

Satellite Image Map of North Dakota

NORTH Dakota | Geological Survey
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INTRODUCTION

This map presents a compiled satellite view of North Dakota created from the Sentinel-2 Quarterly Cloudless Mosaic dataset. Sentinel-2 satellites carry a Multispectral Instrument (MSI) that captures surface reflectance in multiple wavelengths, enabling detailed observation of land cover, vegetation, water, and geologic features. As a Level 3 product, the mosaic merges numerous image acquisitions to create a consistent, cloud-free representation of the land surface. Because cloud cover frequently obscures the ground, these mosaics provide a valuable resource for surface analysis.

MAP METHODOLOGY

The European Space Agency (ESA) produces Sentinel-2 Quarterly Cloudless Mosaic tiles by first collecting all available Level-2A imagery during the three-month period of interest. Cloud and shadow pixels are identified using the Level-2A scene classification layer, which labels pixels affected by clouds or other artifacts so that they can be excluded from the mosaic calculation. After masking invalid observations for each pixel, the remaining clear sky measurements are sorted, and the first quartile value for each band is selected to represent that pixel in the final mosaic. This statistical approach reduces the influence of residual clouds or bright outliers. The compositing process is performed separately for the red, green, blue, and near-infrared bands, producing a cloud-free, radiometrically consistent tile. Individual georeferenced tiles were downloaded from the Copernicus Data Space Ecosystem Browser and imported into ArcGIS Pro, where built-in mosaicking tools were used to merge them into a seamless, state-wide raster image.

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Data Source:
Copernicus Sentinel-2 (processed by ESA), 2025, MSI Level 3 Quarterly Cloudless Mosaic, Q3 2025, European Space Agency. Retrieved from:
<https://dataspace.copernicus.eu/>
Period of Acquisition: July, 2025 - September, 2025

DATA PROCESSING DOCUMENTATION
Copernicus Data Space Ecosystem, (n.d.), Sentinel-2 Level 3 Quarterly Mosaics documentation. Retrieved from: <https://documentation.dataspace.copernicus.eu/Data/SentinelMissions/Sentinel2.html>