

## THE NATIONAL

THE NATIONAL Tue Jul 28 2009, 10:00pm ET Byline: PETER MANSBRIDGE PETER MANSBRIDGE (HOST): -

KELLY CROWE (REPORTER): Should we allow climate change to drive a species into extinction or should we interfere?

PETER MANSBRIDGE (HOST): Kelly Crowe on the question that's got scientists divided: How to save the forests of British Columbia.

Vast swaths of forest in British Columbia have already been destroyed by the mountain pine beetle, a pest that has managed to survive the warmer winters, and if projections about climate change are right, more trees will die. So now researchers in B.C. are testing out a new strategy to help save the forests, a promising experiment perhaps, but is it taking conservation efforts a step too far? Here's Kelly Crowe with "Adaptation."

KELLY CROWE (REPORTER): High in the interior of British Columbia, an unprecedented experiment is underway. They're taking trees that normally grow in a warmer climate and planting them here on an old logging site, trying to help forests adapt to climate change which is happening too fast for the trees to keep up. It's the first research of its kind, exploring a controversial idea called assisted migration, moving trees further and faster than they could move on their own. Researcher Greg O'Neill is heading up the experiment for the province.

GREG O'NEILL (BRITISH COLUMBIA MINISTRY OF FORESTS AND RANGE): This is a very high, cold, dry site. We're about 1600 metres. We fully expect that probably half the trees, at least half the trees that we plant here will die. We realize that. We need to confirm that, quantify exactly how many trees out of each species, out of each seed source will die, will do well. We'll be tracking these trees for 20, 30 years at least. We want to understand exactly how well they will tolerate this high, cold, dry climate.

KELLY CROWE (REPORTER): It makes sense that an experiment like this would happen here first in a place defined by the forests, supported by their wealth and now threatened by climate change. It's evident in the red stain of dead trees killed by the mountain pine beetle that can now survive the warmer winters. And that's after a warming of just one degree over the last century, foreshadowing the potential devastation that lies ahead.

That's why B.C. researchers are beginning to explore daring ideas about how to help forests keep up with climate change.

KELLY CROWE (REPORTER): At the Department of Forest Sciences at the University of British Columbia, tree geneticist Sally Aitken is studying what has become the most at-risk tree species in the West, the white bark pine. In this growth chamber, graduate

student Sierra Curtis McLane is testing the temperature tolerance of the white-bark pine and its major competitor, the lodgepole pine. Assisted migration might be the only way to save the white-bark pine because the tree can't keep up with the warming climate. On this computer model, the white-bark pine grows in the purple areas, the cool, high alpine forests. Watch what happens when the model is programmed to go forward 70 years under middle-of-the-road climate change projections. The purple high alpine climate is forced much farther north. That's in just 70 years, the lifetime of an average tree. Look at the model again. Each colour represents a specific growing area. Fast forward 70 years, and with each colour change entire ecosystems will have to either move or die.

SALLY AITKEN (UNIVERSITY OF BRITISH COLUMBIA DEPARTMENT OF FOREST SCIENCES): From scientific studies of re-colonization of trees after the last ice age, we know that the fastest tree species moved was about 100 or 200 metres per year. They would have to move much faster than that, some estimates suggest an average of 7 kilometres a year, of shift, movement of populations and expansion of ranges to keep up with the changing climate, and they simply cannot reproduce and disperse and establish that quickly.

KELLY CROWE (REPORTER): Because trees can't move fast enough on their own, the idea is to help them keep up with the climate by moving southern trees further north. This is the Sitka spruce, a tree with a range that extends from California to Alaska. Here on the UBC campus, they've planted samples from all over that range.

SALLY AITKEN (UNIVERSITY OF BRITISH COLUMBIA DEPARTMENT OF FOREST SCIENCES): So here we see the trees from the northern part of the range in Alaska. What we're trying to find out is the genetic basis of the adaptation of these trees to their climates, how closely they are adapted to climate, and whether or not they are able to adapt quickly to new climates. As climate changes, will these populations be able to adapt quickly enough?

KELLY CROWE (REPORTER): In the raised and protected beds, the California trees grow well. But when they're planted directly into the ground, they die, overwhelmed by the colder, wetter winters. At the B.C. Ministry of Forestry Research Centre in Vernon, they're also planting and killing trees from all over the range to see what will grow in the Okanagan Valley.

(Interview) These trees look smaller and they're not doing very well. What happened here?

GREG O'NEILL (BRITISH COLUMBIA MINISTRY OF FORESTS AND RANGE): These four trees are from Edson, Alberta. They grow- they originate from a climate that's about 5 degrees warmer than Vernon. So they are messed up because their natural timing is different from what you would expect here so they've lost their needles, they've lost their top, they're short, they're crooked.

KELLY CROWE (REPORTER): So this is what Edson trees would look like under climate change, a climate change of 5 degrees.

GREG O'NEILL (BRITISH COLUMBIA MINISTRY OF FORESTS AND RANGE): Correct. So a fairly severe climate change.

KELLY CROWE (REPORTER): (Voice over) The challenge is to match the tree to the appropriate degree of climate change. They know they can't move a tree too far out of its comfort zone.

(Interview) What could go wrong?

