Incorporation of Research Results into Forest Management

"*Research to Empower the Manager*"

Gaetan Pelletier

J.D. Irving, Limited

January, 2010

Outline

- Introduction
  - A brief history of JDI FRAC
  - What were the objectives in 1998?
  - What platforms was the R&D under
- How JDI puts knowledge to use
- J.D. Irving, Limited Use of SFMN Research Results in Management
- What's in the future?

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Why the need for Research

- We need to grow more wood
- We change forests both at the stand and landscape scales
- There are significant knowledge gaps on potential impacts of forest management on different taxa and key ecosystem processes
- We are interested at doing the right thing
- We want our decisions to be based on science

Brief History of the JDI Forest Research Advisory Committee

- Founded in 1998 as a product of FSC Certification audits
- Made up of renowned experts in ecological fields
- Originally lead by Gordon Baskerville
- First two years were to establish the foundation
- First projects in 2000-01
- Set aside some benchmark reserves for research

Research to empower the forest manager

- Formed in 1998, JDI FRAC mandate was to identify or advocate research to help company managers solve problems in their forests
- Focused on research to address knowledge gaps w.r.t. non-timber biodiversity values & natural disturbance:
  1) establish objective measures for each target non-timber value
  2) determine functional cause-effect basis for mgmt. of availability of conditions needed for each non-timber value
- FRAC develops and recommends research projects:
  1. assess state of a forest quantitatively with respect to non-timber values, especially biodiversity
  2. role of natural disturbances as the historical cause of temporal/spatial patterns of stand types & stages of development
  3. Issue with intensive forest management
- must empower, not supplant, managers as decision makers
- active partnership of researchers & forest managers
- regular 2-way communication & 2-way education

The membership…

- **Dr. Dave MacLean, forest ecology (Chairman)**
- **Dr. Marc André Villard, bird ecology**
- **Dan Beaudette, habitat & biology**
- **Dr. Robert Wagner, forest productivity**
- **Dr. Jeremy Wilson, landscape ecology**
- **Dr. John Hagan, wildlife & landscape ecology**
- **Dr. Andy Whitman, wildlife & landscape ecology**
- **Company staff**
- **Other Researchers specific to individual projects**

What Platforms was R&D done under?

- JDI Cash & In-Kind
- Sustainable Forest Management Network (SFMN)
- NSERC IPS scholarships
- Other Partnerships (i.e. FMF)

