



**EUROGROUP
FOR ANIMALS**



**EXOTIC PET TRADE: ANALYSIS OF THE
PROBLEMS AND IDENTIFICATION OF
SOLUTIONS**



TABLE OF CONTENTS

1. INTRODUCTION	3
2. PROBLEMS RELATED TO THE KEEPING AND SALE OF EXOTIC PETS	3
2.1 Animal Health and Welfare	4
2.2 Species and habitat conservation	5
2.3 Public health and safety	7
2.4 Invasive threats	7
2.5 Health of other animals	8
2.6 Costs of the exotic pet trade	9
3. RECOMMENDATIONS FOR A BETTER REGULATION	10
3.1 Why a positive list and not a negative one.....	11
3.2 The Positive List and the European Court of Justice	11
3.3. Success stories	12
3.3.1 Belgium.....	13
3.3.2 The Netherlands	14
4. CONCLUSIONS	15
5. REFERENCES	15

1. INTRODUCTION

In recent years, there has been a growing trend in the keeping of non-domesticated, exotic pets (DG SANCO, 2010). This is a notable shift from the more traditional, domesticated pet animals such as cats and dogs, toward species such as reptiles, amphibians, invertebrates as well as non-domestic birds, fish and mammals. The origin of these animals may be uncertain, with some captured from the wild. The lack of proper regulations on their sale and keeping coupled with insufficient knowledge of some private keepers can undermine the welfare of the animal and pose a threat to human and animal health and biodiversity.

The present report aims at summarizing and explaining the problems related to the keeping and trade of exotic pets, presenting arguments stated in peer reviewed articles and published reports. This report also demonstrates that, while there are several ways to regulate the keeping and sale of exotic pets, a Positive List (a list of allowed species) is the most effective, concise, transparent, precautionary, enforceable and economically feasible way to reduce the suffering of exotic animals and the risks for the environment and the human and animal health.

2. PROBLEMS RELATED TO THE KEEPING AND SALE OF EXOTIC PETS

The keeping and trade of exotic animals as pets raise concerns over animal welfare, human and animal health, conservation and the risk of introduction of invasive alien species.

Species such as dogs and cats have been bred and domesticated for centuries and are widely kept as pets. These species may be well suited to life as a pet, especially if they have been bred and raised appropriately for this lifestyle. Also, there is more scientific knowledge available on the husbandry of such species to safeguard their welfare. Over the twentieth century new species, primarily used as laboratory or production animals, such as guinea pigs, rats, gerbils and chinchillas, became popular pets. Today, the keeping of reptiles, amphibians, and invertebrates as well as non-domesticated species of mammals, birds and fish appears to be gaining popularity (Praud and Moutou, 2010). This growing trend warrants further consideration.

2.1 Animal Health and Welfare

Exotic animals have complex needs that are closely tied to their natural diet, environment and behaviour in the wild; these needs are not always known (Praud and Moutou, 2010). Exotic pets are often animals that come from other climate zones and have special requirements for environmental factors such as humidity, temperature, ultraviolet light and soil (van Leeuwen et al, 2010, Fischer et al, 2015). Complex social structures, the need for movement, day-night rhythm, seasonal rhythms, life expectancy and growth have to be taken into account as well. However, it can be difficult, if not impossible in some cases, for the average owner to provide for these needs (Warwick et al., 2014; Whitehead and Vaughn-Jones, 2015). Consequently, animals are suffering as a result of poor husbandry, for instance inadequate nutrition and inappropriate or lack of medical care. In addition, wild animals living in captivity endure insufferable boredom and psychological deprivation, as they are denied the companionship of their own species and access to their natural environments (Kennedy, 2002).

Even when scientific information on the species' needs is available, there can be a lack of knowledge of these requirements by the keepers, thus affecting the welfare and health of the animal. Consequently, concern is increasingly being expressed by both public and animal welfare organisations regarding the mis-selling of wild species as "easy to keep" when in fact the level of care required to fulfill even basic biological needs is frequently considerable (Laidlaw, 2005, Altherr, & Freyer, 2001, Warwick, et al 2014; Warwick, 2014).

Primates are for instance highly intelligent, long-lived animals who form intricate social relationships with each other and experience emotions, and suffer, in a similar way to humans (Jennings and Prescott, 2009). Despite this, when it comes to primates kept as pets there is a surprising lack of regulation in several EU countries, including the UK. Meeting the complex physical and behavioural needs of these wild animals in captivity is incredibly difficult and even modern zoos and research facilities, with all their resources and expertise, are still trying to overcome serious welfare problems (Baxter et al, 2003; Pomerantz et al, 2013).

Primates that have been kept as pets commonly exhibit many abnormal behaviors. Every single pet primate rehomed by the Monkey Sanctuary in Cornwall arrives with behavioral problems (RSPCA & Wild Futures, 2012). These included abnormal repetitive behaviors like pacing back and forth and head-twisting, as well as teeth grinding, self-biting, obsessive grooming, self-grasping, rocking and overeating. For all the above mentioned reasons, caring for primates properly in a household environment is simply not feasible (RSPCA, 2016).

