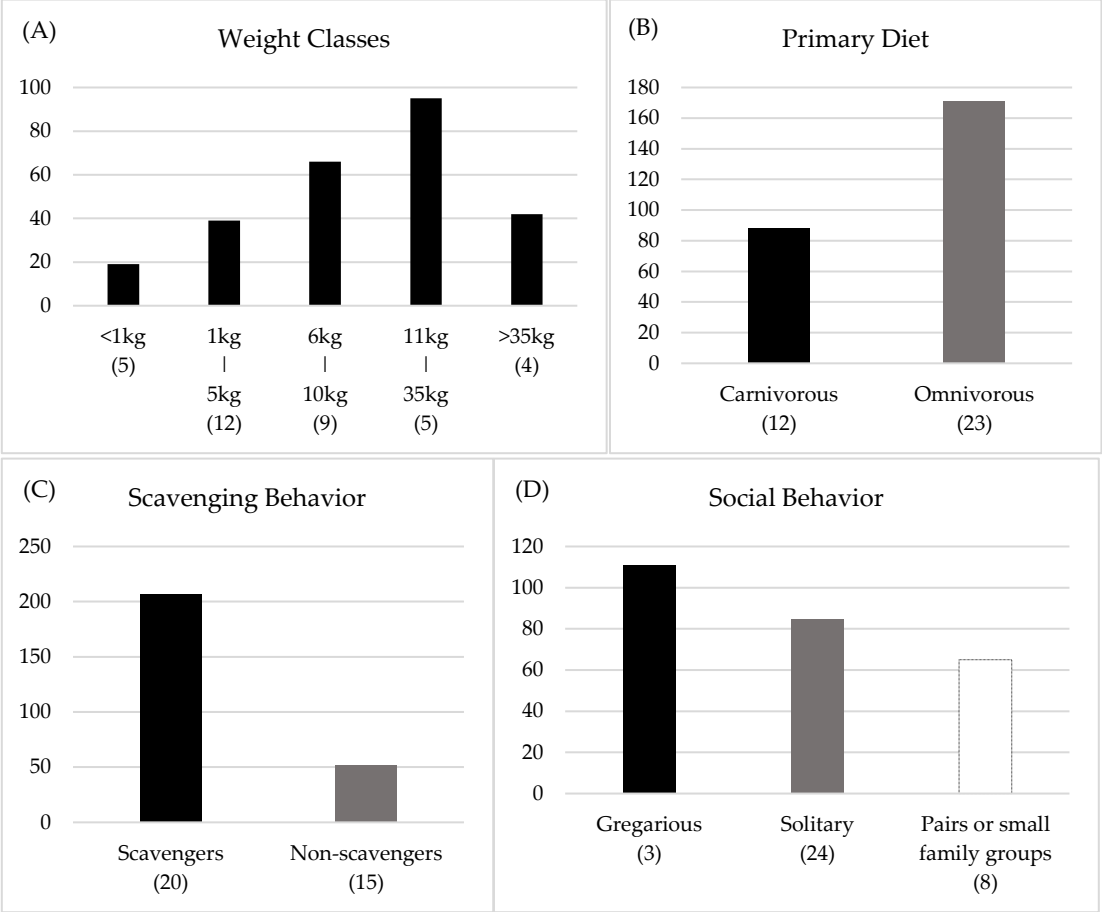


1     **Supplementary Materials**

2     **Figure S1 -** Weight classes (A), primary diet (B), reported scavenging behavior (C) and social behavior (D)  
3     of the carnivore species consumed by wolves worldwide according to the number of times a species of each  
4     category appears as a wolf food item in the sampling sites. The number of consumed species reported for  
5     each category is represented between parentheses.



19 **Table S1** – List of scientific literature on wolf diet that was reviewed to assess carnivore consumption by  
20 wolves, including Country, Region and Bibliographic source. The bibliographic sources with reported  
21 consumption of carnivore species by wolves are marked in bold.

| Country  | Region                    | Bibliographic source                                       |
|----------|---------------------------|------------------------------------------------------------|
| PORTUGAL | Peneda-Gerês              | <b>Álvares, 2011</b>                                       |
|          |                           | <b>Álvares, 1995</b>                                       |
|          |                           | <b>Guerra, 2004</b>                                        |
|          |                           | <b>Petrucchi-Fonseca, 1990</b>                             |
|          |                           | <b>Vos, 2000</b>                                           |
|          |                           | <b>Lançós, 1999</b>                                        |
|          |                           | <b>Roque <i>et al.</i>, 2001</b>                           |
|          | Alvão-Padrela             | <b>Carreira, 1996</b>                                      |
|          |                           | <b>Silva, 2006</b>                                         |
|          |                           | <b>Carreira, 2010</b>                                      |
|          |                           | <b>Carreira and Petrucchi-Fonseca, 2000</b>                |
|          | South Douro               | <b>Quaresma, 2002</b>                                      |
|          |                           | <b>Vos, 2000</b>                                           |
|          |                           | <b>Vingada <i>et al.</i>, 1997</b>                         |
|          |                           | <b>Quaresma, 2002;</b><br><b>Roque <i>et al.</i>, 2003</b> |
|          |                           | <b>Torres, <i>et al.</i>, 2015</b>                         |
|          | Bragança                  | <b>Petrucchi-Fonseca, 1990</b>                             |
|          |                           | <b>Moreira, 1992</b>                                       |
|          |                           | <b>Pimenta, 1998</b>                                       |
| SPAIN    | Galicia                   | <b>Barja, 2009</b>                                         |
|          |                           | <b>Lagos, 2013</b>                                         |
|          |                           | <b>Gutián <i>et al.</i>, 1979</b>                          |
|          |                           | <b>Cuesta <i>et al.</i>, 1991</b>                          |
|          |                           | <b>Llaneza and López-Bao, 2015</b>                         |
|          | Basque Country            | <b>Echegaray <i>et al.</i>, 2007</b>                       |
|          | Asturias                  | <b>Llaneza <i>et al.</i> 2000</b>                          |
|          |                           | <b>Llaneza <i>et al.</i> 1996</b>                          |
|          |                           | <b>Nores <i>et al.</i>, 2008</b>                           |
|          |                           | <b>Cuesta <i>et al.</i>, 1991</b>                          |
|          |                           | <b>Braña <i>et al.</i>, 1982</b>                           |
|          | Castilla-León             | <b>Vicente <i>et al.</i>, 2000</b>                         |
|          |                           | <b>Vilà <i>et al.</i>, 1990</b>                            |
|          |                           | <b>Cuesta <i>et al.</i>, 1991</b>                          |
|          |                           | <b>Barrientos, 1994</b>                                    |
|          | Léon                      | <b>Salvador and Abad, 1987</b>                             |
|          | La Rioja                  | <b>Cuesta <i>et al.</i>, 1991</b>                          |
|          | Extremadura/Sierra Morena | <b>Cuesta <i>et al.</i>, 1991</b>                          |
|          | North Spain               | <b>Castroviejo <i>et al.</i>, 1975</b>                     |

