Montana Gap Analysis - Land Cover

Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: Wildlife Spatial Analysis Lab, The University of Montana
Publication_Date: 19980930
Title: Montana Gap Analysis - Land Cover
Publication_Information:
Publication_Place: Missoula, Montana
Publisher: Wildlife Spatial Analysis Lab, The University of Montana
Description:
Abstract:
MTGAPVEG is an ARC/INFO 90 meter land cover grid (raster file) covering the state of Montana, including a 10 km buffer around the state border as required by the National Gap Analysis Program for edge-matching with adjacent states. Parts of the following 33 Landsat Thematic Mapper (TM) scenes are included: path 34, rows 27-29; path 35, rows 26-29; path 36, rows 27-29; path 37, rows 26-29; path 38, rows 26-29; path 39, rows 26-29; path 40, rows 26-29; path 41, rows 26-28; path 42, rows 26-27; and path 43, row 26.

Land cover was classified in a two-step process: unsupervised classification to define patch boundaries and spectral classes, followed by a supervised classification to assign cover type labels. TM bands 1 - 7, elevation, slope, and aspect attributes were used in the supervised classification. In all scenes, irrigated and non-irrigated agriculture, clouds, cloud shadow, urban areas, surface mines, and fires were manually labeled.

Parts of this grid were produced in four separate projects. Western Montana and northern Idaho were classified for the U.S. Forest Service, Region One, in a project (FSR1) completed in June 1996. The FSR1 project produced a separate riparian layer, unlike the other three projects where riparian vegetation was included in the overall supervised classification. This separate riparian grid was combined with the other FSR1 grids in order to match the later projects. The Little Missouri and Sheyenne National Grasslands were classified for the Custer National Forest as part of a project (CUSTER) completed in July 1997. The

central Idaho project (CICP) was contracted by the U.S. Forest Service, Region Four, and was completed in August 1997. Finally, the eastern Montana project (EMT) was contracted by the Montana Department of Fish, Wildlife and Parks, and was completed in November 1997.

All individual grids within the state of Montana have undergone updates and standardization since the project completion dates in order to have as congruous a coverage throughout the state as possible. Cover types were combined and reduced to 50 types from a total of 94 for use with Gap Analysis. The grid was merged to a 2 ha minimum mapping unit (MMU) for upland cover types and a 90 meter MMU for riparian cover types. Cloud and cloud shadow were merged to 100 ha. Ground-truth data were provided by a variety of organizations for use in the classification process.

For more information, please refer to the project's final report: Redmond, R.L., M.M. Hart, J.C. Winne, W.A. Williams, P.C. Thornton, Z. Ma, C.M. Tobalske, M.M. Thornton, K.P. McLaughlin, T.P. Tady, F.B. Fisher, S.W. Running. 1998. The Montana Gap Analysis Project: final report. Unpublished report. Montana Cooperative Wildlife Research Unit, The University of Montana, Missoula. xiii + 136 pp. + appendices.

An atlas of land cover for the state also is available: Fisher, F.B., J.C. Winne, M.M. Thornton, T.P. Tady, Z. Ma, M.M. Hart, and R.L. Redmond. 1998. Montana land cover atlas. Unpublished report. Montana Cooperative Wildlife Research Unit, The University of Montana, Missoula. viii + 50 pp.

The following metadata elements are required by GAP, but do not parse using the FGDC ms parser (although similar elements can be found later in this document for several of these). For the convenience of GAP users, these elements are listed here. Data Set Identity: MTGAPVEG; Raster File Format: ARC/INFO GRID; Raster File Sensor: NA; Vector File Format: NA; Nonspatial File Format: NA; Source Distance Resolution: 90 meters; Raster File Number of Bytes per Pixel: 4; Native Data Structure: Raster.

Purpose:

These data were produced to map existing land cover in a standardized, consistent manner across the state for use in Montana Gap Analysis (MT-GAP). This land cover grid is suited for analysis at the regional, sub-regional, and landscape levels; it can also provide support for many management disciplines, including timber, wildlife, fisheries, and recreation.

