GEOG*2420

The Earth From Space

Colour Theory and Digital Imagery

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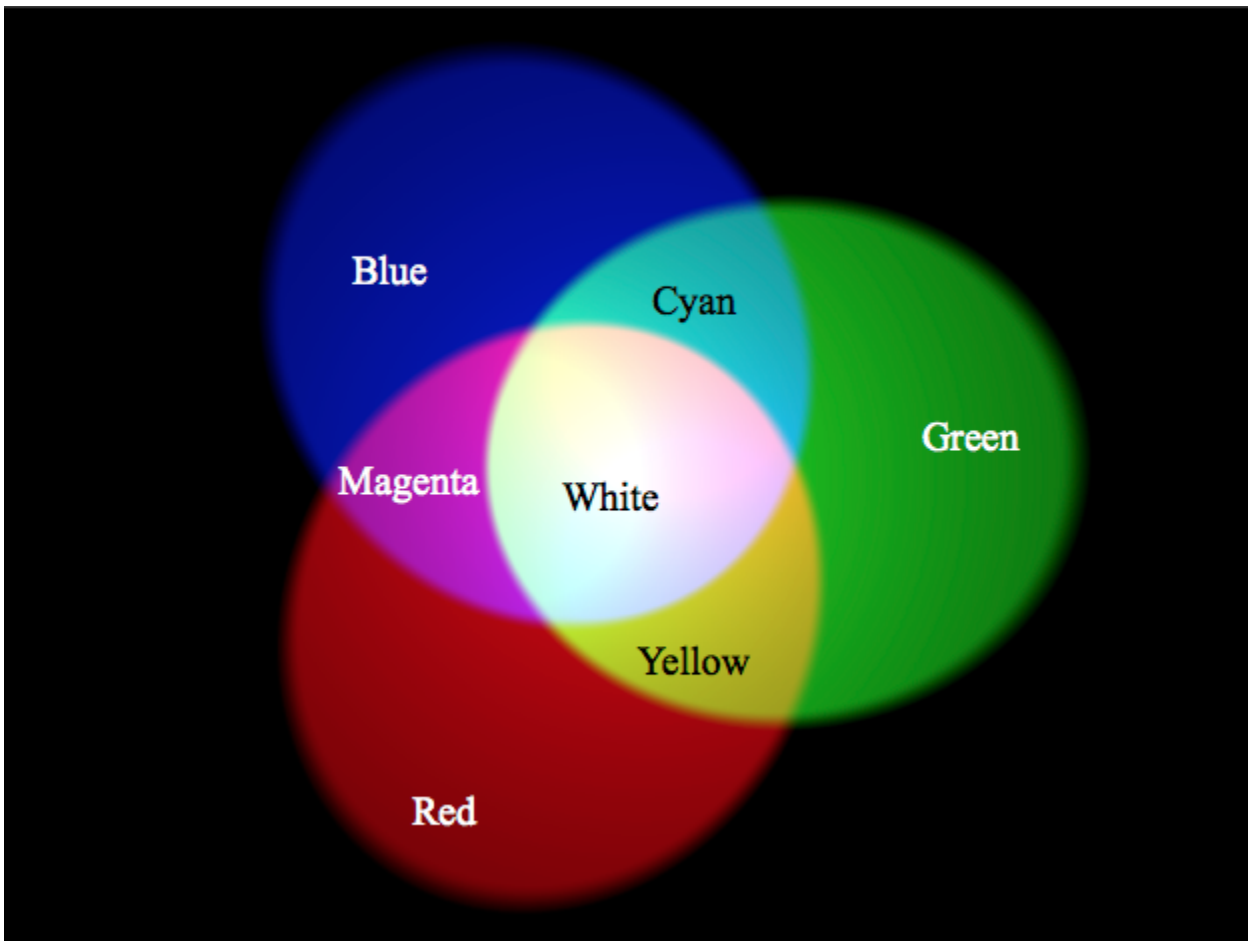
Readings

JR Jensen Chapter 4, pp. 104-106

The additive colour model (RGB)

