

PARADISE LOST?
Climate Change in the North Woods

For additional scientific information, artists' biographies, the *Paradise Lost?* documentary, the exhibition music and to send feedback on the exhibition please visit our Website.

www.wisc.edu/cbe/K12/paradiselost.html

PARADISE LOST?

Climate Change in the North Woods

In May of 2006, 20 artists, seven scientists and six educators met in Northern Wisconsin to learn about climate change and consider ways that art could increase public understanding about climate change in the North Woods. The artists subsequently created pieces reflecting their perceptions of climate change science, impacts made on northern ecosystems, and actions people can take today to protect the North Woods. The goals of the resulting exhibition are to share information about the impacts of climate change on the North Woods and to encourage each of us to make thoughtful decisions to reduce greenhouse gas emissions.

PARADISE LOST?

Climate Change in the North Woods

The exhibition is segmented into three parts:

3 Consider Climate Change

Earth's climate system, human impacts on climate, past records, and expected changes

13 Celebrate the Cold

Our unique northern ecosystem and elements of its beauty and function that we stand to lose with a warmer climate

37 Alter the Course

Actions we can take, individually and collectively, to reduce greenhouse gas emissions and preserve our North Woods paradise

This exhibition/education program is coordinated by:

The University of Wisconsin - Madison: Center for Biology Education, Department of Forest Ecology and Management, Center for Limnology, Trout Lake Field Station, Center for Continuing Studies and the Arts and by the North Lakeland Discovery Center, Manitowish Waters

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Project participants exploring the bog. Photo: Jamie Young

PARADISE LOST? Climate Change in the North Woods

The climate change scenarios currently projected for Wisconsin at the end of this century utterly boggle the mind. Conservative middle-ground scenarios show Wisconsin becoming the climatological equivalent of Arkansas, while Madison's climate will morph into a twin of Oklahoma City. By 2080, the mean summer (June 1 - August 30) temperature for Madison, now 67 degrees F, will likely rise to 85 degrees F. Meanwhile, the North Woods may gradually transition into an oak savannah.

That's so difficult to imagine, so close to what we can only think of as science fiction, that all of us have a great deal of trouble even conceiving of the possibility. Yet there it is, looming on the horizon like the eerie bruised sky that so often precedes a tornado. But how does one address the coming of a tornado, much less the coming of a global environmental upheaval? Climate change is such a vast topic, the terminology so difficult, the computer-modeled evidence so complex, the potential loss so enormous that it is nearly impossible to get our arms around it.

Yet we must respond. So far though, Wisconsinites have failed at anything resembling a regional-wide response, and the question is why. Perhaps we are in such a state of emotional fatigue from the world's incessant litany of environmental ills that we can no longer adequately respond. We reflexively either duck, hide, or throw up our hands in despair and frustration.

After all, there is the scientific tipping point for climate change, and then there's the human emotional tipping point. Tipping points don't always tip people into action. Like the stages of grief, people are often first tipped into denial, anger, flight, or anything other than having to deal with the problem itself.

Or for those of us who live in the North Woods, perhaps at the heart of our failed response is our lack of a richly internalized sense of place. Before you can adequately heal the wounds of a place, or be asked to save a place, you have to first profoundly love it.

Leopold wrote, "We only grieve for what we know." In order to march into the climate change battle, we northerners may need both a deeper ecological literacy and greater sense of belonging to the North. However, the problem is that these only come from long and engaged experience – there's no short course, no weekend trip that will do it. Perhaps our lack of response to climate change shows that we don't love the North Woods enough.

Or perhaps we have failed to respond because so many people are so skeptical about science. The science on climate change alone clearly hasn't been enough to tip us into action. Many people simply don't trust science, or scientists. Humans tend to like things black and white, and since science is a continual search for truths that are always evolving and being reinterpreted, the average person is left with a slippery slope to navigate. What statistical studies should I believe? How can I evaluate the scientific data, and how can I evaluate the models that are derived from it? Whose interpretation of the studies is closest to the truth? For many, believing in climate change boils down to this: who are you going to trust?

Scientists, of course, face the same credibility dilemmas within their fields, and have learned to filter the credible from the merely speculative by evaluating whether a study was peer-reviewed, by looking at its funding source(s), by looking at its methodology, by determining if it represents a consensus viewpoint of other reputable scientists, and by assessing the reputation of the author(s). The public, though, is used to "spin," and many find it easier to not believe anyone rather than to try to sort through the spin on highly complex issues. "You can't believe any of it," is a common refrain. And thus climate change ends up as the baby thrown out with all of science's bath water.

I know of no scientist who does not admit that our present understanding of life on this earth is tentative and incomplete. Physicist and author Chet Raymo writes that despite its lack of perfect truth, "Science is the one truth system committed to change rather than preservation . . . Science is conservative, but of all truth systems that propose to explain the world, it also the most progressive." Revolutions can happen in science, he says, and do. And when they do, it's easy to lose

faith in science if you thought that science had the truth all along. Black and white have always been colors antithetical to science. Einstein once said that the most important tool of the scientist is the wastebasket, and thus as we learn anew today, much of what scientists learned in the past ends up consigned to the circular file.

Likewise, art works best not in black and white, but in a sea of color, in bursts of creative insight. Chet Raymo (physicist and author) writes of the intersection of art and science, "Knowledge is an island in a sea of mystery . . . We are at our best as creatures of the shore, with one foot on the hard ground of fact and one foot in the sea of mystery . . . It is at the shore that the creative work of the mind is done - the work of the artist, poet, philosopher, and scientist."

That is where we, the twenty artists working on this climate change exhibit, now find ourselves – on the shore where science meets art. And the question we have been asking ourselves is how do we reach non-scientific audiences with art that reflects science?

To help us answer that question, we were invited in May to a three-day workshop where we were addressed by a climatologist, a soil scientist, a limnologist, a bog ecologist, a forest ecologist, an Ojibwe elder, a community organizer, and a geographer. During our time together, questions flew between the artists and the scientists about the scientific data and the interpretations of the data, about the uncertainties and the unknowns, about one another's art, about the process of trying to incorporate a profoundly complex scientific concept into art, about what the public might best respond to, about the purpose of art and science, and our purposes as artists and scientists. We grew to appreciate one another and after a while, the lines that separated our careers vanished.

Diana Randolph, a painter from Drummond, WI, wrote later of this relationship, "What struck me was the passionate manner that the scientists delivered their research. Their enthusiasm was contagious. I took notes diligently, sometimes not quite understanding some of the data. But I was determined to read over my notes at a later time to understand and absorb all of the scientific info that was

presented to us . . . I laughed when John Magnuson, UW Madison Limnologist, admitted that he was petrified with fear when each of us at the workshop was given a small sketchbook as a gift. He wondered if he had to draw something with one of the professional artists looking over his shoulder. It hadn't occurred to me that a scientist would have any anxieties, also . . . after awhile the lines that separated our careers vanished."

Throughout the workshop, each artist had the chance to explain the medium within which he/she works and what each tries to bring to their art. We grappled with what we were trying to accomplish and how to get it done. We talked about creating take home messages of our interconnectedness, our uncertainty but our willingness to act anyway, our local sense and spirit of place, our ownership of how we choose to live our lives, our hopefulness, our sense of greater community, our honoring of future generations.

John Magnuson, emeritus professor of limnology at UW Madison, used the metaphor of a compass to describe the role of science: "The compass is what science is – it points the direction and lays out alternative paths." He added, "The gyroscope represents the political and cultural debates that ultimately lead to some accepted view." The gyroscope spins the debates, spins ethics, spins actions until we are led to follow a particular path.

At times in defining our mission, we used the metaphor of fire. The scientists urged us to put out the big fire of climate change and not fight the thousands of little fires that will result if we don't.

One artist said we needed to be "fire souls," which triggered a thought in me that we needed to be controlled burns – that science and the art have to be fused but managed carefully. I thought of how controlled burns clear away the understory, expose the soil to light, and kindle new growth. Perhaps, both as artists and scientists, we have to see ourselves as cautious evangelists, breathing the fire of our convictions, but not the fire of chaotic thought, or a fire from which people would run. Indeed, relative to climate change, we need to be a campfire that people will gather around, think the deep thoughts that fire somehow elicits, see one another in that

“we have to see ourselves as cautious evangelists, breathing the fire of our convictions, but not the fire of chaotic thought, or a fire from which people would run.” - John Bates

flickering glow for the combination of science and spirit that we truly are, and then carry that fire the rest of our lives.

Joe Rose, a Native American elder from the Bad River Ojibwe Reservation, told us that we were in the age of the Seventh Fire. “At the heart of everything is this – everything has a spirit. If we were to accept this, and all of its meaning, we would never harm anything.”

Clearly, we need in this exhibit to help people feel a reverence for the entire natural world, and that reverence needs to be sacred or spiritual, however that meaning manifests for every individual. We have no choice but to enter into a long-term love affair with this planet, a marriage in its deepest soulful promise where we will actively choose to live out our love in our daily actions and gestures. It has always seemed to me that too many of us engage with this planet in the equivalent of one-night stands. We skip away in the morning after having taken all the riches from it, and never look back. Love requires our commitment. It’s a spilling over, an overflowing, a high tide that doesn’t recede.

One biologist wrote, “The conservation of rivers is not a matter of rivers, but of the human heart.” Substitute anything you wish for “rivers,” including the Earth, and the statement holds true. The intellect is only part of the route by which we create change - the most powerful course has always been through the heart.

How do we hope in this exhibit to reach all these hearts? Through the channels that have always worked best with humans - through the arts, through direct experience, through stories, through relationships. But also with science. “Art and science are each sublime activities of the human mind; we are less than human without either,” writes Chet Raymo.

If we achieve any success in this work, it will occur only through igniting others. We know we can’t do it alone - there are no independent creatures. Doing your own thing, the mantra of the 60s, has always been a lie. Human life, like the natural world, is built on links, on interdependence, on connections. I heard C.Y. Allen, a professor at UW Stevens Point, say once, “Freedom isn’t doing whatever you want. It’s knowing who you are, what you’re supposed to be doing on this earth, and then doing it.”

Terry Daulton, a biologist and painter from Mercer, WI, and the primary driving force behind the exhibit’s creation, says of her hopes for the exhibit: “As far as what art can do that science

can’t - I actually see art and science as part of a continuum . . . I often see science that I think has artistic elements, and art that is based on science. Our society tends to see the two as diametrically opposed but I see them as linked. What artist isn’t inspired by some part of the world as we know it. What scientist doesn’t love and gain inspiration from the topic he/she is exploring. Good science is artistic . . . So I think that the art can communicate in a way to catch people’s attention and leave them inspired to learn more or be more open to new ideas.”

I believe people are willing to be tipped into change, but what we all want to know is can we be tipped into something better, something that helps bring our lives into greater balance and lessens our stress, our disillusionment, our anger? That may be the largest challenge that we face in this exhibit – how do we in a few small pieces of art convey both the desperate need to react to climate change and yet point the way with light rather than total darkness? As artists, perhaps all we can ultimately do is blend our voices, our art, our deepest inspiration into the cauldron of earth’s life, try to illuminate new possibilities, and see what happens. ■

John Bates

John’s article originally appeared in the Winter 2007 edition of *Wisconsin People & Ideas*.



Project participants created environmental installations and ice sculptures. Photos: Jamie Young

“When one tugs at a single thing in nature, he finds it is attached to the rest of the world.” - John Muir

Consider Climate Change

To many people, the North Woods is a paradise of deep forests, clear lakes and cold streams – a retreat from urban life. To some it means home, a rich blend of environment and culture where people’s daily lives are entwined with the natural elements. Located at the meeting of three great biomes – the northern boreal forest, the eastern deciduous forest and the western prairies – the North Woods is particularly vulnerable to the effects of climate change. Here, some habitats and species are likely to contract or expand because they are at the edge of their range. Viewing this paradise through the lenses of art and science will help illuminate how climate change affects us in our own backyard and show what each of us can do to make a difference.

A complex system of checks and balances controls the Earth’s climate. Energy from the sun interacts with our atmosphere and the Earth’s surface. Temperature differences in turn create wind, precipitation, clouds, and larger climatic patterns such as prevailing winds, ocean currents, and seasonal storms.

Human impacts threaten to upset this balance.

North Woods Climate – Expecting Change?

Current research suggests that by the end of the 21st century, North Woods summers will feel much like those of current-day Arkansas, with winters like current-day Iowa.

Check the Forecast for Year 2100



Winter

warmer by 6-11° F on average, precipitation increase by 15-30%, snow pack reduced by melting



Spring

somewhat wetter, fewer long gentle rains, more driving downpours and dramatic storms



Summer

hotter by 8-18° F on average, extreme heat more common, the growing season could be 4-7 weeks longer, drier with maybe 20% less rainfall, more intense storm events



Fall

somewhat wetter, fewer long gentle rains, more driving downpours and dramatic storms

These climate changes will deeply affect North Woods plants, animals and people.

