

Adaptive Capacity of Pikas

Physiological and Behavioral Responses to Changing Microclimate



Climate Change

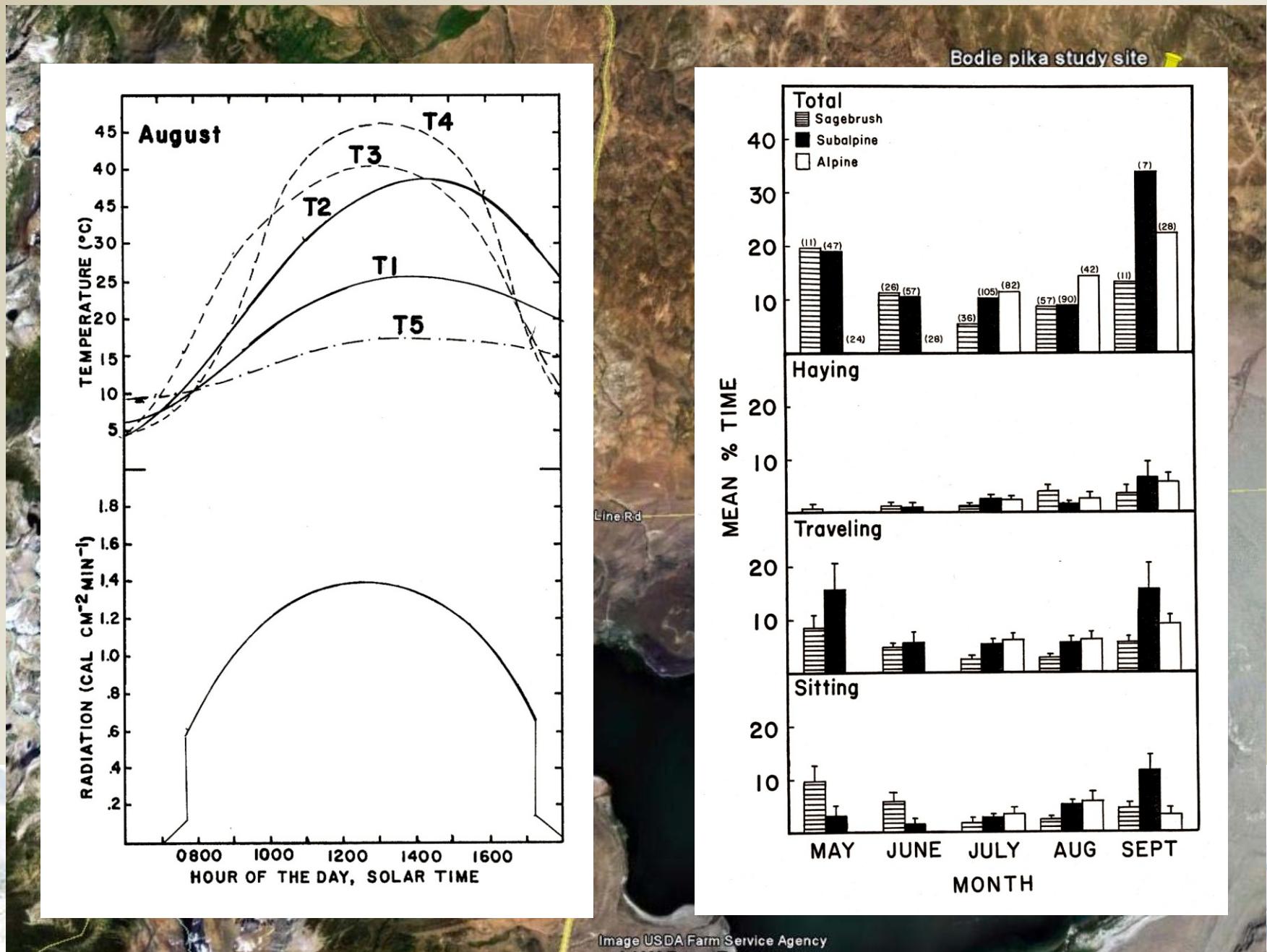
**Altithermal
Habitat Change**

**Species
Adaptive Capacity**



Edward W. West, Ph.D.
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1974 – 1980 PIKA ADAPTIVE CAPACITY RESEARCH



