

RECLAMATION *Managing Water in the West*



Estimating Unmetered Irrigation Demand with High Resolution Remote Sensing Data

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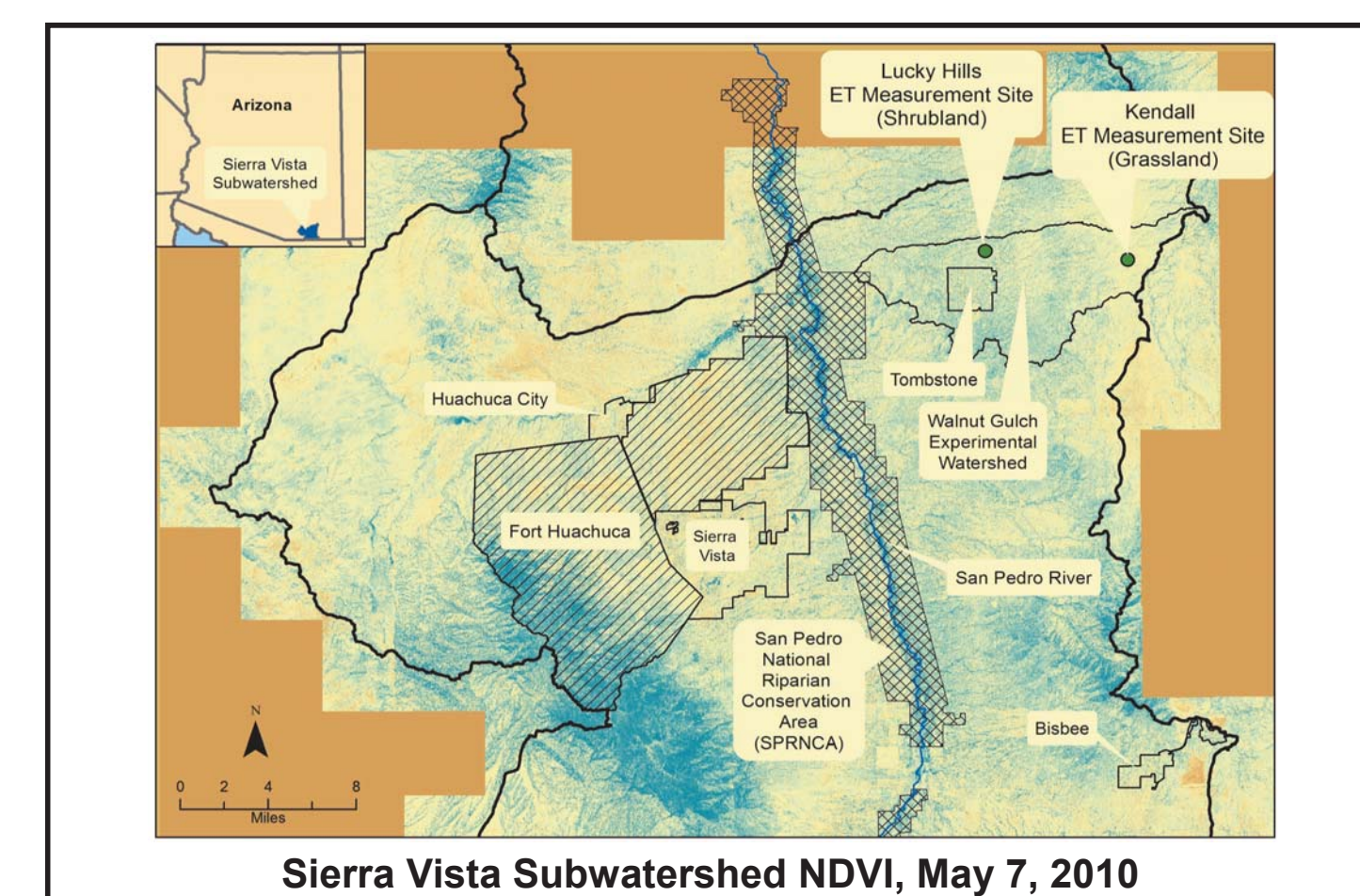
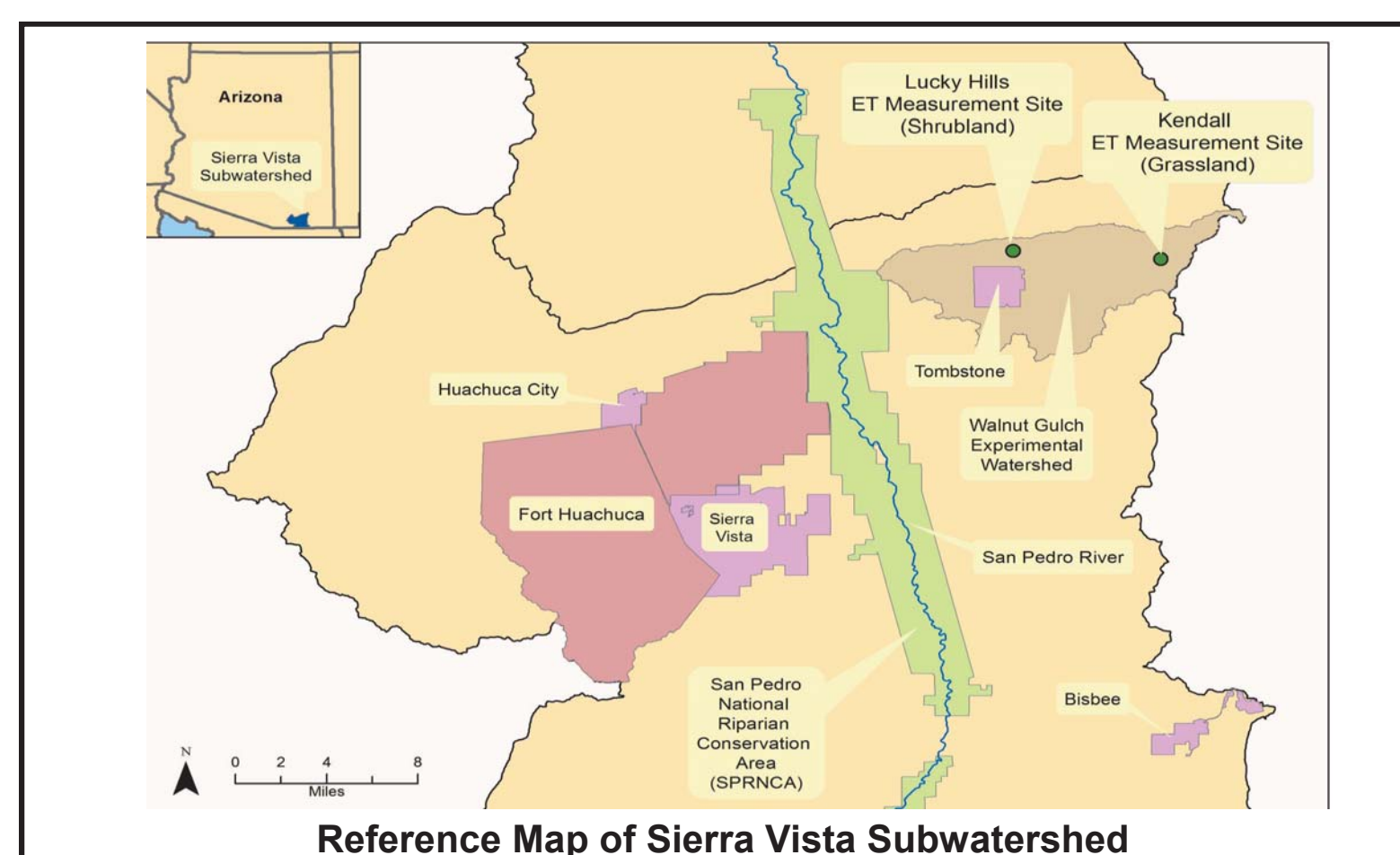
