San Diego State: Fire and Climate Contribution to Changing Environment and Extinction

Authors: Matthew Montoya George Rodriguez Alexander Jenkins Daniel Miller Wendy Cooper

Published Date: 02-16-2019

Arkansas State University-Main Campus

School of Environmental Studies

Under extreme weather conditions we live with the increase in diseases, storms, and even impacts on our environment and other life forms. In the future, these scenarios might become even more severe.

An emerging study by San Diego State University researcher Jean Henry focuses on fire and its connection to climate and extinction, and proposes a novel approach that could help prevent and manage wildfires.

Henry, a professor in the Department of Biology in the College of Natural Resources and Environmental Sciences at SDSU, recently visited parts of Italy where extreme weather conditions have brought on wildfires.

There, Henry worked with an Italian water research team led by Professor Paolo Massa at the University of Pisa in northwestern Italy.

â€œIn the early 1990s when I worked there on forest fires, the climate conditions were totally different,â€ said Henry.

â€œThis team had the very basic idea that extreme weather conditions such as summer drought, high temperatures, high humidity, even storminess, can all lead to formation of forest fires.â€

During these fire seasons the team also studied how the wildlands are adapted to maximize fire capacity, and sometimes counter wildfire processes.

This research led to the development of two main mathematical models.

One is for forest fires and the other is for fire speed.

The argument for disaster prevention for wildfires is that each fire is basically a small boat that can take out bigger boats. In the forest you can destroy between ten and twenty times more seawood than any single fire can,â€ said Henry.

â€œBecause of these lessons learned in Pisa it is possible to develop a model that studies the speed and distance of the most destructive fires as they take place in a forest. This is needed to help the forest fire management planning,â€ she added.

After several failed attempts by a number of countries, including Brazil, the Federal Wildfire Authority (Bananewebreu, or BaFe) last year developed a satellite-based computer model that enables it to better monitor conditions in the fire zones and the fire suppression activities during the fighting of the fires.

The team is currently working on a large-scale research project where they will attempt to remove the baseline data set and get a near real-time comparison of how the fire affects.

â€œPeople can control the ignition of wildfires by using the traditional wisdom of burning off,â€ explained Henry.

â€œThis intervention can reduce the number of fires, the size of the fire, and the duration of the fire.â€

This is based on the scientific experience that fires, in general, can be controlled by man-made control methods such as the control of fuels or by combining different fuels.

â€œUltimately, these methods only work so well when we operate under a stable climate and limited frequency of extreme weather conditions,â€ said Henry.

â€œIt is also challenging when the power of these climatic events are multiple, with changing extremes.â€

This next challenge lies in the mitigation aspects of all weather conditions.

â€œWhen we have severe drought, followed by hotter and drier temperatures and during more extreme, windy weather events we cannot always detect the fires in advance,â€ explained Henry.

â€œUnder these extremes we must find new methods of taking action to prevent all these situations from happening in the first place.â€

â€œItâ€™s a paradox of fire that wildfires can burn more fuel at lower cost than the controlled burns,â€ she added.

â€œThis is very likely due to the adaptations that are practiced during the fire season itself to reduce the costs of fighting the fire.â€

In addition to effective fire prevention measures, additional fire management technologies can also be developed.

Henry pointed out that some research is also being done by the U.S. Forest Service to develop chemical sprays to fight fires and disinfecting fuels.

A Black And White Cat Looking Out Of A Window