Tree photos by: Jamie Young



Ages 3 and Up: A Puzzle for Our Children, 2006, mixed media



Ages 3 and Up: A Puzzle for Our Children, detail

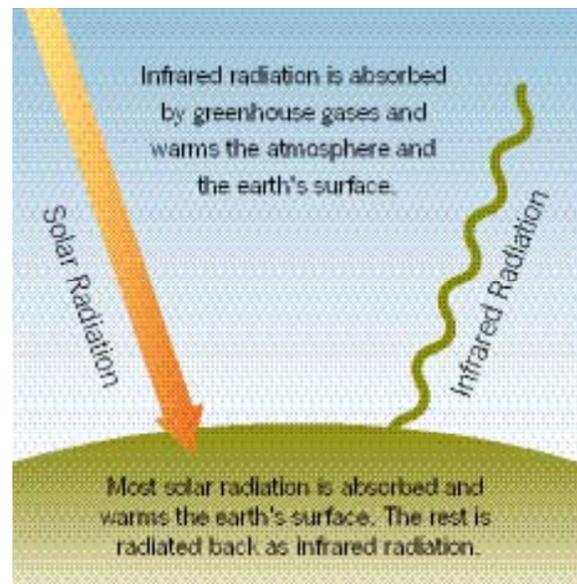
Jamie Young

My project is a statement about the fact that climate change is a long-term problem that has no easy answers, and can't be solved by just putting the puzzle pieces back together. It's a giant child's toy because it's about what we leave our descendants. Our children and grandchildren will have to put the puzzle back together, and it won't be easy, as we continue to pull the pieces farther away from where they go. In my work I'm often drawn to exploring the emotional power and beauty of the natural world. After learning about the predicted effects of global warming in Wisconsin--that our state will likely have the same climate as Arkansas does; I couldn't get that idea out of my mind. I find it disturbing that Wisconsin would be like the southern states, kudzu and all, no more birch trees, and little snow.

Greenhouse Gases – Too Much of a Good Thing

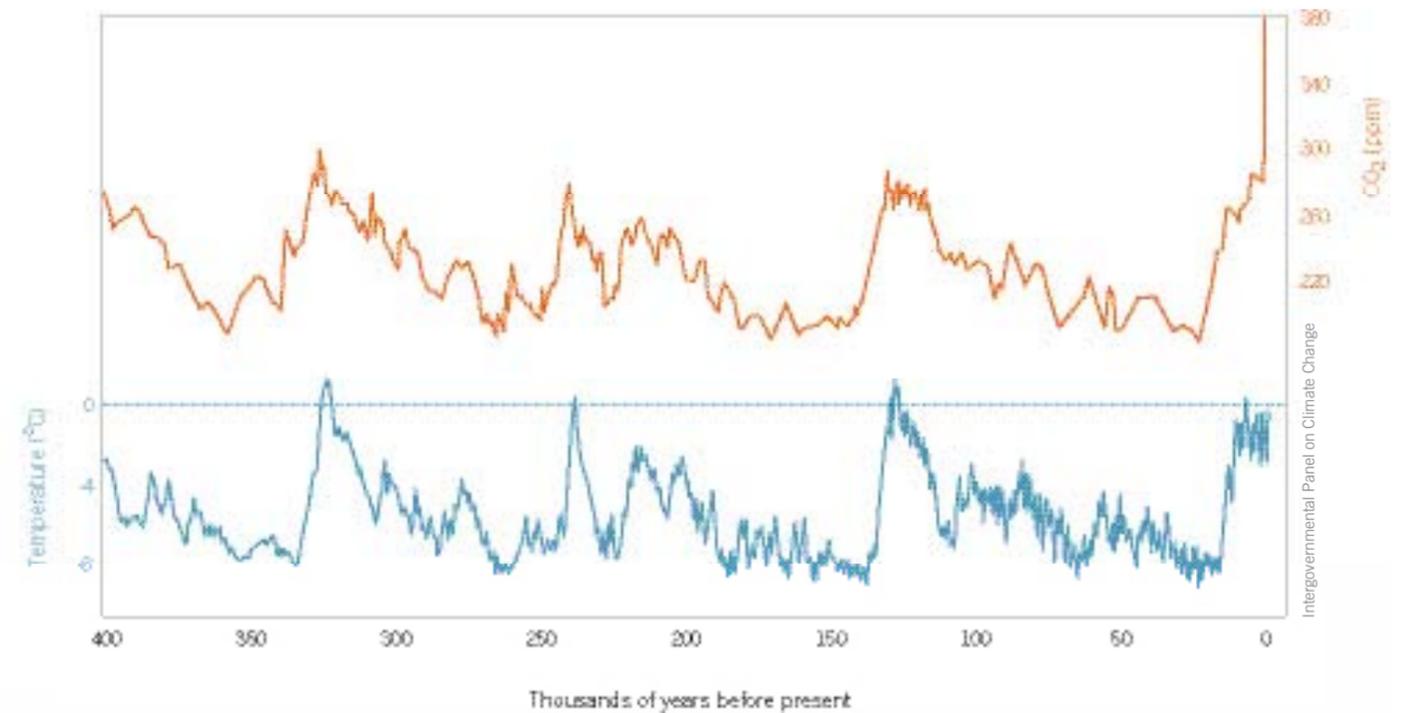
The Sun is Earth's ultimate source of light and heat. Energy from the sun passes through the atmosphere and warms our planet's surface. Earth, in turn, radiates energy upward to cool itself down – but the energy the Earth sends out is in a different form. This form of energy, infrared radiation, is easily absorbed by greenhouse gases.

Greenhouse gas molecules in the atmosphere block some energy from leaving the Earth, which is a good thing – to a point. These powerful gases make up less than 1% of our atmosphere, but are largely responsible for keeping the Earth at an optimal temperature for life as we know it. Relatively small changes in greenhouse gas levels in the atmosphere are associated with the beginnings and endings of ice ages...and currently with global warming. All things being equal, higher greenhouse gas concentrations mean more heat becomes trapped in the atmosphere. The most important greenhouse gases include carbon dioxide, nitrous oxide, methane, and water vapor.



Of the greenhouse gases, people most commonly affect carbon dioxide (CO₂). Levels of CO₂ in the atmosphere over the past million years averaged 160-280 parts per million (ppm). Since the Industrial Revolution (about 1800), CO₂ levels have steadily risen. Today, CO₂ is nearly doubled, measuring about 380 ppm. This rise comes mostly from burning fossil fuels and clearing forests. Current forecasts suggest that, depending on our efforts to control emissions, CO₂ may rise to between 550 and 1000 ppm by the year 2500.

CO₂ and Temperature

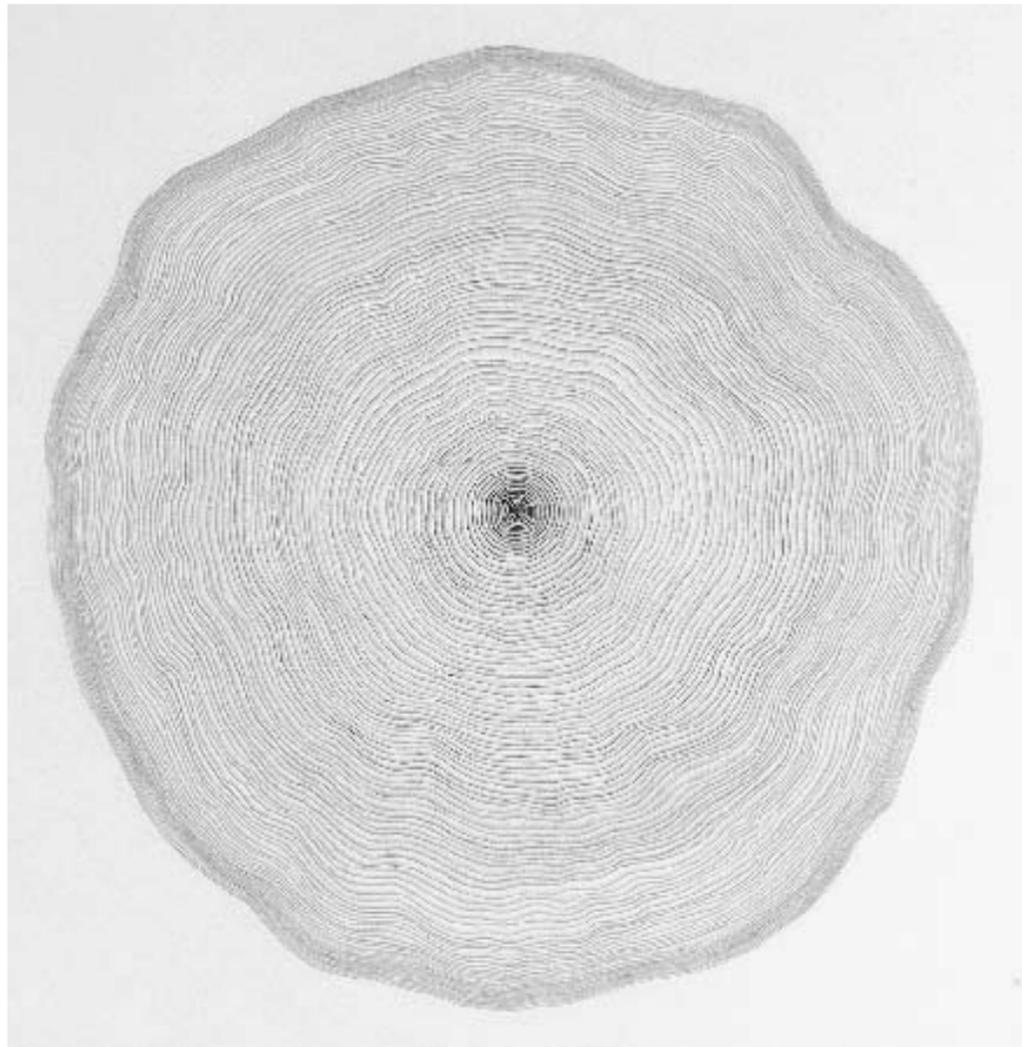


Fluctuations in temperature and in the atmospheric concentration of CO₂ over the past 400,000 years as inferred from Antarctic ice-core records. The vertical red bar is the increase in atmospheric carbon dioxide levels over the past two centuries and before 2006.

Consensus on the Climate

While scientists still debate some details of climate change, there is no scientific argument on these key facts:

- The global average temperature is increasing faster than at any time in the last 600,000 years.
- Most of this increase is due to human activities.
- People release CO₂ by combustion of fossil fuels and land use activities.
- Reducing the effects of human-caused increases in greenhouse gases will take decades to centuries to become effective.
- If we act now, we can greatly reduce the impacts of climate change.



Generations, 2006, graphite on paper



Generations, detail

Scott Pauli

My drawing has several meanings to me. In a literal sense it is a representation of 100 years in the life of a red pine. It could be the past 100 years or the next 100 years. Why 100? Because 100 years is the average amount of time that one ton of CO₂ released will stay in our atmosphere. CO₂ is one of the main contributing factors to global climate change. Why red pine? Red pine is one of the North Woods tree species that is threatened by climate change.

100 years is a long time, it is also a short time. Time is something that I learned a lot about with this project. In what seemed a short time (3 days) I absorbed a wealth of knowledge about climate change and made connections with artists and scientists. In a seemingly long time (50 hours, .5/ring) sitting over my drafting table, I learned how slowing down, and not multi-tasking can bring out more than a drawing. I thought of how every ring affected the next, just as every year effects the next. The form that revealed itself could be seen as many things – a spider’s web, a satellite view of a storm, the overhead view of waves, a fingerprint. I thought about the words of Frank Montano as the group ended the retreat sitting in a circle. He told about the Ojibwe belief in the great powers of the circle in nature. I envision our little group as the first ring in a tree that is growing across the state. As the exhibition moves and effects more people, the circles of influence will grow, just like the drawing.

GUT PUNCH *John Bates*

Climate change is like a slow gut punch.
At some point, we’ll realize
the air has been knocked out of us,
and we’ll lie on the ground gasping,
gulping for breath.

And when we can finally breathe again,
we’ll sit up stunned,
our guts sore for a long time.

“The trouble with normal is it always gets worse,”
goes the chorus of a folk song.
That’s only if normal is headed the wrong direction.
Turned in the direction of light,
we might just become illumined.
Turned in the direction of the dark,
we’re led to blindness.

The problem is that the present is invisible.
I mean right now,
right wherever you are
(unless you’re in the middle of a hurricane).
Slow change often ultimately yields an epiphany:
Yes! I see it now!
Slow change also often ultimately yields regret:
Oh, if only I’d known!

The invisible present.
The trouble with normal.
Gut punches.

We need a fast forward button,
or a preview your printing button
that shows us in technicolor
what the future will look like.
And then, of course,
we all need to actually watch,
and truly pay attention,

just like that moment
after the gut punch
when you get your first breath back
and you realize the so incredibly obvious

that you breathe every second
that each breath is utterly precious
necessary
and even delicious.

So breathe in
slowly,
breathe out,
slowly.

Think about normal –
consider that on this invisible course,
we will become the state formerly known as Wisconsin.

Then think about that invisible breath.

