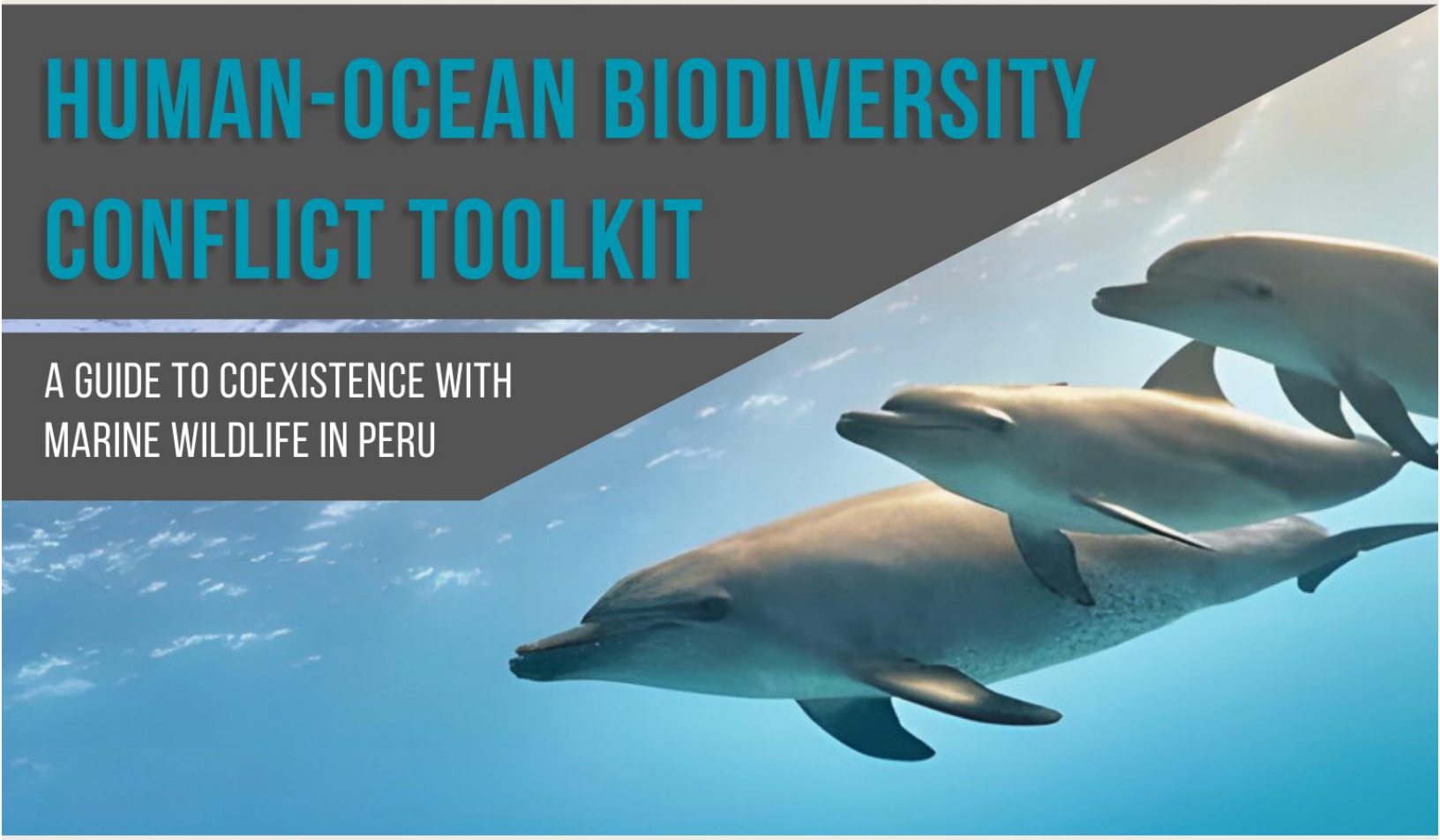
HUMAN-OCEAN BIODIVERSITY CONFLICT TOOLKIT

A GUIDE TO COEXISTENCE WITH MARINE WILDLIFE IN PERU



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CONTENTS

ACRONYMS AND ABBREVIATIONS

Human-Wildlife Conflict — **HWC**

Human-Wildlife Coexistence —**HW-Coexistence**

Non-Government Organizations —**NGOs**

Ministry of Environment — **MINAM**

Peruvian Marine Institution — **IMARPE**

Environment Assessment and Enforcement Agency — **OEF**

National Environmental Certification Service for Sustainable Investments —**SENACE**

1.0 EXECUTIVE SUMMARY

1.1 Vision and Objectives

This toolkit envisions a future of transformative coexistence between Peru's Pacific coast communities and marine biodiversity, developing an enhanced sustainability and equitable relationship between the two. Revolutionizing bycatch reduction and mitigation strategies that honor local communities' cultural and economic constraints, while fostering cross collaboration between government, organizations, and community stakeholders.

