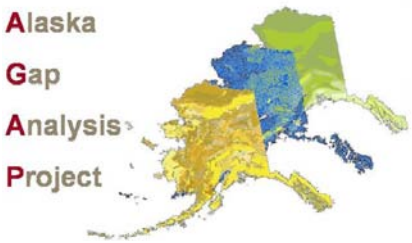


ANCILLARY DATA VARIABLES

PROCESSING INFORMATION AND MODELING USES

Version 1.0

Alaska Natural Heritage Program
University of Alaska Anchorage

Spatial Ecosystem Analysis Lab
UAS University of Alaska Southeast

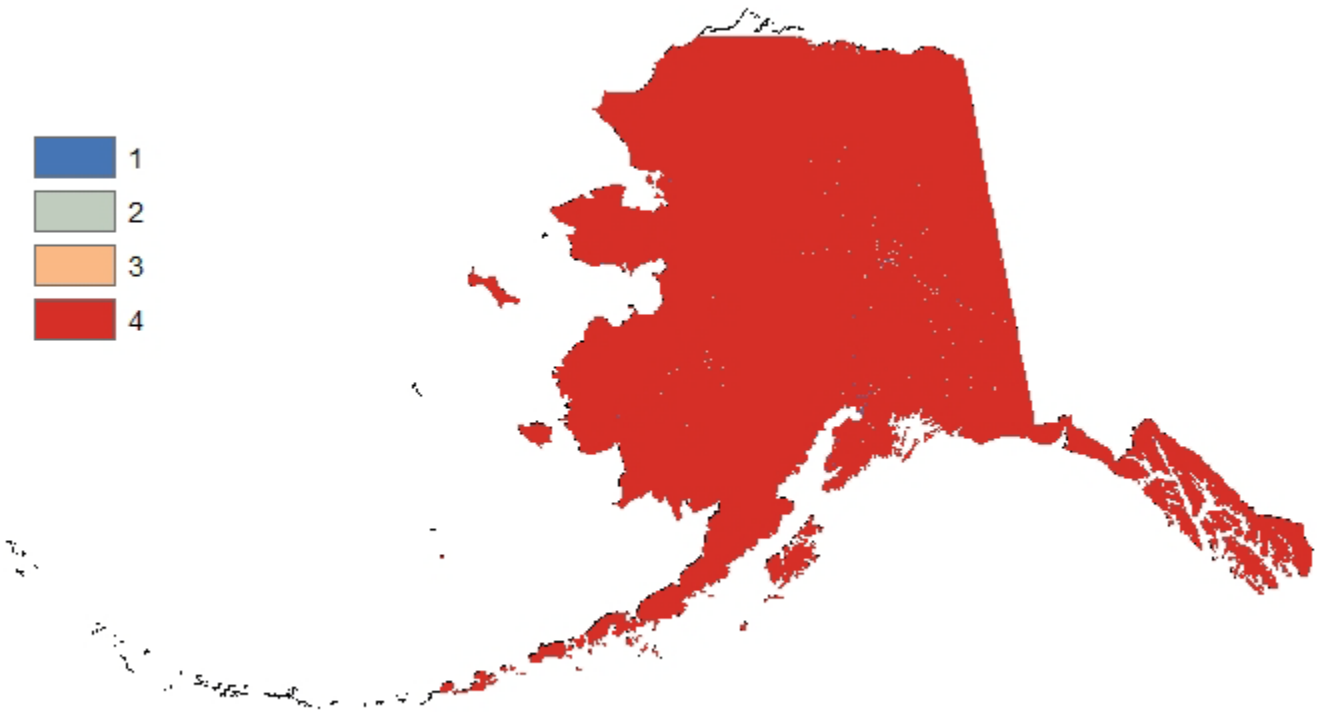
BACKGROUND

The ancillary data component of the project included creation of a core dataset of 58 variables, of which 24 variables were ultimately used and presented in this document, to support deductive and inductive modeling efforts. This was handled primarily by an ancillary-data team at the University of Alaska. These variables represented geological, hydrological, physiographical, ecological, landcover, disturbance, infrastructure, and climate characteristics; as well as a subset of data to support processing. Activities included:

- Collating and organizing original and raw datasets (e.g. national hydrography data) and their metadata from a variety of sources
- Defining criteria and key attributes of source data
- Developing a processing workflow to help address data consistency and help track data processing
- Spatial processing of data including conversion to grid formats, standardizing coordinate systems, resampling resolutions, and merging tiled datasets
- Datasets were created at an extent matching a "Alaska GAP" project template extent that included all mapped terrestrial land surface of Alaska, a coastal margin of ~2km, and 'filler' cells used to create a uniform rectangular project extent for modeling consistency.
- Final variables were created with a cell size resolution of 60-m; each representing approximately $2.19*10^8$ cells and 7.5gb of data; resulting in a total of about 0.5TB total data.
- Final variables were published in an ESRI grid (*.grd) format.
- All data were published to a standardized coordinate system with Datum of NAD1983 and Projection of Alaska Albers.

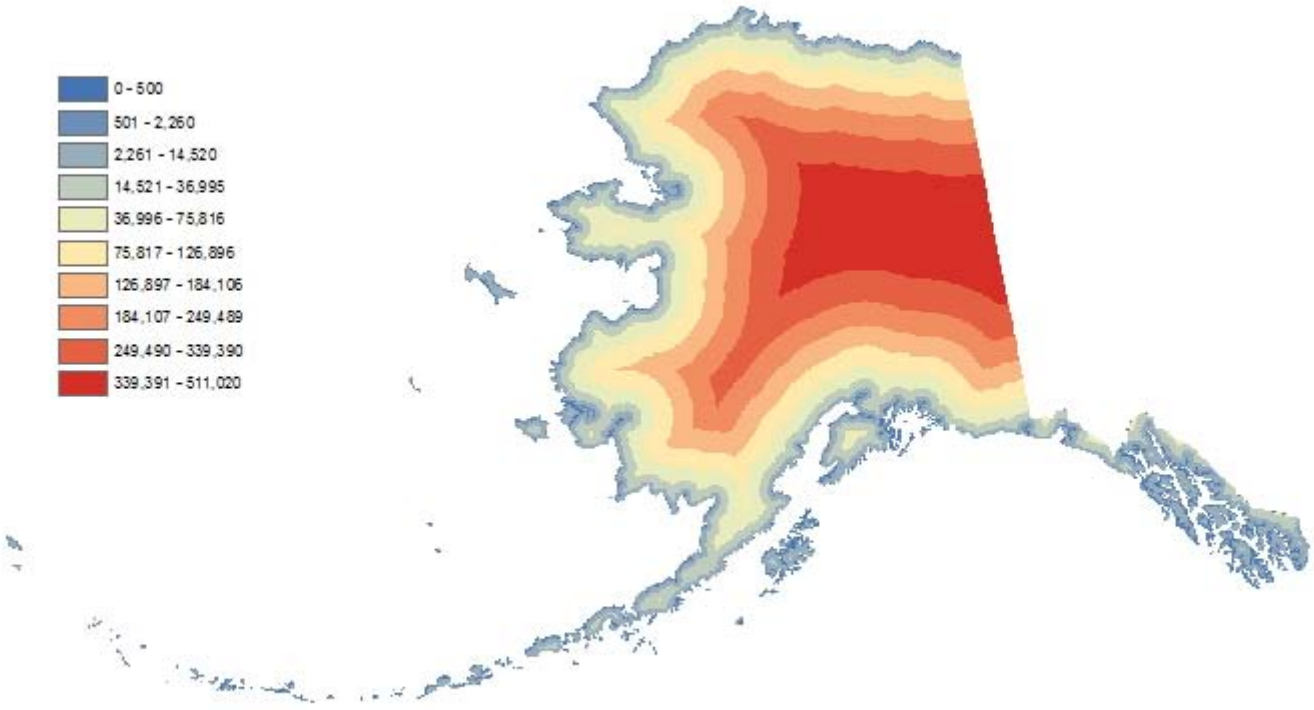
For more information contact:
Sanjay Pyare, Ph.D.
Associate Professor
Environmental Science & Geography Programs
& Spatial Ecosystem Analysis Lab (SEALAB)
http://sealab.uas.alaska.edu/

University of Alaska Southeast
11120 Glacier Hwy
Juneau AK 99801
(907) 796-6007
sanjay.pyare@uas.alaska.edu



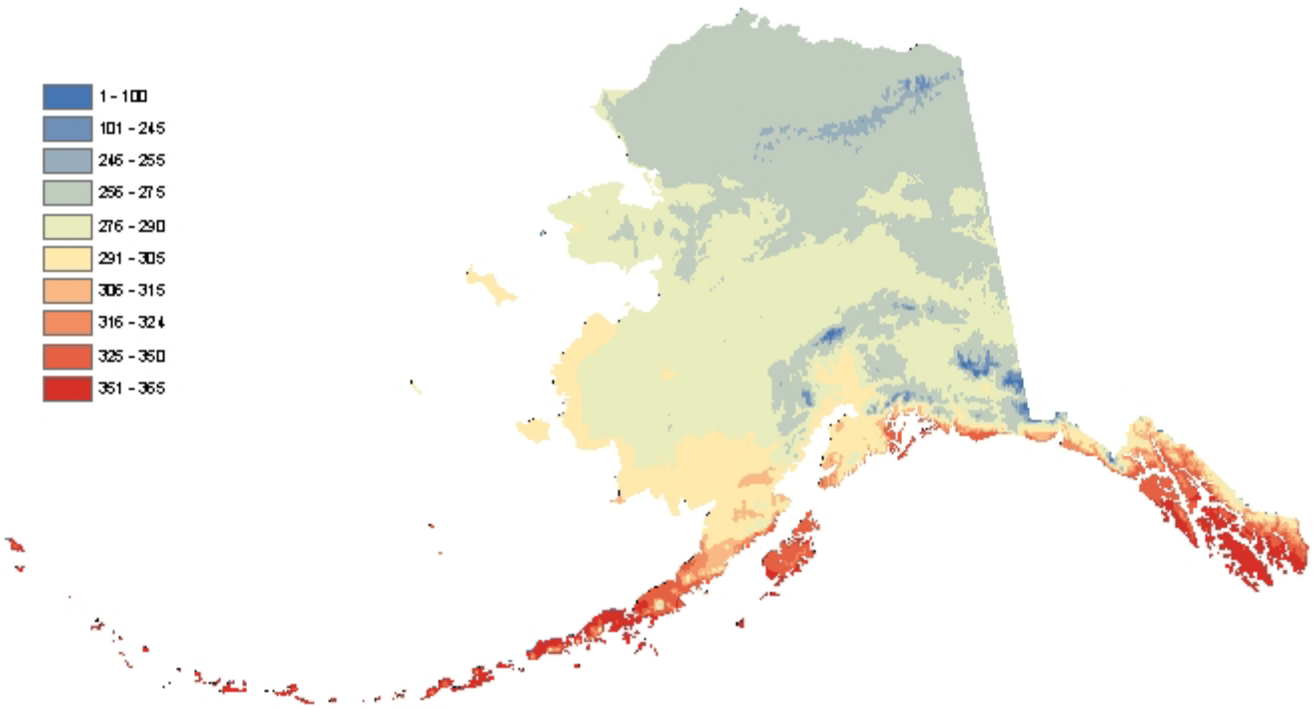
Dataset Name:	Anthropogenic Disturbance	*Variable Type:*	Categorical
File Name:	avoidance	*GAP Model Type (s):*	Deductive
Attribute:	Disturbance Level (1-4)	*Data Source:*	Landfire

