Sample Query Purpose

The purpose of this sample is to illustrate how to constrain the results of a query to an area of interest, by referencing map units that coincide with that area of interest. The Soil Data Mart Query Guide indicates that, at least for SSURGO data, this can also be done by referencing other geographic regions that are guaranteed to always be present in the data for a SSURGO survey area. Specific examples are not provided for those cases, primarily because referencing anything other than map units is a relatively inaccurate way to constrain the results of a query to an area of interest.

How is a map unit unambiguously identified?

A map unit can be unambiguously identified by the combination of survey area symbol and map unit symbol (legend.areasymbol and mapunit.musym). This combination of attribute values can be used because we know that the survey area symbol for the STATSGO survey area is "US", and we know that the survey area symbol for any SSURGO survey area will never be "US", and because we know the no two SSURGO survey areas will ever share the same value for legend.areasymbol. These conventions were introduced in the sample query document titled "Discriminating between SSURGO and STATSGO". So in other words, for the entire set of SSURGO and STATSGO map units, combined, no two map units in that set will share the same combination of values for legend.areasymbol and mapunit.musym.

A map unit can also be unambiguously identified by its corresponding national map unit symbol (mapunit.mukey), alone. Again, this pertains to the entire set of SSURGO and STATSGO map units, combined. In other words, for the entire set of SSURGO and STATSGO map units, combined, no two map units in that set will ever share the same value for mapunit.mukey.

Referencing map units using national map unit symbols (mapunit.mukey) is the preferred approach, because the syntax is less messy and it is possible to construct a more efficient query using mapunit.mukey, alone. The reason we mention both possibilities is that, for some methods of determining which map units coincide with an area of interest, national map unit symbols are not available.

How can I determine which map units coincide with my area of interest?

Soil Data Access Area of Interest Map

Is this option available for SSURGO?	Depends on whether or not SSURGO spatial data is available for the entire area of interest.
Is this option available for STATSGO?	No, at least not a this time, because the initial version of this interface is based entirely on SSURGO data. If and when a similar interface based on STATSGO data might be available remains to be determined.

Are survey area symbols (legend.areasymbol) and survey area specific map unit symbols (mapunit.musym) available via this option?	Technically, yes, but this interface was designed to automatically generate a properly formatted comma delimited list of map unit keys for an area of interest, so there would be no reason to purse using survey area and map unit symbols, since they would have to be manually compiled.
Are national map unit symbols (mapunit.mukey) available via this option?	Yes, this interface was designed to automatically generate a properly formatted comma delimited list of map unit keys for an area of interest.

The Area of Interest interface available via the Soil Data Access website lets you define an area of interest and then request an automatically generated, properly formatted comma delimited list of map unit keys for an area of interest. This list of map unit keys can be copied and pasted into a query.

For the initial release of this interface in early 2007, a list of map unit keys can only be generated for a relatively small area of interest. Later releases will provide the capability to generate a list of map unit keys for larger areas of interest. At the time that this was written we hadn't yet determined the maximum extent that would be allowed for the first release of Soil Data Access Area of Interest map. It will allow at least as large of area of interest as Web Soil Survey (10,000 acres), and probably larger.

In most cases, using this interface will probably be the preferred method for determining which map units coincide with an area of interest.

Web Soil Survey Soil Map

Is this option available for SSURGO?	Depends on whether or not SSURGO spatial data is available for the entire area of interest.
Is this option available for STATSGO?	No, because Web Soil Survey is based exclusively on SSURGO data.
Are survey area symbols (legend.areasymbol) and survey area specific map unit symbols (mapunit.musym) available via this option?	Yes, because Web Soil Survey is capable of displaying either survey area specific map unit symbols or national map unit symbols. Web Soil Survey refers to map unit keys as "national map unit symbols".
Are national map unit symbols (mapunit.mukey) available via this option?	Yes, because Web Soil Survey is capable of displaying either survey area specific map unit symbols or national map unit symbols. Web Soil Survey refers to map unit keys as "national map unit symbols".

