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WAS *EQUUS CEDRALENSIS* A NON-STILT LEGGED HORSE? TAXONOMICAL IMPLICATIONS FOR THE MEXICAN PLEISTOCENE HORSES

FUE *EQUUS CEDRALENSIS* UN CABALLO DE PATAS NO ZANCONAS? IMPLICACIONES TAXONÓMICAS PARA LOS CABALLOS PLEISTOCÉNICOS MEXICANOS

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Palabras clave. Pleistoceno. Rancholabreano. *Equus.* Mexico. Norteamérica.

THE SMALL-SIZED horse *Equus cedralensis* was erected based on specimens from the late Pleistocene locality of El Cedral, San Luis Potosí, in north-central Mexico (Figure 1). The species was diagnosed as one of the smallest North American horse species, with teeth that are morphologically very similar to the other horses found at Cedral (i.e., *Equus conversidens* and *E. mexicanus*) but smaller in size (Alberdi et al., 2014). Its postcranials are also small in size, without stilt-legged metapodials, which are less slender than those of *E. francisci* (Alberdi et al., 2014).

Studies on Pleistocene *Equus* teeth morphology recognized a very similar size and enamel pattern between the *E. cedralensis* and *E. francisci* specimens (Barrón-Ortiz et al., 2017; Priego-Vargas et al., 2017), raising the possibility that the new Mexican species is a synonymy of *E. francisci*, but given its non-stilt legged status, it was tentatively considered a valid species (Priego-Vargas et al., 2017).

Based on paleogenomic and morphometric analyses, a new genus of horse for the Pleistocene of North America was erected: *Haringtonhippus francisci* (= *Equus francisci*); this was a New World stilt-legged equid that inhabited a vast area, from Alaska to Texas (Figure 1). In Mexico this equid was tentatively identified in San Josecito Cave, Nuevo Léon, based on a short mitochondrial DNA sequence (Heintzman et al., 2017), and recently it was identified in southern Mexico based on morphological characters (Jiménez-Hidalgo et al., 2019); it is possible that *Equus cedralensis* is a junior synonym of *Haringtonhippus francisci*.

With the aim of establishing if *E. cedralensis* is a non-stilt legged small horse species, we performed multivariate and univariate analyses of metatarsals from several stilt-legged and stout-legged Pleistocene equid species from North America, including this Mexican species.

MATERIALS AND METHODS

We analyzed 332 metatarsals from caballine (*Equus* spp.) and non-caballine (*Haringtonhippus francisci*) Pleistocene horses, including 23 specimens of *Equus cedralensis* from Alberdi et al. (2014). The geographical extent of the samples was comprised of 13 North American sites, including two Mexican *Equus cedralensis* localities (Figure 1). The list of specimens, localities, and bibliographic references used in this work are in the Supplementary Online File.

We performed a principal component analysis (PCA) with the variables: greatest length (GL), proximal breadth (Bp), distal breadth (Bd), and smallest breadth of the diaphysis (SD), following Von Den Driesch (1976) and Eisenmann et al. (1988), in order to evaluate the morphological variation of stilt-legged horses (*Haringtonhippus francisci*), stout-legged horses (*Equus* spp.), and *E. cedralensis*, and also to find the most significant variables to discriminate among these horses.

Additionally, we performed a linear discriminant analysis (DA), using the same variables for the PCA, with the categories “stilt-legged” and “stout-legged”. We employed common covariance as the discriminant method, given that all variables were in covariance (i.e. they proceeded from the same bone element), to designate the *E. cedralensis* individuals as either stilt-legged or stout-legged horses. To test statistic differences among the multivariate centroids of the categories, we performed a Pillai's Trace test.

Following the results of the PCA, we developed a robustness index with the variables that displayed the highest eigenvector values in each principal component (PC1 and PC2). Then, we proceeded to compare the stilt-legged horses and stout-legged horses with the *E. cedralensis* sample, with one-way ANOVA and a Tukey-Kramer test.

To test if latitude has any influence in the robustness index, we analyzed the data of the stilt-legged horses and *E. cedralensis* from five selected sites, ranging from 64° to 18° latitude. Finally, we compared these sites with a one-way ANOVA and a Tukey-Kramer test.

All statistical tests were performed with JMP 8.0 (SAS Institute, Inc., https://www.jmp.com). In all cases, the level of significance was $\alpha = 0.05$.

RESULTS

The PCA showed that the overall metatarsal morphospace of *E. cedralensis* overlaps with both the stilt and stout-legged horses (Figure 2.1). The PCA eigenvectors are in Table 1.

The DA showed that 77.7% of the *E. cedralensis* sample were classified as stilt-legged horses (*Haringtonhippus francisci*), while 22.2% were classified as stout-legged horses. Two specimens (INAH DP-3078d and INAH DP-4730d) are close to the *Haringtonhippus francisci* holotype (Figure 2.2). Also, the DA showed statistically significant differences among the stilt and stout-legged groups (Prob>F= <0.0001).

The ANOVA of the robustness index (Figure 2.3), showed statistically significant differences among the categories of stilt-legged, stout-legged and *E. cedralensis* (Prob > F= <0.0001). The Tukey-Kramer test showed no statistically significant differences between *E. cedralensis* and the stilt-legged horses (Prob > F= 0.0923), but it showed statistically significant differences between *E. cedralensis* and the stout-legged horses, as well as between stilt and stout-legged horses (Prob > F= <0.0001 in both cases).

Finally, we tested if the geographical provenance of the stilt-legged horses (*Haringtonhippus francisci*) and *E. cedralensis* (classified as a stilt-legged horse in our analysis) had any influence in the robustness index (Figure 2.4). We found no statistically

significant differences among most of the samples (Table 2), the only exception being the comparison of the samples from Valsequillo (Puebla) and Natural Trap Cave (Wyoming), which show statistically significant differences (Prob > F= <0.0210).

DISCUSSION

Our results indicate that *Equus cedralensis* was a stilt-legged horse, not different from *Haringtonhippus francisci;* therefore, the autapomorphy that diagnosed the species is no longer valid, giving that its dental morphology is very similar to *H. francisci*, as was shown by Barrón-Ortiz et al. (2017) and Priego-Vargas et al. (2017). Consequently, we propose that the Mexican specimens described and figured by Alberdi et al. (2014) as *E. cedralensis* should be referred as *Haringtonhippus francisci*, in accordance with the Statement of the Principle of Priority (ICZN, 1999: Article 23).

Recently, Marín-Leyva et al. (2019) reached a similar conclusion using a geometric morphometrics approach for Mexican Pleistocene equids, in which *E. cedralensis* is a stilt-legged, slender equid species.

Some metatarsal specimens identified as *E. cedralensis* by Alberdi et al. (2014) were within the morphospace of *E. conversidens* in our analysis (Figure 2.2), suggesting that they were misidentified. Barrón-Ortiz et al. (2017) also identified some teeth specimens as *E. conversidens* that were originally identified as *E. cedralensis.*

Our analysis showed that there is no latitudinal robustness cline among the stilt-legged samples from diverse North American localities (64º N- 18ºN).

The results of our study indicate that *Haringtonhippus francisci* had a very broad geographic range during the Pleistocene in North America, from Alaska to southern Mexico, and that only one small-sized stilt-legged species of equid roamed Mexico, *H. francisci*.

CONCLUSIONS

The species *Equus cedralensis* was diagnosed as having stouter metapodials than those of *E. francisci*, but our analyses of a large sample of stout-legged and stilt-legged equid specimens along with *E. cedralensis* from several localities of the Pleistocene of North America showed that it is a stilt-legged equid. Therefore, *Equus cedralensis* should be considered a junior synonym of *Haringtonhippus francisci*, because its dental morphology and size is very similar to that of *H. francisci* and lacks any other diagnostic character that allows it to be distinguished as a valid species.

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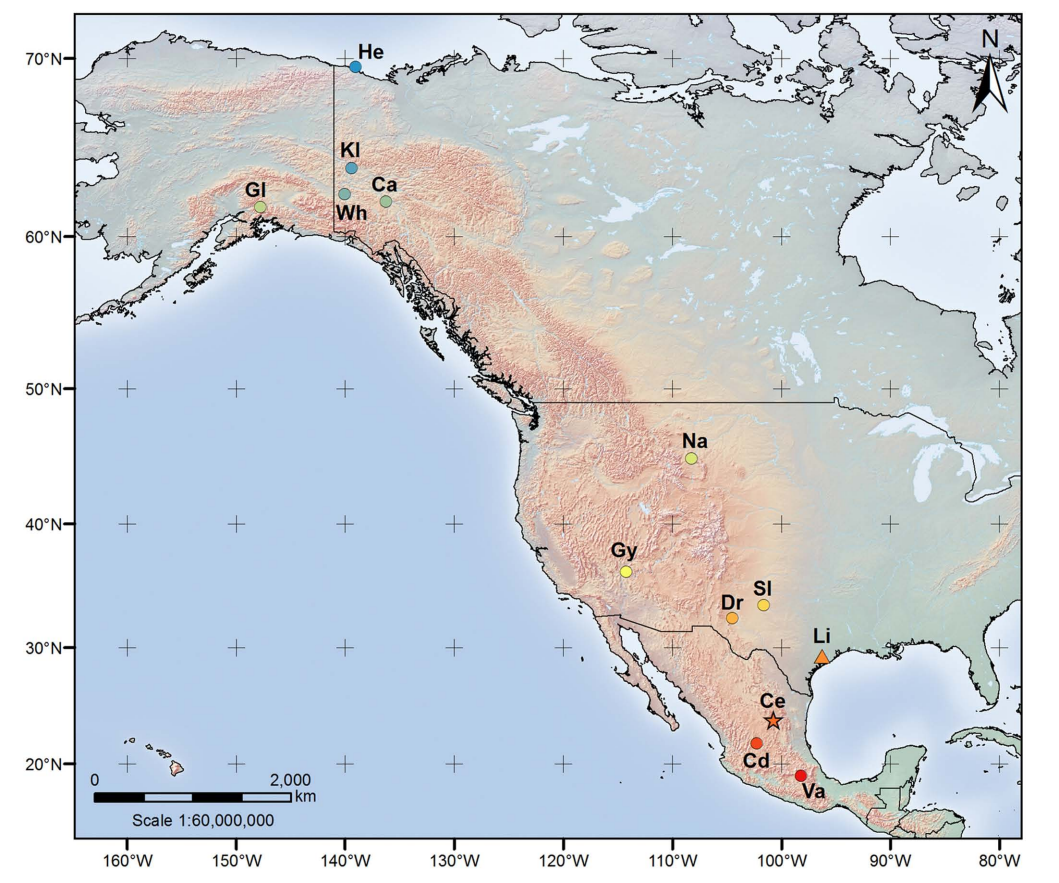
Figure Captions