Processing Notes: Select attributes relating to anthropogenic disturbance activity were selected from the Alaska coverage area of the 2008 Landfire Existing Vegetation Type (EVT, USGS EROS, Sioux Falls, SD and at the USFS, Rocky Mountain Research Station, Missoula, MT) and reclassified into one of four values: 1 – no disturbance, 2 – low disturbance, 3 – medium disturbance, and 4- high disturbance. Data were resampled from 30-m cell resolution and reprojected from NAD83 Albers Conical Equal Area. Landfire EVT classifications included: 20 Developed-General 21 Developed-Open Space 22 Developed-Low Intensity 23 Developed-Medium Intensity 24 Developed-High Intensity 31 Barren 32 Quarries/Strip Mines/Gravel Pits 80 Agriculture-General 81 Agriculture-Pasture/Hay 82 Agriculture-Cultivated Crops and Irrigated Agriculture 83 Agriculture-Small Grains 84 Agriculture-Fallow 85 Agriculture-Urban/Recreational Grasses.



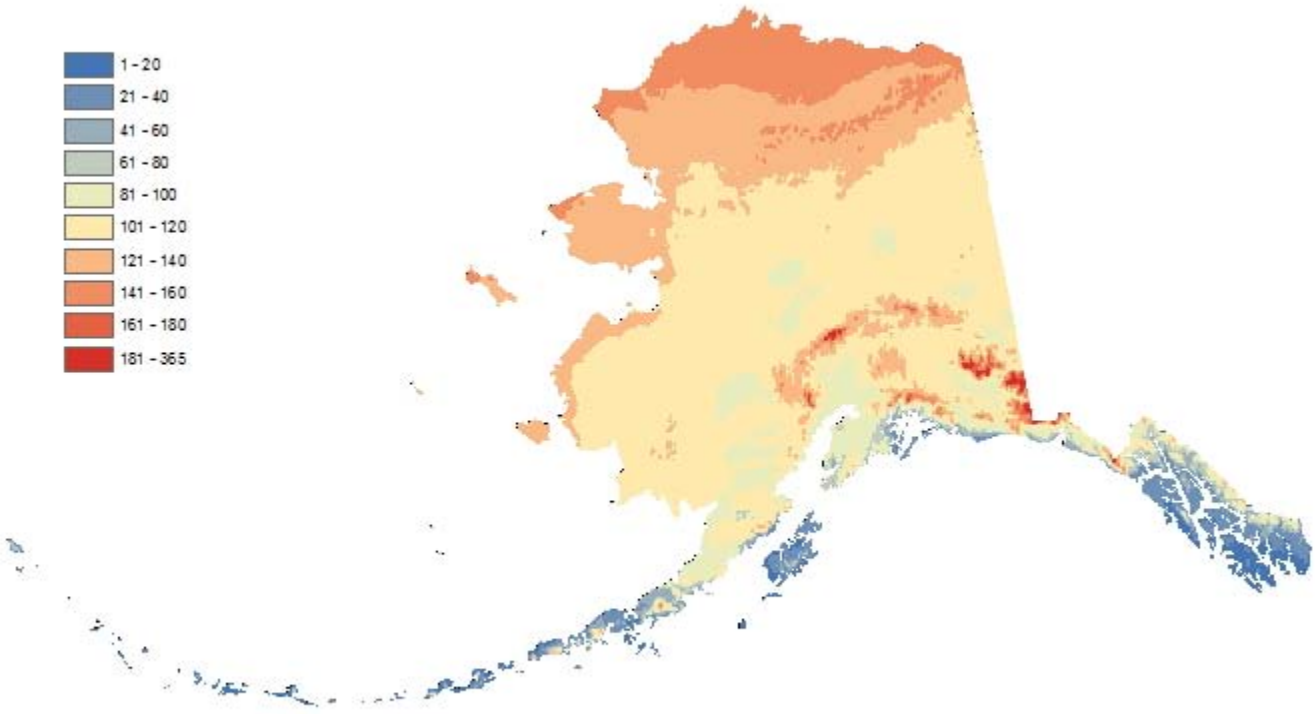
Dataset Name:	Distance to Coastline	*Variable Type:*	Continuous
File Name:	coast_dist	*GAP Model Type (s):*	Deductive
Attribute:	Distance (m)	*Data Source:*	DNR Alaska Coastline, USGS NHD coastline

Processing Notes: Alaska Department of Natural Resources' 1998 Alaska Coastline 1:63,360 (See: http://dnr.alaska.gov/SpatialUtility/SUC?cmd=vmd&layerid=56), supplemented with select features from USGS National Hydrography Data where coastline data were missing, e.g. Aleutians, were used to calculate planar distances to the interior land surface from the coastline using standard ESRI raster processing methods.



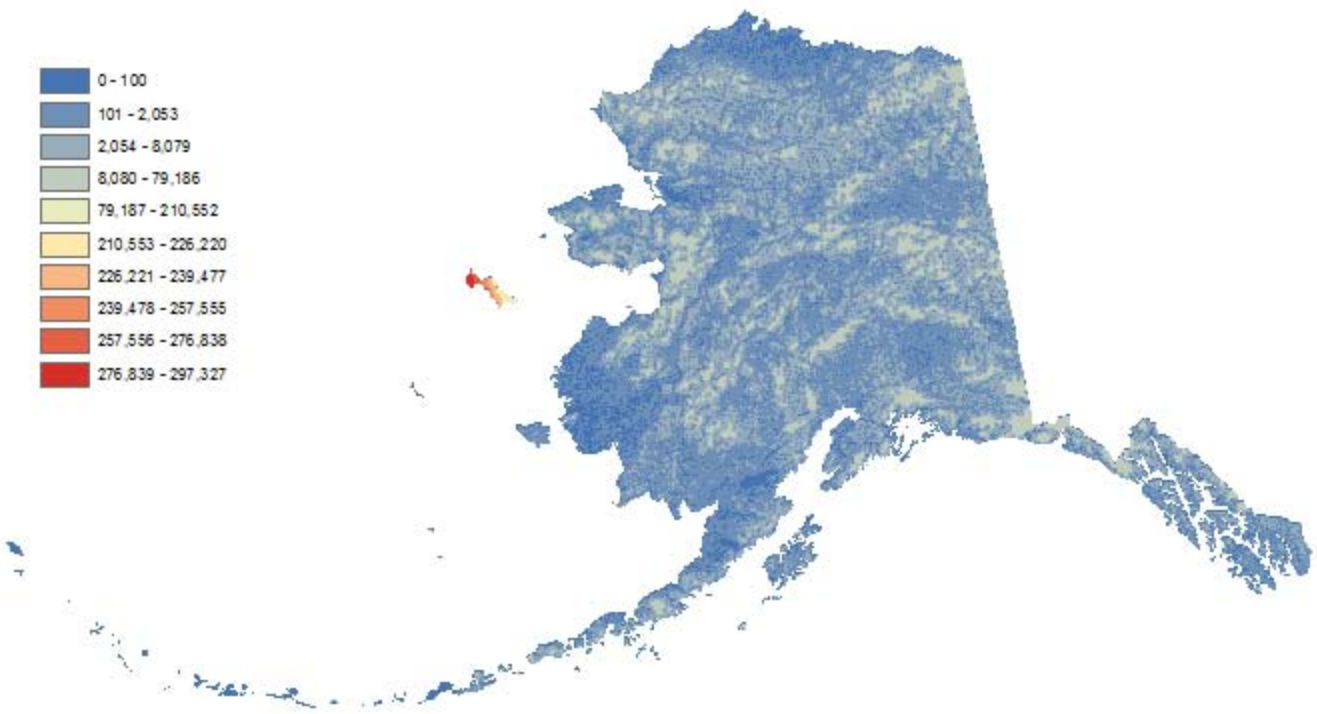
Dataset Name:	First Day of Freeze	*Variable Type:*	Ordinal
File Name:	dayfrz	*GAP Model Type (s):*	Inductive
Attribute:	Julian date (day)	*Data Source:*	SNAP temperature-derivative

Processing Notes: Estimated Julian day of the first freeze date of the year was derived from historical derived temperature products published circa 2010 by Scenarios Network for Alaska Planning (SNAP). See: http://www.snap.uaf.edu/data.php. These data were derived from 1961-1990 PRISM temperature reference data, and calculated by assuming a linear change in temperature between the 15th day of consecutive months, with mean monthly temperatures representing temperature on the 15th day. Data were resampled (not downscaled) from grids with 2-km cell-size resolution.



