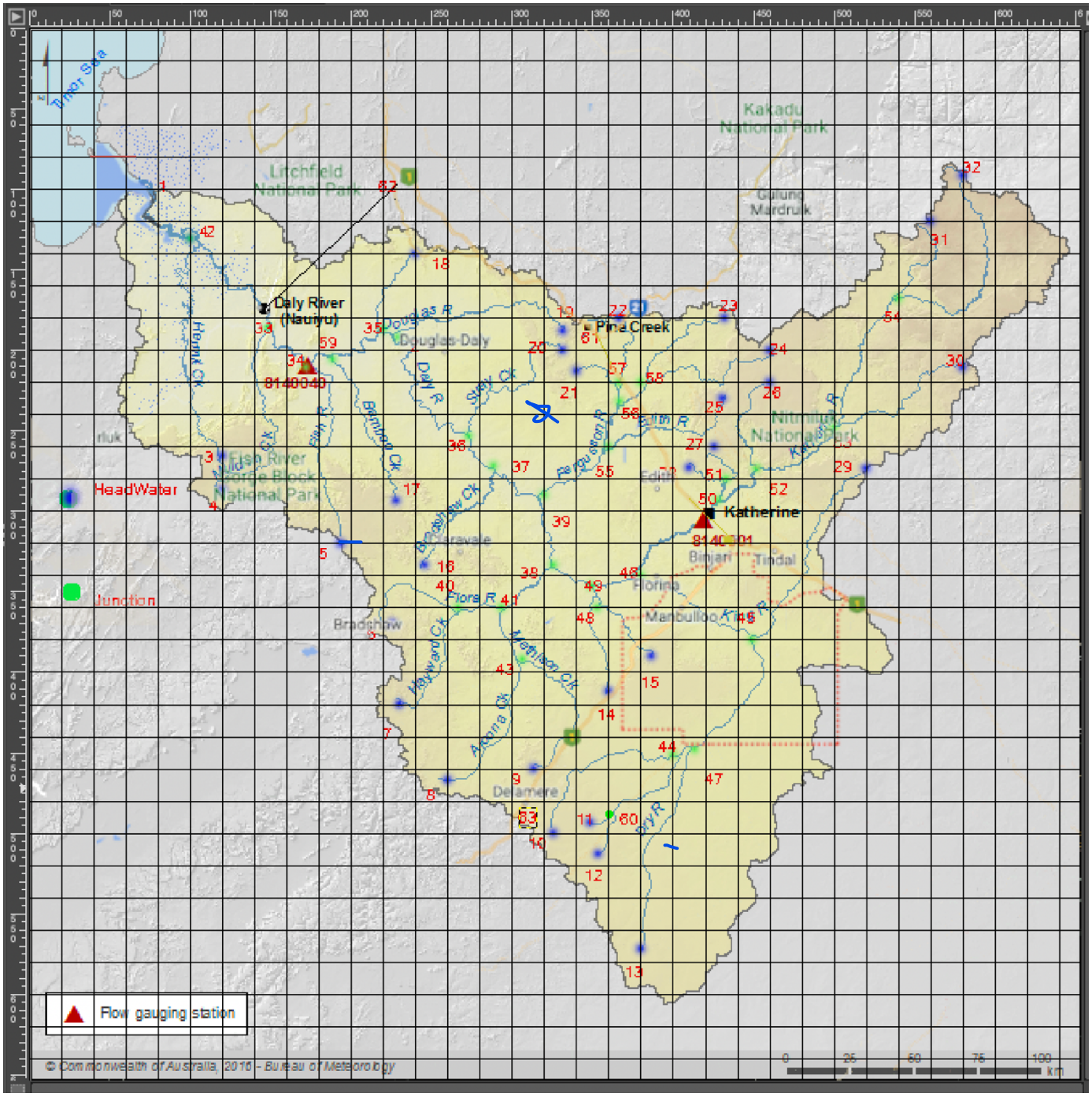
WATER: Optimizing Collection and distribution



You should be reading data from file if programming. I have added roads to travel with boat trailer
Note the x, y coordinates do not match lat and long in the area.

For this assignment you are given a map:

1. Locations of headwaters (Springs), Junctions, and Flow Gauging Stations over the years with numbers
2. Paths of river between sites (approximate distance by direct line)
3. Road between some sites

You will upload to the submission link a document with assumptions and a python file or a related Java/C/Js file or a word document with pseudo code.

Requirements

Make sure your Document file has the assumptions you have made in interpreting the clients' requirements and **very brief** description of how you solved the problem. This is so that if you code does not work as I expect, I can check if you code works according to your requirements you have assumed.

As I have not given the area where tidal flow reaches, so the river flow is in one direction

Question 1

What cycles exist in the graph and how can you find them from code.

Provide the *function list_cycles() -> [List of nodes, List2 of nodes, etc]*

Question 2

We are flying a drone over the country and want to check all the nodes (junctions and headwaters) in any area. We will start at top right point of area. Give the order of nodes we should flyover to see all nodes in shorted time.

Explain what method you use.

Provide flight path ((*x1,y1),(x2,y2l) –> List of nodes*

Question 3

Water from each headwaters has different chemical composition. We will feed you the sequence of junctions a chemical mix passes and its concentration in a tuple, maybe not on the same creek. Provide the likely headwater source of that chemical. Note water might be seeping from other headwaters into a creek.

is this graph 1-way or 2-way

Marks for simplified coding

For instance [(58,3),(55,10),(52,5)] gives 25

[(57,10),(56,5),(55,2)] gives 22,21

Provide *chemical_source([(junction1,conc1), (junction2,conc2), etc]) -> node number/s*

Question 4

Create a Trie of the names of the rivers and creeks on the map. Encode each of the node characters with a binary code-word as shown in class, to form the smallest encoding

Provide *code_string(s) -> encoded string* - a function that returns the code for a word entered from the alphabet collected from the river names