22 **Table S1 (Cont.)** – List of scientific literature on wolf diet that was reviewed to assess carnivore consumption  
 23 by wolves, including Country, Region and Bibliographic source. The bibliographic sources with reported  
 24 consumption of carnivore species by wolves are marked in bold.

| Country                  | Region                           | Bibliographic source                     |
|--------------------------|----------------------------------|------------------------------------------|
| ITALY                    | Pollino National Park            | <b>Ciucci <i>et al.</i>, 2004</b>        |
|                          | Cuneo (includes France)          | <b>Marucco, 2003</b>                     |
|                          | Turin                            | Gazzola <i>et al.</i> , 2007             |
|                          |                                  | Gazzola <i>et al.</i> , 2005             |
|                          | Aosta                            | Palmegiani <i>et al.</i> , 2013          |
|                          | Tuscany                          | Mattioli <i>et al.</i> , 1995            |
|                          |                                  | Davis <i>et al.</i> , 2012               |
|                          |                                  | <b>Ståhlberg <i>et al.</i>, 2016</b>     |
|                          |                                  | Mattioli <i>et al.</i> , 2011            |
|                          | Arezzo                           | Bassi <i>et al.</i> , 2012               |
|                          | Appenines                        | <b>Boitani, 1982</b>                     |
|                          | Northern Apennines               | <b>Meriggi <i>et al.</i> 1991</b>        |
|                          | Orecchiella Natural Park         | <b>Ciucci <i>et al.</i>, 1996</b>        |
|                          | Abruzzo National Park            | <b>Patalano and Novari, 1993</b>         |
| POLAND                   | Central-East Italy               | <b>Pezzo <i>et al.</i>, 2003</b>         |
|                          | Southeastern Poland              | Smietana <i>et al.</i> , 1993            |
|                          |                                  | Jędrzejewski <i>et al.</i> 2012          |
|                          | South Poland                     | <b>Nowak <i>et al.</i>, 2005</b>         |
|                          | Northeastern Poland              | <b>Jędrzejewski <i>et al.</i> 2012</b>   |
|                          | Eastern Poland                   | <b>Jędrzejewski <i>et al.</i> 2012</b>   |
|                          | Central Poland                   | <b>Nowak <i>et al.</i>, 2011</b>         |
|                          | Northwest Poland                 |                                          |
|                          | North and West Poland            |                                          |
|                          | Podlaskie                        | <b>Jędrzejewski, <i>et al.</i>, 2000</b> |
|                          |                                  | <b>Jędrzejewski <i>et al.</i>, 2002</b>  |
| GREECE                   | Greece                           | <b>Jędrzejewski <i>et al.</i>, 1992</b>  |
|                          |                                  | <b>Papageorgiou, <i>et al.</i>, 1994</b> |
| GERMANY                  | Eastern German                   | Migli <i>et al.</i> , 2005               |
|                          | Northeastern Saxony              | <b>Wagner <i>et al.</i>, 2012</b>        |
| BELARUS                  | Northeastern Belarus             | Ansorge <i>et al.</i> , 2006             |
| HUNGARY                  | Northeastern Hungary             | <b>Sidorovich <i>et al.</i>, 2003</b>    |
| ESTONIA                  | Southern Estonia                 | <b>Lanszki <i>et al.</i>, 2012</b>       |
|                          | Middle and South-eastern Estonia | <b>Kübarsepp and Valdmann, 2003</b>      |
| LATVIA                   | North-eastern and Western Latvia | <b>Valdmann <i>et al.</i>, 1998</b>      |
|                          | Latvia                           | <b>Valdmann <i>et al.</i>, 2005</b>      |
|                          |                                  | <b>Žunna <i>et al.</i>, 2009</b>         |
| SCANDINAVIA<br>PENINSULA | Sweden and Norway                | <b>Andersone and Ozolins, 2004</b>       |
|                          |                                  | <b>Müller, 2006</b>                      |
|                          |                                  | <b>Ståhlberg <i>et al.</i>, 2017</b>     |

**Table S1 (Cont.)** – List of scientific literature on wolf diet that was reviewed to assess carnivore consumption by wolves, including Country, Region and Bibliographic source. The bibliographic sources with reported consumption of carnivore species by wolves are marked in bold.

| Country                | Region                                 | Bibliographic source                       |
|------------------------|----------------------------------------|--------------------------------------------|
| FINLAND                | North Karelia                          | <b>Gade-Jorgensen and Stagegaard, 2000</b> |
| DENMARK<br>(GREENLAND) | Nansen Land                            | <b>Marquard-Petersen, 1988.</b>            |
| ROMANIA                | Eastern Romanian Carpathians mountains | <b>Corradini, 2015</b>                     |
| SLOVAKIA               | North Central Slovakia                 | <b>Rigg and Gorman, 2004</b>               |
| SWITZERLAND            | Swiss Alps                             | Weber and Hofer, 2010                      |
| TURKEY                 | Kars                                   | <b>Capitani <i>et al.</i>, 2016</b>        |
| IRAN                   | Northwest Isfahan                      | Hosseini-Zavarei <i>et al.</i> , 2013      |
|                        | Yazd                                   | Tourani <i>et al.</i> , 2014               |
| PAKISTAN               | Gilgit Baltistan                       | Anwar <i>et al.</i> , 2012                 |
|                        | Khyber-Pakhtunkhwa                     | <b>Shabbir <i>et al.</i>, 2013</b>         |
| INDIA                  | Maharashtra                            | <b>Habib, 2007</b>                         |
|                        | Gujarat                                | <b>Jhala, 1993</b>                         |
|                        |                                        | <b>Jethva and Jhala, 2004</b>              |
| CHINA                  | Qinghai                                | <b>Liu and Jiang, 2003</b>                 |
|                        | Harbin                                 | <b>Gao, 1990</b>                           |
|                        | Inner Mongolia                         | <b>Gao, 1990</b>                           |
|                        |                                        | Zhang <i>et al.</i> , 2009                 |
|                        |                                        | Chen <i>et al.</i> , 2011                  |
| KYRGYZSTAN             | Issyk-Kul Region                       | <b>Jumabay-Uulu <i>et al.</i>, 2014</b>    |
| MONGOLIA               | Hustai National Park                   | Van Duyne <i>et al.</i> , 2009             |
|                        |                                        | <b>Hovens and Tungalaktuja, 2005</b>       |
| CANADA                 | Canada's Artic                         | <b>Kuyt, 1969</b>                          |
|                        | Yukon                                  | <b>Theberge and Cotrell, 1977</b>          |
|                        | British Columbia                       | <b>Darimont <i>et al.</i>, 2004</b>        |
|                        |                                        | <b>Bryan <i>et al.</i>, 2006</b>           |
|                        |                                        | Milakovic and Parker, 2011                 |
|                        |                                        | <b>Steenweg, 2011</b>                      |
|                        | British Columbia and Alberta           | <b>Cowan, 1947</b>                         |
|                        | Alberta                                | <b>Fuller and Keith, 1980</b>              |
|                        |                                        | James, 1999                                |
|                        |                                        | <b>Morehouse and Boyce, 2011</b>           |
|                        |                                        | Carbyn <i>et al.</i> , 1993                |
|                        | Western Manitoba                       | Sallows, 2007                              |
|                        | Québec                                 | <b>Messier and Crête, 1985</b>             |
|                        |                                        | <b>Tremblay <i>et al.</i>, 2001</b>        |