Time_Period_of_Content:

Time_Period_Information:

Multiple_Dates/Times:

Calendar_Date: 19940401

Calendar_Date: 19980930

Currentness_Reference: calendar date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None Scheduled
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -115.72800919
East_Bounding_Coordinate: -103.46514406
North_Bounding_Coordinate: 49.11842777
South_Bounding_Coordinate: 44.14107633
Keywords:
Theme:
Theme_Keyword_Thesaurus: none
Theme_Keyword: vegetation
Theme_Keyword: land cover
Theme_Keyword: classification
Theme_Keyword: Landsat Thematic Mapper scenes
Theme_Keyword: remote-sensing image
Theme_Keyword: Gap Analysis
Place:
Place_Keyword_Thesaurus: Geographic Names Information System
Place_Keyword: Montana
Access_Constraints:
This data set is in the public domain, and the recipient may not assert any proprietary rights thereto nor represent it to anyone as other than a data set produced by the Wildlife Spatial Analysis Lab at the University of Montana.
Use_Constraints:
This data set is provided "as-is" without warranty of any kind, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The user assumes all responsibility for the accuracy and suitability of this data set for a specific application. In no event will the creators, The University of Montana, or the US Geological Survey be liable for any damages, including lost profits, lost savings, or other incidental or consequential damages arising from the use of or inability to use this data set. Use of these data requires the ability to read Arc/Info Grid data sets. Users must assume responsibility for determining the suitability of these data for their purposes. Not for use at scales greater than 1:100000.
Point_of_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: Wildlife Spatial Analysis Lab, The University of Montana
Contact_Person: Roland L. Redmond
Contact_Position: Principal Investigator
Contact_Address:
Address_Type: mailing and physical address
Address: Wildlife Spatial Analysis Lab, The University of Montana
City: Missoula
State_or_Province: MT
Postal_Code: 59812-1063
Country: USA
Contact_Voice_Telephone: 406 243 5208 (email preferred)
Contact_Facsimile_Telephone: 406 243 6064
Contact_Electronic_Mail_Address: red@wru.umt.edu
Hours_of_Service: Monday-Friday, 8-5, Mountain Time
Browse_Graphic:

```
          Browse_Graphic_File_Name: mtgapveg.jpg
          Browse_Graphic_File_Description: Sample image of the data set
          and/or its extent.
          Browse_Graphic_File_Type: JPEG
     Data_Set_Credit:
          The Wildlife Spatial Analysis Lab for creation of the geospatial
          data set.
     Native_Data_Set_Environment:
          The Wildlife Spatial Analysis Lab uses IBM RS/6000 Workstations
          running AIX 4.1 with Arc/Info software versions 7.04 and 7.11,
          Erdas version 7.5, and Imagine version 8.1.

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Data_Quality_Information:
     Attribute_Accuracy:
          Attribute_Accuracy_Report:
               Thematic accuracy of the land cover map was assessed using a
               bootstrap method which did not require the collection of an
               independent set of reference data. Cover type classification
               accuracies were estimated for 45 types; these averaged
               61.4%, and ranged from 4.4% for Western Hemlock to 93.2% for
               Missouri Breaks. Interpolation of the mean error estimates
               at each ground reference point allowed us to map the land
               cover accuracy across the state. Estimated mean accuracy
               exceeded 80% in the southwest corner (Beaverhead and Madison
               Counties) and in the western portion of the Highline in
               Glacier, Toole, and Pondera Counties; lower estimated
               accuracies were associated with some of the insular mountain
               ranges in central Montana from Gallatin County north through
               Cascade and Judith Basin Counties. For more information on
               accuracy of vegetation attributes, please refer to the
               project's final report: Redmond, R.L., M.M. Hart, J.C.
               Winne, W.A. Williams, P.C. Thornton, Z. Ma, C.M. Tobalske,
               M.M. Thornton, K.P. McLaughlin, T.P. Tady, F.B. Fisher, S.W.
               Running. 1998. The Montana Gap Analysis Project: final
               report. Unpublished report. Montana Cooperative Wildlife
               Research Unit, The University of Montana, Missoula. xiii +
               136 pp. + appendices.
     Logical_Consistency_Report:
          All grid attributes were checked for consistency of appropriate
          range values.
     Completeness_Report:
          All areas in Montana and the surrounding 10km buffer are included
          in this map.
     Positional_Accuracy:
          Horizontal_Positional_Accuracy:
               Horizontal_Positional_Accuracy_Report:
                    Claimed root-mean square error for horizontal position
                    of the terrain-corrected Landsat TM images is 18 meters
                    in the x direction (WNW-ESE) and 30 meters in the y
                    direction (NNE-SSW).
     Lineage:
          Source_Information:
               Source_Citation:
                    Citation_Information:
                         Originator: Hughes STX Corporation
```

```
                Publication_Date: 1991, 1992, 1993
                Title:
                     Terrain-corrected Landsat Thematic Mapper
                     Images p34r29, p35r26-28, p36r26-29,
                     p37r26-29, p38r26-29, p39r26-29, p40r26-29,
                     p41r26-28, p42r26-27
                Geospatial_Data_Presentation_Form: remote-sensing
                image
                Publication_Information:
                     Publication_Place: Lanham, Maryland
                     Publisher: Hughes STX Corporation
     Source_Scale_Denominator: 60000
     Type_of_Source_Media: Online
     Source_Time_Period_of_Content:
          Time_Period_Information:
               Multiple_Dates/Times:
                    Calendar_Date: 19910615
                    Calendar_Date: 19930805
          Source_Currentness_Reference: calendar date
     Source_Citation_Abbreviation: HSTX
     Source_Contribution: Provided base imagery for
     classification.
Source_Information:
     Source_Citation:
          Citation_Information:
               Originator: Multi-Resolution Land Cover Consortium
               (MRLC)
               Publication_Date: 1994, 1996
               Title:
                    Terrain-corrected Landsat Thematic Mapper
                    Images p34r28, p35r29, p43r26
               Geospatial_Data_Presentation_Form: remote-sensing
               image
               Publication_Information:
                    Publication_Place: Sioux Falls, South Dakota
                    Publisher: Multi-Resolution Land Cover
                    Consortium (MRLC)
     Source_Scale_Denominator: 60000
     Type_of_Source_Media: Online
     Source_Time_Period_of_Content:
          Time_Period_Information:
               Multiple_Dates/Times:
                    Calendar_Date: 19940829
                    Calendar_Date: 19960515
          Source_Currentness_Reference: calendar date
     Source_Citation_Abbreviation: MRLC
     Source_Contribution: Provided base imagery for
     classification.
Source_Information:
     Source_Citation:
          Citation_Information:
               Originator: EOSAT Corporation
               Publication_Date: 19950617
               Title: Terrain-corrected Landsat Thematic Mapper
               Image p34r27
               Geospatial_Data_Presentation_Form: remote-sensing
               image
```

```
                Publication_Information:
                     Publication_Place: Lanham, Maryland
                     Publisher: EOSAT Corporation
          Source_Scale_Denominator: 60000
          Type_of_Source_Media: Online
          Source_Time_Period_of_Content:
               Time_Period_Information:
                    Single_Date/Time:
                         Calendar_Date: 19950617
               Source_Currentness_Reference: calendar date
          Source_Citation_Abbreviation: EOS
          Source_Contribution: Provided base imagery for
          classification.
     Source_Information:
          Source_Citation:
               Citation_Information:
                    Originator: U.S. Forest Service, Region 1
                    Publication_Date: 199504
                    Title: Existing Ground-Truth Databases
                    Geospatial_Data_Presentation_Form: map
                    Publication_Information:
                         Publication_Place: Montana
                         Publisher: U.S. Forest Service
          Source_Scale_Denominator: 24000
          Type_of_Source_Media: digital
          Source_Time_Period_of_Content:
               Time_Period_Information:
                    Multiple_Dates/Times:
                         Calendar_Date: 199504
                         Calendar_Date: 199510
               Source_Currentness_Reference: calendar date
          Source_Citation_Abbreviation: GRTR
          Source_Contribution: Provided training data for assigning
          cover type labels.
     Source_Information:
          Source_Citation:
               Citation_Information:
                    Originator: U.S. Forest Service, Region 4
                    Publication_Date: 199504
                    Title: Existing Ground-Truth Databases
                    Geospatial_Data_Presentation_Form: map
                    Publication_Information:
                         Publication_Place: Montana
                         Publisher: U.S. Forest Service
          Source_Scale_Denominator: 24000
          Type_of_Source_Media: digital
          Source_Time_Period_of_Content:
               Time_Period_Information:
                    Multiple_Dates/Times:
                         Calendar_Date: 199609
                         Calendar_Date: 199705
               Source_Currentness_Reference: calendar date
          Source_Citation_Abbreviation: GRTR
          Source_Contribution: Provided training data for assigning
          cover type labels.
     Source_Information:
          Source_Citation:
```

```
          Citation_Information:
               Originator: U.S. Bureau of Land Management
               Publication_Date: 199704
               Title: Existing Ground-Truth Databases
               Geospatial_Data_Presentation_Form: map
               Publication_Information:
                    Publication_Place: Montana
                    Publisher: U.S. Bureau of Land Management
     Source_Scale_Denominator: 60000
     Type_of_Source_Media: digital
     Source_Time_Period_of_Content:
          Time_Period_Information:
               Single_Date/Time:
                    Calendar_Date: 199704
          Source_Currentness_Reference: calendar date
     Source_Citation_Abbreviation: GRTR
     Source_Contribution: Provided training data for assigning
     cover type labels.
Source_Information:
     Source_Citation:
          Citation_Information:
               Originator: Natural Resource Conservation Service
               Publication_Date: 199706
               Title: Existing Ground-Truth Soil Survey Databases
               Geospatial_Data_Presentation_Form: map
               Publication_Information:
                    Publication_Place: Montana
                    Publisher: Natural Resource Conservation
                    Service
     Source_Scale_Denominator: 24000
     Type_of_Source_Media: digital
     Source_Time_Period_of_Content:
          Time_Period_Information:
               Single_Date/Time:
                    Calendar_Date: 199706
          Source_Currentness_Reference: calendar date
     Source_Citation_Abbreviation: GRTR
     Source_Contribution:
          Provided training data for assigning cover type labels.
          To protect private landowners, NRCS overlaid WSAL
          polygons with their points and identified polygons
          containing ground truth plots; source scale is 1:24,000
          or finer.
Source_Information:
     Source_Citation:
          Citation_Information:
               Originator: U.S. Bureau of Indian Affairs
               Publication_Date: 199706
               Title: Existing Ground-Truth Databases
               Geospatial_Data_Presentation_Form: map
               Publication_Information:
                    Publication_Place: Montana
                    Publisher: U.S. Bureau of Indian Affairs
     Source_Scale_Denominator: 24000
     Type_of_Source_Media: digital
     Source_Time_Period_of_Content:
          Time_Period_Information:
```