Figure 1. Fossil localities of the samples analyzed in this work. The star indicates the type locality of *Equus cedralensis* (El Cedral, San Luis Potosí), and the triangle, the type locality of *Haringtonhippus francisci* (Lissie Formation, Texas). **He**, Herschel Island (Yukon), **K,**: Klondike area (Yukon), **Wh,** White River area (Yukon), **Ca,** Carmacks (Yukon), **Gl,** Glacier Creek (Alaska), **Na**, Natural Trap Cave (Wyoming), **Gy**, Gypsum Cave (Nevada), **Sl**, Slaton local fauna (Texas), **Dr,** Dry Cave (New Mexico), **Cd,** Cedazo local fauna (Aguascalientes), **Va**, Valsequillo local fauna (Puebla).

Figure 2. **1,** Two main components of the Principal Component Analysis (cumulative variance= 90.931%). The dotted lines represent metatarsal morphospaces. **2,** Results of the Discriminant Analysis, the crosses represent the multivariate centroid of the groups, the inner circles correspond to a 95% confidence limit of the groups's mean, and the outer circles are the 50% of the points of that group. Variables abbreviations are the same as in the Table 1. **3,** Univariate analysis of the robustness index among North American Pleistocene horses classified as stilt-legged and stout-legged, including the *E. cedralensis* sample (including the Valsequillo site sample). **4,** Geographical variation of the robustness index of stilt-legged horses (*E. cedralensis* included). The dotted blue line represents the robustness index of the *Haringtonhippus francisci* holotype. For figures 3 and 4, the box plots show the means and standard deviation of each group. The middle line shows the great mean. Blue dots represent the stout-legged horses, green dots stilt-legged horses, red asterisks *E. cedralensis*, and green asterisk *Haringtonhippus francisci* holotype.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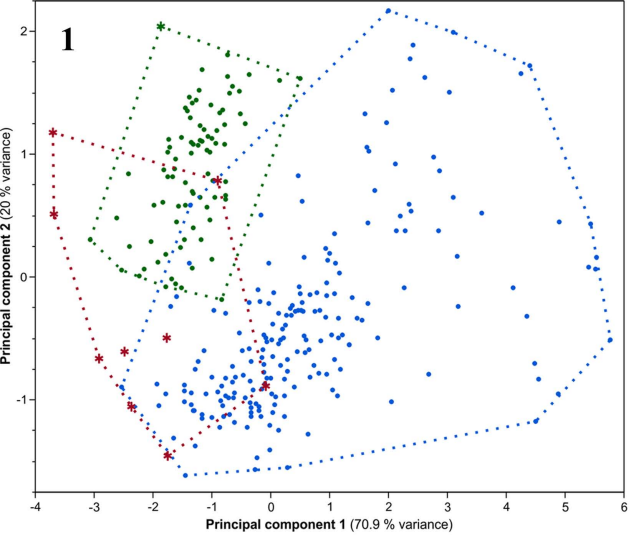
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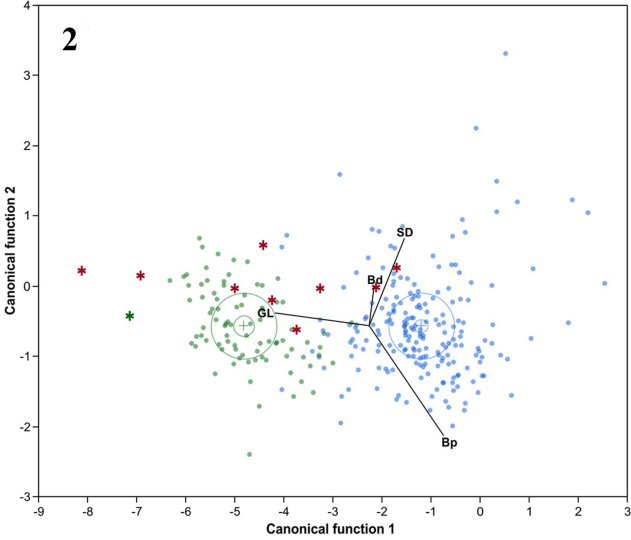
Principal component 2 (20 % variance)
Principal component 1 (70.9 % variance)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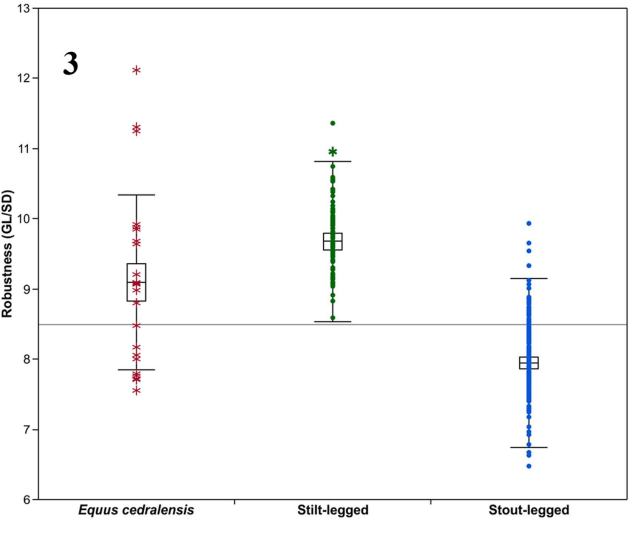
Canonical function 2
Canonical function 1
SD
Bd
GL
Bp


3
Robustness (GL/SD)
Equus cedralensis
Stilt-legged
Stout-legged

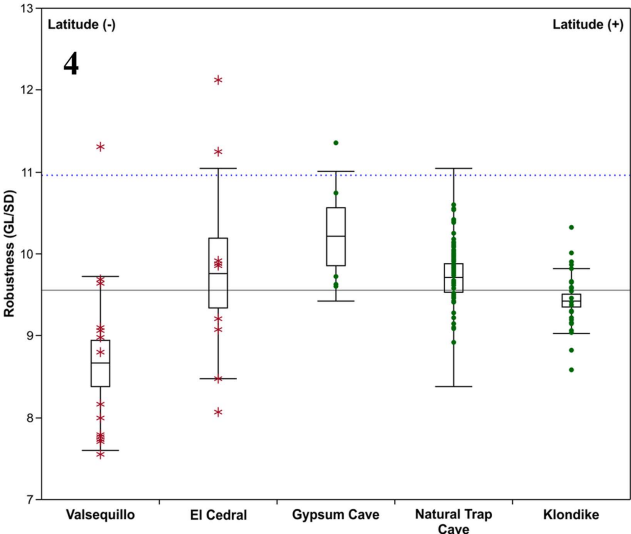

4
Latitude (-)
Latitude (+)
Robustness (GL/SD)
Valsequillo
El Cedral
Gypsum Cave
Natural Trap Cave
Klondike

TABLE 1 - Eigenvector values for each principal component (PC) of the PCA. The highest values employed for the robustness index are in bold.

