



# BAN THE USE OF LIVE-BAIT FISH

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**RECOMMENDED**

# Research Report: Animal Welfare – Ban the use of live-bait fish

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## Executive Summary

Bait fish are small fish farmed or caught for use as bait to attract large, predatory fish. Bait fish production in most countries is either small-scale, incidental, or simply serves to sell fish that are too small to meet food fish market requirements. However, there are several countries where bait fish farming is conducted on an extremely large scale, with poor welfare conditions and intensive aquaculture practices. This is most prominent in the US, where bait fish represents a large-scale, commercial industry. The USDA estimates that there are 1.3 *billion* bait fish sold in the US annually. The welfare conditions of bait fish raised on this larger scale are likely to be quite similar to fish farmed for food. Therefore, the welfare is likely to be very low; fish are grossly overstocked and subjected to cramped conditions in poor quality water. In fact, it may be the case that bait fish have worse lives than fish farmed for food. Most fish are slaughtered after they are farmed, whereas bait fish are transported many times to wholesalers and retailers, and then are purchased by anglers who keep them in conditions of varying, but often low, quality before impaling them on their hooks. Considering that recent research implies that fish experience pain to a much greater degree than previously thought, this practice should now be considered abhorrent and archaic.

This charity would be advocating for a ban on the use of live-bait fish (likely specifically phrased as the use of live-bait fish farmed or caught in other bodies of water) in states in the USA. There are several states and countries which have introduced strong regulations or bans on bait fish, and there are several organizations that have managed to secure successes in curtailing this industry, suggesting that this is a tractable policy to advocate for. However, this area of advocacy is highly neglected, and we could not identify any active organization working on this in the US.

Modeling this intervention in Ohio, USA, we have found that it can be extremely cost-effective. Our cost-effectiveness estimate yielded an estimated impact of 440 welfare points affected per dollar when considering both charity and government costs. **Success in this state alone could save up to 80 million fish, annually.**

One potential concern about this idea is that instead of using live-bait fish, anglers may choose to use invertebrates (such as maggots, worms and leeches) as bait; and depending on how many anglers switch to invertebrates over non-animal bait alternatives, and how many invertebrates they use, there is potential for harm to be caused. Despite this, in our models and with the help of survey data collected with

Rethink Priorities, we feel confident that this charity is likely to be net positive in expectation. However, this is an important consideration that charity founders should be aware of when starting the charity and when operating.

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# 1 Introduction

This report has been produced by Charity Entrepreneurship (CE). CE's mission is to cause more effective charities to exist in the world by connecting talented individuals with high-impact intervention opportunities. We achieve this goal through an extensive research process and our Incubation Program. In 2022, our research process focused on the top interventions within animal welfare.

*Ban the use of live-bait fish* was chosen by CE research staff as a potentially promising intervention within this category. This decision was part of an eight-month process designed to identify interventions that were most likely to be high-impact avenues for future charity entrepreneurs. This process began by listing nearly 275 ideas and gradually narrowing them down, examining them in more and more depth.

In order to assess how promising interventions would be for future charity entrepreneurs, we use a variety of different decision tools such as group consensus decision-making, weighted factor models, cost-effectiveness analyses, quality of evidence assessments, case study analyses, and expert interviews.

This process was exploratory and rigorous, but not comprehensive – we did not research all 275 ideas in depth. As such, our decision not to take forward a charity idea to the point of writing a full report should not be seen as a view that the idea is not good.

## 2 Background

Fish and crustaceans are raised and sold as bait all over the world. In particular, bait fish are small fish farmed or caught for use as bait to attract large, predatory fish. Bait fish production in most countries is either small-scale, incidental, or simply serves to sell fish that are too small to meet food fish market requirements ([Carole and Kwamena, 2008](#)). However, there are several countries where bait fishing is conducted on a large scale, with conditions and intensive aquaculture practices. For instance, the U.S. bait fish industry provides an example of bait fish production that has been developed into a large and important industry. The conditions of bait fish raised on this larger scale are likely to be quite similar to factory-farmed fish, and therefore welfare is likely to be low, with high rates of disease, morbidity and mortality.

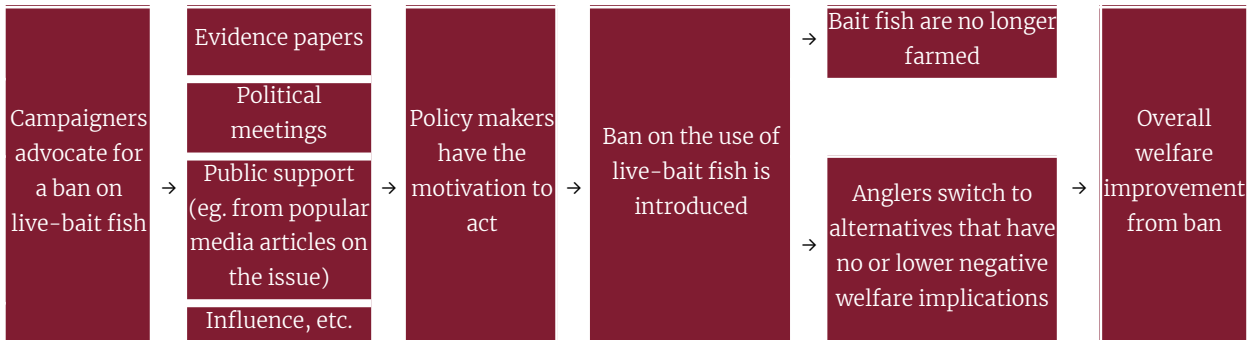
Although estimating the size of the bait fish industry in particular geographies and worldwide is difficult due to a lack of well-collected and direct data, as well as somewhat conflicting numbers between different sources, data from the USDA Census of Aquaculture from 2018 and 2013 states that there are approximately 1.3 billion bait fish sold in the US in 2018, and 1.17 billion in 2013 ([USDA, 2018a; b; c](#)). This data is likely to be reasonably reliable, and seems to be on the lower bound of claims that other particular farms and states have made in the past ([Simčikas, 2018](#)). Further, we think the industry is likely to be similar (scaled to the size of the country and industry) in other countries where recreational fishing is most popular. Overall, it seems plausible that the size of the industry is at a conservative minimum of several billion globally, with a realistic estimate being 10 billion.

