

Writing SDA Queries that Return Geometry

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Introduction

This is a short tutorial on how to interact with the Soil Data Access (SDA) web-service (<http://sdmdataaccess.nrcs.usda.gov/>) using R. Queries are written using a dialect of SQL ([https://technet.microsoft.com/en-us/library/bb264565\(v=sql.90\).aspx](https://technet.microsoft.com/en-us/library/bb264565(v=sql.90).aspx)). On first glance SQL appears similar to the language used to write NASIS queries and reports, however, these are two distinct languages. Soil Data Access is a "window" into the spatial and tabular data associated with the current SSURGO snapshot. Queries can contain spatial and tabular filters. If you are new to SDA or SQL, have a look at this page (<http://sdmdataaccess.nrcs.usda.gov/QueryHelp.aspx>).

If this is your first time using SDA, please see a related tutorial (https://r-forge.r-project.org/scm/viewvc.php/*checkout*/docs/soilDB/SDA-tutorial.html?root=aqp) to get started.

Additional tips on advanced spatial queries can be found here (<http://sdmdataaccess.sc.egov.usda.gov/documents/AdvancedSpatialDataAccess.pdf>).

[details pending]

Follow along with the blocks of code below by copying / pasting into a new R "script" document. Each block of commands can be run by pasting them into the R console, or by "stepping through" lines of code by moving the cursor to the top of a block (in the R script panel) and repeatedly pressing ctrl + enter.

Install Required R Packages

You only need to do this once. If you haven't installed these packages, then copy the code below and paste into the RStudio "console" pane.

```
# run these commands in the R console  
# stable version from CRAN + dependencies  
install.packages("httr", dep=TRUE)  
install.packages("soilDB", dep=TRUE)  
install.packages("rgdal", dep = TRUE)  
install.packages("raster", dep = TRUE)  
install.packages("rgeos", dep = TRUE)  
# latest versions from r-forge  
install.packages("soilDB", repos = "http://R-Forge.R-project.org", type = "source")
```

Simple Queries

Now that you have the required packages, load them into the current R session.

```
library(soilDB)
library(rgeos)
library(sp)
library(maps)

# get polygons for a single mukey
q <- "SELECT G.MupolygonWktWgs84 as geom, '462594' as mukey from SDA_Get_MupolygonWktWgs84_from_
Mukey('462594') as G"
res <- SDA_query(q)

# result is a data.frame, "MupolygonWktWgs84" contains WKT representation of geometry
str(res)
```

```
## 'data.frame': 38 obs. of 2 variables:
## $ geom : chr "POLYGON ((-120.77740109665115 37.628472182459824, -120.77724116990088 37.6284
67823952107, -120.77715902715808 37.62842004666634)| __truncated__ "POLYGON ((-120.8730746755266
1 37.62900777895004, -120.87300762026977 37.628995038704751, -120.87297861832062 37.628982297912
977)| __truncated__ "POLYGON ((-120.69082792184261 37.642203424277156, -120.69061368129361 37.64
2354969307206, -120.69051862990732 37.64238480913064)| __truncated__ "POLYGON ((-121.06422300901
647 37.594782773539833, -121.06430297298499 37.594700295834713, -121.06438762935065 37.594582948
6151,")| __truncated__ ...
## $ mukey: int 462594 462594 462594 462594 462594 462594 462594 462594 462594 462594 462594 ...
```

```
# convert to SPDF
s <- processSDA_WKT(res)

# check
head(s@data)
```

gid	mukey
1	462594
2	462594
3	462594
4	462594
5	462594
6	462594

```
plot(s)
```



```
# get polygons associated with map units that contain "amador" as a major component
q <- "select G.MupolygonWktWgs84 as geom, mapunit.mukey, muname
FROM mapunit
CROSS APPLY SDA_Get_MupolygonWktWgs84_from_Mukey(mapunit.mukey) as G
WHERE mukey IN (SELECT DISTINCT mukey FROM component WHERE compname like 'amador%' AND majcompfl
ag = 'Yes')"
```

```
res <- SDA_query(q)
str(res)
```