The following toolkit seeks to establish long-term attitudes, values, behavioral, ecological, biodiversity, and power-dynamic change, scaffolding a future where marine biodiversity thrives, coastal community culture is enriched, and where human-wildlife conflict (HWC) transforms into human-wildlife coexistence (HW-Coexistence); A future in which HW-Coexistence in Peru is shepherded by collective pride and a shared devotion for marine ecological sustainment.

In an effort to reach the toolkits vision of HW-Coexistence in Peru coastal communities, its objective aims to equip non-government organizations (NGOs) and conservation managers in Peru with insightful research-driven strategies that directly mitigate marine bycatch while adhering to communities' cultural, economic, and ecological constraints.

This toolkit sets out to provide support for stakeholders by identifying bycatch factors and unique but possible strategies, guided by participatory research, collaborative strategizing, cross-power-dynamic ideology, and conflict-resolution tools and technologies, Integrating Informative research with local community members' expertise and knowledge.

1.2 Target Audience

Peruvian NGOs and conservation managers are this toolkit primary audience, designed for those actively engaged/involved in marine mitigation monitoring. NGOs and conservation managers are vital participants due to their management of the intersection between scientific research, community involvement, and additionally the implementation of mitigation policies and or strategies. (Participatory Framework Design Assignment)

Having deeper relationships with local leadership, they possess a stronger comprehension of both expert knowledge and local perspectives; enabling them to be best suited for understanding how different strategies will affect local engagement or exclusion. (Participatory Framework Design Assignment) Resulting in this toolkit equips NGOs and conservation managers with methods, adaptable education approaches, and an enhanced collaborative process.

A secondary audience of this toolkit includes the local communities, who are essential stakeholders in bycatch and bycatch mitigation strategy development. Local communities are the direct source of HWC and, in turn, are the key stakeholders for HW-Coexistence. (Participatory Framework Design Assignment) This toolkit desires that the primary audience of NGOs and conservation managers co-develop strategies with these local communities, to strengthen community pride and ownership of mitigation strategies, ensuring local practices align with proposed strategies, and reducing overall financial risk and or harming relationship dynamics

1.3 Stakeholder Analysis

- NGO and Conservation Managers

NGOs and conservation managers involved in environmental sustainability, education, and coexistence. This includes regional and national NGOs that engage in ecological conservation, marine biodiversity conservation, and community outreach.

Interests:	Role in Toolkit:
▪ Bycatch reduction and marine biodiversity conservation ▪ Developing and implementing sustainable conservation strategies ▪ Strengthening relationships with local communities and government ▪ Securing funding and grants for program viability ▪ Develop positive ecological and sociological impacts	▪ Facilitate scientific research, frameworks, and community knowledge ▪ Direct community education and data collection ▪ Implement and test strategies with local communities ▪ Monitor long-term mitigation and provide adaptive management ▪ Primary future owners of the toolkit and derived content

-Local Communities

Local communities on the Pacific coast of Peru where their culture, livelihood, and identities are directly impacted by marine ecology.

Interests:	Role in Toolkit:
▪ Economic stability ▪ Culture protection and conservation of tradition ▪ Fair treatment from authority stakeholders ▪ Maintain marine access for resources ▪ Strengthen community cohesion and involvement ▪ Improve environmental resilience	▪ Provide local knowledge, cultural insight, and local priorities ▪ Engage in surveys, forums, and collaborative strategizing ▪ Assist in strategy testing and evaluation. Assist in adapting content to align with local norms ▪ Serve as future toolkit directors and maintainers in the N community

-Small-Scale Fisheries

Artisanal fisheries operating off the Pacific coast of the majority financially struggle to access markets, and market levels of market vulnerability; they are also members in local members ' groups on the Pacific coast.

Interests:	Role in Toolkit:
▪ Profitable fishing opportunities ▪ Decreasing financial pressure due to debt ▪ Minimize bycatch without reducing targeted catches or increasing expenses ▪ Receiving appropriate compensation, training resources, and resources for adopting new practices ▪ Avoid enforcement of penalties or regulations	▪ Provide primary knowledge and observations ▪ Engage in surveys, forums, and collaborative strategizing ▪ Assist in tool and policy testing ▪ Identify practical constraints of potential strategies ▪ Evaluate and sustain the real-world feasibility of toolkit-derived strategies

-Peruvian Government

Peruvian government agencies such as the Ministry of Environment (MINAM), the Peruvian Marine Institution (IMARPE), the Environment Assessment and Enforcement Agency (OEF), and the Environmental Certification Service for Sustainable Investments (SENACE), and regional authorities tasked to manage and enforce ecological, biodiversity, and conservation efforts.