“Forests, lakes and rivers, clouds and winds, stars and flowers, stupendous glaciers and crystal snowflakes – every form of animate or inanimate existence, leaves its impress upon the soul of man.”

- Orison Swett Marden

Celebrate the Cold

If the North Woods had to be described by one term, COLD would stand out from the crowd.

Why not live in the north? Too COLD!

How's the weather today? Pretty COLD!

How was your swim? Water was COLD!

When you hear the snow squeak under your winter boots, or your wet hair freezes solid on the way to the car, or you step into the night to watch the northern lights, the cold of the North Woods seeps into your bones. Many people love the cold, clear winter days and the pared-down landscape of snow and bare trees. Winter and snow are a part of our sense of place.

How will the North Woods feel with a warmer climate?

Climate change will impact more than snowmobiles and ski slopes. Warmer temperatures and accompanying changes in precipitation will impact lakes, forests and bogs and the unique plants and animals who inhabit them.



Moonlight and Shadows on Snow, 2006, oil on panel

David Neic

My work explores nocturnal phenomenon and the phenomena of seeing. Utilizing a flashlight to view my palette and painting, and night vision to view the sky and land, I routinely make observational paintings under the night sky. The moon phases and cycles are a constant preoccupation. Temperature, precipitation and wind are part of the sensory experience. Winter provides the most effective time for this process. It provides long nights for working time and cold sub-freezing temperatures for energy. In northern Wisconsin there is often snow throughout winter and this is an integral part of the experience. Snow provides reflection, putting the light in motion. The extra light makes observational painting more feasible and snow's glow makes the experience more magical and enchanted.

As the climate is changing in this region the average winter temperature is increasing, decreasing the likelihood that there will be a base of snow throughout each winter. This is detrimental to this painting process and is a loss of a fascinating aspect of winter.

Works on facing page:

Moon Rising Through Winter Forest (top), 2006, oil on panel

Winter Moonset Crescent 3/4 (middle), 2006, oil on panel

Crescent Moon Setting Behind Winter Forest (lower), 2006, oil on panel



FIRST FROST *John Bates*

Late August, and it's 27° this morning,
In the wetlands below our house,
the alders and sedges shine white
in the rosy sunrise.
In the garden, the tomatoes have failed to follow
the first commandment of autumn:
Thou Shall Not Freeze.
Unpicked tomatoes hang on limp branches,
each stem like Atlas crumpled
beneath the Earth he once bore.

The rising sun quickly changes the predawn frost
into droplets as simple as gentle rain.

Except frost kills unmercifully,
a magic moment reached when cells burst without a cry,
ice expanding within them,
cutting cell walls like a balloon punctured
after a long birthday party.

Insects better have laid eggs by now,
trusting everything to a new generation.
And the insect-eating birds better have left, too,
this momentary white slate,
this foreshadow of winter.

Frost is like a quick tear in a fabric,
a renting weakness that will tear further
nearly every morning over the next eight months
until the rescue of May.

And the mammals better be weaving their new coats.
And the crazy birds that stay
better be fashioning their new plumage.

Cause it's coming.
That long slow train that will stall and exhale
its engine breath on us,
a cold steam that will
turn a once lush sea of green
into an undulation
of white
and shadows on white.

The rich soundful joy
that marked spring
as the great resurrector,
will mute like a trumpet bell
stuffed with white cloth.

The quiet time is coming,
the no event,
the nuances of cold frozen ground
and snow to the knees
and gray dawns that last eight hours
and then slip quickly into deep darkness.

Get ready.

Hope and Healing in a World of Wounds

Sarah Wright

“The Lord God took the man and put him in the Garden of Eden to work it and take care of it.” (Genesis 2:15)

I grieve because I did not know her, and never will. Aldo Leopold wrote that “we grieve only for what we know,” but I think in this case he’s only partly right. It is difficult to recognize the symptoms of grief when it is we who are lost, suffering from severed mutualisms. When we feel a sadness that cannot be named, a pang of isolation from something indescribable, we are mourning for the people and the species—the relationships which should have been—senselessly and prematurely taken from us.

The weight of what is at risk, and what has already been lost, on our rapidly warming planet is impossible to comprehend—but we can understand the tragedy of a single species driven to extinction by a careening climate. It is impossible to feel the magnitude of loss encompassed by countless young lives ended with sudden violence, but we can tell the individual stories of the lost, to illuminate the invisible threads that connect dead history to our present. We can find a place in our hearts to grieve for what we should have known.

I try to learn as much as I can about the aunt I never knew, as children someday will try to acquaint themselves with species likely to be extirpated from Wisconsin by a warming climate. What did the black-and-white warbler and the walleye look like? What spots were their preferred habitats? What nourished them? Where did the red pine and paper birch grow? How were they pollinated? Or their seeds dispersed? It is impossible to really know something or someone from these tidbits of information, yet there is a certain satisfaction gained in trying.

Out of curiosity, I visited the U.S. Fish & Wildlife Service’s online list of species known to have gone extinct from the Midwest region over the past one-hundred years or so, probably due to overhunting and habitat destruction for the most part. It includes one mammal (the Eastern elk), 6 fishes, 5 clams, 3 birds, and 2 plants. **THEY NO LONGER EXIST ON EARTH,** declares the Website in capital letters, just in case anyone doubted it. I am a biologist, supposed to think rationally for a living, yet tears sprang to my eyes in spite of me as I read these words. **THEY NO LONGER EXIST ON EARTH.** I will never know them; none of us will ever know them.

I know that trying to reconstruct my Aunt Patti based on others’ memories and scattered artifacts of her short life is as hopeless as imagining the majesty of the former North Woods by visiting the few remnants of it which survived the Great

Cut-over. But my hunger for knowledge of her is as visceral as a wolf’s affinity for her pack, or my own need to hear the rustling of canopies in breezes blown in from afar.

This much I know: she was the first child born to my grandparents, not long after their service in World War II. Much of her childhood was spent in Peoria, Illinois, before the family’s move to Wisconsin in the early 1960s. She was a model student throughout her 13 years of Catholic school, earning a scholarship to a Franciscan university in Milwaukee, and was working toward a master’s degree in chemistry there when she died. She had gravitated toward the sciences from a young age; she and her adoring younger brother (who would become my dad) won the Peoria science fair in the same university fieldhouse where, coincidentally, I graduated from college several decades later. Her first fiance returned from Vietnam too emotionally scarred to marry her; she later married a musician, whose band was playing in the music hall that became the site of her death on a hot August night in 1975. She was smothered between the aging building and a car hurtling over the sidewalk, uncontrolled by its drunken driver. In a matter of seconds my Aunt Patti’s life was taken, years before I was born.

I often can’t bring myself to break the placid surface of my father’s thoughts to ask about her, though I know she’s never far from the upper layer of his consciousness. So I was delighted to be privy to secrets and treasures among my grandmother’s things, when my dad finally worked up the heart to go through them years after her passing. My grandma had saved virtually every report card, school project, and homemade mother’s day gift from each of her children; I looked through the boxes of mementos with the combination of excitement and hesitation one might feel while reading someone else’s diary. And then we came across what was, to me, the loveliest piece of them all, as thrilling a discovery as a fossilized impression of a long-extinct plant.

My aunt had made a booklet in fifth grade, with construction paper covers emblazoned in crayon entitled “God’s Gifts to Us,” perhaps an assignment for catechism class. Growing up, I had only tolerated sitting through mass and never considered myself very religious, but her words deeply touched me. She wrote with an eloquence beyond her years about the sin of harming God’s creation, and included a drawing of Jesus feeding a menagerie of animals. My dad slipped it carefully into a laminated folder, so that it resembled an herbarium sheet of a rare plant specimen collected decades ago, yellowed and fragile but so beautiful it hurts.

I had gathered that my aunt, like her mother, was the type of Catholic deeply committed to social justice; my dad recalls that an “Indian Power” sticker adorned the bumper of her car, that she participated in sit-ins during the American Indian Movement’s takeover of an old Coast Guard station

in Milwaukee. But this was the first I’d learned of her concern for the environment in particular. At the time, I was an environmental science student trying to promote awareness of global warming on a largely apathetic campus. The simple wisdom offered by my own aunt, when she had been a fifth-grader just a couple of miles from my university, filled me to bursting with elation. I am connected to her! Then with grief: but we should have had the chance to talk about these things together. **SHE NO LONGER EXISTS ON EARTH.**

What did she sound like? What articles did she read while working on her master’s thesis? Did she work in environmental chemistry? What made her most happy? Where were her favorite places to look at stars? These are the questions that will always haunt me, like imagined visions of species extirpated long ago.

It’s true—extinction of species is a normal natural process. Assemblages of species are continually cycling, as some forms wink out and others better suited to a changed environment emerge. As the Earth’s climate warmed following the retreat of the glaciers, species migrated northward to colonize areas newly hospitable to them, just as they do today; probably, some species were locally extirpated from their southernmost extremes as conditions became too warm there. But the critical difference today is that these changes are happening at break-neck speed. They are slow on our human time scale, but on Earth’s time scale they are as sudden and violent as my aunt’s death, leaving little time for species to adapt and to maintain their relationships with one another. The tragedy is not in death itself—we will all die eventually—but in losing each other too soon, as natural processes accelerate to warp speed.

I could have learned plentitudes from her. She could have been my mentor as a woman in science; she could have shown me how to weave faith and reason. I don’t know enough to know what I could have given her but my love and admiration.

Our life cycles should have overlapped. Instead, I’m left to feel as lost as a flower whose blooming schedule is now out of sync with its bumblebee pollinator when a warming climate sends them conflicting cues, as undone as a mother bird whose brood hatches long after the peak abundance of the insects she needs to feed her babies. Perhaps the most profound grief and the greatest losses are those which dislocate the interactions that sustain us.

One person is directly culpable for killing my aunt. His faulty decision to take the wheel when he should have taken a bus or walked to wherever he was going cost her life, and pieces of all the lives touched by hers. But we are all culpable—you and I alike—for the damage wreaked by our vehicles of convenience. We are often far removed from the consequences of our energy-intensive lifestyles—from children’s lungs slowly



Snow angel photo by: Scott Pauli

smothered by our emissions, invisible species gradually wilting away, traditional ways of life unwound by warped seasons. Perhaps we hesitate to accept the facts of global warming in the richest nation on Earth because to accept them is also to accept our collective guilt, to lose our innocence. But we can regain paradise by taking responsibility for one another. To do less would be to waste the pain of what we’ve already lost.

In my loneliest moments, when I doubt whether I want to or am capable of finishing my PhD, it is often in honor of Aunt Patti that I keep going. She was denied the luxury of making such a decision for herself. I keep going because she motivates me to learn about and try to protect “God’s Gifts to Us.” She allows me to believe that you and I are still fifth-graders at heart, that we care enough about each other and the fifth-graders of the future to come together and make better choices, so that we’ll still have those Gifts to share in the years to come. We have more than a few seconds to take control of the wheel and alter our course, but not much longer than that on Earth’s time scale.

I don’t doubt for a moment that we can restore Eden, in the North Woods and beyond. But it will take every single one of us and the tears of our collective grief to cultivate it. Now is the time when we must truly be the salt of the Earth. ■

The foremost principle of ecology is that everything is connected. As an ecologist and writer, I think of myself as a ‘connector’. I have always seen biology, art, and literature as closely intertwined fields of study which all entail keen observation of life and relationships—particularly when and how relationships go awry and may be healed. My goal is to contribute words which have the power to evoke the disjunction and displacement of humans, plants, birds, and earth from one another in the changing climate of northern Wisconsin. But I hope that my writing will also move us to repair severed connections, and restore our bonds with sacred places.

MISSED CONNECTION Buzzed from one end of the meadow to the other and back again, hoping to alight on your nectar guides. Never found you, still crave your sweetness. Was I too early? Too late? Could it be you've found another? My love of flight has crashed with your memory. My wings no longer beat with fervent hopes of you.

NO LONGER WAITING 4 U All summer long I anticipated your vibrations. I bloomed showier than ever, with the most alluring UV stripes and sweetest nectar, just for you. So many lonely days in waiting...afraid I'd go unpollinated and finally gave my reward to another. Where were you?

CAN'T WAIT TO SMELL U Last fall I admired you from afar—nice markings! Leaving the den earlier than usual and hoped u might be awake from your slumbers 2. Can we catch a fish some time?

ONE TO ONE Didn't want to hurt you but just had to go. Used to having time to myself while you were out on the ice; we're both happier when you're fishing. Warmer winters are ruining our marriage. Either we need to move farther north or you need a new hobby.

COMMON INTERESTS Ice fishing addict seeks like-minded buddies up north to share shanty. Not enough ice down here and itching to fish. Will gladly bring beer, gear; need patch of lake and good company.

SICK SINCE YOU'VE GONE AWAY I know the heat was hard on you, but I really need you back. The air is dead without your warbling, and I'm COVERED in spruce budworms! I'll surely die without you.

HUNGRY FOR YOU I used to find you nibbling on the newly unfurled leaves during my spring flight north; I come back the same time as usual but you're nowhere to be found! I'm starving without you.

