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"Assessment of CITES Awareness in the United States of America and Subsequent
Development of a Social Media Education Strategy to Increase Understanding
of the CITES Mission and Related Shark Conservation"

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Abstract

Despite the importance of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), it is unclear how much the general population of the United States of America (US) knows of its existence or its role in conserving endangered species. This study assessed the knowledge and attitudes of the US general population regarding CITES and shark conservation using survey and attitudinal methodology. A survey instrument and process were designed to collect and analyze data to test the hypothesis that the majority of the general US population is not aware of what the treaty is, what it does and does not do, and how shark conservation is integrated into the treaty. With a response rate of 51%, a total of 521 participants were included in the survey. Less than 4% of the sample US population was familiar with CITES, revealing significant knowledge gaps regarding the existence and importance of the core principles of the Convention. Social media's reach and accessibility across the US affords an opportunity to address this dearth of CITES awareness. This study investigated best practices for developing and presenting a social media conservation education strategy, with sharks as the focal charismatic species. Based upon the survey results, social media education models were created that demonstrated how to educate and inform the US public about the critical role of CITES in conservation. It's essential to educate the US public about the treaty's crucial role in conservation as this could increase their support for CITES policies and the leaders engaged at the forefront of species protection.

Resumen

A pesar de la importancia de la Convención sobre el Comercio Internacional de Especies Amenazadas de Flora y Fauna Silvestres (CITES), no está claro cuánto sabe la población general de los Estados Unidos de América sobre su existencia o su papel en la conservación de especies en peligro de extinción. Este estudio evaluó el conocimiento y las actitudes de la población general de los Estados Unidos con respecto a la CITES y la conservación de los tiburones utilizando una metodología de encuestas y actitudes. Se diseñó un instrumento y un proceso de encuesta para recopilar y analizar datos para probar la hipótesis de que la mayoría de la población general de los Estados Unidos no está consciente de lo que es el tratado, qué hace y qué no hace, y cómo se integra la conservación de tiburones en el mismo. Con una tasa de respuesta del 51%, se incluyeron en la encuesta un total de 521 participantes. Menos del 4% de la muestra de la población de los Estados Unidos estaba familiarizada con CITES, lo que revela importantes lagunas de conocimiento sobre la existencia y la importancia de los principios básicos de la Convención. El alcance y la accesibilidad de las redes sociales en los Estados Unidos brindan la oportunidad de abordar esta escasez de conciencia sobre la CITES. Este estudio investigó las mejores prácticas para desarrollar y presentar una estrategia de educación para la conservación en las redes sociales, con los tiburones como la especie carismática central. Sobre la base de los resultados de la encuesta, se crearon modelos de educación en las redes sociales que demostraron cómo educar e informar al público estadounidense sobre el papel fundamental de la CITES en la conservación. Es importante educar al público de los Estados Unidos sobre el papel crucial del tratado en la conservación, ya que esto podría aumentar su apoyo a las políticas de la CITES y a los líderes comprometidos en la vanguardia de la protección de especies.

Definition of Terms

CITES **-** Convention on International Trade in Endangered Species of Wild Fauna and Flora

CoP **-** Conference of the Parties or meeting of the Conference of the Parties

DOI - US Department of the Interior

FB - Facebook

FDA **-** Food and Drug Administration

IG - Instagram

INGO - International Non-Governmental Organization

IRB **-** Institutional Review Board

IUCN **-** International Union for Conservation of Nature

LI **-** LinkedIn

MA - CITES Management Authority

MOE - Margin of error

NGO **-** Non-Governmental Organization

PSA - Public Service Announcement

SA - CITES Scientific Authority

SM - Social Media

TW - Twitter

US **-** United States of America

USDA - United States Department of Agriculture

USFWS - US Fish and Wildlife Service

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Chapter 1. Introduction

1.1. Genesis of CITES and United States Collaboration

The United States of America (US) has been a member of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since its inception. First proposed in 1963 in Washington, D.C. by the International Union for Conservation of Nature (IUCN), and known for some time after that as the "Washington Convention," CITES was created in response to concerns about the impact of international trade on endangered species. The text of the Convention was adopted in 1973 and went into force two years later on July 1, 1975, after the 10 signatory countries ratified it (CITES, 2023b). CITES is an international, multilateral treaty that aims to regulate the international trade of endangered species in order to protect them from over-exploitation or threats of extinction (Walsh, 2005).

The US played a leading role in the development of CITES and was the first country to sign the treaty. The US has actively participated in the work of CITES and has played a vital role in shaping its policies and procedures. (Anne St. John, Senior Biologist, Wildlife Trade and Conservation Branch, Division of Management Authority USFWS, personal communication, March 30, 2022) The US has also been a significant importer and exporter of wildlife products, and as such, has been subject to the regulations of CITES (Bager Olsen *et al.*, 2019). Even though CITES is a legally binding agreement for the Parties, it is not typically self-executing. In other words, it cannot be fully put into effect until domestic measures that specifically address its objectives have been established. For this reason, it is crucial for CITES Parties to have laws in place that enable them to carry out and enforce all aspects of the Convention (CITES, 2023d).

In the US, domestic law pertaining to CITES is part of the Endangered Species Act. The US Endangered Species Act of 1973 created a framework to protect and conserve threatened and endangered species domestically and internationally. Through this Act, the US is party not only to CITES but to many treaties, such as the International Convention for the High Seas Fisheries for the North Pacific and the International Conventions for the Northwest Atlantic Fisheries (National Oceanic and Atmospheric Administration, n.d.).

The US has long used CITES to conserve a wide range of endangered species that are subject to international trade. The US has also been involved in efforts to strengthen CITES broadly, by promoting greater transparency, accountability, capacity, and compliance among its member countries.

1.2. CITES Organization in the US

The US Fish and Wildlife Service (USFWS) is designated as the Scientific Authority (SA) and Management Authority (MA) responsible for implementing CITES in the US. Every CITES Party is required to designate a national SA and MA.

The USFWS is a bureau within the US Department of the Interior (DOI) and is responsible for managing the nation's fish, wildlife, and plant resources. The USFWS is divided into several programs, including the International Affairs Program, which includes the US CITES authorities (U.S. Fish and Wildlife Service, n.d.-a). The USFWS's International Affairs Program, through its Division of SA and Division of MA, is responsible for implementing CITES regulations within the US.

The SA is responsible for providing scientific information and advice to the MA and other Parties involved in implementing CITES regulations. The Division of SA is responsible for reviewing CITES trade permit applications, conducting scientific species assessments, and providing guidance on CITES issues. The MA is responsible for enforcing CITES regulations within the US. The Division of MA also issues CITES permits for the import, export, and re-export of species listed under CITES.

The responsibility of inspecting wildlife and plant specimens for compliance with CITES regulations falls under the USFWS's Office of Law Enforcement and the US Department of Agriculture (USDA), respectively. Their task is to ensure that the international trade of endangered and threatened species is sustainable and lawful, while also preventing illegal trade activities.

1.3. Original Hypothesis

This study explored the hypothesis that most of the US population does not know what CITES is, what it does, and what it does not do. If the hypothesis was confirmed, this would indicate an educational need among the general US population that could enhance support for CITES regulations, enforcement, and species protection. To achieve a stronger understanding and awareness of CITES in the US, it is imperative that those with knowledge work to bridge awareness of those gaps. Doing so may lead to the protection and conservation of biodiversity. For example, if the public is aware that CITES is regulating international trade to conserve species numbers, and if the public knows that the conservation of this species could potentially help related species recover their numbers, they might be more supportive of leaders voting for protective measures or be more likely to engage in the public comment period regarding possible US proposals to include certain species under the CITES Appendices. If the public lacks an understanding of why regulations are imposed by leaders and fails to recognize that these regulations can be lifted once a species has recovered, these elected officials could risk losing public support.

Further, if the public was more knowledgeable about what animals and animal parts were legal to import, they might be less likely to make purchases that cannot be brought home while traveling abroad. Additionally, many people who know about CITES are under the false impression that listed species are protected within range states. Citizens should be made aware that threatened and endangered species are not protected within the borders of their sovereign country unless additional domestic framework is present. In that case, they might encourage and support national legislation that would protect the species within their national borders. An educated and motivated populace can be a powerful force for change (Dunn *et al.*, 2022). An informed and knowledgeable population would be more likely to support elected and appointed officials, laws, policies, and regulations that align with their values and beliefs. Understanding can lead to actions that result in the conservation and protection of endangered species.

1.4. Importance

Conserving and protecting endangered species is vital for the planet's health, the survival of ecosystems, and aligns with the value of stewardship or environmental health that is espoused in

many cultures and religions. (Dara Satterfield, AAAS Science & Technology Policy Fellow, Division of Management Authority USFWS, personal communication, March 27, 2022)

Wildlife species are increasingly recognized for their ecological services. Animals are integral to ecosystems and vital to our daily lives in many ways. For example, bees and bats function as essential pollinators (Buchmann & Nabhan, 2012); birds feeding on insects keep mosquito numbers in check, reducing the human risk of malaria (Collins *et al*., 2019); sharks keep fisheries healthy (Drymon & Scyphers, 2017; Motivarash *et al*., 2020); and phytoplankton produce oxygen (Sekerci & Petrovskii, 2018). Conversely, if a species drops to a critical level or becomes extinct, case studies document losses and changes in entire ecosystems (Hilty *et al*., 2019). Species extinctions and severe declines can have both direct and indirect effects in ecosystems, with far-reaching consequences and multifactorial repercussions (Aarts, 1999; Ebenman & Jonsson, 2005). Species extinctions and declines have in some cases devastating effects on human communities, as many people depend upon these species for livelihoods, food, shelter, and community and family health (Gouwakinnou *et al*., 2019).

Animals become endangered due to multiple threats, including habitat loss, competition from invasive species, and climate change (Masters & Norgrove, 2010; Siddiqui *et al*., 2021). For many species, the most critical factor that threatens them is over-exploitation through international trade (Mair *et al*., 2019). Successfully conserving endangered species, therefore, requires protecting them from overharvesting and ensuring that international trade does not threaten their survival.

Although the local use of threatened and endangered animals for bush meat hunts and other usages can place species at risk, a more significant threat to endangered animals can be the international marketplace. Rare and endangered animals are generally sold at great profit on the international market (Birdwell, 2022). With few economic alternatives, some citizens of low income countries are left without options other than to hunt and gather endangered specimens and place them on the international marketplace. (Murillo & Huson, 2014).

1.5. Basic CITES Knowledge for the General Public

To address the issue of overexploitation and to stop the unsustainable culling of endangered plants and animals in the wild that could result in species extinction, the international community has sought to control, slow, or, at times, stop the trade of these specimens by regulating their international sale. It has done this through CITES (CITES, 2022; Matters, 2011). The CITES Appendices include over 40,900 species, including approximately 6,610 species of animals and 34,310 species of plants (CITES, 2023a). Flora and Fauna species that meet the biological and trade criteria are included in the CITES Appendices. The CITES Appendices are not stagnant. The CoP convenes every three years, and at such meetings member Parties discuss proposals to amend the CITES Appendices (inclusion, transfer, or deletion). The Parties closely examine species assessments, population trends, the effect of international trade on population numbers, mitigations currently observed by range states, and much more. This process culminates when the Parties decide, either by consensus or vote, to adopt the amendment proposal or to reject a proposal to amend the Appendices.

The result is a list of species included in one of the three Appendices according to the threat level. If a species is listed, import, export, re-export, and introduction from the sea must be authorized by a system of permits and certificates. Failure to comply with CITES requirements for international trade for listed species could result in fines or confiscation of specimens, or civil or criminal charges.

1.6. Shark Conservation as a Vehicle for CITES Knowledge Enhancement

If the results of this study identify a CITES knowledge gap and an educational opportunity, a social media-based educational strategy could be created to enhance public awareness. In order to review specific best practices and create broadly resonating messages, popular social media (SM) platforms could be examined. The ultimate goal would be to raise consciousness about CITES by focusing on the oft-misunderstood Chondrichthyes class, specifically leveraging sharks as a "poster species" for CITES. The benefits of focusing on sharks are two-fold. First, they are charismatic animals that have captivated and mesmerized the US public and are, therefore, likely to grab the attention of SM users. Second, focusing on sharks offers an opportunity to raise awareness about how they are unsustainably harvested and traded for shark fin soup, resulting in their listing as threatened or endangered by the IUCN.

Sharks are apex predators that play a critical role in marine ecosystems. Sharks aid in removing weak and sick prey, keeping the species below them in the food chain healthy, and maintaining the balance with competitors, thereby ensuring species diversity (Edwards, 2006). As predators, they function within their niche to maintain homeostasis within their ecosystem. Sharks indirectly maintain seagrass and coral reef habitats, and the overfishing of sharks has resulted in declining coral reefs, seagrass beds, and commercial fisheries (Porter, 2011).

Changes in shark populations affect marine food webs. In the absence of sharks, would-be prey, such as smaller omnivores, can thrive and feed on bivalves and other lower food chain specimens, thus tipping the entire ecosystem dynamic (Ferretti *et al.*, 2010). Local economies and food supplies are affected when fishery yields diminish due to the additional competition resulting from increased omnivore populations.

Shark finning is one of the leading causes of shark overfishing and poaching (Haase, 2022). A traditional dish, shark fin soup, drives the high demand for fins. This expensive soup is sold worldwide but is primarily found throughout Asia. Although the fin has no nutritional value, it has a significant symbolic meaning and is an indicator of wealth and success that is traditionally served at important occasions such as weddings, business celebrations, and until recently, government functions. A challenge for a CITES-listed species is that once the fin is severed from the shark, it is often difficult to identify the origin of the fin. There are now genetic tests and visual guides that are accessible to most countries. These tools are affordable, accurate, and easy to learn. Although sharks and their vital role in the ecosystem are important for the context of the current study, the purpose of the paper is to determine the level of CITES knowledge among a cross-section of the US population.

1.7. Objectives

This work had two objectives. The first objective was to survey a representative US population sample about knowledge and attitudes regarding CITES. A questionnaire was created and utilized to collect responses. A primary objective was to learn if people knew about CITES. Following this, the next step was to query the population on the scope and accuracy of their

knowledge about the Convention. For example, could listed species be traded at all? Did listing a species change how species were traded within the borders of the range states? Were people supportive of protecting animals based upon the realities and needs of local communities? Were people interested in exploring alternatives so these people could continue to thrive even after protections were introduced?

The second objective was to use the survey results to identify knowledge gaps and educational opportunities. The results could be used to model the design of a social media-based education strategy that would enhance US public understanding regarding CITES. The answers to the survey questions were essential to inform a better understanding of the extent of national awareness. If a need was identified, the results could be used to design an educational strategy leveraging the power and reach of different SM platforms. Combined, SM campaigns and the CITES awareness survey have the potential to advance the US population's understanding of the Treaty.

Chapter 2. Literature Review

2.1. CITES and the US

The US was instrumental in creating CITES, has been a leader since its inception, and has used CITES as a tool for conservation domestically. For example, the US has strengthened protections for its domestic species through CITES listings (e.g., as a proponent of turtle species listings) and has also used CITES regulations to safely oversee the American alligator skin trade, in a way that keeps the species at healthy levels (Dara Satterfield, AAAS Science & Technology Policy Fellow, Division of Management Authority USFWS, personal communication, March 27, 2022). It is important to examine the details of this mutualistic relationship in order to understand how the public views CITES and what steps can be taken to increase awareness.

2.1.1. Why CITES is Critical to the US

There are several reasons why CITES is important to the US, including the following:

Protection of endangered species: CITES helps to protect species by regulating their international trade. Many species that are endangered in the wild are still traded internationally for uses that include medicine, food, or as pets. CITES controls this trade to ensure that it is legal and does not harm the survival of these species (CITES, 2023b).

Conservation: CITES promotes the conservation of wildlife and their habitats. By regulating the international trade of wild animals and plants, CITES helps to reduce demand and promotes sustainable use (CITES, 2023b).

Economic benefits: The US is home to many internationally traded species. CITES helps ensure that these species' trade is biologically sustainable, legal, and does not harm the economy or environment (U.S. Fish and Wildlife Service, n.d.-d).

International cooperation: CITES provides a framework for international cooperation on wildlife trade issues. This structure helps the US to work with other countries to protect threatened and endangered species and promote conservation. CITES is vital to the US because it helps to protect endangered species, promotes conservation, provides economic benefits, and fosters international cooperation on wildlife trade issues (Vincent *et al.*, 2014).

2.1.2. U.S. efforts to enhance CITES capacity abroad

Diplomacy: The US is a significant player in international diplomacy, and its involvement in CITES helps to foster cooperation and collaboration among nations to protect endangered species and preserve biodiversity. Sussman (2004) stated, "When the US provides leadership, it bolsters multilateral efforts to address global environmental problems. When it fails to offer leadership, it weakens that effort."

The US provides financial support to CITES:

Contributions to the CITES Secretariat: CITES member countries provide financial contributions to the CITES Secretariat, which is the administrative body responsible for implementing CITES. The Secretariat relies on contributions from member countries to fund its activities, including organizing meetings, monitoring the implementation of CITES regulations, and providing technical assistance to member countries (CITES, 2023c).

Funding for conservation projects: The US government provides funding for conservation projects worldwide, including projects that support the implementation of CITES regulations. For example, the USFWS provides grants to organizations working to combat wildlife trafficking, protect endangered species, and promote sustainable trade in wildlife and wildlife products (U.S. Fish and Wildlife Service, n.d.-b).

