

# Package ‘rnpn’

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**Title** Interface to the National 'Phenology' Network 'API'

**Description** Programmatic interface to the Web Service methods provided by the National 'Phenology' Network (<<https://usanpn.org/>>), which includes data on various life history events that occur at specific times.

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**License** MIT + file LICENSE

**Depends** R (>= 3.5.0)

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**VignetteBuilder** knitr

**URL** <https://docs.ropensci.org/rnpn/> (website)

<https://github.com/ropensci/rnpn/> (devel)

**NeedsCompilation** no

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 rnpn-package

*Interface to the National Phenology Network API*


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## Description

This package allows for easy access to the National Phenology Network's Data API. To learn more, take a look at the vignettes. events that occur at specific times.

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check_geo_service	<i>Runs a basic check to see if a valid response is returned by Geoserver and returns TRUE/FALSE</i>
-------------------	--

---

**Description**

Used in unit tests to determine if tests should be run

**Usage**

```
check_geo_service()
```

---

check_service	<i>Runs a basic check to see if a valid response is returned by the NPN Portal service and returns TRUE/FALSE</i>
---------------	---

---

**Description**

Used in unit tests to determine if tests should be run

**Usage**

```
check_service()
```

---

nnp_abundance_categories	<i>Get Abundance Categories</i>
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---

**Description**

Gets data on all abundance/intensity categories and includes a data frame of applicable abundance/intensity values for each category

**Usage**

```
nnp_abundance_categories(...)
```

**Arguments**

...            Curl options passed on to [GET](#)

---

`npn_datasets`*Get Datasets*

---

**Description**

Returns a complete list of information about all datasets integrated into the NPN dataset. Data can then be pulled for individual datasets using their unique IDs

**Usage**

```
npn_datasets(...)
```

**Arguments**

```
...           Curl options passed on to GET
```

**Value**

data.frame of datasets and their IDs

**Examples**

```
## Not run:  
npn_datasets()  
  
## End(Not run)
```

---

`npn_download_geospatial`*Download Geospatial Data*

---

**Description**

Function for directly downloading any arbitrary Geospatial layer data from the NPN Geospatial web services.

**Usage**

```
npn_download_geospatial(  
  coverage_id,  
  date,  
  format = "geotiff",  
  output_path = NULL  
)
```

**Arguments**

coverage_id	The coverage id (machine name) of the layer for which to retrieve. Applicable values can be found via the <code>nbn_get_layer_details()</code> function under the 'name' column.
date	Specify the date param for the layer retrieved. This can be a calendar date formatted YYYY-mm-dd or it could be a string integer representing day of year. It can also be NULL in some cases. Which to use depends entirely on the layer being requested. More information available from the <code>nbn_get_layer_details()</code> function.
format	The output format of the raster layer retrieved. Defaults to GeoTIFF.
output_path	Optional value. When set, the raster will be piped to the file path specified. When left unset, this function will return a raster object.

**Details**

Information about the layers can also be viewed at the `getCapabilities` page directly: <https://geoserver.usanpn.org/geoserver/wms>

**Value**

Data frame containing all layer details as specified in function description.

**Examples**

```
## Not run:
ras<-nbn_download_geospatial("si-x:30yr_avg_six_bloom","255")

## End(Not run)
```

---

nbn\_download\_individual\_phenometrics

*Download Individual Phenometrics*

---

**Description**

This function allows for a parameterized search of all individual phenometrics records in the USA-NPN database, returning all records as per the search parameters in a data table. Data fetched from NPN services is returned as raw JSON before being channeled into a data table. Optionally results can be directed to an output file in which case raw JSON is converted to CSV and saved to file; in that case, data is also streamed to file which allows for more easily handling of the data if the search otherwise returns more data than can be handled at once in memory.

**Usage**

```
npn_download_individual_phenometrics(
  request_source,
  years,
  coords = NULL,
  individual_ids = NULL,
  species_ids = NULL,
  station_ids = NULL,
  species_types = NULL,
  network_ids = NULL,
  states = NULL,
  phenophase_ids = NULL,
  functional_types = NULL,
  additional_fields = NULL,
  climate_data = FALSE,
  ip_address = NULL,
  dataset_ids = NULL,
  genus_ids = NULL,
  family_ids = NULL,
  order_ids = NULL,
  class_ids = NULL,
  pheno_class_ids = NULL,
  email = NULL,
  download_path = NULL,
  six_leaf_layer = FALSE,
  six_bloom_layer = FALSE,
  agdd_layer = NULL,
  six_sub_model = NULL,
  additional_layers = NULL,
  wkt = NULL
)
```

**Arguments**

request_source	Required field, string. Self-identify who is making requests to the data service
years	Required field, list of strings. Specify the years to include in the search, e.g. c('2013','2014'). You must specify at least one year.
coords	List of float values, used to specify a bounding box as a search parameter, e.g. c ( lower_left_lat, lower_left_long, upper_right_lat, upper_right_long )
individual_ids	Comma-separated string of unique IDs for individual plants/animal species by which to filter the data
species_ids	List of unique IDs for searching based on species, e.g. c ( 3, 34, 35 )
station_ids	List of unique IDs for searching based on site location, e.g. c ( 5, 9, ... )
species_types	List of unique species type names for searching based on species types, e.g. c ( "Deciduous", "Evergreen" )
network_ids	List of unique IDs for searching based on partner group/network, e.g. c( 500, 300, ... )

