## Elmira Variant 94-ID-0962

				Part	icle-size	distribut	ion					
			vc	с	m	f	vf	Total	Total	Total	Textural	1.5 MPa
Horizon	Depth	>2mm	sand	sand	sand	sand	sand	sand	silt	clay	class	H <sub>2</sub> O
	(cm)	(%)			(%	6) of <2n	nm					(%)
		• •										
Oi	10-5											
Oe,Oa	5-0			-								
E	0-10	6.3	36.7	25.5	7.5	9.6	5.9	85.2	13.8	1.1	1 co sand	1.7
Bs1	10-24	10.4	49.3	29.0	6.6	3.9	2.0	90.7	7.8	1.4	coarse sand	2.5
Bs2g	24-46	15.1	65.6	23.3	5.7	2.4	0.9	97.8	1.8	0.3	coarse sand	1.2
Bs3g	46-66	23.7	64.3	20.6	9.3	3.2	0.9	98.2	1.7	0.1	coarse sand	1.2
BC	66-99	7.3	54.7	29.1	9.7	4.0	1.1	98.6	1.3	0.1	coarse sand	0.5
СВ	99+	14.7	33.7	32.7	21.4	8.8	1.5	98.1	1.8	0.1	coarse sand	0.4

Horizon	Depth	Hα	EC	Org. C	N Ca <sup>+2</sup>	IH₄OAc- Mg <sup>+2</sup>	extractat Na <sup>+</sup>	ole K <sup>+</sup>	KCl e Al <sup>+3</sup>	xtract H <sup>+</sup>	ECEC	Base saturation
	(cm)	P	(dS/m)	(%)				cmol(	+)/kg -			(%)
	. ,											
Oi	10-5											
Oe,Oa	5-0											
E	0-10	3.36	0.083	0.22	0.26	0.04	0.04	0.07	1.86	0.87	3.14	13
Bs1	10-24	4.24	0.053	0.53	0.37	0.04	0.04	0.08	0.71	0.07	1.31	41
Bs2g	24-46	4.47	0.037	0.20	0.28	0.02	0.04	0.05	0.23	0.03	0.65	60
Bs3g	46-66	4.70	0.036	0.21	0.35	0.03	0.04	0.06	0.20	0.01	0.69	70
BC	66-99	5.22	0.039	0.12	0.21	0.02	0.03	0.06	0.06	0.05	0.43	74
CB	99+	5.11	0.037	0.08	0.30	0.03	0.03	0.05	0.10	0.06	0.57	72

		NaF		Р	Cl extra	3D ctable	Pyroph extra	osphate ctable		Oxal	ate-extractab	ole Optical
Horizon	Depth	pH	Glass	retention	Fe	Al	Fe	Al	Fe	Al	Si	density
	(cm)		(% of vfs)	(%)				(%	6)			
Oi	10-5											
Oe,Oa	5-0											
Е	0-10	7.9	0	15	0.10	0.07	0.01	0.06	0.02	0.03		0.06
Bs1	10-24	10.9	0	25	0.36	0.26	0.10	0.20	0.32	0.42		0.24
Bs2g	24-46	10.6	0	17	0.18	0.11	0.02	0.08	0.17	0.21		0.11
Bs3g	46-66	10.7	0	19	0.22	0.16	0.02	0.10	0.19	0.28		0.11
BC	66-99	10.2	0	15	0.15	009	0.01	0.06	0.11	0.13		0.05
СВ	99+	9.7	0	15	0.18	0.05	0.01	0.04	0.10	0.07		0.05

# Modeled Spodosol distribution in the Selkirk Mountains

(from Valerio, 2011)



map units with Spodosols

map units with some Spodosols/ spodic intergrades

map units without Spodosols







Occurrence of Spodosols and non-Spodosols in the Kaniksu National Forest as a function of aspect and elevation. Data are from Valerio (2011).



Spodosols dominant – ~10.8% of study area Spodosols and/or intergrades present – ~11.9% Spodosols absent – ~77.3%

Modeled distribution of Spodosols in the Kaniksu National Forest study area of northern Idaho. Data are from M. Valerio (2011).