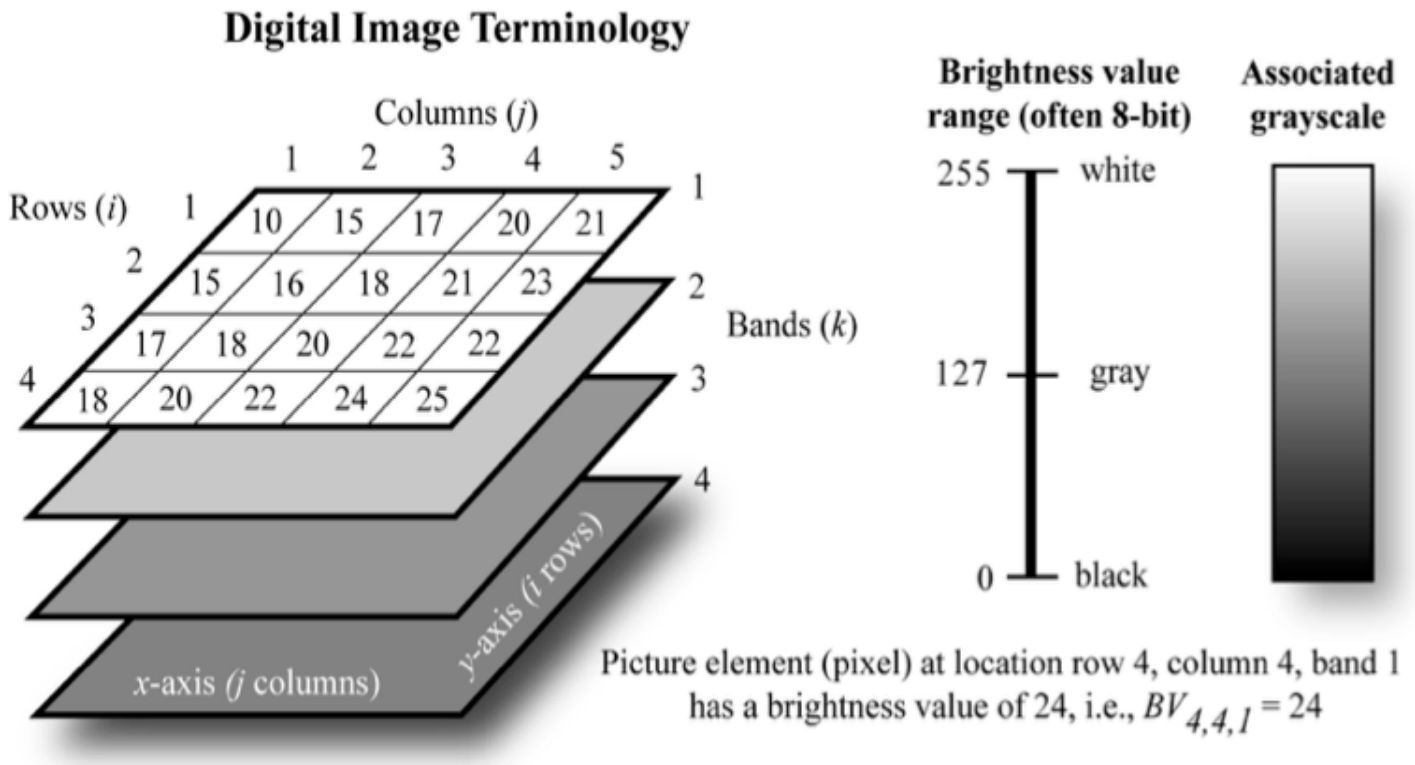


(source: unknown)

RGB colour and digital images

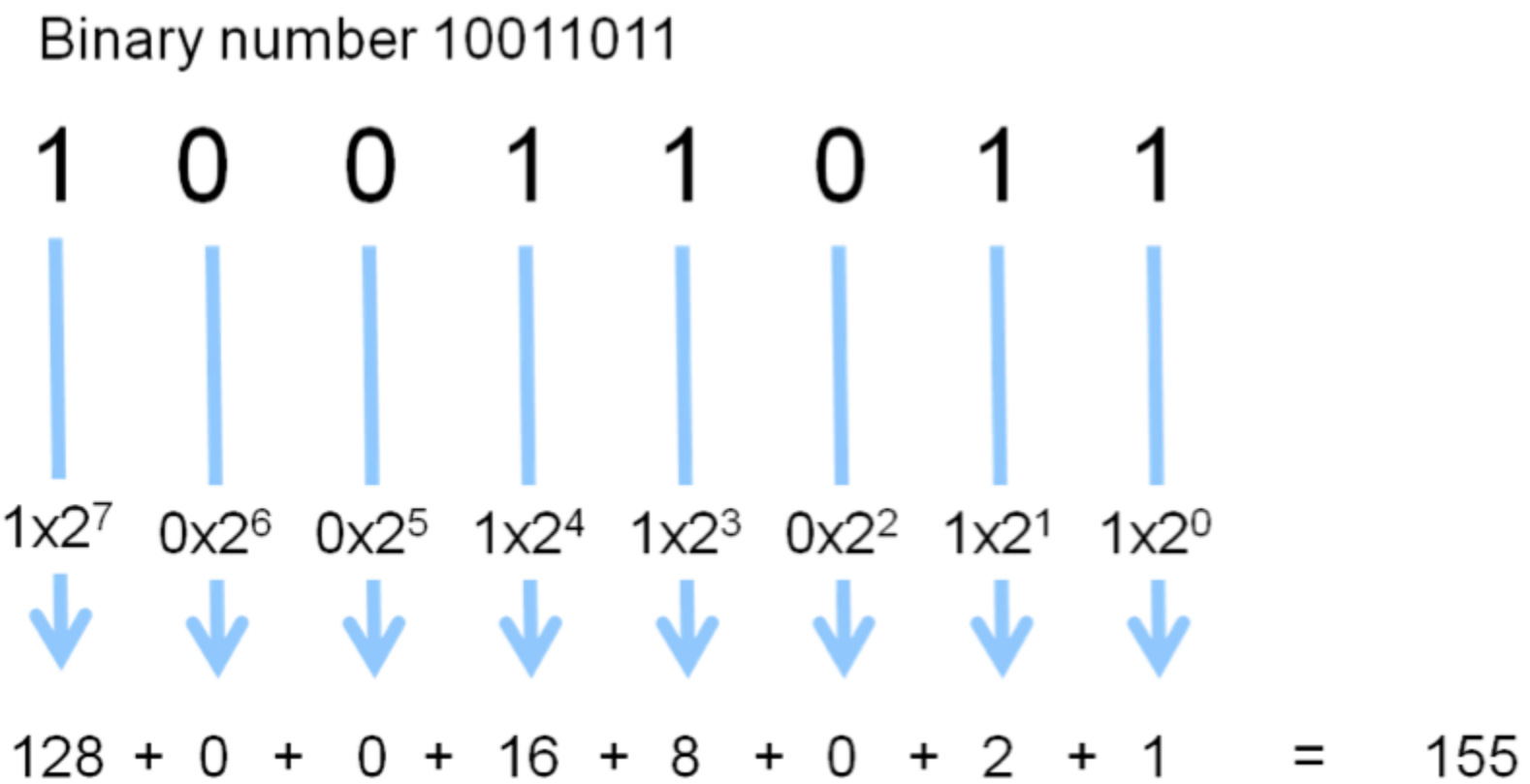
- The additive colour model is commonly used to display digital imagery.

