

Star trails circle high above Manitoba's Sandilands Provincial Forest. Located on the boreal forest's southern edge, these trees form part of the world's largest stands of pristine wilderness.

all eyes on the boreal forest

By Duncan Morrison

A MASSIVE, BOUNTIFUL AND PRISTINE LAND, COVERING THE COUNTRY LIKE A BLANKET, **CANADA'S BOREAL FOREST** IS UNDER PRESSURE LIKE NEVER BEFORE.

DDR. MARC GARNEAU HAS VIEWED OUR PLANET IN A WAY THAT MOST OF US CAN ONLY STARE AT THE STARS AND IMAGINE.

After flying three space missions and spending 677 hours – roughly one entire month – in orbit, Garneau has an environmental message about the state of the Earth that is powerful, awe-inspiring and motivational. At the same time, the words of Canada's first ever astronaut are unfailingly direct and frighteningly effective.

"Going into space allows you to see what is really an extraordinary planet, the one we live on, and going into space changes your perspective on how you view this planet," said Garneau during an interview last spring from the Canadian

Space Agency headquarters in St. Hubert, Que., on the outskirts of Montréal. "And maybe that has something to do with the fact you go around it 16 times a day. You begin to realize, that it (the Earth) is not that big."

"The planet is a very fragile system because you see the damage that we do to it," he added. "And because you know the population of the world is going to go up somewhere between 9.5 and 12 billion people by 2050, which is going to put extraordinary pressure on this planet, both in terms of the amount of pollution we create and the amount of resources which we need to sustain that population, you can't help but come back from that experience and feel that we must ring the alarm. Because, when you are down on Earth and all you see is a 10-mile radius around you, it doesn't seem that bad."

Garneau, who was appointed president of Canada's Space Agency in November 2001, flew space shuttle missions in 1984, 1996 and 2000. Each of those flights took the now 54-year-old Québec City native and his crewmates around the Earth on continuous trajectories of north and south latitudinal coordinates every 90 minutes. His tales of visible woe on the Earth's surface include Amazonia, Madagascar, Russia and Lake Chad.

"When you see it from that global perspective, you realize that it is a very finite set of resources," Garneau said. "I'm more concerned about it as a result of that, and this is why I have made Earth Observation a priority of the Canadian Space Program."

As a proud Canadian, Garneau scrutinized his homeland very closely. Two of his missions, in 1984 and 2000, traveled

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directly over parts of Canada's boreal forest, one of the world's last remaining wilderness areas. According to Garneau, the changes in Canada's boreal between his first and last mission were evident, citing tracts of clear-cutting in British Columbia as examples. But, he says, aside from the overwhelming size of this country's boreal forest, his strongest take-home memory was the omnipresent "glint".

"As you know, Canada has a quarter of the wetlands of the world, and that is something that you do notice amongst the water bodies. They are much smaller but you do notice them," explained Garneau, whose range of vision from the shuttle's arched flight path scoped the landscape a staggering 1,500 kilometres ahead. "And you see them because of the glinting, which is quite an interesting effect. If the sun is up you may be going over land but when you go over water bodies, they reflect. It's like a mirror, and it's called glint. So you can be going over a marshy area and you're getting this very strong glint back in your face and that is literally a reflection of the sun. As you move along in the shuttle you get the glint jumping from body of water to body of water."



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— Dr. Marc Garneau

Garneau's nod to the vast water resource of Canada's boreal forest is exactly the reason that Ducks Unlimited Canada (DUC) has identified the national boreal forest as a major conservation priority and an area that has been earmarked for increased attention and diligence as DUC strives toward its conservation mission. For from fresh water comes life and the betterment of it for waterfowl, wildlife and people.

Gary Stewart, DUC's national forest coordinator and manager of western boreal programs, says Canada's boreal forest offers a rare and unique opportunity for DUC and forward-thinking governments, industry, First Nations and aboriginal groups, academic institutions, foundations and conservation organizations to be strategic in the move to boreal conservation.