Interests:	Role in Toolkit:
▪ Eliminate the general perception of Peru and bycatch ▪ Achieve national conservation goals ▪ Maintain economic stability in the fishing industry ▪ Avoid conflicts with local communities and minimize enforcement responsibilities	▪ Provide regulatory data and scientific support ▪ Invest in programs and projects that fill gaps in national capacities and outreach ▪ Support certain mitigation strategies ▪ Collaborate openly with NGOs and local communities ▪ Utilize toolkit frameworks to adjust current policies

2.0 CONTEXT AND CONFLICT

2.1 Dolphins in Peru *(Creative Proposal, Global Case Study)*

The main species of dolphin found in Peru are the Burmeister's porpoises (Phocoena spinipinnis), dusky dolphins (Lagenorhynchus obscurus sp. Posidonia), common dolphins (Delphinus Delphis), and common bottlenose dolphins (Tursiops truncatus). Dolphins are complex, social creatures that reside within family groups (pods), often showing signs of depression and anxiety if separated from their pods. Dolphins play a crucial role in the overall balance of marine environments (NOAA.org, 2022).

As prey, they serve as a crucial food source for sharks and orcas; without them, their predators wouldn't have adequate food to eat (Sunshine Scenic Tours.com, 2022). As predators, their roles are even more vital. Dolphins' diets consist primarily of fish, jellyfish, squid, and crustaceans; dolphins maintain balance within the marine ecosystem's food chain as they regulate their prey populations, including sick and diseased fish, which prevents sickness and disease from spreading to other populations, including humans (Sunshine Scenic Tours.com, 2022).

They are a highly intelligent species and use sound both for communication and to hunt for food (NOAA.org, 2022). Dolphins are incredibly adaptable, being able to thrive in most habitats, and their intellect and viability in oceanic ecosystems make them crucial indicators for ocean health and biodiversity (Sunshine Scenic Tours.com, 2022).

2.2 Peruvian Fishing and Bycatch *(Global Case Study, Creative Proposal)*

Within the fishing industry, Peru stands as a giant, generating billions in revenue through the exportation of fisheries. In 2023, Peruvian frozen fish products alone, such as squid, reached a

total export value of $1.565 billion, according to the article Peruvian super fishing takes the world by storm published on Peru.info. Peruvian fishing has long been at the head of fishing exports; Gregory Ferguson-Cradler, author of Coping with crisis: The Peruvian state-owned fishing enterprise Pesca Perú, 1973-1998, states "the late 1960s Peruvian dishing boats harvested more fish than any other country in the world...20% of total global fish yield in 1970 was Peruvian" (Ferguson-Cradler, 2023).

There is no doubt that Peru is a vital member of the fishing industry. However, since the 1960s, Pure has also been at the forefront of the global bycatch crisis. In the ProDelphinus Final Report titled Estimating bycatch rates and abundance of small cetaceans in Pukwana, Peru to guide management and conservation initiatives, (2024) says that since the mid-1990, “over 2,000 small cetaceans were killed annually... with annual catch estimates exceeding 1,000 dusky dolphins and more than 300 Burmeister's porpoises." (Alvarez et al., 2024)

Bycatch is a major threat to marine ecology. The decrease in vital species populations has a significant impact on the survival of different species and the maintenance of balance. Bycatch also significantly harms the sustainability and resilience of fishing communities and economies. (Durant et al., 2025)

Peru's fishing industry is primarily made up of small-scale, artisanal fisheries, which account for 40% of the world's fisheries bycatch. (Villar et al., 2024) Peru's dependence on local artisanal fisheries is exponential. Artisanal fisheries in Peru are responsible for 80% of the fish that feed the population. Simultaneously, 67% of Peru's artisanal fisheries are informal, meaning they lack the formal contracts and structures that characterize the regulated fishing sector. (Future Fish, 2024)

Informal Peruvian fisheries, due to their lack of contractual funding, turn to private lenders who often provide unfavorable loans, creating a cycle of poverty and the need to overfish. (Future Fish, 2024) Similarly, the lack of formal contracts leaves artisanal fisheries vulnerable to market shifts, causing informal fisheries to face unstable incomes and job uncertainties. On average, these informal artisanal fisheries earn 38% less than formal fisheries. (Future Fish, 2024)

