

# Carefish report - welfare assessment in pots and traps fisheries



Promoting better fishing standards

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Carefish/catch project - promoting better fishing standarts  
Report on welfare assessment in pots and traps fisheries, May 2023

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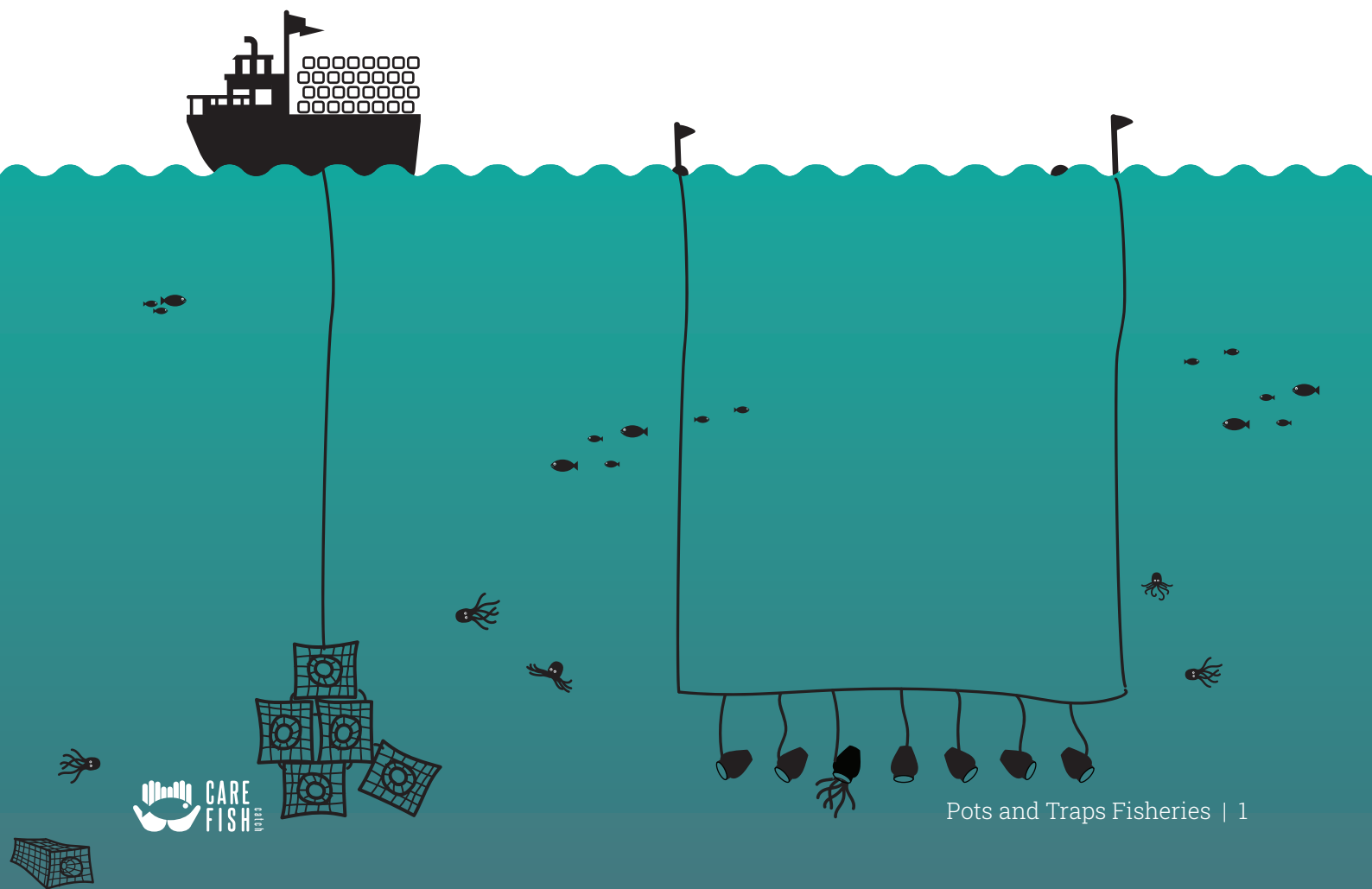
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# BRINGING WELFARE TO THE FISHERIES SECTOR

Animal welfare is an emerging issue in aquaculture and fisheries, relating to ethics, animal health and product quality. A growing number of researchers, decision makers and advocacy groups have been pushing for fish welfare to be thoroughly researched and integrated in the conversation about the future of seafood standards. Following these lines, the Carefish/catch project aims to promote better fishing standards, by assessing animal welfare impacts in fisheries and promoting better fishing standards.

