



**Asia-Pacific
Economic Cooperation**

**Manual on Good Practices to Improve
the Supply Chain of Marine Products
from the Subsistence Fishery Sector in
the Asia Pacific Region**

**Ocean and Fisheries Working Group
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Foreword

Small-scale fisheries are highly dynamic, labour intensive and usually not integrated with local marketing arrangements. Small-scale fishers, their families and communities are critically dependent on fish for their food and livelihood security and are extremely vulnerable to external pressures and shocks.

Products originating from subsistence or small-scale fisheries require good handling practices along the supply chain, since up to 30% of the catch in some cases, is lost due to poor handling practices.

Therefore, proper management and efficiency throughout the core of the supply chain can increase the economic growth of the fishery communities, open new job positions for women and strengthen food security; consequently, we will need fewer marine resources contributing to the conservation of the fish stock.

The aim of this manual is to facilitate the improvement of the catch condition of subsistence fishers (aiming at food security) by reducing economic losses and overfishing by the deterioration of fish products that were not properly handled, achieving that consumers receive high-quality products.

A Stakeholders Workshop of APEC Economies took place in Lima, Peru from 1 to 4 May 2016, with the aim of deciding the contents and format of this publication.

The workshop recommended that:

- The target audience would be the subsistence fisheries segment.
- The key topic would be the application of good fish handling principles to catching, landing and transport to the 1st point of sale.
- The contents do not aim to set the final level for subsistence Fishers, just the initial level.
- Each economy will be free to add up and transform what they require to adapt it to their needs.
- The manual will be delivered to the fisherfolk via the extension offices or the authorities.
- The manual will be delivered in draft pdf for guidance and as an “InDesign” software file bundle as to be easily translated, adapted and printed by the different APEC economies
- The economies can add Chapters, but hopefully, maintain the present minimal content.
- As the “target” audience may have little formal education, the way to engage them is via “cartoon” type illustrations and an informal language to present the key messages in the text.
- The “cartoon” part is to be based on a fishers’ “family” setting and with examples of good and bad practices.
- Illustrations would be in black and white to facilitate printing, and also to be used as “colouring book” by the children in the fishers’ households.
- Fish Handling message would be presented under four simple pillars:
 - Keep it clean
 - Keep it cold
 - Treat it gently
 - Move it fast

How to use this manual

The manual is intended for use as a training aid to help introduce and explain post-harvest fishing topics to subsistence fisherfolk and others actors in the coastal fisheries value chain. To support this aim, the manual presents as much information as possible in a visual form, for the benefit of fisherfolk whose literacy may be limited. For the same reason, the text has been kept as simple and non-technical as possible.

In compiling this manual, we have split the many interwoven aspects of fishing and post-harvest into a series of individual topics. Each covered in “chapters” intended to convey the information and practices relevant to that particular subject. We have tried to be comprehensive in the coverage of each topic.

Since there is a vast variety of fishing cultures and practices among the APEC membership, we tried to present a range of options or opinions on related subjects.

The manual has a structure of separate but consecutive chapters, as to allow for training delivery in an integral programme or by chapters.

Each chapter has guiding text to be used as “aide memoire” by trainers and illustrations for each concept, as to convey the message without relying only on written words.

Chapter 1 deals with the basics of good fish handling and provides a reference for all other chapters.

Chapter 2 deals with good fish handling at the time of capture and harvesting.

Chapter 3 deals with good fish handling at landing.

Chapter 4 deals with good fish handling during transportation.

Chapter 5 deals with good fish handling at point of sale and the prior importance of these practices.

Chapter 6 deals with the very basics of traceability at all stages.

Chapter 7 deals with the very basic relationship between ecosystems and fishing.

The pages of each chapter present the contents in a “graphic narrative” with the key concepts of the chapter supported by minimal text and examples of common good and bad practices.

The illustrations are based on a fisherfolk family along with different “characters’ representing fish, bacteria and enzymes. The fisher guides the explanations to his family and colleagues through the manual.

The illustrations are in black and white to facilitate printing, but also to be used as “colouring book” and encourage the children in the fishing families to keep the manual in their households.

Disclaimer

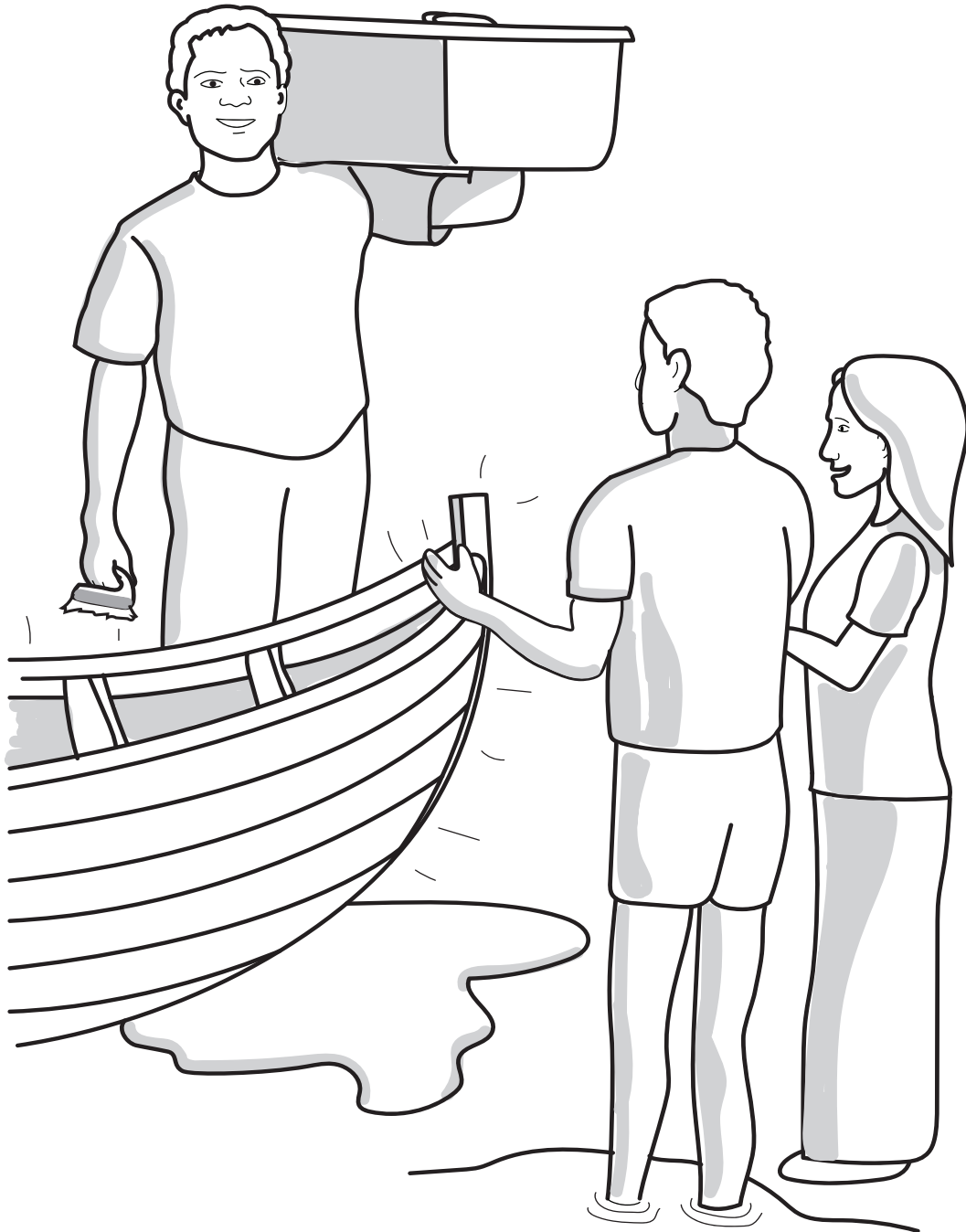
Reference to persons in any particular gender is understood to include persons of the opposite gender unless otherwise stated, or made explicit by the context.

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The 4 Rules of Good Fish Handling

Chapter 1



As the fisherman pulled in his catch, his children ran up to him.
“Dad, Dad, can you tell us about the most important things about catching fish?”

Sure, he said and sat down with them and his wife after he'd taken care of his catch and cleaned himself.

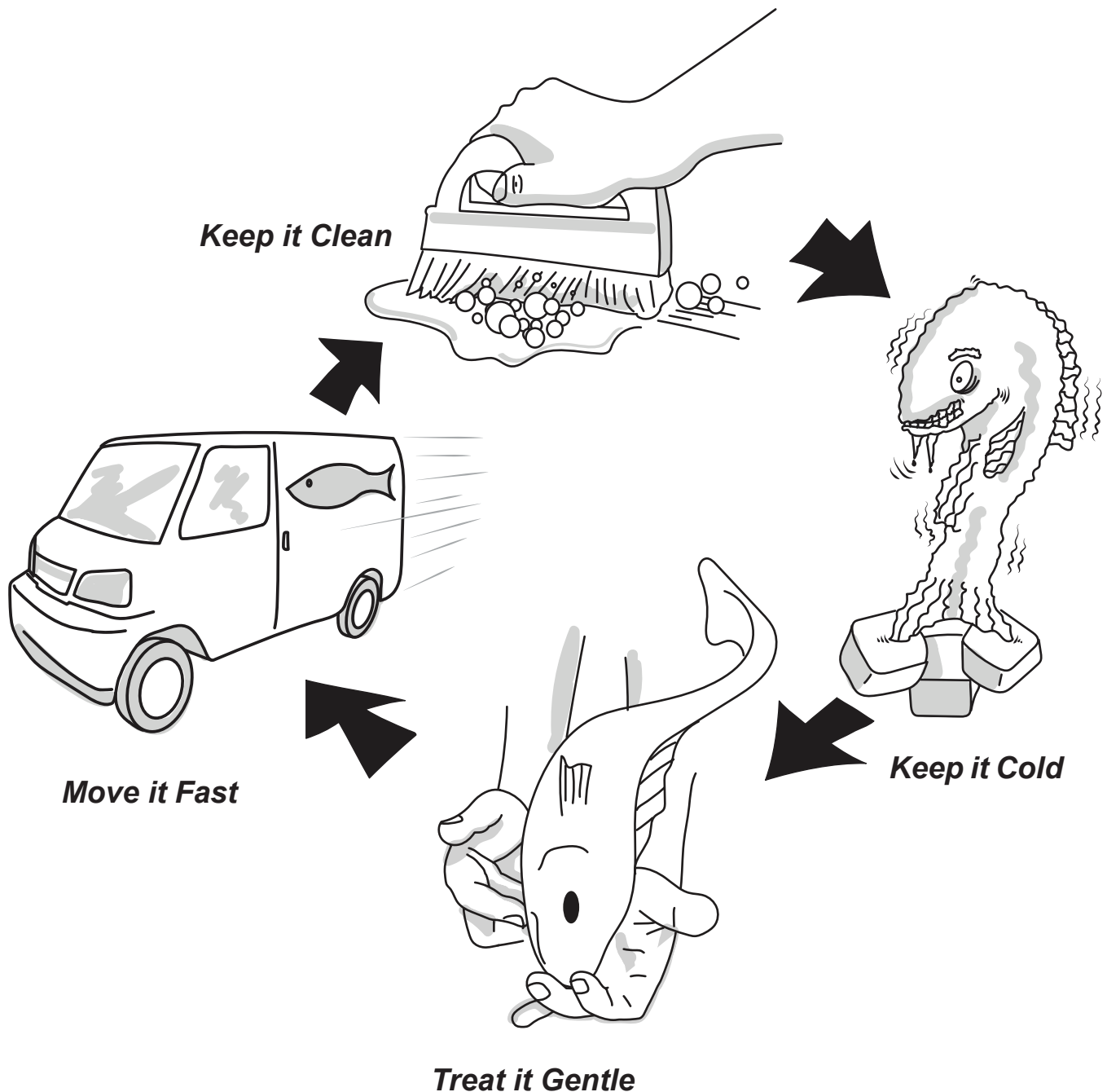
He had a book with lots of pictures to show them.



There are 4 important rules about fish handling.

I'll tell you about them, and how these apply to catching, landing, transporting and selling fish.

