

Multispectral Imagery

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Multispectral imagery is sometimes discussed as a way to locate potential unmarked graves and burials sites associated with Indian Residential Schools. This document defines multispectral imagery, discusses where it is useful, and outlines its limitations in the search for unmarked graves.

What is Multispectral Imagery?

Most standard photography captures light that is visible to the human eye - the “visible spectrum.” However, other wavelengths of light are not detectable to the human eye. Multispectral cameras take pictures across other parts of the electromagnetic spectrum that the human eye cannot detect, including infrared and ultraviolet. The images captured show those different spectra of light.

How is Multispectral Imagery Useful in Unmarked Grave Detection?

The wavelengths captured in multispectral imagery can provide information about vegetation, including the relative health or distribution of various types of plants. This has been used in archaeology to detect differences in soils related to past human activity; for example, where people live can change what nutrients are available in the soil or how much water collects in an area, which can change the plant types and health. When a person is buried in a grave, this can also change the amount of water present and the nutrients available for plants to grow. However, a grave will not always show up on multispectral imagery. Analyses of multispectral imagery can be run to measure differences in how light is reflected off of different surface features, including vegetation, that may correlate with unmarked graves (Rocke and Ruffell 2022).

Multispectral imagery can be collected from satellites, airplanes, or drones. Most of the multispectral imagery that is available publicly is collected via satellites, but often is not at a high enough resolution to be useful in locating potential unmarked graves. Drone-mounted cameras are better suited for high-resolution survey over areas of interest. It is important to ensure that any drone flights have good spatial control so the images can be accurately placed in the right location (see the RTK GNSS document for more details), often using a GIS data system. The images are processed in software to generate what is called an NDVI (normalized difference vegetation index) image. NDVI is the most common method for evaluating the relative health of the vegetation growing in the area. These images are then examined by an expert to see if there are patterns that could correspond to potential unmarked graves.

What Are the Challenges of Multispectral Imagery?

Multispectral imagery can only provide information about areas of the ground that show differences in the health or type of vegetation. Multispectral imagery should also be collected at the height of growth in mid-summer to be most effective. There are many reasons why vegetation grows differently, so this method should only be used with other types of technology or in areas where organized burial grounds, such as cemeteries, are known or suspected to be present. Even in places with known burials, interpretation of the results should be treated with caution and any results should be compared with other sources of information.