

an ECA of under ten percent (10%). Thus a rule of thumb was developed, that "no more than 25% of a watershed could be cut in a 30-year time period." This worked in the Idaho watersheds, with damage showing up when this was exceeded. The problem became evident when this model was used by others working in different geographic areas, with different geology and stability factors without studying the impact in their area of operation.

ECA analysis is easily manipulated by changing the time to hydrologic recovery. Many studies in the Western U.S. with over 50-60 years of records since the cutting activity have not shown recovery back to the pre-harvest hydrograph. Yet many areas, including here in Canada, are using a 35-year recovery period. This biases the model to allow more cutting before the watershed has recovered from the first entry.

Another problem with the ECA model is that it assumes that there is a set amount or percentage of increase every year, no matter what the precipitation for that year. In reality in years of low or low-moderate precipitation there will be very little additional runoff, but in years of high precipitation there will be a very high percent of additional runoff. Statistically, if the cutting activity is a new impact at the same time period as a year of high precipitation, there will be damage, even at the 20 percent threshold. The model also does not look at the form of precipitation. There is no way to model a rain on snow event that is common in triggering mass failures and flooding in this region of the country.

This procedure was developed and only works on at least third-order streams. It will not work on small watersheds like those on Perry Ridge, and where the conditions are naturally unstable. The impact of vegetation removal is too concentrated for this level model to be sensitive to the changes.

What does the ECA model do?

This is a list of the uses of the ECA model and where it can be used as a planning benefit.

- The ECA model shows the relative increase in water yield from timber removal between different proposed activities.
- The ECA model can be used to compare different proposed activities.
- The ECA model is an efficient and easy way to develop a shortcut water balance.
- The ECA model allows a planner to lay out blocks with a minimum of impact by spreading out the water yields in different watersheds.
- The ECA model is a good planning model for use in large geographic areas.
- The ECA model can be used in conjunction with a land system inventory or sediment model to give relative amounts of sediment produced on different landforms and at different locations within the watershed.
- The ECA model can be used in conjunction with a channel stability analysis to give some relative impacts to the stream channel and predict channel erosion.