Dataset Name:	First Day of Thaw	*Variable Type:*	Continuous (integer)
File Name:	daythaw	*GAP Model Type (s):*	Inductive
Attribute:	Julian date (day)	*Data Source:*	SNAP temperature-derivative

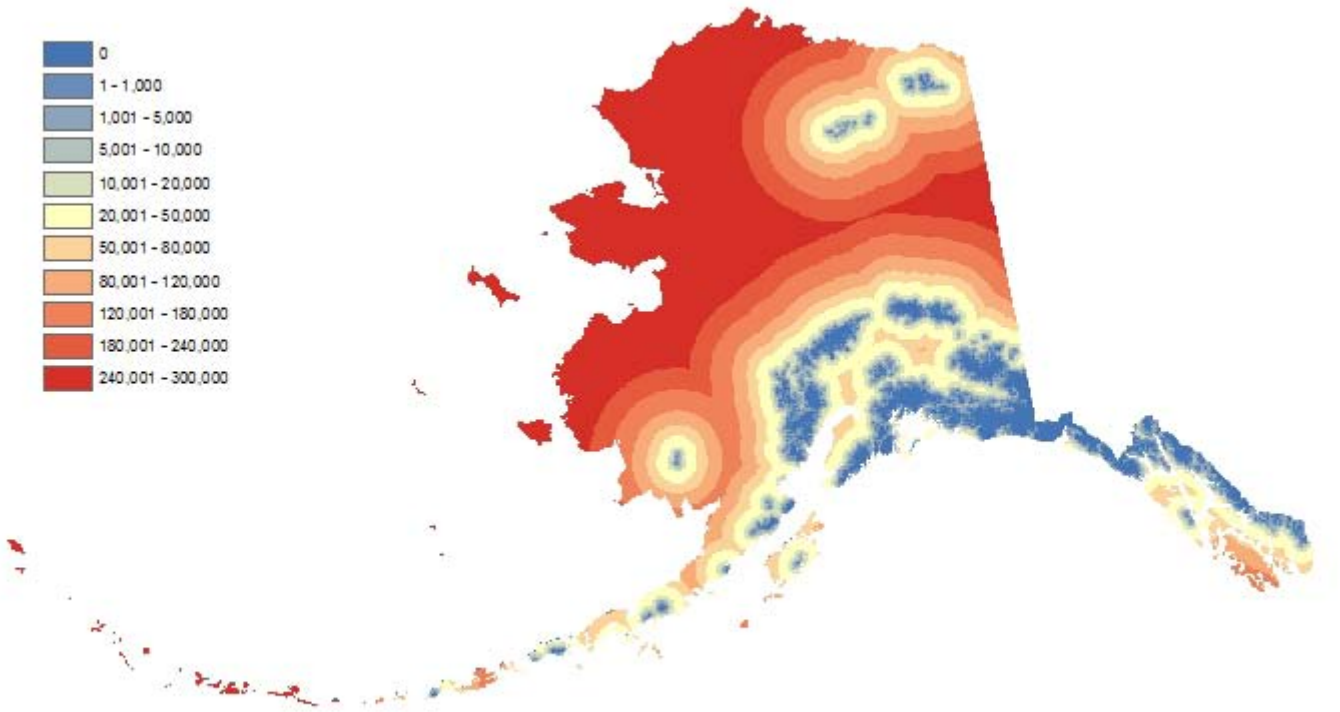
Processing Notes: Estimated Julian day of the first thaw date of the year was derived from historical derived temperature products published circa 2010 by Scenarios Network for Alaska Planning (SNAP). See: http://www.snap.uaf.edu/data.php. These data were derived from 1961-1990 PRISM temperature reference data, and calculated by assuming a linear change in temperature between the 15th day of consecutive months, with mean monthly temperatures representing temperature on the 15th day. Data were resampled (not downscaled) from grids with 2-km cell-size resolution.



Dataset Name:	Distance to Non-Flowing	*Variable Type:*	Continuous & Categorical
File Name:	lentic	*GAP Model Type (s):*	Inductive and Deductive
Attribute:	Distance (m)	*Data Source:*	USGS National Hydrography Data

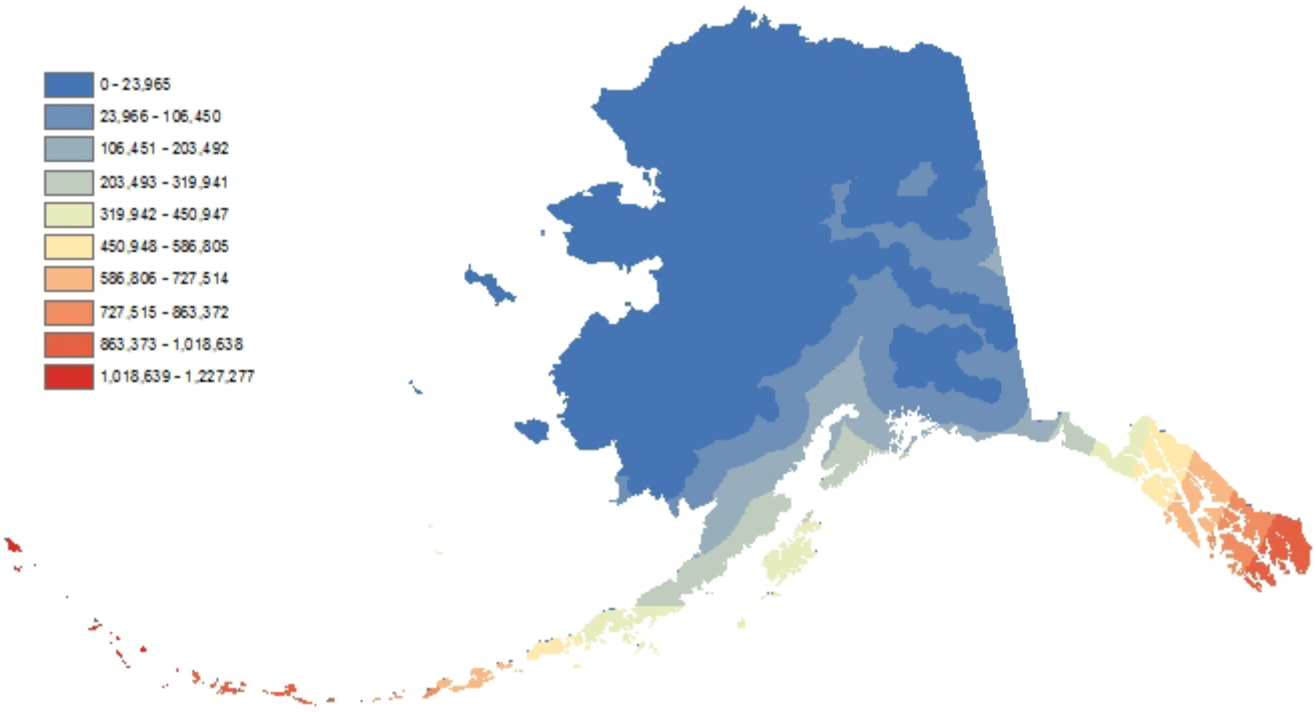
Processing Notes: Non-lotic water features were selected from a merged USGS National Hydrography Dataset consolidated from six subregional datasets, and planar distances both interior and exterior to these features were calculated using standard ESRI raster processing methods. For inductive modeling, only exterior distances were retained. For deductive modeling (not shown), interior and exterior distances were retained, and these data were further classified into 1 of 17 possible classes of distance range-categories from 0 to > 4000m (0, 60, 120, 250, 500, 1000, 2000, 4000, >4000).

In addition, for use in deductive modeling, similar variables were created for flowing water and wetland vegetation features, but not shown explicitly in this version of this document.



Dataset Name:	Distance to Glacier	*Variable Type:*	Continuous
File Name:	dist2glacier	*GAP Model Type (s):*	Inductive
Attribute:	Distance (m)	*Data Source:*	ADNR glacier coverage

Processing Notes: Glacier data were derived from ADNR LRIS data, mapped in 1998 at a 1:1,000,000 scale. See: http://dnr.alaska.gov/SpatialUtility/SUC?cmd=extract&layerid=27 . The glacier data were combined from DNNET coverages comprising from 5 degree by 5 degree tiles for Alaska. Planar distances exterior to these features were calculated using standard ESRI raster processing methods.

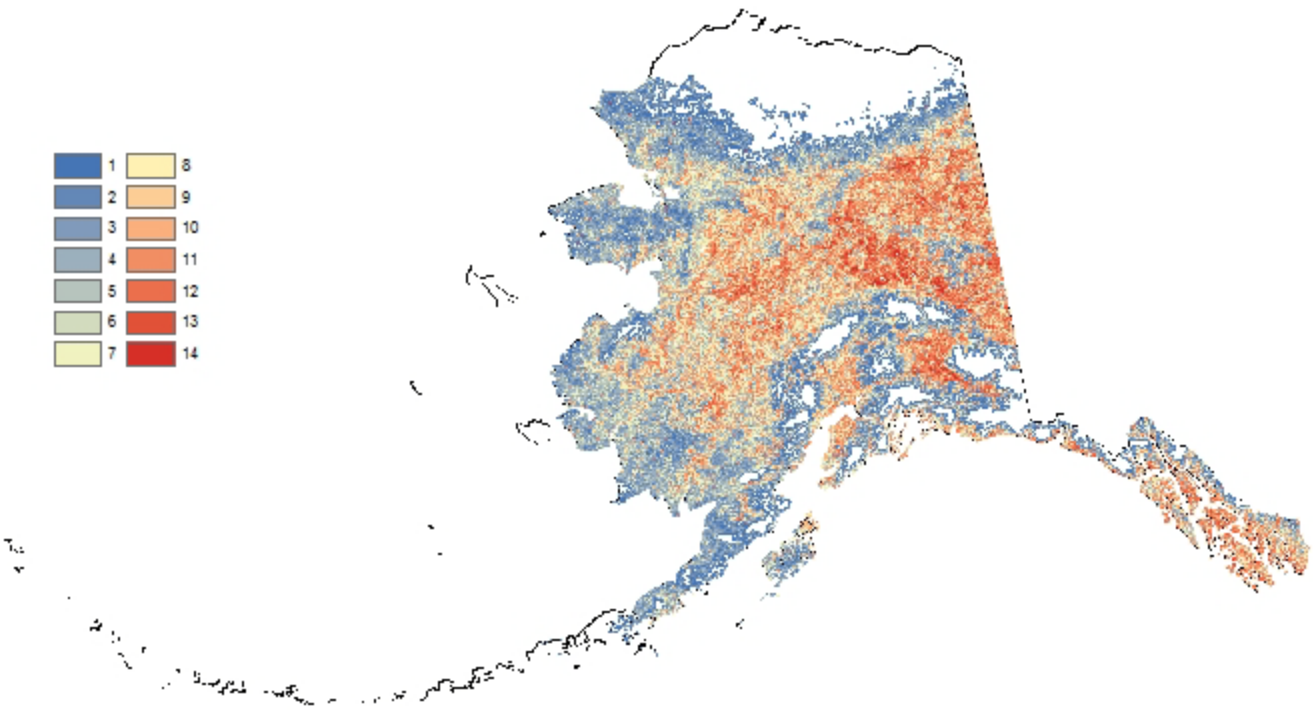


Dataset Name:	Distance to Permafrost	*Variable Type:*	Continuous
File Name:	dist2pfrost	*GAP Model Type (s):*	Inductive
Attribute:	Distance(m)	*Data Source:*	USGS EROS

Processing Notes: Permafrost occurrence was derived from USGS-EROS historical data mapped at a 1:2,500,000 scale. See http://agdcwww.wr.usgs.gov/agdc/agdc.html. Source information for this feature was based on a Permafrost of Alaska Map (circa 1965) and therefore this variable was used only to delineate general permafrost occurrence areas across the state without reference to permafrost categorization due to ambiguity about current conditions. Planar distances exterior to these features were calculated using standard ESRI raster processing methods.

