Instructions for Public API Data Access

The purpose of this document is to provide instructions for users to access the water data that is stored in the New Hampshire Department of Environmental Services Real-Time Data & Information for Watersheds website. This will be referred to herein as the "Water Data Website"

There are two way to access the data via the API. One is to use the Browsable API in a browser, and the other is to call the API directly using tools such as Python or cURL. There are limitations to using the Browsable API, and using a tool such as Python or cURL is recommended.

The first step, before you can download any timeseries data, is to figure out which timeseries data you want to download. A complete list of timeseries can be obtained by visiting https://nhdes.rtiamanzi.org/api/timeseries/sparse/. This can result in a rather large number of records, so it is best to filter by `location__code` or `parameter__code` as described in the following paragraphs.

The `location__code` is typically a 5-character code that is used to identify a gauging station. For example, the "Suncook River at Allenstown" is ALLN3. We will use ALLN3 as an example site throughout this document, but there are many sites to choose from. The easiest way to determine which code you want data for is to find the station on the Water Data Website using either the List of Map views on the Observations page. A complete list of stations can also be retrieved by clicking on https://nhdes.rtiamanzi.org/api/locations/?layer__code=STATIONS or running the following command in a terminal:

Request:

```
$ curl https://nhdes.rtiamanzi.org/api/locations/?layer__code=STATIONS
```

Response (truncated):

```
[
    {
        "id": "3d0a6863-c7bd-44ee-aaae-55864717bddf",
        "type": "Feature",
        "geometry": {
            "type": "MultiPoint",
            "coordinates": [
                [
                    -71.406152574472,
                    43.1595625713704
                ]
            ]
        },
        "properties": {
            "name": "Suncook River at Allenstown",
            "code": "ALLN3",
            "enabled": true,
            "description": null,
```

```json
                "layer": "bbf40db0-7ce5-4223-9044-691a61aebb2a",
                "parent": "7928a829-2c5a-4f22-bfd2-6a4540061245",
                "fields": [
                    {
                        "id": "028d81e2-9890-4494-b71d-b1325f177468",
                        "attribute_name": {
                            "id": "4588a046-b76a-4367-9eae-159ae8b1a195",
                            "code": "SYMBOLOGY",
                            "name": "Symbology",
                            "enabled": true,
                            "description": "Store the symbology code of a station"
                        },
                        "char_value": "M_FC",
                        "num_value": null,
                        "bool_value": null
                    },
                    {
                        "id": "f77166e9-9b24-4fcc-a90f-b3acc3190aaa",
                        "attribute_name": {
                            "id": "82993c28-2dc2-4c46-9e7f-57c1d6f1bd4b",
                            "code": "MANUAL_ENTRY",
                            "name": "Manual Entry",
                            "enabled": true,
                            "description": "Specify that site is a manual data entry
   site"
                        },
                        "char_value": null,
                        "num_value": null,
                        "bool_value": false
                    }
                ]
            }
        },
        {...}
    ]
```

In each of the JSON objects returned, in the properties section is a name and code for each of the stations. The code is what you want to include in future requests.

The parameter__code is typically a 3 to 4 character code the describes the type of data stored in the timeseries, for example, instantaneous streamflow (QIN), river stage (STG), pool elevation (PELV) or incremental precipitation depth (PTPX), to name a few. A complete list of parameter codes can retrieved by visiting https://nhdes.rtiamanzi.org/api/parameters/ or running the following command in a terminal:

Request:

```
$ curl https://nhdes.rtiamanzi.org/api/parameters/
```

Response (truncated):

```json
[
    ...
    {
        "id": "c7e34cf8-68dd-4053-b58e-3f4c566bd4a7",
        "name": "River Stage",
        "code": "STG",
        "unit": {
            "id": "e0d7e5db-e75c-4e8c-b3e7-63f530647220",
            "name": "Feet",
            "code": "FT",
            "enabled": true,
            "description": null
        },
        "enabled": true,
        "description": null,
        "statistic_type": {
            "id": "c0275be3-31a7-4bb2-8261-667062babb7e",
            "name": "Instantaneous",
            "code": "INST",
            "enabled": true,
            "description": "An instantaneous value (e.g. the stream flow or stage
at a specific time)"
        },
        "windowed_interval": null
    }
    ...
]
```

Within this response payload, you can find the name and code for parameters available in the system. Note not all parameters are available at all locations. This response payload also contains information about the units and statistic type for each parameter.

Once you have determined which parameter__code and/or location__code you are interested in, you can construct a URL to retrieve a list of timeseries that meet your criteria. For example, if you wanted timeseries for the River Stage at Suncook River at Allenstown, you would construct the following URL: https://nhdes.rtiamanzi.org/api/timeseries/sparse/? parameter__code=STG&location__code=ALLN3

Request:

```
$ curl https://nhdes.rtiamanzi.org/api/timeseries/sparse/?
parameter__code=STG&location__code=ALLN3
```

Response:

```json
[
    {
        "id": "c0da89d0-34a8-419f-9864-746658cbd524",
```

```
            "name": "River Stage",
            "code": "ALLN3.USGS.STG.PT1H",
            "parameter": "c7e34cf8-68dd-4053-b58e-3f4c566bd4a7",
            "tree_node": "31bae2a8-018d-48d1-9ebe-b13ae3860a57",
            "location": "3d0a6863-c7bd-44ee-aaae-55864717bddf"
        }
    ]
```

Or, if you just know you want timeseries data at a particular location, you could try a request that only includes the `location_code`. For example, `https://nhdes.rtiamanzi.org/api/timeseries/sparse/?location__code=ALLN3`. In this case you will get a response that includes all the timeseries available for that location.