"We are way behind in what we know about Canada's boreal in comparison to what we know about regions such as the Prairies," Stewart says. "If we could push back time a century in the settled parts of Canada, we would be in the unique situation we are now in in the boreal. The opportunity to influence future land use in this vast and productive region through sound science, solid conservation programs, delivery and best management practices is critical."

Canada's boreal forest represents a major part of the world's boreal region, encircling the northern part of the globe and stretching like a huge green belt from the northwest of the Yukon across the Northwest Territories and northern portions of British Columbia, Alberta, Saskatchewan and Manitoba.

Swooping southward along the east side of Lake Winnipeg, the forest continues eastward, curving through the Shield country of northwestern Ontario, the Hudson Bay lowlands and into northern Quebec before crossing into Labrador and Newfoundland.

This vast "belt" contains more than one-quarter of the world's remaining forests. As reinforced by Garneau, many areas of this green belt contain significant areas of blue, as 30 percent or more of the forest is comprised of wetlands and water. In fact, Canada's boreal holds more fresh water in wetlands, lakes and rivers than any place on Earth.

Wetlands are some of the most productive ecosystems on Earth and the wetlands of Canada's boreal are no different. Wetlands of the forest are critically important to bears, beavers, wolves, woodland caribou, moose and other wetland-dependent species found within the immense region. But they are also breeding, staging and molting areas used by tens of millions of migratory waterfowl and upwards of 100 million shorebirds each year.

The United States and Canadian wildlife services survey a large area of the western boreal forest annually. These surveys have shown that, for reasons yet to be determined, populations of common boreal nesting species such as lesser scaup and scoters are showing long-term, significant declines.

DUC has been researching and designing conservation strategies since 1997 in Canada's western boreal forest (WBF), an area that stretches from northwestern Ontario to Alaska. Recently, DUC has begun to deliver active programs of protection and sustainable development in this wetland-rich landscape that annually provides breeding habitat for 14 to 15 million ducks

and is second only to the Prairie Pothole Region in terms of continental waterfowl breeding effort. Perhaps more importantly, it also provides habitat for as much as 75 per cent of all continental ducks in migration or for molt.

Less is known about the waterbird populations of Canada's eastern boreal forest, but its proximity to the coastal areas and islands of the Atlantic Ocean, Hudson Bay, the Great Lakes and St. Lawrence River make it a landscape of vital importance for the huge numbers of waterfowl, waterbirds and colonial nesting species that use the Atlantic and Mississippi flyway for their fall flight.

"At least 75 per cent of the world's black duck population breeds in the eastern boreal while the entire North Atlantic population of Canada geese are also produced there," says Raymond Sarrazin, recently tasked with spearheading DUC's national boreal efforts in the east. "Common loons and

left: courtesy of the Canadian Space Agency
right: www.grandmaison.mb.ca

Sunrise greets the boreal forest near Upsala, Ontario. Canada's boreal forest largely remains a wilderness, but climate change and development, particularly along its southern fringes, threatens the sanctity of the region.



almost the entire world's population of hooded mergansers are dependent upon the eastern boreal as are the sea ducks, including the COSEWIC-listed species of concern, harlequin ducks and Barrow's goldeneye, that stage and use the forest at some point of their life cycle. And, as we know, there is also a legitimate connection between the watershed and landscape health of boreal forest and the coastal estuaries."

While waterfowl and waterbirds flock to wetland areas, all avifauna benefit from the wetlands of the forest. It is estimated that Canada's boreal forest is the birthplace of as many as three billion of North America's warblers, thrushes, sparrows, hawks and other land-living birds. About 200 bird species regularly live in the boreal forest, with almost 40 species almost entirely dependent on the region. Recent reports indicate that populations of several boreal-dependent birds like Connecticut warblers, rusty blackbirds and Canada warblers, have declined sharply in recent years. Other species, such as bay-breasted warblers, Bicknell's thrushes and black-backed woodpeckers, may experience greater stress in the near future.