Although several states and countries have introduced strong regulations or bans on bait fish, it is still a significant industry in many parts of the world. The intervention explored in this report is policy advocacy for a ban on the use of live-bait fish (likely specifically phrased as the use of live-bait fish caught in other bodies of water).

### 3 Theory of change

The theory of change for advocating for a ban on the use of live-bait. We also highlight the key assumptions being made in this theory of change.

The theory of change for this intervention could be as follows:



The key assumptions, corresponding to each step (i.e., “→”) in the theory of change, are:



Scale: key uncertainty, high uncertainty, some uncertainty, low uncertainty, unconvincing.

## 4 Approaches

Overall, there were several approaches that we considered while looking at how to curb the poor welfare conditions of live-bait fish:

1. Ban the use of live-bait fish (this is likely more accurately and fully described as banning the use of live-bait fish that are from other bodies of waters)
2. Ban the commercial farming of bait fish
3. Ban the import of certain bait fish species
4. Increase regulations on welfare standards for bait fish farming
5. Increase regulations on welfare standards for bait fish at the level of the wholesaler/retailer
6. Corporate campaigns against large bait fish suppliers

To compare these options, we created a weighted factor model to compare the impact and tractability of these approaches:

Approach	Impact	Tractability	Overall level of promise
Ban the use of live-bait fish	High- reduces market completely, other than people farming or catching their own bait fish	Moderate- some examples of success in different countries	High
Ban the commercial farming of bait fish	Low- no change in demand and therefore production may shift to another country	Moderate	Moderate
Ban the import of certain bait fish species	Low-moderate- might reduce import of particularly low welfare bait fish, but still a domestic market. The overall impact, therefore, would rely on the percentage of bait fish that is imported vs. locally produced.	Moderate- a few examples of successful import bans	Moderate
Increase regulations for farming	Moderate- likely some low hanging fruit for welfare improvement.	Low-moderate: Unclear how amenable bait fish farmers might be	Low



	This could also increase prices which could decrease purchases, resulting in fewer bait fish being farmed overall		
Increase regulations for wholesaler/retailer	Low- unclear how long bait fish are on wholesaler/retailer shelves waiting to be purchased, might be more of an acute benefit compared to their life on a farm	Low-moderate	Low
Corporate campaigns against large bait fish suppliers	Low- seems like although there are some large suppliers, it is quite decentralized with lots of small suppliers	Low- seems quite hard to convince a recreational fishing shop to care about live-bait fish, which is majority of suppliers	Low

On this basis, it seemed reasonably clear that a ban on the use of live-bait fish is the most promising approach that this organization could take.

## 5 Geographic assessment

Overall, there were two main questions we had to answer:

1. Where is the use of live-bait already banned?
2. In which countries is there a commercial live-bait fish industry?
  - a. In those places where there is an intense aquaculture supply,
    - i. What is the scale of the industry?
    - ii. How tractable is it to campaign there?
    - iii. How neglected is it to campaign there?

### 5.1 Where is the use of live-bait already banned?

There are several countries where the use of live-bait fish is banned:

- Scotland - ban on the use of live vertebrates as bait ([Fisheries Management Scotland, 2003](#))
- Rest of the UK - only allowed to use bait fish caught in the same waters it is used ([gov.uk, n.d.](#))

- Australia - One state (out of six states and two territories) only allows anglers to use bait fish caught in the same waters as it is used, but the use of live-bait fish is allowed in all other states and territories ([Native Fish Australia, 1993](#))
- Switzerland - ban on the use of live vertebrates as bait ([Basel in English, n.d.](#))
- Norway - ban on the use of live fish as bait ([Visit Norway, n.d.](#))
- Poland - only allowed to use bait fish caught in the same waters it is used ([Fishinglicense.eu, n.d.](#))
- Germany - ban on the use of live fish as bait ([fishingsouthbaltic.eu, n.d.](#))
- Austria - ban on the use of live fish as bait ([Paris Animaux Zoopolis, 2022](#); [RIBISKE KARTE, n.d.](#); [ebners-waldhof.at, n.d.](#))
- Ireland - ban on the use of live fish as bait ([Inland Fisheries Ireland, n.d.](#))
- Denmark - ban on the use of live fish as bait ([Iva, 2022](#))
- France - Paris Animaux Zoopolis are running a successful campaign there which has resulted in several cities/provinces banning live-bait ([Paris Animaux Zoopolis, 2022](#)). There is no nation wide ban yet.
- A number of US states and Canadian provinces - overall banned in nine out of 13 Canadian provinces and 10 out of 50 US states ([Kerr, 2012a](#)). More detailed information about laws in each state can be found in Appendix 4 of Kerr, 2012.

## 5.2 In which countries is there a commercial live-bait fish industry?

This question was quite hard to answer, and we were unable to find comprehensive and strong evidence to establish places where there was a commercial live-bait fish industry.

- USA: USDA data confirms a commercial industry ([USDA, 2018a](#); [b](#); [c](#)), and a Google search reveals many large scale suppliers throughout the country.
- Canada: several sources confirm an industry (for example, see [Ontario OUT of DOORS, 2020](#)), however it is unclear if there are bait fish farms, or whether people catch wild bait fish and then sell them. There is some evidence that there may be at least some of the latter, with Canada having bait fish “harvesters” that have a bait fish license. In addition to this, there is some evidence that the conditions in Canada may not be suitable for commercial aquaculture ([Kerr, 2012b](#))
- Australia: there seem to be a few large scale suppliers ([Tweed Bait, n.d.](#); [A1 Bait Supplies, n.d.](#); [WA Bait Supply, n.d.](#); [The Bait Shop Gold Coast, n.d.](#))
- France: Paris Animaux Zoopolis have reported on there being a bait fish industry in France ([Paris Animaux Zoopolis, 2022](#))

Overall, we think that there is a reasonable chance that we may have missed some geographies that have a significant live-bait fish industry, but are fairly confident that the above countries have a reasonably large scale industry. Other geographies that might look promising are any countries that have a large recreational fishing industry, and other countries in Europe where there is not currently a ban on the use of live-bait fish.

