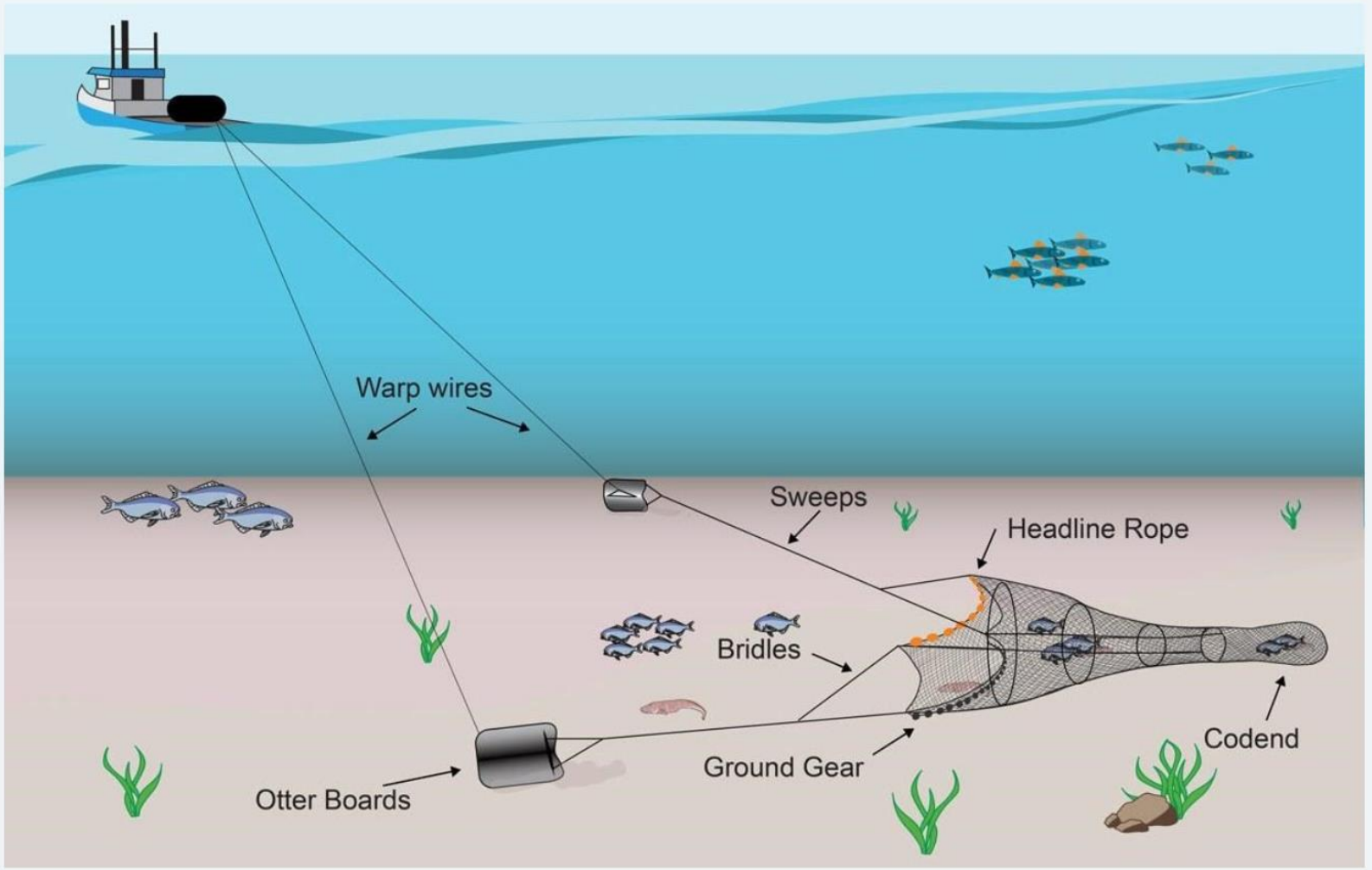

Fishing nets & its operations

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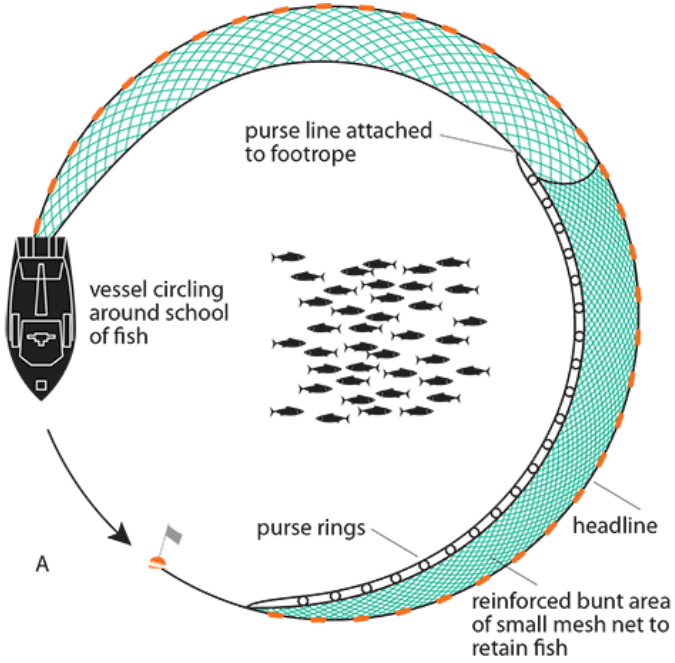
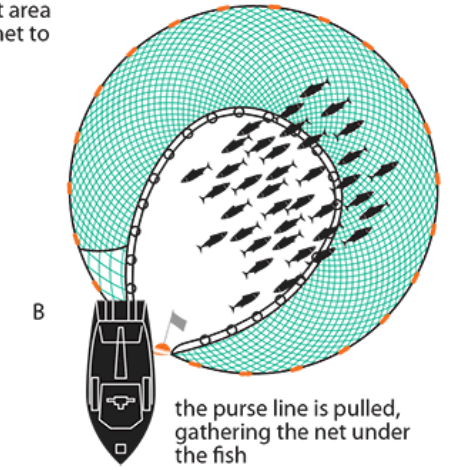
Introduction

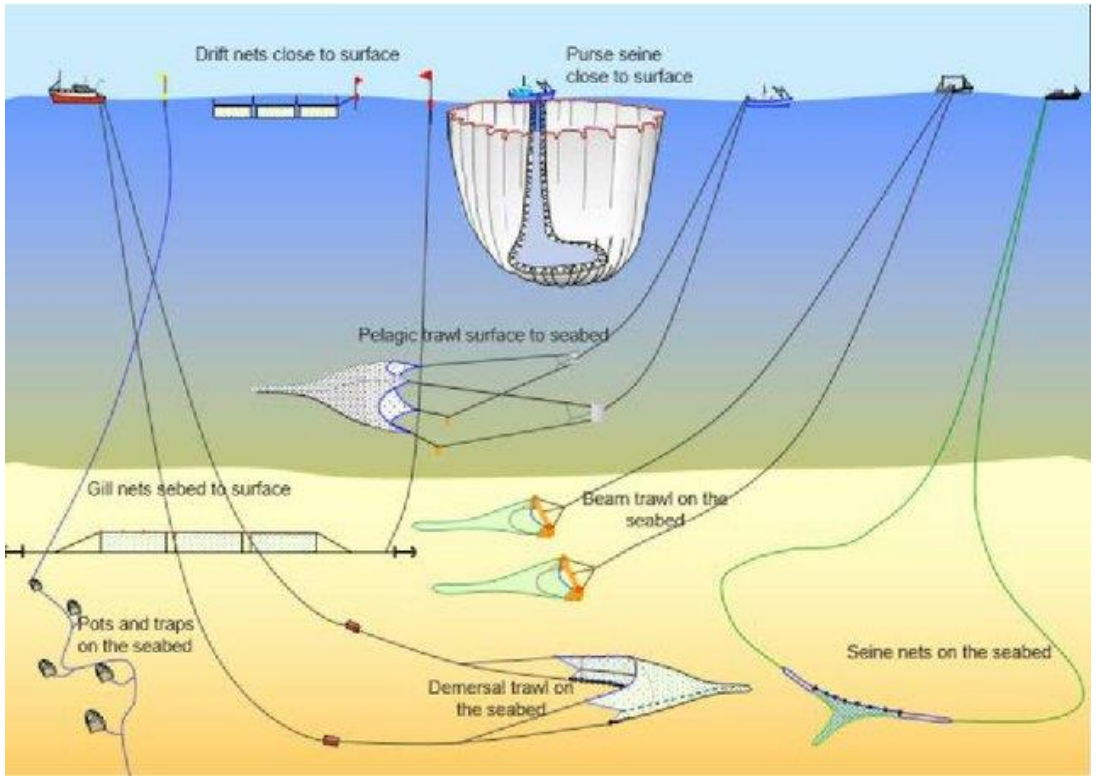
- There are different systems of fish harvesting used in the world which is ranging from primitive to highly sophisticated systems.
- Fishing gear vary with structure, materials used, principle of capture process and method of operation.
- The selection of fishing gears mostly dependent on fish species, environmental factors and fishing ground condition.
- Fishing gear use five mechanism to capture fishes i. e.
  - 1. Gilling and Tangling
  - 2. Trapping
  - 3. Filtering
  - 4. Hooking and spearing
  - 5. Pumping





