Climate Change in Minnesota Forests

By Lee E. Frelich

Lee Frelich is director of The University of Minnesota Center for Hardwood Ecology. He spoke on the topic of climate change at the Sigurd F. Olson birthday anniversary luncheon, sponsored by the Listening Point Foundation in April 2007.

Between 1896 and 1905, the Nobel Prize-winning Swedish scientist Svante Arrhenius established that increasing concentrations of CO2 in the atmosphere as a result of burning fossil fuels would likely increase temperatures world wide. Today we are in an atmosphere with rapidly increasing CO2 levels, and a middle of the road prediction is that temperatures will rise 3-6 degrees Fahrenheit worldwide, although an increase twice that is possible in mid-continental regions such as Minnesota.

The middle of the North American continent has one map of the longest prairie-forest borders in the world. Minnesota sits right on this border, which is both a reason it is a special place—because the prairie and forest are both here—and also a reason that Minnesota is especially vulnerable to climate change, since the position of the border depends on the balance between temperature, precipitation and evaporation.

Trees have responded to changing climates in the past by migration rather than by evolving tolerance to a new climate, and they will do so again in the future. Past rates of migration have been about an order of magnitude slower than that necessary to respond to the expected degree of warming temperature over the next 100 years, and for parts of Minnesota, fragmentation will slow the rate of migration, so that many plant and animal species will be unable to respond and will need out help to survive the transition. Therefore, major changes in our forests are expected. The most likely scenario is a net drying of the climate and movement of the prairie-forest border to the east, which would convert most of Minnesota's to savannas and grasslands. There is some chance that the future climate will be warm and wet, which would allow forests of white pine, hemlock, sugar maple and red oak to eventually develop in the areas currently occupied by boreal forest.

Several other factors at work in our forests will reinforce the impacts of a warmer climate. These include: (1) deer grazing,



Vision of the past? This jackpine forest, a historical forest type in the BWCAW, may be replaced by forests of white pine, hemlock, sugar maple, and red oak as the northern climate continues to change.

which prevents reproduction of white pine, red oak, white cedar, and yellow birch; (2) invasive ecosystem engineers such as European earthworms that increase soil density, thereby retarding water infiltration and making nutrients less available, as well as removing the insulating duff layer from the forest floor, allowing soils to become even warmer during the summer than a warmer climate alone; (3) invasive insects pests and diseases such as emerald ash borer, mountain pine beetle, and sudden oak death that could reach Minnesota more quickly in a warmer climate; and (4) native insects that could reach epidemic proportions under a warmer climate where they have greater winter survival and longer growing seasons.

Changing wind and fire frequency will also influence Minnesota forests in the future. During the early phase of global warming, there were fewer forest fires than from 1700-1900, but that situation is likely to reverse over the next few decades, especially on shallow soil areas like the BWCAW, where a longer growing season means warmer soils that dry out more easily. Frequent fires could help push BWCAW forests towards a savanna. A warmer climate will likely also support more severe thunderstorms with their forest leveling downburst winds. Studies of the 1999 blowdown in the BWCAW show that historical forest

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FROM THE CHAIRMAN'S DESK

Letter from the Chair

Each of us probably has a favorite book or chapter written by Sigurd F. Olson. Whether I am reading one of Olson's works for the first time or the tenth time, some new nugget of environmental and wilderness insight



usually presents itself to me. One of my favorite environmental touchstones is "Balance and Order" found in *Reflections from the North Country*.

Olson, in "Balance and Order," outlines some major environmental challenges. He discusses the societal drive toward greater consumption of resources rather than the promotion of more simple and less resource intensive lifestyles. Olson juxtaposes this situation with some environmental wisdom of the ages, including his personal experience with wilderness.

Olson then distills this information, along with some complex scientific and philosophical truths, to reach this conclusion: "Nature is always in a state of equilibrium, and only when we manipulate it for our own purposes, do we contribute toward imbalance."

For those who seek to protect and enjoy wilderness, human actions that contribute to an imbalance in these special places can sometimes seem overwhelming. The imbalance ranges from overuse of a wilderness place because it is loved so much to more egregious actions such as encroachment, development and building electric power line corridors in wilderness places. Another source of imbalance should prompt us to ask what global climate change means for wilderness?

