Autumn Wellness in Nature

Autumn will soon arrive, temperatures will begin to cool, and daylight hours will start to decrease as summer slips through our fingers.

Hiking is a fantastic autumn activity. The beauty of the fall brings refreshing, crisp air and stunning colors on trees and leaves. Hiking is a form of physical fitness that has many health benefits.

- The benefits of hiking include improved mood and sleep, weight control, and a lower risk of type 2 diabetes and heart disease.
- Hiking improves bone density and strengthens your core, quadriceps, hamstrings and your hip and lower leg muscles.
- Hiking is also a great opportunity to bond with your partner. A hike on a beautiful autumn day can be incredibly romantic. The fresh air and beautiful surroundings will lift your mood and allow you to clear your mind and re-connect with each other in a serene environment.
- Do you have children? Bring them! A family fall hike will allow your kids to release their energy and stay fit and healthy in the process. Hiking allows children to focus on peaceful surroundings and teaches them to appreciate nature.
- The family hike is a wonderful option for bonding with your children in a relaxed setting, without the many distractions of modern-day life

Global Lake Temperature Project

by Bryce Williamson and Evan Wilson, Summer Interns

Lake ecosystems are very vulnerable to climate change, and as a result scientists have been interested in studying what climate change has done to lakes in recent years. For a quarter of a century, scientists have been collecting water-temperature data in lakes from all over the world. However, these data have been scattered among individual scientists so that no one person has access to all of it. In 2005 though, a multi-national team of researchers called The Global Lake Temperature Collaboration (GLTC) started working to put surface temperature data from 1985 to 2009 into one place. They were then able to look at global trends in lakes to see what factors affect surface temperature.

The GLTC compiled temperature data from satellite data and from research conducted by various scientists on the ground. The huge number of sources made collecting the data difficult, and it was also hard to tell whether the methods for collecting the data were similar enough for all of it to be comparable. To address this issue, the team did some complex statistical analysis to show that the data from different lakes were, in fact, comparable. For a total of 291 lakes, they obtained data on surface temperature and also factors that could influence temperature. These factors included climatic information, such as data on sunlight and air temperature, as well as physical information, such as lake size and depth.

With all of the data in one place, the GLTC could see a number of trends. Most clearly, lake temperatures have increased worldwide and correlate well with air temperatures. However, in some parts of North America and Europe lake temperatures are rising faster than air temperatures. Sunlight was another particularly important factor: surface temperatures were clearly higher for lakes with more sunlight.

Additionally, the researchers could see that the weather around a lake generally influences water temperature more than the physical characteristics of the lake. But although the climatic factors like air temperature and sunlight were more important, it was also clear that on a more local scale physical properties of lakes have a large influence on surface temperature. For example, shallower lakes tend to be warmer than deeper lakes in the same area.

Some trends in the data were less clear, such as the relationship between cloud cover and water temperature. During the day, clouds block sunlight, decreasing the water temperature. At night though, they trap heat close to the Earth, keeping water temperature higher. Two-sided patterns like this require more thought and research to be well understood.

The overall trends of heating observed by the GLTC could have devastating ecological effects for certain species that live in or rely on lakes. Understanding what factors affect lake temperature helps scientists to understand how lakes may change in the future with climate change. This may in turn help them to better conserve lake ecosystems.

Lakes Represented by The Global Lake Temperature Collaboration (GLTC): In-situ and Remote Sensing-based Measurements

Legend
- In Situ = 100 lakes
- Remote Sensing = 199 lakes

0   2,350   4,700   9,400   14,100   18,800
                                                    Kilometers

Coordinate System: Geographic Coordinate System
Datum: World Geodetic System 1984

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