One important objective of the project is to identify keypoints of welfare hazards and suggest improvements to reduce suffering of individuals in specific fishing methods. This would enable the establishment of welfare standards into the fisheries sector, through a series of recommendations and guidelines to be implemented into the fisheries certification program Friend of the Sea.



## Pots and Traps Fisheries

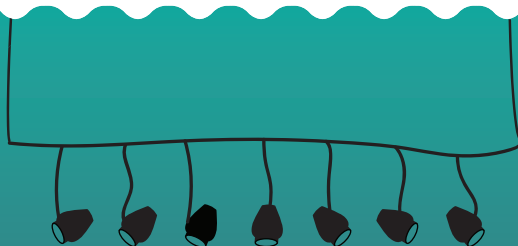
Pots and traps (hereafter named traps for streamlining reasons) are fishing gears commonly used in both small-scale and industrial fisheries around the world. While they account for a relatively small proportion of global fish landings, certain target species can bring in significant revenue for the sector, as reported by the Food and Agriculture Organization (FAO). Trap enclosures or devices typically have rigid structures and employ bait or the appearance of refuge to lure fish, crustaceans, or mollusks inside, from which escape is difficult. Most traps are deployed on the seabed or riverbed, targeting primarily benthic species at depths ranging from a few meters to 700 meters, and a haul-in line is used to check and rebait the traps.

Stationary traps are a type of passive or static fishing method that are often arranged in strings, with the number of devices attached to a single long main line dependent on various factors such as the type of gear used, target species, vessel size and design, the area of deployment, and the type of seabed. Modern traps are designed with the behavior of the target species and local fishing practices in mind, and can vary in shape, size, and construction materials. Common materials used include wood, clay, steel, nylon, polyethylene wire netting, and plastic, the latter becoming increasingly popular despite its environmental impact. The traps are usually baited with fish or live bait, often crustaceans, with the choice of bait depending on the target species.

Compared to other demersal fishing gears like bottom trawling, most traps have a lesser impact on the habitat, although there is still evidence of seabed impact during trap fishing operations, especially on rocky bottoms. Benthic habitats can be interfered with or even destroyed when the main and secondary lines are hauled aboard, or when lost traps continue to catch fish (known as ghost fishing). Although there are legal limits on the number of traps that can be owned and deployed, the fact that traps can remain underwater for several days makes it challenging to monitor these fisheries and enforce regulations.

Although non-target species are usually successfully removed from traps, there is still by-catch associated with this fishery, which can nevertheless cause (relatively low) mortality depending on factors such as depth and soaking times. By-catch of Protected, Endangered, or Threatened (PET) species is also reported, with turtles becoming entangled in vertical lines and both vertical and ground lines causing entanglement of marine mammals, resulting in permanent injuries or death. Currently, there is a debate regarding the implementation of mitigation methods, such as using culling rings to allow undersized animals to escape, sinking groundlines instead of floating ones between traps, reducing the number of buoy lines, or using ropeless gears with associated recovery/hauling technology.

The objective of the Carefish/catch project is to evaluate the potential for reducing fish suffering during capture in various fisheries. Therefore, it is crucial to address the fishing procedure for each fishing method. This report will concentrate on traps that are used in the octopus fishery in southern Portugal.