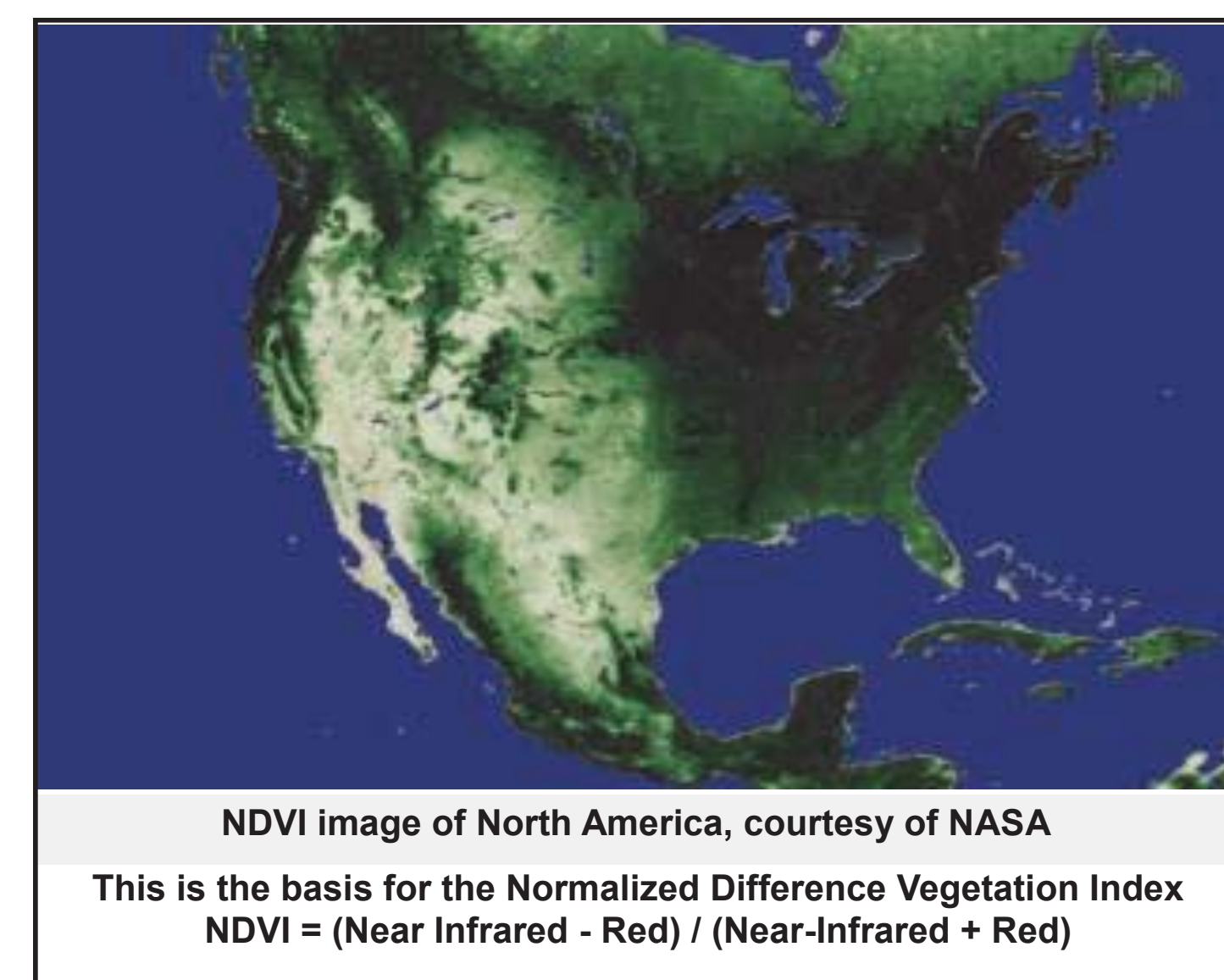
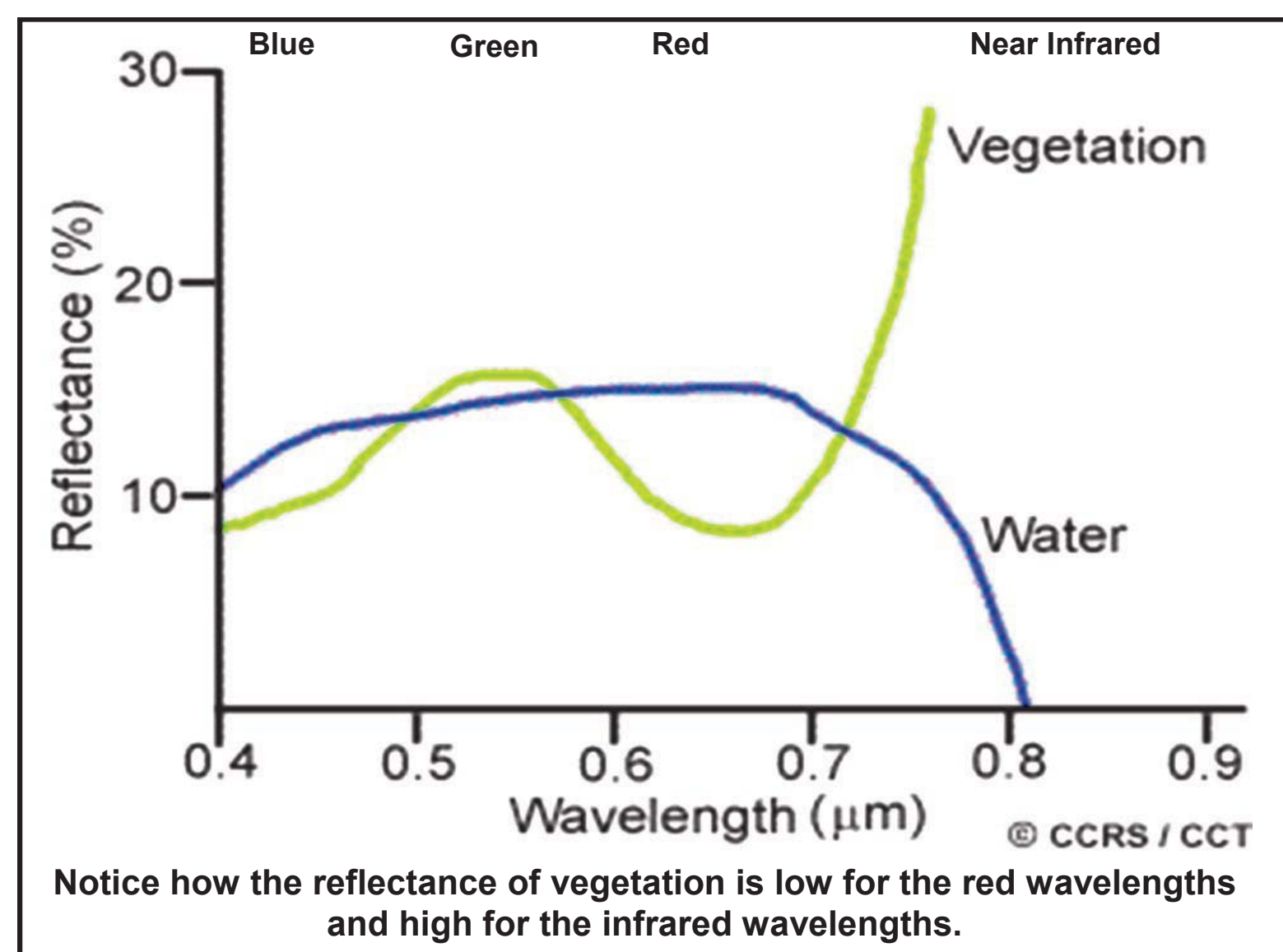
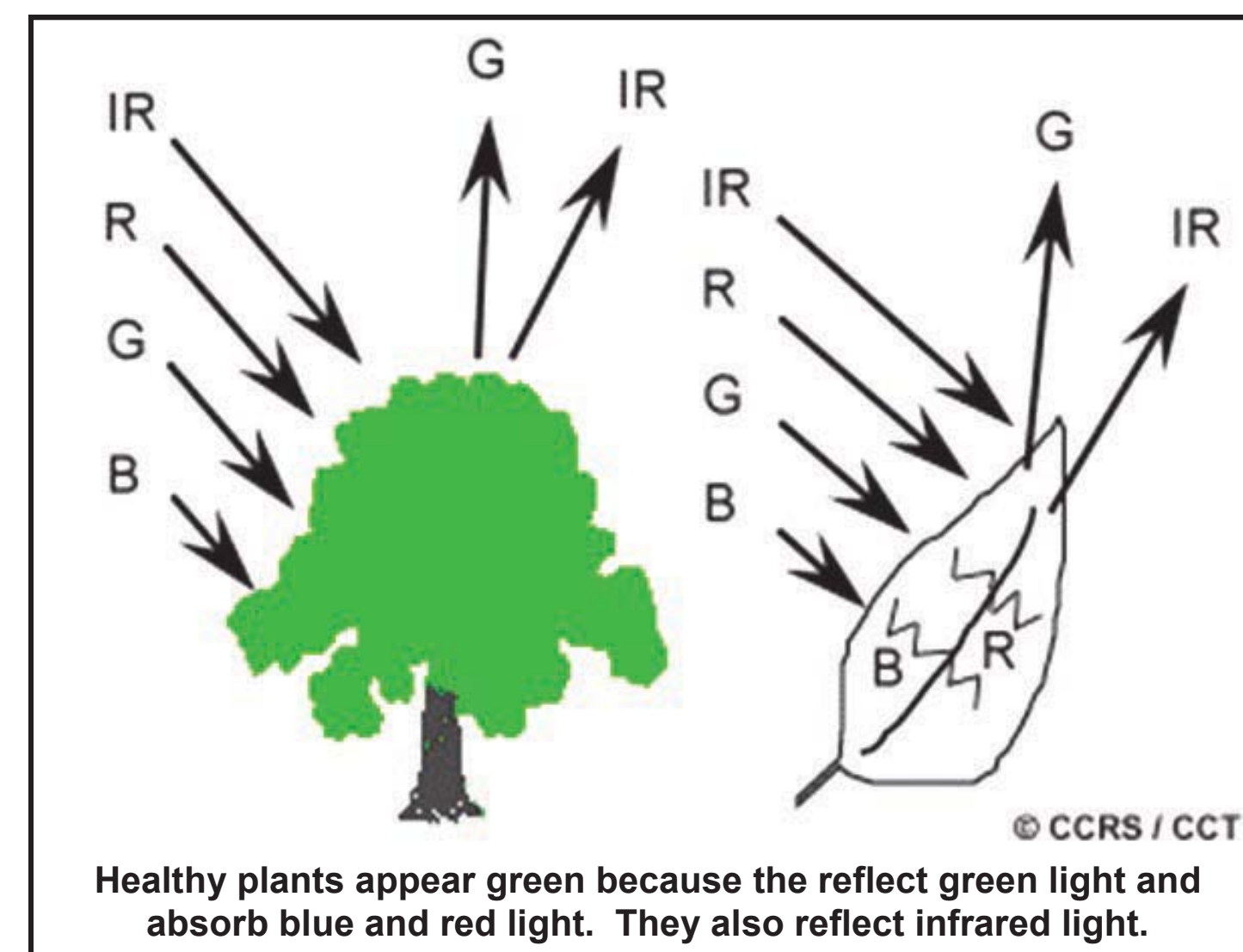