The 4 Rules of Fish Handling

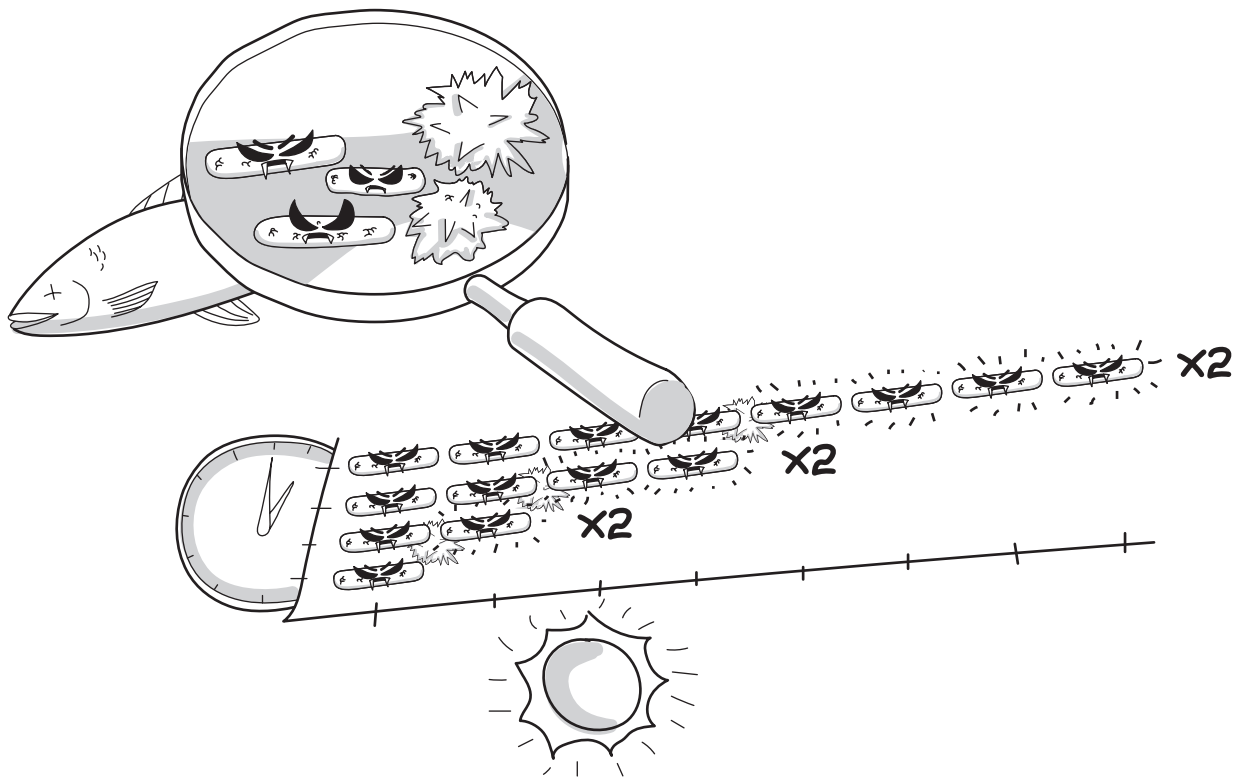


As soon as the fish dies, it begins to break down and rot

What makes it rot is **Bacteria**, which starts to multiply in minutes. When bacteria multiply they eat the flesh of the fish and spread in search of more food

And there are the **Enzymes**, which also make the fish rot. They normally break down the food in the fish's stomach, but they start breaking down the fish, after its death

The best way to slow down Bacteria and Enzymes, is by making them feel cold

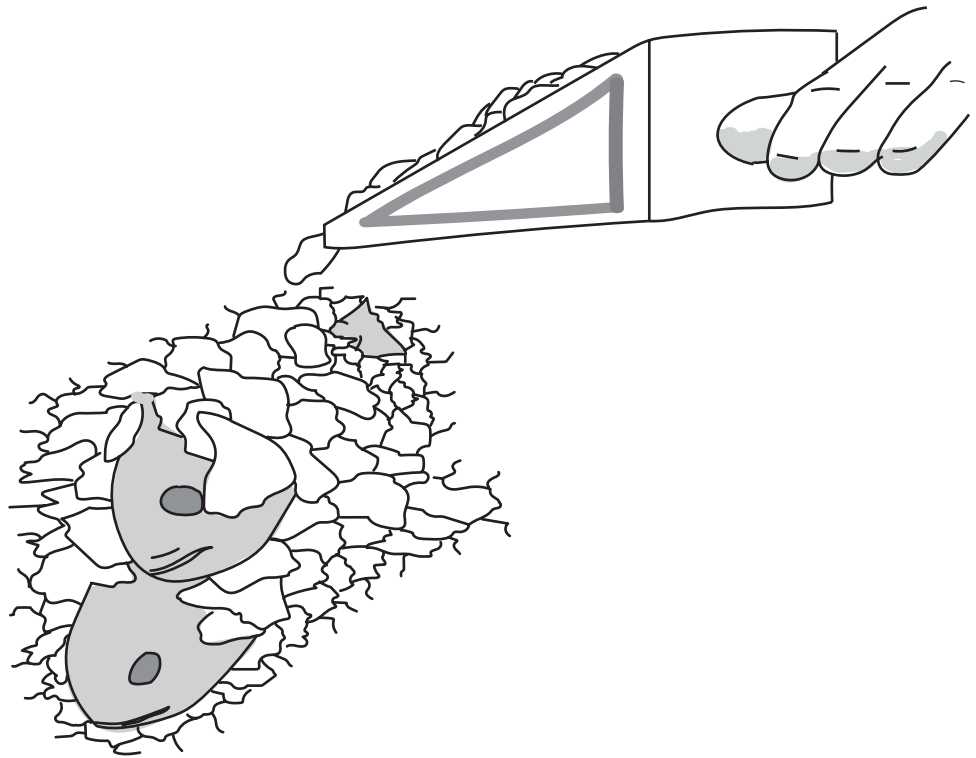


As soon as you catch the fish, the initial rule is to **KEEP IT COLD** as quick as possible otherwise it will start to break-down very fast

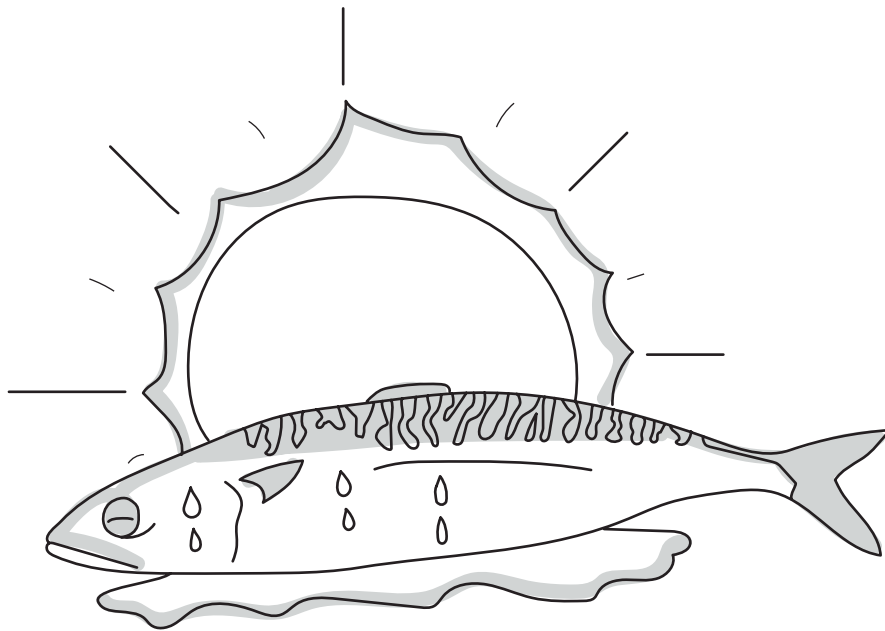


Ice well the fish or store it in a cold place to reduce the bacteria's multiplication and the enzyme's activity

The colder the fish, the longer it will stay fresh and the fresher it will taste



Can you recover the good quality of the fish once it is warm, by putting it in ice?



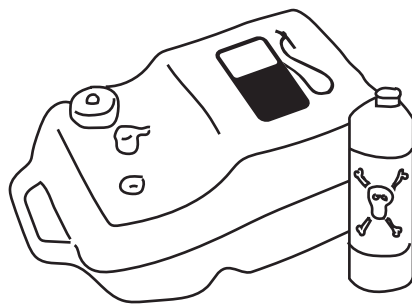
“Unfortunately not, once they are spoiled, nothing makes them better again”

The next rule is to keep **EVERYTHING CLEAN**

Everything the fish touches, including people, must be kept very clean.
Your boat, fishing gear, equipment and even the fishers

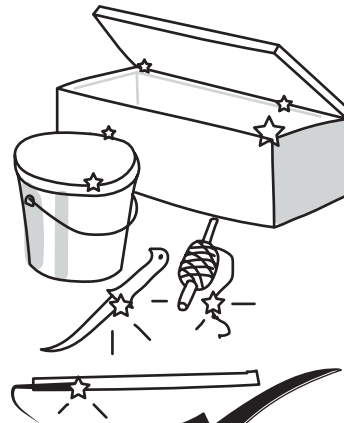
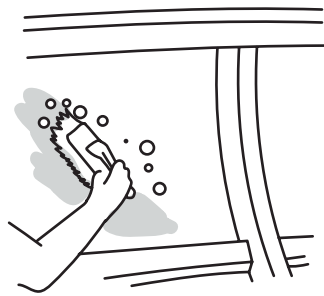


The cleaner the boat, the fish baskets and bins, the ice and the fishers, the longer the fish will stay fresh and the fresher it will taste

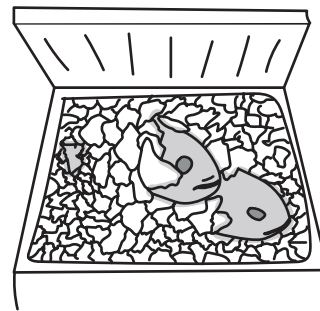


Make sure that the fuel and oil don't mess up the boat and ruin the fish

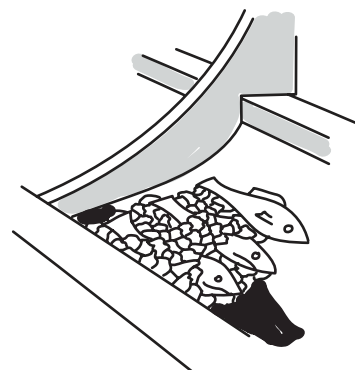
The most important rule of cleaning: We cannot clean with dirty stuff!



Use clean water for washing and keep everything clean.
Use brush, detergent and disinfectant if it possible

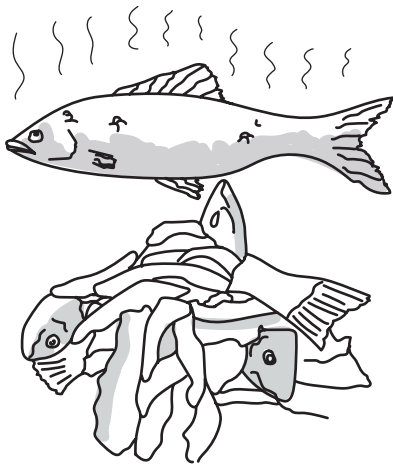


Use clean ice, in clean fish containers, and keep it iced

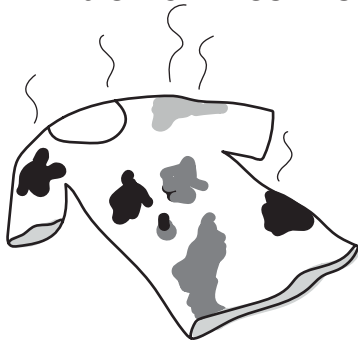


Don't wash the fish in dirty seawater, and dont keep it in dirty places

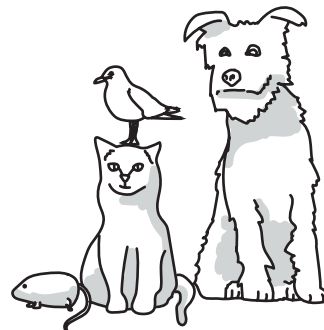
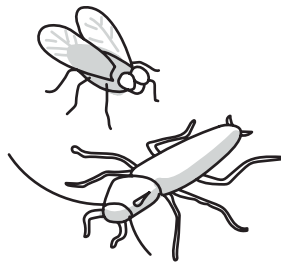
We need to make sure that



All the fish guts, bait and rotting fish must be kept as far away as possible from fresh fish, to avoid cross-contamination

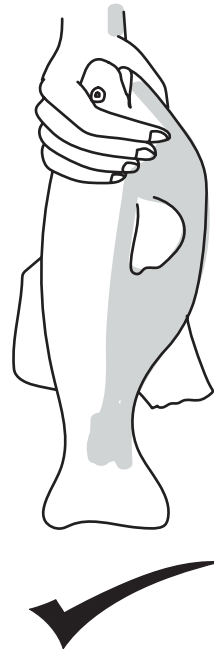
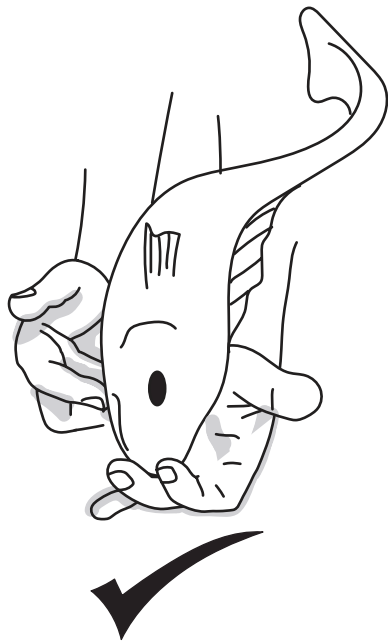


And you must be clean, and on good health to work with fish, otherwise you'll infect the fish and make people sick

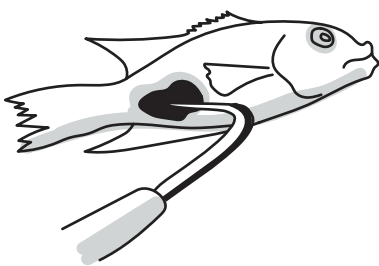


Insects, pests, domestic animals and birds can also infect you or the fish, and make people sick. So we have to keep them away from fresh fish

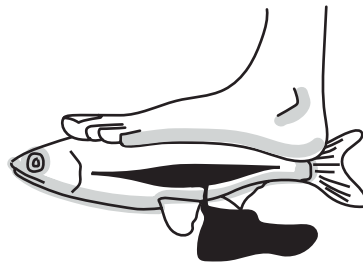
The next rule we must remember is to **BE GENTLE** with the fish



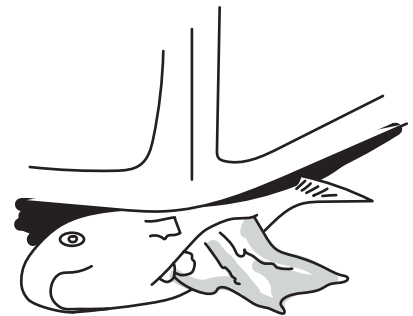
The fish will spoil faster if you bruise it, split the skin, or burst the guts
Holding fish from the head is a good way to avoid damage