states	List of US postal states to be used as search params, e.g. c ( "AZ", "IL" )
phenophase_ids	List of unique IDs for searching based on phenophase, e.g. c ( 323, 324, ... )
functional_types	List of unique functional type names, e.g. c ( "Birds" )
additional_fields	List of additional fields to be included in the search results, e.g. c ( "Station_Name", "Plant_Nickname" )
climate_data	Boolean value indicating that all climate variables should be included in additional_fields.
ip_address	Optional field, string. IP Address of user requesting data. Used for generating data reports
dataset_ids	List of unique IDs for searching based on dataset, e.g. NEON or GRSM c(17,15)
genus_ids	List of unique IDs for searching based on taxonomic family, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids is also set.
family_ids	List of unique IDs for searching based on taxonomic family, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids is also set.
order_ids	List of unique IDs for searching based on taxonomic order, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids or family_ids are also set.
class_ids	List of unique IDs for searching based on taxonomic class, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids, family_ids or order_ids are also set.
pheno_class_ids	List of unique IDs for searching based on pheno class. Note that if both pheno_class_id and phenophase_id are provided in the same request, phenophase_id will be ignored.
email	Optional field, string. Email of user requesting data.
download_path	Optional file path to which search results should be re-directed for later use.
six_leaf_layer	Boolean value when set to true will attempt to resolve the date of the observation to a spring index, leafing value for the location at which the observations was taken
six_bloom_layer	Boolean value when set to true will attempt to resolve the date of the observation to a spring index, bloom value for the location at which the observations was taken
agdd_layer	numeric value, accepts 32 or 50. When set, the results will attempt to resolve the date of the observation to an AGDD value for the location; the 32 or 50 represents the base value of the AGDD value returned. All AGDD values are based on a January 1st start date of the year in which the observation was taken.
six_sub_model	Affects the results of the six layers returned. Can be used to specify one of three submodels used to calculate the spring index values. Thus setting this field will change the results of six_leaf_layer and six_bloom_layer. Valid values include: 'lilac', 'zabelli' and 'arnoldred'. For more information see the NPN's Spring Index Maps documentation: <a href="https://www.usanpn.org/data/spring_indices">https://www.usanpn.org/data/spring_indices</a>

<code>additional_layers</code>	Data frame with first column named 'name' and containing the names of the layer for which to retrieve data and the second column named 'param' and containing string representations of the time/elevation subset parameter to use. This variable can be used to append additional geospatial layer data fields to the results, such that the date of observation in each row will resolve to a value from the specified layers, given the location of the observation.
<code>wkt</code>	WKT geometry by which filter data. Specifying a valid WKT within the contiguous US will filter data based on the locations which fall within that WKT.

### Details

This data type includes estimates of the dates of phenophase onsets and ends for individual plants and for animal species at a site during a user-defined time period. Each row represents a series of consecutive "yes" phenophase status records, beginning with the date of the first "yes" and ending with the date of the last "yes", submitted for a given phenophase on a given organism. Note that more than one consecutive series for an organism may be present within a single growing season or year.

Most search parameters are optional, however, users are encouraged to supply additional search parameters to get results that are easier to work with. `Request_Source` must be provided. This is a self-identifying string, telling the service who is asking for the data or from where the request is being made. It is recommended you provide your name or organization name. If the call to this function is acting as an intermediary for a client, then you may also optionally provide a user email and/or IP address for usage data reporting later.

Additional fields provides the ability to specify additional, non-critical fields to include in the search results. A complete list of additional fields can be found in the NPN service's companion documentation <https://docs.google.com/document/d/1yNjupricKOAXn6tY1sI7-EwkcfdGUZ7lxYv7fcPjO8/edit#heading=h.7yy4i3>. Metadata on all fields can be found in the following Excel sheet: [http://www.usanpn.org/files/metadata/individual\\_phenometri](http://www.usanpn.org/files/metadata/individual_phenometri)

### Value

Data table of all status records returned as per the search parameters. Null if output directed to file.

### Examples

```
## Not run:
#Download all saguaro data for 2013 and 2014
npn_download_individual_phenometrics(
  request_source="Your Name or Org Here",
  years=c('2013', '2014'),
  species_id=c(210),
  download_path="saguaro_data_2013_2014.json"
)

## End(Not run)
```



---

`nbn_download_magnitude_phenometrics`*Download Magnitude Phenometrics*

---

## Description

This function allows for a parameterized search of all magnitude phenometrics in the USA-NPN database, returning all records as per the search results in a data table. Data fetched from NPN services is returned as raw JSON before being channeled into a data table. Optionally results can be directed to an output file in which case raw JSON is saved to file; in that case, data is also streamed to file which allows for more easily handling of the data if the search otherwise returns more data than can be handled at once in memory.

## Usage

```
nbn_download_magnitude_phenometrics(  
  request_source,  
  years,  
  period_frequency = "30",  
  coords = NULL,  
  species_ids = NULL,  
  genus_ids = NULL,  
  family_ids = NULL,  
  order_ids = NULL,  
  class_ids = NULL,  
  pheno_class_ids = NULL,  
  station_ids = NULL,  
  species_types = NULL,  
  network_ids = NULL,  
  states = NULL,  
  phenophase_ids = NULL,  
  functional_types = NULL,  
  additional_fields = NULL,  
  climate_data = FALSE,  
  ip_address = NULL,  
  dataset_ids = NULL,  
  email = NULL,  
  download_path = NULL,  
  taxonomy_aggregate = NULL,  
  pheno_class_aggregate = NULL,  
  wkt = NULL  
)
```