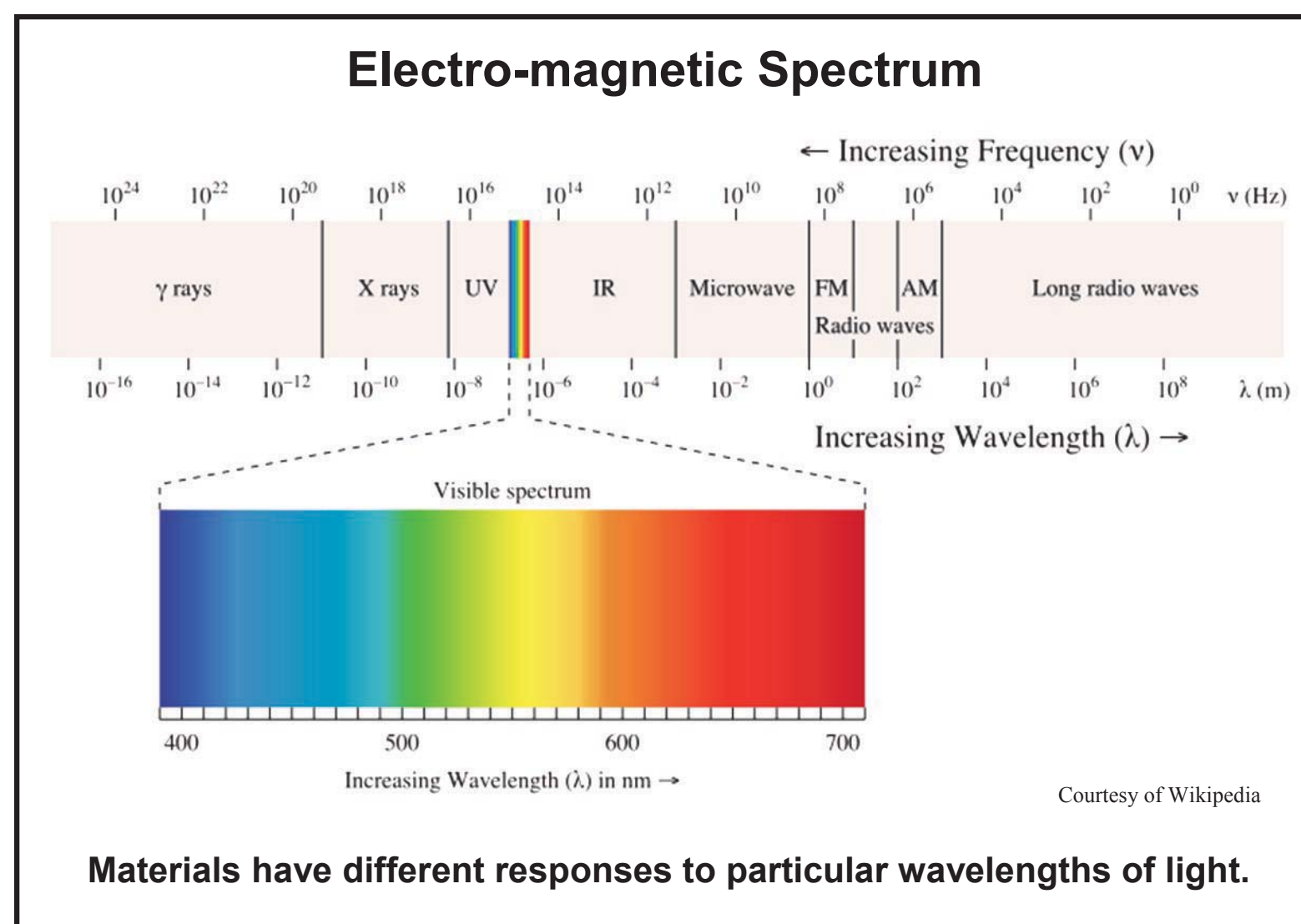
Motivations:

- Irrigation by unmetered wells is a significant part of many water budgets in semi-rural areas.