Variable	PC1	PC2	PC3	PC4
Greatest length (Gl)	0.31437	**0.94811**	0.01243	0.04584
Proximal breadth (Bp)	0.55436	-0.14616	-0.51146	-0.64010
Smallest breadth of the diaphysis (SD)	**0.55730**	-0.21756	-0.27549	0.75246
Distal breadth (Bd)	0.53223	-0.17997	0.81385	-0.14826

TABLE 2 - Results of the Tukey-Kramer test of different stilt-legged horse localities, including the Mexican sites. The statistically significant value is in bold

Site A	*Site B*	*Difference*	*Std. Err. Dif.*	*p-Value*
Gypsum Cave	*Valsequillo*	*1.549932*	*0.5937468*	*0.0756*
El Cedral	*Valsequillo*	*1.097405*	*0.4869139*	*0.1683*
Natural Trap Cave	*Valsequillo*	*1.045295*	*0.3382593*	***0.021***
Gypsum Cave	*Klondike*	*0.786412*	*0.56025*	*0.6267*
Klondike	*Valsequillo*	*0.76352*	*0.3832619*	*0.2769*
Gypsum Cave	*Natural Trap Cave*	*0.504637*	*0.5304807*	*0.876*
Gypsum Cave	*El Cedral*	*0.452527*	*0.6356693*	*0.9534*
El Cedral	*Klondike*	*0.333884*	*0.4454548*	*0.9441*
Natural Trap Cave	*Klondike*	*0.281775*	*0.2752529*	*0.8439*
El Cedral	*Natural Trap Cave*	*0.05211*	*0.4073814*	*0.9999*

