Unpublished Digital Surficial Geologic-GIS Map of Saint Croix National Scenic Riverway, Minnesota and Wisconsin (NPS, GRD, GRI, SACN, SACN digital map) adapted from MNGS maps(2007, 2010, 2001 and 2002), an NPS WRD GIS database (2000), and WGNHS maps (2017, 2004, 2000 and 1985)

Metadata also available as

Frequently-anticipated questions:

What does this data set describe?

Title:

Unpublished Digital Surficial Geologic-GIS Map of Saint Croix National Scenic Riverway, Minnesota and Wisconsin (NPS, GRD, GRI, SACN, SACN digital map) adapted from MNGS maps(2007, 2010, 2001 and 2002), an NPS WRD GIS database (2000), and WGNHS maps (2017, 2004, 2000 and 1985)

Abstract:
The Unpublished Digital Surficial Geologic-GIS Map of Saint Croix National Scenic Riverway, Minnesota and Wisconsin is composed of GIS data layers and GIS tables in a 10.1 file geodatabase (sacn_surficial_geology.gdb), a 10.1 ArcMap (.mxd) map document (sacn_surficial_geology.mxd), individual 10.1 layer (.lyr) files for each GIS data layer, an ancillary map information document (sacn_surficial_geology.pdf) which contains source map unit descriptions, as well as other source map text, figures and tables, metadata in FGDC text (.txt) and FAQ (.pdf) formats, and a GIS readme file (sacn_geology_gis_readme.pdf). Please read the sacn_geology_gis_readme.pdf for information pertaining to the proper extraction of the file geodatabase and other map files. To request GIS data in ESRI 10.1 shapefile format contact Stephanie O'Meara (stephanie.omeara@colostate.edu; see contact information below). The data is also available as a 2.2 KMZ/KML file for use in Google Earth, however, this format version of the map is limited in data layers presented and in access to GRI ancillary table information. Google Earth software is available for free at: <http://www.google.com/earth/index.html>. Users are encouraged to only use the Google Earth data for basic visualization, and to use the GIS data for any type of data analysis or investigation. The data were completed as a component of the Geologic Resources Inventory (GRI) program, a National Park Service (NPS) Inventory and Monitoring (I&M) Division funded program that is administered by the NPS Geologic Resources Division (GRD). Source geologic maps and data used to complete this GRI digital dataset were provided by the following: Minnesota Geological Survey, National Park Service and Wisconsin Geological and Natural History Survey. Detailed information concerning the sources used and their contribution the GRI product are listed in the Source Citation section(s) of this metadata record (sacn_surficial_geology_metadata.txt or sacn_surficial_geology_metadata_faq.pdf). Users of this data are cautioned about the locational accuracy of features within this dataset. Based on the source map scale of 1:200,000 and United States National Map Accuracy Standards features are within (horizontally) 127 meters or 416.7 feet of their actual location as presented by this dataset. Users of this data should thus not assume the location of features is exactly where they are portrayed in Google Earth, ArcGIS or other software used to display this dataset. All GIS and ancillary tables were produced as per the NPS GRI Geology-GIS Geodatabase Data Model v. 2.3. (available at: <http://science.nature.nps.gov/im/inventory/geology/GeologyGISDataModel.cfm>). The GIS data projection is NAD83, UTM Zone 15N, however, for the KML/KMZ format the data is projected upon export to WGS84 Geographic, the native coordinate system used by Google Earth. The data is within the area of interest of Saint Croix National Scenic Riverway.

Supplemental_Information:
The data layers (feature classes) that comprise the Unpublished Digital Surficial Geologic-GIS Map of Saint Croix National Scenic Riverway, Minnesota and Wisconsin include: SACNGLGA (Geologic Contacts), SACNGLG (Geologic Units), SACNOCR