According to Schuppli and Fraser (Schuppli and Fraser, 2000) the welfare and health of many exotic species cannot be guaranteed when they are kept in captivity as it might be difficult to provide for the "Five Freedoms" defined by the Farm Animal Welfare Council (1992):

1. Freedom from hunger, thirst and malnutrition: to be satisfied, it requires adequate knowledge of the species and its needs and availability of often specialised food to the owner.
2. Freedom from disease and injury: it requires adequate veterinary knowledge and availability of, as well as access to, veterinarians with such expertise.
3. Freedom from physical and thermal discomfort: it requires knowledge of the way in which a species lives in the wild and how this can be effectively translated into a captive setting.

4. Freedom from fear, distress and other negative psychological states: it requires the ability to recognise positive, neutral and negative psychological states in the animal, as well as an ability to act to counter negative and neutral states.
5. Freedom to carry out most normal forms of behaviour: it requires insight on their natural behavior in the wild and how this can be provided for in a captive environment (e.g. social groups, substrate for digging, etc.).



Fig. 1 Barbary macaque (*Macaca sylvanus*)

It is then clear that a comprehensive knowledge of the species and of their specialized housing requirements and environmental/ethological needs are unlikely to be held by the average keeper; this combined with the constraints of a household setting, makes extremely difficult to meet the Five Freedoms for many of the species of exotic pets.

When animals are wild- caught, their welfare is severely affected also by the stress of the capture and of the transport to their final destination.

2.2 Species and habitat conservation

Although the focus is shifting towards captive-bred animals, founder stocks (e.g. parents) are still collected in the wild and wild animals may still be captured to diversify the gene pool or introduce desired characteristics (Smith et al, 2009).

The capture of animals in the wild for the exotic pet trade can contribute to the decline in wild populations and threaten biodiversity (Bush et al, 2014 and Bohm et al, 2013). Crude and non-species-specific methods may be used to catch wild animals, which can damage the ecosystem and result in injuries or death for both target and non-target animals. It has been estimated that for every chimpanzee kept as a pet or in a zoo, another 10 animals died for capture or trade conditions (Stiles et al, 2013). The harvesting of wild animals can deplete native populations up to 70% (EcoHealth Alliance, 2011).

There is currently no available, up-to-date information on the trade in wild pets in the EU, which makes it difficult to evaluate the exact source of all animals and thus the impacts of their removal from the wild. However, there is evidence that shows that permitting systems are being used to facilitate illegal trade and to "launder" illegally-traded animals into the system (ENDCAP, 2012).

The collection of individuals from the wild to supply the wild pet trade has been cited as a major factor in the population decline of a number of reptile species. For example, over-collection of Greek or spur-thighed tortoises (*Testudo graeca*) has contributed to serious depletions of populations in North Africa (Van Dijk et al., 2004). Over-collection for international trade was also cited in the proposal to list the North American spotted turtle (*Clemmys guttata*) on CITES Appendices in 2000 (Secretariat of the Convention on Biological Diversity, 2010; Toland et al., 2012).

From 2002 to 2006, almost 1,000 critically endangered Egyptian tortoises were illegally-trafficked, and seized, in the EU - which represent around 13% of the species' entire wild population (Crossland, 2007).

As few as approximately 7,000 Barbary macaques (*Macaca sylvanus*) are thought to remain in the wild: a reduction of some 80% over the past three decades, driven largely by demand for the European pet trade (AAP, 2010; Moroccan Primate Conservation Foundation, 2010).

The existing markets for legal trade in wild species in regions such as the EU and the USA are thought to drive a parallel illegal trade (Cook et al., 2002), and the current level of exploitation for the wild pet trade continues to propel species such as the Barbary macaque towards extinction (AAP, 2010; Redmond, 2005).

2.3 Public health and safety

Exotic species can pose a potential health and safety risk for their keepers, other captive animals and native wildlife (Praud and Moutou, 2010).

Exotic animals can be carriers of diseases such as rabies, monkey pox and salmonella.

The worldwide movement of animals has increased the potential for the translocation of zoonotic diseases, which pose serious risks to human health (Marano et al, 2007). In fact, introducing so many animals into a new and unnatural environment—our homes—after removing them from the ecosystems in which they evolved represents a disruption of substantial magnitude. This displacement brings these animals into close proximity with species they have not previously encountered, and the public health consequences may be startling. A famous example is the outbreak in the United States of monkeypox in humans, a result of human's close contact with prairie dogs sold as pets.

Some zoonoses exist in Europe and are well-studied; others are exclusively exotic and poorly understood (Praud and Moutou, 2010). In the UK there are approximately 6,000 cases of reptile related Salmonella infections annually (Toland et al, 2012) and around 27 % of all hospitalised Salmonella infection cases among children under five in the UK are from reptile pets (Murphy and Oshin, 2015).

