



FIA–FSP pilot project using grad students to improve applied forestry research

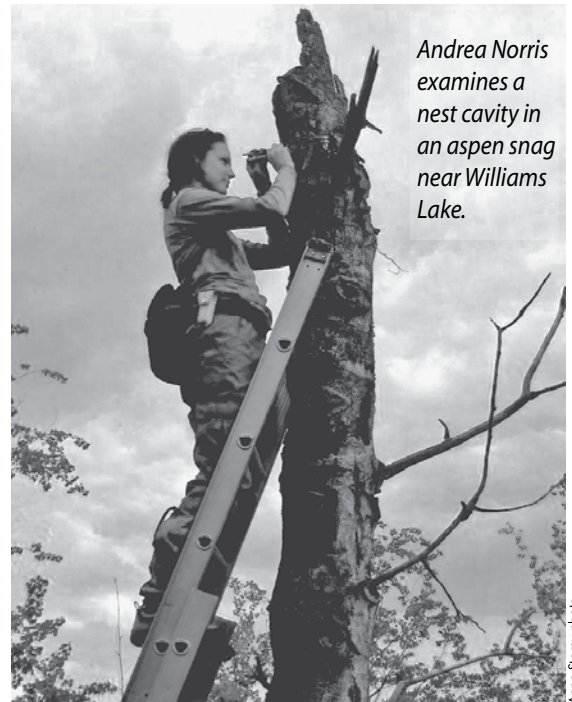
by Susan Leech,
Contributing Writer

A new source of graduate student research funding in British Columbia should improve applied forestry research by encouraging more meaningful collaborations between students, academics, and practitioners. Funded through the Forest Investment Account–Forest Science Program (FIA–FSP), the pilot program pairs graduate students with forestry professionals and academic advisors, allowing students from qualified universities in British Columbia to conduct applied research on a wide range of topics related to forest management and conservation.

The program was championed to the FIA–Forest Science Program by **Art Tautz**, science advisor with the BC Ministry of Environment and a member of the FIA–FSP Forest Science Board, the group of scientists and professionals that provides guidance on development and implementation of the FIA–FSP.

“One of the biggest challenges we face in forestry in British Columbia is finding a way to ensure that our research dollars are directed towards projects that are both academically rigorous and relevant to the key issues being faced by forestry professionals,” said Tautz. “This pilot program has been designed to do exactly that, while encouraging young researchers to remain in British Columbia and work on issues relevant to our province.”

Operating out of the University of British Columbia’s Centre for Applied Conservation Research, the graduate student research pilot program accepts applications from students registered at British Columbia-based universities offering graduate degrees. **Dr. Peter Arcese**, co-chair of UBC’s Centre for Applied Conservation Research, leads the team that made the initial selection of 10 Masters and PhD students to work on forest ecosystem research. In addition to Arcese, the selection team included researchers from four other universities, one representative from industry, and two members of the FIA–FSP Forest Science Board. The team assessed each of the 23 initial applications against



Andrea Norris examines a nest cavity in an aspen snag near Williams Lake.

Anne Storey photo

... continued on page 2

Inside

Investigating the effects of forest disturbance on watershed function	4
FIA–FSP aims to develop knowledge and deliver results	6
Mayson Lake study examines hydrological processes	10
Report takes first step in establishing sustainable forestry benchmarks	12
What is biodiesel? Using alternative fuels in the forest industry	13
FORREX celebrates award winners	14
Forum links natural resources practitioners with continuing education	14
Forest estate models help with decision making	15
Silviculture worker shortage and mixed-species discussions dominate	16
Dilemma weighs accessing research against peer-reviewed publishing	18
DASHR measures and maps connectivity	20
FORREX partners with BC First Nations Forestry Council	21
MPB is affecting real estate values	21
Management implications of forest defoliators: Dr. Otvos interview	22
Fanning the passion for alluvial fans	25
CIF’s Woodlot Tour explores treatment options and funding sources	26
Invasive Plant Council offers T.I.P.S.	27
From Science to Sustainability: Knowing, Understanding, and Applying	28
FORREX welcomes new team members	29
Open access journals: The future of publishing?	30
Call for Posters	31
Upcoming Events	32



FIA–FSP Forest Science Corner

FIA Forest Investment Account
Forest Science Program



... continued from page 1

a stringent set of selection criteria, including fit to FIA–FSP goals, applicability to forest management, appropriateness of the proposed methodology, First Nations involvement, and proposed budget.

“We aimed for an evaluation system that emphasized academic rigour, application and, especially, meaningful collaboration between students and their academic, government, and industrial colleagues,” said Arcese.

