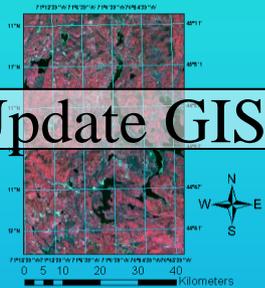


# Terrestrial Remote Sensing The Earth from Above

Leslie Morrissey  
RSENr/UVM

# Advantages of Remote Sensing

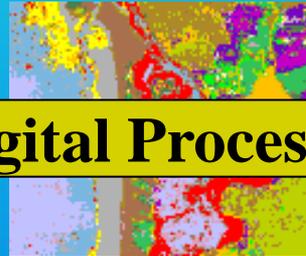
Update GIS



Global Coverage



Digital Processing



Multitemporal



Multispectral



# Information Differs by Wavelength



**BLUE**



**GREEN**



**RED**



**NEAR IR**



**MID-IR**



**MID-IR**

# Multispectral Imagery

Panchromatic



Natural Color



Color Infrared  
(CIR)



# Multitemporal Analysis

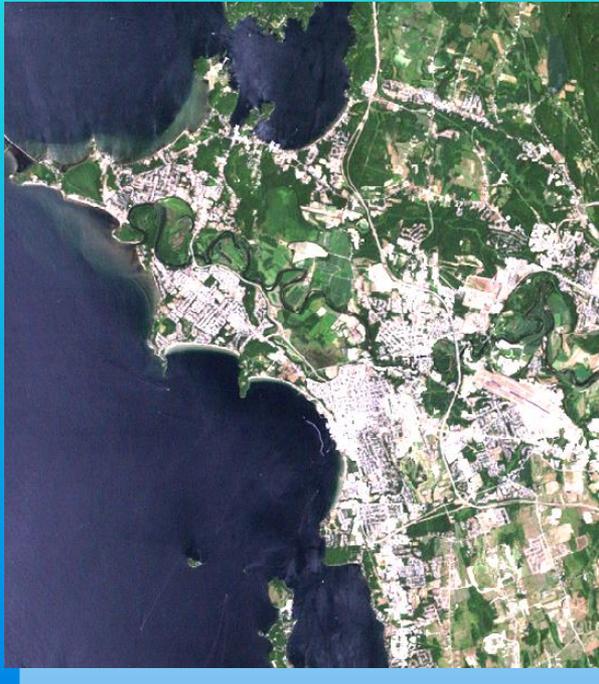


April



August

# Different Band Combinations



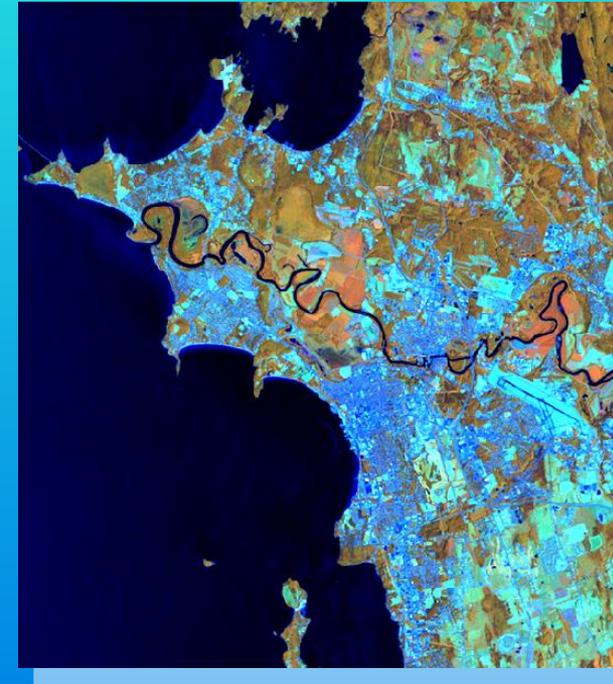
Natural Color

B, G, R



Color Infrared (CIR)