Taxon	Robustness MV	ID	Institution	Collection number	Site	Region	Greatest length (GL)	Proximal breadth (Bp)	Smallest breadth of the diaphysis (SD)	Distal breadth (Bd)	Reference	Robustness index
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	160.8	Irish Gulch	Klondike	262.59	40.12	28.65	30.48	Heintzman et al., 2017	9.165445026
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	76.2	Hester Creek	Klondike	255.42	42.2	25.52	31.42	Heintzman et al., 2017	10.00862069
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	130.6	Quartz Creek	Klondike	258.04	37.4	27.04	27.05	Heintzman et al., 2017	9.542899408
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	404.48	Hunker Creek - Alton Placer	Klondike	253.67	40.14	26.28	30.5	Heintzman et al., 2017	9.652587519
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	417.13	Eureka Creek	Klondike	253.28	41.98	26.77	31.42	Heintzman et al., 2017	9.461337318
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	109.7	Quartz Creek	Klondike	266.93	42.58	27.05	32.16	Heintzman et al., 2017	9.868022181
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	404.205	Hunker Creek - Alton Placer	Klondike	254.78	41.69	27.65	30.94	Heintzman et al., 2017	9.214466546
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	404.662	Hunker Creek - Alton Placer	Klondike	254.49	42.36	27.69	30.89	Heintzman et al., 2017	9.190682557
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	29.169	Hunker Creek - T&C Holdings	Klondike	260.58	44.32	28.83	31.79	Heintzman et al., 2017	9.038501561
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	303.371	Eldorado Creek	Klondike	257.69	40.56	26.03		Heintzman et al., 2017	9.89973108
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	401.268	Quartz Creek	Klondike	262.36	40.24	26.71	29.61	Heintzman et al., 2017	9.822538375
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	25922	Natural Trap Cave	Wyoming	267.36	41.56	28.38	32.35	Heintzman et al., 2017	9.420718816
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	26002	Natural Trap Cave	Wyoming	276.91	42.33	27.95	33.04	Heintzman et al., 2017	9.907334526
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	25919	Natural Trap Cave	Wyoming	279.81	40.97	29	31.37	Heintzman et al., 2017	9.64862069
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	25916	Natural Trap Cave	Wyoming	268.29	39.56	28.92	31.2	Heintzman et al., 2017	9.276970954
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	33141	Natural Trap Cave	Wyoming	280.19	41.77	26.44	32.6	Heintzman et al., 2017	10.59720121
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	25918	Natural Trap Cave	Wyoming	281.3	41.43	29.88	34.15	Heintzman et al., 2017	9.414323963
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	32288	Natural Trap Cave	Wyoming	270.18	39.67	27.42	31.43	Heintzman et al., 2017	9.853391685
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	32776	Natural Trap Cave	Wyoming	273.04	43.98	30.03		Heintzman et al., 2017	9.092241092
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	32327	Natural Trap Cave	Wyoming	268.52	41.14	26.62	31.01	Heintzman et al., 2017	10.08715252
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	32326	Natural Trap Cave	Wyoming	282.65	42.35	28.15	33.82	Heintzman et al., 2017	10.04085258
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	33440	Natural Trap Cave	Wyoming	270.32	38.97	27.26	31.02	Heintzman et al., 2017	9.916360968
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	33718	Natural Trap Cave	Wyoming	267.8	40.1	29.43	30.9	Heintzman et al., 2017	9.099558274
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	33421	Natural Trap Cave	Wyoming	275.04	43.6	27.9	31.88	Heintzman et al., 2017	9.858064516
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	33420	Natural Trap Cave	Wyoming	275.79	43.65	28.69	31.81	Heintzman et al., 2017	9.612757058
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	33419	Natural Trap Cave	Wyoming	270.88	41.38	27.81	34.1	Heintzman et al., 2017	9.740381158
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	33333	Natural Trap Cave	Wyoming	283.58	43.54	28.74	31.72	Heintzman et al., 2017	9.867084203
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	41435	Natural Trap Cave	Wyoming	284.67	41.05	28.58	33.87	Heintzman et al., 2017	9.960461861
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	39778	Natural Trap Cave	Wyoming	272.41	42.34	27.9		Heintzman et al., 2017	9.763799283
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	41750	Natural Trap Cave	Wyoming	276.21	41.07	27.65	32.34	Heintzman et al., 2017	9.989511754
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	43812	Natural Trap Cave	Wyoming	273.75	41.67	28.29	32.7	Heintzman et al., 2017	9.676564157
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	43380	Natural Trap Cave	Wyoming	267.39	40.52	25.66	31.73	Heintzman et al., 2017	10.42049883
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	43262	Natural Trap Cave	Wyoming	271.94	41.13	27.07	32.62	Heintzman et al., 2017	10.04580717
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	42262	Natural Trap Cave	Wyoming	266.78	41.97	29.18	31.82	Heintzman et al., 2017	9.1425634
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	44670	Natural Trap Cave	Wyoming	279.75	40.24	29.38	33.13	Heintzman et al., 2017	9.521783526
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	42150	Natural Trap Cave	Wyoming	273.43	40.53	27.82	31.71	Heintzman et al., 2017	9.828540618
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	47164	Natural Trap Cave	Wyoming	286.85	42.86	27.17	33.59	Heintzman et al., 2017	10.55760029
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	45644	Natural Trap Cave	Wyoming	271.44	42.52	28.57	34.45	Heintzman et al., 2017	9.500875044
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	45421	Natural Trap Cave	Wyoming	284.22	40.96	28.33		Heintzman et al., 2017	10.03247441
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	45599	Natural Trap Cave	Wyoming	273.14	41.73	26.96	32.09	Heintzman et al., 2017	10.13130564
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	45374	Natural Trap Cave	Wyoming	274.28	41.59	27.39	32.51	Heintzman et al., 2017	10.01387368
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	44786	Natural Trap Cave	Wyoming	274.02	40.75	28.98	32.18	Heintzman et al., 2017	9.455486542
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	48226	Natural Trap Cave	Wyoming	279.18	39.79	27.84	32.27	Heintzman et al., 2017	10.02801724
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	48154	Natural Trap Cave	Wyoming	280.4	40.13	29.6	33.29	Heintzman et al., 2017	9.472972973
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	47956	Natural Trap Cave	Wyoming	284.02	41.66	29.47	33.95	Heintzman et al., 2017	9.637597557
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	47667	Natural Trap Cave	Wyoming	277.3	39.74	27.81	30.91	Heintzman et al., 2017	9.971233369
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	47427	Natural Trap Cave	Wyoming	270.69	41.57	29.36	32.34	Heintzman et al., 2017	9.219686649
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	48265	Natural Trap Cave	Wyoming		40.96	28.65	33.63	Heintzman et al., 2017	0
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	50817	Natural Trap Cave	Wyoming	290.03	47	29.66	36.52	Heintzman et al., 2017	9.778489548
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	51007	Natural Trap Cave	Wyoming	286.56	43.35	29.31	33.26	Heintzman et al., 2017	9.776867963
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	50784	Natural Trap Cave	Wyoming	276.52	42.31	26.26	30.82	Heintzman et al., 2017	10.53008378
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	50664	Natural Trap Cave	Wyoming	280.31	43.07	29.8	33.35	Heintzman et al., 2017	9.406375839
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	50438	Natural Trap Cave	Wyoming	275.19	42.97	27.25	32.28	Heintzman et al., 2017	10.0987156
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	52095	Natural Trap Cave	Wyoming	266.81	41.17	25.63	31.77	Heintzman et al., 2017	10.41006633
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	52202	Natural Trap Cave	Wyoming	267.29	41.08	26.25	31.62	Heintzman et al., 2017	10.18247619
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	52034	Natural Trap Cave	Wyoming	270.74	40.35	25.68	32.25	Heintzman et al., 2017	10.54283489
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	52030	Natural Trap Cave	Wyoming	271.6	40.16	25.78	31.98	Heintzman et al., 2017	10.53529868
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	52823	Natural Trap Cave	Wyoming	278.54	41.58	29.08	33.21	Heintzman et al., 2017	9.578404402
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	53505	Natural Trap Cave	Wyoming	264.95	41.74	26.42	33.28	Heintzman et al., 2017	10.02838759