Prioritizing the above geographies with a commercial live-bait fish industry, we used a brief weighted factor model, as shown below:

	Scale of industry	Tractability of advocacy	Neglectedness of advocacy	Overall level of promise
USA (particular states)	High <sup>1</sup>	Moderate	High	High
Canada (particular provinces)	Low <sup>2</sup>	Moderate	High	Low
Australia	Moderate <sup>3</sup>	Low <sup>4</sup>	High	Moderate
France	Moderate	Moderate	Low	Low

Our heuristics were:

- A geography is likely to be highly neglected unless there is an organization we are aware of working in that place. The only geography which we know has an active advocacy campaign is France, where Paris Animaux Zoopolis is working. The Wildlife Conservation Society's work in Canada is no longer active.
- Advocacy is likely to be moderately tractable if there are several examples of bans at a regional or state level within a country, and is likely to have a low tractability if there are none or limited examples of bans. For France, the US and Canada, there are several provinces with bans; in Australia, there is only one state with a ban, and there was strong opposition when it was believed that Emma Hurst MP of the Animal Justice Party was attempting to table an

<sup>1</sup> Industry is large scale given popularity of recreational fishing and respectively larger population. USDA estimates suggest that there could be 1.3 billion bait fish farmed in the US.

<sup>2</sup> Many provinces have a ban so we would estimate that the remaining industry is reasonably small. In addition, it seems like at least some proportion of bait fish in Canada are wild caught, and not farmed.

<sup>3</sup> Based on the smaller population, we would estimate that the scale of industry is smaller, but were unable to identify any direct data.

<sup>4</sup> The Animal Justice Party, an Australian political party with an EA member of parliament, was recently accused of working on a bill to ban the use of live-bait fish ([boatsales.com.au](https://boatsales.com.au), 2021). Subsequent to this, the party told the media that the two proposed bills were on a separate matter, and that the use of live-bait for fishing was something that they opposed but not the focus of the two bills. The suggestion of a ban on live-bait fish caused controversy which suggests low tractability for this issue.

amendment to the animal cruelty bill to consider live-bait animals ([Fish Raider, 2021](#); [boatsales.com.au, 2021](#)).

Given that the US likely represents the most promising opportunity, we then attempted to prioritize which states an organization might focus on within the USA. Although we have data on which states the use of live-bait fish is legal in and which it is illegal in ([Kerr 2012a](#)), narrowing down on which state to focus on was difficult as we were unable to find data on the tractability of advocacy by state. Further, the only data we were able to find was the volume of production of bait fish by state, rather than consumption ([USDA, 2018a](#); [b](#); [c](#)). Since this intervention bans the use of bait fish, we tried to determine which states fishing is most popular in, but this was unclear. It is also unclear whether it is better to focus on a state with a high volume of bait fish production (this might imply they have a high volume of use if bait fish is not transported across states), or those with a low volume of bait fish production (since this might mean there is less opposition and a weaker lobby from the local industry).

Although we have very low confidence on this and would strongly recommend that a charity working on this intervention conduct a thorough geographic assessment by state, our best guess is that north-eastern and eastern states with a moderately sized industry are likely to be the most promising states to work in, including but not limited to: Minnesota, Ohio, Wisconsin, and Florida.

### 5.3 Conclusion

This geographic assessment, which was not comprehensive, suggests that the US is the promising geography for this intervention, as well as potentially Australia, but we did not thoroughly investigate other countries. Within the US, we were not confident on which states were most promising for a charity to focus on but found that Minnesota, Ohio, Wisconsin, and Florida could be preliminarily promising. However, we think that a more thorough, on-the-ground assessment of which state to work in would be quite useful. You could also look out for lobbying opportunities that arise when a state considers some bait fish regulation and asks for feedback, for example.

## 6 Quality of evidence

As outlined in the geographic assessment, there is a reasonable precedent for countries banning live-bait fish entirely or with small exceptions. Therefore, this section will exclusively focus on the evidence for the impact of advocacy on states

and countries banning live-bait fish. To answer this question, we used three approaches:

1. Which organizations have advocated for a ban in the past, and how successful have they been?
2. For bans that have happened in the past, have advocacy organizations helped?
3. What impact does animal advocacy in particular have on banning live-bait fish?

## 6.1 Which organizations have advocated for a ban in the past, and how successful have they been?

Although there is a possibility that we missed some organizations, we did a reasonably comprehensive search (both desk research and asking experts) of any groups advocating for a ban on bait fish. Based on this, we identified the following groups:

### Paris Animaux Zoopolis

Paris Animaux Zoopolis (PAZ) has organized several campaigns against live-bait fishing in France ([Paris Animaux Zoopolis, 2022](#)). Their overall approach has been to convince individual cities/districts to ban live-bait fish, with the ultimate goal of getting enough traction to push for a national level ban. Paris, Saint-Etienne, and Grenoble have voted against live-bait fishing as a result of PAZ's work. As well as this, many ministers have committed to and/or expressed their desire to ban live-bait fishing (75 and 28 respectively), several ministers have raised questions on live-bait fishing in parliament or through written questions. Several candidates also committed to banning this practice in the presidential and legislative elections of 2022.

### Wildlife Conservation Society (WCS)

WCS, a Canadian based NGO, has a number of programs. We spoke with the individual who has been involved in their policy advocacy on bait fish. They worked in Ontario, asking for a ban predominantly from an ecological risk perspective making the case that the use of live-bait fish could cause invasive species to spread as the Arctic watershed of that region goes out into the Atlantic ([Wildlife Conservation Society Canada, 2015](#)). They were successful in certain parts of Northern Ontario, but were not successful in Eastern or Southern Ontario (where there is a lot of fishing) or the rest of Ontario. They found that there were big lobby

groups against the ban, that governments were unwilling to shut down the livelihood of the local bait fish industry, and that this policy would have likely been more successful if there was some compensation program for those working in the bait fish industry.