1974 - 1980 PIKA ADAPTIVE CAPACITY RESEARCH

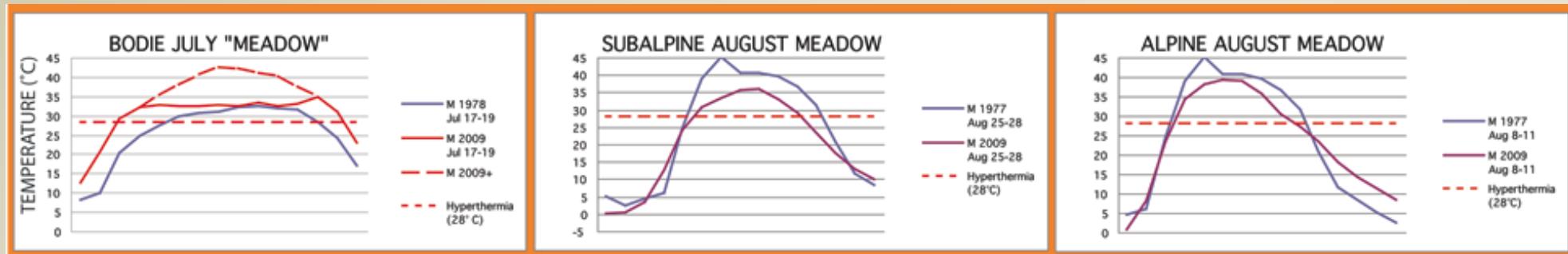
SPSS STATISTICS FOR OCHOTONA PROGRAM *						
	FILE OCHOTONA (CREATION DATE = 04/03/90) SUBFILE SUB1					
	PEARSON CORRELATION COEFFICIENT					
	TEMP	QABS	TOT	SIT	TRAV	HAY
TEMP	1.0000 (52) <u>P=*****</u>	0.7856 (52) <u>P=0.001</u>	-0.3815 (52) <u>P=0.023</u>	-0.0869 (52) <u>P=0.270</u>	-0.3924 (52) <u>P=0.002</u>	-0.2424 (52) <u>P=0.042</u>
QABS		1.0000 (52) <u>P=0.001</u>	-0.1206 (52) <u>P=0.197</u>	0.0254 (52) <u>P=0.429</u>	-0.1775 (52) <u>P=0.104</u>	0.0366 (52) <u>P=0.398</u>
TOT			-0.3815 (52) <u>P=0.003</u>	-0.1206 (52) <u>P=0.197</u>	1.0000 (52) <u>P=*****</u>	0.6452 (52) <u>P=0.001</u>
SIT				-0.0869 (52) <u>P=0.270</u>	0.0254 (52) <u>P=0.429</u>	0.5115 (52) <u>P=0.031</u>
TRAV					-0.9266 (52) <u>P=0.001</u>	0.2242 (52) <u>P=0.055</u>
HAY						-0.4160 (52) <u>P=0.001</u>
(COEFFICIENT / (CASES) / SIGNIFICANCE)				(A VALUE OF 99.0000 IS PRINTED IF A		