In 1996, the Peruvian government established Law No. 26585, which made the previously mentioned cetacean dolphins and two river dolphins legally protected. (Guiding et al., 2023) Puru has pledged to protect 30% of marine habitats by 2030, yet as of 2024, only 10% are protected. (Carrere, 2024)

Recently, in 2020, multiple organizations, including Peruvian governmental entities, championed environmental conservation and education efforts in local communities. They established a space for dialogue and training for artisanal fishermen to help develop and manage conservation and sustainable artisanal fishing. (Nature & Culture, 2024)

2.3 Current Bycatch Mitigation Strategies in Peru (Global Case Study)

Peru artisans use multiple fishing methods, such as gillnets and longline fishing. Gillnets are panels of netting usually pulled across the surface of the water. Gillnet fishermen in Peru are noted as having 2-4 dolphins per trip, which are often later used as bait. (Campbell et al., 2020) Longline fishing is the method of trolling thousands of hooks behind a vessel. Peru's longline fishermen reportedly state that they use 15-20 dolphins for a 15-day fishing trip. (Campbell et al.,

2020) Figure 1 shows the 4 Peruvian harbors, their fishing methods, and the rates/averages of dolphin bycatch and bait use.

			Bycatch (#Dol)		State (%)			Fate of bycatch (found dead) (%)					Fate of bycatch (found alive) (%)				
Port	*n*	Fishery	Mean	Range	Alive	Dead	NR	Discard	Bait	Consume	Sale	NR	Release	Bait	Consume	Sale	NR
Paita	41	Longline	1*	1–3*	74	26	0	38	27	31	0	4	95	0	0	0	5
Salaverry	28	Gillnet	3	1–5	0	100	0	74	17	6	3	0	82	0	0	0	18
Pucusana	24	Both	2	1–7	25	58	17	68	5	26	0	0	100	0	0	0	0
Ilo	54	Longline	1	0–2	53	38	9	56	9	28	3	3	85	3	3	3	6

*n is the total number of surveys completed per site. The column "Bycatch" lists the number of individuals bycaught reported by fishers per trip or season. NR, No response; Dol, dolphins. *Bycatch per fishing season (100% longline fishers). Season: Spring (September–December).*

Another possible mitigation solution was experimented with. To reduce bycatch in gillnets, LED lights were developed to deter marine animals. The results of implementing LED lights in an experiment, as published in the article "An Illuminating Idea to Reduce Bycatch in the Peruvian Small-Scale Gillnet Fishery," showed a 70% reduction in cetacean bycatch and a 74% reduction in sea turtle bycatch. (Bielli et al., 2020) Shown in Figure 2.

	Probability		CPUE
Treatment	Sea turtles	Cetaceans	Rays
Control	0.086	0.048	0.034
Illuminated	0.022	0.014	0.052
% change	−74.4	−70.8	+34.6

Pingers have also been experimented with in Peru. Pingers, which can be applied to both longline and gillnets, did present another possible mitigation solution, shown in Figure 3. The effectiveness is still unclear, and the potential consequences, such as marine animal disruption and environmental condition changes, are a significant concern. (Mangel et al.,2013)

	No pingers		With pingers			
Species	Mean	range ± 1 SE	Mean	range ± 1 SE	% change	P
Dolphins & porpoises						
Total	0.798	(0.678–0.939)	0.502	(0.407–0.619)	−37.2	0.045
Delphinus spp.	0.289	(0.225–0.372)	0.160	(0.114–0.226)	−44.6	0.093
L. obscurus	0.048	(0.029–0.080)	0.043	(0.025–0.073)	−10.4	0.827
T. truncatus	0.051	(0.030–0.085)	0.031	(0.017–0.056)	−39.4	0.360
P. spinipinnis	0.001	(0.000–0.009)	0.000	(0.000–0.004)	−75.0	0.379
Globicephala spp.	0.000	(0.000–0.092)	0.000		−100.0	0.692
Sharks & rays						
Sharks	18.6	(14.0–24.7)	26.3	(19.7–35.0)	29.3	0.088
Rays	0.001	(0.000–0.007)	0.002	(0.000–0.009)	22.2	0.817

Another concern with the implementation of pingers is the financial expense. As mentioned before, Peru is primarily comprised of informal artisanal fisheries, which require an additional expense that is economically impossible. Figure 4 shows the average cost of a pinger, which doesn't seem expensive to first-world countries but adds up quickly for countries such as Peru.

