USGS science for a changing world

Mapping, Remote Sensing, and Geospatial Data

What are the band designations for the Landsat satellites?

The sensors on each of the Landsat satellites acquire data in different ranges of frequencies along the electromagnetic spectrum. Ongoing improvements in technology allow newer sensors to acquire data in more wavelengths.

Learn more:

- Bandpass Wavelengths for all Landsat Sensors
- Common Landsat Band Combinations
- What are the best Landsat spectral bands for use in my research?
- Spectral Characteristics Viewer

Explore More Science

Landsat
Landsat Bands
Mapping, Remote Sensing, and Geospatial Data

Landsat 1-5 Multispectral Scanner (MSS) images consist of four spectral bands with 60 meter spatial resolution. Approximate scene size is 170 km north-south by 185 km east-west (106 mi by 115 mi). Specific band designations differ from Landsat 1-3 to Landsat 4-5.

Landsat 1-5 Multispectral Scanner (MSS)

Landsat 1-3	Landsat 4-5	Wavelength (micrometers)	Resolution (meters)
Band 4	Band 1	0.5-0.6	60
Band 5	Band 2	0.6-0.7	60
Band 6	Band 3	0.7-0.8	60
Band 7	Band 4	0.8-1.1	60

Landsat 4-5 Thematic Mapper (TM) images consist of seven spectral bands with a spatial resolution of 30 meters for Bands 1 to 5 and 7. Spatial resolution for Band 6 (thermal infrared) is 120 meters, but is resampled to 30-meter pixels. Approximate scene size is 170 km north-south by 183 km east-west (106 mi by 114 mi).

Landsat 4-5 Thematic Mapper (TM)

Landsat 4-5	Wavelenth (micrometers)	Resolution (meters)
Band 1	0.45-0.52	30
Band 2	0.52-0.60	30
Band 3	0.63-0.69	30
Band 4	0.76-0.90	30
Band 5	1.55-1.75	30
Band 6	10.40-12.50	120 (30)
Band 7	2.08-2.35	30

Landsat 7 Enhanced Thematic Mapper Plus (ETM+) images consist of eight spectral bands with a spatial resolution of 30 meters for Bands 1 to 7. The resolution for Band 8 (panchromatic) is 15 meters. All bands can collect one of two gain settings (high or low) for increased radiometric sensitivity and dynamic range, while Band 6 collects both high and low gain for all scenes. Approximate scene size is 170 km north-south by 183 km east-west (106 mi by 114 mi).

Landsat 7 Enhanced Thematic Mapper Plus (ETM+)

Landsat 7	Wavelength (micrometers)	Resolution (meters)
Band 1	0.45-0.52	30
Band 2	0.52-0.60	30
Band 3	0.63-0.69	30
Band 4	0.77-0.90	30
Band 5	1.55-1.75	30
Band 6	10.40-12.50	60 (30)
Band 7	2.09-2.35	30

Landsat 7	Wavelength (micrometers)	Resolution (meters)
Band 8	.52-.90	15

Landsat 8 Operational Land Imager (OLI) **and Thermal Infrared Sensor** (TIRS) images consist of nine spectral bands with a spatial resolution of 30 meters for Bands 1 to 7 and 9. New band 1 (ultra-blue) is useful for coastal and aerosol studies. New band 9 is useful for cirrus cloud detection. The resolution for Band 8 (panchromatic) is 15 meters. Thermal bands 10 and 11 are useful in providing more accurate surface temperatures and are collected at 100 meters. Approximate scene size is 170 km north-south by 183 km east-west (106 mi by 114 mi). The instruments on Landsat 9 (launch ready mid-2021) are being designed as improved copies of Landsat 8.

Landsat 8-9 Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS)

Bands	Wavelength (micrometers)	Resolution (meters)
Band 1 - Coastal aerosol	0.43-0.45	30
Band 2 - Blue	0.45-0.51	30
Band 3 - Green	0.53-0.59	30
Band 4 - Red	0.64-0.67	30
Band 5 - Near Infrared (NIR)	0.85-0.88	30
Band 6 - SWIR 1	1.57-1.65	30
Band 7 - SWIR 2	2.11-2.29	30
Band 8 - Panchromatic	0.50-0.68	15
Band 9 - Cirrus	1.36-1.38	30
Band 10 - Thermal Infrared (TIRS) 1	10.6-11.19	100
Band 11 - Thermal Infrared (TIRS) 2	11.50-12.51	100