The Web Soil Survey application allows a user to define a limited size area of interest. An area of interest that doesn't correspond to a survey area is limited to no more than 10,000 acres. After defining an area of interest, a user can indicate whether traditional map unit symbols or map unit keys should be displayed. In Web Soil Survey, map unit keys are referred to as "national map unit symbols".

After defining an area of interest, select the tab titled "Soil Map". On the "Soil Map" tab, in tabular format, survey area symbols are always displayed and either map unit symbols or map unit keys are displayed, depending on which option the user selected. Regardless of which map unit symbol option was selected, the resulting column is always named "Map Unit Symbol", with no further qualifiers.

Obviously this option is only suitable for a relatively small area of interest, because the complete set of map unit identifiers has then be manually copied and pasted, one at a time, in order to be used in a query.

GIS

Is this option available for SSURGO?	Depends on whether or not SSURGO spatial data is available for the entire area of interest.
Is this option available for STATSGO?	Yes
Are survey area symbols (legend.areasymbol) and survey area specific map unit symbols (mapunit.musym) available via this option?	Yes, because these two attributes are included in any map unit feature class.
Are national map unit symbols (mapunit.mukey) available via this option?	Yes, because this attribute is included in any map unit feature class.

Determining which map units coincide with an area of interest would be accomplished by downloading all of the soil spatial data necessary to completely span the area of interest, and loading that data into the GIS, and then by using the capabilities of the GIS software to determine the distinct set of map unit identifiers for the set of map units that coincide with the area of interest, in whole or part.

Typically, other layers would be loaded into the GIS to help define the boundary or boundaries of the area of interest. To utilize this approach, one would have to somehow determine the complete set of survey areas that would be necessary to completely span the area of interest, and then request the spatial data for those survey areas from either the Soil Data Mart or the Geospatial Data Gateway.

This option is one of the better approaches for a complex area of interest that includes more than one spatial extent. This option may also be preferable for a larger area of interest, because for a sophisticated enough GIS user, it may not be necessary to have to manually copy and paste each individual map unit identifier. Unfortunately, this option is only available to those that have access to GIS software and the know-how to utilize that software for this purpose.

Soil Survey Manuscript Publication Soil Map

Is this option available for SSURGO?	Depends on whether or not a soil survey manuscript publication exists for each necessary survey area, and whether or not one has access to each necessary soil survey manuscript publication.
Is this option available for STATSGO?	No, because a soil survey manuscript publication is not available for STATSGO.

Are survey area symbols (legend.areasymbol) and survey area specific map unit symbols (mapunit.musym) available via this option?	Survey area specific map unit symbols are available but determining the area symbol corresponding to a published soil survey manuscript requires some extra effort.
Are national map unit symbols (mapunit.mukey) available via this option?	No, because only the survey area specific map unit symbols are displayed in a soil survey manuscript publication soil map.

There are two complications associated with using this approach to determine which map units coincide with an area of interest.

1. Soil survey manuscript publications are often out of date before they even become publicly available. In addition, data for the corresponding survey area may have been extensively updated since a manuscript's original publication. There is no guarantee that a map unit symbol that occurs in such a publication still exists in the current digital data for that survey area.

2. The area symbol associated with a survey area isn't typically documented anywhere in a soil survey manuscript publication. One would have to attempt to determine the appropriate survey area symbol by doing something like going to the Soil Data Mart website and manually searching for a survey area with the exact same name as that of the soil survey manuscript publication, and copying the associated area symbol.

This option is definitely the option of last resort, and this option was only feasible for a relatively small area of interest to begin with, due to the necessity of manually compiling the list of map unit identifiers.

Warning

Survey area symbols, survey area specific map unit symbols and national map unit symbols can change over time. Over time new symbols may be added and existing symbols may be dropped. There is no guarantee that every symbol in a set of survey area symbols, survey area specific map unit symbols or national map unit symbols captured on a particular day is still going to be valid the following day. In addition, using the syntax shown in the samples below, there would be no warning that a particular symbol is no longer valid.