(Outcrops), SACNOCRA (Outcrop Boundaries), SACNGFL (Glacial Feature Lines), SACNGLF (Geologic Line Features), SACNCN1 (Depth to Bedrock Lines), SACNLIN (Paleoshorelines), SACNSEC (Geologic Cross Section Lines), SACNATD (Geologic Attitude Observation Localities), SACNGFP (Glacial Feature Points), SACNGML (Geologic Measurement Localities), SACNGSL (Geologic Sample Localities), SACNGPF (Geologic Point Features), SACNGOF (Geologic Overlay Features), SACNGOFA (Geologic Overlay Feature Boundaries) and SACNHZP (Hazard Point Features). There are five additional ancillary map components, the Surficial Geologic Unit Information Table (sacnunit) Table, the Source Map Information Table (sacnmap), the Karst Features Master Table (Karst_Master), the Karst Features Remarks Table (Karst_Remarks), and the Ancillary Map Information Document (sacn_surficial_geology.pdf). Refer to the NPS GRI Geology-GIS Geodatabase Data Model v. 2.3 (available at: <http://science.nature.nps.gov/im/inventory/geology/GeologyGISDataModel.cfm>) for detailed data layer (feature class) and table specifications including attribute field parameters, definitions and domains, and implemented topology rules and relationship classes. For the KML/KMZ format all or only some of the data layers are available. The KMZ file also possesses on-line links to the GRI program and its products, and to this readme document, the FAQ metadata, and the GRI ancillary map information document pertaining to this dataset/map.

1. **How should this data set be cited?**

   National Park Service (NPS) Geologic Resources Inventory (GRI) program, 20180828, Unpublished Digital Surficial Geologic-GIS Map of Saint Croix National Scenic Riverway, Minnesota and Wisconsin (NPS, GRD, GRI, SACN, SACN digital map) adapted from MNGS maps(2007, 2010, 2001 and 2002), an NPS WRD GIS database (2000), and WGNHS maps (2017, 2004, 2000 and 1985).

2. **What geographic area does the data set cover?**

   West_Bounding_Coordinate: -93.000218
   East_Bounding_Coordinate: -91.0001831779
   North_Bounding_Coordinate: 46.3749512175
   South_Bounding_Coordinate: 44.6249671568

3. **What does it look like?**

   Not applicable
   No browse graphic provided

4. **Does the data set describe conditions during a particular time period?**

   Calendar_Date: 28-Aug-2018
   Currentness_Reference: ground condition

5. **What is the general form of this data set?**

   Geospatial_Data_Presentation_Form: map

6. **How does the data set represent geographic features?**
   a. **How are geographic features stored in the data set?**
   b. **What coordinate system is used to represent geographic features?**

      Grid_Coordinate_System_Name: Universal Transverse Mercator
      Universal_Transverse_Mercator:
   UTM_Zone_Number: 15
   Transverse_Mercator:
   Scale_Factor_at_Central_Meridian: 0.999600
   Longitude_of_Central_Meridian: -93.0
   Latitude_of_Projection_Origin: 0.000000
   False_Easting: 500000.000000
   False_Northing: 0.000000

      Planar coordinates are encoded using coordinate pair
      Abscissae (x-coordinates) are specified to the nearest 0.000007
      Ordinates (y-coordinates) are specified to the nearest 0.000007
      Planar coordinates are specified in meters

      The horizontal datum used is North American Datum of 1983.
      The ellipsoid used is Geodetic Reference System 80.
      The semi-major axis of the ellipsoid used is 6378137.000000.
      The flattening of the ellipsoid used is 1/298.257222.

7. **How does the data set describe geographic features?**

   Entity_and_Attribute_Overview:
   Refer to the NPS GRI Geology-GIS Geodatabase Data Model v. 2.3 (available at: <http://science.nature.nps.gov/im/inventory/geology/GeologyGISDataModel.cfm>) for detailed feature class and table attribute field parameters, definitions and domains, and implemented relationship classes, as well as for implemented feature class topology rules.
   Entity_and_Attribute_Detail_Citation:
   NPS GRI Geology-GIS Geodatabase Data Model v. 2.3. (available at: <http://science.nature.nps.gov/im/inventory/geology/GeologyGISDataModel.cfm>)

Who produced the data set?

1. **Who are the originators of the data set?** (may include formal authors, digital compilers, and editors)
   - National Park Service (NPS) Geologic Resources Inventory (GRI) program
2. **Who also contributed to the data set?**

James R. Chappell, Dylan Rolley, Sarah Lowe, James Winter, Dalton Meyer and Stephanie O'Meara (Colorado State University)

3. **To whom should users address questions about the data?**

Stephanie O'Meara
Colorado State University
Research Associate, Geologist/GIS Specialist/Data Manager
1201 Oak Ridge Drive, Suite 200
Fort Collins, Colorado 80525
USA

(970) 491-6655 (voice)
stephanie.omeara@colostate.edu

Hours_of_Service: 9:00 a.m. to 5:00 p.m. (MST), Monday - Friday

---

Why was the data set created?