## PEDON DESCRIPTION Lower Trout Creek Spodosol 10ID021002

Print Date: 09/19/2012	Country: United States
Description Date: 8/11/2010	State: Idaho
Describer: Brian Gardner, Bruce Knapp, Paul	County: Poundany
McDaniel	County. Boundary
Site ID: 10ID021002	MLRA: 43 Northern Rocky Mountains
Site Note: uncut forest – no evidence of past harvest	Soil Survey Area: ID670 Idaho Panhandle National Forest,
	Idaho-Montana; 4-2 Moscow, Idaho
Pedon ID: 10ID021002	Map Unit:
Soil Name as Described/Sampled: Pence-like	Latitude: 48 degrees 49 minutes 10.20 seconds north
Soil Name as Correlated:	Longitude: 116 degrees 32 minutes 35.20 seconds west
Classification: Sandy-skeletal, isotic, frigid Typic	Datum: NAD83
Haplorthods	Datum. NADOS
Pedon Type: map unit inclusion	UTM Zone: 11
Pedon Purpose: research site	UTM Easting: 533538 meters
Local Physiographic Area: Trout Creek	UTM Northing: 5407493 meters
Upslope Shape: concave	Primary Earth Cover: Tree cover
Cross Slope Shape: linear	Secondary Earth Cover: Conifers
Geomorphic Setting: on footslope of side slope of	
mountainflank, lower third of mountain valley on	Parent Material: volcanic ash and till derived from granite
mountain range	
Particle Size Control Section: 35 to 110 cm.	
Diagnostic Features: ochric epipedon 10 to 24 cm;	Existing Vegetation: blue huckleberry, Engelmann spruce,
albic horizon 10 to 24 cm; andic soil properties 10 to	grouse whortleberry, pyrola, queencup beadlily, Rocky Mountain
24 cm; spodic horizon 24 to 50 cm; cambic horizon 50	Douglas-fir, rusty menziesia, subalpine fir, western hemlock,
to 65 cm.	western larch, western redcedar, western white pine

Slope (%)	Elevation (m)	Aspect (deg)	Drainage Class
22.0	1,409.0	335	well

Oi--0 to 10 cm; slightly decomposed plant material; abrupt wavy boundary.

**E--10 to 24 cm**; gray (10YR 5/1) ashy loam, light gray (10YR 7/1), dry; 8 percent clay; weak fine subangular blocky structure; 8 percent nonflat subangular very strongly cemented 2 to 75-millimeter granite fragments; abrupt irregular boundary.

**Bhs--24 to 30 cm**; dark brown (7.5YR 3/4) gravelly sandy loam, brownish yellow (10YR 6/6), dry; 6 percent clay; moderate fine subangular blocky structure; 25 percent nonflat subangular very strongly cemented 2 to 75-millimeter granite fragments; clear irregular boundary.

**Bs1--30 to 50 cm**; brown (7.5YR 4/4) gravelly sandy loam, brownish yellow (10YR 6/6), dry; 5 percent clay; moderate fine subangular blocky structure; 20 percent nonflat subangular very strongly cemented 2 to 75-millimeter granite fragments; clear irregular boundary.

**Bs2--50 to 65 cm**; dark yellowish brown (10YR 4/6) very gravelly loamy sand, light yellowish brown (2.5Y 6/4), dry; 3 percent clay; weak fine subangular blocky structure; 35 percent nonflat subangular very strongly cemented 2 to 75-millimeter granite fragments; clear irregular boundary.

**C--65 to 76 cm**; light olive brown (2.5Y 5/4) very gravelly sand, pale yellow (2.5Y 7/4), dry; 2 percent clay; massive; 50 percent nonflat subangular very strongly cemented 2 to 75-millimeter granite fragments.

#### Pedon ID: S10ID021002

#### Sampled As : Pence

## \*\*\* Primary Characterization Data \*\*\*

(Boundary, Idaho)