Don't gaff the fish on the body



Don't stand on the fish

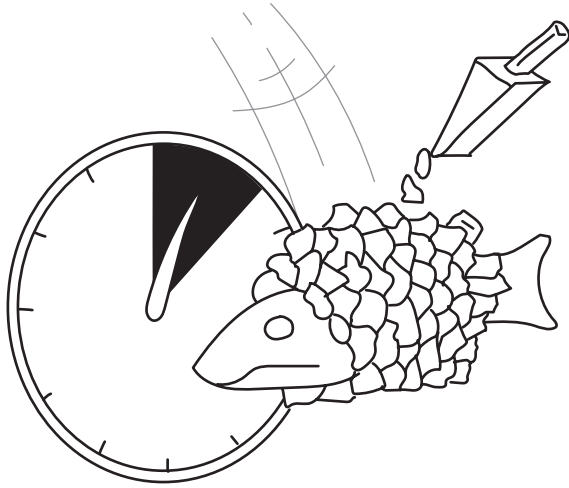


Don't squash the fish under heavy objects

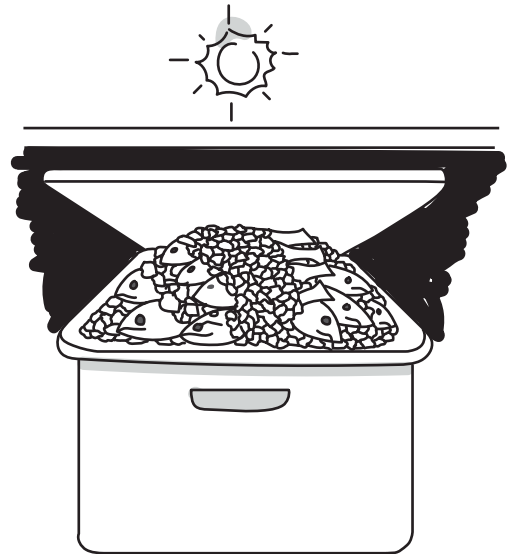
If you're a good fisher, you should treat your fish with respect and care from catching to selling

The fourth rule to remember is to **BE QUICK**

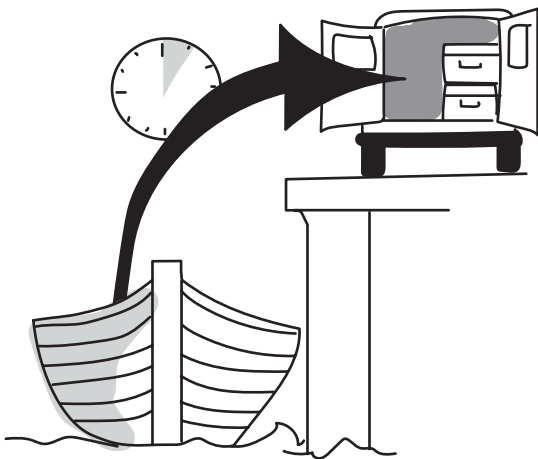
To avoid bacteria and enzymes damaging the fish, ice it and transport it quickly



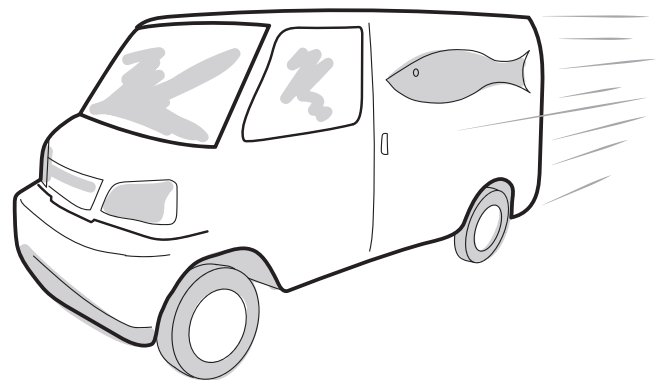
If you're low on ice, you need to transport it quickly



If you can't be quick you'll need lots of ice



Make sure that you don't leave the fish untended for longer than strictly necessary

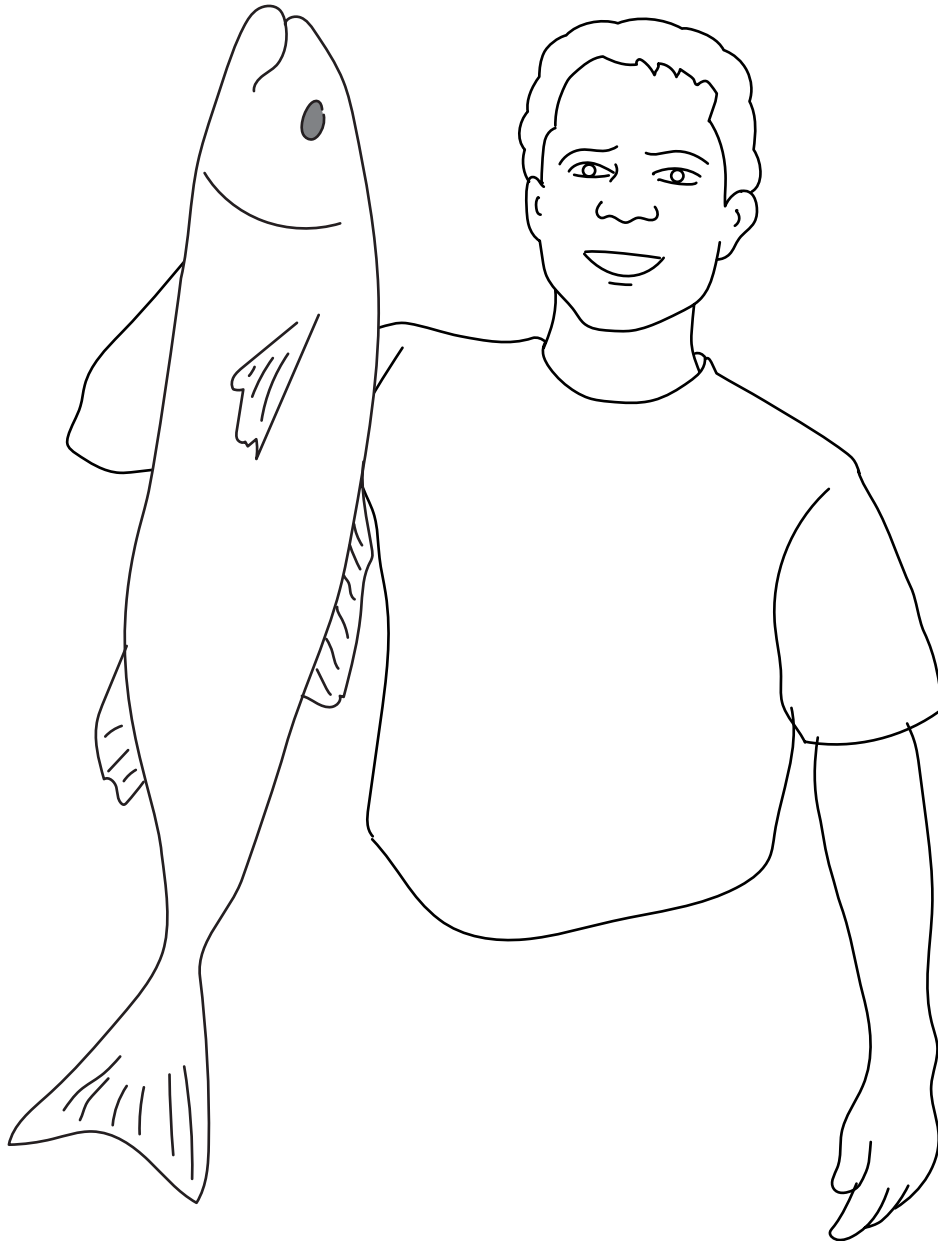


Make sure that the transporter does not ruin the fish by not icing it or leaving it for a long time in the truck

Catching the Fish

Chapter 2

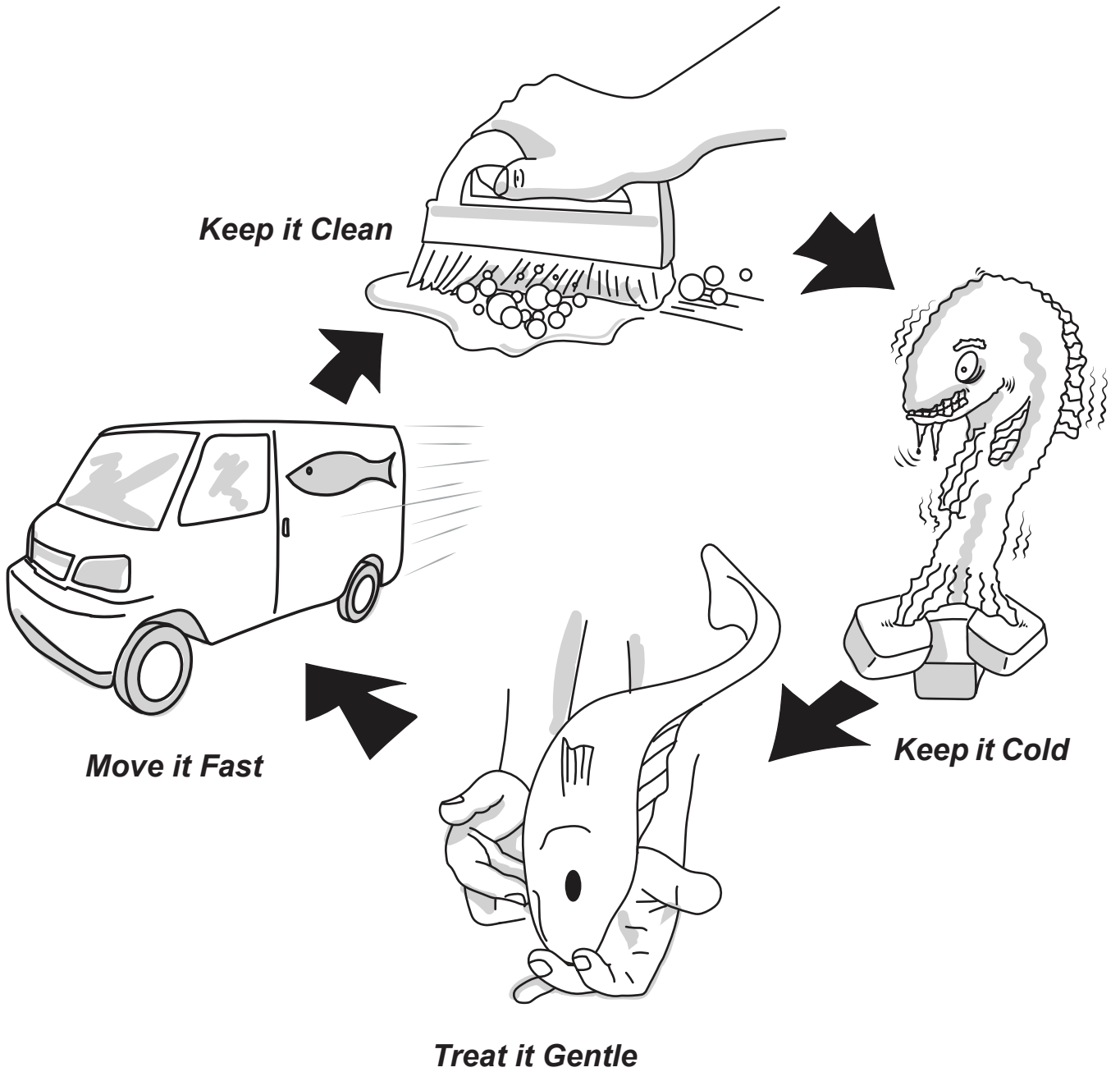
“It doesn’t matter how you catch fish, the 4 Rules of Fish Handling always apply”



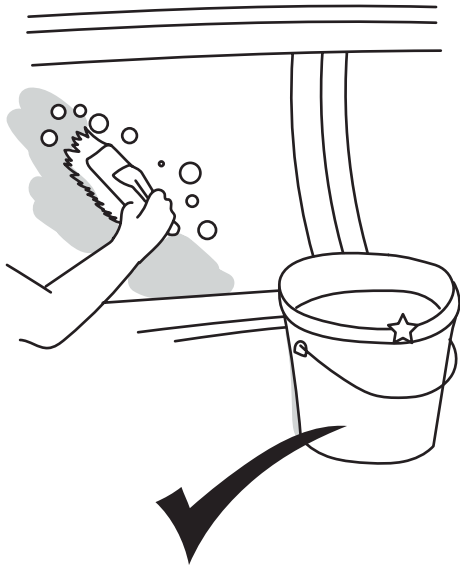
It could be fishing from a boat, spearfishing or from the shore.

Lets see how they work in different situations

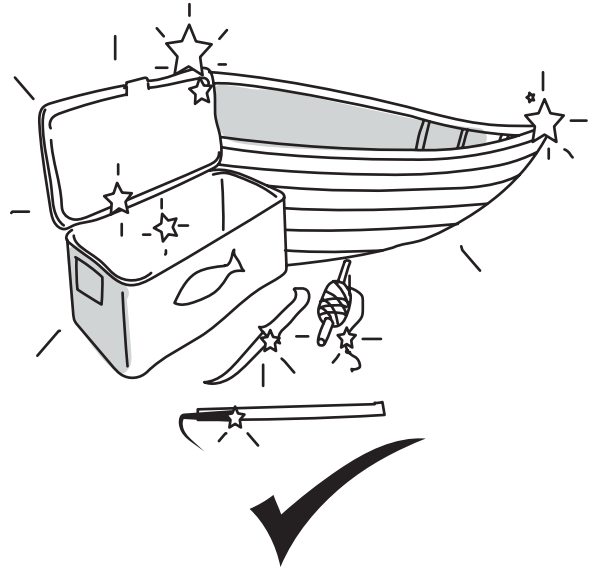
Can you remember the rules?



