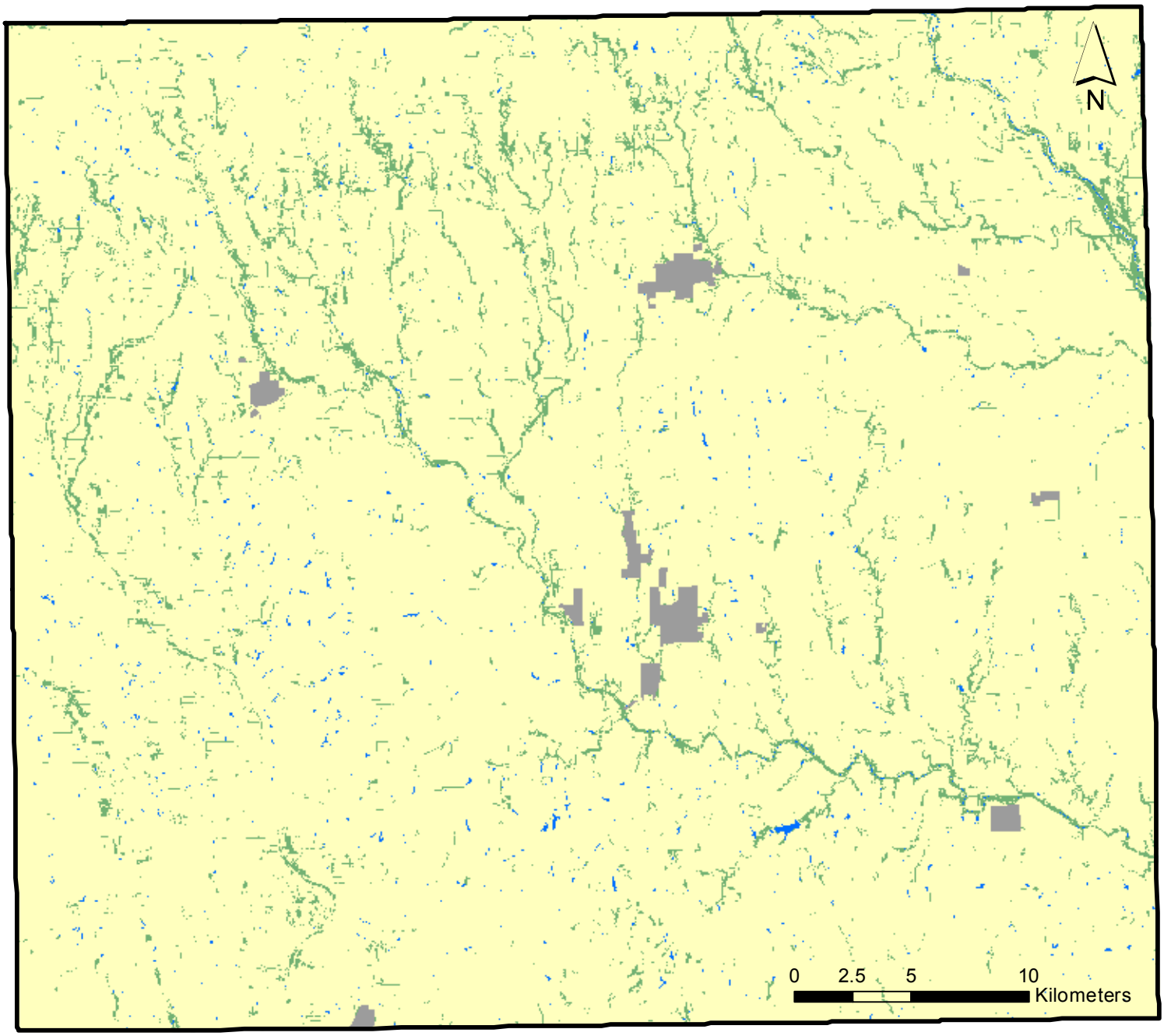
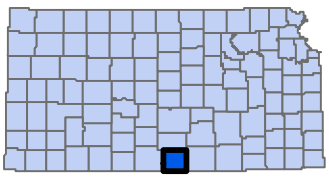
Harper County, KS Land Cover 2014

Sample Dataset



Legend

Tree | Other | Water | Town/City



Paull, Darci A.; Whitson, Jakob W.; Marcotte, Abbey L.; Liknes, Greg C.; Meneguzzo, Dacia M.; Kellerman, Todd A. 2017. High-resolution land cover of Kansas (2015). Fort Collins, CO: Forest Service Research Data Archive. https://doi.org/10.2737/RDS-2017-0025