CALLING ALL NECTAR DRINKERS! We'll have the goods, but you've got to get here early. Snowmelt comes sooner and the Big Guys are catching on—we've got to get our growin' goin' before the canopy closes in on us. Trout Lily, Dutchy's breeches, Spring Beauty—we're all here but going fast! Bring your proboscis el pronto!



Winter's End, detail

Helen Klebesadel

In the watercolor *Winter's End* I use the annual break up of ice on Lake Superior, coupled with a hot orange sunset, to represent losses we will sustain if climate change, with its warming temperatures, brings an end to winter as we know it. Imbedded in the ice are images of snow covered forests and cold weather dependent species in our delicately balanced ecosystem. These trees, plants, animals and insects require cold to survive.

They will migrate north with the colder temperatures they need. In addition to the loss of snow covered beauty, cold weather activities, and deep silences of winter, losing winter's cold would mean the loss of certain species of warblers, butterflies, waterfowl, fish, flowers, trees, and mammals that mean 'home' to Wisconsinites. This painting asks each of us to do what we can to save winter and all it includes.



Winter's End, 2006, watercolor

Lakes, Small to Superior

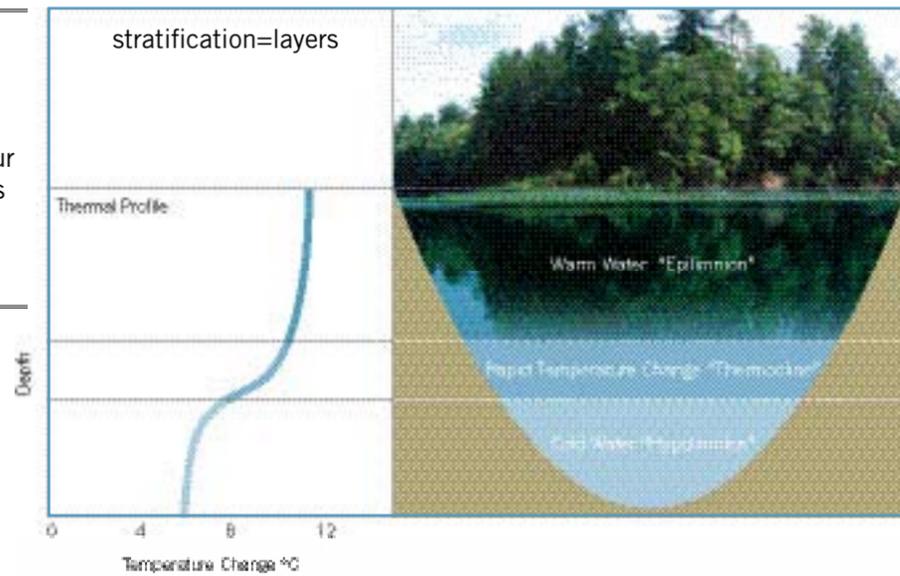
How will climate change affect lakes?

- Increased algae and nutrients, turning clear lakes more green and murky
- Increased runoff and erosion from sudden storms
- Increased thermal layering in lakes in summer, causing low oxygen in deep zones
- Changes from cold and cool water fish such as trout and pike to warmer water species such as bass and catfish
- More invasive warm water species such as carp
- Less winter ice cover

Lake stratification

Warmer temperatures will prolong the duration of summer temperature layers, preventing mixing and thus preventing oxygen from reaching the deeper layers of the lake.

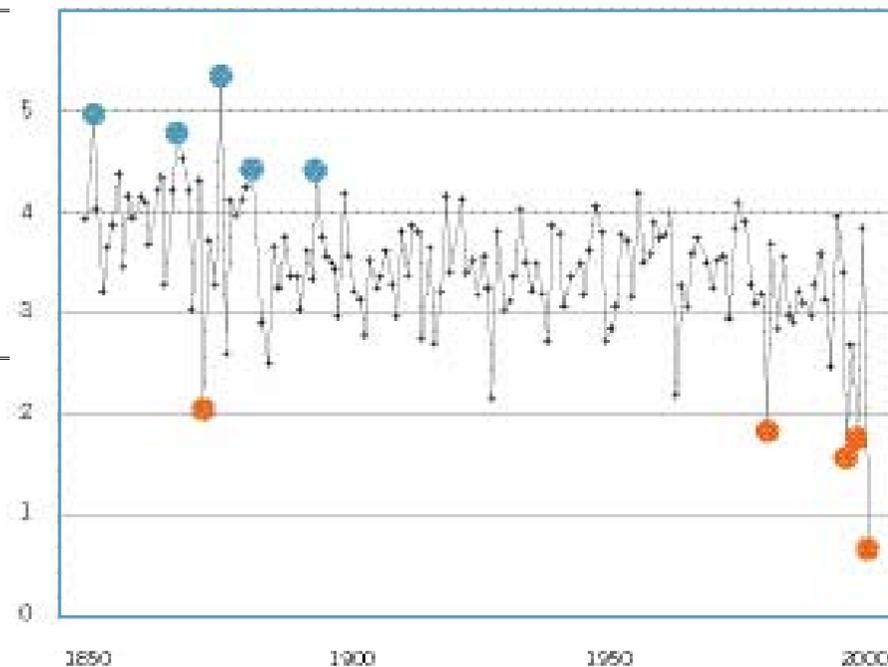
UW Center for Limnology



Months of ice cover on Lake Mendota, Madison, WI

The years with the longest duration of ice cover (over five months) were all before 1900. Four of the five years with the shortest duration (less than two months) were in the last 30 years.

UW Center for Limnology



Lake Superior photo by: Jeff Richter

Superior Effects

Imagine taking a swim at 40°F! That is the average annual surface temperature for Lake Superior, the largest freshwater lake on Earth. If you spread Superior's three quadrillion gallons of water out to a depth of one foot, it would cover all of North and South America. Superior creates microclimates and local weather, such as lake effect snows, changes in fall and spring frosts, and extended growing seasons.

How will climate change affect this Great Lake and its shores?

It is possible that Lake Superior's size and volume will help buffer impacts of warming in the region. This would provide a refuge as species move north. However, impacts may include:

- Dry docks: increased evaporation and changes in the water cycle may lower lake levels.
- Greener water: warmer surface and near-shore waters may promote algae.
- Changes in flow rates of tributary streams could impact spawning fish.
- Lake effect snow will increase if the lake has open water in winter.



The Things We Know, 2006, watercolor

Amy Arnston

Growing up in the Great Lakes region, water has always been a powerful symbol for me. It symbolizes both birth and death, both change and the eternal. This painting speaks to loss.

This large watercolor painting shows Lake Superior at sunrise. A new day dawns with unusually warm colors superimposed on the lake, symbolizing climate change. The colors are chosen from my visit to the Bahamas where the color of the water is (currently) very different from Lake Superior. In the distance, you can see birds migrating north. Many of our flora and fauna will need to move north for survival, time permitting. The painting is titled, *The Things We Know*, based on Aldo Leopold's statement that "We only grieve for what we know". As an artist, author and art professor, my commitment to painting is enriched by a respect for art/design history, and the region I live in. Abstract color, shape and texture are an underpinning to all my realistic paintings of water, as are a sense of place and time.



Ice Messengers, 2006, oil on canvas

Diana Randolph

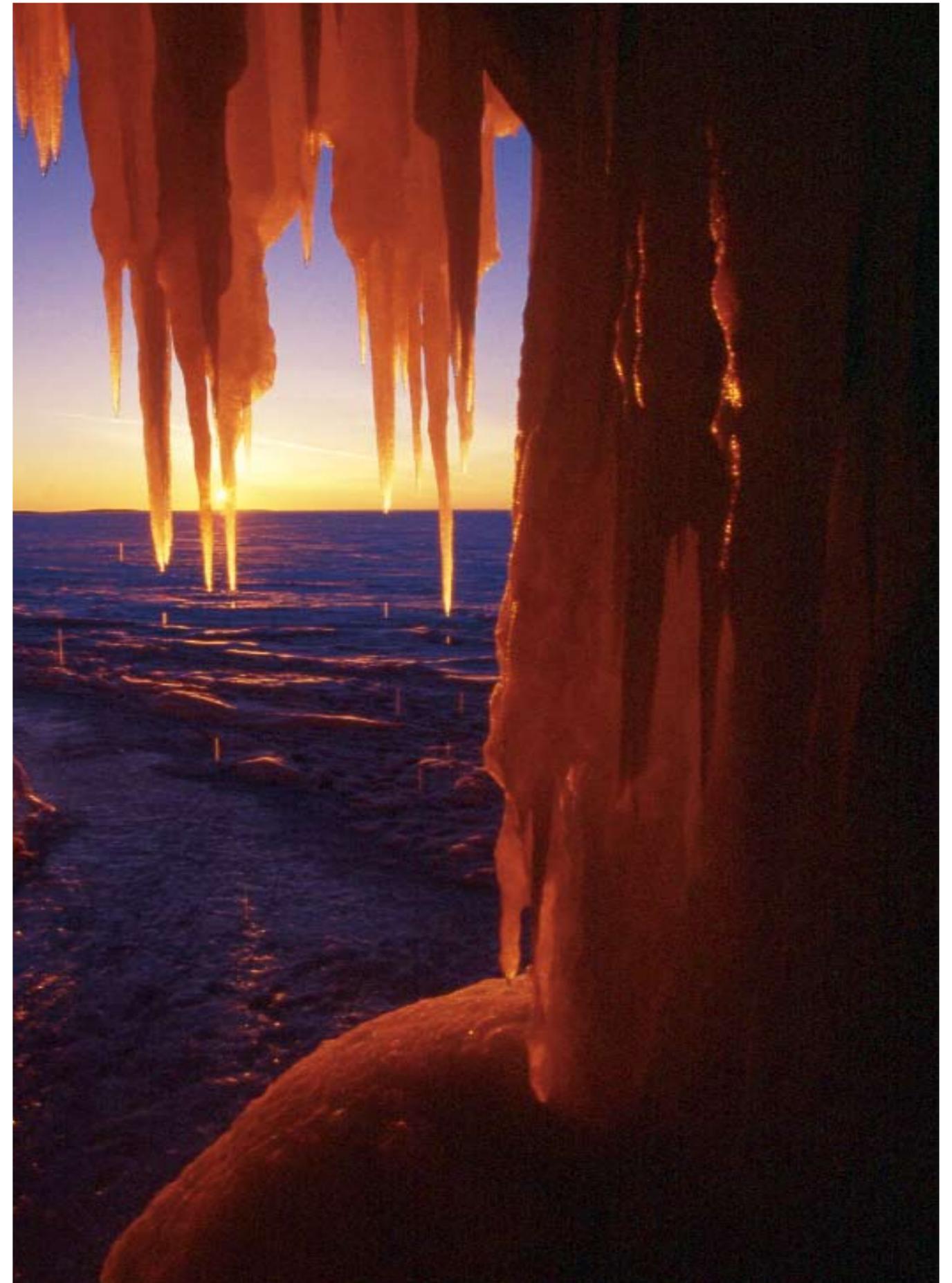
I was beckoned to paint ice on Lake Superior after hearing a presentation at the May 2006 Climate Change workshop by University of Wisconsin-Madison limnologist, John Magnuson, who has studied and observed lakes for many years. He said that ice is a miner's canary to a limnologist. He encouraged me to explore the National Oceanic and Atmospheric Administration (NOAA) website which includes ice chart data of the Great Lakes from numerous years. There I discovered that on February 6, 1973 total ice coverage for all the Great Lakes was 14.32 percent. On February 4, 2002 ice coverage was only 6.46 percent. My favorite event each February is to cross country ski in the Book Across the Bay (Chequamegon Bay), a night time race lit with ice luminaries from Ashland to Washburn. If ice coverage continues to lessen each winter that magical ski event may not be able to take place.



Jeff Richter

Just to the north of me lies a superior lake. I've been observing and photographing its splendor for 30 years. Something has changed. Three images show the extent of the ice from February 1996 to February 2005. The last image portrays what I imagine a future February may look like. We know fossil fuels are going to run out in the near future. We suspect we're doing significant harm to the planet by burning fossil fuels. We know renewable resources are the best long-term solution. What are we waiting for? What are we waiting for?

February, Past and Future, 2006, photographs
February 2000 (opposite)
February 1996 (above top)
February 2005 (above left)
February 200? (above right)





Walleye photo by: Dave Marshall

Fishing for an Answer?