Without a doubt, there is urgency. The natural resource wealth and potential of the forest has long been known. Further development of these resources will happen, not if, but when and where. Traditionally, boreal wetlands have been considered stable and undisturbed due to their remoteness. Management of boreal wetlands was viewed as expensive and unnecessary. But this is changing, and quickly. Canada's boreal, though vast and difficult to access, is undergoing changes from undeveloped wilderness to a resource-rich commercial region at an increasing rate.

The industrial development of these resources creates huge challenges for sustainable forest management. In some areas of Canada's boreal, deforestation by agricultural interests is occurring at rates that rival those in the Amazon basin. Besides the loss of forest to agriculture, six distinct land use pressures predominate in Canada's boreal forest: petroleum exploration and development, hydroelectric development, forestry, mining, acid precipitation and climate change. The land use issues are further complicated by the fact that the predominance of pressures varies across the boreal forest. For example, gas and oil exploration is important in the western boreal, while hydroelectric development is more prevalent in the East. Urban expansion and encroachment, for the most part, are not the bane of the landscape as they are in regions of southern Canada. But there is no doubt as to what the bulk of the boreal forest's resources are ticketed for.

"Canada's boreal forest is truly a continental resource," explained Ron Maher, DUC's manager of Ontario operations, who spent a good part of his early career in the boreal forest's claybelt region near Timmins, Ont. "The benefits of the boreal are being felt most strongly by those that don't live there. The demand is coming from North America's urban centres and that is what is driving the resource extraction component of Canada's boreal forest."

The disturbances associated with industry (roads, pipelines, seismic, cut blocks), are often linear. Rather than a massive site-specific eradication of habitat, disturbances are long and narrow and often uniform in breadth resulting in cumulative impacts and permanent deletions to the forest land base. In

owls: Brian Wolitski; warblers: © Robert McCaw; pumpjack, refinery, aerials: Darin Langlois

some areas of Canada's boreal, these linear disturbances criss-cross the forest like chains on an escape artist, contributing to further forest fragmentation and disturbance of wetlands and watersheds and increasing the potential for conflict between waterbird habitats and resource development activities.

Sound and effective land management decisions are often hampered by insufficient information, especially when it comes to decisions about the environmental impacts on important wetland and watershed features. There is a dearth of information on how these landscape features and climate influence the hydrology, water quality, nutrient status and ecology of these wetland/water systems in the boreal.

DUC is looking at the impacts on boreal wetlands and watersheds of regional pressures in northern Alberta to help guide its conservation strategies in the western boreal with hopes these findings will be applicable on a national level. This promising template for wetland conservation and the sustainable development of the forest was initiated by DUC and Alberta-Pacific Forest Industries Inc. (Al-Pac) on 115,000 square kilometres in northeastern Alberta, including the Al-Pac Forest Management Area (FMA). The ambitious plan aspires to combine sound science and resource development to generate economic wealth from a healthy environment. It is common-sense conservation in its truest form.

But the meticulous conservation planning invested in areas like the Al-Pac FMA are too few and far between across the boreal. People are growing increasingly concerned. The need to limit the toll of accelerating extraction of natural resources has inspired much debate and dialogue among those aware of the concentrated assault on specific areas of the forest.

In 1999, the Senate Committee on Agriculture and Forestry's Subcommittee on the Boreal Forest published *Competing Realities: The Boreal Forest at Risk*. This report contains recommendations intended to ensure that Canada adopt a "national forest landscape-based approach to managing a boreal forest that is coming increasingly under siege."

Included in the report's 35 recommendations is a proactive recommendation to develop a natural landscape-based forest use regime for the boreal forest, with up to 20 per cent allocated to intensive timber production; up to 60 per cent designated for less intensive management with preservation of biodiversity as primary objective; and up to 20 per cent protected to preserve ecologically and culturally significant areas. All of the recommendations, according to one of the report's Senate authors, are vital to the future of Canada's forest and should be heeded. Soon.

"If we don't do something, then we are going to be in real trouble," warned the Hon. Mira Spivak, deputy chair of the Senate report subcommittee chaired by the Hon. Nicholas Taylor. "The extraction of resources from Canada's boreal is being done with a degree of foolishness that smart business people should not be a part of."

