Appendix K: Site Evaluation Protocol

Introduction:

Thurston County has developed a Habitat Conservation Plan for multiple species, known as the Thurston County Habitat Conservation Plan (HCP). Under the HCP, mitigation will be required for unavoidable impacts to the habitats of species covered by the plan. This guide is specific to the three subspecies of Mazama Pocket Gopher (*Thomomys mazama*, MPG) that are included in the HCP, as a means to verify whether the glacial outwash soils known to support the MPG (**Table 1**) are present on a parcel proposed for development. The soils referenced are described fully in the USDA Natural Resources Conservation Service (NRCS) Soil Survey of Thurston County, Washington (Pringle et al.,1990). A detailed description of the soil survey process is described in the Field Book for Describing and Sampling Soils (Schoeneberger et al., 2012).

Thurston County has developed a map of parcels with glacial outwash soils known to support the MPG and other prairie-associated species, provided by NRCS and US Fish and Wildlife Service (USFWS). This map will be incorporated into the HCP as screen layers, available in Thurston County GeoData (GeoData), that establish the presence of potential habitat for the covered species based on soil types. The presence of these soils in triggers potential mitigation fees under the HCP. Hence the term "gopher soils" or "MPG soils" refers to the soil types MPG have been known to use.

A soil testing protocol, based on the "Long-Term Agricultural Lands of Commercial Significance" (LTA) soil survey process created by NRCS and the MPG soils verification process implemented by USFWS during the 2015-2016 Thurston County MPG project screenings, has been developed for landowners who wish to provide evidence as to whether MPG soils are actually present on their property. The only way to remove a project from the MPG soil classification would be through onsite documentation that the soil in the project area does not match the soil mapping in the HCP habitat screen. The Thurston County MPG soil survey process, if results reveal an absence of MPG soils on all or certain portions of a property, may result in exemption from coverage under the HCP and mitigation requirements for the MPG.
Detailed information about how the NRCS maps were created is described in a March 19, 2008 Thurston County staff report titled: *Response to Western Washington Growth Management Hearings Board Order to Designate Long-Term Agricultural Lands of Commercial Significance, Thurston County Planning Commission Public Hearing Draft.* We did not review that decision protocol, so cannot comment on it. But in general, the maps were created first using Thurston County NRCS[1] soil map units in the GeoData coverage[2] that were classified as prime agricultural land" (PAL[3]) by NRCS.

[1] Natural Resources Conservation Service, formerly called Soil Conservation Service or SCS
[2] GeoData is a hand-digitized version of the actual Thurston County Soil Survey. That soil survey is now available online at http://websoilsurvey.nrcs.usda.gov/, and should be consulted in concert the GeoData for best information.
[3] Based on the NRCS Land Capability Classification protocol

Thurston County Soil Survey-based MPG Map Units

NRCS Map Unit #	*Soil Series Name and Description*
1	Alderwood gravelly sandy loam, 0-3 percent slope
2	Alderwood gravelly sandy loam, 3-15 percent slope
20	Cagey loamy sand
32	Everett very gravelly sandy loam, 0-3 percent slope
33	Everett very gravelly sandy loam, 3-15 percent slope
46	Indianola loamy sand, 0-3 percent slope
47	Indianola loamy sand, 3-15 percent slope
50	Kapowsin silt loam, 3-15 percent slope
65	McKenna gravelly silt loam, 0-5 percent slope
73	Nisqually loamy fine sand 0-3 percent slope
74	Nisqually loamy fine sand 3-15 percent slope
75	Norma fine sandy loam
76	Norma silt loam
109	Spana gravelly loam
110	Spanaway gravelly sandy loam, 0-3 percent slope
111	Spanaway gravelly sandy loam, 3-15 percent slope
112	Spanaway stony sandy loam, 0-3 percent slope
113	Spanaway stony sandy loam, 3-15 percent slope
114	Spanaway-Nisqually complex, 2-10 percent slope
126	Yelm fine sandy loam, 0 to 3 percent slope
127	Yelm fine sandy loam, 3-15 percent slope

Table 1. Soils known to support the MPG, including NRCS Map unit and slopes

We should note that in some cases, there could be inclusions of other, non-MPG soils series in a GeoData map unit that cannot be extracted without detailed and complex soil mapping, which is outside of the scope of this protocol. Since this scenario may occur at some point, a clear decision should be made as to whether that alternate approach (detailed soil mapping at the series level) may be accepted by the County. If so, a Certified Soils professional, as identified below, would be required to carry out that work.