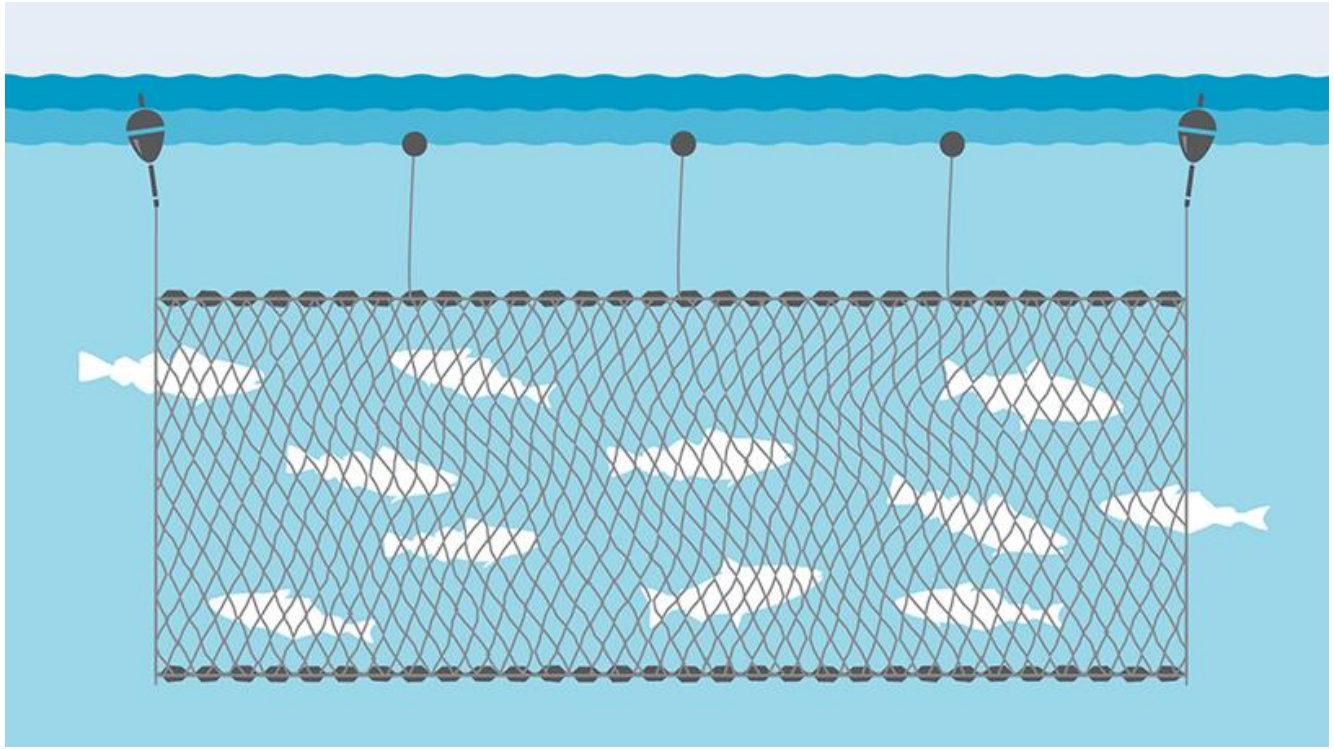
Introduction

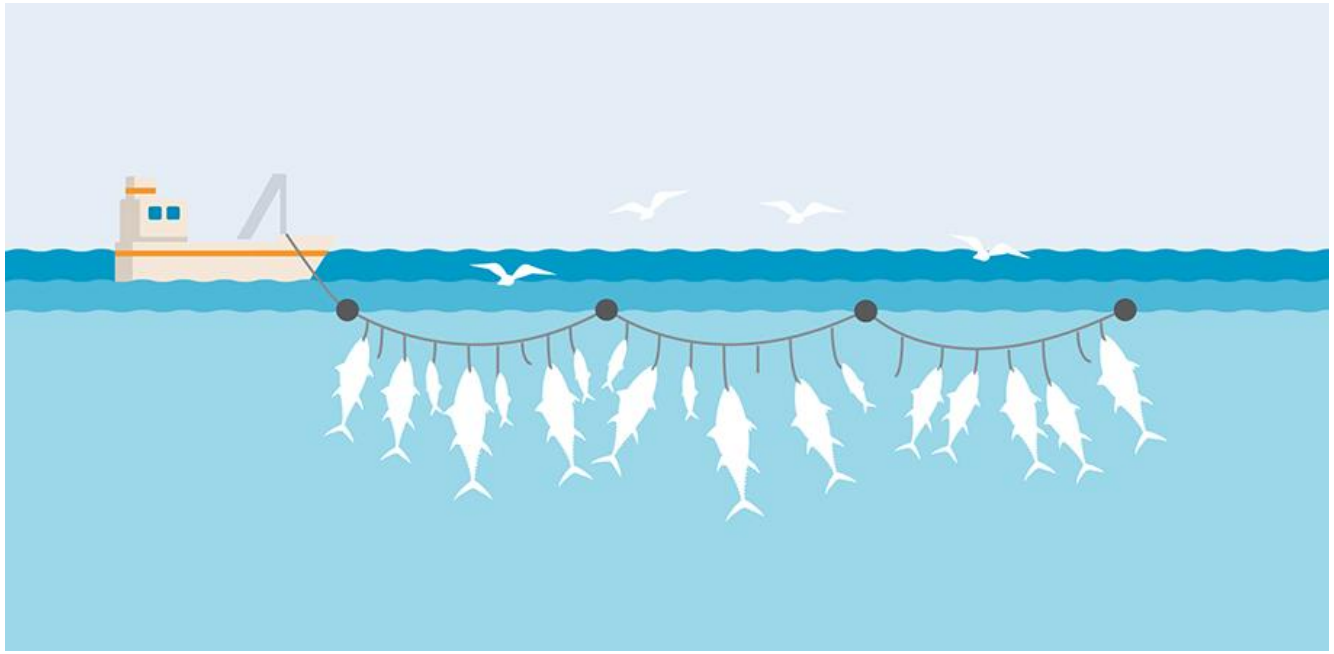
- The most commercially used fishing gears are – Purse seine and Trawl net followed by gillnet, entangling nets and traps.
- Based on the usage of material of construction the fishing gears are grouped into –
- 1. Net fishing gear – Fishing with netting which is constructed with webbing – Gillnets, Trawl nets, Purse seines etc.
- 2. Tackles – fishing gear in which hooks are an important part and catch fish individually – Hooks and lines
- 3. Miscellaneous gears – Traps, Grappling and wounding, and electrical fishing.



Introduction

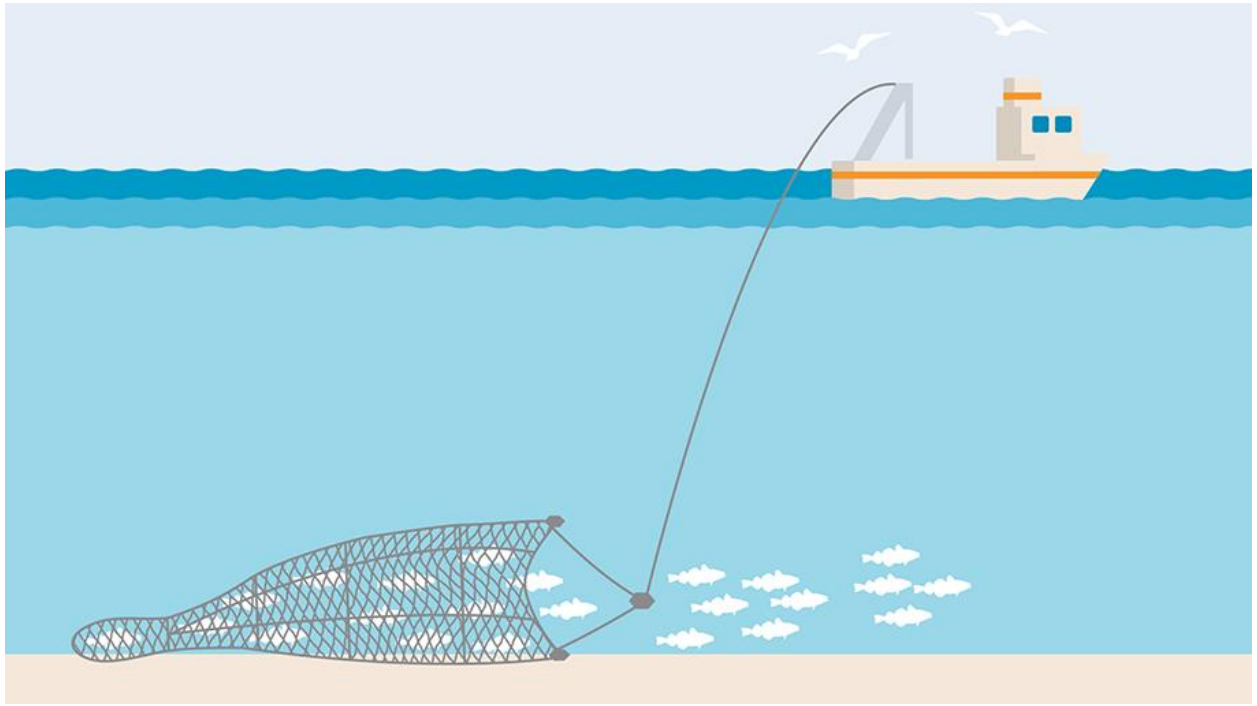
- Fishing gears may be either Passive or active fishing gears.
  1. **Passive fishing gears:**
- The fishing gear which do not move in water for harvesting of fish.
- Fish comes in the way of net and het harvested
- Example – Gillnets and entangling nets, hook and line, traps etc.

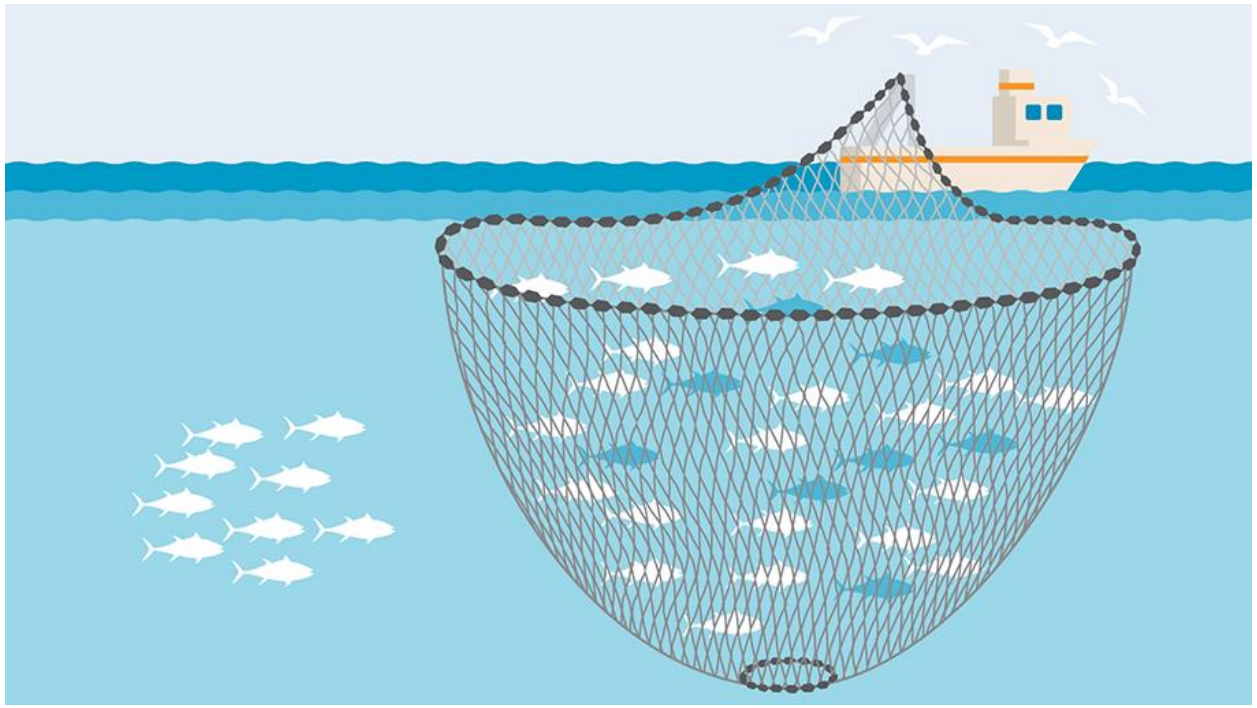




Introduction

- **Active fishing gears: -**
- The gear which moves in the way of fish to capture it.
- Active fishing gears consume more energy during fishing more productive than passive type of gears.
- Example – Trawl net, purse seine, Troll line etc.





Selection of fishing Gears

- Based on the degree of selectivity the fishing gear are more selective like gillnets, hook and lines and traps.
- The less selective fishing gears are – trawl net, seine nets, entangling nets etc.

- **Depending on the sector in which they are used are:-**
  - 1. Small scale or artisanal fishing gears
  - 2. Large scale/industrial/ mechanized/ commercial fishing gears.