Support for enforcement efforts: The US government provides funding and technical assistance to support the enforcement of CITES regulations. The USFWS works closely with other countries to prevent the illegal trade of wildlife and wildlife products and provides training and support to law enforcement agencies around the world (U.S. Fish and Wildlife Service, n.d.-c).

Support for scientific research: The US government provides funding for scientific research on wildlife conservation and trade, which helps to inform the development and implementation of CITES policies.

Market influence: The US is one of the largest markets for flora and fauna and their byproducts (Kotze, 2022). The US also has a significant influence on global trade policies. As such, the US has the ability to shape CITES policies and influence other countries to comply with CITES regulations.

Scientific expertise: The US has significant scientific expertise in wildlife conservation and trade. This expertise is critical to the development and implementation of effective CITES policies.

Enforcement: In addition financing endeavors in other nations, the US is one of the most active countries in the enforcement of CITES regulations. The USFWS is responsible for enforcing CITES regulations in the US and works closely with other countries to prevent the illegal trade of wildlife and wildlife products (U.S. Fish and Wildlife Service, n.d.-c).

2.2. CITES Awareness and the US Public - The Challenges

An informed and knowledgeable population can bolster CITES conservation efforts, however, there are several challenges to teaching the US population about international treaties and conservation:

1. **Lack of awareness:** Many people in the US may not be aware of the existence or importance of international treaties related to conservation. This can be due to a lack of exposure to these issues (Silver *et al.*, 2022).

2. **The complexity of the subject matter:** International treaties and conservation can be complicated. Subjects require an understanding of science, policy, and law (Alter & Meunier, 2009). The multidisciplinary knowledge requirements can create challenges for educators trying to communicate the concepts to a general audience.

3. **Political polarization:** Environmental issues, including conservation and international treaties, can be highly politicized in the US (Birch, 2020). This can make it challenging to engage people from different political backgrounds in a productive conversation about these issues (Bolsen & Shapiro, 2017).

4. **Lack of engagement:** Even when people are aware of international treaties and conservation issues, they may not feel they need to be more personally invested in them or see them as relevant to their daily lives. This can lead to a lack of engagement and interest in the topic (Peterson *et al.*, 2005).

5. **Skepticism:** Some people may be skeptical of international treaties, regulations, and the role of global consensus and commitment in conservation, believing they represent a threat to national sovereignty or are ineffective in achieving their goals (Mead, 2020).

To address these challenges, it is vital to emphasize the importance of conservation and sustainable use of natural resources and to provide clear and accessible information about international treaties and their role in achieving these goals. Engaging people in meaningful conversations about the benefits of conservation and the role of international treaties can help build awareness and support for these issues. It is also important to recognize and address the political and cultural barriers that may be contributing to skepticism or lack of engagement on these issues (Akerboom & Craig, 2022).

2.3. Previous Studies Determining CITES Awareness Levels

An extensive literature search indicates that no prior studies have quantified the CITES knowledge in the US. Several previous studies examined awareness levels in the West African nations of Sierra Leone, Nigeria, and Ghana. (Foray-Musa, 2016; John, 2019; Koomson, 2019). Foray-Musa (2016) studied stakeholder awareness and compliance with CITES in Sierra Leone, utilizing interviews, focus groups, and stakeholder meetings. The results revealed low stakeholder awareness and compliance and suggested that raising awareness and compliance would be crucial for the successful implementation of the convention. John (2019) utilized a questionnaire to assess the level of awareness of CITES management among critical stakeholders in Nigeria, discovering that the level of awareness was suboptimal. John also identified gaps and concluded that raising awareness of CITES implementation was a needed first step to mainstream wildlife management. Koomson (2019) assessed the knowledge base and level of awareness of relevant stakeholders on CITES in Ghana. The methods Koomson used included a literature review, a targeted questionnaire, and interviews. The results of Koomson's study revealed inadequate stakeholder knowledge and underscored an urgent need for a comprehensive awareness-creation strategy for stakeholders in Ghana.

2.4. Teaching Conservation through Social Media

SM has become a powerful worldwide communication tool. For many users, SM started as a novel method to stay in touch with friends and family. Subsequently, it became a valuable platform to communicate news and information, both verified and fake news and information. (Venugeetha *et al*., 2022)

Education experts teach that before learning begins, students must be present and attentive. Statista, a for-profit company specializing in collecting and online marketing statistics and projections, states that the major challenge in reaching this SM potential "classroom of students" is to attract and maintain the attention of a class while delivering truthful, vetted, and critical conservation messages (Brossard & Scheufele, 2013; Parsons *et al.*, 2014).

In addition to the studies that have focused on SM's possibilities as a teaching platform, some scholars have also examined its relevance in science and conservation in particular. Bik and Goldstein (2013) explored how scientists can use SM to reach a larger audience, noting that 86% of the population gets its information from internet sources (Shearer, 2021). Following up on this study, Wu *et al.* (2018) argued that scientists must learn how to navigate and utilize SM and that a more detailed framework is needed. More recent studies have offered more examples to provide a roadmap to use SM in conservation education effectively.

2.5. Most Effective Methodology for Successful Social Media Conservation Education

The importance of understanding the nuances of different SM platforms, which is critical for building an effective educational campaign of public service announcements (PSAs), is often underestimated (Shahbaznezhad, *et al.*, 2021). For example, Twitter appeals to short verbal exchanges, whereas Instagram entirely depends upon a "visual hook" to deliver any lesson blurb (Li & Xie, 2020).

Studies have defined the optimal way to leverage SM for science and conservation education (Bik & Goldstein, 2013). Different demographics, algorithms, and rules for each platform mean that a successful educational campaign requires a keen understanding of not only the subject matter but also a firm grasp of all SM platforms utilized, their unique messaging style, and their demographic and engagement techniques (Guo & Saxon, 2017). Messages should be created to engage an attentive audience throughout an educational program successfully. (PSA Research Center, 2023).

2.6. Value of Vivid Imagery in Educational Campaigns

The internet and particularly popular SM platform feeds are very cluttered. As a result, content designers have seconds to try and capture a viewer's attention. For example, a dramatic photograph of a shark stands a strong chance of attention-grabbing, permitting the audience's factual, educational message to have a chance to be processed (Shaw *et al*., 2022).

2.7. CITES Social Media-Based Campaign

SM could provide an effective platform for increasing global knowledge about CITES, including amplifying CITES success stories and sharing updates throughout the year and during CITES meetings.

An educational strategy could begin with the goal of narrowing any knowledge gap detected by the study survey to increase the US population's knowledge regarding CITES and the conservation of threatened and endangered animals, with a focus on sharks. The goals could be further detailed by identifying specific teaching points. The next step would be gaining an understanding of the target audience. Next, content creation followed by execution of posting of content would be needed. The last step would be the measurement of the impact and analysis of this data for future steps.

2.8. Social Media Platform Optimization

SM has a broad reach globally and is now a major source for how people learn about current events. As of October 2021, there were 4.55 billion active SM users; approximately 58% of the world's population could not only receive news but respond and join the conversation (We are Social, 2022).

Key SM educational questions to explore include the following:

- What is the target demographic?
- How can one interact with this audience?
- What are the best ways to optimize a post and the platform's algorithm?
- Can one reach other audiences by using targeted hashtags? Should strategic partnerships be pursued?

Therefore, this understanding would be required to take CITES messages and adapt them to fit a specific platform (Rossmann, & Young, 2016).

Much has been written about the potential for SM as a platform for education and ocean conservation efforts (Wu *et al*., 2018). A study published in the *Journal of Advertising* (Voorveld *et al*., 2018), systematically reviewed the strengths and weaknesses of various popular SM platforms when used for educational campaigns. A study published in 2020 targeted the importance of SM for shark conservation efforts. Taklis *et al.* (2020) stated, "Our study highlights the importance of SM as a valuable tool in collecting baseline information while identifying and focusing on important conservation issues about sharks in Greece." An additional 2022 study highlighted the importance of SM for wildlife conservation. Leveraging Twitter geolocated data to gauge public awareness about conservation and the rhino trade, one author wrote that "Social media is an effective method of information dissemination, providing a real-time, low-cost, and convenient platform for the public to release opinions on wildlife protection. This paper aims to explore SM usage in understanding public opinions toward conservation events and illegal rhino trade" (Shan *et al*., 2022).

The potential audiences for a SM post are considerable and global (Statista, 2022):

- Facebook – 2.9 billion users
- Instagram – 1.3 billion users
- TikTok – 1 billion users
- LinkedIn – 800 million users
- Twitter – 436 million users
- YouTube – 2.3 billion users

SM has a rapid, inexpensive point of entry. Messages have the chance to be seen by billions of people and can reach a worldwide audience. Never before have specific educational messages had such a far-reaching platform and potential for enhancing understanding.

Although entry to popular platforms is free, the effort it takes to brainstorm effective strategies can take significant time and resources. Stellar imagery dramatically increases the probability of any post being read and engaging the reader (Bouvier, 2019). The time of a post also

dramatically increases its success (Lee, 2013). Only a small percentage of posts are catchy enough to rise above the internet noise, while even fewer become viral and make a significant impact (O'Glasser *et al.*, 2020). Successful educational campaigns require dedication and educated interaction with the audience. Questions posted by readers must be answered immediately, and posts must be patrolled for "spam" and fake news to remain civil and credible. Consistency is vital to build momentum for any educational campaign. Most public accounts require funds for "boosting" posts, meaning the platform gets paid to promote posts to desired audiences.

Platforms change their rules regularly, which makes things more challenging for educators. Algorithms that once relied on keywords or viewer support can change suddenly, and new strategies and tactics must be deployed if an educational brand is to remain visible. Furthermore, messages must be built differently for each SM platform to be effective. Different platforms cater to targeted audiences, and content is accessed differently on each platform.

The promise of SM as a teaching tool for conservation generally, and CITES and shark conservation in particular, remains very high. Understanding the strengths and weaknesses of each platform is essential.

Facebook

According to Black (2021), Facebook (FB) has close to three billion active users from all demographic groups, making it an ideal platform for CITES educational campaigns. Mottola (2022) suggests that successful educational messages can create a community of readers, but vigilance is required to manage the page and dispel fake news. Strong images, narratives, and personal tie-ins can help attract readership. Boosting posts for a fee can increase their visibility, and functional hyperlinks make the platform user-friendly. However, Black (2021) noted that FB has faced scrutiny for privacy leaks and its targeted advertising business model.

Instagram

Instagram (IG) is a popular SM platform with over 1.3 billion users worldwide and 123 million users in the US alone, primarily consisting of younger audiences who spend an average of 30

minutes on the platform daily (Aslam, 2022). IG allows users to post images and videos as "post" or "story," with stories being more suitable for short-term events and employing creative filters and functional hyperlinks. IG also integrates with FB and Twitter, making it easier for users to share content across multiple platforms (Mottola, 2022). Furthermore, IG captions with strategic hashtags can attract new viewers, and although verification and additional information URL links can be included in captions, they are rarely used (Aslam, 2022).

LinkedIn

LinkedIn (LI) is a platform that is often overlooked for educational campaigns, but it has a user base with an "action mindset" and a willingness to engage with business-to-business posts (Yaeger, 2021). Although membership and engagement rates are lower than other SM platforms, LI allows usable hyperlinks to be posted in captions, enabling readers to access more in-depth articles and to fact-check. LI is a platform where influencers, journalists, decision-makers, and other potential message hubs are active and use their real names, making it possible to reach a wide readership beyond LI (Mottola, 2022).

Twitter

Twitter (TW) is a platform for concise, quick idea posts limited to 280 characters and is often paired with a strong image. The platform has been a source of misinformation, but the site has since implemented measures to flag inaccurate tweets. For conservation education, TW is an excellent platform to post short factual messages and bring followers along for an entire experience. The platform's reach and interactivity can be increased by including strategic hashtags and tagging influencers. Brands use TW accounts to keep customers updated and to build a successful audience, direct tweets should be read and immediately answered. (Konikoff, 2021; Shiffman, D.S. 2012; Bombaci, 2016). Content from other sources tweeting about CITES should receive prompt responses, e.g., replies in agreement, disagreement, or replies that add additional data and retweets.

2.9. Design Optimization for Social Media

In designing the initial CITES educational modules, the big picture and key messages could be outlined and further broken down into digestible teaching points appropriate for SM. A more

extensive lesson plan would include multimedia posts, online influencers, and potentially celebrities to maximize attention.

Each SM platform requires its own micro-map due to its unique methodology, algorithms, and target demographic (Montana State University, 2022; Rossmann & Young, 2016, p. 5). An objective would be to teach the same information in different ways congruent with the platform. All the latest updates for the targeted SM platforms could be reviewed (FB, TW, LI, and IG) to ensure optimizing the reach with messaging (Lua, 2020). Additional attention could be given to assets used to break through SM distractions to maximize user reach.

Affordable online design tools, such as CANVA, could be used to edit images with text and include other features. CANVA also provides a sizable royalty-free image and video library. The CANVA tool could be used to easily edit and optimize images so they comply with the parameters of each SM platform.

To capture user attention, dynamic still images could be utilized. Stunning nature photography and video capture attention and dramatically increase the success of a post (Farnsworth, 2011; Li & Xie., 2020).

2.10. Distributions Logistics

When it comes to managing messaging on various SM platforms, educators can find it challenging. Hootsuite is a useful tool for educators to streamline the process of managing messaging on various SM platforms. The tool allows for tailoring and optimizing messages for each platform, including customizing message length, previewing cropped imagery, activating platform-specific @callout tags, and using hashtags. Hootsuite can track keywords and phrases related to the campaign, enabling educators to target platforms that show interest in such terms. This approach helps identify individuals interested in the subject related to the campaign but lacking knowledge of CITES' structure, functions, and objectives and connect them directly with the educational messaging. The tool also enables educators to schedule messages for future posting, monitor and respond to interactions, and view insights into campaign engagement via

charts and metrics, which can inform on the campaign's effectiveness. (Cooper & Cohen, 2021; Lee, 2013; Ogunniyi *et al.*, 2022).

2.11. Synergy and Strategic Partnerships

To maintain a strong SM presence, all platforms must be fed new posts consistently, but creating quality content at the pace required is difficult. Because of this challenge, a growing number of corporations, NGOs, and government agencies are creating strategic partnerships so they can multipurpose quality content. This potential synergy presents an opportunity to amplify CITES awareness messaging. Educational messaging created by the USFWS would optimally be used by interested strategic partners to amplify the message. Resource material could also include vetted, clever, and educational messaging originating from external partners and being reused by the USFWS and the DOI (Austin, 2010).

2.12. Proven Marketing Success Tips

The success of any educational PSA on SM will be bolstered by proven marketing paradigms. The materials should all be high quality and include stunning images, truthful yet pithy messaging, and attractive graphic layouts. The message should be posted in various ways; repetition of the messaging is critical for the salient points to be retained by the audience.

Chapter 3. Methodology

3.1. Research Study Parameters

This survey was conducted in the US between August 3 and August 22, 2022, to assess the US general population's knowledge and attitudes regarding CITES and shark conservation. The group studied was a sample of US adult residents (18-years-old and older) who responded to a survey opportunity by Centiment—a research, sampling, and survey organization. The study population was drawn from Centiment's US population database, which is representative of the adult US population (Thomas Wimmer, Centiment representative, personal communication, July 25, 2022).

3.2. Research Design

After formulating the hypothesis, a survey instrument and process were designed to collect and analyze data. The survey was used to test the hypothesis that the majority of the general US population does not know what CITES is, what it does, what it does not do, and how shark conservation is integrated into the treaty. The research design took the form of a structured survey questionnaire. The questions identified the population percentage that knew what CITES was and how much they knew about CITES.

Before being sent to the US test population group, the electronic survey was sent for a "pilot run" to two additional groups: a small group of CITES masters' students who had recently matriculated at the Universidad Internacional de Andalucía (in the Management and Conservation of Species in Trade: The International Framework program, 14th edition), and a newsletter subscribed group of approximately 30,000 ocean conservationists. The survey's technical validity was confirmed when complete surveys with the correct deployment of skip logic were received. Clarity was assessed via personal communication with select individuals in the first set of surveys. Once this quality was validated the questionnaire was distributed to the final study population.

The survey was designed to maximize participant understanding of each question and ensure that the survey was administered objectively and clearly. The survey questionnaire was also designed intentionally to be accessible and relatively brief to collect key data and minimize the risk of

participant attrition due to survey length or intrusive questions. Finally, the compiled data set of survey results was designed to approximate knowledge of CITES in the general US adult population and, regardless of their baseline awareness, their attitudes regarding the importance of the core principles of CITES.

3.3. Participant Selection, Sample Size and Margin of Error

The study population goal was to survey a representative sample of the general US population. To reach a representative population and a sample size large enough to solicit responses with an optimal degree of confidence, the survey company Centiment was utilized (Centiment, n.d.-c). Academic institutions such as Harvard University, Stanford University, the Massachusetts Institute of Technology, and the Smithsonian Institution use this company for their surveys. Centiment has established a US population database representative of the US population as a whole. The researcher then sent the survey instrument by electronic mail to randomly selected individuals who were in the Centiment database. The accuracy of the data was then measured for its margin of error (MOE).