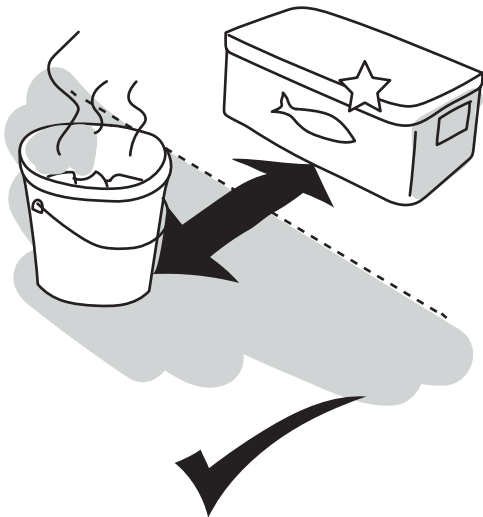
“How to keep your boat CLEAN”



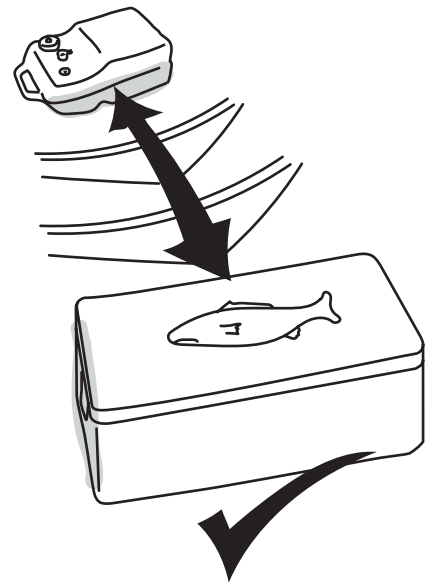
Keep the boat clean with clean water, a scrubbing brush and detergent and disinfectant



Clean equipment means less bacteria and enzymes, and that means better fish



“Separate bait or old fish from new fish”
The bacteria in the old fish or bait, will spoil the new fish if they’re together in the same place

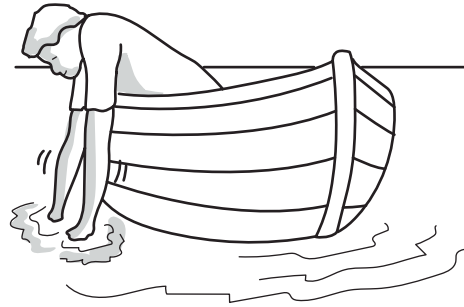


Keep fuel away from your fish to avoid spoiling your catch. Buyers will pay less money for fish smelling like fuel

Take good care of your equipment



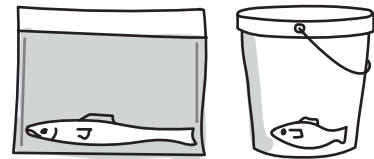
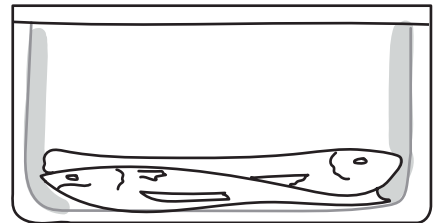
Keep a cleaning set, use it with clean seawater, scrubbing brush and detergent and disinfectant



If you run out of detergent, at least clean your gear with clean seawater, and a clean scrubbing brush

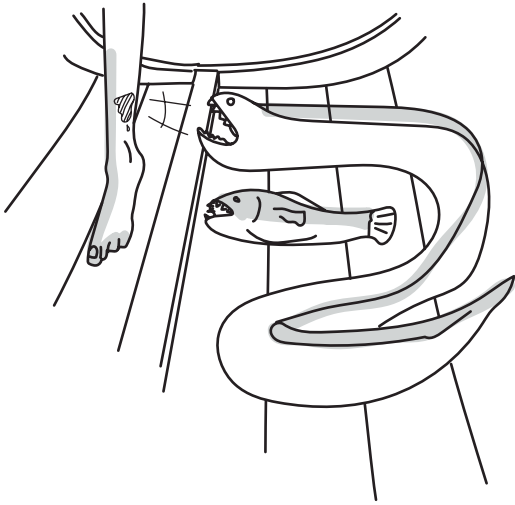


When gear is well cleaned, drying it under sunlight is a good way to kill any remaining bacteria



Make sure your containers are well maintained and adequate for the fish you catch

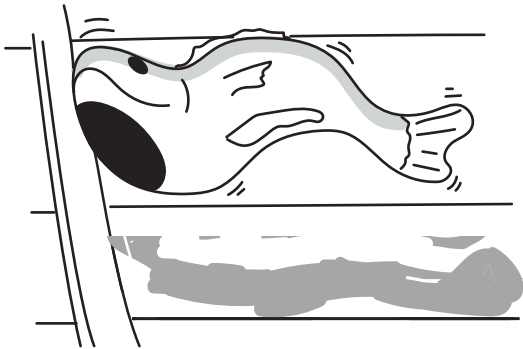
Fish kept in the bottom of the boat can cause a number of problems



Spikes and teeth of thrashing fish can cause you injury.



Slime and blood from fish makes the boat slippery and dangerous



Thrashing fish hit themselves against frames or hard items, cutting, bruising and lowering the quality of the fish

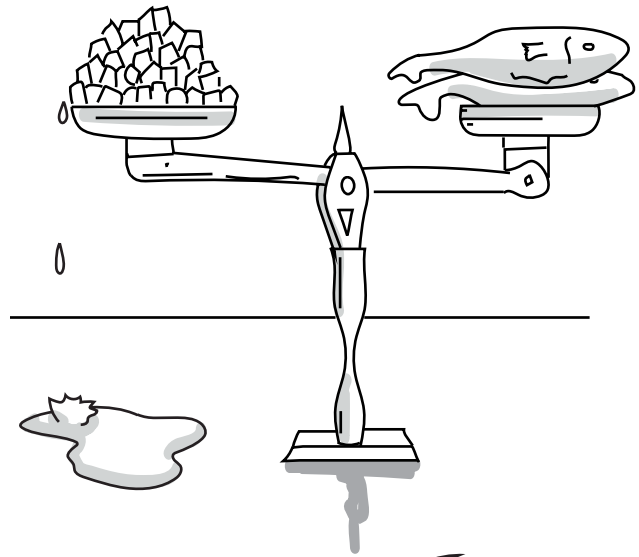


Any dirty or contaminated things your handle risk falling on good fresh fish and ruining it

How to keep your fish COOL onboard

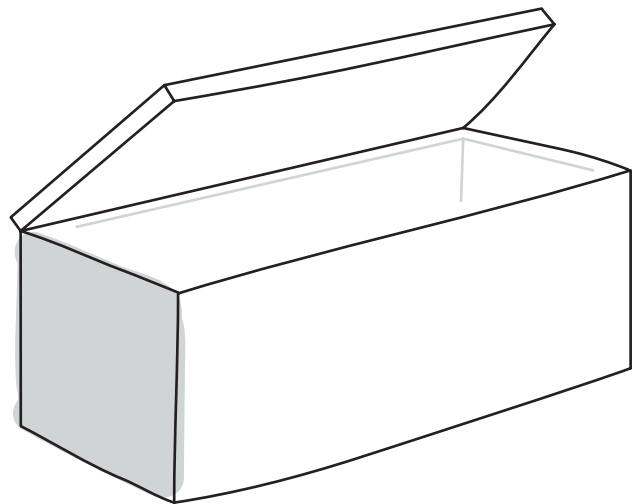
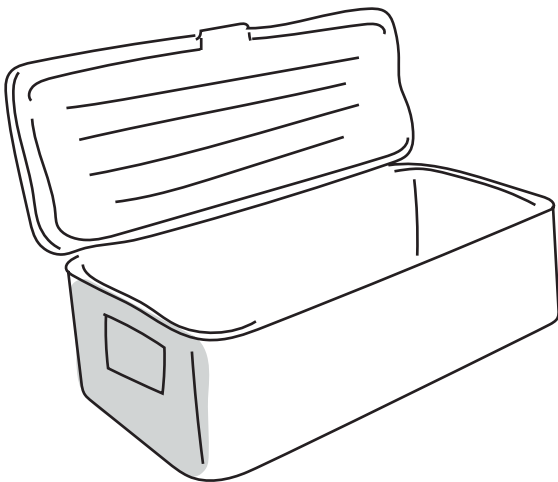


The fish needs to “feel” cold when you touch it



Try to have as much ice as fish, you are trying to catch

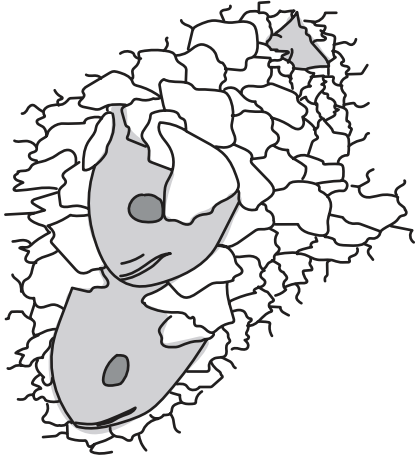
The best way to carry ice is in an insulated container



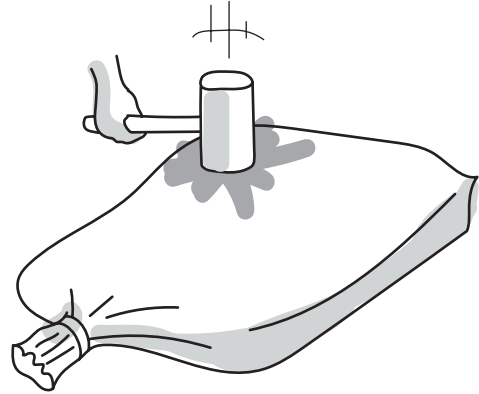
Plastic Chiller Bins work well in all types of boats, in big boats you can use old fridges or chest freezers, but they are more dangerous to handle, harder to clean and rust away very quickly

The cooler you keep your fish the longer it will last

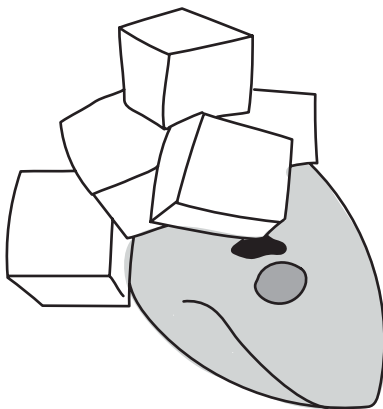
But not all icing works the same



Flake or small ice is best.
The small pieces surround the fish
closer, so it's better cooled



You can smash the big pieces of ice
into smaller ones, inside a bag to
avoid losing ice and making it dirty

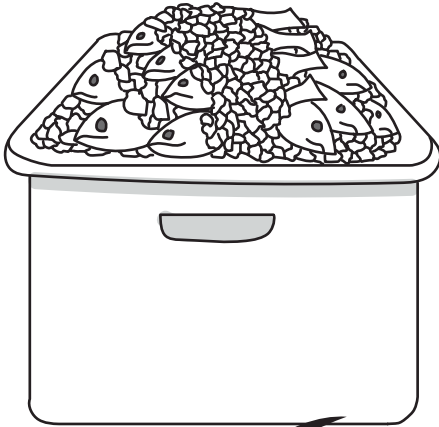


Big blocks of ice don't cool as well
as small ones and damage the fish

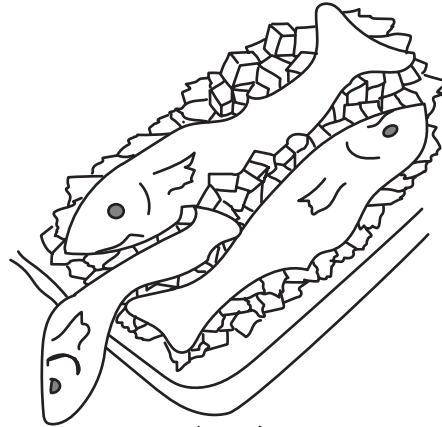


Reusing old dirty ice is not a good
idea as it contaminates the "new" fish

Good Icing practices



Layer the fish and the ice, so there is always ice on top and below the fish

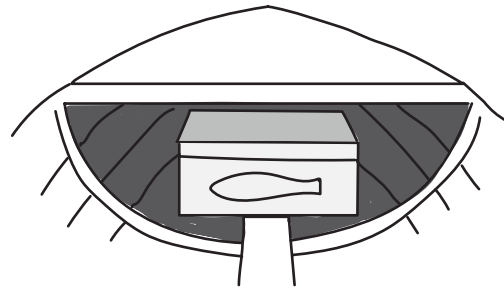


If the top layer has melted or the ice shifted, repack the fish

What can be done if you have no access to ice?



Get the guts and gills out and rinse it well in clean seawater

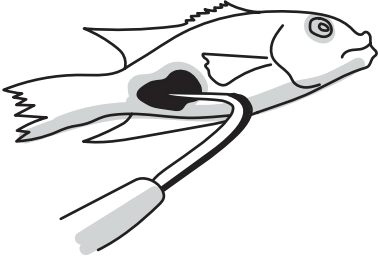


Store the fish in shaded area of the boat away from the sun



If the fish are too big, put a clean thick wet cloth over them and keep it wet

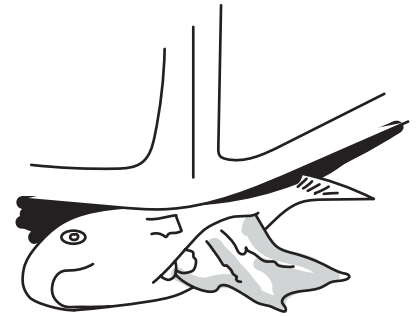
Be GENTLE with the fish in the boat



Don't gaff the fish on the body.



Don't stand on the fish.

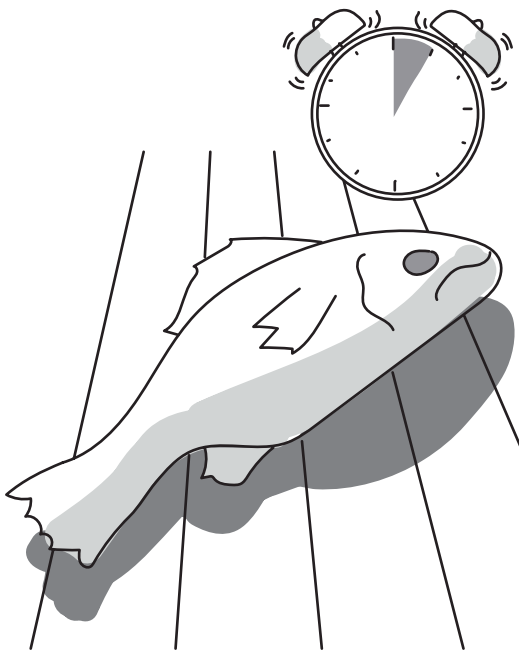


Don't squash the fish under heavy objects

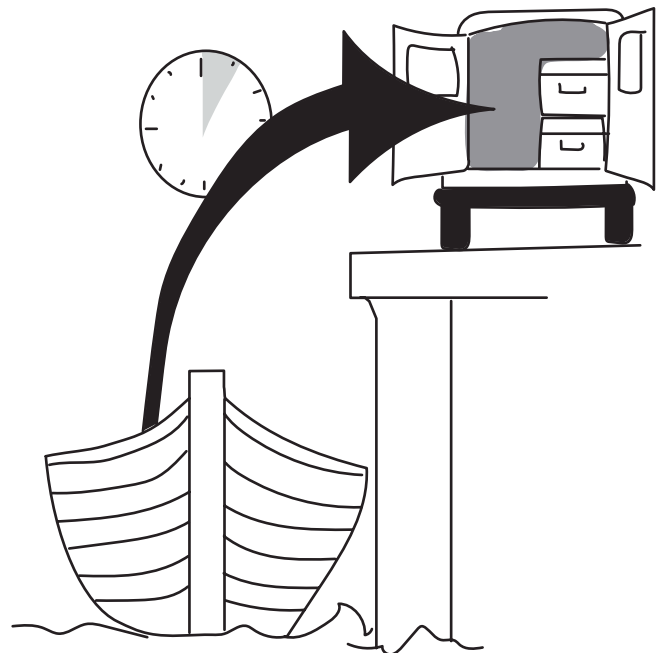
Be QUICK moving the fish out of the boat

The less time bacteria and enzymes have, the better the catch will be.

