POLARIS SOILS SERVICE

API Documentation 2020

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Service Overview

The POLARIS Service API offers a means to clip POLARIS data to a user-provided area of interest. POLARIS Data is a 30-m resolution soil map of the Contiguous United States and includes an array of soil parameters at certain depths along with four statistics about each parameter.

The Polaris API is broken down into a POST and a GET request. The POST request is where the boundary, soil parameters, and statistics are sent to the service. The response is the file name that can be used to retrieve GeoTiff that was generated in the back-end. The GET request consists of passing the file name from the POST request and the response is the clipped Polaris GeoTiff.

SOIL PH IN H2O	AREA PER PART (ACRES)	% OF TOTAL
6.07-6.09	6.76	4.52%
6.09-6.11	13.2	8.82%
6.11-6.13	31.18	20.84%
6.13-6.15	46.87	31.33%
6.15-6.17	30.23	20.21%
6.17-6.19	21.36	14.28%

Average value for field: 6.14

POLARIS Service API in FarmScope

GET Request

GET Request Example – application/json

```
{
"inputShape":"{"geometryType":"esriGeometryPolygon","features":[{"geometry":{"ring
s":[[[-88.509566,39.598643],[-88.509484,39.593239],[-88.509476,39.589665],[-
88.514219,39.589738],[-88.518608,39.589742],[-88.518855,39.589739] ]],
"spatialReference":{"wkid":4326}}}]},
"SoilValue": "mean",
"SoilHorizon": "15-30",
"Statistics": "mean"
}
```

Header Parameters

content-type: " x-www-form-urlencoded"

Ocp-Apim-Subscription-Key: Subscription keys are given upon purchase -   Purchase APIs ↗

Request Parameters

Parameter	Data Type	Required?	Default	Options	Description
inputShape	Esri Geometry Polygon	Yes	--	--	The shape information for field in esri Geometry Polygon format.
SoilValue	String	Yes	--	See SoilValue table	Soil property to generate map of.
Statistics	String	Yes	--	min, max, mean, and var	Statistics options (min, max, mean, and variance)
SoilHorizon	String	Yes	--	"0-5" "5-15" "15-30" "30-60" "60-100" "100-200"	Soil depth in CM.

Request Parameter Details

SoilValue Details

Variable	Units	Description
silt	%	silt percentage
sand	%	sand percentage
clay	%	clay percentage
bd	g/cm^3	bulk density
awc	m^3/ m^3	available water content
theta_s	m^3/ m^3	saturated soil water content
theta_r	m^3/ m^3	residual soil water content
theta_33	m^3/ m^3	soil water content at field capacity
theta_1500	m^3/ m^3	soil water content at the wilting point
ksat	cm/hr	saturated hydraulic conductivity
resdt	cm	depth to restriction layer
ph	N/A	soil pH in H2O
om	%	organic matter
caco3	%	calcium carbonate in soil
cec	meq/100g	cation exchange capacity of soil
lambda	N/A	pore size distribution index (brooks-corey)
hb	cm	bubbling pressure (brooks-corey)
n	N/A	measure of the pore size distribution (van genuchten)
alpha	cm^{-1}	scale parameter inversely proportional to mean pore diameter (van genuchten)

Soil Statistic Details

1. **mean** – Arithmetic mean
2. **min** – Minimum
3. **max** – Maximum
4. **var** – Variance

GET Response

GET Response Example (Snippet) – application/json

```
{"results":[{"paramName":"MeanFieldValue","dataType":"GPString","value":"6.17"},{"
paramName":"PolygonOutput","dataType":"GPFeatureRecordSetLayer","value":{"displayF
ieldName":"","geometryType":"esriGeometryPolygon","spatialReference":{"wkid":4326,
"latestWkid":4326},"fields":[{"name":"FID","type":"esriFieldTypeOID","alias":"FID"
},{"name":"ID","type":"esriFieldTypeInteger","alias":"ID"},{"name":"GRIDCODE","typ
e":"esriFieldTypeInteger","alias":"GRIDCODE"},{"name":"val_float","type":"esriFiel
dTypeDouble","alias":"val_float"},{"name":"Shape_Length","type":"esriFieldTypeDoub
le","alias":"Shape_Length"},{"name":"Shape_Area","type":"esriFieldTypeDouble","ali
as":"Shape_Area"}],"features":[{"attributes":{"FID":1,"ID":1,"GRIDCODE":6179237,"v
al_float":6.1792369999999996,"Shape_Length":0.0025317420608140925,"Shape_Area":2.0
972534543453469e-007},"geometry":{"rings":[[[-
88.513221989999977,39.598409325000034],[-88.514217762999976,39.598469014000045],[-
88.51420851599994,39.598557971000048]...
```

Citations:

- POLARIS Data and Info: http://hydrology.cee.duke.edu/POLARIS/PROPERTIES/v1.0/
- Chaney et al, "POLARIS: A 30-meter probabilistic soil series," USGS: https://pubs.er.usgs.gov/publication/70170912
- Esri Geometry Polygon: http://resources.esri.com/help/9.3/arcgisengine/arcobjects/esriGeometry/esriGeometryType.htm

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