**Table S1 (Cont.)** – List of scientific literature on wolf diet that was reviewed to assess carnivore consumption by wolves, including Country, Region and Bibliographic source. The bibliographic sources with reported consumption of carnivore species by wolves are marked in bold.

| Country                  | Region                 | Bibliographic source                        |
|--------------------------|------------------------|---------------------------------------------|
| CANADA                   | Outaouais              | Potvin <i>et al.</i> , 1988                 |
|                          | Ontario                | Forbes and Theberge, 1996                   |
|                          |                        | <b>Theberge <i>et al.</i>, 1978</b>         |
|                          |                        | <b>Pimlott <i>et al.</i>, 1969</b>          |
|                          |                        | <b>Voigt <i>et al.</i>, 1976</b>            |
| UNITED STATES OF AMERICA | Alaska                 | Peterson <i>et al.</i> , 1984               |
|                          |                        | <b>Fox and Streveler, 1986</b>              |
|                          |                        | Spaulding <i>et al.</i> , 2000              |
|                          |                        | <b>Stephenson <i>et al.</i>, 1982</b>       |
|                          |                        | <b>Ballard <i>et al.</i>, 1987</b>          |
|                          |                        | <b>Murie, 1944</b>                          |
|                          |                        | <b>Lafferty <i>et al.</i>, 2014</b>         |
|                          | Montana                | <b>Arjo <i>et al.</i>, 2002</b>             |
|                          |                        | Derbridge <i>et al.</i> , 2012              |
|                          | Minnesota              | <b>Van Ballenberghe <i>et al.</i>, 1975</b> |
|                          |                        | <b>Fritts and Mech, 1981</b>                |
|                          |                        | <b>Chavez and Gese, 2005</b>                |
|                          | Arizona and New Mexico | Reed <i>et al.</i> , 2006                   |
|                          |                        | Carrera <i>et al.</i> , 2008                |
|                          |                        | Merkle <i>et al.</i> , 2009                 |
|                          | Isle Royale            | <b>Mech, 1966</b>                           |
|                          | Grand Teton            | <b>Trejo, 2012</b>                          |
|                          | Yellowstone            |                                             |

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**Table S2** – Eco-morphological traits of each carnivore species reported to be consumed by wolves, with reference to the number of compiled studies and sampling sites, reported magnitude of consumption (FO: Frequency of Occurrence; Biomass: Percentage of consumed biomass) and extant range per Continent.

| Species         | Scientific name                 | Family     | Average adult weight (Kg) | Weight Class <sup>(a)</sup> | Primary Diet | Scavenging Behavior <sup>(b)</sup> | Social Behavior <sup>(c)</sup> | N° of Studies | N° of Sampling Sites | Mean FO <sup>(d)</sup> | Mean Biomass <sup>(d)</sup> | Range                      |
|-----------------|---------------------------------|------------|---------------------------|-----------------------------|--------------|------------------------------------|--------------------------------|---------------|----------------------|------------------------|-----------------------------|----------------------------|
| Domestic Dog    | <i>Canis familiaris</i>         | Canidae    | 31.0                      | iv                          | Omnivore     | 1                                  | G                              | 42            | 70                   | 5.2%                   | 1.9%                        | NAmerica<br>Europe<br>Asia |
| Red Fox         | <i>Vulpes vulpes</i>            | Canidae    | 7.0                       | iii                         | Omnivore     | 1                                  | P                              | 33            | 39                   | 0.6%                   | 0.4%                        | NAmerica<br>Europe<br>Asia |
| Wolf            | <i>Canis lupus</i>              | Canidae    | 43.3                      | v                           | Carnivore    | 1                                  | G                              | 15            | 22                   | 0.8%                   | 0.3%                        | NAmerica<br>Europe<br>Asia |
| Raccoon Dog     | <i>Nyctereutes procyonoides</i> | Canidae    | 7.7                       | iii                         | Omnivore     | 1                                  | P                              | 10            | 11                   | 2.0%                   | 1.3%                        | Europe<br>Asia             |
| Coyote          | <i>Canis latrans</i>            | Canidae    | 11.5                      | iv                          | Omnivore     | 1                                  | P                              | 4             | 4                    | 0.9%                   | NA                          | NAmerica                   |
| Arctic Fox      | <i>Alopex lagopus</i>           | Canidae    | 3.7                       | ii                          | Carnivore    | 1                                  | P                              | 2             | 3                    | 0.7%                   | NA                          | NAmerica<br>Europe<br>Asia |
| Indian Fox      | <i>Vulpes bengalensis</i>       | Canidae    | 2.6                       | ii                          | Omnivore     | 0                                  | P                              | 2             | 2                    | NA                     | 1.0%                        | Asia                       |
| Corsac Fox      | <i>Vulpes corsac</i>            | Canidae    | 2.3                       | ii                          | Carnivore    | 1                                  | P                              | 1             | 1                    | NA                     | NA                          | Asia                       |
| Golden Jackal   | <i>Canis aureus</i>             | Canidae    | 7.9                       | iii                         | Carnivore    | 1                                  | P                              | 1             | 1                    | 0.2%                   | NA                          | Europe<br>Asia             |
| European Badger | <i>Meles meles</i>              | Mustelidae | 13.0                      | iv                          | Omnivore     | 1                                  | G                              | 19            | 19                   | 1.6%                   | 2.3%                        | Europe<br>Asia             |

