**Supplementary Material**

Characteristics of home range areas used by Saker Falcons (*Falco cherrug*) wintering on the Qinghai-Tibetan Plateau

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Appendix S1. Status (estimated breeding pairs) and distribution (by country) of Saker Falcons, as used in the IUCN/BirdLife International Global Red List assessment in 2012.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Country** | **Year** | **Min** | **Max** | **Med** |
| Afghanistan | 2010 | 10 | 100 | 55 |
| Austria | 2010 | 15 | 25 | 20 |
| Bulgaria | 2010 | 0 | 10 | 5 |
| China | 2010 | 1000 | 5000 | 3000 |
| Croatia | 2010 | 5 | 10 | 8 |
| Czech Republic | 2010 | 10 | 15 | 13 |
| Georgia | 2010 | 3 | 5 | 4 |
| Germany | 2010 | 0 | 1 | 1 |
| Hungary | 2010 | 176 | 190 | 183 |
| Iraq | 2010 | 0 | 50 | 25 |
| Iran | 2010 | 10 | 100 | 55 |
| Kazakhstan | 2011 | 800 | 1450 | 1125 |
| Kyrgyzstan | 2010 | 50 | 50 | 50 |
| Macedonia | 2010 | 0 | 3 | 2 |
| Moldova | 2010 | 8 | 15 | 12 |
| Mongolia | 2010 | 2000 | 5000 | 3500 |
| Pakistan | 2010 | 0 | 50 | 25 |
| Poland | 2010 | 0 | 2 | 1 |
| Romania | 2010 | 2 | 12 | 7 |
| Russia | 2010 | 1854 | 2542 | 2198 |
| Serbia | 2010 | 52 | 64 | 58 |
| Slovakia | 2010 | 23 | 25 | 24 |
| Tajikistan | 2010 | 10 | 100 | 55 |
| Turkey | 2010 | 5 | 70 | 38 |
| Turkmenistan | 2010 | 100 | 150 | 125 |
| Ukraine | 2010 | 270 | 345 | 308 |
| Uzbekistan | 2010 | 10 | 15 | 13 |
| Totals |  | 6413 | 15399 | 10910 |

Appendix S2. Details of platform transmitter terminals (PPTs) used in this study, showing PTT identification number, age (Ad. = adult; Juv. = juvenile) and sex (F = female) of the Saker Falcon, country of deployment, weight and power source, manufacturer (Microwave Telemetry, Inc., Columbia, MD, USA and North Star Science and Technology, LLC, King George, VA, USA), type of location data provided, number of Argos and GPS locations used to plot home ranges in winter tracking period (LC 3, 2, 1 and A), start and end date of winter tracking period.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **PTT #** | **Age/Sex** | **Country** | **PTT type** | **Manufacturer** | **Location data** | **N. locations** | **Period** |
| **Argos** | **GPS** | **Start** | **End** |
| 3839 | Ad./F | Russia | 30g battery | Microwave | Argos | 5 | NA | 25 Jan 1998 | 23 Feb 1998 |
| 29040 | Ad./F | Mongolia | 35g solar | Microwave | Argos | 51 | NA | 25 Sep 2000 | 03 Mar 2001 |
| 35989 | Ad./F | Mongolia | 35g solar | Microwave | Argos | 29 | NA | 17 Oct 2002 | 11 Feb 2003 |
| 56581 | Juv./F | Mongolia | 16g solar | North Star | Argos | 45 | NA | 24 Oct 2006 | 02 Apr 2007 |
| 90890 | Ad./F | Mongolia | 30g solar | Microwave | Argos & GPS | NA | 283 | 27 Nov 2009 | 27 Feb 2010 |
| 90893 | Ad./F | Mongolia | 30g solar | Microwave | Argos & GPS | NA | 413 | 17 Oct 2009 | 20 Feb 2010 |
| 93546 | Ad./F | Mongolia | 30g solar | Microwave | Argos & GPS | NA | 123 | 13 Oct 2010 | 23 Feb 2011 |
| 93548 | Juv./F | Mongolia | 30g solar | Microwave | Argos & GPS | NA | 124 | 15 Oct 2009 | 18 Nov 2009 |

Appendix S3. Mean and median distance from a reference GPS point of satellite location data of varying quality i.e., GPS location signals and Argos signals of location classes (LC) 3, 2, 1, 0, A and B. All signals were received within 4 hours of the GPS reference location; mean interval (h) between signals of each type is shown

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Signal Type/LC | *N* | Mean ± SE (km) | Median: Range (km) | Interval ± SE (h) |
| GPS | 592 | 1.7 ± 0.1  | 0.6: 0.0 - 20.3 | 2.4 ± 0.0 |
| 3 | 8 | 0.4 ± 0.8 | 0.2: 0.1 - 1.5 | 1.9 ± 0.7 |
| 2 | 11 | 1.2 ± 0.3 | 0.8: 0.0 - 3.3  | 2.2 ± 0.4 |
| 1 | 12 | 2.2 ± 1.0 | 1.0: 0.3 - 12.8 | 1.6 ± 0.4 |
| 0 | 7 | 11.7 ± 3.3 | 7.7: 2.9 - 27.8  | 1.4 ± 0.4 |
| A | 16 | 5.0 ± 3.0 | 1.0: 0.1 - 49.3 | 1.6 ± 0.2 |
| B | 48 | 31.5 ± 7.3 | 11.2: 0.5 - 216.2 | 1.7 ± 0.2 |

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Appendix S4. Land cover types identified on the Qinghai-Tibetan Plateau.

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| **Code** | **Land cover types** |
| 11 | cropland irrigated |
| 12 | cropland non-irrigated |
| 21 | forest canopy >30% |
| 22 | shrub |
| 23 | forest canopy 10-30% |
| 31 | grassland cover >50% |
| 32 | grassland cover 20-50% |
| 33 | grassland cover 5-20% |
| 42 | Lake |
| 44 | glacier/permanent snow |
| 46 | flooded |
| 61 | desert |
| 62 | Gobi |
| 63 | salt flat |
| 64 | marsh |
| 65 | Bare |
| 66 | bare rock |
| 67 | other non-vegetated |



Figure S1. Location points for surveys of Plateau Pikas and pika holes along a road and track route in Qinghai Province.



a b



c d

Figure S2a-d. Winter home range descriptions for two Saker Falcons deployed with PTTs providing both Argos and GPS location data. a: 95% MCP of GPS locations and b: 70% MCP of Argos location for PTT# 90890. c: 95% MCP of GPS locations and d: 70% MCP of Argos location for PTT# 90893.