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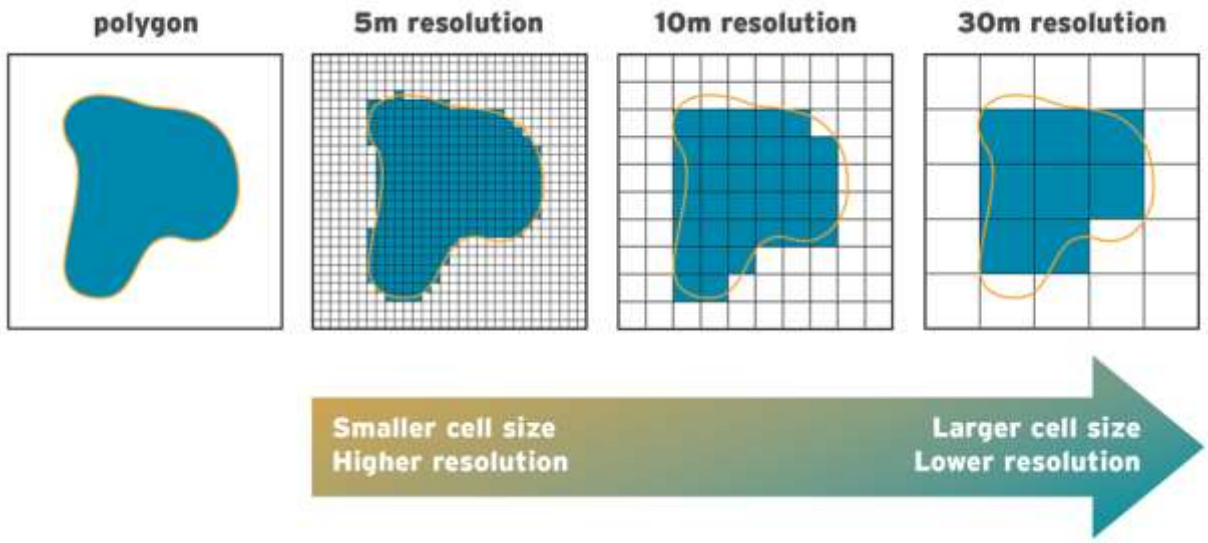
Types of resolution?

Image resolution is the detail an image holds. The term applies to raster digital images, film images, and other types of images. Higher resolution means more image detail.

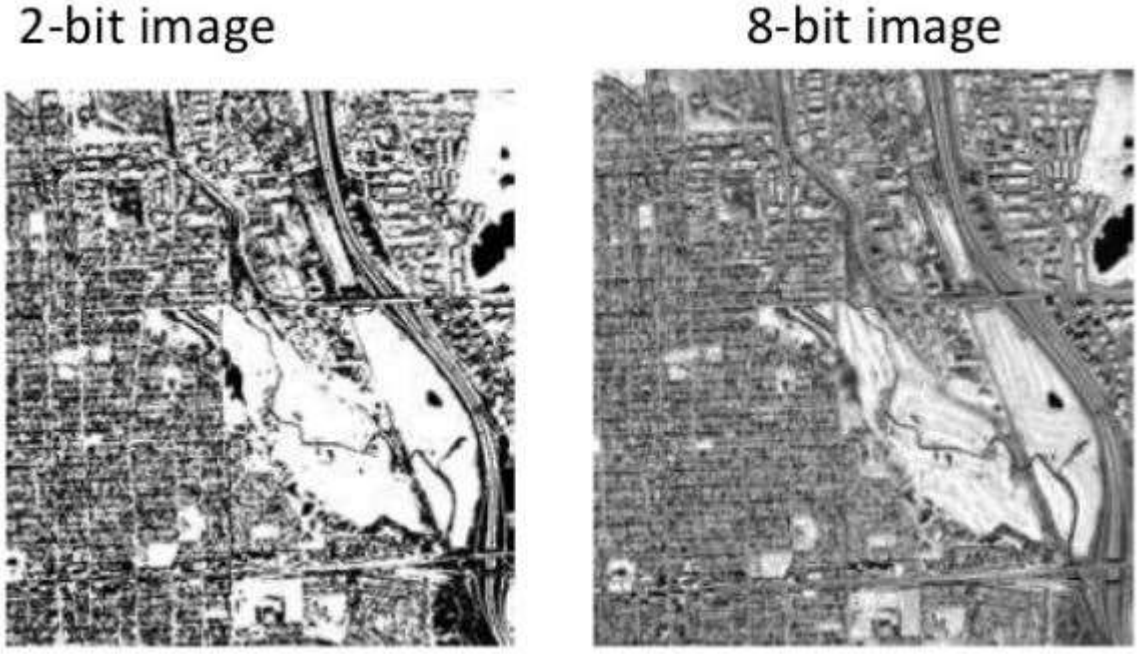
In remote sensing we refer to four types of resolution: **spatial, spectral, radiometric** and **temporal.**

- **Spatial resolution** refers to the size of the smallest feature that can be detected by a satellite sensor or displayed in a satellite image. It is usually presented as a single value representing the length of one side of a square. For example, a spatial resolution of 250m means that one pixel represents an area 250 by 250 meters on the ground.



- **Spectral Resolution** refers to the ability of a satellite sensor to measure specific wavelengths of the electromagnetic spectrum.
  - The finer the spectral resolution, the narrower the wavelength range for a particular channel or band.
  - Spectral Resolution describes the ability of a sensor to define fine wavelength intervals
  - This refers to the number of bands in the spectrum in which the instrument can take measurements
  - Higher Spectral resolution = better ability to exploit differences in spectral signatures

- **Radiometric resolution** refers to the number of possible data file values in each band (indicated by the number of bits into which the recorded energy is divided).
  It is the ability of a sensor to detect differences in energy magnitude. Sensors with low radiometric resolution are able to detect only relatively large differences in the amount of energy received, sensors with high radiometric resolution are able to detect relatively small differences in the amount of energy received.



  By comparing a 2-bit image with an 8-bit image, one can see that there is a large difference in the level of discernible details. The more sensitive a sensor is to the reflectance of an object as compared to its surroundings, the smaller an object that can be detected and identified.

- **Temporal resolution** refers to the time between images. The capability for satellites to provide images of the same geographical area more frequently has increased dramatically since the dawn of the space age.