

# Geologic Map of the Winslow 30' x 60' Quadrangle, Coconino and Navajo Counties, Northern Arizona

**Tags**  
geologic map

## Summary

The geologic map of the Winslow quadrangle was prepared by the USGS Navajo Land Use Planning Project in cooperation with the Navajo Nation and funded through the USGS National Cooperative Geologic Mapping Program to provide connectivity to the regional geologic framework of the Grand Canyon area of northern Arizona. The Winslow quadrangle geologic map (sheets 1 and 2) will benefit local, state, federal, Navajo, and private land resource managers who direct environmental and land management programs such as range management, plant and animal studies, flood control, water resource investigations, and natural hazards associated with sand dune mobility. The geologic information will support ongoing and future geologic investigations and associated scientific studies within the Winslow quadrangle.

## Description

This digital map database represents the general distribution of bedrock and surficial deposits in the Winslow 30' x 60' quadrangle. The database delineates map units that are identified by general age and lithology following the stratigraphic nomenclature of the U.S. Geological Survey. The Winslow quadrangle encompasses approximately 5,018 km<sup>2</sup> (1,960 mi<sup>2</sup>) within Coconino and Navajo Counties of northern Arizona and is bounded by longitude 110° to 111° W., and latitude 35° to 35°30' N. South of the Navajo Nation, private and State lands form a checkerboard pattern on the quadrangle. This digital database for the geologic map of the Winslow 30' x 60' quadrangle, Arizona, is a cooperative effort of the U.S. Geological Survey (USGS) and the Navajo Nation to provide regional geologic information for resource management officials and visitor information services of the Navajo Nation. Field work on the Navajo Nation was conducted with the cooperation of, and under written permit from, the Navajo Nation Minerals Department. All scientific study on the Navajo Nation requires a permit from the Navajo Nation Minerals Department, P.O, Box 1910, Window Rock, Arizona 86515, (928) 871-6587.

## Credits

This digital database was prepared by George Billingsley and Debra Block. Technical reviews were provided by Jonathan Matti of the U.S. Geological Survey and Michael Ort of Northern Arizona University. Digital review was provided by Sue Priest of the U.S. Geological Survey. Prepared in cooperation with the Navajo Nation.

## Use limitations

Not for use at scales greater than 1:24,000. Any derivative products utilizing these datasets shall clearly indicate their source. If users modify the data in any way they are obligated to describe the types of modifications they have performed. User specifically agrees not to misrepresent these datasets, nor to imply that changes they made were approved by the U.S. Geological Survey.

## Extent

**West** -111.0 **East** -110.0

**North** 35.5 **South** 35.0

## Scale Range

**Maximum (zoomed in)** 1:24,000

**Minimum (zoomed out)** 1:100,000

## ArcGIS Metadata ►

## Topics and Keywords ►

THEMES OR CATEGORIES OF THE RESOURCE [geoscientificInformation](#)

CONTENT TYPE [Downloadable Data](#)

[EXPORT TO FGDC CSDGM XML FORMAT AS RESOURCE DESCRIPTION](#) [No](#)

PLACE KEYWORDS [Winslow, USA, Arizona, Navajo County, Navajo Nation Reservation, Coconino County, Colorado Plateau](#)

THESAURUS ►

TITLE [U.S. Board on Geographic Names](#)

ALTERNATE TITLES <http://geonames.usgs.gov/index.html>

[Hide Thesaurus ▲](#)

THEME KEYWORDS [geologic map](#)

THESAURUS ►

TITLE [USGS Thesaurus](#)

ALTERNATE TITLES <http://www.usgs.gov/science/tab-term.html>

[Hide Thesaurus ▲](#)

[Hide Topics and Keywords ▲](#)

## Citation ►

TITLE [Geologic Map of the Winslow 30' x 60' Quadrangle, Coconino and Navajo Counties, Northern Arizona](#)

EDITION [1.0](#)

PRESENTATION FORMATS [digital map](#)

[FGDC GEOSPATIAL PRESENTATION FORMAT](#) [vector digital data](#)

SERIES

NAME [U.S. Geological Survey Scientific Investigations Map](#)