High-resolution land cover of Kansas (2015)

Metadata:

Identification_Information:

Citation:
Citation_Information:
Originator: Paull, Darci A.
Originator: Whitson, Jakob W.
Originator: Marcotte, Abbey L.
Originator: Liknes, Greg C.
Originator: Meneguzzo, Dacia M.
Originator: Kellerman, Todd A.
Publication_Date: 2017
Title:
High-resolution land cover of Kansas (2015)
Geospatial_Data_Presentation_Form: raster digital data
Publication_Information:
Publication_Place: Fort Collins, CO
Publisher: Forest Service Research Data Archive
Online_Linkage: https://doi.org/10.2737/RDS-2017-0025
Description:
Abstract:

This data publication contains 2015 high-resolution land cover data for each of the 105 counties within Kansas. These data are a digital representation of land cover derived from 1-meter aerial imagery from the National Agriculture Imagery Program (NAIP). There is a separate file for each county. Data are intended for use in rural areas and therefore do not include land cover in cities and towns. Land cover classes (tree cover, other land cover, water, or city/town) were mapped using an object-based image analysis approach and supervised classification.

Purpose:
These data are designed for conducting geospatial analyses and for producing cartographic products. In particular, these data are intended to depict the location of tree cover in the county. The mapping procedures were developed specifically for agricultural landscapes that are dominated by annual crops, rangeland, and pasture and where tree cover is often found in narrow configurations, such as windbreaks and riparian corridors. Because much of the tree cover in agricultural areas of the United States occurs in

windbreaks and narrow riparian corridors, many geospatial datasets derived from coarser-resolution satellite data (such as Landsat), do not capture these landscape features. This dataset and others in this series are intended to address this particular data gap.
Supplemental_Information:
This metadata file contains documentation for the entire set of land cover county files. Individual metadata documents containing detailed information specific (e.g. spatial) to each county are included with the data files.
Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 2015
Currentness_Reference:
ground condition
Status:
Progress: Complete
Maintenance_and_Update_Frequency: As needed
Spatial_Domain:
Description_of_Geographic_Extent:
Kansas
Bounding_Coordinates:
West_Bounding_Coordinate: -102.045253
East_Bounding_Coordinate: -94.588387
North_Bounding_Coordinate: 40.000958
South_Bounding_Coordinate: 36.993601
Keywords:
Theme:
Theme_Keyword_Thesaurus: ISO 19115 Topic Category
Theme_Keyword: imageryBaseMapsEarthCover
Theme:
Theme_Keyword_Thesaurus: National Research & Development Taxonomy
Theme_Keyword: Inventory, Monitoring, & Analysis
Theme_Keyword: Resource inventory
Theme_Keyword: Natural Resource Management & Use
Theme_Keyword: Agroforestry
Theme_Keyword: Water
Theme:
Theme_Keyword_Thesaurus: None
Theme_Keyword: tree cover
Theme_Keyword: windbreaks
Theme_Keyword: agroforestry
Theme_Keyword: riparian
Theme_Keyword: land cover
Place:
Place_Keyword_Thesaurus: None
Place_Keyword: Kansas
Access_Constraints: None

Use_Constraints:
These data were collected using funding from the U.S. Government and Kansas State University – Kansas Forest Service and can be used without additional permissions or fees. If you use these data in a publication, presentation, or other research product please use the following citation:

Paull, Darci A.; Whitson, Jakob W.; Marcotte, Abbey L.; Liknes, Greg C.; Meneguzzo, Dacia M.; Kellerman, Todd A. 2017. High-resolution land cover of Kansas (2015). Fort Collins, CO: Forest Service Research Data Archive. https://doi.org/10.2737/RDS-2017-0025