<sup>(a)</sup>Weight Classes: i = <1kg; ii = 1-5kg; iii = 6-10kg; iv= 11-35kg; v = >35kg; <sup>(b)</sup>Scavenging Behavior: 1= scavenging behavior reported; 0 = scavenging behavior not reported.;

<sup>(c)</sup>Social behavior: S = Solitary; G = Gregarious; P = Pairs or small family groups; <sup>(d)</sup> NA: Not Available

**Table S2 (Cont.)** – Eco-morphological traits of each carnivore species reported to be consumed by wolves, with reference to the number of compiled studies and sampling sites, reported magnitude of consumption (FO: Frequency of Occurrence; Biomass: Percentage of consumed biomass) and extant range per Continent.

| Species                    | Scientific name          | Family     | Average adult weight (Kg) | Weight Class <sup>(a)</sup> | Primary Diet | Scavenging Behavior <sup>(b)</sup> | Social Behavior <sup>(c)</sup> | N° of Studies | N° of Sampling Sites | Mean FO <sup>(d)</sup> | Mean Biomass <sup>(d)</sup> | Range                      |
|----------------------------|--------------------------|------------|---------------------------|-----------------------------|--------------|------------------------------------|--------------------------------|---------------|----------------------|------------------------|-----------------------------|----------------------------|
| Stoat                      | <i>Mustela erminea</i>   | Mustelidae | 0.2                       | i                           | Carnivore    | 0                                  | S                              | 6             | 8                    | 2.7%                   | 2.7%                        | NAmerica<br>Europe<br>Asia |
| Fisher                     | <i>Martes pennanti</i>   | Mustelidae | 3.4                       | ii                          | Carnivore    | 1                                  | S                              | 3             | 5                    | 0.8%                   | NA                          | NAmerica                   |
| American Mink              | <i>Neovison vison</i>    | Mustelidae | 1.0                       | i                           | Carnivore    | 0                                  | S                              | 3             | 4                    | 1.8%                   | 1.3%                        | NAmerica                   |
| North American River Otter | <i>Lontra canadensis</i> | Mustelidae | 8.2                       | iii                         | Carnivore    | 0                                  | P                              | 3             | 4                    | 3.1%                   | 2.1%                        | NAmerica                   |
| American Marten            | <i>Martes americana</i>  | Mustelidae | 0.7                       | i                           | Carnivore    | 0                                  | S                              | 1             | 4                    | 1.1%                   | NA                          | NAmerica                   |
| Marten                     | <i>Martes</i> sp.        | Mustelidae | 1.5                       | ii                          | -            | -                                  | -                              | 3             | 2                    | 2.6%                   | 1.5%                        | Europe                     |
| European Pine Marten       | <i>Martes martes</i>     | Mustelidae | 1.3                       | ii                          | Carnivore    | 1                                  | S                              | 2             | 2                    | NA                     | NA                          | Europe<br>Asia             |
| Least Weasel               | <i>Mustela nivalis</i>   | Mustelidae | 0.1                       | i                           | Carnivore    | 1                                  | S                              | 2             | 2                    | NA                     | NA                          | NAmerica<br>Europe<br>Asia |
| American Badger            | <i>Taxidea taxus</i>     | Mustelidae | 7.4                       | iii                         | Carnivore    | 1                                  | S                              | 1             | 1                    | NA                     | NA                          | NAmerica                   |
| Long-tailed Weasel         | <i>Mustela frenata</i>   | Mustelidae | 0.2                       | i                           | Carnivore    | 0                                  | S                              | 1             | 1                    | 0.1%                   | NA                          | NAmerica                   |

<sup>(a)</sup>Weight Classes: i = <1kg; ii = 1-5kg; iii = 6-10kg; iv = 11-35kg; v = >35kg; <sup>(b)</sup>Scavenging Behavior: 1= scavenging behavior reported; 0 = scavenging behavior not reported.;

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| Species        | Scientific name         | Family     | Average adult weight (Kg) | Weight Class <sup>(a)</sup> | Primary Diet | Scavenging Behavior <sup>(b)</sup> | Social Behavior <sup>(c)</sup> | Nº of Studies | Nº of Sampling Sites | Mean FO <sup>(d)</sup> | Mean Biomass <sup>(d)</sup> | Range                      |
|----------------|-------------------------|------------|---------------------------|-----------------------------|--------------|------------------------------------|--------------------------------|---------------|----------------------|------------------------|-----------------------------|----------------------------|
| Stone Marten   | <i>Martes foina</i>     | Mustelidae | 1.7                       | ii                          | Omnivore     | 0                                  | S                              | 1             | 1                    | NA                     | NA                          | Europe<br>Asia             |
| Eurasian Otter | <i>Lutra lutra</i>      | Mustelidae | 9.5                       | ii                          | Carnivore    | 0                                  | S                              | 1             | 1                    | NA                     | NA                          | Europe<br>Asia             |
| Wolverine      | <i>Gulo gulo</i>        | Mustelidae | 11.8                      | iv                          | Carnivore    | 1                                  | S                              | 1             | 1                    | 0.4%                   | NA                          | NAmerica<br>Europe<br>Asia |
| Domestic Cat   | <i>Felis catus</i>      | Felidae    | 4.4                       | ii                          | Carnivore    | 0                                  | S                              | 15            | 17                   | 1.3%                   | 1.0%                        | NAmerica<br>Europe<br>Asia |
| Jungle Cat     | <i>Felis chaus</i>      | Felidae    | 7.3                       | iii                         | Carnivore    | 0                                  | S                              | 1             | 1                    | NA                     | NA                          | Asia                       |
| Bobcat         | <i>Lynx rufus</i>       | Felidae    | 9.3                       | iii                         | Carnivore    | 0                                  | S                              | 1             | 1                    | NA                     | NA                          | NAmerica                   |
| Canada Lynx    | <i>Lynx canadensis</i>  | Felidae    | 11.2                      | iv                          | Carnivore    | 1                                  | S                              | 1             | 1                    | NA                     | NA                          | NAmerica                   |
| Pallas's Cat   | <i>Otocolobus manul</i> | Felidae    | 3.5                       | ii                          | Carnivore    | 0                                  | S                              | 1             | 1                    | NA                     | NA                          | Asia                       |
| Black Bear     | <i>Ursus americanus</i> | Ursidae    | 118.8                     | v                           | Omnivore     | 1                                  | S                              | 8             | 9                    | 2.0%                   | 5.8%                        | NAmerica                   |
| Brown Bear     | <i>Ursus arctos</i>     | Ursidae    | 252.5                     | v                           | Omnivore     | 1                                  | S                              | 6             | 6                    | 1.0%                   | 0.6%                        | NAmerica<br>EuropeAsia     |