If you cannot be cold with fish, then definitely be quick!



Don't leave the fish unattended on the deck of the boat for too long.

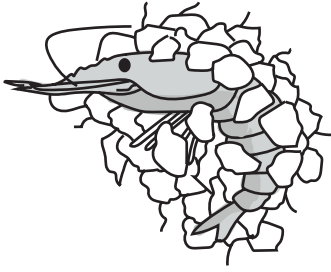


Unload the fish as quick as possible after fishing.

Many fishers catch other species, but do it from the shore.
The 4 rules apply to them too and what they're catching.

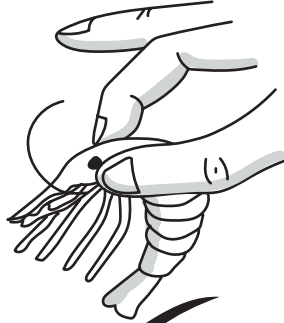
Prawns and Shrimp

Can spoil quickly and loose their fluids, which reduces their value and flavour



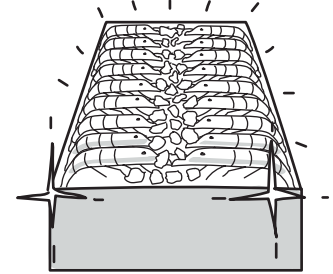
Be Quick and Keep Cool

Cool them down quickly with ice because prawns spoil quickly



Be Gentle

Because they damage easily and loose value.
Broken ones spoil faster

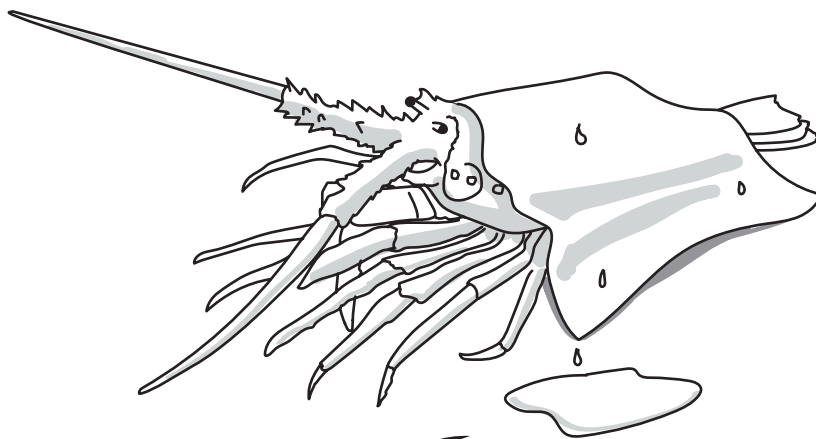


Be Clean

The cleaner the ice and the containers the longer and fresher they will last

Lobsters

Lobsters have more value when alive, putting them in ice will kill them, but it is important to keep them cool and hydrated



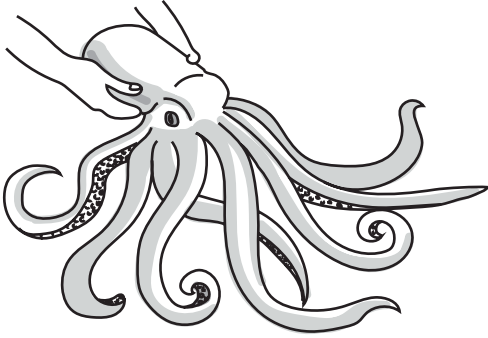
Keep them Cool

By wrapping them into a tight damp cloth

Many fishers catch other species, but do it from the shore.
The 4 rules apply to them too and what they're catching.

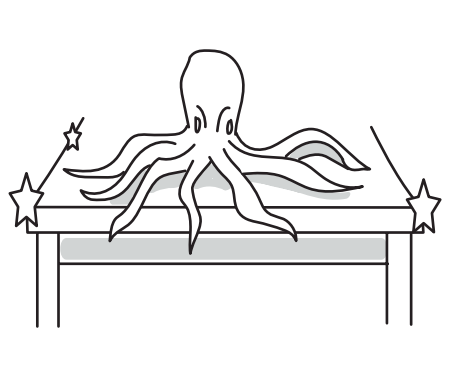
Octopus

Are very delicate because they don't have a rigid bony skeleton



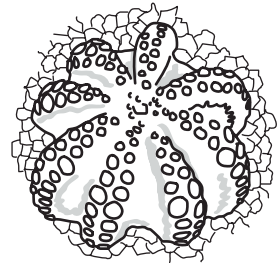
Be Gentle

Minimise physical damage,
the skin breaks easily



Be Clean

When you gut it, clean it
and cut it



Keep Cold

Once dead keep it
iced as they spoil fast

Shellfish

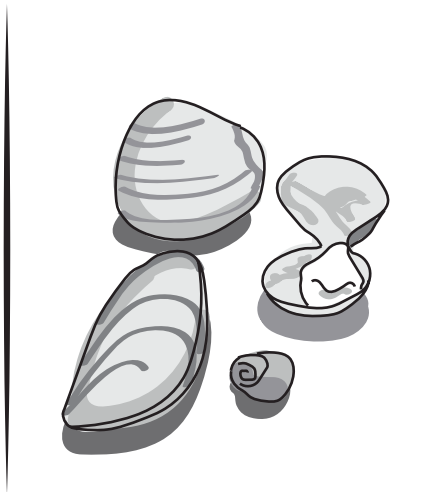
Harvest only from clean places.

If the water smells foul, it is better for you to cook them, and don't eat them raw.



Be Clean

Don't harvest after big
rains, if cattle is nearby



Be Gentle

Don't throw them around.
They should be kept alive

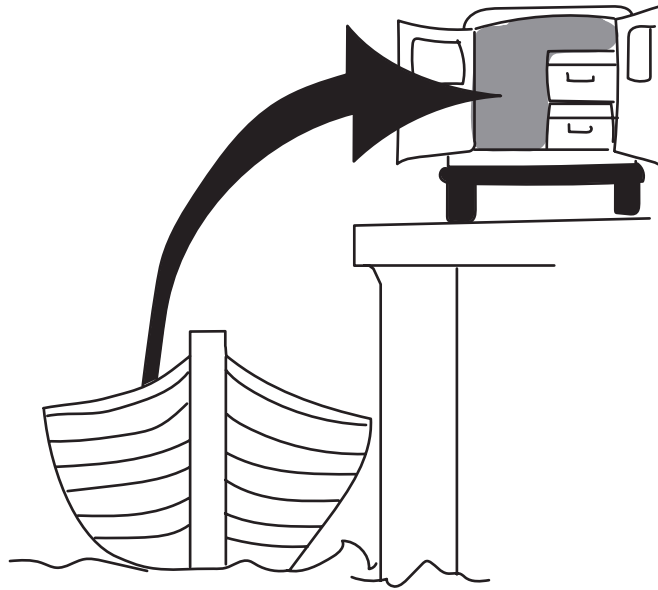


Keep Cold

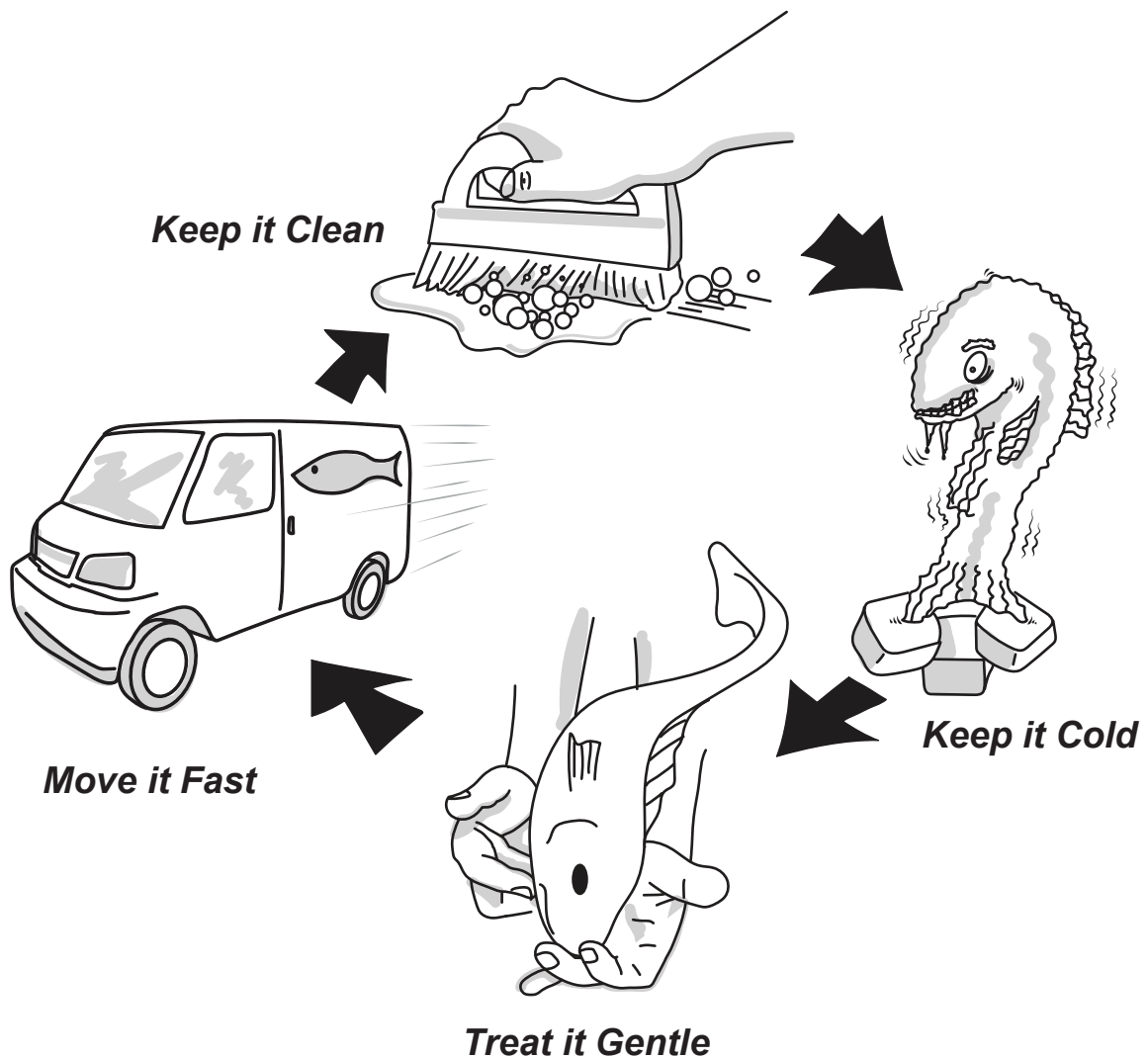
Keep them in a damp
place without sunlight

Landing the Fish

Chapter 3

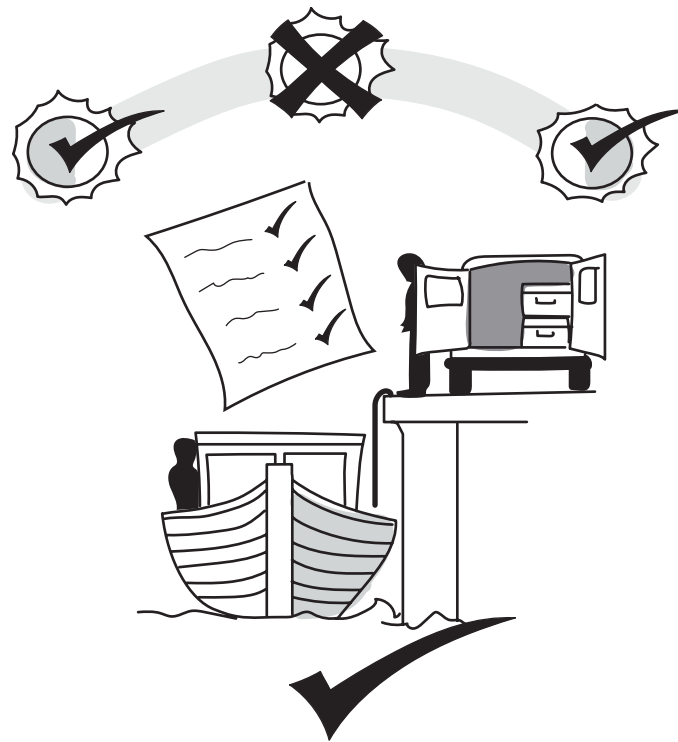


It doesn't matter where or when you unload your fish, the 4 rules are important

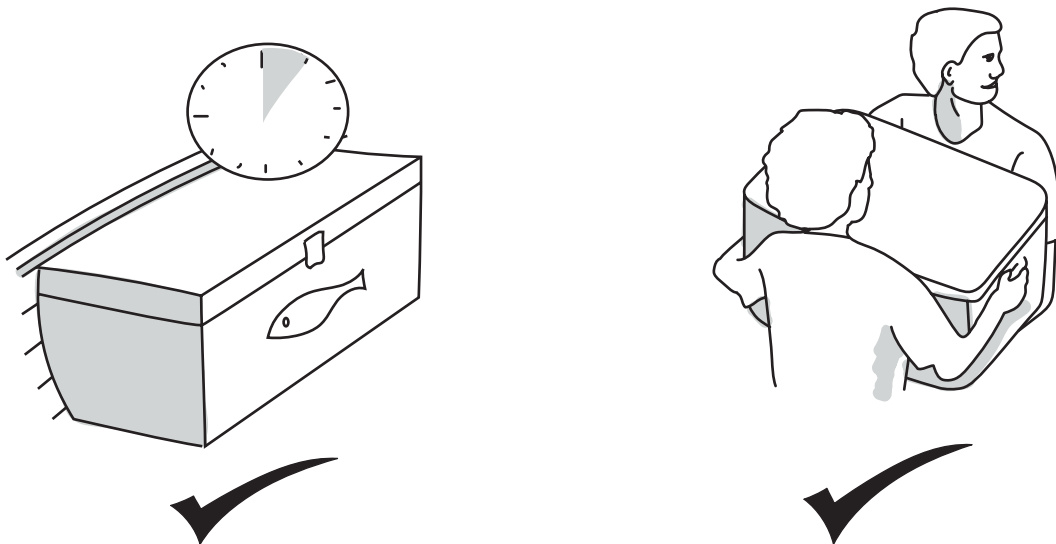


Best Practices

Landing should only commence once all the equipment and people are ready.