ISSUE [SIM 3247](#)

[Hide Citation ▲](#)

## Citation Contacts ►

RESPONSIBLE PARTY

INDIVIDUAL'S NAME [George H. Billingsley](#)

CONTACT'S ROLE [originator](#)

#### RESPONSIBLE PARTY

INDIVIDUAL'S NAME Debra Block  
CONTACT'S ROLE originator

#### RESPONSIBLE PARTY

INDIVIDUAL'S NAME Margaret Hiza Redsteer  
CONTACT'S ROLE originator

#### RESPONSIBLE PARTY

ORGANIZATION'S NAME U.S. Geological Survey  
CONTACT'S ROLE publisher

[Hide Citation Contacts ▲](#)

## Resource Details ►

DATASET LANGUAGES English

DATASET CHARACTER SET utf8 - 8 bit UCS Transfer Format

STATUS completed

SPATIAL REPRESENTATION TYPE vector

#### SPATIAL RESOLUTION

DATASET'S SCALE

SCALE DENOMINATOR 50000

#### SUPPLEMENTAL INFORMATION

Although the nominal scale of a USGS 30' x 60' topographic quadrangle is 1:100,000, we present the geologic map of the Winslow quadrangle in two panels at the 1:50,000-scale in order to preserve geologic features that were mapped and compiled at the 1:24,000-scale, but are too detailed to show at the 1:100,000-scale. For map plotting purposes and readability, we present the geologic map as west (sheet 1) and east (sheet 2) panels, each consisting of sixteen 7.5' quadrangles. A third map sheet contains a Correlation of Map Units, a List of Map Units, and an explanation of map symbols that is applicable to both map sheets. The accompanying style file (SIM3247.style) contains the symbols applied to each feature class in ArcMap to create the cartographic map.

#### CREDITS

This digital database was prepared by George Billingsley and Debra Block. Technical reviews were provided by Jonathan Matti of the U.S. Geological Survey and Michael Ort of Northern Arizona University. Digital review was provided by Sue Priest of the U.S. Geological Survey. Prepared in cooperation with the Navajo Nation.

#### ARCGIS ITEM PROPERTIES

[Hide Resource Details ▲](#)

## Extents ►

#### EXTENT

DESCRIPTION

ground condition

#### GEOGRAPHIC EXTENT

BOUNDING RECTANGLE

EXTENT TYPE Extent used for searching

WEST LONGITUDE -111.0  
EAST LONGITUDE -110.0  
NORTH LATITUDE 35.5  
SOUTH LATITUDE 35.0  
EXTENT CONTAINS THE RESOURCE Yes

*Hide Extents ▲*

## Resource Points of Contact ►

### POINT OF CONTACT

INDIVIDUAL'S NAME George H. Billingsley  
ORGANIZATION'S NAME U.S. Geological Survey  
CONTACT'S POSITION Emeritus Geologist  
CONTACT'S ROLE principal investigator

### CONTACT INFORMATION ►

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### ONLINE RESOURCE

LOCATION <http://pubs.usgs.gov/sim/3247>  
FUNCTION PERFORMED download

*Hide Contact information ▲*

*Hide Resource Points of Contact ▲*

## Resource Maintenance ►

### RESOURCE MAINTENANCE

UPDATE FREQUENCY not planned

*Hide Resource Maintenance ▲*

## Resource Constraints ►

### CONSTRAINTS

#### LIMITATIONS OF USE

Not for use at scales greater than 1:24,000. Any derivative products utilizing these datasets shall clearly indicate their source. If users modify the data in any way they are obligated to describe the types of modifications they have performed. User

specifically agrees not to misrepresent these datasets, nor to imply that changes they made were approved by the U.S. Geological Survey.

