



## **Assessing Risk Communication in the Pet and Aquarium Trade: An Analysis of Outreach and Engagement Efforts**

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## Abstract

The international pet and aquarium trade, and intentional or unintentional release of those pets by individuals, has contributed to the establishment of many species to areas where they are not native, resulting in detrimental consequences to local ecosystems, economies, and livelihoods. A number of outreach campaigns across the United States aim to communicate the risk of non-native pet release through education and the offering of alternative solutions to pet owners who are no longer able to care for their pets. Through semi-structured interviews with campaign managers, content analysis of campaign materials, and an analysis of relevant online search results, our project aims to assess the scope of these outreach strategies to understand whether they are effectively intervening in an individual's decision-making process to release a non-native pet. Ultimately, this project's outcomes will ensure that economic and human resources invested in risk communication campaigns are using effective and inclusive techniques.

## Background

Non-native pet ownership is a growing fad in the United States and some sources estimate that 1 in 10 households own this type of pet (e.g., non-native pet includes fish, ferrets, rabbits, hamsters, guinea pigs, gerbils, turtles, snakes, lizards, pigeons, poultry, livestock, and other rodents, birds, and reptiles; AVMA, 2012). The international pet and aquarium trade, and intentional or unintentional release of those organisms by individuals, has contributed to many non-native species establishing in areas where they did not originate (Duggan, 2010; Patoka et al., 2018). These releases may have unintended, but detrimental consequences to local ecosystems, particularly if a non-native species establishes a breeding population. It is estimated that global damages inflicted by non-native species have totaled nearly \$1.3 trillion (2017 U.S. dollars) over the past 50 years (Zenni et al. 2021). Little research has been conducted on non-native pet and aquarium release as a vector which makes communicating the risk difficult. However, many organizations and agencies across the United States have initiated an array of outreach campaigns – defined here as a set of organized messages found in promotional materials focused on an identified goal – in an attempt to address repercussions and offer alternative actions to pet and aquarium releases.

Currently, the U.S. Fish and Wildlife Service provides support and works alongside its partners and industry to implement programs that are intended to educate people to be responsible pet owners and environmental stewards. Additionally, state-specific campaigns (e.g., Illinois' Release Zero, Michigan's Ripple) attempt to reach local audiences through both traditional and community-based marketing techniques. Episcopio-Sturgeon and Pienaar (2020) suggest that communication surrounding the risk of pet and aquarium release may be better focused on educating new non-native pet owners about the traits and care of their desired pet, as well as communicating options to adopt out their pets should they no longer want to own. A baseline understanding of existing outreach campaigns as related to pet and aquarium release is essential to determine whether these efforts align with recent studies on pet trade risk communication.

## Project Purpose

1

Understand the collective goals of outreach campaigns across the United States related to preventing the release of non-native species found within the pet and aquarium trade.

2

Assess the scope of communication strategies used in relevant outreach campaigns to understand whether and how they are effectively intervening in an individual's decision-making process to release a non-native pet.

# Insights from the Literature

A comprehensive literature review was conducted to collate published research pertaining to pet owner motivations and behavior change. The literature was analyzed and main findings compiled.

## Understanding Pet Owners

Effective outreach campaigns understand their audience's values and attitudes toward a particular issue and use targeted messaging to shift behavior in the desired direction (Leuvan et al. 2022). To effectively communicate with pet owners, then, it is important to understand the individual motivations behind pet ownership. Crowell-Davis (2008) studied drivers of pet ownership and grouped motivations into **6 broad categories**:

1. Some people own pets so that they can **perceive and relate to them as humans**. The animal is seen as a companion, friend, or family member. This is the most common reason for pet ownership.
2. Some people own pets as **pieces of equipment**. These animals serve a function, such as protecting, herding, or hunting.
3. Some people own pets as **avocations**, exhibiting or showing them. These animals are perceived as property to be bought or sold.
4. Some people own pets as **status symbols**. These animals are kept to exhibit wealth or power.
5. Some people own pets as **ornaments** (colorful fish or birds with colorful plumage). These animals are kept specifically for their aesthetic value.
6. Some people consider pets to be **objects in their environment** that function as extensions of themselves. This relationship may be a subconscious one.

This view of pet owner motivation can begin to inform our understanding of the variety of reasons a pet owner might make the decision to release their pet into the wild. For example, pet owners may make different decisions about how to help a sick pet, discipline or punish a misbehaving pet, or dispose of a pet they see as no longer "performing" (Corwell-Davis, 2008).

## Identifying Drivers for Release

The release rate of unwanted pets is generally unknown and understudied. However, reasons for release may include inability to care for animals that are sick, old, aggressive, or large (Duggan et al., 2006; Holmberg et al., 2015; Stringham and Lockwood, 2018).

One study found that only 8% of pet owners admitted to releasing unwanted pets. Reasons for release were related to excessive growth of the pet and/or lack of space, desire to return the animal to the wild, seeking better conditions for the animal, lack of time for care, and accidental release (Banha et. al., 2019).

Education and pet trade regulation could play a role in influencing ownership motivation and pet and aquarium release risk. Formation of extensive information campaigns that utilize specialized media, social networks, and smartphone apps could be essential before new invasive species policies are enacted in the future (Patoka et al., 2018).

## Influencing Behavior

The scientific literature offers several concepts and theories regarding social influences of behavior change relevant to this project. This section summarizes the most notable theories and concepts along with their practical applications.

The Theory of Planned Behavior (Ajzen 1991) is perhaps the most relevant concept in this study and, in fact, serves as a model for at least two of the campaigns we identified in the study (see campaign analysis methods section). This theory describes three main factors which inform one's intention to behave a certain way (Figure 1). Those factors include one's attitude about the behavior (e.g., "Do I like it?"), influential social or subjective norms (e.g., "What do others think of this?"), and perceived behavioral control or self-efficacy (e.g., "Do I have the right skills or resources to do this?"). These three factors combine to inform one's intention to behave in a certain way, which then may or may not result in the desired behavior. Affirmative acknowledgment of each step of this process is essential to result in the desired behavior. If a person 1) does not like or agree with the behavior, 2) does not see peers or respected others doing the behavior, or thinks it is too risky to go against norms, or 3) does not think they have the necessary skills to behave in the desired way, the desired behavior will likely not occur. Furthermore, even if these three elements are satisfactory (i.e., "I like it, this is normal, and I have the skills."), there can be an "intention-action gap," where there remains some barrier or friction to acting in accordance with the intention.

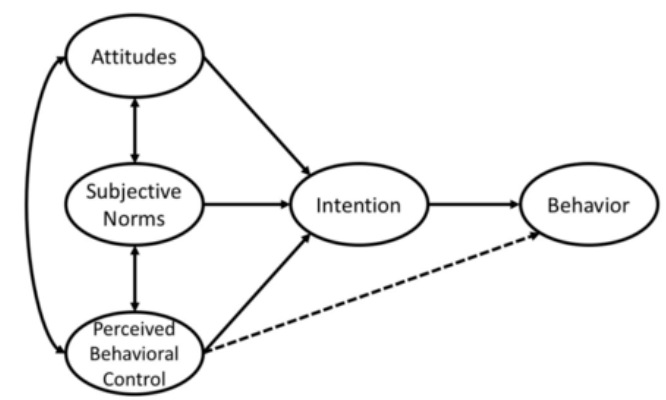


Figure 1. Schematic to help visualize the Theory of Planned Behavior (Ajzen 1991).

The Theory of Planned Behavior is useful in identifying an ideal scenario towards desired behavior and designing outreach campaigns to ensure each element is present. For example, in positively influencing someone's attitude about a behavior, we can consider Frame Theory, which asks the question "Are some ways of presenting the same information more persuasive than others?" (Stern 2018). Framing an issue as local and relevant to the identified audience can produce greater motivation to act than framing that is focused on more physically or psychologically distant issues. Similarly, the Availability Heuristic concept presents a mental shortcut that we use to assess the probability that something is true based on how easily we can recall personal experiences with the issue (Stern 2018). We are prone to underestimate the significance of something if we lack personal experience with it, which may come into play if a person is unaware, for example, of the decline of biodiversity in their local ecosystem.

The need to belong is a powerful drive behind our behavior, and we can use this understanding to ensure activation of behaviors is durable. Identity Theory helps us to understand the interplay between how one sees themselves and their perception of how others see them. When internal and external identities are in congruence, positive emotions and agency result, whereas “role confusion” can result in embarrassment, shame, or guilt. These negative emotions can drive behavior. This concept is important to understand in designing outreach campaigns, particularly those which attempt to activate certain identities (e.g., “responsible pet owner”) or integrate consequences to undesirable behavior. Generally, it is more effective to motivate an individual towards positive action (“do this!”) as opposed to shaming them away from negative action (“don’t do this...or else!”) (Luevan et al. 2022). This optimism and pride, or perceived behavioral control as outlined in the Theory of Planned Behavior, is essential for an individual to maintain motivation in the face of daunting challenges, particularly those at a large ecological scale (McAfee et al. 2019). Offering clear, simple, and accessible steps to action enhance an individual’s ability to act in a desired way.