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                Single_Date/Time:
                    Calendar_Date: 199706
            Source_Currentness_Reference: calendar date
        Source_Citation_Abbreviation: GRTR
        Source_Contribution: Provided training data for assigning
        cover type labels.
    Source_Information:
        Source_Citation:
            Citation_Information:
                Originator: U.S. Geological Survey
                Publication_Date: 199603
                Title: 1:100,000-scale Digital Line Graphs
                Geospatial_Data_Presentation_Form: map
                Publication_Information:
                    Publication_Place: Reston, VA
                    Publisher: U.S. Geological Survey
        Source_Scale_Denominator: 100000
        Type_of_Source_Media: digital
        Source_Time_Period_of_Content:
            Time_Period_Information:
                Multiple_Dates/Times:
                    Calendar_Date: 199603
                    Calendar_Date: 199704
            Source_Currentness_Reference: calendar date
        Source_Citation_Abbreviation: HYDR
        Source_Contribution: Provided hydrography layer.
    Source_Information:
        Source_Citation:
            Citation_Information:
                Originator: U.S. Geological Survey
                Publication_Date: 199507
                Title: 7.5-minute Digital Elevation Models
                Geospatial_Data_Presentation_Form: map
                Publication_Information:
                    Publication_Place: Reston, VA
                    Publisher: U.S. Geological Survey
        Source_Scale_Denominator: 24000
        Type_of_Source_Media: digital
        Source_Time_Period_of_Content:
            Time_Period_Information:
                Multiple_Dates/Times:
                    Calendar_Date: 199507
                    Calendar_Date: 199609
            Source_Currentness_Reference: calendar date
        Source_Citation_Abbreviation: DEM
        Source_Contribution: Provided majority of topography layer.
    Source_Information:
        Source_Citation:
            Citation_Information:
                Originator: Defense Mapping Agency
                Publication_Date: 199507
                Title: 1-degree Digital Elevation Models
                Geospatial_Data_Presentation_Form: map
                Publication_Information:
                    Publication_Place: Bethesda, MD
                    Publisher: Defense Mapping Agency
        Source_Scale_Denominator: 250000
```