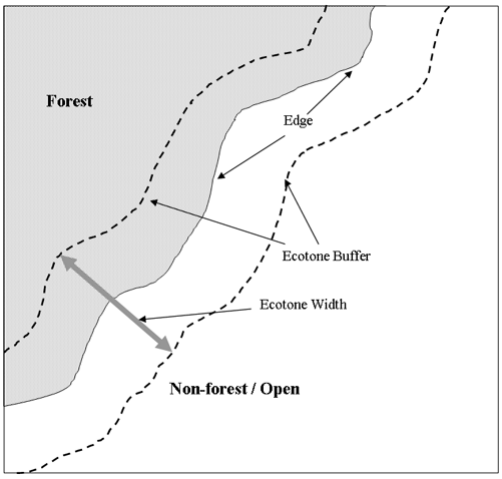
Dataset Name:	Elevation	*Variable Type:*	Continuous
File Name:	ak_ned_60	*GAP Model Type (s):*	Inductive and Deductive
Attribute:	Elevation (m)	*Data Source:*	USGS National Elevation Data

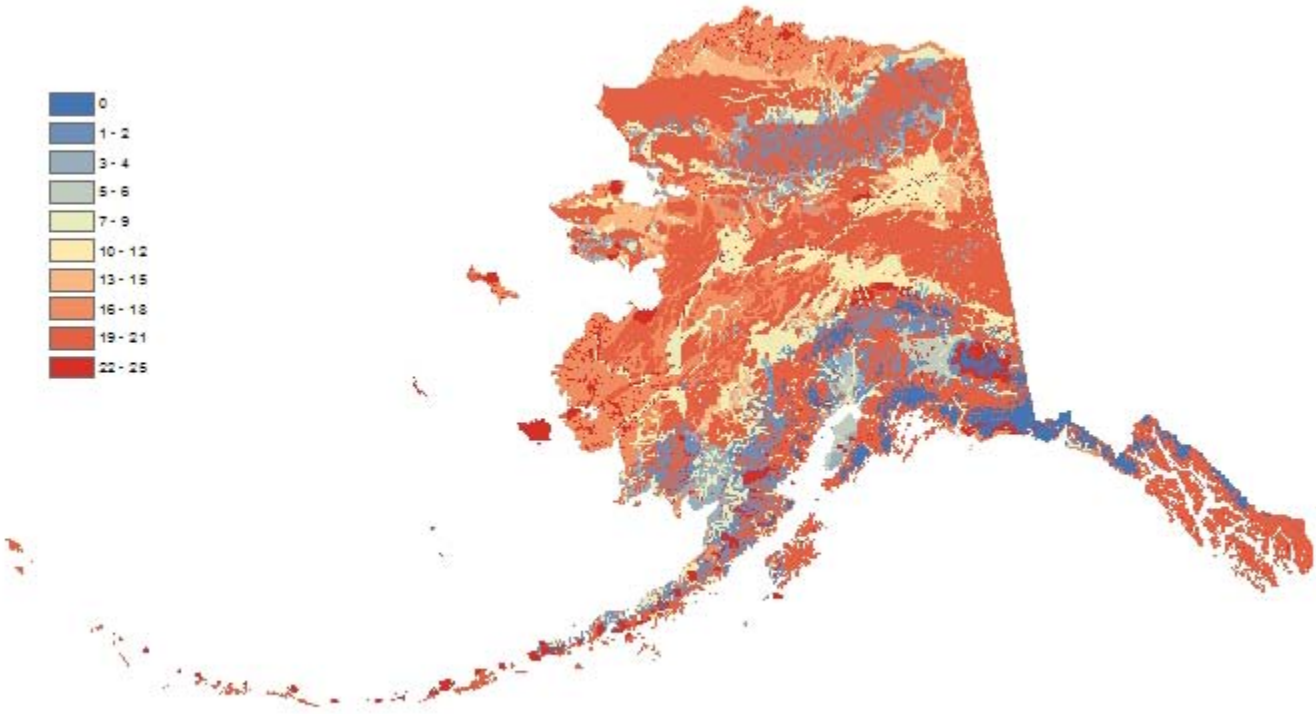
Processing Notes: These data were minimally processed and derived from USGS National Elevation Data (NED) with a cell size resolution of 60m.



Dataset Name:	Forest Buffer & Ecotone	*Variable Type:*	Categorical
File Name:	forest_buffer, ecotn_forest	*GAP Model Type (s):*	Deductive
Attribute:	Distance class (1-17)	*Data Source:*	NLCD

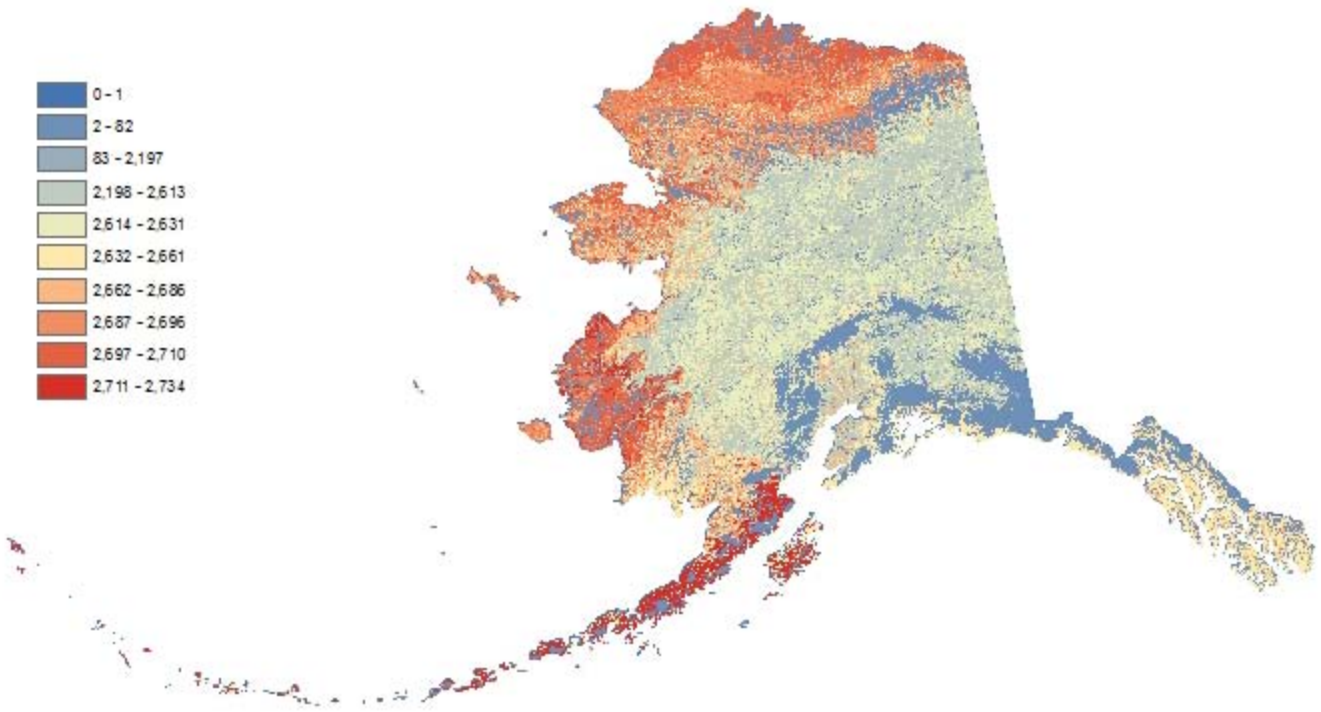
Processing Notes: Forest cover data were derived from select landcover classes of the 2001 National Land Cover Dataset (NLCD) for Alaska. Landcover classes were 41 - Deciduous Forest, 42 - Evergreen Forest, and 43 - Mixed Forest, as well as class 91 - Palustrine Forested Wetland, which include mesic forest types found throughout coastal and interior Alaska. All other classes were treated as non-forest cover, and edges were defined as all forest/non-forest boundaries. Planar distances both interior (i.e. from forest/non-forest edge into forest) and exterior (i.e. from forest/non-forest edge into non-forest) to edge features were calculated using standard ESRI raster processing methods and these data were further classified into 1 of 15 possible classes of distance range-categories from 0 to 4000m (0, 60, 120, 250, 500, 1000, 2000, 4000). The Ecotone variable was a closely related derivative and represented the swath of forest/non-forest spanning across the interior and exterior portions of edges calculated above, as classified into 1 of 6 possible width classes (0, 60, 120, 250, 500, 1000).





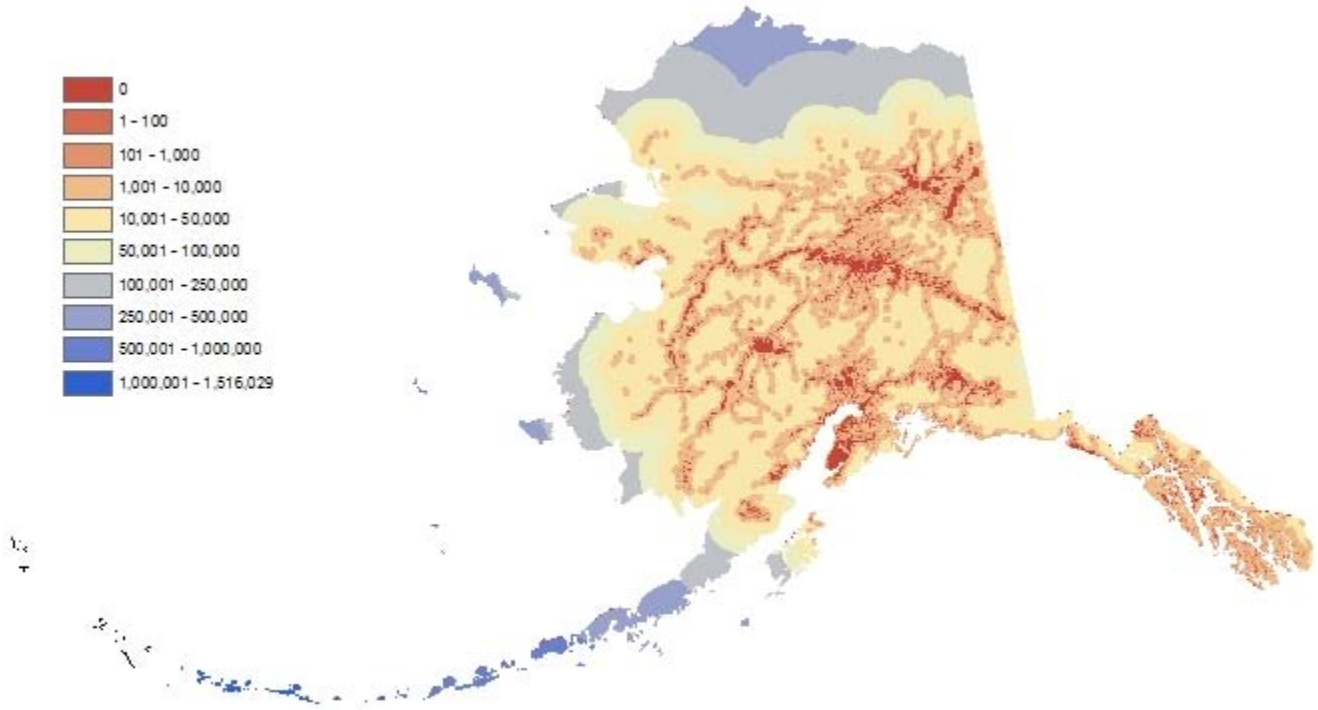
Dataset Name:	Geology	*Variable Type:*	Categorical
File Name:	geology	*GAP Model Type (s):*	Inductive
Attribute:	Class	*Data Source:*	USGS Surficial Geology