The protocol that we offer below can be successfully carried out by the following properly trained professionals, ranked more or less in order of preference:

- A certified professional soil scientist (SSSA CPSS, NSCSS RPSS) or soil classifier (SSSA CPSC);
- A WA state-licensed wastewater system designer who has taken WOSSA Continuing Education classes in soil profile interpretation
- A certified professional wetland scientist (SWS PWS) who has taken Continuing Education classes in hydric soil profile interpretation;
- A Professional Engineer who has proven credentials and has taken classes in soil profile interpretation

Standard Field Protocol

Tools and materials needed:

Thurston County GeoData aerial map showing NRCS soils
Tile spade
Hand-auger
Munsell Color Book
Meter stick or tape measure
Data form for recording soil descriptions (or notebook for detailed documentation)
Spray bottle filled with water, for wetting soils
Grain size sieve set (standard sizes)
Camera

On most sites, the following process should yield enough information to verify or refute the MPG soil classification.

Step 1: Take Thurston County GeoData soils map to the field, to locate the boundary of the portion of the parcel mapped with MPG soils, unless such soils are mapped throughout the parcel.

Examine landscape features of the property in question, particularly in the proposed building envelope and buffer, in relation to surrounding portions of the parcel. Observe slope features surrounding each sampling point. Features such as a nearly level bench or depression, for example, may signify a soil inclusion. Other features to assess include:

- Landform
- Slope
- Hydrology – Wetland or seasonally high groundwater
- Vegetation type
- Obvious indications that soils have been previously graded, filled, or otherwise substantially disturbed; in such cases, an attempt should be made to identify and verify soils at one of the least disturbed portions of the site, particularly when in or surrounding a proposed building area.
- Soil materials, including cemented layers, layers of silt or substantial clay content, or strongly contrasting soil textures

If more than half of the parcel falls outside the appropriate slope range for the mapped soil series, then the parcel may not contain the mapped gopher soils. Please note that on sites that are close to the 50% cut-off, survey-level information may be required to refute the soil classification based on slope alone. In that case, the surveyor, working together with the field professional, will provide a surveyed line showing exactly where the edge of the slope break occurs on the landscape.

If more than half the parcel falls within the slope for the mapped soil series, then proceed to check on soil depth conditions on only the portion of the parcel with slopes feasible to support MPG soils. See slopes for the appropriate soil series in **Figure 1.**

Selecting Soil Pit Locations

For soil pit analysis, identify locations which best represent the mapped soil series in the portion of the parcel in which you are working. If available, already-exposed soil profiles, such as septic test pits, may be used to examine soil type. Soil pit analysis should be avoided in the following areas:

- Compacted or disturbed areas (unless representative of the entire parcel)
- Areas which lie within a drainage channel or pond
- Sections of the parcel which lie in or near a path or road.
- Areas with vegetation which greatly differs from surrounding plant cover, in the same mapped soil type
- Locations which lie on the borders of two different mapped soil types

Step 2: Hand-auger or tile spade soils to **30** inches depth across the mapped MPG soils areas at 200-300 foot intervals. For a 20-acre site entirely within MPG soils, that would result in around 10-20 sample points. There should be no fewer than 8 sample points on a 20-acre site regardless.

- If soil is too rocky or compacted to dig a pit with a spade and an auger must be used, place soil on a tarp in order to identify by horizon.
- If no bedrock or glacial till (or other material that is impossible to hand auger or dig through) is encountered within 24 inches, then proceed with evaluation of soil color for indication of presence of shallow groundwater tables.
- Examine soils for texture, color, and other characteristics typical of mapped soil series (i.e. amount of rock fragments, cemented layers, layers of silt or substantial clay content, or strongly contrasting soil textures).

Step 3: With a tile spade, cut an intact slab of soil profile from the side of the auger hole, and lay the slab flat on the ground beside the hole. Most tile spades are about 14 inches long, which will require a second deeper slab to see the entire profile to at least 20 inches depth. With flat palms, push sideways in opposite directions on the slab face to break the slab vertically to reveal undisturbed soil structure and colors within the slab.