# Carefish/catch experimental approach on Fisheries welfare

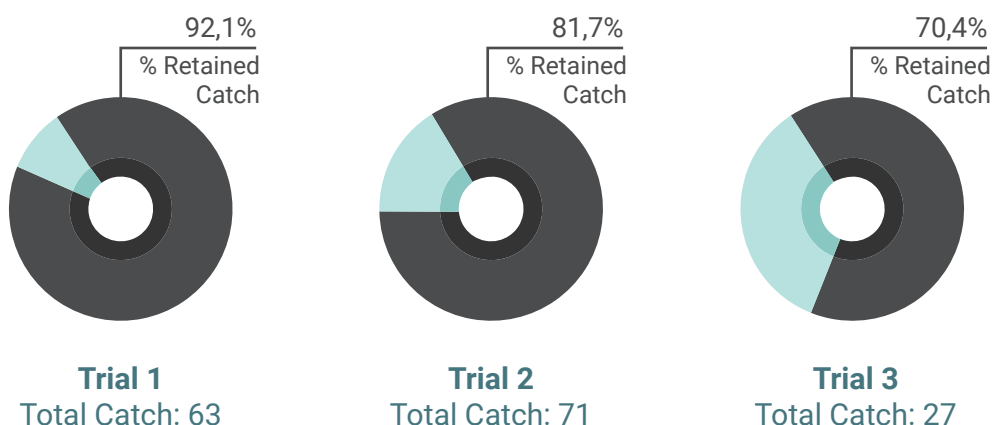
For this study, our focus has been to better understand the impact of trap fisheries in welfare of target species. Through a close collaboration with local fishing communities, experimental trials were conducted to enable; i) the identification of key points of animal suffering, and ii) the proposal of innovative and alternative methods or recommend other best practices and consequently to improve product quality.

## Video analysis:

Videos and onboard observations on artisanal fishing vessels during three fishing trips (conducted within one week) were analysed to examine all events during the hauling process and sorting operation, providing a comprehensive overview of the impact of the fishery on the welfare of octopuses. The entire process for each trap, from hauling onboard to storage, typically lasted from 40 seconds to a minute, although it took longer in some cases. It should be noted that this is a preliminary study with limited sampling coverage. Data on the total number of traps, catch, and discard volume were collected (Table 1).

**Table 1.** Traps catch data and respective retention rate collected during regular fishing trips (trials) in collaboration with local fishing fleet targeting octopus. Data was obtained based on video analysis of the fishing operation recordings. Catch and discards reported by number of individuals (n).

	Total Traps	% Traps with octopus	Catch Retained (n)	Discards (n)	% Retained Catch
<b>Trial 1</b>	340	18.5	58	5	92.1
<b>Trial 2</b>	653	10.9	58	13	81.7
<b>Trial 3</b>	395	6.8	19	8	70.4



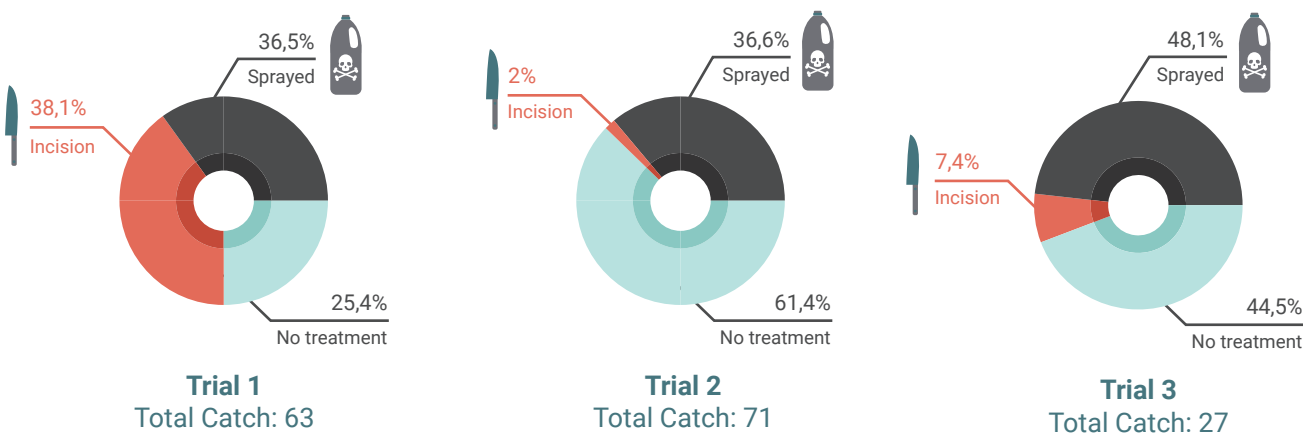
**Figure 1.** Traps retention rate for each fishing trip (trial), based on the onboard operation video analysis. Retention rate in grey reported in percentage (%).

