Supplementary material for:

Rethinking megafauna

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This file includes:

Appendix S1. Etymology and popular definition of megafauna.

According to the Oxford dictionary (https://en.oxforddictionaries.com/), megafauna, a term resulting from combining “mega” (from the Greek “megalos”, which means large, or denoting a factor of 10^6 or, in computing grounds, 2^{20}) and “fauna” (from the ancient Rome nature-goddess Fauna), are either “the large mammals of a particular region, habitat, or geological period” or “animals that are large enough to be seen with the naked eye”. As emphasized in this review, the ambiguity and disparity of these popular definitions is also reflected in the scientific literature. In fact, vague terminology such as “large animals”, “large terrestrial/marine animals”, “large-bodied animals/mammals”, “mega-mammals/herbivores/vertebrates”, “beasts”, “big/biggest beasts” “giants”, “giant mammals” and “large-gigantic vertebrates” is common in the scientific literature.

Appendix S2. Species and photograph credits of Figure 1.

From left to right, top to bottom: proboscidean (extinct; N. García), *Mammuthus* sp. (extinct; A. Campos-Arceiz), *Ursus deningeri* (extinct; N. García), *Megantereon whitei* (extinct; E. Revilla), *Loxodonta africana* (W.M. Getz), *Ceratotherium simum* (F.D. Carmona-López), *Giraffa camelopardalis* (S. Justicia-Carmona), *Ursus arctos* (A. Wajrak), *Bison bonasus* (A. Wajrak), *Megaptera novaeangliae* (A. Wajrak), *Carcharhinus amblyrhynchos* (A. Ibáñez-Yuste), *Chelonias mydas* (A. Ibáñez-Yuste), *Larus michahellis* (S. Eguía), *Urogymnus polylepis* (Z. Hogan), *Crocodylus niloticus* (F.D. Carmona-López), *Hippopotamus amphibius*, (F.D. Carmona-López), *Fromia nodosa* (A. Ibáñez-Yuste), *Clavelina dellavallei* (A. Ibáñez-Yuste), *Dardanus calidus* (A. Ibáñez-Yuste), *Hermocide caruncula*ta (A. Ibáñez-Yuste), *Pseudoceros ferrugineus* (A. Ibáñez-Yuste), *Lumbricus* sp. (J.M. Barea-Azcón), *Alphasida* sp. (F. Sánchez-Piñero), *Scolopendra* sp. (J.M. Barea-Azcón), *Lycosa tarantula* (S. Justicia-Carmona).

Appendix S3. References reviewed.

Papers cited in Table S3 are marked with asterisks (*: papers cited in the column "Based on citation by"; **: papers cited in the column "Reference").

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Appendix S4. Methods.

Literature review

Megafauna definitions. Following guidelines provided by Haddaway et al. (2015), we used the Web of Science to search for publications (appearing prior to October 2016) with the term "megafauna" in the title, thus obtaining a first output of 374 papers. We further restricted our search to scientific papers written in English and that we could fully access, thereby obtaining 276 articles (see Appendix S3 for a complete list of reviewed references). We read each article to extract the following information. First, we divided the papers in two main groups: those that provide an explicit definition of megafauna and those that do not provide such a definition. For the former, we noted if authors supported their definition with citations, arguments or both; or if definitions were not supported by any citation or argument. Also, we recorded if definitions included these criteria: animal body size, taxonomy, region, ecological function, and life history traits. Second, we recorded the period (prehistorical and historical), ecosystem (terrestrial, marine, freshwater and soil) and taxonomic group (vertebrate and invertebrate) referred in the articles. By "prehistoric megafauna" we mean large animals that are now extinct and are known only through the fossil record (Koch and Barnosky 2006), as opposed to currently extant megafauna or historically extinct megafauna which are known through written records.

Terminology associated with megafauna research. We used VOSviewer (http://www.vosviewer .com/), a freeware for creating and visualizing semantic networks or term maps of scientific literature (van Eck and Waltman 2011, van Eck et al. 2013). The software applies text mining in the abstract and title of the selected papers and clustering functions to analyze co-occurrence of terms (van Eck and Waltman 2010). In a first selection, we obtained 8,251 terms. From these terms, we focused on the terms (n=123) that co-occurred in the title or abstract of more than 10 articles. Then, we removed general terms that randomly co-occurred in articles, such as 'data', 'analysis', 'study' or 'result'. We also removed the term 'megafauna' when it appeared alone without any adjective (e.g. benthic megafauna, marine megafauna or Pleistocene megafauna) to avoid any bias towards this term that could hide emergent patterns in megafauna related research. The final subset of terms (n=71) was used to build a co-occurrence network that revealed three major megafauna research clusters (Figs. S1 and S2).

Survey of researchers

Sampling procedure. We designed a questionnaire to investigate the megafauna concept among researchers. The questionnaire was divided in three parts: Part 1 was devoted to researchers' personal and expertise data; Part 2 showed pictures of 120 species (15 mammals, 15 birds, 15 reptiles, 15 amphibians, 15 fishes, 15 terrestrial invertebrates, 15 marine invertebrates and 15 freshwater invertebrates, spanning the whole body size range of each group; habitat refers to the main habitat during the whole life, being also the main habitat for adults); and Part 3 formulated questions regarding different definitions of megafauna. We used foreground color pictures of animals without human-related scale references. All photographs avoided backlighting, represented the entire body of the animal, had less than 10% visible sky and pictured adult individuals. The complete list of species included in the questionnaire is shown in Table S4. Among the list of pictures, we asked respondents to indicate the species that fell into their concept of megafauna. Other questions included are described in Tables S5 and S6 and below.