RGB colour and digital images



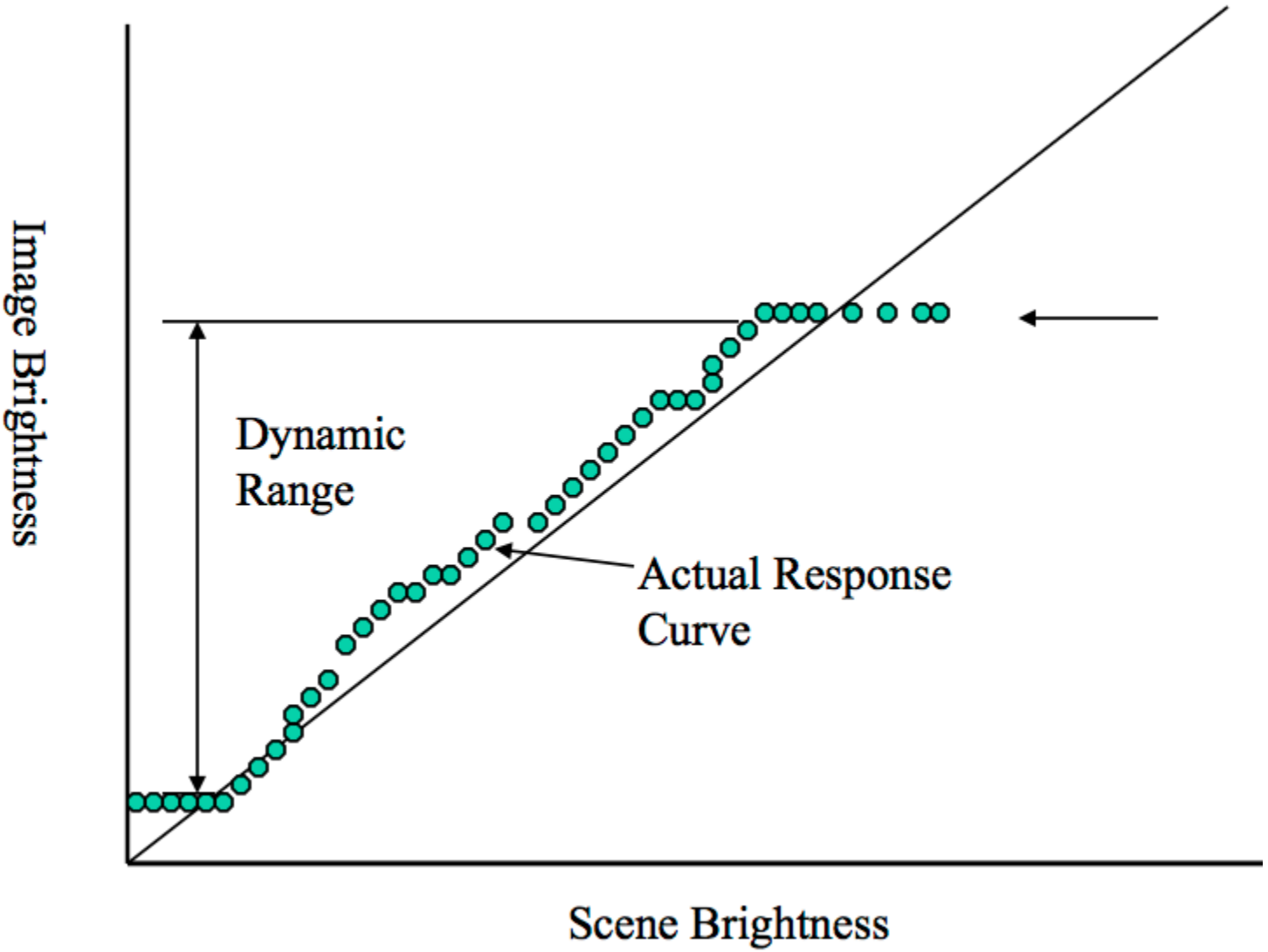
(source: Jensen, 2007)

RGB colour and digital images



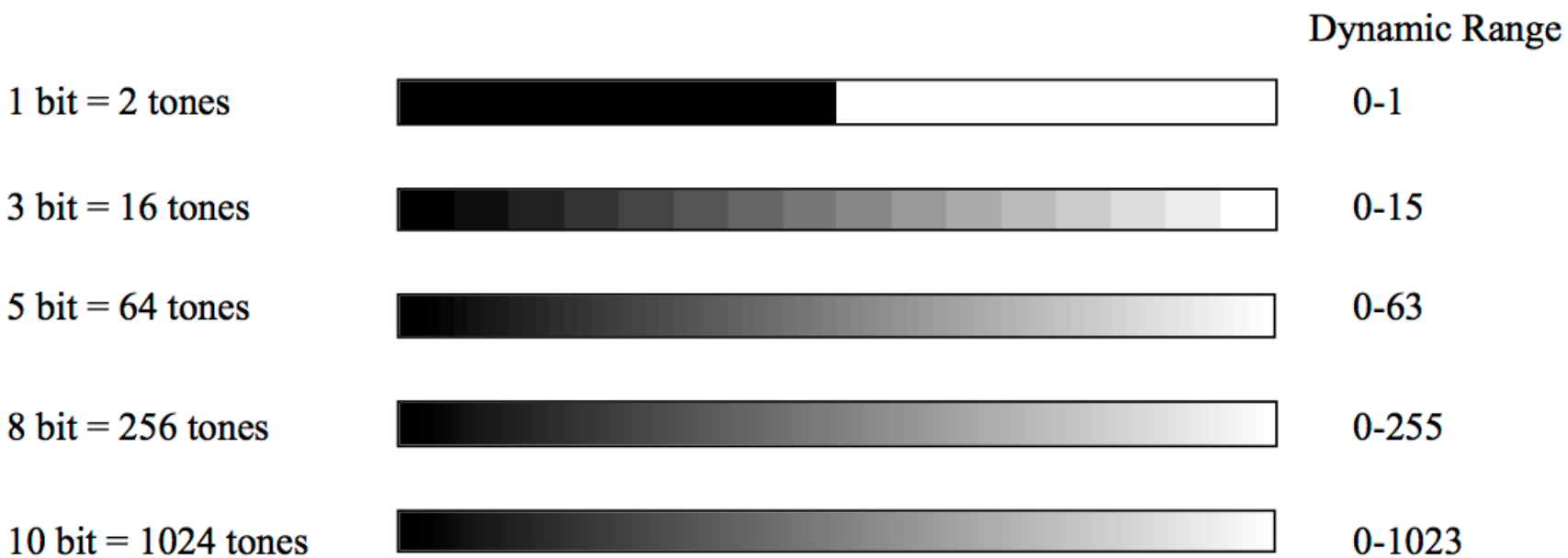
(source: Lindsay, 2013)

