

FINAL CODE

Team ID	PNT2022TMID48183
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") #
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)
```