We selected the respondents in several steps following Sutherland et al. (2013) and Hays et al. (2016). First, we identified leading experts in the ecology and conservation of megafauna (particularly, human-wildlife conflicts and ecosystem services associated with megafauna), as well as in paleontology (mainly, vertebrate paleontology and paleoecology), based on their publication record and extent of work in these fields. These experts were invited to participate in a workshop organized in the Doñana Biological Station-CSIC (EBD; Seville, Spain, November 9-11 2016; http://www.ebd.csic.es/web/megafauna-workshop/home) to discuss on megafauna and their benefits and detriments to humans. Before the meeting, experts were asked to fill in the questionnaire on-line. Second, the same questionnaires were distributed to researchers who attended the first workshop session, which was open to all EBD researchers. These EBD researchers were asked to fill in the questionnaires at the beginning of the session, i.e. before hearing invited researchers and participating in discussions. Third, experts attending the workshop (*n*=20) were asked to contact and distribute the questionnaires to other researchers of their fields with the aim of obtaining a minimum of ten researchers belonging to the 12 broad fields resulted from all combinations of ecosystem of expertise (terrestrial, marine and freshwater), period of expertise (prehistorical and historical) and taxonomic expertise (vertebrates and invertebrates). We obtained a total of 93 questionnaires (note that one researcher can be expert in more than one combination of ecosystem, period and taxonomic expertise).

Species traits associated with megafauna. To represent species traits and other relevant characteristics that may determine the probability of a species to be classified as megafauna, we compiled information on the taxonomy, biology, ecology, behavior, conservation status and popularity among the general public of the species included in the questionnaires (see Table S5 for details on the traits and the references used). Also, we recorded respondents' characteristics that might have an influence on the questionnaires' results (personal details, and research experience and expertise; see Table S6 for details). We used Boosted Regression Trees (BRTs; Elith et al. 2008) to rank species characteristics in relation with their capacity to predict the probability of each species to be classified as megafauna. Then, we built a Generalized Linear Model (GLM) with a Gaussian distribution error relating the probability of each species to be classified as megafauna with body mass, taxonomic group and their interaction. In this analysis, we applied a logit-transformation to the probability of each species to be classified as megafauna. Additionally, we conducted a regression tree analysis (Strobl et al. 2009) to identify the body mass threshold for which species have the highest probability of being classified as megafauna.

We also checked if respondents' features might influence their probability of classifying a species as megafauna. First, we also used BRTs and linear models to relate respondents' features to the number of species classified as megafauna by each researcher (0 to 120). Then, we used GLMs with Gaussian error distribution to test if the most important respondent features identified by BRTs (age, expertise on mammals and ecosystem of expertise; respondent experience was discarded here and in further analysis because its close relationship with respondent age) had a significant effect on the number of species classified as megafauna. Post-hoc tests were performed using the max-*t* test robust against residual departures from normality and homoscedasticity (Herberich et al. 2010). Second, we used a manyGLM model (model-based analysis of multivariate data; Wang et al. 2012) with a binomial distribution error to explore if respondents' characteristics influenced the probability of a given species to be classified as megafauna. For this, we used the most influential variables identified by BRTs as predictors.

The results on species traits were in general consistent over the variation of the respondents' characteristics tested (age, expertise in mammals, and ecosystem of expertise; Fig. S2b). However, older respondents (GLM, age slope=-0.388, P=0.023, R^2=0.06) and experts in mammals (ANOVA test, $F_{1,79}$=4.27, P=0.042, R^2=0.05) were slightly more conservative; i.e. they classified a lower percentage of species as megafauna (Fig. S4). The ecosystem of expertise also had a significant effect on the percentage of species classified as megafauna (ANOVA test, $F_{3,77}$=2.86, P=0.042, R^2=0.10), but post-hoc analyses showed no significant differences among categories. In addition, the many-GLM analysis showed that these respondents' characteristics (age, expertise on mammals and ecosystem of expertise) did not influence the probability of an individual species to be classified as megafauna (many-GLM test statistic=18.6, P=0.152).

What criteria should define megafauna? We asked whether respondents would include any of the following criteria (binary response, no/yes) within a definition of megafauna: body mass (i.e., megafauna species should be those above a given body mass threshold), taxonomy (i.e., the "megafauna threshold" should be defined within each taxonomic group, irrespective of the threshold defined for other groups), ecological function (i.e., the "megafauna threshold" should be defined within each functional group, irrespective of the threshold defined for other groups), ecological context (i.e., the definition should be context-dependent, according to the structure and species richness of the local natural community; thus, the same species could be defined as megafauna in one region of the world but not in other), life history traits (i.e., the "megafauna threshold" should be defined according to key life history traits such as lifespan, reproductive strategy and fecundity), and extinction risk (i.e., the “megafauna threshold” should be defined according to the risk of extinction; obviously, this criterion does not apply for extinct taxa). We discarded two questionnaires (2.2% of total questionnaires) because this part was incomplete or wrong. In addition, we included one open-ended question to identify other criteria that could be taking into account to define megafauna.

By means of GLMs (binomial distribution errors), we analyzed the influence of respondents’ characteristics on their preferences for the given criteria to classify a species as megafauna. We focused on the three characteristics that were more important in determining the propensity to classify a given species as megafauna (see previous point and Fig. S2b): age, ecosystem of expertise and expertise on mammals.

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Table S1. The disparity of megafauna definitions, according to the general criteria used to define megafauna, the ecosystem in which the definition is normally applied, and the broad taxonomy of the species included as megafauna.

Criterion	Definition	Ecosystem	Taxonomy
Size (mass)	Species over 100 pounds (c. 45 kg; e.g. Martin 1967)	Terrestrial	Vertebrates
	Species over 1,000 kg in adult body mass (Doughty et al. 2016), derived from the megaherbivore concept of Owen-Smith (Owen-Smith 1988, 2013)	Terrestrial	Vertebrates
	Species over 45 kg (Estes et al. 2016)	Marine (pelagic)	Vertebrates and invertebrates
	Species over 30 kg (He et al. 2017)	Freshwater	Vertebrates
Size (length)	Species over 20 mm in length that exert strong influences on gross soil structure (Coleman and Crossley 2004)	Soil	Vertebrates and invertebrates
	Species visible on seabed photographs (normally over c. 1 cm) or caught by trawl nets (e.g. Grassle et al. 1975, Smith and Hamilton 1983)	Marine (benthic and epibenthic)	Vertebrates and invertebrates
Size (implicit)	Particular taxonomic groups, such as marine mammals, sea turtles and seabirds (termed “air-breathing marine megafauna”; e.g. Lewison et al. 2014), as well as sharks, rays, other predatory fish (e.g. Sleeman et al. 2007) and even polar bears and cephalopods (Hooker and Gerber 2004)	Marine (pelagic)	Mainly vertebrates
	Particular taxonomic groups, such as decapods and fish (Cartes et al. 2010, Papiol et al. 2013)	Marine (benthic and epibenthic)	Vertebrates and invertebrates
	Particular taxonomic groups, such as crustaceans, amphibians and fish (e.g. Vilella et al. 2004)	Freshwater	Vertebrates and invertebrates
	Particular functional groups, such as higher/apex marine predators (McClellan et al. 2014, Hooker and Gerber 2004)	Marine (pelagic)	Mainly vertebrates