Processing Notes: Surficial geology classes of Alaska were derived from a map compiled by N.V. Karlstrom et. al. 1964 and published as a georeferenced dataset in 1999 by the USGS as a Miscellaneous Geologic Investigations Map I-357 at 1:1,584,000. These data were rasterized and each unique Qc codes was designated an arbitrary class value. See: http://agdc.usgs.gov/data/usgs/geology/metadata/beikman.html



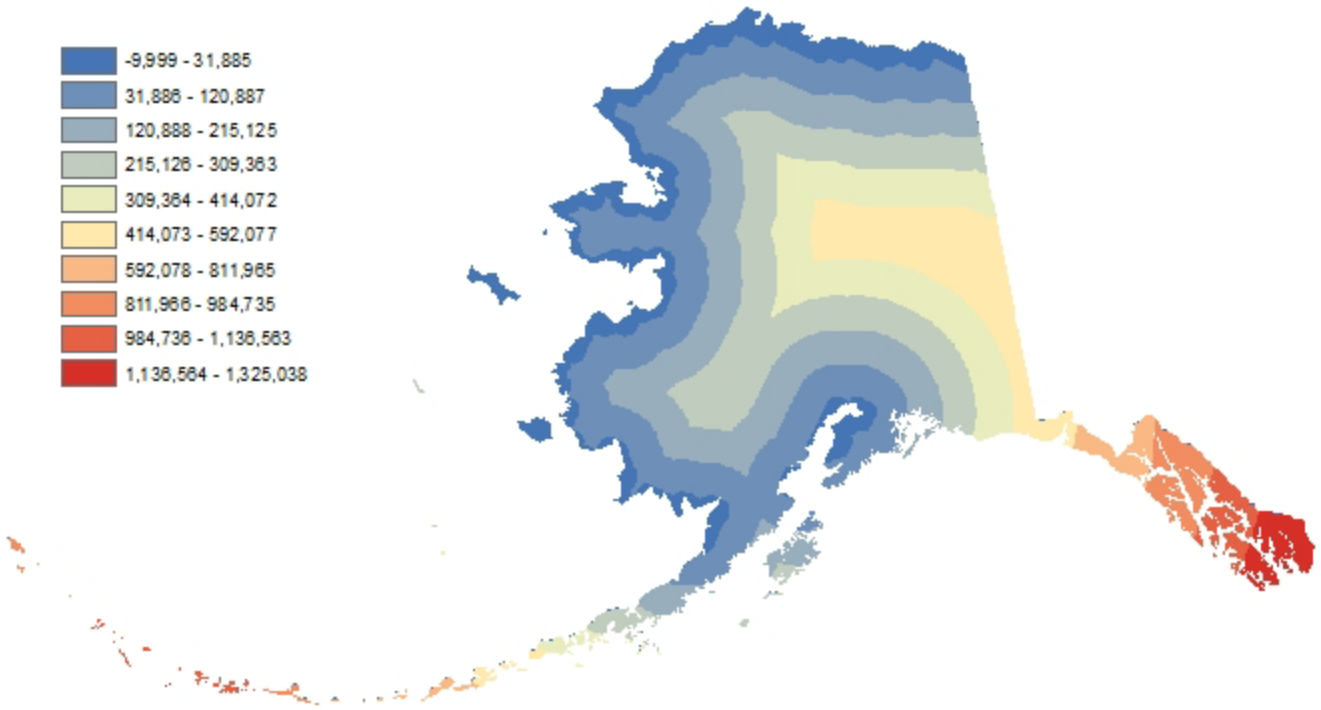
Dataset Name:	Vegetation	*Variable Type:*	Categorical
File Name:	lf_60	*GAP Model Type (s):*	Deductive
Attribute:	Landcover class	*Data Source:*	Landfire EVT

Processing Notes: Vegetation types were derived from the first (2009) iteration of Landfire existing vegetation types (EVT). Data were merged from several subregions and resampled (not upscaled) from grids with 30m cell-size resolution. In some cases, EVT values were collapsed across subregions into broader categories to remove purely regional categories.



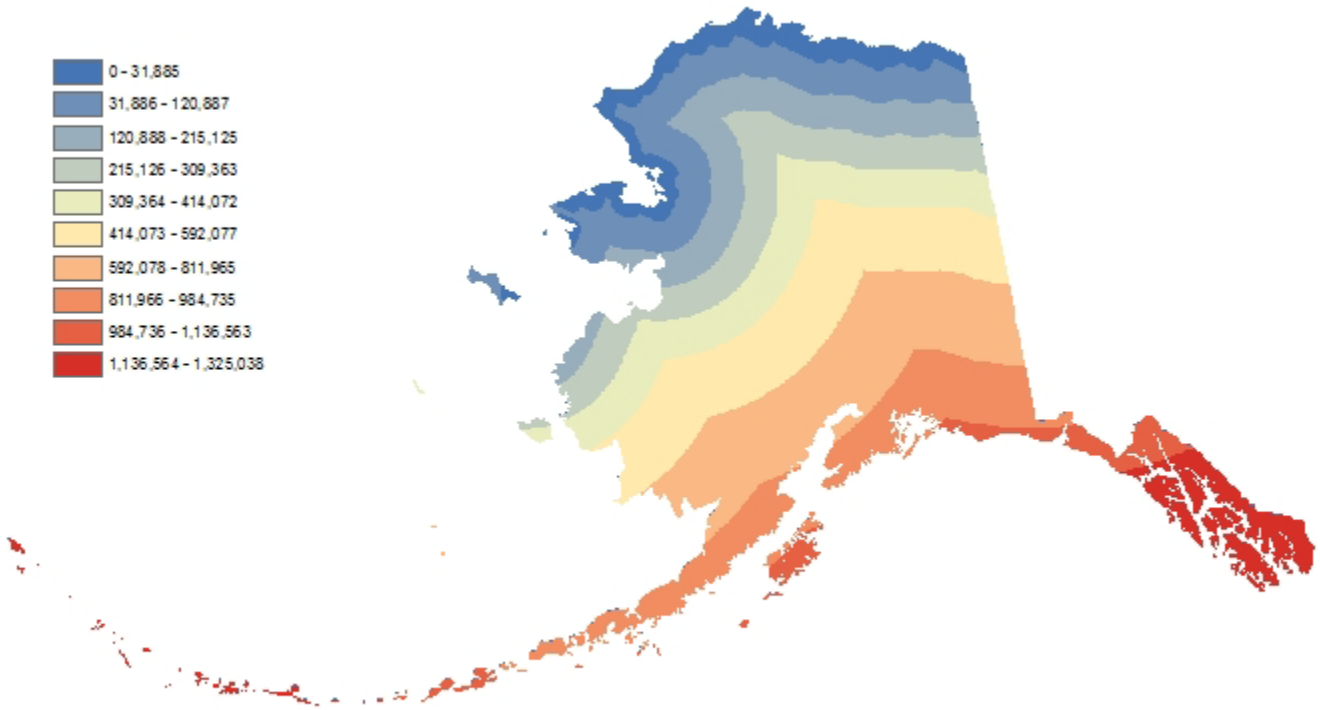
Dataset Name:	Distance to Insect Damage	*Variable Type:*	Continuous
File Name:	insect_dist	*GAP Model Type (s):*	Inductive
Attribute:	Distance (m)	*Data Source:*	ADNR Forestry

Processing Notes: Data were derived from mapped areas of forest damaged by insect irruptions (i.e., spruce budworm, larch sawfly, aspen leaf miner, and Ips/ engraver beetles) between 1989 and 2003. Planar distances exterior to these features were calculated using standard ESRI raster processing methods.



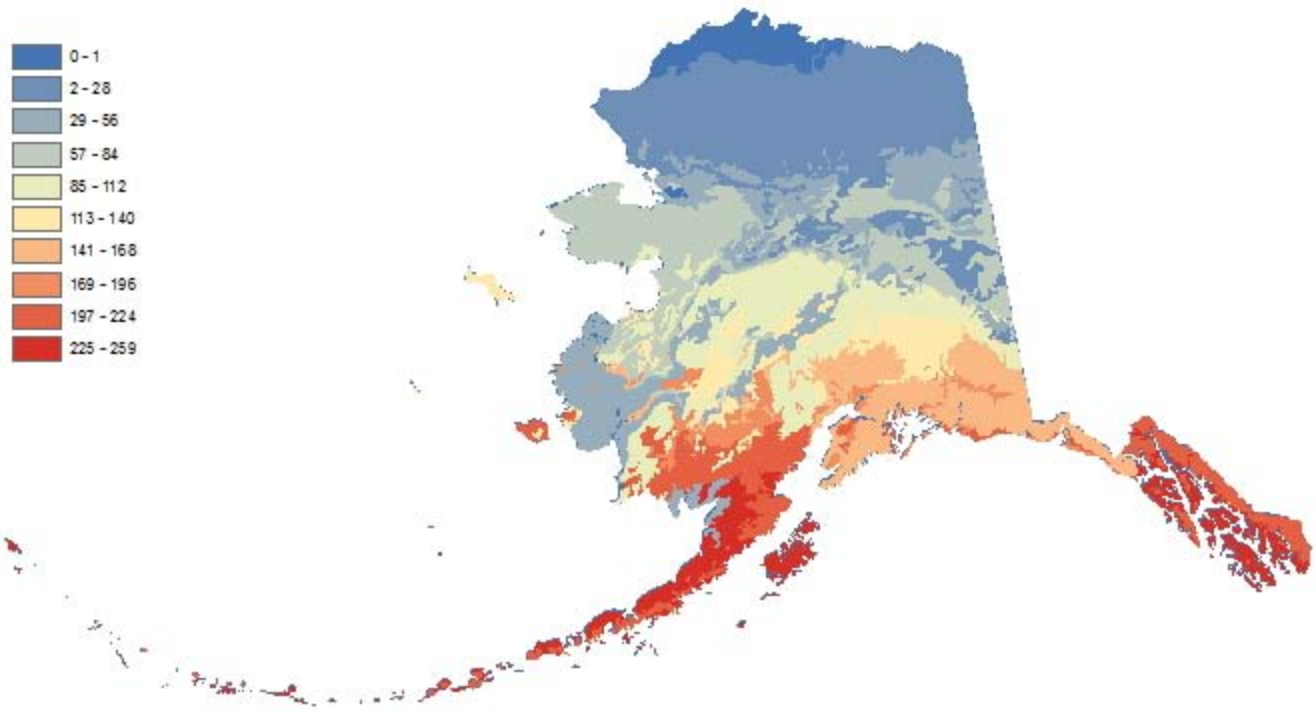
Dataset Name:	Distance to Sea Ice in December	*Variable Type:*	Continuous
File Name:	sice_dec_dist	*GAP Model Type (s):*	Inductive
Attribute:	Distance (m)	*Data Source:*	NSIDC

Processing Notes: Arctic sea ice distribution was derived from passive-microwave remote sensing data archived by the National Snow Ice and Data Center. See: http://nsidc.org/data/nsidc-0051.html . Monthly mean coverages for December of the years 2003-2007 were combined into a composite feature. Planar distances exterior to these features were calculated using standard ESRI raster processing methods.