- **Based on the water bodies in which they are used are :-**
  - 1. Inland fishing gears
  - 2. Marine fishing gears

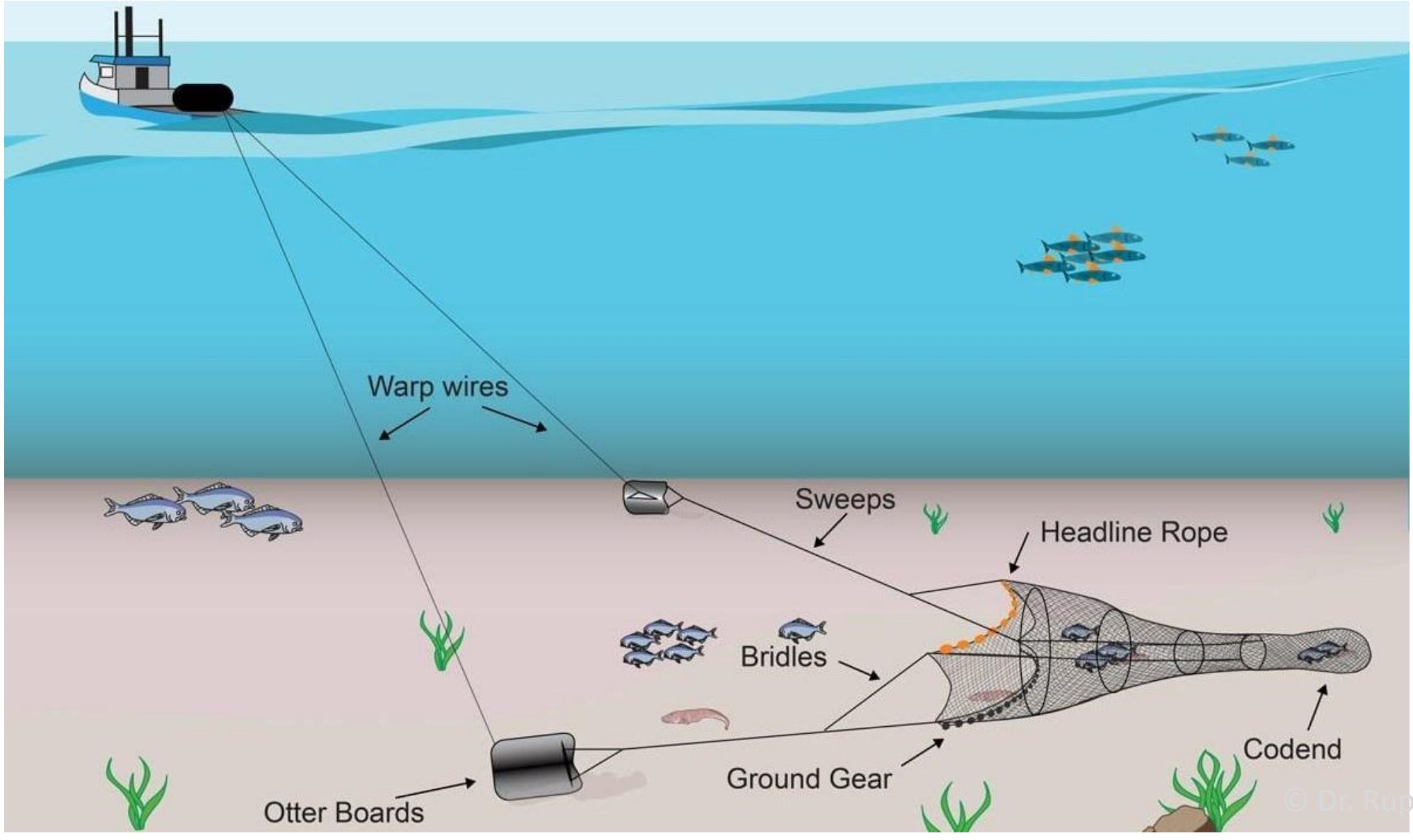
Selection of fishing Gears

- **Based on the area of operation the fishing gears are:-**
  - 1. Coastal fishing gears
  - 2. Offshore fishing gears
  - 3. Deep sea fishing gear
- **Depending on the fishing position in the water column are:-**
  - 1. Pelagic fishing gear
  - 2. Mid water fishing gears
  - 3. Bottom fishing gears
- **Hardy (1947) classified the fishing methods into 3 groups:-**
  - 1. Luring
  - 2. Snaring / Trap
  - 3. Attacking

Types of Gear & it's Operation

1. Trawl net
2. Purse seine net
3. Gill net
4. Hooks & lines
5. Turtle Exclusion Device (TED)
6. Non-conventional fishing methods such as
    i. Light fishing
    ii. Hose pipe fishing
    iii. Electric fishing

1. Trawl Net



Trawl Net

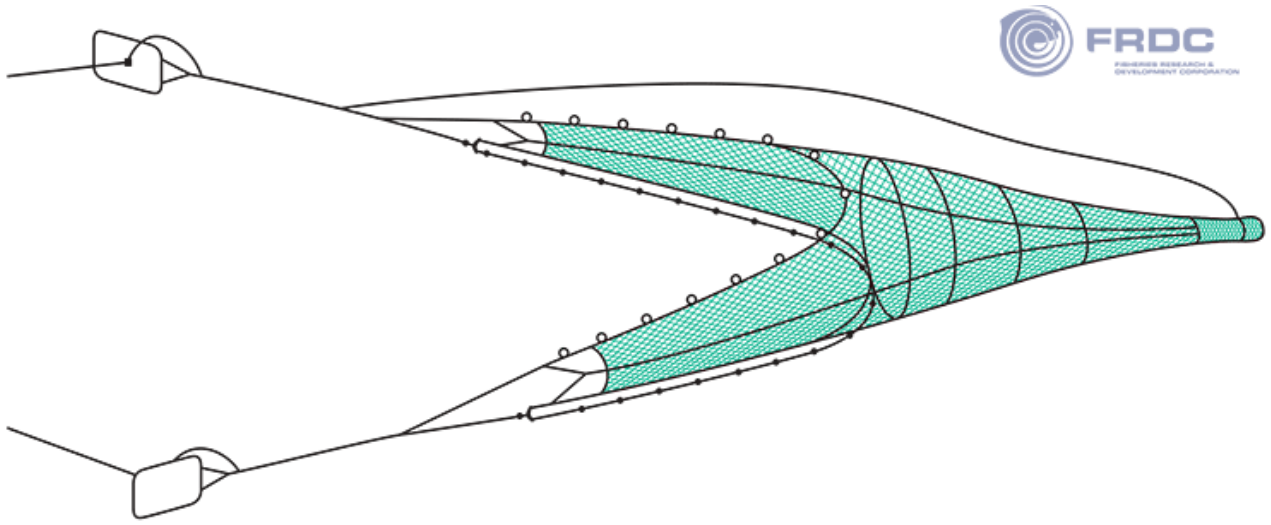
- Trawl is a conical bag shaped gear which is dragged through the water either at the bottom or subsurface water.
- The opening of the mouth region of the net is maintained with the help of floats on the head rope and sinkers in the foot rope and otter boards to maintain the horizontal opening.
- Trawl is one of the most widely used commercial fishing methods at internationally.
- Trawling is performed in many ways, in depths of water ranging from just a few metres to 1600 m.

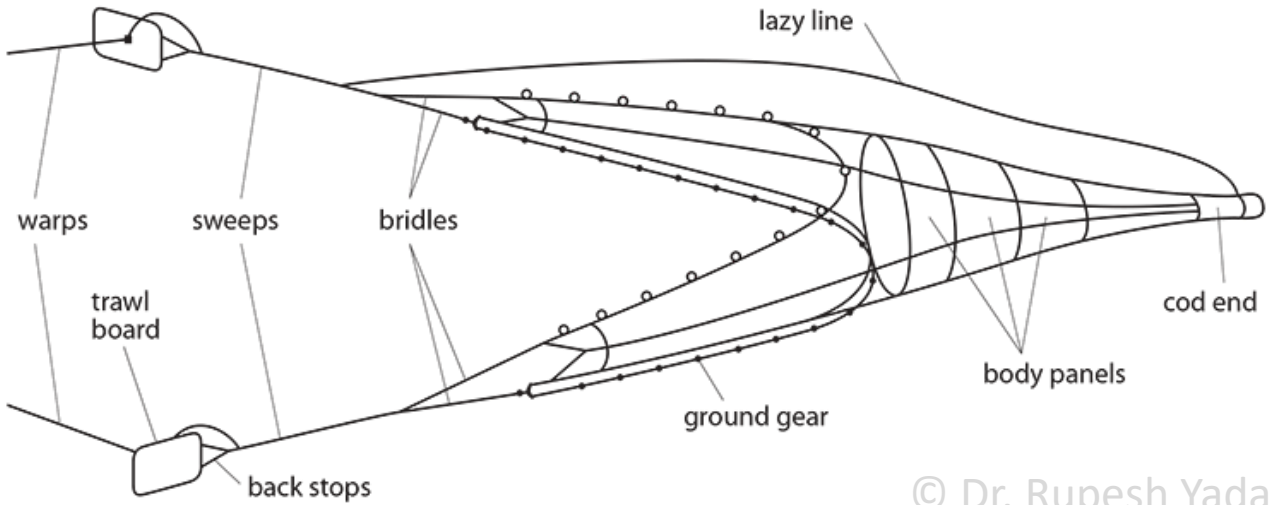
Trawl Net

- Based on the position in water column where they are operated, trawls are classified into bottom trawl and midwater trawl.
- Based on the mouth opening of the trawl they are grouped into beam trawl, otter trawl, bull trawl.
- Based on the number of trawls operated from a single vessel, there are double rig trawl, triple rig trawl and quad rig trawl.
- Some of the recent innovations in trawl net designs are use of large mesh trawls in the fore parts of the net which minimize drag and hence fuel requirements.

Trawl Net

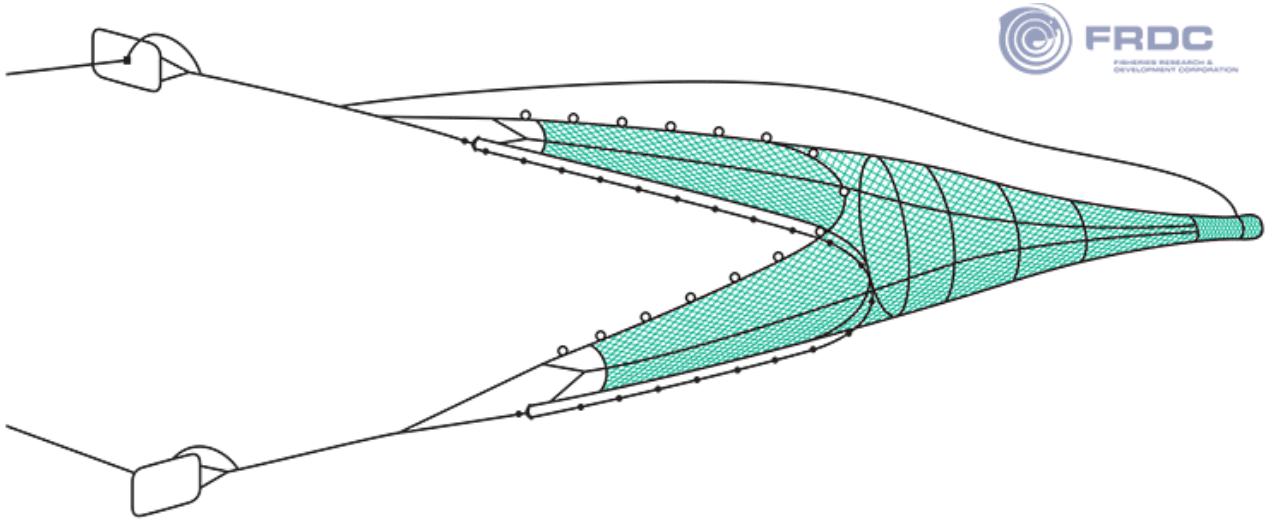
- Trawls are made up of components that perform specialized functions, as described below-
- **Warps** are wire ropes connecting the trawl boards to the vessel.
- They are stored on winch drums for ease of operation.