On a typical night, multiple survey areas in the Soil Data Mart database are updated. For most updates, is it unlikely that any symbols will have been changed, added or dropped. These types of changes tend to only occur when an error is discovered, or a major update of a survey area has occurred. If you are subscribed to a survey area through the Soil Data Mart website, you will be notified whenever that survey area is updated. When ever a survey area is updated, you should assume that such a change may have taken place.

If you are not subscribed to all survey areas that coincide with a corresponding area of interest, the only truly safe approach is to only use a given list of survey area symbols, survey area specific map unit symbols or national map unit symbols on the day when that list was compiled. If you are subscribed to all survey areas that coincide with a corresponding area of interest, you could safely reuse a given list of survey area symbols, survey area specific map unit symbols or national map unit symbols until you receive notification that any one

of those survey areas was updated, although you should probably also keep in mind that glitches on either can occasionally prevent the receipt of a survey area update notification.

Sample Query Syntax

Sample 1 - Constraining results to a small area of interest that lies entirely within a single survey area, using survey area symbol and survey area specific map unit symbols.

The following query returns selected attributes from tables "sacatalog", "legend", "mapunit", "component" and "chorizon", for the SSURGO map units in a four square mile area of interest in Hall County Nebraska.

None of the survey area specific map unit keys in the sample below included any letters, but had they, each letter would need to be in the proper case (lower case versus upper case) in order for this query to function correctly.

```
--Sample query begins…
--Note that a pair of dashes denotes the beginning of a comment.
SELECT
saversion, saverest, -- attributes from table "sacatalog"
l.areasymbol, l.areaname, l.lkey, -- attributes from table "legend"
musym, muname, museq, mu.mukey, -- attributes from table "mapunit"
comppct_r, compname, localphase, slope_r, c.cokey, -- attributes from
table "component"
hzdept_r, hzdepb_r, ch.chkey -- attributes from table "chorizon"

FROM sacatalog sac
  INNER JOIN legend l ON l.areasymbol = sac.areasymbol
  AND l.areasymbol = 'NE079'
    INNER JOIN mapunit mu ON mu.lkey = l.lkey
    AND mu.musym IN
('1547','1796','2238','3300','3301','3537','3782','5705','5905','6957','80
20','8022','8023')
      LEFT OUTER JOIN component c ON c.mukey = mu.mukey
        LEFT OUTER JOIN chorizon ch ON ch.cokey = c.cokey

--WHERE…
--Sample query ends.
```

Sample 2 - Constraining results to a small area of interest that spans more than one survey area, using survey area symbols and survey area specific map unit symbols.

The following query returns selected attributes from tables "sacatalog", "legend", "mapunit", "component" and "chorizon", for the SSURGO map units in a small area of interest that spans Bexar and Medina Counties in Texas.

The letters in the survey area specific map unit symbol below must be in the proper case (lower case versus upper case) for this query to function correctly. Survey area symbols are not case sensitive.

```
--Sample query begins…
--Note that a pair of dashes denotes the beginning of a comment.
SELECT
saversion, saverest, -- attributes from table "sacatalog"
l.areasymbol, l.areaname, l.lkey, -- attributes from table "legend"
musym, muname, museq, mu.mukey, -- attributes from table "mapunit"
comppct_r, compname, localphase, slope_r, c.cokey, -- attributes from
table "component"
hzdept_r, hzdepb_r, ch.chkey -- attributes from table "chorizon"

FROM sacatalog sac
  INNER JOIN legend l ON l.areasymbol = sac.areasymbol
    INNER JOIN mapunit mu ON mu.lkey = l.lkey
    AND (
    (l.areasymbol = 'TX029' and mu.musym = 'TaB') or
    (l.areasymbol = 'TX029' and mu.musym = 'TaC') or
    (l.areasymbol = 'TX029' and mu.musym = 'TaD') or
    (l.areasymbol = 'TX325' and mu.musym = 'Prb') or
    (l.areasymbol = 'TX325' and mu.musym = 'TAD') or
    (l.areasymbol = 'TX325' and mu.musym = 'TAF')
)
      LEFT OUTER JOIN component c ON c.mukey = mu.mukey
        LEFT OUTER JOIN chorizon ch ON ch.cokey = c.cokey

--WHERE…
--Sample query ends.
```

Sample 3 - Constraining results to a small area of interest using national map unit symbols.