Sandy-skeletal, isotic, frigid Typic Haplorthod

Print Date: Sep 19 2012 3:06PM

#### USDA-NRCS-NSSC-Soil Survey Laboratory

#### ; Pedon No. 10N1372

Bulk Density	& Moisture		Γ	-1-	-2-	-3-	-4-	-5-		-6-	-7-	-8-	-9-		10-	-11-	-12-	-13-			
Layer	Depth (cm)	Horz	Prep	(Bulk Den 33 kPa ( g cm DbWR1	sity) Oven Dry ) <sup>-3</sup> ) DbWR1	Cole Whole Soil	( 6 kPa (	10 kPa	Wate	r Content - 33 kPa of < 2mm - DbWR1	1500 kPa 3C2a1a	) 1500 kF Moist )	Pa Rati AD/ 3D1	o OD	WRD Whole Soil cm <sup>3</sup> cm <sup>-3</sup>	Aggst Stabl 2-0.5mm %	( Ratio/ CEC7	Clay) 1500 kP	а		
10N06577 10N06578 10N06578 10N06579	0-10 10-24 10-24 24-30	Oi E E Bhs	S S M S	0.86 0.87	0.87 0.89	0.004				38.9 38.9	4.9 4.3 10.2		1.05 1.00 1.03	54 )6 ( 30 (	0.27 0.22		1.76 3.22	1.32 2.08			
10N06579 10N06580 10N06580 10N06581 10N06581	24-30 30-50 30-50 50-65 50-65	Bhs Bs1 Bs1 Bs2 Bs2	M S M S M	1.35	1.40	0.009				13.9	12.8 5.0 6.0 3.0 3.6		1.01 1.00	12 ( )5	0.09		1.70 0.97	1.25 0.86			
10N06582 10N06582	65-76 65-76	C C	S M								2.5 3.0		1.00	)5			0.68	0.63			
Carbon & Ex	tractions			-1-	-2-	-3	45	1	6-	-7-	-8-	-9-	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-
Layer	Depth (cm)	Horz	Prep	( C ( 4H2a	- Total N % of <2 4H2a	) C S C mm 4H2a	Org C/ C Ra ·-)	N (* atio F (* 4	e Fe IG1	ith-Cit Ext Al 4G1	) Mn 4G1	() Al+½Fe % of < ;	Ammon ODOE 2mm 4G2a	um Oxa Fe 4G2a	Alate Extra Al 4G2a	ction Si ) 4G2a	) Mn mg kg <sup>-1</sup> 4G2a	( Na C (	Pyro-Ph Fe - % of < 4G3	Al 2mm 4G3	) Mn ) 4G3
10N06577 10N06578 10N06579 10N06580 10N06581 10N06582	0-10 10-24 24-30 30-50 50-65 65-76	Oi E Bhs Bs1 Bs2 C	ទ ទ ទ ទ ទ ទ ទ ទ ទ ទ ទ ទ ទ ទ ទ ទ ទ ទ ទ	41.12 1.74 2.33 0.76 0.33 0.20	1.30 0.09 0.09 0.07 0.01 0.02	0.07    	32 20 26 11 36 12	1 0 0	- 1.9 ).6 ).4 ).3	tr 1.0 0.4 0.2 0.2	tr tr tr tr	0.12 2.46 0.86 0.36 0.30	0.08 0.26 0.09 0.05 0.03	0.07 1.41 0.43 0.15 0.12	0.08 1.75 0.65 0.28 0.24	tr 0.57 0.17 0.07 0.06	14.1 105.3 89.3 32.7 39.2		tr 0.3 0.1 tr tr	0.1 0.6 0.3 0.2 0.1	

				***	Primary	Characte	rization [	Data ***										
Pedon ID: S10ID021002 (Boundary, Idaho)													Print Date: Sep 19 2012 3:06PM					
Sampled As : Pence		Sandy-skeletal, isotic, frigid Typic Haplorthod																
USDA-NRCS-NSSC-Soil Survey Laboratory	,				; P	edon No.	10N1372											
CEC & Bases	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	-9-	-10-	-11-	-12-	-13-	-14-				
	(	NH <sub>4</sub> OA	AC Extract	able Base	s)				CEC8	CEC7	ECEC		(	- Base)	]			

								Sum	Acid-	Extr	KCI	Sum	NH <sub>4</sub>	Bases	AI	(- Saturat	tion -)
	Depth			Ca	Mg	Na	к	Bases	ity	AI	Mn	Cats	OAC	+AI	Sat	Sum	NH <sub>4</sub> OAC
Layer	(cm)	Horz	Prep	(		cmol	(+) kg <sup>-1</sup> - ·			)	mg kg <sup>-1</sup>	( cm	nol(+) kg <sup>-1</sup>	)	(	%	)
				4B1a1a	4B1a1a	4B1a1a	4B1a1a		4B2b1a1	4B3a1a	4B3a1a		4B1a1a				
10N06578	10-24	Е	s	0.2	tr		0.2	0.4	10.5	3.4	0.5	10.9	6.5	3.8	89	4	6
10N06579	24-30	Bhs	S				0.2	0.2	27.6	1.0	0.6	27.8	15.8	1.2	83	1	1
10N06580	30-50	Bs1	s				0.2	0.2	12.7	0.9	0.3	12.9	6.8	1.1	82	2	3
10N06581	50-65	Bs2	S				0.1	0.1	6.5	0.8	0.1	6.6	3.4	0.9	89	2	3
10N06582	65-76	С	S				0.2	0.2	4.8	0.5	0.1	5.0	2.7	0.7	71	4	7