COMMITTEE STAFF SUMMARY FOR MAY 16-17, 2023 WRC

6. BULLFROGS AND NON-NATIVE TURTLES

Today's Item **Information ☒** **Action ☐**

Discuss potential strategies from the American Bullfrog and Non-native Turtles Stakeholder Engagement Project staff report.

Summary of Previous/Future Actions

• Project referred to WRC	December 12-13, 2018
• Discussed results and analyses	2022; WRC, multiple meetings
• Discussed staff recommendations	January 11-12, 2023; WRC
• **Today discuss recommendations**	**May 16-17, 2023; WRC**

Background

In December 2018, the Commission referred to the Wildlife Resources Committee (WRC) a stakeholder engagement plan to track progress addressing issues around non-native American bullfrog (commonly referred to simply as bullfrog) and turtles that are imported into California for food and the pet trade. The plan involved three independent groups developing situation analyses and strategies for addressing the threats, challenges, and opportunities posed by bullfrog and non-native turtles and their impacts on native wildlife. The fourth group identified in the plan is the California State Legislature, which will be engaged in the process now that the work of the three groups is essentially complete. WRC has received regular progress updates.

For the situation analyses and strategies work, the independent groups were formed and composed of representatives from three different spheres of California society that have a vested interest in bullfrog and non-native turtle concerns. The first group was composed of representatives from local, state, and federal government agencies, the second from environmental and animal welfare groups, and the third from various commercial sector and industry groups.

The groups met separately and worked on the same task (in parallel) to analyze: (1) threats to California's environment posed by bullfrog and non-native turtles, (2) benefits and cultural values of bullfrog and turtles in California's communities and other intersections with human well-being values, (3) knowledge gaps in our understanding of the relevant systems and operative biological processes, and (4) opportunities for progress in addressing the issues posed by invasive bullfrog and non-native turtles in California's environment. The three groups used a flexible, comprehensive process called the *Open Standards for the Practice of Conservation* to guide their analyses (see https://conservationstandards.org/about/ for more information). Commission staff sincerely thanks the many participants for their diligence and sharing their expertise.

Previously, staff presented three documents to support WRC discussion: (1) an account of the stakeholder process results, (2) various analyses of that information, and (3) draft options and recommendations. Today, staff will present the final version of a report that consolidates the three earlier documents and represents the final deliverable from the stakeholder engagement

process. The recommendations contained within the report are based on stakeholder work to date and public input.

Also included is the executive summary for a report of a research survey of U.S. owners and businesses in the amphibian trade network, conducted by the University of Tennessee, the Pet Advocacy Network (formerly the Pet Industry Joint Advisory Council) and others (Exhibit 2). The report provides insights into the size and composition of the U.S. pet businesses that are engaged in the pet amphibian trade, as well as information on their understanding and consideration of amphibian diseases.

Committee Recommendation

WRC Co-Chair Zavaleta has identified some preliminary strategy recommendations of interest to her:

- More resources for DFW (Strategy 1)
- A ban on live imports (Strategy 17)
- Localized eradication (Strategy 15)
- Dispatching bullfrogs in contests (Strategy 23)
- Water and reservoir management (Strategy 27)
- Prevent water contamination via education for private owners and schools (Strategy 32)
- Prevent water contamination via regulation for commercial importers, pet stores, market facilities, etc. (Strategy 32)
- Recommending *against* domestic aquaculture (Strategy 19) and adding bullfrogs or turtles to the restricted species list (Strategies 30 and 31)

Today, WRC will discuss information in the report, various bullfrog and non-native turtle issues and solutions, and a potential future recommendation from WRC to the Commission (to be developed potentially at the September WRC meeting).

Significant Public Comments

The Endangered Habitats League urges WRC to take all steps to protect California ecosystems from invasive bullfrogs and turtles, including instituting import bans (Exhibit 3).

Recommendation

Commission staff: See Exhibit 1 for staff recommendations.