The following query returns selected attributes from tables "sacatalog", "legend", "mapunit", "component" and "chorizon", for the SSURGO map units in a four square mile area of interest in Hall County Nebraska.

By using national map unit symbols (mapunit.mukey) there is no need to make any survey area references, because for the entire set of SSURGO and STATSGO map units, combined, no two map units in that set will ever share the same national map unit symbol.

```
--Sample query begins…
--Note that a pair of dashes denotes the beginning of a comment.
SELECT
saversion, saverest, -- attributes from table "sacatalog"
l.areasymbol, l.areaname, l.lkey, -- attributes from table "legend"
musym, muname, museq, mu.mukey, -- attributes from table "mapunit"
comppct_r, compname, localphase, slope_r, c.cokey, -- attributes from
table "component"
hzdept_r, hzdepb_r, ch.chkey -- attributes from table "chorizon"

FROM sacatalog sac
  INNER JOIN legend l ON l.areasymbol = sac.areasymbol
    INNER JOIN mapunit mu ON mu.lkey = l.lkey
    AND mu.mukey IN

('107559','107646','107674','107682','107707','107794','107853','107854','
107865','107867','107869','107870','107871')
      LEFT OUTER JOIN component c ON c.mukey = mu.mukey
        LEFT OUTER JOIN chorizon ch ON ch.cokey = c.cokey

--WHERE…
--Sample query ends.
```

Sample 4 - Constraining results to a large area of interest using national map unit symbols.

The following query returns selected attributes from tables "sacatalog", "legend", "mapunit", "component" and "chorizon", for the SSURGO map units in a four square mile area of interest in Hall County Nebraska.

This syntax should be used for a large list of map unit keys, because the In clause of the previous sample is inefficient, since the map unit key for every single map unit in the Soil Data Mart database is being tested against the entire set of map unit keys in the In clause. Although the set of map unit keys in the In clause of the previous sample is small, that would not be the case for a large area of interest. The In clause in the Select clause of the Insert statement below will be relatively efficient even for a large area of interest.

What's the dividing line between "a small area of interest" and "a large area of interest"? That isn't clear. It may depend on whether or not your query times out. If you want to be conservative, always use the syntax shown below when dealing with national map unit symbols.

```
--Sample query begins…
```

```
--Note that a pair of dashes denotes the beginning of a comment.
CREATE TABLE #AOIMUKeys (
mukey VARCHAR(30) NOT NULL PRIMARY KEY
)

INSERT INTO #AOIMUKeys
SELECT mukey
FROM mapunit
WHERE mukey IN(
'107559','107646','107674','107682','107707','107794','107853','107854','1
07865','107867','107869','107870','107871'
)

SELECT
saversion, saverest, -- attributes from table "sacatalog"
l.areasymbol, l.areaname, l.lkey, -- attributes from table "legend"
musym, muname, museq, mu.mukey, -- attributes from table "mapunit"
comppct_r, compname, localphase, slope_r, c.cokey, -- attributes from
table "component"
hzdept_r, hzdepb_r, ch.chkey -- attributes from table "chorizon"

FROM sacatalog sac
  INNER JOIN legend l ON l.areasymbol = sac.areasymbol
    INNER JOIN mapunit mu ON mu.lkey = l.lkey
    INNER JOIN #AOIMUKeys aoimu ON mu.mukey = aoimu.mukey
      LEFT OUTER JOIN component c ON c.mukey = mu.mukey
        LEFT OUTER JOIN chorizon ch ON ch.cokey = c.cokey

--WHERE…
--Sample query ends.
```