Division of Policy and Directives Management
U.S. Fish and Wildlife Service
Public Comments Processing, Attn: Docket No.
FWS–R9–FHC–2009–0093
4401 North Fairfax Drive, Suite 222
Arlington, VA 22203

Dear U.S. Fish & Wildlife Service,

I am the Founder & Executive Director of SAVE THE FROGS! (www.savethefrogs.com), America's first and only public charity dedicated to protecting amphibians. Our mission is to protect amphibian populations and to promote a society that respects and appreciates nature and wildlife. SAVE THE FROGS! is comprised of an international team of scientists, educators, policymakers and naturalists dedicated to environmental protection.

On behalf of SAVE THE FROGS! and our 570 members, I would like to thank the USFWS for examining methods of controlling the spread of *Batrachochytrium dendrobatidis* (chytrid fungus: www.savethefrogs.com/chytrid), and I would also like to thank you for soliciting comments from members of the public.

Approximately one-third of amphibian species worldwide are listed as threatened by the IUCN, and up to 200 species have completely disappeared since 1979. This rate of extinction is at least 500 times the background amphibian extinction rate expected based on examinations of the fossil record. Chytridiomycosis (the potentially lethal skin disease caused by *Batrachochytrium dendrobatidis*) is widely regarded as one of the greatest threats to the Earth's biodiversity, having caused more species extinctions than any other disease in recorded history. Up to 100 amphibian species around the world have been driven to complete extinction by the disease in recent decades, and thus it is crucial that we take the necessary steps to prevent further extinctions.

As self-regulation has clearly not been successful in preventing the spread of chytrid fungus since it was first identified in 1998, SAVE THE FROGS! supports government regulations that would limit the transport of amphibians infected with the chytrid fungus *Batrachochytrium dendrobatidis*. **Specifically, SAVE THE FROGS! urges the USFWS to authorize the petition submitted by the Defenders of Wildlife to list, under the Lacey Act, all live amphibians or their eggs in trade as injurious unless certified as free of *Batrachochytrium dendrobatidis*.**

I have been researching and educating people about the chytrid fungus since mid-2003. I am a recognized expert on the ecology of *Batrachochytrium dendrobatidis* and also on the techniques one uses to diagnose infection by the fungus. I conducted my Ph.D. research on the ecology of chytridiomycosis in wild frog populations (how infection levels vary with season, altitude, latitude and breeding habitat) and on ways to diagnose chytrid infections in the laboratory. I have published 15 articles on amphibian disease in international peer-reviewed journals, and I developed and taught a 5-day amphibian disease detection course at the Smithsonian Tropical Research Institute in Panama City in October 2009. I also wrote a detailed protocol for detection of the chytrid fungus by quantitative PCR (available at

www.savethefrogs.com/qpcr) that has been downloaded by scientists from over 30 countries. As the Executive Director of SAVE THE FROGS!, I have also spent a significant portion of the past three years educating people about the chytrid fungus, and working with governments and industries to stop its spread.

Please find below:
(1) My responses to the 14 queries posed by the USFWS;
(2) An appendix in which I offer rebuttals to the talking points issued by the Pet Industry Joint Advisory Council (PIJAC) regarding the current proposal; and
(3) A list of references.

1. What Federal, State, or tribal regulations exist to prevent the spread of chytrid fungus?

In the United States, no federal or tribal regulations are exist. California is the only state that has enacted any measures to prevent the spread of chytrid fungus: in March 2010, the California Fish and Game Commission voted unanimously to stop issuing permits for the importation of non-native frogs (and turtles) into the state for use as food, and in May 2010, the Commission held a "re-consideration" hearing and upheld the motion. The Commission was acting in large part due to the undeniable impact of chytrid fungus on California's amphibian populations (Rachowicz et al. 2006), and the clear link between the frog legs trade and the spread of chytrid fungus (Gratwicke et al. 2009, Schloegel et al. 2009). This sets an important precedent, as California is the first state in the USA to enact such restrictions. Unfortunately, the composition of the Commission changes regularly and thus these measures are by no means permanent. Nor does the Commission have any measures in place that address the amphibian laboratory, pet, zoo or bait trades.