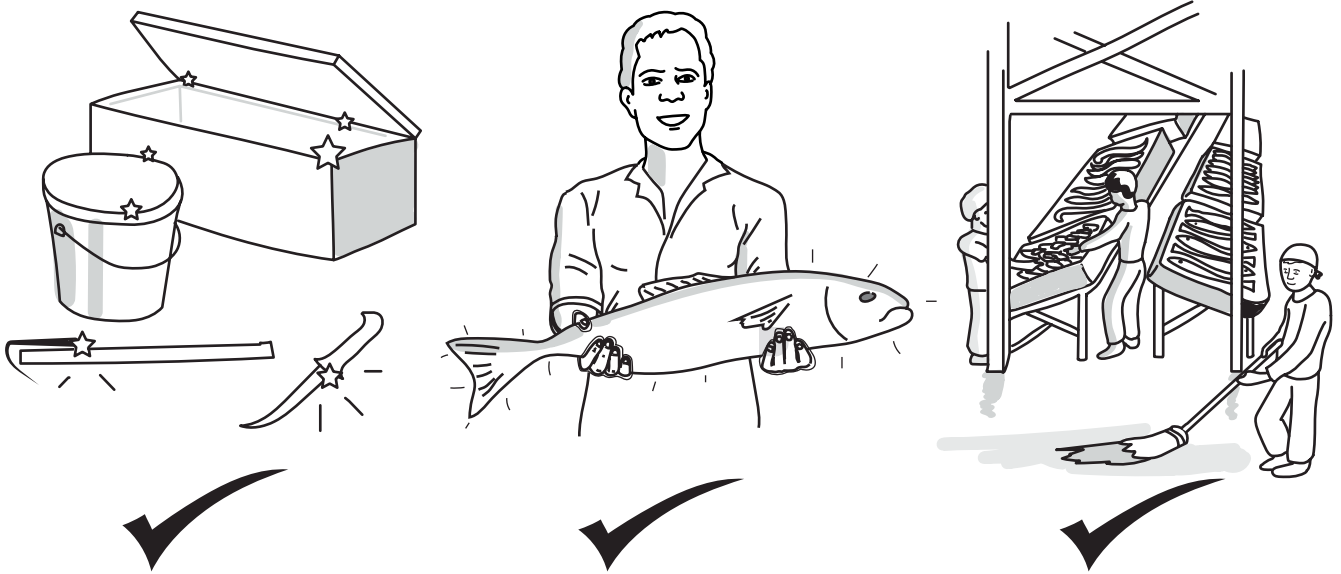
Unload the catch quickly to avoid the fish sitting out in the heat.
Avoid the hottest part of the day.



Be Quick and Keep Cool

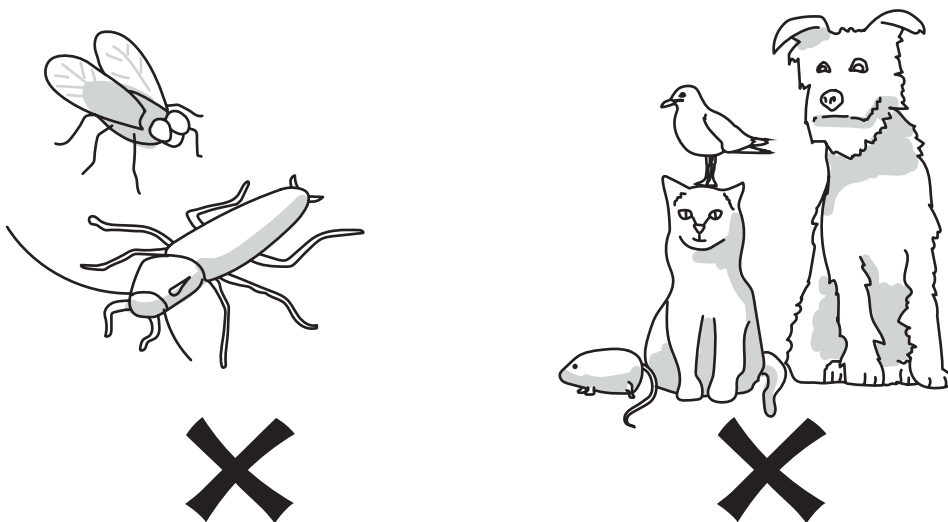
Don't leave your fish in the onboard storage any longer than necessary. If you need to leave it longer, check it regularly and add more ice if needed. Unload the fish box and then transfer the fish later into the next cool place, with ice.

Here is where you leave your hard caught fish, so make sure that the people receiving it respect the 4 rules.



Be Gentle and Keep it Clean

Good cleaning of everything, including fish boxes is vital after use. Rinse, scrub with detergent/disinfectant and rinse well with fresh water before adding fish or ice.

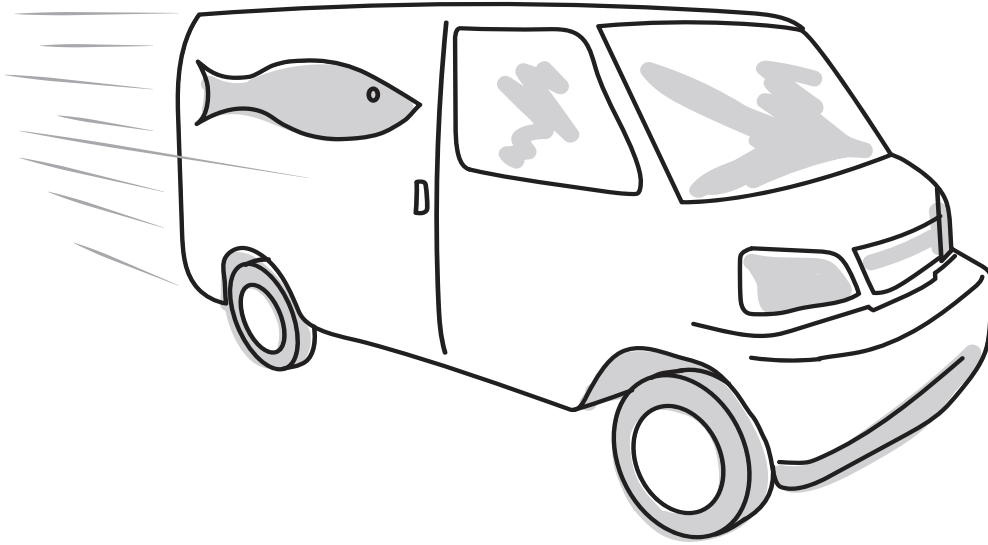


Keep it Clean

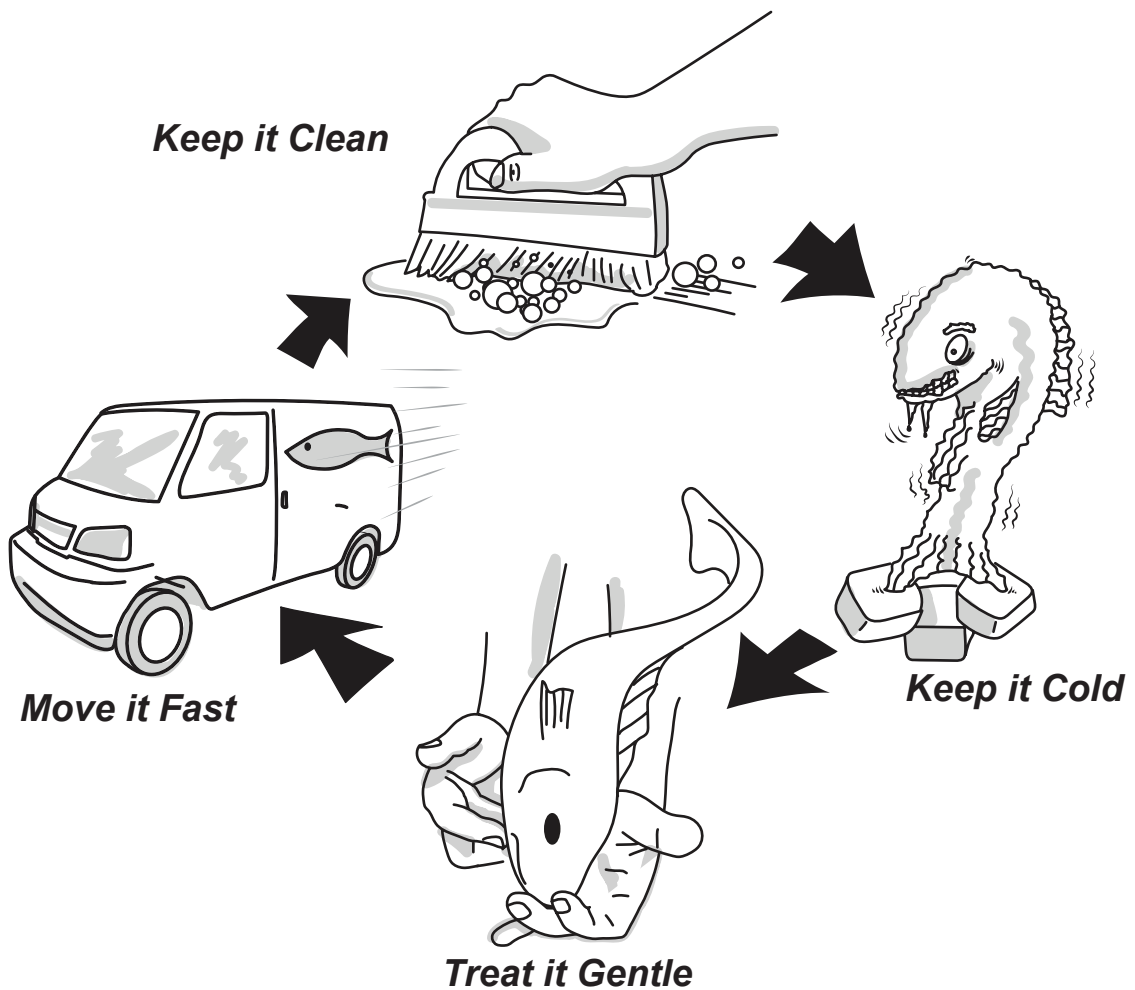
Ensure that there are no insects, pests or domestic animals in the landing site. And if they are, make sure that they don't get into the fish or come onto the boat.