Exhibits

1. Final *Staff Report on the American Bullfrog and Non-Native Turtle Stakeholder Engagement Process*, dated May 12, 2023 (to be distributed separately)
2. *Amphibian Consumer and Business Survey* executive summary, undated
3. Email from Dan Silver, Executive Director, Endangered Habitats League, received April 29, 2023

Committee Direction/Recommendation (N/A)

Executive Summary
Amphibian Consumer and Business Survey

Department of Forestry, Wildlife, and Fisheries
University of Tennessee
Knoxville, TN

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Acknowledgements: This study was funded by the University of Tennessee One Health Initiative. Investigators thank industry partners Pet Industry Joint Advisory Council (PIJAC), Josh's Frogs, Reptiles by Mack, and their representatives.

Correspondence: A copy of the full report is available upon request from the investigators [N. C. Poudyal (npoudyal@utk.edu) or M. Gray (mgray11@utk.edu)]. To learn more about this research initiatives and partnership, please visit out project website at https://onehealth.tennessee.edu/pijac/

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Background

With growing concerns over amphibian populations in recent decades, researchers and stakeholders in the amphibian trade network have become increasingly interested in understanding how shipping and husbandry practices in trade could impact the prevalence of pathogens and beneficial microbes. To fill this knowledge gap, the need for conducting a comprehensive survey of businesses (importers, breeders, retailers, wholesalers) and consumers (i.e., pet owners) involved in amphibian trade was realized.

The University of Tennessee Institute of Agriculture (UTIA) collaborated with the Pet Industry Joint Advisory Council (PIJAC) and other partners involved in the amphibian trade to identify science-based solutions that promote and foster amphibian wellbeing, minimize revenue losses due to harmful pathogens, and decrease opportunities for pathogen spillover from captive to wild populations. A Memorandum-of-Understanding (MOU) and Memorandum-of-Agreement (MOA) were established in 2021 between UTIA and PIJAC to guide this project, with financial support provided by the UT One Health Initiative to conduct a pilot study. Other amphibian care community partners and collaborators include Josh's Frogs, Reptiles by Mack, Washington State University, Michigan State University, University of Massachusetts-Boston, and Rutgers University.

Information collected in the surveys will be useful in identifying potential opportunities and barriers to developing an industry-led healthy trade program that ensures animal well-being, reducing disease-related financial losses for businesses, and increasing customer satisfaction. Additionally, information will enable researchers to provide recommendations on best strategies to reduce pathogens and increase prevalence of beneficial microbes in trade.

The specific objectives of the study were to: 1) characterize the size and composition of the US pet businesses that are engaged in the pet amphibian trade; 2) understand the awareness and attitudes that amphibian pet businesses and owners have with respect to harmful and beneficial microbes; 3) estimate the value businesses and owners place on amphibians free of pathogens such as *Ranavirus (Rv*), *Batrachochytrium dendrobatidis (Bd)*, and *Batrachochytrium salamandrivorans (Bsal);* and 4) characterize the current husbandry practices of amphibian pet dealers and owners, and their willingness to engage in proactive strategies that promote beneficial microbes and reduce harmful microbes in their facilities and the broader amphibian pet trade.

Approach

Data needed to meet the objectives of this project were collected by designing and administering an online survey of pet amphibian owners and businesses in the US. In collaboration with the industry partners (PIJAC, Josh's Frogs, Reptiles by Mack), the investigators developed a semi-structured questionnaire survey that included questions addressing numerous aspects of the amphibian trade ranging from awareness and knowledge of pathogens (*Bd*, *Bsal*, and *Rv*), current husbandry and disposal practices, agreement with statements regarding biosecurity practices, and motivations and values (willingness-to purchase, willingness-to-pay etc.) regarding acquiring pathogen-free amphibians.

The anonymous and voluntary survey instrument and protocols used were approved by the University of Tennessee Knoxville (UTK) Institutional Review Board for human subjects' research (Approval#: UTK IRB-21-06494-XM). The survey questionnaire was then formatted and administered using the Qualtrics

online survey platform. The survey was initially launched in mid-July 2021 with an email message sent from our industry partners to businesses and consumers in their membership list and contacts within their business network. A link to complete the survey was also placed on the project website (https://onehealth.tennessee.edu/pijac/) located in the public domain of University of Tennessee.