The identities we hold in a larger societal context invoke Social Norm Theory, which explores those unwritten rules about how to behave in a certain setting (Cialdini et al. 2006, Mascia & Mills 2018). By understanding Descriptive social norms (how people typically behave) and Injunctive social norms (how we think we *should* behave), we can begin to identify reference groups which hold power to influence others and activate both internal and external values and attitudes towards behavior. Practically, this can be accomplished by highlighting positive social proof that others are doing the behavior, drawing attention to the desired norm, engaging the right messenger to represent the behavior, and tailor messages to speak to identity-related values. Importantly, a common pitfall of outreach campaigns is to focus messaging on the undesirable behavior, which could be unintentionally emphasizing a social norm. In other words, if the majority of messaging speaks to “not releasing a pet” this could send a message that many pet owners take this route, which requires an individual to decide to go against this perceived norm.

Regarding invoking fear or emphasizing risk in undesirable actions taken (i.e., “If you do this, there will be consequences”), we can look to the Extended Parallel Process Model for Fear Appraisals (Maloney et al., 2011). Fear appraisals can be effective at influencing behavior if the recipient of the message experiences both 1) the feeling of a salient threat, and 2) a belief that the threat can be adequately averted. If no fear is inspired, then no desired response is likely. If fear is inspired without a sense of efficacy, or belief in one’s ability to avert the threat, then undesirable behavioral responses including denial or avoidance are likely. Research shows that imagery choice in outreach can influence salience or efficacy, but rarely both (Wright et al. 2014). Images tend to either heighten people’s perceived importance of environmental issues (salience) or their perception of their ability to effect change (efficacy). Figure 2 below outlines this often-subconscious process.

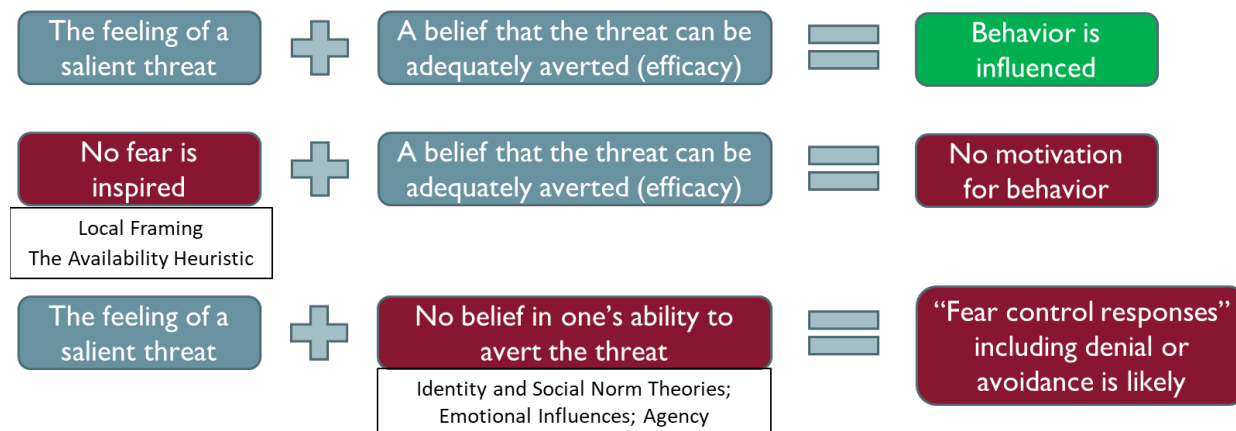


Figure 2: Outline of the process of using fear/risk/threat models for behavior change.

Important concepts in effective communications include anchoring, or being influenced by the information we hear first, and choice overload, which is becoming paralyzed by too many options especially if we are unsure of what we want (Leuvan et al. 2022). The latter can be avoided by using “chunk theory,” which suggests that five or fewer choices are ideal, and if more are necessary, that grouping into like categories helps an individual to narrow down the options which make sense for them. We can apply both anchoring and choice theory by offering a short set of prioritized actions to an audience.

There are many other effective communications techniques which can inform outreach efforts (Luevan et al. 2022). Competing for someone’s attention is difficult in our information-saturated world, so designing messages to be vivid, novel, clear, and relatable are of utmost importance. Repetition of consistent messages across platforms and messengers is key to avoiding confusion or competition. Using prompts in the decision-making moment (i.e., moment when the desired action would actually take place) can be highly influential. Critical components of the prompts are that they happen in the space and time of the decision being made and call out a specific behavior which the audience either already knows how to do or which requires little instruction. These prompts are ideally polite, uplifting, and non-demanding so as to empower the individual and avoid shame or embarrassment (McAfee et al. 2019).

Community-based social marketing (CBSM) provides a useful framework to tie several of these theories and concepts together (Ackbar et al. 2021, Ackbar et al. 2022, McKenzie-Mohr n.d.). Community-based social marketing offers an alternative to informational-only campaigns and instead encourages intentionally engaging community members at a local level using relevant and barrier-free messaging. Designing campaigns using CBSM requires engagement of the people directly involved with or impacted by the issue at hand, to ensure an adequate understanding of how to align actions with values, identify barriers to success, and promote the message throughout the established network. Community-based social marketing also emphasizes regular evaluation of the efforts, to ensure the campaign is keeping up with changes in norms, barriers, or contextual influences on the issue.

# Campaign Analysis Methods

To meet our project objectives, we utilized a mixed method approach to data collection and analysis. We used a combination of semi-structured interviews, content analysis, and statistical analysis of web search results. This combination of insights allowed us to crosswalk the common messaging used in outreach campaigns with theoretical and exhibited behavior of pet owners to ultimately evaluate whether campaigns are effectively reaching their desired audiences.

An online search was conducted to identify existing outreach campaigns from around the United States targeting pet owners from February 2022 to March 2022. Campaigns or education programs were considered for further evaluation if they focused on preventing non-native pet release and if outreach materials (i.e., flyers, posters, brochures, social media posts, education materials) were utilized to communicate with their audience. Eight focal campaigns were selected to represent a wide geography and a variety of local, state, and federal agency programs, and non-government organizations (NGOs). Figure 3 shows the process used by our team to narrow our selection.

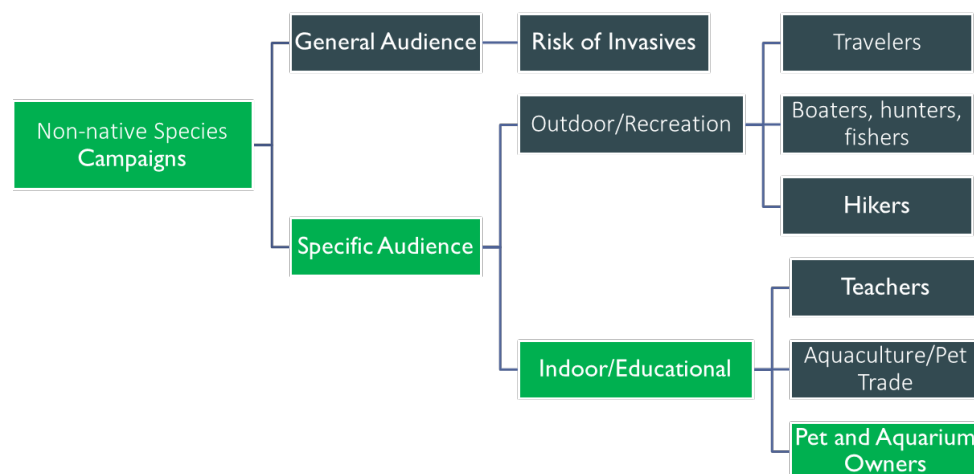


Figure 3: Flow chart depicting how focal campaigns were selected. The green path indicates the path followed by our team to select campaigns that focused on pet ownership and pet and aquarium release.

## **Focal Campaigns**

Listed below are the focal campaigns that were chosen, accompanied by a purpose statement and a direct link to their online campaign or affiliated link.

- 1) [Florida Fish and Wildlife Conservation Commission - Exotic Pet Amnesty Program](#)  
Purpose Statement: "To reduce the number of nonnative species released into the wild, the Exotic Pet Amnesty Program offers a free and legal opportunity for Florida residents to surrender nonnative pets they are no longer able to keep."  
[Exotic Pet Amnesty Program | FWC \(myfwc.com\)](#)



2) Be a Hero Release Zero / TakeAIM

Purpose Statement: "The Be a Hero campaign provides tools for recreational water users, terrestrial recreationists and organisms-in-trade hobbyists to prevent the spread of invasive species."

[Release Zero \(transportzero.org\)](https://transportzero.org)

Purpose Statement: "This website provides individuals with the information and tools they need to help prevent the spread of aquatic invasive species commonly found in trade."

[AIM | Aquatic Invaders in the Marketplace Aquatic Invaders in the Marketplace \(takeaim.org\)](https://takeaim.org)

3) Don't Let it Loose!

Purpose Statement: "Whether you're just curious about how released pets can become invasive species or you're looking for rehoming advice for your pet, Don't Let It Loose™ is here to help. Use the resources found throughout this website to learn more about how released pets can become invasive species and about how you can help."