*Appropriate use includes fine-scale assessment of tree cover, total extent of tree cover, county-level summaries of tree cover categories, and construction of cartographic products.
Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Darci Paull
Contact_Organization: Kansas Forest Service
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Address_Type: mailing and physical
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State_or_Province: KS
Postal_Code: 66502
Country: USA
Contact_Voice_Telephone: 785-532-3312
Contact_Electronic_Mail_Address: `dpaull@ksu.edu`
Contact Instructions: Prefer email contact.
Data_Set_Credit:
This project was funded by the USDA Forest Service, Northern Research Station, Forest Inventory and Analysis and Kansas State University - Kansas Forest Service.
Native_Data_Set_Environment:
Microsoft Windows 7 Enterprise Service Pack 1; ESRI ArcMap 10.3.1
Cross_Reference:
Citation_Information:
Originator: Liknes, Greg C.
Originator: Perry, Charles H.
Originator: Meneguzzo, Dacia M.
Publication_Date: 2010
Title:
Assessing tree cover in agricultural landscapes using high-resolution aerial imagery
Geospatial_Data_Presentation_Form: journal article
Series_Information:
Series_Name: Journal of Terrestrial Observation

Issue_Identification: 2(1): 38-55
Online_Linkage: https://www.treesearch.fs.fed.us/pubs/34796
Online_Linkage: http://docs.lib.purdue.edu/jto/vol2/iss1/art5
Cross_Reference:
Citation_Information:
Originator: Meneguzzo, Dacia M.
Originator: Liknes, Greg C.
Originator: Nelson, Mark D.
Publication_Date: 2013
Title:
Mapping trees outside forests using high-resolution aerial imagery: a comparison of pixel- and object based classification approaches
Geospatial_Data_Presentation_Form: journal article
Series_Information:
Series_Name: Environmental Monitoring and Assessment
Issue_Identification: 185: 6261-6275
Online_Linkage: https://doi.org/10.1007/s10661-012-3022-1
Analytical_Tool:
Analytical_Tool_Description:
R is a free software environment for statistical computing and graphics.
Tool_Access_Information:
Online_Linkage: https://www.r-project.org/
Tool_Access_Instructions:
R is freely available via the URL provided above. Download instructions available on the website.
Analytical_Tool:
Analytical_Tool_Description:
E-cognition 9.1
Tool_Access_Information:
Online_Linkage: http://www.ecognition.com/
Tool_Access_Instructions:
Access information available via the URL provided above.
Analytical_Tool:
Analytical_Tool_Description:
randomForest: Breiman and Cutler's Random Forests for Classification and Regression Classification and regression based on a forest of trees using random inputs.
Tool_Access_Information:
Online_Linkage: https://cran.r-project.org/web/packages/randomForest/index.html
Tool_Access_Instructions:
Access information available via the URL provided above.

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Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report:
Because of the randomization that occurs in the Random Forests algorithm (Breiman 2001), we created land cover classification models from training data 10 times and

averaged the out-of-bag samples in order to produce an estimate of agreement between the training data and the classification model. This is not intended to replace an independent assessment of accuracy but provides some information as to how well our classification model was able to separate the land cover classes (see \Supplements\KS_2015_county_accuracy_reports.csv for results, variable descriptions noted below).

Breiman, L. Machine Learning. 2001. 45: 5. https://doi.org/10.1023/A:1010933404324
Quantitative_Attribute_Accuracy_Assessment:
Attribute_Accuracy_Value: XX.X% (Tree Cover class)
Attribute_Accuracy_Explanation:
Mean agreement between out-of-bag samples for 10 runs of a Random Forest (TM) classification model.
Quantitative_Attribute_Accuracy_Assessment:
Attribute_Accuracy_Value: XX.X% (Other Land Cover class)
Attribute_Accuracy_Explanation:
Mean agreement between out-of-bag samples for 10 runs of a Random Forest (TM) classification model.
Quantitative_Attribute_Accuracy_Assessment:
Attribute_Accuracy_Value: XX.X% (Water class)
Attribute_Accuracy_Explanation:
Mean agreement between out-of-bag samples for 10 runs of a Random Forest (TM) classification model.
Quantitative_Attribute_Accuracy_Assessment:
Attribute_Accuracy_Value: XX.X% (Overall agreement)
Attribute_Accuracy_Explanation:
Mean agreement between out-of-bag samples for 10 runs of a Random Forest (TM) classification model.
Logical_Consistency_Report:
not applicable
Completeness_Report:
Areas within the county, but not including cities and towns, have been attributed as Tree Cover, Other Land Cover, or Water. Cities and towns were masked out in a post-processing step and assigned to a separate category. Cities and towns were masked out because the characteristics of urban tree cover are different than those of rural tree cover in agricultural areas of the central United States. A separate mapping procedure would be required to precisely map urban tree cover where crowns often have more separation and occur in more complex landscapes.
Positional_Accuracy:
Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report:
We did not compare image segment boundaries to any ground reference data.
Lineage:
Source_Information:
Source_Citation:
Citation_Information:

Originator: U.S. Dept. of Agriculture - Farm Service Agency - Aerial Photography Field Office
Publication_Date: 2015
Title:
Kansas NAIP 2015 imagery
Geospatial_Data_Presentation_Form: raster digital data
Series_Information:
Series_Name: National Agriculture Imagery Program (NAIP) imagery
Publication_Information:
Publication_Place: Salt Lake City, UT
Publisher: U.S. Dept. of Agriculture - Farm Service Agency - Aerial Photography Field Office
Online_Linkage: https://www.fsa.usda.gov/programs-and-services/aerial-photography/imagery-programs/naip-imagery/
Type_of_Source_Media: online
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 2015
Source_Currentness_Reference:
external hard drive
Source_Citation_Abbreviation:
NAIP
Source_Contribution:
Imagery from the U.S. Department of Agriculture's National Agriculture Imagery Program (NAIP) formed the basis for this dataset. We obtained uncompressed (.TIF) DOQQ image tiles via an external hard drive from the Aerial Photography Field Office in Salt Lake City, UT.
Source_Information:
Source_Citation:
Citation_Information:
Originator: U.S. Census Bureau
Publication_Date: 2013
Title:
TIGER Geodatabases
Geospatial_Data_Presentation_Form: vector digital data
Series_Information:
Series_Name: 2013 TIGER Geodatabases
Online_Linkage: https://www.census.gov/geo/maps-data/data/tiger-geodatabases.html
Type_of_Source_Media: online
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 2013
Source_Currentness_Reference:
ground condition

Source_Citation_Abbreviation:
CENSUS
Source_Contribution:
2013 Geodatabase feature class (Incorporated_Place) was used to identify the location of cities and towns. Land cover was masked from these areas, which were then assigned to their own class.
Process_Step:
Process_Description:
1. Uncompressed, 4-band (RGB-NIR) NAIP DOQQ image tiles in *.tif format were segmented using the multi-resolution segmentation algorithm in eCognition 9.1. The resulting image segments for each DOQQ image were exported in shapefile format.
Source_Used_Citation_Abbreviation:
NAIP
Process_Date: 2016
Process_Step:
Process_Description:
2. A spatially balanced sample of shapefiles from the county was created.
Process_Date: 2017
Process_Step:
Process_Description:
3. A photo interpreter collected good representative samples of each of four land cover classes (Tree, Other Vegetation, Nonvegetated/Barren, or Water) as training data. A minimum of 15 samples were collected for each land cover class within each shapefile selected in Step 2.
Process_Date: 2017
Process_Step:
Process_Description:
4. The training data collected in step 3 were used to train a Random Forest model using R statistical software, and the model was then applied to all of the shapefiles for the county.
Process_Date: 2017
Process_Step:
Process_Description:
5. Each output from the classification process were reviewed for class label errors, which were manually changed to the appropriate class where possible. Although identified errors were corrected, errors may remain. For areas where the segments were an ambiguous mix of tree and non-tree land or areas where a large amount of manual digitization would be required to correct errors, class labels were left unchanged.
Process_Date: 2017
Process_Step:
Process_Description:
6. Each shapefile was clipped to remove sidelap pixels and the clipped results were merged into a county-wide file.
Process_Date: 2017
Process_Step:
Process_Description:

7. The mosaicked county dataset was reviewed for class label errors, and where possible, those were manually changed to the appropriate class. For areas where the segments were an ambiguous mix of tree and non-tree land or areas where a large amount of manual digitization would be required to correct errors, class labels may have been left unchanged.
Process_Date: 2017
Process_Step:
Process_Description:
8. A city/town vector layer (from the U.S. Census Bureau) was used to create the city/town class.
Source_Used_Citation_Abbreviation:
CENSUS
Process_Date: 2017
Process_Step:
Process_Description:
9. The resultant county-wide shapefile from step 8 was converted to .tif format.
Process_Date: 2017

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Spatial_Data_Organization_Information:
Direct_Spatial_Reference_Method: Raster
Raster_Object_Information:
Raster_Object_Type: Pixel

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Spatial_Reference_Information:
Horizontal_Coordinate_System_Definition:
Planar:
Grid_Coordinate_System:
Grid_Coordinate_System_Name: Universal Transverse Mercator
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 1983
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.25722210088