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	53503	Natural Trap Cave	Wyoming	278.26	40.29	27.34	31.96	Heintzman et al., 2017	10.17776152
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	53504	Natural Trap Cave	Wyoming	264.35	40.77	26.95	32.54	Heintzman et al., 2017	9.80890538
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	53310	Natural Trap Cave	Wyoming	275.9	41.42	27.3	33.16	Heintzman et al., 2017	10.10622711
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	53042	Natural Trap Cave	Wyoming	283.29	40.05	27.82	32.15	Heintzman et al., 2017	10.1829619
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	52898	Natural Trap Cave	Wyoming	274.28	41.61	27.59	32.49	Heintzman et al., 2017	9.941283074
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	53885	Natural Trap Cave	Wyoming	270.03	42.22	30.28	32.34	Heintzman et al., 2017	8.917767503
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	62055	Natural Trap Cave	Wyoming	273.26	43.38	26.94	31.05	Heintzman et al., 2017	10.14328137
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	63454	Natural Trap Cave	Wyoming	278.63	41.24	26.82	31.1	Heintzman et al., 2017	10.38888889
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	62158	Natural Trap Cave	Wyoming	272.99	41.32	26.64	31.19	Heintzman et al., 2017	10.24737237
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	61843	Natural Trap Cave	Wyoming	275.41	43.1	27.46	32.48	Heintzman et al., 2017	10.02949745
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	57716	Natural Trap Cave	Wyoming	276.41	40.39	27.83	31.11	Heintzman et al., 2017	9.932087675
Haringtonhippus francisci	*stilt-legged*	NWSL equids	KU	52203	Natural Trap Cave	Wyoming	288.07	46.07	28.81	35.8	Heintzman et al., 2017	9.998958695
Haringtonhippus francisci	*stilt-legged*	NWSL equids	LACM(CIT)	109 / 149291	Gypsum Cave	Nevada	268.38	43.07	27.87	33.64	Heintzman et al., 2017	9.629709365
Haringtonhippus francisci	*stilt-legged*	NWSL equids	LACM(CIT)	109 / 160129	Gypsum Cave	Nevada	254.81	40.73	23.72	31.25	Heintzman et al., 2017	10.74241147
Haringtonhippus francisci	*stilt-legged*	NWSL equids	LACM(CIT)	109 / 160130	Gypsum Cave	Nevada	252.35	40.48	26.26	29.62	Heintzman et al., 2017	9.609672506
Haringtonhippus francisci	*stilt-legged*	NWSL equids	LACM(CIT)	109 / 160131	Gypsum Cave	Nevada	252.13	40.41	22.2	27.85	Heintzman et al., 2017	11.35720721
Haringtonhippus francisci	*stilt-legged*	NWSL equids	LACM(CIT)	109 / 160132	Gypsum Cave	Nevada	268.93	44.4	27.64	34.2	Heintzman et al., 2017	9.729739508
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	488.248	Lower Quartz Creek - Schmidt Placer	Klondike	257.81	39.77	26.92	30.32	Heintzman et al., 2017	9.576894502
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	407.539	Upper Quartz Creek	Klondike	261.82	44.24	27.28	32.19	Heintzman et al., 2017	9.597507331
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	406.504	Quartz Creek	Klondike	264.16	38.5	25.59	28.79	Heintzman et al., 2017	10.32278234
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	406.842	Quartz Creek	Klondike	257.69	40.37	28.43	29.76	Heintzman et al., 2017	9.064016884
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	407.452	Upper Quartz Creek	Klondike	263.61	41.41	28.1	27.36	Heintzman et al., 2017	9.38113879
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	406.251	Quartz Creek	Klondike	260.88	41.91	28.31	30.72	Heintzman et al., 2017	9.215118333
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	461.149	Independence Creek	Klondike	262.91	42.69	27.92	31.42	Heintzman et al., 2017	9.416547278
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	407.119	Upper Quartz Creek	Klondike	259.13	42.97	26.8	31.44	Heintzman et al., 2017	9.669029851
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	475.1	Hunker Creek - above Gold Bottom	Klondike	256.65	43.78	29.9	33.08	Heintzman et al., 2017	8.58361204
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	406.821	Quartz Creek	Klondike	265.23	43.79	28.52	31.64	Heintzman et al., 2017	9.299789621
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	406.932	Quartz Creek	Klondike	251.75	39.69	27.11	26.16	Heintzman et al., 2017	9.286241239
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	407.185	Upper Quartz Creek	Klondike	258.02	42.79	29.23	29.97	Heintzman et al., 2017	8.827232296
Haringtonhippus francisci	*stilt-legged*	NWSL equids	YG	489.371	Upper Quartz - Schmidt Placer	Klondike	254.59	42.34	27.82	31.77	Heintzman et al., 2017	9.151329978
Haringtonhippus francisci	*stilt-legged*	*francisci* type	TAMU	2518	Wharton County	Lissie Formation	285	39	26	29	(Eisenmann et al., 2008)	10.96153846
Equus cedralensis		Small size	INAH	DP-4110d	El Cedral	El Cedral	271	41	27.5	36.8	Alberdi et al., 2014	9.854545455
Equus cedralensis		Small size	INAH	DP-3078d	El Cedral	El Cedral	263	32	21.7	30.1	Alberdi et al., 2014	12.11981567
Equus cedralensis		Small size	INAH	DP-4730d	El Cedral	El Cedral	253.1	32.8	22.5	30	Alberdi et al., 2014	11.24888889
Equus cedralensis		Small size	INAH	DP-5020d	El Cedral	El Cedral	247.1	40	25	38	Alberdi et al., 2014	9.884
Equus cedralensis		Small size	INAH	DP2908d	El Cedral	El Cedral	239.5	35.2	26	32	Alberdi et al., 2014	9.211538462
Equus cedralensis		Small size	INAH	DP-4727i	El Cedral	El Cedral	242	37.3	24.4	36	Alberdi et al., 2014	9.918032787
Equus cedralensis		Small size	INAH	DP-4116i	El Cedral	El Cedral	236	38	26	35	Alberdi et al., 2014	9.076923077
Equus cedralensis		Small size	INAH	DP-2825i	El Cedral	El Cedral	250	44	31	40	Alberdi et al., 2014	8.064516129
Equus cedralensis		Small size	INAH	DP-3077i	El Cedral	El Cedral	233	40	27.5	37	Alberdi et al., 2014	8.472727273
Equus cedralensis		Small size			Valsequillo	Valsequillo	294		26		Alberdi et al., 2014	11.30769231
Equus cedralensis		Small size			Valsequillo	Valsequillo	281.6		29.2		Alberdi et al., 2014	9.643835616
Equus cedralensis		Small size			Valsequillo	Valsequillo	280.9		29		Alberdi et al., 2014	9.686206897
Equus cedralensis		Small size			Valsequillo	Valsequillo	272.9		30		Alberdi et al., 2014	9.096666667
Equus cedralensis		Small size			Valsequillo	Valsequillo	272.9		30.1		Alberdi et al., 2014	9.066445183
Equus cedralensis		Small size			Valsequillo	Valsequillo	272.9		30.4		Alberdi et al., 2014	8.976973684
Equus cedralensis		Small size			Valsequillo	Valsequillo	272.9		31		Alberdi et al., 2014	8.803225806
Equus cedralensis		Small size			Valsequillo	Valsequillo	257.2		31.5		Alberdi et al., 2014	8.165079365
Equus cedralensis		Small size			Valsequillo	Valsequillo	257.6		32.2		Alberdi et al., 2014	8
Equus cedralensis		Small size			Valsequillo	Valsequillo	268.8		34.5		Alberdi et al., 2014	7.791304348
Equus cedralensis		Small size			Valsequillo	Valsequillo	268.8		34.6		Alberdi et al., 2014	7.768786127
Equus cedralensis		Small size			Valsequillo	Valsequillo	266.6		34.5		Alberdi et al., 2014	7.727536232
Equus cedralensis		Small size			Valsequillo	Valsequillo	269.6		35		Alberdi et al., 2014	7.702857143
Equus cedralensis		Small size			Valsequillo	Valsequillo	266		35.2		Alberdi et al., 2014	7.556818182
Equus lambei	*stout-legged*		CMN	25938	Dawson Loc. 16	Klondike	267.4	49	32.3	38.9	Heintzman et al., 2017	8.278637771
Equus lambei	*stout-legged*		CMN	13476	Dawson Loc. 32	Klondike	265.5	48.2	32.3	38.6	Heintzman et al., 2017	8.219814241
Equus lambei	*stout-legged*		CMN	17563	Dawson Loc. 32	Klondike	265	52	34.8	40.5	Heintzman et al., 2017	7.614942529
Equus lambei	*stout-legged*		CMN	2773	Sixtymile Loc. 1	Klondike	264.4	48.7	31.5	38.3	Heintzman et al., 2017	8.393650794
Equus lambei	*stout-legged*		CMN	17270	Dawson Loc. 28	Klondike	259.6	47.1	31.1	36.4	Heintzman et al., 2017	8.347266881
Equus lambei	*stout-legged*		CMN	25178	Dawson Loc. 16	Klondike	258.2	43.1	28.3	30.6	Heintzman et al., 2017	9.123674912
Equus lambei	*stout-legged*		CMN	13477	Dawson Loc. 32	Klondike	256	48.6	34.6	36.6	Heintzman et al., 2017	7.398843931
Equus lambei	*stout-legged*		CMN	10467	Dawson Loc. 24	Klondike	255.9	46.5	32.3	33.3	Heintzman et al., 2017	7.922600619
Equus lambei	*stout-legged*		CMN	25187	Dawson Loc. 16	Klondike	254.2	50.4	31.9	37.7	Heintzman et al., 2017	7.968652038
Equus lambei	*stout-legged*		CMN	25188	Dawson Loc. 16	Klondike	253	42.6	27.1	32.1	Heintzman et al., 2017	9.335793358
Equus lambei	*stout-legged*		CMN	11752	Dawson Loc. 28	Klondike	252	49.3	33.4	34.3	Heintzman et al., 2017	7.54491018
Equus lambei	*stout-legged*		CMN	29068	Sixtymile Loc. 3	Klondike	251	47.4	30.9	35.5	Heintzman et al., 2017	8.122977346
Equus lambei	*stout-legged*		CMN	13478	Dawson Loc. 32	Klondike	249.5	44.2	30.5	35	Heintzman et al., 2017	8.180327869
Equus lambei	*stout-legged*		CMN	17511	Dawson Loc. 32	Klondike	249	42.9	29.3	33.7	Heintzman et al., 2017	8.498293515