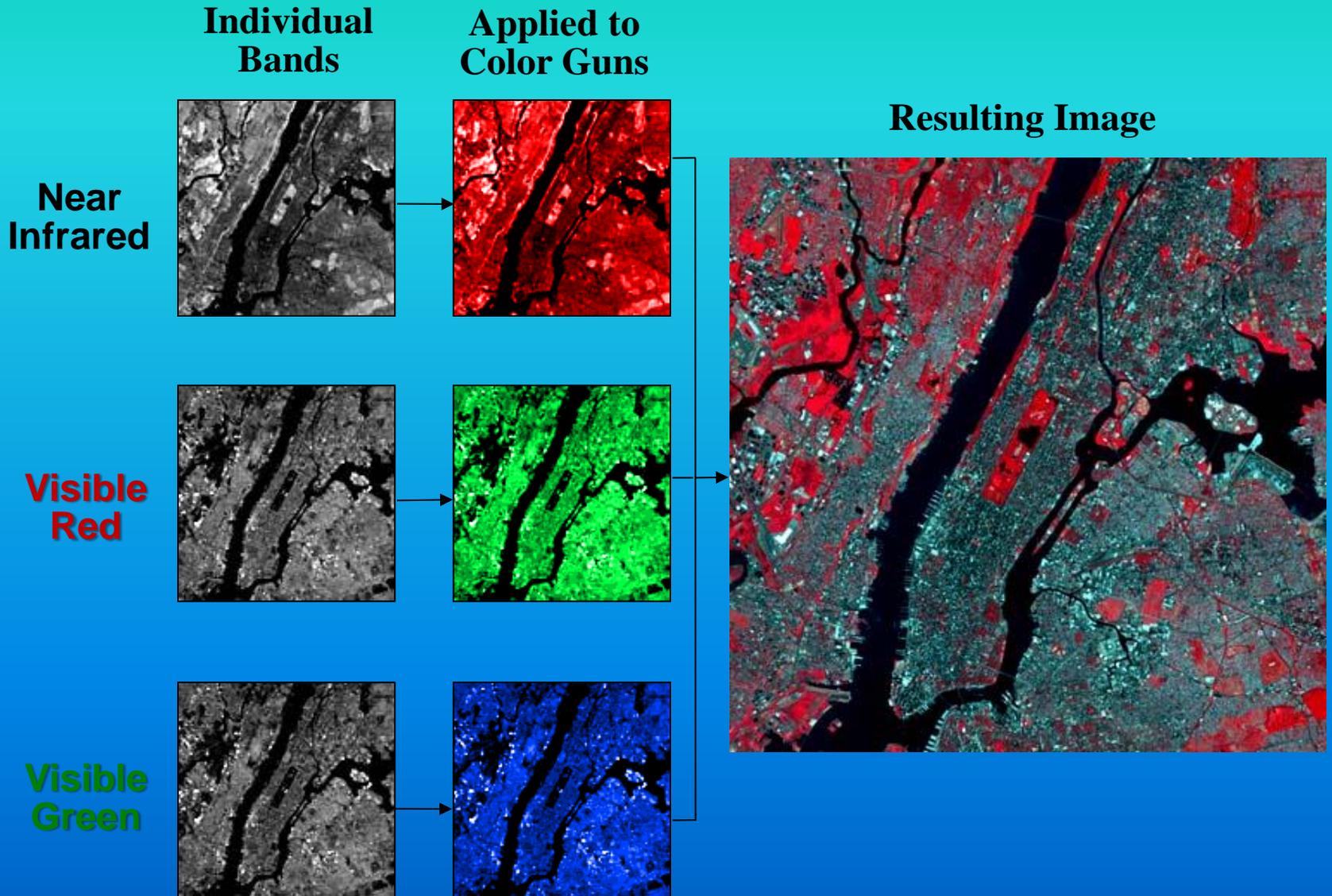
G, R, NIR



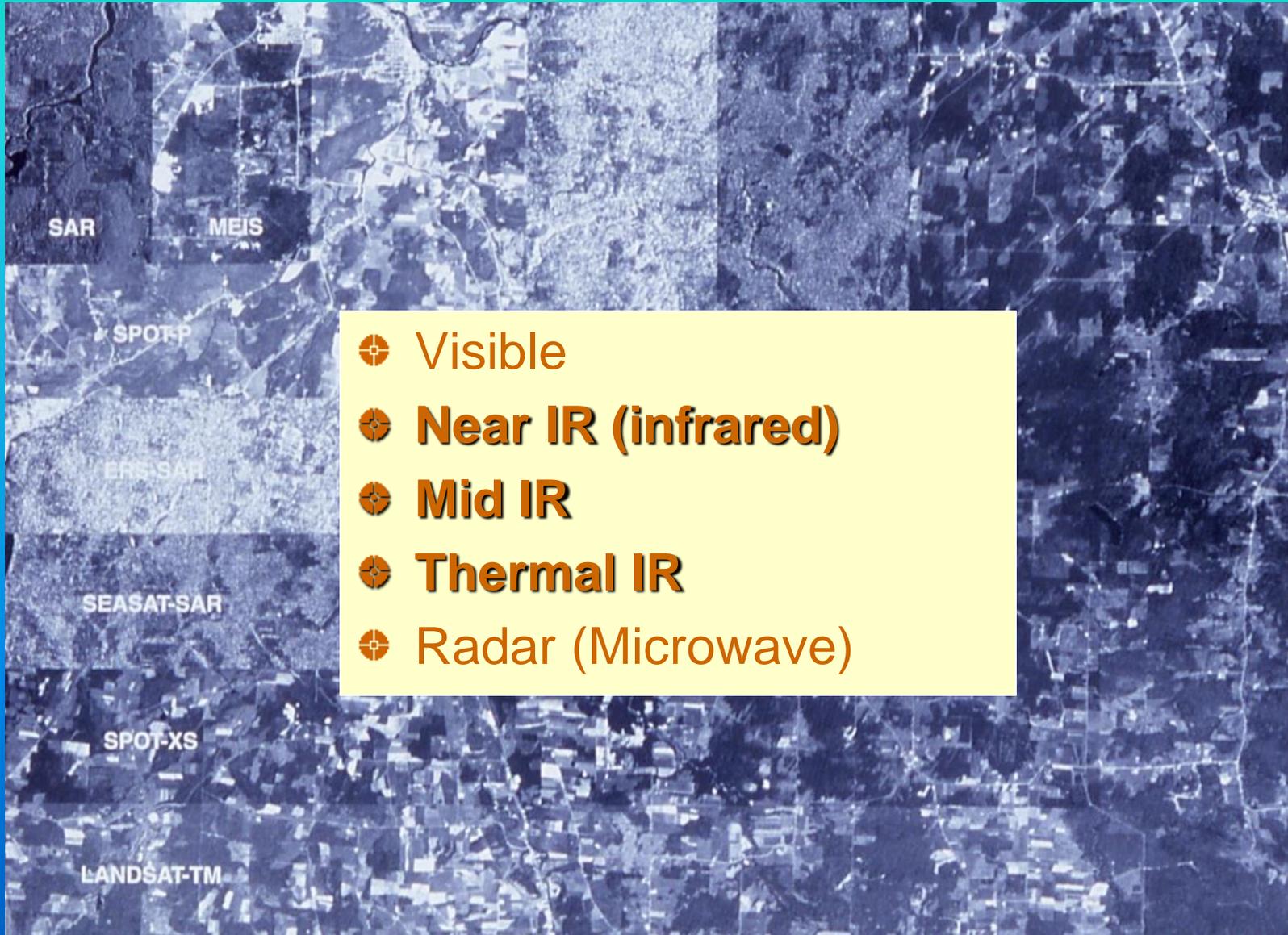
Soil Composite

G, R, Mid IR

# Color Infrared (CIR)



# Key Regions of the EMS



- ⊕ Visible
- ⊕ **Near IR (infrared)**
- ⊕ **Mid IR**
- ⊕ **Thermal IR**
- ⊕ Radar (Microwave)