The data are intended to assist NPS personnel in the protection and management of Saint Croix National Scenic Riverway.

How was the data set created?

1. **From what previous works were the data drawn?**

MNGS Miscellaneous Map Series M-178 (source 1 of 16)

Meyer, Gary N., 2007, Surficial Geology of the Twin Cities Metropolitan Region, Minnesota: Miscellaneous Map Series M-178, Minnesota Geological Survey (MNGS), St. Paul, Minnesota.

Type_of_Source_Media: digital data and image
Source_Scale_Denominator: 200000
Source_Contribution:
Geologic features were derived from source digital data. In addition, geologic features not present with the digital data were digitized using a TIF image of the source map georeferenced in NAD83 UTM. The source map image was also used to attribute features, as well as to check (QC) line quality, both positionally and spatially, and feature attribution. Ancillary source map text, including unit descriptions, and graphics, if present, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.
NPS hydrography digital database (source 2 of 16)

National Park Service Water Resources Division, 2000, Saint Croix National Scenic River Small-Scale Base GIS Data: digital database Small-Scale GIS Data, National Park Service (NPS), Fort Collins, Colorado.

Type_of_Source_Media: digital data
Source_Scale_Denominator: 100000
Source_Contribution:
Select hydrography features and attribution (St. Croix River) were derived from source digital data. Ancillary map text, including unit descriptions, and graphics, if present on the source map, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

WGNHS unpublished digital data Wisconsin Saint Croix Quaternary Map (source 3 of 16)

Carson, E., Rawling, J.E., III, and Rose, C, 2017, Quaternary Geologic Map of Portions of the St. Croix National Scenic Riverway, Wisconsin: unpublished digital data Wisconsin Saint Croix Quaternary Map, Wisconsin Geological and Natural History Survey (WGNHS), Madison, Wisconsin.

Type_of_Source_Media: digital data
Source_Scale_Denominator: 100000
Source_Contribution:
Features and attribution were derived from source digital data. Ancillary map text, including unit descriptions, and graphics, if present on the source map, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

WGNHS Open-File Report 2004-22 (source 4 of 16)

Kostka, S.J., Hinke, D.M., Mickelson, D.M., a, 2004, Preliminary Quaternary Geologic Map for St. Croix County, Wisconsin: Open-File Report 2004-22, Wisconsin Geological and Natural History Survey (WGNHS), Madison, Wisconsin.

Type_of_Source_Media: digital data and image
Source_Scale_Denominator: 100000
Source_Contribution:
Geologic features were derived from source digital data. In addition, geologic features not present with the digital data were digitized using a TIF image of the source map georeferenced in NAD83 UTM. The source map image was also used to attribute features, as well as to check (QC) line quality, both positionally and spatially, and feature attribution. Ancillary source map text, including unit descriptions, and graphics, if present, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

WGNHS Bulletin 92 (source 5 of 16)

Johnson, M.D., 2000, Pleistocene Geology of Polk County, Wisconsin: Bulletin 92, Wisconsin Geological and Natural History Survey (WGNHS), Madison, Wisconsin.

Type_of_Source_Media: digital image

Source_Scale_Denominator: 100000
Source_Contribution:
Geologic features present on the source map were digitized using a .TIF image of the map georeferenced in NAD83 UTM. The source map image was also used to attribute features, as well as to check (QC) line quality, both positionally and spatially, and feature attribution. Ancillary source map text, including unit descriptions, and graphics, if present, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

MNGS County Atlas Series C-22 Part A, Plate 3 (source 6 of 16)

> Setterholm, Dale R., 2010, Geologic Atlas of Chisago County, Minnesota (Plate 3, Surficial Geology): County Atlas Series C-22 Part A, Plate 3, Minnesota Geological Survey (MNGS), St. Paul, Minnesota.