Request:

```
$ curl https://nhdes.rtiamanzi.org/api/timeseries/sparse/?location__code=ALLN3
```

Response:

```
[
    {
        "id": "fb0fe97e-d898-4a1f-9f37-5371f1905c6c",
        "name": "Observed River Discharge",
        "code": "ALLN3.USGS.QIN.PT1H",
        "parameter": "227e7f89-91e8-40a0-a866-e3290c6d1396",
        "tree_node": "31bae2a8-018d-48d1-9ebe-b13ae3860a57",
        "location": "3d0a6863-c7bd-44ee-aaae-55864717bddf"
    },
    {
        "id": "c0da89d0-34a8-419f-9864-746658cbd524",
        "name": "River Stage",
        "code": "ALLN3.USGS.STG.PT1H",
        "parameter": "c7e34cf8-68dd-4053-b58e-3f4c566bd4a7",
        "tree_node": "31bae2a8-018d-48d1-9ebe-b13ae3860a57",
        "location": "3d0a6863-c7bd-44ee-aaae-55864717bddf"
    }
]
```

Once you have found the timeseries you are interested in, you can retrieve the details for that timeseries by calling, `https://nhdes.rtiamanzi.org/api/timeseries/{id}`, where `id` is the ID of the timeseries. For example, if you wanted the details for `River Stage` at `Suncook River at Allenstown` you would call `https://nhdes.rtiamanzi.org/api/timeseries/c0da89d0-34a8-419f-9864-746658cbd524`. If you are confident this is the timeseries you are interested in, you can skip this step which provides some extra metainfo about the timeseries.

Request:

```
$ curl https://nhdes.rtiamanzi.org/api/timeseries/c0da89d0-34a8-419f-9864-
746658cbd524
```

Response:

```json
{
    "id": "c0da89d0-34a8-419f-9864-746658cbd524",
    "name": "River Stage",
    "code": "ALLN3.USGS.STG.PT1H",
    "parameter": {
        "id": "c7e34cf8-68dd-4053-b58e-3f4c566bd4a7",
        "name": "River Stage",
        "code": "STG",
        "unit": {
            "id": "e0d7e5db-e75c-4e8c-b3e7-63f530647220",
            "name": "Feet",
            "code": "FT",
            "enabled": true,
            "description": null
        },
        "enabled": true,
        "description": null,
        "statistic_type": {
            "id": "c0275be3-31a7-4bb2-8261-667062babb7e",
            "name": "Instantaneous",
            "code": "INST",
            "enabled": true,
            "description": "An instantaneous value (e.g. the stream flow or stage
at a specific time)"
        },
        "windowed_interval": null
    },
    "interval": "PT1H",
    "variant": null,
    "properties": {},
    "location": {
        "id": "3d0a6863-c7bd-44ee-aaae-55864717bddf",
        "name": "Suncook River at Allenstown",
        "code": "ALLN3",
        "enabled": true,
        "description": null,
        "layer": "bbf40db0-7ce5-4223-9044-691a61aebb2a"
    },
    "tree_node": {
        "id": "31bae2a8-018d-48d1-9ebe-b13ae3860a57",
        "name": "USGS",
        "enabled": true,
        "tree_node_type": "9fcce7ee-221e-4056-bec6-720b4d0c9f30",
        "parent": null,
        "properties": null
    },
```

```json
        "entry_type": {
            "id": "0456f779-14de-4570-bee1-8af995cc21bc",
            "name": "Script",
            "code": "SCPT",
            "enabled": true,
            "description": "Timeseries data enrty type for data entered via a script."
        },
        "latest_value": {
            "id": "034619f3-2ce2-4395-9a33-cbeac73c1f3d",
            "timeseries": "c0da89d0-34a8-419f-9864-746658cbd524",
            "datetime": "2022-10-21T20:00:00Z",
            "num_value": 286.0299987792969,
            "char_value": null
        },
        "threshold_limits": {}
    }
```

Now, to retrieve the actual timeseries data we construct a URL similar to the previous but append `values` to the end so it would look like `https://nhdes.rtiamanzi.org/api/timeseries/c0da89d0-34a8-419f-9864-746658cbd524/values/`. You should also include a `start` and `end` query parameter to limit the amount of data that is returned, so your URL would look like `https://nhdes.rtiamanzi.org/api/timeseries/c0da89d0-34a8-419f-9864-746658cbd524/values/?start=2022-09-22T09:00:00&end=2022-11-21T09:00:00`. Note all times are in UTC both the `start` and `end` parameters as well as the data that is returned. Time strings must be in ISO 8601 format.

Note, this URL does not currently work in the browsable API but will work with cURL, Python or a similar client.

Request:

```
$ curl https://nhdes.rtiamanzi.org/api/timeseries/c0da89d0-34a8-419f-9864-
746658cbd524/values/?start=2022-09-22T09:00:00&end=2022-11-21T09:00:00
```

Response:

```json
[
    {
        "id":"dd18d4fb-e495-4bdf-ae0d-e087fc396107",
        "timeseries":"c0da89d0-34a8-419f-9864-746658cbd524",
        "datetime":"2022-10-18T16:00:00Z",
        "num_value":285.739990234375,
        "char_value":null
    },
    {
        "id":"c45fe7d8-1d6f-40f6-bedd-c6212b635154",
        "timeseries":"c0da89d0-34a8-419f-9864-746658cbd524",
        "datetime":"2022-10-18T17:00:00Z",
        "num_value":285.75,
```

```
            "char_value":null
        },
        ...
    ]
```