- For the mineral[4] soil series in the list above:

[4] Mineral soil versus Organic soil: A mineral soil is dominated by sand silt and clay; an organic soil has an unusually high content of organic materials from a slower than usual breakdown of plant materials. This second condition only occurs in wetland soils that are saturated for extended periods of time. The organic soil series map units are called “mucks” in the list above; the rest are mineral soils.

- If the soil to at least 20 inches depth matches the description, texture, color, hue, chroma, and other features typical of the appropriate MPG soils series mapped on the parcel, based on the NRCS Soils Guide (Pringle et al. 1990) and the Munsell Color Book (Munsell Color 1975), then the soil meets criteria to be classified as MPG. **Appendix A.** summarizes the typical hues, values, and chromas of all MPG soil series, by horizon and depth. Measure and record horizon depths. Use a spray bottle to wet soils as needed during pedon analysis.

- Photograph the soil profile exposed in your soil pit

- Record soil features using a USDA-NRCS Pedon Description Form (**Appendix B.)** or similar form, or take detailed notes which contain the information required in the form.

- Collect soil samples for laboratory sieve or other characterization analysis, if needed. Samples should be 3 to 4 kg, or a minimum of 1 kg for soils with fragments up to 20 mm in size (Schoeneberger et al., 2012).

Please note that on sites which are close to the 50% cut-off in terms of soil depth – similar to the slope class problem described above -- survey-level information may be required to refute the soil classification based on soil depth alone. In that case, the surveyor, working together with the field professional will provide a surveyed line showing exactly where the edge of the soil depth break occurs on the landscape.

Step 4:

If any of the soil layers within 24 inches depth below the soil surface are dominantly grey with a Munsell Color Book chroma of 2 or less interspersed with rusty (reddish or orange) spots of color, then the seasonal water table **may** be too shallow for the soil to support MPG habitat.

The color-based evidence of a shallow seasonal water table described above will persist for many years after a mineral soil has been effectively drained. Some of the organic soils listed in **Table 1**, such as the Norma and McKenna series, are known to be poorly drained and are sometimes found in wetlands. Potentially, such soils on a site may have been wetland soils which were effectively drained. This final step is intended to document whether or not the hydrologic regime (long-duration water table) that created those soil colors or that soil organic matter content still persists above 24 inches depth. If it does, then the area **may** not be regulated as MPG habitat since there are possible restrictions to tunneling and food caching. However, MPG have been known to temporarily utilize or disperse over seasonally flooded areas during dry periods (G. Olson, pers. comm.).

- First, locate, sketch map and describe as precisely as possible any artificial (human-made) or natural (nature-made) drainage features that may have lowered the water table indicated by the soil colors or organic content, as described above

  - Artificial drainage: surface ditches or evidence of drain tiles (include depth and width of ditch or drain tile as well as water surface depth, if present), how the ditches or drains connect, the direction of flow, and where they enter and exit the target parcel… etc.

- Natural drainage: such as a deeply incised natural stream channel that may have drained what was once a wetland on a stream-side terrace.

This documentation provides evidence that a previous hydrologic condition may not persist under current site conditions. If ditches are at least one foot deeper than 20 inches, and they are well-maintained, that alone may be enough to indicate that the soil is properly classified as those supporting potential MPG habitat. If the ditches are shallower than 20 inches, then it is likely that there is a seasonal water table within 20 inches, which may restrict use by the MPG.

If there are rusty (reddish or orange) spots of color at less than 20 inches depth below the soil surface, interspersed between a background Munsell Color Book chroma of **greater than** 2, then the soil is expected to be well drained enough during the growing season to meet criteria to be classified as MPG, although it may have a periodic short duration winter water table event in response to winter storms.

- If this work is carried out during the wet season, direct observation and measurement of the water table may be sufficient during mid-to-late winter months. **However, this may require a return visit during a drier period (i.e., late spring or summer) in order to verify that flooding is persistent enough to exclude seasonal use by the MPG.**

  - For work carried out during late winter months, direct observation and documentation that the water table is at greater than 20 inches depth over a period of at least 4 weeks prior to April 1 is an excellent indication that the site hydrology has been lowered to below 20 inches by the artificial or natural drainage features. In that case, the parcel DOES meet criteria to be classified as MPG.

  - If the water table is at less than 20 inches for more than 4 weeks at a time during any period between April 1 and October 1, then the area should **NOT** be classified as MPG.