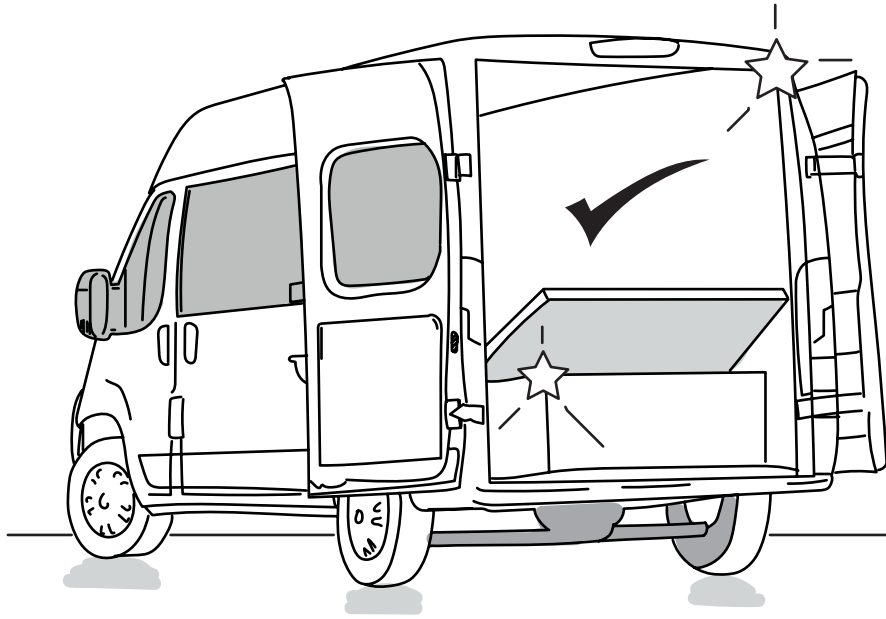
Transporting the Fish

Chapter 4



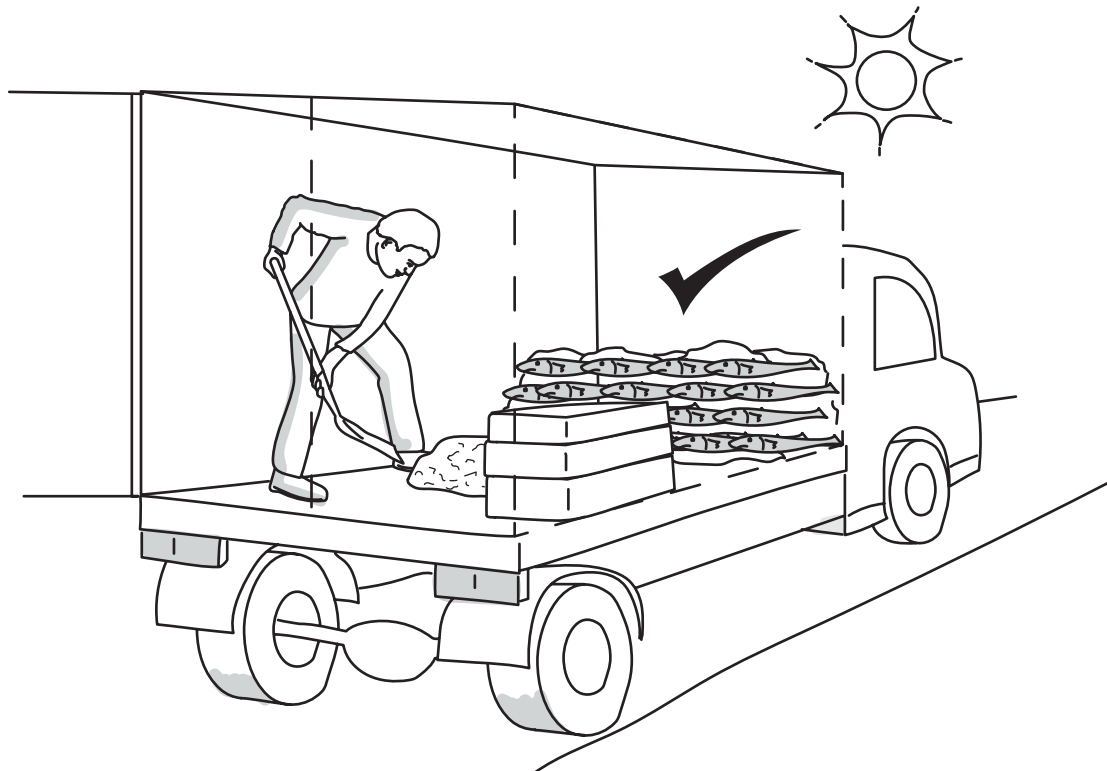
With the transport, you also need to be clean, cold, gentle and fast, just like when catching and landing fish!





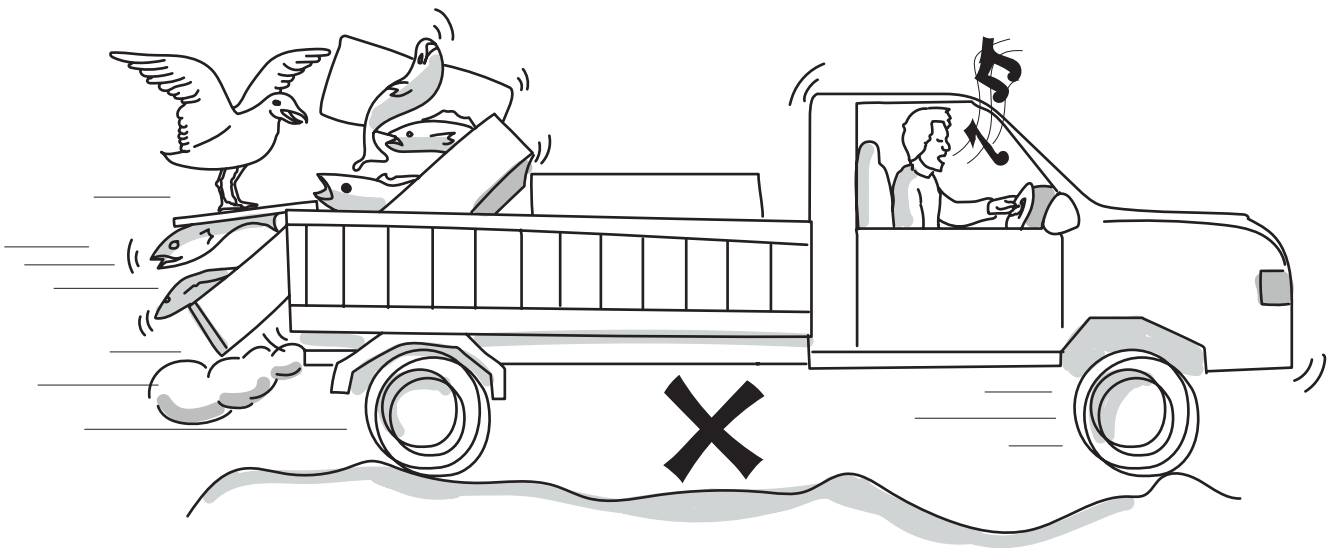
Keep it Clean

Good cleaning of everything that touches the fish is really important. Rinse, scrub with detergent//disinfectant and rinse well with fresh water before loading fish or ice.



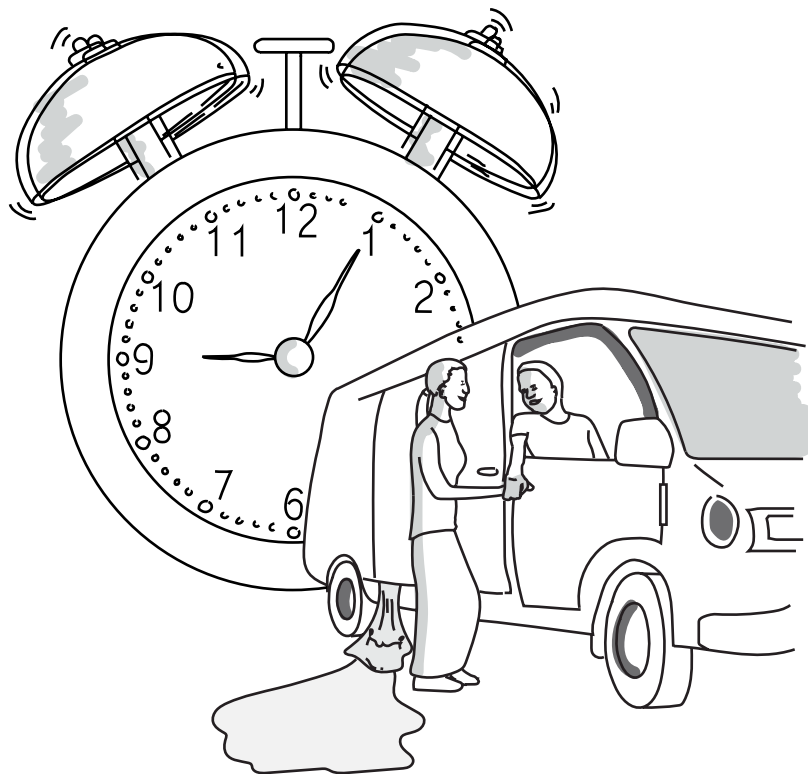
Keep it Cold

Ice the fish like if it was on the boat to avoid temperature fluctuations. This is especially important if the fish is in transported for a long time.



Treat it Gentle

If the truck is open all the fish should be covered or in boxes and the load tied down. Drive slowly if the roads are bumpy to avoid damaging the fish.

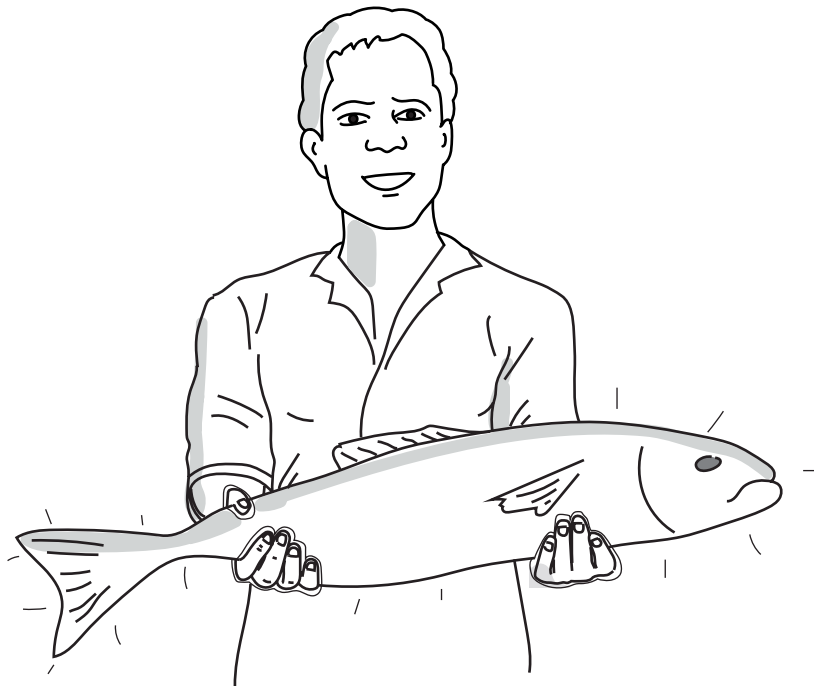


Move it fast

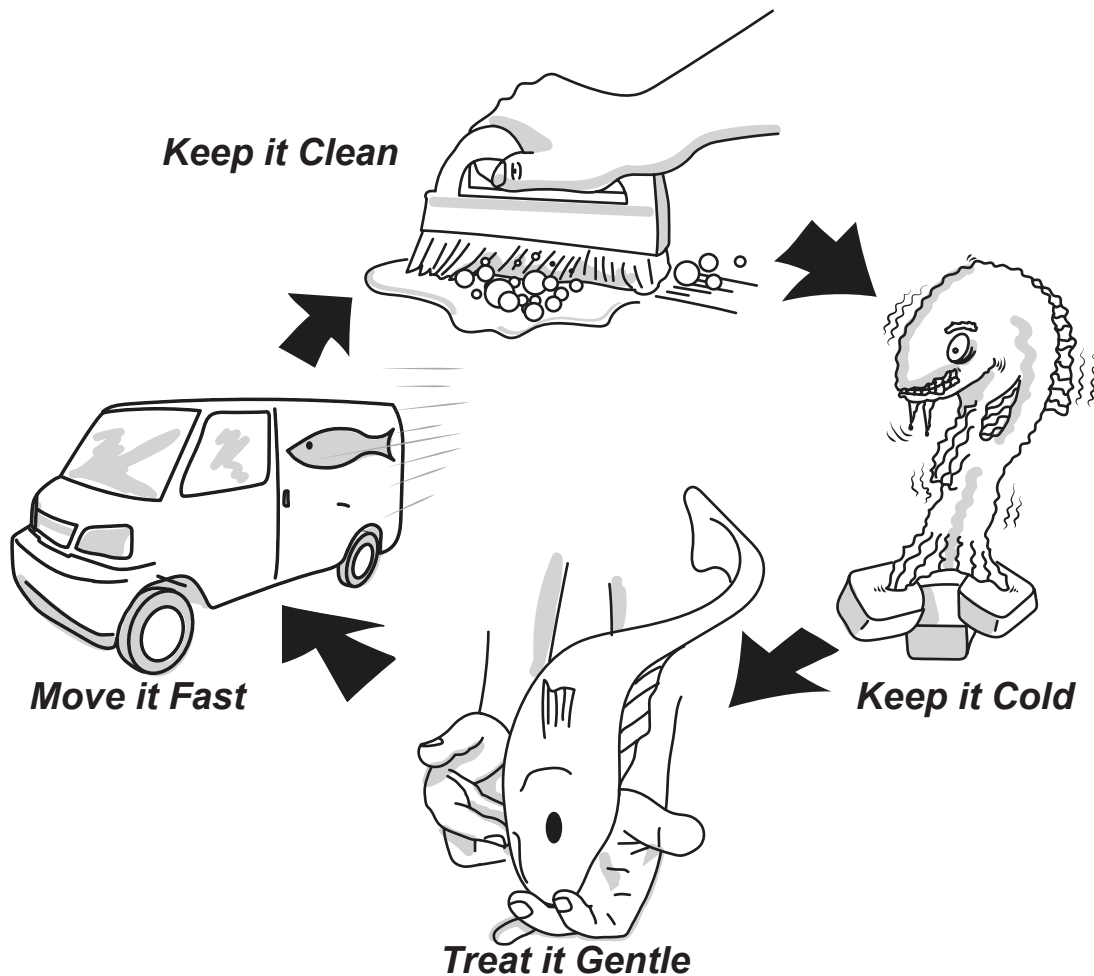
You should not be driving faster than allowed! But don't waste time either!