Type_of_Source_Media: digital data and image
Source_Scale_Denominator: 100000
Source_Contribution:
Geologic features were derived from source digital data. In addition, geologic features not present with the digital data were digitized using a TIF image of the source map georeferenced in NAD83 UTM. The source map image was also used to attribute features, as well as to check (QC) line quality, both positionally and spatially, and feature attribution. Ancillary source map text, including unit descriptions, and graphics, if present, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

MNGS County Atlas Series C-13 Part A, Plate 4 (source 7 of 16)

> Boerboom, T.J., 2001, Geologic Atlas of Pine County, Minnesota (Plate 4, Surficial Geology): County Atlas Series C-13 Part A, Plate 4, Minnesota Geological Survey (MNGS), St. Paul, Minnesota.

Type_of_Source_Media: digital data and image
Source_Scale_Denominator: 100000
Source_Contribution:
Geologic features were derived from source digital data. In addition, geologic features not present with the digital data were digitized using a TIF image of the source map georeferenced in NAD83 UTM. The source map image was also used to attribute features, as well as to check (QC) line quality, both positionally and spatially, and feature attribution. Ancillary source map text, including unit descriptions, and graphics, if present, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

WGNHS Regional Map Series 3 (source 8 of 16)

> Clayton, Lee, 1985, Pleistocene Geology of the Superior Region, Wisconsin: Regional Map Series 3, Wisconsin Geological and Natural History Survey (WGNHS), Madison, Wisconsin.

Type_of_Source_Media: paper
Source_Scale_Denominator: 250000
Source_Contribution:

Geologic features present on the source map were digitized using a .TIF image of the paper/mylar map that was scanned at 300dpi and georeferenced in NAD83 UTM. The source map scan was also used to attribute features, as well as to check (QC) line quality, both positionally and spatially, and feature attribution. Ancillary source map text, including unit descriptions, and graphics, if present, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

MNGS County Atlas Series C-22 Part A (source 9 of 16)

> Setterholm, Dale R., 2010, Geologic Atlas of Chisago County, Minnesota: County Atlas Series C-22 Part A, Minnesota Geological Survey (MNGS), St. Paul, Minnesota.

Type_of_Source_Media: digital data and image
Source_Scale_Denominator: 100000
Source_Contribution:
Geologic features were derived from source digital data. In addition, geologic features not present with the digital data were digitized using a TIF image of the source map georeferenced in NAD83 UTM. The source map image was also used to attribute features, as well as to check (QC) line quality, both positionally and spatially, and feature attribution. Ancillary source map text, including unit descriptions, and graphics, if present, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

MNGS County Atlas Series C-22 Part A, Plate 1 (source 10 of 16)

> Setterholm, Dale R., 2010, Geologic Atlas of Chisago County, Minnesota (Plate 1, Data-Base Map): County Atlas Series C-22 Part A, Plate 1, Minnesota Geological Survey (MNGS), St. Paul, Minnesota.

Type_of_Source_Media: digital data
Source_Scale_Denominator: 100000
Source_Contribution:
Features and attribution were derived from source digital data. Ancillary map text, including unit descriptions, and graphics, if present on the source map, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

MNGS County Atlas Series C-13 Part A, Plate 1 (source 11 of 16)

> Boerboom, T.J., 2001, Geologic Atlas of Pine County, Minnesota (Plate 1, Data-Base Map): County Atlas Series C-13 Part A, Plate 1, Minnesota Geological Survey (MNGS), St. Paul, Minnesota.

Type_of_Source_Media: digital data
Source_Scale_Denominator: 100000
Source_Contribution:
Features and attribution were derived from source digital data. Ancillary map text, including unit descriptions, and graphics, if present on the source map, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

MNGS County Atlas Series C-22 Part A, Plate 6 (source 12 of 16)

Setterholm, Dale R., 2010, Geologic Atlas of Chisago County, Minnesota (Plate 6, Bedrock Topography): County Atlas Series C-22 Part A, Plate 6, Minnesota Geological Survey (MNGS), St. Paul, Minnesota.

Type_of_Source_Media: digital data and image
Source_Scale_Denominator: 100000
Source_Contribution:
Geologic features were derived from source digital data. In addition, geologic features not present with the digital data were digitized using a TIF image of the source map georeferenced in NAD83 UTM. The source map image was also used to attribute features, as well as to check (QC) line quality, both positionally and spatially, and feature attribution. Ancillary source map text, including unit descriptions, and graphics, if present, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

MNGS County Atlas Series C-13 Part A (source 13 of 16)

Boerboom, T.J., 2001, Geologic Atlas of Pine County, Minnesota: County Atlas Series C-13 Part A, Minnesota Geological Survey (MNGS), St. Paul, Minnesota.