Bycatch species, mostly demersal, were either kept or released based on their commercial value. However, several welfare issues related to onboard handling were reported when these species were kept (see section below). Regarding the octopus fishery, all octopuses were pulled out of the traps with significant force (often excessive) during the emptying process.

Additionally, bleach was commonly sprayed on an average of 40% of the total captured octopuses (Table 2). This practice was used to help release octopuses from the gear and to speed up the onboard operation, and albeit is mainly used on larger individuals octopus of all sizes are affected. Such procedure raises important concerns regarding the post-release mortality of discarded octopuses that were sprayed with bleach, particularly juveniles that were stressed, injured, and exhibited lethargic behavior, making them more susceptible to predation and death from their injuries. It is recommended that this practice be completely banned in this fishery.

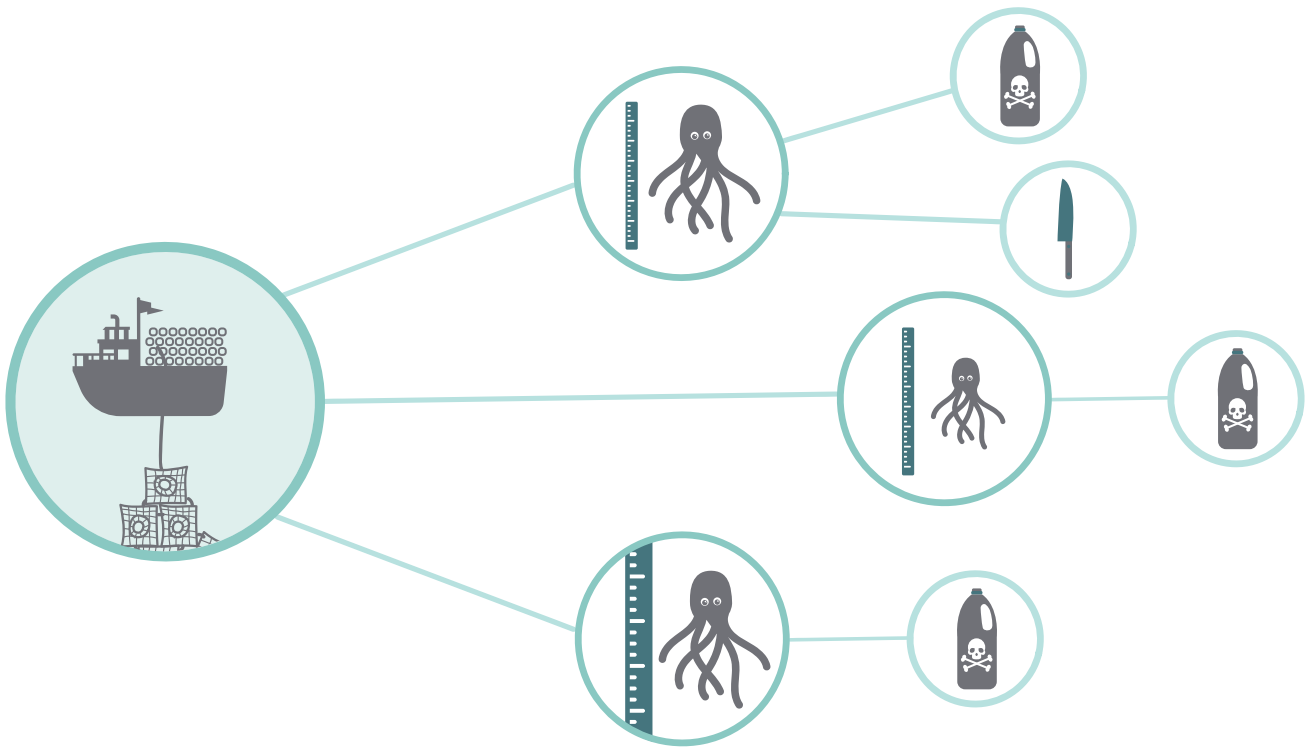
**Table 2.** Data for traps fishery and rates on bleach spraying practice and brain incision procedure observed during the fishing trips (trials) targeting octopus.