# Near Infrared (NIR)

- Sensitive to green vegetation

water/land interface

- B & W - single band →
  - healthy veg >> bright

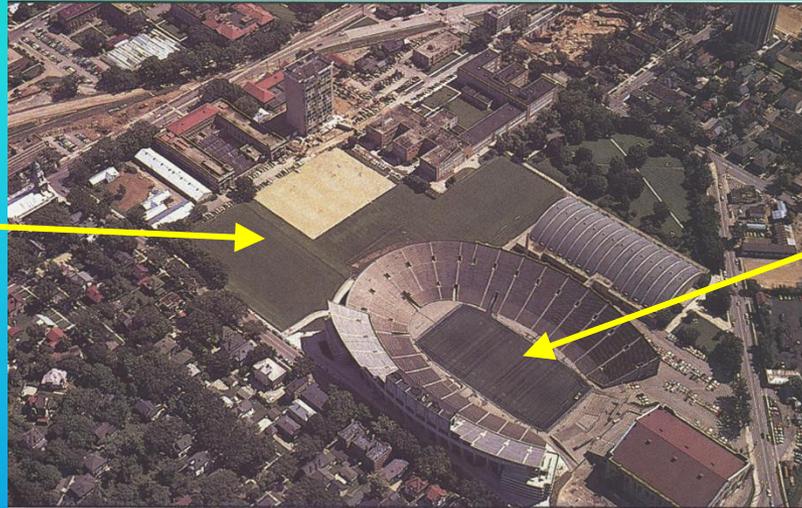
- Color infrared (CIR) ←
  - healthy vegetation >> red

- Applications
  - crop disease/pests
  - health, productivity
  - vegetation mapping

