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For more information, or to join  
Wild Ones Natural Landscapers,  
here's how to reach us:

**Phone**

(920) 730-3986  
(877) 394-3954 (Toll-Free)

**Mail**

PO Box 1274  
Appleton, WI 54912-1274

**E-Mail**

ExecDirector@wildones.org

**WebSite**

www.wildones.org

Celebrating natives  
plant and natural  
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since 1979.

## The Grapevine

By Maryann Whitman

### This Spaceship Earth

On February 2, 2007, the IPCC (Intergovernmental Panel on Climate Change), removed all doubt as to whether climate change is in fact occurring. In their report they concluded that not only is the average temperature of the planet rising at an unprecedented rate, but the chemistry of our air, our water, and our soils is changing in a manner that is not sustainable.

Composed of 2,500 scientists from 192 countries, the IPCC was established in 1988 by the World Meteorological Association and the UN Environment Program. In 2007 it is publishing its fourth, three-part report on climate change. Part I assesses the relevant science. Part II considers the potential positive and negative consequences of climate change on the natural world and the economy, and ways the world can adapt to them. And Part III works on options for slowing or halting climate change.

The IPCC doesn't conduct research or run experiments. Instead, it gathers, sifts, and summarizes the best information available. IPCC reports are intended to be "comprehensive, objective, open, and transparent" assessments of the state of scientific knowledge on climate change. The bulk of the info comes from scientific and technical data published in peer-reviewed literature.

IPCC is the gold standard. It is as close as humanity is ever likely to get to the "Final Word" on climate change. So how does this affect the Wild Ones mission?

### Plant Migration and Climate Change

Plants are the bottom of the global food chain. They fix the energy of the sun, converting it into a form that the rest of the biosphere can use as sustenance. As go plants so goes the rest of the biosphere – and plants in turn are reliant on insects for pollination – and birds and other animals for seed dispersal.

Terrestrial plants are thought of as sedentary in their habits – but they are mobile on a seasonal basis – one growing season at a time. As their habitat changes will they be able to migrate into distant locations at a pace that keeps up with the rate of change? Some recently published research suggests that some rapidly reproducing, weedy species will be able to keep up with a rapid rate of change (that we are likely to experience over a coming period of time), while other species, that



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are slow to mature, with long life spans, with special requirements for survival, will be in danger of regional extirpation. If these are rare and endangered species, they will become extinct. If it is a keystone species, one that plays a greater role in maintaining ecosystem function than would be predicted based on its abundance, all will be disrupted. (*Keystone: the wedge-shaped stone that holds together the parts of an arch. If removed, the arch collapses.*)

We have evidence from fossil records and from records of the behavior of contemporary invasive species, that species are capable of moving great distances, to new habitats. Consider the obstacle presented by the Great Lakes as the most recent glaciers were retreating. Consider the rate of spread of cheatgrass, (*Bromus tectorum*). Introduced into the West in the 1880s as a contaminant in agricultural seed, over the next 20 years it spread slowly – and then exploded in the following 10 years. Within 40 years it had occupied hundreds of thousand of square miles. (The lag-time of modern invasions, the time it takes for an introduced species to unquestionably establish reproducing populations, ranges from decades to a century.)

Another thing we have learned from invasive species is that in the absence of disturbances, many plant communities are resistant to invasion. So dispersal and travel distances are not the only problems that migrating species might face.

### **Landscape Patterning**

We have done much to fragment and destroy habitat connections through which migrating plants might move. If climate change renders the remaining habitats inhospitable, many plants may be stranded. This same fragmenting and destruction of habitat also has a deleterious impact on the insects that pollinate plants, and the birds and animals that aid in the dispersal of seed.

The microorganisms in the soils that are a life support to our native plants are also to be considered. A recent “metagenomics” experiment showed a couple

of important things – there are still large numbers of these species to be isolated and identified, and, more importantly to this discussion, most microbial lineages stay in one environment for very long periods of time. This contradicts the common belief that every microbe can potentially live everywhere. Moreover their modes of migration to friendlier habitats are severely limited, if not nonexistent.

### **Pollinators and dispersers of seeds**

The availability of pollinators and dispersers is affected by their overall population numbers. It is also affected by their phenology, the seasonal timing of life cycles of plants, animals, and insects.

A changing climate will be reflected in the changing seasonal cycles of plants, animals, and insects. Plants and their pollinators have both adapted to highly choreographed relationships. Plants produce pollen and nectar at specific times in order to attract pollinators who also are accustomed to appear at specific times. The pollinators come not to pollinate but rather to collect food stuffs for their own survival.

Consider the mayhem that will result when all the calendars are thrown awry by climate change. We already see migrating birds arriving and leaving at different times. There is much we don't know about pollinators, their migratory or over-wintering habits. We don't know what prompts a wild bumblebee's emergence from her winter hibernaculum – time or temperature. We just know that they appear in the spring when flowers have started to bloom.

### **Wild Ones Mission**

Our mission is to foster biodiversity by aiding the survival of native plants, through promoting their use in our landscapes. It seems that to be true to our mission we need to find out what we can about the climate change that experts tell us is upon us, and participate in any way that we can to slow its development – all in the hope of gaining time for the species we wish to preserve – time for them to be able to adapt themselves.

Maryann is Editor of the Wild Ones Journal, and comes to the position with an extensive background in environmental matters of all kinds.