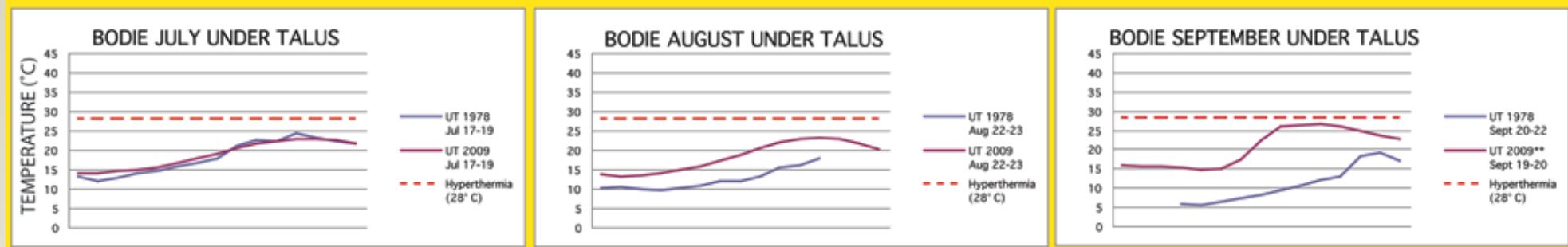
TEMPERATURE PROFILES - A 30 YR COMPARISON



