Mountain Pine Beetle Climatic Suitability Maps

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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.

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

```
library(raster)

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

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

```
  raster(f)
})
```

Plot maps

Logan, Jesse A, Jacques Régnière, and James A Powell. 2003. "Assessing the impacts of global warming on forest pest dynamics." *Frontiers in Ecology and the Environment* 1 (3): 130–37. doi:10.1890/1540-9295(2003)001[0130:ATIOGW]2.0.CO;2.

Nealis, Vince G, and Brian Peter. 2008. "Risk assessment of the threat of mountain pine beetle to Canada's boreal and eastern pine forests." Infromation Report. Victoria, BC: Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre.

Régnière, Jacques, and Barbara Bentz. 2007. "Modeling cold tolerance in the mountain pine beetle, Dendroctonus ponderosae." *Journal of Insect Physiology* 53 (6): 559–72. doi:10.1016/j.jinsphys.2007.02.007.

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.