Of the 478 respondents who initiated the survey over a period of 6 weeks, 392 finished the survey. The first question on the survey was a screening question for respondents to identify their role or relationship with the amphibian trade network. Of the 469 respondents that responded to the question, 85% identified themselves as amphibian pet owners/consumers, 18% as amphibian breeders, 17% as retailers, 4% as wholesalers, and 1% as amphibian importers. Those who identified themselves as consumers or pet owners only were directed to a module specific to consumers only, whereas those identifying themselves as business only were sent to a separate module specific to amphibian businesses. Those who identified themselves as both consumer and business (36% of those that responded to the question) were given an opportunity to complete both modules. This summary presents the results from all the responses completed by September 10, 2021.

Results

Amphibian owner/consumer survey

Consumer characteristics: Of 357 consumer respondents, one-half (50%) of respondents were female, 40% male, 6% non-binary/third gender, and 3% preferred not to say. Eighty-eight percent of respondents identified themselves as White, 1% Asian, 1% Black or African American and 8% identified as another race or ethnicity. About 48% reported being under 35 years old, 34% indicated they were between 35 and 55, and the remaining 17% reported being older than 55. In terms of education attained, 38% reported attending "Some college", 31% reported having completed a bachelor's degree, 18% completed a graduate degree, and 12% completed high school.

Ownership history: Participation in the consumer module of the survey was limited to consumers who indicated they either currently owned, or had owned, an amphibian in the past. Fifty-seven percent of consumer respondents reported owning amphibians for more than 4 years, and 64% reported having owned more than 4 amphibians.

Ninety-five percent of consumers indicated they currently own or have previously owned a frog or toad, while 38% reported owning, or having owned a newt/salamander. Thirty-six percent of consumers reported owning more than one species of amphibian and eighty-one percent reported either currently or previously also owning a reptile(s). Thirty-five percent of consumers reported owning amphibians for over 10 years.

Acquisition*:* Ninety-two percent of consumers indicated they had purchased an amphibian(s), while 24% indicated they had rescued or found a pet amphibian(s) and 19% reported having collected a pet amphibian from the wild. The majority (59%) of consumers reported having purchased an amphibian(s) from an "In-store retailer/pet store", while 49% reported having purchased from an online retailer. One-half (50%) of consumers reported paying $1-$25 per month to care for their pet amphibian while 39% of consumers indicated they spent between $26-$75 for their most recently acquired amphibian;

Ownership importance*:* Consumers were presented with 7 factors potentially influencing their decision to own their most recently acquired amphibian. Scientific or educational value, sense of companionship, and aesthetic and environmental values were relatively more important than religious significance, cultural significance, and family favorites. Most consumers indicated being at least moderately familiar with general knowledge of amphibians, the role of amphibians in the environment, status/trends of amphibian populations, and benefits to humans from amphibians.

Care and disposal of amphibians*:* Consumers mainly acquired information about caring for their pet amphibian(s) from websites (92%), personal experience (87%), and scientific journals (61%). Ninety-one percent of consumers indicated they had never become unable to keep or been forced to get rid of a pet amphibian. Of those that had been forced to get rid of an amphibian, the most common reason (41%) was family relocation, followed by inability to care for it (22%). No respondents indicated they had released the animal into nature.

Sixty-three percent of consumers indicated their amphibians receive veterinary care or diagnostic tests as needed, and 99% indicated a willingness to seek veterinary care or administer treatment at home if their pet amphibian showed signs of illness. Seventy-nine percent of consumers reported having had a pet amphibian die; 61% of those disposed of the animal through burial.