In 2003, Australia enacted what are perhaps the world's strictest regulations on the importation of non-native amphibians, this being due to chytridiomycosis having driven at least seven of Australia's frog species to complete extinction after it was introduced into the country in the late 1970's (Berger et al. 1998, Woodhams and Alford 2005, Skerratt et al. 2007). Amphibian importation is now allowed only for zoological and laboratory usage, and must be accompanied by certificates demonstrating that stringent disease control measures (including quarantine) have taken place.

Japan banned both the sale and import of American Bullfrogs (*Lithobates catesbeianus*) in 2006, and South Korea banned their importation circa 2007, both countries in part due to the consistently high chytrid infection levels found in this species, which sees heavy trade and transport (Bonaccorso et al. 2003, Daszak et al. 2004, Schloegel et al. 2009).

2. Are there any known mechanisms in the United States to test for, control, or regulate movement of interstate transport of chytrid fungus?

There are many ways to test for chytrid fungus, both in water and on amphibian skin (Berger et al. 1999, Vredenburg and Summers 2001, Berger et al. 2002, Rachowicz 2002, Annis et al. 2004, Boyle et al. 2004, Kriger et al. 2006a, Kriger et al. 2006b, Retallick et al. 2006, Hyatt et al. 2007, Kirshtein et al. 2007, Padgett-Flohr and Goble 2007, Skerratt et al. 2008). Most major

universities have the technologies to test for the fungus using the most reliable method, which is quantitative polymerase chain reaction (qPCR: http://savethefrogs.com/qpcr).

Controlling the movement of interstate transport of chytrid fungus falls into two categories: (1) controlling human-mediated movements, and (2) controlling movements caused by non-human animals and environmental factors such as flowing water.

(1) Controlling human-mediated movements of chytrid fungus
The trade and transport of amphibians for use as pets, food, bait, laboratory specimens and zoos is staggering, likely numbering into the hundreds of millions of individuals per year (Cunningham et al. 2003, Schlaepfer et al. 2005, Gratwicke et al. 2009, Schloegel et al. 2009, Warkentin et al. 2009). Chytridiomycosis has been identified in amphibians involved in intercontinental movements due to the pet trade (Aplin and Kirkpatrick 1999, Raverty and Reynolds 2001, Une et al. 2008), laboratory animal trade (Reed et al. 2000, Parker et al. 2002), food trade (Mazzoni et al. 2003, Schloegel et al. 2009), bait (Picco and Collins 2008) and zoo trade (Pessier et al. 1999). Volume of trade is large, numbering in the millions of individuals per year (Cunningham et al. 2003).

The sheer volume of trade suggests – and the aforementioned studies confirm -- that numerous opportunities exist for the successful introduction of the fungus to disparate parts of the world via anthropogenic movements of live amphibians. As such, **controlling the human mediated interstate transport of chytrid fungus requires both educating people about the inherent risks of amphibian transport AND enacting legal measures that further deter people from transporting infected amphibians across state lines and federal borders**. It should be clear that there have been no educational initiatives to date that have stopped the interstate transport of amphibians, and to the best of my knowledge there are no major educational initiatives currently in place, or being planned.

(2) Controlling movements caused by non-human animals and environmental factors such as flowing water.
The chytrid fungus can be transported by flowing water and by migrating amphibians. Stopping these movements is incredibly difficult; as such it is important to take preventive measures so that the chytrid never arrives in the stream or on the migrating amphibian in the first place. It should be clear that the rate of travel of the fungus by human-mediated means (e.g. via cars, airplanes) is much higher than by non-human means.

3. How many businesses import live amphibians or their eggs for interstate commerce?
I do not know of any regulatory commission or trade group that collects this data.

4. How many businesses sell live amphibians or their eggs for interstate commerce?
On December 15th, 2010 at least 20 different vendors placed classified ads on http://market.kingsnake.com/index.php?cat=14 to assist in their sales of amphibians. That is just one site on one day, and does not include large chain stores such as Petco and Petsmart both of which operate over 1,000 stores.

5. What are the annual sales of these imported live amphibians and their eggs?
I do not know of any regulatory commission or trade group that collects this data.