Dr. Lee Frelich, during the April 2007 Sigurd F. Olson birthday anniversary luncheon, presented the science of climate change. He outlined for us the balance and order usually found in nature, measurements used to understand the escalation in carbon emissions since the industrial revolution, and the effects global climate change is already having on Minnesota's northern forests. For the details, please read his article in this issue. The urgent twofold message I took away from his presentation is this: (1) human

induced climate change is having a profound and accelerated effect on forest ecosystems, and (2) the forests of northern Minnesota today could become tomorrow's prairies.

We have been informed by Dr. Frelich and challenged by his findings. Sigurd Olson, too, leaves us with a challenge. He reminds us of the basic ecological truth that is often ignored: the interdependence and interaction of all living things. Olson states "...unless we choose wisely in the few decades ahead, the fragile and intricate web of life could become a web of death." How can we restore balance to the web of life? What does climate change mean for the places we call wilderness? What type of wilderness do we want to leave for future generations?

To respond to Olson's challenge, and the current human-induced imbalance in nature, we can once again turn to and find answers in his writings. "Only when we see ourselves as members of a balanced community can we live successfully. . . . [O]ur guiding philosophy should be the enhancement of life through a vast dissemination of environmental and social knowledge and the encouragement of practices that will protect and preserve the kind of world we want."

We know what sustains us and we know the important role wilderness plays in our collective wellbeing. Please join me in advancing the dialogue about the effect climate change is having on wilderness and taking some immediate action, at the personal and other public and more global levels, to significantly reduce carbon emissions and protect our web of life. Thank you.

—Tim Rudnicki

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LPF ACTIVITIES, EVENTS & UPDATES

Activities, Events & Updates

- ♦ National Historic Register Update: The application required to list Listening Point on the National Historic Register has been submitted, revised, and then resubmitted. The Minnesota Historical Society will make a determination at the state level and then submit the application to the federal government for inclusion on the National Register of Historic Places possibly as soon as the end of this year.
- ♦ Blueberry Arts Festival: The 27th annual Blueberry Arts festival will be held in Ely July 27-29, 2007. Once again, the Listening Point Foundation will be hosting an informational booth with an exhibit of a few of Sig's mementos, gift items, and educational materials. Please stop by and say hello. And as always, we are looking for volunteers to greet folks. If you are interested, please contact Alanna Johnson at 218-365-7890.
- ♦ Intern Program: The Vermilion Community College intern program is up and running. Luke Patterson is the guide for the "Visit to Listening Point" presentation. The scheduled tour begins at 1:00 p.m. every Tuesday and includes a power point presentation, a van trip to the Point, a visit to the writing shack and an optional viewing of "The Wilderness World of Sigurd Olson" movie. There is a charge for the tour and arrangements can be made by calling 218-235-2198.

- ♦ Summer Visitors: We've hosted many visitors to Listening Point already this year, including two college classes—one from Northland College in Ashland, Wisconsin, and an English writing class from Vermilion Community College here in Ely; a number of groups from Camp DuNord; and individuals from as far away as Texas. For some it was a second or third visit!
- ◆ Technology Update: The Listening Point Foundation has purchased its own laptop computer, and we will have high-speed internet access in another month or so. Onward and upward!

Visitors check out the LPF display at last year's Blueberry Arts Festival in Ely. Make plans to stop by this year.



Coming to Ely? Plan on a visit to Sig's "Listening Point." Just give us a call! 1-218-365-7890.

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TRIBUTE FROM THE BOARD

Honoring Bob and Vonnie Olson

Forward by Tim Rudnicki, LPF Chairman

Sigurd F. Olson's writings and actions helped to protect wilderness places. His works still serve to help us better appreciate wilderness and the important role wilderness plays in our individual lives as well as in maintaining our collective well being. Olson's writings and his actions may even inspire us, as well as future generations, to work to protect wild places. While Olson's path to becoming one of the great environmental leaders and writers of the 20th Century is rich in detail, one of his touchstones for intellectual and spiritual refreshment and inspiration was Listening Point, the rugged place on Burntside Lake.