The MOE formula was calculated to identify the degree of uncertainty based on the sample size relative to the entire US population. The MOE formula is a statistical tool used to calculate the range of possible errors in survey results. The formula considers the sample size and the confidence level, which is usually set at 95%, to estimate the margin of error (Qualtrics, 2023). The MOE is the maximum difference between the actual population parameter and the estimated value obtained from a survey. In other words, it provides a measure of the uncertainty in survey results, which is essential for making accurate inferences about a population (Qualtrics, 2023).

Each study participant volunteer was selected from a population of US-based adults (18-years-old and older) who had self-selected to complete surveys in exchange for small, varied, and nominal rewards, which are given by Centiment to encourage participation and they range from electronic book vouchers to credit for online games. The responding surveyed individuals from the US sample population were further characterized by their identified gender, access to SM, highest educational degree, and political party affiliation. Demographic variables

were utilized to gain deeper insight into who the sample population was and their responses to the survey questions.

3.4. Research Instrument

The questions were drafted and the questionnaire tool was created to collect data for the survey from the sample population. The circulated questionnaire can be reviewed in Figure A11. Questions were included that assessed participant knowledge and attitudes about general ecosystem preservation and conservation, recognition of CITES, understanding and familiarity with CITES specifics, general understanding of the importance of sharks within the marine ecosystem, and awareness of existing shark protections via CITES.

Attrition is always a concern when conducting surveys (Lynn, 2017). People lose interest in surveys that are too long or seem redundant. A skip logic survey, also known as branching or conditional logic, is a feature in online surveys that allows researchers to direct respondents to specific questions or sections of a survey based on their previous answers. This customization saves time and creates a more personalized and efficient survey experience for participants, as it allows them to skip questions that are irrelevant to them. This mechanism can lead to higher response rates, better quality data, and a more positive overall experience for respondents (Lynn, 2017). Our survey employed skip logic to optimize the survey completion rate. The skip logic flow can be reviewed in Figure 1.

Questionnaire

Do you believe wildlife conservation should be a national priority?

Have you heard of the CITES treaty?

No

Yes

Define the acronym "CITES" or describe your understanding of the convention mission. (Please note that if you do not know the definition go back and recheck the way you answered the previous question.)

CITES is the the Convention on International Trade in Endangered Species of Wild Fauna and Flora, a global agreement among governments to regulate or ban international trade in species under threat. Do you believe CITES is important?

CITES is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Animals and Plants), a global agreement among governments to regulate or ban international trade in species under threat of extinction. Do you believe CITES is important?

Now that you know the name of the convention, do you recall hearing anything about this treaty?

Do you think CITES is effective in achieving its mission?

Do you know the purpose of a CITES Appendix?

How important do you believe it is to regulate the international trade of threatened and endangered animals?

Can animals listed on a CITES Appendix be internationally traded?

To show you are paying attention please select "Fall" as your answer choice

Figure 1: Questionnaire Skip Logic Flow
Source: Author's schematic of questionnaire skip logic flow

3.5. Survey Goals

The survey had three overarching goals:
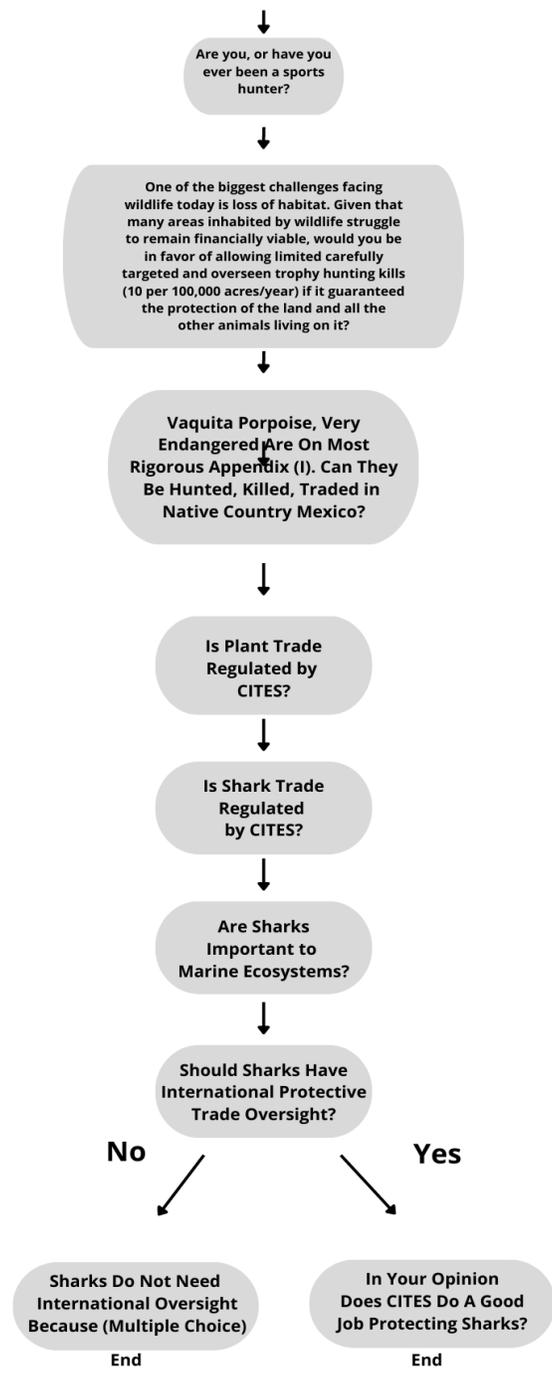
1. To determine the percentage of the sample population aware of CITES.

2. To determine the percentage of the sample population who believe conservation should be a national priority and, therefore, by inference, are interested in learning about CITES.

3. To determine the percentage of the sample population who believe in conservation of threatened and endangered species, including sharks, through international regulation of trade.

3.6. Question and Flow Explanation

The survey tool began with a general attitude question: **"Do you consider wildlife conservation a national priority?"** This question was used to gauge how important wildlife conservation was to the participant.

"Have you heard of the CITES treaty?" This second question, which was a general knowledge question, was asked as a core question to measure participants' CITES awareness. The sampled population was then divided into those who answered "NO" or "YES" to this question. Those who answered "NO" were given a definition and explanation of CITES. Given this new information, they were then asked: "**Do you believe CITES is important?**" to gauge their attitude. Those who answered "YES" were asked to define the acronym CITES or describe the CITES mission. This step was done to ensure the data was as clean as possible. Therefore, participants who answered this question incorrectly were not truly aware of CITES. The data was cleansed by rerouting these participants back to the group that answered "NO" to the question, "**Have you heard of the CITES treaty?**"

Those who answered correctly were given the definition and explanation of CITES and were then asked the same attitude question as those who answered "NO." The "YES" group were further asked an attitude question: **"Do you think CITES is effective in achieving its mission?"** as well as more in-depth knowledge questions: "**Do you know the purpose of a CITES Appendix?**" and "**Can animals listed on a CITES Appendix be internationally traded?**"

The "NO" group was further asked a knowledge question: "**…do you recall hearing anything about this treaty?**" and then an attitude question: "**How important do you believe it is to regulate the international trade of threatened and endangered animals?**" This was a core attitude question about the CITES mission for those with no previous knowledge about CITES.

Both groups were then asked a question to ensure that they were paying attention to the survey details. This question, "**To show you are paying attention, please select 'Fall' as your answer choice.**" Participants who might not have been truly engaged in the survey were selected if they answered incorrectly, and their surveys were deleted from the sample population.

This step was followed by a set-up question: "**Are you, or have you ever been a sports hunter?**" The setup question was posed to gauge how many people were sport-hunting participants. This answer set the baseline for the follow-up question: "…**would you be in favor of allowing limited, carefully targeted and overseen trophy hunting kills (10 per 100,000 acres/year) if it guaranteed the protection of the land and all the other animals living on it?**" This attitude question was meant to reveal the number of people interested in considering trade-offs to protect wildlife.

The next question was designed to measure the knowledge of the sample population regarding CITES international trade regulations of endangered species vs. range state regulation: "**Vaquita Porpoises are extremely endangered; perhaps only ten individuals remain in the wild. These animals are listed in the most rigorous CITES Appendix I. According to CITES, can the Vaquita porpoise be hunted, killed, or sold within its native country Mexico?**"

This question was followed by two knowledge questions regarding CITES's scope of regulation: "**Is the international trade of plants regulated by CITES?" and " Is the international trade of sharks regulated by CITES?**" A knowledge question followed this and then an attitude question regarding sharks: "**Are sharks important to marine ecosystems?**" and " **Should sharks have international trade oversight?**" Based on the answer to the last question, those who answered "YES" were asked: " … **is CITES doing a good job at protecting sharks?**"

Those who answered "NO" were asked to pick from a multiple-choice list why sharks do not need international oversight.

3.7. Ethical Considerations

This research was conducted to expand knowledge and identify specific areas to inform an educational strategy. The specific goal was to increase the knowledge level and support of the US population for CITES. This approach is consistent with the ethical principles of environmental stewardship, which include economic growth, social inclusion, and environmental protection (Mathevet *et al*., 2018).

Survey participation followed the ethical principles of informed consent. Participants were explicitly informed about the nature of the survey and participated voluntarily. Participant privacy was ensured, as were the participants' responses.

"Centiment is compliant with and is certified by the Institutional Review Board (IRB), an appropriately constituted group that has been formally designated to review and monitor biomedical research involving human subjects. This group review serves an important role in protecting the rights and welfare of human research subjects. Centiment does not store any project data once results have been delivered" (Centiment, n.d.-a).

3.8. Data Analysis and Display

Data results were displayed graphically in tables, pie charts, and bar graphs. Two different question branches within the survey warranted different follow-up questions. The first division of sub-questions depended upon whether a participant said they had heard of the CITES treaty. The second split of the participant population depended upon the answer to "Should sharks have international protective trade oversight?"

This data was displayed in pie graphs and bar graphs for intuitive visual understanding. When the data was displayed in pie graph figures, numerical results were converted into percentages to facilitate result comparisons between survey questions. Bar graphs were utilized to compare responses to key questions between segments of the US population based on political party

affiliation and by the highest educational level achieved. A final bar graph was used to juxtapose those in the US population sample who had heard of CITES versus those who thought wildlife conservation should be a national priority.

The Likert scale is commonly used to measure attitudes, opinions, and perceptions in surveys, and it was chosen for this study to obtain detailed data. A standard Likert scale consists of a question and a scale of five answers ranging from "strongly agree/extremely important" to "strongly disagree/not at all important," with "neutral" in the middle from which the respondents can choose. In addition to these choices, respondents could also usually choose "disagree/not important" and "agree/important."

The survey consisted of questions with Likert scale answers and other questions with categorical answers (yes, no, unsure, or sometimes). After reviewing the data it was determined that the categorical format produced the most useful data display and interpretation. Therefore, all Likert scale data were converted to categorical data. It is important to note that although the Likert scale can be useful, it may not always be applicable in all research scenarios, so data converting was crucial for obtaining useful and understandable results.

In detail, the responses for "1" and "2," "strongly disagree/not at all important" and "disagree/not important," were combined as "no" in the findings, and the responses for "4" and "5" "strongly agree/extremely important" and "agree/important" were converted to "yes." In one question responses for "1" and "2," " I have never heard anything about this treaty" and " I have heard very little about this treaty" were coalesced as "no" in the findings, and the responses for "4" and "5" "I know a good amount" and " I know something about" were converted to "yes."

Finally, other questions were presented with categorical answer choices. The three formats used include:
"yes" versus "no"
"yes" versus "no" versus "unsure"
"sometimes" versus. "no" versus "unsure"

Chapter 4. Results

4.1. Population and Sample Size

The population sample size and survey return rate are detailed in Table 1. The responding participants were a sample of the adult US population consisting of 521 participants out of a random 1,029 surveys sent, with a response rate of 51%. The population was further characterized by gender (Table 2), the highest educational degree level obtained (Table 3), identified political party affiliation (Table 4), and by access to SM (Table 5). The US population sample was nearly balanced by gender. Having a high school diploma was the largest segment of the sample by highest educational level achieved, followed by having achieved a college degree. The sample population identified political affiliations was roughly a third each of Democrats, Republicans, and independents. Almost 90% of the US population sample said they had access to SM.

Table 1: Survey Response Rate

	Completed Surveys	Surveys Sent	Returned %
US Population	521	1029	51%

Source: Author's integration of survey data into GoogleDoc table

Table 2: Gender Distribution

	Female	Male	
US Population	245 / 47%	276 / 53%	

Source: Author's integration of survey data into GoogleDoc table

Table 3: Highest Educational Degree Distribution

	Pre High	High School	College	Graduate
US Population	27 / 5.2%	284 / 54.8%	146 / 28.2%	61 /11.8%

Source: Author's integration of survey data into GoogleDoc table

Table 4: Political Party Affiliation Distribution

	Democrat	Republican	independent
US Population	178 / 34%	185 / 36%	158 / 30%

Source: Author's integration of survey data into GoogleDoc table

Table 5: Participants Active on at Least One Social Media Platform

	Yes	No	
US Population	468 / 89%	53 / 11%	

Source: Author's integration of survey data into GoogleDoc table

4.2. Survey Results

The full survey results are displayed in pie chart format in Figure 2-19. The first two questions were core survey questions. While 3.5% of our sample responded that they had heard of CITES, 80.4% of the same sample US population responded that they believed wildlife conservation should be a national priority. These results were displayed side by side in Figure 22. Of the total US sample population, 21.3% responded that CITES regulates the international trade of plants, and 29.4% responded that CITES regulates the international trade of sharks.

Of the 3.5% of the sample that had heard of CITES, after being given the definition and purpose of CITES, 94.4% responded they believed CITES was important. Within this same group, 72.2% responded that CITES effectively achieved its mission, 66.6% responded that they knew the purpose of a CITES Appendix, and 55.6% responded that animals listed on a CITES Appendix could sometimes be internationally traded.

The majority (96.5%) of the sample responded that they had not heard of the CITES treaty. After being given a description of CITES, 10.7% of this subgroup said "yes" to the question "now that you know the name of the Convention, do you recall hearing anything about the treaty? 79.3% of the subgroup responded that they believed it was important to regulate the international trade of threatened and endangered animals and 77.1% responded that they believed CITES was

important. This showed low current general US population sample awareness of CITES, but strong interest in the regulating of international trade of affected species.

Only 16.7% of the total US population sample responded that they had ever been a sports hunter. Over 70% of the same population said they would favor allowing limited, carefully targeted and overseen trophy hunting if it guaranteed the protection of the land and all the other animals living on it.

Less than 9% of the total population sample in the United States indicated that they were aware that CITES agreements did not govern the laws of an independent nation. In the survey, participants were presented with a scenario featuring the critically endangered Vaquita porpoise (listed under Appendix I) and were asked if it could be hunted, killed, or sold within Mexico, its country of origin, "according to CITES regulations." The correct answer was "yes" because CITES regulations only apply when there is an attempt to engage in international trade. Therefore, unless the Mexican government instituted domestic regulations to protect the Vaquita porpoise, it would not be safeguarded.

Over 82% of the total US population sample responded that sharks are important to marine ecosystems, and 84.3% responded that sharks should have international protective trade oversight. Further, 22.3% responded that CITES was doing a good enough job protecting sharks, and 64% responded that they were unsure.

Of the 15.7% that responded that sharks should not have international protective trade oversight, the three most common reasons were that: 1) "sharks were not endangered" (35.5%); 2) "the oceans are so immense that reports of some shark species as endangered are most likely inflated" (27.1%); and 3) "sharks attack humans, are considered pests, and we are better off without them" (22.4%).

Figure 20 segments the US sample population by political party affiliation on three specific questions. Those identifying as Democrats, Republicans, or independents all responded similarly to the following questions: "Do you believe wildlife conservation should be a national priority?"

(percent yes 78.3-82.5 %); "Have you heard of the CITES treaty?" (percent yes 2.7-3.9%); and "Are sharks important to marine ecosystems?" (percent yes 81.0-85.3%).

The US sample population was segmented by the highest education level achieved in Figure 21, and responses to the same three questions were graphed. Participants self-identified as having a pre-high school diploma, high school diploma, bachelor's degree, or a graduate degree. The same participants were then asked the same three questions. All groups responded similarly to these questions: "Do you believe wildlife conservation should be a national priority?" (percent yes 69.3-82.4%); "Have you heard of the CITES treaty?" (percent yes 0-6.4%); and "Are sharks important to marine ecosystems?" (percent yes 77.4-85.7%).