6. What are the species of amphibians, fish, or other class of animal have been affected by chytrid fungus in the United States and how they were infected?
Chytrid fungus has been detected on over 287 amphibian species from 25 families (see http://www.savethefrogs.com/kerry-kriger/pdfs/Kriger-Hero-2009-Supporting-Online-Materials.pdf for the detailed list, which is two years old). Many of these species are native to the USA, and many are considered threatened by federal or IUCN criteria (e.g. *Ambystoma californiense, Rana aurora, Rana draytonii, Rana muscosa, Rana pretiosa, Rana sierrae, Bufo boreas, Rana chiricauhensis, Rana yapapaiensis, Rana tarahumarae, Bufo baxteri*).

Morgan et al (2007) examined mountain yellow-legged frogs in the Sierra Nevadas and concluded that the chytrid fungus was introduced to their populations by human-mediated movements. Detailed studies have not been conducted on the other species listed, though many studies have examined the movement of chytrid fungus via trade routes, as discussed in Section 2 above.

7. What are the current and potential effects to species listed as threatened or endangered under the ESA that are contaminated with chytrid fungus?

Batrachochytrium dendrobatidis has been found on dead and dying amphibians concurrent with population declines in Australia (Berger et al. 1998), South America (Ron et al. 2003), North America (Rachowicz et al. 2006), Central America (Lips et al. 2003, Lips et al. 2006), Europe (Bosch et al. 2001, Bosch and Martinez-Solano 2006), and Africa (Weldon and du Preez 2004). Thus it is the pathogen most directly linked to amphibian declines (Green et al. 2002). As *Batrachochytrium dendrobatidis* lives in keratin and all amphibians have keratin in their skin, it is thought that any amphibian species is potentially susceptible to chytrid infection.

In the United States, *Batrachochytrium dendrobatidis* has caused well-documented mass die-offs of *Rana sierrae* and *Rana muscosa* in California (Rachowicz et al. 2006); *Rana yavapaiensis* and *Rana chiricauhensis* in Arizona (Bradley et al. 2002); *Bufo boreas* in Colorado (Muths et al. 2003, Scherer et al. 2005); and it is the likely cause of the decline of the endangered *Bufo canorus* in California (Kagarise Sherman and Morton 1993).

Based on the propensity for *Batrachochytrium dendrobatidis* to drive amphibians to local or species extinction, the potential effects of the fungus on ESA-listed amphibians are enormous and include population and species extinction. Furthermore, amphibians are an integral component of the ecosystem, and their disappearance could cause cascading effects that negatively affect other endangered species. *Batrachochytrium dendrobatidis* has no known positive effects on amphibians and its presence in any ESA-listed amphibian species is likely to delay any recovery efforts for that species.

8. What are the potential costs of recovering threatened or endangered species affected by chytrid fungus?

This is a difficult question to answer because there are no documented reports of any affected amphibians that have been recovered by human intervention. Recovery methods would require:

(1) The abatement of non-chytrid threats (i.e. pollutants, invasive species, habitat destruction);
Cost: Potentially in the millions of dollars.

(2) Captive breeding programs that headstart amphibians and augment their numbers in the wild;
Cost: Potentially in the millions of dollars. Note that not all amphibians breed well in captivity.

(3) Eradication of the chytrid fungus from individuals.
Cost: There are no known instances of researchers' successfully eradicating chytrid infections from all of a population's individuals, but an attempt would like cost $10,000-$100,000.

(4) Eradication of the chytrid fungus from the area in which the amphibians live, including the water and soil.
Cost: There are no known instances of researchers' successfully eradicating chytrid infections from the water and soil at a site. Necessary research could cost into the millions of dollars.

9. What is the likelihood that wild amphibians would be affected by the importation of live amphibians or their eggs that harbor chytrid fungus?

This question must be answered by examining both (1) the likelihood for the chytrid fungus to make its way into wild amphibian populations after being imported into a state; and also by examining (2) its likelihood of affecting amphibians once it becomes established in the population.

(1) Likelihood of the chytrid fungus making its way into wild amphibian populations after being imported into a state:

When an infected frog arrives in a new location, its disease can spread to native populations if (1) it escapes captivity, (2) it is intentionally set free, or (3) water from its holding tank is released into the environment (the chytrid fungus has waterborne zoospores). Amphibians can escape captivity by crawling through poorly secured terraria or after the building in which they are housed is destroyed by a natural disaster; they are often set free by well-intentioned owners; and the water they are held is nearly always disposed of without having been decontaminated. As such, it is highly likely that if the chytrid fungus enters a state, it will also make its way into the environment and into frog populations.