Awareness of and concerns regarding pathogens*:* A majority of consumer respondents (63%) indicated that before reading the survey they were unaware of *Bacillus mycoides* or other beneficial microbes, and their ability to impede growth of harmful microbes and increase disease resistance in amphibians. Seventy percent of consumers indicated, prior to reading the survey, they were aware that the *Bd*, *Bsal*, and *Rv* pathogens can be transmitted through the pet trade. Most consumers (64%) indicated they were "not at all concerned" when acquiring their most recent amphibian that the animal may have been previously infected with *Bd*, *Bsal*, or *Rv*, while 23% reported being "very concerned". Ninety-six percent of consumers reported having never detected harmful pathogens in their amphibians. One respondent reported that Bsal was detected in their pet amphibian(s), although this response is highly surprising, because: (1) only a limited number of U.S. laboratories are known to be testing for Bsal infection (using qPCR) and confirming the disease Bsal chytridiomycosis (via histopathology), (2) it is best practice for laboratories that record positive results for a novel pathogen to have a second laboratory confirm a positive Bsal result to minimize uncertainty, and (3) known Bsal testing laboratories have been instructed to report results to the North American Bsal Task Force, which has not occurred to date.

Perception of threats: Eighty-four percent of consumers agreed the threat of transmission of *Rv*, *Bd*, and *Bsal* pathogens from pets to natural areas is serious and 92% percent somewhat or strongly agreed that protecting natural populations of amphibians from *Rv*, *Bd*, and *Bsal* is important, although only 36% of consumers somewhat or strongly agreed they know what it takes to keep amphibians free of *Rv*, *Bd*, and *Bsal*. The majority of consumers indicated they were extremely likely to take prescribed steps to limit the spread of harmful pathogens to natural areas.

Value of pathogen-free amphibians*:* Seventy-nine percent of consumers indicated it would be extremely or very important that the animal they acquire be free of the *Bd*, *Bsal*, and *Rv*. Seventy-six percent indicated they would be willing to pay more for an amphibian that is certified free of the *Bd*, *Bsal*, and *Rv* pathogens.

Business survey

Business characteristics*:* Of 143 business responding businesses, 59% identified themselves as amphibian breeders, 57% as retailers, 14% as wholesalers, and 5% as amphibian importers. Twenty-five percent of businesses identified as more than one type of business.

Seventy-five percent of amphibian business respondents indicated they deal with both reptiles and amphibians, while 16% deal with amphibians only. Eighty-one percent of businesses reported obtaining their amphibians from breeders, followed by hobbyists (66%), wholesalers (60%), retailers (26%), importers (24%) and wild caught (14%). Eighty-four percent of business respondents indicated they sell to hobbyists, 67% to households, 29% to breeders, 26% to retailers and 11% to wholesalers. Almost a third (29%) of businesses indicated they had been in the amphibian business for over 20 years, while 19% reported having been in business for 11-20 years; another 19% indicated they had been in business for 6-10 years. In terms of annual business sales, 30% reported less than $5,000 while 20% reported annual sales of over $1,000,000. Of the remaining businesses, 17% indicated annual sales of $5,000-$50,000, 13% reported $500,000-$1,000,000, 11% reported $200,000-$500,000, and 8% reported $50,000-$200,000. The Midwest region of the country accounted for the most business respondents to the survey (33%), followed by the Southeast (20%), with respondents being relatively evenly distributed across the other regions of the country. Eighty-two percent of respondents indicated they only conduct business with buyers and sellers of amphibians in the United States.

Share of amphibian business*:* Approximately half (51%) of businesses indicated that amphibians accounted for less than 10% of their total sales, while 23% reported amphibians accounted for 10%-25% of total sales, 12% reported 76%-100%, 8% reported 26%-50% and the remaining 6% reported amphibian sales accounted for 51%-75% of their total sales.

Factors important in business decisions: When asked to rate the importance of various factors in making business decisions, a high level of importance was placed on issues of ethics, social concerns, and legal compliance.