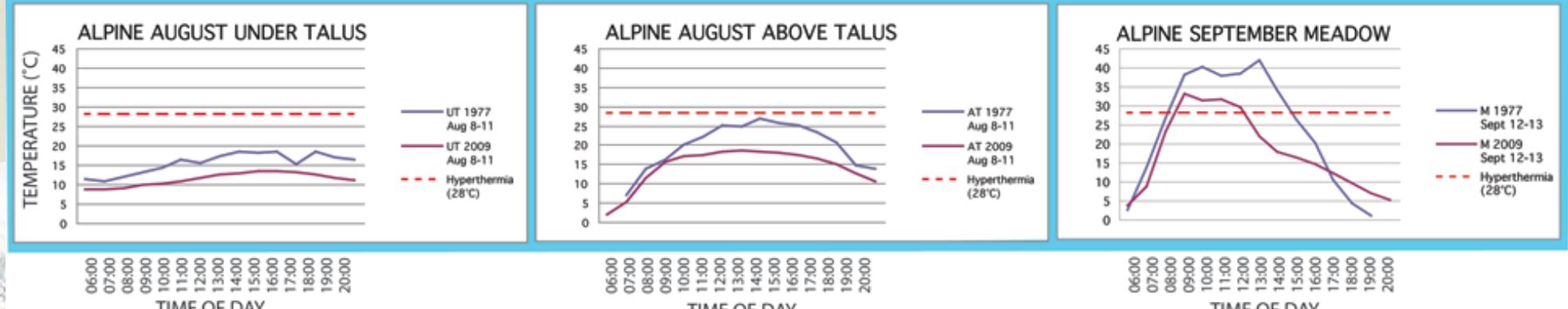
ALL MEADOWS
COMPARABLY HOT



DELAYED COOLING
IN FALL AT BODIE



POTENTIAL COOLING
IN ALPINE



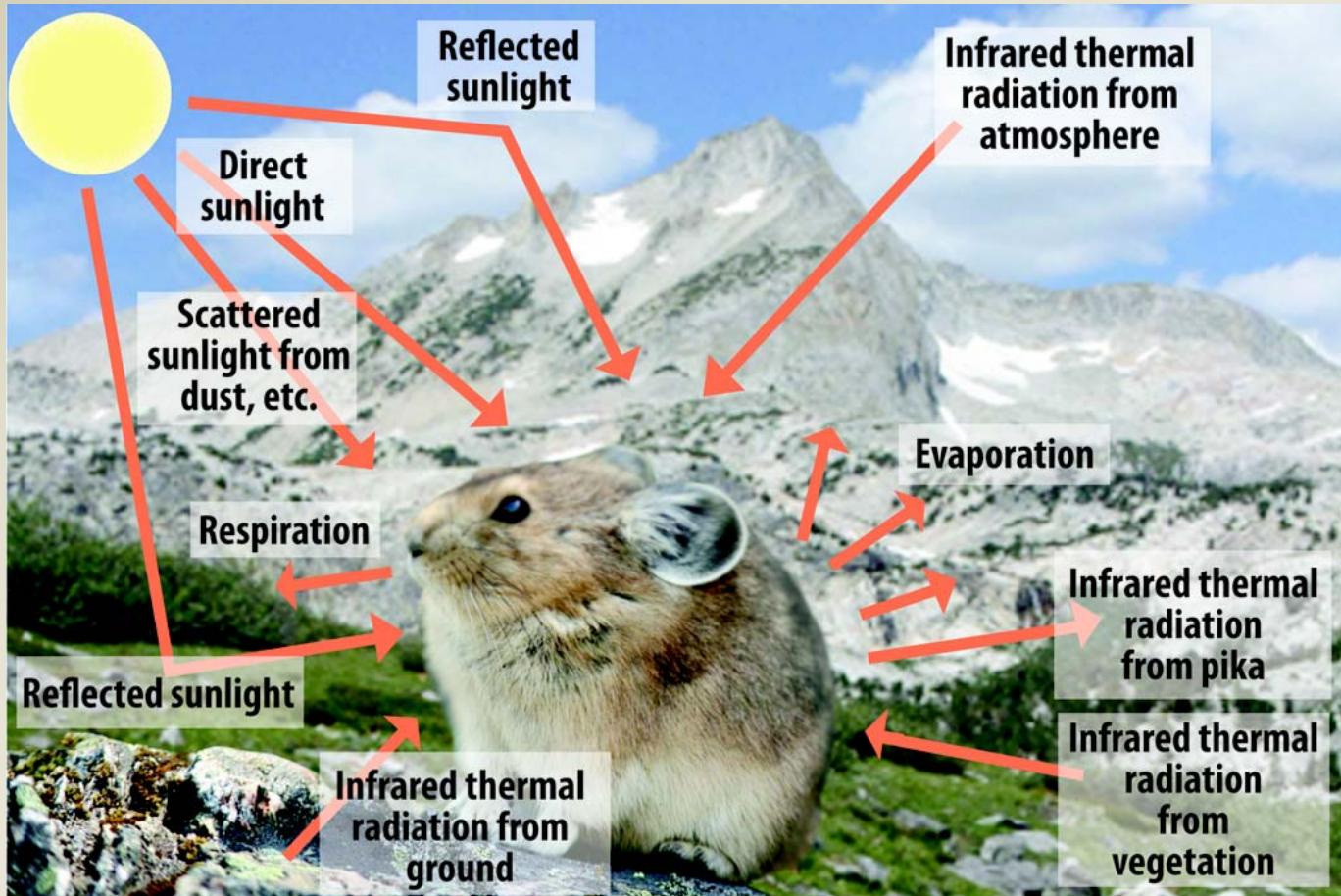
PIKA HABITAT THERMAL PROFILES

	BODIE UNDER TALUS			SUBALPINE UNDER TALUS			ALPINE UNDER TALUS				
	JUNE	JULY	AUGUST	JUNE	JULY	AUGUST	JUNE	JULY	AUGUST		
0:15										0:15	
0:45										0:45	
1:35										1:35	
1:45										1:45	
2:35										2:35	
2:45										2:45	
3:35										3:35	
3:45										3:45	
4:35										4:35	
4:45										4:45	
5:35										5:35	
5:45	43.39	47.41	50.75	54.06	55.70	57.24	54.45	43.49	42.79	40.70	
6:15	43.06	47.02	50.38	55.72	55.46	49.97	53.88	53.47	43.53	42.33	48.84
6:45	43.20	46.99	49.93	55.50	55.30	49.71	53.32	53.30	43.39	43.97	48.88
7:15	43.53	47.30	50.30	55.46	55.48	49.78	52.40	55.25	43.72	43.67	48.90
7:45	44.13	47.73	50.53	55.74	55.80	50.09	52.03	53.92	44.32	42.35	49.00
8:15	44.42	47.99	51.10	55.90	54.69	50.58	52.87	52.63	44.58	43.98	55.06
8:45	44.68	48.09	51.60	56.93	56.65	53.12	53.49	53.36	46.75	46.52	52.28
9:35	45.10	48.29	52.13	56.86	56.85	53.72	54.33	54.32	47.75	48.06	51.00
9:45	45.62	48.51	52.72	57.42	57.24	52.45	54.96	54.94	48.75	50.12	53.19
10:15	46.36	48.83	53.48	58.26	57.90	53.42	55.92	55.90	49.62	49.26	54.21
10:45	47.10	49.27	54.39	59.18	58.89	54.59	57.07	56.88	50.36	48.00	54.87
11:15	48.17	49.86	55.63	60.29	58.95	54.00	58.54	58.30	51.15	49.29	55.92
11:45	49.22	50.45	57.07	61.56	61.05	57.63	60.36	59.55	53.44	53.32	56.50
12:35	50.62	51.07	58.43	61.05	62.66	59.27	62.24	63.07	52.29	52.72	57.53
12:45	51.75	53.47	60.15	64.56	64.00	60.74	64.33	62.55	52.89	53.67	58.55