## Arguments

`request_source` Required field, string. Self-identify who is making requests to the data service

years	Required field, list of strings. Specify the years to include in the search, e.g. c('2013','2014'). You must specify at least one year.
period_frequency	Required field, integer. The integer value specifies the number of days by which to delineate the period of time specified by the start_date and end_date, i.e. a value of 7 will delineate the period of time weekly. Any remainder days are grouped into the final delineation. This parameter, while typically an int, also allows for a "special" string value, "months" to be passed in. Specifying this parameter as "months" will delineate the period of time by the calendar months regardless of how many days are in each month. Defaults to 30 if omitted.
coords	List of float values, used to specify a bounding box as a search parameter, e.g. c ( lower_left_lat, lower_left_long, upper_right_lat, upper_right_long )
species_ids	List of unique IDs for searching based on species, e.g. c ( 3, 34, 35 )
genus_ids	List of unique IDs for searching based on taxonomic family, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids is also set.
family_ids	List of unique IDs for searching based on taxonomic family, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids is also set.
order_ids	List of unique IDs for searching based on taxonomic order, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids or family_ids are also set.
class_ids	List of unique IDs for searching based on taxonomic class, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids, family_ids or order_ids are also set.
pheno_class_ids	List of unique IDs for searching based on pheno class id, e.g. c ( 1, 5, 13 )
station_ids	List of unique IDs for searching based on site location, e.g. c ( 5, 9, ... )
species_types	List of unique species type names for searching based on species types, e.g. c ( "Deciduous", "Evergreen" )
network_ids	List of unique IDs for searching based on partner group/network, e.g. ( 500, 300, ... )
states	List of US postal states to be used as search params, e.g. c ( "AZ", "IL" )
phenophase_ids	List of unique IDs for searching based on phenophase, e.g. c ( 323, 324, ... )
functional_types	List of unique functional type names, e.g. c ( "Birds" )
additional_fields	List of additional fields to be included in the search results, e.g. ( "Station_Name", "Plant_Nickname" )
climate_data	Boolean value indicating that all climate variables should be included in additional_fields
ip_address	Optional field, string. IP Address of user requesting data. Used for generating data reports
dataset_ids	List of unique IDs for searching based on dataset, e.g. NEON or GRSM c(17,15)
email	Optional field, string. Email of user requesting data.
download_path	Optional file path to which search results should be re-directed for later use.

taxonomy_aggregate	Boolean value indicating whether to aggregate data by a taxonomic order higher than species. This will be based on the values set in family_ids, order_ids, or class_ids. If one of those three fields are not set, then this value is ignored.
pheno_class_aggregate	Boolean value indicating whether to aggregate data by the pheno class ids as per the pheno_class_ids parameter. If the pheno_class_ids value is not set, then this parameter is ignored. This can be used in conjunction with taxonomy_aggregate and higher taxonomic level data filtering.
wkt	WKT geometry by which filter data. Specifying a valid WKT within the contiguous US will filter data based on the locations which fall within that WKT.

## Details

This data type includes various measures of the extent to which a phenophase for a plant or animal species is expressed across multiple individuals and sites over a user-selected set of time intervals. Each row provides up to eight calculated measures summarized weekly, bi-weekly, monthly or over a custom time interval. These measures include approaches to evaluate the shape of an annual activity curve, including the total number of "yes" records and the proportion of "yes" records relative to the total number of status records over the course of a calendar year for a region of interest. They also include several approaches for standardizing animal abundances by observer effort over time and space (e.g. mean active bird individuals per hour). See the Metadata window for more information.

Most search parameters are optional, however, failing to provide even a single search parameter will return all results in the database. Request\_Source must be provided. This is a self-identifying string, telling the service who is asking for the data or from where the request is being made. It is recommended you provide your name or organization name. If the call to this function is acting as an intermediary for a client, then you may also optionally provide a user email and/or IP address for usage data reporting later.

Additional fields provides the ability to specify more, non-critical fields to include in the search results. A complete list of additional fields can be found in the NPN service's companion documentation <https://docs.google.com/document/d/1yNjupricKOAXn6tY1sI7-EwkcfdwGUZ7lxYv7fcPjO8/edit#heading=h.df3zspop>. Metadata on all fields can be found in the following Excel sheet: [http://www.usanpn.org/files/metadata/magnitude\\_phenometr](http://www.usanpn.org/files/metadata/magnitude_phenometr)

## Value

Data table of all status records returned as per the search parameters. Null if output directed to file.

## Examples

```
## Not run:
#Download book all saguaro data for 2013
nbn_download_magnitude_phenometrics(
  request_source="Your Name or Org Here",
  years=c(2013),
  species_id=c(210),
  download_path="saguaro_data_2013.json"
)
```

```
## End(Not run)
```

---

```
npn_download_site_phenometrics  
Download Site Phenometrics
```

---

## Description

This function allows for a parameterized search of all site phenometrics records in the USA-NPN database, returning all records as per the search parameters in a data table. Data fetched from NPN services is returned as raw JSON before being channeled into a data table. Optionally results can be directed to an output file in which case raw JSON is converted to CSV and saved to file; in that case, data is also streamed to file which allows for more easily handling of the data if the search otherwise returns more data than can be handled at once in memory.

