NWS Watch, Warning, and Advisory Geolocation

The purpose of this document is to describe how the National Weather Service (NWS) uses two different methodologies to geolocate watch, warning, and advisory (WWA) products. As a result, there is potential for a user query to miss some or all alerts. The methodologies used are geolocation via NWS managed zones or by county. This is done to differentiate between small scale (county based warnings) and large scale (zone based) events.

County Alerts

County based products (primarily small scale and represented by polygons), are:

- Severe Thunderstorm Warning
- Tornado Warning
- Severe Weather Statement
- Flash Flood Warning/Flash Flood Statement
- Flood Warning/Flood Statement
- Special Marine Warning
- Snow Squall Warning
- Dust Storm Warning
- Dust Storm Advisory
- Extreme Wind Warning

For these alerts, responses received from api.weather.gov alerts endpoints will contain a "geometry" property which captures the boundaries of these alerts in the form of a polygon. Example:

```
"geometry": {
        "type": "Polygon",
        "coordinates": [
            [
                [
                    -85.15999999999997,
                    29.94999999999999
                ],
                [
                    -84.84000000000003,
                    30.02
                ],
                [
                    -84.71999999999999,
                    30.03999999999999
```

```
                            ],
                            [
                                -84.950000000000003,
                                30.279999999999998
                            ],
                            [
                                -85.13000000000001,
                                30.239999999999998
                            ],
                            [
                                -85.350000000000009,
                                30.19999999999999
                            ],
                            [
                                -85.159999999999997,
                                29.949999999999999
                            ]
                        ]
                    ]
                },
```

The polygons are represented more generally in the "geocode" property of the data response in Javascript Object Notation (JSON) format. For these products, the reference is done against the county's Federal Information Processing Standard (FIPS) code. An example of this response in JSON format can be seen below:

```
            "geocode": {
                "UGC": [
                    "ARC133",
                    "ARC061"
                ],
                "SAME": [
                    "005133",
                    "005061"
                ]
            },
```

Please note, there is no mapping in these alerts to public forecast or fire zones.

The Universal Geographic Code (UGC) is the National Weather Service's representation of the FIPS standard. It contains the two letter state abbreviation, C (for county) and the county's FIPS number. In this example the alert covered parts of Howard and Sevier counties in Arkansas. The Specific Area Message Encoding (SAME) code will always be the number FIPS code for the state (with a preceding 0) and the county FIPS code. A full list of state and county codes can be sourced from the US Census Bureau (https://www.census.gov/geographies/reference-files/2019/demo/popest/2019-fips.html)

The National Weather Service also issues county-based but non-polygon alerts. Currently, these are:

- Severe Thunderstorm Watch
- Tornado Watch

These products will contain the geocode property but will not contain a polygon property.

Zone Based Warnings

For large scale or longer lasting events, such as snow storms, fire threat, or heat events, alerts are issued by NWS public forecast zones or fire weather zones. These zones differ in size and can cross county boundaries. They are maintained by the Weather Service and updated twice yearly. A shapefile and a description of its contents can be downloaded for use from https://www.weather.gov/gis/AWIPSShapefiles.

Data queried from api.weather.gov for these alerts will not contain any polygon information. Similar to polygon based alerts however, there will be a geocode property which describes which zones (public or fire) are under that alert, along with the county mappings to those zones when retrieving data in JSON format. For example:

```
"geocode": {
    "UGC": [
        "UTZ493"
    ],
    "SAME": [
        "049001",
        "049017",
        "049027",
        "049031",
        "049055",
        "049041"
    ]
},
```
For this alert (a Red Flag Warning), the fire weather zone (UTZ493) maps to the six counties.

Special Cases

There also are alerts which can be issued for rapidly changing weather with no size or duration considerations. Currently, these are:

- Marine Weather Statement
- Special Weather Statement

These can be formatted using counties or public/marine forecast zones.

How do I request alert products from api.weather.gov?

There are several ways in which to request alert data from api.weather.gov. Historical data (all alerts for the last seven days) can be retrieved through the /alerts endpoint. Current data (only currently active alerts that are ongoing or will come into effect in the near future) can be retrieved through the /alerts/active endpoint. For further information on the differences between these two, please see the "Specification" tab. When determining your point of interest, it is important to consider the data you wish to receive.

To get started, you can obtain all zone information by requesting your point of interest from the /points endpoint. Example:

https://api.weather.gov/points/38.9807,-76.9373

The response contains information on how to obtain all relevant information from the API for your point of interest. As noted above, county based alerts are not mapped to zones but zone based alerts are mapped to counties. The effect this has is for requests such as:

https://api.weather.gov/alerts/active?zone=MDZ013

or

https://api.weather.gov/alerts?zone=MDZ013

Will not contain county based products. However requests such as:

https://api.weather.gov/alerts?zone=MDC033

or

https://api.weather.gov/alerts/active?zone=MDC033

Will contain all county based alerts and all zone based alerts that are associated to the county or counties requested. If there are multiple zones associated with that county, the response from API will include all alerts for those zones.

If you wish to only receive active alerts for a specific point (for example, your house) regardless how the products are generated, you can request that via the point parameter:

https://api.weather.gov/alerts/active?point=38.9807,-76.9373

or for all alerts

https://api.weather.gov/alerts?point=38.9807,-76.9373

If you have any questions about any of the information in this primer document, please contact the NCO Onboarding team at idp-support@noaa.gov.