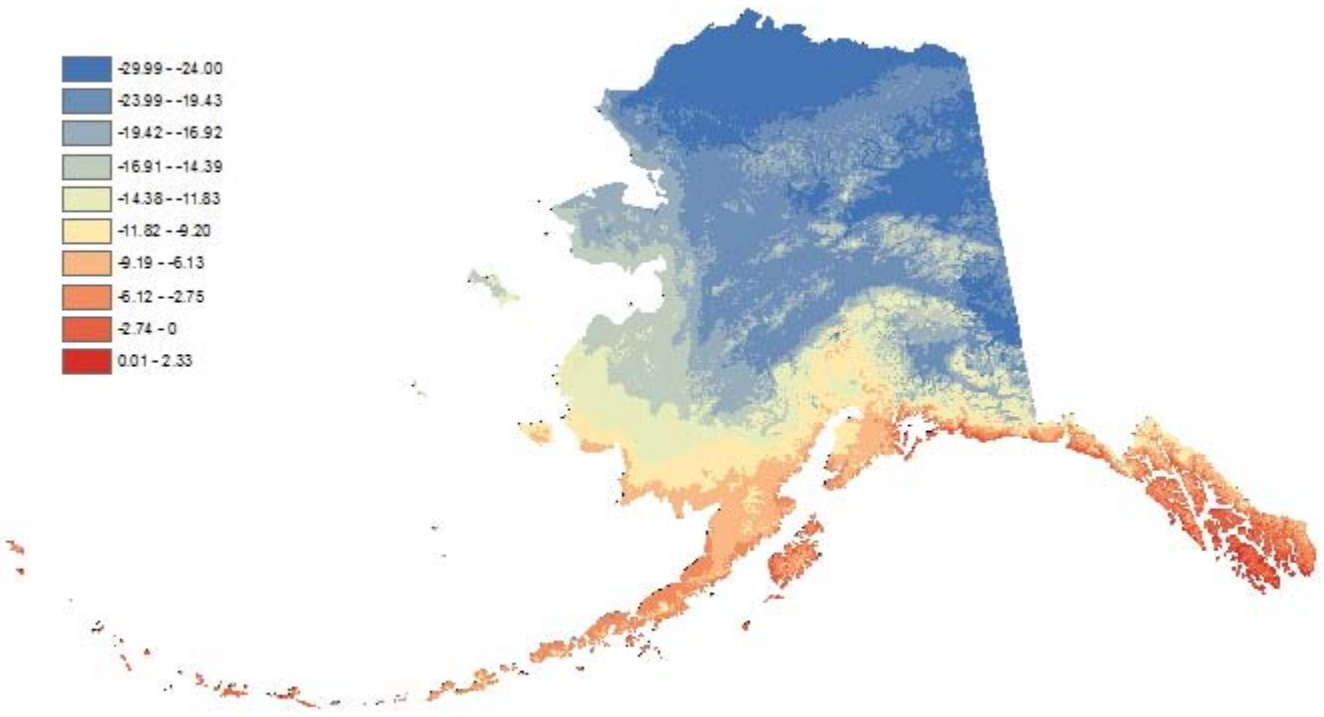
Dataset Name:	Distance to Sea Ice in June	*Variable Type:*	Continuous
File Name:	sice_jun_dist	*GAP Model Type (s):*	Inductive
Attribute:	Distance (m)	*Data Source:*	NSIDC

Processing Notes: Arctic sea ice distribution was derived from passive-microwave remote sensing data archived by the National Snow Ice and Data Center (NSIDC). See: http://nsidc.org/data/nsidc-0051.html. Monthly mean coverages for June of the years 2003-2007 were combined into a composite feature. Planar distances exterior to these features were calculated using standard ESRI raster processing methods.



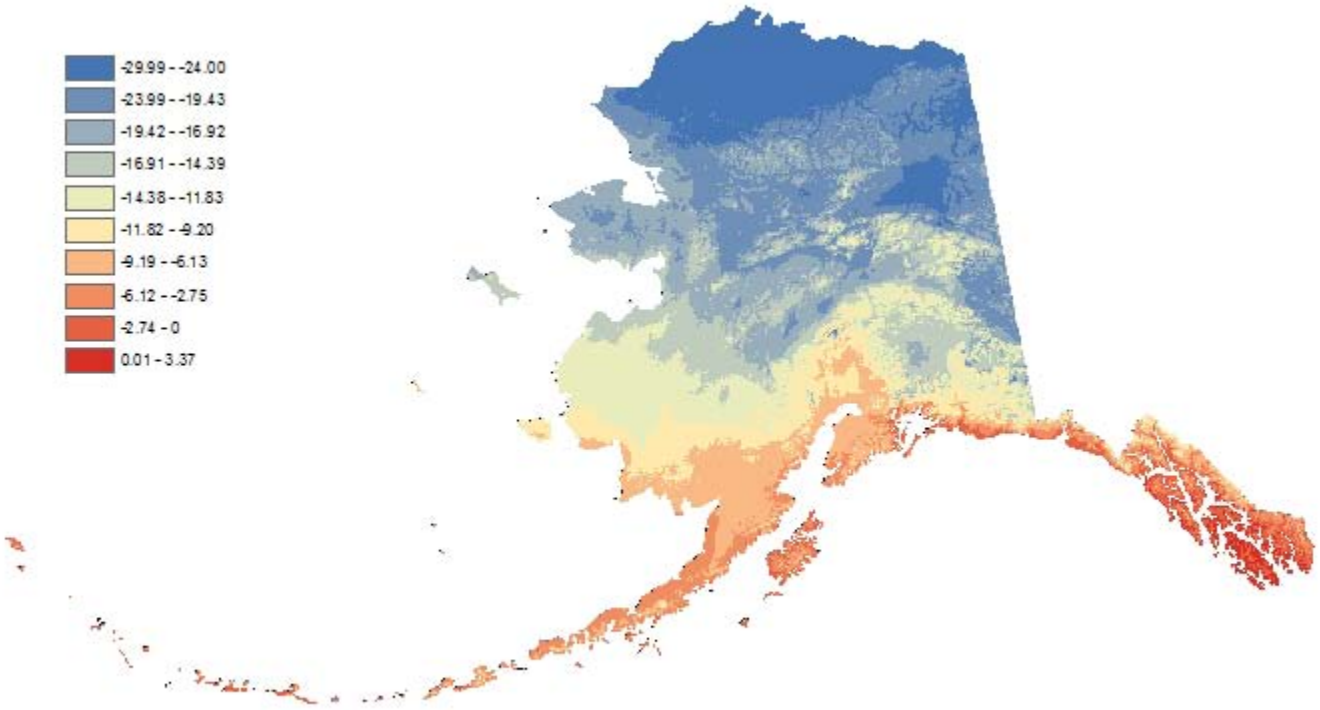
Dataset Name:	Soils	*Variable Type:*	Categorical
File Name:	soils	*GAP Model Type (s):*	Inductive
Attribute:	Class	*Data Source:*	NRCS STATSGO

Processing Notes: Soil types were derived from 2011 STATSGO soil survey dataset developed by the U.S. Department of Agriculture, Natural Resource Conservation Service. Data were originally mapped to a scale of 1:2,500,000. These data were rasterized and each unique MUSYM (e,g. soil mapping unit) value was designated an arbitrary class value.



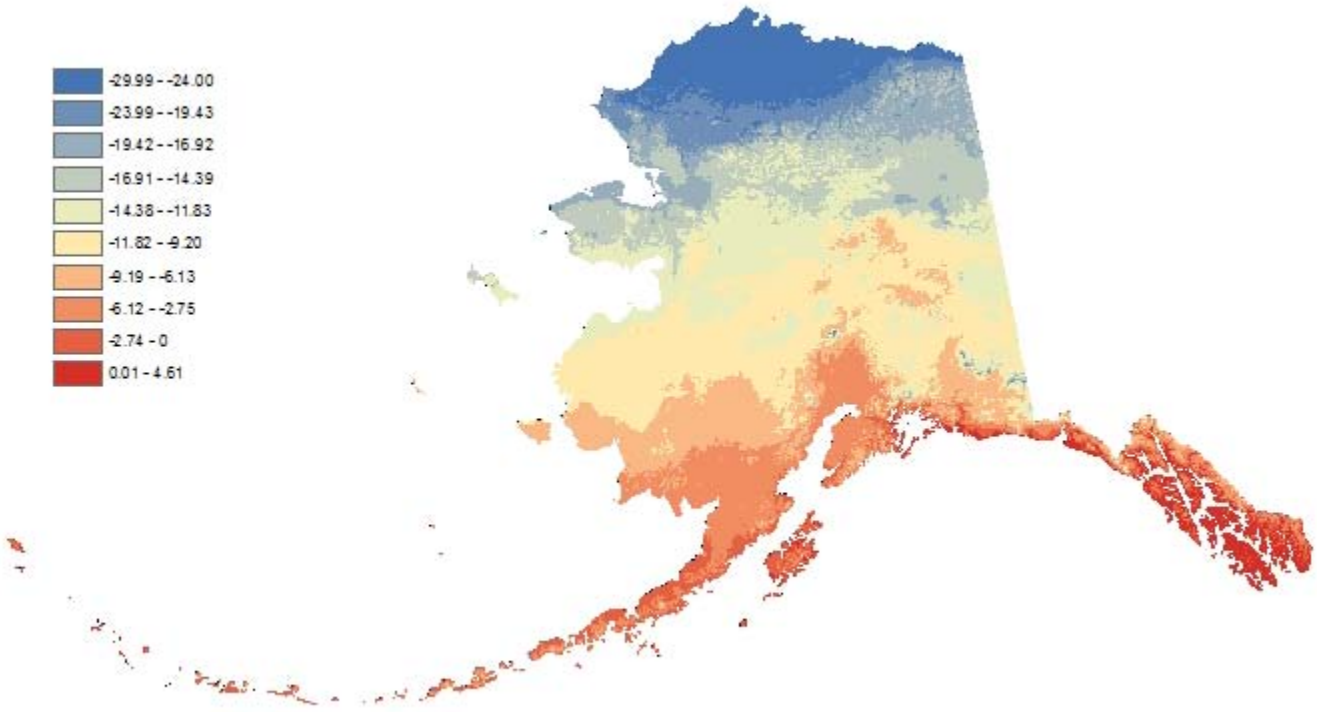
Dataset Name:	Average Temperature in January	*Variable Type:*	Continuous
File Name:	tmean01	*GAP Model Type (s):*	Inductive
Attribute:	Temperature (Celsius)	*Data Source:*	PRISM