## Usage

```
npn_download_site_phenometrics(  
  request_source,  
  years,  
  num_days_quality_filter = "30",  
  coords = NULL,  
  species_ids = NULL,  
  genus_ids = NULL,  
  family_ids = NULL,  
  order_ids = NULL,  
  class_ids = NULL,  
  pheno_class_ids = NULL,  
  station_ids = NULL,  
  species_types = NULL,  
  network_ids = NULL,  
  states = NULL,  
  phenophase_ids = NULL,  
  functional_types = NULL,  
  additional_fields = NULL,  
  climate_data = FALSE,  
  ip_address = NULL,  
  dataset_ids = NULL,  
  email = NULL,  
  download_path = NULL,  
  six_leaf_layer = FALSE,  
  six_bloom_layer = FALSE,  
  agdd_layer = NULL,  
  six_sub_model = NULL,  
  additional_layers = NULL,  
  taxonomy_aggregate = NULL,  
  pheno_class_aggregate = NULL,
```

```

    wkt = NULL
  )

```

### Arguments

request_source	Required field, string. Self-identify who is making requests to the data service
years	Required field, list of strings. Specify the years to include in the search, e.g. c('2013','2014'). You must specify at least one year.
num_days_quality_filter	Required field, defaults to 30. The integer value sets the upper limit on the number of days difference between the first Y value and the previous N value for each individual to be included in the data aggregation.
coords	List of float values, used to specify a bounding box as a search parameter, e.g. c ( lower_left_lat, lower_left_long, upper_right_lat, upper_right_long )
species_ids	List of unique IDs for searching based on species, e.g. c ( 3, 34, 35 )
genus_ids	List of unique IDs for searching based on taxonomic family, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids is also set.
family_ids	List of unique IDs for searching based on taxonomic family, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids is also set.
order_ids	List of unique IDs for searching based on taxonomic order, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids or family_ids are also set.
class_ids	List of unique IDs for searching based on taxonomic class, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids, family_ids or order_ids are also set.
pheno_class_ids	List of unique IDs for searching based on pheno class id, e.g. c ( 1, 5, 13 )
station_ids	List of unique IDs for searching based on site location, e.g. c ( 5, 9, ... )
species_types	List of unique species type names for searching based on species types, e.g. c ( "Deciduous", "Evergreen" )
network_ids	List of unique IDs for searching based on partner group/network, e.g. ( 500, 300, ... )
states	List of US postal states to be used as search params, e.g. c ( "AZ", "IL" )
phenophase_ids	List of unique IDs for searching based on phenophase, e.g. c ( 323, 324, ... )
functional_types	List of unique functional type names, e.g. c ( "Birds" )
additional_fields	List of additional fields to be included in the search results, e.g. ( "Station_Name", "Plant_Nickname" )
climate_data	Boolean value indicating that all climate variables should be included in additional_fields
ip_address	Optional field, string. IP Address of user requesting data. Used for generating data reports
dataset_ids	List of unique IDs for searching based on dataset, e.g. NEON or GRSM c(17,15)

email	Optional field, string. Email of user requesting data.
download_path	Optional file path to which search results should be re-directed for later use.
six_leaf_layer	Boolean value when set to true will attempt to resolve the date of the observation to a spring index, leafing value for the location at which the observations was taken
six_bloom_layer	Boolean value when set to true will attempt to resolve the date of the observation to a spring index, bloom value for the location at which the observations was taken
agdd_layer	numeric value, accepts 32 or 50. When set, the results will attempt to resolve the date of the observation to an AGDD value for the location; the 32 or 50 represents the base value of the AGDD value returned. All AGDD values are based on a January 1st start date of the year in which the observation was taken.
six_sub_model	Affects the results of the six layers returned. Can be used to specify one of three submodels used to calculate the spring index values. Thus setting this field will change the results of six_leaf_layer and six_bloom_layer. Valid values include: 'lilac', 'zabelli' and 'arnoldred'. For more information see the NPN's Spring Index Maps documentation: <a href="https://www.usanpn.org/data/spring_indices">https://www.usanpn.org/data/spring_indices</a>
additional_layers	Data frame with first column named 'name' and containing the names of the layer for which to retrieve data and the second column named 'param' and containing string representations of the time/elevation subset parameter to use. This variable can be used to append additional geospatial layer data fields to the results, such that the date of observation in each row will resolve to a value from the specified layers, given the location of the observation.
taxonomy_aggregate	Boolean value indicating whether to aggregate data by a taxonomic order higher than species. This will be based on the values set in family_ids, order_ids, or class_ids. If one of those three fields are not set, then this value is ignored.
pheno_class_aggregate	Boolean value indicating whether to aggregate data by the pheno class ids as per the pheno_class_ids parameter. If the pheno_class_ids value is not set, then this parameter is ignored. This can be used in conjunction with taxonomy_aggregate and higher taxonomic level data filtering.
wkt	WKT geometry by which filter data. Specifying a valid WKT within the contiguous US will filter data based on the locations which fall within that WKT.

## Details

This data type includes estimates of the overall onset and end of phenophase activity for plant and animal species at a site over a user-defined time period. Each row provides the first and last occurrences of a given phenophase on a given species, beginning with the date of the first observed "yes" phenophase status record and ending with the date of the last observed "yes" record of the user-defined time period. For plant species where multiple individuals are monitored at the site, the date provided for "first yes" is the mean of the first "yes" records for each individual plant at the site, and the date for "last yes" is the mean of the last "yes" records. Note that a phenophase may

have ended and restarted during the overall period of its activity at the site. These more fine-scale patterns can be explored in the individual phenometrics data.

Most search parameters are optional, however, users are encouraged to supply additional search parameters to get results that are easier to work with. Request\_Source must be provided. This is a self-identifying string, telling the service who is asking for the data or from where the request is being made. It is recommended you provide your name or organization name. If the call to this function is acting as an intermediary for a client, then you may also optionally provide a user email and/or IP address for usage data reporting later.

