

From: [Guinotte, John](#)
To: [Betty Grizzle](#); [Stephen Torbit](#)
Subject: den regression w lat and elev
Date: Wednesday, December 20, 2017 10:30:56 AM
Attachments: [dens lat elev regression.xlsx](#)

Hi Betty,

Attached is the updated den lat/elev regression with Heinemeyer's sites added. Additions dropped the R2 to 0.69. The green shaded cells in the spreadsheet are her sites. You might want to rerun in R to double check R2.

Best,
John

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OBJECTID	FID_Dens_C	Common_Nam	Directions	Observers	Person_Con	Verificati	Source_Age	DEN	FWS_SOURCE	FWS_LINK	DATES	DEN_TYPE	STRUCTURE	TOTAL_DETE	FWS_YEAR	FWS_DECADE	Comments_A	Snow_Cover	DUP_Notes	Num_Snow_Y	FID_Dens_C	Latitude	Elev_ft	Elevation (meters)	label	Meltout	sd_may15_m	slope_deg
18	1	WOLVERINE	UPPER CORNER OF A TRIBUTARY	WINTERLY	BIULOGIST	FIELD WORK	NONE LISTED	1	IF FWS SOURCE	42	20080518	NONE LISTED	NONE LISTED	3	2008	2000	AT LEAST 3	NO SNOW		7	1	45.39338074	8218	2505		03-Jul-08	0	13
10	3	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	NONE LISTED	1	IF FWS SOURCE	634	-9	NONE LISTED	NONE LISTED	-9	-9	2000	WINTERLY	NO SNOW		1	3	44.70584889	9240	2816			0	4
23	4	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	1	20030400	NATAL	LOG COMPLEX	-9	2003	2000	DENS FROM GLACIER PARK	No snow		3	4	48.76351359	6325	1928	GLAC	25-May-03	1.036	12
27	5	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	2	20030500	MATERNAL	LOG COMPLEX	-9	2003	2000	DENS FROM GLACIER PARK	No snow		3	5	48.76601263	6546	1995	GLAC	25-May-03	1.045	15
24	6	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	3	20040400	NATAL	LOG COMPLEX	-9	2004	2000	DENS FROM GLACIER PARK	imagery, slight snow patches in		6	6	48.75208815	5929	1807	GLAC	04-Jun-04	0.407	9
25	7	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	4	20040400	MATERNAL	DOWN LOG	-9	2004	2000	DENS FROM GLACIER PARK	imagery, slight snow patches in		6	7	48.75248863	5981	1823	GLAC	29-Jun-04	0.539	8
26	8	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	5	20040500	MATERNAL	LOG/BOULDER	-9	2004	2000	DENS FROM GLACIER PARK	imagery, slight snow patches in		6	8	48.75303579	6211	1893	GLAC	29-Jun-04	0.653	10
22	9	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	6	20050300	NATAL	SPIDER TREE	-9	2005	2000	DENS FROM GLACIER PARK	2015, tread Snow May 30,		6	9	48.74839372	6487	1977	GLAC	11-Jun-05	0.531	16
21	10	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	7	20050400	MATERNAL	SPIDER TREE	-9	2005	2000	DENS FROM GLACIER PARK	2015, tread Snow May 30,		6	10	48.74837132	6472	1973	GLAC	11-Jun-05	0.531	15
20	11	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	8	20050500	MATERNAL	SPIDER TREE	-9	2005	2000	DENS FROM GLACIER PARK	2015, tread Snow May 30,		7	11	48.74787698	6272	1912	GLAC	11-Jun-05	0.468	13
31	12	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	9	20060400	UNCONFIRMED	LOG COMPLEX	-9	2006	2000	DENS FROM GLACIER PARK	No snow		5	12	48.8017407	4966	1514	GLAC	14-May-06	0	11
32	13	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	10	20060300	UNCONFIRMED	UNK	-9	2006	2000	DENS FROM GLACIER PARK	imagery, clone		5	13	48.89694047	6866	2093	GLAC	25-May-06	1.435	9
19	14	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	11	20060400	UNCONFIRMED	UNK	-9	2006	2000	DENS FROM GLACIER PARK	imagery, clone Snow May 30,		6	14	48.74391584	7389	2252	GLAC	07-Jun-06	1.233	25