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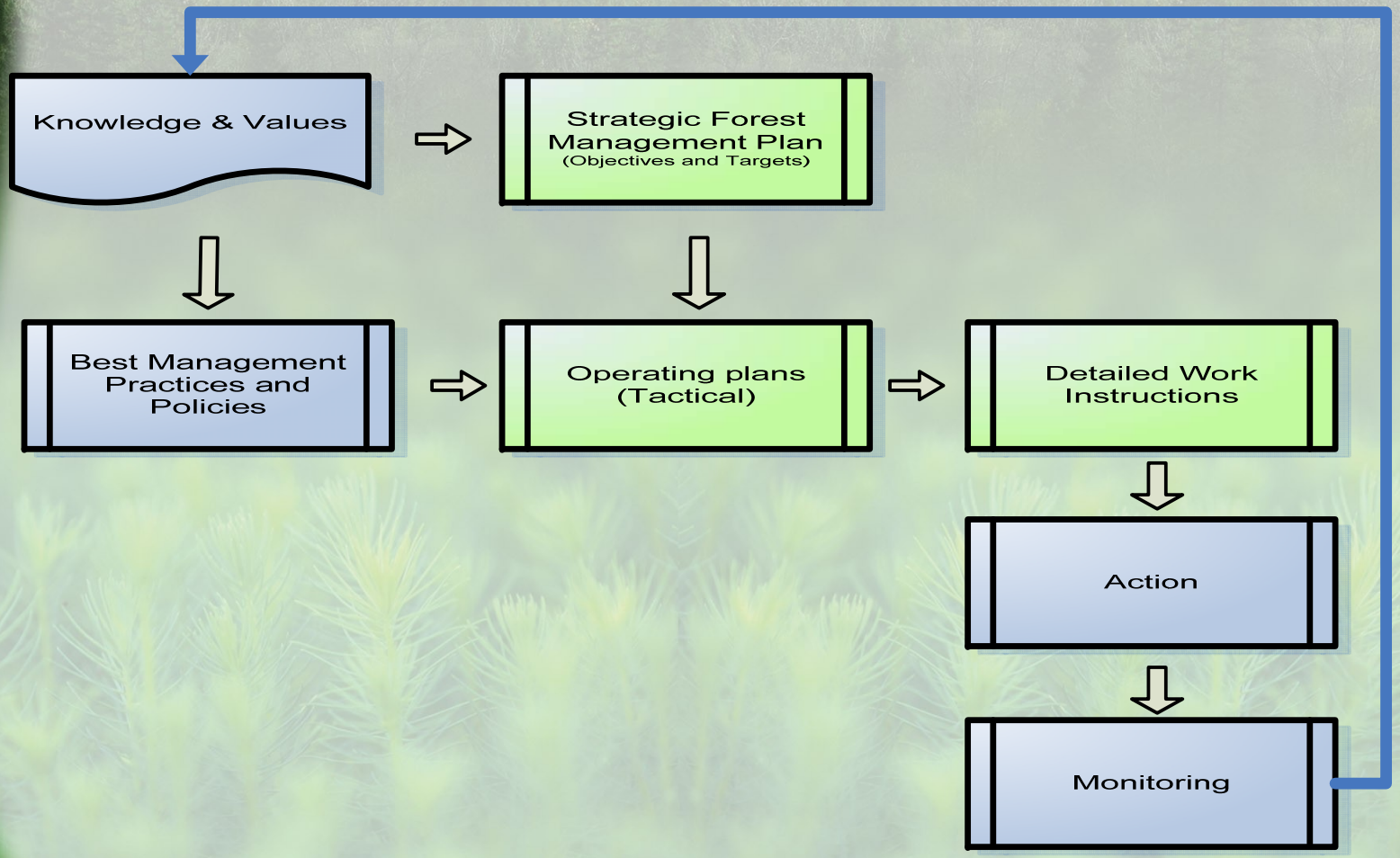
Our Forest Management Process