Rodents are the most widespread New Companion Animal in Europe and also represent the group of mammals with the highest number of species (more than 2,000). The most frequent zoonotic risks linked to rodents are benign skin infections. In more rare cases, wild rodents can transmit severe diseases such as the plague (Ruiz, 2001).

Even though the import of primates is prohibited, except under very strict conditions, primates from illegal sources are regularly introduced into Europe. Due to their phylogenetic proximity to humans, primates in particular presents high health risks. These zoonoses include rabies, Monkey B virus, tuberculosis, digestive bacteria and various parasites (Praud and Moutou, 2010).

Certain exotic species, such as venomous snakes, primates and large cats can pose a serious safety risk to humans also from their predatory, aggressive or poisonous nature.



Fig.2 Monkeypox

2.4 Invasive threats

As exotic animals have complex needs, when owners are no longer able or willing to care for their pets, they may release them into the wild, or the animals can escape (Genovesi et al, 2012, Genovesi et al, 2015). Released or escaped animals may present a threat to native wildlife and the local ecosystem (e.g. predation, hybridisation, competition, etc.). While not all non-native species introduced to a new area may become invasive, those that do establish can have significant impacts on endangered native species and human livelihood. Analyses of species invasions in Europe document a dramatic increase in invasions since the start of the twentieth century which is still on-going. The pet trade has been recognized to be one of the main pathways of this invasion by the Bern Convention and by the Convention on Biological Diversity (CBD).

Some invasive alien species may completely replace native ones, as in the case of the red squirrel (*Sciurus vulgaris*) in areas of expansion of the American grey Squirrel (*Sciurus carolinensis*; Bertolino et al., 2014).

The invasion of the protected habitat of the Ebro Delta in Cataluña, Spain, by the apple snail (*Pomacea insularum*), is another example of a pet trade-caused invasion. Introduced through the drains from a wholesaler of exotic pets, the snail has caused millions of Euros worth of damage to rice crops in Spain (Barcelona Field Studies Centre, 2010).

The invasive potential of a species in a particular country is not always known, as the behavior of a species may vary according to different environmental and ecological conditions (Faraone et al, 2008). Invasive species can have a number of negative impacts on the areas that they invade. Some invaders can physically alter the habitat in addition to destruction (Worth, 2004), like the Coypu (*Myocastor coypus*). Other invasive species may not destroy habitat but can have an impact by killing large numbers of endemic species (Dorcas et al, 2012). Burmese pythons, for example, are top predators in the Everglades. As such, they have decimated local mammal and bird populations. There is also the risk for native species to be outcompeted for resources by invasive species (Genovesi et al, 2015). For example, Asian carp were introduced into the US and outcompeted native fish for food and space which lead to declines in the native fish populations (National Wildlife Federation, U.S).



Fig.3 Grey squirrel (*Sciurus carolinensis*)

2.5 Health of other animals

The exotic pet trade may have a serious negative impact also through the spreading of diseases to other animal species (Farrer et al, 2011). Most of the pathogenic agents causing zoonoses can be transmitted to other animals too. For example, this is the case with rabies (primates, carnivores and chiroptera), tuberculosis (all mammals and reptiles), leptospirosis (rodents), Q-fever (reptiles and primates) and brucellosis (all mammals).

There are many documented cases of exotic pets spreading diseases to other animals. The spread of the amphibian pathogen *Batrachochytrium salamandrivorans* (B.sal) is a timely example. *Bsal*, which is native to Asia, is thought to have been introduced to Europe by amphibians imported for the exotic pet trade. The disease has recently brought fire salamander populations in the Netherlands to the brink of extinction, causing up to 96% declines and is feared likely to have a devastating effect on amphibian biodiversity elsewhere in Europe (Stokstad, 2014; Fischer et al, 2007).

Turtles are susceptible to host the pathogenic agent that is transmitted by ticks, causing cowdriosis, a major fatal disease in bovines. The U.S has banned all imports of African tortoises for this reason, in order to protect cattle from the disease (Moutou 2004).

2.6 Costs of the exotic pet trade

Data regarding economic costs to EU governments related to environmental impacts, outbreaks of animal and human diseases or injuries resulting from the international trade in wild animals have not been collated, but are estimated to cost the global economy billions of dollars (Secretariat of the Convention on Biological Diversity, 2010).

The establishment of invasive alien species (IAS), many of which originate from the wild pet trade, can result in devastating economic costs to agriculture and natural resource industries (Pimentel et al, 2005, Shine et al, 2009; Williams et al, 2010). Once invasive alien species become established, control or eradication programmes are difficult, expensive, and often incite public opposition (Shine et al., 2009; Secretariat of the Convention on Biological Diversity, 2010). The European Commission estimates the cost of controls and damage from IAS in the European Union at approximately 12 billion Euros per year, although this figure may actually represent only 10% of real cost (Vila et al, 2010; European Commission, COM (2013)620).