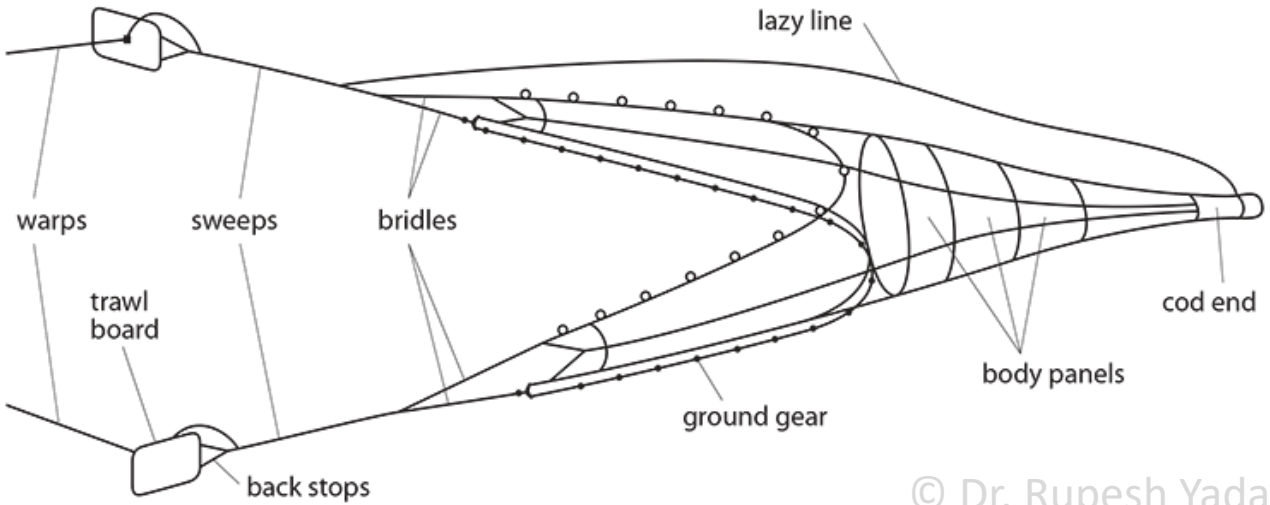




Trawl Net

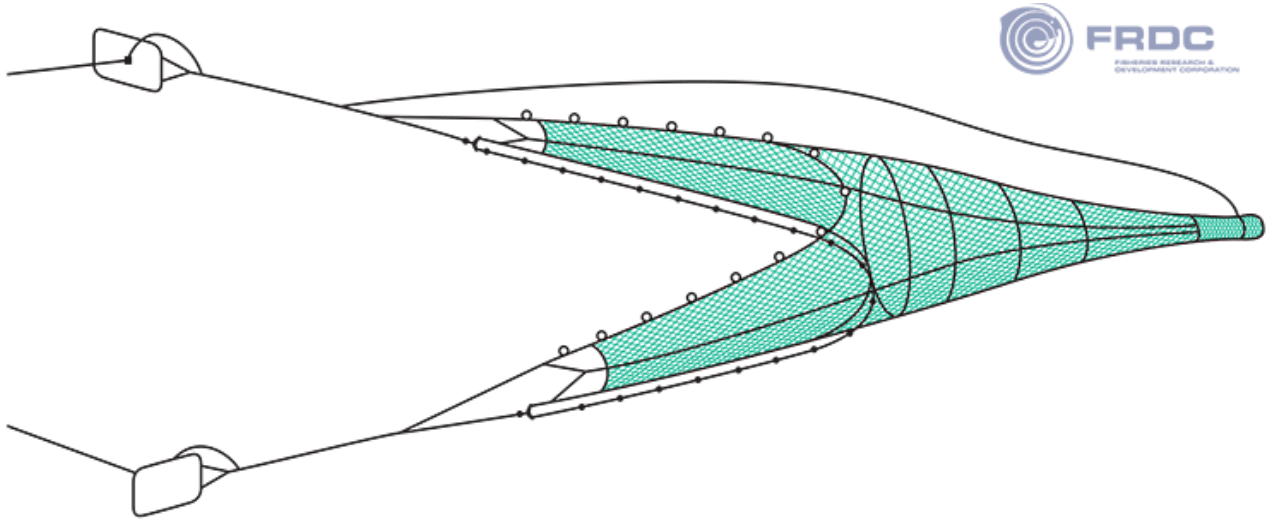
- **Trawl boards** (also called otter boards or trawl doors) keep the net open horizontally by acting as hydrodynamic kites.
- They also provide weight, which is required to keep the trawl at the desired depth of operation.

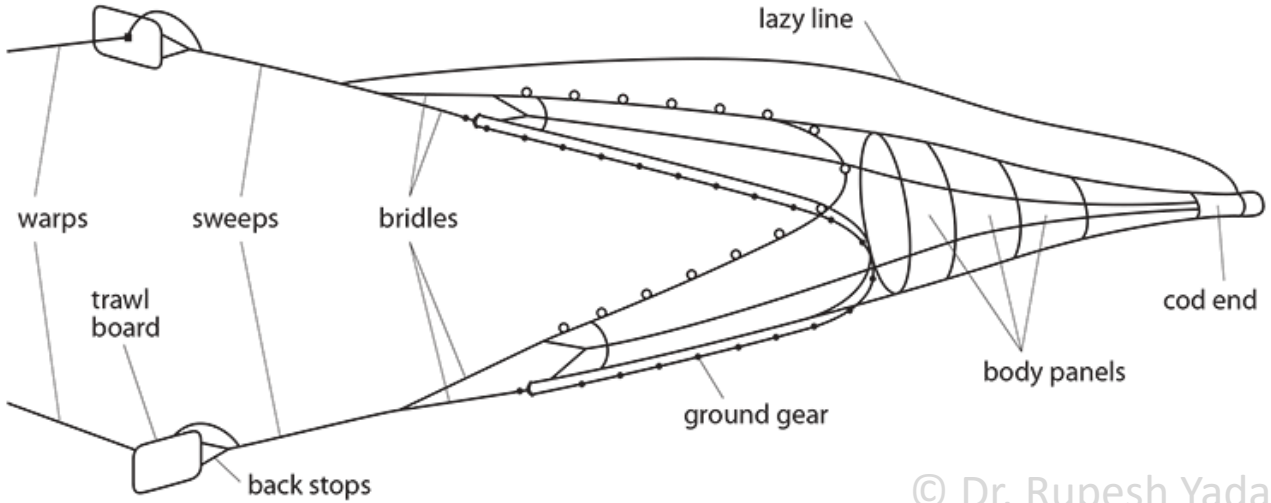




Trawl Net

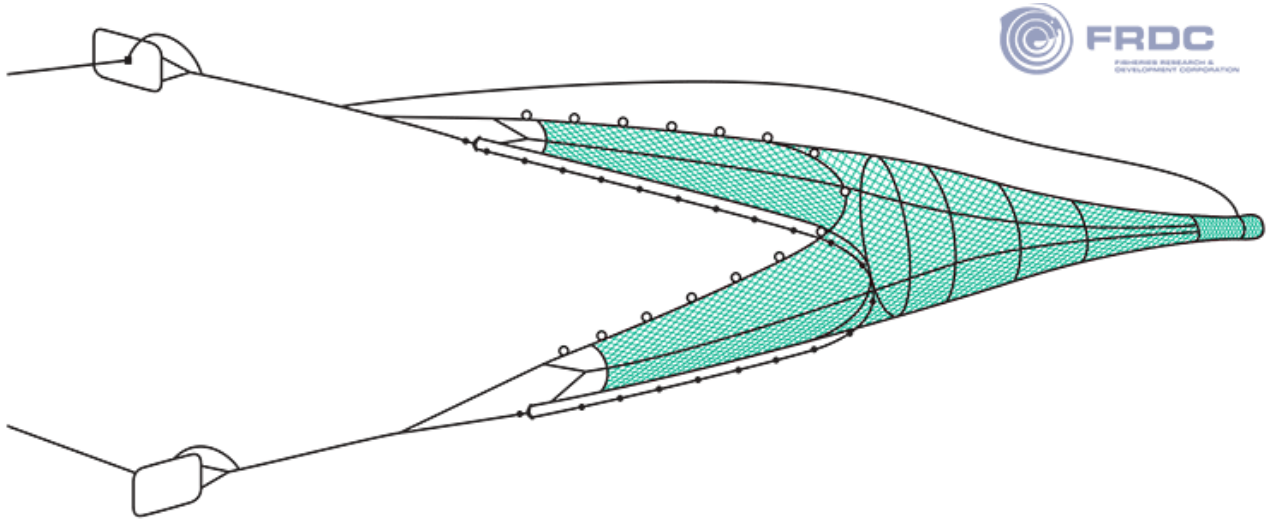
- **Back strops** are short lengths of wire or chain that connect the trawl boards to the sweeps.
- Sweeps are used on demersal otter trawls to connect the back stops to the bridle on each side of the net.
- Bridles connect the sweep on each side of the net to the headline and footrope on the wing ends of the net.

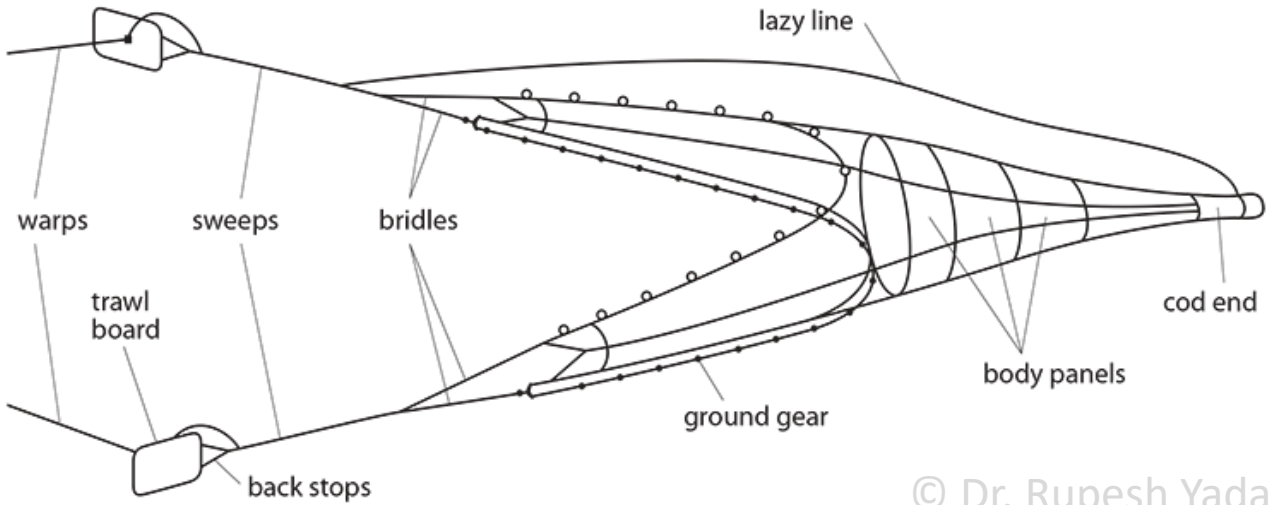




Trawl Net

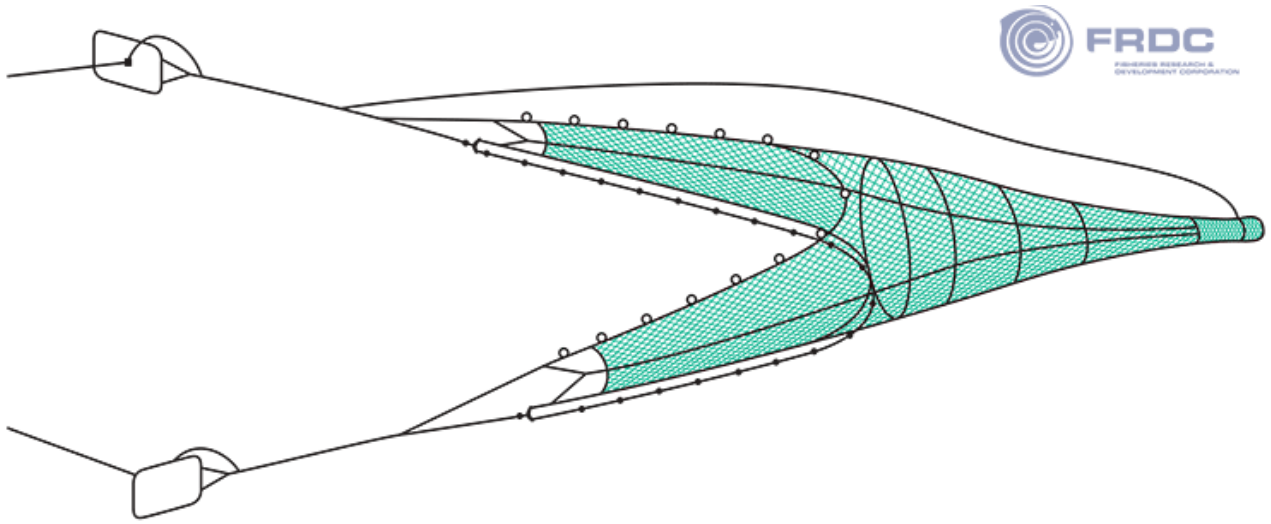
- **Ground gear** is a wire or chain that is attached to the footrope by short chain droppers.
- The ground gear may have several rubber or steel cylinders and spacers threaded along its length.
- The purpose of the ground gear is to reduce damage from catching by lifting the footrope and net clear of the seabed.