RGB colour and digital images



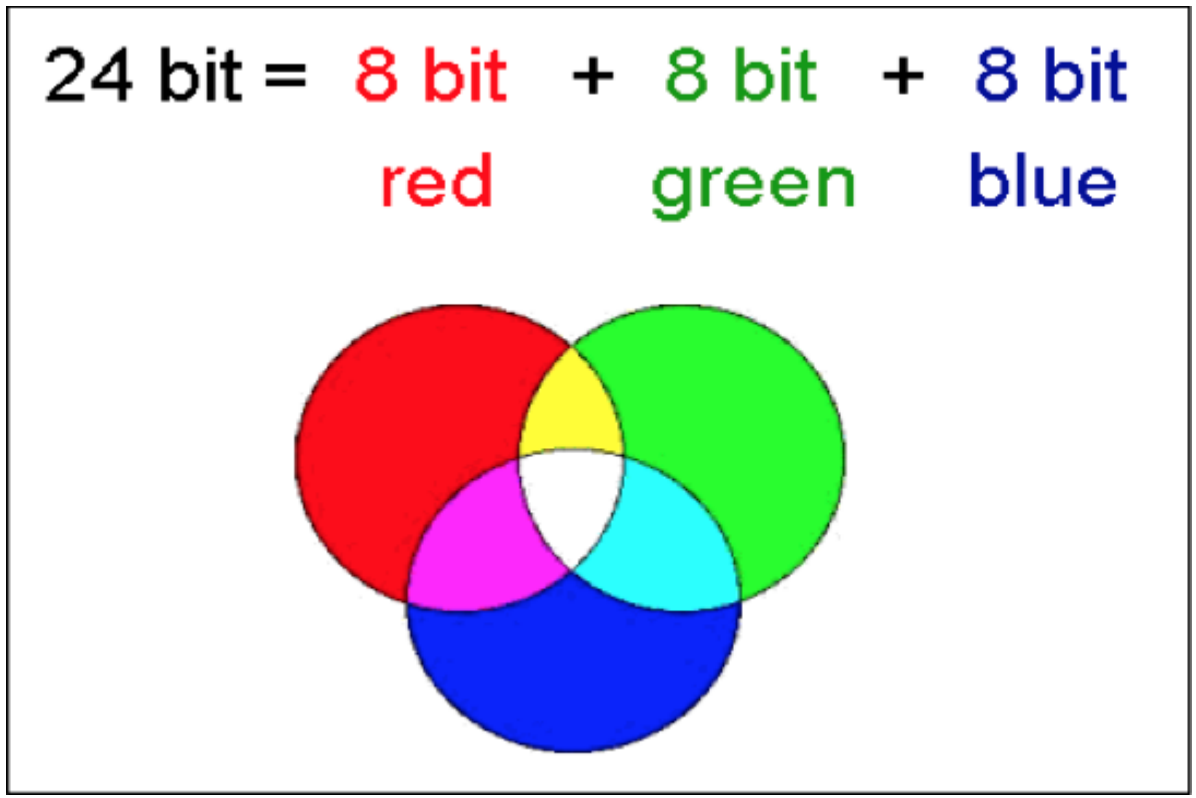
(source: unknown)

RGB colour and digital images



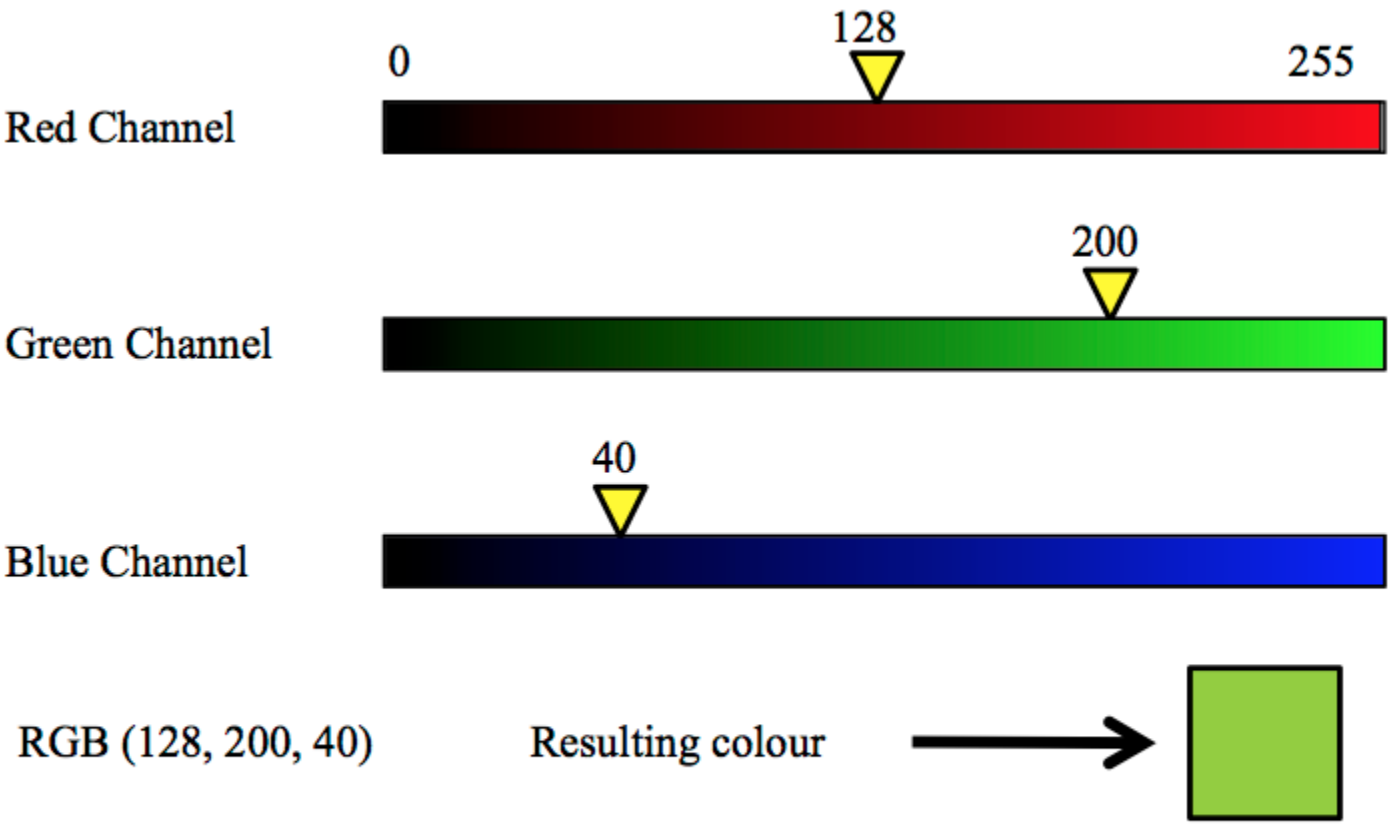
(source: Lindsay, 2013)

Additive colour model (RGB)



(source: unknown)