4.3. Graphical Data Display
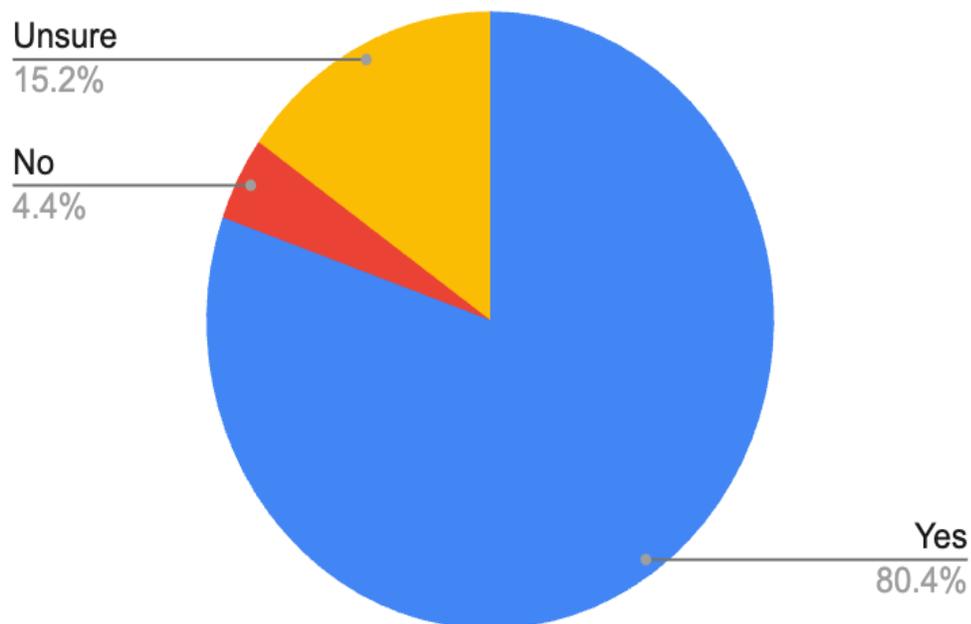
US Population = 521	Yes	No	Unsure	% Yes
Do you believe wildlife conservation should be a national priority?	419	23	79	80.4%

Figure 2: Do you believe wildlife conservation should be a national priority?
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

The data presented in Figure 2 indicates that over 80% of the US general population sample believes wildlife conservation should be a national priority.

Yes
3.5%

No
96.5%
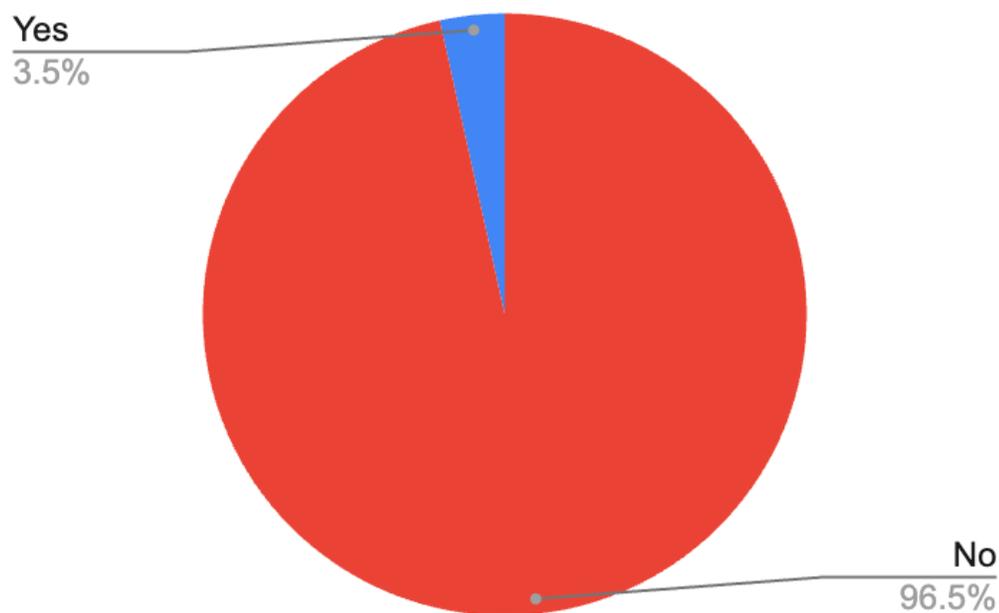
US Population = 521	Yes	No	Unsure	% Yes
Have you heard of the CITES treaty?	18	503	0	3.5%

Figure 3: Have you heard about the CITES treaty? (branch question)
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

The hypothesis was centered on a particular question: does the general public in the US have knowledge of CITES? The results we obtained were overwhelmingly negative, with only 3.5% of the population indicating that they had heard of CITES. To further explore this, we implemented a skip logic branch question, which presented participants who were familiar with CITES with four follow-up questions, while those who had not heard of the treaty were presented with a different set of three questions.

CITES Aware Group =18	Yes	No	Unsure	% Yes
CITES is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Animals and Plants), a global agreement among governments to regulate or ban international trade in species under threat of extinction. Do you believe CITES is important?	17	1	0	94.4%

Figure 4: Do you believe CITES is important? CITES Aware Group
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

Those respondents who answered affirmatively to the question, "Have you heard of the CITES treaty?" were directed to this follow-up question. It is worth noting that this group represents a very small and limited "convenience sample." Nonetheless, the results from this subgroup overwhelmingly showed that those familiar with the treaty consider it to be important.
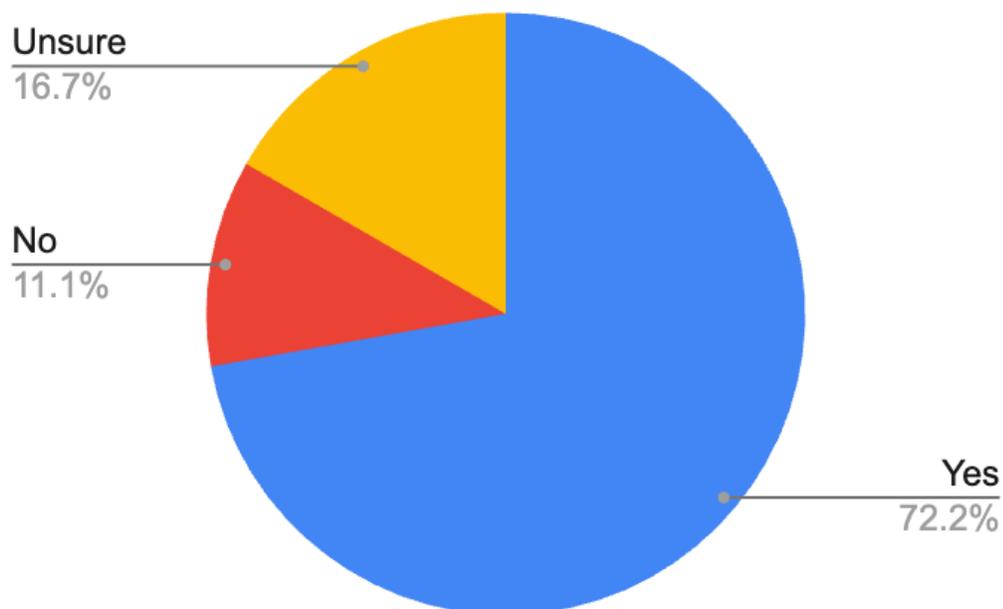
CITES Aware Group =18	Yes	No	Unsure	% Yes
Do you think CITES is effective in achieving its mission?	13	2	3	72.2%

Figure 5: Do you think CITES is effective in achieving its mission? CITES Aware Group
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

Respondents who responded positively to the question, "Have you heard of the CITES treaty?" were additionally asked whether they believed that CITES was accomplishing its objectives. Within this limited convenience sample, 72.2% of participants affirmed that CITES was indeed achieving its mission.
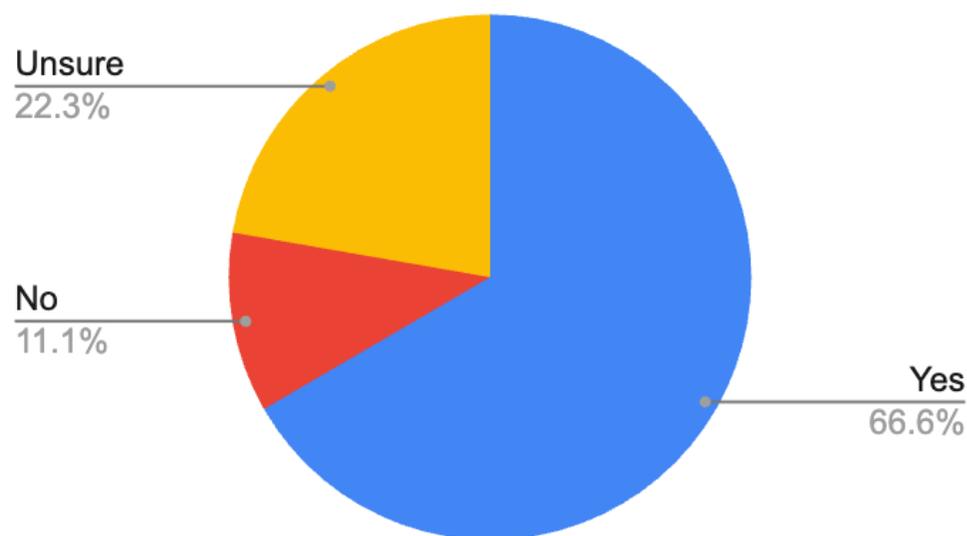
CITES Aware Group =18	Yes	No	Unsure	% Yes
Do you know the purpose of a CITES Appendix?	12	2	4	66.6%

Figure 6: Do you know the purpose of a CITES Appendix? CITES Aware Group
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

Respondents who responded positively to the question, "Have you heard of the CITES treaty?" were additionally asked whether they knew the purpose of a CITES Appendix. Sixty-six point six answered "yes."
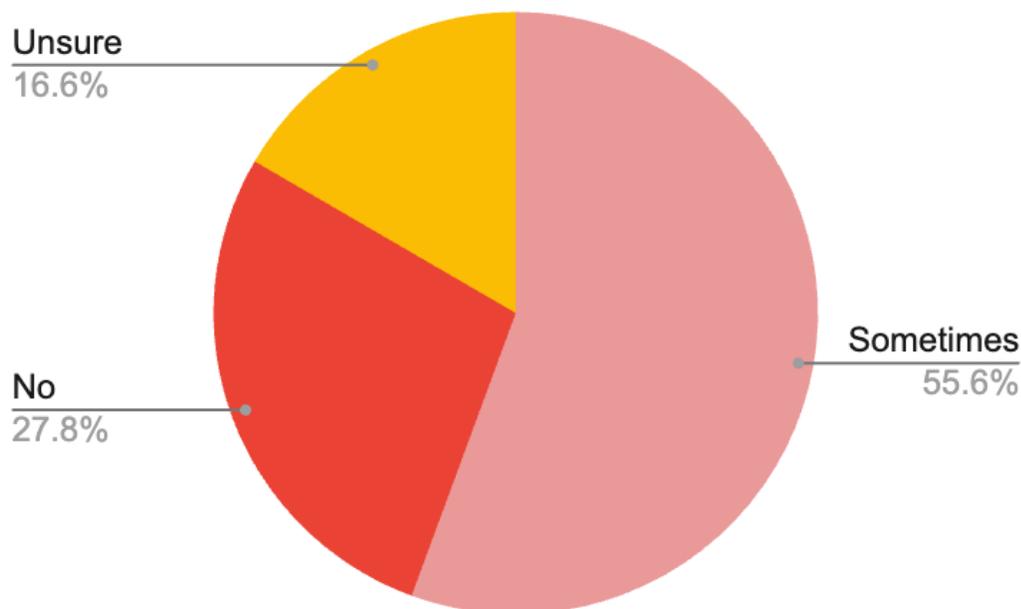
CITES Aware Group =18	Sometimes	No	Unsure	% Sometimes
Can animals listed on a CITES Appendix be internationally traded?	10	5	3	55.5%

Figure 7: Can animals listed on a CITES Appendix be internationally traded? CITES Aware Group
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

Those respondents who responded affirmatively to the branch question, "Have you heard of the CITES treaty?" were further asked about their understanding of whether animals listed on an Appendix (without specifying which one) could be traded internationally. Within this small sample of participants who were familiar with CITES, around 28% held an incorrect belief that the inclusion of a species on any Appendix would completely halt all international trade of that animal. In contrast, 55.6% of the population provided the correct answer of "sometimes." This question was designed to gauge the level of understanding and knowledge among participants who were already acquainted with CITES.

CITES non-Aware Group = 503	Yes	No	Unsure	% Yes
CITES is the Convention on International Trade in Endangered Species of Wild Fauna and Flora, a global agreement among governments to regulate or ban international trade in species under threat. Do you believe CITES is important?	381	31	82	77.1%

Figure 8: Do you believe CITES is important? CITES non-Aware Group
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

For participants who responded negatively to the branch question, "Have you heard about the CITES treaty?", this was the first follow-up question. Due to the large size of this subgroup, the statistical confidence level remained high. This question first provided an introduction and definition of CITES to the participant, and followed by asking whether they believed the treaty held importance. The majority of respondents (77.1%) indicated that they believed the treaty was important.
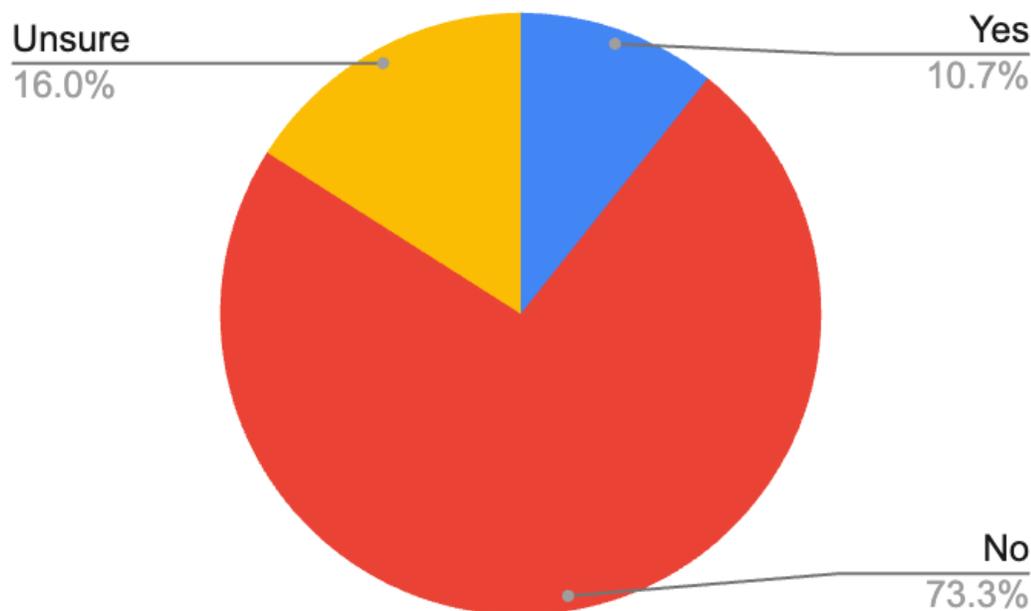
CITES non-Aware Group = 503	Yes	No	Unsure	% Yes
Now that you know the name of the convention, do you recall hearing anything about this treaty?	53	362	79	10.7%

Figure 9: Do you recall hearing anything about this treaty? CITES non-Aware Group
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

This question was posed to participants who initially said they had not heard of CITES. In this question, participants were presented with a description of the treaty, and after receiving this orientation we asked, "Now that you know the name of the Convention, do you recall hearing anything about the treaty?" A total of 10.7% of the population answered affirmatively.
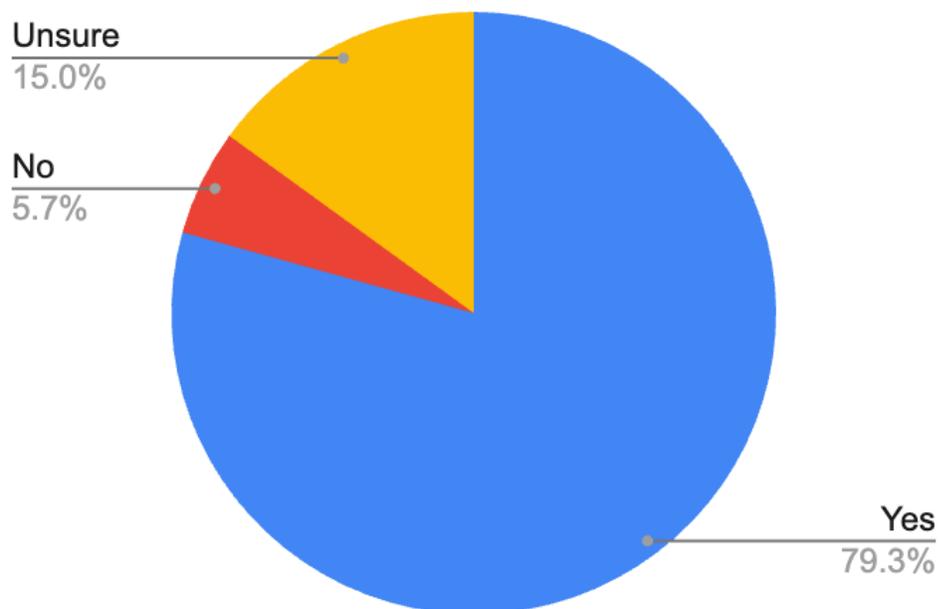
CITES non-Aware Group = 503	Yes	No	Unsure	% Yes
Do you believe it is important to regulate the international trade of threatened and endangered animals?	392	28	74	79.3%

Figure 10: Do you believe it is important to regulate the international trade of threatened and endangered animals? CITES non-Aware Group
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

The subpopulation who answered that they had not heard of CITES were asked if they thought it important to regulate the international trade of threatened and endangered animals. Close to 80% of this group thought it was important.
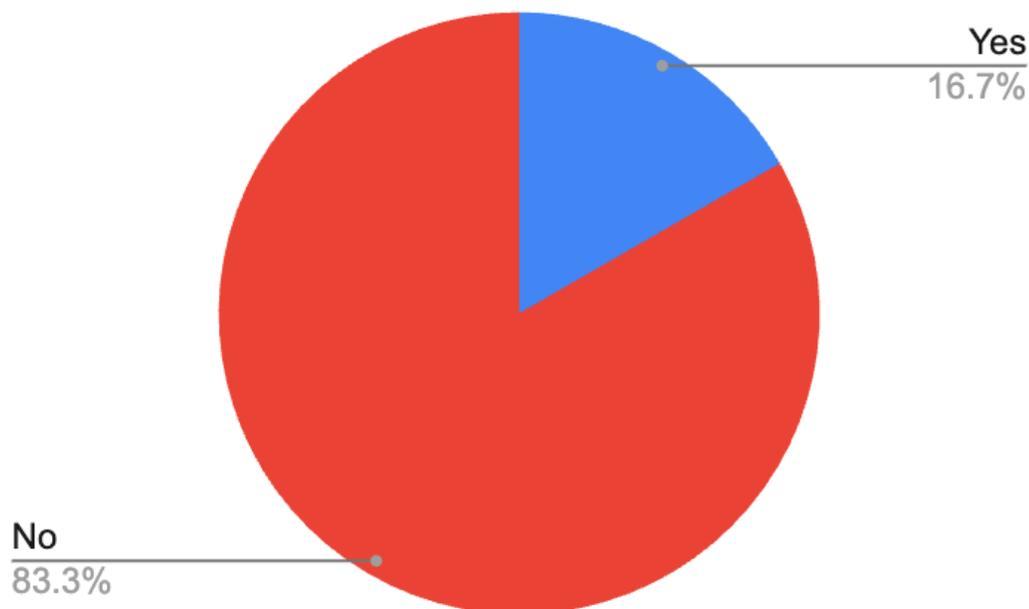
US Population = 521	Yes	No	Unsure	% Yes
Are you, or have you ever been a sports hunter?	87	434	NA	16.7%

Figure 11: Are you, or have you ever been a sports hunter? Entire population
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

The survey question was posed to the entire group, and the responses indicated that roughly 17% of the surveyed population engaged in sports hunting. This allowed for the identification of a baseline of individuals who were passionate about hunting for subsistence or recreation.

