



# A CHILLING EFFECT ON BEEKEEPING

## Global Warming, Beekeeping, and Unexpected Outcomes

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By now, most of you are in the midst of a Spring nectar flow or preparing for one. Lots of us waded through snow back in February and early March, feeding colonies, sliding pollen patties into hives, and otherwise trying to get some serious brood rearing started.

After a day working hives in snow, any beekeeper might be tempted to think that a little global warming might not be such a bad idea.

But they'd be wrong.

Before we go any further, I guess I should explain why you keep hearing the term "debate" in regard to global warming. The only debate among reputable scientists is about the specific negative impacts that are resulting and will result from global warming. If you read newspapers rather than scientific journals, you are subjected to the distortion of "journalists" who have problems differentiating between carbon monoxide and carbon dioxide, yet presume to provide "objective balance" on issues that they can't be bothered to learn about themselves. In this case, "objective balance" becomes the amusing notion that viewers and readers are entitled to "both sides" of any issue, without any mention that one "side" is being presented by a tiny number of paid shills.

The result is that one person interviewed represents 99.97% of the scientific community, who have a firm consensus that global warming is not only being caused by human activities, but also agree that it is a serious issue. The other person interviewed represents the tiny number of scientists in the employ of the worst of the air polluters.

If you look carefully, you will notice that the scientist claiming that global warming is either not happening at all or is not being caused by heavy industry wears a lab coat that is slightly too large. This is to hide the unsightly bulges of the wads of cash stuffed into his pockets by polluters to entice him to make himself a laughingstock among his peers.

But it just isn't funny.

And beekeeping will suffer badly from global warming.

But not in the way you might think.

### GLOBAL WARMING, COLDER CLIMATE

Climate models indicate that global warming can cause a localized "mini-ice age" of sorts, with ripple effects that would make beekeeping more difficult in

some places, and impossible in others. It could happen within the next few decades, and last for generations. It has happened before, and samples of ocean water temperature and salinity continue to indicate that it could happen soon, suddenly, and without much warning.

In 2002, the National Academy of Sciences published a report that they titled "Abrupt Climate Change: Inevitable Surprises." You can read the entire report online at [www.nap.edu/books/0309074347/html](http://www.nap.edu/books/0309074347/html). The NAS is not some fringe group of tree-huggers. The NAS is the "science advisor to the nation," and scientists who are asked to contribute to the efforts of the NAS serve without pay to address critical national issues and give advice to the federal government and the public. The title of their report alone should make clear just how universal the acknowledgement of global warming as a serious and negative force is among qualified experts.

In short, the report says that ongoing global warming is certain to break something beyond repair, and while no one can predict the exact outcome, every climate model described as "sophisticated" shows sudden and negative impact resulting from the gradual warming resulting from current forms of industrial activity. "Sudden" as in "without warning." "Negative" as in "massive crop failures."

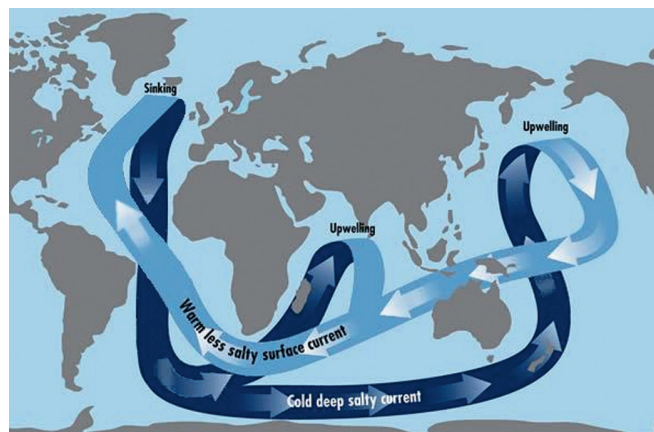
### HOT NEWS

But one need not be a specialist to notice that strange things are happening. One need only read the newspaper. Global warming has been melting ice from glaciers and from the polar regions for the past few decades. Recent reports of major tangible events have included:

- In 2002, a 2123 square mile piece of the Thwaites Glacier in Antarctica broke away and floated into the Amundsen Sea, earning the name "Iceberg B-22." To get a sense of how large this hunk of ice really is, the state of Delaware covers about 2500 square miles.

- Also in 2002, a 1254 square mile chunk of ice broke off the "Larsen B" ice shelf on the Antarctic Peninsula.

- In September of 2003, the "Ward Hunt" Ice Shelf, the largest in the Arctic covering an area about as large as all of Chicago, Illinois, cracked in two, prompting scientists to punch a few numbers into pocket calculators and conclude that in as little as a decade,



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man's production of excess CO<sub>2</sub> will create a navigable open-water "Northwest Passage" between Greenland and the Bering Straits of Alaska every Summer.

