

## FINAL CODE

Team ID	PNT2022TMID19640
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)
```