Overall, they were optimistic about an organization working in other Canadian provinces or on the east coast of the US; but they think that work in Ontario might be difficult as they estimate that they have likely made all the progress that is possible. They further noted that in considering the implementation of this intervention, it would be useful to approach this from an ecological and biosecurity perspective, and that she was not aware of any NGO approaching this from a welfare perspective.

## Campaign for the Abolition of Angling

The Campaign for the Abolition of Angling (CAA) has previously run campaigns advocating for a ban on the use of live-bait fish in England and the rest of the UK ([Campaign for the Abolition of Angling, n.d.](#)).

It is unclear if the organization is currently still active, but in 1996, they launched a campaign to ban live-bait, staging a rooftop occupation of the Environment Agency in Bristol ([web.archive.org, 2016](#)). They collected thousands of signatures, which in the following year, led the National Federation of Anglers to consider the future of live-baiting, and in 1999 the Salmon and Freshwater Review was set up which investigated live-baiting, but purely from an environmental and economic perspective rather than a welfare perspective.

CAA was the only known organization at this time to be advocating for a ban on live-bait fish. Overall, as the ban on use of live-bait fish in Scotland in 2003 and the effective limitations in the rest of the UK in 2007 came much later than CAA's biggest demonstrations it is not clear whether CAA played a pivotal role. However, they did manage to gain significant traction with key industry and government agencies at a time when animal welfare advocacy and awareness was less established.

## The Scottish Federation for Coarse Angling and the Pike Anglers Alliance for Scotland

The ban on the use of live-bait fish in Scotland is reported to have followed a "long and well-argued campaign by the Scottish Federation for Coarse Angling and the

Pike Anglers Alliance for Scotland, which was supported by the Pike Anglers Club of Great Britain.” ([PAC News, 2007](#)) This suggests that the advocacy efforts of these organizations was pivotal in securing the ban, though we note that this press release was written by the Pike Anglers Club of Great Britain who may have an invested interest in connecting the victory to these organizations given its support of them.

## Eurogroup for Animals

Eurogroup for Animals has stated that live bait should not be used by long-line and pole and line commercial fishing operations ([Eurogroup for Animals, 2020](#)), but it is unclear whether they support a ban on the use of live bait in all instances, or if they have run any specific campaigns on the issue.

## Overall assessment

We identified four organizations that have run campaigns on bait fish in the last 20 years, and one that ran one in the late 1990s.

Attributing the role and significance of policy advocacy in policy change is difficult; however, given that there are relatively few NGOs working in this space, we think that it is likely that any NGO that had successfully advocated for a policy change had a low counterfactual replaceability, and that their role was likely to be reasonably significant.

Overall, this does seem like a challenging area for policy advocacy, but there have been a small number of successes which does suggest some tractability.

## 6.2 For bans that have happened in the past, have advocacy organizations helped?

It was very difficult to retrospectively look at countries where there has been a ban and do a retrospective causal analysis of how that happened, and the role that advocacy organizations seem to have played. The only case study that we could clearly form an impression on was the ban in Scotland.

In Scotland, it seems like there were two primary organizations that were responsible for the ban on the use of live-bait fish – the Scottish Federation for Coarse Angling and the Pike Anglers Alliance for Scotland, which was supported by the Pike Anglers Club of Great Britain ([PAC News, 2007](#)). It is relevant to note that

most ministers who voted in favor of the bill did so on biosecurity grounds, with only a few Green MPs considering the impacts on fish welfare.

## Overall assessment

Overall, we found some limited evidence for the effectiveness of advocacy on banning the use of live-bait fish. This analysis has updated us that advocacy in this space can be tractable.

However, it is difficult to know how to interpret this information; it could be the case that advocacy has been successful everywhere that it is tractable, and the states and countries where it is not banned have a strong industry where advocacy is likely to be significantly more difficult. This might mean that relying on historical evidence on how successful advocacy has been might be misleading, and in fact future advocacy attempts might prove to be more challenging than this evidence suggests. We think that this is a possibility that we cannot exclude, but given the neglectedness of the space, we are somewhat optimistic that there are still places where live-bait fish are legal and advocacy is tractable.

We also note that using historical evidence in this way could give us a biased perspective due to survivorship bias, where we are more likely to find information about successful campaigns. However, all of these concerns apply to any historical analysis.

## 6.3 What impact does animal advocacy in particular have on banning live-bait fish?

In looking at countries where the use of live-bait fish has been banned, ecological reasons (i.e., not introducing invasive species) and biosecurity reasons (preventing disease) have been the primary reasons for these bans being put in place. Other than in France, none of the successful efforts to ban or regulate bait fish were done by animal advocacy organizations.

For example, in the Manitoba province in Canada, there is a plan to gradually phase out the harvest and use of live bait over 2022-2026, to help stop the spread of aquatic invasive species, without any reference to animal welfare ([Outdoor Canada, 2022](#)). Another example: Maine has banned certain species of fish for use as live or dead bait fish, primarily based on a risk assessment of which species have the



highest risk of invasive disease introduction ([Maine Department of Inland Fisheries & Wildlife, n.d.](#)).

The implications for this intervention are unclear. On the one hand, it could mean that there are numerous levers to pull to convince governments to introduce a ban on live-bait fish, which increases its tractability. On the other hand, it might mean that approaching this from an animal welfare perspective, either entirely or in part, may not be tractable. This in and of itself is not an issue; as the organization may not wish to strongly, or at all, foreground animal welfare as a consideration in their advocacy work.

## 6.4 Conclusion

In light of this, and in summary, we expect that relative to other ideas that CE has previously recommended in the animal welfare space, focused policy advocacy to ban live-bait fish would be slightly but not significantly more challenging.

## 7 Expert views

We spoke to three experts – the individual at the Wildlife Conservation Society who ran its bait fish campaign, Amandine Sanvisens from Paris Animaux Zoopolis (PAZ) and Saulius Simčikas from Rethink Priorities.