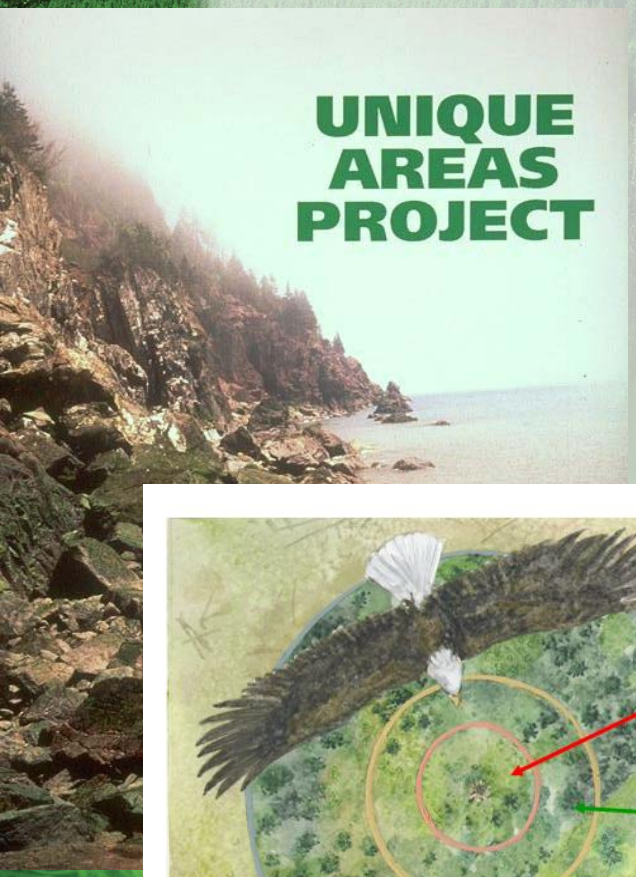


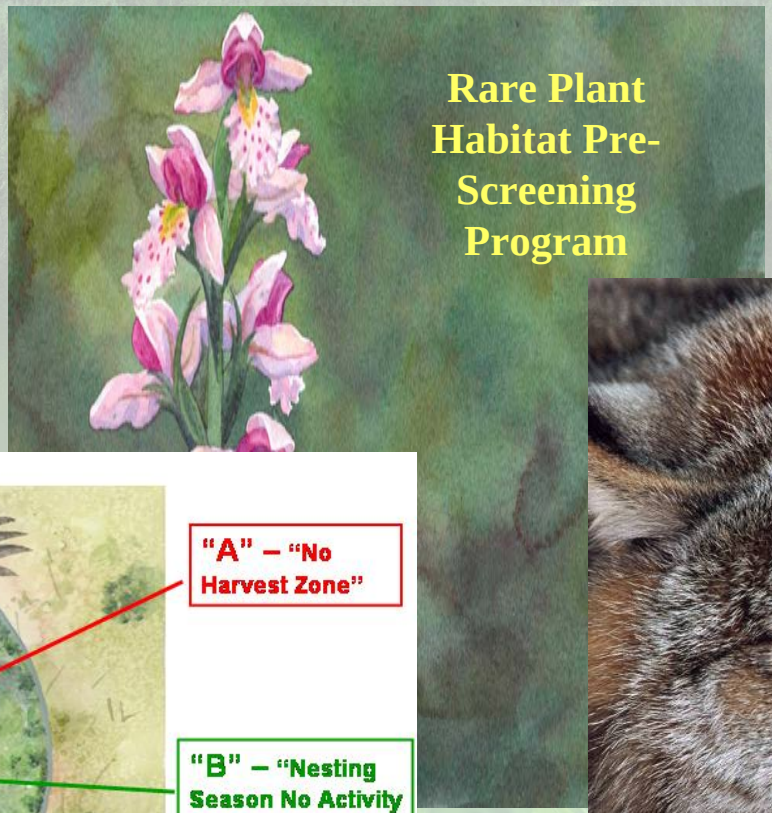
How we use new Knowledge

Knowledge gained from cooperative research is used to :

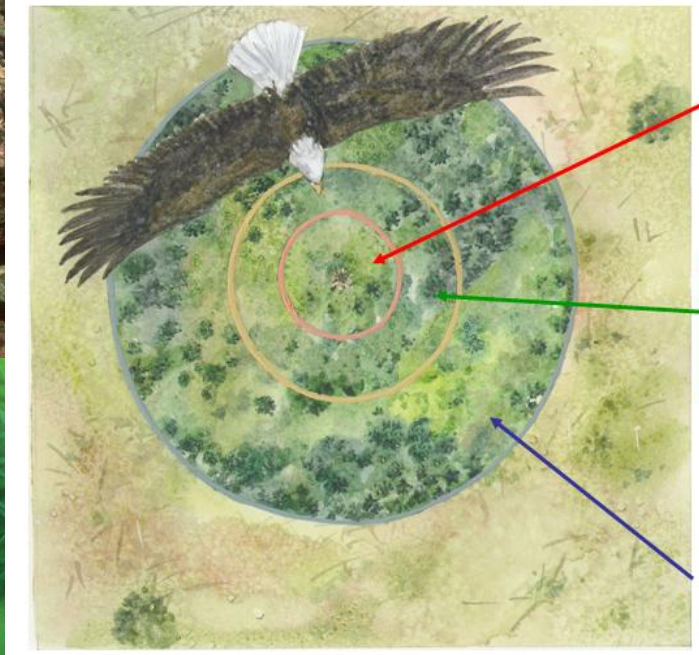
- **trigger analyses to quantify our baseline situation and/or prepare forecasts of future forest conditions to compare to proposed targets.**
- **initiate a review of how we inventory certain habitat features and stratify our forest inventory.**
- **formulate new management strategies, objectives, targets and measures.**
- **formulate Best Management Practices for implementation in the field**
- **come up with new research questions.**
- **include an issue as a new significant environmental impact in our EMS**