#### LEGAL CONSTRAINTS

##### LIMITATIONS OF USE

The U.S. Geological Survey (USGS) provides these geographic data "as is." The USGS makes no guarantee or warranty concerning the accuracy of information contained in the geographic data. The USGS further makes no warranties, either expressed or implied as to any other matter whatsoever, including, without limitation, the condition of the product, or its fitness for any particular purpose. The burden for determining fitness for use lies entirely with the user. Although these data have been processed successfully on computers at the USGS, no warranty, expressed or implied, is made by the USGS regarding the use of these data on any other system, nor does the fact of distribution constitute or imply any such warranty. In no event shall the USGS have any liability whatsoever for payment of any consequential, incidental, indirect, special, or tort damages of any kind, including, but not limited to, any loss of profits arising out of use of or reliance on the geographic data or arising out of delivery, installation, operation, or support by USGS.

[Hide Resource Constraints ▲](#)

## Data Quality ►

#### SCOPE OF QUALITY INFORMATION ►

RESOURCE LEVEL **dataset**

[Hide Scope of quality information ▲](#)

#### DATA QUALITY REPORT - QUANTITATIVE ATTRIBUTE ACCURACY ►

**MEASURE DESCRIPTION** The geodatabase was checked for polygon adjacency. Validation tests determined that lines attributed as 'Contact' do not separate equivalent map units and lines attributed as 'Fault - Concealed' do not separate different map units.

[Hide Data quality report - Quantitative attribute accuracy ▲](#)

#### DATA QUALITY REPORT - CONCEPTUAL CONSISTENCY ►

**MEASURE DESCRIPTION** Topological integrity of the data is maintained in the geodatabase by the following rules: geologic lines 1) must not self-overlap, 2) must not self-intersect, 3) must not have pseudonodes, 4) must not intersect or touch interior, 5) must be single part, and 6) must not have dangles [excepting faults]; geologic polygons 1) must not overlap, 2) must not have gaps, and 3) boundary must be covered by [geologic lines]. These topological relationships reflect the geometric relationship of geologic entities. Each line segment has a length and directionality that is appropriate for the geologic feature it depicts.

[Hide Data quality report - Conceptual consistency ▲](#)

#### DATA QUALITY REPORT - COMPLETENESS OMISSION ►

**MEASURE DESCRIPTION** This map is designed to describe completely the surficial and bedrock geology at a 1:24,000 scale. Geologic information only mappable at a larger scale has been omitted. All geospatial database elements are attributed.

[Hide Data quality report - Completeness omission ▲](#)

#### DATA QUALITY REPORT - ABSOLUTE EXTERNAL POSITIONAL ACCURACY ►

**MEASURE DESCRIPTION** The positional accuracy of the location of the geologic contacts and faults varies as a function of topography and geology. Contacts and faults that occur in bedrock in moderate terrain are considered to be accurately located, and within +/- 5 meters of their actual location on the topographic base map. This accuracy diminishes in areas where the topography is either flat or very steep. Contacts between surficial units are often difficult to discern, and are considered to be approximately located, despite being attributed as accurately located. The 1:24,000 topographic maps and corresponding Digital Raster Graphics (DRGs) that were used as the primary mapping base for this project were assumed to meet the National Map Accuracy Standard of +/- 12 meters. The scanned source maps, which were georeferenced to the DRGs, all had registration errors of less than +/- 12 meters, and most had errors of less than +/- 5 meters.

[Hide Data quality report - Absolute external positional accuracy ▲](#)

[Hide Data Quality ▲](#)

## Lineage ►

#### PROCESS STEP ►

**DESCRIPTION** The geologic map of the Winslow quadrangle was produced by stereoscopic analysis of aerial photographs, augmented by extensive field checking. Primary resources include color aerial photographs flown in 2004, 2005, and 2006, at the 1:24,000-scale, and flown in 2005 at the 1:40,000-scale. The geologic linework originally was compiled onto 1:24,000-scale paper USGS topographic maps. The 32 draft paper maps were scanned and georeferenced to the corresponding 7.5' topographic map digital raster graphic (DRG) in ArcGIS. Geologic features were digitized and symbolized from the field sheets, and additional field checks were performed where needed.