[Don't Let It Loose | Promoting responsible pet ownership. \(dontletitloose.com\)](https://dontletitloose.com)

4) Georgia Department of Natural Resources - Aquatic Nuisance Species Education Program

Purpose Statement: "Educate grade school kids and teachers about aquatic nuisance species in our state and how they can help."

[Aquatic Nuisance Species \(ANS\) in Georgia | Department Of Natural Resources Division \(georgiawildlife.com\)](https://georgiawildlife.com)

5) Minnesota Department of Natural Resources - Aquatic Invasive Species Social Marketing Project

Purpose Statement: "The project aims to promote the adoption of desirable aquatic invasive species (AIS) prevention behaviors and create positive social norms around AIS prevention in Minnesota."

[Aquarium and Pond Hobbyist Survey for AIS Prevention 2021 \(state.mn.us\)](https://state.mn.us)

6) Texas Parks and Wildlife - Never Dump Your Tank

Purpose Statement: "Motivate aquarium owners to dispose of any unwanted aquarium fish, plants or animals in a safe, responsible, and humane fashion in order to stop the introduction and spread of aquatic invasive species and help preserve native Texas ecosystems."

[Never Dump Your Tank \(texasinvasives.org\)](https://texasinvasives.org)

7) Habitattitude / Pet Advocacy Network

Purpose Statement: "This educational campaign with the uncommon name addresses common concerns of private enterprise, state and federal natural resource agencies, and responsible pet owners: protecting our environment from the impacts of invasive species. Habitattitude™ seeks to inspire and empower people to explore the connection between responsible pet ownership and environmental stewardship."

[Habitattitude™ | Protect Our Environment From Invasive Species](https://habitattitude.com)

Purpose Statement: “We are the policy voice of the responsible pet care community, advocating for pet care priorities at the local, state, federal and international levels.”

[The Voice of the Responsible Pet Care Community - Pet Advocacy Network](#)

8) Reduce Invasive Pet and PLant Escapes (RIPPLE)

Purpose Statement: “Working with aquarium and water garden owners and retailers to ensure Michigan's waterways are protected against invasive species.”

[RIPPLE: Reduce Invasive Pet and PLant Escapes \(michigan.gov\)](#)

### **Semi-structured Interviews**

The goal of the interviews with campaign affiliates was to further learn about campaign audiences, messaging, challenges, and monitoring efforts. Video interviews were conducted via Microsoft Teams, recorded, and transcribed for theme identification (this was done manually).

Campaign affiliates were interviewed using a semi-structured technique, following a list of pre-prepared questions (see Appendix A) and allowing for follow-up questions when relevant. Campaign materials such as brochures, posters, informational handouts, classroom education packets, and news articles were collected both before and during interviews.

### **Outreach Materials**

Sixty-one unique outreach materials were collected and analyzed from the eight focal campaigns and from 11 other pet and aquarium release campaigns which met our inclusion criteria (i.e., within the United States, available materials).

Each outreach material was assessed using a matrix of questions to determine the following messaging elements: species and audience focus, whether audience was instructed to do something or not do something (i.e., “action orientation”), message framing, order of listed alternatives to dumping/release, imagery style, and whether the material implied social pressure to act or a risk to inaction (see Appendix B).



## **Web Engine Search**

The internet search engines Google and Bing were used in “incognito” mode to search for combinations of: five "stems", eight "actions", and four "taxa" (Table 1).

*Table 1: Combinations for stems, actions, and taxa that were pulled into the internet search engines.*

| Stem                 | Action  | Taxa                              |
|----------------------|---|-----------------------------------|
| Can I...             | release, let go of, get rid of, give away, surrender, rehome, kill, euthanize | My...<br>pet, fish, snake, turtle |
| How do I...          |   |                                   |
| Should I...          |   |                                   |
| What happens if I... |   |                                   |
| Where can I...       |   |                                   |

We developed a hypothesis of user search motivations, outlined below. The five stems represent two search directions, depending on the user’s motivation.

### **Search Direction**

**Solution-seeking:** Consideration of ease of or access to solution

- Where can I \_\_\_\_ my...?
- How do I \_\_\_\_ my...?

**Permission-seeking:** Consideration of consequence or risk; Concern for pet or self-image

- Can I \_\_\_\_ my...?
- Should I \_\_\_\_ my...?
- What happens if I \_\_\_\_ my...?

The eight actions represent three pre-decision intentions of the user, divided by whether they are seeking information about their pet’s ability to continue to live in the wild, not in the wild, or not at all.

### **Pre-Decision Intention**

**Into Wild:**

- Release (pet “freed” from human care)
- Let go of (human-focused decision point)
- Get rid of (high motivation: “dumper”)

**Not Into Wild:**

- Give away (possession-focused)
- Surrender (human-focused decision point)
- Rehome (pet seen as part of family)

**End-of-life:**

- Kill (non-technical)
- Euthanize (seeking no-pain solution)

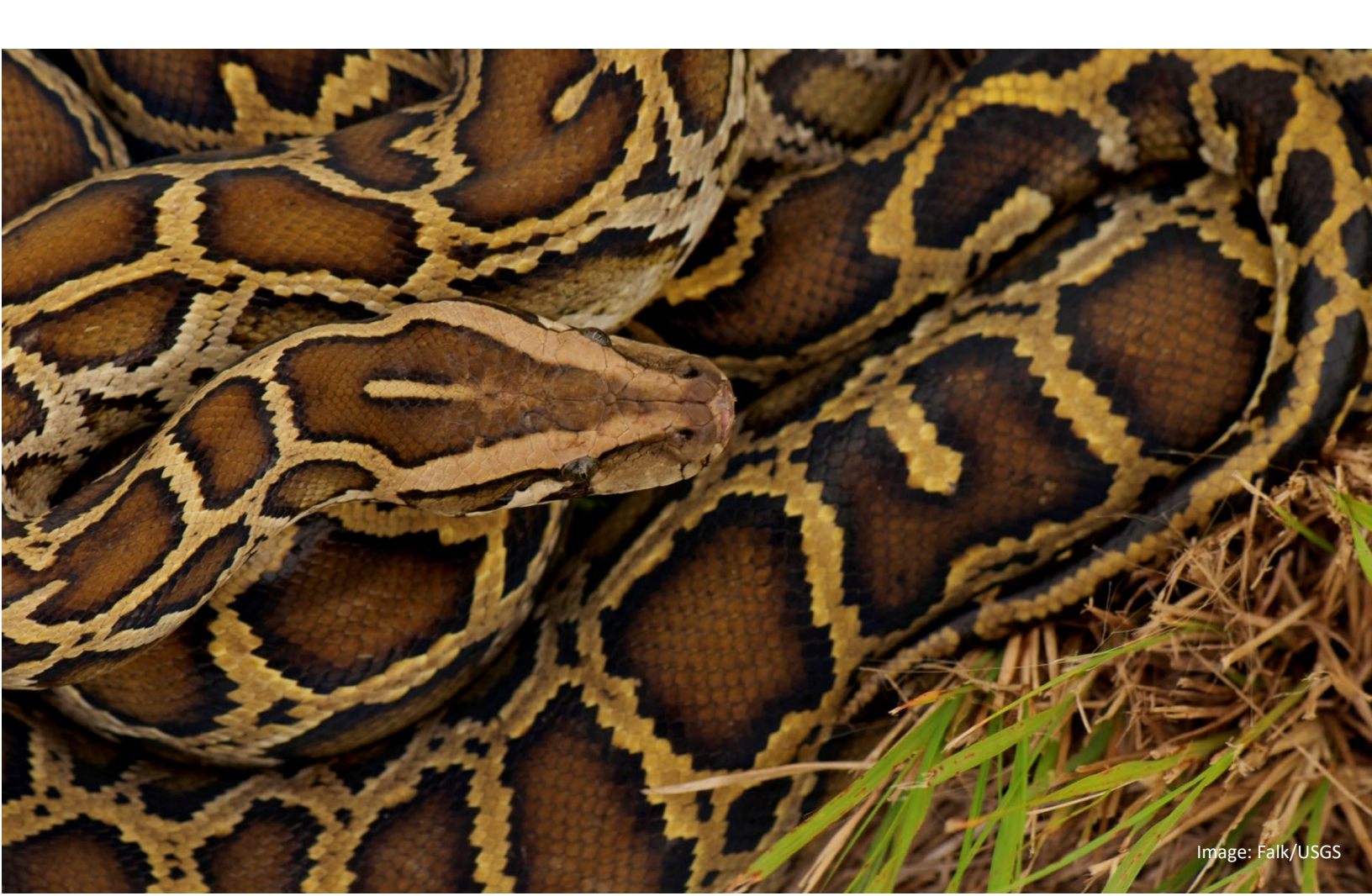


The four taxa were determined by identifying the top taxa found within the U.S. Geological Survey's Nonindigenous Aquatic Species (NAS) database. The NAS database defines the use of the word "pet" as a general term for organisms in trade that are held as ornamentals or pets by the public.

When combined, 160 unique search terms (e.g., "Where can I give away my turtle?") were used in this part of the study.

The top 10 web page titles that resulted from the stem-action-taxa searches were recorded, as well as whether each result represented one of our selected campaigns, a public forum, video, or advertisement.