	Initial pinger cost	Pingers (50USD) + batteries	Initial pinger cost	Pingers (75USD) + batteries
Annual cost of one pinger + batteries	50	61.9	75	86.9
Total annual cost per vessel (43 pingers + batteries)	2150.0	2662.1	3225	3737.1
Savings per vessel in the first year	−576	−1088	−1651	−2163
Savings per vessel in the second year	1768.1	1255.9	1768.1	1255.9

2.4 Conflict Drivers (Global Case Study)

HWC regarding bycatch in the Pacific waters of Peru is riddled with complex variables such as ecological, economic, cultural, and institutional factors. These complexities create difficult intersections of harm for both local communities and marine species. The most significant conflict driver is the economic despair of artisanal fisheries, many of whom operate in the face of extreme financial constraints, stemming from the unequal high-interest loans and increasing government fishing rights fees (Earth Journalism Network, 2021).

This economic constraint requires fisheries to maximize the volume of catches often just to meet the minimum financial requirement, this practice limits the time or selectiveness of what marine

species caught Additionally, this constraint leads to fisheries utilizing bycatch species like dolphins as resources for further fishing (Durant et al., 2025).

In many Peruvian communities, fishing is a rooted piece of culture and identity. Stemming from dependence on fish as a resource for financial means and nutrient-rich marine fisheries in Peru are responsible for 80% of the fish that feed the population (Future Fish, 2024). Due to this dependance, litigation strategies are met with resistance, requiring material changes for fisher costs that these communities don't have, or implementing policies may be perceived as a threat to the community's culture and identity.

2.5 SWOT Analysis for Bycatch Mitigation in Peru

3.0 EDUCATION AND TRAINING PLANS

3.1 Lesson One: Tag & Track

The tittle of this lesson is Tag & Track: Learning Dolphin Movement. It aims to introduce dolphin patterns and bio adhesive tags. It's designed as an informal enjoyment lesson to build emotional connection to the bycatch issue while also equipping participants with critical knowledge for strategy development. Through this exercise participants will be exposed to how dolphins navigate the shores or Peru, building recognition of when and where dolphins are most likely to be and in turn avoid that area.

It also has the potential to be implemented as an educational exercise for NGOs to facilitate for local communities. Involving community youth is a vital aspect of long-term mitigation, having then build a connection and comprehension of bycatch mitigation skills is an essential strategy for every framework.

- Materials

- Rubber dolphin toys
- Tape
- Large, laminated map of the local fishing area
- Toy boats and nets

- Instructions

1. In groups, practice applying tags (tape) to rubber dolphin toys to learn the correct placement.
2. Then, on a large map of the region, each group places their rubber dolphins along their assigned movement paths.
3. Finally, each group moves their assigned boat and nets on the map to avoid the dolphins while continuing to fish.

3.2 Lesson One: Net Check

This activity is called Net Check: Reducing Bycatch by Reusing, it aims to educate participants about bycatch prevention by building the habit of checking gillnets for loose or torn points. It helps NGO participants learn about the conditions that fisheries face and a practical repair that can affect bycatch rates in Peru. Torn or loose mesh points in gillnets are a significant bycatch factor, dolphins and other marine species get stuck in these torn points and without a way to reverse they thrash around until they are fully wrapped within the net. A simple strategy of checking gillnets and then repairing them is a simple implementation that doesn't cost fisheries and helps them become more aware of other simple prevention actions that they can make.

This activity is and informal learning styled activity, designed to get participants engaged and involved in the action itself. This experience can also be facilitated by NGOs to utilize within local communities to teach fishermen about this prevention strategy.

-Instructions

- As individuals, open provided gillnet and identify all loose and or torn points.
- Practice different repair methods like knots, adhesive, etc. Until the gillnet is fully repaired.
- Each participant then evaluates and shares the method they found the most effective in repairing and holding together, show the others if they didn't try it.
- End with a large reflection and evaluation discussion talking about potential applications, challenges, weaknesses, etc.

-Materials

1. Real, torn/loose gillnets
2. Replacement netting for participants that want to try to patch parts of the gillnet. (optional)

4.0 COMMUNITY ENGAGEMENT PLAN

4.1 Strategies and Initiatives

-Relationship development

This toolkit centralizes within community knowledge and engagement, Peru's HWC stems from the unequitable power dynamics or outside enforcement on struggling communities. Spearheading community engagement with formal discussions and perspective sharing, providing an open and safe environment for local community members to highlight their barriers and challenges that prevent bycatch mitigation to be implemented.

Additionally, requesting other forms of community discourse through tools like surveys and forums, these allow for community members who may not be forthcoming in their voice to provide valuable insight anonymously. Overtime, community members will begin to open up to more in depth research and primary observations, including community fisheries to aid in mitigation testing, or facilitating NGO members to accompany them in oceanic expeditions.

Involving the community before solutions or strategies are introduced builds relationships and trust between the stakeholders. It enhances collaboration and creative mitigation strategies and tools that adhere community concerns and pressures while discovering an approach that addresses bycatch.