<sup>(a)</sup>Weight Classes: i = <1kg; ii = 1-5kg; iii = 6-10kg; iv= 11-35kg; v = >35kg; <sup>(b)</sup>Scavenging Behavior: 1= scavenging behavior reported; 0 = scavenging behavior not reported.;

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|-------------------------|----------------------------|-------------|---------------------------|-----------------------------|--------------|------------------------------------|--------------------------------|---------------|----------------------|------------------------|-----------------------------|----------------------------|
| Raccoon                 | <i>Procyon lotor</i>       | Procionidae | 6.6                       | iii                         | Omnivore     | 1                                  | S<br>4                         | 7             | 19.0%                | NA                     | NA                          | NAmerica<br>Europe<br>Asia |
| Harbor Seal             | <i>Phoca vitulina</i>      | Phocidae    | 97.5                      | v                           | Carnivore    | 0                                  | S<br>2                         | 2             | 6.3%                 | NA                     | NA                          | NAmerica                   |
| Seal                    | <i>Phoca</i> sp.           | Phocidae    | 97.5                      | v                           | Carnivore    | 0                                  | S<br>1                         | 3             | NA                   | 2.0%                   | NA                          | NAmerica                   |
| Striped Skunk           | <i>Mephitis mephitis</i>   | Mephitidae  | 2.3                       | ii                          | Omnivore     | 1                                  | S<br>3                         | 2             | NA                   | NA                     | NA                          | NAmerica                   |
| Common Genet            | <i>Genetta genetta</i>     | Viveridae   | 2.0                       | ii                          | Carnivore    | 0                                  | S<br>1                         | 1             | 0.3%                 | 0.2%                   | 0.2%                        | Europe                     |
| Masked Palm Civet       | <i>Paguma larvata</i>      | Viveridae   | 4.0                       | ii                          | Omnivore     | 0                                  | S<br>1                         | 1             | 10.6%                | NA                     | NA                          | Asia                       |
| Indian Gray Mongoose    | <i>Herpestes edwardsii</i> | Herpestidae | 2.5                       | ii                          | Carnivore    | 1                                  | S<br>1                         | 1             | NA                   | NA                     | NA                          | Asia                       |
| Undetermined canid      | -                          | Canidae     | 13.0                      | iv                          | -            | -                                  | -<br>3                         | 6             | 1.9%                 | NA                     | NA                          | NAmerica<br>Europe<br>Asia |
| Undetermined mustelid   | -                          | Mustelidae  | 4.3                       | ii                          | -            | -                                  | -<br>7                         | 6             | 0.9%                 | 1.9%                   | 1.9%                        | -                          |
| Undetermined felid      | -                          | Felidae     | 7.1                       | iii                         | -            | -                                  | -<br>1                         | 2             | NA                   | NA                     | NA                          | -                          |
| Undetermined Carnivores | -                          | -           | -                         | -                           | -            | -                                  | -<br>11                        | 13            | 1.1%                 | 0.6%                   | 0.6%                        | -                          |

<sup>(a)</sup>Weight Classes: i = <1kg; ii = 1-5kg; iii = 6-10kg; iv= 11-35kg; v = >35kg; <sup>(b)</sup>Scavenging Behavior: 1= scavenging behavior reported; 0 = scavenging behavior not reported.;

<sup>(c)</sup>Social behavior: S = Solitary; G = Gregarious; P = Pairs or small family groups; <sup>(d)</sup>NA: Not Available

**Table S3** – Published evidences on observations of antagonistic interactions between wolves and carnivore species, with reference to the existence/absence of consumption of the victims (total or partial), observation method, country and respective continent.

| Species killed by wolves | Scientific name         | Victim(s) consumption | Methods                | Country               | Continent     | Source                         |
|--------------------------|-------------------------|-----------------------|------------------------|-----------------------|---------------|--------------------------------|
| Golden Jackal            | <i>Canis aureus</i>     | No                    | Telemetry/Prey remains | Iran                  | Asia          | Mohammadi <i>et al.</i> , 2017 |
| Black bear               | <i>Ursus americanus</i> | No                    | Telemetry              | USA (Minnesota)       | North America | Rogers and Mech, 1981          |
| Black bear               | <i>Ursus americanus</i> | Yes                   | Reports                | Canada                | North America | Horejsi <i>et al.</i> , 1984   |
| Black bear               | <i>Ursus americanus</i> | Yes                   | Prey remains           | Canada                | North America | Paquet and Carbyn, 1986        |
| Black bear               | <i>Ursus americanus</i> | No                    | Prey remains           | Canada                | North America | Joslin, 1966                   |
| Brown bear               | <i>Ursus arctos</i>     | No                    | Reports                | USA (Alaska)          | North America | Murie, 1944                    |
| Brown bear               | <i>Ursus arctos</i>     | No                    | Prey remains           | USA (Yellowstone)     | North America | Gunther and Smith, 2004        |
| Coyote                   | <i>Canis latrans</i>    | No                    | Telemetry/Prey remains | USA (Yellowstone)     | North America | Merkle <i>et al.</i> , 2009    |
| Coyote                   | <i>Canis latrans</i>    | No                    | Telemetry/Prey remains | USA (Alaska)          | North America | Thurber <i>et al.</i> , 1992   |
| Coyote                   | <i>Canis latrans</i>    | No                    | Reports/Prey remains   | USA (Minnesota)       | North America | Stenlund, 1955                 |
| Coyote                   | <i>Canis latrans</i>    | Yes                   | Prey remains           | Canada                | North America | Munro, 1947                    |
| Wolf (pup)               | <i>Canis lupus</i>      | Yes                   | Telemetry/Prey remains | Canada                | North America | Latham and Boutin, 2011        |
| Wolf (pup)               | <i>Canis lupus</i>      | Yes                   | Video Records          | Canada                | North America | McLeod, 1990                   |
| Wolf (pup)               | <i>Canis lupus</i>      | Yes                   | Reports                | Canada                | North America | Kuyt, 1969                     |
| Wolverine                | <i>Gulo gulo</i>        | No                    | Reports                | USA (Alaska)          | North America | Murie, 1944                    |
| Wolverine                | <i>Gulo gulo</i>        | No                    | Prey remains           | USA                   | North America | Burkholder, 1962               |
| Red fox                  | <i>Vulpes vulpes</i>    | No                    | Reports                | USA                   | North America | Mech, 1970                     |
| Domestic Dog             | <i>Canis familiaris</i> | No                    | Telemetry              | Finland               | Europe        | Kojola, 2004                   |
| Domestic Dog             | <i>Canis familiaris</i> | Yes                   | Reports                | Finland               | Europe        | Kojola, 2002                   |
| Domestic Dog             | <i>Canis familiaris</i> | Yes                   | Reports/Prey remains   | USA (Minnesota)       | North America | Fritts and Paul, 1973          |
| Domestic Dog             | <i>Canis familiaris</i> | No                    | Reports                | USA (Alaska) / Canada | North America | McNay and Hicks, 2002          |
| Domestic Dog             | <i>Canis familiaris</i> | Yes                   | Reports                | Sweden                | Europe        | Backeryd, 2007                 |
| Domestic Dog             | <i>Canis familiaris</i> | Yes                   | Prey remains           | Portugal / Spain      | Europe        | F. Álvares, unpub. data.       |
| Domestic Cat             | <i>Felis catus</i>      | Yes                   | Prey remains           | Poland                | Europe        | S. Novak, unpub. data          |