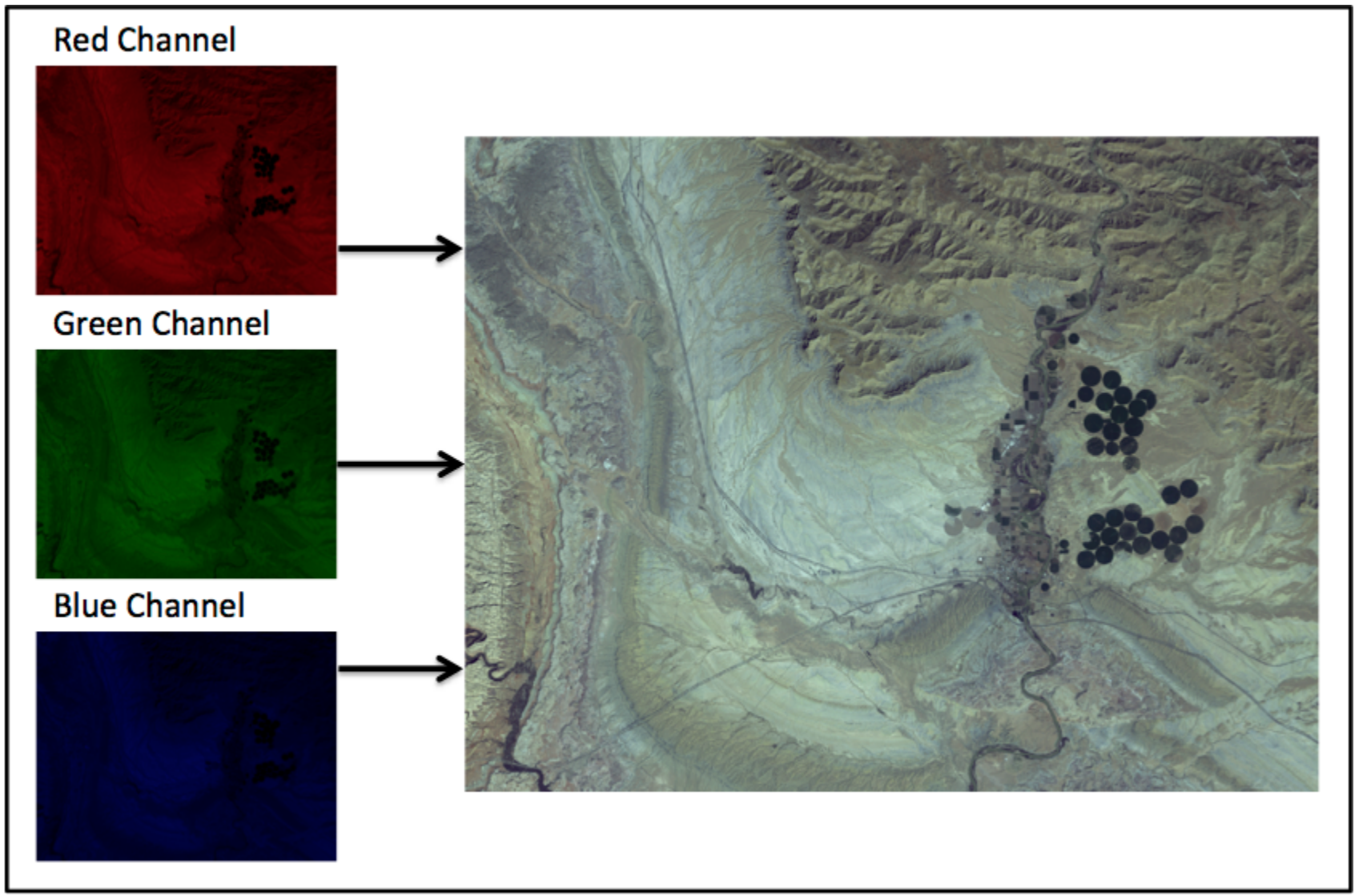
Additive colour model (RGB)



24-bit colour has 16.7 million unique colours

(source: Lindsay, 2013)

Digital Colour-composite images



(source: Lindsay, 2013)

Multispectral satellite data bands

Landsat 8 Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS) Launched February 11, 2013	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	10.60 - 11.19	100 * (30)
	Band 11 - Thermal Infrared (TIRS) 2	11.50 - 12.51	100 * (30)

(source: USGS, 2015)