- Informal designed activities

Once community and NGO relationships are developed, then NGO facilitated programs, experiences, and or activities can be introduced. This aims to build participation through egaging and impactful events/opportunities such as the education and training lessons. Hands-on

encouragement helps foster deeper connection and enthusiasm proven to increase participants motivations, attitudes, and values towards the topic.

This is especially impactful for youth community members, as they represent the future of HW-Coexistence in their communities. Integrating a motivation or conservation scaffolding to learn and protect is not only vital to build community engagement in the present but ensure the long-term establishment of HW-Coexistence.

4.2 Stakeholder Dynamics

An essential dynamic this toolkit adheres to is the engagement strategy of redistributing power dynamics in favor for community stakeholders such as fisheries, community leaders, etc. Often, conservation efforts are resisted and unsuccessful derives from authority stakeholders like government agencies and NGOs, predetermine the mitigation strategies, unintentionally enforcing green colonialism and or top-down authority.

Contrastingly, this toolkit recognizes the opportunity of equal power dynamics amongst stakeholders, ensuring engagement is fostered from community motivation and sense of community ownership. Communities define the issues, collaborate with NGOs in strategy development, and have equal voice in final decisions. NGOs and government agencies act as supporting partners with local communities, eventually providing a facilitation role and access to needed recourses. HW-Coexistence must be shaped within the community, not imposed upon it. (Reflection 3, 2025)

Equally as critical, all participating stakeholders, especially NGOs and government agencies much respect community cutlers and economics. Fisheries within these communities

routinely face systemic financial pressures, which has flourished into a debt cycle that constrains their ability to adopt new implementations.

NGOs and government agencies again, must act as a supportive partner, respecting their limited comprehension of community's cultures, identities, economics, etc. This toolkits engagement plan addresses these constraints upon communities by reinforcing the central idea that community knowledge and insight is the primary source for creation.

4.3 Timeline and Budget

-Timeline

This toolkit outlines an engagement timeline that focuses on building deep-rooted relationships and trust, requiring consistent and open communication between stakeholders. The beginning emphasizes listening and discussion, before shifting efforts towards mitigation development, trial applications, and evaluation before toolkit revisions. It adheres to the understanding that communities require time to voice their perspectives, comprehend strategy development, and identify strategy consequences.

Timeline: **6 Months**

Month 1 – Stakeholder relationship building and local insight sharing
Month 2 – Informal designed activities and further community directed research
Month 3-4 – Toolkit collaborative drafting amongst NGOs and community leaders/ambassadors
Month 5 – Integrate trial application of toolkit for community feedback
Month 6 – Collaborative toolkit revisions, community approval, and final toolkit distribution

-Budget

This toolkit prioritizes affordability and equity, considering community economic constraints utilize low-cost materials, small grants or stipends, and recourse reuseable tactics;

designing a budget to ensure participatory communities avoid financial hardship. Toolkit funds are provided to logistics like transportation needs, limited gear replacements, bycatch mitigation technology if strategy calls for it (Pingers, LED, etc.), and straight to community future monitoring funds, so long-term community motivations can last.

Estimated Budget Range: **$10,000 – $15,000**

4.4 Ethics and Unintended Consequences

Previously mentioned, this toolkit's most significant priority is to shift the top-down authority power dynamics in favor for equitable community led collaboration. Aligning with that statement, this toolkit plans to avoid the practice of green colonialism, which stems from the interjection of external actors that predetermine ides, without considering the limited cultural, economic, or emotional connection they display.

To achieve this goal, all collaborative content, strategies, programs etc. will be evaluated by a community led review that emphasizes the balance of the proposed content verses its benefits or consequences upon the community. Fisheries, community leaders, and a panel of community members from different professions, must accept any proposed content before its distributed.

Additionally, a major concern is the possibility for participatory communities to experience economic challenges, social exclusion, or missus of insight. These communities are already vulnerable groups of people, toolkit outcomes even if positive could be utilized to justify punitive and or discriminatory actions.

This toolkit plans to counter this concern by including and enforcing strict protocols of all content and data shared outside of participating stakeholder, meaning no data or content is

permitted to be shared with outside actors by a stakeholder without the communities' fisheries, leaders, and panels entire consent. The protocols are integrated as safeguards to uphold the sustainability and protection of both marine biodiversity and communities.

5.0 POLICY AND ADVOCACY

5.1 Policy Analysis – System-Level Change

The Peruvian government implemented laws in the 1960s prohibiting the intentional bycatch of dolphins, in later analysis and observations discovered that smaller fisheries have disregarded the prohibiting, stemming from lack of government enforcement and scattered government agencies. (Policy Analysis Assignment) Government ministries including PRODUCE, MINAM, OEF, SENACE, and IMARPE often overlap responsibilities and authority, creating sufficient gaps in policy implementation and enforcement.