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**Table S4** – Results from Pearson Correlation test between values of Frequency of Occurrence (FO) and Percentage of consumed biomass (Biomass) of carnivores in wolf diet in 87 sampling sites.

|                                                             |                                | FO      | Biomass |
|-------------------------------------------------------------|--------------------------------|---------|---------|
| FO                                                          | Pearson Correlation ( $\rho$ ) | 1       | 0.911** |
|                                                             | Sig. (p value)                 |         | 0.000   |
| Biomass                                                     | Pearson Correlation ( $\rho$ ) | 0.911** | 1       |
|                                                             | Sig. (p value)                 | 0.000   |         |
| **, Correlation is significant at the 0.01 level (2-tailed) |                                |         |         |

**Table S5** – Description of the 15 ecological and human-related variables used to assess factors determining carnivore consumption by wolves, including the source, time period, metrics and variable type. The uncorrelated six variables included in the GLM tests are marked in bold (see Methods section for details).

| Variables name                                           | Source                                                                                                                                                                                                                       | Period    | Metric        | Type                     |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------|--------------------------|
| Percentage of Small mammals in wolf diet                 | Compiled studies                                                                                                                                                                                                             | -         | Sampling site | Food Source              |
| Percentage of Wild ungulates in wolf diet                | Compiled studies                                                                                                                                                                                                             | -         | Sampling site | Food Source              |
| Percentage of Livestock in wolf diet                     | Compiled studies                                                                                                                                                                                                             | -         | Sampling site | Food Source              |
| Protected area                                           | Compiled studies                                                                                                                                                                                                             | -         | Sampling site | Human activity           |
| Road Density                                             | Socioeconomic Data and Applications Center; NASA;<br><a href="http://sedac.ciesin.columbia.edu/data/set/groads-global-roads-open-access-v1">http://sedac.ciesin.columbia.edu/data/set/groads-global-roads-open-access-v1</a> | 1980-2010 | Nº of cells   | Human activity           |
| Human Density                                            | Socioeconomic Data and Applications Center; NASA;<br><a href="http://sedac.ciesin.columbia.edu/data/set/gpw-v4-population-density">http://sedac.ciesin.columbia.edu/data/set/gpw-v4-population-density</a>                   | 2000      | Mean density  | Human activity           |
| Cattle Density                                           | Global cattle density; <a href="http://www.fao.org/geonetwork/srv/en/">http://www.fao.org/geonetwork/srv/en/</a>                                                                                                             | 2005      | Mean density  | Human activity           |
| Anthromes                                                | Ellis <i>et al.</i> (2010); Anthromes version 2.0;<br><a href="http://ecotope.org/anthromes/v2/data/">http://ecotope.org/anthromes/v2/data/</a>                                                                              | 1900-2000 | Coefficient   | Human activity           |
| Agricultural Area                                        | GlobCover 2009 v2.3; <a href="http://due.esrin.esa.int/page_globcover.php">http://due.esrin.esa.int/page_globcover.php</a>                                                                                                   | 2004-2009 | Nº of cells   | Human activity           |
| Urban Area                                               | GlobCover 2009 v2.3; <a href="http://due.esrin.esa.int/page_globcover.php">http://due.esrin.esa.int/page_globcover.php</a>                                                                                                   | 2004-2009 | Nº of cells   | Human activity           |
| Forest Cover                                             | GlobCover 2009 v2.3; <a href="http://due.esrin.esa.int/page_globcover.php">http://due.esrin.esa.int/page_globcover.php</a>                                                                                                   | 2004-2009 | Nº of cells   | Environmental conditions |
| Mean Altitude                                            | Worldclim; <a href="http://www.worldclim.org/">http://www.worldclim.org/</a>                                                                                                                                                 | -         | Mean values   | Environmental conditions |
| Temperature Seasonality                                  | Worldclim; <a href="http://www.worldclim.org/">http://www.worldclim.org/</a>                                                                                                                                                 | 1960-1990 | Mean values   | Environmental conditions |
| Precipitation Seasonality                                | Worldclim; <a href="http://www.worldclim.org/">http://www.worldclim.org/</a>                                                                                                                                                 | 1960-1990 | Mean values   | Environmental conditions |
| <b>NDVI<br/>(Normalized Difference Vegetation Index)</b> | Broxton <i>et al.</i> (2014); <a href="https://landcover.usgs.gov/green_veg.php">https://landcover.usgs.gov/green_veg.php</a>                                                                                                | 2001-2012 | Mean values   | Environmental conditions |