Designing company programs

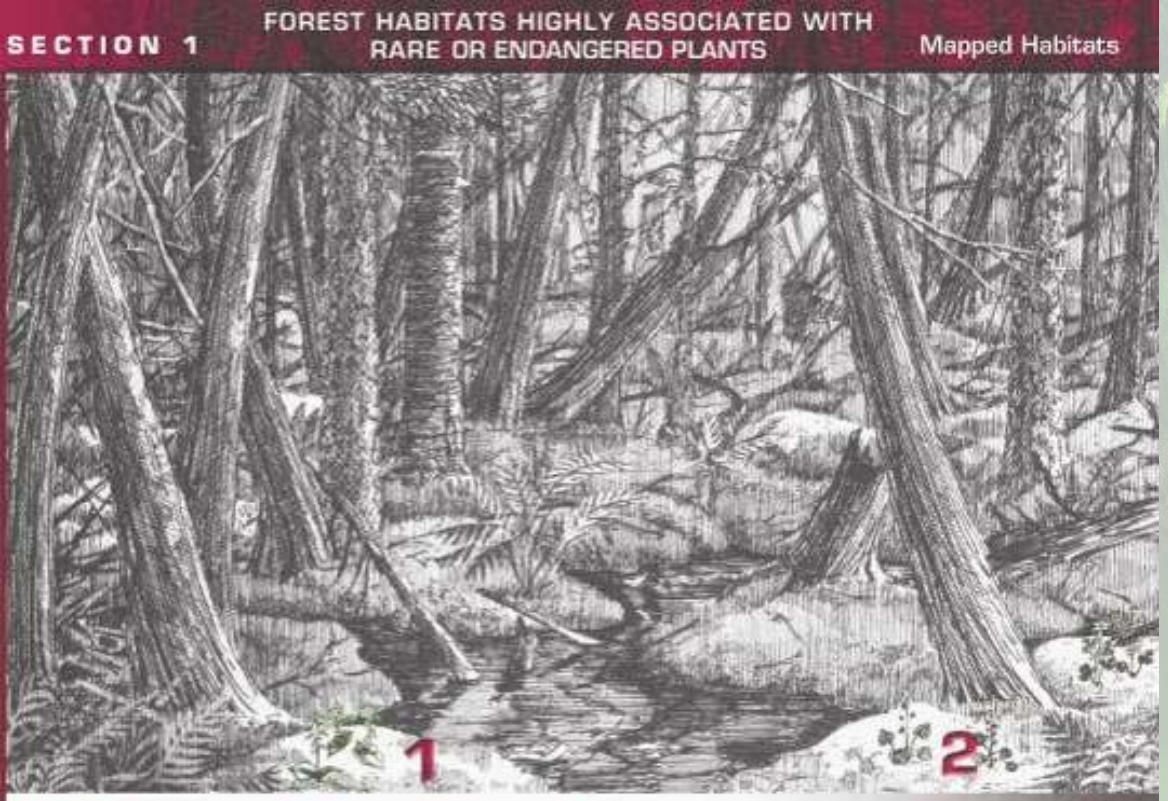




Rare Plant Habitat Pre-Screening Program



Forest Species of Concern



Cedar Swamps & Seeps (Calcareous)

IMPORTANCE: Cedar Swamps are cool, low-lying forests that are usually adjacent to a stream or a meandering set of streams. The presence of cedar generally indicates high soil richness. The shaded, moist and rich site conditions make these sites good habitat for many orchids and other S/E plants.

Cedar seeps are pockets of cedar within the coniferous forest that are saturated by a cold groundwater source. The shrub layer is generally sparse, with the ground layer consisting mainly of sphagnum moss. The moist environment, calcium-laden groundwater and low light conditions, make cedar seeps favourable to many S/E plants.

Associated Natural Communities: Northern White Cedar Swamp, Cedar-Spruce Seepage Forest.

Enduring Features	Flat, poorly-drained, rich bedrock Seeps: Gently sloped, open water source, poorly drained, rich bedrock
Dominant Canopy	Eastern white cedar 80-90%, balsam poplar (20%) Mature / over-mature age class
Other Associates	Tamarack, black spruce, balsam fir, black ash
Canopy Closure	50-90%
Prominant Shrub Species	Wild raisin, speckled alder, dogwoods
Prominent herbaceous species (bloom dates in brackets)	Kidney-leaved violet (*V. renifolia*) (May to July), yellow lady slipper (*C. parviflorum*) (early to mid June), sweet scented bedstraw (July - August), naked miterwort (June - July), twayblades (June - August), dwarf rattlesnake plantain (July - August), cinnamon fern, sweet coltsfoot (*petasites frigidus* var. *palmatus*)

