Mountain Pine Beetle Climatic Suitability Maps

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Contents

Overview

We have 7 MPB climate scenarios (using four different indices: `S`, `L`, `R`, `G`) ready to use as model drivers. The Logan suitability index (`L`) is based on summer temperatures (Logan, Régnière, and Powell 2003). The Regniere suitability index (`R`) is based on MPB cold tolerance (*i.e.*, winter survival) (Régnière and Bentz 2007). The Safranyik suitability index (`S`) is based on aspects of both summer temperatures and winter survival (Safranyik, L.; Shrimpton, D.M.; Whitney 1975). Finally, the composite SLR index (`G`) takes the harmonic mean of the `S`, `L`, and `R` models.

These are described in further detail in Nealis and Peter (2008), and of course in their respective publications cited above. BioSim was used to generate the maps (see B. J. Bentz et al. 2010; Logan, Régnière, and Powell 2003; Safranyik et al. 2010).

index	description
S	Safranyik
L	Logan
R	Regniere
G	Composite

For each of the four indices, there are 1981-2010 normals plus the projections from two RCP scenarios (either 4.5 or 8.5), covering a span of 120 years, split into 30-year frames.

All maps are projected using LCC and cover all of Canada.

Data source

Maps were produced in BioSim (*need info!*).

They were uploaded to and retrieved from the NoFC FTP site on 26 October 2016.

Load maps

```
files <- dir(path = maps.dir, pattern = '[.]tif', full.names = TRUE)

maps <- lapply(files, function(f) raster(f))
```

Plot maps

References

Bentz, B J, J Régnière, C J Fettig, E M Hansen, J L Hayes, J A Hicke, R. G. Kelsey, J. F. Negrón, and S. J. Seybold. 2010. "Climate Change and Bark Beetles of the Western United States and Canada: Direct and Indirect Effects." *BioScience* 60 (8): 602–13. doi:10.1525/bio.2010.60.8.6.

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Safranyik, Les, Allan L Carroll, Jacques Régnière, David W Langor, William G Riel, Terry L Shore, Brian Peter, Barry J Cooke, Vince G Nealis, and Stephen W Taylor. 2010. "Potential for range expansion of mountain pine beetle into the boreal forest of North America." *The Canadian Entomologist* 142 (5): 415–42. doi:10.4039/n08-CPA01.

Safranyik, L.; Shrimpton, D.M.; Whitney, H.S. 1975. "An interpretation of the interaction between lodgepole pine, the mountain pine beetle, and its associated blue stain fungi in western Canada." In *Management of Lodgepole Pine Ecosystems Symposium Proceedings*, edited by D M Baumgartner, 406–28. Pullman, WA: Washington State University Coop. Extension Service. http://wfiwc.org/sites/default/files/Safranyik_Shrimpton_Whitney_1975.pdf.