A unique feature of the program is that eligible funding topics are identified by professionals from applied fields. Currently, the list of sponsors for the program includes scientists from the provincial and federal governments, non-profit organizations, and private companies. These scientists serve as research mentors and act as a gateway to the “real world” of forestry research, ensuring that projects are focussed on relevant questions and that key results are quickly put into practice.

Now in its second year, the program has provided \$250,000 to fund graduate student projects on topics ranging from impacts of the mountain pine beetle outbreak on cavity-nesting birds, to how Douglas-fir leave trees can help seedlings establish mycorrhizal networks (see research highlights). Students receive between \$6,500 and \$15,000 per year for one to three years to conduct their research and deliver results to practitioners.

While the program fills a significant funding gap in British Columbia, its continuation will depend on how well this pilot project works.

“The Forest Science Board has committed to providing three years of funding to see the current students through their programs. But it is one-time funding only—we need to show how successful the program is to keep the money coming in,” explained **Gary Hunt**, Thompson Rivers University professor and member of the Forest Science Board. He added that success is being carefully tracked by the Forest Science Board, with 10 key performance criteria being measured. “We should be able to show at the end of this pilot that the program led to improved applied research that meets both the needs of our clients and the mandate of FIA–FSP.”

Research Highlights

The FIA–FSP Graduate Student Pilot Project is currently funding 10 Masters and PhD students from three different universities: UBC, Simon Fraser University (SFU), and the University of Northern British Columbia (UNBC). A few highlights and early results:

Effects of fine-scale canopy heterogeneity on understorey plants in a coastal temperate forest

Ian Giesbrecht, SFU MRM (Masters of Resource Management) Candidate

Supervisor: **Dr. Ken Lertzman**, SFU

Sponsor: **Andy MacKinnon**, BC Ministry of Forests and Range (MOFR)

Giesbrecht’s research examines the role of variation in canopy structure and associated light transmission in shaping the understorey plant communities of coastal old-growth forests. Fine-scale disturbances produce spatial and temporal heterogeneity that may have important influences on understorey vegetation within old-growth stands. Giesbrecht will examine this and related hypotheses, using data from hemispheric canopy photos, vegetation plots, and stand-structure mapping. Because ecosystem managers may look to understorey plants for indicators of biodiversity, a better understanding of understorey plant patterns in relation to overstorey structure could aid managers in designing and evaluating the effectiveness of management strategies for achieving biodiversity conservation goals.

Results to date: Giesbrecht is currently finishing his first field season. In collaboration with Andy MacKinnon and **Sari Saunders** of the BC Ministry of Forests and Range, Giesbrecht is working within a new network of permanent plots designed for the long-term study of old-growth forests. In 2007, two 1-ha (100 m x 100 m) tree-mapped plots were installed on western Vancouver Island. For Giesbrecht’s component of the research, a grid of canopy photographs, plus vegetation and substrate sub-plots, were established in each stand. For more information on the old-growth permanent plot network, visit: http://www.for.gov.bc.ca/rco/research/eco/old_growth_vari.htm

Defining breeding habitat selection mechanisms for the red-listed sagebrush Brewer’s sparrow

Megan Harrison, SFU MSc Candidate

Supervisor: **Dr. David Green**, SFU

Sponsor: **Jared Hobbs**, BC Ministry of Environment

The sagebrush Brewer’s sparrow (*Spizella breweri breweri*) is a provincially red-listed species (declining across its range). While changes in habitat quality and availability may be driving the species’ decline, little consensus has been reached regarding the habitat characteristics that Brewer’s sparrows prefer, or the mechanisms underlying the

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FIA–FSP fast facts

The Forest Investment Account–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 lands. In 2007/08, the FIA–FSP is investing \$11.6 million in research projects related to sustainable forest management and improving timber growth and value. Another \$2.8 million will be invested in extension activities to deliver existing information that is not currently accessible to users, as well as new information resulting from research funded through the FIA–FSP and other organizations. For more information, see <http://www.fia-fsp.ca>



FIA–FSP Forest Science Corner

...continued from page 2

species' habitat selection. Harrison's study will clarify Brewer's sparrow habitat preferences by relating physical habitat variables to order-of-territory establishment across available sites, rather than by using relative abundance as a measure of preference. She will also test for possible social factors influencing habitat selection by using call-playback experiments in apparently suitable, but unoccupied, habitats.

Results to date: This season, Harrison tracked settlement patterns and recorded vegetation characteristics for 90 territories. She also conducted call-playback experiments during three time periods. Results from the first two time periods (pre-breeding and breeding seasons) suggest that social factors, or at least the presence of conspecific song, do not influence Brewer's sparrow settlement decisions. Further results will be available next year.