Note: With the exception of Estes et al. (2016) and Coleman and Crossley (2004), all definitions come from papers obtained during our literature review. The complete references are shown in Appendix S3.

Table S2. Definitions of megafauna found in the reviewed scientific literature, according to the studied ecosystem (terrestrial, marine and freshwater).

Definition	Based on citation by	Arguments	Reference
Terrestrial			
Land animals weighing more than 45 kg, along with a few smaller species, constituted the "megafauna"	(none)	no	Roberts et al. 2001
Large (>5 kg) mammals	(none)	no	Price and Webb 2007
We decided to restrict this analysis to five orders of (mostly) large bodied taxa (Artiodactyla, Carnivora, Primates, Perissodactyla and Proboscidea)	(none)	no	Louys et al. 2007
Megafaunal (>45 kg) carnivores and herbivores	(none)	no	Fox-Dobbs et al. 2008
Large mammals from distinct orders with body mass ≥1000 kg	(none)	no	Guimarães et al. 2008
Megafauna are defined here as extinct species with body mass estimates of >30 kg or attaining estimates of ≥30% greater body mass than their closest living relatives	(none)	no	Ayliffe et al. 2008
Megafauna (animals >40 kg)	(none)	no	Turney et al. 2008
Weighing at least 44 kg	(none)	no	Barnosky 2008
Body size limit of approximately 7 kg	(none)	no	Pushkina and Raia 2008
The weight definition of megafauna is a little heavier (50 kg) than Martin's (1984) >44 kg standard	(none)	no	Webb 2008
Medium- and large-bodied mammals (> 1 kg, termed here 'megafauna')	(none)	no	Louys and Meijaard 2010
Megafauna (defined as animals >44 kg)	Barnosky et al. 2004	no	Doughty et al. 2010
The concept of megafauna employed in this paper considers as belonging to this set, large animals over 44 kg	Martin and Klein 1984, Barnosky et al. 2004, Barnosky 2008	no	Ghilardi et al. 2011
Megafaunal species (terrestrial mammals weighing >44 kg)	Barnosky et al. 2004	no	Mann et al. 2013
The term megafauna refers to an arbitrary compilation of relatively large mammalian, reptilian, and avian taxa, ranging in size from ∼10 kg or less up to >2,000 kg	Horton 1984, Wroe et al. 2004a, b, Fry et al. 2009	no	Wroe et al. 2013b
Body masses >44 kg	Martin and Klein 1984, MacPhee 1999, Barnosky et al. 2004	no	Turvey et al. 2013
Megafauna (prey over 150 kg)	(none)	no	Bird et al. 2013
Large mammals (more than or equal to 10 kg)	(none)	no	Sandom et al. 2014
Large-bodied mammals (>44 kg)	(none)	no	Boulanger and Lyman 2014
Megamammals (over 1000 kg) and most large mammals (over 44 kg)	(none)	no	Prado et al. 2015
Megafauna genera (animals weighing >45 kg)	Barnosky et al. 2004	no	Mann et al. 2015
Megafaunal (>45 kg) mammals	(none)	no	Feranec et al. 2016
'Megafauna' (that is, species > 44 kg)	Koch and Barnosky 2006	no	Johnson et al. 2016a
Terrestrial megafaunal species (average body weight exceeding 44 kg)	Koch and Barnosky 2006	no	Villavicencio et al. 2016
Mammal megafauna (≥ 44 kg body mass)	Sandom et al. 2014	no	Doughty et al. 2016a
Megaherbivores (herbivores ≥ 1 ton in body weight)	Owen-Smith 2013	no	Doughty et al. 2016b
Large herbivores (≥45 kg in body weight) […] megaherbivores (≥1,000 kg)	(none)	no	Bakker et al. 2016
Megafauna (animals with more than 44 kg body weight)	Doughty et al. 2013, Wolf et al. 2013	no	Gross 2016
'Megafauna' genera (that is, large vertebrates with mature individuals >40 kg)	Koch and Barnosky 2006	no	Saltre et al. 2016
Terrestrial/marine			
We selected the largest species (>10 kg)	(none)	no	McClenachan et al. 2016
Terrestrial/freshwater			
Megafauna (>50 kg)	(none)	no	Webb 2009
Marine			