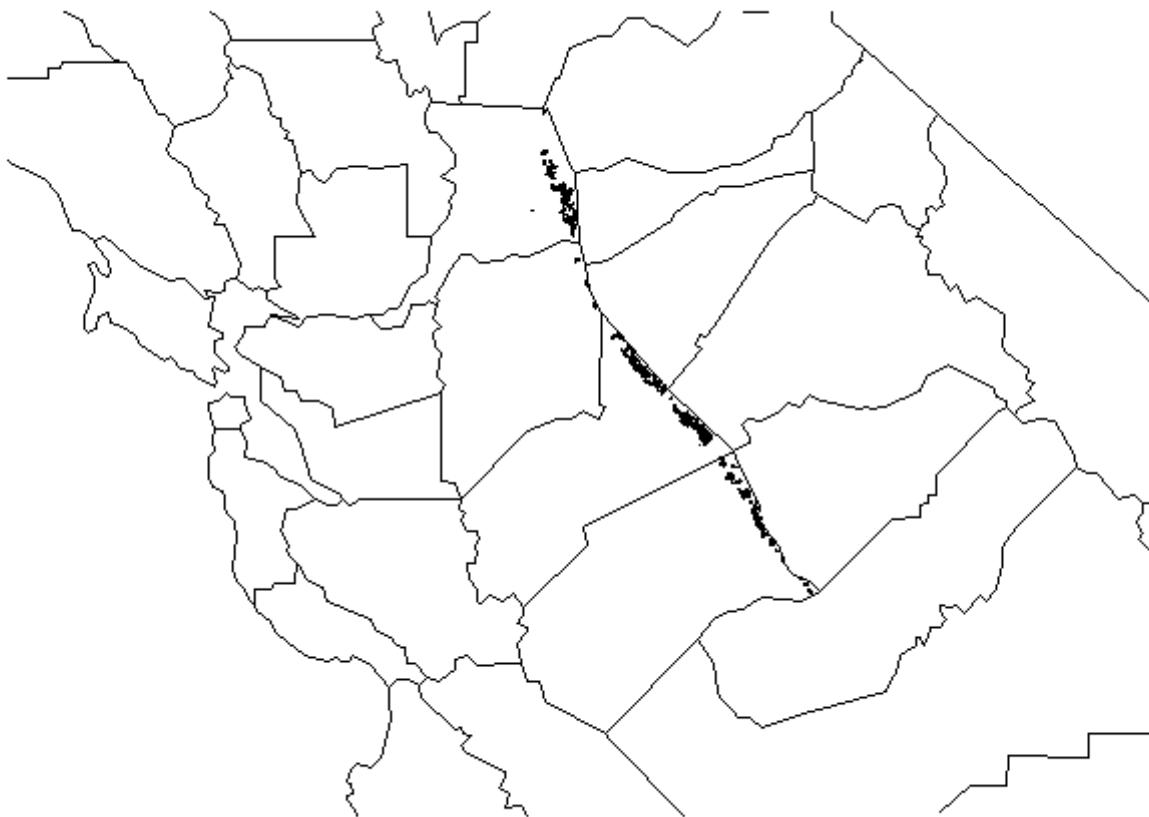
```
## 'data.frame': 262 obs. of 3 variables:
## $ geom : chr "POLYGON ((-121.15252230315829 38.580559769164942, -121.15239322126237 38.580
5240627318, -121.15232348375943 38.580526744993861,"| __truncated__ "POLYGON ((-121.056860277119
23 38.461657600967762, -121.05679087490459 38.4616014427027, -121.05679053944492 38.461583337311
417,"| __truncated__ "POLYGON ((-121.10304826277805 38.47214151628399, -121.1029176725373 38.472
175211524956, -121.10254082289315 38.472307142353067,"| __truncated__ "POLYGON ((-121.1423778475
304 38.553496947813784, -121.14231028963967 38.553483871770844, -121.14225094505555 38.553458894
016423"| __truncated__ ...
## $ mukey : int 461845 461845 461845 461845 461845 461845 461845 461845 461845 461845 ...
## $ muname: chr "Amador-Gillender complex, 2 to 15 percent slopes" "Amador-Gillender complex,
2 to 15 percent slopes" "Amador-Gillender complex, 2 to 15 percent slopes" "Amador-Gillender co
mplex, 2 to 15 percent slopes" ...
```

```
s <- processSDA_WKT(res)
```

```
# check: OK
head(s@data)
```

gid	mukey	muname
1	461845	Amador-Gillender complex, 2 to 15 percent slopes
2	461845	Amador-Gillender complex, 2 to 15 percent slopes
3	461845	Amador-Gillender complex, 2 to 15 percent slopes
4	461845	Amador-Gillender complex, 2 to 15 percent slopes
5	461845	Amador-Gillender complex, 2 to 15 percent slopes
6	461845	Amador-Gillender complex, 2 to 15 percent slopes

```
# map
par(mar=c(0,0,0,0))
map('county', 'California', xlim=c(-123.25, -118.75), ylim=c(36.5, 39))
plot(s, add=TRUE)
```



This document is based on `soilDB` version 1.6.9.