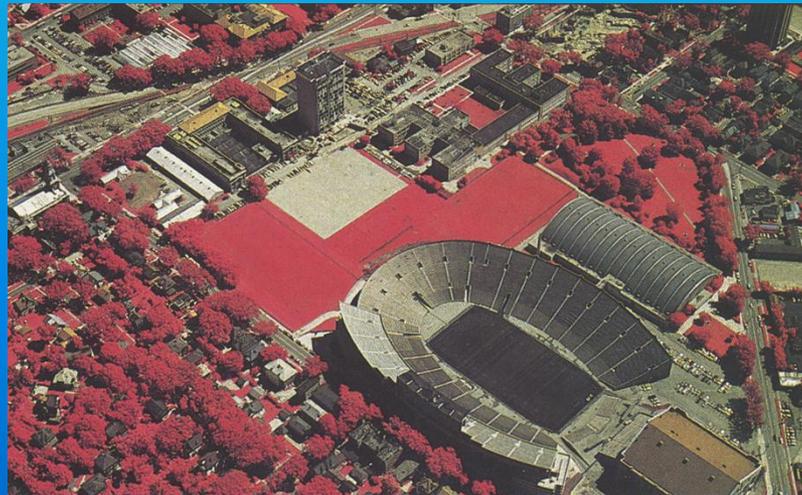


# Artificial Turf?

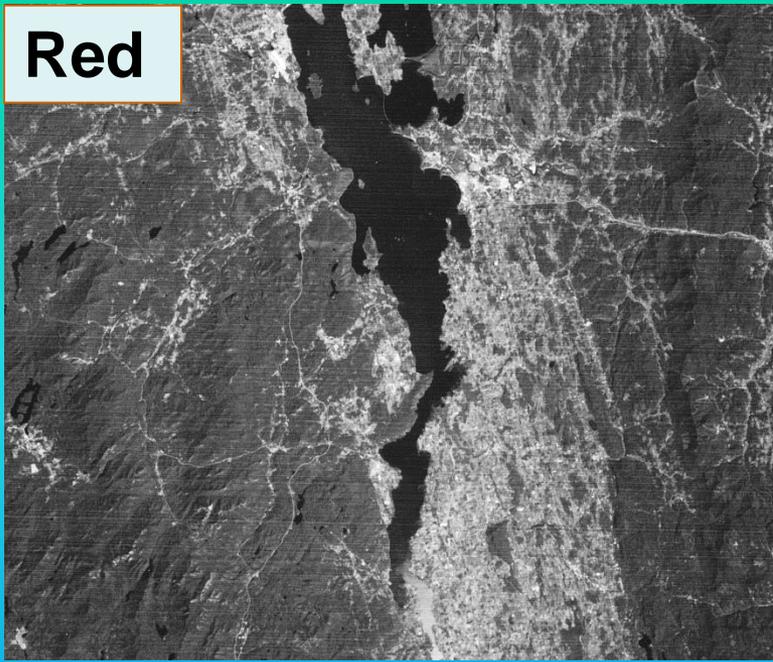
grass



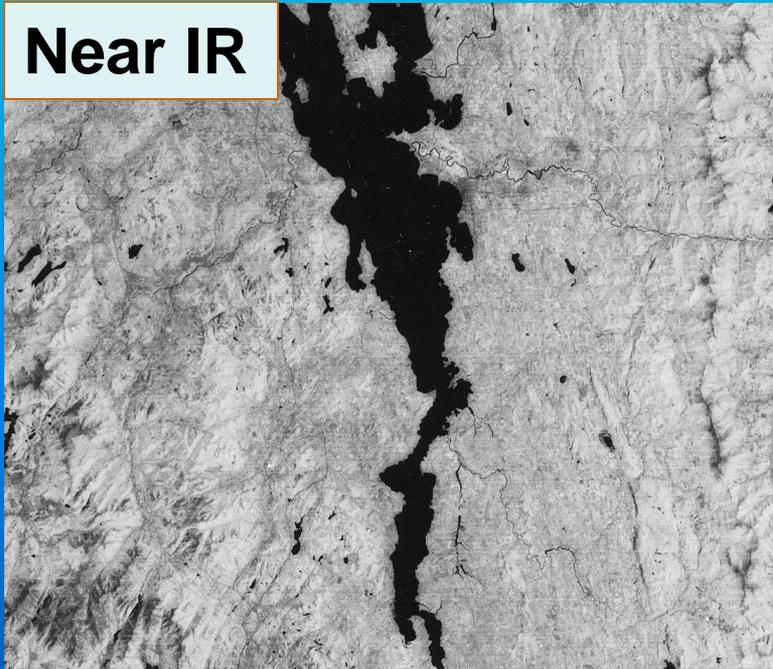
Artificial turf  
or grass?