Megafauna (operationally defined as organisms readily visible in photographs)	(none)	yes	Grassle et al. 1975
Megafauna were operationally defined as any organism large enough to be identified in a photograph. Animals less than 2 cm in diameter were visible, but could not be identified	(none)	yes	Schneider et al. 1987
Operationally, megafauna may be defined as organisms large enough to be recognized in photographs (typically ≥1-2 cm)	Grassle et al. 1975, Rex 1981, Ohta 1983, Smith and Hamilton 1983	yes	Kaufmann et al. 1989
All organisms visible in each frame of film	(none)	yes	Arquit 1990
Megafauna were operationally defined as organisms large enough to be identified. Animals less than 20 mm in diameter were visible, but could not be identified	(none)	yes	Schneider and Haedrich 1991
Megafauna (i.e. cetaceans and other large organisms)	(none)	no	Viale and Frontier 1994
The community fraction encompassing the benthic organisms which are large enough to be seen in bottom images and/or to be caught by trawls	Gage and Tyler 1991	yes	Piepenburg and Schmid 1996
Megafauna, in this context, are large marine vertebrates that can be surveyed from the air	(none)	yes	Preen et al. 1997
Megafauna are animals […] large enough to be visible in photographs of the sea floor (> ca 1 cm)	Grassle et al. 1975, Rice et al. 1982, Smith and Hamilton 1983, Smith et al. 1993, Lauerman et al. 1996	yes	Kaufmann and Smith 1997
Megafauna (animals living on the sediment surface and large enough to be visible in photographs)	(none)	yes	Lauerman et al. 1997
Megafauna (> 1 cm)	(none)	no	Arango and Solano 1999
Megafauna are defined as animals visible in bottom photographs or 'trawl-caught' organisms more than 3 cm stretch-mesh	Rowe 1983 and refs. therein	yes	Rodrigues et al. 2001
The grouping of higher marine predators describes ocean megafauna, including a variety of taxa: cetaceans, pinnipeds, sea otters, polar bears, seabirds, sharks, cephalopods, and predatory fish	(none)	no	Hooker and Gerber 2004
Sensu Gage & Tyler 1991	Gage and Tyler 1991	no	Echeverria et al. 2005
The usefulness of photogram metric methods in deep-sea research has led to megafauna being defined as those organisms large enough (typically > 1 cm) to be identified in photographs	(none)	yes	Ruhl 2007
Visible megafauna	(none)	yes	Braby et al. 2007
Megafauna (whales, dolphins, sharks, turtles, manta rays, dugongs)	(none)	no	Sleeman et al. 2007
The megafauna's component (for this study, animals retained in the OTMS' codend: mesh size = 12 mm)	(none)	yes	Ramírez-Llodra et al. 2008
All discernible organisms	(none)	yes	Gonzalez-Mirelis et al. 2009
Megafauna, defined as large animals visible in bottom photographs or caught in trawl samples	(none)	yes	Gooday et al. 2009
>4 mm	(none)	no	Bluhm et al. 2009
Visible megafauna using a camera system	(none)	yes	MacDonald et al. 2010
Decapod crustaceans	(none)	no	Cartes et al. 2010
Megafauna, defined as individuals >10 mm	Collie et al. 1997	no	Ragnarsson and Burgos 2012
Megafauna (>1 cm)	(none)	no	Sonnewald and Türkay 2012
Megafauna includes those organisms over 1 cm that inhabit the sediment-water interface	Grassle et al. 1975	no	Gates and Jones 2012
Megafauna (fishes and decapods)	(none)	no	Papiol et al. 2013
(Megafauna), that are defined as those typically large enough to be viewed in photographs or caught with trawls	Gage and Tyler 1991	yes	Valentine and Benfield 2013
Megafauna, i.e. the group of organisms inhabiting the sediment-water interface and ≥1 cm	Grassle et al. 1975, Rex 1981	no	Beazley et al. 2013
Megafauna are defined as those organisms >1 cm which inhabit the sediment–water interface, or are arbitrarily	Bergmann et al. 2011	yes	Meyer et al. 2013

delineated as any organism which is visible with a camera			
Visible megafauna	(none)	yes	Rybakova et al. 2013
A selection of megafauna (*Lophelia pertusa*, *Madrepora oculata*, *Paragorgia arborea*, *Primnoa resedaeformis*, *Mycale lingua*, *Geodia baretti*, *Acesta excavata* and fish)	(none)	no	Purser et al. 2013a
Megafauna (organisms of >1 cm)	(none)	no	Würzberg et al. 2014
Seabirds, marine mammals, and sea turtles, collectively termed air-breathing marine megafauna	Baum et al. 2003, Rivalan et al. 2010, Crowder and Heppell 2011, Wallace et al. 2010	no	Lewison et al. 2014
Apex predators such as dolphins, whales, sharks, seals, seabirds and marine turtles, together known as marine megafauna	(none)	no	McClellan et al. 2014
Epibenthic megafauna (>1 cm)	(none)	no	Yesson et al. 2015
Megafaunal organisms were defined as those being larger than a few centimeters and were visible on the sediment surface	(none)	yes	Kita et al. 2015
Deep-sea epibenthic megafauna are animals (usually >1 cm) that occupy the surface layer of seabed sediment and are visible in photographs	Grassle et al. 1975, Smith et al. 1993	yes	Dunlop et al. 2015
The marine megafauna we focus on in this study include small cetaceans (dolphins and porpoises), dugongs, and turtles	(none)	no	Teh et al. 2015
Freshwater			
Megafauna (crustaceans, amphibians and fish)	(none)	no	Vilella et al. 2004

Note: Only articles with the term "megafauna" in the title were considered for this purpose. The complete references are shown in Appendix S3.

Table S3. List of species included in the questionnaires, according to their taxonomic group.