Equus lambei	*stout-legged*		CMN	17562	Dawson Loc. 32	Klondike	248.4	44.5	31.7	36.4	Heintzman et al., 2017	7.835962145
Equus lambei	*stout-legged*		CMN	28965	Dawson Loc. 17	Klondike	248.2	47.3	32.4	35.6	Heintzman et al., 2017	7.660493827
Equus lambei	*stout-legged*		CMN	11754	Dawson Loc. 28	Klondike	247.4	44.5	30.6	33.7	Heintzman et al., 2017	8.08496732
Equus lambei	*stout-legged*		CMN	13479	Dawson Loc. 32	Klondike	245.2	44.5	30	35.6	Heintzman et al., 2017	8.173333333
Equus lambei	*stout-legged*		CMN	11751	Dawson Loc. 28	Klondike	244.4	42.9	31	34.7	Heintzman et al., 2017	7.883870968
Equus lambei	*stout-legged*		CMN	17585	Dawson Loc. 13	Klondike	243.2	45.9	31.6	34.9	Heintzman et al., 2017	7.696202532
Equus lambei	*stout-legged*		CMN	28966	Dawson Loc. 17	Klondike	243	42.2	28.6	33.4	Heintzman et al., 2017	8.496503497
Equus lambei	*stout-legged*		CMN	17600	Dawson Loc. 28	Klondike	240.6	43.6	28.7	33.8	Heintzman et al., 2017	8.383275261
Equus lambei	*stout-legged*		CMN	17269	Dawson Loc. 28	Klondike	240.2	43	27.9	31	Heintzman et al., 2017	8.609318996
Equus lambei	*stout-legged*		CMN	28968	Dawson Loc. 17	Klondike	238.3	41.8	27.8	31.8	Heintzman et al., 2017	8.571942446
Equus lambei	*stout-legged*		NMC	11753	Dawson Loc. 28	Klondike	234.6	38.4		30.5	Heintzman et al., 2017	
Equus mexicanus	*stout-legged*	Large size	INAH	DP-5018i	Cedral	El Cedral	292	57	41.5	54.6	Alberdi et al., 2014	7.036144578
Equus mexicanus	*stout-legged*	Large size	INAH	DP-5019d	Cedral	El Cedral	298	55	43	53.7	Alberdi et al., 2014	6.930232558
Equus mexicanus	*stout-legged*	Large size	INAH	DP-4118i	Cedral	El Cedral	280	57.7	36.5	53.7	Alberdi et al., 2014	7.671232877
Equus mexicanus	*stout-legged*	Large size	INAH	DP-3069i	Cedral	El Cedral	289	50.3	35	50.5	Alberdi et al., 2014	8.257142857
Equus mexicanus	*stout-legged*	Large size	INAH	DP-3068i	Cedral	El Cedral	282.7	55.5	37	52.7	Alberdi et al., 2014	7.640540541
Equus mexicanus	*stout-legged*	Large size	INAH	DP-4728d	Cedral	El Cedral	273.5	58.7	40.3	53	Alberdi et al., 2014	6.786600496
Equus mexicanus	*stout-legged*	Large size	INAH	DP-2850d	Cedral	El Cedral	285	59	43	55	Alberdi et al., 2014	6.627906977
Equus mexicanus	*stout-legged*	Large size	INAH	DP-4115i	Cedral	El Cedral	294	56.3	41	57.3	Alberdi et al., 2014	7.170731707
Equus mexicanus	*stout-legged*	Large size	INAH	DP-4729d	Cedral	El Cedral	292	59	40	56	Alberdi et al., 2014	7.3
Equus mexicanus	*stout-legged*	Large size	INAH	DP-3067d	Cedral	El Cedral	282	52	36	49	Alberdi et al., 2014	7.833333333
Equus mexicanus	*stout-legged*	Large size	INAH	DP-3066i	Cedral	El Cedral	275.8	52	35	52	Alberdi et al., 2014	7.88
Equus mexicanus	*stout-legged*	Large size	INAH	DP-2955d	Cedral	El Cedral	289	54	35	51	Alberdi et al., 2014	8.257142857
Equus mexicanus	*stout-legged*	Large size	INAH	DP-4111d	Cedral	El Cedral	295	55.5	39.2	54.5	Alberdi et al., 2014	7.525510204
Equus mexicanus	*stout-legged*	Large size	INAH	DP-2895i	Cedral	El Cedral	275	50.7	42.5	55.3	Alberdi et al., 2014	6.470588235
Equus mexicanus	*stout-legged*	Large size	INAH	DP-4731d	Cedral	El Cedral	275	58.1	37.8	53.5	Alberdi et al., 2014	7.275132275
Equus mexicanus	*stout-legged*	Large size	INAH	DP-3065d	Cedral	El Cedral	268.7	55	40.3	54.5	Alberdi et al., 2014	6.667493797
Equus mexicanus	*stout-legged*	Equus cf. scotti	CMN	17573	Dawson Loc. 30	Klondike	283.9	53.9	35.9	38.1	Heintzman et al., 2017	7.908077994
Equus mexicanus	*stout-legged*	Equus cf. scotti	CMN	17293	Dawson Loc. 7	Klondike	281.6	53	34.1	41	Heintzman et al., 2017	8.258064516
Equus mexicanus	*stout-legged*	Equus cf. scotti	CMN	29867	Sixtymile Loc. 3	Klondike	277.6	49.3	29.1	36.8	Heintzman et al., 2017	9.5395189
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	198.1	Lower Last Chance - Henry Gulch Placers	Klondike	304.29	49.01	34.63	42.61	Heintzman et al., 2017	8.78688998
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	378.8	Little Blanche Creek	Klondike	287.7	52.41	34.47	39.13	Heintzman et al., 2017	8.346388164
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	378.4	Little Blanche Creek	Klondike	273.32	47.18	34.4		Heintzman et al., 2017	7.945348837
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	378.1	Little Blanche Creek	Klondike	287.08	50.87	33.26	38.49	Heintzman et al., 2017	8.631389056
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	378.5	Little Blanche Creek	Klondike	280.56	53.76	36.79	36.84	Heintzman et al., 2017	7.625985322
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	378.3	Little Blanche Creek	Klondike	296.61	51.89	34.92	36.67	Heintzman et al., 2017	8.493986254
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	378.58	Little Blanche Creek	Klondike	290.74	53.95	36.86	40.28	Heintzman et al., 2017	7.887683125
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	378.7	Little Blanche Creek	Klondike	290.08	51.85	34.79		Heintzman et al., 2017	8.338028169
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	378.2	Little Blanche Creek	Klondike	287.41	54.27	33.59		Heintzman et al., 2017	8.5564156
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	378.59	Little Blanche Creek	Klondike	278.67	50.21	35.87	36.53	Heintzman et al., 2017	7.76888765
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	439.49	Dominion Creek - Sailer's Placer	Klondike	311.26	57.71	38.39	44.89	Heintzman et al., 2017	8.107840583
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	439.77	Dominion Creek - Sailer's Placer	Klondike	309.32	58.27	38.12	43.51	Heintzman et al., 2017	8.114375656
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	412.27	Paradise Hill - Tony Beet's	Klondike	300.89	55.01	35.17	41.46	Heintzman et al., 2017	8.555302815
Equus mexicanus	*stout-legged*	Equus cf. scotti	YG	148.2	Thistle Creek	Klondike					Heintzman et al., 2017	
Equus mexicanus	*stout-legged*	Equus excelsus	FC	687	El Cedazo	El Cedazo	265.6	50.7	38.1	45.5	Mooser and Dalquest, 197	6.971128609
Equus mexicanus	*stout-legged*	Equus excelsus	FC	688	El Cedazo	El Cedazo	268.4	49.5	32.8	44.4	Mooser and Dalquest, 197	8.182926829
Equus mexicanus	*stout-legged*	Equus excelsus	FC	689	El Cedazo	El Cedazo	261.9	47.2	32.1	44.5	Mooser and Dalquest, 197	8.158878505
Equus mexicanus	*stout-legged*	Equus excelsus	FC	690	El Cedazo	El Cedazo	261.9	45.9	32.3	44.6	Mooser and Dalquest, 197	8.108359133
Equus mexicanus	*stout-legged*	Equus excelsus	FC	691	El Cedazo	El Cedazo	264.3	42.9	32.4	45.5	Mooser and Dalquest, 197	8.157407407
Equus mexicanus	*stout-legged*	Equus excelsus	FC	692	El Cedazo	El Cedazo	260.2	45.7	32.4	43.2	Mooser and Dalquest, 197	8.030864198
Equus mexicanus	*stout-legged*	Equus excelsus	FC	693	El Cedazo	El Cedazo	259.6	44.5	32.4	41.9	Mooser and Dalquest, 197	8.012345679
Equus mexicanus	*stout-legged*	Equus excelsus	FC	694	El Cedazo	El Cedazo	258.8	48.6	34.5	48.8	Mooser and Dalquest, 197	7.501449275
Equus conversidens	*stout-legged*	*Equus conversidens*		5183	Slaton local fauna	Slaton local fauna	263	46.7	31.2	42.3	Dalquest 1967	8.429487179
Equus conversidens	*stout-legged*	*Equus conversidens*		5007	Slaton local fauna	Slaton local fauna	264	49	31.8	42.4	Dalquest 1967	8.301886792
Equus conversidens	*stout-legged*	*Equus conversidens*		6486	Slaton local fauna	Slaton local fauna	255	47.8	32.7	43.2	Dalquest 1967	7.798165138
Equus conversidens	*stout-legged*	*Equus conversidens*		6561	Slaton local fauna	Slaton local fauna	264		32	47	Dalquest 1967	8.25
Equus conversidens	*stout-legged*	*Min*			Dry Cave	Dry Cave	262	44.3	30	40.3	Harris and Porter, 1980	8.733333333
Equus conversidens	*stout-legged*	*Max*			Dry Cave	Dry Cave	274	47.7	30.4	43.6	Harris and Porter, 1980	9.013157895
Equus conversidens	*stout-legged*	*Equus conversidens*	FC	695	El Cedazo	El Cedazo	240.5	44	31.3	40	Mooser and Dalquest, 197	7.68370607
Equus conversidens	*stout-legged*	*Equus conversidens*	FC	696	El Cedazo	El Cedazo	242	44.5	32.5	42.3	Mooser and Dalquest, 197	7.446153846
Equus conversidens	*stout-legged*	*Equus conversidens*	FC	707	El Cedazo	El Cedazo	253.1	42.9	29.6	40.2	Mooser and Dalquest, 197	8.550675676
Equus conversidens	*stout-legged*	*Equus conversidens*	FC	713	El Cedazo	El Cedazo	252	38.5	29	33	Mooser and Dalquest, 197	8.689655172
Equus spp.	*stout-legged*		YG	417.72	Eureka Creek	Klondike	256.18	50.03	33.42	38.06	Heintzman et al., 2017	7.665469779
Equus spp.	*stout-legged*		YG	407.45	Upper Quartz Creek	Klondike	270.8	48.31	33.62	38.41	Heintzman et al., 2017	8.054729328
Equus spp.	*stout-legged*		YG	406.751	Quartz Creek	Klondike	261.36	47.19	32.57	35.57	Heintzman et al., 2017	8.024562481
Equus spp.	*stout-legged*		YG	421.84	Green Gulch	Klondike	249.3	46.44	32.14	36.35	Heintzman et al., 2017	7.756689484
Equus spp.	*stout-legged*		YG	404.18	Hunker Creek - Alton Placer	Klondike	291.4	49.89	32.85	38.71	Heintzman et al., 2017	8.870624049