GREG O'NEILL (BRITISH COLUMBIA MINISTRY OF FORESTS AND RANGE): It's possible that if one were to move the tree too far, the plantation might not do well. If we don't move it far enough, the trees may be very sick in their last couple decades of life, say, 70, 80 years from now before they're harvested when the climate's 3 or 4 degrees warmer.

KELLY CROWE (REPORTER): (Voice over) So they need to know more. That's why they're taking thousands of seedlings for 16 species and planting them in 48 locations across the province, a major experiment spanning several decades and the first of its kind to research human-assisted migration of trees to keep up with climate change.

GREG O'NEILL (BRITISH COLUMBIA MINISTRY OF FORESTS AND RANGE): There's very good evidence that if we plant trees adapted to warmer climates that the trees will be healthier, they will be straighter, and they will be more productive. So the intention here is to understand the climatic tolerances, how far can we move the trees safely so that they'll grow well, not just now but also into the future.

KELLY CROWE (REPORTER): It's not just the trees that can't move fast enough to keep up with climate change. Lots of other species won't be able to survive once their habitat changes. Butterflies, fish, mammals, what about them? It's a controversial question. Should we allow climate change to drive a species into extinction or should we interfere and move them to someplace they've never been? It's a debate that is rocking the normally staid world of conservation biology.

ANTHONY RICCIARDI (MCGILL UNIVERSITY): This is becoming a conservation bandwagon born of the desperation that some biologists feel.

KELLY CROWE (REPORTER): At McGill University, conservation biologist Anthony Ricciardi is leading the charge against assisted migration. He says every time a plant or animal is moved out of its habitat, it's like spinning an ecological roulette wheel, and he's an expert in what can go wrong when an invasive species gets out of control, like the green crab transported around the world in the ballast water of ships.

ANTHONY RICCIARDI (MCGILL UNIVERSITY): We have great difficulty in predicting the impacts of a species that's moved outside of its native range, away from its natural enemies, away from the environmental constraints that it's adapted to, into an area where it's meeting other species that have no evolutionary experience with it. Under these situations, sometimes we've had strong ecological impacts, and we can understand them after they've happened, we can explain them after the fact in many cases, but forecasting them is entirely a different situation.

KELLY CROWE (REPORTER): Humans have always moved species around, sometimes by accident, sometimes on purpose. Back in the late 19th century, the European house sparrow was released in North America by immigrants who wanted to be surrounded by the birds of their homeland. More than a century later, it has become one of the most invasive birds on the continent, competing with native birds for food and habitat. And then there's the story of the red squirrel in Newfoundland. Scientists were trying to save a threatened mammal called the pine marten by introducing the red squirrel as a food source. It backfired. The pine marten had no appetite for the squirrel.

ANTHONY RICCIARDI (MCGILL UNIVERSITY): And it turned out the red squirrels outcompeted a rare bird for spruce cones and so caused that bird to become endangered. That was the Newfoundland crossbill. But this is an example where the best of intentions, the most careful planning have led to an unanticipated problem, and I can foresee many unanticipated problems occurring if we were to engage in this on a broad scale, moving species around all across the planet in an attempt to save them.

KELLY CROWE (REPORTER): The B.C. trees are among the first species to be deliberately moved by scientists because of climate change, and they're being moved only short distances and only under careful supervision and monitoring. But with estimates that up to half the world's species might need to move to survive warming temperatures, Anthony Ricciardi is concerned that it's the beginning of a wider trend.

ANTHONY RICCIARDI (MCGILL UNIVERSITY): I'm not against the research. I'm quite fascinated by the research. I'm against the notion that this is going to proceed regardless of the concerns of a large group of conservation biologists. I'm against the idea that this will be a common tool in the toolbox to deal with climate change.

KELLY CROWE (REPORTER): Greg O'Neill is hesitant to wade into the wider debate over assisted migration, but with B.C.'s forests poised to change dramatically, he believes it's important to at least take the time to study the possibilities.

GREG O'NEILL (BRITISH COLUMBIA MINISTRY OF FORESTS AND RANGE): There's a long-held view that local is best, and this view is grounded in a lot of good science. However, we're in a different era now with climate change, and we have to look outside the box and look at new opportunities.

KELLY CROWE (REPORTER): Moving a species to save it evokes an image of Noah's Ark, selecting particular plants and animals and moving them out of harm's way. But for

Anthony Ricciardi, it also evokes a nightmare of Pandora's box. Once the lid on assisted migration is opened, it will be impossible to close.

ANTHONY RICCIARDI (MCGILL UNIVERSITY): Plants and animals alter the environment around them. Plants do it by, for example, changing the chemistry of the soil they're living in. Animals do it by altering food chains. So they change the rules of existence for other organisms.

KELLY CROWE (REPORTER): As scientists struggle with the idea of assisted migration, the question that looms over the debate is this: By interfering with nature to try to repair the damage, will humans end up making the problems even worse?

Kelly Crowe, CBC News, near Princeton, British Columbia. ONSCREEN: Debi Goodwin, producer Catherine McIsaac, editor © 2009 CBC. All Rights Reserved. Length: 2018 words Idnumber: 200907280017 Keywords: british columbia; kelly crowe; climate change; reporter; mcgill university; columbia ministry; anthony ricciardi; forest sciences; columbia department; assisted migration; trees; range; neill; forests; sally aitken