  - To be classified as MPG, the water table may persist for long periods of time between October 1st and April 1st, as long as it drains to below 20 inches by April 1 in most years.

  - On some sites, this documentation may require water table monitoring, either by regular manual measurements or through installation of programmable dataloggers or a studpipe with a datalogger that can record periodic water table levels (details provided below). If this monitoring indicates clearly that water tables persist for 4 weeks at a time after April 1 in most years, **then that parcel should not be regulated as MPG.**

Step 5: Reports

Following the soil field assessment, a report should be submitted to Thurston County. The report should include detailed information describing findings, and state clearly whether or not the MPG soils mapped on the property were verified. The following information should be included:

- Purpose and scope of the study

- Table depicting soil series mapped on parcel, with USDA NRCS Soil Survey map unit symbols
- GeoData or NRCS Soil Map for parcel in question
- Map depicting locations of soil test pits
- Description of site topography and dominant vegetation type(s)
- Description of soil taxonomy, soil horizon names, and horizon depths, including hue, value, chroma, texture, structure, and presence of features such as coarse fragments and roots
- Photographs of exposed soil profiles; include markers and labels defining borders and names of soil horizons
- Determination of soil series identified from field and laboratory sieve or other analysis; sieve report table
- Determination of water table and location

Citations

Munsell Color (1975). *Munsell Soil Color Charts.* 1975th ed., Munsell Color.

Pringle, R. F. et al. (1990). Soil Survey of Thurston County, Washington. U.S. Department of Agriculture, Soil Conservation Service.

Schoeneberger, P.J., D.A. Wysocki, E.C. Benham, and Soil Survey Staff (2012). Field book for describing and sampling soils, Version 3.0. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE.

Appendix A: Hue, Value, and Chromas of Table 1. Gopher Soils, by Horizon

NRCS Map Unit #	Soil Series/depth	Hue by Horizon*		Value/ Chroma
1/2	**Alderwood series**			
	0 to 6 inches	**A:** Very dark brown	10YR	2/2
		Gravelly sandy loam, dark brown (dry)	7.5 YR	3/4
	6 to 15 inches	**Bw1:** Dark brown	7.5 YR	3/4
		Gravelly sandy loam, yellowish brown (dry)	10 YR	5/6
	15 to 30 inches	**Bw2**: Dark brown	7.5 YR	3/4
		Very gravelly sandy loam light yellowish brown (dry)	10 YR	6/4
	30 inches	**Bqm:** Dark grayish brown	2.5 Y	4/2
		Very gravelly sandy loam light brownish gray (dry)	10 YR	6/2
20	**Cagey series**			
	0 to 6 inches	**Ap:** Dark brown	10 YR	3/3
		Loamy sand, brown (dry)	10 YR	5/3
	6 to 28 inches	**Bw:** Dark yellowish brown	10 YR	4/4
		Loamy sand, pale brown (dry)	10 YR	6/3
	28 to 34 inches	**C1:** Light olive brown	2.5 Y	5/4
		Fine sand, light brownish gray (dry)	2.5 Y	6/2
	34 to 60 inches	**C2:** Light olive brown	2.5 Y	5/4
		Fine sand, pale olive (dry)	5 Y	6/3
		Many fine distinct strong brown, mottles	7.5 YR	5/8
32/33	**Everett series**			
	0 to 3 inches	**A**: Dark reddish brown	5 YR	2/2
		Very gravelly sandy loam, dark brown (dry)	10 YR	4/3
	3 to 12 inches	**Bw**: Dark brown	7.5 YR	3/4
		Extremely gravelly sandy loam, brown (dry)	10 YR	5/3
	12 to 20 inches	**BC**: Dark yellowish brown	10 YR	4/4
		Extremely gravelly loamy sand, pale brown (dry)	10 YR	6/3
	20 to 28 inches	**C1**: Olive brown	2.5 Y	4/4
		Extremely gravelly loamy sand, grayish brown (dry)	2.5 Y	5/2
	28 to 60 inches	**C2**: Dark grayish brown	2.5 Y	4/2
		Extremely gravelly sand, gray	5 Y	6/1
46/47	**Indianola series**			
	0 to 6 inches	**A:** Dark reddish brown	5 YR	3/3
		Loamy sand, brown (dry)	10 YR	5/3
	6 to 13 inches	**Bw:** Dark reddish brown	5YR	3/4
		Loamy sand, pale brown (dry)	10 YR	6/3

