National Whitebark Pine Restoration

All GIS layers are raster with 1 km pixel resolution. Spatial extent is for US only unless otherwise specified

Name	Format	Source	Contact	Description	Units
			RANGEWIDE		
Potential	Geotiff	Keane et al. (2012)	Bob Keane, USFS	Modeled layer to identify all areas that have the potential to support WBP	Presence (1) of WBP
Dominant	Geotiff	Keane et al. (2012)	Bob Keane, USFS	Modeled layer to identify all areas that are currently dominated by WBP	Presence (1) of WBP
Existing	Geotiff	http://whitebarkfound.org/resources/help-update-range-maps	Cyndi Smith, Adam Collingwood, Parks Canada, Waterton Lakes National Park, Alberta	Updated map of existing WBP distribution, includes Canada	Presence (1) of WBP
Refugia	Geotiff	Mahalovich et al. 2017	Mary F. Mahalovich USFS	Model predictions for WBP genetic refugia for current conditions (1981-2020 climate normal period) based on the representative concentration pathways (RCP) 4.5 and RCP 8.5 to capture the lower and upper bounds of uncertainty, respectively; and for mid-century (2011-2040) under RCP 8.5 to represent upper bound. No refugia predicted for mid-century lower bound RCP 8.5 scenario; hence, no grid layer included.	Presence (1) of WBP
Viability	Geotiff	http://charcoal.cnre.vt.edu/climate/species/speciesDist/Whitebark-pine/	Nicholas Crookston, USFS	Model predictions for viability of WBP for current conditions and future conditions under 3 global climate models (CGCM3, GFDLLCM21, HADCM3), 4 emission scenarios (A1B, A2, B1, B2), and years	Species Viability Scores, 0-1

Name	Format	Source	Contact	Description	Units
				2030, 2060, 2090; includes Canada. Note, layer for HADCM3, B2, year 2090 not available.	
Loss to Mountain Pine Beetle & Rust	Geotiff	https://www.fs.fed.us/foresthealth/applied-sciences/mapping-reporting/gis-spatial-analysis/national-risk-maps.shtml	Frank Sapio, USFS	Percentage of WBP basal area lost to Mountain Pine Beetle & Blister Rust	Percent, 0-100
Loss to Mountain Pine Beetle & Rust by HUC6 watershed	Geotiff	https://www.fs.fed.us/foresthealth/applied-sciences/mapping-reporting/gis-spatial-analysis/national-risk-maps.shtml	Frank Sapio, USFS	Percentage of WBP basal area lost to Mountain Pine Beetle & Blister Rust summarized to HUC6 watershed	Proportion, 0-1
Total basal area of all tree spp.	Geotiff	https://www.fs.fed.us/foresthealth/applied-sciences/mapping-reporting/gis-spatial-analysis/national-risk-maps.shtml	Frank Sapio, USFS	Total basal area across all tree species	Square feet per acre, 0 – 1,243
Tree presence	Geotiff	https://www.fs.fed.us/foresthealth/applied-sciences/mapping-reporting/gis-spatial-analysis/national-risk-maps.shtml	Frank Sapio, USFS	Tree presence or absence (also known as 'Treed areas')	Presence (1) or absence (0)
Mountain Pine Beetle aerial		Not yet available			

Name	Format	Source	Contact	Description	Units
detection surveys					
			SUB-RANGE MAPS		
Region 6	Geotiff	O:\NFS\R06\Program\Botany\Whitebark Pine\GIS	Andrew Bower, USFS	WBP distribution in USFS Region 6	Presence (1) of WBP
GYA Probability	Geotiff	https://www.sciencebase.gov/catalog/item/5845a4a6e4b04fc80e52346a	Andrew Chang, Montana State University	Probability of suitable WBP habitat in Greater Yellowstone Area (GYA) for recent year (2010) and future conditions based on 1 global climate model (ENS_AVG), 2 representative concentration pathways (RCP 4.5 and 8.5), and years 2040,2070, 2099	Probability of suitable WBP habitat, 0-1
Flathead National Forest		Not yet available			
Salish/ Kootenai tribes		Not yet available			
			OTHER ANCILLARY RANGEWIDE LAYERS		
LANDFIRE Biophysical Settings	ArcGIS grid	https://www.landfire.gov/version_comparison.php?mosaic=Y	Rollins, Matthew, USFS	Vegetation dominant prior to Euro-American settlement based on biophysical environment & historical disturbance regime (version 2014)	LANDFIRE Vegetation classification system
LANDFIRE Existing vegetation type	ArcGIS grid	https://www.landfire.gov/version_comparison.php?mosaic=Y	Rollins, Matthew, USFS	Existing vegetation type (version 2014)	LANDFIRE Vegetation classification system