To determine common words which resulted in each search, web page titles were entered into a word counter (databasics.io) to identify the most common unigrams (single word). Then, we used the Word Clouds R package (<https://cran.r-project.org/web/packages/wordcloud/index.html>) and the R program (Version 4.2.2; <https://www.r-project.org/>). A Word Cloud presents text data with the size of the word reflecting frequency. We identified the prevalence of unigrams within six search groupings, i.e., permission and solution-seeking in the wild, into the wild, and end of life. We then compared prevalent unigrams among the groupings to understand what unigrams should be included in campaigns so that campaigns can effectively reach their desired audience.

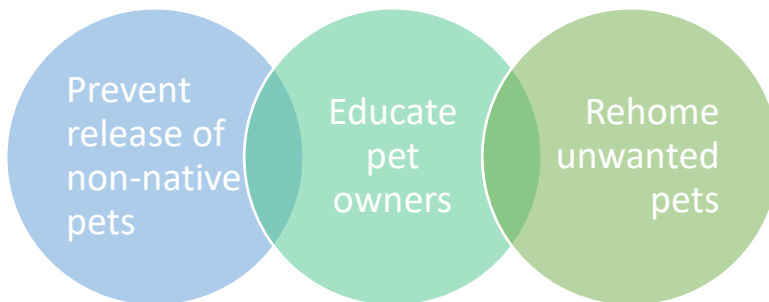


# Key Findings

## Campaign Affiliate Interview Themes

We interviewed nine campaign affiliates from the eight focal campaigns between April and May of 2022 and heard three fundamental objectives primary to all campaigns. These included: 1) changing behavior, 2) encouraging responsible pet ownership, and 3) engaging collaborative partnerships.

The fundamental objectives inform the three means objectives, or means to achieving the fundamental objectives, commonly expressed in our campaign interviews (Figure 4). These objectives were to: 1) prevent the release of non-native pets, 2) educate pet owners and retailers, and 3) rehome unwanted pets.



*Figure 4: Objectives commonly expressed by campaign affiliates during interviews.*

Two of the eight campaigns are informed by CBSM, while the remaining six did not recognize any particular social science or behavior change model in their campaign planning and implementation. Campaigns are most often engaging their audiences through face-to-face discussions, digital media (social and website), group presentations, and paper materials/signage.

Group presentations were often geared toward hobbyists, gardeners, or existing pet owners, even though studies have shown that these groups are already knowledgeable about the risks of releasing pet into the wild and are less likely to make that decision. These audiences may also be more connected to a community with rehoming options (Banha et al, 2019).

The target audiences were most often pet and aquarium owners but also included water garden hobbyists, retailers and distributors, recreationalists, and the general public.

When asked about the motivations of these audiences to participate in the campaign's action, the campaign affiliates recognize three motivations: 1) suggested actions are easy and low-cost, 2) the individual is excited to learn, or 3) they feel a sense of responsibility to act.

We found distinctions among the campaigns' intended messaging and tone, according to the campaign affiliates. Four of the eight campaigns strove for a positive or helpful tone, while three of the eight included messaging with a grim, dangerous, or risky tone. Two of the campaigns recognized the importance of educational information being "science-based" whereas one campaign explicitly chose a less scientific tone to appeal to a broader audience. Finally, four of the campaigns stressed the importance of focusing on



influencing the behavior of the individual, although exactly which behavior was desired differed between campaigns.

Image: USGS



We also asked about resource investment in the campaigns and found a wide variety of financial and staff investments. Official campaign staff ranged from one temporary staff member to several full-time staff, and several interviewees identified managing the campaign as one of several job responsibilities. Half of the campaigns were grant-funded, while others had annual funding built into organizational budgets.

Importantly, none of the campaign affiliates we interviewed identified formal monitoring efforts to assess the long-term success or impact of the campaign. Those which ran social media campaigns collected analytics, although were overall uncertain about the utility or meaningfulness of this information. Beyond this, they captured metrics related to the common objective of educating pet owners. These metrics

addressed reach and participation, such as number of materials distributed, number of attendees at presentations, and number of pet surrenders at targeted events. Nearly all of the affiliates expressed interest in learning more about how to evaluate change in behavior or attitude over time, while considering the varying capacities of the affiliates.

There were common challenges expressed by the campaign affiliates, as well. Given the range of investment in the campaigns, we heard all but one campaign described a lack of time/capacity, or inadequate funding. Three of the campaigns were challenged by connecting with other campaigns to collaborate, form partnerships, or share lessons learned and resources. Another expressed struggle was the low reach or participation of their audience.

## Campaign Messaging Findings

We reviewed 61 outreach materials (e.g., flyer, brochure, book) from 19 campaigns which met our inclusion criteria. We identified the apparent or stated audience for each material reviewed, binned into the eight categories shown in Figure 5. Pet Owners are the identified audience for most of the materials, with the general public (i.e., no indication of a more specific audience) applying to the second highest number of materials. The rest of the specific categories, Youth Pet Owners, Educators, Gardeners, Outdoor Recreationists, Retailers, and Adopters, have fewer than 10 materials from no more than three of the 19 campaigns.

### Intended Audience

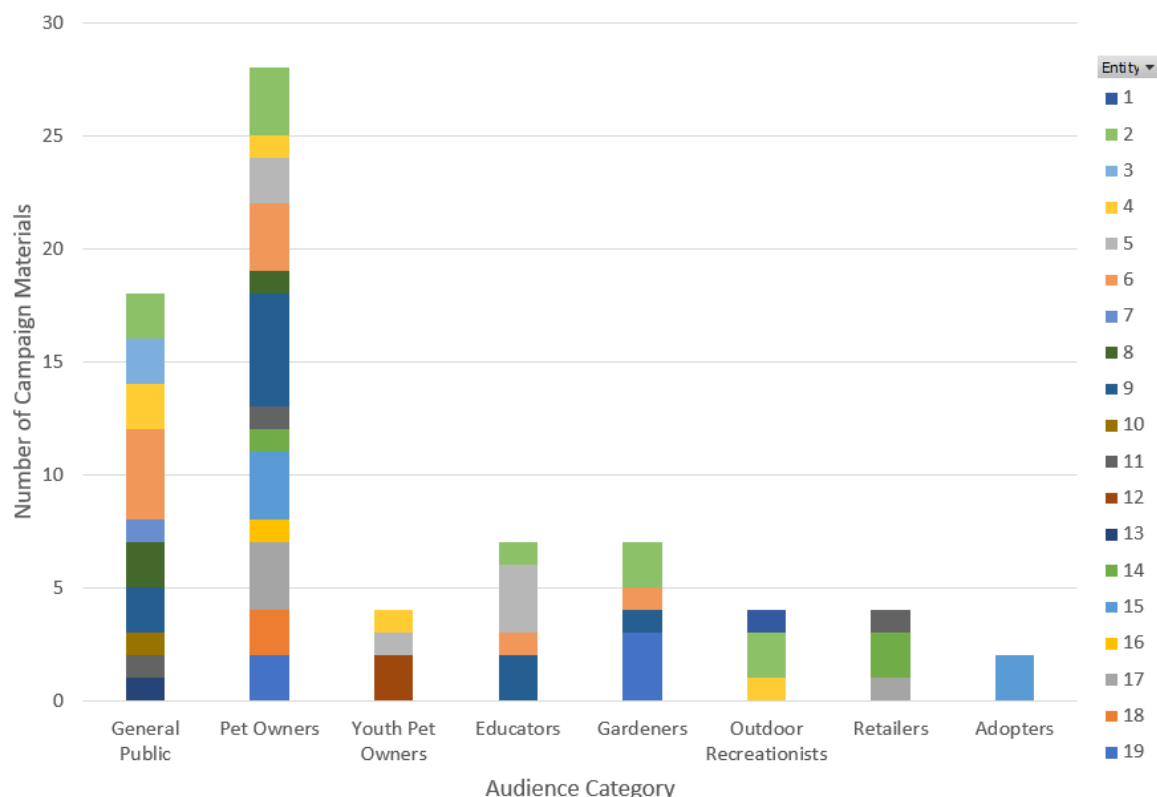


Figure 5: Target audience of campaign outreach materials by category.

### Action Orientation

We analyzed each outreach material's content to determine whether their messaging for the intended audience was to either Act ("do this") or Avoid ("don't do this"). The former, "do this," could include instructions on alternative actions one could take to releasing their pet, while the latter, "don't do this" might include, for example, language about not dumping aquarium water near waterways. The majority of materials (n=41) asked readers to avoid certain actions and offered alternative actions in their place. An equal number of materials (n=9) offered either language about avoiding or acting. That is, nine outreach

materials asked readers to “not do something” without suggesting alternative actions, while another nine materials asked readers to take a suggested action without specifying an action to avoid. Two materials did not specify any action (Table 2).