Climate Change in Your Creel Basket

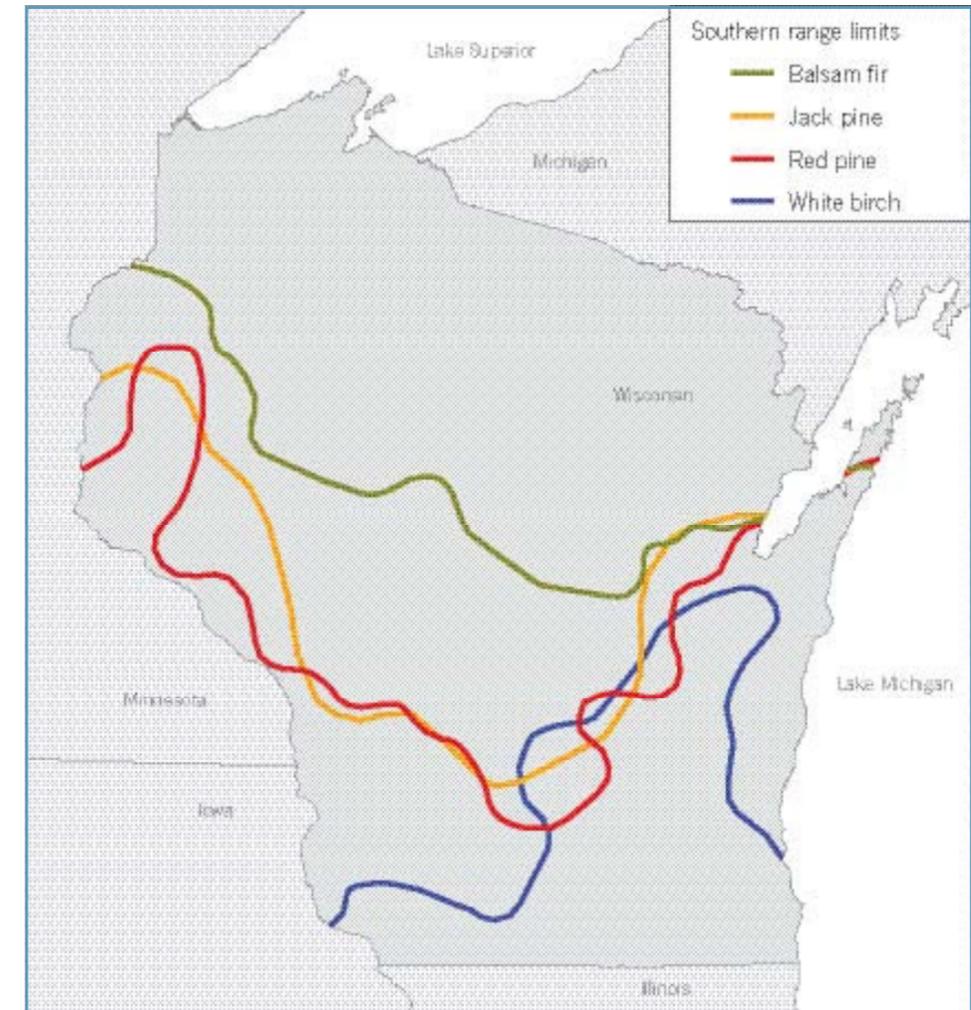
- As waters warm, fish like perch, smallmouth bass and carp may extend their range about 300 miles north into Ontario.
- 8 minnow, 7 sunfish, and 3 sucker species may extend their ranges north in the Great Lakes region with warming waters.
- The southern limit of cold water fish like whitefish, lake trout and brook trout, and cool water species, like northern pike and walleye, may move north.
- Reproduction of lake trout, walleye and pike may decline as spawning habitats warm.
- Lake trout may be lost in many warming inland lakes.
- There may be fewer winter fish-kills due to less winter ice cover on lakes.

For the angler this may mean a change in bag limits, what species you fish for, and where you fish.

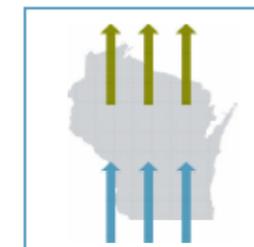
Northward Ho - Habitats on the Move

As the climate changes, plant and animal ranges will also change. In the North Woods, many northern forest plants may decline or be eliminated, while the range of some southern species may move north. White spruce, balsam fir, red pine, jack pine and paper birch will likely disappear from our region due to climate change. The new conditions may favor species such as oak and other hardwoods, but they may be slow to migrate north.

Southern range limits for four species likely to be affected by climate change, estimated from the 1996 US Forest Inventory and Analysis



Map produced 27 Mar 2006, Forest Landscape Biology Lab, University of Wisconsin-Madison



As climate changes, we expect northward migration of some tree species from the south.

At the same time, many tree species will be displaced to the north or extirpated.

Peatlands, Our Carbon Savings Accounts

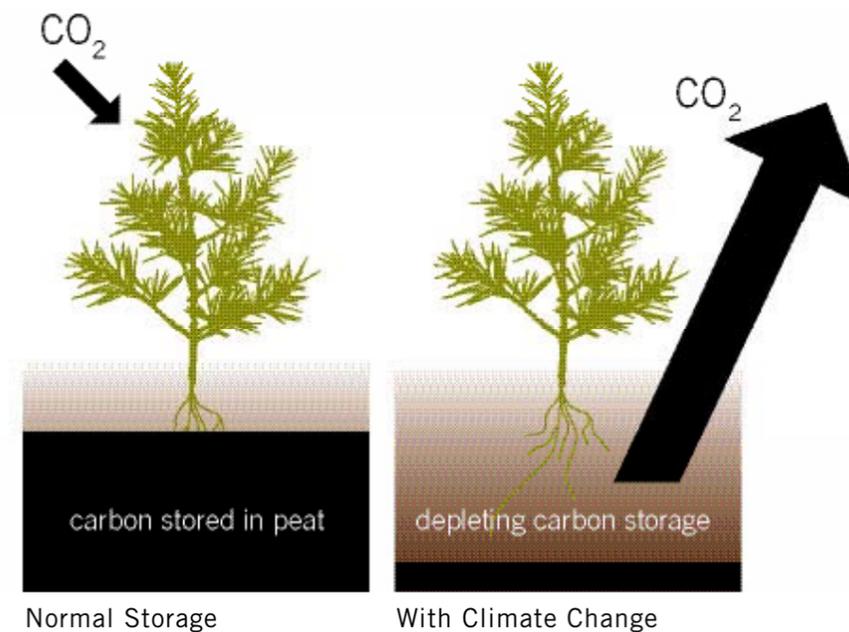
“In the fall, heathers become coppery and even the sphagnum is full of color. The pitcher plants stand bold and tall as they change from summer’s green to red. Dwarf birches and sweet gale have by then followed suit and with the gold of rushes make the bog an unforgettable delight.” ~ Sigurd F. Olson

Bogs are more than beautiful in the eye of the beholder. They function as a filter, removing pollutants from the water. They support specialized plant and animal species like the arctic shrew, southern bog lemming, mink frog, and Connecticut warbler. Bogs also help moderate our climate.

The northern peatlands of the Upper Midwest and Canada tie up a large pool of carbon in their deep layers. This is because decomposition is very slow in the cold, acidic bog sediments. The carbon from plant growth and death becomes buried deep in the peat, trapping it for centuries. Warming will likely cause bog ecosystems to shift north. In addition, as bogs warm, decomposition of sediments will increase, releasing more stored carbon.

Bog sediments also tie up naturally occurring heavy metals such as mercury, which could be released in larger quantities as sediments decompose. This means additional climate warming and increases in dangerous toxins in the environment.

“Peatlands contain more carbon than the entire atmosphere and account for approximately half of the world’s terrestrial carbon stores” - T. Balser



Icons – Bog, Birch, and Pine, 2006, pastel on wood panel

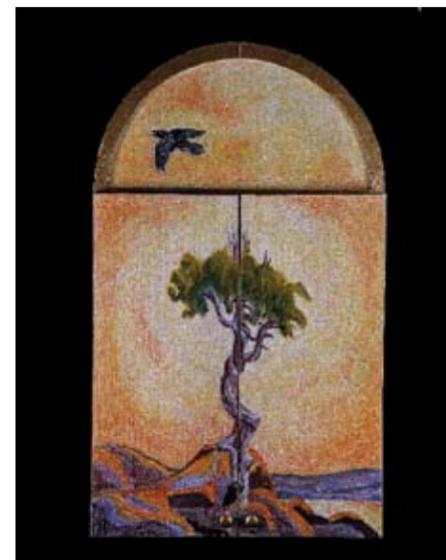
Terry Daulton

I have always sought spiritual connections in nature. Walking in a tall pine grove or across a tamarack bog gives me a sense of the Devine.

I painted this triptych to share my love for three habitats threatened by climate change: white birch groves, red pine forests, and bogs. I included soils, which support thousands of species - fungi, bacteria, insects – and are essential to ecosystems. The top of the triptych shows a raven as a messenger.

“Little Cedar Tree Spirit” (Manido Giizhigance) on the doors is found on the Grand Portage Reservation in Minnesota. This ancient tree clings to the rocky shore of Lake Superior, and is sacred to Native Americans.

Perhaps we are like this tree, perched at a dangerous edge where survival requires a strong grip and bending with nature. If so, I hope we meet the climate change challenge with a hint of this tree’s grace.



Icons – Bog, Birch, and Pine, front view



Bog Paludarium, detail, pitcher plant

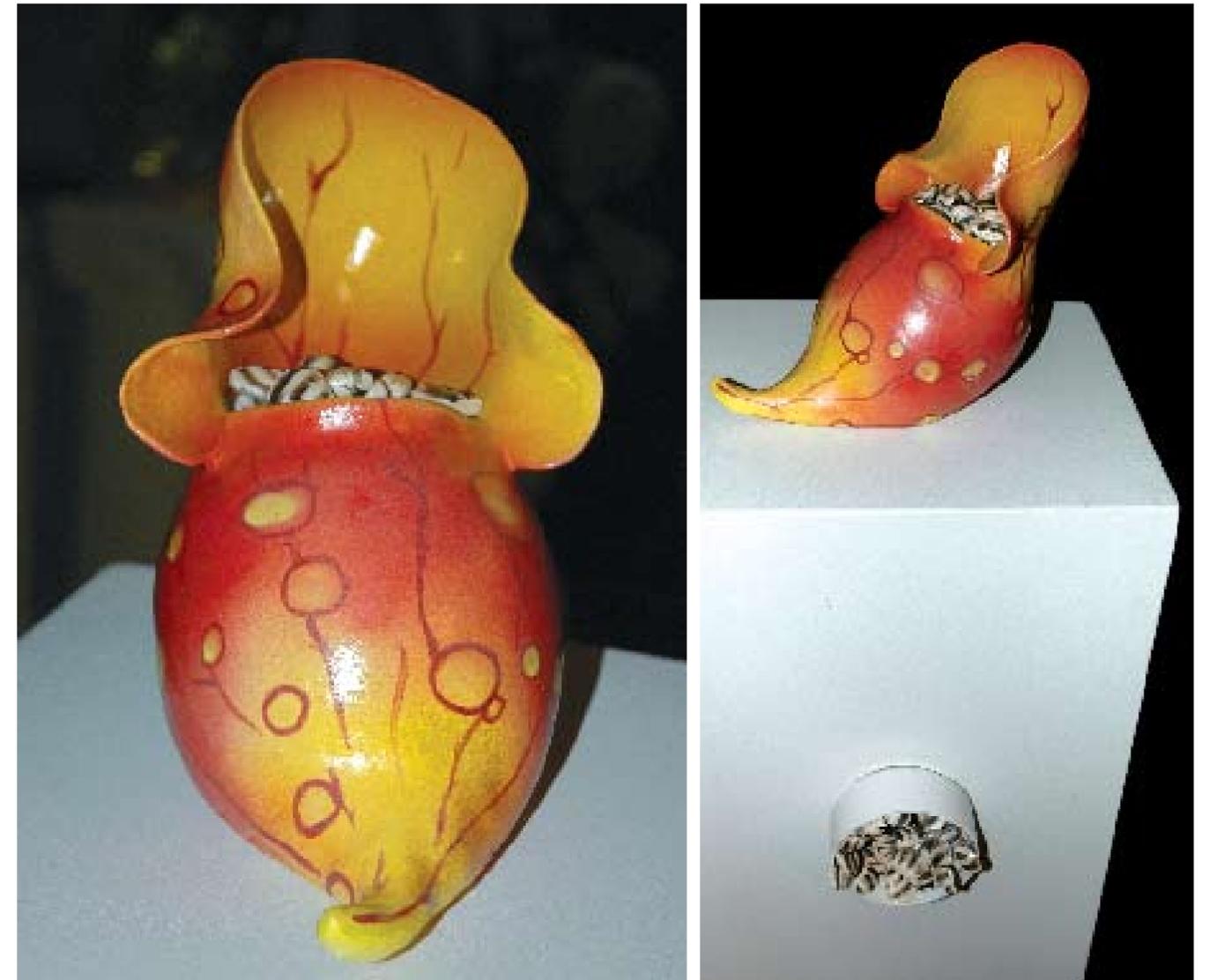
pitcher plant photo by: Kandis Elliot

John Glaeser

Though this compilation of bog textures, colors, shapes and water is a diminutive realm, and to be sure an artistically romantic icon, it does provide for us a few moments of close observation of living plant diversity found in larger natural wetland ecosystems. If this pause for inquiring observation triggers a desire to learn more about importance of wetland habitats, our tiny corner of Nature is doing its bit. Sustaining a continuing year round viable mini bog will be a challenge. This is uncharted territory. With daily misting to simulate morning dew, adding water to the pond weekly, providing appropriate lighting and doing occasional pruning, we may have a sustainable Paludarium (an aquatic / terrarium combo), a mini bog concept. Schools might want to give it a try.