US Population = 521	Yes	No	Unsure	% Yes
One of the biggest challenges facing wildlife today is loss of habitat. Given that many areas inhabited by wildlife struggle to remain financially viable, would you be in favor of allowing limited carefully targeted and overseen trophy hunting kills (10 per 100,000 acres/year) if it guaranteed the protection of the land and all the other animals living on it?	383	138	NA	73.5%

Figure 12: Compromises and Trade-Offs: Entire population
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

The objective of this survey question was to assess whether the US public would endorse or approve of trophy hunting if it had the potential to financially benefit the habitat of the hunted species and the entire ecosystem. The aim was to determine whether the respondents would be open to trade-offs. Of all the participants, 73.5% indicated that they would find this approach acceptable.
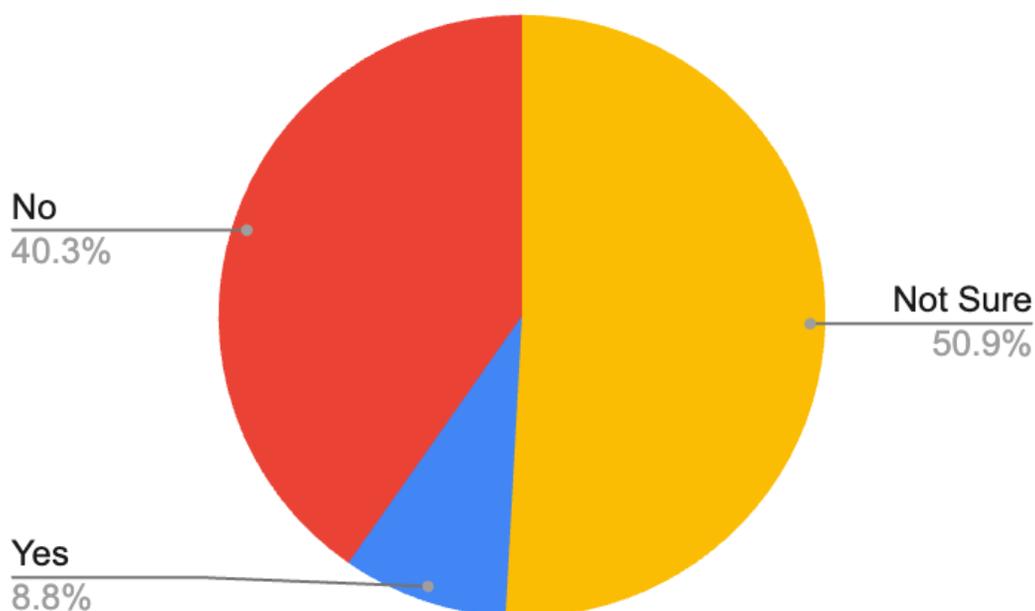
US Population = 521	Yes	No	Unsure	% Yes
Vaquita porpoise are extremely endangered; perhaps only ten individuals remain in the wild. These animals are listed in the most rigorous, CITES Appendix I. According to CITES, can the Vaquita porpoise be hunted, killed or sold, within its native country Mexico?	46	210	265	8.8%

Figure 13: Range State Regulation vs. CITES: Entire population
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

To test the participants' knowledge of CITES policy within a sovereign nation, a particular instance of the vaquita dolphin was used in this question. The question aimed to determine whether the respondents were aware of the applicability of CITES regulations to activities and regulations in Mexico, a sovereign state, regarding the endangered Vaquita porpoise. However, only a minor proportion of the participants (8.8%) knew that the CITES Appendix classification did not override domestic laws in range states.
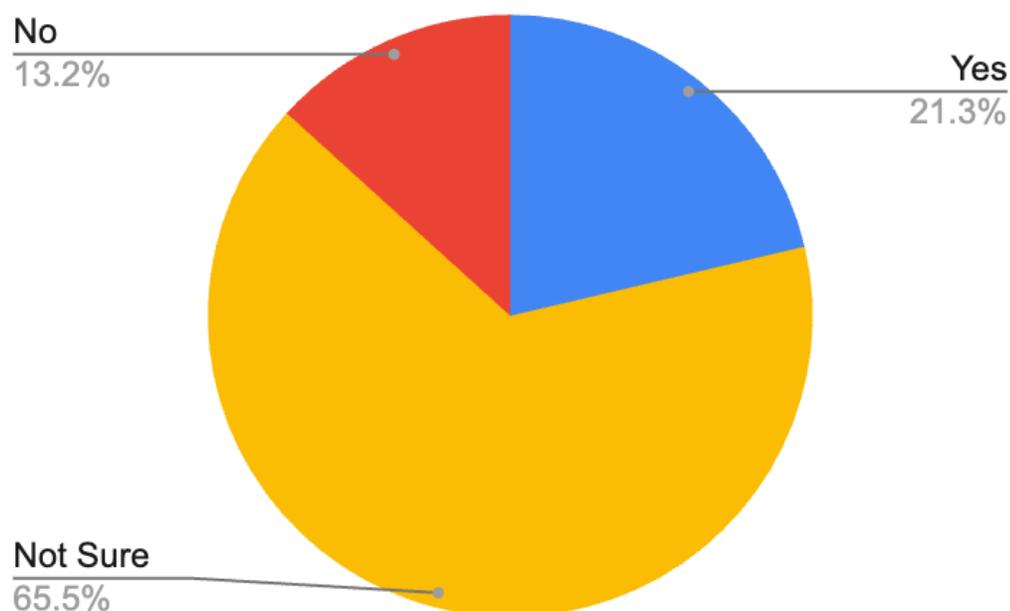
US Population = 521	Yes	No	Unsure	% Yes
Is the international trade of plants regulated by CITES?	111	69	341	21.3%

Figure 14: Is the international trade of plants regulated by CITES? Entire population
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

Out of all the species listed under CITES, the highest number, which is 34,310, belonged to the plant kingdom. This question was included in the survey to test another fundamental aspect of the treaty. However, it was found that 21.3% of the participants were aware that CITES covered plants as well.
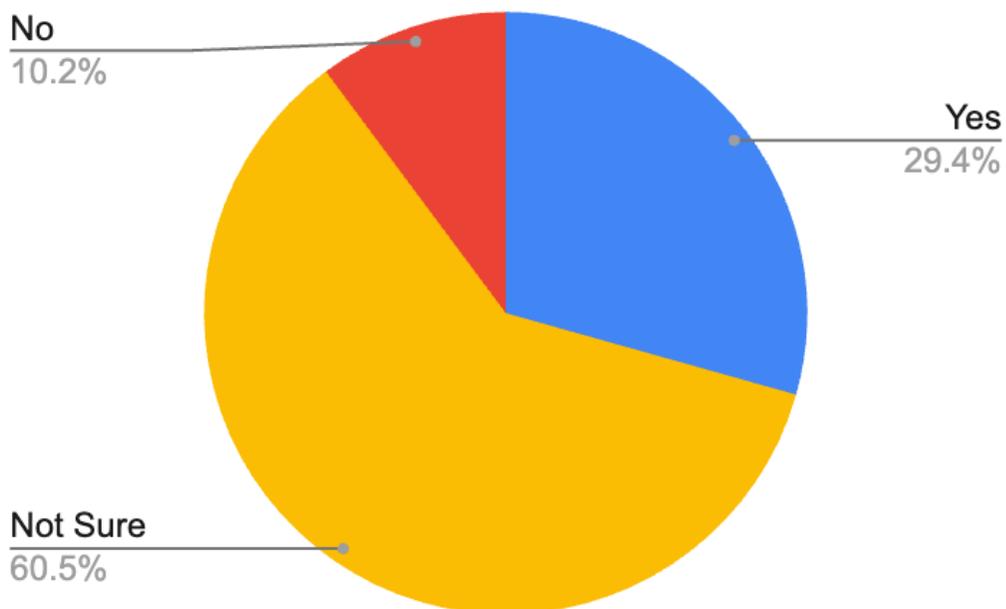
US Population = 521	Yes	No	Unsure	% Yes
Is the international trade of sharks regulated by CITES?	153	53	315	29.4%

Figure 15: Is the international trade of sharks regulated by CITES? Entire population
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

Similar to the previous inquiry, this question was posed to the entire survey population. It was discovered that 29.4% of the overall population was knowledgeable about CITES's inclusion of shark species in its listings.
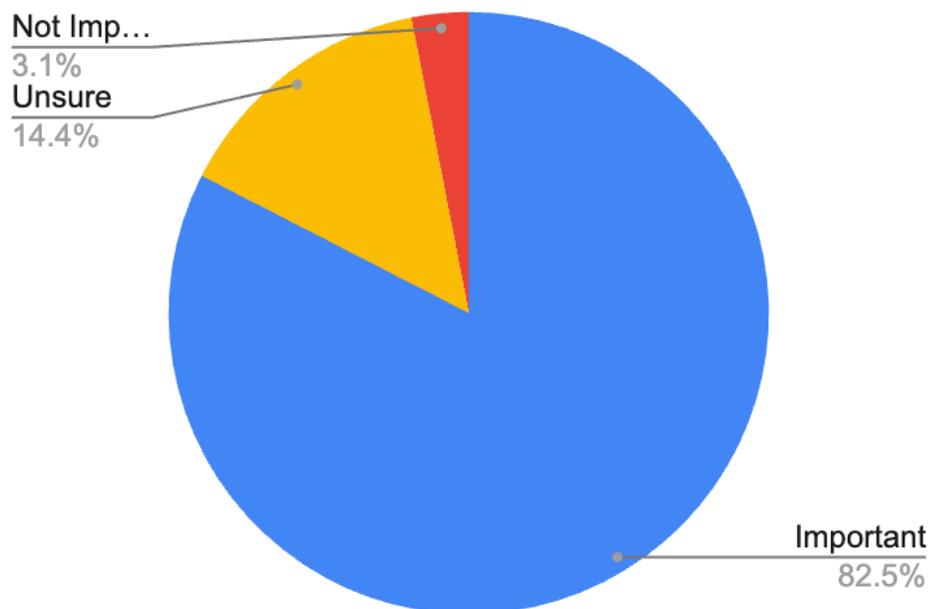
US Population = 521	Yes	No	Unsure	% Yes
Are sharks important to marine ecosystems?	430	16	75	82.5%

Figure 16: Are sharks important to marine ecosystems? Entire population
Source: Graphical depiction combining survey data and pie graph, derived from survey data
processed with Excel and combined in Pixlr

When the participants were asked "Are sharks important to marine ecosystems?" 82.5%
of respondents replied "yes."
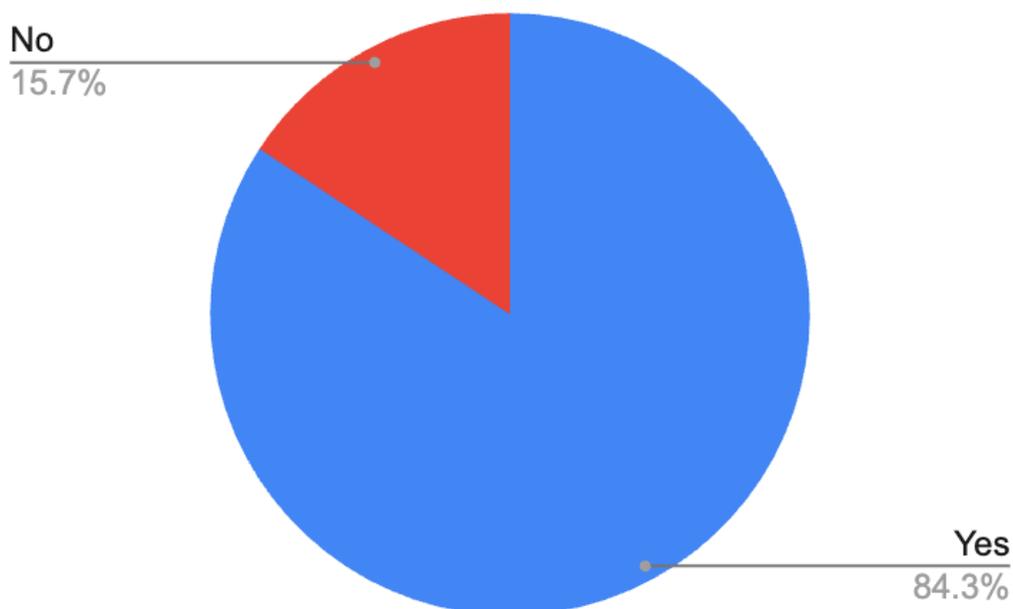
US Population = 521	Yes	No	Unsure	% Yes
Should sharks have international protective trade oversight?	439	82	NA	84.3%

Figure 17: Should sharks have international protective trade oversight? Entire population (branch question)
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

The majority of the survey participants, around 84% or 439 individuals, believed that sharks should have a general international protective trade oversight. This was a foundational question asked in the survey. Based on the response to this inquiry, participants were provided with a specific follow-up question.
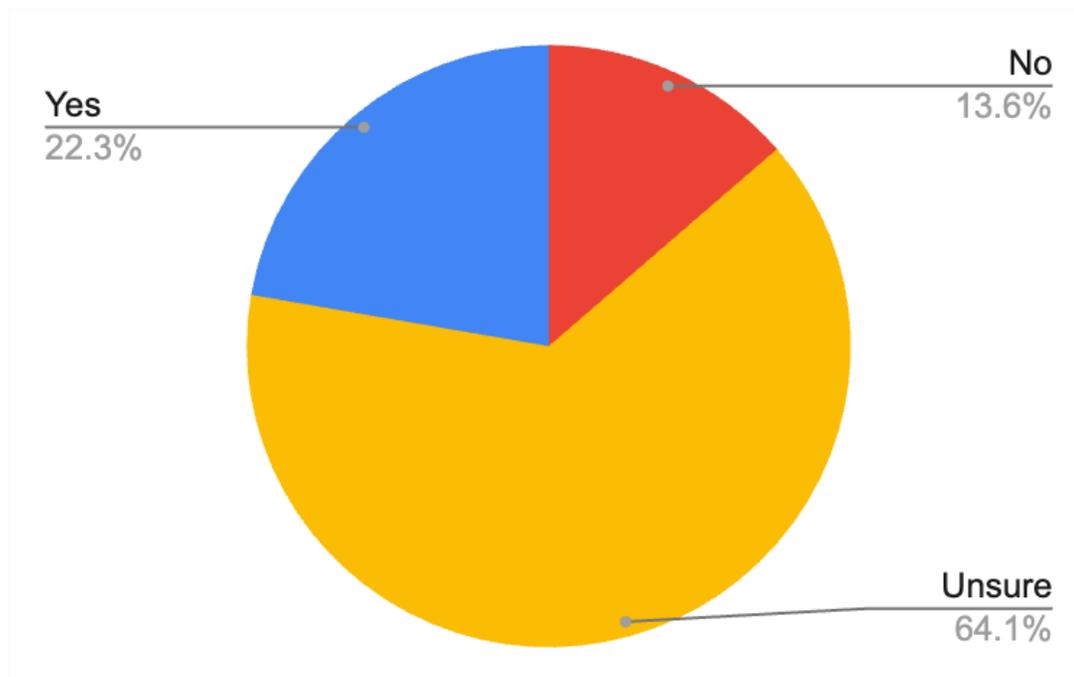
Agree with International Protection = 439	Yes	No	Unsure	% Yes
In your opinion, is CITES doing a good enough job protecting sharks?	98	60	282	22.3%