Group	Species	Group	Species	Group	Species	Group	Species
Mammals	*Acerodon jubatus*	Reptiles	*Blanus cinereus*	Fishes	*Acipenser sturio*	Marine invertebrates	*Aplysia fasciata*
	Alces alces		*Chamaeleo jacksonii*		*Amphiprion ocellaris*		*Architeuthis dux*
	Physeter macrocephalus		*Chelonoidis hoodensis*		*Cetoscarus bicolor*		*Cestum veneris*
	Delphinus capensis		*Crocodylus niloticus*		*Pterois antennata*		*Eurythenes gryllus*
	Homo sapiens		*Dermochelys coriacea*		*Hippocampus histrix*		*Gorgonia flabellum*
	Hydrochoerus hydrochaeris		*Eunectes murinus*		*Manta birostris*		*Physalia physalis*
	Loxodonta africana		*Hydrophis belcheri*		*Mola mola*		*Homarus gammarus*
	Odobenus rosmarus		*Iguana delicatissima*		*Neoceratodus forsteri*		*Macrocheira kaempferi*
	Ornithorhynchus anatinus		*Naja naja*		*Oncorhynchus nerka*		*Octopus vulgaris*
	Orycteropus afer		*Tarentola mauritanica*		*Silurus glanis*		*Ophidiaster ophidianus*
	Panthera tigris		*Testudo graeca*		*Petromyzon marinus*		*Rhizostoma pulmo*
	Pongo pygmaeus		*Trachemys scripta*		*Rhincodon typus*		*Riftia pachyptila*
	Procyon lotor		*Varanus albigularis*		*Salmo trutta*		*Salpa maxima*
	Suncus etruscus		*Varanus komodoensis*		*Sphyrna mokarran*		*Tridacna gigas*
	Trichechus inunguis		*Crotalus mitchellii*		*Xiphias gladius*		*Xestospongia muta*
Birds	*Anodorhynchus hyacinthinus*	Amphibians	*Agalychnis callidryas*	Terrestrial invertebrates	*Achatina fulica*	Freshwater invertebrates	*Anax imperator*
	Anser anser		*Amphiuma means*		*Actias isabellae*		*Austropotamobius pallipes*
	Aptenodytes forsteri		*Andrias japonicus*		*Aedes albopictus*		*Daphnia magna*
	Aquila chrysaetos		*Bufo bufo*		*Attacus atlas*		*Ditiscus marginalis*
	Campephilus melanoleucos		*Caecilia thompsoni*		*Vespa vetulina*		*Argyroneta aquatica*
	Ciconia ciconia		*Megophrys nasuta*		*Iberus gualterianus*		*Dugesia tigrina*
	Diomedea exulans		*Phyllobates terribilis*		*Lucanus cervus*		*Ephemera danica*
	Gymnogyps californianus		*Pipa pipa*		*Mantis religiosa*		*Hirudo medicinalis*
	Falco peregrinus		*Proteus anguinus*		*Morpho peleides*		*Hydra viridis*
	Heliomaster longirostris		*Pyxicephalus adspersus*		*Pandinus imperator*		*Lethocerus indicus*
	Larus canus		*Rhacophorus nigropalmatus*		*Phobaeticus serratipes*		*Leuctra bidula*
	Otis tarda		*Salamandra salamandra*		*Mastotermes darwiniensis*		*Nepa cinerea*
	Pelecanus conspicillatus		*Scaphiophryne gottlebei*		*Scolopendra cingulata*		*Pomacea canaliculata*
	Struthio camelus		*Siphonops annulatus*		*Brachypelma smithi*		*Potamon fluviatile*
	Tyto alba		*Triturus marmoratus*		*Scarabaeus sacer*		*Unio tumidiformis*

Table S4. Description of the characteristics of the species included in the questionnaires.

Variable	Label	Type	Levels	Details
Taxonomy (coarse)	Taxonomy	Binary	vertebrates, invertebrates	
Taxonomy (group)	Group	Categorical	mammals, birds, reptiles, amphibians, fishes, terrestrial invertebrates, marine invertebrates, freshwater invertebrates	
Ecosystem	System	Categorical	terrestrial, marine, freshwater, mixed	
Ecological function	Eco_function	Categorical	predation, scavenging, parasitism, herbivory, pollination, seed dispersal, other, mixed	for adults
Diet	Diet	Categorical	carnivorous, herbivorous, omnivorous	main diet of adults
Body mass	Body_mass	Numeric	$0.50 – 4.25 \times 10^{7}$	mean adult – female for dimorphic species – weight, in g (decimal log transformed). When this information was unavailable, weight was estimated according to orders of magnitude
Relative body mass	Rel_body_mass	Numeric	$6.27 \times 10^{-7} – 13.54$	species body mass, in g / mean group body mass, in g ratio (decimal log transformed)
Reproductive system	Reprod_system	Categorical	viviparous, oviparous, ovoviviparous, asexual, other, mixed	
Offspring	Offspring	Binary	altricial, precocial	
Lifespan	Lifespan	Numeric	0.1 – 2,300	maximum species lifespan in the wild, in years (log-transformed). When this information was unavailable, lifespan was obtained from captive individuals or from similar species
Color	Color	Binary	contrasted-colorful, cryptic	adult body color pattern
Activity	Activity	Categorical	diurnal, nocturnal, both	main daily activity of adults
Social system	Social_system	Categorical	eusocial/colonial, congregatory, other, mixed	for adults
Locomotion	Locomotion	Categorical	aquatic, terrestrial, aerial, passive, sessile, mixed	for adults
Island dwelling	Island	Binary	yes, no	main distribution restricted to islands
Migratory	Migratory	Binary	yes, no	capacity to perform long-distance migrations
Invasive	Invasive	Binary	yes, no	
IUCN status	IUCN	Ordinal	IUCN Red List Category: NE/DD (Not Evaluated/Data Deficient), LC (Least Concern), NT (Near Threatened), VU (Vulnerable), EN (Endangered), CR (Critically Endangered)	
Popularity	Popularity	Ordinal	lower, higher	according to searching interest in Google Trends of *Diceros bicornis* in 2016

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Table S5. Description of the variables used to characterize the respondents to the questionnaire.

Variable	Label	Type	Levels
Age	Age	Numeric	21-74
Gender	Gender	Binary	female, male
Experience as a researcher	Experience	Ordinal	pre-researcher (i.e. University students that aim to start a scientific career), PhD student, post-doc researcher, senior researcher
Megafauna workshop attendant	Workshop	Binary	yes, no
Expertise on plants	Plant	Binary	yes, no
Expertise on mammals	Mammal	Binary	yes, no
Expertise on birds	Bird	Binary	yes, no
Expertise on reptiles	Reptile	Binary	yes, no
Expertise on amphibians	Amphibian	Binary	yes, no
Expertise on fish	Fish	Binary	yes, no
Expertise on invertebrates	Invertebrate	Binary	yes, no
Number of taxonomic groups of expertise	Tax_expertise	Ordinal	0-6
Ecosystem of expertise	System	Categorical	terrestrial, marine, freshwater, mixed
Period of expertise	Period	Categorical	prehistorical, historical, both

Table S6. Results of the GLM relating respondents' age, expertise on mammals and ecosystem of expertise with the criteria used by respondents to classify species as megafauna. Variable (Age, Expertise on mammals, Ecosystem of expertise) significance, goodness of fit (R^2) and sample size (n) are shown. Significant results ($\alpha<0.05$) are given in bold.