	13 to 25 inches	**BC:** Dark brown	10 YR	4/3
		Loamy sand, pale brown (dry)	10 YR	6/3
	25 to 35 inches	**C1:** Dark yellowish brown	10 YR	4/4
		Sand, Light brownish gray (dry)	2.5 Y	6/2
	35 to 60 inches	**C2:** Olive brown	2.5 Y	4/4
		Sand, light brownish gray (dry)	2.5 Y	6/2
50	**Kapowsin series**			
	0 to 4 inches	**A:** Dark brown	10 YR	3/3
		Silt loam, brown (dry)	10 YR	5/3
	4 to 11 inches	**BA:** Dark yellowish brown	10 YR	3/4
		Silt loam, light yellowish brown (dry)	10 YR	6/4
	11 to 18 inches	**BW1:** Dark yellowish brown	10 YR	4/4
		Silt loam, pale brown (dry)	10 YR	6/3
	18 to 22 inches	**BW2:** Dark yellowish brown	10 YR	3/6
		Loam, light yellowish brown (dry)	10 YR	6/4
		Few fine faint yellowish brown, mottles	10 YR	5/4
	22 to 30 inches	**2Bw3:** Dark yellowish brown	10 YR	4/6
		Gravelly loam, pale brown (dry)	10 YR	6/3
		Yellowish brown	10 YR	5/4
		Few fine faint yellowish brown, mottles	10 YR	5/4
	30 to 60 inches	**2Bqm:** Grayish brown	2.5 Y	5/2
		Gravelly loam, Light gray (dry)	2.5 Y	7/2
65	**McKenna series**			
	0 to 9 inches	**A:** Black	10 YR	2/1
		Gravelly silt loam**,** dark gray (dry)	10 YR	4/1
	9 to 13 inches	**BA:** Very dark grayish brown	10 YR	3/2
		Gravelly silt loam, light brownish gray (dry)	10 YR	6/2
		Few fine faint yellowish brown, mottles	10 YR	5/6
	13 to 21 inches	**Bw1:** Very dark grayish brown	10 YR	3/2
		Very gravelly silt loam**,** pale brown (dry)	10 YR	6/3
	21 to 28 inches	**Bw2:** Dark brown	10 YR	3/3
		Very gravelly loam**,** pale brown (dry)	10 YR	6/3
		Common medium distinct dark brown, mottles	7.5 YR	4/4
	28 to 36 inches	**Bw3:** Dark yellowish brown	10 YR	3/4
		Very gravelly loam**,** pale brown (dry)	10 YR	6/3
		Few fine faint yellowish brown, mottles	10 YR	5/8
		Olive gray, mottles	5 Y	5/2
	36 to 60 inches	**Cr:** Dark greenish gray	5 BG	4/1
		Dense glacial till that crushes to very Gravelly loam, gray (dry)	N	6/0
73/74	**Nisqually series**			
	0 to 5 inches	**Ap:** Black	5 YR	2/1
		Loamy fine sand, dark gray (dry)	10 YR	4/1
	5 to 18 inches	**A1:** Very dark gray	10 YR	3/1