The estimated costs to the healthcare profession of treating an injury or infection caused by wild pets has not been quantified, although examples may range from €250 per consultation to €2,500 per day hospitalization (ENDCAP, 2012). In the UK alone it is estimated that there may be around 5,600 cases of reptile-related salmonellosis (RRS) annually (Toland et al, 2012). RRS is one of approximately 70 diseases that may be or can be attributable to wild pets (Warwick et al, 2012).

As owners of exotic pets are not appropriately informed and prepared to deal with factors such as the life span, adult size, social needs, cost of care and veterinary treatments and requirements for appropriate social and physical environment of their pets, these are often abandoned or delivered to rescue centres. In addition, rescue centres regularly receive illegally traded animals confiscated by the competent authorities. The direct consequence of absent or inadequate laws and regulation is a

situation in which the demand for rescue is significantly higher than the actual capacity of rescue facilities, both in terms of available space and funds. AAP Animal Advocacy and Protection estimates at € 10,000 the average cost per year of rescuing a raccoon (*Procyon lotor*), € 6,000 for a Degu (*Octodon degus*), and € 22,000 for a Chimp (*Pan Troglodytes*) (AAP personal communication).



Fig.4 AAP Animal Advocacy and Protection Rescue Centre

3. RECOMMENDATIONS FOR A BETTER REGULATION

Within the European Union the competence to legislate on the subject of exotic pets belongs to the Member States. According to the Eurogroup for Animals' analysis of national legislation related to the keeping and sale of exotic pets in Europe, where such legislation exists, it is very diverse (Eurogroup for Animals, 2013). Legal provisions may ban the keeping of some species of animals (negative or black lists), or allow only some species to be kept (positive or white lists). Keeping may also require authorization in the form of a license.

While so different ways to regulate the keeping and trade of exotic pets exist, a Positive List is the most effective, concise, transparent, enforceable and economically feasible way. The following chapters explain how this regulation works and why it is preferable to other kind of legislation.

3.1 Why a positive list and not a negative one

Firstly, a positive list is preferable to a negative one due to its simplicity: a concise list of animals that may be kept provides clarity to owners and enforcement agencies and creates less regulatory bureaucracy for governments (Eurogroup for Animals, 2010). This reduces administrative costs and lowers the judicial backlog currently generated by deciding matters of animal welfare when there is an appeal by the pet owners.

Additionally, negative lists need to be continually updated in a slow and burdensome process as new species are observed being kept as pets, the conservation status of a species becomes critical or incidents occur with species threatening human and animal health and the environment. For these reasons, negative lists will always lag behind new trends in exotic pet keeping and shifts in the trade, and create a false sense of acceptability regarding the safety and welfare of keeping certain species. The positive list is a preventive model at its core: it is meant to avoid the problems mentioned above and related to the exotic pet trade.

The positive list approach has already received support from the European Court of Justice (see below section 3.2) and also from the Federation of Veterinarians of Europe, (FVE/013/pos/006). The FVE's published statement mentions that *"FVE calls for competent authorities to work on the establishment of lists of animals, based on a thorough assessment, according to certain scientific criteria, of the risks for the animal itself, its owners and the society, the indigenous species and ecosystems. Animals shall be approved for keeping by private individuals on the basis of their listing"*.

Finally, the adoption of a positive list system doesn't imply an increased need for rescue centres: as with many cases of new legislation, also the positive list regulation might include transitional measures for owners of species not included on the list. This means that a higher influx of animals being brought to rescue centres immediately after adoption of the legislation can easily be avoided. For instance, the Belgian and the Dutch Positive List Regulations state that an animal which has been kept already or was in gestation at the moment when the Positive List came into force, can be kept and it can change owners (including commercially) until the moment of his natural death, as long as it is not allowed to breed. According to the Dutch Positive List, the animals must be identified and registered with the relevant authority, in order to ensure for a feasible and cost-effective enforcement.



Fig.5 Raccoon (*Procyon lotor*)

3.2 The Positive List and the European Court of Justice

When a Positive List for mammals has been introduced in Belgium by Royal Decree in 2001, this unprecedented legislative move caused a stir in national and international circles, and the regulation was challenged in court as hindering trade between EU Member States.

In the Ruling from the European Court of Justice of 19 June 2008 (Andibel Ruling), the Court stated that the Belgian Positive List was not in violation of EU free trade regulations and identified the conditions under which a positive system may be introduced. Objective scientific information must be used for the assessment of a species, the criteria used must be objective and non-discriminatory, and the list with designated species can be modified by applications from organizations or private parties.