Table 2: Action orientation of campaign outreach materials.

| Action Orientation    | Number of Materials |
|-----------------------|---------------------|
| Both Avoid and Act    | 41                  |
| Avoid Only            | 9                   |
| Act Only              | 9                   |
| Neither Avoid nor Act | 2                   |

### Message Framing

We analyzed the content for loss content (e.g., some entity is negatively impacted) or gain content (e.g., some entity benefits), and in either case, identified the recipient of the loss or gain (e.g., native species experience increased competition for food). Forty-seven of 61 materials included a loss framing (Figure 6), while only four materials included gain-focused content. Native species and the ecosystem in general are identified in the campaign materials as the greatest source of environmental loss, with the economy identified nearly twice as often as other human-related losses.

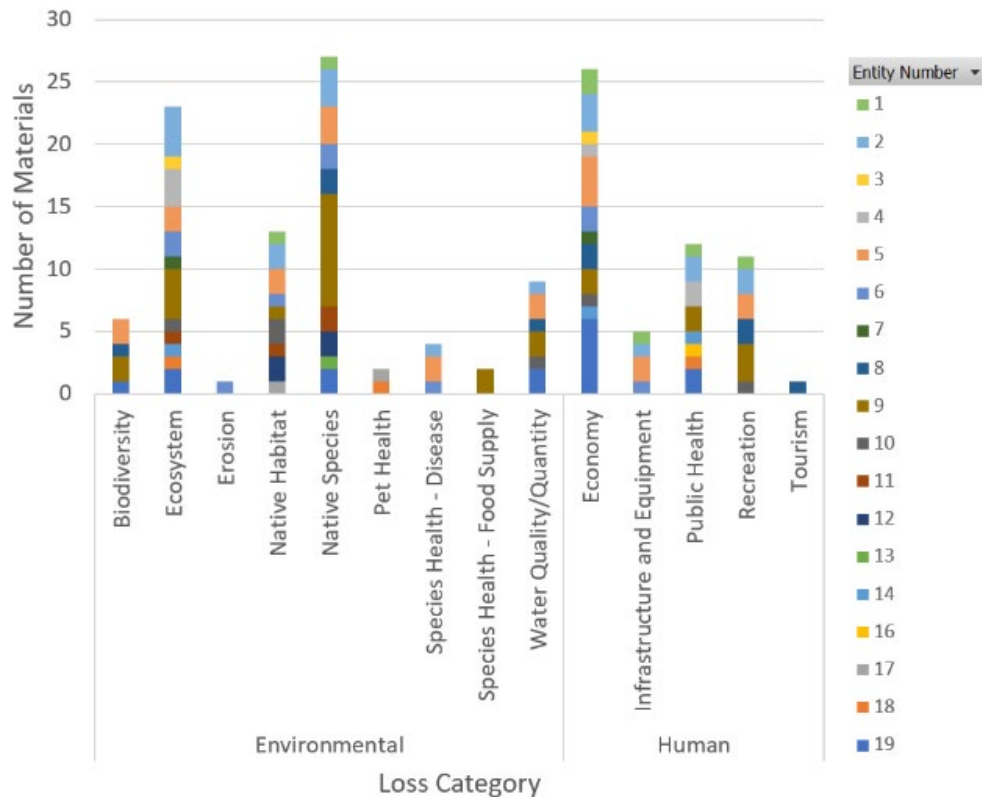


Figure 6: Representation of sources of loss as noted in campaign outreach materials when loss framing was used.



## Order of Recommendations

We found 51 of the 61 materials offered at least one recommended action to releasing a pet into the wild. Of those that offered recommendations, all but seven offered more than one (i.e., a list). The recommendations were binned into categories (Figure 7). Giving away or rehoming a pet was the most frequently suggested recommendation throughout all the suggestions. Second-most suggested in listed recommendations was “never release, dump, or move a non-native pet.” The third most common recommendation was similar to the first most common but specifically suggested returning the unwanted pet to a professional (e.g., pet store, veterinarian). When euthanasia was mentioned as a recommendation, the fourth most common suggestion, it was only in context of reaching out to a professional for assistance. The remaining 18 recommendations varied in order and frequency throughout the rest of the materials.

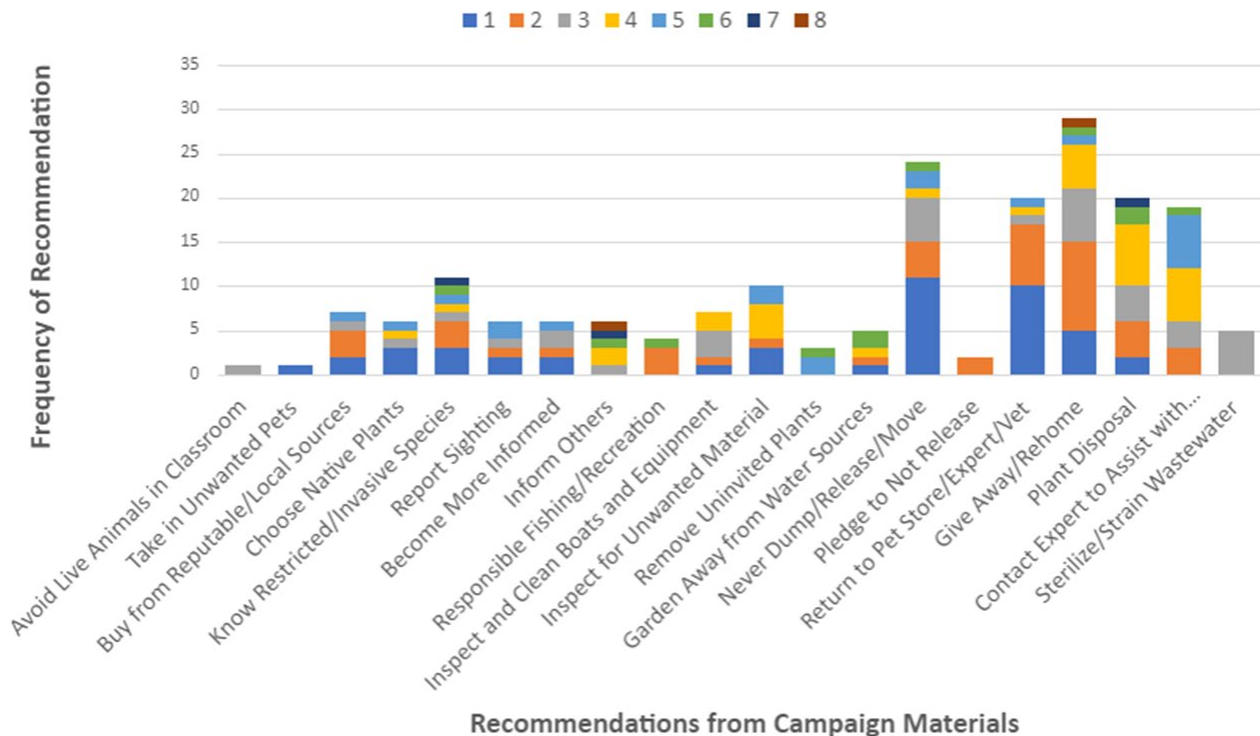


Figure 7: Frequency of recommendations listed in campaign outreach materials. Color coding represents the order of the recommendation's listing (i.e., first through eighth).

Table 3 demonstrates the diversity of recommendations which appear first in a list of suggestions, indicating that there is not a consistently suggested recommendation depending on which material someone is viewing. In other words, an individual viewing one material may receive a different set of suggestions than if they were to view a different material. We found 40% of listed recommendations fell within “Prevention Recommendations” which aim to prevent a release scenario altogether. Nearly half of the recommendations fell within the “Release Alternative” category, which focused on the idea that “if you are thinking about releasing your pet, do this instead”. The remaining recommendations qualified as “Avoidance Recommendations”, where release was discouraged but no recommendation or alternative was suggested. From this, it becomes clear that viewers may be getting very different advice on what to do with unwanted pets from campaigns that have a similar end goal. Furthermore, considering the amount of

time between when a pet owner receives a campaign material with a list of recommendations and when they actually consider releasing their pet, the “Release Alternatives” may be forgotten in the decision-making moment.