Thanks to two very special people, Robert and Vonnie Olson, Listening Point can continue to serve as a source of inspiration for all who experience it. Robert, Sigurd's son, and his spouse Vonnie, had the foresight to establish the Listening Point Foundation. They put their hearts and souls into creating the Foundation so as to protect Listening Point, including Sigurd's cabin at the Point, and to advance Sigurd's legacy of wilderness education.

Through my service on the Board of the Listening Point Foundation, I have had the great pleasure to work with Robert and Vonnie and speak with them, at length, about Sigurd, his work and the special place called Listening Point. Robert and Vonnie truly understand what it means to think globally and act locally. They understand the environmental linkages that make us one global community, and they understand the importance of the place called Listening Point. For the many, many people that have already benefitted from experiencing Listening Point, and for the many yet to have that experience, thank you Robert and Vonnie.

Other Founders of the Listening Point Foundation have this to say about Robert and Vonnie:

There would be no Listening Point Foundation without Bob and Vonnie Olson. It's that simple. Their foresight, dedication, and hard work has put this organization on solid ground, and ensured the preservation and continued promotion of Sigurd Olson's legacy. Besides that, they're wonderful, and I love them.

—David Backes

It is with a great deal of pleasure that I recall my time working with Bob and Vonnie Olson in setting up Listening Point Foundation, Inc. Bob and Vonnie are both very hard working, focused and fun people to be associated with in the origins of the Foundation. I could always depend on them to do what they said they would do and on a timely basis. They are people of integrity, honesty and have a deep appreciation of environmental awareness.

—Randy Pachal



Bob and Vonnie Olson, at their home in Seeley, Wisconsin

Anybody touched by the legacy of Sigurd Olson, and there are many, know the symbolic value of Listening Point—both the book and the place after which it is named. What genius it was for Robert and Yvonne Olson to establish a foundation that carries that name well into the future, even as it preserves the ancient values Sig called "the intangibles." Though the point and the cabin are, indeed, shrines, they are much more; they are tangible reminders that human beings have a deep spiritual need to be attentive to the world in which we live and value the gift of silence, for it allows us to listen and grow in our understanding. Such attention enhances our search to find a sense of balance in our lives

Many people who have benefitted from Sig's legacy have their favorite quote from his valuable writings. Mine comes from page 104 in *Open Horizons*: "I think the loss of quiet is one of the great tragedies of civilization and to have known even for a moment the silence of the wilderness is one of our most precious memories."

Listening Point Foundation will encourage many future generations to find that "silence" and hone their "listening skills." What a debt we owe to Bob and Vonnie who have devoted so much energy and skill to perpetuating the legacy of this remarkable man through the foundation named after Sig's unique "bare, glaciated spit of rock" from which he could "…explore the entire north and all life..."

Elizabeth, a great person in her own right, often expressed gratitude for the encouragement Vonnie gave to Sig in his early years of writing. These two people, Robert and Yvonne, have continued the enrichment and we are grateful!

-Paul O. Monson

My parents were neighbors of Sig and Elizabeth Olson, so I

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Climate Change (continued from page 1)

types such as jack pine are replaced by other forests when these blowdowns occur.

Paleoecology teaches us that, at least from a human perspective, transitions from one forest type to another (or from forest to grassland) at the time of climate change are messy and long lasting. Existing forests die quickly in a changing climate, but it takes several centuries for new species to migrate in, for community interactions among species to develop, and for new ecosystem processes to develop. Although this seems like a long time to people, it is only a short time in the life of forests that exist on time scales of millennia. People may be attached to having a certain type of forest in a certain place, but trees and ecosystems do not care whether they exist in the United States or in Canada; all that matters for their existence is the appropriate climate. Should we help new species move into the BWCAW? Should we keep them out and favor the historical species as long as possible? How should we manage invasive diseases and pests in the wilderness? Such questions have no answers and should been debated.