The likelihood of the chytrid fungus making its way into wild amphibian populations after being imported into a state also increases if the total number of opportunities is high. Indeed, millions of non-native American Bullfrogs enter San Francisco, New York and Los Angeles each year from ports in China, Taiwan, Brazil, Uruguay and elsewhere (and a recent study showed that over 60% of the American Bullfrogs tested in California markets were infected with the chytrid fungus) (Schloegel et al. 2009). The trade in wild-caught amphibians for use as pets is also high,

numbering in the millions of individuals being imported into the United States each year (Schlaepfer et al. 2005). Unfortunately, no published reports exist that quantify the number of amphibians transported across state or federal lines for use in the dissection or laboratory research trades, but it is also likely to be in the millions of individuals each year.

As such, there exist numerous opportunities for the chytrid fungus to enter wild amphibian populations subsequent to its importation into a state.

(2) Likelihood of chytrid fungus affecting amphibians once it becomes established in the population:

There is a high likelihood that native amphibian populations would experience a population decline or extinction following the introduction of chytrid fungus (or a new strain thereof) into their population (Kriger and Hero 2009a,b). Amphibian populations often have no evolved defenses against new pathogens, and multiple studies demonstrate that *Batrachochytrium dendrobatidis* is not native to the United States (Morehouse et al. 2003, Morgan et al. 2007, Goka et al. 2009). History demonstrates that local or global species extinction is likely to follow the introduction of chytrid fungus (Viggers et al. 1993, Lips et al. 2006, Rachowicz et al. 2006, Skerratt et al. 2007), and there is currently no known way to eradicate chytridiomycosis or any other amphibian disease from wild populations.

10. What would it cost to eradicate chytrid fungus?

While methods exist for curing laboratory animals infected with *Batrachochytrium dendrobatidis*, it is not currently possible to eradicate the fungus from wild amphibian populations. Nor is it possible to protect (e.g. immunize) a natural wilderness area prior to the arrival of the chytrid fungus. Thus eradicating the fungus from an ecosystem would require enormous amounts of money with no assurance of success. In general, humans are unable to eradicate wildlife diseases of any kind from wild animal or plant populations.

On the contrary, eradicating the chytrid fungus from amphibians destined for interstate or international travel via the pet, food, bait and laboratory trades could in large part be accomplished by diagnostic testing and quarantine of every amphibian in question, with no amphibians being allowed to travel unless and until chytrid-free status has been certified.

11. Are there any potential benefits to allowing the chytrid fungus pathogen to be imported?

No, there are no benefits to allowing such import.

12. What is the potential for the industries that conduct trade in amphibians to self-police through voluntary best practices; for example, how successful is the "Bd-Free 'Phibs Campaign" sponsored by the Pet Industry Joint Advisory Council?

The number one best practice in reducing chytrid spread is to test an amphibian for chytrid fungus prior to transporting it. As only a negligible proportion of vendors voluntarily test amphibians for chytrid fungus, self-regulation to date has clearly been a failure. I know of no

examples of successes in this realm. Indeed, if best practices were currently being implemented, there would be few opponents to the current proposal: the opponents are those people who do not want to institute best practices.

I have been involved in amphibian conservation full-time since 2003 and the only place I ever saw mention of the Bd-free 'Phibs Campaign was at the 2007 Tempe conference on chytrid. This suggests that the campaign had had very little penetration into the general public and that it has been unsuccessful. Further, it is difficult to imagine this campaign as having any potential for success as neither the term "Bd" nor "'Phibs" conveys any meaning to the average citizen.

13. What are peer-reviewed methods for detecting chytrid fungus have been published?

There are many ways to test for chytrid fungus, both in water, and infecting amphibian skin (Berger et al. 1999, Vredenburg and Summers 2001, Berger et al. 2002, Rachowicz 2002, Annis et al. 2004, Boyle et al. 2004, Kriger et al. 2006a, Kriger et al. 2006b, Retallick et al. 2006, Hyatt et al. 2007, Kirshtein et al. 2007, Padgett-Flohr and Goble 2007, Skerratt et al. 2008), and most major universities have the technologies to test for the fungus using the most reliable method, which is quantitative polymerase chain reaction (qPCR: http://savethefrogs.com/qpcr).