Figure 18: In your opinion, is CITES doing a good enough job protecting sharks? This question was given to participants who believed sharks should be overseen by CITES
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

Those participants who responded affirmatively to the query, "Should sharks have international protective trade oversight?" were further asked if they believed that CITES was effectively safeguarding sharks. Out of those participants, 22.3% responded positively.
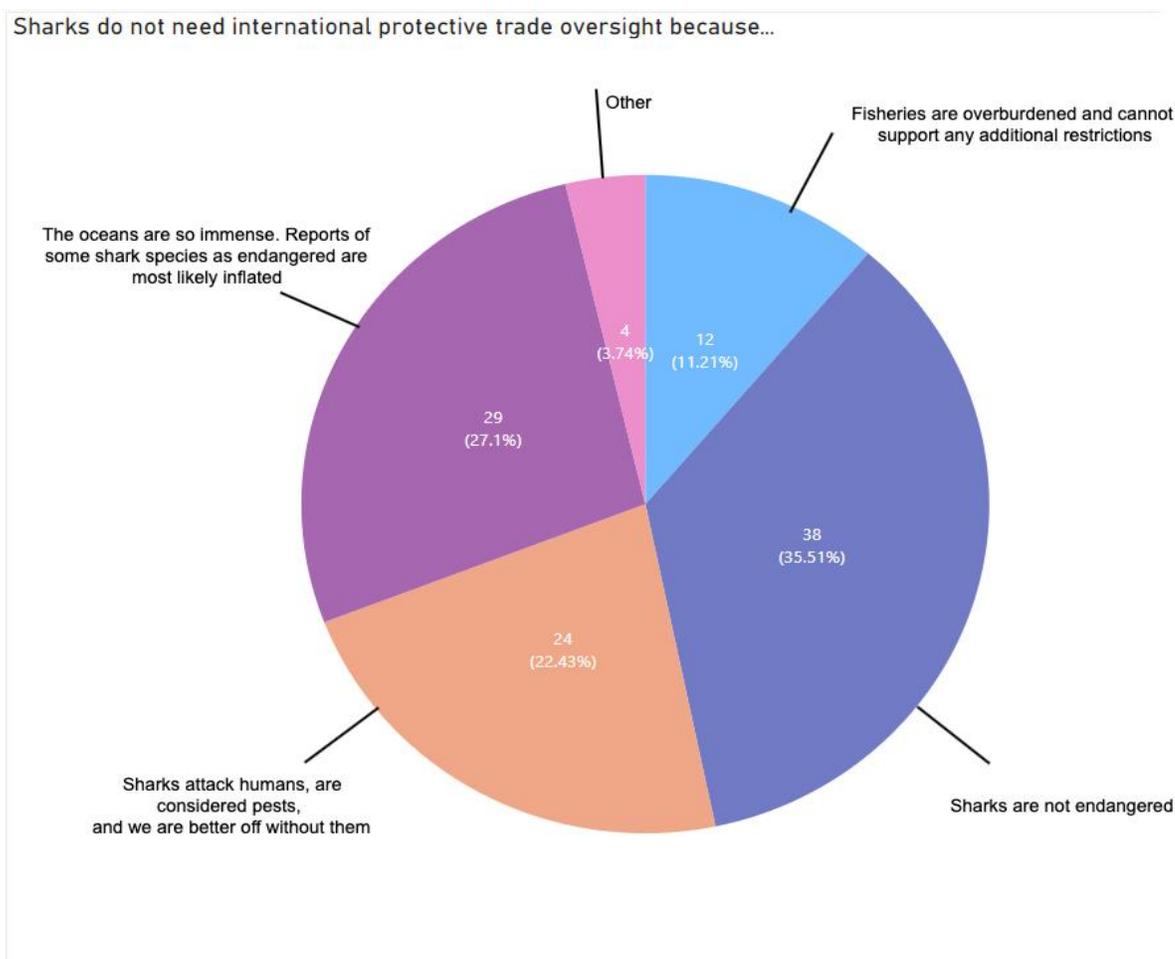
Figure 19: Sharks do not need international oversight because: (multiple answer option) This question was given to participants who do not believe sharks should be overseen by CITES
Source: Graphical depiction combining survey data and pie graph, derived from survey data processed with Excel and combined in Pixlr

Those participants who responded negatively to the query, "Should sharks have international protective trade oversight?" were provided with several options to explain their rationale. Respondents were permitted to choose multiple answers. The largest group, comprising 35.5%, believed that sharks were not endangered, while 27% believed that reports of shark endangerment were likely exaggerated due to the vast size of the ocean. Additionally, 24% of respondents believed that since sharks attack humans, they are pests and we would be better off without them.
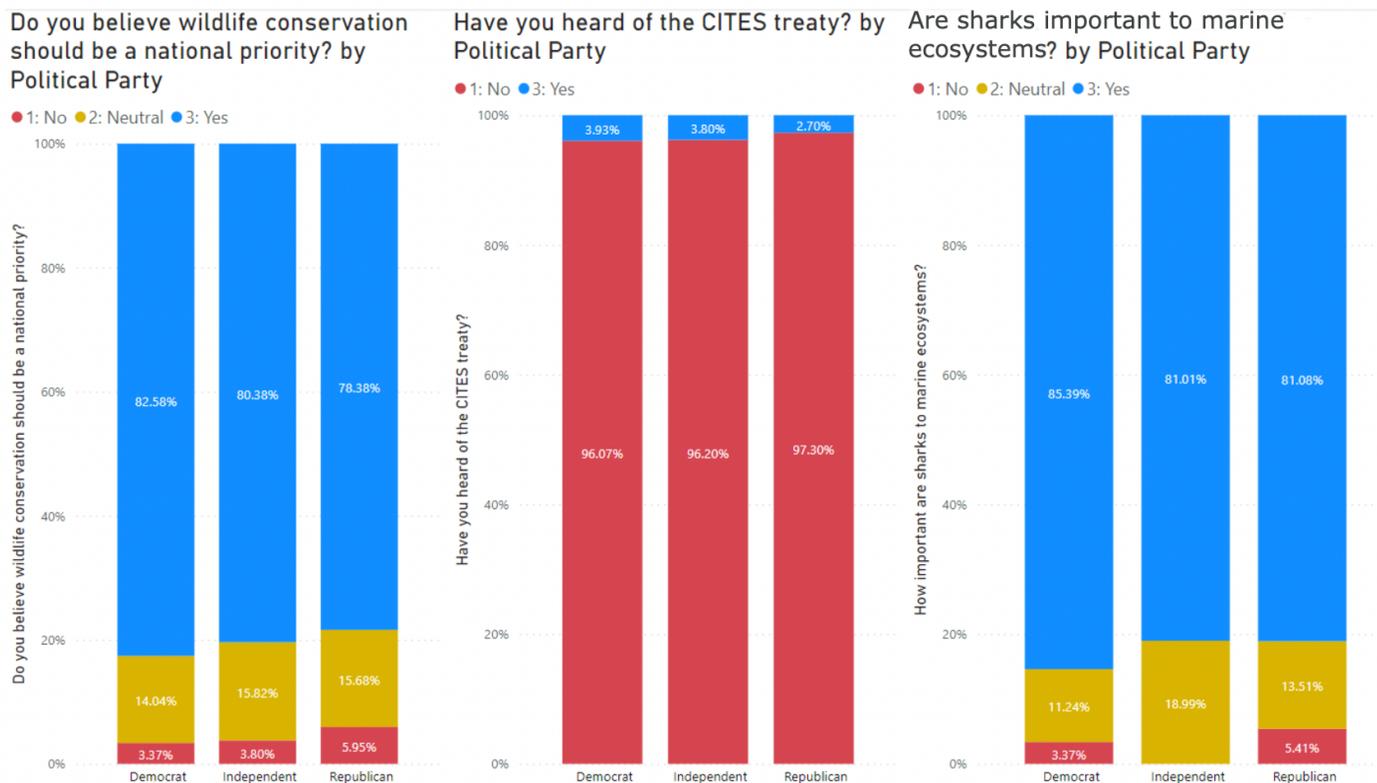
Figure 20: US Population Sample by Political Party Affiliation
Source: Excel data interpretation

The survey's responses to the three main questions were compared between political parties. However, there were no significant differences observed in all three cases. The majority of the participants, regardless of their political affiliations (Democrats, Republicans, and independents), believed that wildlife conservation should be a top national priority, were not familiar with CITES, and agreed that sharks are important to marine ecosystems.
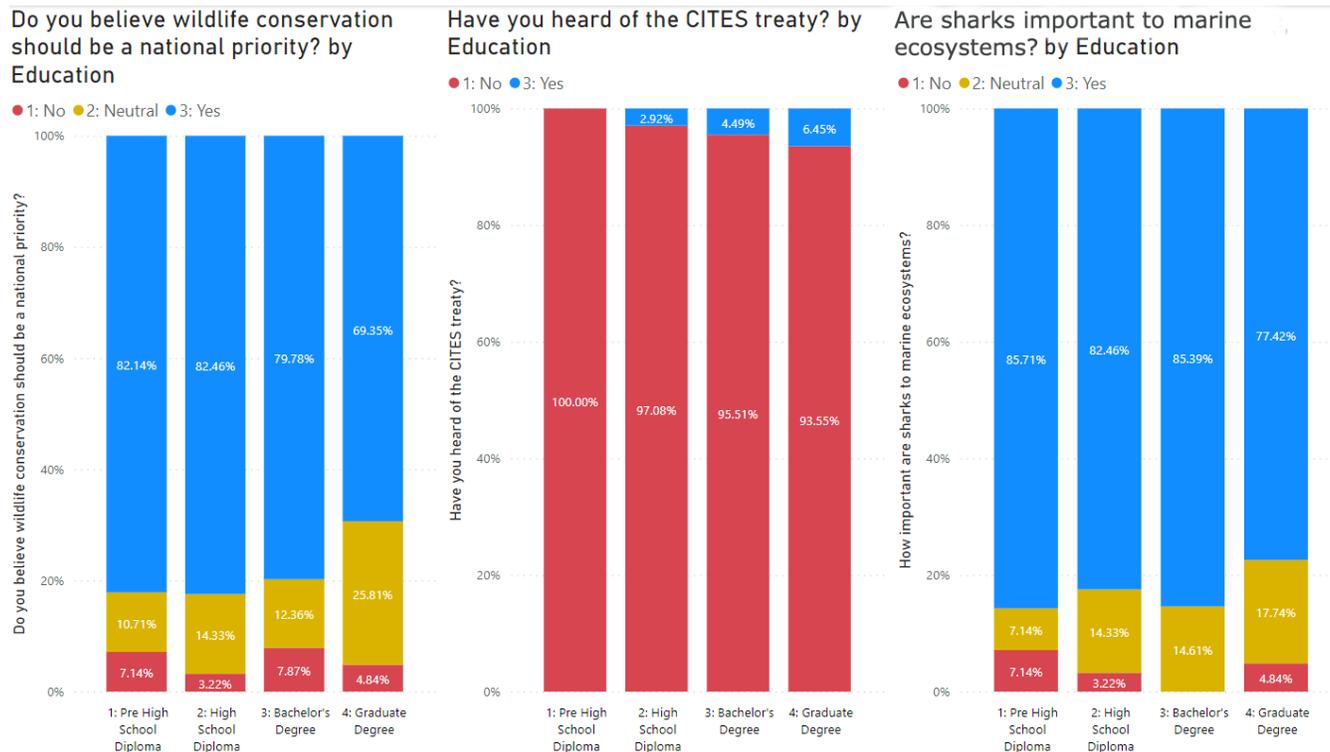
Figure 21: US Population Sample by Highest Education Degree Achieved
Source: Excel data interpretation

The survey's responses to the three main questions were compared by educational level; however, there were no significant differences observed in all three cases. The majority of the participants, regardless of their educational level (Pre-high school diploma, high school diploma, bachelor's degree, and graduate degree), believed that wildlife conservation should be a top national priority, were not familiar with CITES and agreed that sharks are important to marine ecosystems.
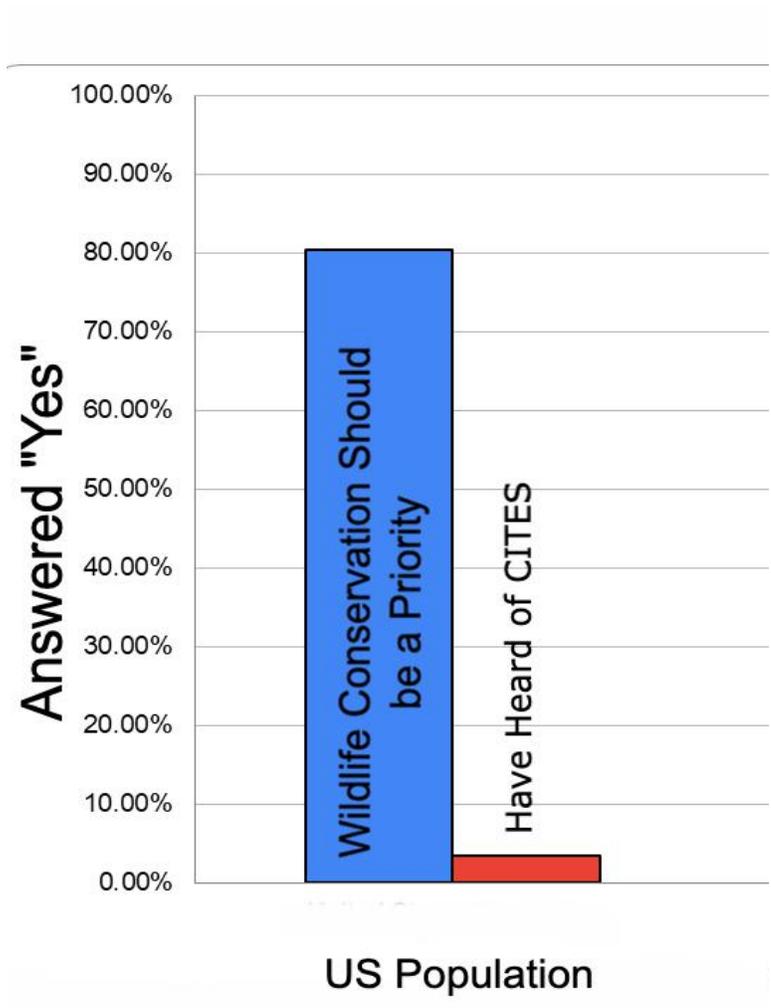
Figure 22: Population Support for Conservation vs CITES Awareness
Source: Excel data interpretation

The majority of the US population surveyed thought wildlife conservation is important, but only a small percentage had ever heard of CITES

4.4. Statistical Analysis

The population sample size was analyzed by using a MOE calculation. The results are displayed in Table 6.

Table 6: Survey Confidence Level

General US Population	Completed Surveys	Entire Population	Margin of Error for 95% Confidence Interval +/-
	521	332,403,650	4%

Source: Author's integration of survey data and MOE results into GoogleDoc table

The MOE was calculated to be 4%, indicating a strong level of confidence for a survey sample; under 5% is considered optimal.

4.5. Subpopulation Convenience Sample

In this study, some smaller subgroups were identified, and their responses may not be statistically significant or reflect the views of the entire population. Nonetheless, researchers can utilize these responses as a convenience sample, particularly in exploratory research. Such a sample can provide insights and hypotheses for further research, but it is important to recognize the sample's limitations and not generalize the results to the broader population. (Leiner, 2016).

Chapter 5. Discussion

5.1. Summary

This study was designed to test the hypothesis that most of the US population does not know about CITES or its function. The primary question, "Have you heard of the CITES treaty?" was central to the hypothesis that most US residents are not familiar with CITES. The US population sample data revealed that more than 95% had never heard of the CITES Treaty. Additionally, despite being informed about what CITES is, over 90% of the sample from the US population exhibited a deficiency in comprehending that CITES does not control the commerce of endangered and threatened animals within a nation's borders. More than 70% did not know that CITES could regulate the international trade of sharks.

In juxtaposition to the lack of knowledge regarding CITES within the US population sample, the data revealed widespread interest in wildlife conservation and regulating the international trade in threatened and endangered species. Over 80% of the US population sample believed wildlife conservation should be a national priority. The vast majority of the US population sample indicated that they thought CITES and the regulation of the international trade of threatened and endangered species were necessary. Over 80% of this population indicated that they thought sharks were important to marine ecosystems and should also have international trade oversight. Furthermore, the vast majority expressed that they would be willing to accept trade-offs, such as limited regulated hunting, to protect wildlife and habitat. The US population sample's beliefs regarding wildlife conservation appeared to transcend political party affiliation and education level.

A better understanding of CITES, its mission, its implications, and how regulations affect travelers, wildlife users/traders, and global biodiversity would be productive. For example, when traveling, many tourists are unaware of CITES-listed species and only learn that an item cannot be imported when they arrive at their destination and are not permitted to import. Awareness of the long-term objectives of CITES would include the public in a critical discussion. Although the US recognizes a personal effects exemption under certain circumstances and for certain species/specimens, some specimens are not permitted entry into the country. At present, most tourists who have their items confiscated due to bans only find out about the regulations when

their belongings are taken away, and they possibly receive a fine, at customs, but even in such a situation, these tourists are not given a thorough explanation for why their overseas purchases are being seized. They are not provided with detailed information about CITES or educated about the potential impact that unrestricted international trade could have on endangered and threatened species.