Reduction in emissions of CO2 to slow the rate of warming, keeping the deer population in balance with its habitat, and stopping the movement of invasive species, especially invertebrates such as earthworms and insects, would help our forests adjust to the future environment. If we reduce CO2 emissions greatly (by 50-80 percent) worldwide in the next few decades, then the magnitude of warming will be relatively small, occur over a longer time, and be more manageable. This may allow us to hang on to the forests in northern Minnesota.



Above: Seedling regeneration on the forest floor around the trunk of a maple tree, in an area without nonnative earthworm infestation.



Above: The forest floor around a mature maple, in an area infested by nonnative earthworms.

Forest effects in northeastern Minnesota due to a warmer climate:

- Tree species decreasing in abundance: jack pine, red pine, black spruce, white spruce, paper birch, aspen, balsam poplar, tamarack
- Tree species increasing in abundance: sugar maple, red maple, white pine, basswood, red oak, bur oak, green ash, yellow birch, red maple
- Tree species migrating in: Hemlock, white oak, black cherry

Forces are at work that may push Minnesota forests towards savanna:

- Drier, warmer soils support fewer trees
- Higher evaporation to precipitation ratio
- European earthworms stripping the insulating duff layer from the forest floor

Honoring Bob and Vonnie Olson (continued from page 4)

grew up with both Bob and Sig Jr.. Although I am a few years younger than Bob I remember visiting the Olson home and watching Bob construct model airplanes of balsa sticks and paper. Most of his models were relatively small rubber band powered ones. However, he constructed one larger radio controlled model with a gas engine. It was a beautiful machine. The first time he flew it, it got away from him and flew off, never to be seen again. We also skied together although skiing was more his father's and brother's sport.

When Bob went off to college and on

to a career in the U.S. State Department, I did not see much of him for many years. I did, however, visit Listening Point whenever I was in the area. Elizabeth managed to maintain Listening Point with the help of friends and volunteers for many years after Sig's death, but eventually she too had to give up and relocate nearer to Bob and Vonnie. That is when Bob came forward with the idea of the Listening Point Foundation. He asked me to help him, which I was only too happy to do. It has been most gratifying to watch the Foundation use and maintain the property to support Sig's vision. Hopefully it will

continue indefinitely to signify the human requirement for a Wilderness experience. Keep up the good work!

—David Peterson

The establishment of the LPF was a great gift we all received from Bob and Vonnie and the whole Olson family. Bob and Vonnie's perseverance was critical in this process. Without any previous experience, they were able to wade through numerous obstacles to see this happen.

—Chuck Wick

Gift Shop

Share the spirit of Listening Point with friends and family with one of these gift items that celebrate Sigurd Olson and Listening Point.



The Story of **Listening Point**

This 28-page booklet, written by Sig's son Robert K. Olson, tells the inside story of how Listening Point came to be and why, what it meant to Sigurd Olson, and what it continues to mean to wilderness lovers and loyalists. Features dozens of historical photos and images.



A Spiritual Field Guide

This 192-page softcover book contains passages from a wide variety of writers, activists and others (including Sigurd F. Olson) who have thought long and deeply about the meaning and value of nature and wilderness. perfect companion.



Solitary Shores CD

First recorded in 1983, Solitary Shores was Douglas Wood's musical tribute to Sigurd Olson. All of the songs have a strong North Country flavor, and there is even a segment of Sig reading from one of his own essays. This is an album for lovers of the Northwoods and fans of Sig Olson.



Brandenburg Cards

Listening Point at winter's end. captured photographer Jim Brandenburg and featuring a quote from Sigurd Olson. Set of 10 full-color note cards with envelopes.

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SIGURD F. OLSON

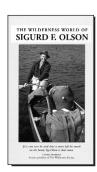
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The Wilderness World of Sigurd F. Olson Video

.....\$13

This intimate film captures the life and spirit of Sigurd Olson late in his life. VHS format, 30 minutes long.



The Wilderness World of Sigurd F. Olson DVD

A digitally remastered version of the classic film "The Wilderness World of Sigurd F. Olson" includes more than two hours of conversations with Sig as he speaks about the craft of writing and life in the wilderness. You'll also hear Sig's wife Elizabeth and their son Sig Jr. speak candidly about Sigurd, his profession, and life in the north woods. The audio clips are set to a slideshow of Olson family photographs.

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