Name	Format	Source	Contact	Description	Units
LANDFIRE Canopy bulk density	ArcGIS grid	https://www.landfire.gov/version_comparison.php?mosaic=Y	Rollins, Matthew, USFS	Forest canopy bulk density (version 2014)	Density of available canopy fuel in a stand, 1-45 (kg m-3 * 100)
LANDFIRE Fuel loading model	ArcGIS grid	https://www.landfire.gov/version_comparison.php?mosaic=Y	Rollins, Matthew, USFS	Wildland surface fuel classification with representative loading for each fuel component (version 2014)	LANDFIRE fuel classification system
VMAP Existing dominant vegetation – Region 1	ArcGIS grid	Barber 2012	Jed Gregory, USFS	Mid-level existing vegetation classification for USFS Region 1	Region 1 mid-level vegetation classification
Elevation	Geotiff	https://earthexplorer.usgs.gov/	USGS	Digital elevation model, includes Canada	meters
Hydrologic Unit Code (HUC) 4,6,8	ArcGIS grid	ftp://rockyftp.cr.usgs.gov/vdelivery/Datasets/Staged/Hydrography/WBD/National/GDB/	USGS	Watershed Boundary Datasets defining areal extent of water drainages, at Subregion (HUC4), Basin (HUC6), and Subbasin (HUC8) levels, includes Canada.	Hydrologic Unit Codes, with associated watershed names
US fire perimeters	Geotiff	https://www.mtbs.gov/direct-download	Jeffrey Eidenshink, USGS	Year of last fire, 1984-2015	Year
US fire severity	Geotiff	https://www.mtbs.gov/direct-download	Jeffrey Eidenshink, USGS	Severity class of most recent fire, 1985-2015	Burn severity classification, 1-6
Canadian fire perimeters	Geotiff	http://cwfis.cfs.nrcan.gc.ca/ha/nfdb	Canadian National Fire database	Year of last fire, 1917-2016, for Alberta & British Columbia provinces	Year
Forest Inventory Analysis WBP plots	Geotiff	https://apps.fs.usda.gov/fia/datamart/CSV/datamart_csv.html	Greg Reams, USFS	Number of WBP trees (live and dead, 5 inches DBH and greater) inventoried in each FIA forest inventory plot	Number of WBP trees / 168 m^2

Name	Format	Source	Contact	Description	Units
Land ownership	ArcGIS grid	US: https://gapanalysis.usgs.gov/padus/data/download/; Canada: https://www.protectedplanet.net/	US: Lisa Johnson, USGS; Canada: Brian MacSharry, UNEP World Conservation Monitoring Centre	Managing agencies of public lands at the state/province and federal levels, including Canada. US lands additionally classified as non-wilderness, wilderness, and wilderness study areas.	Public land agency ownership
Roads	Geotiff	US: https://nationalmap.gov/transport.html; Canada: http://open.canada.ca/data/en/dataset/8e089409-8b6e-40a9-a837-51fcb2736b2c	US: USGS, National Geospatial Technical Operations Center; Canada: Government of Canada; Statistics Canada;	Roads of any size, includes Canada.	Presence (1) or absence (0)
Trails		Not yet available			
US Western states	ArcGIS grid	https://www.arcgis.com/home/item.html?id=870029dd3baa4c14a5131cd7090a03ea	FracTrackerAlliance	11 western US states	State name
Canadian provinces	ArcGIS grid	http://open.canada.ca	Government of Canada; Statistics Canada;	Alberta and British Columbia provinces	Province name