Overall, experts were optimistic about a new charity operating in this space. They were globally positive about the potential impact that this could have for animal welfare, and they were cautiously optimistic about the tractability of advocacy in this space. They suggested that banning the use of live-bait fish is likely to be the most tractable approach; they did suggest that this organization should also consider approaching this from an ecological and biosecurity perspective, and that this organization would need to be working with fishermen to try and help them to identify viable alternatives to live-bait fish (and ultimately get buy-in from them as they are likely to be the strongest lobby against this ban). The expert from WCS suggested that financial remunerations to live-bait fish suppliers may make this intervention more tractable, and that this was something that was considered by their group in Canada.

Note that it is possible that some of the experts, being either researchers who originally wrote about the promise of work in this space from an animal welfare perspective or policy advocates in the space, may have greater optimism and desire

for this intervention to succeed and to have another actor in the space; overall, we think there is a low to moderate possibility of this, and therefore slightly discount the optimism presented here.

## 8 Cost-effectiveness analysis

Our [cost-effectiveness analysis](#) models the impact of advocating for a ban on live-bait fish in Ohio, USA. We consider both government and charity costs, and our endline metric is the total number of welfare points<sup>5</sup> (WPs) and the number of welfare points affected per dollar per year by this intervention. In addition, because of the uncertainty of the model, we have also included the 90% confidence interval for the WP gain for this intervention.

This policy change looks extremely cost-effective. We summarize the main end-line metrics of this cost-effectiveness analysis in the table below:

Policy	Total WPs affected (if campaign is successful)	Total WPs affected (expected)	WPs affected/\$ (Charity costs)	WPs affected/\$ (Government and charity costs)
<a href="#">Banning the use of live-bait fish in Ohio, USA</a>	8,685,484,766	868,548,477	537.02 (-115.83 to 1263.58)	439.78 (-94.85 to 1034.77)

In the section below, we will discuss the inputs used in this model, how they were estimated, why we used them, and how they are used together to calculate the end-line metric of the number of welfare points affected per dollar per year.

You can also explore our [Guesstimate model](#) to see how we evaluated the potential trade off of a small percentage of anglers switching to use live invertebrates instead of live fish, or catching their own bait fish as a result of the ban.

<sup>5</sup> Welfare points are a metric created by Charity Entrepreneurship to evaluate the impact of animal welfare interventions. You can find out more about how this metric was created on [the EA forum](#) as well as an example of how we have used welfare points in the past [to compare the lifetime welfare of different animals](#).

## 8.1 Costs

### Charity costs

The charity costs were estimated by the Charity Entrepreneurship team and were held constant throughout all of the cost-effectiveness analysis models made during this research round. These costs were estimated based on the country that the intervention was being implemented in (developed or developing) and whether the intervention was a policy change or direct implementation intervention (e.g., working with farmers directly).

The following costs will be modeled:

	Developed country (Policy)	Developing country (Policy)	Developing country (Direct implementation)
Year one	\$100,000	\$100,000	\$100,000
Year two	\$200,000	\$165,000	\$250,000
Year three and beyond (Operating at scale)	\$300,000	\$225,000	\$400,000

### Government costs

We based our estimate of government costs on the assumption that the Ohio or American government would be responsible for ensuring the enforcement of this ban, for example, through audits/routine visits. It was quite difficult to find any data on the cost of audits, or the revenue generated from audits or penalties from non-compliance with any new regulation.

In light of this, we took a conservative estimate that enforcement of a use ban would roughly cost 10% of the total value of the total industry size of bait fish in Ohio where sales of bait fish totalled \$2,131,000 in 2018 ([USDA, 2018c](#)).

## 8.2 Effects

The overall effect of this policy change is defined in terms of the total number of welfare points affected. Because there was some uncertainty in the estimates used on the effects of this intervention, we used confidence intervals for relevant inputs to estimate the direction and size of effect in our [Guesstimate model](#).

Broadly, we looked at the following benefits and potential harms of this intervention:

- Benefits of fish no longer being farmed for use as live bait
- Harms due to anglers shifting to using invertebrates as bait
- Harms due to anglers shifting to catching their own fish as bait

### Benefits of fish no longer being farmed for use as live bait

- *Number of bait fish*: the number of bait fish in Ohio was estimated to be 78M (60M-100M), based on the fact that Ohio has a \$2,131,000 industry in 2018 according to the USDA data, and from the same data, an average of 37.05 bait fish farmed per dollar ([USDA, 2018c](#)).
- *Number affected by factory farming*: Although there was no evidence on this, we assumed that 80% (CI 75-85%) of bait fish are factory farmed, with the rest being farmed at the same catchment zone, or through other means.
- *Number affected by intervention*: Another report conducted by the team looked at compliance rates across the EU, UK and New Zealand in 16 different sources, and took a weighted average of these to get an expected compliance rate of ~75%. We expect the compliance rate to be similar in the US or other high-income countries where this policy might be advocated for, and so have used this approximation (for more detail, see [the "Calculations" tab of the CEA spreadsheet for our "Ban low welfare imports" intervention idea](#)).
- *Welfare gain per animal*: Assuming that an animal not existing is net neutral, [Charity Entrepreneurship's previous estimates of welfare animal index](#) puts the welfare of factory farmed fish at -27 to -58. Therefore, we assume a welfare gain of 27-58 points.
- *Days of suffering*: It is unclear how long bait fish are farmed for before being used.

- Minnows, one of the most commonly used species of freshwater bait fish, can take approximately five–eight weeks to breed to a size of 2.5 inches ([Wallace and Walters, 2004](#)), and several months to a year before they are the appropriate size to be used as bait ([Carpenter, 2017](#); [Gunderson and Tucker, 2000](#)). In the wild, they can live up to several years ([Ullmann, 2019](#)).
- Other species seem to be bred for longer. For example, most golden shiners are sold when they are one year old, some earlier, some when they are 1.5 years old ([Gunderson, 2018](#))

Due to this wide variation, we took a point estimate of 230 days of suffering with a CI of 100–365 days of suffering.

- *Sentience*: We approximated the sentience of fish as 62.5%. Our sentience estimates are informed by work from [Open Philanthropy](#) and [Rethink Priorities](#).