13:35	53.27	54.73	61.68	65.95	65.30	62.35	66.38	64.03	55.99	54.85	59.55
13:45	54.70	55.73	63.83	67.39	67.12	63.63	68.37	65.68	57.32	54.98	60.17
14:35	55.68	55.49	65.25	68.96	68.63	65.24	70.58	67.05	57.84	57.23	62.82
14:45	56.83	56.20	66.42	70.55	69.35	66.59	72.71	68.60	54.45	54.95	60.04
15:15	57.84	57.10	67.59	71.75	70.08	67.72	74.48	69.84	55.15	56.73	62.59
15:45	58.77	57.97	68.54	72.96	70.37	68.81	76.05	70.82	58.66	57.28	62.80
16:35	58.63	58.96	68.52	73.73	70.05	68.40	77.36	73.49	58.48	57.66	63.35
16:45	57.02	59.25	70.02	74.47	70.08	69.92	71.96	76.45	58.29	57.21	63.50
17:35	56.29	59.46	70.21	75.38	69.40	69.94	78.17	72.13	57.54	57.05	69.05
17:45	56.01	59.78	70.38	74.63	69.82	69.63	78.15	73.80	56.80	56.76	63.50
18:35	55.54	58.93	70.20	74.47	68.33	69.34	77.39	73.20	56.00	56.28	62.67
18:45	55.23	59.80	69.82	73.95	67.71	68.94	77.16	70.45	55.21	55.66	62.35
19:15	54.77	59.60	69.14	71.09	67.18	68.16	75.92	69.43	54.30	54.89	63.47
19:45	54.26	59.35	68.48	72.29	66.60	67.39	74.36	68.33	53.60	54.38	63.00
20:35	53.68	58.98	67.79	71.36	65.93	66.24	72.65	66.83	50.15	51.08	53.39
20:45	53.04	58.60	67.03	70.89	65.07	65.32	73.08	65.53	50.45	52.77	52.81
21:35	52.35	58.25	66.09	69.53	64.30	65.45	72.15	62.62	52.05	58.83	64.97
21:45	51.71	57.94	65.44	69.97	64.82	65.45	72.45	62.45	51.55	58.21	64.93
22:35	51.14	57.44	65.97	69.62	64.60	65.45	72.15	62.45	51.55	58.21	64.93
22:45	50.56	57.04	65.44	69.19	64.12	65.45	72.45	62.45	51.55	58.21	64.93
23:35	50.01	56.56	65.04	68.66	63.65	65.45	72.15	62.45	51.55	58.21	64.93
23:45	49.45	56.04	64.54	68.16	63.22	65.45	72.45	62.45	51.55	58.21	64.93
	JUNE	JULY	AUGUST	JUNE	JULY	AUGUST	JUNE	JULY	AUGUST		