Bog Paludarium, 2006, bog habitat



Pitcher Plant, 2006, ceramic

Rachel Dorn

The incursion of invasive species charts a parallel course with the changes brought about by raised CO₂ levels. The movement of invasives into the region was a result of connecting waterways to allow human society freer access to trade and transit. The easy movement of people and goods also brought foreign species into new bodies of water. Climate change is caused by society's interest in cheap, fast and easy movement of people and goods.

When opening the shipping routes from the Great Lakes through the Saint Lawrence Seaway, we as a society grossly underestimated the problems of tampering with the natural barriers. Awareness and change in individual habits has been successful in limiting the further movement of invasives to unconnected bodies of water. Similarly, raised social consciousness and understanding can help stem the increase of CO₂ emissions. A job of scientists is to educate. A job of artists is to create a powerful image. I hope to create a metaphor for the ideas discussed by scientists in this exhibition. The pitcher plant represents the bog ecosystem, vulnerable and in danger from climate change. The zebra mussels represent human interference with the natural system. Although zebra mussels are unlikely to reach bogs, warmer temperatures will increase survival of some invasive species.



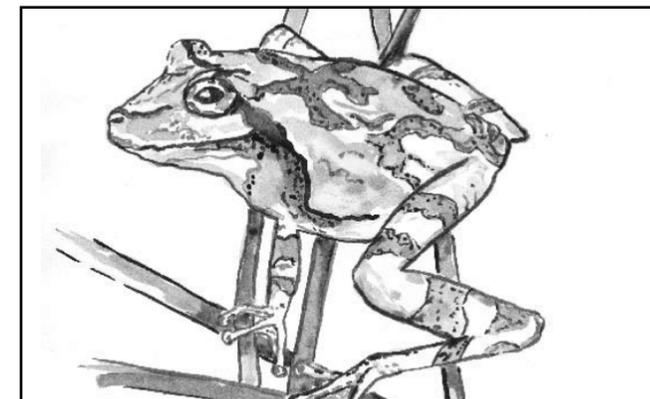
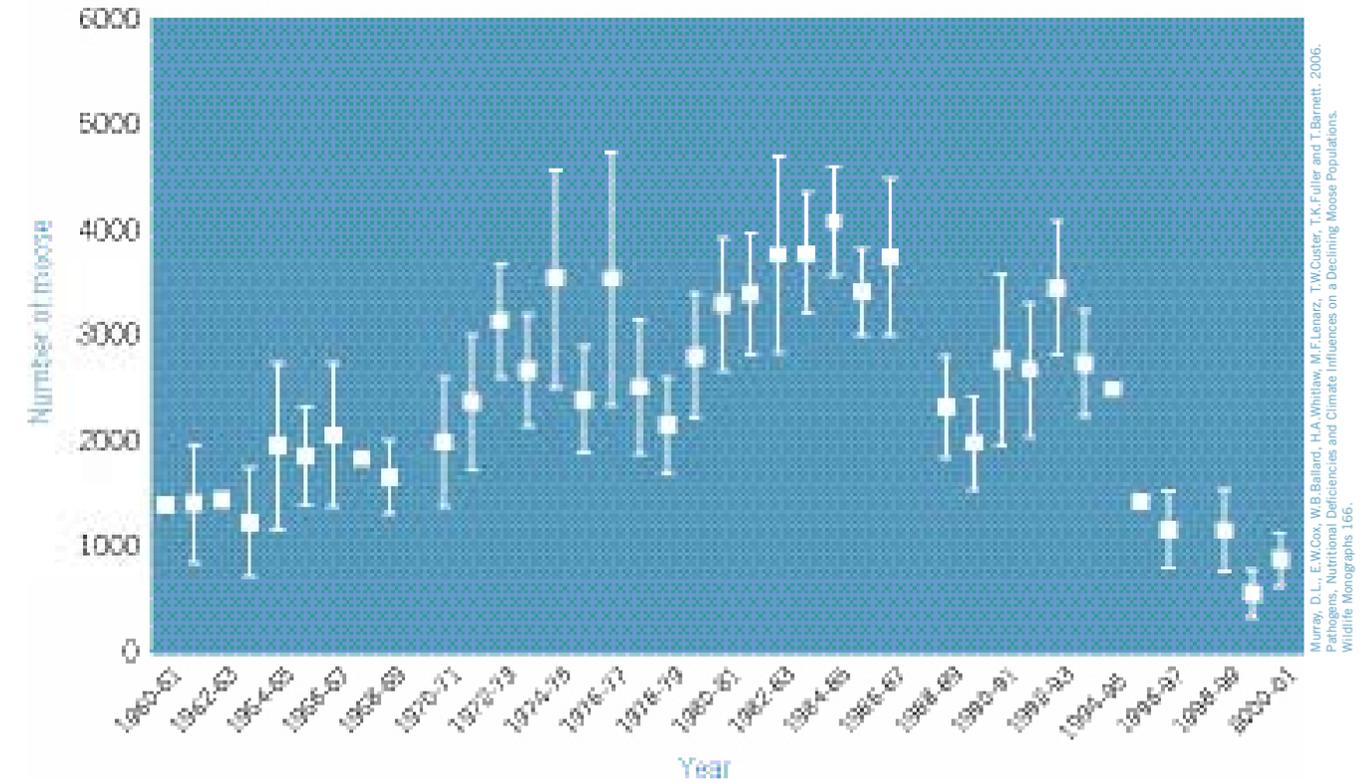
Moose Running, 2006, acrylic

Joyce Koskenmaki

Climate change is causing devastating changes to wildlife, especially in the north. *The Moose Running* is a metaphor for the effects of global warming on all wild animals. This moose is running from a forest fire, but warmer temperatures also make moose more vulnerable to diseases and parasites. I was inspired by ancient rock paintings across North America and Asia which use a style recently named “x-ray” in which the interior of the animal is decorated with stylized views of its skeleton.

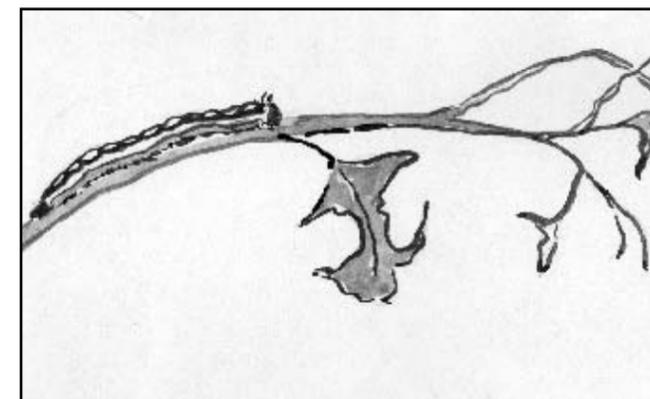
When an animal was depicted this way it indicated the sacredness of the animal. I photographed the skeleton of a moose in a museum and I had a photo sent from my sister in Alaska, of a moose running through her yard. The two photos matched, and I was able to put them together. I wanted in this way to express my own feelings about the sacredness of all wild animals.

Northwest Minnesota Moose Population 1960 to 2001



Wildlife that may decline:

moose, lynx, spruce grouse, American redstart, white-throated sparrow, and other songbirds, wetland-nesting birds, and amphibians.



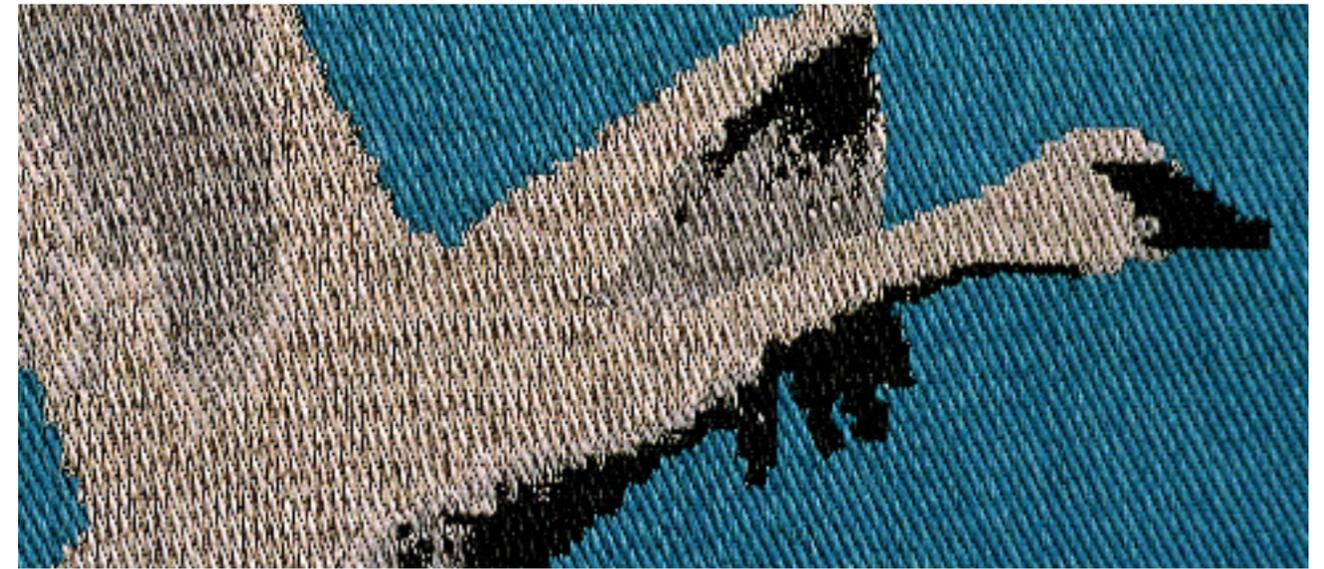
Wildlife species that may do well:

white-tailed deer, raccoon, skunk, cardinal, mockingbird, orchard oriole, wild turkey, ring-necked pheasant, mosquitoes, forest tent caterpillars and ticks.

Tree frog and forest tent caterpillar, india ink illustrations by: Terry Daulton

Mary Burns

What will our woodlands be like without the ethereal call of the hermit thrush or the “zee-zee-zee-zu-zee” of the black-throated green warbler tumbling down through the hemlocks? Who will usher in spring when the white throated sparrow’s “Oh, sweet Canada, Canada, Canada” no longer wakes us? This weaving, “The Trail of Feathers,” depicts bird species that may no longer be able to breed in Wisconsin. On panel one, these birds include redstarts, evening grosbeaks, Cape May warbler, Blackburnian warblers, magnolia warbler, and trumpeter swans. Panel two includes raven, loon, purple finch, winter wren, and black-throated green warbler.



The Trail of Feathers, detail



The Trail of Feathers, 2006, weaving

“I love to think of nature as an unlimited broadcasting station, through which God speaks to us every hour, if we will only tune in.” - George Washington Carver

Alter the Course

Many people see climate change as a gloom and doom issue. Yet if we take Carver’s advice and “tune in” we will find many solutions to this complex problem.

Today, our culture is dependent on fossil fuels for transportation, electric generation, food production; in short, we draw on fossil fuels for our day-to-day existence and lifestyles. We don’t have to wait for governments to do something about this. We can act now and let governments catch up later. We can become leaders in our own communities.

Our individual efforts to reduce CO₂ emissions are an important beginning. Building on this effort, we need to work for a future that does not rely on fossil fuels.

Our quality of life, the health of the planet and future generations depend on our willingness to meet this challenge.

A TREATY BETWEEN THE OJIBWE NATION AND THE UNITED STATES OF AMERICA
AT LAPOINTE IN THE STATE OF WISCONSIN ON OCTOBER 15, 2006**

PREAMBLE

TO ALL AND SINGULAR TO WHOM THESE PRESENTS SHALL COME, GREETINGS:

WHEREAS, after nearly two hundred years of working to eradicate the cultures of its Indigenous Peoples, the governmental leaders of the United States of America now understand that those cultures hold invaluable teachings for living properly with our land, water and air, and,

WHEREAS, our land, water and air are now facing the long-term negative effects of climate change, largely brought by the precipitous increase of greenhouse gases released into the earth's atmosphere due to human intervention, and,

WHEREAS, today's leaders of both the Ojibwe Nation and the United States, recognize that past leaders like Kechewashkeenh (Great Buffalo), Aldo Leopold, Mamongesada (Loon's Foot), Sigurd Olson, Waubishgaugauge (White Crow), John Muir, Waubojeeg (White Fisher), Gaylord Nelson and Waubijjauk (White Crane), all understood the lasting importance of land stewardship, thus in turn, we, as today's descendents of these leaders, in order to enjoy the long-term existence of humans on this planet, understand that it is imperative to continue this tradition.