*Table 3: Recommendations from campaign outreach materials, with the order in which the recommendation was listed in the material, number of times that recommendation was listed in that order, and its relative proportion to the grand total of recommendations is shown.*

| Recommendations from Campaign Materials     | Order of Recommendations |           |           |           |           |           |          |          | Grand Total | Relative Proportion |
|---|--------------------------|-----------|-----------|-----------|-----------|-----------|----------|----------|-------------|---------------------|
|   | 1                        | 2         | 3         | 4         | 5         | 6         | 7        | 8        |             |                     |
| <b>Prevention Recommendations</b>           | <b>18</b>                | <b>14</b> | <b>11</b> | <b>11</b> | <b>10</b> | <b>6</b>  | <b>2</b> | <b>1</b> | <b>73</b>   | <b>38.0%</b>        |
| Avoid Live Animals in Classroom             | 0                        | 0         | 1         | 0         | 0         | 0         | 0        | 0        | 1           | 0.5%                |
| Take in Unwanted Pets                       | 1                        | 0         | 0         | 0         | 0         | 0         | 0        | 0        | 1           | 0.5%                |
| Buy from Reputable/Local Sources            | 2                        | 3         | 1         | 0         | 1         | 0         | 0        | 0        | 7           | 3.6%                |
| Choose Native Plants                        | 3                        | 0         | 1         | 1         | 1         | 0         | 0        | 0        | 6           | 3.1%                |
| Know Restricted/Invasive Species            | 3                        | 3         | 1         | 1         | 1         | 1         | 1        | 0        | 11          | 5.7%                |
| Report Sighting                             | 2                        | 1         | 1         | 0         | 2         | 0         | 0        | 0        | 6           | 3.1%                |
| Become More Informed                        | 2                        | 1         | 2         | 0         | 1         | 0         | 0        | 0        | 6           | 3.1%                |
| Inform Others                               | 0                        | 0         | 1         | 2         | 0         | 1         | 1        | 1        | 6           | 3.1%                |
| Responsible Fishing/Recreation              | 0                        | 3         | 0         | 0         | 0         | 1         | 0        | 0        | 4           | 2.1%                |
| Inspect and Clean Boats and Equipment       | 1                        | 1         | 3         | 2         | 0         | 0         | 0        | 0        | 7           | 3.6%                |
| Inspect for Unwanted Material               | 3                        | 1         | 0         | 4         | 2         | 0         | 0        | 0        | 10          | 5.2%                |
| Remove Uninvited Plants                     | 0                        | 0         | 0         | 0         | 2         | 1         | 0        | 0        | 3           | 1.6%                |
| Garden Away from Water Sources              | 1                        | 1         | 0         | 1         | 0         | 2         | 0        | 0        | 5           | 2.6%                |
| <b>Avoidance Recommendations</b>            | <b>11</b>                | <b>6</b>  | <b>5</b>  | <b>1</b>  | <b>2</b>  | <b>1</b>  | <b>0</b> | <b>0</b> | <b>26</b>   | <b>13.5%</b>        |
| Never Dump/Release/Move                     | 11                       | 4         | 5         | 1         | 2         | 1         | 0        | 0        | 24          | 12.5%               |
| Pledge to Not Release                       | 0                        | 2         | 0         | 0         | 0         | 0         | 0        | 0        | 2           | 1.0%                |
| <b>Release Alternative</b>                  | <b>17</b>                | <b>24</b> | <b>19</b> | <b>19</b> | <b>8</b>  | <b>4</b>  | <b>1</b> | <b>1</b> | <b>93</b>   | <b>48.4%</b>        |
| Return to Pet Store/Expert/Vet              | 10                       | 7         | 1         | 1         | 1         | 0         | 0        | 0        | 20          | 10.4%               |
| Give Away/Rehome                            | 5                        | 10        | 6         | 5         | 1         | 1         | 0        | 1        | 29          | 15.1%               |
| Plant Disposal                              | 2                        | 4         | 4         | 7         | 0         | 2         | 1        | 0        | 20          | 10.4%               |
| Contact Expert to Assist with Euthanization | 0                        | 3         | 3         | 6         | 6         | 1         | 0        | 0        | 19          | 9.9%                |
| Sterilize/Strain Wastewater                 | 0                        | 0         | 5         | 0         | 0         | 0         | 0        | 0        | 5           | 2.6%                |
| <b>Grand Total</b>                          | <b>46</b>                | <b>44</b> | <b>35</b> | <b>31</b> | <b>20</b> | <b>11</b> | <b>3</b> | <b>2</b> | <b>192</b>  |                     |

### *Imagery and Language*

We tracked whether materials used illustrations or photography for their visuals and found the following: 33 (of 61) materials used only photography of real animals or plants, 14 materials used both photography and illustrations, 9 used only illustrations, and 5 did not include any visuals.

Half of the materials (n=31) included some element of education about specific invasive species, while eight materials used some form of storytelling in their messaging.

We reviewed the language used in materials for indications of social pressure and found that 80% of the materials included some form of social pressure or promotion of a norm. This can be seen in the following themes in Table 4.

*Table 4:* Language used in materials for indication of social pressure, binned by similar word-choice.

| Social Pressure Language | Number of Materials |
|--------------------------|---------------------|
| Report/Law Enforcement   | 12                  |
| Be Responsible           | 8                   |
| Everyone's Problem       | 4                   |
| Working Together         | 4                   |
| Shared Responsibility    | 7                   |
| You Can Help             | 4                   |
| Right Thing to Do        | 3                   |
| Why You Should Care      | 3                   |
| People Like You Help     | 2                   |
| Future Generations       | 1                   |
| Shed Bad Habits          | 1                   |

We reviewed the language used in materials for indications of user agency, encouraging or empowering the reader to act or change a behavior. We found that 66% of the materials included some form of agency or empowerment language, shown in the following themes in Table 5.

*Table 5:* Language used in materials for indication of user agency, binned by similar word-choice.

| Agency Language            | Frequency |
|----------------------------|-----------|
| You Can Help               | 22        |
| Follow Simple Steps        | 8         |
| We Need You                | 3         |
| Learn How to Take Action   | 2         |
| Together We Can            | 2         |
| You Can Make a Difference  | 2         |
| Everyone Can Help          | 1         |
| You Play an Important Role | 1         |

We also reviewed the materials for language related to risk or threat. We found that 82% of the materials included one or more of the following words and/or phrases. These words/phrases included the following:

#### **Key Words**

Eradication  
Invaders  
Serious  
Devastating  
Detrimental  
Harm  
Extremely Difficult  
Costly/Cost Millions  
Severe Impacts  
Major Damage  
Dire Consequences  
Threat  
Outcompeting  
Danger  
Voracious  
Suffer Immensely  
Wreak Havoc  
Danger  
Caution  
Prohibited  
Restricted  
Pets Suffer Before They Die  
Invasives are Bad Guys  
Violation of Law  
Penalties  
Beware

#### **Web Engine Search Language Trends**

To understand what a pet owner might find when searching online for release-related information, we analyzed the online presence of our eight focal campaigns to understand whether different actions in a search produced different results. These results also show where other campaigns, outside of our selected eight, appeared in the top ten results. Campaigns qualified for inclusion if linked directly to the campaign website, a clear reference to the campaign on a partner website (e.g., retail pet store), or a clear campaign promoted by a university or established non-profit. The vast majority of searches (>93.14%) did not result in any campaign link. Table 6 is organized by taxa, showing even further nuance in search terms results.

Table 6: Frequency of the focal campaigns and “other campaigns” appearing in top ten search results. Yellow highlights show where “other campaigns” appeared, while orange highlights show where focal campaigns appeared.

| Taxa   | Campaign Presence | Release | Let Go Of | Get Rid Of | Give Away | Surrender | Rehome  | Kill    | Euthanize | Grand Total |
|--------|-------------------|---------|-----------|------------|-----------|-----------|---------|---------|-----------|-------------|
| Pet    | No Campaign       | 89.29%  | 98.33%    | 95.59%     | 92.11%    | 97.44%    | 95.38%  | 100.00% | 99.02%    | 95.95%      |
| Pet    | Other Campaign    | 4.76%   | 1.67%     | 4.41%      | 7.89%     | 2.56%     | 4.62%   | 0.00%   | 0.98%     | 3.27%       |
| Pet    | Study Campaign    | 5.95%   | 0.00%     | 0.00%      | 0.00%     | 0.00%     | 0.00%   | 0.00%   | 0.00%     | 0.78%       |
| Fish   | No Campaign       | 79.17%  | 90.16%    | 88.24%     | 93.27%    | 94.90%    | 95.37%  | 100.00% | 100.00%   | 93.14%      |
| Fish   | Other Campaign    | 19.44%  | 8.20%     | 8.24%      | 1.92%     | 0.00%     | 4.63%   | 0.00%   | 0.00%     | 4.71%       |
| Fish   | Study Campaign    | 1.39%   | 1.64%     | 3.53%      | 4.81%     | 5.10%     | 0.00%   | 0.00%   | 0.00%     | 2.14%       |
| Snake  | No Campaign       | 97.87%  | 100.00%   | 96.24%     | 91.67%    | 89.47%    | 94.32%  | 100.00% | 100.00%   | 96.83%      |
| Snake  | Other Campaign    | 2.13%   | 0.00%     | 3.76%      | 8.33%     | 10.53%    | 5.68%   | 0.00%   | 0.00%     | 3.17%       |
| Snake  | Study Campaign    | 0.00%   | 0.00%     | 0.00%      | 0.00%     | 0.00%     | 0.00%   | 0.00%   | 0.00%     | 0.00%       |
| Turtle | No Campaign       | 93.90%  | 94.79%    | 93.75%     | 100.00%   | 100.00%   | 100.00% | 99.07%  | 100.00%   | 97.54%      |
| Turtle | Other Campaign    | 6.10%   | 5.21%     | 6.25%      | 0.00%     | 0.00%     | 0.00%   | 0.93%   | 0.00%     | 2.46%       |
| Turtle | Study Campaign    | 0.00%   | 0.00%     | 0.00%      | 0.00%     | 0.00%     | 0.00%   | 0.00%   | 0.00%     | 0.00%       |

Identified campaigns appeared in the top ten search results from search terms including “Fish” and “Pet.” No focal campaigns resulted from “Snake” or “Turtle” searches. The specific search terms which included a campaign are shown in Table 6 (highlighted in orange cells):

### Fish

Can I give away my...  
 Can I surrender my...  
 How do I give away my...  
 How do I surrender my...  
 Should I surrender my...  
 What happens if I give away my...  
 What happens if I let go of my...  
 What happens if I surrender my...  
 Where can I get rid of my...  
 Where can I give away my...  
 Where can I release my...  
 Where can I surrender my...