I successfully performed qPCR analyses for chytrid fungus on nearly 3,000 samples, at an estimated cost of approximately $5 per sample, and my methods are clearly described in (Kriger et al. 2006a) and on http://savethefrogs.com/qpcr (and the materials freely downloadable from that webpage). There is also a paper by Ruthig and DeRidder in review – or possibly in press – in Diseases of Aquatic Organisms that very clearly describes recent improvements to qPCR methods that further reduce the costs of the test.

14. Are there any other comments or information regarding the listing of live amphibians as injurious unless free of chytrid fungus?

Economics:
Contrary to the views expressed by many of its opponents, this proposal has a high probability of economically benefitting many involved in the amphibian pet trade, specifically those involved in captive breeding (as opposed to those involved in the sale of wild-caught amphibians). Most wild-caught amphibians in the pet trade originate outside of the USA, whereas most captive-bred amphibians originate in the USA (even if they are a non-native species). If the proposal does indeed make it more difficult to transport amphibians across federal or state lines, the captive-breeding industry would simply shift to a model where most sales and purchases occur within the vendor's home state. On the contrary, the infected wild-caught amphibians coming from outside the United States would not be able to enter the Unted States, causing a decrease in the availability of wild-caught amphibians, and a subsequent increase in demand for captive-raised amphibians. Not only would this increase sales by US-based captive breeders, it would decrease the demand on wild amphibian populations, many of which are already over-harvested (whether they are CITES listed or not).

Many opponents of this proposal claim that vendors could not bear the cost of diagnostic testing. However, diagnostic testing can be done for less than $10 an animal, and this cost would simply be passed on to the pet owner. African Clawed Frogs can be purchased for $2.50 at Petsmart. Surely an owner could afford $12.50. It is not a consumer's inherent right as an American to be able to purchase a pet for the same price as a can of beans, and there is nothing unconstitutional about requiring amphibians to be chytrid-free before being shipped across state or federal lines. Furthermore, if every pet frog came with information about the additional fees incurred due to the amphibian testing, it would be extremely educational to the consumer. Finally, a certificate of chytrid-free status would possibly even increase amphibian sales, and many job openings will be created by increased demand for diagnostic testing.

With regards to the proposal's potential effect on the amphibian food trade, I know of no restaurants or supermarkets that are reliant on their sales of frog legs. As Americans, we are fortunate to have many choices of food, and thus most supermarkets and restaurants should have no problem converting either to frozen frog legs; frog legs from frogs originating within the state; or simply another type of food.

Differences in strain

Many opponents of this ban claim that the chytrid fungus is not a threat to US amphibians because it is already so widespread. This line of logic is completely incorrect, for two reasons: (1) the chytrid fungus is not in every population of amphibians in the USA and thus these populations have no evolved resistance to chytridiomycosis; and (2) different strains of the fungus exist, and they vary in virulence (Berger et al. 2005, Retallick and Miera 2007). Amphibians can acquire some immunity to the fungus over time (Kriger and Hero 2006), but the continued introduction of new strains of chytrid to their populations would render their acquired immunity of no use.

Whether or not chytrid has become established in a wild amphibian population, it remains extremely important to keep any new chytrid fungi from entering the population. In this regard, the proposal to list, under the Lacey Act, all live amphibians or their eggs in trade as injurious unless certified as free of *Batrachochytrium dendrobatidis*, is a major step in the right direction towards protecting America's amphibians and ecosystems from further disease-related decline and extinction.

Sincerely,
Kerry Kriger, Ph.D.
SAVE THE FROGS! - Founder, Executive Director, Ecologist
www.savethefrogs.com
www.savethefrogs.com/kerry-kriger

15 December 2010

Appendix 1

Please find below my point-by-point rebuttal to the talking points issued by the Pet Industry Joint Advisory Council (PIJAC) regarding the current proposal.

PIJAC: • Research indicates that Bd is pathogenic to some, but not all amphibian species. Maps produced by a team of researchers, including federal agency scientists, indicate that it is already widespread in the United States. Furthermore, some scientists believe that it may be native to, or long established in, the eastern part of the U.S.

KK: I know of no scientists who believe that *Bd* is native to the eastern United States. Regardless of how many species are already affected or how widespread the fungus is, it is important to keep new strains of the fungus from entering populations, as strains vary in virulence (Berger et al. 2005, Retallick and Miera 2007), and we need to enable recovering populations to develop resistance to the strain that currently infects them, without adding additional pressures from new chytrid introductions. PIJAC's argument is akin to saying that if people in a town already have cancer from the nearby chemical plant, it is just fine to keep manufacturing and disposing harmful chemicals in that town.