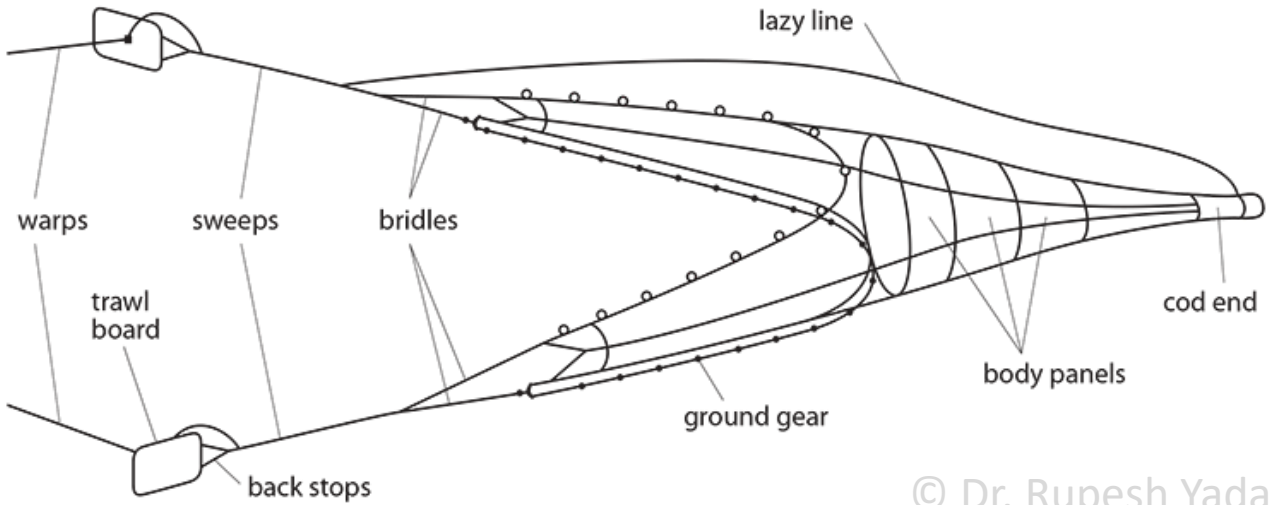




Trawl Net

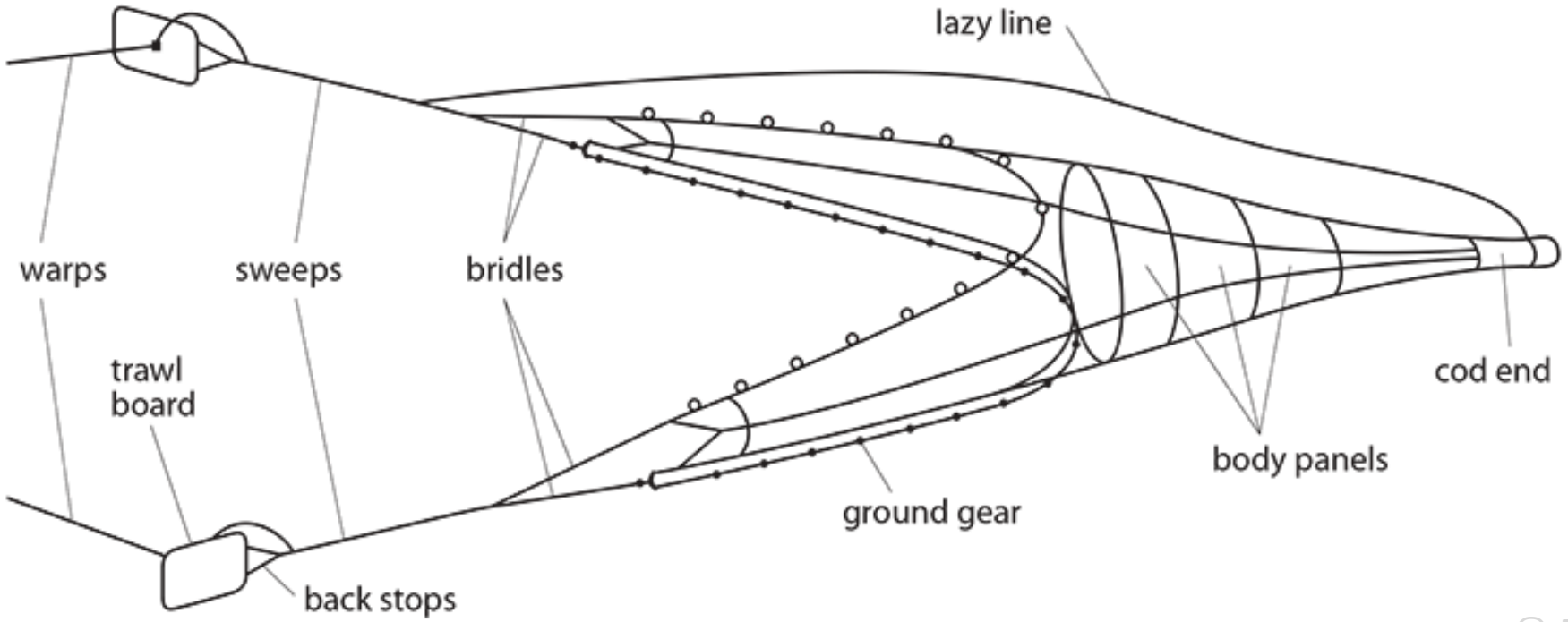
- **Body panels** are the panels of net that make up the body of the trawl.
- They comprise upper and lower sections.
- **The cod-end or bag** is the last section of the net, where fish are collected and held during trawling operations.
- This area has the smallest mesh size, which determines the size of fish that the trawl will retain.
- The end of the cod-end is tied with a quick-release knot so that the fish can be easily emptied from the net.





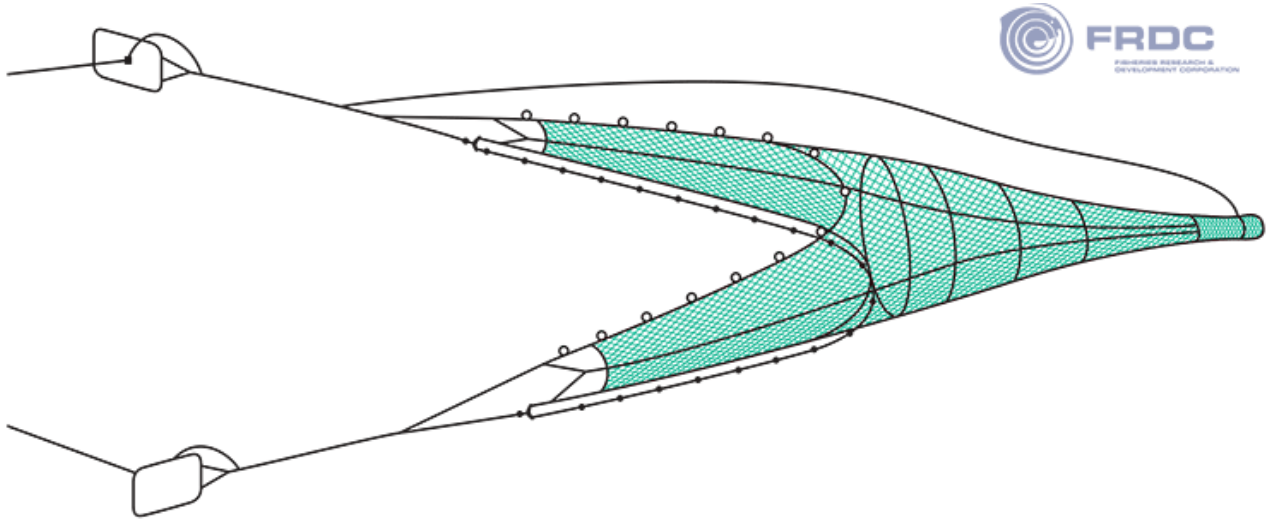
Trawl Net

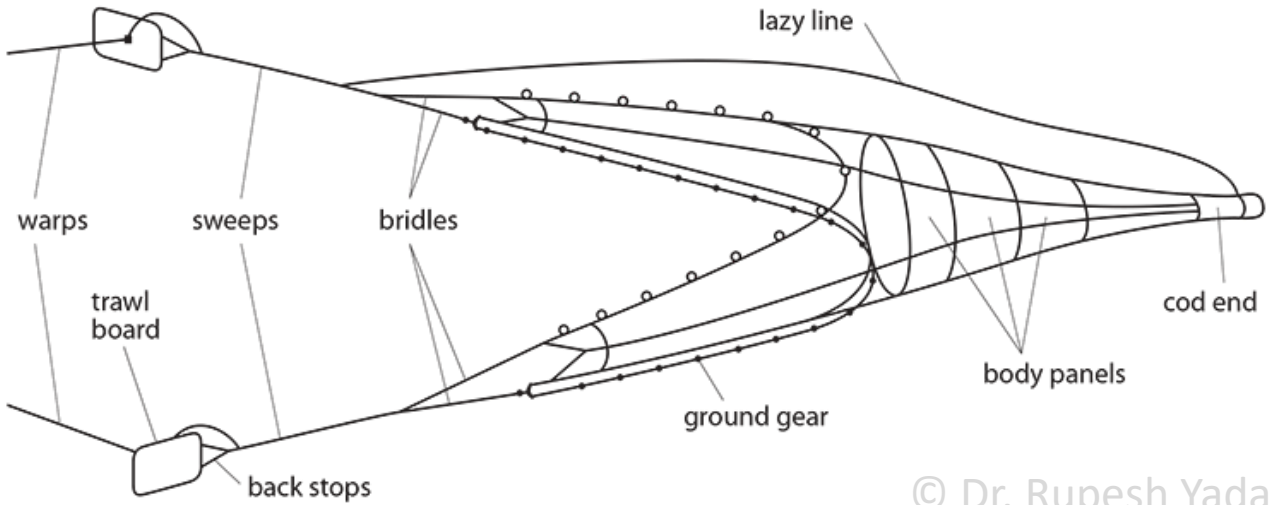
- **The lazy line is sometimes used to pull the cod-end on board so that it can be emptied.**



Trawl Net

- **Beam trawls** (also called dredge nets, beam tide nets or push nets) are used in Queensland to catch school prawns and bay prawns. In northern Queensland and the Northern Territory, a beam trawl is sometimes used to sample the catch in demersal otter trawl prawn fisheries, both before the larger demersal otter trawl gear is set and during the trawl itself, to make sure the area being fished is still productive.



