

# FINAL CODE

DATE	3 NOVEMBER 2022
TEAM ID	PNT2022TMID00516
PROJECT NAME	REAL TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM

## CODE:

```
# Import common libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

# Import the PyGeohydro libaray tools
import pygeohydro as gh
from pygeohydro import NWIS, plot

# Use the national water info system (NWIS)
nwis = NWIS()

# Specify date range of interest
dates = ("2020-01-01", "2020-12-31")
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# Filter stations to have only those with proper dates
stations = info_box[(info_box.begin_date <= dates[0]) &
(info_box.end_date >= dates[1])].site_no.tolist()

# Remove duplicates by converting to a set
stations = set(stations)

# Specify characteristics of interest
select_attributes = ['CAT_BASIN_AREA', 'CAT_ELEV_MAX',
'CAT_STREAM_SLOPE']

# Initialize a storage matrix
nldi_data = np.zeros((len(flow_data.columns), len(select_attributes)))

# Loop through all gages, and request NLDI data near each gage
for i, st in enumerate(flow_data.columns):

    # Navigate up all flowlines from gage
    flowlines = NLDI().navigate_byid(fsource = 'nwissite',
                                     fid = f'{st}',
                                     navigation="upstreamTributaries",
                                     source = 'flowlines',
                                     distance = 10)

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# Get the nearest comid
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station_comid = flowlines.nhdplus_comid.to_list()[0]
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# Source NLDI local data
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nldi_data[i,:] = NLDI().getcharacteristic_byid(station_comid, "local",  
char_ids = select_attributes)
```