Equus spp.	*stout-legged*		YG	407.26	Upper Quartz Creek	Klondike	240.61	45.44	29.93	33.9	Heintzman et al., 2017	8.039091213
Equus spp.	*stout-legged*		YG	328.8	Hunker Creek - Alton Placer	Klondike	251.39	45.75	30.58	35.78	Heintzman et al., 2017	8.220732505
Equus spp.	*stout-legged*		YG	406.623	Quartz Creek	Klondike	262.21	49.62	36.17	36.87	Heintzman et al., 2017	7.249377938
Equus spp.	*stout-legged*		YG	406.471	Quartz Creek	Klondike	252.42	45.42	32.07	35.78	Heintzman et al., 2017	7.87090739
Equus spp.	*stout-legged*		YG	402.164	Quartz Creek	Klondike	254.06	46.5	32.59	34.77	Heintzman et al., 2017	7.795642835
Equus spp.	*stout-legged*		YG	401.158	Quartz Creek	Klondike	249.15	45.96	32.39	32.79	Heintzman et al., 2017	7.692188947
Equus spp.	*stout-legged*		YG	404.14	Hunker Creek - Alton Placer	Klondike	254.91	45.77	28.73	33.64	Heintzman et al., 2017	8.872607031
Equus spp.	*stout-legged*		YG	328.85	Hunker Creek - Alton Placer	Klondike	246.22	43.41	29.48	34.56	Heintzman et al., 2017	8.352103121
Equus spp.	*stout-legged*		YG	401.94	Quartz Creek	Klondike	258.09	48.48	33.61	31.56	Heintzman et al., 2017	7.678964594
Equus spp.	*stout-legged*		YG	406.553	Quartz Creek	Klondike	266.24	48.31	34.14	37.05	Heintzman et al., 2017	7.79847686
Equus spp.	*stout-legged*		YG	406.87	Quartz Creek	Klondike	256.28	49.04	33.12	37.62	Heintzman et al., 2017	7.737922705
Equus spp.	*stout-legged*		YG	406.3	Quartz Creek	Klondike	269.47	50.78	32.61	38.08	Heintzman et al., 2017	8.26341613
Equus spp.	*stout-legged*		YG	407.453	Upper Quartz Creek	Klondike	260.21	46.27	31.83	37.48	Heintzman et al., 2017	8.174992146
Equus spp.	*stout-legged*		YG	407.24	Upper Quartz Creek	Klondike	247.55	44.73	31.08	33.81	Heintzman et al., 2017	7.964929215
Equus spp.	*stout-legged*		YG	421.54	Green Gulch	Klondike	259.63	45.13	30.44	36.66	Heintzman et al., 2017	8.529237845
Equus spp.	*stout-legged*		YG	406.276	Quartz Creek	Klondike	247.42	48.33	32.32	36.43	Heintzman et al., 2017	7.655321782
Equus spp.	*stout-legged*		YG	406.531	Quartz Creek	Klondike	247.54	45.66	34.17	34.61	Heintzman et al., 2017	7.244366403
Equus spp.	*stout-legged*		YG	402.7	Quartz Creek	Klondike	273.11	54.15	34.96	40.64	Heintzman et al., 2017	7.812070938
Equus spp.	*stout-legged*		YG	407.157	Upper Quartz Creek	Klondike	255.89	47.53	31.61	35.86	Heintzman et al., 2017	8.095223031
Equus spp.	*stout-legged*		YG	421.55	Green Gulch	Klondike	244.17	41.85	30.66	34.04	Heintzman et al., 2017	7.963796477
Equus spp.	*stout-legged*		YG	303.37	Eldorado Creek	Klondike	242.74	40.67	30.43	32.34	Heintzman et al., 2017	7.976996385
Equus spp.	*stout-legged*		YG	378.56	Little Blanche Creek	Klondike	283.71	53.14	38.71	39.51	Heintzman et al., 2017	7.329113924
Equus spp.	*stout-legged*		YG	126.47	Irish Gulch	Klondike	253.82	46.57	33.68	34.3	Heintzman et al., 2017	7.536223278
Equus spp.	*stout-legged*		YG	417.1	Eureka Creek	Klondike	253.91	46.74	31.78	34.18	Heintzman et al., 2017	7.989616111
Equus spp.	*stout-legged*		YG	417.3	Eureka Creek	Klondike	263.92	47.24	31.69	38.07	Heintzman et al., 2017	8.328179236
Equus spp.	*stout-legged*		YG	417.17	Eureka Creek	Klondike	245.28	47.98	31.54	37.59	Heintzman et al., 2017	7.776791376
Equus spp.	*stout-legged*		YG	403.63	EL Claims	Klondike	271.22	49.03	31.83	39.46	Heintzman et al., 2017	8.52089224
Equus spp.	*stout-legged*		YG	401.26	Quartz Creek	Klondike	261.61	51.42	33.86	38.52	Heintzman et al., 2017	7.726225635
Equus spp.	*stout-legged*		YG	328.43	Hunker Creek - Alton Placer	Klondike	250.18	47.6	33.07	35.46	Heintzman et al., 2017	7.565164802
Equus spp.	*stout-legged*		YG	417.25	Eureka Creek	Klondike	257.72	52.48	34.01	36.29	Heintzman et al., 2017	7.577771244
Equus spp.	*stout-legged*		YG	328.57	Hunker Creek - Alton Placer	Klondike	249.59	48.08	30.87	35.33	Heintzman et al., 2017	8.085195983
Equus spp.	*stout-legged*		YG	157.77	Irish Gulch	Klondike	245.05	43.45	30.52	34.11	Heintzman et al., 2017	8.029161206
Equus spp.	*stout-legged*		YG	5.41	Hunker Creek	Klondike	231.81	44.18	29.41	32.11	Heintzman et al., 2017	7.882012921
Equus spp.	*stout-legged*		YG	403.261	EL Claims	Klondike	256.37	49.37	32.15	33.02	Heintzman et al., 2017	7.974183515
Equus spp.	*stout-legged*		YG	303.778	Eldorado Creek	Klondike	267.79	50.84	34.02	38.32	Heintzman et al., 2017	7.871546149
Equus spp.	*stout-legged*		YG	194.2	Gold Run tephra type site	Klondike	242.8	44.07	30.32	37.11	Heintzman et al., 2017	8.007915567
Equus spp.	*stout-legged*		YG	306.89	Last Chance Creek - 16 pup	Klondike	240.88	42.31	27.97	34.75	Heintzman et al., 2017	8.612084376
Equus spp.	*stout-legged*		YG	302.54	Skukum Gulch	Klondike	246.59	44.51	31.27	36.96	Heintzman et al., 2017	7.885833067
Equus spp.	*stout-legged*		YG	6.89	Gold Ruun Creek Ross Claim	Klondike	261.57	48.11	31.71	37.13	Heintzman et al., 2017	8.248817408
Equus spp.	*stout-legged*		YG	328.4	Hunker Creek - Alton Placer	Klondike	241.2	44.7	29.27	34.41	Heintzman et al., 2017	8.240519303
Equus spp.	*stout-legged*		YG	126.24	Irish Gulch	Klondike	245.81	47.53	30.61	36.03	Heintzman et al., 2017	8.030382228
Equus spp.	*stout-legged*		YG	402.443	Quartz Creek	Klondike	257.89	47.27	32.01	34.12	Heintzman et al., 2017	8.05654483
Equus spp.	*stout-legged*		YG	404.479	Hunker Creek - Alton Placer	Klondike	253.03	48.79	31.3	36.87	Heintzman et al., 2017	8.084025559
Equus spp.	*stout-legged*		YG	404.56	Hunker Creek - Alton Placer	Klondike	255.32	48.45	31.31	33.14	Heintzman et al., 2017	8.1545832
Equus spp.	*stout-legged*		YG	328.68	Hunker Creek - Alton Placer	Klondike	260.58	46.65	29.96	35.02	Heintzman et al., 2017	8.697596796
Equus spp.	*stout-legged*		YG	328.74	Hunker Creek - Alton Placer	Klondike	244.81	45.76	31.4	35.73	Heintzman et al., 2017	7.796496815
Equus spp.	*stout-legged*		YG	404.133	Hunker Creek - Alton Placer	Klondike	262.99	47.56	32.33	37.17	Heintzman et al., 2017	8.134549954
Equus spp.	*stout-legged*		YG	300.9	Lindow Creek	Klondike	248.07	45.84	29.8	34.85	Heintzman et al., 2017	8.324496644
Equus spp.	*stout-legged*		YG	328.39	Hunker Creek - Alton Placer	Klondike	246.08	44.24	30.11	34.34	Heintzman et al., 2017	8.1727001
Equus spp.	*stout-legged*		YG	328.36	Hunker Creek - Alton Placer	Klondike	249.07	48.36	31.83	35.28	Heintzman et al., 2017	7.825007854
Equus spp.	*stout-legged*		YG	391.65	Quartz Creek	Klondike	253.12	45.48	32.18	35.02	Heintzman et al., 2017	7.865755127
Equus spp.	*stout-legged*		YG	110.35	Irish Gulch	Klondike	261.59	46.1	32.75	37.37	Heintzman et al., 2017	7.987480916
Equus spp.	*stout-legged*		YG	135.2	Last Chance Creek - 16 pup	Klondike	240.95	41.93	30.24	33.02	Heintzman et al., 2017	7.96792328
Equus spp.	*stout-legged*		YG	379.21	Skukum Gulch	Klondike	264.81	47.17	32.66	36.28	Heintzman et al., 2017	8.108083282
Equus spp.	*stout-legged*		YG	302.81	Skukum Gulch	Klondike	240.11	44.06	28.71	34.58	Heintzman et al., 2017	8.363288053
Equus spp.	*stout-legged*		YG	328.69	Hunker Creek - Alton Placer	Klondike	243.46	45.19	29.01	35.63	Heintzman et al., 2017	8.392278525
Equus spp.	*stout-legged*		YG	404.132	Hunker Creek - Alton Placer	Klondike	261.59	49.75	31.23	36.49	Heintzman et al., 2017	8.376240794
Equus spp.	*stout-legged*		YG	404.695	Hunker Creek - Alton Placer	Klondike	271.34	50.24	34.77		Heintzman et al., 2017	7.803853897
Equus spp.	*stout-legged*		YG	376.36	Hunker Creek - above Gold Bottom	Klondike	260.3	45.25	31.12	36.83	Heintzman et al., 2017	8.364395887
Equus spp.	*stout-legged*		YG	328.78	Hunker Creek - Alton Placer	Klondike	245.44	45.31	29.64	36.07	Heintzman et al., 2017	8.280701754
Equus spp.	*stout-legged*		YG	402.442	Quartz Creek	Klondike	258.38	45.86	30.14	34.57	Heintzman et al., 2017	8.572660916
Equus spp.	*stout-legged*		YG	303.372	Eldorado Creek	Klondike	271.12	50.27	30.65	39.12	Heintzman et al., 2017	8.845676998
Equus spp.	*stout-legged*		YG	150.82	Thistle Creek - float	Klondike	261.86	47.47	32.1	36.23	Heintzman et al., 2017	8.157632399
Equus spp.	*stout-legged*		YG	355.108	Green Gulch	Klondike	270.39	48.39	32.6	38.77	Heintzman et al., 2017	8.294171779
Equus spp.	*stout-legged*		YG	328.37	Hunker Creek - Alton Placer	Klondike	245.39	45.98	32.14	37.32	Heintzman et al., 2017	7.635034225
Equus spp.	*stout-legged*		YG	303.993	Eldorado Creek	Klondike	247.24	49.77	32.97	37.84	Heintzman et al., 2017	7.498938429
Equus spp.	*stout-legged*		YG	328.38	Hunker Creek - Alton Placer	Klondike	244.84	45.72	28.95	35.42	Heintzman et al., 2017	8.457340242
Equus spp.	*stout-legged*		YG	328.42	Hunker Creek - Alton Placer	Klondike	246.58	46.51	30.8	36.9	Heintzman et al., 2017	8.005844156
Equus spp.	*stout-legged*		YG	328.6	Hunker Creek - Alton Placer	Klondike	242.36	43.79	27.91	33.99	Heintzman et al., 2017	8.683625941
Equus spp.	*stout-legged*		YG	355.111	Green Gulch	Klondike	262.57	47.92	31.44		Heintzman et al., 2017	8.351463104