	Total Catch (n)	Spraying (n)	Incision (n)	% Sprayed	% Incision
Trial 1	63	23	24	36.5	38.1
Trial 2	71	26	2	36.6	2.8
Trial 3	27	13	2	48.1	7.4



**Figure 2.** Observed data on both treatments onboard of trap fishing operation targeting octopus. Spraying rate in grey, incision rate in orange and no treatment in light green.

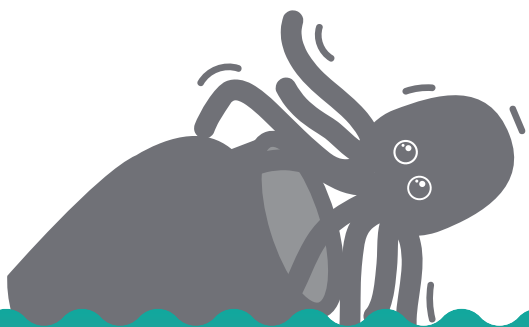
Percussive stunning by incision of a sharp object, directly in the animal’s brain, was also observed and usually applied to larger animals that would become easier to handle onboard (Table 2 and Figure 2). This practice, similar to “Ikejime” for fish, seems ideal regarding animal welfare as it renders the animal unconscious instantaneously and irreversibly when performed correctly. During fishing operations, it is reported that, if the individual was large enough, stunning was performed in a very precise manner and such size-based selection represented only 16% on average of all catch (Figure 3). It is then recommended to apply this method to all retained animals to reduce suffering and induce a rapid death before storage.



**Figure 3.** Size-related selection process during fishing operation. Only larger octopuses are effectively euthanized onboard. Part of the remaining individuals are sprayed with bleach, including juveniles that are released afterwards.

## Welfare impact of Pots and Traps Fishing :

By combining our expertise in assessing welfare (or lack thereof) in fish farming with a solid experience in fisheries, we can have important insights into the suffering of fish and other marine groups while being caught at sea, and possible ways to mitigate such suffering. Several key points were identified in traps fisheries, specifically on the impact on octopus welfare. A wide variety of stressors were identified, such as bleaching, injuries experienced during the process of forced pulling out of the trap, accidental falling on board, handling during the process of storage, and a stressful death once inside the storage compartment. The spraying of bleach should be prohibited, and slaughter by brain incision should be done to all animals considered as catch, as a precautionary and more suitable measure regarding welfare standards.



# Key points with Impact on Fish Welfare

## i. Capture

The Traps fishing process starts with the deployment of baited devices from the vessel while it moves slowly ahead. The devices are left on the seabed and the duration of soak time is dependent on various factors such as the target species, their behavior, or bait durability. Eventually, traps are retrieved or manually lifted onto the vessel. If the soak time is prolonged, there is a possibility for some of the catch to escape. Non-target species or juveniles below the legal size may be attracted by the bait and should be immediately released. By-catch can be reduced by increasing gear selectivity or changing the gear based on the target species, or by implementing more effective management procedures such as adjusting the distance between traps, imposing closure periods, or restricting fishing in spawning areas. The impact on welfare while underwater can result in pain, injuries, or death from predation, suffocation, exhaustion, physical wounds such as cuts, skin damage, bleeding, or psychological effects from the stress of being restrained during trapping.

