Research Proposals was issued in early August 2007; letters of intent were due by October 10th 2007. For more information, see www.fia-fsp.ca.