## Harms due to anglers shifting to using invertebrates as bait

- *Percentage of anglers now using invertebrates (worms or maggots, hatched insects like crickets and grasshoppers, or leeches)*– According to Rethink Priorities survey, approximately 33.3% of respondents said that they would purchase invertebrates. When they took into account that some respondents buy more bait fish per year than others, they also calculated a weighted average percentage that 25% of respondents would purchase invertebrates
  - Informed by the survey results, we subjectively settled on a point estimate of 30%, with a CI of 25% to 35% (using the weighted average as the lower bound and the raw survey results as the upper bound).
- *How many more invertebrates would be used compared to bait fish (i.e., for each bait fish that you would use, how many worms or maggots would you use)*– Rethink Priorities conducted a follow-up survey among respondents who previously indicated that they would use worms or maggots as an alternative to bait fish, asking them how many invertebrates they would buy for each bait fish. The average quantity was 39.72, with a median of 20, a mode of 50, and a 25% quartile of 5 and 75% quartile of 50.
  - In conjunction to this, we did a search of how large the packets of maggots and other invertebrates are sold in:
    - On recreational fishing websites, it seems that most insects are sold in pints– for instance, maggots are sold in a pint for

approximately £3 ([Willy Worms, n.d.](#)), with each pint containing 500–2500 maggots ([fishingmagic.com, 2017](#); *Personal conversation with angling shops*).

- On the other hand, worms are sold in smaller quantities, and significantly less might be required. An expert that we talked to mentioned that one might need 25 worms for three hours of fishing.

In light of this, we took a conservative estimate of 100 invertebrates per bait fish, with a CI of 40 to 200.

- *WP loss for invertebrates now being used as bait fish*: Based on the weighted animal welfare index, we did a shallow investigation on the likely suffering of factory farmed invertebrates that might be used as a replacement for bait fish (specifically maggots and leeches), as can be seen in the [“WP for invertebrates” tab of our cost-effectiveness analysis](#). From this, we estimated their welfare at -10 to -32. Therefore, we assume a welfare gain of 10–32 points.
- *Days of suffering*:
  - Maggots: five–seven days ([Rigby, 2013](#))
  - Worms: three weeks – six months ([wormcity.co.uk, n.d.](#); [Ag Marketing Resource Center, 2022](#))

It is uncertain how long invertebrates may live in a shop or in the angler's possession. In light of this, and to account for time on the farm, in a shop and in an angler's possession, we have estimated a total 22 days of suffering, with a CI of 9 to 40.

- *Sentience estimate*: We used an estimate of 10% for the sentience of invertebrates. Although we anticipate that the sentience of worms and maggots may differ, we have used this as a general estimate. Our sentience estimates are informed by work from [Open Philanthropy](#) and [Rethink Priorities](#).

Note that we did not include any harms associated with anglers breeding their own bait fish, as none of the respondents in the USA mentioned that they would take this approach.

## Harms due to anglers shifting to catching their own fish as bait

- *Percentage of anglers that would shift to catching their own bait fish* – Rethink Priorities conducted a survey to help answer this question; when they asked respondents what they would do if they could no longer buy bait fish, 8.2% of respondents in the US and 9.2% of international respondents said that they would catch their own bait fish. When they took into account that some respondents buy more bait fish per year than others, they also calculated a weighted average percentage that 18.6%–19.5% of respondents would catch their own bait fish. Informed by the survey results, we subjectively settled on a point estimate of 13% of anglers catching their own bait fish, with a CI of 8.3%–20.0% (taking the lower bound as the raw result of the survey data, and upper bound being the weighted average).
- *Days of suffering*– assuming that bait fish are caught and used as bait on the same day, we approximate one day of suffering.
- *WP loss of fish being caught and used as bait fish*: Considering just the day that bait fish are caught and used, we would estimate that this is extremely unpleasant, in terms of their suffering and ultimate death. We would estimate this to be 10–15 WP for this day.
- *Sentience*: As above for farmed bait fish, we approximate a sentience of 62.5%. Our sentience estimates are informed by work from [Open Philanthropy](#) and [Rethink Priorities](#).

Using these inputs, we calculated an estimate for the total number of welfare points that could potentially be averted through banning the use of live-bait fish. Then, to estimate the overall impact of the charity over its lifetime, we also considered the following inputs:

- *Probability of success* – Using the base rate of approximately 15% that has been applied through a number of the interventions that we have looked at in the animal welfare space, we would estimate that policy work on this space is likely to be slightly, but not significantly, more challenging. As well as this, we anticipate that an organization may be able to work in several different states at a time, which increases the overall probability of success in one state. We would therefore estimate a probability of success of 10%.

- *Time taken for a campaign to be a success* – We estimated the time taken for a campaign to be successful as five years. This was a fairly subjective assessment of how quickly animal welfare policy change happens, that was held constant between interventions in CE’s animal welfare reports (unless there was specific evidence or reason to think that it might differ, which there was not in this instance).
- *Discount rate* – a discount rate of 4% was uniformly applied for all interventions considered during this research round, as we are evaluating impact in the future and we wanted to evaluate this impact in present value terms.

## 9 Implementation

### 9.1 Crucial consideration – Potential to do harm

As shown in our [Guesstimate model](#), in weighing up the benefits of less live-bait fish being used against the harms of invertebrates being used (and anglers catching their own bait fish), there is a potential that this intervention might be net negative.

We tried to reduce uncertainty as much as possible through a survey about what anglers might switch to if they could no longer use live-bait fish. This was a medium-sized survey of over 2,000 anglers, kindly run by Rethink Priorities. However, we are less certain about our estimates of the welfare points of different animals, and less certain about our sentience estimates. If an individual had different considerations on both of these parameters, it would make this intervention look more or less promising. As well as this, modifying the days of suffering can affect how positive/negative this intervention is, reflecting how ‘sensitive’ this intervention is to potentially doing more good or harm.

Overall, our Guesstimate model tends towards this being a net positive intervention. We estimate a welfare point gain of 500M points, with a 95% CI of -110M to 1.2B. To get more certainty on this concern and to narrow the range of this confidence interval, it would be helpful to:

1. Have a much stronger sense of how many days of suffering bait fish and invertebrates used as bait experience, in particular, how long they are kept on shelves in shops and by anglers after purchase.