```
     Type_of_Source_Media: digital
     Source_Time_Period_of_Content:
          Time_Period_Information:
               Multiple_Dates/Times:
                    Calendar_Date: 199507
                    Calendar_Date: 199609
          Source_Currentness_Reference: calendar date
     Source_Citation_Abbreviation: DEM
     Source_Contribution:
          Provided topography layer where 7.5-minute DEM data
          were unavailable.
Process_Step:
     Process_Description:
          Classify: unsupervised classification was performed on
          the input image.
     Source_Used_Citation_Abbreviation: HSTX, MRLC, EOS
     Process_Date: 19960601
     Source_Produced_Citation_Abbreviation: CLAS
Process_Step:
     Process_Description:
          Merge: using customized software, merged all raster
          polygons below a specified minimum mapping unit (mmu)
          with most similar neighbor larger than the mmu.
          Makedem: extracted a digital elevation model (DEM) from
          the WSAL dem database for use during labeling.
          Makehydrography: extracted a hydrography coverage from
          the WSAL hydrography database for use during labeling.
          Buildvat: built an Arc/Info value attribute table (VAT)
          to hold all items (fields) for which descriptive data
          could be developed for each region.
     Source_Used_Citation_Abbreviation: CLAS, DEM, HYDR
     Process_Date: 19960901
     Source_Produced_Citation_Abbreviation: EXTR
Process_Step:
     Process_Description:
          Processgt: filled in spectral, topographic, and
          hydrologic information in ground-truth training data
          for use in supervised classification.
     Source_Used_Citation_Abbreviation: GRTR, EXTR
     Process_Date: 19970201
     Source_Produced_Citation_Abbreviation: GRT
Process_Step:
     Process_Description:
          Labelagurbcloud and Labelother: manually labeled
          agricultural, urban, and cloud areas, as well as mines
          and areas burned in fires.
     Source_Used_Citation_Abbreviation: EXTR, CLAS
     Process_Date: 199708
     Source_Produced_Citation_Abbreviation: EXTR
Process_Step:
     Process_Description:
          Labelveg: performed supervised classification,
          labelling each region with its vegetation attributes:
          cover_code, cov_code_1, cov_code_2, cov_code_3, and
          cov_prob_1.
     Source_Used_Citation_Abbreviation: EXTR, GRT
     Process_Date: 19970301
```

Source_Produced_Citation_Abbreviation: EXTR
Process_Step:
Process_Description:
Edgematch: for each scene, identified and labeled regions to be retained where overlap occurs among scenes to make a seamless image for the entire state.
Source_Used_Citation_Abbreviation: EXTR
Process_Date: 19971031
Source_Produced_Citation_Abbreviation: EXTR
Process_Step:
Process_Description: Validate: validation was performed for all items in the VAT.
Source_Used_Citation_Abbreviation: EXTR
Process_Date: 19971125
Source_Produced_Citation_Abbreviation: EXTR
Process_Step:
Process_Description:
TrimDatabase: when appropriate, key veg item values were set to zero (null) outside the Montana state border (with a 10 km border).
Source_Used_Citation_Abbreviation: EXTR
Process_Date: 19971201
Source_Produced_Citation_Abbreviation: EXTR
Process_Step:
Process_Description: LandCover: create 30m ARC/INFO grid of land cover.
Source_Used_Citation_Abbreviation: COVR
Process_Date: 199711
Source_Produced_Citation_Abbreviation: COVR
Process_Step:
Process_Description:
RecodeVeg: Recombined the 94 land cover types to 50 for Gap Analysis.
Source_Used_Citation_Abbreviation: COVR
Process_Date: 199712
Source_Produced_Citation_Abbreviation: COVR
Process_Step:
Process_Description:
MergeFinal: Merged all land cover types except cloud and cloud shadow to a 2 hectare MMU. Merged cloud and cloud shadow to 100 ha MMU. (Uses customized software)
Source_Used_Citation_Abbreviation: MERG
Process_Date: 19980223
Source_Produced_Citation_Abbreviation: MERG
Process_Step:
Process_Description: Grid: Resampled 30m land cover grid to 90m.
Source_Used_Citation_Abbreviation: LDGD
Process_Date: 19980227
Source_Produced_Citation_Abbreviation: LDGD
Process_Step:
Process_Description:
Riparian: Extracted water and riparian cover types (5000 - 6400) from 30m land cover grid. Resampled to 90m, and merged with the 90m land cover grid, LDGD (giving the riparian grid priority in the merge).
Source_Used_Citation_Abbreviation: COVR