PIJAC: • In response to the Defenders of Wildlife petition, the U.S. Department of Agriculture (USDA) has determined that Bd is "non-actionable" because it is already widespread within the United States. The Department of the Interior and USDA are partners under the National Aquatic Animal Health Plan (NAAHP,) and we question the ability of FWS to provide the administration, infrastructure and budget necessary to unilaterally implement an injurious wildlife listing that is consistent with the NAAHP, as well as international guidance and law, such as The World Organization of Animal Health (OIE) standards.

KK: Again, just because a problem already exists does not mean it is "non-actionable". If there is crime in a town, should we forgo any attempts to eradicate the crime? No, that would be a ridiculous response. Furthermore, I know of no amphibian biologists or chytrid biologists in the USDA and do not recall them ever having a call for comments; nor have I seen any studies on chytrid that they have produced, so I question the basis of their supposed determination. With regards to the USFWS' ability to provide the administration, infrastructure or budget necessary to implement the proposal, this is the United States, and we are the world leaders in finding ways to accomplish things we deem important. I have complete faith in the Service's ability to implement the proposal on par with OIE standards.

PIJAC: • We do not believe that it was the intent of the authors of the Lacey Act to list native wildlife as injurious. Nor do we believe that there is authority under the Lacey Act to list micro-organisms or vertebrate species that might carry micro-organisms as hitchhikers (whether or not those micro-organisms might/might not cause disease).

KK: The authors of the Lacey Act lived over 100 years ago, and the threat of wildlife diseases was poorly understood and rarely considered. Global trade and a burgeoning human population has increased the likelihood of disease spread by many orders of magnitude. The authors did have a complete understanding of the threat posed by non-native organisms, and

the goal of this proposal is to reduce the spread of *Batrachochytrium dendrobatidis*, widely regarded as one of the most harmful invasive species known.

PIJAC: • Amphibians imported and transported for the pet trade are intended for life-long, secure containment. Escapes or deliberate releases in the natural environment are extremely rare given the volume of amphibians in trade. The greatest risk of Bd spread within the U.S. is via "on-the-ground" pathways, e.g., fish stocking, fishing, boating.

KK: Regardless of the intent of the vendor, there exist many pathways for the entrance of the infected amphibian or the water it was held in into the environment (section 9 above), and the volume of amphibians in trade numbers in the hundreds of millions annually. Further, the pet trade is only one of several amphibian trades. Finally, the three greatest risks stated by PIJAC (fish stocking, fishing, boating) have never been shown to spread chytrid.

PIJAC: • The pet industry is already well aware of the risks posed by Bd and has led the way in taking proactive responsibility/measures for minimizing Bd spread via its pathway/practices (e.g., Bd-free 'Phibs campaign and individual company programs for testing/treatment of Bd). Members of the pet industry care about their stock for both animal welfare and economic purposes. The pet industry is well-positioned to self-regulate the spread of Bd.

KK: Being aware of risks is great, but many people are aware of risks yet continue the harmful activity: e.g. cigarette smokers, drunk drivers, etc. The "Bd-free Phibs Campaign", as discussed above, has not been successful. The industry is in a poor position to self-regulate: if they were willing to test amphibians for chytrid fungus prior to shipping them across state lines, they would have no need to oppose this proposal. I know of no amphibian vendor that voluntarily tests all their amphibians prior to shipping. I know of no amphibian vendor that quarantines all amphibians prior to shipping. Furthermore, the pet industry lacks the necessary infrastructure for self-regulation, as not all vendors are required to comply with the suggestions or requirements of any pet regulatory board or group.

PIJAC: • It is not clear how FWS would implement a program of Bd treatment, testing, surveillance, reporting and permitting. FWS must be consistent with international trade law and the OIE has not yet completed its guidance on amphibians and Bd. We strongly suspect that FWS will not have the capacity to implement the guidance that the OIE develops in a timely and economically feasible manner.