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THERMAL TRACKING



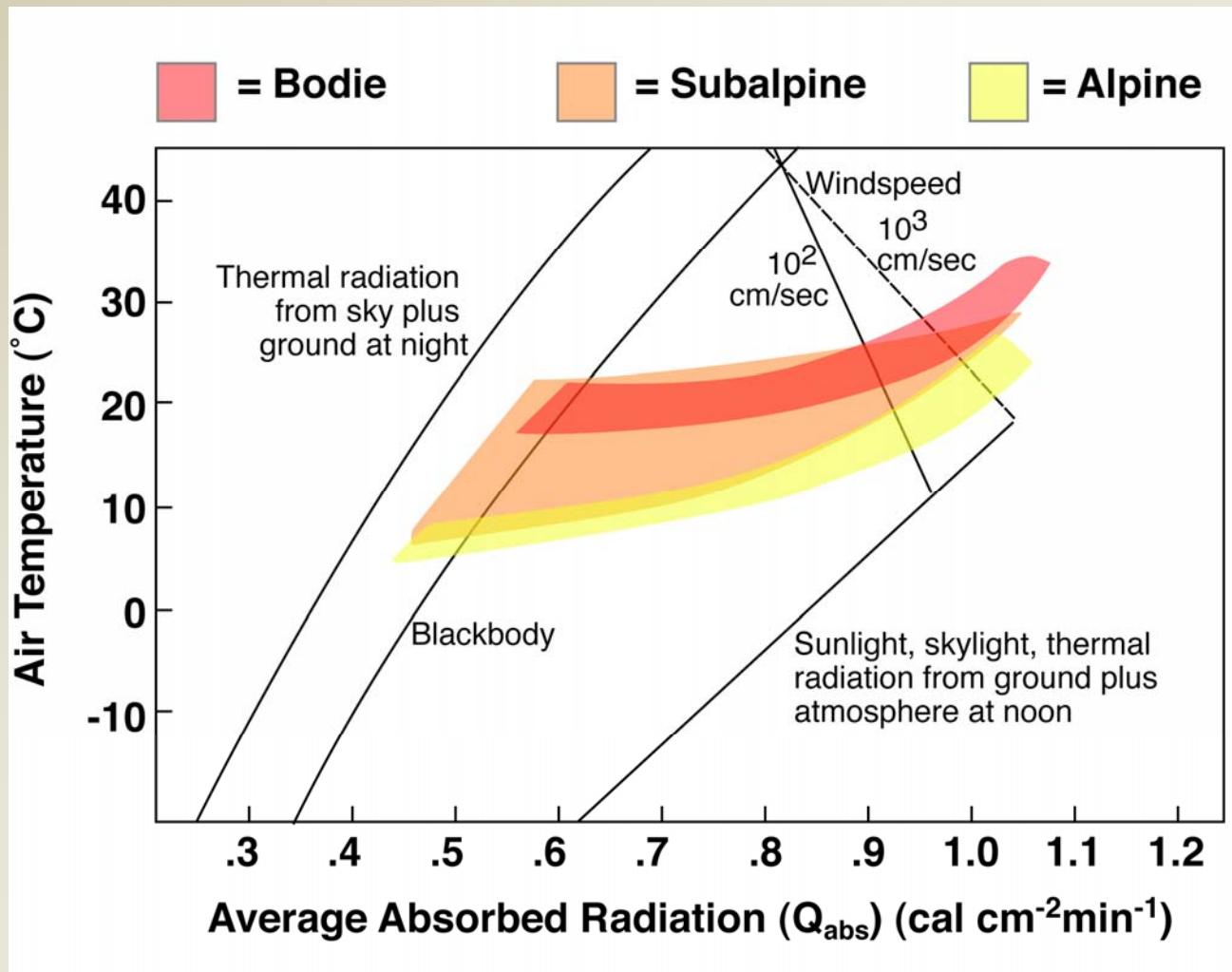
$$M + Q_{abs} = \varepsilon\sigma(T_r + 273)^4 + k(V^{1/3}/D^{2/3})(T_r - T_a) + E$$