Criteria	**Age**	**Expertise on mammals**	**Ecosystem of expertise**	R^2	n
Body mass	0.773	0.522	0.228	0.09	86
Taxonomy	0.888	**0.018**	0.636	0.05	86
Ecological function	0.204	0.346	0.328	0.04	86
Ecological context	0.344	0.968	0.056	0.07	85
Traits	0.134	0.895	0.442	0.06	86
Risk	**0.011**	**0.024**	**0.034**	0.27	86

Fig. S1. Number of articles on megafauna published per year, according to ecosystem (t: terrestrial, f: freshwater, m: marine), period (p: prehistorical, h: historical) and clusters defined by the semantic network analysis (1: terrestrial megafauna, 2: marine ecology of benthic and epibenthic megafauna, 3: biodiversity conservation of marine air-breathing large vertebrates and other large pelagic species; see main text and Fig. S2). Only articles with the term "megafauna" in the title were considered.

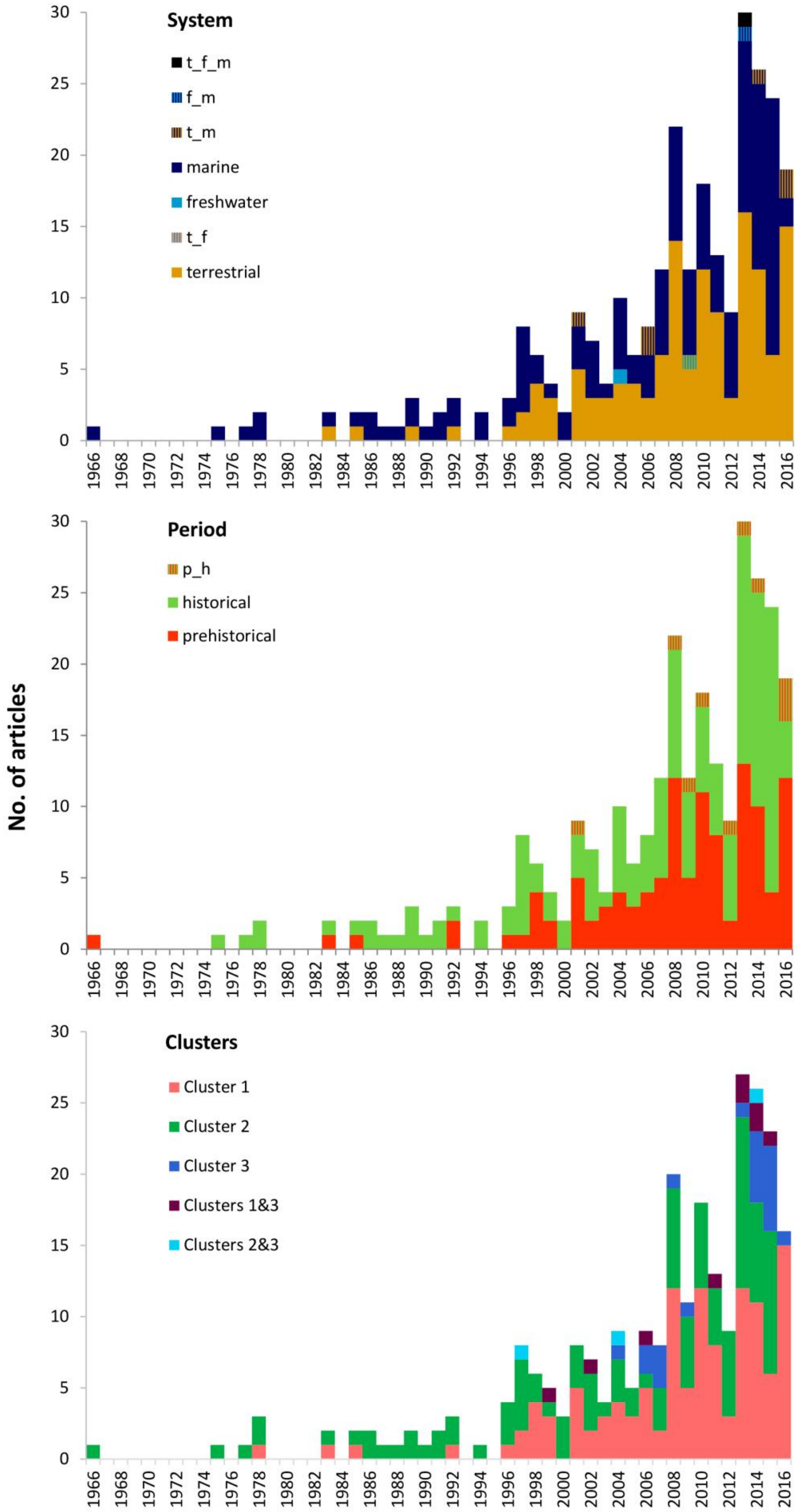

Fig. S2. The semantic network of the most relevant terms extracted from the megafauna literature. This semantic network indicates three clusters: terrestrial megafauna (red cluster), marine ecology of benthic and epibenthic megafauna (green cluster), and biodiversity conservation of marine air-breathing large vertebrates and other large pelagic species (blue cluster). Node size denotes the relative frequency with which the labeled term occurs in the title and abstract of the surveyed publications.