Additional fields provides the ability to specify additional, non-critical fields to include in the search results. A complete list of additional fields can be found in the NPN service's companion documentation <https://docs.google.com/document/d/1yNjupricKOAXn6tY1sI7-EwkcfwdGUZ7lxYv7fcPjO8/edit#heading=h.ueaxz>. Metadata on all fields can be found in the following Excel sheet: [http://www.usanpn.org/files/metadata/site\\_phenometrics\\_data](http://www.usanpn.org/files/metadata/site_phenometrics_data)

## Value

Data table of all status records returned as per the search parameters. Null if output directed to file.

## Examples

```
## Not run:
#Download all saguaro data for 2013 and 2014
npn_download_site_phenometrics(
  request_source="Your Name or Org Here",
  years=c('2013', '2014'),
  species_id=c(210),
  download_path="saguaro_data_2013_2014.json"
)

## End(Not run)
```

---

npn\_download\_status\_data

*Download Status and Intensity Records*

---

## Description

This function allows for a parameterized search of all status records in the USA-NPN database, returning all records as per the search parameters in a data table. Data fetched from NPN services is returned as raw JSON before being channeled into a data table. Optionally results can be directed to an output file in which case the raw JSON is converted to CSV and saved to file; in that case, data is also streamed to file which allows for more easily handling of the data if the search otherwise returns more data than can be handled at once in memory.

**Usage**

```

nbn_download_status_data(
  request_source,
  years,
  coords = NULL,
  species_ids = NULL,
  genus_ids = NULL,
  family_ids = NULL,
  order_ids = NULL,
  class_ids = NULL,
  station_ids = NULL,
  species_types = NULL,
  network_ids = NULL,
  states = NULL,
  phenophase_ids = NULL,
  functional_types = NULL,
  additional_fields = NULL,
  climate_data = FALSE,
  ip_address = NULL,
  dataset_ids = NULL,
  email = NULL,
  download_path = NULL,
  six_leaf_layer = FALSE,
  six_bloom_layer = FALSE,
  agdd_layer = NULL,
  six_sub_model = NULL,
  additional_layers = NULL,
  pheno_class_ids = NULL,
  wkt = NULL
)

```

**Arguments**

<code>request_source</code>	Required field, string. Self-identify who is making requests to the data service
<code>years</code>	Required field, list of strings. Specify the years to include in the search, e.g. <code>c('2013','2014')</code> . You must specify at least one year.
<code>coords</code>	List of float values, used to specify a bounding box as a search parameter, e.g. <code>c(lower_left_lat, lower_left_long, upper_right_lat, upper_right_long)</code>
<code>species_ids</code>	List of unique IDs for searching based on species, e.g. <code>c(3, 34, 35)</code>
<code>genus_ids</code>	List of unique IDs for searching based on taxonomic family, e.g. <code>c(3, 34, 35)</code> . This parameter will take precedence if <code>species_ids</code> is also set.
<code>family_ids</code>	List of unique IDs for searching based on taxonomic family, e.g. <code>c(3, 34, 35)</code> . This parameter will take precedence if <code>species_ids</code> is also set.
<code>order_ids</code>	List of unique IDs for searching based on taxonomic order, e.g. <code>c(3, 34, 35)</code> . This parameter will take precedence if <code>species_ids</code> or <code>family_ids</code> are also set.



class_ids	List of unique IDs for searching based on taxonomic class, e.g. c ( 3, 34, 35 ) . This parameter will take precedence if species_ids, family_ids or order_ids are also set.
station_ids	List of unique IDs for searching based on site location, e.g. c ( 5, 9, ... )
species_types	List of unique species type names for searching based on species types, e.g. c ( "Deciduous", "Evergreen" )
network_ids	List of unique IDs for searching based on partner group/network, e.g. ( 500, 300, ... )
states	List of US postal states to be used as search params, e.g. c ( "AZ", "IL" )
phenophase_ids	List of unique IDs for searching based on phenophase, e.g. c ( 323, 324, ... )
functional_types	List of unique functional type names, e.g. c ( "Birds" )
additional_fields	List of additional fields to be included in the search results, e.g. c( "Station_Name", "Plant_Nickname" )
climate_data	Boolean value indicating that all climate variables should be included in additional_fields
ip_address	Optional field, string. IP Address of user requesting data. Used for generating data reports
dataset_ids	List of unique IDs for searching based on dataset, e.g. NEON or GRSM c(17,15)
email	Optional field, string. Email of user requesting data.
download_path	Optional file path to which search results should be re-directed for later use.
six_leaf_layer	Boolean value when set to true will attempt to resolve the date of the observation to a spring index, leafing value for the location at which the observations was taken
six_bloom_layer	Boolean value when set to true will attempt to resolve the date of the observation to a spring index, bloom value for the location at which the observations was taken
agdd_layer	numeric value, accepts 32 or 50. When set, the results will attempt to resolve the date of the observation to an AGDD value for the location; the 32 or 50 represents the base value of the AGDD value returned. All AGDD values are based on a January 1st start date of the year in which the observation was taken.
six_sub_model	Affects the results of the six layers returned. Can be used to specify one of three submodels used to calculate the spring index values. Thus setting this field will change the results of six_leaf_layer and six_bloom_layer. Valid values include: 'lilac', 'zabelli' and 'arnoldred'. For more information see the NPN's Spring Index Maps documentation: <a href="https://www.usanpn.org/data/spring_indices">https://www.usanpn.org/data/spring_indices</a>
additional_layers	Data frame with first column named 'name' and containing the names of the layer for which to retrieve data and the second column named 'param' and containing string representations of the time/elevation subset parameter to use. This variable can be used to append additional geospatial layer data fields to the results, such that the date of observation in each row will resolve to a value from the specified layers, given the location of the observation.

pheno_class_ids	List of unique IDs for searching based on pheno class. Note that if both pheno_class_id and phenophase_id are provided in the same request, phenophase_id will be ignored.
wkt	WKT geometry by which filter data. Specifying a valid WKT within the contiguous US will filter data based on the locations which fall within that WKT.

