LandSat:

<https://www.usgs.gov/faqs/what-are-band-designations-landsat-satellites>

**Bandas:**

# What are the band designations for the Landsat satellites?

The sensors aboard each of the [Landsat satellites](https://www.usgs.gov/landsat-missions) were designed to acquire data in different ranges of frequencies along the electromagnetic spectrum ([View Bandpass Wavelengths for all Landsat Sensors](https://www.usgs.gov/media/images/spectral-bandpasse-all-landsat-sensors)). The Multispectral Scanner (MSS) carried on Landsat 1,2,3,4 and 5 collected data in four ranges (bands); the Thematic Mapper (TM) sensor on Landsat 4 and Landsat 5 included those found on earlier satélites and also introduced a thermal and a shortwave infrared band. A panchromatic band was added to Landsat 7’s Enhanced Thematic Mapper Plus (ETM+) sensor.

While the earlier satellites carried just one sensor, Landsat 8 acquires data in 11 bands from two separate sensors: the Operational Land Imager (OLI) and the Thermal Infrared Sensor (TIRS). The instruments on Landsat 9 were designed as improved copies of the Landsat 8 sensors.

**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 - Green | Band 1 - Green | 0.5-0.6 | 60 |
| Band 5 - Red | Band 2 = Red | 0.6-0.7 | 60 |
| Band 6 - Near Infrared (NIR) | Band 3 - Near Infrared (NIR) | 0.7-0.8 | 60 |
| Band 7 - Near Infrared (NIR) | Band 4 - Near Infrared (NIR) | 0.8-1.1 | 60 |

**Landsat 4-5 Thematic Mappe**r (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 - Blue | 0.45-0.52 | 30 |
| Band 2 - Green | 0.52-0.60 | 30 |
| Band 3 - Red | 0.63-0.69 | 30 |
| Band 4 - Near Infrared (NIR) | 0.76-0.90 | 30 |
| Band 5 - Shortwave Infrared (SWIR) 1 | 1.55-1.75 | 30 |
| Band 6 - Thermal | 10.40-12.50 | 120 (30) |
| Band 7 - Shortwave Infrared (SWIR) 2 | 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 - Blue | 0.45-0.52 | 30 |
| Band 2 - Green | 0.52-0.60 | 30 |
| Band 3 - Red | 0.63-0.69 | 30 |
| Band 4 - Near Infrared (NIR) | 0.77-0.90 | 30 |
| Band 5 - Shortwave Infrared (SWIR) 1 | 1.55-1.75 | 30 |
| Band 6 - Thermal | 10.40-12.50 | 60 (30) |
| Band 7 - Shortwave Infrared (SWIR) 2 | 2.09-2.35 | 30 |
| Band 8 - Panchromatic | .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](https://www.usgs.gov/landsat-missions/landsat-9) are improved copies of those on Landsat 8.

[View Landsat 7 / Landsat 5 and Landsat 8/9 Common Band Combinations](https://www.usgs.gov/media/images/common-landsat-band-combinations)

| ****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 - Shortwave Infrared (SWIR) 1 | 1.57-1.65 | 30 |
| Band 7 - Shortwave Infrared (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 |