1 Broad lipped Twayblade

2 Naked Miterwort

Sweet Coltsfoot

Dwarf Rattlesnake Plantain

Example:

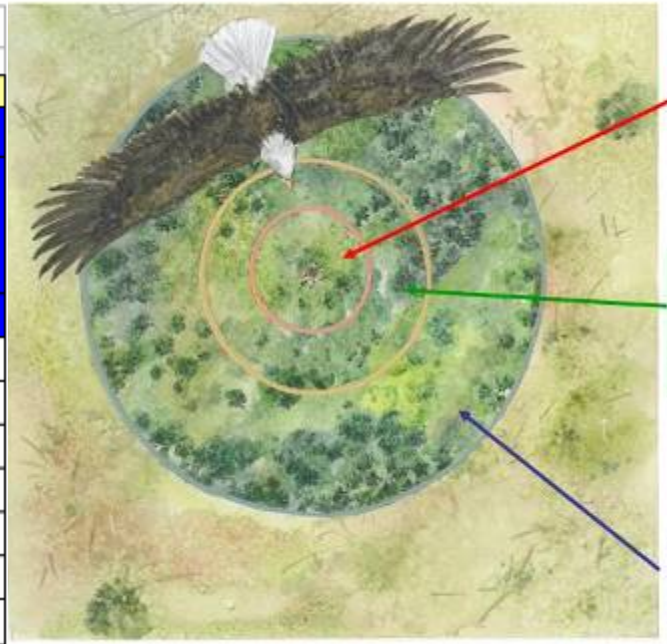
Special Habitat Types :

- Calcareous TH
- Floodplain Hardwoods
- Calcareous eC Swamps & seeps
- Older Growth wP Stands
- Forested base of cliffs and talus slopes
- Non-calcareous TH
- bS Swamps

Example: Stick Nest BMP's

RAPTOR & HERON NEST BUFFERING STANDARDS

Species	Nest Type	Buffer Type					
		"A"		"B"		"C"	
		No Harvest Zone (m)		Nesting Season No-Activity Zone from March 1st to August 15th		No-Roads Zone (m)	
		50	100	≥ 100	≥ 200	≥ 100	≥ 400
Bald Eagle	Stick		✓		✓		✓
Peregrine Falcon	Cliff		✓		✓		✓
Cooper's Hawk	Stick		✓		✓	✓	
Red Shouldered Hawk	Stick		✓		✓	✓	
Long-eared Owl	Stick		✓		✓	✓	
Boreal Owl	Cavity		✓		✓	✓	
Hawk Owl	Stick		✓		✓	✓	
Heron (All Species)	Stick		✓		✓		✓
Sharp-shinned Hawk	Stick	✓		✓		✓	
Northern Goshawk	Stick	✓		✓		✓	
Red-Tailed Hawk	Stick	✓		✓		✓	
Broad-winged Hawk	Stick	✓		✓		✓	
Barred Owl	Cavity	✓		✓		✓	
Northern Saw-whet Owl	Cavity	✓		✓		✓	
Osprey	Stick	✓		✓		✓	
American Kestrel	Cavity	✓		✓		✓	
Merlin	Stick	✓		✓		✓	
Great Horned Owl	Stick	✓		✓		✓	



Example: Training Guides

Range Maps

Known Locations (Unique Areas)

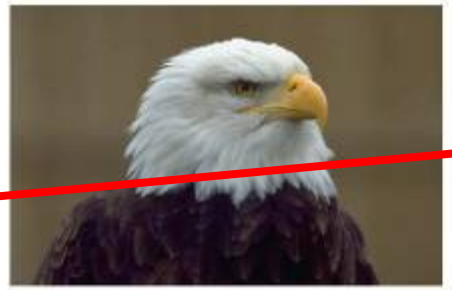
Description

Habitat

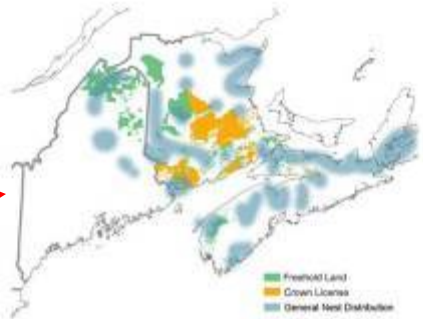
Recommended Practices

Bald Eagle

(*Haliaeetus leucocephalus*)