Other US groups could benefit from knowledge of CITES as well, including those who trade in or harvest wildlife, pet owners (e.g., those traveling or moving abroad with CITES-listed pets), and hunters who travel internationally. Enhancing the public's awareness of CITES could support international travel and legal and biologically sustainable wildlife trade.

5.2. Interpretation

The results overwhelmingly support the hypothesis that the vast majority of the general US population is not aware of CITES, as indicated by Figure 3. In contrast, Figure 2 and Figure 22 indicate that a high proportion of the general US population thinks wildlife conservation should be a national priority and favors the regulation of international trade of threatened and endangered species. These findings have important implications and may reflect a high value placed on the principle of environmental stewardship.

The findings suggest that the lack of awareness about CITES and the support of regulating international trade to conserve endangered species is not restricted to a particular political party or educational background. Despite prevalent stereotypes in the US that may imply a link between political party affiliation or education level and the level of support for wildlife conservation, Figure 20 and Figure 21 demonstrate widespread support across the political and educational spectrum.

Among the small group of individuals who were aware of the existence of CITES, a significant majority (94%) considered it important (Figure 4), while a slightly smaller majority of 72.2% believed that CITES was effective in fulfilling its mission (Figure 5). The study aimed to determine whether this population was familiar with the fundamental principles of CITES. Among this group, 66.6% indicated that they knew the purpose of a CITES Appendix (as shown

in Figure 6). When asked whether species listed in the Appendix could be traded internationally, 55.6% answered "Sometimes," while the remaining individuals answered "No" or "Unsure," as indicated in Figure 7.

The group who initially answered that they had not heard of CITES were given a second chance to respond about CITES awareness after being given a definition of CITES. Among the group of individuals who initially reported not having heard of CITES, 10.7% indicated that they recalled hearing something about the Treaty when prompted, as shown in Figure 9. This same group was also asked whether they believed it was important to regulate the international trade of threatened and endangered species, with a significant majority of 79.3% answering "Yes," which is shown in Figure 10 and 77.1% expressed that they believed the Treaty was important (Figure 8). Despite being previously unaware of CITES, this population demonstrated a strong belief in the importance of regulating the trade of threatened and endangered species.

Nearly 90% of the participants in the US sample reported having access to SM, which indicates that SM platforms could serve as a viable means to educate the wider US population about CITES. The results suggest that leveraging SM channels could be an effective strategy for promoting awareness and understanding of international trade regulations to safeguard endangered species.

The study group as a whole was asked if they engaged in sport hunting. This was important to establish a baseline of individuals who were enthusiastic about hunting as a means of subsistence or recreation. Figure 11 shows that 16.7% of the participants identified as hunters. Subsequently, we sought to determine whether the general US population would support or condone trophy hunting if it could financially support the habitat of the hunted species and their entire ecosystem. Over 73% of the participants indicated that they would find this model acceptable, as shown in Figure 12. This finding supports the idea that most of the general US population would be willing to accept trade-offs to conserve wildlife and habitat, which implies a real-world view that balances the needs and wants of stakeholders.

The subsequent questions were intended to assess whether the respondents possessed a more comprehensive understanding of CITES. When asked about the applicability of CITES regulations on the endangered Vaquita porpoise to activities and regulations within Mexico, a sovereign state, only a small percentage of participants (8.8%) were aware that CITES Appendix designation did not supersede domestic laws in range states, as illustrated in Figure 13. Another query evaluated the knowledge depth of the participants on plants. Despite the fact that the CITES Appendices (updated Feb. 2023) are comprised of 40,900 species, of which 6,610 are animal species and 34,310 are plant species, Figure 14 indicates that only 21.3% of the population was aware that plants were also included in CITES jurisdiction.

Likewise, Figure 15 demonstrates that only 29.4% of the general population was aware that CITES includes shark species in its listings. However, when asked "Are sharks important to marine ecosystems?" a significant 82.5% responded affirmatively as shown in Figure 16. Furthermore, when asked if sharks should be granted international protection, Figure 17 shows that 84.3% of respondents answered "Yes." These findings identified that the US population sample lacked understanding of many aspects of CITES yet supported regulation of international trade as a conservation measure.

5.3. Implications

The results of this study identified key knowledge gaps regarding CITES and an educational opportunity for the general US population. Increasing the proportion of the US population that is aware of and understands CITES could result in additional support of CITES goals, activities, regulations, and enforcement. Specifically, a more knowledgeable populace could become more prepared for activities pertinent to CITES regulations (such as traveling with a CITES-listed pet) and actively engaged in the actions and decisions of the US delegation to CITES.

The discrepancy between the limited awareness of CITES and the widespread belief that conservation of wildlife should be a national priority, coupled with the conviction that international regulation of the trade of threatened and endangered species is crucial, generates a dynamic tension. The possibility of this tension being resolved through an educational strategy, program, and implementation could hold significant implications for CITES. The expressed

values and priorities of the general US population are strong indicators in favor of the success of an educational intervention. The finding that these results were resilient across political party affiliation and educational levels was encouraging in the face of the current trend for US residents to have polarized viewpoints depending upon the optics of their political party (Falkenberg *et al.,* 2022; Tucker *et al.,* 2018). This may suggest that long-term efforts to unify the populace, at least on certain issues, could be possible for at-risk species conservation.

This study builds on previous related studies. Koomson authored a study that assessed the level of awareness of relevant CITES stakeholders in Ghana (Koomson, 2019). Foray-Musa examined stakeholder awareness and national compliance with CITES in Sierra Leone (Foray-Musa, 2016), and John studied the awareness among critical stakeholders regarding CITES implementation in Nigeria (John, 2019). All three of these studies assessed expert and government stakeholders, but none assessed the general population of their examined country. The present study provides the first such analysis for the US.

5.4. Study Limitations

Although this study may be the first to investigate US citizens' awareness and attitudes toward CITES, it is limited in several ways. The study findings must be evaluated with caution, considering the study's constraints and possible sources of bias. Surveys are helpful in exploring uncharted areas of inquiry, and the findings may contribute to the development of new hypotheses for further research. However, this methodology is not appropriate for establishing evidence for cause and effect relationships. This study can provide a foundation for future studies to expand upon.

Although the sample size was adequate with a reasonable margin or error, it is still only a representative sample of the whole US adult population. The subset of Americans familiar with CITES was unexpectedly low, and future research should focus on larger populations.

Selection bias may have distorted the findings. Centiment's US database is representative of the whole US population, but respondents who completed the survey may not be representative of the population receiving the survey. Although all efforts were made to minimize selection bias,

there is a chance that the sample population did not entirely represent the diversity of the US population.

The survey relied on a self-selected pool of participants who were incentivized to join the Centiment survey pool and take surveys through various minimal premiums such as online book coupons or game vouchers. While this could introduce bias, Centiment tried to provide incentives that would appeal to different population segments. Despite the potential for selection bias, the study attempted to overcome it by using a relatively large sample size.

Future research may consider starting with the categorical data model rather than the Likert scale. The survey was limited in the number and scope of questions asked to participants, and more questions could have provided more data but at the risk of participant attrition. The conclusions must be tempered with knowledge of these limitations.

5.5. Educational Opportunity and Strategy

Although it is clear that the majority of all participants believed that wildlife conservation should be a national priority, it is also clear that the majority of the general US population did not know what was being done to regulate the international trade of wildlife (endangered and threatened animals). This knowledge gap is a challenge and an opportunity.

To address this opportunity, a social media-based educational model utilizing shark conservation as a vehicle to teach about CITES was designed. A model and educational example posts were created (presented in this chapter and the Appendix), and these may allow for the future development of a more expanded educational plan. Key teaching points for the overall SM educational strategy included:

    (a) CITES is an international agreement among governments;

    (b) The CITES mission is to ensure that international trade is legal and does not threaten species' survival;

    (c) CITES member Parties use science to create proposals;

    (d) Why YOU need CITES (sub-points could include: The loss of any species could damage an entire ecosystem, threatening food supplies and spreading disease, and CITES can

also help U.S. businesses and individuals engage in sustainable trade of wildlife in a way that keeps species protected);

(e) CITES-listed species are not protected within a country unless domestic protection laws are enacted (CITES establishes international law only but does have implications for national level requirements that Parties may implement);

(f) Success stories (listed species that have recovered, and been delisted, should be included);

(g) How CITES affects anyone traveling (if listed items are acquired abroad, travelers may not be able to import their purchase);

(h) Today, CITES protects approximately 40,000 species against overexploitation due to international trade;

(i) For many years, CITES has been among the conservation agreements with the largest membership, currently with 184 Parties.

Key teaching points for the SM educational strategy regarding Chondrichthyes information included

(a) Why sharks should be overseen by CITES (overfishing for international trade for purposes such as shark fin soup is unsustainable);

(b) Why should we care about sharks (sharks protect the health of the oceans);

(c) Sharks can be overfished (relationship to fisheries).

5.6. Educational Opportunities for the US Scientific and Management Authorities

The US MA and SA have the access, opportunity, and occasionally post CITES-targeted messages on both the DOI and the USFWS SM platforms. Combined, they have a strong reach with over five million followers.

Table 7: USFWS and DOI Social Media Followers

Fish & Wildlife Service Facebook	https://www.facebook.com/USFWS	769,000	
Department of Interior Facebook	https://www.facebook.com/USInterior	838,000	
Fish & Wildlife Service Twitter	https://twitter.com/USFWS	39,600	
Department of Interior Twitter	https://twitter.com/Interior	121,900	
Fish & Wildlife Service Instagram	https://www.instagram.com/usfws/	637,000	
Department of Interior Instagram	https://www.instagram.com/usinterior/	2,500,000	
Fish & Wildlife Service LinkedIn	https://www.linkedin.com/company/usfws/	186,000	
Department of Interior LinkedIn	https://www.linkedin.com/company/department-of-the-interior/	158,000	
		5,248,900	**Grand Total Followers**

Source: Author's integration of current follower numbers, retrieved from each platform. Open source SM graphics GoogleDoc table

5.7. Collaboration - Amplify the Message

USFWS could extend the reach and impact of its SM messaging by creating an open-source online research center complete with SM optimized graphics and copy. This center would allow

other individuals, groups and organizations to easily access and download content to post on their own SM platforms. This approach would enable the widespread distribution of high-quality, vetted content that could be used by USFWS and DOI followers, as well as any other NGO or strategic partners who want to share quality content on social media.

The United Nations already has similar resource centers available, such as a downloadable photo center (United Nations, n.d.-a) and the UN Strategic Development Goals online logo and graphics resource center. (United Nations, n.d.-b)

It is difficult to feed SM platforms with quality content; this opportunity would benefit everyone. Posts could be created in multiple languages and messaging could be broad or focused.

Approximately 150 International Non-Governmental Organizations (INGO) and NGOs attended CITES CoP19 (CITES, 2022), each representing a set of interested individuals. Most of these organizations have public followers who would benefit by learning the basic CITES tenets, how the proceedings affect them, and how CITES impacts the things they care about. USFWS could provide premade, clever and accurate educational social media posts and make them download ready for others to repost.

5.8. CITES Social Media Education Example

A series of key messages that introduce people to the core of CITES and shark conservation were created after the current CITES awareness level for the general public was confirmed through the questionnaire process. The answers to the "How? Why? Where? Who? What?" were incorporated using strong, vetted messaging and storytelling. These sample messages sought to leverage the specifics of FB, TW, IG, and LI to educate those in the general public who do not yet know about the importance of CITES (Le Busque *et al*., 2019; Shiffman *et al*., 2020).

Integrating the SM profile descriptions, the following example (Figure 23) was created and subsequently, others that follow in the Appendix (Figures A1-A11). The single post below exemplifies how the same educational point for multiple platforms could be modified. At times, some posts were not appropriate for a specific SM platform; for example, an image that is not graphically or photographically strong would not be well received on IG and could result in

follower atrophy. In general, a strong graphic image would be well-received on all platforms. Sometimes the image could be augmented with a graphical message, and sometimes the caption would be all that was needed to convey the lesson. In this case, a compelling, clean shark image was used. An image with much "negative space," or clean blank space, where the messaging would pop, was purposefully selected. Images of animals should be crisp and within a beautiful environment or as a full frame as possible. Each post should contain a simple message that collectively would create a lesson and, over time, could convey the entire subject. Strong posts could be repeated.

The messages were tailored to suit each SM platform. TW tweets must be short and colloquial. FB messaging can be more in-depth as can LI. If using tags care must be taken to be sure they are the correct tags for the correct SM platform.

Figure 23: SM Post: CITES and Importance of International Cooperation
(Graphic © Georgienne Bradley - created on CANVA platform using integrated free-use images)

Twitter Caption - The treaty @CITES exists to conserve species becoming #extinct due to unregulated #international trade. Stand behind their decisions.

Facebook Caption - CITES exists to protect species from becoming extinct due to unregulated international trade. When placed on an Appendix, the international trade of a threatened or

endangered species can be temporarily stopped, monitored and/or regulated until the species is no longer deemed endangered. #LetsWorkTogether #GlobalVillage.

LinkedIn Caption - CITES exists to protect species from becoming extinct due to unregulated international trade. When placed on an Appendix, the international trade of a threatened or endangered species can be temporarily stopped, monitored, and/or regulated until the species is no longer deemed endangered.

Instagram Caption - CITES exists to protect species from becoming extinct due to unregulated international trade. When placed on an Appendix, the international trade of a threatened or endangered species can be temporarily stopped, monitored, and/or regulated until the species is no longer deemed endangered. #CITES #endangeredanimals #Poaching #seaturtle #seaturtles #turtlesofinstagram #endangered #seaturtlesofinstagram #criticallyendangered #endangeredanimals #turtlesofinstagram #greenseaturtle #savetheseaturtles #seaturtleconservation #saveseaturtles #seaturtlerescue #CoP

Two additional social media models including graphic and text were also included in Figure A1, "Did You Know?" CITES Regulates INTERNATIONAL trade of endangered species but has NO jurisdiction on National laws. Also, Figure A2 uses a stunning photograph of a shark to captivate the reader's attention. The post highlights the vital role that sharks play in maintaining a healthy ocean ecosystem and emphasizes the connection between healthy oceans and popular foods such as sushi and tapas. The call-to-action urges the public to protect sharks and support CITES.

Figure A3 employs a creative montage graphic to convey the message that animals do not recognize political boundaries and therefore require international cooperation to protect them. The post includes callouts to @CITES, @Sharkweek, @SeaSave, and @WWF, ensuring that it will appear in the feeds of other large followings.

A graphic depicting a charismatic turtle alongside examples of souvenirs commonly purchased by tourists, depicted in Figure A4, sends a powerful message about the harmful impact of such

purchases. The post serves as a reminder that stopping the demand for such souvenirs will lead to a reduction in their production, protecting wildlife in the process.

Figure A5 is the first in a series of graphics-only posts that feature a cartoon of CITES-listed animals. The post emphasizes CITES's key role in the prevention of species extinction, the maintenance of healthy ecosystems, the assurance of sustainability, and the protection of jobs that depend upon natural resources.

Asking questions is an effective way to engage an audience. Figure A6 is a sample of a simple question SM post that is designed with bright colors and cute cartoon animals. Follow-up posts A7 through A10 incorporate the same style and color and provide simple, non-comprehensive facts about CITES Appendix I, Appendix II, and Appendix III. Close monitoring and quick response to comments drive engagement and increase activity.

Chapter 6. Conclusions and Recommendations

6.1. Conclusions

- In support of the study hypothesis, the survey methodology results revealed that over 95% of the general US population sample was unaware of CITES.

- The vast majority of this population sample believed that wildlife conservation should be a national priority and supported the regulation of international trade in threatened and endangered species.

- The belief that wildlife conservation should be a national priority was independent of participants' educational level or political affiliation.

- The general US population sample expressed that limited trophy hunting was acceptable in cases that would ensure the support of critical habitat and species protection (73.5%).

- Among the US population aware of CITES, specific details of the treaty were not well understood.

- Most people did not realize that CITES decisions only apply to international trade and do not, in any way, change how an animal is protected or hunted within its particular range state.

- The vast majority of the general US population sample believed that sharks are important to the environment .

- SM has become a powerful worldwide communication tool. This study showed that even though most participants were unaware of CITES, almost 90% of participants actively used SM. This scenario presented a strong educational opportunity.

6.2. Recommendations

- The CITES educational examples developed in this paper should be used as a model to develop a comprehensive CITES educational program for the general US population. This program should be implemented and monitored with analytics for impact. Sharks or other charismatic species should be used to optimize engagement.

- The USFWS has an opportunity to fill the gaps in knowledge identified in this study as the lead agency for CITES implementation in the US. They would need to implement a stronger and more consistent CITES educational program. The SM platforms of the DOI and USFWS could be utilized to provide US residents with easier access to CITES-related knowledge. To engage the public, the SM program could showcase charismatic animals and stunning flora while highlighting the basic principles of CITES. Since almost 90% of the US population uses SM, it presents a great opportunity to enhance CITES education and awareness. Both DOI and USFWS have significant followings on SM, with the DOI having approximately 2.8 million SM followers and the USFWS having approximately 1.6 million SM followers.

- The USFWS communications team has the potential to establish an open-source media resource center that provides free access to pre-made educational resources. This would amplify the educational effort expeditiously. Strategic partners would include organizations, including INGOs, NGOs, and socially responsible businesses, as well as influencers and private citizens. All stakeholders could download these captivating "CITES lesson plans" and share them periodically. Resources included in this online tool chest would include social media-friendly images and vetted messages that aim to inform the public and increase national awareness regarding CITES.