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**Table S6** – Results from Pearson Correlation test for the 11 environmental and human related variables obtained from on-line data sources and used to assess factors determining carnivore consumption by wolves. Significant correlations in bold (\*\* Correlation significant at  $p < 0.01$ ; \* Correlation significant at  $p < 0.05$ ).

|                              |                                | Mean<br>Altitude | Temperature<br>Seasonality | Precipitation<br>Seasonality | NDVI            | Anthromes       | Cattle<br>Density | Human<br>Density | Urban<br>Area   | Agricultural<br>Area | Forest<br>Cover | Road<br>Density |
|------------------------------|--------------------------------|------------------|----------------------------|------------------------------|-----------------|-----------------|-------------------|------------------|-----------------|----------------------|-----------------|-----------------|
| Mean Altitude                | Pearson Correlation ( $\rho$ ) | 1                | -0.004                     | 0.040                        | <b>-0.237**</b> | -0.006          | -0.146            | -0.114           | -0.129          | 0.064                | <b>-0.323**</b> | <b>-0.166*</b>  |
|                              | Sig. (p value)                 |                  | 0.962                      | 0.604                        | 0.002           | 0.941           | 0.060             | 0.144            | 0.096           | 0.409                | 0.000           | 0.032           |
| Temperature<br>Seasonality   | Pearson Correlation ( $\rho$ ) | -0.004           | 1                          | 0.010                        | -0.023          | <b>-0.247**</b> | <b>-0.510**</b>   | 0.148            | 0.135           | <b>-0.367**</b>      | <b>0.198*</b>   | <b>-0.238**</b> |
|                              | Sig. (p value)                 | 0.962            |                            | 0.899                        | 0.771           | 0.001           | 0.000             | 0.057            | 0.082           | 0.000                | 0.010           | 0.002           |
| Precipitation<br>Seasonality | Pearson Correlation ( $\rho$ ) | 0.040            | 0.010                      | 1                            | <b>-0.339**</b> | 0.033           | <b>0.210**</b>    | <b>0.289**</b>   | <b>0.209**</b>  | <b>0.268**</b>       | <b>-0.448**</b> | -0.019          |
|                              | Sig. (p value)                 | 0.604            | 0.899                      |                              | 0.000           | 0.673           | 0.007             | 0.000            | 0.007           | 0.000                | 0.000           | 0.807           |
| NDVI                         | Pearson Correlation ( $\rho$ ) | <b>-0.237**</b>  | -0.023                     | <b>-0.339**</b>              | 1               | 0.086           | <b>0.160*</b>     | <b>-0.181*</b>   | <b>-0.170*</b>  | 0.023                | <b>0.641**</b>  | <b>0.237**</b>  |
|                              | Sig. (p value)                 | 0.002            | 0.771                      | 0.000                        |                 | 0.268           | 0.039             | 0.019            | 0.028           | 0.767                | 0.000           | 0.002           |
| Anthromes                    | Pearson Correlation ( $\rho$ ) | -0.006           | <b>-0.247**</b>            | 0.033                        | 0.086           | 1               | <b>0.153*</b>     | -0.042           | -0.067          | <b>0.353**</b>       | -0.148          | 0.098           |
|                              | Sig. (p value)                 | 0.941            | 0.001                      | 0.673                        | 0.268           |                 | 0.048             | 0.589            | 0.392           | 0.000                | 0.056           | 0.209           |
| Cattle Density               | Pearson Correlation ( $\rho$ ) | -0.146           | <b>-0.510**</b>            | <b>0.210**</b>               | <b>0.160*</b>   | <b>0.153*</b>   | 1                 | -0.010           | -0.021          | <b>0.360**</b>       | -0.116          | <b>0.349**</b>  |
|                              | Sig. (p value)                 | 0.060            | 0.000                      | 0.007                        | 0.039           | 0.048           |                   | 0.894            | 0.784           | 0.000                | 0.136           | 0.000           |
| Human Density                | Pearson Correlation ( $\rho$ ) | -0.114           | 0.148                      | <b>0.289**</b>               | <b>-0.181*</b>  | -0.042          | -0.010            | 1                | <b>0.945**</b>  | 0.140                | <b>-0.228**</b> | <b>0.252**</b>  |
|                              | Sig. (p value)                 | 0.144            | 0.057                      | 0.000                        | 0.019           | 0.589           | 0.894             |                  | 0.000           | 0.070                | 0.003           | 0.001           |
| Urban Area                   | Pearson Correlation ( $\rho$ ) | -0.129           | 0.135                      | <b>0.209**</b>               | <b>-0.170*</b>  | -0.067          | -0.021            | <b>0.945**</b>   | 1               | <b>0.202**</b>       | <b>-0.245**</b> | <b>0.322**</b>  |
|                              | Sig. (p value)                 | 0.096            | 0.082                      | 0.007                        | 0.028           | 0.392           | 0.784             | 0.000            |                 | 0.009                | 0.001           | 0.000           |
| Agricultural Area            | Pearson Correlation ( $\rho$ ) | 0.064            | <b>-0.367**</b>            | <b>0.268**</b>               | 0.023           | <b>0.353**</b>  | <b>0.360**</b>    | 0.140            | <b>0.202**</b>  | 1                    | <b>-0.548**</b> | <b>0.424**</b>  |
|                              | Sig. (p value)                 | 0.409            | 0.000                      | 0.000                        | 0.767           | 0.000           | 0.000             | 0.070            | 0.009           |                      | 0.000           | 0.000           |
| Forest Cover                 | Pearson Correlation ( $\rho$ ) | <b>-0.323**</b>  | 0.198*                     | <b>-0.448**</b>              | <b>0.641**</b>  | -0.148          | -0.116            | <b>-0.228**</b>  | <b>-0.245**</b> | <b>-0.548**</b>      | 1               | -0.048          |
|                              | Sig. (p value)                 | 0.000            | 0.010                      | 0.000                        | 0.000           | 0.056           | 0.136             | 0.003            | 0.001           | 0.000                |                 | 0.536           |
| Road Density                 | Pearson Correlation ( $\rho$ ) | <b>-0.166*</b>   | <b>-0.238**</b>            | -0.019                       | <b>0.237**</b>  | 0.098           | <b>0.349**</b>    | <b>0.252**</b>   | <b>0.322**</b>  | <b>0.424**</b>       | -0.048          | 1               |
|                              | Sig. (p value)                 | 0.032            | 0.002                      | 0.807                        | 0.002           | 0.209           | 0.000             | 0.001            | 0.000           | 0.000                | 0.536           |                 |