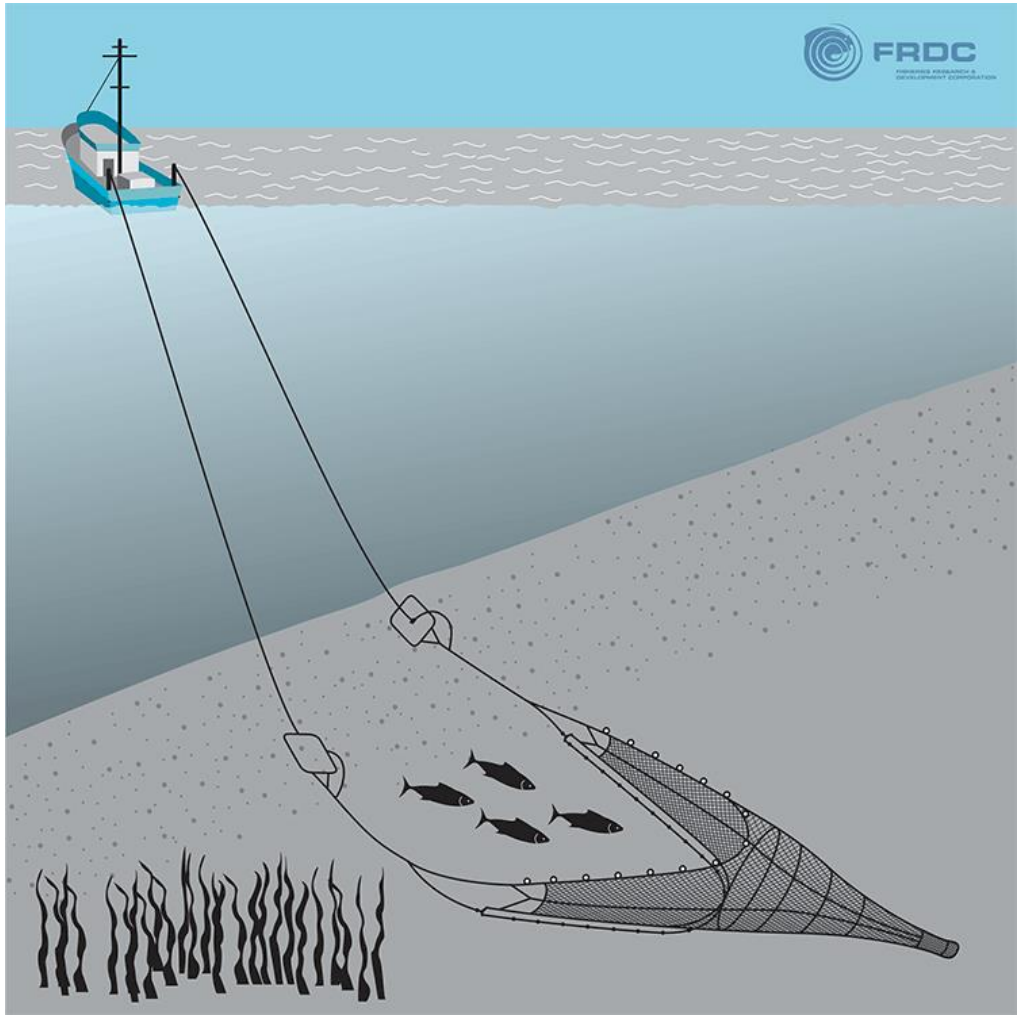


Trawl Net

- **Beam trawls** is simple in construction and can be used by small vessels, especially in restricted areas such as lakes and estuaries.
- It is constructed with two curved, steel end plates; the height of the end plates determines the vertical opening of the net.
- A straight steel bar that connects the tops of the end plates acts as a solid 'headline' and also determines the horizontal net opening.
- The top of the netting is attached to the beam, while the footrope is attached to the back of the end plates.

Trawl Net

- **Demersal otter trawling** for fish (also called stern trawling, bottom trawling, otter trawling or trawling) operates in south-eastern Australia, the south of Western Australia and the North West Shelf.
- A modified version (see semipelagic otter trawl, below) is used in some areas of the Northern Territory and Queensland.
- Australian trawl vessels also operate in Antarctic waters and on the high seas. Species taken in the southern fisheries include Blue Grenadier, Pink Ling, Silver Warehou, flathead and Redfish.
- In northern Australia, species taken include Snapper, emperor, rock cod and squid.

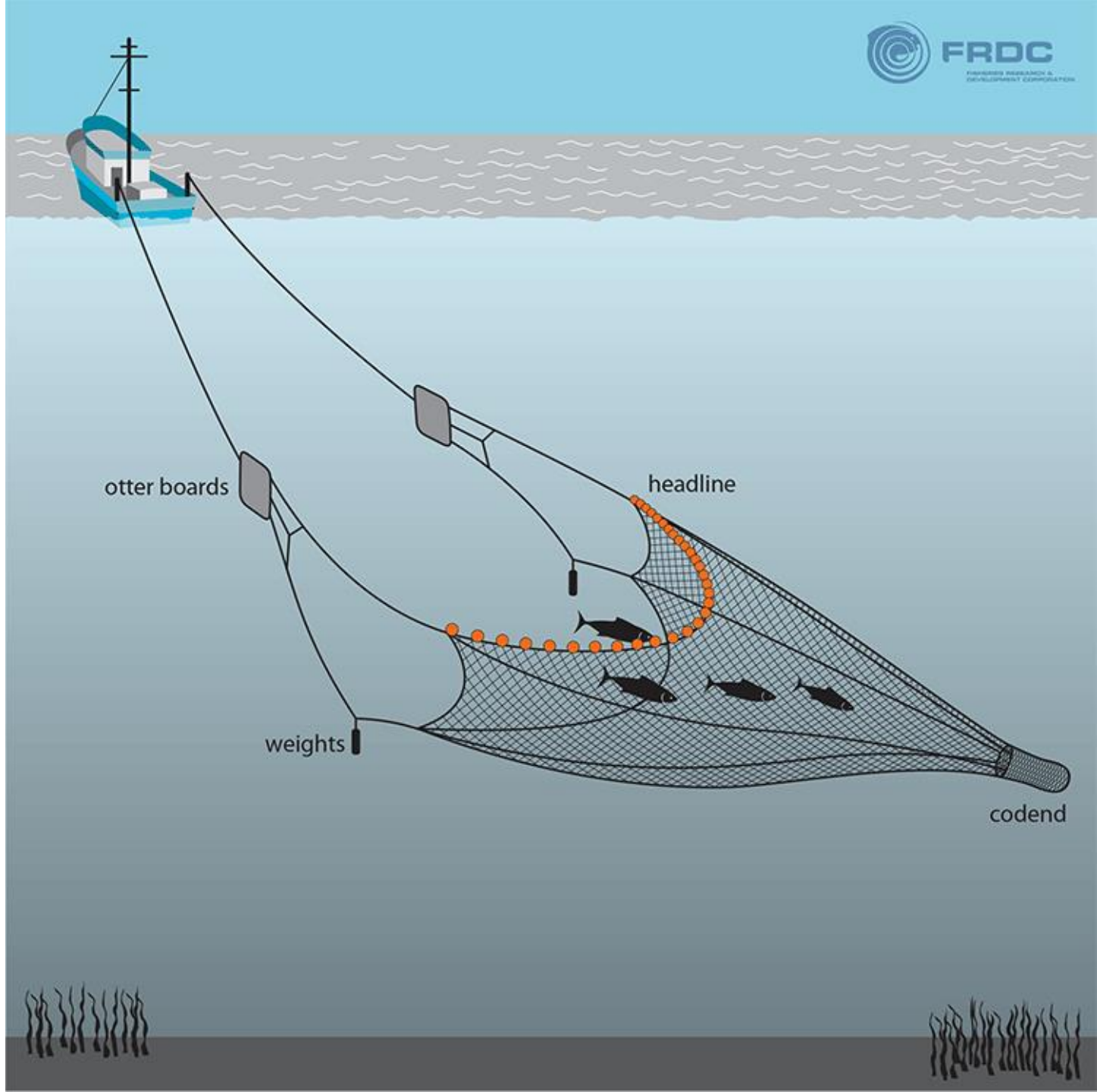


Trawl Net

- **Semipelagic otter trawl** (also called high-aspect semipelagic trawl or semi-demersal trawl) fishes close to the seabed, with only the trawl boards, wing end weights and chain droppers coming in contact with the seabed.
- This type of trawl net is commonly used to target finfish in the Northern Territory.

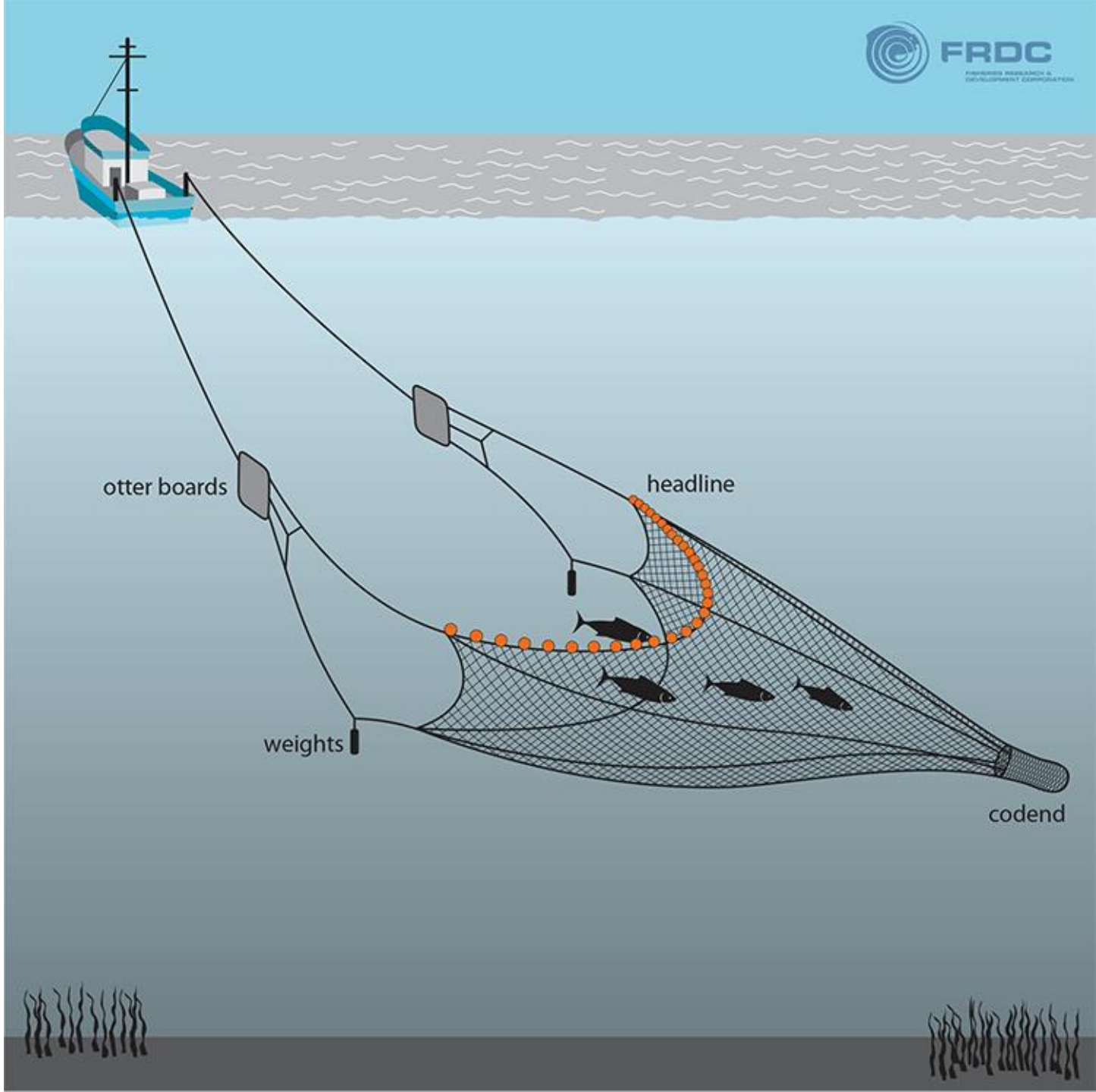
Trawl Net

- **Midwater trawling** is mainly used to target pelagic finfish such as Redbait, Jack Mackerel and Blue Mackerel in the Commonwealth Small Pelagic Fishery, and spawning Blue Grenadier in the Commonwealth Trawl Sector.