```
               Process_Date: 19980229
               Source_Produced_Citation_Abbreviation: GAPV

  ----------------------------------------------------------------------

Spatial_Data_Organization_Information:
     Direct_Spatial_Reference_Method: Raster
     Raster_Object_Information:
          Raster_Object_Type: Grid cell
          Row_Count: 6115
          Column_Count: 10430

  ----------------------------------------------------------------------

Spatial_Reference_Information:
     Horizontal_Coordinate_System_Definition:
          Planar:
               Map_Projection:
                    Map_Projection_Name: Albers Conical Equal Area
                    Albers_Conical_Equal_Area:
                         Standard_Parallel: 46
                         Standard_Parallel: 48
                         Longitude_of_Central_Meridian: -109.5
                         Latitude_of_Projection_Origin: 44.25
                         False_Easting: 600000.00000
                         False_Northing: 0.00000
               Planar_Coordinate_Information:
                    Planar_Coordinate_Encoding_Method: row and column
                    Coordinate_Representation:
                         Abscissa_Resolution: .1
                         Ordinate_Resolution: .1
                    Planar_Distance_Units: meters
          Geodetic_Model:
               Horizontal_Datum_Name: North American Datum of 1927
               Ellipsoid_Name: Clarke 1866
               Semi-major_Axis: 6378206.4
               Denominator_of_Flattening_Ratio: 294.98
     Vertical_Coordinate_System_Definition:
          Altitude_System_Definition:
               Altitude_Datum_Name: NGVD29
               Altitude_Resolution: 1
               Altitude_Distance_Units: meters
               Altitude_Encoding_Method: Implicit coordinate