The Court recalled that the protection of animal welfare is a legitimate goal of general importance. Prohibitions or limitations which are justified, among other reasons, for the protection of the health of humans or animals may be set, on the condition that these prohibitions or limitations are not used as a means of arbitrary discrimination or as a covert limitation of trade between member states. Limitations to the free trade of goods can be justified by compelling demands such as the protection of the environment or animal welfare. The production of a positive list and any (later) changes to it must be based on objective criteria and must not be discriminatory. The procedure must be simple enough to allow interested parties to be able to get new mammal species added to the national list of designated species and any ruling for the designation or non-designation of an animal to the list can be justifiably contested.

According to the Court, a request for placement of a species on the list of mammals that may be kept can only be rejected based on extensive research of the interests and demands listed in the ruling, such research being based on the most trustworthy scientific information available and the most recent results of international research.

3.3. Success stories

Belgium and the Netherlands have been the first two EU countries that adopted a positive list system to regulate the sale and keeping of exotic pets. However, across Europe and beyond there is a growing interest for the positive list as the ideal legislation to regulate the sale and keeping of animals as pets.

Currently, both the Belgian and the Dutch Positive Lists address only mammals. This is due to the following reasons:

- There is more knowledge available, worldwide, on mammals;
- Trade of mammals counts fewer species;
- The public is in general more receptive to animal matters when it concerns mammals.

3.3.1 Belgium

A Positive List for mammals had been under discussion in Belgium since 1989 and was introduced by Royal Decree in 2001. As mentioned above, the regulation was then challenged in court as hindering trade between EU Member States.

However, in June 2008 the European Court of Justice ruled that the Belgian Positive List was not in violation of EU free trade regulations, as long as it was based on objective and non-discriminatory criteria and a procedure was in place for parties to request the inclusion of species on the list (Andibel ruling). The final Royal Decree of 16 July 2009 maintains the same 42 mammal species originally on the list and includes an Annex of criteria according to which species can be evaluated for their inclusion on the list.

The Belgian Positive List is designed according to the following criteria:

1. Animal welfare: Animals must be easy to keep and kept with respect to their essential physiological, ethological and ecological needs.
2. Environment: No species should be listed for which there are clear indications that, in case an animal escapes, it would be able to survive in nature and consequently represent an ecological risk.
3. Human health: The animals should not be aggressive by nature and/or dangerous, or expose the health of humans to any other particular danger.
4. Husbandry: Bibliographic information must be available concerning the keeping of these animals.
5. No doubt: In case of contradictory data or information on the possibilities to keep an animal, the animal should be given the benefit of doubt, i.e. it will not be on the list.

A recent study demonstrates that after the final adoption of the Positive List in 2009, the illegal trade on exotic mammal pets in Belgium has been very limited, confirming previous Belgian Government's statements on the efficiency of the system (Eurogroup for Animals, 2016). Indeed, only 22 confiscations have been recorded in 6 years, for a total of 92 animals and an average of 3.7 cases per year. In addition, if compared to countries in which only a few species are forbidden (through negative lists), only a limited number of individuals of illegal species needed to be rescued in Belgium (37 in total from 2009 to 2014, with an average of 6 animals per year).

According to the Belgian Federal Public Service for Health, Food Chain Safety and Environment, a draft of a positive list for reptiles is under preparation.

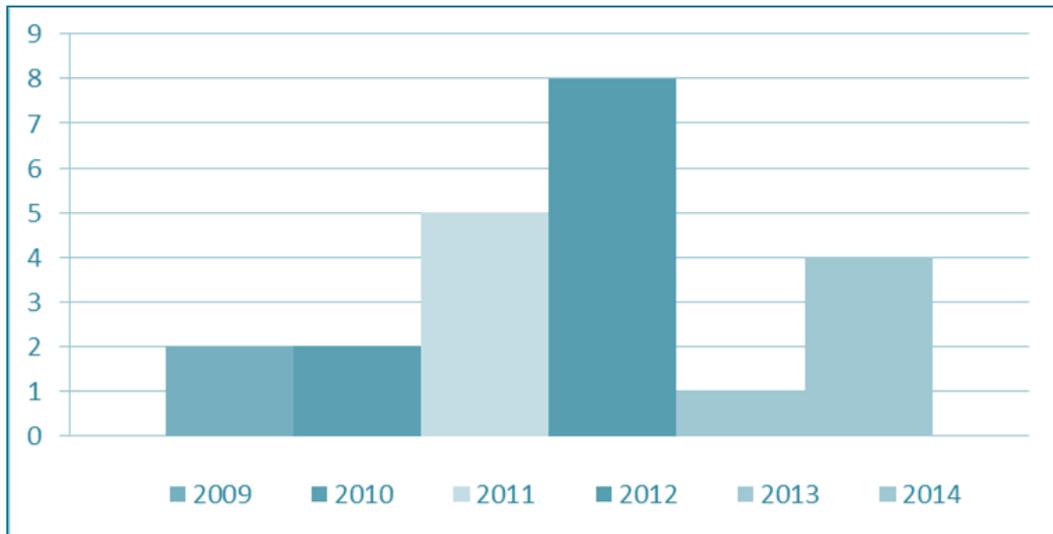


Fig. 6 Number of cases of confiscated mammals in Belgium after the final adoption of a Positive List

3.3.2 The Netherlands

The Netherlands adopted a Positive List for mammals in January 2015.