KK: Again, these arguments are out of line with reality. Saying that a problem is difficult to contend with does not justify foregoing the effort. In common terms, that is usually referred to as quitting. Most of us are raised with values that tell us to rise to the occasion, adapt, overcome and improvise, not quit without the slightest amount of effort. As for the OIE, they have issued clear instructions that chytridiomycosis is a "notifiable disease" and should be treated as such. As for the international trade laws mentioned by PIJAC, I know of no international trade laws that state that all countries must allow their citizens and corporations to freely import and transport amphibians without government regulations.

PIJAC: • Treatment protocols for amphibians need to be carefully developed in accordance with animal welfare standards. If an amphibian has to be dosed when it crosses into the United States and again each time it crosses a state line, that single animal might receive a chemical treatment three or more times within a matter of a week. The pet industry is strongly opposed to any treatment protocol that would kill an amphibian or shorten its lifespan.

KK: I am very happy that PIJAC is in support of animal health, however it would be more prudent to just not allow the infected animal to travel across state or federal lines. Also, there exist non-chemical methods of treating amphibians (i.e. heat treatement).

PIJAC: • Based on the language in the Federal Register Notice, it appears that FWS would treat the intentional and unintentional movement of amphibians in trade equally. In other words, if someone unintentionally moved larvae or eggs in a shipment (e.g., aquatic plants), he or she would be subject to a felony-level violation if they crossed state lines. If that is the case, numerous private sector, as well as agency, activities that are not intentionally associated with the amphibian trade would be severely compromised.

KK: It is important that trades with high likelihood of unintentionally transporting amphibians be aware of their activities and decrease the number of opportunities for unintentional transport. I am certain though that the FWS would not be issuing felony citations for unintentional and especially first time offenders outside the amphibian trade.

PIJAC: • The economic impact of listing all amphibians as injurious unless proven Bd-free could devastate the reptile/amphibian segment of the pet industry. Not only would people be put out of work, but the public would have far less of an opportunity to build an appreciation for amphibians—an appreciation that ultimately translates into a desire to help conserve these and other animals in the wild.

KK: Reptiles have nothing to do with this proposal. As I discussed above, amphibian captive breeders would likely see more demand for their product, as this proposal would likely decrease the number of wild-harvested non-USA amphibians entering the country. Captive breeders would sell a higher proportion of their animals within their state, and would improve their sanitation regimes such that they can still ship across state lines. The cost of testing would be passed on to the consumer, and the only consumers likely to be put off by the small price increase would be those consumers who purchase amphibians as a passing fancy. Those consumers are the ones most likely to set their animal free into the wild when they tire of it, and they are the most likely to mis-treat their animals and allow them to die early due to poor treatment. The increase in price would thus result in more suitable pet owners.

Further, most humans have the knowledge to secure their food and shelter via different possible occupations, and humans are not on the verge of extinction. I doubt any human will die if this proposal is enacted, and it is almost certain that *Homo sapiens* will not be driven to

extinction because of this proposal. Conversely, one-third of the world's amphibian species are on the verge of complete extinction, and keeping them alive is our moral duty and a necessity for our ecosystems. This proposal is a major step forward towards protecting America's amphibian populations.

PIJAC: • We question the willingness/ability of the average pet amphibian owner to treat, test and report Bd prior to relocating their pets across state lines. We further question the ability of state and federal agencies to enforce the Lacey Act under these circumstances.

KK: PIJAC's statement confirms that the pet community is unwilling and unable to self-regulate and that they have had poor success in educating their consumers about this issue or convincing them of its importance. This highlights the need for an improved method of preventing the interstate transport of infected amphibians, such as this proposal. Regardless, the vast majority of interstate amphibian movements will be due to the vendors, not the end-users. It is true though that the end-users must be educated, and I strongly encourage PIJAC and the government to offer funds to groups such as SAVE THE FROGS! that educate the public about chytridiomycosis and ways to prevent its spread.

PIJAC: • Although pet amphibians are rarely released into the natural environment, hobbyists and pet owners who fear that they would be in violation of the Lacey Act may be inclined to release their amphibians rather than euthanize them. Listing could, thus, foster the conditions that both the FWS and pet industry would like to prevent.

KK: PIJAC's statement that pet amphibians are rarely released into the wild is thoroughly incorrect: I have met many teachers, kids, and parents who have purposely released their pets into the wild. Further, the scenario offered by PIJAC is pretty ridiculous, as I doubt many people will say "I can't ship my amphibian across state lines, so I will let it go free!".

REFERENCES

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