Type_of_Source_Media: digital data and image
Source_Scale_Denominator: 100000
Source_Contribution:
Geologic features were derived from source digital data. In addition, geologic features not present with the digital data were digitized using a TIF image of the source map georeferenced in NAD83 UTM. The source map image was also used to attribute features, as well as to check (QC) line quality, both positionally and spatially, and feature attribution. Ancillary source map text, including unit descriptions, and graphics, if present, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

MNGS County Atlas Series C-22 Part A, Plate 4 (source 14 of 16)

Setterholm, Dale R., 2010, Geologic Atlas of Chisago County, Minnesota (Plate 4, Quaternary Stratigraphy): County Atlas Series C-22 Part A, Plate 4, Minnesota Geological Survey (MNGS), St. Paul, Minnesota.

Type_of_Source_Media: digital data and image
Source_Scale_Denominator: 100000
Source_Contribution:
Geologic features were derived from source digital data. In addition, geologic features not present with the digital data were digitized using a TIF image of the source map georeferenced in NAD83 UTM. The source map image was also used to attribute features, as well as to check (QC) line quality, both positionally and spatially, and feature attribution. Ancillary source map text, including unit descriptions, and graphics, if present, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

MNGS County Atlas Series C-13 Part A, Plate 5 (source 15 of 16)

Boerboom, T.J., 2001, Geologic Atlas of Pine County, Minnesota (Plate 5, Quaternary Cross Sections): County Atlas Series C-13 Part A, Plate 5, Minnesota Geological Survey (MNGS), St. Paul, Minnesota.

Type_of_Source_Media: digital data and image
Source_Scale_Denominator: 100000
Source_Contribution:
Geologic features were derived from source digital data. In addition, geologic features not present with the digital data were digitized using a TIF image of the source map georeferenced in NAD83 UTM. The source map image was also used to attribute features, as well as to check (QC) line quality, both positionally and spatially, and feature attribution. Ancillary source map text, including unit descriptions, and graphics, if present, were captured, formatted and added to the ancillary map information document. See the Process Step section for additional information.

MNGS unpublished digital data Karst Features of Minnesota (source 16 of 16)

Alexander, E.Calvin Jr., and Tipping, Bob, 2002, Karst Features of Minnesota: unpublished digital data Karst Features of Minnesota, Minnesota Geological Survey (MNGS), St. Paul, Minnesota.

Type_of_Source_Media: digital data
Source_Scale_Denominator: 24000
Source_Contribution:
Features and attribution were derived from source digital data. Ancillary tables (Karst_Master and Karst_Remarks) were derived from source data and related to the Hazard Points Features feature class (SACNHZP). See the Process Step section for additional information.

2. **How were the data generated, processed, and modified?**

Date: 28-Aug-2018 (process 1 of 1)
1.) GIS features were produced from source digital data or digitized from a source map. See the Source Information Contribution section(s) for specific source map details. GIS features converted from source digital data were imported into a GRI data model compliant geodatabase. For details on the GRI data model see the NPS GRI Geology-GIS Geodatabase Data Model v. 2.3 (available at: <http://science.nature.nps.gov/im/inventory/geology/GeologyGISDataModel.cfm>). GIS features captured from a source map were digitized from a TIF image of the map georeferenced in NAD83 UTM. 2.) Line quality of digitized features was checked against the source scan to ensure that GIS features were represented accurately, both positionally and spatially. Line quality of digital data was checked and if warranted edited to ensure good quality linework. 3.) Feature attribution was derived for all features using the source data attribution and the source printed/plotted map if available. 4.) Data Model topology rules were validated on all features and any topology errors corrected. 5.) Quality control (QC) consisted of checking features and their attribution against the source digital data, as well as against the source printed/plotted map if available. A GRI developed ArcObjects tool was run to check for GRI data model validation and feature-related consistency. 6.) The UNIT and MAP tables were populated and checked against the