Distribution:



Description:

A very large raptor with a body length of 71-96cm (28-38in) and a wingspan of 204cm (80in). The adult has an evenly dark brown body with white head and tail. Yellow eyes, legs, and bill. Immature is variably dark with white scattered throughout body, grey bill, dark brown eyes. Takes 4-5 years to reach adult plumage. An immature Bald Eagle is sometimes confused with a mature Golden Eagle. Although females are slightly larger than males, there are no differences in feather colour and pattern. Diet: prefers fish but also eats large birds, small mammals and carrion. **Nesting season: March 1st – August 15th** Although northeastern population is predominantly migratory, some individuals will over winter in our area, especially along coast, or near stable food source (ie near livestock farms, meat processing areas etc.)

Habitat:

Large nests (2.4-3m [8-10ft] wide and 0.9-1.2m[3-4ft] deep), are constructed of sticks and are re-used for many years. Most often chooses the largest and tallest tree (usually pines) in a stand alongside lake/riversshores or seacoasts. Will defend an area 1-2km^2 (0.4-0.8mi^2) from other eagles.

Known Locations (Unique Areas Sites):

CMS – 50004, 60005, 60006, 60008,60014, 60055, 60056,60057, 60058
DD – 40007, 40067, 40069
Sx – 70097
NS – 80001, 80004, 90046, 90026
Me – 20023, 20024, 20025, 20026, 20009, 20080, 20075, 20077, 20085, 20086, 20087, 20088, 20089, 20090

NB Status: Endangered (regionally)
NB S Rank: S2N
NS Status: None
NS S Rank: S3N
Me Status: Threatened
Me S Rank: S4N
Fed Gov't Status: Threatened, US Endangered Species Act
G Rank: G4

Recommended Practices:

The first 2 or 3 months of nesting are most sensitive to disturbance. Chronic disturbance may cause them to abandon eggs

Aggressive displays or regular sightings of this bird in an area may indicate a nearby nest location. This should be confirmed prior to operations in the block. If a nest is located within 400m of operations, the following recommendations should be applied.

Provide a protective (uncut) wildlife management zone of 100m (330ft) around nest. All harvest methods are acceptable outside this 100m zone **during the non-nesting period (Aug 16th – Feb 27).**
Consider retaining an alternative nest tree on site.
Avoid new road construction within 400m(1312ft) of nest site, if not already established.

See Operating Near Raptor Nests diagram, page 9.

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Adaptive Management because of FRAC

- Direct changes in on-the-ground practices and setting of management plan objectives
- Clearer understanding at the forest and stand scales of forest dynamics over time from a broader range of values than primary forest products
- A long-term legacy of study sites including the working forest, reserve areas and natural-disturbance inspired adaptive management reserve areas

A fresh look at habitat structures

- The numbers of large live trees (>30cm) has increased from 10 to 60 for tolerant and old hardwood stand types as well as old mixedwood
- FRAC research has also been used in revising the New Brunswick Crown land standards.
- Assessment of dead stems and coarse woody debris has been included in Forest Development Surveys in the district to quantify these characteristics.

New Habitat Definitions

Habitat	Crown Closure	Basal Area (m^2/ha)				Live Stems	Dead Stems (Stems/Ha)			Cavities	CWD (m^3/ha)
		All Species	TH	HW	SW	>= 30cm	>= 10cm	>= 30cm	>= 45cm		>= 8cm
Old Tolerant Hardwood	40%	18	14			60	20		0.5		
Old Hardwood Habitat	40%	18		14		60	20	15	0.5		
Old Mixedwood Habitat	40%	18		6	6	60					20
Old Spruce-Fir Habitat	40%	18			14	10	20	10			30
Old Forest Habitat	40%	18				20		3			30

New instructions to operators

Based on studies woodpeckers:

- In TH partial cuts, leave 5-8 large beech trees per hectare
- In plantation thinnings, leave poplars as future snags

New strategic analytical tools

- Combinations of harvesting and protection impacts in the event of an insect outbreak
- Assessment of management strategies from both the forest carbon and forest products standpoints allow carbon to be an integrated forest value.