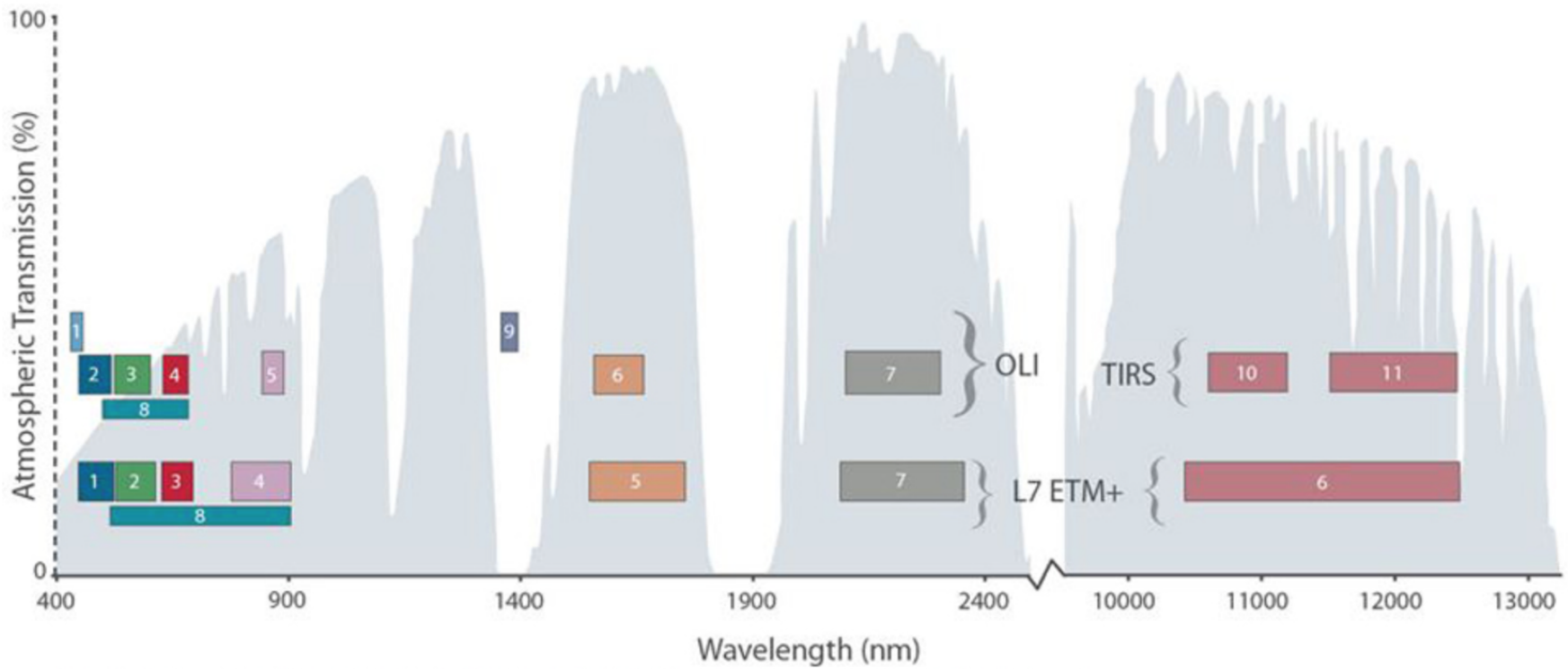
Multispectral satellite data bands

Common Landsat 8 band combinations

Natural Color	4 3 2
False Color (urban)	7 6 4
Color Infrared (vegetation)	5 4 3
Agriculture	6 5 2
Atmospheric Penetration	7 6 5
Healthy Vegetation	5 6 2
Land/Water	5 6 4
Natural With Atmospheric Removal	7 5 3
Shortwave Infrared	7 5 4
Vegetation Analysis	6 5 4

(source: Butler, 2013)

Multispectral satellite data bands

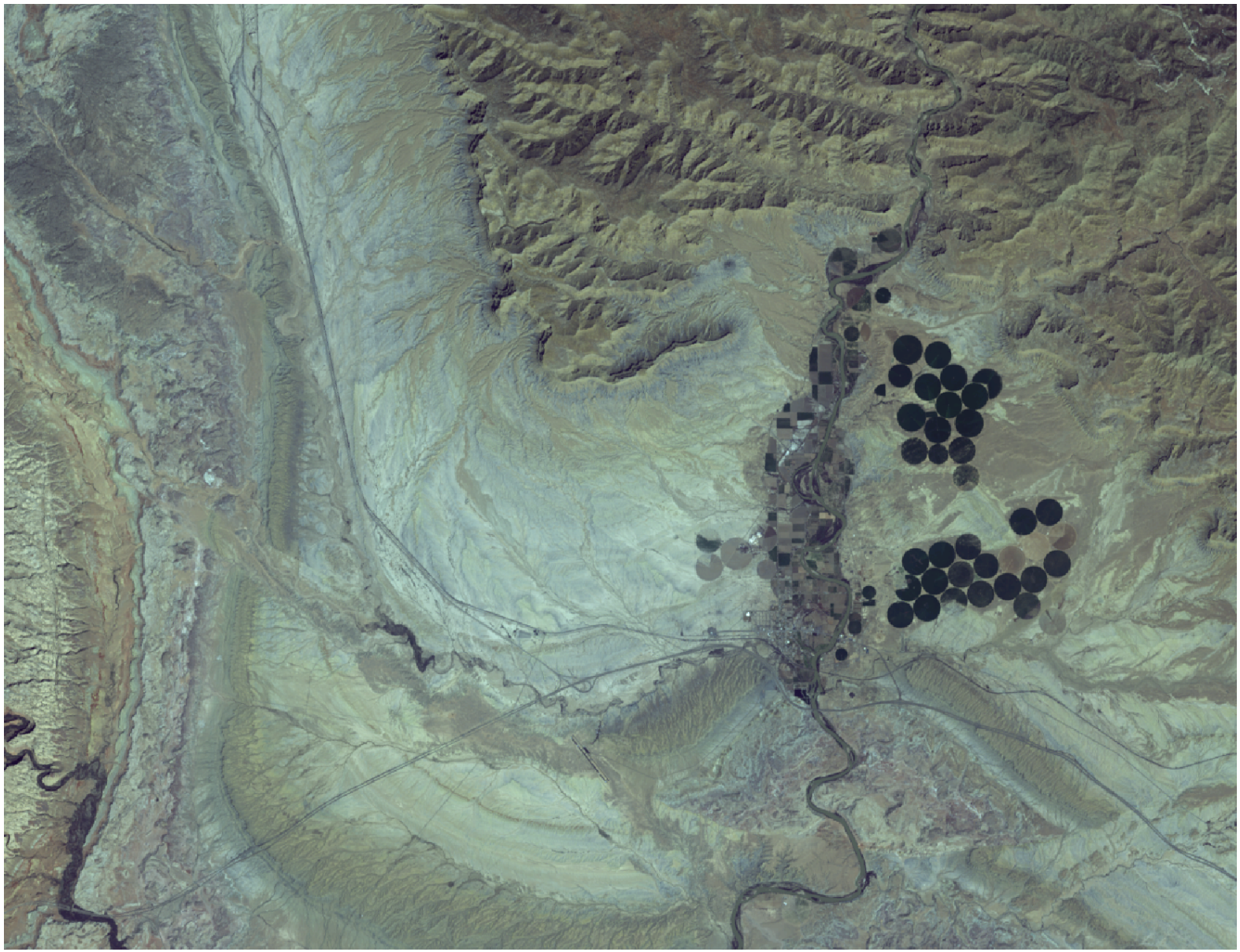


Bandpass wavelengths for Landsat 8 OLI and TIRS sensor, compared to Landsat 7 ETM+ sensor

Note: atmospheric transmission values for this graphic were calculated using MODTRAN for a summertime mid-latitude hazy atmosphere (circa 5 km visibility).