The assignment to provide criteria and advice on a systematic whereby a positive list for mammals could be drawn up was given to Wageningen University Livestock Research (hereafter WUR). The systematic needed to meet the Andibel ruling of 2008 from the European Court of Justice (see above), which contains criteria that must be met by a positive list for mammals. This led to the development of a systematic, the basis of which was formed by estimating the risk of affecting the welfare of the animal and any possible effects on the health of humans and animals based on criteria included in the Decree Keepers of Animals and on the explicit recognized intrinsic value of animals stated by the Law.

WUR was then requested to assess/estimate the presence and seriousness of these risks per species and to include recent insights and policy choices into an adjusted version of the systematic, so that it is achievable in practice and will lead to trustworthy and socially supported results. On 2014, WUR worked out a method whereby a well thought-out welfare and health risk assessment for the animal and an assessment of the risk of danger to humans can be produced in an insightful, consequential and responsible manner.

Consequently, the risks assessments for the inclusion of species in the Dutch Positive List are based on scientific and/or otherwise factual evidence, and from that perspective can be easily taken up as a standard for other countries.

4. CONCLUSIONS

The exotic pet trade threatens the survival of wild species, the welfare of the animals and the health of humans and other animals from the spread of diseases. Some wild animals are captured under dire conditions and suffer high mortality rates throughout the trade cycle. The complex needs of exotic animals can be difficult to meet in captivity and when animals become too costly, difficult to manage, or lose their novelty, they are often abandoned and can threaten native wildlife and the ecosystem.

Controlling and eradicating invasive alien species, treating people because of zoonotic diseases, fighting against illegal trade and culling thousands of farm animals in order to prevent the spread of illness, are all direct consequences of absent or inadequate laws and regulations on exotic pet trade.

Several different ways to regulate the keeping and trade of exotic pets exist. However, based on ever-changing trends, new species regularly appear in the European pet trade; therefore, negative lists (which ban the keeping of some species of animals) do not fulfill the precautionary approach and need regular updates that require extensive resources and entail a considerable time lag due to bureaucratic burden. In contrast, the present report demonstrates that a positive list is a concise list based on a scientific risk assessment that provides clarity to owners and enforcement agencies and creates less regulatory bureaucracy and costs for the government.

For all the above mentioned reasons, we strongly encourage all European and National competent authorities to adopt and implement a Positive List of allowed pet species, as this is the ideal legislation to regulate the sale and keeping of animals as pets.

5. REFERENCES

- AAP Animal Advocacy and Protection, 2010. *Stop buying monkeys in Morocco*.
<https://www.aap.nl/en/news/stop-buying-monkeys-morocco>
- Altherr, F., & Freyer, D., 2001. *Morbidity and mortality in private husbandry of reptiles*. RSPCA report.
- Arena, P, Steedman, C. and Warwick C., 2012. *Amphibian and reptile pet markets in the EU an investigation and assessment*. Animal Protection Agency, Animal Public, International Animal Rescue, Eurogroup for Wildlife and Laboratory Animals, Fundación para la Adopción, el Apadrinamiento y la Defensa de los Animales, 52 pgs.
- Barcelona Field Studies Centre, 2010. <http://geographyfieldwork.com/EbroDeltaAppleSnailInvasion.htm>
- Baxter V.K., Shaw G.C., Sotuyo N.P., Carlson C.S., Olson E.J., Zink M.C., Mankowski J.L., Adams R.J., Hutchinson E.K., Metcalf Pate K.A., 2003. *Serum albumin and body weight as biomarkers for the antemortem identification of bone and gastrointestinal disease in the common marmoset*. PLoS ONE 8(12): e82747. doi:10.1371/journal.pone.0082747
- Bertolino S., Bertolino, N. Cordero di Montezemolo, D.G. Preatoni, L.A Wauters, 2014. *A grey future for Europe: Sciurus carolinensis is replacing native red squirrels in Italy*. Biol. Invasions <http://dx.doi.org/10.1007/s10530-013-0502-3>.
- Bohm, M., Collen, B., Baillie, J.E.M., Bowles, P., Chanson, J., Cox, N., 2013. *The conservation status of the world's reptiles*. Biological Conservation, 157:372–385.
- Brown, M. C, 2008. *Reaping the Whirlwind? Human Disease from Exotic Pet* . BioScience 58(1):6-7.
<http://www.bioone.org/doi/full/10.1641/B580102>
- Bush, E.R., Baker, S.E. & MacDonald, D.W., 2014. *Global Trade in Exotic Pets 2006–2012* Conservation Biology, Volume 28, No. 3, 663–676.
- Campbell, F. and P. Kriesch. 2003. Invasive Species Pathway Team: final report. 25. p. Available at: <http://www.invasivespecies.gov/council/pathways.doc>
- Cook D, Roberts M & Lowther J. , 2002. *The international wildlife trade and organised crime: A review of the evidence and the role of the UK*. Regional Research Institute, University of Wolverhampton.
- Crossland D., 2007. *Alarm over exotic pet boom: Invasion of Pet Piranhas*. Spiegel International.
<http://www.spiegel.de/international/alarm-over-exotic-pet-boominvasion-of-the-pet-piranhas-a-467865.html>

