Implications of the River Continuum Concept to Conservation and Management Efforts: the Case of the Tailed Frog

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Extended Abstract: Long-term conservation of animals can be challenging when species occupy complex ecosystems. Tailed frog[1] distribution and abundance patterns, for example, are intricately linked to multiple-scale parameters that influence the dynamic fluvial environment they inhabit. We were able to describe this intricate web of relationships by conducting detailed timed searches of streams from confluence to headwater in various biogeoclimatic regions, and relating each survey site to habitat, basin, and regional characteristics[2].

At the regional level, topography, geology, and climate interact to produce a variety of channel situations. For example, in the northern Coast Mountains, south-facing creeks are less hospitable to tadpoles because they face incoming storms; extreme rain events combined with steep gradients make channels very dynamic (Fig. 1). Conversely, at the same latitude in the Hazelton Mountains, leeward of the Coast Mountain range, south-facing basins yield the largest number of tadpoles because they are significantly more productive in this region of continental climate (Fig. 1). Glaciers and neves are often lodged in the headwaters of north-facing basins, and even in the absence of these ice and snow fields, creeks are too cold at high elevation to support tadpole growth and development.

At the watershed level, peak abundances of tadpoles are found in small basins (Fig. 2) that represent tributaries to larger creek systems. As small basins are usually steeper, fine sediments are flushed and boulders interlock to form the step-pool and cascade habitats that tadpoles thrive in; however, when small basins get too steep (> 100%) they can be subject to high disturbance regimes, with flashy discharge and colluviation producing mobile bedloads that are detrimental to tadpoles. Discharge rates within the step-pool and cascade environments of small, moderate to steep basins fall within a range that is tolerable to tadpoles: 1–10 m^3/s, depending on the stability of the channel substrate (Fig. 2).

In summary, the selection and design of tailed frog nature reserves should be based on landscape parameters, because these ultimately determine the site conditions. A simple GIS

[1]This research applies to both the coastal tailed frog (*Ascaphus truei*), and the Rocky Mountain tailed frog or inland tailed frog (*A. montanus*).

[2]Dates of research: July–Aug. 2001, July–Aug. 2002, July–Aug. to September 2003 (work builds on tailed frog research carried out since 1994).

model using regional tailed frog data is the most effective means of obtaining a preliminary list of sites to protect. Groundtruthing is equally important, however, given that certain habitat-level characteristics such as local geological patterns (e.g., shear zones) and stream temperature regimes can not be ascertained from maps.

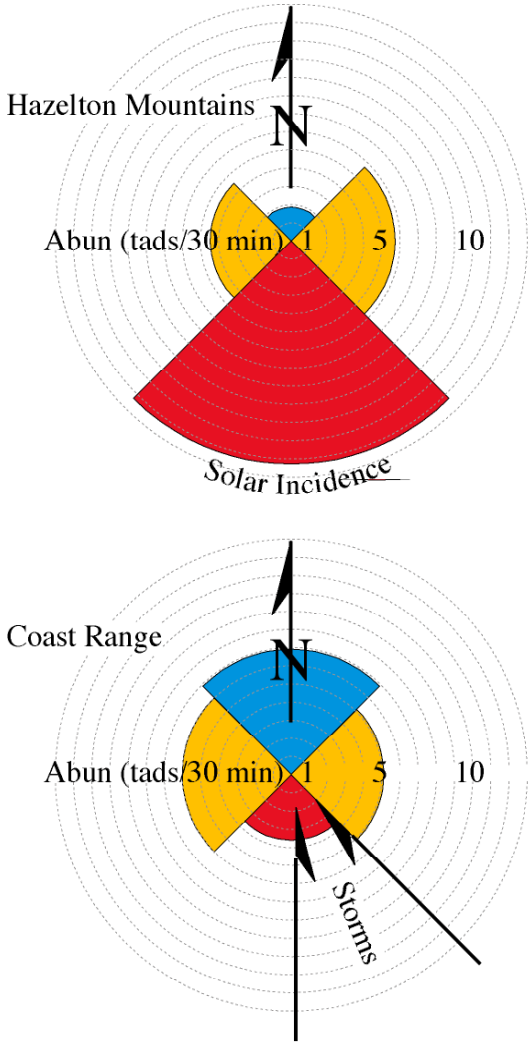

Figure 1. Tadpole abundance and distribution in relation to climate.