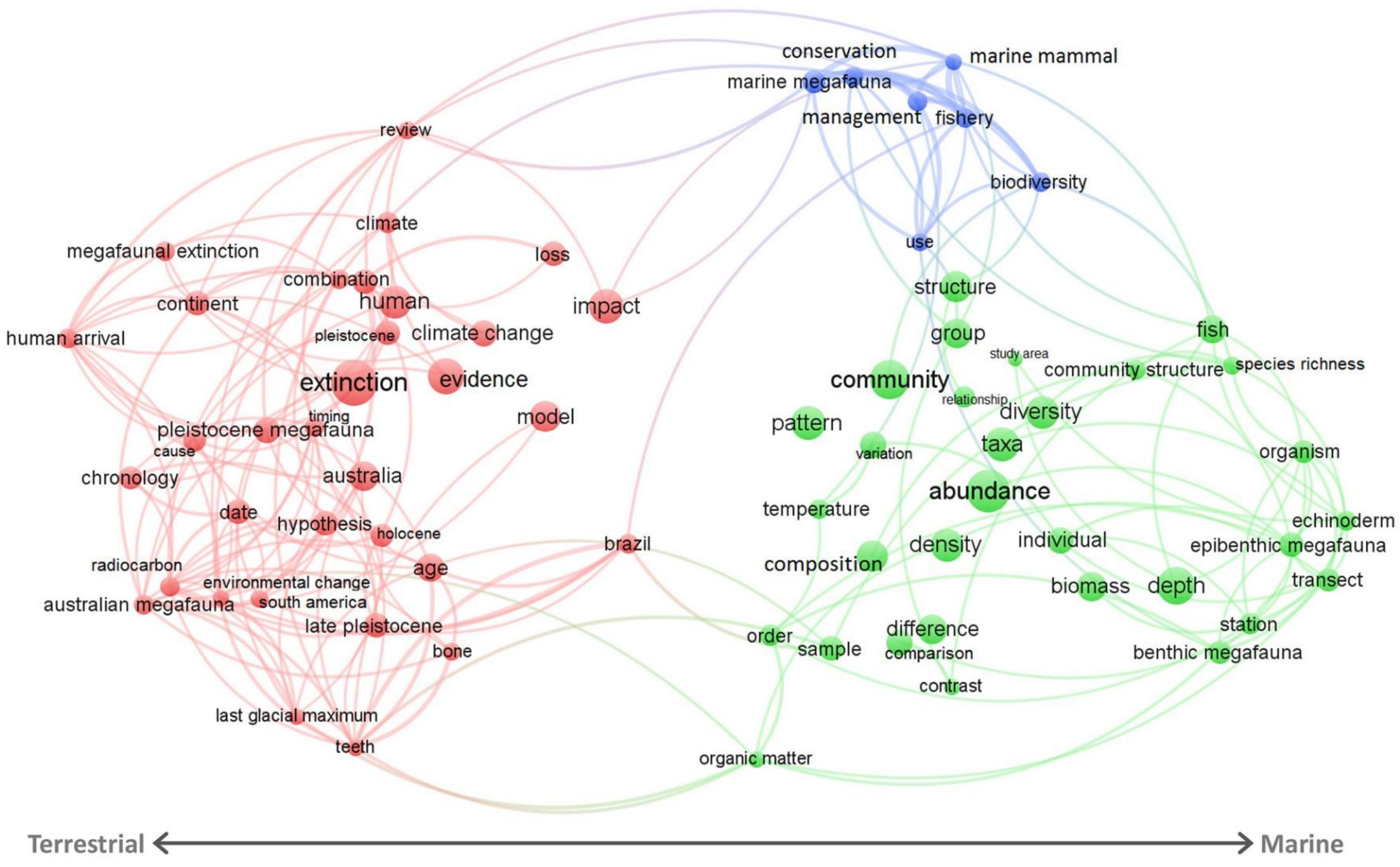

Fig. S3. Results of Boosted Regression Trees (BRTs) showing the relative importance of species traits (a) and respondents' characteristics (b) to predict the probability of a species to be classified as megafauna. See the variable full names in Tables S5 and S6.

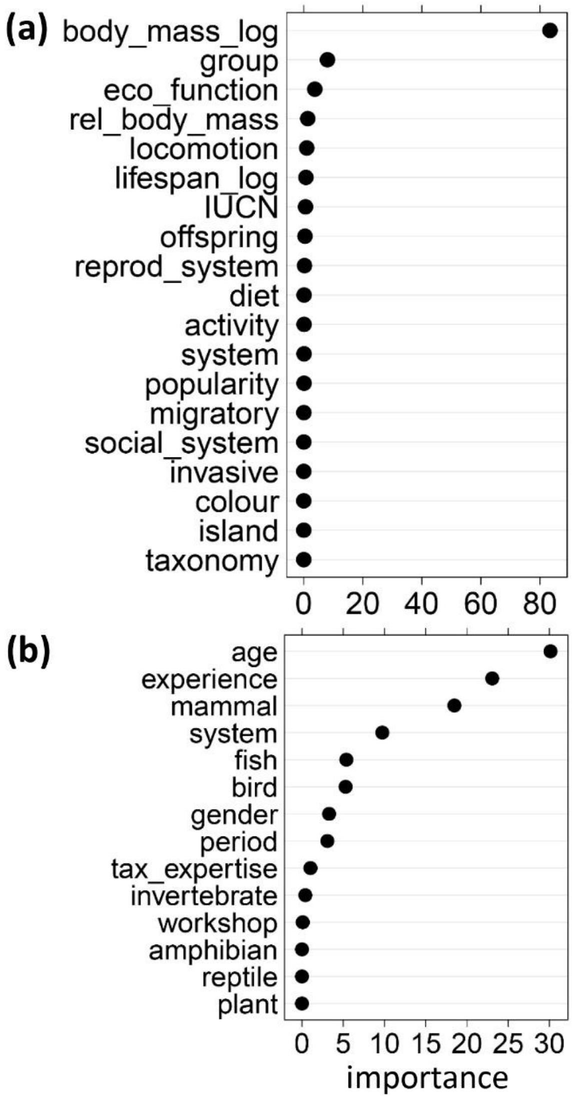

Fig. S4. Relationships between the respondents' characteristics and the number of species they classified as megafauna (range: 0-120). Non: pre-researcher (i.e. University students that aim to start a scientific career); Pre: predoctoral researcher; Post: postdoctoral researcher; Sen: senior researcher. Ecosystem labels are T: terrestrial; F: freshwater; M: marine; Mixed. Period labels are: Pre: prehistorical, His: historical; Both. Variable full names in Table S6.