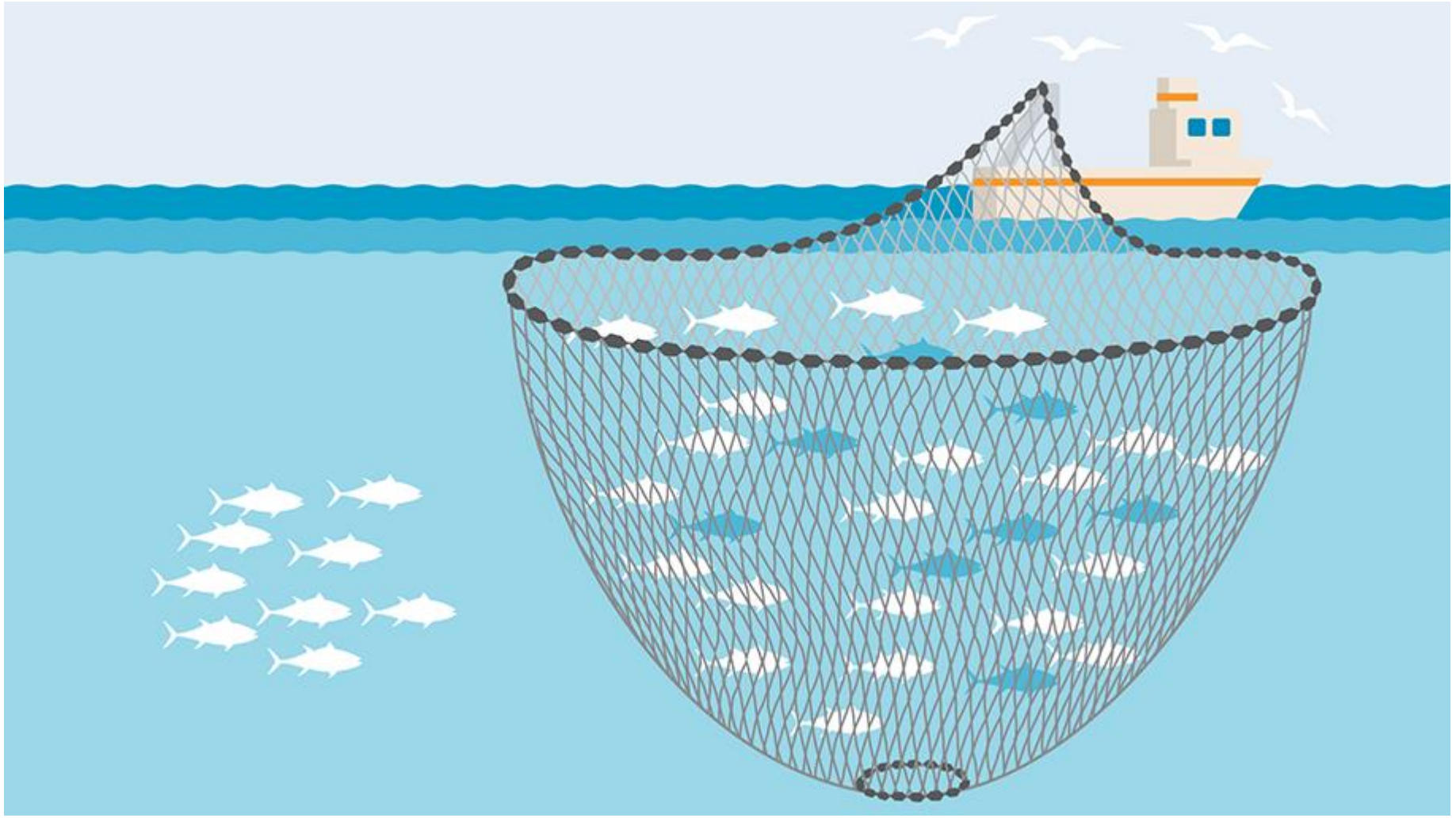
Trawl Net

- Midwater trawl nets resemble demersal trawl nets for fish, except that they are of a lighter construction and have a much larger mouth with short or no wings. The trawl boards are connected to the net via a long bridle and help to give the net its horizontal opening.
- Vertical opening of the net is achieved by flotation on the headline and weight on the footrope, as well as an additional weight on each lower bridle, close to where it connects to the footrope.
- The position of the net in the water column is controlled by the length of the warp and by varying the speed of the vessel.



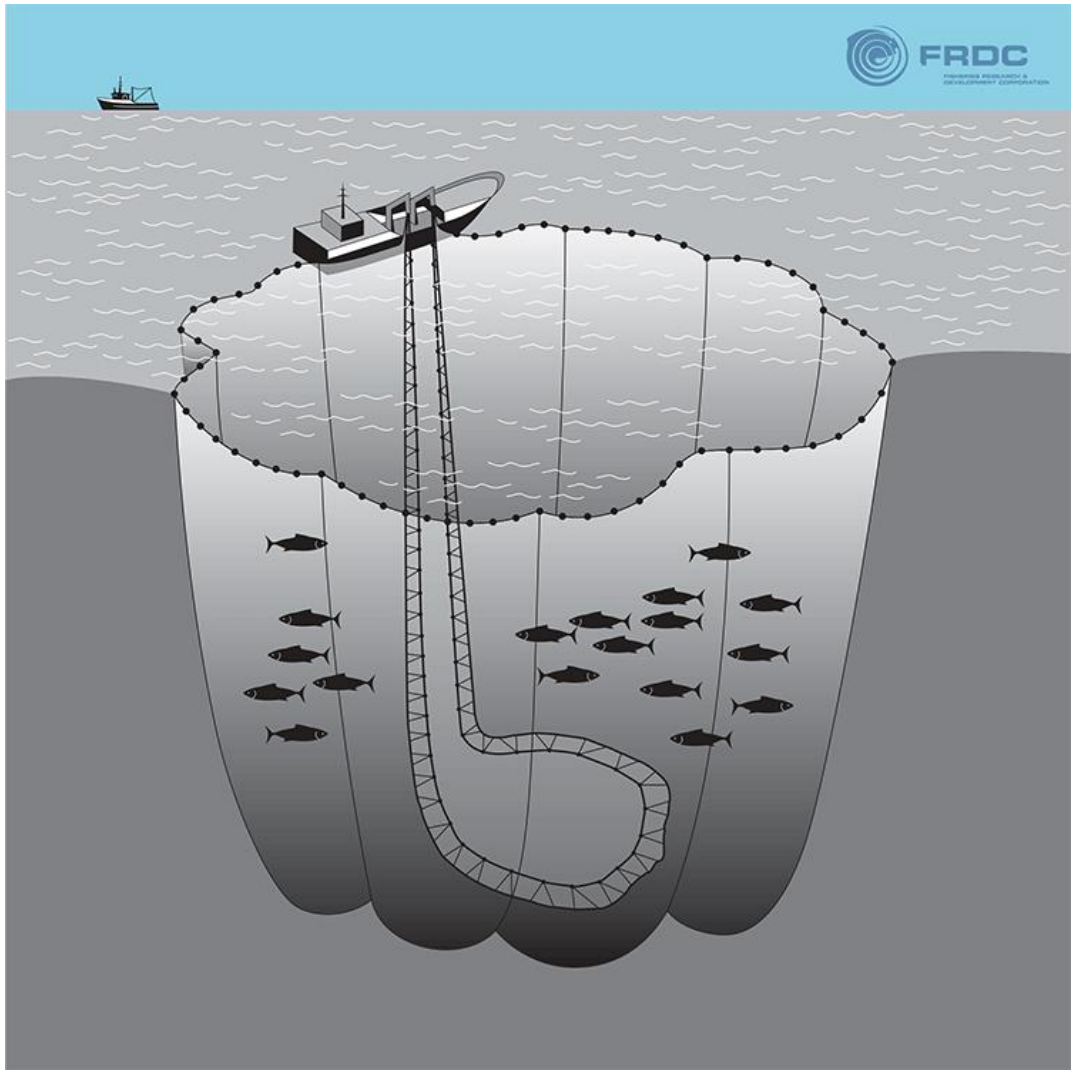
2. Purse seine net

- It is surrounding gear having purse line at the bottom.
- When purse line gets pulled, the net get closed from bottom side and prevent the fish from escaping.
- It can be operated either from single or two boats.



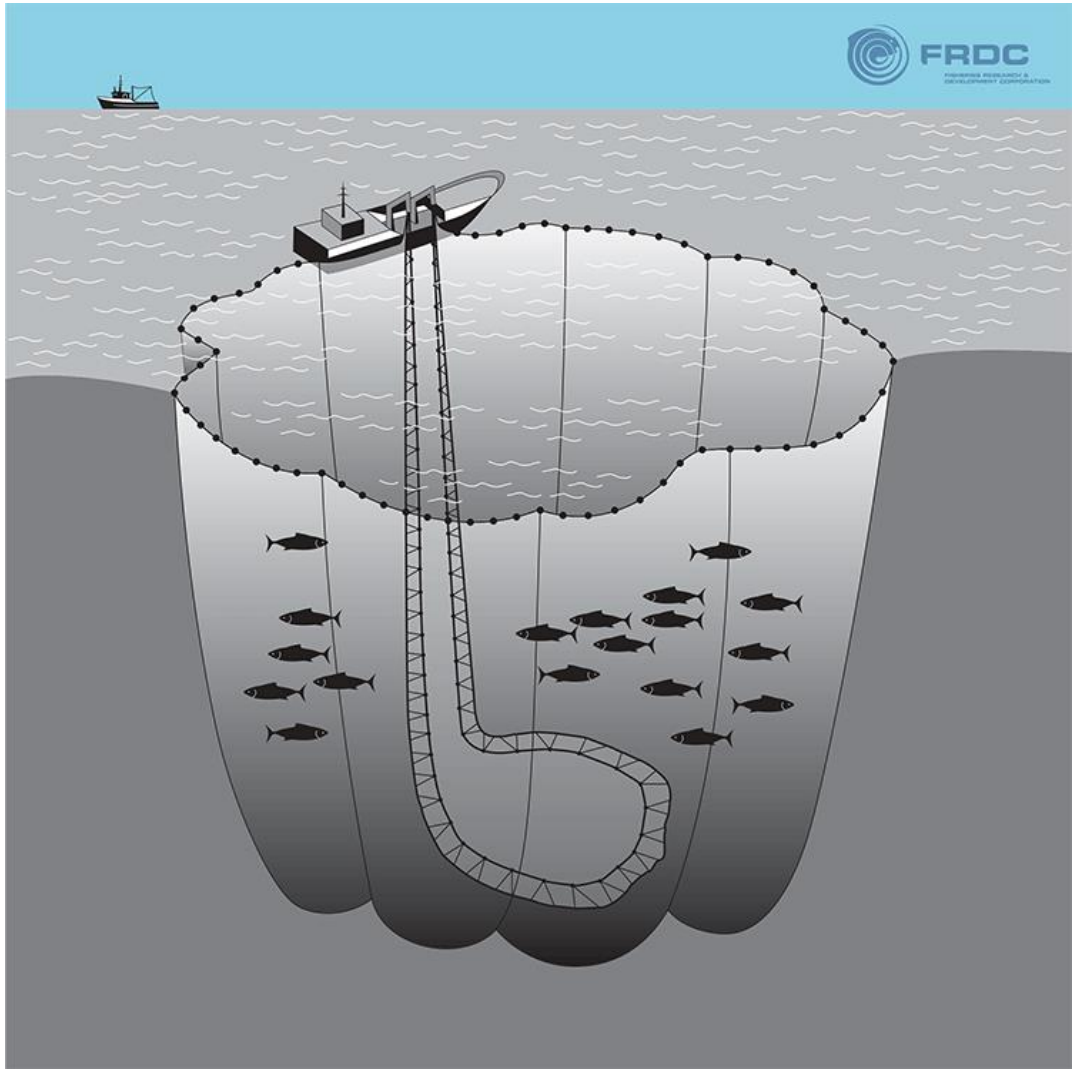
2. Purse seine net

- Purse-seine nets are used in the southern states of Australia to target schooling pelagic fish species, such as Australian Sardine, Jack Mackerel and Southern Bluefin Tuna.
- They are positively buoyant, with sufficient flotation to support the expected catch.