New understandings

- regeneration response of tolerant hardwoods to various stand management options
- response of bryophytes, vascular plants and small mammals to pre-commercial thinning of natural regeneration
- the complexity of forest management as well as emphasizes the long-term commitment to forest stewardship.

Graduate Students

- regular presentation and review of individual projects by FRAC members and JDI managers

- communicating results to JDI employees across the company as well as to the general public.

1. Jeff Higdon. 2004
2*. David Etheridge. 2005
3. Brendan Hemens. incomplete.
4*. Mike Montigny. 2005
5. Adam Dick. 2010.
6. Jean-Sébastien Guénette. 2003
7. Jérôme Lemaître. 2004
8. Anne-Sophie Bertrand. 2006
9*. Eric Neilson. 2007
10*. Chris Hennigar. 2009
11*. Jonathan Leggo 2010.
12. Greg Slaney. 2008
13. Chang, Wei-Yew. 2010.
14*. Luke Amos-Binks. 2010
15*. Amanda Colford. 2010
16. Bruno Chicoine. 2009
17. Amy Witkowski. 2010
18. Keri La France. 2010
19. Julie Henderson. 2010
20*. Pascale Forget. 2008
21. Matt Smith. 2010.
22. Aurore Pérot. 2008
23*. Samuel Haché. 2009
24*. Jean-Francois Poulin. 2008
25. Chris Ward. 2009
26. Jean-Francois Carle. 2010

Our Forests' Role in Reducing Greenhouse Gases

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At the plant level....

[illegible]

At the forest stand level....

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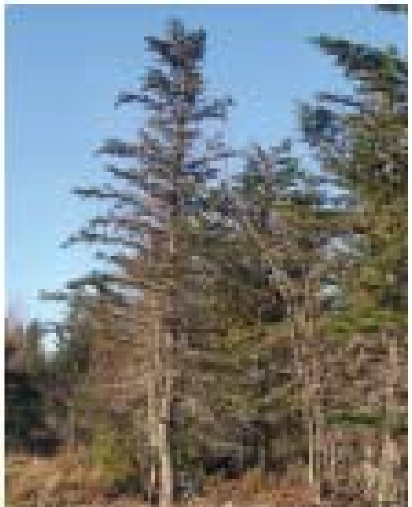

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At the landscape level....

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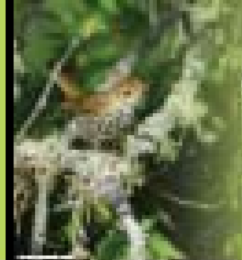

Understanding Ecological Effects of Harvesting Using Birds as Indicators

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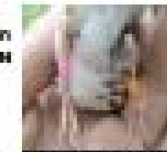

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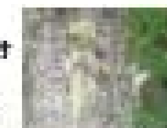
Brown creeper



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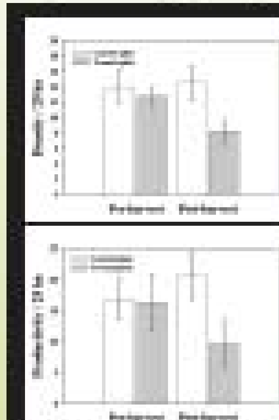

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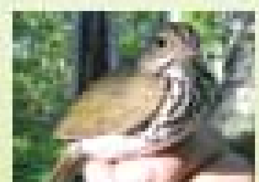
Results