Directorate General for Health and Food Safety (DG SANCO), European Commission, 2010. *Evaluation of the EU Policy on Animal Welfare and Possible Policy Options for the Future*. <http://ec.europa.eu/food/animal/welfare/actionplan/3%20Final%20Report%20-%20EUPAW%20Evaluation.pdf>

Dorcas, M.E., et al, 2012. *Severe mammal declines coincide with proliferation of invasive Burmese pythons in Everglades National Park*. Proceedings of the National Academy of Sciences. 109(7):2418-2422.

EcoHealth Alliance, 2011. [Online]. Available: http://www.ecohealthalliance.org/press/67ecohealth_alliance_calls_for_improved_education_surrounding_exotic_pet_ownership.

ENDCAP, 2012. *Wild pets in the European Union*. <http://endcap.eu/wp-content/uploads/2013/02/Report-Wild-Pets-in-the-European-Union.pdf>

Eurogroup for Animals, 2013. *Analysis of national legislation related to the keeping and sale of exotic pets in Europe*.

Eurogroup for Animals, 2016. *The implementation of the positive list for mammal pets in Belgium: a success story. An analysis and evaluation of the implementation and enforcement of the Positive List legislation in Belgium*. In press.

European Commission, 2013. *Proposal for a Regulation of the European Parliament and the Council on the prevention and management of the introduction and spread of invasive alien species* COM (2013)620 final.

Faraone, F.P., Lillo, F., Giacalone, G. & Valvo, M.L. , 2008. *The large invasive population of Xenopus laevis in Sicily, Italy*. Amphibia-Reptilia, 29:405-412.

Farrer, R. A., Weinert, L. A et al., 2011. *Multiple emergences of genetically diverse amphibian-infecting chytrids include a globalized hypervirulent recombinant lineage*. PNAS, vol. 108, no. 46, pp. 18732-18736, 2011.

Federation of Veterinarians in Europe, *Regulation of keeping animals as companion animals through the establishment of lists* - FVE/013/pos/006 http://www.fve.org/uploads/publications/docs/006_fve_position_on_positive_lists_of_exotic_species_final.pdf

Fischer, M.C. & Garner, T.W.J., 2007. *The relationship between the emergence of Batrachochytrium dendrobatidis, the international trade in amphibians and introduced amphibian species*. Fungal Biology Reviews, 21:2–9. doi:10.1016/j.fbr.2007.02.002.

Fisher, A.C., Bartsch, F. and Altherr, S., 2015. *Enstasjon Whonzimmer – Exotische Saugetiere als Haustiere*. Pro Wildlife, München, 32 pages.

Moroccan Primate Conservation Foundation, 2010. *The history and current status of the Barbary macaque* <http://www.mpcfoundation.nl/pages.php?pageid=14323>

Genovesi, P., Carnevali, L., Alonzi, A. and Scalera, R., 2012. *Alien mammals in Europe: updated numbers and trends, and assessment of the effects on biodiversity*. Integrative Zoology, vol. 7, no. 3, pp. 247-253, 2012.

Genovesi P, Carnevali L, Scalera R., 2015. *The impact of invasive alien species on native threatened species in Europe*. ISPRA M ISSG, Rome. Technical report for the European Commission. Pp.18.

Kennedy, B. A., 2002. *The Trade of Wild Animals: A Serious Problem*. Earth Caretaker.

Laidlaw, R., 2005. *Scales and tails: the welfare and trade of reptiles kept as pets in Canada*. Zoocheck Canada, 135pp. <http://www.zoocheck.com/Exotics/Reptile%20Report%20Canada.pdf>

Jennings M. and Prescott M.J., 2009. *Refinements in husbandry, care and common procedures for non-human primates*. Laboratory Animals 43: Supplement 1.

Marano, N et al. Paul M. Arguin, M, P. and Pappaioanou, M., 2007. *Impact of globalization and animal trade on infectious disease ecology*. Emerg Infect Dis [serial on the Internet]. Available from <http://wwwnc.cdc.gov/eid/article/13/12/07-1276>

Murphy, D. and Oshin, F, 2015. *Reptile-associated salmonellosis in children aged under 5 years in South West England*. Searching journal content for Femi Oshin. Arch Dis Child 100:4 364-365.