Processing Notes: Mean historical temperature for January was derived from the 2010 PRISM (Parameter-elevation Regressions on Independent Slopes Model) climate mapping system, which is a modeled climatological dataset summarized at monthly intervals across the period 1981-2010. See: http://www.prism.oregonstate.edu/. Data were resampled (not downscaled) from grids with 800m cell and projected from a geographic coordinate system of NAD83.



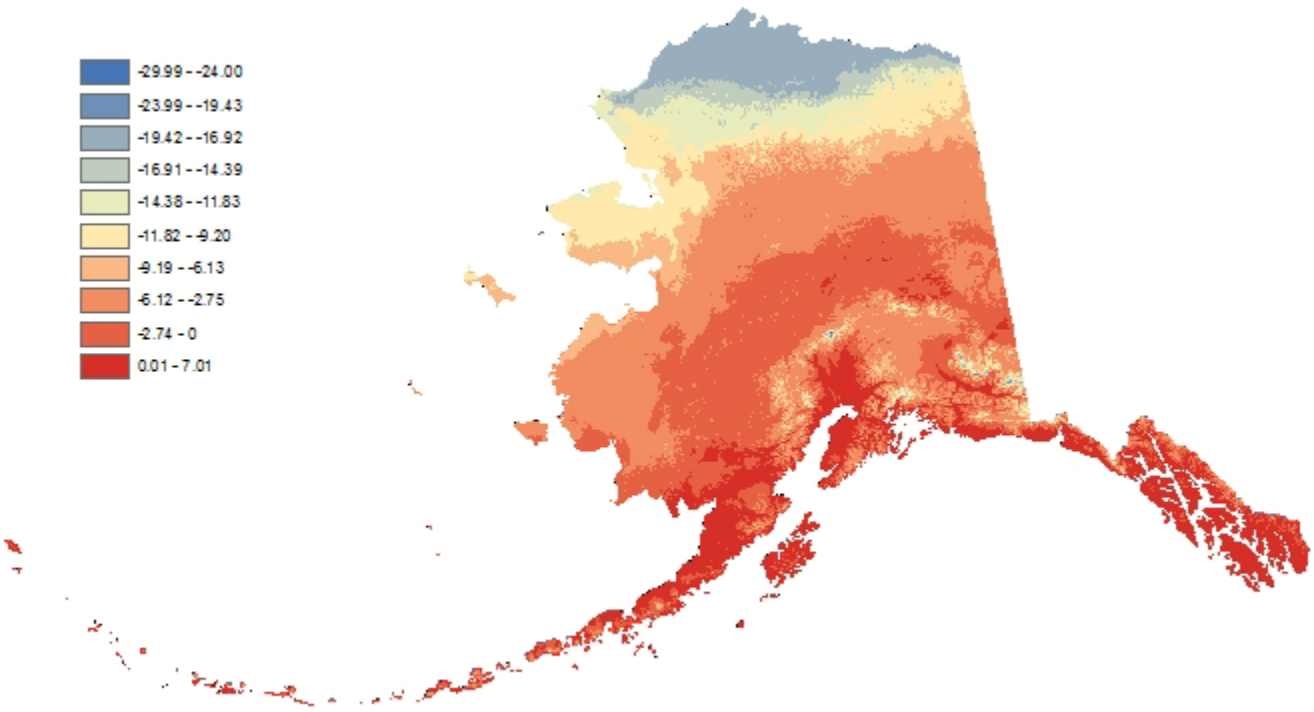
Dataset Name:	Average Temperature in February	*Variable Type:*	Continuous
File Name:	tmean02	*GAP Model Type (s):*	Inductive
Attribute:	Temperature (Celsius)	*Data Source:*	PRISM

Processing Notes: Mean historical temperature for February was derived from the 2010 PRISM (Parameter-elevation Regressions on Independent Slopes Model) climate mapping system, which is a modeled climatological dataset summarized at monthly intervals across the period 1981-2010. See: http://www.prism.oregonstate.edu/. Data were resampled (not downscaled) from grids with 800m cell and projected from a geographic coordinate system of NAD83.



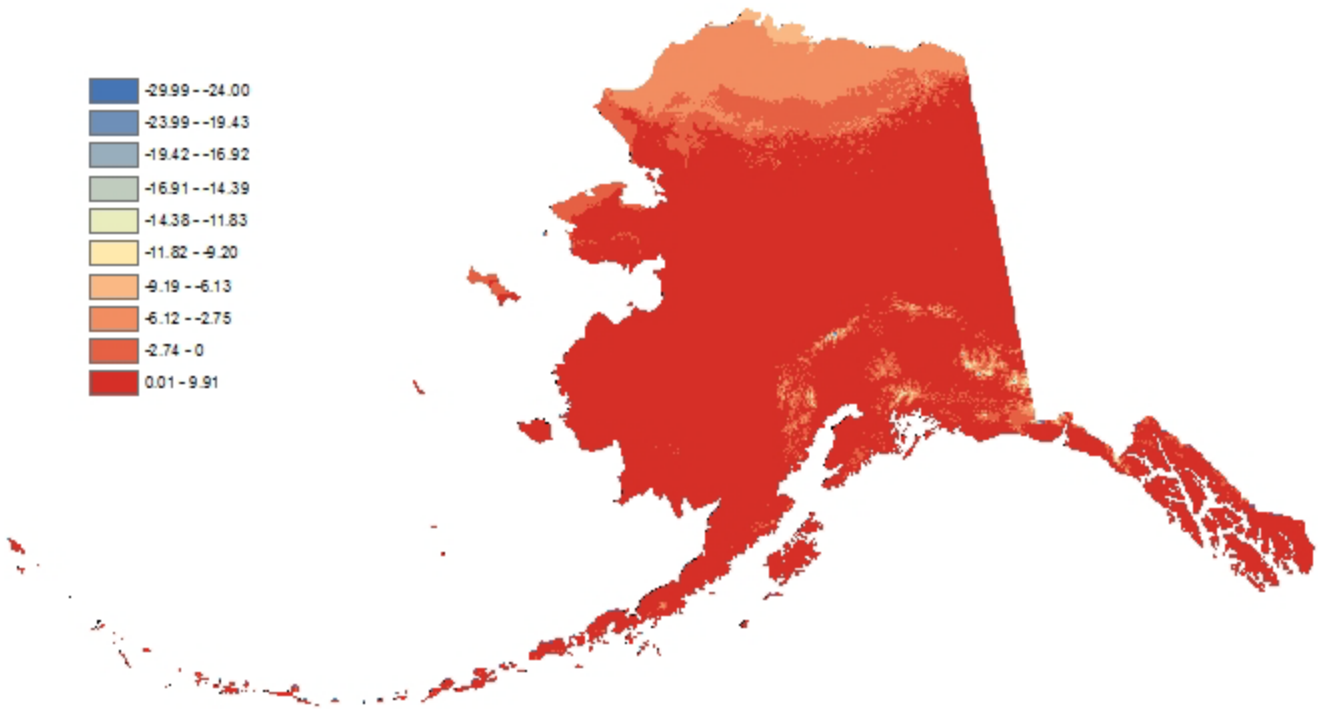
Dataset Name:	Average Temperature in March	*Variable Type:*	Continuous
File Name:	tmean03	*GAP Model Type (s):*	Inductive
Attribute:	Temperature (Celsius)	*Data Source:*	PRISM

Processing Notes: Mean historical temperature for March was derived from the 2010 PRISM (Parameter-elevation Regressions on Independent Slopes Model) climate mapping system, which is a modeled climatological dataset summarized at monthly intervals across the period 1981-2010. See: http://www.prism.oregonstate.edu/. Data were resampled (not downscaled) from grids with 800m cell and projected from a geographic coordinate system of NAD83.