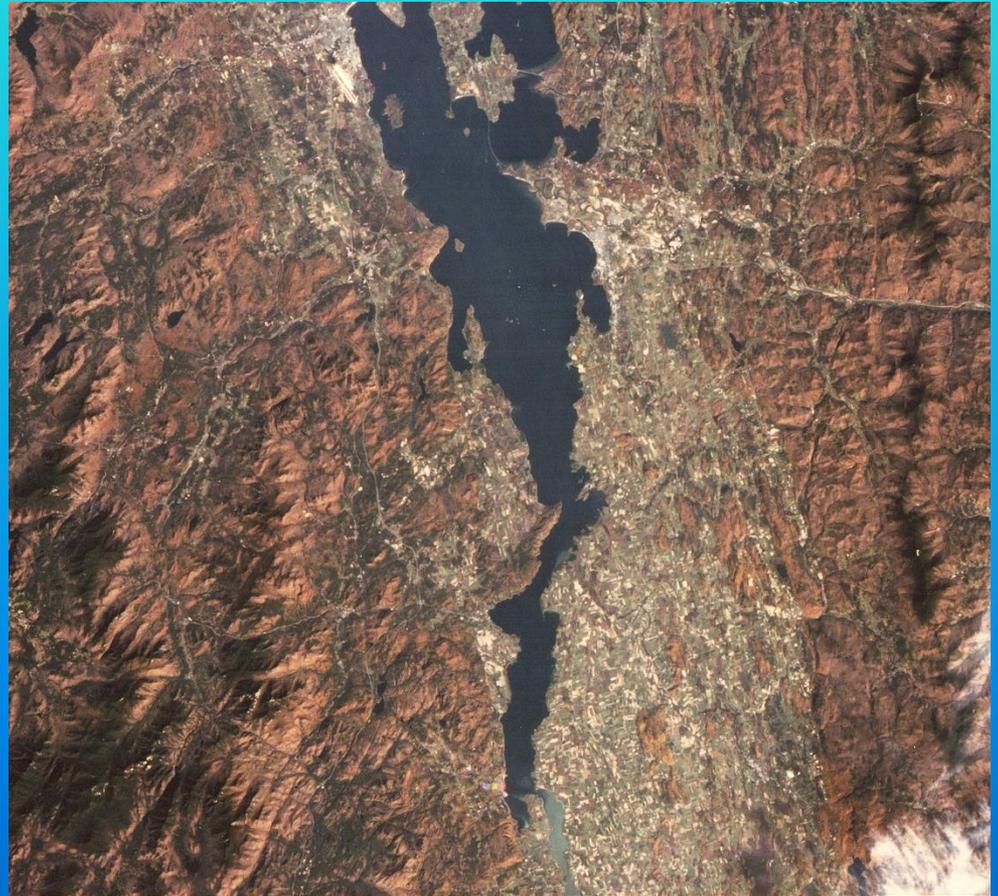
**Red**



**Near IR**

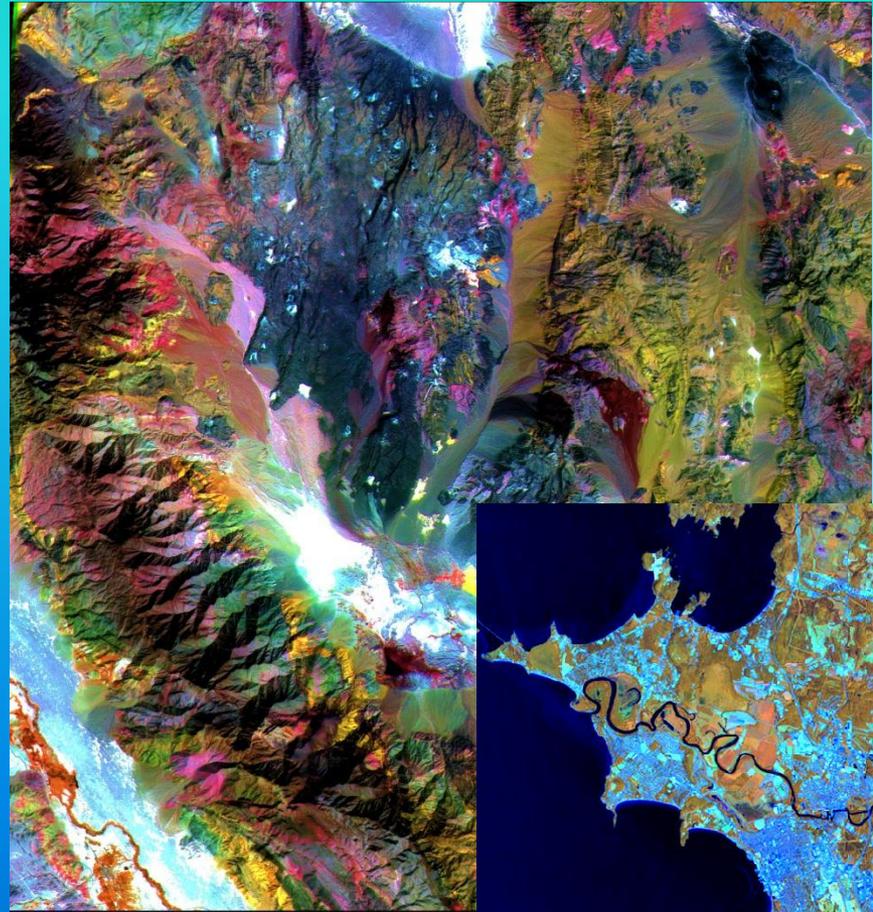


## Visible, Near IR and CIR Composite



# Mid IR (aka Shortwave IR)

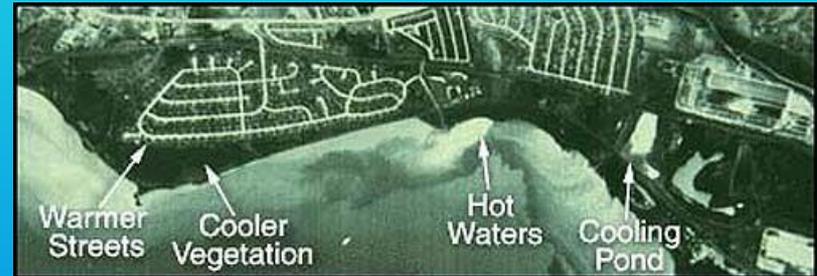
- ⊗ Rock/mineral mapping
- ⊗ Snow vs. clouds
- ⊗ Land vs. water
- ⊗ Veg/soil moisture



# Thermal Infrared



- ❖ Sensitive to **temperature**
  - ❑ emitted energy
- ❖ Applications
  - ❑ forest fires
  - ❑ ocean temperature
  - ❑ heat loss from buildings
  - ❑ urban heat islands
  - ❑ water pollution