Ovenbird



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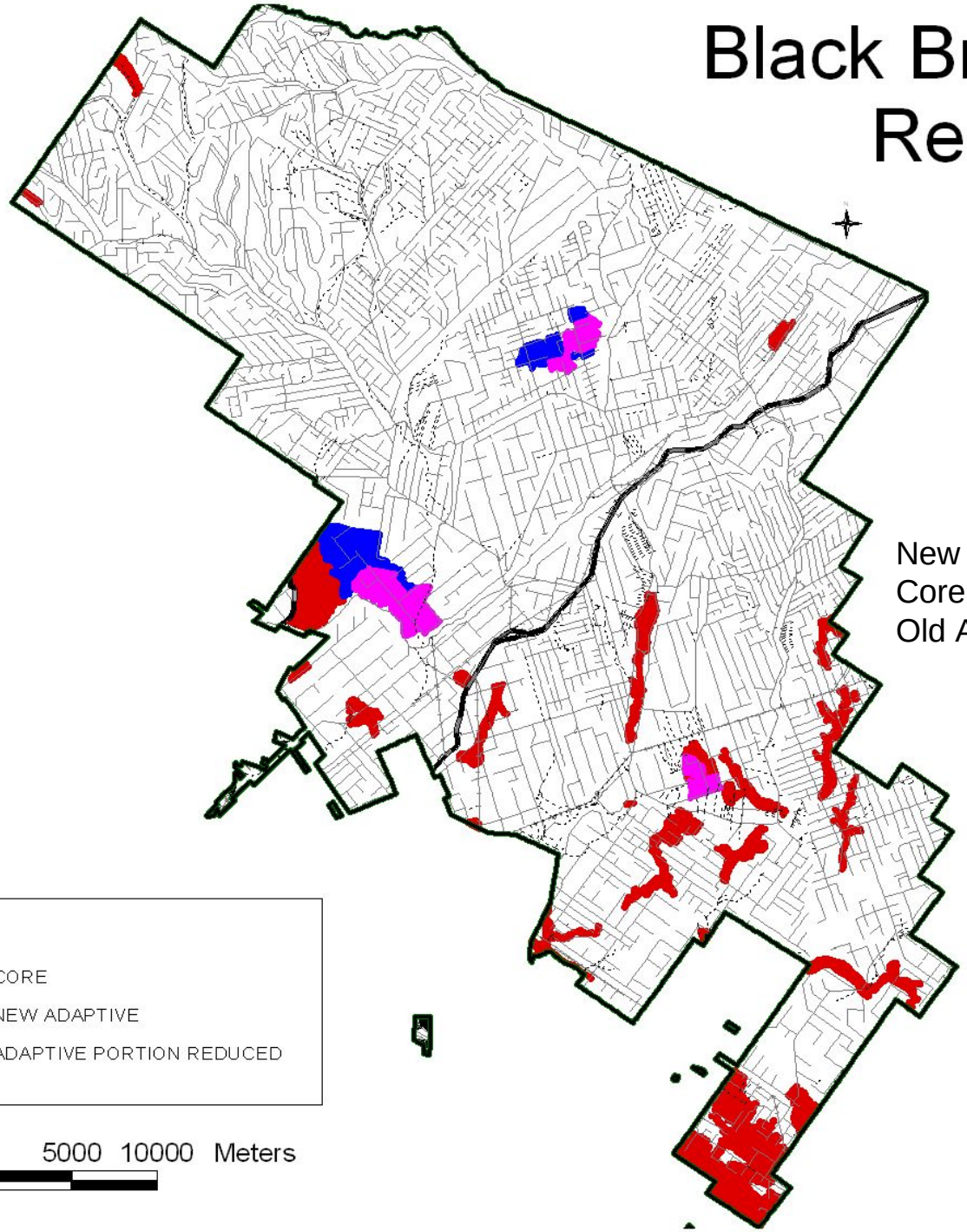
Black Brook District Reserves



New Adaptive Reserves = 1387ha
Core Reserves = 6720 ha
Old Adaptive Reserves = 2781 ha

Key Success Factors

- Research projects were developed from the outset by a structured group of company forest managers and researchers
- FRAC pursued several research ideas related to managing for biodiversity and using natural disturbance information as input into stand- and forest-level management decisions.
- There has been company ‘buy-in’ regarding the value of the research from the outset
- On-going redirection and mutual learning on the part of both managers and researchers
- Regular and continuing communication is a key component of effective applied research projects.

So, has all this research empowered the manager?

YES! Because JDI staff has:

- Gained considerable knowledge in ecosystem processes and functions
- Learned to apply the findings to our management
- Developed relationships and networks with researchers
- Made it part of our daily business language

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New Directions

Recognition that, over time, some planted stands will be required to serve as old softwood habitat has resulted in the new research project related to varying levels structural diversity and coarse woody debris at the commercial thinning stage of planted stand development. Vascular plants, bryophytes, beetles, song birds and small mammals will be monitored across replicated study sites.

Thank you!