  ----------------------------------------------------------------------

Entity_and_Attribute_Information:
     Detailed_Description:
          Entity_Type:
               Entity_Type_Label: MTGAPVEG.VAT
               Entity_Type_Definition: Grid Cell Value Attribute Table
               Entity_Type_Definition_Source: None
          Attribute:
               Attribute_Label: VALUE
               Attribute_Definition:
                    Land cover class assigned in supervised classification,
                    then recoded to GAP land cover types.
```

Attribute_Definition_Source: none
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: 1100
Enumerated_Domain_Value_Definition: Urban or Developed Lands
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 2010
Enumerated_Domain_Value_Definition: Agricultural Lands - Dry
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 2020
Enumerated_Domain_Value_Definition: Agricultural Lands - Irrigated
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 3110
Enumerated_Domain_Value_Definition: Altered Herbaceous
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 3130
Enumerated_Domain_Value_Definition: Very Low Cover Grasslands
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 3150
Enumerated_Domain_Value_Definition: Low/Moderate Cover Grasslands
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 3170
Enumerated_Domain_Value_Definition: Moderate/High Cover Grasslands
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 3180
Enumerated_Domain_Value_Definition: Montane Parklands and Subalpine Meadows
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 3210
Enumerated_Domain_Value_Definition: Mixed Mesic Shrubs
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 3300
Enumerated_Domain_Value_Definition: Mixed Xeric Shrubs
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 3309
Enumerated_Domain_Value_Definition: Silver Sage
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 3310
Enumerated_Domain_Value_Definition: Salt-Desert Shrub/Dry Salt Flats
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 3350
Enumerated_Domain_Value_Definition: Sagebrush
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 3510
Enumerated_Domain_Value_Definition: Mesic Shrub-Grassland Associations
Enumerated_Domain_Value_Definition_Source: none

Enumerated_Domain_Value: 3520
Enumerated_Domain_Value_Definition: Xeric Shrub-Grassland Associations
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4000
Enumerated_Domain_Value_Definition: Low Density Xeric Forest
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4140
Enumerated_Domain_Value_Definition: Mixed Broadleaf Forest
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4203
Enumerated_Domain_Value_Definition: Lodgepole Pine
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4205
Enumerated_Domain_Value_Definition: Limber Pine
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4206
Enumerated_Domain_Value_Definition: Ponderosa Pine
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4207
Enumerated_Domain_Value_Definition: Grand Fir
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4210
Enumerated_Domain_Value_Definition: Western Red Cedar
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4211
Enumerated_Domain_Value_Definition: Western Hemlock
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4212
Enumerated_Domain_Value_Definition: Douglas-fir
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4214
Enumerated_Domain_Value_Definition: Rocky Mountain Juniper
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4215
Enumerated_Domain_Value_Definition: Western Larch
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4216
Enumerated_Domain_Value_Definition: Utah Juniper
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4223
Enumerated_Domain_Value_Definition: Douglas-fir/Lodgepole Pine
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4260
Enumerated_Domain_Value_Definition: Mixed Whitebark Pine Forest
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4270
Enumerated_Domain_Value_Definition: Mixed Subalpine Forest
Enumerated_Domain_Value_Definition_Source: none

Enumerated_Domain_Value: 4280
Enumerated_Domain_Value_Definition: Mixed Mesic Forest
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4290
Enumerated_Domain_Value_Definition: Mixed Xeric Forest
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4300
Enumerated_Domain_Value_Definition: Mixed Broadleaf and Conifer Forest
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 4400
Enumerated_Domain_Value_Definition: Standing Burnt Forest
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 5000
Enumerated_Domain_Value_Definition: Water
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 6110
Enumerated_Domain_Value_Definition: Conifer Riparian
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 6120
Enumerated_Domain_Value_Definition: Broadleaf Riparian
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 6130
Enumerated_Domain_Value_Definition: Mixed Broadleaf and Conifer Riparian
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 6200
Enumerated_Domain_Value_Definition: Graminoid and Forb Riparian
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 6300
Enumerated_Domain_Value_Definition: Shrub Riparian
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 6400
Enumerated_Domain_Value_Definition: Mixed Riparian
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 7300
Enumerated_Domain_Value_Definition: Rock
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 7500
Enumerated_Domain_Value_Definition: Mines, Quarries, Gravel Pits
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 7600
Enumerated_Domain_Value_Definition: Badlands
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 7604
Enumerated_Domain_Value_Definition: Missouri Breaks
Enumerated_Domain_Value_Definition_Source: none
Enumerated_Domain_Value: 7800
Enumerated_Domain_Value_Definition: Mixed Barren

```
                Sites
                Enumerated_Domain_Value_Definition_Source: none
                Enumerated_Domain_Value: 8100
                Enumerated_Domain_Value_Definition: Alpine Meadows
                Enumerated_Domain_Value_Definition_Source: none
                Enumerated_Domain_Value: 9100
                Enumerated_Domain_Value_Definition: Snowfields or
                Ice
                Enumerated_Domain_Value_Definition_Source: none
                Enumerated_Domain_Value: 9800
                Enumerated_Domain_Value_Definition: Clouds
                Enumerated_Domain_Value_Definition_Source: none
                Enumerated_Domain_Value: 9900
                Enumerated_Domain_Value_Definition: Cloud Shadows
                Enumerated_Domain_Value_Definition_Source: none
     Attribute_Units_of_Measure: Numeric, 5
Attribute:
     Attribute_Label: COUNT
     Attribute_Definition: Number of 90m x 90m pixels for each
     land cover type.
     Attribute_Definition_Source: none
     Attribute_Domain_Values:
          Range_Domain:
               Range_Domain_Minimum: 15410
               Range_Domain_Maximum: 13632485
     Attribute_Units_of_Measure: Numeric, 7
Attribute:
     Attribute_Label: HECTARES
     Attribute_Definition: Area of each land cover type in
     hectares.
     Attribute_Definition_Source: none
     Attribute_Domain_Values:
          Range_Domain:
               Range_Domain_Minimum: 12482
               Range_Domain_Maximum: 11042310
     Attribute_Units_of_Measure: Numeric, 8
Attribute:
     Attribute_Label: COVERTYPE_CODE
     Attribute_Definition:
          Same as VALUE attribute (see above). Attribute added to
          meet GAP's National Standards.
     Attribute_Definition_Source: none
     Attribute_Domain_Values:
          Range_Domain:
               Range_Domain_Minimum: 1100
               Range_Domain_Maximum: 9900
     Attribute_Units_of_Measure: Numeric, 5
Attribute:
     Attribute_Label: COVERTYPE_NAME
     Attribute_Definition:
          The descriptive name of each land cover type assigned
          in the supervised classification (see
          Enumerated_Domain_Value_Definitions for VALUE
          attribute, above).
     Attribute_Definition_Source: varied
     Attribute_Domain_Values:
          Unrepresentable_Domain: character field
```

