ENV202/502 – INTRODUCTORY REMOTE SENSING

Practical Assessment 2

Due: Monday week 7, 11.59pm

Contribution to unit grade: 20%

Format: Short Answer

Length: As required

Late penalty: 10% per day

# Pre-Week

1. Participation in pre-class questions – weeks 4 - 6 (15 points)

# Week 4

1. Discuss how multispectral image vegetation spectral profiles differ in detail to those simulated through Liberty or given in the USGS spectral libraries last week. How would you expect this difference to affect your ability to monitor vegetation? (4 points)
2. Complete the following table using information from the practical and/or class notes to compare the spatial dimensions of these three different datasets. (9 points)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Worldview-2 | Landsat 8 | MODIS |
| Image width (km) |  |  |  |
| Image height (km) |  |  |  |
| Pixel size |  |  |  |
| Smallest identifiable features and approx dimensions (m) |  |  |  |
| File size |  |  |  |
| Example mapping application specific and appropriate to the spatial resolution and image extent |  |  |  |

1. Compare and contrast the three given MODIS images, describe any apparent differences and their likely causes. (3 points)
2. Is it possible to have a sensor that collects data of high resolution in spatial, spectral, and temporal domains? What are the necessary trade-offs between these dimensions? (6 points)
3. Describe the effects of changing the radiometric resolution of your data. How does this impact your ability to interpret features within the imagery? (3 points)
4. Complete the following table (30 points)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Spectral bands (number and position) | Pixel size (m) | Scene Extent (km) | Radiometric Resolution | Revisit frequency | Applications |
| Landsat 8 |  |  |  |  |  |  |
| SPOT 5 |  |  |  |  |  |  |
| Terra MODIS |  |  |  |  |  |  |
| EO-1 Hyperion |  |  |  |  |  |  |
| Quickbird |  |  |  |  |  |  |
| RapidEye |  |  |  |  |  |  |
| ALOS AVNIR-2 |  |  |  |  |  |  |
| ASTER |  |  |  |  |  |  |
| Worldview-2 |  |  |  |  |  |  |
| AVHRR |  |  |  |  |  |  |

# Week 6

1. Using the WV2 image of downtown Darwin and based on the labelling in the figure below, fill in the following table (28 points)



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Colour and tone | Texture | Size | Shape | Pattern | Shadow | Context (site & association | Feature |
| A |  |  |  |  |  |  |  |  |
| B |  |  |  |  |  |  |  |  |
| C |  |  |  |  |  |  |  |  |
| D |  |  |  |  |  |  |  |  |
| E |  |  |  |  |  |  |  |  |
| F |  |  |  |  |  |  |  |  |
| G |  |  |  |  |  |  |  |  |

1. Using your Worldview 2 image as a guide, indicate the cues that you would use to differentiate between the following (4 points):

Land and water

Urban residential and industrial

Grasses, mangroves, and savannah woodland

Cars and boats

1. Which of the primary colours mix together, and in what proportions, to make the following colours:

Orange

Grey

Black

Dark purple

1. Taking into account the input bands and the true colour display, describe the tone and colour of the following features, and the reason why they appear this way. The first one has been done for you (6 points):

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Tone** | **Colour** | **Justification** |
| Deep water | Dark | Blue | Moderate reflectance in blue, low to very low in green and red. Therefore the dominant colour is blue, with little contribution from the other bands. Tone is dark as reflectance levels are relatively low. |
| Healthy Vegetation |  |  |  |
| Bare dry ground |  |  |  |

1. Taking into account the input bands and the standard false colour display, describe the tone and colour of the following features, and the reason why they appear this way (9 points)

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Tone** | **Colour** | **Justification** |
| Deep water |  |  |  |
| Healthy Vegetation |  |  |  |
| Bare dry ground |  |  |  |

1. Taking into account the input bands and the false natural colour display, describe the tone and colour of the following features, and the reason why they appear this way (9 points)

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Tone** | **Colour** | **Justification** |
| Deep water |  |  |  |
| Healthy Vegetation |  |  |  |
| Bare dry ground |  |  |  |

1. Complete the following table. The first one has been done for you (6 points)

|  |  |  |  |
| --- | --- | --- | --- |
| **Display Type** | **Display Tone and Colour** | **Input Contribution** | **Potential Feature & Justification** |
| RGB = NIR, R, G | Bright red | High NIR  Low red  Low green | Healthy vegetation – reflects high levels of NIR due to internal cellular structure and biomass; absorbs red for photosynthesis |
| RGB = NIR, R, G | Bright white |  |  |
| RGB = NIR, R, G | Bright cyan |  |  |
| RGB = SWIR, NIR, G | Moderate orange |  |  |