source(s). Relationship classes were also added and used to ensure attribution consistency between feature class and table attribution. Karst tables were derived from source data. Relationship classes were added to link Karst tables to the Hazard Point Features (SACNHZP) feature class. 7.) Feature symbology was produced for all feature classes. An attempt was made to best match symbology to its source map, however, in some cases features symbology maybe slightly modified, primarily based on the limitations of the ArcGIS geology styles. In some cases, however, symbology may have been modified to reconcile differences from multiple sources. 8.) An ArcMap Document was produced, in part by a GRI finalize mxd tool, and layer (.lyr) files saved for all data layers. 9.) The ancillary map information PDF document, see the Supplemental Information section for additional information, was produced from textual information and figures present on the source map(s) and/or in digital data files. If applicable, source map images were produced at 150dpi or greater resolution and optical character recognition (OCR) software was used to produce text from source map text. The text, source map images and other ancillary source map information were added to a Help & Manual (.hmxz) template file. The .hmxz file was then compiled to produce the ancillary map information document. Any compilation errors were then checked and corrected and the document was reviewed for content, usability and grammatical errors. 10.) A Google Earth .kmz/.kml file was produced from the finalized ArcMap document and geodatabase with certain UNIT table fields appended to each feature class prior to export.

Person who carried out this activity:

James R. Chappell
Colorado State University
Research Associate, Geologist/GIS Specialist
1201 Oak Ridge Drive, Suite 200
Fort Collins, Colorado 80525-5589
USA

(970) 491-5147 (voice)
jrchapp@lamar.colostate.edu

Hours_of_Service: 9:00 a.m. to 5:00 p.m. (MST), Monday - Friday

Data sources used in this process:

- MNGS Miscellaneous Map Series M-178, NPS hydrography digital database, WGNHS unpublished digital data Wisconsin Saint Croix Quaternary Map, WGNHS Open-File Report 2004-22, WGNHS Bulletin 92, MNGS County Atlas Series C-22 Part A, Plate 3, MNGS County Atlas Series C-13 Part A, Plate 4, WGNHS Regional Map Series 3, MNGS County Atlas Series C-22 Part A, MNGS County Atlas Series C-22 Part A, Plate 1, MNGS County Atlas Series C-13 Part A, Plate 1, MNGS County Atlas Series C-22 Part A, Plate 6, MNGS County Atlas Series C-13 Part A, MNGS County Atlas Series C-22 Part A, Plate 4, MNGS County Atlas Series C-13 Part A, Plate 5, MNGS unpublished digital data Karst Features of Minnesota

3. **What similar or related data should the user be aware of?**

   National Park Service Geologic Resources Inventory (GRI) program, 20180828, Metadata for the Unpublished Digital Surficial Geologic-GIS Map of Saint Croix National Scenic Riverway, Minnesota and Wisconsin (NPS, GRD, GRI, SACN, SACN digital map).

How reliable are the data; what problems remain in the data set?

1. **How well have the observations been checked?**

   Feature and table attribution was derived and checked with the source map(s). Attribution was checked (QCd) for errors. Users of this data are advised to FULLY and CAREFULLY READ the "DISTRIBUTION LIABILITY" section of this metadata before using the data.

2. **How accurate are the geographic locations?**

   Data was produced from digital source data and digitized from a georeferenced source map .TIF image(s) (300dpi). Users of this data are cautioned about the locational accuracy of features within this dataset. Based on the source map scale and United States National Map Accuracy Standards features are within (horizontally) 127 meters or 416.7 feet of their actual location as presented by this dataset. Users of this data should thus not assume the location of features is exactly where they portrayed are in ArcGIS or other software used to display this dataset. The PRECISION of any Shapefile (.shp) files is DOUBLE. The maximum root mean square (RMS) horizontal accuracy of the georeferenced image as measured in ArcMap is 86.1 meters. Coordinate tics on the georeferenced (registered and rectified) source map image(s) were checked against control points that had the exact specified coordinates of the tic. The direct distance between the image tic and its control point were measured. All measured distances were less than 50% of the required distance to meet National Map Accuracy Standards (1/50th of an inch for maps at 1:20,000 scale and smaller). Features were checked (QCd) after digitizing for positional accuracy errors using the georeferenced source map image.

3. **How accurate are the heights or depths?**

   No vertical coordinates are present in this GRI digital dataset.

4. **Where are the gaps in the data? What is missing?**

   All data is considered complete to the extent of the source map(s).