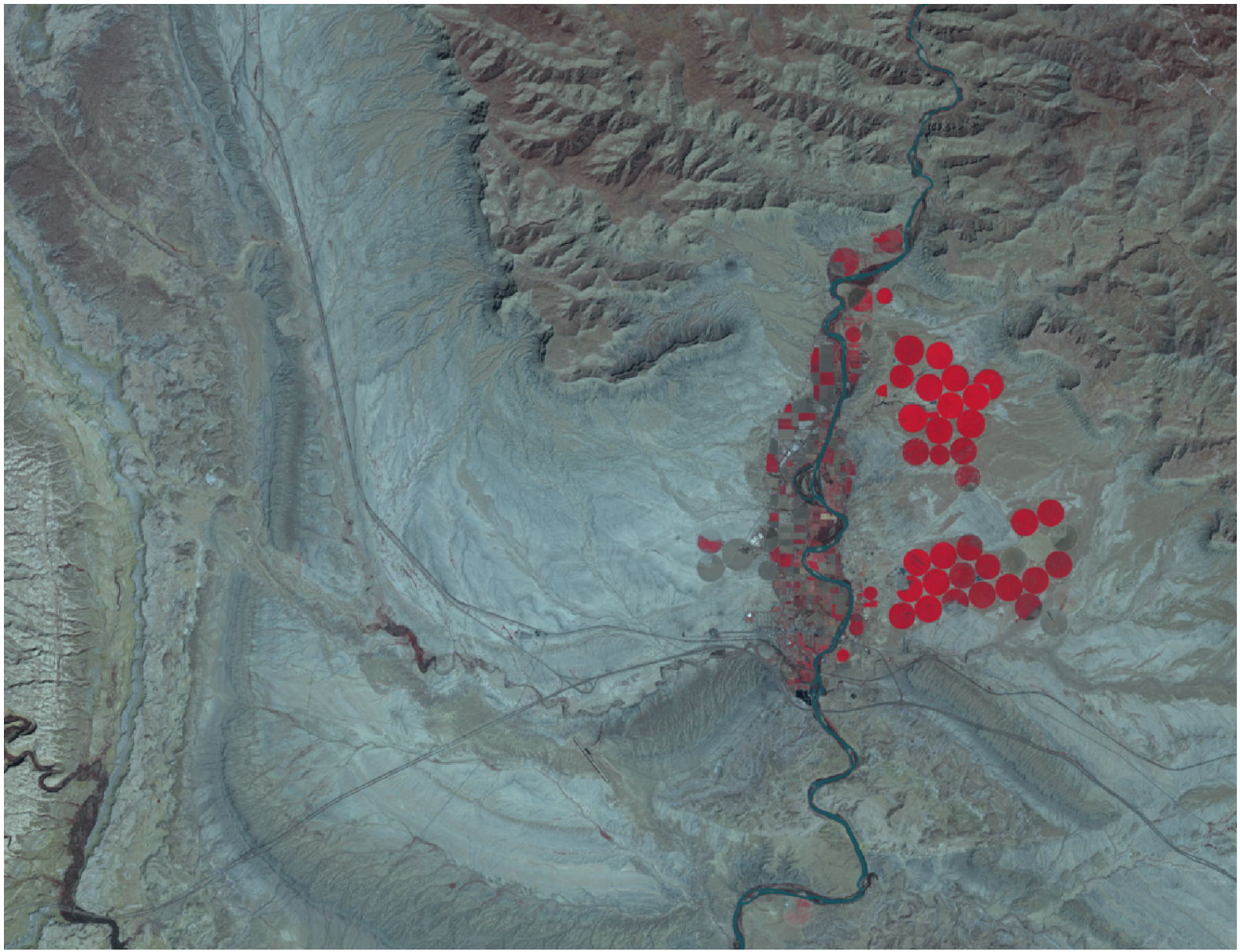
(source: USGS, 2015)

Natural colour (Landsat-8 RGB-432)



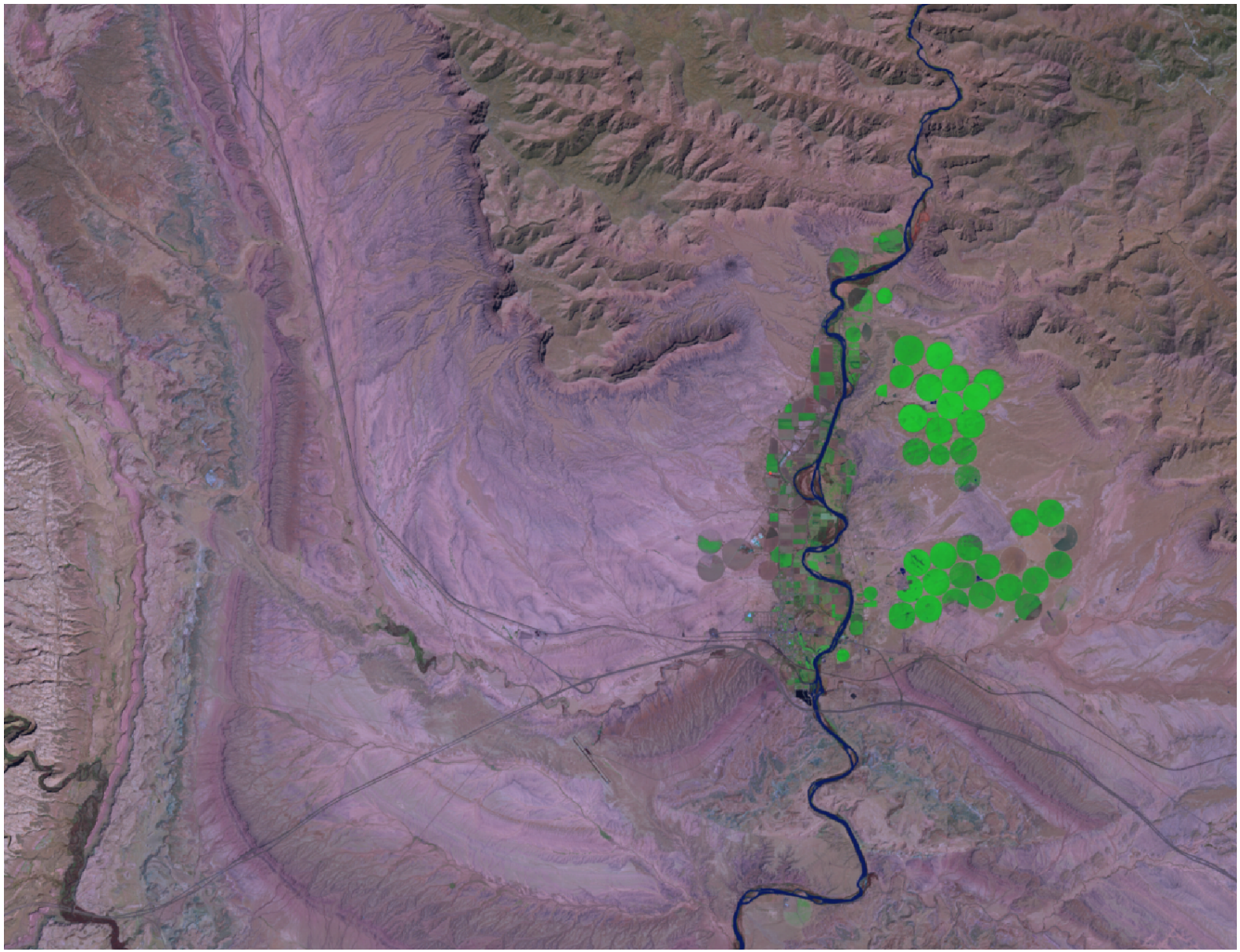
(source: Lindsay, 2013)

