

FINAL CODE

Team ID	PNT2022TMID23696
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 library 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)
```