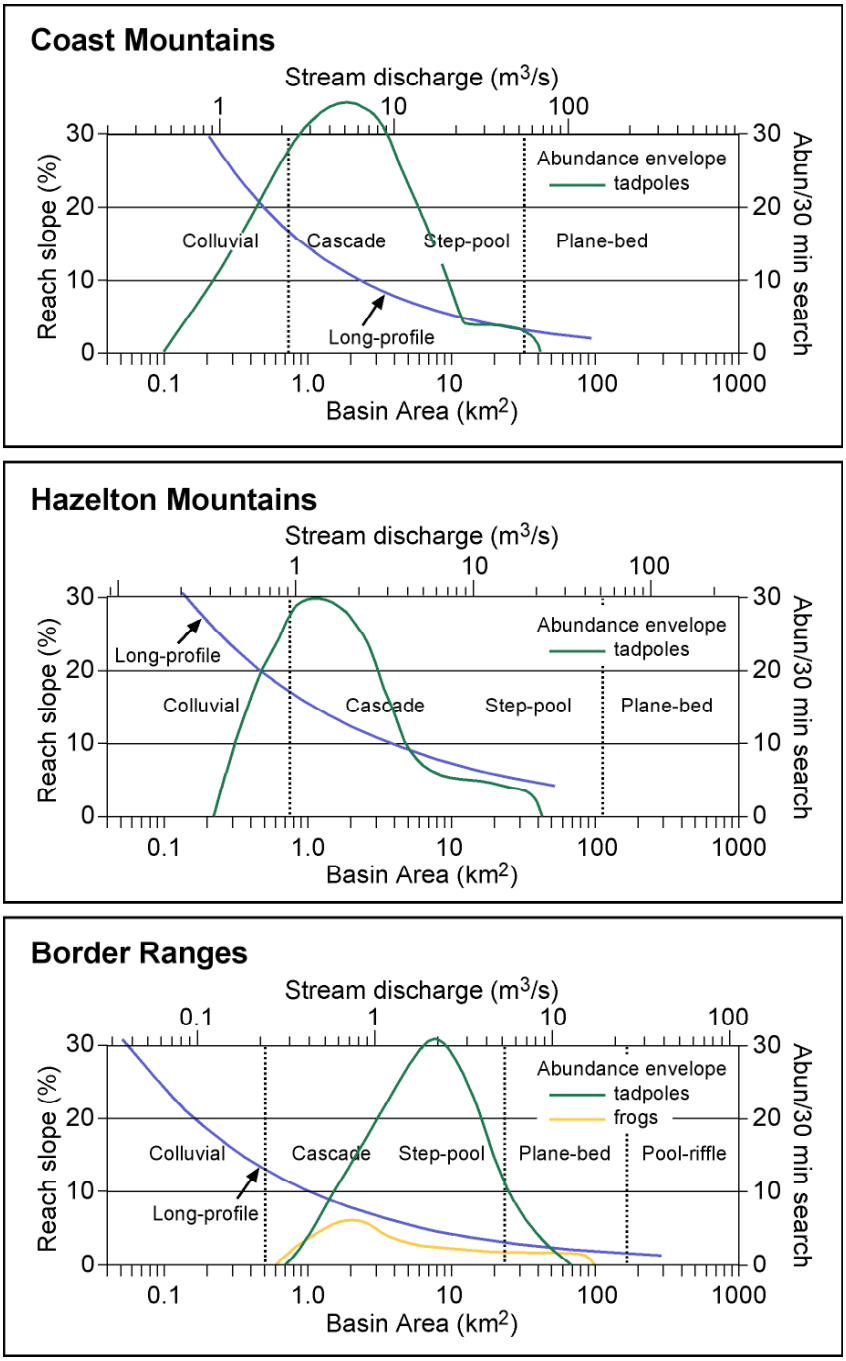

Figure 2. Tadpole abundance and distribution in relation to physiography.