5. **How consistent are the relationships among the observations, including topology?**

GIS data in 10.1 file geodatabase and 2.2 KML/KMZ file formats.

How can someone get a copy of the data set?

Are there legal restrictions on access or use of the data?

Access_Constraints: None
Use_Constraints:
Not for use at scale greater than 1:200,000 (source map scale). Users of this data are cautioned about the locational accuracy of features within this dataset. Based on the source map scale and United States National Map Accuracy Standards features are within (horizontally) 127 meters or 416.7 feet of their actual location as presented by this dataset. Users of this data should thus not assume the location of features is exactly where they are portrayed in Google Earth, ArcGIS or other software used to display this dataset.

1. **Who distributes the data set?** (Distributor 1 of 1)

Stephanie O'Meara
Colorado State University
Research Associate, Geologist/GIS Specialist/Data Manager
1201 Oak Ridge Drive, Suite 200
Fort Collins, Colorado 80525
USA

(970) 491-6655 (voice)
stephanie.omeara@colostate.edu

Hours_of_Service: 8:00 a.m. to 4:00 p.m. (MST), Monday - Friday
Contact_Instructions:
GRI data are available at: <http://irma.nps.gov/App/Reference/Search>

2. **What's the catalog number I need to order this data set?**

```
GIS map data available in 10.1 file geodatabase format (in
sacn_surficial_geology_gdb.zip) and in 2.2 KML/KMZ format (in
sacn_surficial_geology_kml.zip)
```

3. **What legal disclaimers am I supposed to read?**

The National Park Service shall not be held liable for improper or incorrect use of the data described and/or contained herein. These data and

related graphics are not legal documents and are not intended to be used as such.

The information contained in these data is dynamic and may change over time. The data are not better than the original sources from which they were derived. It is the responsibility of the data user to use the data appropriately and consistent within the limitations of geospatial data in general and these data in particular. The related graphics are intended to aid the data user in acquiring relevant data; it is not appropriate to use the related graphics as data.

The National Park Service gives no warranty, expressed or implied, as to the accuracy, reliability, or completeness of these data. It is strongly recommended that these data are directly acquired from an NPS server and not indirectly through other sources which may have changed the data in some way. Although these data have been processed successfully on a computer system at the National Park Service, no warranty, expressed or implied is made regarding the utility of the data on another system or for general scientific purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies to both to individual use of the data and aggregate use with other data.

4. **How can I download or order the data?**
    - **Availability in digital form:**

Data format:	GDB (version ArcGIS 10.1) GIS (geodatabase format) map download (sacn_surficial_geology_gdb.zip) Size: 13.2
Network links:	NPS Data Store, https://irma.nps.gov/DataStore/
Data format:	KML/KMZ (version 2.2) Google Earth (kml/kmz format) map download (sacn_surficial_geology_kml.zip) Size: 15.8
Network links:	NPS Data Store, https://irma.nps.gov/DataStore/
Data format:	PDF (version 9) Ancillary Map Information Document Size: 40.3
Network links:	NPS Data Store, https://irma.nps.gov/DataStore/
Data format:	PDF (version 9) GIS Readme Document Size: 0.1
Network links:	NPS Data Store, https://irma.nps.gov/DataStore/
Data format:	PDF (version 9) FAQ Metadata File Size: 0.1
Network links:	NPS Data Store, https://irma.nps.gov/DataStore/

    - **Cost to order the data:** None
    - **Special instructions:**

Search and download GRI data at:
<http://irma.nps.gov/App/Reference/Search>

Who wrote the metadata?

Dates:

Last modified: 28-Aug-2018

Metadata author:

James R. Chappell
Colorado State University
Research Associate, Geologist/GIS Specialist
1201 Oak Ridge Drive, Suite 200
Fort Collins, Colorado 80525-5589
USA

(970) 491-5147 (voice)
jrchapp@lamar.colostate.edu

Hours_of_Service: 9:00 a.m. to 5:00 p.m. (MST), Monday - Friday

Metadata standard:

FGDC Content Standards for Digital Geospatial Metadata (FGDC-STD-001-1998)

Metadata extensions used:

- <http://www.fgdc.gov/standards/>

Generated by mp version 2.7.19 on Thu Aug 30 10:11:11 2018