

Climate data developed for the 2020 Resources Planning Act (RPA) Assessment^{1,2} and related efforts. These data can be used for numerous applications by private and public land management and research constituents. Examples include understanding climate as a stressor during the assessment phase of Land Management Plan revision, improving management decisions by incorporating climate information, and greatly improving stakeholder communication. More information is available in a Forest Service General Technical Report³. Datasets are available as text files or netCDF files.

DATA DESCRIPTION	UNITS	SPATIAL EXTENT	SPATIAL RESOLUTION	TEMPORAL DOMAIN	POTENTIAL USE*
<u>Current and Recent Past</u>					
Historical Gridded Observed Climate Data ^{4,5} (METDATA ⁶) <i>variables include minimum and maximum temperature, precipitation, solar radiation, minimum and maximum relative humidity, potential evapotranspiration, wind speed</i>	Varies by variable	Conterminous U.S.	4 km	1979-2015 <i>Monthly timestep</i>	National-level to Broad-level applications and some Mid-level applications. Provides information on recent historical climate for areas within the conterminous U.S., including a national forest or region. Can evaluate historic climate trends for the assessment phase of Forest Plan development or revision. Appropriate for use in ecological model building.
Historical Modeled Data ^{†,5,7,8} (MACAv2-METDATA ⁹) <i>variables include minimum and maximum temperature, precipitation, solar radiation, minimum and maximum relative humidity, potential evapotranspiration, wind speed</i>	Varies by variable	Conterminous U.S.	4 km	1950-2005 <i>Monthly timestep</i>	National-level to Broad-level applications and some Mid-level applications. Assessing the impact of climate change on natural resources and assessing future changes in climate and their impacts when used in concert with the climate projections (see dataset below).
<u>Future Projections</u>					
Climate Projections ^{†,5,7,8} (MACAv2-METDATA ⁹) <i>variables include minimum and maximum temperature, precipitation, solar radiation, minimum and maximum relative humidity, potential evapotranspiration, wind speed</i>	Varies by variable	Conterminous U.S.	4 km	2006-2099 <i>Monthly timestep</i>	National-level to Broad-level applications and some Mid-level applications. In concert with the historical modeled data, can assess future changes in climate and the impact of climate change on natural resources.

* A description of FS business applications by spatial scales is available in Table 1-1 of the [Existing Vegetation Classification, Mapping, and Inventory Technical Guide, v2.0](#)

† Denotes corresponding datasets exist in both the *Current and Recent Past* and *Future Projection* sections of the table

References and Footnotes:

- ¹ U.S. Department of Agriculture, Forest Service. 2023. Future of America's Forest and Rangelands: Forest Service 2020 Resources Planning Act Assessment. Gen. Tech. Rep. WO-102. Washington, DC. XXX p. <https://doi.org/10.2737/WO-GTR-102>
- ² The RPA website provides links to prior RPA Assessments and webinars that detail the use of the climate data and projections by the various resource areas included in the assessment: <https://www.fs.usda.gov/research/inventory/rpaa>
- ³ Joyce, L.A.; Coulson, D. 2020. Climate scenarios and projections: A technical document supporting the USDA Forest Service 2020 RPA Assessment. Gen. Tech. Rep. RMRS-GTR-413. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 85 p. <https://doi.org/10.2737/RMRS-GTR-413>
- ⁴ Coulson, David P.; Joyce, Linda A. 2020. RPA Historical observational data (1979-2015) for the conterminous United States at the 1/24 degree grid scale based on MACA training data (METDATA). 2nd Edition. Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2017-0070-2>
- ⁵ Abatzoglou, J.T. 2013. Development of gridded surface meteorological data for ecological applications and modelling. International Journal of Climatology. 33(1): 121–131. <https://doi.org/10.1002/joc.3413>
- ⁶ The METDATA data have been used by other entities that analyze, summarize, and display the data in alternative ways to serve their purposes and questions. For example, the METDATA (recent historical gridded climate data) are available through the NW Climate Toolbox, [an online viewing tool](#) that can summarize climate data in a variety of different ways for a desired geographic area.
- ⁷ Joyce, Linda A.; Abatzoglou, John T.; Coulson, David P. 2018. Climate data for RPA 2020 Assessment: MACAv2 (METDATA) historical modeled (1950-2005) and future (2006-2099) projections for the conterminous United States at the 1/24 degree grid scale. Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2018-0014>
- ⁸ Historical modeled and future projected climate data are based on the MACAv2 METDATA climate dataset which used the MACA method for downscaling Global Climate Models (GCMs) from their native coarse resolution to a higher spatial resolution. Modeled results are available for the GCMs in the table below. The table lists the climatic conditions (least warm, hot, dry, wet, and middle/moderate) that each model was selected to represent for the period 2040-2070, as well as the institution responsible for producing the model. Scenarios for projections include RCP 4.5 and RCP 8.5.

Least Warm	Hot	Dry	Wet	Middle
MRI-CGCM3	HadGEM2-ES	IPSL-CM5A-MR	CNRM-CM5	NorESM1-M
Meteorological Research Institute, Japan	Met Office Hadley Center, UK	Institut Pierre Simon Laplace, France	National Centre of Meteorological Research and European Centre for Advanced Research and Training, France	Norwegian Climate Center, Norway

The Office of Sustainability and Climate has posted (internal to the Forest Service) GIS rasters using the temperature and precipitation data for RCP 4.5 and RCP 8.5 and all 5 of the RPA selected climate models ([\\usda.net\fs\FS\NFS\Collaboration\WOClimate\GIS\National_Data\Climate\RPA](https://usda.net/fs/FS/NFS/Collaboration/WOClimate/GIS/National_Data/Climate/RPA)). The rasters include historical modeled, projected, projected absolute change (temperature only), and projected percent change (precipitation only) between the historical time period (1971-2000) and the future time period (2041-2070).

- ⁹ The MACAv2METDATA data have been used by other entities that analyze, summarize, and display the data in alternative ways to serve their purposes and questions. For example, Luce used the MACAv2METDATA for a climate change analysis of snow and water on National Forest System lands. The map sets include variables related to precipitation, air temperature, snow (e.g. April 1 snow water equivalent, snow residence time), and stream flow (<https://www.fs.usda.gov/rm/boise/AWAE/projects/national-forest-climate-change-maps.html>). See also [Yazzie and Chang](#) (2017) and [Sheehan et al.](#) (2019).