- Uncertainty about this component of the water budget makes it difficult to estimate current and future water needs.
- We use high-resolution remote sensing data and local evapotranspiration data to directly estimate the area irrigated by unmetered wells.

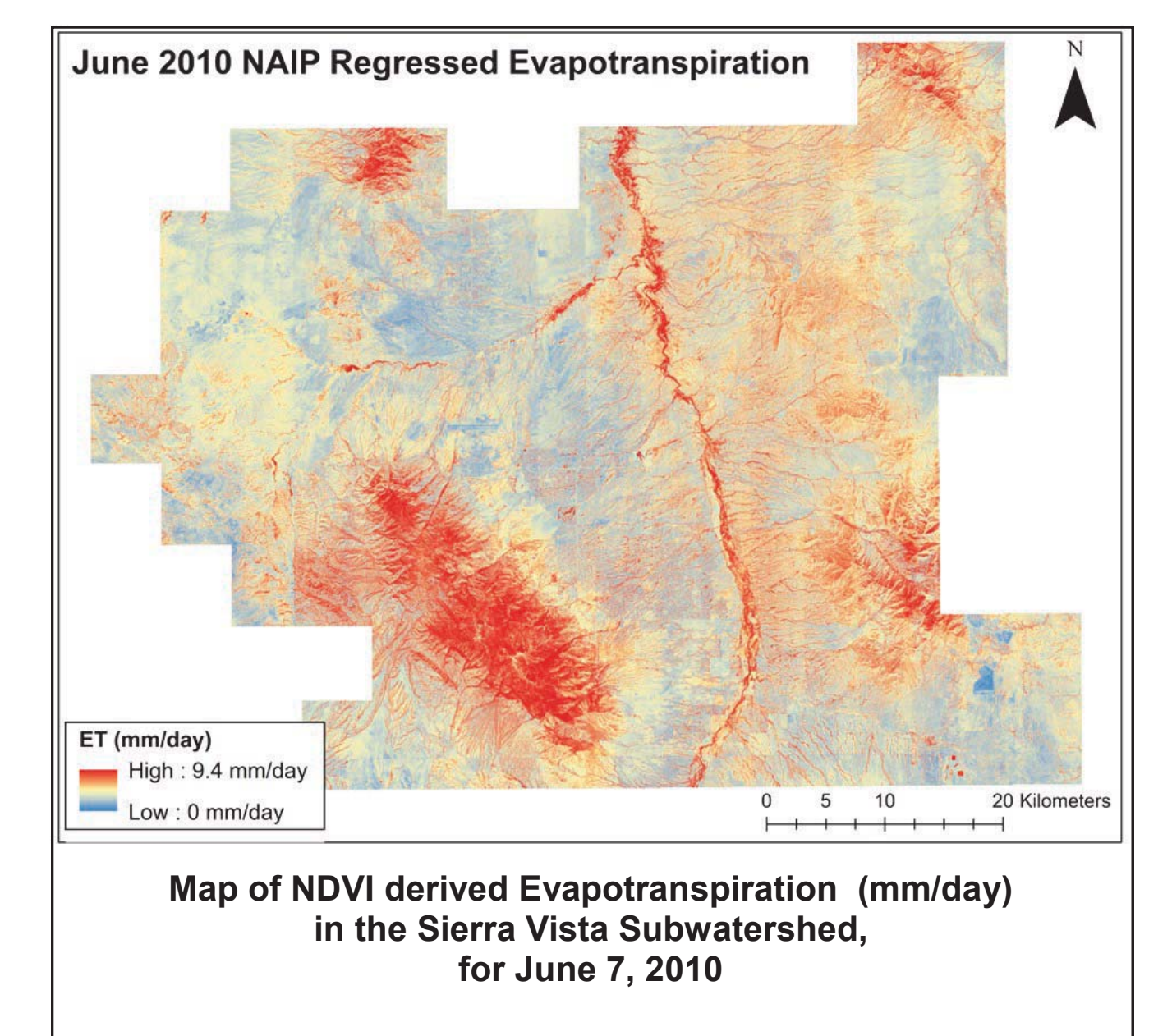
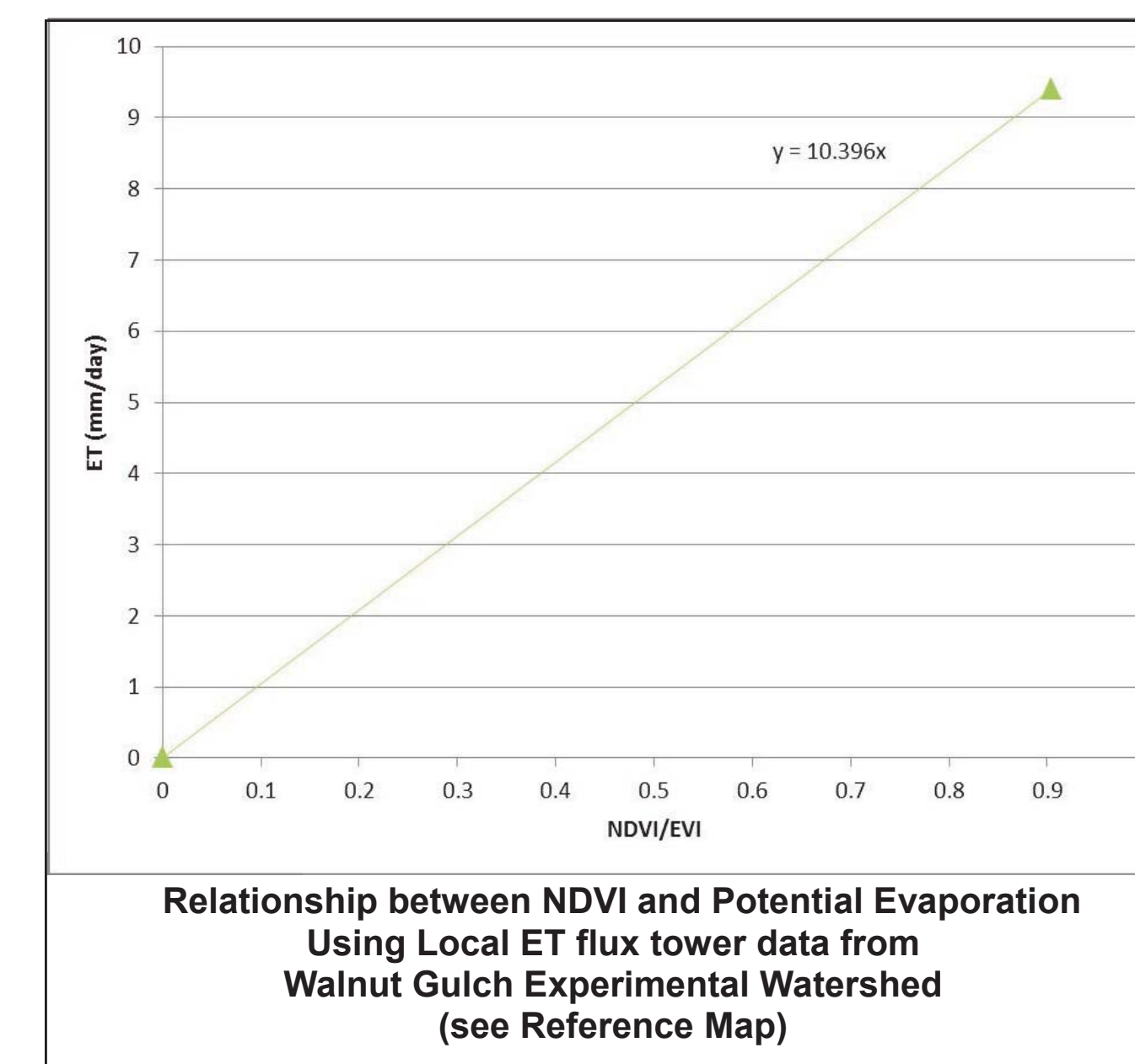