National Wildlife Federation, U.S: <http://www.nwf.org/wildlife/threats-to-wildlife/invasive-species/asian-carp.aspx>

Pimentel D., Zuniga R. & Morrison D., 2005. *Update on the environmental and economic costs associated with alien-invasive species in the United States*. Ecological Economics 52: 273-288.

Pomerantz O., Meiri S. and Terkel J., 2013. *Socio-ecological factors correlate with levels of stereotypic behaviour in zoo-housed primates*. Behavioural Processes 98:85-91.

Praud, A. and Moutou, F., 2010. *Health risks from new companion animals*. Eurogroup for Animals, 31 pp.

Redmond I., 2005. *The primate pet trade and its impact on biodiversity conservation*. In: Born to be wild: Primates are not pets. London: International Fund for Animal Welfare (IFAW).

RSPCA, 2016. *Do you give a monkey's?*

http://www.rspca.org.uk/adviceandwelfare/pets/other/primates?utm_source=PR&utm_medium=Redirect&utm_campaign=PetPrimates

RSPCA & Wild Futures, 2012. *Primates as Pets: Is there a case for regulation?*

Schuppli, C. A. and Fraser, D., 2000. *A framework for assessing the suitability of different species as companion animals*. *Animal Welfare*, vol. 9, pp. 359 - 372.

Secretariat of the Convention on Biological Diversity, 2010. *Pets, Aquarium, and Terrarium Species: Best Practices for Addressing Risks to Biodiversity*. Montreal, SCBD, Technical Series No. 48, 45 pages.

Shine C., Kettunen M., ten Brink P., Genovesi P. & Gollasch S., 2009. *Technical support to EU strategy on invasive species (IAS). Recommendations on policy options to control the negative impacts of IAS on biodiversity in Europe and the EU. Final report for the European Commission*. Institute for European Environmental Policy (IEEP), Brussels, Belgium. 35 pp. Available at:

http://ec.europa.eu/environment/nature/invasivealien/docs/Shine2009_IAS_Final%20report.pdf

Smith, K. F., Behrens, M., 2009. *Reducing the Risks of the Wildlife Trade*. *Science*, vol. 324, no. 5927, pp. 594-595, 1 May 2009

Stiles, D., Redmond, I., Cress, D., Nellemann, C., Formo, R.K. (eds). 2013. *Stolen Apes – The Illicit Trade in Chimpanzees, Gorillas, Bonobos and Orangutans. A Rapid Response Assessment*. United Nations Environment Programme, GRID-Arendal. www.grida.no

Stokstad, E., 2014. *The coming salamander plague*. *Science* 346 (6290): 530-531.

Toland, E, Warwick, C and Arena, P. C., 2012. *The exotic pet trade : pet hate*. *The Biologist* 59(3) ; 14-18.

Van Dijk P.P., Corti C., Mellado V.P. & Cheylan M., 2004. *Testudo graeca (reptile)*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.4.

Vilà M., Basnou C., Pyšek P., Josefsson M., Genovesi P., Gollasch S., Nentwig W., Olenin S., Roques A., Roy D., Hulme P.E., & DAISIE partners, 2010. *How well do we understand the impacts of alien species on ecosystem services? A pan-European, cross-taxa assessment*. *Frontiers in Ecology and the Environment*, 8(3)135-144 doi: 10.1890/080083.

Warwick, C., Arena, P.C., Steedman, C. and Jessop, M., 2012. *A review of captive exotic animal-linked zoonoses*. *Journal of Environmental Health Research*, 12:9-24.

<http://www.cieh.org/jehr/default.aspx?id=41594>

Warwick, C., Steedman, C., Jessop, M., Toland, E, and Lindley, S., 2014. *Assigning degrees of ease or difficulty for pet animal maintenance: the EMODE system concept*, *Journal of Agriculture and Animal Ethics* DOI 10.1007/s10806-013-9455-x Available at:

<http://link.springer.com/content/pdf/10.1007%2Fs10806-013-9455-x.pdf>

Warwick, C., 2014. *The Morality of the Reptile "Pet" Trade*. Journal of Animal Ethics 4 (1): 74–94.

Whitehead, M.L. and Vaughn-Jones, C., 2015. *Suitability of species kept as pets*. Veterinary Record 2015 177:573.

Williams, F., Eschen, R., Harris, A., Djeddour D. H., Pratt, C.F., Shaw R. S., Varia S., Lamontagne-Godwin J.D., Thomas S.E., Murphy, S.T., 2010. *The Economic Cost of Invasive Non-Native Species on Great Britain*. CAB/001/09. www.cabi.org

Worth, K, 2014. *Argentina and Chile Decide Not to Leave It to Beavers*. Scientific America <http://www.scientificamerican.com/article/argentina-and-chile-decide-not-to-leave-it-to-beavers/>