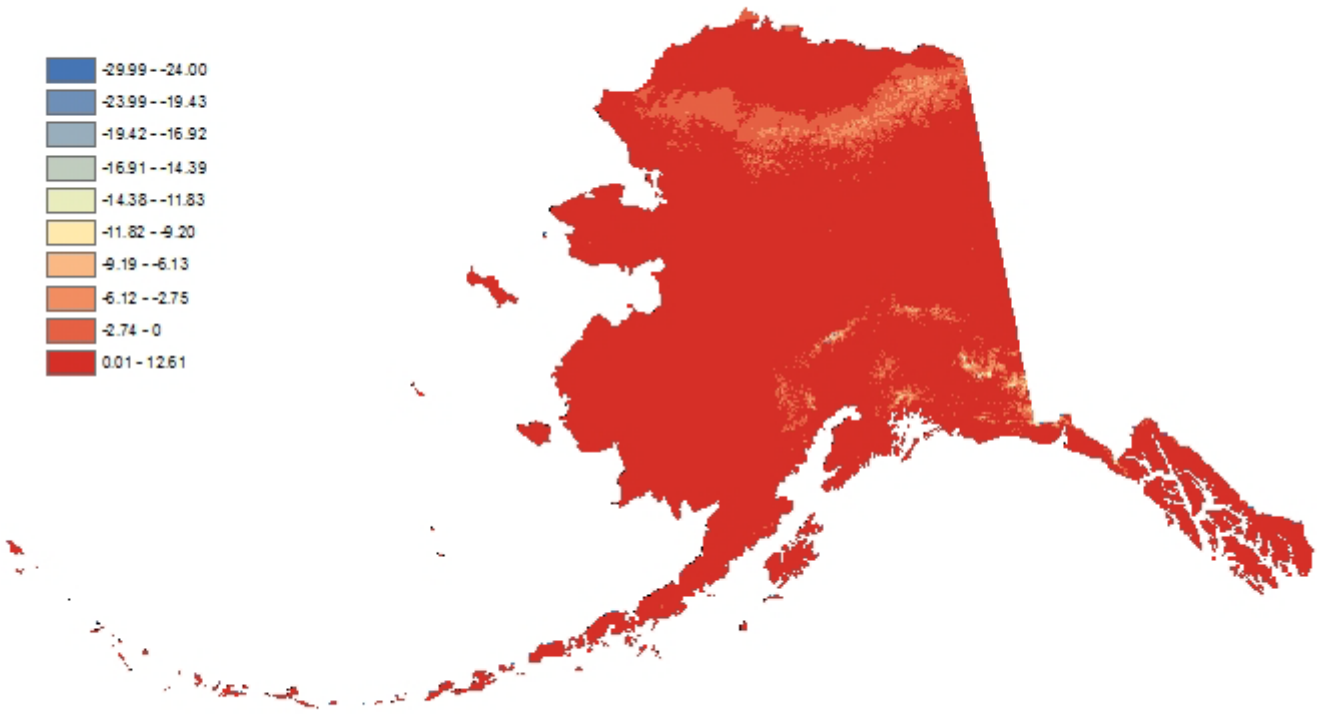
Dataset Name:	Average Temperature in April	*Variable Type:*	Continuous
File Name:	tmean04	*GAP Model Type (s):*	Inductive
Attribute:	Temperature (Celsius)	*Data Source:*	PRISM

Processing Notes: Mean historical temperature for April was derived from the 2010 PRISM (Parameter-elevation Regressions on Independent Slopes Model) climate mapping system, which is a modeled climatological dataset summarized at monthly intervals across the period 1981-2010. See: http://www.prism.oregonstate.edu/. Data were resampled (not downscaled) from grids with 800m cell and projected from a geographic coordinate system of NAD83.



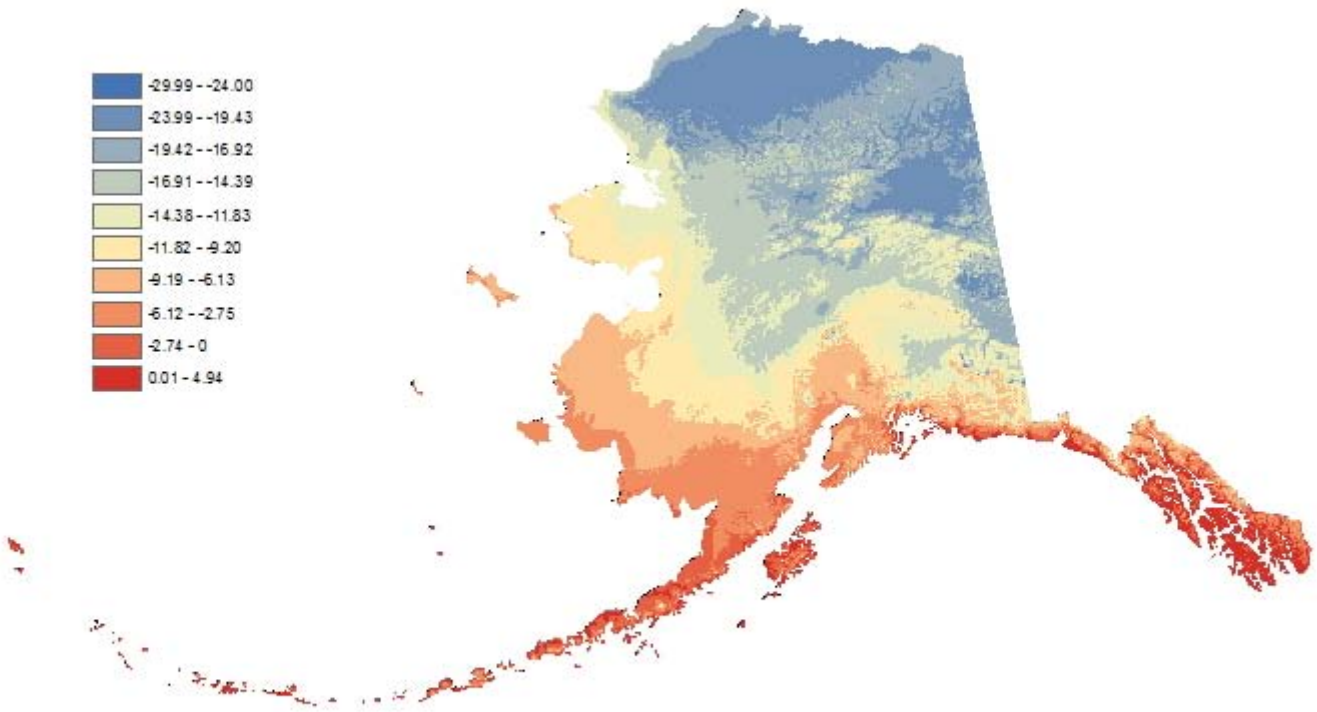
Dataset Name:	Average Temperature in May	*Variable Type:*	Continuous
File Name:	tmean05	*GAP Model Type (s):*	Inductive
Attribute:	Temperature (Celsius)	*Data Source:*	PRISM

Processing Notes: Mean historical temperature for May was derived from the 2010 PRISM (Parameter-elevation Regressions on Independent Slopes Model) climate mapping system, which is a modeled climatological dataset summarized at monthly intervals across the period 1981-2010. See: http://www.prism.oregonstate.edu/. Data were resampled (not downscaled) from grids with 800m cell and projected from a geographic coordinate system of NAD83.



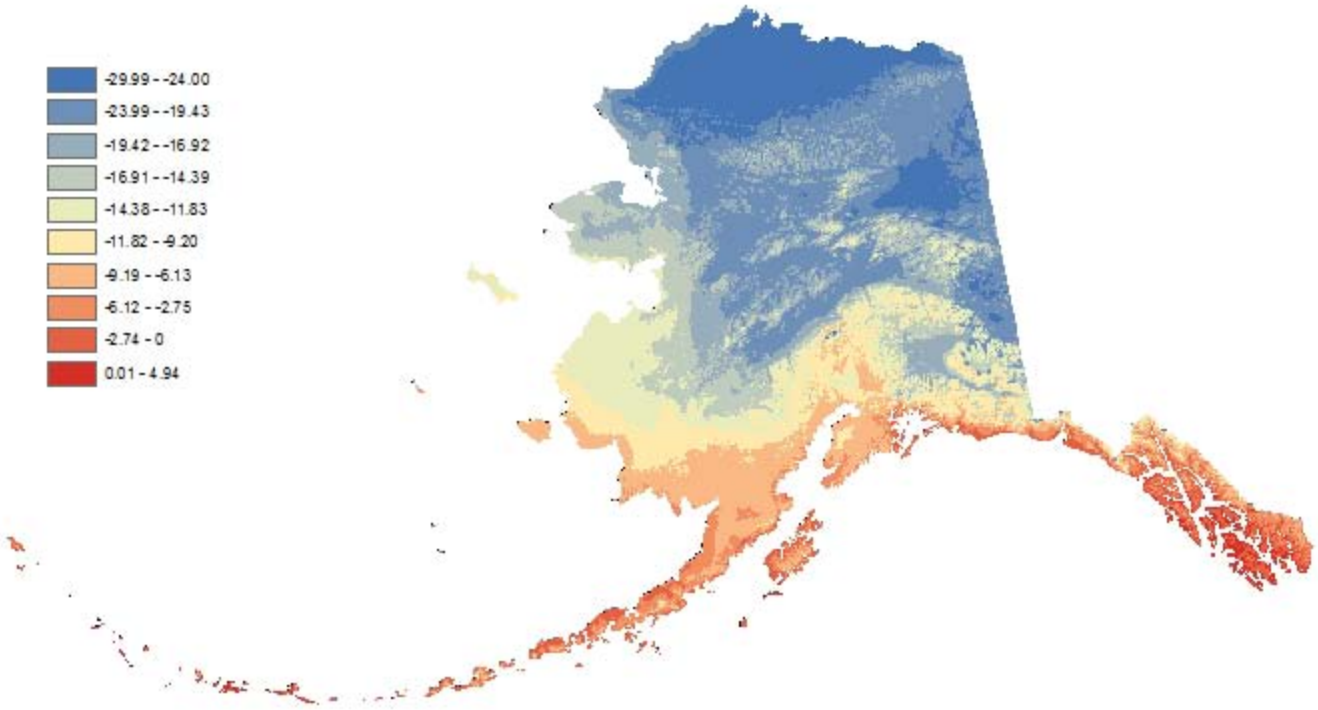
Dataset Name:	Average Temperature in September	*Variable Type:*	Continuous
File Name:	tmean09	*GAP Model Type (s):*	Inductive
Attribute:	Temperature (Celsius)	*Data Source:*	PRISM

Processing Notes: Mean historical temperature for September was derived from the 2010 PRISM (Parameter-elevation Regressions on Independent Slopes Model) climate mapping system, which is a modeled climatological dataset summarized at monthly intervals across the period 1981-2010. See: http://www.prism.oregonstate.edu/. Data were resampled (not downscaled) from grids with 800m cell and projected from a geographic coordinate system of NAD83.



Dataset Name:	Average Temperature in November	*Variable Type:*	Continuous
File Name:	tmean11	*GAP Model Type (s):*	Inductive
Attribute:	Temperature (Celsius)	*Data Source:*	PRISM

Processing Notes: Mean historical temperature for November was derived from the 2010 PRISM (Parameter-elevation Regressions on Independent Slopes Model) climate mapping system, which is a modeled climatological dataset summarized at monthly intervals across the period 1981-2010. See: http://www.prism.oregonstate.edu/. Data were resampled (not downscaled) from grids with 800m cell and projected from a geographic coordinate system of NAD83.



Dataset Name:	Average Temperature in December	*Variable Type:*	Continuous
File Name:	tmean12	*GAP Model Type (s):*	Inductive
Attribute:	Temperature (Celsius)	*Data Source:*	PRISM

Processing Notes: Mean historical temperature for December was derived from the 2010 PRISM (Parameter-elevation Regressions on Independent Slopes Model) climate mapping system, which is a modeled climatological dataset summarized at monthly intervals across the period 1981-2010. See: http://www.prism.oregonstate.edu/. Data were resampled (not downscaled) from grids with 800m cell and projected from a geographic coordinate system of NAD83.