According to Cathy Wilkinson, director of the Canadian Boreal Initiative (CBI), the Senate report had the right idea. Yet, as director for one of the leading organizations trying to



Above: At home in the boreal forest are hunters such as the rare great gray owl (1) and colourful songbirds like the bay-breasted warbler (2) and the black-burnian warbler (3). Mostly unscarred by development, the delicate region is experiencing an increasing demand for its resources (4,5).

affect conservation in Canada's great forest, she wondered to what extent this progressive report was being used by those it was intended for.

"We commissioned research to see what progress had been made on the Senate's recommendations during the last four years and we discovered that very limited progress has been made," said Wilkinson about the CBI's recent progress report on the federal and provincial governments' actions. "We need to work together to create a framework that includes the interests of First Nations, conservation groups and industry. A plan must include both large-scale protected areas and sustainable industrial development to ensure the survival of the boreal ecosystem and the communities that depend on it."

As Wilkinson alluded to, there are huge values for people in Canada's boreal. Its trees, soils and peat lands represent the world's largest terrestrial storehouse of carbon, integral to regulating global climate and combating climate change. The boreal forest's natural wealth sustains the traditional lifestyle of many of Canada's aboriginal communities.

"There are a lot of expectations and anxiety at the same time," explains Michael Nadli, a Dene businessman and former Grand Chief of the Deh Cho First Nation in Fort Providence, N.W.T. "I could jump in a boat today and paddle off and never see another person for days. I can just be one with nature. The First Nations world is changing, and yet we have to keep our communities vibrant and cultural. We must gain a semblance of nature and control development."

Nadli's successor as Deh Cho Grand Chief, Herb Norwegian, is equally conservation-minded and has been very involved in numerous key initiatives in his region. This will continue to bode well for the nearby Mackenzie Valley as it contains one of the last remaining great river systems essentially in its natural state. Along the Mackenzie River Valley are many world class wetland landscapes of vital importance to waterbirds, wildlife and people in the Northwest Territories. In the face of possible development of a natural gas pipeline linking the Mackenzie Delta to Alberta, perhaps as early as 2008, many people are concerned that cultural and ecological values be safeguarded in advance.

However, it is also through projects such as the proposed pipeline that Canada's boreal also sustains thousands of jobs and contributes billions to the Canadian economy. The long-

term integrity of the boreal region is key to the sustainability and well being of these communities and economies and to the vital ecological goods and services the boreal provides for all Canadians and the global community. DUC recently signed on to the Canada Forest Accord 2003-2008, which commits the organization to applying knowledge, expertise and resources to sustainable forest management, guided by the spirit and intent of Canada's National Forest Strategy.

"Ducks Unlimited Canada will promote and partner in research that examines the effects of natural and human disturbances on wetlands and water by elucidating the relationships between waterfowl, wetland characteristics, and landscape and climatic controls," says Stewart who has been leading DUC's efforts in the WBF since 1997. "The findings will result in world-leading management guidelines and protocols that can be used by industry to reduce the effect of industrial activities on water and wetlands, establish new best management principles, and will be used in their forest management, harvest design and restoration plans."

With such logical plans toward balancing the environment, science and industry through common-sense conservation solutions, perhaps the heaviest words come from the man who has spent so much time weightlessly viewing the Earth.

"It is very important, for Canadians in particular, to be sensitive to it (the environment), because we happen to live in this huge country," Garneau said. "If you live in Luxembourg or Holland or Hong Kong, you are sensitive to the fact that there is not much room between you and the next person, but it is very easy for Canadians to be complacent about environmental issues because we are blessed with so much. So it (the environment) is particularly important for Canadians to be sensitive to and I'm encouraged by Canadian attitudes in that respect."

Canada has a unique opportunity to show the world how to balance development with protection across one of the world's last, great wilderness areas. But the key word is unique, for it only comes around once. The time for world-leading best management practices and state-of-the-art conservation planning in Canada's boreal forest is now. ✎



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– Gary Stewart
manager, western boreal programs
Ducks Unlimited Canada