- At current melting rates, the US Park Service says that by the year 2030 there will be no glaciers in Montana's Glacier National Park.

You are likely wondering how melting polar ice caps could cause a "mini ice-age." The answer lies in the fact that ice is frozen *fresh* water, and melting ice decreases the local salinity (saltiness) of ocean salt water in a few key places.

One of those key places is in the North Atlantic, where both water temperature and salinity data have been recorded for years, and significant changes have alarmed the scientists who study such things.

### WHAT GOES AROUND, COMES AROUND

The world map is a simplified diagram of the "Global Ocean Conveyor." While North Americans know of the "Gulf Stream," few know that it is merely one short segment of a worldwide ocean circulation pattern. The amount of water flowing in this current past any one point at any one time is roughly equal to the average of all the rain that falls on the planet, 15 million cubic meters per second.

In the tropics, this current is warmed. It carries this warmth along the east coast of the U.S., and into the North Sea. The impact of this warmth is enough to allow the British to enjoy days at the beach at the same latitude where, in Canada, polar bears are the only ones enjoying a swim in the ocean.

When the current reaches the northern Atlantic, it cools enough to make the water more dense.

The colder water is heavier than the surrounding water, and sinks into the deep sea, then following a southward path, continuing around the planet-wide loop.

But temperature alone is not enough to move all that water. Salinity is also a significant factor in the process. The denser water has a higher salinity, since as water density increases, there is more salt in any one cubic foot of water.

If the water were less salty, it would be less dense and would not sink at the temperatures found in this area.

The salinity of both surface waters and deep ocean waters in this area have been measured since the 1900s as a part of the ongoing monitoring of fishing stocks. Until the 1970s the salinity had been almost constant. But it began to drop. The drop-off in salinity indicated that the flow of the ocean conveyor had been reduced by 20%.

The salinity had been diluted by massive amounts of fresh water from melting ice. Siberian rivers are pumping out more fresh water at a volume equivalent to three Mississippi rivers. Arctic ice is melting, and the glaciers in Greenland are also melting. All of this fresh water directly dilutes the salinity of the water in the North Atlantic. Melting of Antarctic ice appears to have less direct impact, but is also considered to be a diluting factor for the deep-sea flow that passes Antarctica.

Continued warming and melting would, at some point, tip the balance and halt the flow of the water.

The impact on Europe would be significant. Beekeeping would become nearly impossible, but this would be among the least of the problems that they would face. Britain would likely be more concerned about having snow on the ground for 30 to 100 days per year and Wintertime lows in the -20°F range.

But the impact would not be limited to Europe. Central America would likely lose up to 40% of its rainfall. The best computer models available suggest that vegetation making up the rainforests would die and be replaced by grassland. The rainfall currently falling on the tropics would fall further south. The Asian monsoons would weaken or fail for many locations. Agriculture in Asia depends on regular heavy monsoon rains. Merely "weak" monsoons would produce famine and economic collapse.

### THIS HAPPENED BEFORE, NOT LONG AGO

Scientists who study "paleoclimatology" (the climate, long ago) drill deep into glaciers to capture and analyze pollen, dust, and air bubbles trapped in the ice at various levels. They drill into the sea floor, and look at calcium carbonate levels in the remains of sea shells. They hunt for long-submerged tree trunks preserved in bogs and deep lakes, and look at the tree rings. All of the data clearly indicate that an event that happened about 12,000 years ago, the "Younger Dryas Event," was likely triggered by a shutdown of the Global Ocean Conveyor.

The conditions now are very different from those that preceded the Younger Dryas. The Younger Dryas happened as the Earth was coming out of a major ice age. While we should not expect advancing glaciers to cover locations currently occupied by major European cities as they did in the Younger Dryas, we can expect several changes, starting with an average temperature drop of about 6°C in the North Atlantic, and 4°C just about everywhere else.

### THE ICE MAN COMETH?

The transition from warm to frigid can happen in as little as a decade or two. While no one is exactly sure just how much warmer and how less salty the seawater near Greenland can be before the Global Ocean Conveyor simply stops, hard data indicates that the flow of water is clearly slowing down.

No existing atmospheric computer model can accurately predict the exact sequence of events that might follow such an abrupt change. However, as happened in each of the abrupt changes recorded in glaciers worldwide, if the conveyor were to shut down, the worldwide climate would likely "thrash" for several decades before settling into its new colder, dryer state. The consequences to agricultural production of each these "thrashes" would be devastating.

If allowed to continue to accelerate, global warming could, in our lifetime, result in scenes like the one now outside my window becoming much more common, rather than less.

So, should beekeepers be concerned about the environment and issues like global warming?

Only if we want to continue keeping bees. **BC**