Awareness of and concerns regarding pathogens: Most businesses (53%) indicated that before reading the survey they were unaware of beneficial microbes, such as *Bacillus mycoides*, that can inhibit growth of pathogens and increase disease resistance in amphibians. Almost half (47%) of businesses indicated that they would definitely consider administering treatment to their amphibian(s) using "probiotics" such as *Bacillus mycoides,* while 53% indicated they would need more information. Eighty-one percent of businesses indicated, prior to reading the survey, they were aware that the pathogens *Bd*, *Bsal*, *Rv* can be transmitted through the pet trade.

Seventeen percent of businesses indicated a harmful pathogen had been detected at their facility. Two percent of respondents (2 businesses) indicated detecting Bsal at their facilities. This response is highly surprising for the same reasons stated above. To date, no known detections of Bsal have been reported in North America.

Perception of threats: More than half (55%) of businesses indicated they were very concerned that transmission of pathogens through the trade network of pets or pet products may impact the amphibians in their facility.

Experience and attitudes toward amphibian health: Sixty-three percent of businesses reported having an amphibian die of illness or disease at their facility. The average approximate value of total loss (including treatment, care, and disposal cost) resulting from the illness or death was $940. Eighty-five percent of businesses indicated they somewhat or strongly agreed the threat of transmission of the *Bd*, *Bsal*, and *Rv* pathogens from pets to natural areas is serious, 87% indicated they somewhat or strongly agreed protecting natural populations of amphibians from *Bd*, *Bsal*, and *Rv* is important to their business, and 90% somewhat or strongly agreed businesses should actively take part in preventing transmission of *Bd*, *Bsal*, and *Rv* in the pet trade network.

Biosecurity practices: While most (92%) businesses indicated they use disinfectants to clean surfaces and tanks, use gloves when handling animals (60%) and quarantine new animals in a separate room (66%), fewer businesses test new acquisitions for pathogens (18%), conduct testing to monitor for disease (22%), or treat recirculating water (23%) or wastewater (24%) prior to disposal. Only a quarter (25%) of respondent businesses indicated having the capacity to improve biosecurity practices at their facility without increasing costs.

Value of pathogen-free amphibians: Eighty-six percent of businesses indicated it was extremely or very important that animals be healthy and free of the *Bd*, *Bsal*, and *Rv* pathogens when introduced to their facility. Ninety-seven percent indicated they would be interested in acquiring an animal that is certified as free of the *Bd*, *Bsal*, and *Rv* pathogens and 59% indicated they would be willing to pay more for an animal that is certified as free of the *Bd*, *Bsal*, and *Rv* pathogens. Of those willing to pay more, 22% indicated they would be willing to pay 1%-5% more, 36% indicated 6%-10% more, and 28% indicated they would be willing to pay 11%-20% more.

Conclusions:

Amphibian businesses and consumers in the United States acquire their animals from a variety of sources and are concerned about the potential for pathogen transmission. Consumers and businesses alike believe that the threat of harmful pathogens to their pets and natural areas is serious, which indicates the severity of risk as perceived by stakeholders. While a substantial portion of respondents showed interest in beneficial microbes, relative lack of awareness about their benefit(s) indicates that some outreach and education may be needed to create a demand for this treatment option. Finally, both consumers and businesses expressed a strong preference for amphibians that are free of harmful pathogens and indicated a willingness to pay a significant price premium to acquire certified disease-free animals. This implies a viability of a market-based certification mechanism to help promote a clean trade, free of the *Bd*, *Bsal*, and *Rv* pathogens, and the long-term sustainability of the amphibian pet industry. Finally, these findings are based on a pilot study of a limited number of respondents and a more detailed study is warranted to enhance the generalizability of these conclusions.

From: Dan Silver <dsilverla@me.com>
Sent: Saturday, April 29, 2023 11:14 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Item 6, Wildlife Resources Committee, May 23, 2023, Bullfrogs and non-native turtles

Hon Chair and Commission Members:

Endangered Habitats League urges you to take all steps, including import prohibition, to protect California ecosystems from these invasive species.

Thank you

Sincerely,
Dan Silver

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