- It is advisable to motivate the IUCN, the Species Survival Network, and other groups with a keen interest in CITES to produce their own SM CITES education series, which should be freely accessible and downloadable through online resource centers. They must encourage their member organizations to share these educational messages on their SM accounts, exponentially increasing their reach.

- The USFWS and other organizations working to increase awareness about CITES should monitor their metrics closely. By posting periodic quiz questions on their SM platforms, they could assess whether their educational strategy is effectively benefiting their followers. This approach would also allow for course correction until the most effective educational strategy for their audience is determined.

- Using the questionnaire and responses presented in this paper as a baseline, the USFWS should conduct future surveys to see if the US CITES awareness increases. In future surveys, a greater sample size should be used, and the questions should be posed using a categorical data model.

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Appendix

Additional Social Media Posts

Figure A1: SM Post: CITES Works Internationally
Graphic © Georgienne Bradley - created on CANVA platform using integrated free-use images

Twitter Caption - Alert! International Protection AND National Protection of Endangered Species working together give the best chance for species survival. #CITES #Endangered

Facebook Caption - Stay informed. It is critical for the future that endangered and threatened species be regulated on the international marketplace. BUT it is also critical to make sure protective domestic policy is firmly in place if we expect to save species.

LinkedIn Caption - Stay informed. It is critical for the future that endangered and threatened species be regulated on the international marketplace. BUT it is also critical to make sure protective domestic policy is firmly in place if we expect to save species.

Instagram Caption - Many shark species travel across national borders during their instinctual migratory paths. We must all be aware that many sharks are vulnerable and work diligently to support CITES and domestic regulations to protect them. #shark #protect #protection #sharks #endangered #endangeredspecies #protected #protectwhatyoulove #protectourplanet #sharkconservation #protectouroceans #protectwildlife #wildlifeprotection #protectanimals #protecttheocean #endangeredanimals #sharkfin #protecting #sharksofinstagram #savethesharks #saveoursharks #stoppoaching #helpsavesharks #antipoaching #environmentalprotection #protecttheoceans #protectthem #sharkfinsoup #protectourkids #protectocean
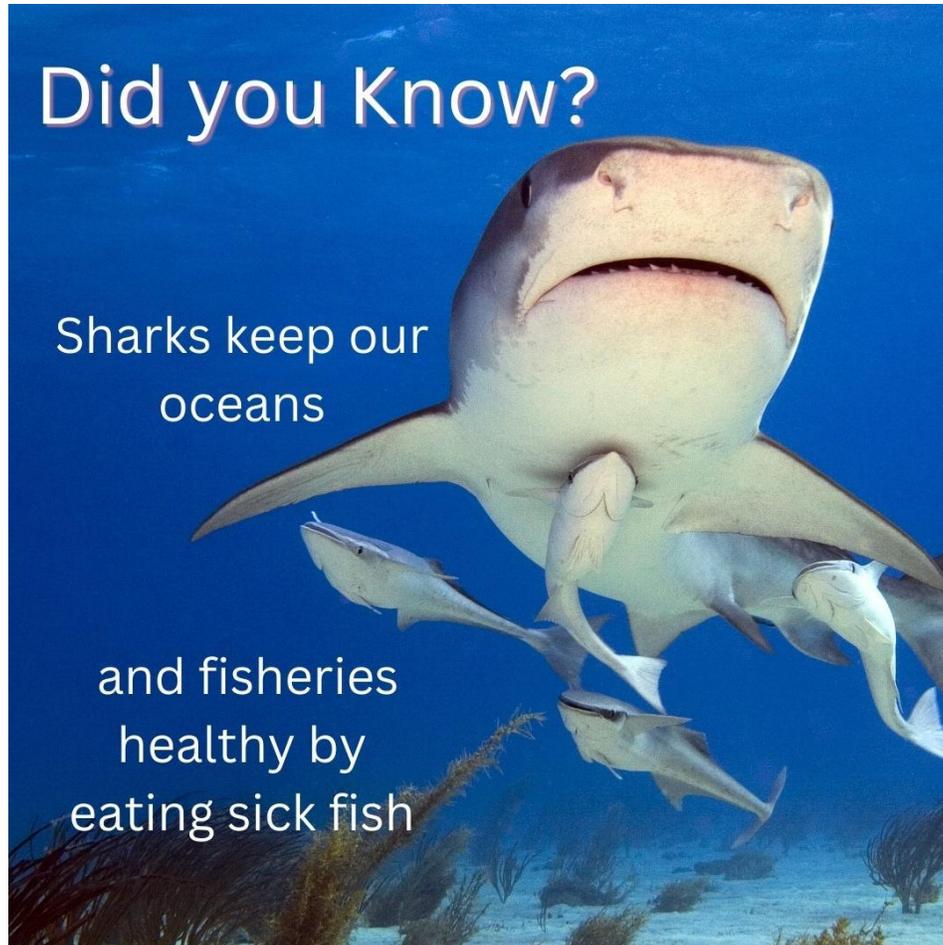
Figure A2: SM Post: Sharks are Important to the Ecosystem
Graphic © Georgienne Bradley - created on CANVA platform using integrated free use images

Twitter Caption: Like sushi? Keep shark populations healthy if you want to enjoy sashimi tapas in the future. #StandBehindCITES & Support CITES decisions, if we work globally, you feel results locally.

Facebook Caption: Like sushi? Keep shark populations healthy if you want to enjoy sashimi tapas in the future. #StandBehindCITES Support CITES decisions, if we work globally, you will feel results locally. @Sharks @SaveOurSeas @sharks.org

LinkedIn Caption: Like sushi? Keep shark populations healthy if you want to enjoy sashimi tapas in the future. #StandBehindCITES Support CITES decisions, if we work globally, you will feel results locally.

Instagram Caption: Sharks keep oceans healthy. Sharks are critical to international food supply. Sharks are "Fin-ominal" If you like sushi, or any other seafood. Thank sharks for keeping that resource healthy and balanced! #sushi #sharks #sushilover #sushiporn #lovesushi #lovesharks #ilovesharks #sharkscience #sushiheaven #sharksarefriends #sushiforever #sushifix

Figure A3: SM Post: Importance for International Borders
Graphic © Georgienne Bradley - created on CANVA platform using integrated free use images

Twitter Caption: How FINtastic it would be to travel the world without needing a passport! That is what sharks do daily. This means we need to monitor and protect them internationally. It's no SEAcret @CITES is critical. @Sharkweek @SeaSave @WWF

Facebook Caption: Want to know a 'SEAcret'? Sharks travel stealth, crossing borders every day and they do not need a passport! But that means national protection laws for vulnerable species are not enough. We need the 'FINtastic' international review and protection that @CITES gives. @Sharkweek @SeaSave @WWF

LinkedIn Caption: Want to know a 'SEAcret'? Sharks travel stealth, crossing borders every day and they do not need a passport! But that means national protection laws for vulnerable species are not enough. We need the 'FINtastic' international review and protection that @CITES gives.

Instagram Caption: Chomp on this! Sharks cross international boarders every day and they do not use passports! While that sounds like a FINtastic advantage, it also puts vulnerable and endangered species at risk. We need the 'FINtastic' international review and protection that @CITES gives. #stoppoaching #antipoaching #poaching #cites #internationaltradelaw #conservation #shark #sharks #wildlifeconservation #endangered #endangeredspecies #oceanconservation #marineconservation #sharksofinstagram #saveoursharks #lovesharks #finning #sharksfin

Figure A4: SM Post: CITES Adherence Can Help Save Species
Graphic © Georgienne Bradley - created on CANVA platform using integrated free use images

Twitter Caption: Slow and steady will win the race against #endangerment. Don't buy and transport @CITES prohibited products when abroad. If in doubt… Leave it out!

Facebook Caption: Slow down. When purchasing souvenirs abroad, be sure you are not buying animals or byproducts that are prohibited for import by @CITES. Your items could be confiscated and you could be contributing to the endangerment of a species. Come out of your shell remember.. If in doubt… Leave it out! You can help stop extinction…

LinkedIn Caption: Slow down. When purchasing souvenirs abroad, be sure you are not buying animals or byproducts that are prohibited for import by @CITES. Your items could be confiscated and you could be contributing to the endangerment of a species. Come out of your shell remember.. If in doubt… Leave it out! You can help stop extinction…

Instagram: *Slow down*. When purchasing souvenirs abroad, be sure you are not buying animals or byproducts that are prohibited for import by @CITES. Your items could be confiscated and you could be contributing to the endangerment of a species. Come out of your shell remember.. If in doubt… Leave it out! You can help stop extinction ##turtles #seaturtle #iliketurtles #turtlesofinstagram #endangered #extinction #endangeredspecies #seaturtles #cites #turtles_of_instagram #turtlesallthewaydown #turtlesofig #seaturtleconservation #extinctionisforever #loveturtles #saveseaturtles #turtles_of_insta

Additional Social Media Design Concepts

Figure A5: SM Post: CITES is for Everyone
Graphic © Georgienne Bradley - created on CANVA platform using integrated free use images

Figure A6: SM Post: What Are CITES Appendices?
Graphic © Georgienne Bradley - created on CANVA platform using integrated free use images

Figure A7: SM Post: Appendix I Explained

Graphic © Georgienne Bradley - created on CANVA platform using integrated free use images

Figure A8: SM Post: Appendix II Explained
Graphic © Georgienne Bradley - created on CANVA platform using integrated free use images

Figure A9: SM Post: Appendix III Explained
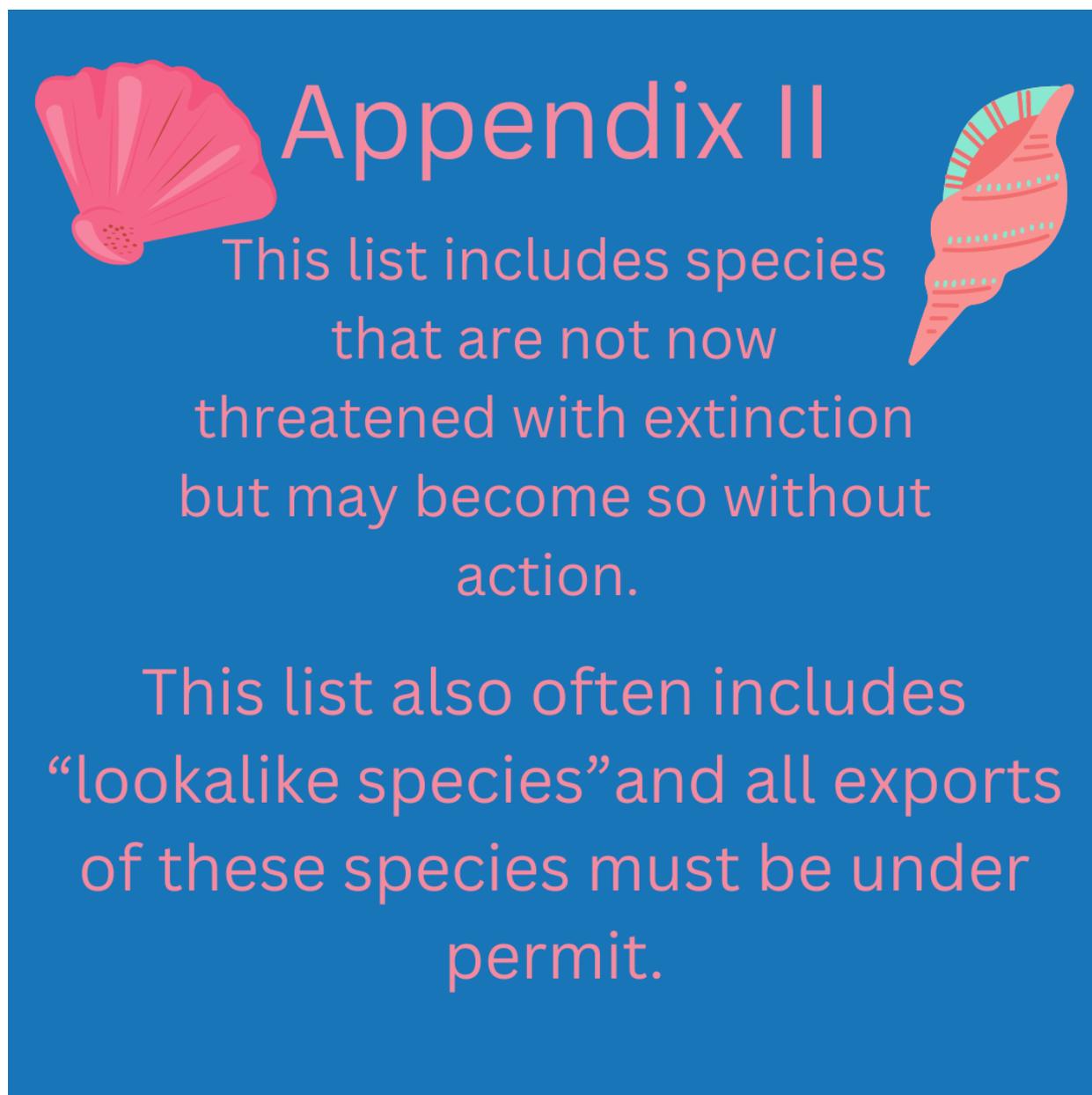Graphic © Georgienne Bradley - created on CANVA platform using integrated free use images

Figure A10: SM Post: Appendices Explained

Graphic © Georgienne Bradley - created on CANVA platform using integrated free use images

Circulated Questionnaire

Section 1 of 8

Threatened and Endangered Wildlife Awareness

This is an academic questionnaire being used for the completion of a graduate thesis. This survey is an effort to help us gain a better understanding of knowledge and attitudes towards wildlife conservation. Your email address is being collected for verification purposes and will only be used to send you the final results of the survey. Your email address will not be used for any other purpose or be shared. The survey should take approximately three minutes to complete.

Do you believe wildlife conservation should be a national priority? *

	1	2	3	4	5	
Not at all Important	◯	◯	◯	◯	◯	Extremely Important

Have you heard of the CITES treaty? *

◯ Yes

◯ No

Below question asked only of participants answering "Yes" above. Qualifies their answer.

CITES Description

Define the Acronym "CITES" or describe your understanding of the convention mission. (Please note that if you do not know the definition go back and recheck the way you answered the previous question.)   *

Your answer

CITES Importance

CITES is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Animals and Plants), a global agreement among governments to regulate or ban international trade in species under threat of extinction. Do you believe CITES is important? *

	1	2	3	4	5	
Not at all Important	◯	◯	◯	◯	◯	Extremely Important

Do you think CITES is effective in achieving its mission? *

◯ Yes

◯ No

◯ Not Sure

Do you know the purpose of a CITES Appendix? *

◯ Yes

◯ No

◯ Not Sure

Can animals listed on a CITES Appendix be internationally traded? *

◯ No

◯ Sometimes

◯ Not Sure

Statement of CITES Definition

CITES is the the Convention on International Trade in Endangered Species of Wild *
Fauna and Flora, a global agreement among governments to regulate or ban
international trade in species under threat. Do you believe CITES is important?

	1	2	3	4	5	
Not at all Important	○	○	○	○	○	Extremely Important

Now that you know the name of the convention, do you recall hearing anything *
about this treaty?

	1	2	3	4	5	
I have never heard anything about this treaty	○	○	○	○	○	I know a good amount

How important do you believe it is to regulate the international trade of threatened *
and endangered animals?

	1	2	3	4	5	
Not at all Important	○	○	○	○	○	Extremely Important

CITES Questions

Are you, or have you ever been a sports hunter? *

○ Yes

○ No

One of the biggest challenges facing wildlife today is loss of habitat.
Given that many areas inhabited by wildlife struggle to remain financially viable, would you be in favor of allowing limited carefully targeted and overseen trophy hunting kills (10 per 100,000 acres/year) if it guaranteed the protection of the land and all the other animals living on it? *

○ Yes

○ No

Vaquita porpoise are extremely endangered; perhaps only ten individuals remain in the wild. These animals are listed in the most rigorous, CITES Appendix I. According to CITES, can the Vaquita porpoise be hunted, killed or sold within its native country Mexico? *

○ Yes

○ No

○ Not Sure

Is the international trade of plants regulated by CITES? *

○ Yes

○ No

○ Not Sure

Is the international trade of sharks regulated by CITES? *

◯ Yes

◯ No

◯ Not Sure

Are sharks important to marine ecosystems? *

	1	2	3	4	5	
No - Not important	◯	◯	◯	◯	◯	Yes - Critical

Should sharks have international protective trade oversight? *

◯ Yes

◯ No

CITES and Sharks

In your opinion, is CITES doing a good enough job protecting sharks? *

○ Yes

○ No

○ Not Sure

Shark Protection

Sharks do not need international protective trade oversight because... Please check all that apply (Please note that if you believe sharks need international protection, go back and recheck the way you answered the previous question.) *

☐ Sharks are not endangered

☐ Sharks attack humans, are considered pests, and we are better off without them

☐ The oceans are so immense. Reports of some shark species as endangered are most likely inflated

☐ Fisheries are overburdened and cannot support any additional restrictions

☐ Other: _____

Figure A11: Circulated Questionnaire
Source: Author's Integration - Questionnaire originally created and tested using Google Forms