False-colour Infrared (Landsat-8 RGB-543)



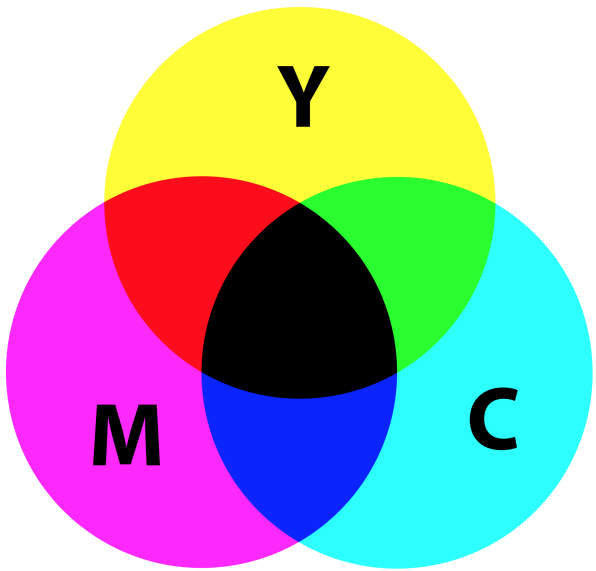
(source: Lindsay, 2013)

False-colour (Landsat-8 RGB-753)

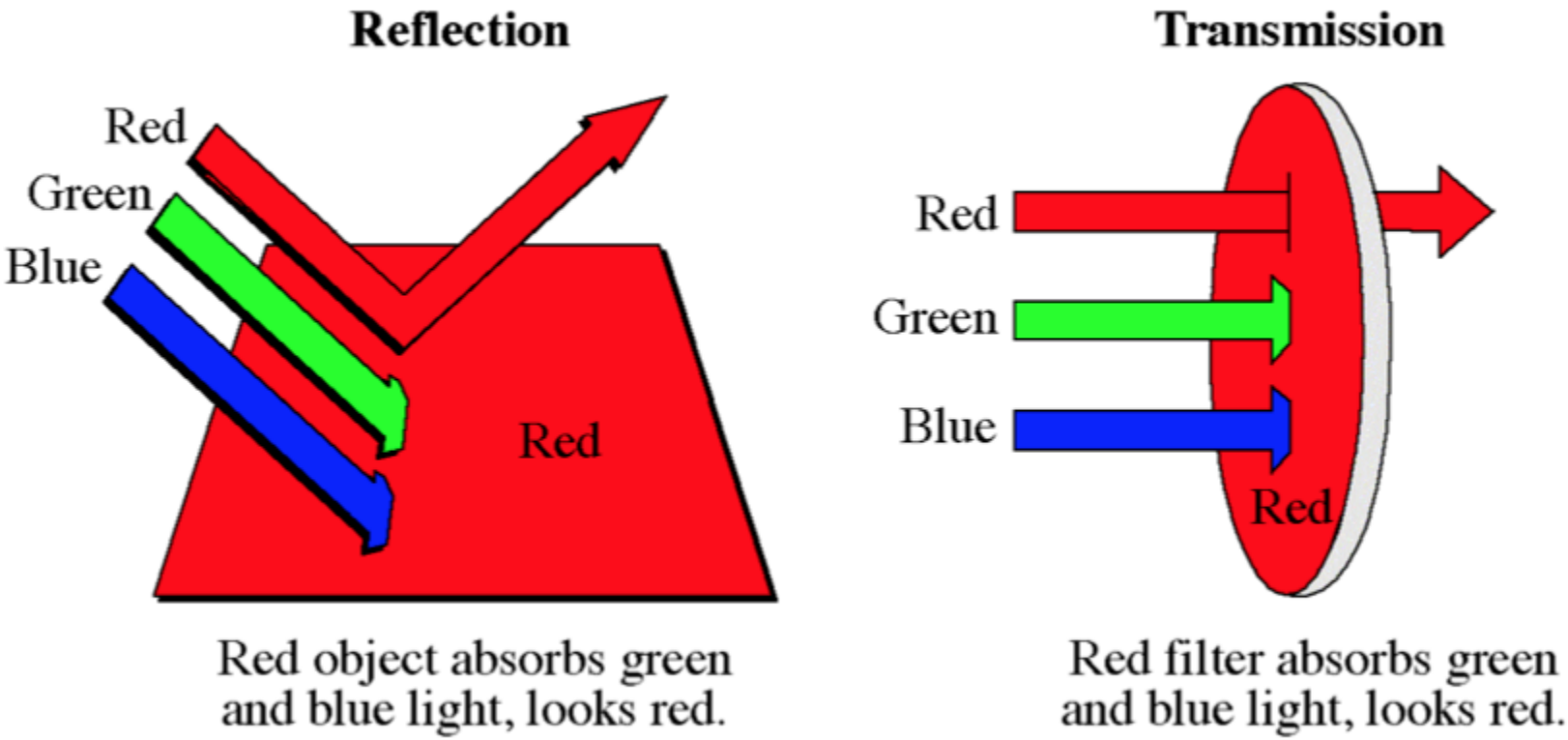


(source: Lindsay, 2013)

Subtractive colour model (CMYK)



Subtractive colour model (CMYK)



(source: Jensen, 2007)

Subtractive colour model (CMYK)

(source: http://www.aoe.com.au/filters.html)

Subtractive colour model (CMYK)

Perceived Colour	Colour Absorbed
Red	Blue and Green
Green	Red and Blue
Blue	Red and Green
Magenta (R + B)	Green
Cyan (B + G)	Red
Yellow (R + G)	Blue
White (R + G + B)	None
Gray	Equal percentages of RGB
Black	Red, Green and Blue

(source: Lindsay, 2013)