Selling the Fish

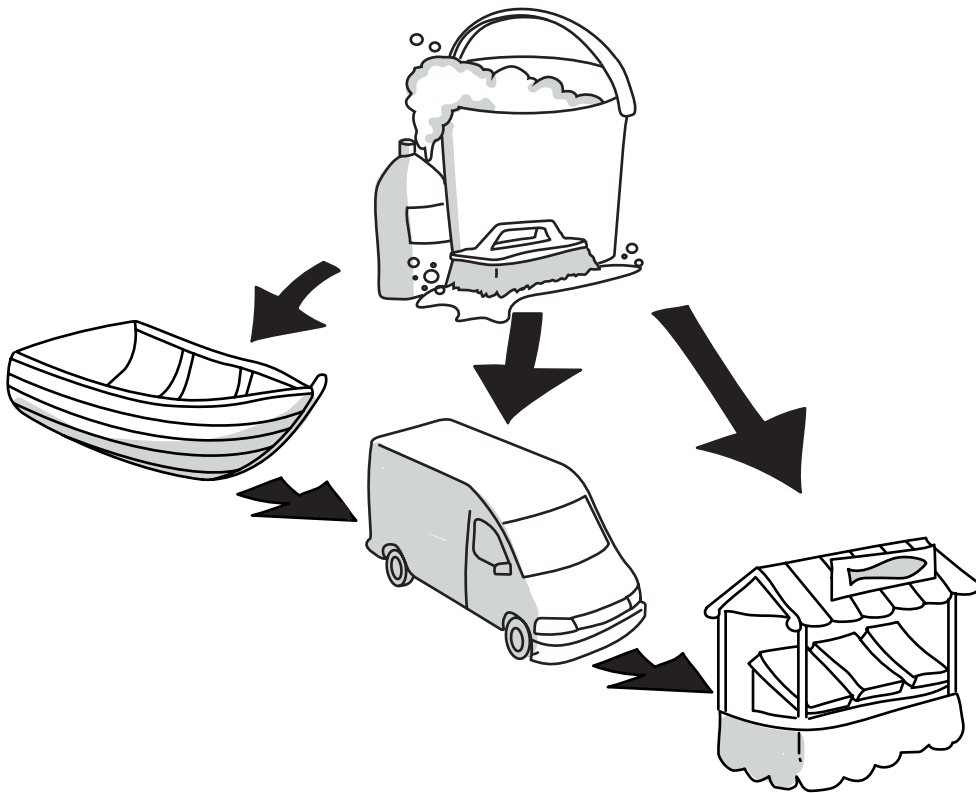
Chapter 5



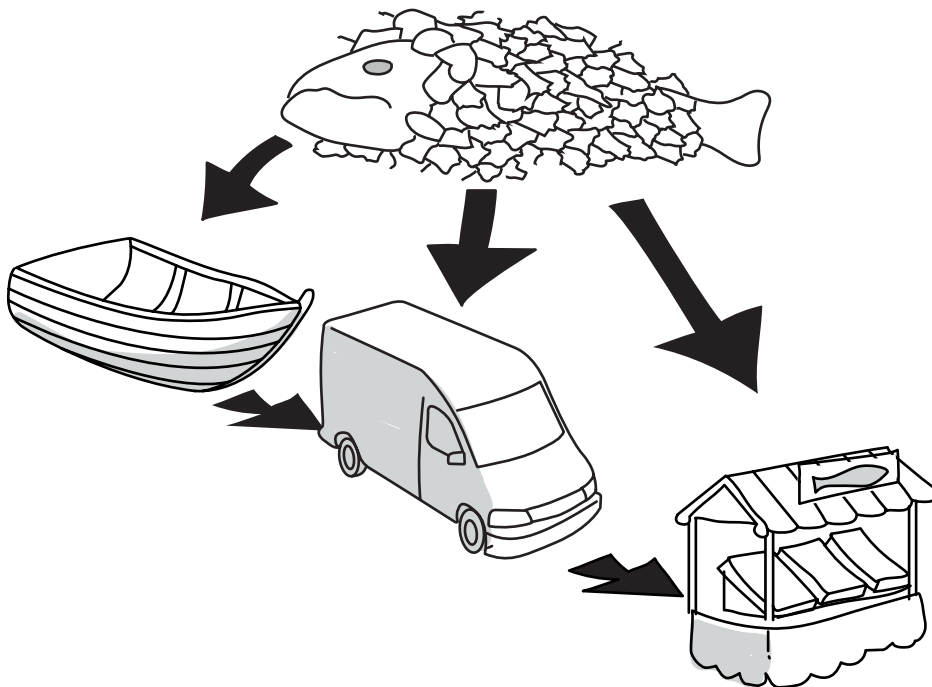
Here is where the effort that you have done so far with the 4 rules will pay back, as you have good fish to sell



Clean and Cold from the boat to the market

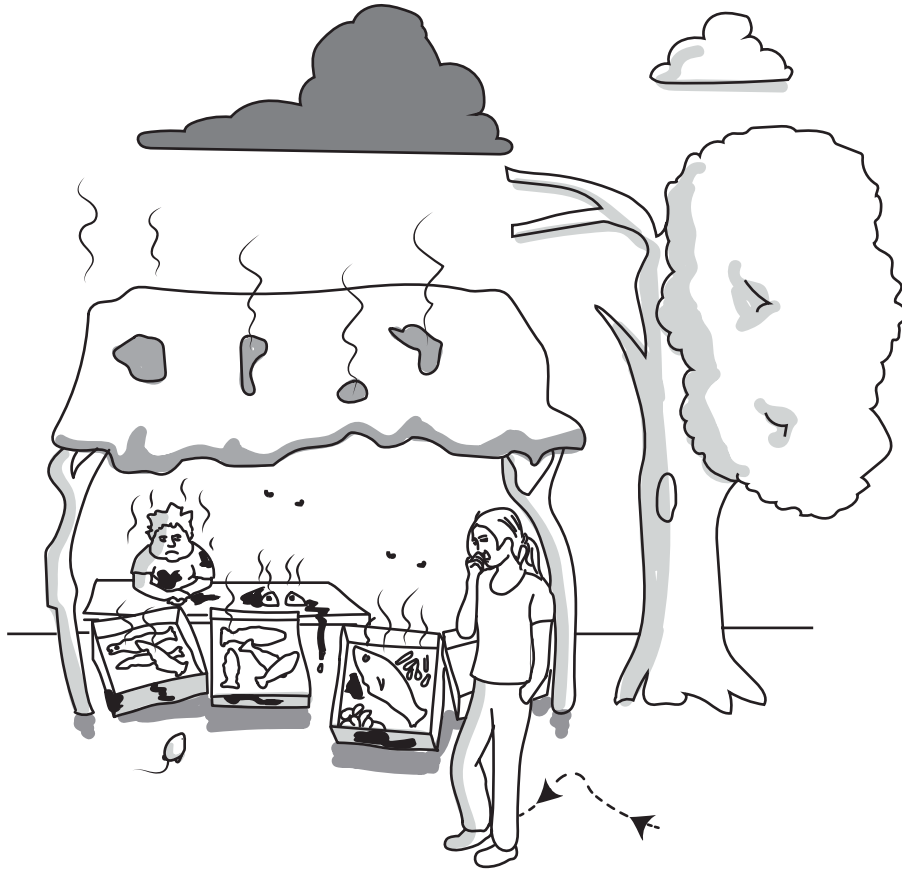


Cleanliness from catching the fish through to selling, avoids unnecessary bacterial contamination and keeps the fish smelling fresher for a better price

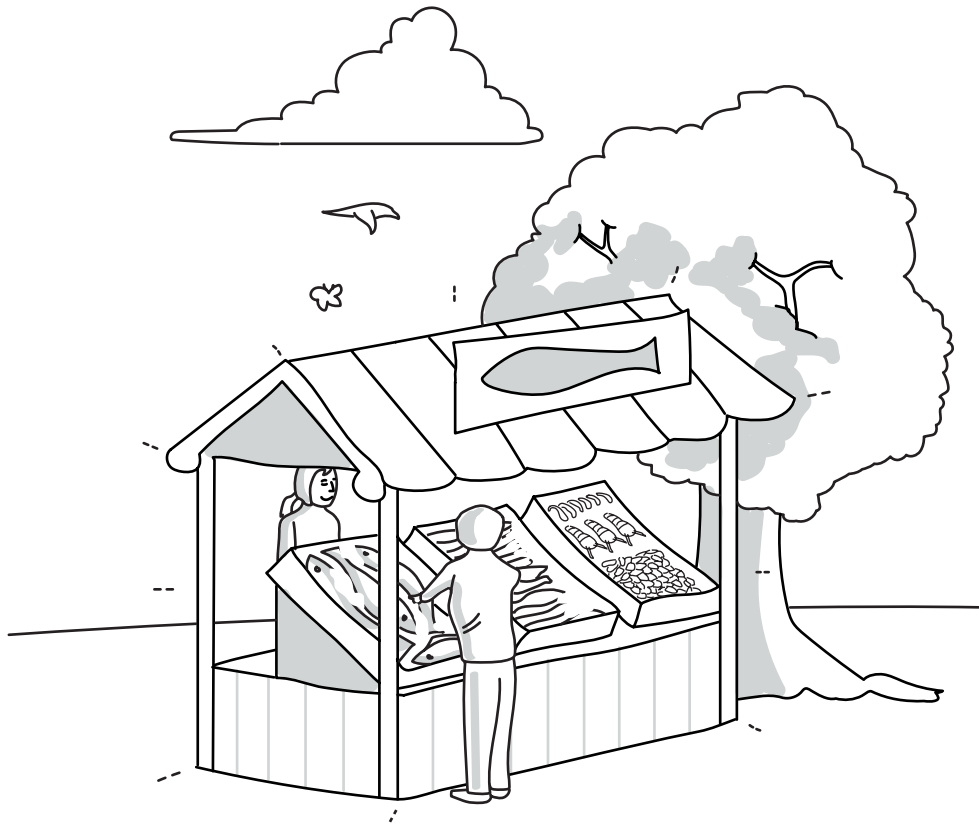


Keeping the fish cold from catching through to selling, slows the bacterial and enzymes activity, keeping the fish fresher for a better price

Clean and Cold in the market



People don't like buying warm fish from messy and smelly fish stalls



People like fresh looking fish, from nicely organised fish stalls.

Traceability of the Fish

Chapter 6

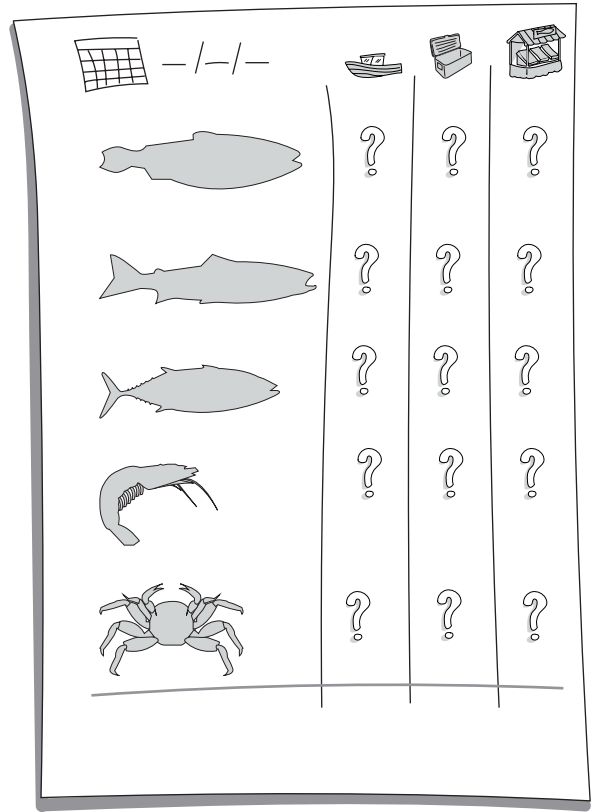
No one really likes paper work...

But is important to keep record of what and how much your caught, to whom you sold it.

Or what fish you brought, from whom, how it was stored and who and when you sold the fish to.

Records could protect you from being short paid. Giving you the ability to identify what fish people brought and who supplied you.

If someone accuses you of doing some-thing wrong, you can prove you didn't do it.

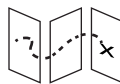


Its good to record the following information

Who caught that fish?



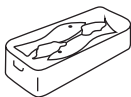
Where it was caught?



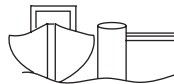
When was it caught?



Was iced and how long was it stored?



When and where was it landed?



Quality and temperature when landed?



Who transported it and to where?



Quality and temperature when delivered?



Who bought it and then sold it?

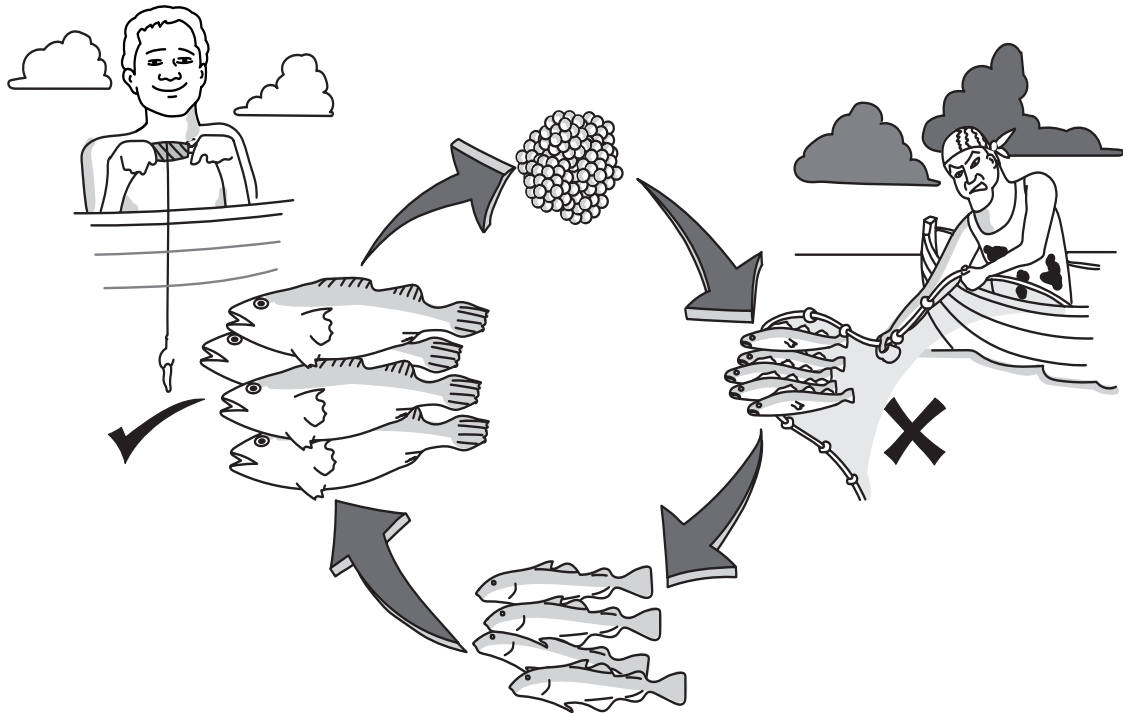


Ecosystem - What fish to catch?

Chapter 7

Is important to understand the life cycles of fish.

We need to ensure that we have fish next year, so we may need to throw the smaller fish back into the water alive, so they can grow up and reproduce. We can keep the big ones that have already reproduced.



If we don't take care, we can get to overfishing, which is a situation where we catch too much fish, at such a fast pace that they cannot naturally replenish.

Fishermen want to make a living by catching and selling fish, as do the fish sellers. Consumers want to eat fish, they also want to preserve the ecosystem, which in turn wants to sustain itself.

If everyone takes care of only their interests and ignores everyone else, then no one wins, and we all lose.

Only by knowing the facts about when and how much fish we can take out of the sea and still have enough left to sustain the fish population, we all will have fish in the future for our families.

Notes

Notes

