TROPICAL ECOLOGY

ASSIGNMENT 1

50 pts. Due Tuesday March 24th 2009

Goal:

The goal of this exercise is to demonstrate how, using web-based resources, it is possible to obtain basic ecological information on any region of the World. This information would be the starting point for the planning of any serious ecological or conservation project.

Background.

In mid-2004, Pitzer College acquired (by generous donation) a 60 hectare property in southwestern Costa Rica. The property was cleared for cattle ranching in the 1970's, then purchased in 1994 after which it underwent varying degrees of reforestation and recovery. Since 2005, this property has been used as the base for a variety of student research projects.

The Question:

What was the 'natural' ecosystem present at this location, before clearance for cattle ranching? In other words, as we develop a plan for restoration of the site, what is our ecological target?

Procedure.

- Determine the latitude and longitude[1] of the site, which is centered 5 kms northwest of the town of Dominical, on the southwest coast of Costa Rica, at 100 m above sea level.
- Use the data below to calculate mean annual biotemperature (MABT).
- Go to the property website (http://costarica.jsd.claremont.edu), "Resources", and download the rainfall data from the adjacent Hacienda Baru reserve. Estimate the potential evapotranspiration (PET) as PET=58.93 * MABT.
- Calculate the PET ratio (PET/rainfall) for the reserve.
- Download a copy of the Holdridge Life Zone chart from the Bio 176 website "Links".
- Determine the HLZ of the Pitzer property.

Write Up.

Your report is open-ended – explore the data and address 'The Question' above. At a minimum, plot the annual rainfall totals against year. Are these annual variations in rainfall significant? (Give some thought to what constitutes 'significant'). What kind of ecosystem can be expected to recover at the site? Use the WWF ecozone information to develop your understanding of the site (http://www.panda.org/what_we_do/where_we_work/ecoregions/about/)

Data

Mean Temperatures, Reserva Baru (conjectural)

MONTH	mean T [C]
Jan	27
Feb	26.5
Mar	27
Apr	26
May	26
June	27
July	27.5
Aug	25
Sep	24.5
Oct	24
Nov	25
Dec	26

[1]Latitude and Longitude.

A Google search will find you the latitude and longitude of Dominical. You can correct for the fact that the Firestone Reserve is 5 kms NW of Dominical by trigonometry:

> *Change eastwards is given by the sine of the compass bearing multiplied by the distance*
> *Change northwards is the cosine of the compass bearing multiplied by the distance.*

You will of course need to know the number of kms in a degree of latitude and longitude in equatorial regions – Google will help you.

If you have Google Earth on your computer, you can check your result; just type in "Dominical" in the search box and use the ruler tool to find the approximate location of Firestone Reserve. The latitude and longitude is given at the bottom of the screen.