2. The welfare conditions of invertebrates used as bait – we are not as confident on our estimate of this as we are for bait fish, as we know the fish farming industry much better than the insect farming industry.
3. A stronger sense of the proportion of anglers who would use invertebrates if live-bait fish are no longer available – we could imagine this would vary between geographies and the availability of different alternatives.
4. The sentience of fish and invertebrates – we imagine that this could be quite hard to estimate or reduce uncertainty about.

Overall, we do not think this is a major break for this organization, but is certainly something that founders working on this intervention would want to focus on answering early on if possible and do constant monitoring and evaluation to keep track of.

## 9.2 Crucial consideration – Is the industry in decline?

Although most of the crucial considerations have been discussed earlier in the report, there is one additional one worth mentioning that ruled this intervention out of previous Charity Entrepreneurship research rounds: Is the bait fish industry in decline?

Unfortunately, there aren't many surveys about what people use when fishing and how this has changed over time. However, there are three main, publicly available datasets that may help answer this question, which are presented below in order of usefulness:

### USDA Data

The USDA National Agricultural Statistics Service has both a 2012/3 and 2017/8 census of the bait fish industry in the USA. We think this source is likely to be fairly reliable. It shows that the bait fish industry has remained fairly stable over the last 5 years:

	2018	2013
Size of industry	\$32,778,000	\$29,375,000
Number of farms	168	166

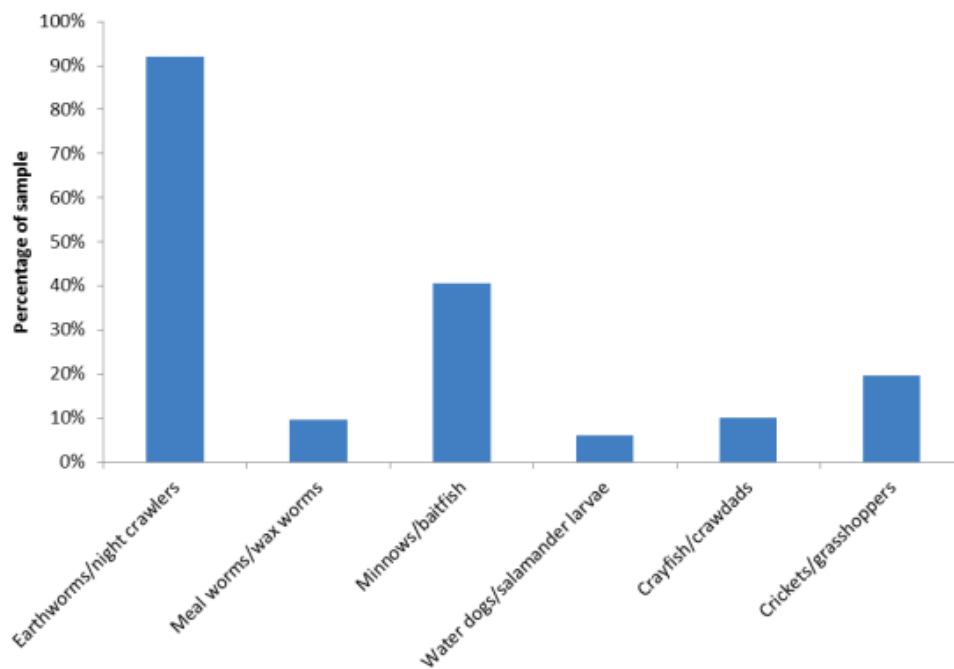
The number of bait fish farmed has also remained fairly constant at ~1.2B ([USDA, 2018a](#); [b](#); [c](#)).

## New Mexico Surveys

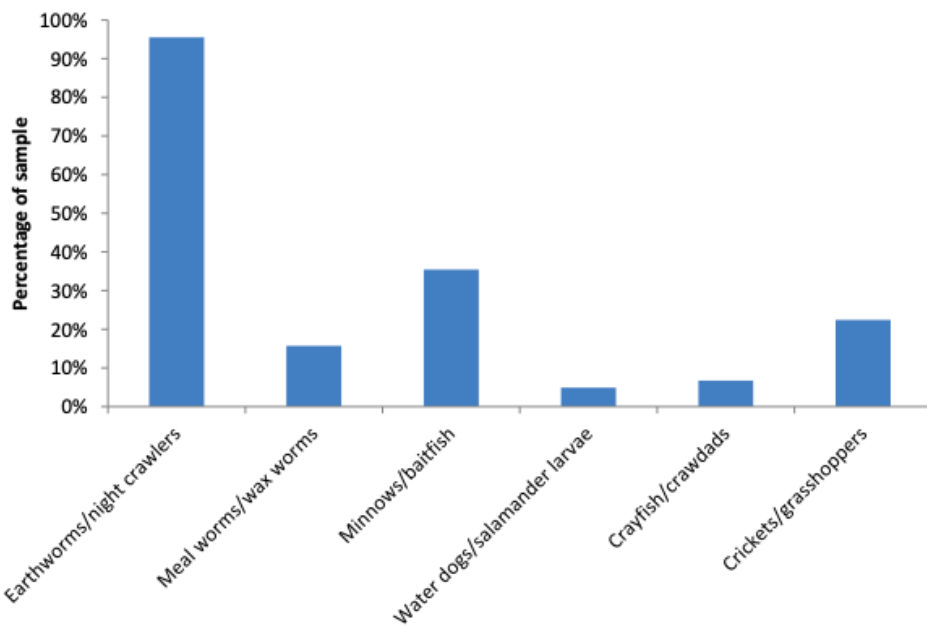
A series of New Mexico Angler Satisfaction surveys found that the use of live bait has remained fairly constant over the last few years:

- 2018: 28.5% use live bait ([Fisheries Management Division New Mexico Department of Game and Fish, 2019](#))
- 2019: 36.3% use live bait ([Fisheries Management Division New Mexico Department of Game and Fish, 2019](#))
- 2020: 34.6% use live bait ([Fisheries Management Division New Mexico Department of Game and Fish, 2021](#))
- 2021: 35.5% use live bait ([Fisheries Management Division New Mexico Department of Game and Fish, 2021](#))

Note that this usage of live bait includes the use of invertebrates. In fact, it seems like most of these anglers using live bait are already using invertebrates more than bait fish. This is illustrated in the graphs below:



Source: [Fisheries Management Division New Mexico Department of Game and Fish, 2019](#)

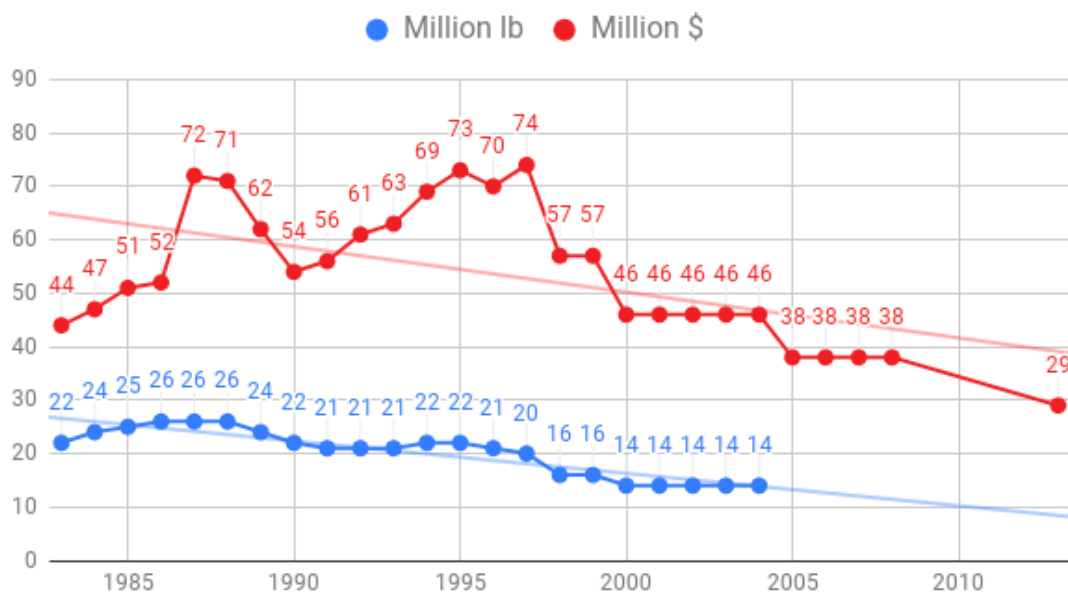


Source: [Fisheries Management Division New Mexico Department of Game and Fish, 2021](#)

### US Fisheries of United States Report

In Rethink Priorities’ report on bait fish, Simčíkas looked at data from Fisheries of the United States reports and the 2013 Census of Aquaculture, which suggest that bait fish farming industry seems to be on the decline ([Simčíkas, 2018](#)).

U. S. Baitfish Aquaculture Production (government data)



Source: [Simčíkas, 2018](#)

However, this data is somewhat old, and the accuracy and validity of this data is unclear e.g., it seems to have excluded common species of bait fish in more recent data collections, and the government data was previously criticized by [Gunderson and Tucker, 2000](#). Simčikas, in his review of this report, mentioned that he believed that this report is too old to inform current trends and what might be expected in the future.

## Conclusion

There was limited evidence on this question. However, with reasonable confidence, in places where the use of live-bait fish has not been banned, it is likely that the size of the bait fish industry is the same size, with some possibility that it has slightly grown or diminished. It seems unlikely that the industry has contracted by more than one order of magnitude, or contracted by enough for this to not be a large-scale issue.

## 9.3 Access

### Information

Outside of the questions outlined in the “[Crucial consideration - Potential to do harm](#)” section, we anticipate that access to information will likely not be a significant issue.

However, there are some pieces of information that we think may vary between geographies and which would be quite useful for an organization to investigate, wherever they work:

- How strong is the recreational fishing industry in that area?
- In that area, what would anglers use instead of live-bait fish?
  - It may vary between locations whether or not people are more likely to substitute with artificial lures, invertebrates or catching their own bait fish.
- Are there any strong non animal welfare related reasons to advocate for a ban on live-bait fish in this particular geography?

### Government

Although we did not speak to any government stakeholders for this report, we would expect that governments would be willing to speak with a new organization working on this issue.

## 9.4 Funding

We would expect that funding would not be too difficult to get, in particular from Effective Altruism aligned donors.

We intuit that it might be more difficult for this organization to get funding from non-EA aligned donors, due to this area being somewhat neglected and having strong lobby opposition. However, there may be environmental and ecological donors who are interested in funding this organization.

Overall, given that we expect that this policy organization would likely have a small to moderate size budget at scale, it seems unlikely that funding would be a significant limiting factor or barrier to success for this organization.

## 9.5 Scalability

One of the main paths to failure for this organization is its scalability. Within the US, we think there is reasonable scalability, with an estimated ~1.3 billion bait fish farmed and 40 states where the use of live-bait fish is still legal. However, outside of the US it is not clear which country is most promising. In our geographic assessment we identified three other countries that likely have a bait fish industry but they do not seem as promising as working in the US for the following reasons:

- Canada - unclear what the size of the industry is, as it seems common to catch wild bait fish and then sell these as live bait, rather than farming these fish
- Australia - likely a lack of tractability and political will informed by the controversy around the belief that an MP from the Animal Justice Party was trying to ban bait fish in 2021
- France - Paris Animaux Zoopolis are already working here, and seeing success, therefore work here is not neglected

However, this geographic assessment was not comprehensive and so there could be some other promising countries. In addition, we think that even if there are no other promising countries to ban the use of live-bait fish in, this organization could potentially pivot to other recreational fishing practices that could be regulated, such as fish stocking.

## 10 Conclusion

Overall, our view is that advocacy for a ban on the use of live-bait fish is an idea worth recommending to future charity founders.

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