How does a mountain pine beetle outbreak influence mechanisms regulating mountain chickadee and red-breasted nuthatch populations?

Andrea Norris, UBC PhD Candidate
Supervisor: **Dr. Kathy Martin**, UBC
Sponsor: **Krista De Groot**, Canadian Wildlife Service


The main purpose of Norris' study is to examine how the mountain pine beetle (MPB) outbreak influences cavity-nesting birds in Interior BC. In particular, she is examining how instability of resource constraints (nest sites, food, and predation) imposed by the beetle outbreak affects population densities, breeding success, and survival of mountain chickadees (*Poecile gambeli*) and red-breasted nuthatches (*Sitta canadensis*) across years, study areas, forest stands (including various stand-level management regimes), and breeding territories. By continuing a long-term study of cavity-nester communities near Williams Lake, BC, she will be able to compare population, nesting data, and behavioural observations from pre-outbreak and outbreak years (1995–2006) to post-outbreak years (2007–2009).

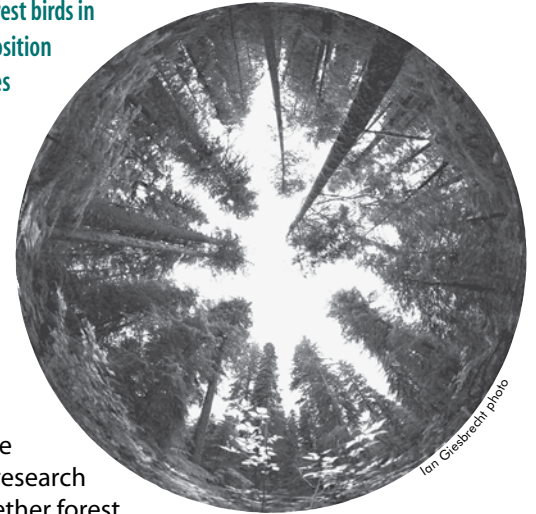
Results to date: Overall, Norris' results suggest the MPB outbreak has elicited bottom-up effects on densities of woodpeckers and nuthatches, which has contributed to a secondary resource pulse of increased nest-cavity availability for mountain chickadees. However, recent population declines of mountain chickadees and red-breasted nuthatches indicate a "boom-and-bust" trend associated with this ephemeral food source and suggest that habitat quality is diminishing in post-epidemic stands.

Abundance and reproduction of focal forest birds in response to habitat structure and composition at multiple scales—do less vagile species respond non-linearly?

Kelly Squires,
SFU PhD Candidate
Supervisor:
Dr. Ken Lertzman, SFU
Sponsor: Canadian Forest
Products

How do species respond to changes in habitat, and can responses be used to set reliable management targets? Squires' research is focussed on determining whether forest birds respond non-linearly to the loss of forest habitat due to logging. Non-linear declines suggest a "habitat threshold," and can indicate the point at which species become highly affected by habitat loss. In theory, thresholds could be used as a guide to set quantitative management targets, such as the amount of forest that should not be logged. Squires will be quantifying changes in bird abundance and reproduction in response to changes in habitat at the stand and landscape scales using an intensive survey method. She will statistically test for non-linearity and thresholds in these relationships, and then compare the results to a related study that will estimate responses using a standard, less intensive survey method.

Results to date: In Squires' first field season, she found over 60 woodpecker nests, conducted songbird surveys off-road, and collected habitat data throughout her study area. Using nest cams, she monitored more than 30 nests to get information on reproductive success; this monitoring will continue in subsequent years at as many nests as possible. She plans to link data on nesting success to habitat data to answer the key research questions. 



Hemispheric photo showing canopy of an old growth Sitka spruce floodplain-forest, Carmanah Walbran Provincial Park.

Table 1. Other graduate student projects.

Name	Project Title
Julia Chandler	Effects of logging and prescribed burning on ecosystem resilience
Sean Haughian	The effects of mountain pine beetle infestation on lichen communities in north-central British Columbia
Robbie Hember	The contribution of climate-induced variability in net primary productivity to the forest carbon budget of British Columbia
Nancy-Anne Rose	Evaluating the Nature Conservancy of Canada's BC Central Interior Ecoregional Plan in the context of forest disturbance and climate change risk scenarios
Jeremy de Waard	Monitoring biodiversity responses to natural and anthropogenic disturbances in British Columbia's forests: The application of DNA barcoding
Francois Teste	Facilitative and competitive effects of residual Douglas-fir trees on seedling establishment, growth, and resource sharing via mycorrhizal networks