FINAL CODE

Team ID	PNT2022TMID11410
Project Name	Real-time river water quality monitoringand 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")
# 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)
# Get the nearest comid
station_comid = flowlines.nhdplus_comid.to_list()[0]
# Source NLDI local data
nldi_data[i,:] = NLDI().getcharacteristic_byid(station_comid, "local",
char_ids = select_attributes)
```