This mitigation strategy addresses these weaknesses by enhancing community involvement and practical attitude, value, and behavioral changes; that elevate policy compliance, bottom-up. Prioritizing participatory monitoring over enforcement, builds collective stewardship and motivation, aiming to bridge the gap between top-down authority enforcement and best fishing practices.

Fisheries as this toolkit previously highlighted, face continuous barriers and challenges in their economic constraints, this results in compliance resistance from fisheries when not supported additionally. The toolkits mitigation strategy compliances and enhances existing regulations by providing support, programs, and activities designed to fit within communities financial and

cultural constraints; low-cost improvements, collaborative designing, and community directed monitoring. (Participatory Framework Design Assignment)

5.2 Integration With Local Efforts

NGOs including Organization for Research and Conservation of Aquatic Animals (ORCA), ProDelphinus, and Areas Costeras y Recoursos Marinos (ACOREMA), are actively participating across Peru in marine conservation efforts; despite fluctuating fundings and capacity, which interferes with mitigation efforts involving community engagement. (Reflection Paper 3)

This mitigation strategy emphasizes community participation by shifting power dynamics and providing engagement strategies that NGOs can facilitate. Even with fluctuating funding provided for these NGOs, facilitating community engagement outlined in this toolkit requires little to no financial backing, rather aiming to foster a collective motivation and feeling of ownership. (Creative Proposal Pitch)

Social engagement, cultural awareness, and practical applications are gaps existing regulations for bycatch reduction leave exposed, this is a crucial disconnect that aids in the ongoing HWC. This toolkit takes into comprehension the community experiences, actively filling in the existing gaps by integrating the often-missing stakeholders (communities) into mitigation development and implementation. (Participatory Framework Design Assignment)

5.3 Scalability – Expanding Framework

Sharing authority, avoiding green colonialism, and respecting community knowledge provides a flexibility/adaptability aspect to this toolkit that other mitigation strategies fail to structure in. This flexibility/adaptability this toolkit yields is applicable across a wide variety of HWC, due to its approach of community motivation and ownership which forces mitigation strategies to encompass cultural and economic feasibility.

Other coastal HWC can be strategized and mitigated with this toolkit, weather its spanning differing culture, economic, and or species. Fostering HW-Coexistence evolves within stakeholder community's needs, ecological changes, and shifting landscapes. (Policy Analysis Assignment)

NGOs and government agencies have the capacity to integrate this toolkits adaptability and positive feedback-loop elements to develop extensive collectives that support community equitability. (Participatory Framework Design Assignment)

6.0 SUSTAINABILITY AND ADAPTIVE MANAGEMENT

6.1 Feedback Loops – Community-Led Adaptation

Success in regard to HWC doesn't directly mean HW-Coexistence is achieved, HW-Coexistence is a foreseeable future process that takes more than singular communities, countries, or continence; rather success in the framework of this toolkit is achieved through continues community-led system revisions and practical adjustments.

This toolkit utilizes repeatable approaches like discussion, activities, etc. which builds extensive comprehension of what works and what doesn't. Fostering generational motivation is key to success, through which, endless growth and betterment of the toolkit's effectiveness and success.

Community members can Identify unexpected challenges yet to arise or cultural changes that come from toolkit integration can all be evaluated throughout time and adjusted appropriately. This toolkit is designed to be flexible and adaptable to ensure mitigation strategies align long-term with the affiliated community despite environmental, economic, and or cultural shifts.

6.2 Cost-Benefit Analysis – Balancing Burdens and Benefits

Balancing the strain of burdens and benefits in the short-term stages of integration can be difficult especially for vulnerable communities. (Global Case Study) In response, this toolkit minimizes the burdens though lower-cost engagement, community-led activities and adjustments.

This response results in the benefits long-term outweighing the burdens, including early constraints. As a community, they gain collective knowledge, newly established leadership roles, and an increased in community pride; ecologically, communities benefit from bycatch mitigation, stronger marine biodiversity, healthier fish recourses for food and income.

6.3 Indicators of Success – Measuring Social and Ecological Change

Statistical data on wildlife betterment is a clear and simple indicator of success within this toolkit, decreases in bycatch conflicts and increase in awareness are quantitative indicators for wildlife success.