THEREFORE, the leaders of the government of the United States of America hereby beseech the Ojibwe People to teach them how to live in this land in a manner that does not cause such disastrous effects as climate change. To facilitate this teaching, they, along with the leaders of the Ojibwe Nation hereby enter into this treaty with clear mind and serious intent, and set forth the following articles of agreement:

ARTICLE 1: Given the long friendship between the Ojibwe Nation and the United States of America, the leaders of the Ojibwe Nation agree to meet the demands of the request stated above. To facilitate the goal of this teaching, the leaders of the United States of America agree to come to Moningwunakauning Miniss (Madeline Island) in Spring 2007 to begin the teaching, and to meet annually at this site for a period of twenty-five years.

ARTICLE 2: Due to the propensity of the United States of America to recurrently find itself at war ever since first encountering the Ojibwe People, the United States of America agrees to study, and adopt as much as practicable, the Ojibwe world view and philosophy of life in order to learn how to begin walking the Road of Peace. Since the world of a people at war as much as the United States has been is out of balance, a condition that can lead to effects like climate change, the Ojibwe People agree to teach the Americans how to achieve the balance between militarism and pacifism that is necessary for on-going life.

ARTICLE 3: The governmental leaders of the United States of America agree to learn the Ojibwe Peoples' long-term perspective on existing as only one of the many species of life on this planet. This will focus on the need to always keep in mind a concern for The Seventh Generation as America resolves the paradox of living to meet the needs of the immediate, but also, at the same time to never forget to meet the needs of the eternally distant.

ARTICLE 4: Remembering that in the past the Americans sent blacksmiths, carpenters, farmers and teachers to the Ojibwe in order "to civilize the savage," the Ojibwe hereby agree to send technicians, artisans, teachers and holy persons to the Americans in order to teach them how to live properly in this land.

ARTICLE 5: Given the urgency of the need to learn how to live with our land, water and air in order to halt the negative effects of climate change, the United States of America, in order to cover the expense of activities stated in the above articles, agrees to annually pay to the Ojibwe Nation, the sum of one hundred million dollars over the next twenty-five years, and that each year's sum is to be transferred to the Ojibwe Nation's financiers at the time of the annual Chequamegon Bay meeting. The decision to renew this payment for another twenty-five years at the above stated amount or to change the amount is left to the discretion of the leaders of the Ojibwe Nation.

ARTICLE 6: All agreements set forth in this treaty are valid and binding at the pleasure of the leaders of the Ojibwe Nation.

RATIFICATION: This treaty shall be obligatory upon the contracting parties, when ratified by the appointed leaders of the constituent communities of the Ojibwe Nation.

TREATY SIGNATORIES: We, the undersigned appointed Ojibwe and United States leaders, acting in the capacity of Treaty Commissioners, hereby give our full faith and trust in both our nations to fulfill the obligations set fourth in the above articles of agreement:

Treaty Commissioner for The Ojibwe Nation

Treaty Commissioner for the United States of America

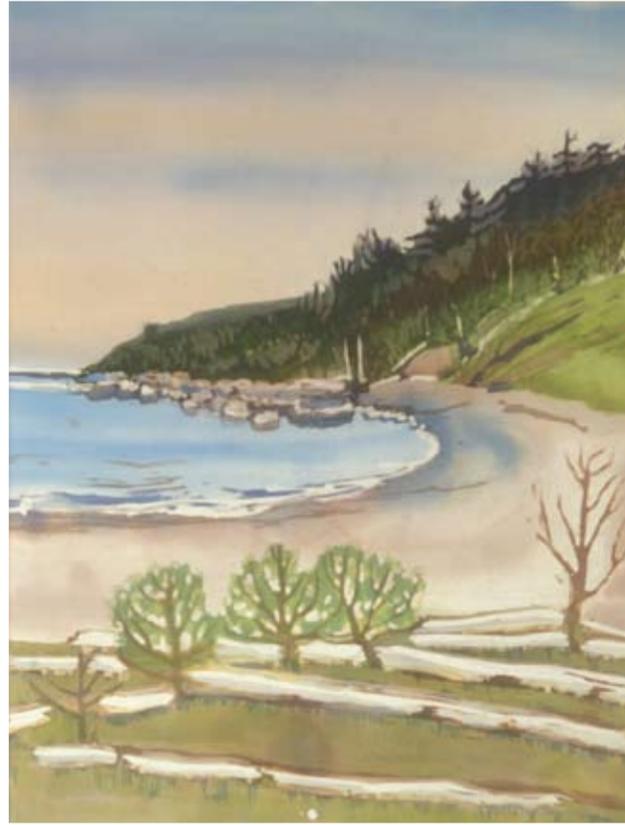
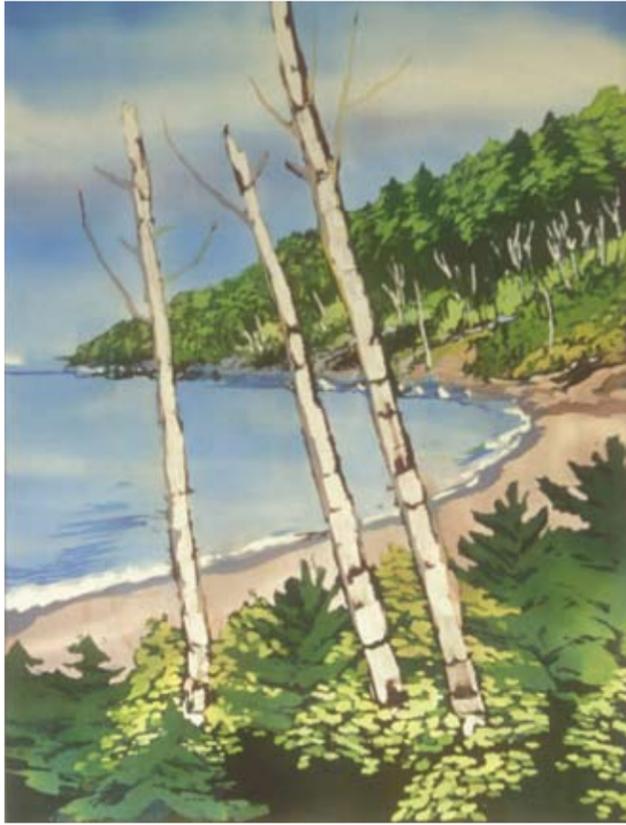
**THIS IS A PURELY FICTITIOUS DOCUMENT, MODELED AFTER THE 1837, 1842 AND 1854 TREATIES BETWEEN THE OJIBWE PEOPLE AND THE UNITED STATES OF AMERICA. IT IS OFFERED IN THE SPIRIT OF ART, FANTASY, HISTORY AND HOPE.



Untitled, 2006, acrylic on wood panel

Howard Paap

This fictitious treaty is fashioned after major Ojibwe-American treaties, and is meant to cause thought about the underpinnings of our relationship with the natural world. We must change, and indigenous people like the Ojibwe can teach us how. If we do not alter our ways plants like white birch, spruce, blueberry and thimbleberry could be extirpated from our region. The Ojibwe directional colors with their union in the center suggests the balance needed for our survival. We can all drive hybrid vehicles and recycle our material waste, but unless we seriously study the philosophical underpinnings of our culture and initiate relevant changes, we will do little to halt the disastrous effects of climate change.



Hope for Lake Superior in 2095, 2006, batik on silk

Fear for Lake Superior in 2095, 2006, batik on silk

Connie Kercove

Even if we make drastic reductions in worldwide greenhouse gas emissions now, temperatures are expected to continue rising before they level off. As the climate warms, some northern tree species will be unable to reproduce. In areas with moisture-retaining soils, growth rates for some maple and pine species may actually increase. My first painting depicts climate warming leveled off, allowing a changed forest to thrive.

If we do nothing to curb global greenhouse gas emissions, temperatures are expected to rise and then spike rapidly. A decline in Lake Superior water level is projected as winter ice coverage decreases. My second painting shows the climate changing faster than tree species can adapt. Dying trees and saplings, severe winds and drought could provide fuel for wildfires. Southern tree species may not move into the region as quickly as northern species recede.

The first painting shows my hope for the future; the second depicts my fear. Let us work together with hope for our grandchildren's future.



Support Our Spruce (above), 2006, pastel

Walking Blind (left), 2006, pastel



jd Slack

Support Our Spruce. When the scientists explained that the spruce would not survive here if the climate continues to heat up, I was devastated. What would home be like without the spruce? Look around you: spruce are everywhere.

I imagine (and hope for) a movement of people of all ages, political affiliations, and races (thus the red, black, yellow, and white ladders and supports) working together to halt the human-induced heating up of our world. Here in the North Woods, the slogan for our efforts could be Support our Spruce!

Walking Blind. One climate change scientist said that with respect to climate change, we are like a person walking blindly toward a cliff. We don't know how far away it is; but we know it is there, somewhere. If we do not stop, take off our blinders and act with intelligence, we will at some point reach that tipping point and tumble off the edge of the world as we know and love it.



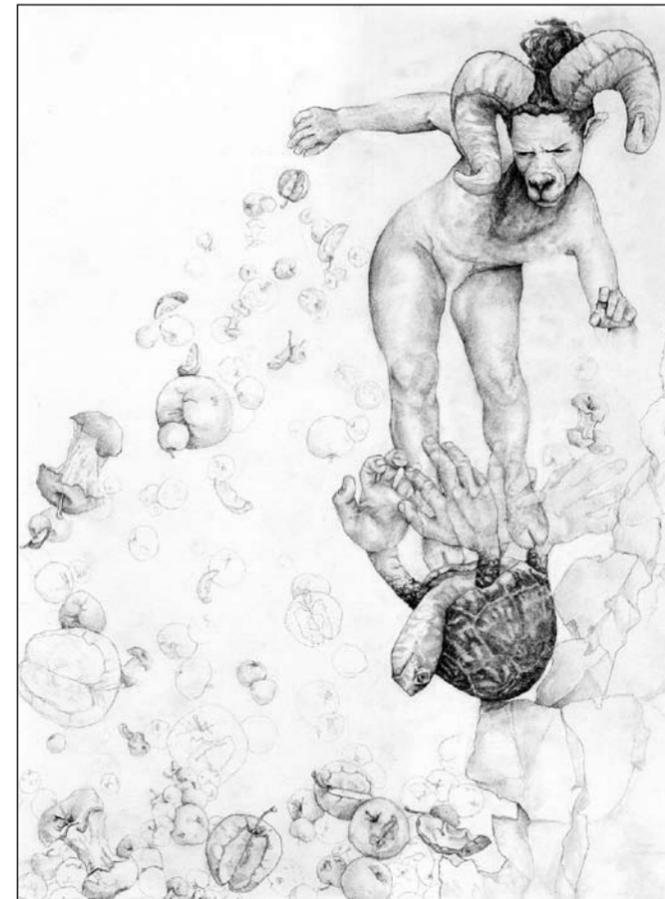
The Warming, 2006, welded steel armature with fabric, wire, aluminum can tabs

Marilyn Annin

Man woke up and saw Trees walking. Fox, Snake and Hare were walking too for the land was uncertain. Wind tore at man and it was hot. Gaia saw Man and was wary.

Man, born of the earth, notices the goddess Gaia, Mother Earth, is busy multi-tasking. She is dealing with turbulence from the sky, Winter has wandered off and her kingdom is on the move to better lands. She is waiting to have a dialogue with Man whom she hopes will be responsive to her concerns.

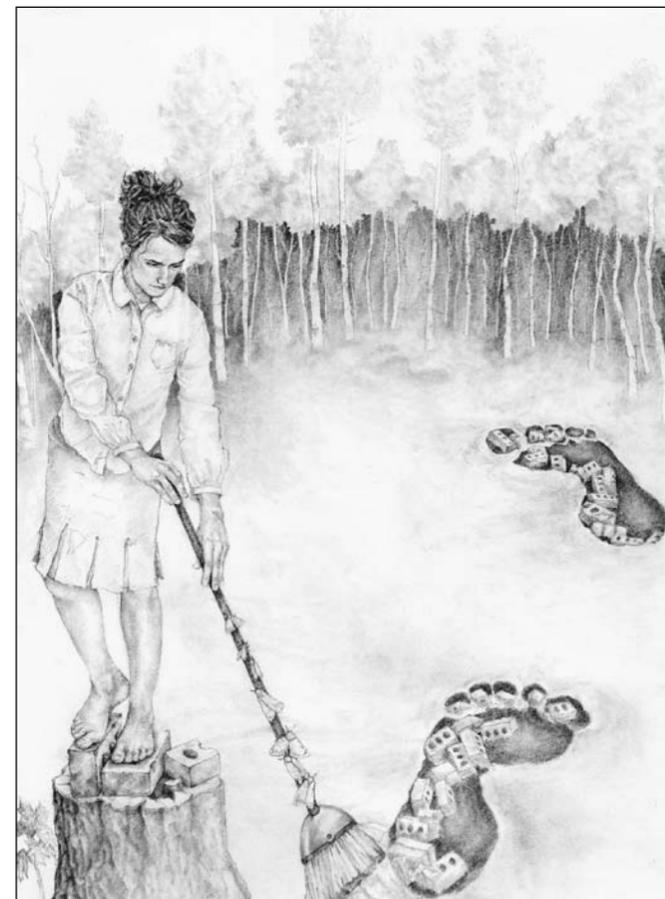
These rigid garments, Man and Gaia, represent the main actors in the global warming drama. Man, dressed in his pin striped overalls is neither good nor evil but he must do more than say his lines to be a hero. Gaia, who created order out of chaos, is waiting to respond. Let's hope Man can influence the last act. If Gaia completes the story Man might not like the ending.