The process of hauling the catch onto the vessel can cause additional mechanical damage to the animals due to the handling involved. To mitigate these injuries, it is recommended to reduce the hauling speed, minimize the rate at which the catch ascends, and even minimize the soak time of the traps. It is crucial to pay special attention to reducing the number of traps that are lost during fishing operations because lost traps can continue to attract and harm animals for days or even months. Regulations regarding gear design should, for example, require the inclusion of a mechanical part that will corrode rapidly, creating an opening for fish to escape from lost traps.

## ii. Onboard handling

Once the traps have been located and the hauling line is secured, they are pulled aboard and emptied. The hauling process can be done manually or with the assistance of a mechanical hauler. During the removal of the catch from the trap, two primary factors contribute to the impact on fish welfare. Firstly, the handling time itself, which involves removing the animal from its natural environment and subjecting it to prolonged air exposure. Secondly, the sorting activity, which adds additional time to the procedure. When considering the entire process, from capture (trapped) to hauling and handling by fishers onboard, leading to killing or death of the fish, various physical, physiological, and mental disturbances occur throughout the capture process. Welfare concerns are amplified by the overall procedure, since air exposure can lead to gill membrane collapse and asphyxiation, direct contact with materials can cause pain, overcrowding can result in injury and pain from contact with other fish, and crushing, decompression, and exhaustion can also occur.

In the specific case of the octopus fishery, the handling of the animals often involves the use of excessive force, when emptying the traps leading to severe external injuries, including dismemberment. The use of bleach to expedite the release of octopuses from the traps is common and causes severe burns to their body, particularly to their eyes. Therefore, it is recommended to prohibit such procedures onboard and instead explore alternative solutions to efficiently empty the traps, such



as redesigning the gears to include larger openings or movable parts, making the process more humane and efficient.

Another significant welfare concern is the storage of too many live animals in cramped compartments, which results in slow and painful death as well as degradation of their flesh. This suffering is further exacerbated by the common practice of using freshwater in containers to artificially increase the weight of the catch, causing additional and intense osmotic stress. These detrimental effects on fish welfare can be mitigated by implementing a simple and effective slaughter procedure prior to storage, ensuring a more humane and appropriate treatment of the animals.

### iii. Stunning and Slaughter

To decrease pain and suffering in trap fishing, it is recommended to stun and slaughter animals as soon as they are brought onboard. Percussive stunning can be utilized by delivering a sharp blow to the head, which destroys the central nervous system and immediately renders the animal unconscious in an irreversible manner. Manual percussive stunning may require additional manpower and equipment, but it is considered suitable for species caught using this fishing method.

A trained crew member can effectively and quickly render the animal unconscious by delivering a sharp blow to the head. This can be accomplished using a fishing priest or a captive bolt pistol. Currently, death by asphyxia on the deck after hauling or during the sorting process is frequently reported onboard in many fisheries. To prevent this, slaughter should be carried out as soon as possible after stunning. Methods such as gill cutting (exsanguination), immersion in ice water (hypothermia), or storage on ice (asphyxia + hypothermia) can be employed to avoid or minimize tissue acidification caused by lactate buildup, thereby maintaining the best possible quality of fish meat.

In the case of the octopus fishery, the recommended practice is stunning by making an incision with a sharp, pointed object (e.g., knife) into the brain, resulting in a swift and humane death. This procedure should be encouraged and ideally performed while the octopuses are still inside the traps or immediately after their removal from the traps. It is crucial that experienced or trained crew members perform the procedure with precision. A misplaced incision may not disrupt the central nervous system but only sever the connection between the brain and the limbs, rendering the animal "octaplegic" while still conscious and aware. Implementing these simple measures can significantly reduce the suffering of octopuses and improve the quality of their meat.

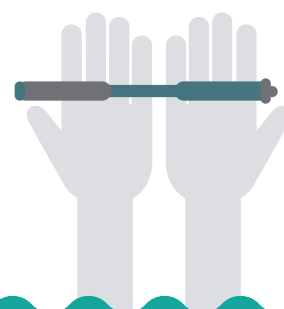
Knife



Captive bolt pistol



Fishing Priest





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