Another indicator that is a little more difficult to measure is the community metrics. Community participation levels through activates, longevity engagement, and continues revisions, as well as qualitative indicators like practice integration in culture and identity. (Reflection Paper 3)

6.4 Reflection – Coexistence Over Time

An essential component to identify positive and unintended impacts are to consistently reflect and evaluate the toolkits long-term adaptions. Identifying if and how the toolkit strengthens culture and identity within communities, stabilizes economic constraints, and avoids green colonialism disruptors. Reflecting on social benefits like relationship development between stakeholders and keeping toolkits foundation in community centering.

Reflecting off biodiversity and ecological effects like dolphin presence in marine ecosystems and enhanced fisheries conditions will help ensure long-term success. Community continuous reflection and adjustments will support the toolkits never-ending evolution into a community owned recourse that they can adapt to any unexpected ecological or social change, progressively getting closer to HW-Coexistence.

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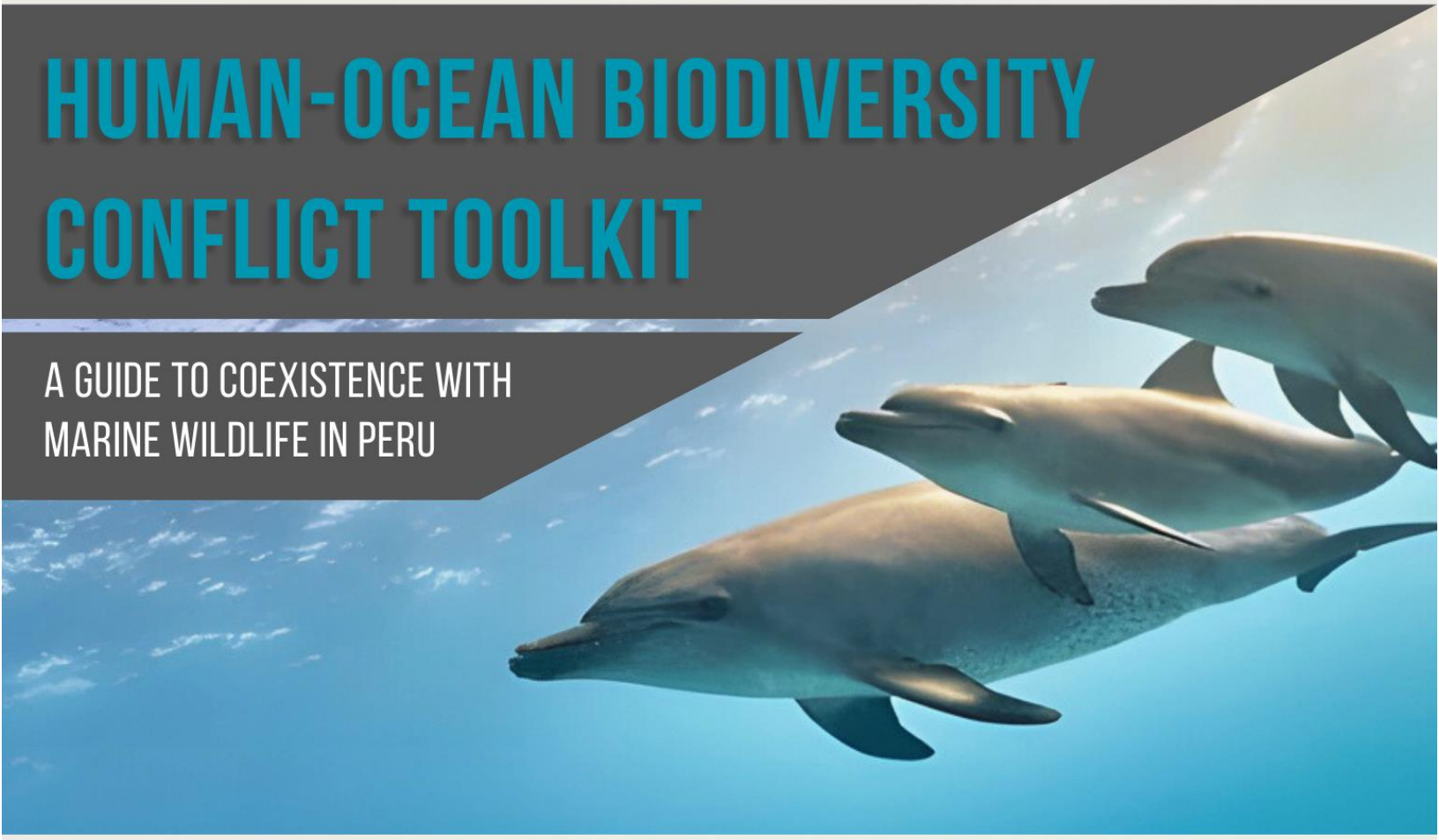

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