Before the Fall (upper), 2006, graphite on paper
What you can (lower), 2006, graphite on paper

Melissa Cooke

My work explores the interconnectivity of humans and nature as well as the impact we make on the Earth. I fuse everyday events with surreal landscapes, symbolic objects and metaphoric actions to explore imbalances and delicate relationships. “Before the Fall” utilizes zoomorphs, people fused with animals, in order to explore the relationship between man and nature. By making composite figures, the figures are given either the powerful characteristics of the animal or are conversely imbued with the animal’s vulnerability. “What you can” illustrates the need to diminish waste and lessen the negative impact that we have on the Earth.



Through analogy and symbolism, I create visual narratives that illustrate the need for community and cooperation in order to preserve our environment. Climate change is altering landscapes and conditions, putting delicate ecological balances in peril. Everything is interconnected. Our fate and well-being rests on the health of the environment.

This Paradise we call the North Woods does not have to be lost. If we all work together we can make a difference for the Lake Superior Region.

“Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it’s the only thing that ever has.”
– Margaret Mead

WHAT CAN YOU DO?

Here are several things you can do to reduce greenhouse gas emissions and alter the course of climate change in the North Woods for the better. Start with the easy options and work up. Many of these ideas have the added value of saving you money, and some will even improve your health!

Home heating and cooling

Reduce up to 44% of total home energy use

- > Use a setback thermostat
- > Insulate and seal air leaks
- > Install an ENERGY STAR® furnace

Appliances and electronics

Reduce up to 39% of total home energy use

- > Turn off and unplug when not in use
- > Buy ENERGY STAR® appliances
- > Replace refrigerators and freezers made before 1990

Water heating

Reduce up to 11% of total home energy use

- > Install a low flow shower head
- > Install a high efficiency water heater

Lighting use

Reduce up to 6% of total home energy

- > Use compact fluorescent bulbs
- > Turn off lights when not in use

Transportation

Reduce or eliminate CO₂ emissions

- > Carpool
- > Walk
- > Bike
- > Take the bus
- > Buy a fuel efficient car
- > Purchase locally grown foods

Renewables

Reduce or eliminate CO₂ emissions

- > Participate in your utility’s green power program
- > Install solar panels or a wind generator

Plant a tree

Recapture CO₂ from the atmosphere

- > Choose a species native to your area
- > Volunteer to help manage invasive species

Write a letter to our leaders

Help them make good decisions

- > Start locally to act globally

To listen to the music created for the exhibition, and to view the documentary film of the project please visit:

www.wisc.edu/cbe/K12/paradiselost.html

Project Musicians

Frank Montano



My climate change music captures the sounds of Lake Superior in the area of the Red Cliff Indian Reservation. I recorded these sounds, and my flute accompaniment, on the shores of Eagle Bay. Being of Ojibwe heritage, from the Red Cliff Band of Chippewas, I have respect for Mother Earth and live my daily life with nature. I have been involved in many projects to preserve Lake Superior and the North Woods of Wisconsin.

Charles Thomas



Great Lakes Paddle

Inspired by a “virtual paddling tour” of Lake Superior given by Climate Change Workshop artist, Jeff Richter, the song was written as a soundtrack to accompany Jeff’s amazing photos.

Industry

Written about industry’s contribution to the problem of climate change. The song’s four sections examine our initial fascination with industry, the ways in which industry and technology began to get away from us, the “fallout” from industry (air pollution, strip mines, leveled forests), and being forced to face the consequences of our actions.

Better Days

A Celtic-inspired song that represents the possibility of a hopeful future. I chose Irish music because it spoke to me of a time when people in communities helped each other, and when they lived “with the land” instead of exploiting it.

Oma Lo Naié

Oma Lo Naié means “Mother we call to you” in a language of which the author is not aware. Close your eyes and imagine you’re part of a ceremony that will bring nature and people of all tribes together in harmony.

Project Scientists

David Mladenoff

David Mladenoff is Beers-Bascom Professor in Conservation, in the University of Wisconsin-Madison Department of Forest Ecology & Management. A native of northern Wisconsin, his research is focused on forest ecosystems and landscapes in the northern Great Lakes region. His work includes research on the effects of climate change, historical land use, wolves, deer, and current management on forests. He teaches a course on landscape ecology. He also enjoys non-research time at a cabin in the North Woods.

Scott Spak

Scott Spak is a Ph.D candidate in Atmospheric & Oceanic Sciences at the University of Wisconsin-Madison. Scott studies regional interactions between atmospheric chemistry and energy at the Center for Sustainability and the Global Environment. His recent research includes forecasting the local effects of global climate change on temperature in the Midwest, and his dissertation focuses on the composition and dynamics of aerosols around the Great Lakes. Scott holds an B.A. in Engineering Sciences from Dartmouth College.

Tim Kratz

Tim Kratz is an aquatic ecologist with research interests in how landscape setting influences lakes and how they are likely to change. He received a Ph.D from University of Wisconsin – Madison in 1981 and is currently the Director of the University of Wisconsin -Madison’s Trout Lake Station, located in the heart of the Northern Highland Lake District in northern Wisconsin. Tim is an avid cross country skier and also enjoys kayaking and hiking. He is concerned about how climate change will alter our lakes, but also how it will affect winter snow cover and the region’s winter recreational activities. He grew up in Milwaukee but has lived in the North Woods since 1981 and loves it.

Teri Balser

Teri Balser studies ecosystems and global change around the world. A soil scientist, Teri is fascinated by life underfoot, and how microorganisms can reinforce or reduce the impact of climate change. She was recently awarded a National Science Foundation Career award for her work bridging scientific disciplines in understanding the soil contribution to climate change. Teri teaches several courses including Soil Biology, Microbial Communities and Global Change, and Women’s Ways of Leading. She has a Ph.D in Soil Science from University of California Berkeley. She can be found teaching, writing, or playing saxophone at various venues around the state!

John Magnuson

John J. Magnuson is Professor Emeritus of Zoology at the University of Wisconsin-Madison, and Director Emeritus of the Center for Limnology, and Emeritus Member of the Limnology and Marine Science Graduate Program. Magnuson’s research activities focus on long-term ecological research on lake ecological systems, potential influence of climate change on inland waters, fish and fisheries ecology, biogeography and landscape ecology of lake and stream systems, and ecological dynamics of biodiversity and invasion.

Mark D. Schwartz

Mark D. Schwartz is a climatologist and professor of Geography at University of Wisconsin-Milwaukee. He studies interactions of climate and vegetation, including studies of changes in the onset of spring during the last 50-100 years. Prof. Schwartz received his Ph.D from the University of Kansas in 1985. and recently published *Phenology: An Integrative Environmental Science*. A main goal for future work is the development of a National Phenology Network which will (among other things) facilitate assessment of the long-term impacts of climate change on the biosphere.

Project Educators

Zach Wilson

Zach Wilson has been the staff naturalist and environmental educator for the North Lakeland Discovery Center for the past seven years. He graduated from Northland College with a degree in Outdoor Education and works with youth and adult audiences. He created and conducted the student education component of this project.

Diane O’Krongly

Diane O’Krongly teaches high school science in Hurley, Wisconsin and attended the climate change workshop.

Pam Baeseman

Pam Baeseman teaches high school science in Mercer, Wisconsin and attended the climate change workshop.

Educational Advisors

Joe Rose, Northland College
Serena Mershon, Gogebic Community College
Joan Schumacher Chadde, Upper Michigan Center for Math and Science Education

Project Creators

Terry Daulton

Terry Daulton is an artist, field biologist and environmental educator. She developed the initial concepts for *Paradise Lost?* and worked in tandem with University of Wisconsin-Madison staff to create the show and organize its exhibition calendar and implement its education components. Her network in the scientific and art communities of the North Woods and knowledge of northern ecosystems enriched and informed the project. She lives in Mercer, Wisconsin where she works as an environmental consultant and artist. She has a M.S. in Environmental Education from University of Wisconsin-Stevens Point.

Dolly Ledin

Dolly Ledin works to engage scientists in reaching out to the community and to engage youth and adults in the process of science. She has worked as outreach coordinator for the University of Wisconsin-Madison Center for Biology Education for the past 17 years. She has worked as an elementary and middle school teacher, an environmental educator with the Wisconsin Department of Natural Resources and an adjunct faculty member with UW Stevens Point. She has an MS in Land Resources from University of Wisconsin-Madison-Institute for Environmental Studies.

Exhibit and Catalog Design

Scott Pauli

The catalog and graphics for the exhibit were designed by Scott. He lives and works in Madison, WI. As a designer, he has worked on environmental advocacy campaigns for Great Lakes Forever and the State Environmental Leadership Program to name a few. As an artist, he works in a variety of media including printmaking, drawing, video and installation. As an educator Scott runs the Mess Hall Press, a design and printmaking program for aspiring high school artists and designers. Scott likes to experience the beauty of the North Woods through canoeing, fly fishing and most of all surfing the Great Lakes. To see more of Scott's work visit www.scottpauli.com.

Environmental Statement about printing

In order to stay true to the project's mission. This catalog was printed with a keen sensitivity to environmental impact. From the catalog size to the paper it was printed on, we have tried to keep the catalog's carbon emissions and production waste as low as possible.

Acknowledgements

Leslee Nelson provided advice on project development and involvement of artists and coordinated the artist selection jury.

We would also like to thank the following people for their support and assistance in making this project a reality: Martha Glowacki, Mark Charon, Callie Bates, Marcy Cella, Catherine Young, Jim Armstrong, Jane Silberstein, Joe Rose, Jennifer Stofflet, J. Marshall Wilson, Camp Jorn, Katy Ralph, Linda Mittlestadt, Erica Howard, Serena Mershon, Chequamogon Food Coop, The Wisconsin Academy of Sciences, Arts and Letters, Wisconsin Energy Conservation Corporation, KEEP (K-12 Energy Education Program), Susan Nelson SAGE (Center for Sustainability and the Global Environment), Pat Behling, UW Center for Climatic Research, Tracey Mofle, Phil Kucera, The Pine Tree Gallery

Videographer

Rachel Carlson

Rachael Carlson is currently pursuing her Master's degree in history from Illinois State University. Her research strives to document how individuals and communities have experienced and are responding to environmental change. This film includes footage from the initial conference with the artists and scientists at Camp Jorn as well as individual interviews with the artists.

Website

David Augustine

Dave is the Center for Biology Education's resident technology consultant and has a background in both computer science and history of science. His role at CBE includes implementing new technology related ideas and programs.

tree	water	energy	acid waste	greenhouse gases
3 fully grown	1,685 gallons	4 million BTU	369 pounds	623 pounds

Calculations based on research by Environmental Defense and other members of the Paper Task Force.

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Please visit:

www.wisc.edu/cbe/K12/paradiselost.html

For additional scientific information, artists' biographies, the *Paradise Lost?* documentary, the exhibition music, or to send feedback on the exhibition.

Check out these sites and publications for more information:

Education partner

North Lakeland Discover Center
discoverycenter.net

Scientific information

Union for Concerned Scientists
ucsusa.org/global_warming/

Climate Crisis Network
climatecrisis.net

National Oceanographic and Atmospheric Admin
noaa.gov

NOAA research on the Great Lakes
glrl.noaa.gov

Wisconsin Department of Natural Resources
dnr.wi.gov/org/aw/air/global/global.htm

US Geological Survey
usgs.gov

National Wildlife Federation
nwf.org

Intergovernmental Panel on Climate Change
ipcc.ch

Carbon footprint websites

myfootprint.org
climatecrisis.net/takeaction/carboncalculator
safeclimate.net/calculator

Renewable energy resources

Focus on Energy
focusonenergy.com

Renew Wisconsin
renewwisconsin.org

Midwest Renewable Energy Association
the-mrea.org

Energy companies

Madison Gas & Electric
mge.com

Wisconsin Public Service
wisconsinpublicservice.com/news/naturewise.aspx

UPPCO
www.uppco.com

Dairyland Power Cooperative
Dairynet.com

Excel Energy
xcelenergy.com/xlweb/cda

Curriculum

United States Environmental Protection Agency
epa.gov/climatechange/wycd/school.html

Wisconsin K-12 Energy Education Program (KEEP)
uwsp.edu/cnr/wcee/keep/

NCAR (National Center for Atmospheric Research)
Website for teachers
ucar.edu/learn/

Lessons from the Lawrence Hall of Science
lhs.berkeley.edu/GSS/studentbooks/climatechange.html

Other arts projects

capefarewell.com

Books

The Weather Makers - Tim Flannery
An Inconvenient Truth - Al Gore
Field Notes from a Catastrophe - Elizabeth Kolbert