Equus spp.	*stout-legged*		YG	378.6	Little Blanche Creek	Klondike	275.28	48.09	31.24	35.97	Heintzman et al., 2017	8.81177977
Equus spp.	*stout-legged*		YG	355.78	Green Gulch	Klondike	242.39	44.58	29.87	35.4	Heintzman et al., 2017	8.114830934
Equus spp.	*stout-legged*		YG	328.41	Hunker Creek - Alton Placer	Klondike	243.01	46.19	30.66	33.08	Heintzman et al., 2017	7.925962166
Equus spp.	*stout-legged*		YG	328.76	Hunker Creek - Alton Placer	Klondike	236.96	42.66	30.41		Heintzman et al., 2017	7.792173627
Equus spp.	*stout-legged*		YG	407.558	Upper Quartz Creek	Klondike	256.99	48.93	32.19	37.51	Heintzman et al., 2017	7.983535259
Equus spp.	*stout-legged*		YG	439.87	Dominion Creek - Sailer's Placer	Klondike	252.21	44.25	30.26	36.42	Heintzman et al., 2017	8.334765367
Equus spp.	*stout-legged*		YG	440.2	Henderson Creek - Cowan's camp	Klondike	257.74	49.17	33.14	36.23	Heintzman et al., 2017	7.777308389
Equus spp.	*stout-legged*		YG	435.31	Trail Gulch	Klondike	263.21	49.5	33.8	36.63	Heintzman et al., 2017	7.787278107
Equus spp.	*stout-legged*		YG	460.7	Eureka Creek	Klondike	254.66	50.01	34.3	38.91	Heintzman et al., 2017	7.424489796
Equus spp.	*stout-legged*		YG	439.63	Dominion Creek - Sailer's Placer	Klondike	265.93	50.19	35.67	37.57	Heintzman et al., 2017	7.455284553
Equus spp.	*stout-legged*		YG	440.23	Henderson Creek - Cowan's camp	Klondike	265.03	45.78	30.65	35.87	Heintzman et al., 2017	8.646982055
Equus spp.	*stout-legged*		YG	454.9	Glacier Creek	Glacier Creek	236.4	43.3	28.9	34.76	Heintzman et al., 2017	8.179930796
Equus spp.	*stout-legged*		YG	454.93	Glacier Creek	Glacier Creek	241.2	41.92	30.45	34.23	Heintzman et al., 2017	7.921182266
Equus spp.	*stout-legged*		YG	440.8	Henderson Creek - Cowan's camp	Klondike	245.6	47.4	30.79	34.68	Heintzman et al., 2017	7.976615784
Equus spp.	*stout-legged*		YG	441.21	Swamp Creek	Klondike	235.6	42.31	28.67	32.81	Heintzman et al., 2017	8.217649111
Equus spp.	*stout-legged*		YG	441.19	Swamp Creek	Klondike	256.88	47.73	31.01	37.17	Heintzman et al., 2017	8.283779426
Equus spp.	*stout-legged*		YG	439.96	Dominion Creek - Sailer's Placer	Klondike	270.38	45.03	30.45	34.76	Heintzman et al., 2017	8.879474548
Equus spp.	*stout-legged*		YG	452.2	Upper Gold Run Creek	Klondike	241.07	43.6	29.09	32.5	Heintzman et al., 2017	8.28704022
Equus spp.	*stout-legged*		YG	308.19	White River	White River	264.8	50.5	33.43		Heintzman et al., 2017	7.921029016
Equus spp.	*stout-legged*		YG	30.7	Revenue Creek	Carmacks	246.32	46.33	30.64	34.93	Heintzman et al., 2017	8.039164491
Equus spp.	*stout-legged*		YG	30.21	Revenue Creek	Carmacks	255.2	46.31	30.84	36.7	Heintzman et al., 2017	8.274967575
Equus spp.	*stout-legged*		YG	30.1	Revenue Creek	Carmacks	268.74	47.61	31.82	37.2	Heintzman et al., 2017	8.445631678
Equus spp.	*stout-legged*		YG	397.72	Simpson Point	Herschel Island	258.78	49.25	33.41	39.86	Heintzman et al., 2017	7.745585154
Equus spp.	*stout-legged*		YG	328.295	Hunker Creek - Alton Placer	Klondike	242.12	48.23	32.68	34.4	Heintzman et al., 2017	7.408812729
Equus spp.	*stout-legged*		YG	328.9	Hunker Creek - Alton Placer	Klondike	240.8	40.95	27.81	31.95	Heintzman et al., 2017	8.658755843
Equus spp.	*stout-legged*		YG	328.52	Hunker Creek - Alton Placer	Klondike	237	40.87	24.56	32.02	Heintzman et al., 2017	9.649837134
Equus spp.	*stout-legged*		YG	197.4	Green Gulch	Klondike	245.47	44.95	28.22	32.2	Heintzman et al., 2017	8.698440822
Equus spp.	*stout-legged*		YG	328.25	Hunker Creek - Alton Placer	Klondike	253.76	43.04		34.31	Heintzman et al., 2017	
Equus spp.	*stout-legged*		YG	162.9	Thistle Creek - float	Klondike	282.96	50.56	34.77	38.16	Heintzman et al., 2017	8.138050043
Equus spp.	*stout-legged*		YG	214.1	Thistle Creek - float	Klondike	302	51.73	34.06	40.3	Heintzman et al., 2017	8.866705813
Equus spp.	*stout-legged*		YG	162.8	Thistle Creek - float	Klondike	308.41	55.22	34.02	42.35	Heintzman et al., 2017	9.065549677
Equus spp.	*stout-legged*		YG	184.3	Thistle Creek - Jaco's Bowl	Klondike	283.21	53.54	35.42	39.76	Heintzman et al., 2017	7.995765104
Equus spp.	*stout-legged*		YG	102.12	Thistle Creek - float	Klondike	306.06	51.98	34.83	34.18	Heintzman et al., 2017	8.787252369
Equus spp.	*stout-legged*		YG	162.7	Thistle Creek - float	Klondike	279.12	54.75	33.29	40.07	Heintzman et al., 2017	8.38449985
Equus spp.	*stout-legged*		YG	150.2	Thistle Creek - float	Klondike	291.99	51.21	33.46	39.7	Heintzman et al., 2017	8.726539151
Equus spp.	*stout-legged*		YG	150.81	Thistle Creek - float	Klondike	254.47	43.96	28.97	33.43	Heintzman et al., 2017	8.783914394
Equus spp.	*stout-legged*		YG	150.5	Thistle Creek - float	Klondike	253.57	47.07	29.26	33.95	Heintzman et al., 2017	8.666097061
Equus spp.	*stout-legged*		YG	110.77	Irish Gulch	Klondike	245.48	46.65	31.37	36.23	Heintzman et al., 2017	7.825310807
Equus spp.	*stout-legged*		YG	474.13	Hunker Creek - Alton Placer	Klondike	300.68	53.73	34.21	40.36	Heintzman et al., 2017	8.789242911
Equus spp.	*stout-legged*		YG	474.165	Hunker Creek - Alton Placer	Klondike	254.48	48.71	30.81	37.45	Heintzman et al., 2017	8.259655956
Equus spp.	*stout-legged*		YG	474.315	Hunker Creek - Alton Placer	Klondike	287.54	50.36	33.72	37.88	Heintzman et al., 2017	8.527283511
Equus spp.	*stout-legged*		YG	474.166	Hunker Creek - Alton Placer	Klondike	246.29	44.22	30.17	36.49	Heintzman et al., 2017	8.163407358
Equus spp.	*stout-legged*		YG	474.153	Hunker Creek - Alton Placer	Klondike	238.54	47.03	31.91	35.4	Heintzman et al., 2017	7.475399561
Equus spp.	*stout-legged*		YG	474.167	Hunker Creek - Alton Placer	Klondike	260.33	48.56	31.67	35.72	Heintzman et al., 2017	8.220082097
Equus spp.	*stout-legged*		YG	474.269	Hunker Creek - Alton Placer	Klondike	291.43	55.84	34.51	40.77	Heintzman et al., 2017	8.444798609
Equus spp.	*stout-legged*		YG	474.168	Hunker Creek - Alton Placer	Klondike	258.37	50.79	31.8	35.93	Heintzman et al., 2017	8.124842767
Equus spp.	*stout-legged*		YG	474.187	Hunker Creek - Alton Placer	Klondike	249.33	45.03	31.89	33.48	Heintzman et al., 2017	7.818438382
Equus spp.	*stout-legged*		YG	488.465	Lower Quartz Creek - Schmidt Placer	Klondike	256.63	47.86	32.8	36.47	Heintzman et al., 2017	7.824085366
Equus spp.	*stout-legged*		YG	482.8	Eldorado Creek - Dewell Placer	Klondike	262.16	51.54	33.14	38.27	Heintzman et al., 2017	7.910681955
Equus spp.	*stout-legged*		YG	488.146	Lower Quartz Creek - Schmidt Placer	Klondike	262.09	47.6	32.6	37.09	Heintzman et al., 2017	8.039570552
Equus spp.	*stout-legged*		YG	488.39	Lower Quartz Creek - Schmidt Placer	Klondike	259.57	44.91	35.1	33.7	Heintzman et al., 2017	7.395156695
Equus spp.	*stout-legged*		YG	475.129	Upper Hunker Creek - Millar Placer	Klondike	255.68	47.05	30.98	36.24	Heintzman et al., 2017	8.253066495
Equus spp.	*stout-legged*		YG	302.181	Skukum Gulch	Klondike	246.94	43	28.23	34.58	Heintzman et al., 2017	8.74743181
Equus spp.	*stout-legged*		YG	103.27	Irish Gulch	Klondike	244.85	47.51	30.19	35.63	Heintzman et al., 2017	8.110301424
Equus spp.	*stout-legged*		YG	300.8	Lindow Creek	Klondike	258.47		34.5	37.48	Heintzman et al., 2017	7.491884058
Equus spp.	*stout-legged*		YG	328.7	Hunker Creek - Alton Placer	Klondike	246.92	45.26	31.97	35.89	Heintzman et al., 2017	7.723490773
Equus spp.	*stout-legged*		YG	110.76	Irish Gulch	Klondike	250.71	48.03	30.37	36.91	Heintzman et al., 2017	8.255186039
Equus spp.	*stout-legged*		YG	489.417	Upper Quartz - Schmidt Placer	Klondike	251.72	49.47	30.92	36.45	Heintzman et al., 2017	8.141009056
Equus spp.	*stout-legged*		YG	489.21	Upper Quartz - Schmidt Placer	Klondike	250.3	48.54	29.89	36.49	Heintzman et al., 2017	8.37403814
Equus spp.	*stout-legged*		YG	489.426	Upper Quartz - Schmidt Placer	Klondike	248.58	48.05	29.56	37.11	Heintzman et al., 2017	8.409336942
Equus spp.	*stout-legged*		YG	489.92	Upper Quartz - Schmidt Placer	Klondike	265.05	43.4	26.67	31.64	Heintzman et al., 2017	9.938132733
Equus spp.	*stout-legged*		YG	489.523	Upper Quartz - Schmidt Placer	Klondike	265.64	52.46	34.28	37.94	Heintzman et al., 2017	7.749124854
Equus spp.	*stout-legged*		YG	489.494	Upper Quartz - Schmidt Placer	Klondike	266.85	49.23	32.97	39.01	Heintzman et al., 2017	8.093721565
Equus spp.	*stout-legged*		YG	489.2	Upper Quartz - Schmidt Placer	Klondike	261.41		29.66		Heintzman et al., 2017	8.813553608
Equus spp.	*stout-legged*		YG	489.386	Upper Quartz - Schmidt Placer	Klondike		40.78	27.83		Heintzman et al., 2017	0
Equus spp.	*stout-legged*		YG	489.287	Upper Quartz - Schmidt Placer	Klondike		43.95	31.9		Heintzman et al., 2017	0
Equus spp.	*stout-legged*		YG	489.229	Upper Quartz - Schmidt Placer	Klondike		38.87	24.54		Heintzman et al., 2017	0
Equus spp.	*stout-legged*		YG	489.415	Upper Quartz - Schmidt Placer	Klondike		37.01	27.68		Heintzman et al., 2017	0

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