# Wildfires

Visible bands



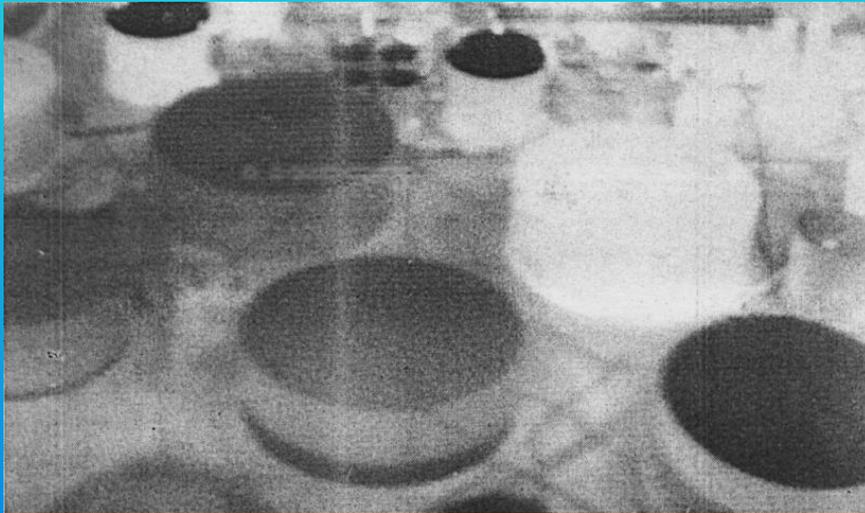
Smoke obscures fire

Thermal bands



Fire hotspots visible

# Thermal Information



Hottest and coldest tanks?



Most recently parked car?

# Advantages of Remote Sensing

- ✦ **Areal context**
- ✦ **Permanent record**
- ✦ Broader spectral sensitivity than human eye
- ✦ Local and **global coverage**
- ✦ Repetitive coverage (**time series**)
- ✦ Many **existing sources** (archives)
- ✦ Many spatial resolutions (depending on sensor)