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Entity_and_Attribute_Information:
Detailed_Description:
Entity_Type:
Entity_Type_Label: Land Cover
Entity_Type_Definition:
map theme

Entity_Type_Definition_Source:
source map legend
Attribute:
Attribute_Label: Land Cover
Attribute_Definition:
A category indicating the land cover.
Attribute_Definition_Source:
source map legend
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition:
Tree Cover
Enumerated_Domain_Value_Definition_Source:
source map legend
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: 2
Enumerated_Domain_Value_Definition:
Other land cover
Enumerated_Domain_Value_Definition_Source:
source map legend
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: 3
Enumerated_Domain_Value_Definition:
Water
Enumerated_Domain_Value_Definition_Source:
source map legend
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: 15
Enumerated_Domain_Value_Definition:
City or town
Enumerated_Domain_Value_Definition_Source:
source map legend
Overview_Description:
Entity_and_Attribute_Overview:
This data publication includes a separate data file for each county of Kansas (\Data\COUNTY_Co.tif and associated files). Land cover categories relate to the presence or absence of tree cover, the presence of water, or indicate a land area is a city or town.

Also included in this download is a comma-delimited ASCII text file containing a table showing how well the classification model was able to separate the land cover classes for each county: \Supplements\KS_2015_county_accuracy_reports.csv.

Variables include:

COUNTY FILE NAME = name of county

TREE COVER (%) = Mean agreement between out-of-bag samples for 10 runs of a Random Forest classification model.

TREE COVER (n) = Sample size for tree cover attribute agreement.

OTHER LAND COVER (%) = Mean agreement between out-of-bag samples for 10 runs of a Random Forest classification model.

OTHER LAND COVER (n) = Sample size for other land cover attribute agreement.

WATER (%) = Mean agreement between out-of-bag samples for 10 runs of a Random Forest classification model.

WATER (n) = Sample size for water attribute agreement.

OVERALL AGREEMENT (%) = Mean agreement between out-of-bag samples for 10 runs of a Random Forest classification model.

OVERALL AGREEMENT (n) = Sample size for overall attribute agreement.

Entity_and_Attribute_Detail_Citation:

None provided

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Distribution_Information:

Distributor:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: USDA Forest Service, Research and Development

Contact_Position: Research Data Archivist

Contact_Address:

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City: Fort Collins

State_or_Province: CO

Postal_Code: 80526

Country: USA

Contact_Voice_Telephone: see Contact Instructions

Contact Instructions: This contact information was current as of June 2017. For current information see Contact Us page on: https://doi.org/10.2737/RDS.

Resource_Description: RDS-2017-0025

Distribution_Liability:

Metadata documents have been reviewed for accuracy and completeness. Unless otherwise stated, all data and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. However, neither the author, the Archive, nor any part of the federal government can assure the reliability or suitability of these data for a particular purpose. The act of distribution shall not constitute any such warranty, and no responsibility is assumed for a user's application of these data or related materials.

The metadata, data, or related materials may be updated without notification. If a user believes errors are present in the metadata, data or related materials, please use the information in (1) Identification Information: Point of Contact, (2) Metadata Reference: Metadata Contact, or (3) Distribution Information: Distributor to notify the author or the Archive of the issues.
Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Format_Name: TIFF
Format_Version_Number: see Format Specification
Format_Specification:
Georeferenced raster digital TIFF file (*.tif)
File_Decompression_Technique: Files zipped with Winzip 14.0
Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name: https://doi.org/10.2737/RDS-2017-0025
Digital_Form:
Digital_Transfer_Information:
Format_Name: CSV
Format_Version_Number: see Format Specification
Format_Specification:
Comma-delimited ASCII text file (*.csv)
File_Decompression_Technique: Files zipped with Winzip 14.0
Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name: https://doi.org/10.2737/RDS-2017-0025
Fees: None

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Metadata_Reference_Information:
Metadata_Date: 20170601
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Contact_Person_Primary:
Contact_Person: Darci Paull

Contact_Organization: Kansas Forest Service
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City: Manhattan
State_or_Province: KS
Postal_Code: 66502
Country: USA
Contact_Voice_Telephone: 785-532-3312
Contact_Electronic_Mail_Address: `dpaull@ksu.edu`
Contact Instructions: Prefer email contact.
Metadata_Standard_Name: FGDC Content Standard for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

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