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THERMAL TRACKING



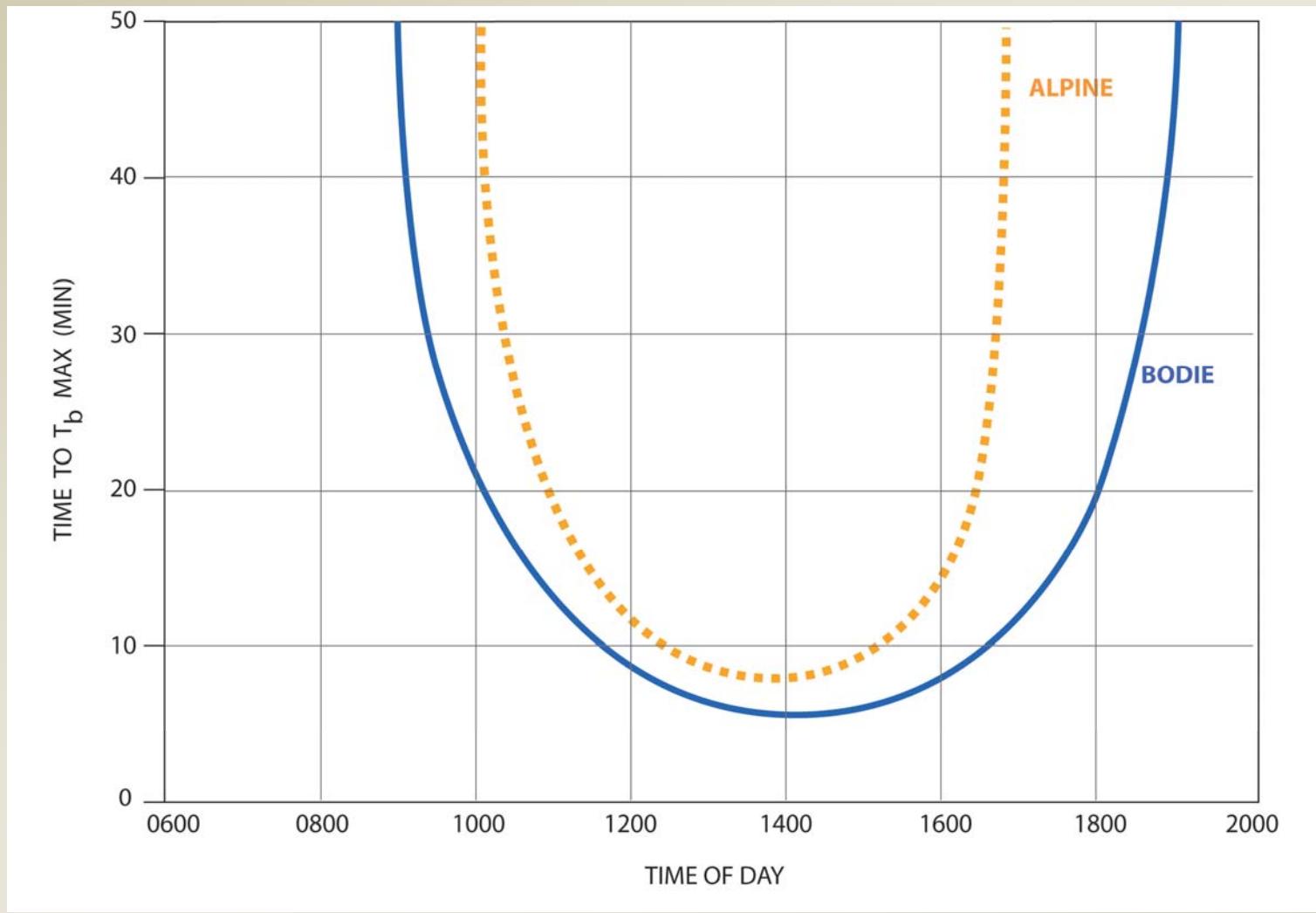
$$M + Q_{abs} = \varepsilon\sigma(T_r + 273)^4 + k(V^{1/3}/D^{2/3})(T_r - T_a) + E$$