### Details

Most search parameters are optional, however, users are encouraged to supply additional search parameters to get results that are easier to work with. Request\_Source must be provided. This is a self-identifying string, telling the service who is asking for the data or from where the request is being made. It is recommended you provide your name or organization name. If the call to this function is acting as an intermediary for a client, then you may also optionally provide a user email and/or IP address for usage data reporting later.

Additional fields provides the ability to specify more, non-critical fields to include in the search results. A complete list of additional fields can be found in the NPN service's companion documentation <https://docs.google.com/document/d/1yNjupricKOAXn6tY1sI7-EwkcfwdGUZ7lxYv7fcPjO8/edit#heading=h.w0nctge>. Metadata on all fields can be found in the following Excel sheet: [http://www.usanpn.org/files/metadata/status\\_intensity\\_datafi](http://www.usanpn.org/files/metadata/status_intensity_datafi)

### Value

Data table of all status records returned as per the search parameters. Null if output directed to file.

### Examples

```
## Not run:
#Download all saguaro data for 2016
npn_download_status_data(
  request_source="Your Name or Org Here",
  years=c(2016),
  species_id=c(210),
  download_path="saguaro_data_2016.json"
)

## End(Not run)
```

---

npn\_get\_agdd\_point\_data

*Get AGDD Point Value*

---

### Description

This function is for requesting AGDD point values. Because the NPN has a separate data service that can provide AGDD values which is more accurate than Geoserver this function is ideal when requested AGDD point values.

**Usage**

```
npn_get_agdd_point_data(layer, lat, long, date, store_data = TRUE)
```

**Arguments**

layer	The name of the queried layer
lat	The latitude of the queried point
long	The longitude of the queried point
date	The queried date
store_data	Boolean value. If set TRUE then the value retrieved will be stored in a global variable named point_values for later use

**Details**

As this function only works for AGDD point values, if it's necessary to retrieve point values for other layers please try the npn\_get\_point\_data function.

**Value**

Returns a numeric value of the AGDD value at the specified lat/long/date. If no value can be retrieved, then -9999 is returned.

---

```
npn_get_custom_agdd_raster
```

*Get Custom AGDD Raster Map*

---

**Description**

This function takes a series of variables used in calculating AGDD and returns a raster of the continental USA with each pixel representing the calculated AGDD value based on start and end date. This function leverages the USA-NPN geo web services

**Usage**

```
npn_get_custom_agdd_raster(  
  method,  
  climate_data_source,  
  temp_unit,  
  start_date,  
  end_date,  
  base_temp,  
  upper_threshold = NULL  
)
```

**Arguments**

method	Takes "simple" or "double-sine" as input. This is the AGDD calculation method to use for each data point. Simple refers to simple averaging.
climate_data_source	Specified the climate data set to use. Takes either "PRISM" or "NCEP" as input.
temp_unit	The unit of temperature to use in the calculation. Takes either "Fahrenheit" or "Celsius" as input.
start_date	Date at which to begin the AGDD calculations
end_date	Date at which to end the AGDD calculations
base_temp	This is the lowest temperature for each day for it to be considered in the calculation.
upper_threshold	This parameter is only applicable for the double-sine method. This sets the highest temperature to be considered in any given day's AGDD calculation

---

nnp\_get\_custom\_agdd\_time\_series

*Get Custom AGDD Time Series*


---

**Description**

This function takes a series of variables used in calculating AGDD and returns an AGDD time series, based on start and end date, for a given location in the continental US. This function leverages the USA-NPN geo web services

**Usage**

```
nnp_get_custom_agdd_time_series(
  method,
  start_date,
  end_date,
  base_temp,
  climate_data_source,
  temp_unit,
  lat,
  long,
  upper_threshold = NULL
)
```

**Arguments**

method	Takes "simple" or "double-sine" as input. This is the AGDD calculation method to use for each data point. Simple refers to simple averaging.
start_date	Date at which to begin the AGDD calculations
end_date	Date at which to end the AGDD calculations

base_temp	This is the lowest temperature for each day for it to be considered in the calculation.
climate_data_source	Specified the climate data set to use. Takes either "PRISM" or "NCEP" as input.
temp_unit	The unit of temperature to use in the calculation. Takes either "Fahrenheit" or "Celsius" as input.
lat	The latitude of the location for which to calculate the time series
long	The longitude of the location for which to calculate the time series
upper_threshold	This parameter is only applicable for the double-sine method. This sets the highest temperature to be considered in any given day's AGDD calculation

---

npn\_get\_layer\_details *Get Geospatial Data Layer Details*

---

## Description

This function will return information about the various data layers available via the NPN's geospatial web services. Specifically, this function will query the NPN's GetCapabilities endpoint and parse the information on that page about the layers. For each layer, this function will retrieve the layer name (as to be specified elsewhere programmatically), the title (human readable), the abstract, which describes the data in the layer, the dimension name and dimension range for specifying specific date values from the layer.