		Loamy fine sand, dark gray (dry)	10 YR	4/1
	18 to 31 inches	**A2:** Very dark grayish brown	10 YR	3/2
		Loamy fine sand, grayish brown (dry)	10 YR	5/2
	31 to 48 inches	**C1:** Light olive brown	2.5 Y	5/4
		Loamy sand, grayish brown (dry)	2.5 Y	5/2
	48 to 60 inches	**C2:** Light olive brown	2.5 Y	5/4
		Light brownish gray (dry)	2.5 Y	6/2
75/76	**Norma Series**			
	0 to 8 inches	**Ap:** Very dark gray	10 YR	3/1
		Silt loam, dark brown (dry)	10 YR	4/3
	8 to 30 inches	**Bw:** Grayish brown	2.5 Y	5/2
		Sandy loam, light brownish gray (dry)	2.5 Y	6/2
		Common medium prominent reddish yellow, mottles	7.5 YR	6/6
	30 to 60 inches	**Cg:** Olive gray	5Y	5/2
		Sandy loam, light gray (dry)	5Y	7/2
		Common medium prominent red, mottles	2.5 YR	5/8
109	**Spana series**			
	0 to 22 inches	**A:** Black	10 YR	2/1
		Gravelly loam, very dark grayish brown (dry)	10YR	3/2
	22 to 26 inches	**Bw1:** Very dark grayish brown	10 YR	3/2
		Gravelly loam, grayish brown (dry)	10 YR	5/2
	26 to 38 inches	**Bw2:** Brown	10 YR	5/3
		Very gravelly loam, pale brown (dry)	10 YR	6/3
	38 to 39 inches	**2C1:** Dark yellowish brown	10 YR	4/4
		Extremely gravelly sandy loam, very pale brown (dry)	10 YR	7/4
	39 to 60 inches	**2C2:** Dark brown	10 YR	4/3
		Extremely gravelly sandy loam, pale brown (dry)	10 YR	6/3
110/111/ 112/113/ 114	**Spanaway series**			
	0 to 15 inches	**A:** Black	10 YR	2/1
		Gravelly sandy loam, very dark grayish brown (dry)	10 YR	3/2
	15 to 20 inches	**Bw:** Dark yellowish brown	10 YR	3/4
		Very gravelly sandy loam, light olive brown (dry)	2.5 Y	5/4
	20 to 60 inches	**C:** Dark yellowish brown	10 YR	4/4
		Extremely gravelly sand, yellowish brown (dry)	10 YR	5/4
126/127	**Yelm series**			
	0 to 8 inches	**Apc:** Dark brown	7.5 YR	3/2
		Fine sandy loam, grayish brown (dry)	10 YR	5/2

	8 to 17 inches	**Bw1:** Dark yellowish brown	10 YR	4/4
		Fine sandy loam, pale brown (dry)	10 YR	6/3
		Few faint greenish gray, mottles	5 GY	6/1
	17 to 36 inches	**Bw2:** Dark grayish brown	2.5 Y	4/2
		Fine sandy loam, light brownish gray (dry)	2.5 Y	6/2
		Few fine faint very dark grayish brown, organic masses 1 to 2 inches in diameter	2.5 Y	3/2
		Few fine faint greenish gray, mottles	5 GY	6/1
	36 to 46 inches	**Bw3:** Olive brown	2.5 Y	4/4
		Fine sandy loam, grayish brown (dry)	2.5 Y	5/2
	46 to 60 inches	**C:** Light olive brown	2.5 Y	5/4
		Loamy sand, light gray (dry)	2.5 Y	7/2

*Colors describe moist soil, unless otherwise stated

Appendix B: USDA-NRCS Soils Form

USDA-NRCS	PEDON DESCRIPTION	Pedon ID # :	Basic Soils Course	May-04

Series or Component Name:	Map Unit Symbol:	Photo #:	Classification:	Soil Moist. Regime (Tax.):

Describer(s):	Date:	Weather: Temp.: Air: Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W Datum:	Location: Sec. T. R.

UTM: Zone: mE: mN:	Topo Quad.:	Site ID: YR: State: County: Pedon #:	Soil Survey Area:	MLRA / LRU:	Transect: ID: Stop #: Interval:

Landscape:	Landform:	Microfeature:	Anthro:	Elevation:	Aspect:	Slope (%):	Slope Complexity:	Slope Shape: (Up & Dn / Across)

Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:

Drainage:	Flooding:	Ponding:	Soil Moisture Status:	Profile Saturated Hydraulic Conductivity Ksat:	Land Cover / Use:

Parent Material:	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Formation: Member:

Erosion: Kind: Degree:	Runoff:	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind:	Diagnostic Horz. / Prop.: Kind: Depth:

P.S. Control Section: Ave. Clay %: Ave. Rock Frag %: Depth Range:	

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER

MISCELLANEOUS FIELD NOTES / SKETCH :

Component Name:		Map Unit Symbol:		Date:	

	Obser. Method	Depth (cm) (TOP) (BOT)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frag Knd % Rnd Sz	Structure Grade Sz Type	Sand %	Silt %	Clay %	LEP	Mottles % Sz Cont. Col Mst Shp Loc
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														

	Redoximorphic Features Knd % Sz Cont. Col. Mst Shape	Concentrations Knd % Sz Cont. Col Mst Shp Loc	Ped / V. Surface Features Knd % Con Dst Loc Col Mst	Roots Qty Sz Loc	Pores Qty Sz Shp	Notes Ksat	Notes Unified
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							