[Hide Process step ▲](#)

#### PROCESS STEP ►

**DESCRIPTION** Many of the Quaternary alluvial and eolian deposits have similar lithologic and geomorphic characteristics and were mapped almost entirely by photogeologic methods. Pliocene(?), Pleistocene, and Holocene surficial deposits were differentiated chiefly on the basis of differences in morphologic character and physiographic position as observed on color aerial photographs and in the field. Older alluvial and eolian deposits are significantly eroded, whereas younger deposits are only slightly eroded and are actively accumulating material. Surficial unit contacts that are adjacent to alluvial, eolian, and bedrock map units are approximate.

[Hide Process step ▲](#)

PROCESS STEP ►

**DESCRIPTION** The channel of the Little Colorado River was mapped by stereo photographic methods using 2005 color digital orthophoto quadrangles (DOQs) and drawn on 1979 and 1986 1:24,000-scale USGS topographic base maps. The present-day (2005) river channel morphology does not match that depicted on the 1979 and 1986 topographic base maps because of changing geomorphic conditions of the Little Colorado River.

*Hide Process step ▲*

*Hide Lineage ▲*

## Distribution ►

DISTRIBUTOR ►

CONTACT INFORMATION

ORGANIZATION'S NAME USGS Information Services  
CONTACT'S ROLE distributor

CONTACT INFORMATION ►

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COUNTRY US

E-MAIL ADDRESS [ask@usgs.gov](mailto:ask@usgs.gov)

*Hide Contact information ▲*

*Hide Distributor ▲*

TRANSFER OPTIONS

ONLINE SOURCE

LOCATION <http://pubs.usgs.gov/sim/3247>

FUNCTION PERFORMED download

*Hide Distribution ▲*

## Fields ►

OVERVIEW DESCRIPTION ►

**ENTITY AND ATTRIBUTE OVERVIEW** This geodatabase contains the feature dataset 'geo' which contains line and polygon feature classes that collectively define the geologic units. Additional feature classes within the geodatabase contain volcanic, karst, and geologic structure data. Each feature class has a corresponding metadata report that should be referred to for additional Data Quality, Spatial Reference, and Entity and Attribute information.

[Hide Overview Description ▲](#)

#### OVERVIEW DESCRIPTION ►

**ENTITY AND ATTRIBUTE OVERVIEW** This geodatabase, SIM3247.mdb, includes the following:  
geo (feature dataset),  
SIM3247\_line (feature class containing geologic contacts and faults),  
SIM3247\_poly (feature class containing geologic unit polygons),  
SIM3247\_atd (feature class containing geologic structure data),  
SIM3247\_fold (feature class containing fold axes),  
SIM3247\_kar (feature class containing karst data),  
SIM3247\_sym (feature class containing line ornamentation for faults),  
SIM3247\_vpf (feature class containing volcanic point data),  
SIM3247\_DRG24k (raster catalog of topographic base maps)

[Hide Overview Description ▲](#)

[Hide Fields ▲](#)

## Metadata Details ►

**METADATA LANGUAGE** English

**METADATA CHARACTER SET** utf8 - 8 bit UCS Transfer Format

**SCOPE OF THE DATA DESCRIBED BY THE METADATA** dataset

#### ARCGIS METADATA PROPERTIES

**METADATA FORMAT** ArcGIS 1.0

**METADATA STYLE** FGDC CSDGM Metadata

**STANDARD OR PROFILE USED TO EDIT METADATA** FGDC

**CREATED IN ARCGIS FOR THE ITEM** 2013-02-04 10:29:30

**LAST MODIFIED IN ARCGIS FOR THE ITEM** 2013-02-06 10:51:51

**AUTOMATIC UPDATES**

**HAVE BEEN PERFORMED** No

[Hide Metadata Details ▲](#)

## Metadata Contacts ►

#### METADATA CONTACT

**INDIVIDUAL'S NAME** Debra Block

**ORGANIZATION'S NAME** U.S. Geological Survey

**CONTACT'S POSITION** Geologist



CONTACT'S ROLE originator

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E-MAIL ADDRESS dblock@usgs.gov

*Hide Contact information ▲*

*Hide Metadata Contacts ▲*

**Metadata Maintenance ►**

MAINTENANCE

UPDATE FREQUENCY not planned

*Hide Metadata Maintenance ▲*