## Usage

```
npn_get_layer_details()
```

## Details

Information about the layers can also be viewed at the getCapabilities page directly: <https://geoserver.usanpn.org/geoserver/wms>

## Value

Data frame containing all layer details as specified in function description.

## Examples

```
## Not run:  
layers <- npn_get_layer_details()  
  
## End(Not run)
```

---

`nbn_get_phenophases_for_taxon`*Get Phenophases for Taxon*

---

### Description

This function gets a list of phenophases that are applicable for a provided taxonomic grouping, e.g. family, order. Note that since a higher taxonomic order will aggregate individual species not every phenophase returned through this function will be applicable for every species belonging to that taxonomic group.

### Usage

```
nbn_get_phenophases_for_taxon(  
  family_ids = NULL,  
  order_ids = NULL,  
  class_ids = NULL,  
  genus_ids = NULL,  
  date = NULL,  
  return_all = 0,  
  ...  
)
```

### Arguments

<code>family_ids</code>	List of taxonomic family ids to search for.
<code>order_ids</code>	List of taxonomic order ids to search for.
<code>class_ids</code>	List of taxonomic class ids to search for
<code>genus_ids</code>	List of taxonomic genus ids to search for
<code>date</code>	Specify the date of interest. For this function to return anything, either this value must be set or <code>return_all</code> must be 1.
<code>return_all</code>	Takes either 0 or 1 as input and defaults to 0. For this function to return anything, either this value must be set to 1 or <code>date</code> must be set.
<code>...</code>	Curl options passed on to <a href="#">GET</a>

### Details

It's also important to note that phenophase definitions can change for individual species over time, so there's a need to specify either a date of interest, or to explicitly state that the function should return all phenophases that were ever applicable for any species belonging to the specified taxonomic group.

When called, this function requires of these three parameters, exactly one of `family_ids`, `order_ids` or `class_ids` to be set.

---

nnp\_get\_point\_data      *Get Point Data Value*

---

### Description

This function can get point data about any of the NPN geospatial layers.

### Usage

```
nnp_get_point_data(layer, lat, long, date, store_data = TRUE)
```

### Arguments

layer	The coverage id (machine name) of the layer for which to retrieve. Applicable values can be found via the <code>nnp_get_layer_details()</code> function under the 'name' column.
lat	The latitude of the point
long	The longitude of the point
date	The date for which to get a value
store_data	Boolean value. If set TRUE then the value retrieved will be stored in a global variable named <code>point_values</code> for later use

### Details

Please note that this function pulls this from the NPN's WCS service so the data may not be totally precise. If you need precise AGDD values try using the `nnp_get_agdd_point_data` function.

---

nnp\_groups      *Get Partner Groups*

---

### Description

Returns a list of all groups participating in the NPN's data collection program. These details can be used to further filter other service endpoints' results.

### Usage

```
nnp_groups(use_hierarchy = FALSE, ...)
```

### Arguments

use_hierarchy	Boolean indicating whether or not the list of networks should be represented in a hierarchy. Defaults to FALSE
...	Curl options passed on to <a href="#">GET</a>

**Value**

List of partner groups, including ID and name

---

nnp_lookup_names	<i>Species Name Lookup</i>
------------------	----------------------------

---

**Description**

Look up species IDs by taxonomic or common name

**Usage**

```
nnp_lookup_names(name, type = "genus", fuzzy = FALSE)
```

**Arguments**

name	A scientific or common name
type	One of common_name, genus, or species
fuzzy	One of TRUE or FALSE, if FALSE, uses fuzzy search via agrep, if FALSE, uses grep

**Examples**

```
## Not run:
nnp_lookup_names(name='Pinus', type='genus')
nnp_lookup_names(name='pine', type='common_name')
nnp_lookup_names(name='bird', type='common_name', fuzzy=TRUE)

## End(Not run)
```

---

nnp_phenophases	<i>Get Phenophases</i>
-----------------	------------------------

---

**Description**

Retrieves a complete list of all phenophases in the NPN database

**Usage**

```
nnp_phenophases(...)
```

**Arguments**

...	Curl options passed on to <a href="#">GET</a>
-----	---



---

`npr_phenophases_by_species`*Get Phenophase for Species*

---

**Description**

Retrieves the phenophases applicable to species for a given date. It's important to specify a date since protocols/phenophases for any given species can change from year to year

**Usage**

```
npr_phenophases_by_species(species_ids, date, ...)
```

**Arguments**

<code>species_ids</code>	List of <code>species_ids</code> for which to get phenophase information
<code>date</code>	The applicable date for which to retrieve phenophases for the given species
<code>...</code>	Curl options passed on to <a href="#">GET</a>

---

`npr_phenophase_definitions`*Get Phenophase Definitions*

---

**Description**

Retrieves a complete list of all phenophase definitions.

**Usage**

```
npr_phenophase_definitions(...)
```

**Arguments**

<code>...</code>	Curl options passed on to <a href="#">GET</a>
------------------	---

---

`npr_phenophase_details`*Get Phenophase Details*

---

**Description**

Retrieves additional details for select phenophases, including full list of applicable phenophase definition IDs and phenophase revision notes over time

**Usage**

```
npr_phenophase_details(ids = list(), ...)
```

**Arguments**

<code>ids</code>	Takes a list of phenophase ids for which to retrieve additional details.
<code>...</code>	Curl options passed on to <a href="#">GET</a>

---

`npr_pheno_classes`*Get Pheno Classes*

---

**Description**

Gets information about all pheno classes, which a higher-level order of phenophases

**Usage**

```
npr_pheno_classes(...)
```

**Arguments**

<code>...</code>	Curl options passed on to <a href="#">GET</a>
------------------	---

---

nnp_set_env	<i>Set Environment</i>
-------------	------------------------

---

**Description**

By default this library will call the NPN's production services but in some cases it's preferable to access the development web services so this function allows for manually setting the web service endpoints to use DEV instead. Just pass in "dev" to this function to change the endpoints to use.