**Table S7** - Weight classes, primary diet, reported scavenging behavior and social behavior of the carnivore species consumed by wolves worldwide, the number of times a species of each category appears as a wolf food item in the sampling sites and the number of consumed carnivore species by category. Weight Classes: i) <1kg; ii) 1 to 5kg; iii) 6 to 10kg; iv) 11 to 35kg; v) >35kg.

| Weight Class | Primary Diet | Scavenging Behavior | Social Behavior              | Nº of Sampling Sites | Nº of Species |
|--------------|--------------|---------------------|------------------------------|----------------------|---------------|
| i            | Carnivorous  | Non-Scavengers      | Solitary                     | 17                   | 4             |
|              |              | Scavengers          | Solitary                     | 2                    | 1             |
| ii           | Carnivorous  | Non-Scavengers      | Solitary                     | 19                   | 3             |
|              |              | Scavengers          | Solitary                     | 8                    | 3             |
|              |              |                     | Pairs or small family groups | 4                    | 2             |
|              | Omnivorous   | Non-Scavengers      | Solitary                     | 2                    | 2             |
|              |              |                     | Pairs or small family groups | 2                    | 1             |
|              |              | Scavengers          | Solitary                     | 2                    | 1             |
| iii          | Carnivorous  | Non-Scavengers      | Solitary                     | 3                    | 3             |
|              |              |                     | Pairs or small family groups | 4                    | 1             |
|              |              | Scavengers          | Solitary                     | 1                    | 1             |
|              |              |                     | Pairs or small family groups | 1                    | 1             |
|              | Omnivorous   | Scavengers          | Solitary                     | 7                    | 1             |
|              |              |                     | Pairs or small family groups | 50                   | 2             |
| iv           | Carnivorous  | Scavengers          | Solitary                     | 2                    | 2             |
|              | Omnivorous   | Scavengers          | Pairs or small family groups | 4                    | 1             |
|              |              |                     | Gregarious                   | 89                   | 2             |
| v            | Carnivorous  | Scavengers          | Gregarious                   | 22                   | 1             |
|              |              | Non-Scavengers      | Solitary                     | 2                    | 1             |
|              | Omnivorous   | Scavengers          | Solitary                     | 15                   | 2             |

**Table S8** – Results from the GLM model for the effects of seasons (W- Winter/Autumn and S- Summer/Spring) on the magnitude of carnivore consumption by wolves, in 88 sampling sites worldwide.

| Parameter   | B      | Std. Error | 95% Wald Confidence Interval |        | Hypothesis Test |    |                |
|-------------|--------|------------|------------------------------|--------|-----------------|----|----------------|
|             |        |            | Lower                        | Upper  | Wald Chi-Square | df | Sig. (p value) |
| (Intercept) | -1.584 | 0.0643     | -1.710                       | -1.458 | 606.877         | 1  | 0.000          |
| [SEASON=W]  | -0.031 | 0.0889     | -0.205                       | 0.143  | 0.120           | 1  | 0.729          |
| [SEASON=S]  | .      | .          | .                            | .      | .               | .  | .              |

**Table S9** – Results from the chi-square test (by comparing the fitted model against the intercept-only model) to assess the fitness of the GLM for the effects of seasons (W- Winter/Autumn and S- Summer/Spring) on magnitude of carnivore consumption by wolves, in 88 sampling sites worldwide.

| Likelihood Ratio Chi-Square                                     | Sig. (p value) |
|-----------------------------------------------------------------|----------------|
| 0.120                                                           | 0.729          |
| <b>Dependent Variable:</b> Log (Class of Carnivore consumption) |                |
| <b>Model:</b> (Intercept), Seasons.                             |                |

**Table S10** – Results from the GLM model for the effects of seasons (W- Winter/Autumn and S- Summer/Spring) on the number of carnivore species consumed by wolves, in 115 sampling sites worldwide.

| Parameter   | B      | Std. Error | 95% Wald Confidence Interval |       | Hypothesis Test |    |                |
|-------------|--------|------------|------------------------------|-------|-----------------|----|----------------|
|             |        |            | Lower                        | Upper | Wald Chi-Square | df | Sig. (p value) |
| (Intercept) | 1.984  | 0.1645     | 1.662                        | 2.307 | 145.474         | 1  | 0.000          |
| [SEASON=W]  | -0.292 | 0.2446     | -0.771                       | 0.188 | 1.423           | 1  | 0.233          |
| [SEASON=S]  | .      | .          | .                            | .     | .               | .  | .              |

**Table S11** – Results from the chi-square test (by comparing the fitted model against the intercept-only model) to assess the fitness of the GLM for the effects of seasons (W- Winter/Autumn and S- Summer/Spring) on the number of carnivore species consumed by wolves, in 115 sampling sites worldwide.

| Likelihood Ratio Chi-Square                                         | Sig. (p value) |
|---------------------------------------------------------------------|----------------|
| 1.423                                                               | 0.233          |
| <b>Dependent Variable:</b> Number of species of consumed carnivores |                |
| <b>Model:</b> (Intercept), Seasons                                  |                |

**Table S12** – Results from the chi-square test (by comparing the fitted model against the intercept-only model) to assess the fitness of the GLM for the effects of environmental and human-related variables on the magnitude of carnivore consumption by wolves, in 87 sampling sites worldwide.

| Likelihood Ratio Chi-Square                                                                                                                                                                                                                                          | Sig. (p value) |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| 33.733                                                                                                                                                                                                                                                               | 0.000          |
| <b>Dependent Variable:</b> Percentage of carnivore consumption<br><b>Model:</b> (Intercept), Protected Area, Percentage of domestic ungulates in wolf diet, Percentage of wild ungulates in wolf diet, Percentage of small mammals in wolf diet, NDVI, Human density |                |

**Table S13** – Results from the chi-square test (by comparing the fitted model against the intercept-only model) to assess the fitness of the GLM for the effects of environmental and human-related variables on the number of carnivore species consumed by wolves, in 143 sampling sites.

| Likelihood Ratio Chi-Square                                                                                                                                                                                                                                                | Sig. (p value) |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| 21.390                                                                                                                                                                                                                                                                     | 0.002          |
| <b>Dependent Variable:</b> Number of species of consumed carnivores<br><b>Model:</b> (Intercept), Protected Area, Percentage of domestic ungulates in wolf diet, Percentage of wild ungulates in wolf diet, Percentage of small mammals in wolf diet, NDVI, Human density. |                |