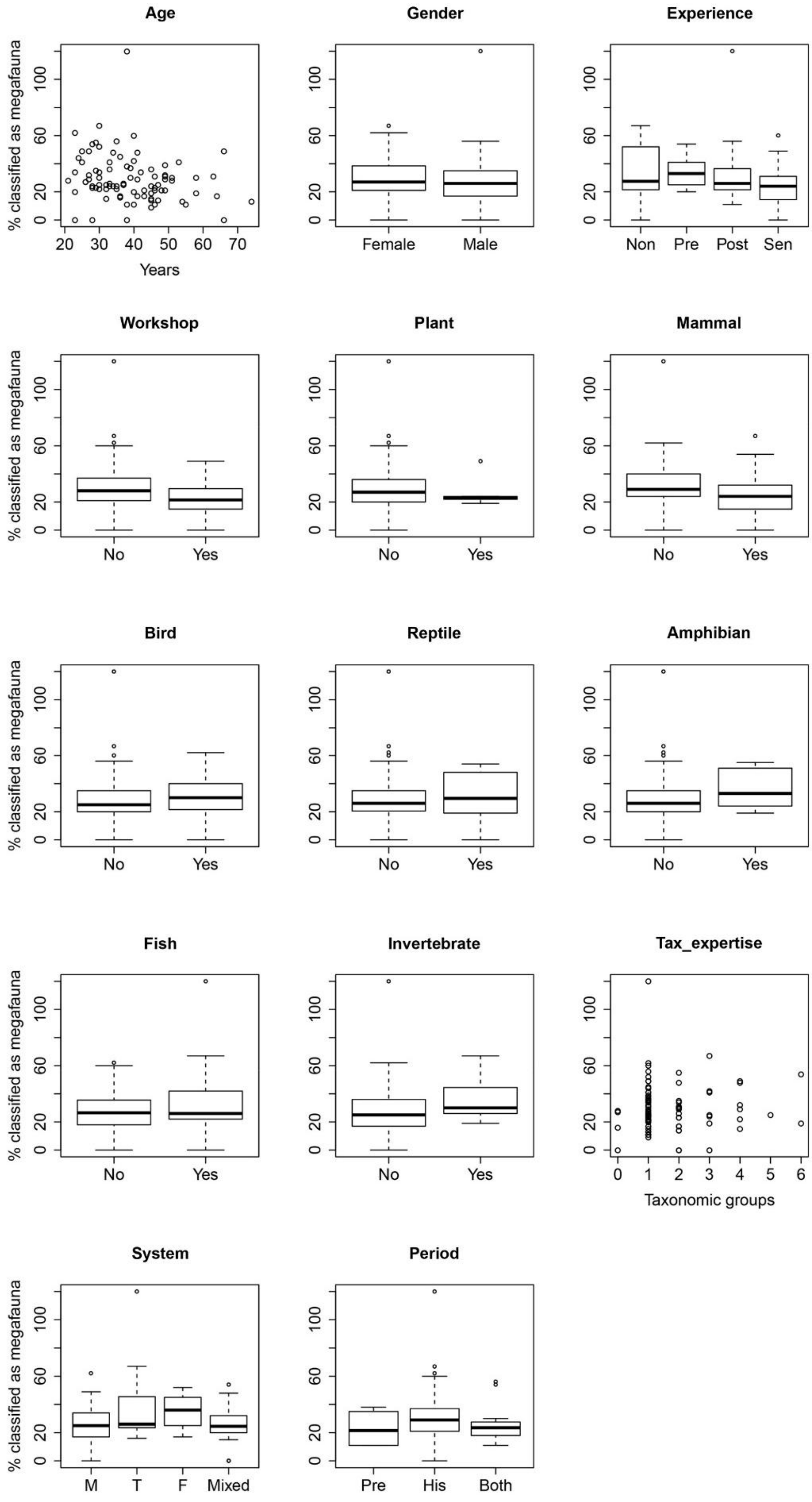

Fig. S5. Respondents' preferences regarding the criteria to define megafauna. Panels show the proportion of respondents that selected each criteria (black: criterion selected in combination with other criteria; grey: criterion selected alone). See Appendix S2 for a definition of the different criteria.

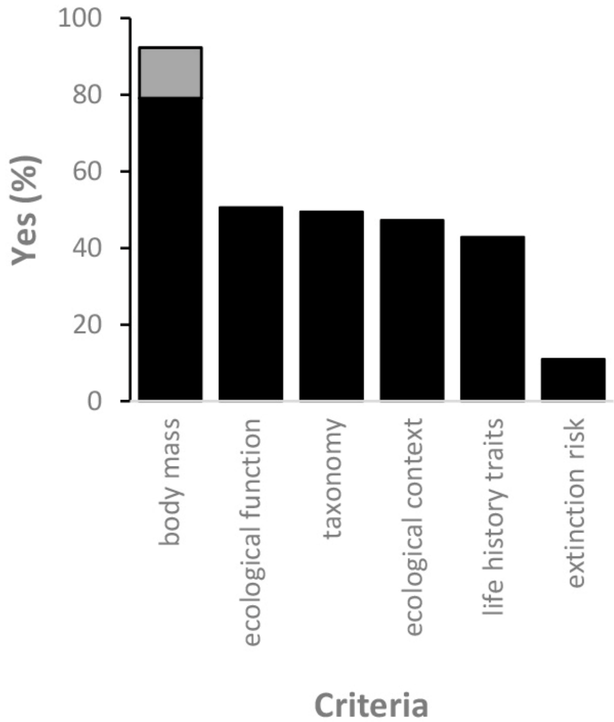

Fig. S6. Relationship between respondents' expertise on mammals and their propensity to consider taxonomy as a criterion to be taken into account when defining megafauna.

Fig. S7. Relationship between respondents' age, expertise on mammals and ecosystem of expertise and their propensity to consider extinction risk as a criterion to be taken into account when defining megafauna. M: marine; T: terrestrial; FW: freshwater. Fitted values are shown in a red solid line.