Table S1. Snow leopard habitat rank coverage and supplemental survey information of 12 sites

Site	**Camera trap number**	**Independent capture**	**Individual**	**Mask area (km^2)**	**Survey period**
AS	50	61	22	4225	2018/10 ~ 2019/1
DQ	35	42	16	3235	2015/10 ~ 2015/12
YT	16	18	8	1385	2015/10 ~ 2015/12
NBYZ	42	25	6	1371	2020/12 ~ 2021/3
DC	9	14	6	2930	2019/1 ~ 2019/4
QML	8	31	18	2593	2018/12 ~ 2019/3
BM	15	35	9	3202	2021/1 ~ 2021/4
DD	23	21	9	4223	2021/1 ~ 2021/4
HB	22	10	4	2835	2021/1 ~ 2021/4
SJ	34	72	16	2333	2020/11 ~ 2021/2
CD0114	14	17	7	2570	2018/11 ~ 2019/2
CD1530	12	8	6	2480	2018/10 ~ 2019/1

Table S2. Density covariates and sources used in multi-session SECR modeling

Covariate name	**Description**	**Source**
maxent	The distribution probability generated from MaxEnt modeling	(Xiao et al., 2019)
maxent_3	Strata based on Jenks optimization analysis of distribution probability inside snow leopard habitat	
priority value	The conservation priority value generated from Zonation analysis	(Xiao et al., 2019)
rank_5	The habitat rank generated from Zonation analysis, five ranks in total	(Xiao et al., 2019)
tri_ma	Terrain ruggedness index, maximum value	(Amatulli et al., 2018)
lu_8	The proportion of bare ground	https://www.arcgis.com/home/item.html?id=cfcb7609de5f478eb7666240902d4d3d
lu_11	The proportion of rangeland	

Table S3. AIC rank of multi-session SECR models with different covariates

model	**logLik**	**AIC**	**dAIC**	**Covariates**
D ~ rank_5	–786.88	1581.77	0	0.50 (95% CI: 0.21 ~ 0.80)
D ~ priority value	–789.31	1586.61	4.85	1.74 (95% CI: 0.54 ~ 2.93)
D ~ maxent_3	–790.65	1589.29	7.53	0.40 (95% CI: –0.03 ~ 0.83)
D ~ maxent	–792.34	1592.68	10.91	0.77 (95% CI: –0.10 ~ 1.65)
D ~ 1	–793.72	1593.44	11.53	-
D ~ lu_8	–793.12	1594.25	12.48	0.82 (95% CI: –0.50 ~ 2.13)

D ~ tri_ma	–793.20	1594.40	12.63	0.01 (95% CI: –0.01 ~ 0.02)
D ~ lu_11	–793.31	1594.62	12.85	–0.61 (95% CI: –1.82 ~ 0.60)