```
Distribution_Information:
     Distributor:
          Contact_Information:
               Contact_Organization_Primary:
                    Contact_Organization: USGS/BRD/Gap Analysis Program
               Contact_Address:
                    Address_Type: mailing and physical address
                    Address: 530 S. Asbury St., Suite 1
                    City: Moscow
                    State_or_Province: Idaho
                    Postal_Code: 83843
                    Country: USA
               Contact_Voice_Telephone: 208 885 3555
               Contact_Facsimile_Telephone: 208 885 3618
               Contact_Electronic_Mail_Address: gap@uidaho.edu
               Hours_of_Service: Monday-Friday, 8-5, Pacific Time
               Contact_Instructions:
                    Please see web page for information on data
                    availability and for placing data requests
                    (http://www.gap.uidaho.edu/gap). This office will not
                    be directly distributing data, but will be able to
                    provide information on where data can be acquired.
     Resource_Description: MTGAPVEG grid; Montana land cover
     Distribution_Liability:
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          the inability to use this data set.
     Standard_Order_Process:
          Digital_Form:
               Digital_Transfer_Information:
                    Format_Name: Arc/Info Grid data sets
                    Format_Version_Number: 7.0.4
                    Format_Specification: None
                    Transfer_Size: 48
               Digital_Transfer_Option:
                    Online_Option:
                         Computer_Contact_Information:
                              Network_Address:
                                   Network_Resource_Name:
                                        See website for information on
                                        acquiring data and links to any
                                        sites where data can be directly
                                        downloaded
                                        (http://www.gap.uidaho.edu/gap).
```

Fees: None.
Distributor:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: Montana State Library, Natural Resource Information System
Contact_Address:
Address_Type: mailing and physical address
Address: 1515 East Sixth Avenue
City: Helena
State_or_Province: Montana
Postal_Code: 59620-1800
Country: USA
Contact_Voice_Telephone: 406 444 5354
Contact_Facsimile_Telephone: 406 444 0581
Contact_Electronic_Mail_Address: gdaumiller@nris.state.mt.us
Hours_of_Service: Monday-Friday, 8-5, Mountain Time
Contact_Instructions:
Please see web page for placing data requests and contacting GIS staff (http://nris.state.mt.us/gis/contact.html).
Resource_Description: MTGAPVEG grid; Montana land cover
Distribution_Liability:
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Standard_Order_Process:
Non-digital_Form:
Contact the Montana State Library to see if the data are available as hardcopy maps.
Fees: For-profit organizations must pay costs to reproduce the data.
Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Format_Name: Arc/Info Grid data sets
Format_Version_Number: 7.0.4
Format_Specification: None
Transfer_Size: 48
Digital_Transfer_Option:
Offline_Option:
Offline_Media: 8mm tape cartridge
Recording_Format: tar
Offline_Option:
Offline_Media: CD-ROM
Recording_Format: ISO 9660 with Joliet (Windows 95) extensions

Fees:
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Metadata_Reference_Information:
Metadata_Date: 19980108
Metadata_Review_Date: 19981215
Metadata_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: Wildlife Spatial Analysis Lab
Contact_Person: Michele Thornton or Melissa Hart
Contact_Position: Image Analyst; MT-GAP Coordinator
Contact_Address:
Address_Type: mailing and physical address
Address: Wildlife Spatial Analysis Lab, The University of Montana
City: Missoula
State_or_Province: Montana
Postal_Code: 59812-1063
Country: USA
Contact_Voice_Telephone: 406 243 5208 (email preferred)
Contact_Facsimile_Telephone: 406 243 6064
Contact_Electronic_Mail_Address: mhart@wru.umt.edu
Hours_of_Service: Monday-Friday, 8-5, Mountain Time
Metadata_Standard_Name: FGDC Content Standards For Digital Geospatial Metadata
Metadata_Standard_Version: 19940608
Metadata_Time_Convention: local time

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