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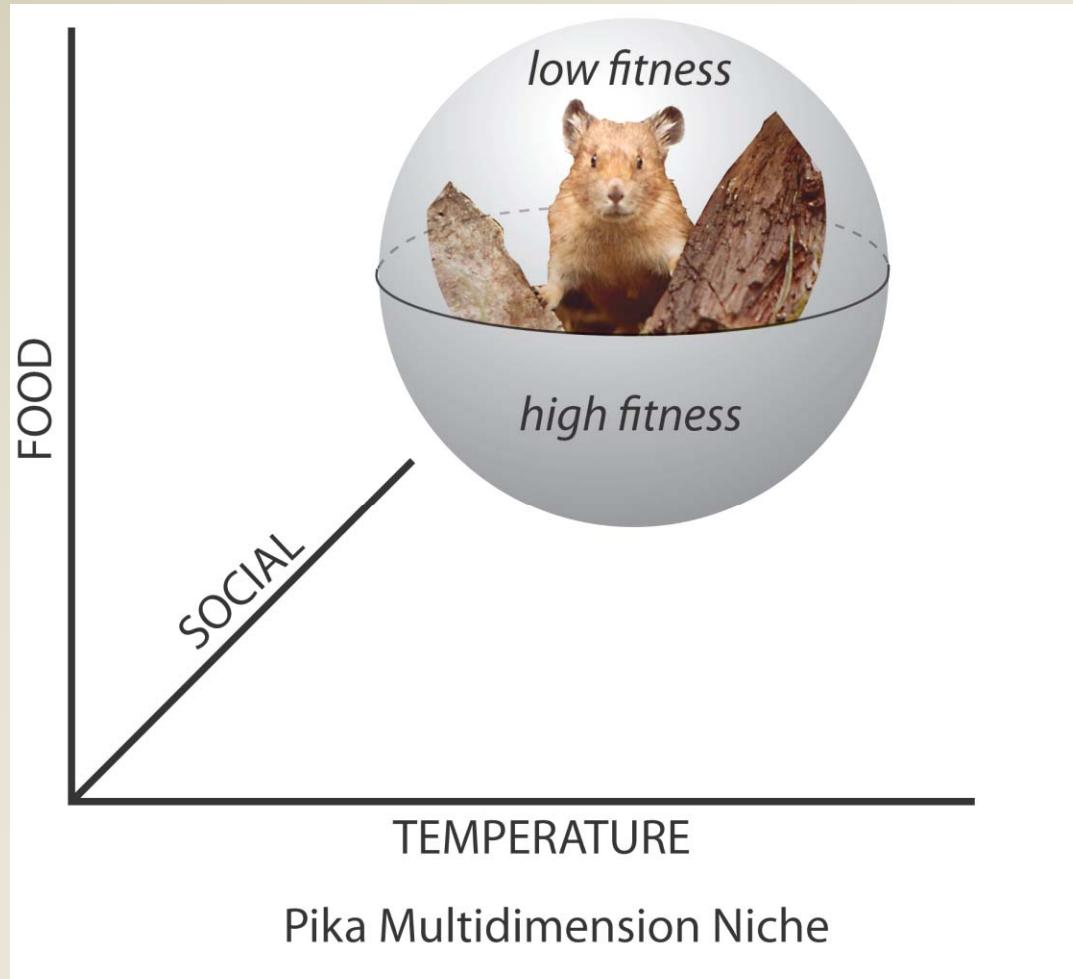
THERMAL LIMITS



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ADAPTIVE CAPACITY



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