Landsat Spectral Bands

1 Coastal water mapping, soil/vegetation discrimination, forest classification, man-made feature identification

2 Vegetation discrimination and health monitoring, man-made feature identification

3 Plant species identification, man-made feature identification

4 Soil moisture monitoring, vegetation monitoring, water body discrimination

5 Vegetation moisture content monitoring

6 Surface temperature, vegetation stress monitoring, soil moisture monitoring, cloud differentiation, volcanic monitoring

7 Mineral and rock discrimination, vegetation moisture content

**Band 1**: 0.45 - 0.52 m (Blue). Band 1 is useful for mapping water near coasts, differentiating between soil and plants, and identifying manmade objects such as roads and buildings.

**Band 2**: 0.52 - 0.60 m (Green). Spanning the region between the blue and red chlorophyll absorption bands, this band shows the green reflectance of healthy vegetation. It is useful for differentiating between types of plants, determining the health of plants, and identifying manmade objects.

**Band 3**: 0.63 - 0.69 m (Red). The visible red band is one of the most important bands for discriminating among different kinds of vegetation. It is also useful for mapping soil type boundaries and geological formation boundaries.

**Band 4**: 0.76 - 0.90 m (Near infrared). This band is especially responsive to the amount of vegetation biomass present in a scene. It is useful for crop identification, for distinguishing between crops and soil, and for seeing the boundaries of bodies of water.

**Band 5**: 1.55 - 1.75 m (Mid-Infrared). This reflective-IR band is sensitive to turgidity -- the amount of water in plants. Turgidity is useful in drought studies and plant vigor studies. In addition, this band can be used to discriminate between clouds, snow, and ice.

**Band 6**: 10.4 - 12.5 m (Thermal infrared). This band measures the amount of infrared radiant flux (heat) emitted from surfaces, and helps us to locate geothermal activity, classify vegetation, analyze vegetation stress, and measure soil moisture.

**Band 7**: 2.08 - 2.35 m (Mid-infrared). This band is particularly helpful for discriminating among types of rock formations.
Band Combinations: Three Examples

Note: By convention, band combinations such as “3,2,1” are listed in red, green, blue order and refer to what we see as red, green, and blue in a Landsat image. In other words, in the combination 3,2,1, what we see as red will be Band 3 radiation; what we see as green will be Band 2 radiation, and what we see as blue will be Band 1 radiation.

True-Color Composite (3,2,1)
True-color composite images approximate the range of vision for the human eye, and hence these images appear to be close to what we would expect to see in a normal photograph. True-color images tend to be low in contrast and somewhat hazy in appearance. This is because blue light is more susceptible than other bandwidths to scattering by the atmosphere. Broad-based analysis of underwater features and landcover are representative applications for true-color composites.

Near Infrared Composite (4,3,2)
Adding a near infrared (NIR) band, and dropping the visible blue band creates a near infrared composite image. Vegetation in the NIR band is highly reflective due to chlorophyll, and an NIR composite vividly shows vegetation in various shades of red. Water appears dark, almost black, due to the absorption of energy in the visible red and NIR bands.

Shortwave Infrared Composite (7,4,3 or 7,4,2)
A shortwave infrared composite image is one that contains at least one shortwave infrared (SWIR) band. Reflectance in the SWIR region is due primarily to moisture content. SWIR bands are especially suited for camouflage detection, change detection, disturbed soils, soil type, and vegetation stress.

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