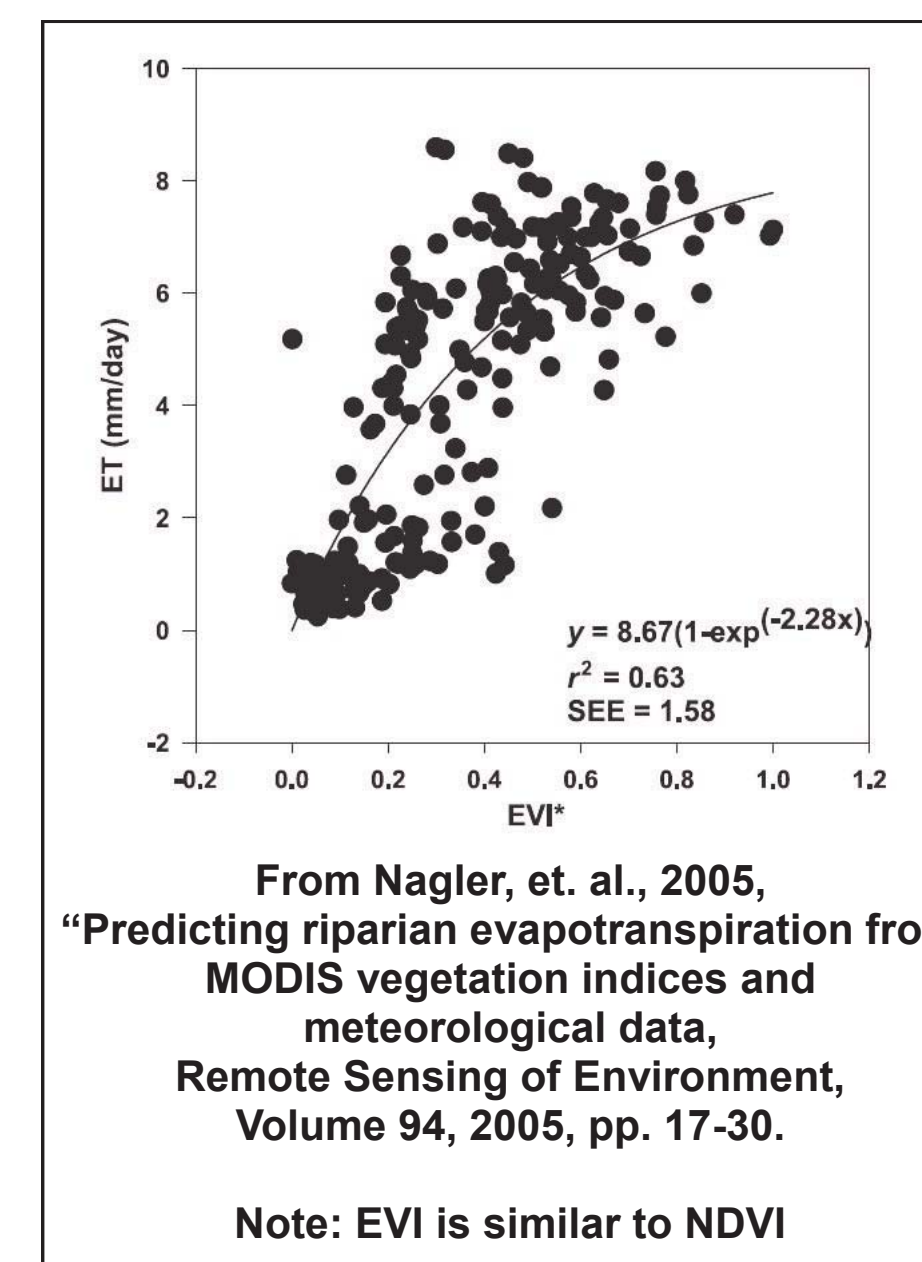
Data Sets:

- 1) Four band (blue, green, red, infrared) aerial photography from USDA National Agricultural Imagery Program, acquired May, 2010.
- 2) Evapotranspiration measurements of several vegetation types from flux towers.
- 3) NDVI satellite images from MODIS (Moderate Resolution Imaging Spectrometer), produced every two weeks.