### Pet

Can I release my...  
 How do I release my...  
 What happens if I release my...  
 Where can I release my...

We also see from these results that certain action terms (e.g., “euthanize”, “get rid of”) produce varying campaign results. “Release” and “get rid of” for example, consistently resulted in links to other campaigns throughout the four taxa, signifying that a user searching with these action words may have a higher likelihood of coming across a campaign. Campaigns might consider aligning terminology with these search terms to optimize search engine results.

The vast majority of search phrases did not result in a campaign of any kind. To understand what else comes up in these search results, we conducted further search results analysis (Table 7).

Table 7: Search phrases and the frequency of them showing up in various result types.

| Taxa          | Result Type               | Release | Let Go Of | Get Rid Of | Give Away | Surrender | Rehome | Kill   | Euthanize | Grand Total |
|---------------|---------------------------|---------|-----------|------------|-----------|-----------|--------|--------|-----------|-------------|
| <b>Pet</b>    | Informational Website     | 52.94%  | 86.44%    | 70.15%     | 59.21%    | 42.11%    | 83.87% | 61.43% | 49.49%    | 60.13%      |
| <b>Pet</b>    | Advertisement             | 17.65%  | 8.47%     | 20.90%     | 13.16%    | 14.04%    | 0.00%  | 0.00%  | 10.10%    | 11.08%      |
| <b>Pet</b>    | Public Forum              | 5.88%   | 0.00%     | 1.49%      | 2.63%     | 0.00%     | 0.00%  | 7.14%  | 0.00%     | 2.06%       |
| <b>Pet</b>    | Video                     | 0.00%   | 0.00%     | 0.00%      | 0.00%     | 0.00%     | 0.00%  | 0.00%  | 6.06%     | 0.95%       |
| <b>Pet</b>    | Sublink                   | 0.00%   | 1.69%     | 1.49%      | 9.21%     | 0.88%     | 16.13% | 2.86%  | 5.05%     | 4.27%       |
| <b>Pet</b>    | Advertisement and Sublink | 0.00%   | 3.39%     | 0.00%      | 5.26%     | 42.98%    | 0.00%  | 0.00%  | 29.29%    | 13.29%      |
| <b>Pet</b>    | Public Forum and Sublink  | 23.53%  | 0.00%     | 5.97%      | 10.53%    | 0.00%     | 0.00%  | 28.57% | 0.00%     | 8.23%       |
| <b>Fish</b>   | Informational Website     | 59.72%  | 83.61%    | 52.94%     | 33.65%    | 32.63%    | 20.37% | 67.90% | 50.55%    | 47.06%      |
| <b>Fish</b>   | Advertisement             | 0.00%   | 0.00%     | 0.00%      | 0.96%     | 0.00%     | 0.00%  | 0.00%  | 1.10%     | 0.29%       |
| <b>Fish</b>   | Public Forum              | 4.17%   | 4.92%     | 9.41%      | 16.35%    | 18.95%    | 22.22% | 0.00%  | 0.00%     | 10.47%      |
| <b>Fish</b>   | Video                     | 19.44%  | 0.00%     | 2.35%      | 0.00%     | 0.00%     | 8.33%  | 11.11% | 12.09%    | 6.46%       |
| <b>Fish</b>   | Sublink                   | 0.00%   | 0.00%     | 0.00%      | 14.42%    | 15.79%    | 5.56%  | 20.99% | 30.77%    | 11.62%      |
| <b>Fish</b>   | Advertisement and Sublink | 0.00%   | 0.00%     | 0.00%      | 0.00%     | 0.00%     | 6.48%  | 0.00%  | 5.49%     | 1.72%       |
| <b>Fish</b>   | Public Forum and Sublink  | 16.67%  | 11.48%    | 35.29%     | 34.62%    | 32.63%    | 37.04% | 0.00%  | 0.00%     | 22.38%      |
| <b>Snake</b>  | Informational Website     | 36.96%  | 12.61%    | 28.57%     | 43.06%    | 75.44%    | 35.23% | 44.68% | 28.00%    | 34.70%      |
| <b>Snake</b>  | Advertisement             | 0.00%   | 0.00%     | 7.52%      | 0.00%     | 0.00%     | 0.00%  | 1.06%  | 3.00%     | 1.85%       |
| <b>Snake</b>  | Public Forum              | 9.78%   | 23.53%    | 8.27%      | 23.61%    | 8.77%     | 20.45% | 5.32%  | 11.00%    | 13.77%      |
| <b>Snake</b>  | Video                     | 13.04%  | 15.97%    | 0.75%      | 0.00%     | 0.00%     | 1.14%  | 9.57%  | 10.00%    | 6.89%       |
| <b>Snake</b>  | Sublink                   | 22.83%  | 0.00%     | 11.28%     | 0.00%     | 14.04%    | 0.00%  | 13.83% | 0.00%     | 7.55%       |
| <b>Snake</b>  | Advertisement and Sublink | 0.00%   | 0.00%     | 21.80%     | 0.00%     | 0.00%     | 0.00%  | 4.26%  | 13.00%    | 6.09%       |
| <b>Snake</b>  | Public Forum and Sublink  | 17.39%  | 47.90%    | 21.80%     | 33.33%    | 1.75%     | 43.18% | 21.28% | 35.00%    | 29.14%      |
| <b>Turtle</b> | Informational Website     | 45.12%  | 36.46%    | 38.54%     | 56.00%    | 65.52%    | 61.76% | 34.26% | 28.70%    | 43.27%      |
| <b>Turtle</b> | Advertisement             | 0.00%   | 0.00%     | 4.17%      | 2.67%     | 0.00%     | 0.00%  | 0.00%  | 3.70%     | 1.45%       |
| <b>Turtle</b> | Public Forum              | 13.41%  | 14.58%    | 10.42%     | 16.00%    | 8.62%     | 14.71% | 7.41%  | 13.89%    | 12.30%      |
| <b>Turtle</b> | Video                     | 7.32%   | 1.04%     | 6.25%      | 0.00%     | 0.00%     | 0.00%  | 13.89% | 6.48%     | 5.07%       |
| <b>Turtle</b> | Sublink                   | 0.00%   | 6.25%     | 9.38%      | 0.00%     | 5.17%     | 2.94%  | 19.44% | 0.00%     | 5.93%       |
| <b>Turtle</b> | Advertisement and Sublink | 0.00%   | 0.00%     | 9.38%      | 6.67%     | 0.00%     | 0.00%  | 0.00%  | 15.74%    | 4.49%       |
| <b>Turtle</b> | Public Forum and Sublink  | 34.15%  | 41.67%    | 21.88%     | 18.67%    | 20.69%    | 20.59% | 25.00% | 31.48%    | 27.50%      |

Informational websites make up the highest percentage of search results within each search term. These informational websites can be content from any number of organizations, educational institutions, community groups, or interested individuals. The variety of content within these sites is immense, and some of it may be incorrect information or differ from the stances of official campaigns. An in-depth content analysis of these informational websites would be a valuable research study to inform the breadth and depth of information being provided to pet owners who turn to the internet for advice.

While the majority of search results are informational websites, we also see interesting trends in results of the other kinds of site types we noted. Public forums, or sites where the general public can ask questions and receive comments from peers (e.g., Quora, Reddit), appeared in the search result lists for many of the search terms used. Public forums often have sublinks, or pages within a general public conversation, and these site types resulted in even greater numbers. This trend shows that campaigns trying to reach pet owners and the general public may need to explore having a presence in public forums. The general public seems to trust their peers and turns to these types of online forums for suggestions with unwanted pets.

Videos also play a role in search actions related to both releasing and euthanizing. This trend is important to note because pet owners may be turning to the internet (i.e., their perceived peers) for practical guidance on these two matters. YouTube and video-based social media (e.g., TikTok) are quickly becoming some of the most trusted sources of information. Official outreach campaigns might consider joining the conversation in public forums and in places where live video – as opposed to text-only – can be found.

### **Statistical Analysis of Language Trends**

Interestingly, the unigrams “Florida” and “Wisconsin” were some of the most prevalent words in common among the six search groupings (Figure 8). One reason for this could be because of successful campaigns led by Florida and Wisconsin groups. Jointly or alternatively, these could be regions where historically more users are acquiring and releasing potentially invasive animals and seeking advice on how to do so. Two broad insights from this result include that certain regional groups may have more successful tactics than others when campaigning, and that campaigns may need to target specific regions that are hotspots of species trade. Additional unigrams that were prevalent among the six search groupings include “survive” and “proper” (Figure 8). This result implies that users are generally concerned with the well-being of the animal when disposing of it and a foresight into the consequences when doing so.