29	15	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	12	20060500	NATAL	LOG COMPLEX	-9	2006	2000	DENS FROM GLACIER PARK	No snow		3	15	48.78035753	6046	1843	GLAC	31-May-06	0.611	11
28	16	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_	13	20060500	MATERNAL	LOG COMPLEX	-9	2006	2000	DENS FROM GLACIER PARK	imagery, dense		3	16	48.77985833	6072	1851	GLAC	31-May-06	0.611	8
30	17	WOLVERINE	GLACIER PARK	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND	1	GLACIER_DENS_								DENS FROM GLACIER PARK	No snow, dense				48.77662022	6305	1922	GLAC	04-Jun-07	0	26
9	18	WOLVERINE	SAWTOOTH IDAHO	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND															44.44612834	8316	2535			0	8
8	19	WOLVERINE	SAWTOOTH IDAHO	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND															44.44114036	8278	2523			0	5
6	20	WOLVERINE	SAWTOOTH IDAHO	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND															44.42191192	8282	2524			0	13
7	21	WOLVERINE	SAWTOOTH IDAHO	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND															44.4285161	8274	2522			0	13
5	22	WOLVERINE	SAWTOOTH IDAHO	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND															44.41574719	8470	2582			0	19
11	23	WOLVERINE	SAWTOOTH IDAHO	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND															44.53052314	8180	2493			0	28
12	24	WOLVERINE	SAWTOOTH IDAHO	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND															44.53439492	8093	2467			0	16
13	25	WOLVERINE	IDAHO	JEFF COPELAND	RESEARCHER	FIELD WORK	JEFF COPELAND															44.53996544	7252	2210			0	12
33	26	WOLVERINE	NONE LISTED LOCATION	NORMAN, BEN	UNKNOWN	VISUAL	NONE LISTED															48.84162273	6410	1954			0	15
34	31	WOLVERINE	UNIDENTIFIED JUST NW OF	FITKIN, S/WDFW	NONE LISTED	VERIFIED METHOD, AIR	WDFW SURVEY															48.88022575	5950	1814		12-Jul-02	0	13
3	34	WOLVERINE	WESLEY LAKE	NONE LISTED	NONE LISTED	VISUAL	NONE LISTED															38.18996676	8819	2688			0	10
2	35	WOLVERINE	SOUTH SIDE OF	NONE LISTED	NONE LISTED	VISUAL	NONE LISTED															36.66578123	10053	3064			0	20
1	36	WOLVERINE	None provided,	NONE LISTED	NONE LISTED	VISUAL	NONE LISTED															36.39633556	11687	3562			0	26
17	37	WOLVERINE	None provided,	BOB INMAN	RESEARCHER	VISUAL	INMAN															45.3986933	8158	2487		17-Jun-04	0	7
4	38	WOLVERINE	None provided,	BOB INMAN	RESEARCHER	VISUAL	INMAN															43.69057702	7870	2399		09-Jun-04	0	9
16	39	WOLVERINE	None provided,	BOB INMAN	RESEARCHER	VISUAL	INMAN															45.37890336	8835	2693		12-Jul-05	0	7
15	41	WOLVERINE	None provided,	BOB INMAN	RESEARCHER	VISUAL	INMAN															45.33189258	8843	2695		18-Jun-06	0	15
14	42	WOLVERINE	None provided, but have ID info	BOB INMAN	RESEARCHER	VISUAL	WILL DUFF															44.96135347	9250	2820		25-May-07	0	10
																						44.95048677		2275.552979				
																						45.20329341		2215.788574				
																						45.10338378		2222.76001				
																						45.09678234		2402.383301				
																						44.50190224		2167.12793				
																						44.50375956		2130.346191				
																						44.50297025		2146.79248				
																						43.90504384		2310.842529				
																						43.90511573		2317.690918				
																						43.90677326		2350.241943				
																						44.07816711		2911.36792				
																						45.19701072		2218.419678				
																						44.77034998		2713.029053				