- 4) GIS data on unmetered well locations, water service provider areas and streams, from AZ Dept of Water Resources and USGS

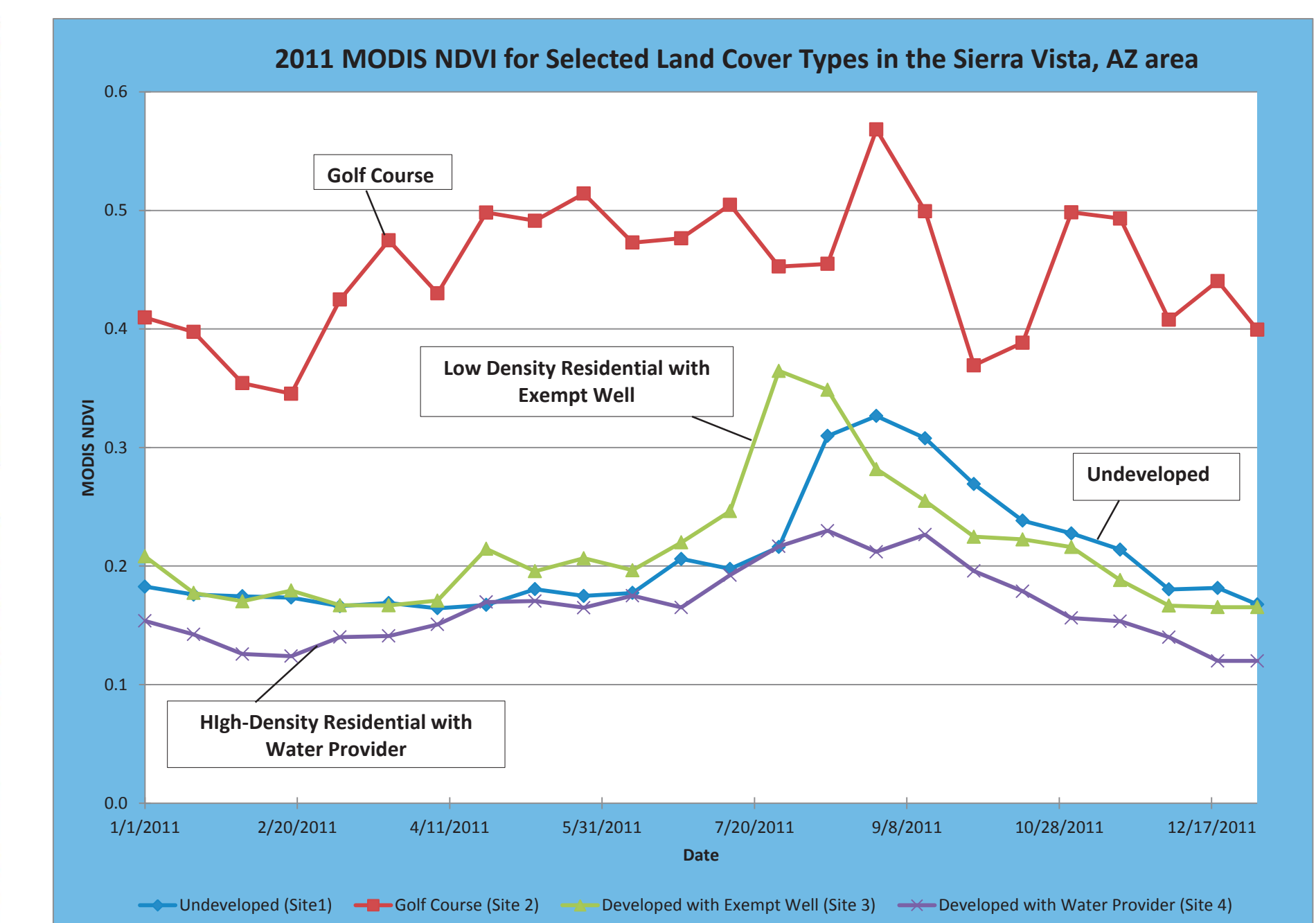
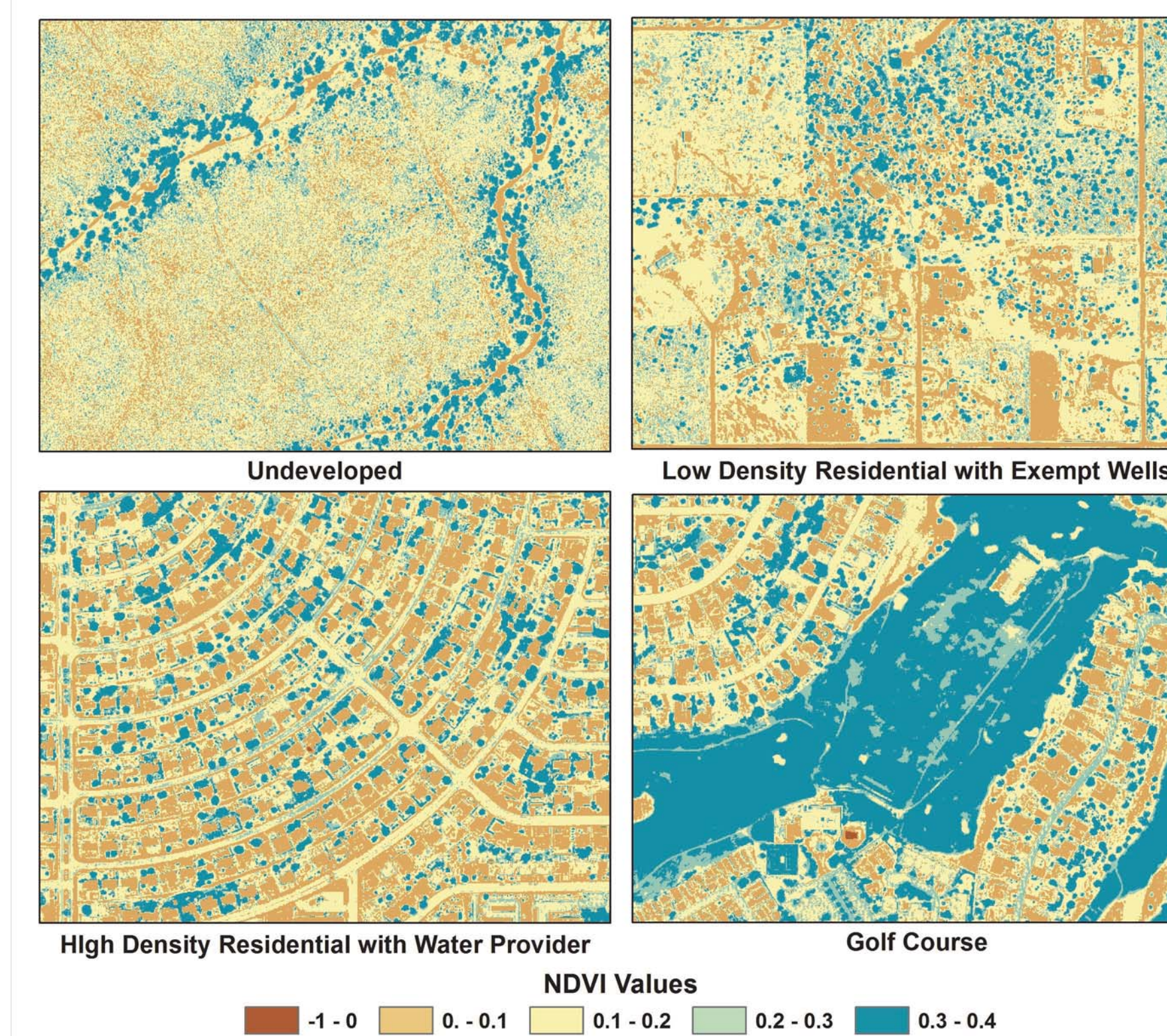
Step 1— Calculate Vegetation Index (NDVI) from NAIP 1 meter resolution Orthophotography (acquired about once every three years)



Step 2 - Convert from NDVI to Evapotranspiration using local ET measurements and other research results



Step 3 - Use MODIS (Moderate Resolution Imaging Spectrometer) 250 m NDVI product, acquired every 16 days, to estimate annual ET.



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