**Usage**

```
nnp_set_env(env = "ops")
```

**Arguments**

env	The environment to use. Should be "ops" or "dev"
-----	--

---

nnp_species	<i>Get Species</i>
-------------	--------------------

---

**Description**

Returns a complete list of all species information of species represented in the NPN database.

Returns information about a species based on the NPN's unique ID for that species

Search for species by state

Search NPN species information using a number of different parameters, which can be used in conjunction with one another, including: - Species on which a particular group or groups are actually collecting data - What species were observed in a given date range - What species were observed at a particular station or stations

**Usage**

```
nnp_species(...)

nnp_species_id(ids, ...)

nnp_species_state(state, kingdom = NULL, ...)

nnp_species_search(
  network = NULL,
  start_date = NULL,
  end_date = NULL,
  station_id = NULL,
  ...
)
```

**Arguments**

...	Curl options passed on to <a href="#">GET</a>
ids	List of species ids for which to retrieve information
state	A US postal state code to filter results
kingdom	Filters results by taxonomic kingdom. Takes either 'Animalia' or 'Plantae'
network	filter species based on a list of unique identifiers of NPN groups that are actually observing data on the species. Takes a list of IDs
start_date	filter species by date observed. This sets the start date of the date range and must be used in conjunction with end_date
end_date	filter species by date observed. This sets the end date of the date range and must be used in conjunction with start_date
station_id	filter species by a list of unique site identifiers

**Value**

data.frame of species and their IDs  
 data.frame of the species' information

**Examples**

```
## Not run:
npn_species()
npn_species_id(ids = 3)

## End(Not run)
## Not run:
npn_species_state(state = "AZ")
npn_species_state(state = "AZ", kingdom = "Plantae")

## End(Not run)
```

---

npn\_species\_types      *Get Species Types*

---

**Description**

Return all plant or animal functional types used in the NPN database.

**Usage**

```
npn_species_types(kingdom = "Plantae", ...)
```

**Arguments**

kingdom	The kingdom for which to return functional types; either 'Animalia' or 'Plantae'. Defaults to Plantae.
...	Curl options passed on to <a href="#">GET</a>

---

nbn_stations	<i>Get Station Data</i>
--------------	-------------------------

---

**Description**

Get a list of all stations, optionally filtered by state

**Usage**

```
nbn_stations(state_code = NULL, ...)
```

**Arguments**

state_code	The postal code of the US state by which to filter the results returned. Leave empty to get all stations.
...	Curl options passed on to <a href="#">GET</a>

**Value**

Stations' latitude and longitude, names, and ids.

**Examples**

```
## Not run:
nbn_stations()
nbn_stations('AZ')

## End(Not run)
```

---

nbn_stations_by_location	<i>Get station data based on a WKT defined geography.</i>
--------------------------	---

---

**Description**

Takes a Well-Known Text based geography as input and returns data for all stations, including unique IDs, within that boundary.

**Usage**

```
nbn_stations_by_location(wkt, ...)
```

**Arguments**

wkt	Required field specifying the WKT geography to use.
...	Curl options passed on to <a href="#">GET</a>

**Value**

Station data as as data.frame.

**Examples**

```
## Not run:
head( npr_stations_by_state(wkt="POLYGON((
-110.94484396954107 32.23623109416672,-110.96166678448247 32.23594069208043,
-110.95960684795904 32.21328646993733,-110.94244071026372 32.21343170728929,
-110.93935080547857 32.23216538049456,-110.94484396954107 32.23623109416672)))")
)

## End(Not run)
```

---

npr\_stations\_by\_state *Get number of stations by state.*

---

**Description**

Get number of stations by state.

**Usage**

```
npr_stations_by_state(...)
```

**Arguments**

...                    Curl options passed on to [GET](#)

**Value**

Number of stations by state as a data.frame.

**Examples**

```
## Not run:
head( npr_stations_by_state() )

## End(Not run)
```

---

nnp\_stations\_with\_spp *Get Stations with Species*

---

### Description

Get a list of all stations which have an individual whom is a member of a set of species.

### Usage

```
nnp_stations_with_spp(speciesid, ...)
```

### Arguments

speciesid	Required. Species id numbers, from 1 to infinity, potentially, use e.g., c(52, 53, etc.) if more than one species desired (numeric)
...	Curl options passed on to <a href="#">GET</a>

### Value

Stations' latitude and longitude, names, and ids.

### Examples

```
## Not run:
nnp_stations_with_spp(speciesid = c(52,53,54))
nnp_stations_with_spp(speciesid = 53)

## End(Not run)
```

---

rnpn-defunct *Defunct functions in rnpn*

---

### Description

- [nnp\\_obsspbyday](#): Removed.
- [nnp\\_allobssp](#): Removed.
- [nnp\\_indspatstations](#): Removed.
- [nnp\\_indsatstations](#): Removed.
- [nnp\\_stationsbystate](#): Removed.
- [nnp\\_stationswithspp](#): Removed.

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