Some prevalent unigrams were unique to the end of life, into wild, and not into wild searches. “Exotic” and “loss” were prevalent unigrams among permission- and solution-seeking end of life searches (Figure 8A, B). Unigrams unique to end of life searches do not provide as much insight as unigrams unique to the wild searches. Among permission- and solution-seeking into the wild searches (Figure 8C, D), “sale” and “guide” were prevalent unigrams. The prevalence of the unigram “sale” could imply an alternative route users may take instead of releasing an animal into the wild. Second, the prevalence of ‘guide’ reinforces the broad implication that users are generally concerned with the well-being of the animal and consequences of its release. The unigrams “safely,” “aquarium,” and “tortoise” were prevalent unigrams among permission- and solution-seeking not into the wild searches (Figure 8E, F). The prevalence of the unigrams “aquarium” and “tortoise” suggests that fishes and tortoises are the primary taxa users are concerned with when wanting to surrender, rehome, or give away their animals. Again, the prevalence of “safely” suggests that users are concerned with well-being and consequences of their choices.



Collectively, these results suggest that campaigns may want to consider using terms/provide information that focuses on providing support for ensuring the well-being of the animal to improve its searchability. Additionally, certain regions may need to be targeted in campaign efforts. Investigating the tactics of regional campaign efforts, such as that in Florida and Wisconsin, could aid in improving campaign messaging overall.

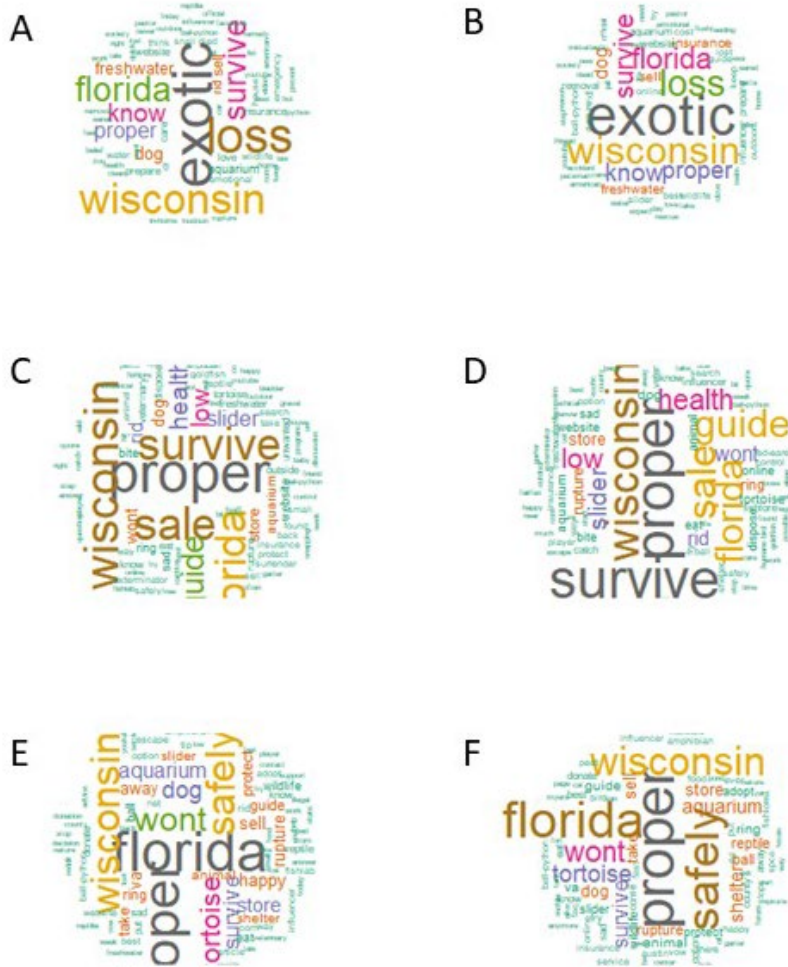


Figure 8: Word Clouds displaying prevalence of unigrams in six search groupings including (A) permission-seeking end of life; (B) solution-seeking end of life; (C) permission-seeking into the wild; (D) solution seeking into the wild; (E) permission-seeking not into the wild; (F) solution seeking not into the wild.



# Considerations for Future Campaigns

1

## **Integrate Network Strategy to Enhance Campaign Effectiveness and Pet Owner Access to Solutions**

- a. **Convene relevant campaign affiliates** to discuss consistent messaging of alternatives to release, including prioritization of options.
- b. **Invest in building communities of pet owners** to increase access to rehoming opportunities and to capitalize on shared identities and values.

There may be a disconnect between the most frequently suggested alternatives and access to practical information on how to pursue that alternative. Many campaigns include rehoming of a pet as a desirable option but leave it up to the pet owner to find suitable homes. Meanwhile, campaign materials referencing euthanasia recommended contacting a professional for help or expressed reservation about suggesting euthanasia as an option altogether, yet this is the topic most likely to be found on public forums. Although campaigns seem to suggest professional help with euthanasia, it seems that pet owners considering this option are more likely to turn to peers in online forums.

- c. **Provide adequate and consistent funding** for campaigns to invest in long term relationship development and collaboration.

The common challenge among campaigns to secure consistent, reliable funding may be impacting not only opportunities to meaningfully engage pet owners, but also to cultivate lasting partnerships with fellow organizations or retailers.

2

## **Refine Campaign Content to More Effectively Align with Audience Values and Needs**

- a. **Invest in a better understanding of the core values** of the intended audience and ensure messaging of campaign aligns with and calls to action these values.
- b. **Increase use of storytelling techniques** to evoke emotional connections to group identity and desired norms. Storytelling can also highlight positive social proof that others are doing the desirable behavior, referred to as modeling.

The top “loss” categories seen in the campaign material analysis portion of the study include economy, native species, and ecosystem, yet campaigns seem unsure about the values and priorities of their target audiences. Campaigns understand their audiences to be motivated by easy and low-cost options, excitement to learn, and a responsibility to act. There may be an opportunity to align this latter motivation with deeper values of their audiences. Perhaps, for example, the economy-focused loss may be presented in a more specific manner, depending on location, industry, and audience values.

- c. **Provide clear actions and use a hopeful tone** to motivate audience. If consequences of undesirable actions are stated, ensure relatability, salience, and agency of individual to make an impact.
- d. **Expand online campaign presence** to include instructional videos.

### 3

#### Build Campaign Reach and Evaluation of Impact

- a. **Avoid psychological distance** of information recall by presenting desired action in the decision-making moment.

All but one campaign material (n=60) was intended for the individual prior to the decision-making moment. Campaigns might consider developing outreach materials which are present when a pet owner may be considering an undesirable action, such as on an aquarium wall (e.g., sticker, magnet) or displayed at common release sites (e.g., signage at public boat ramp).

- b. **Invest in knowledge building** and integration of online search engine optimization best practices. Meeting pet owners where they are, and where they prefer to find information, is key to increasing campaign reach and impact.
- c. **Invest in long term monitoring and evaluation** of campaign effectiveness, utilizing social science methods to understand pet owner behavior change and retailer impact.

## Accompanying Data

The data associated with this report can be found here <https://doi.org/10.5066/P9XWS09V>. This product summarizes data for the web engine search analysis and the outreach materials analysis from our report.

## Disclaimer

Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

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## **Appendix A.**

Interview questions that were asked to campaign affiliates:

### OBJECTIVES

Does the campaign have stated goals and objectives?

If so, how were these goals and objectives developed?

Do any theories, models, or techniques (e.g. behavior change, communication, engagement) guide your campaign efforts?

### AUDIENCE

Who have you identified as your target audience(s)?

How did you identify this audience?

How would you describe the motivations of this audience?

How do you engage/share your materials with these audiences?

### COSTS/INPUTS

How would you describe the messaging of your campaign?

How would you describe the investment (e.g. financial, human resources) you make into this campaign?

### MONITORING/MEASURING

What steps do you take to monitor the effectiveness of the campaign?

Has the campaign shifted or evolved in any way since its inception? If so, how?

### BENEFITS/OUTPUTS

Have you come across any success stories because of this campaign?

### BARRIERS/CHALLENGES

What would you say are challenges to implementing this campaign to its full potential?

### ADVICE/WISHES

If you could start this campaign over, what would you do differently?

In five years, what would you like this campaign to look like?

## Appendix B.

Matrix of questions used to analyze campaign outreach materials.

| Material Details                   | Material Focus    | Action Orientation | Message Framing | Order of Alternatives | Imagery      | Other Messaging Details |
|------------------------------------|-------------------|--------------------|-----------------|-----------------------|--------------|-------------------------|
| Item Number                        | Target Species    | Do This            | Loss Content    | 1                     | Theme Design | Species Education?      |
| Name of Material                   | Intended Audience | Don't Do This      | To Whom?        | 2                     | Illustration | Story Telling?          |
| Entity Number                      |                   |                    | Gain Content    | 3                     | Photography  | Norms/Social Pressure?  |
| Developed by (Campaign/Department) |                   |                    | To Whom?        | 4                     |              | Agency/Empowerment?     |
|                                    |                   |                    |                 | 5                     |              | Threat/Risk?            |
|                                    |                   |                    |                 | 6                     |              |                         |
|                                    |                   |                    |                 | 7                     |              |                         |
|                                    |                   |                    |                 | 8                     |              |                         |