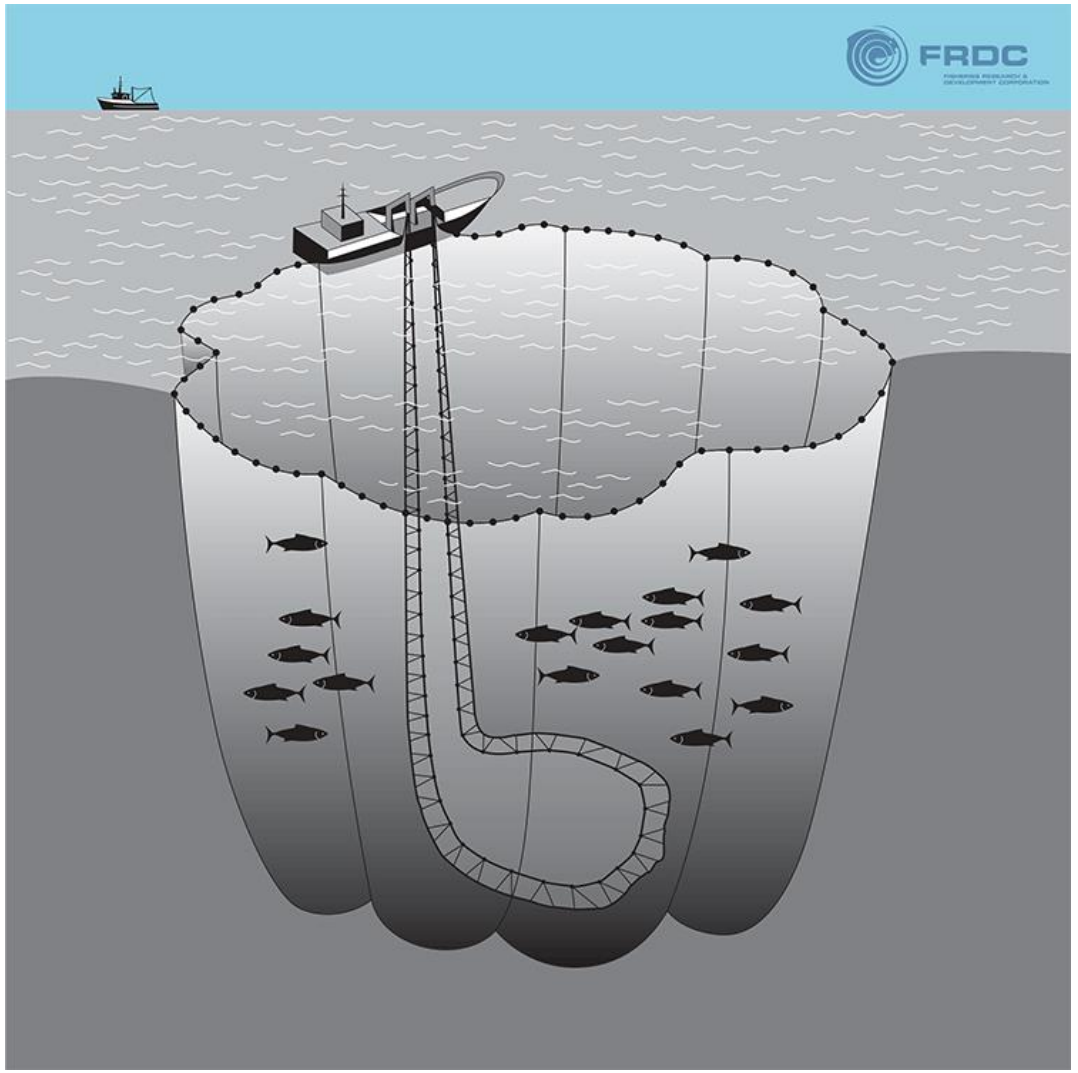
2. Purse seine net

- The end of the net that is set first (the bunt) is heavily reinforced, as this is where the fish will be concentrated when the net is haul.
- The footrope of the net has purse rings attached at regular intervals by rope or chain.
- A purse line runs through the rings; when the line is pulled, it effectively closes the bottom of the net.



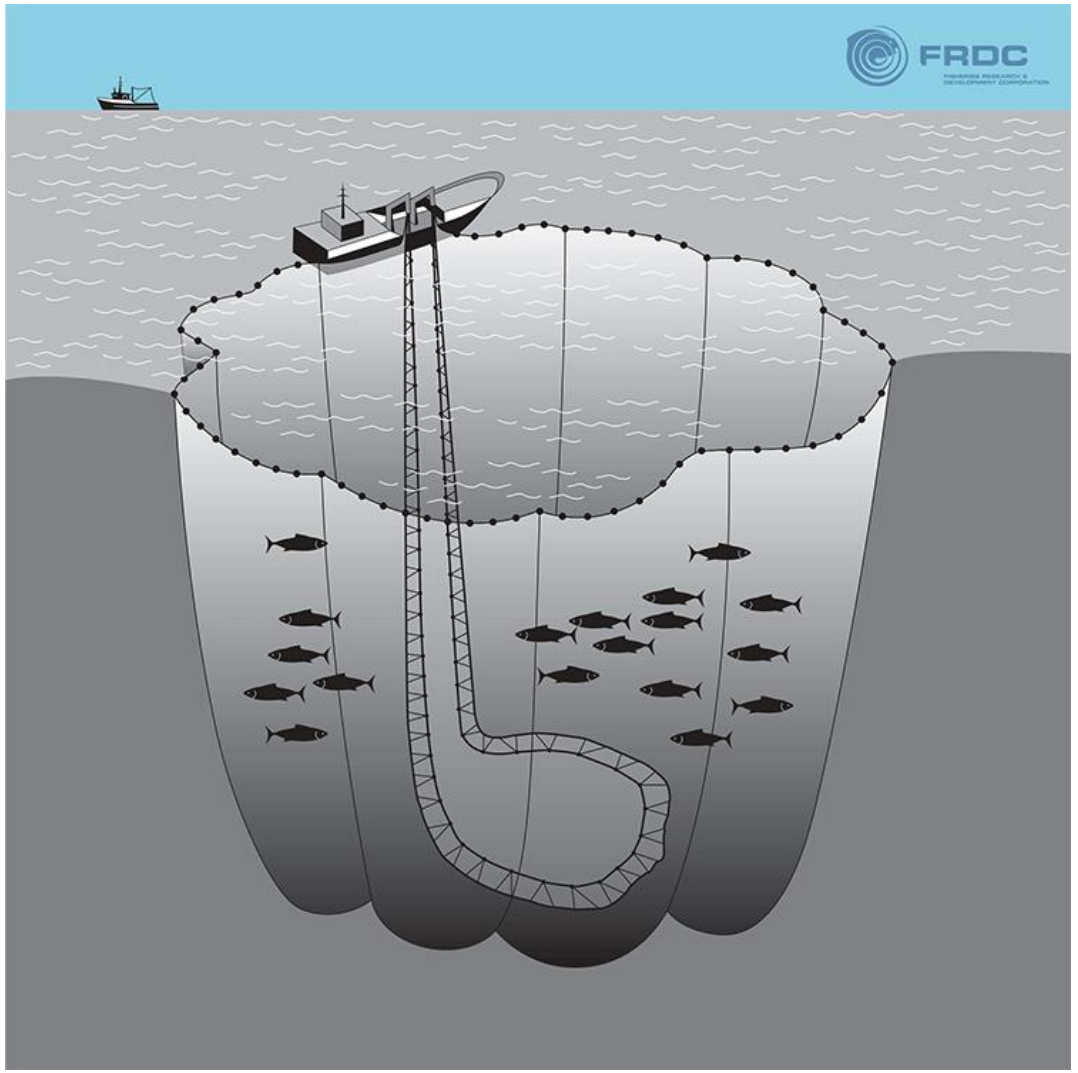
2. Purse seine net

- Schools of fish are located by visual sighting, spotter aircraft or sonar.
- The fishing vessel travels around the school, setting the net, and the headline is then hauled in, so that both ends of the net are close to the vessel.
- The purse line is hauled in from both ends, closing off the bottom of the net.



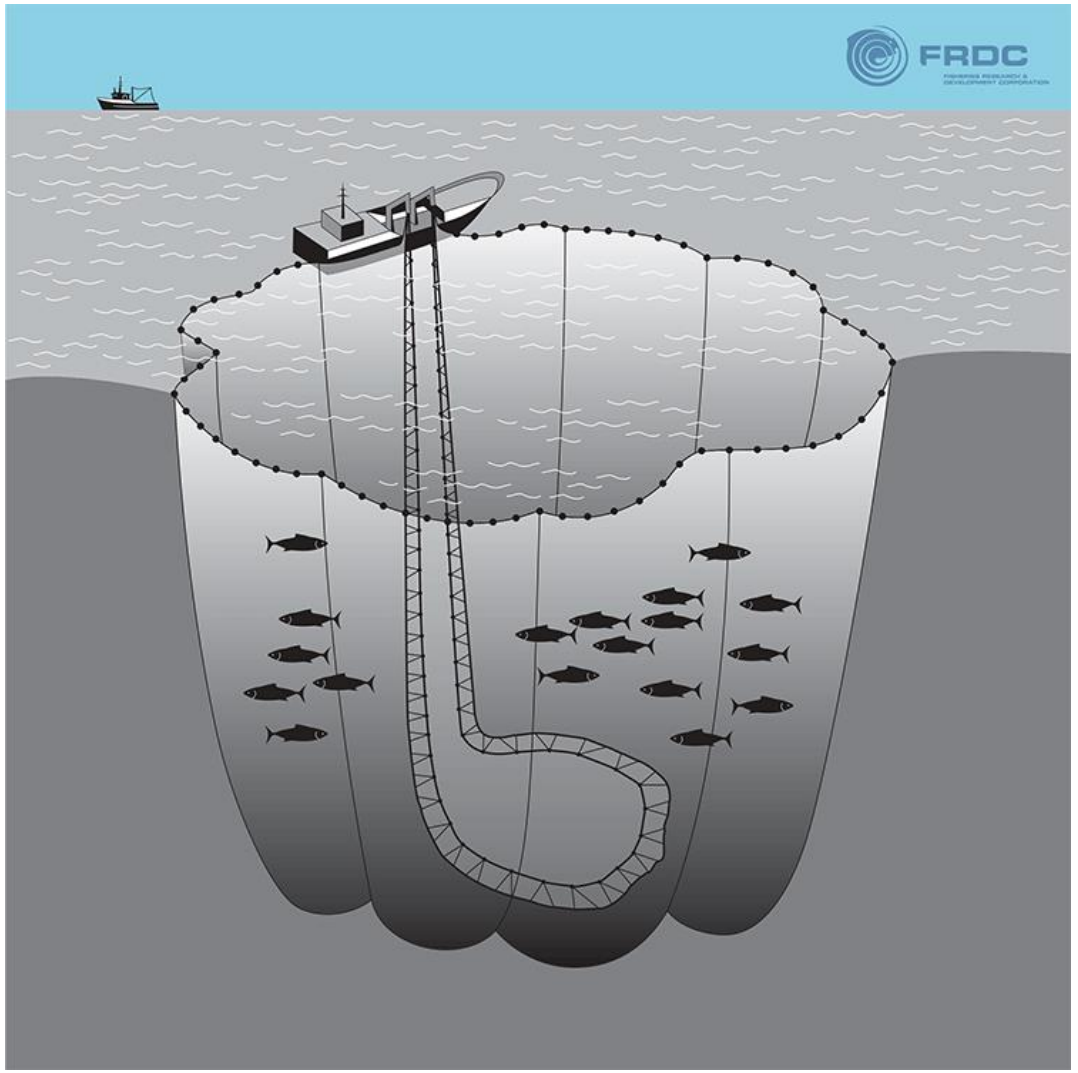
2. Purse seine net

- The net is then pulled in towards the boat, and the catch is either pumped or lifted out in landing nets; alternatively, the entire net is lifted aboard.



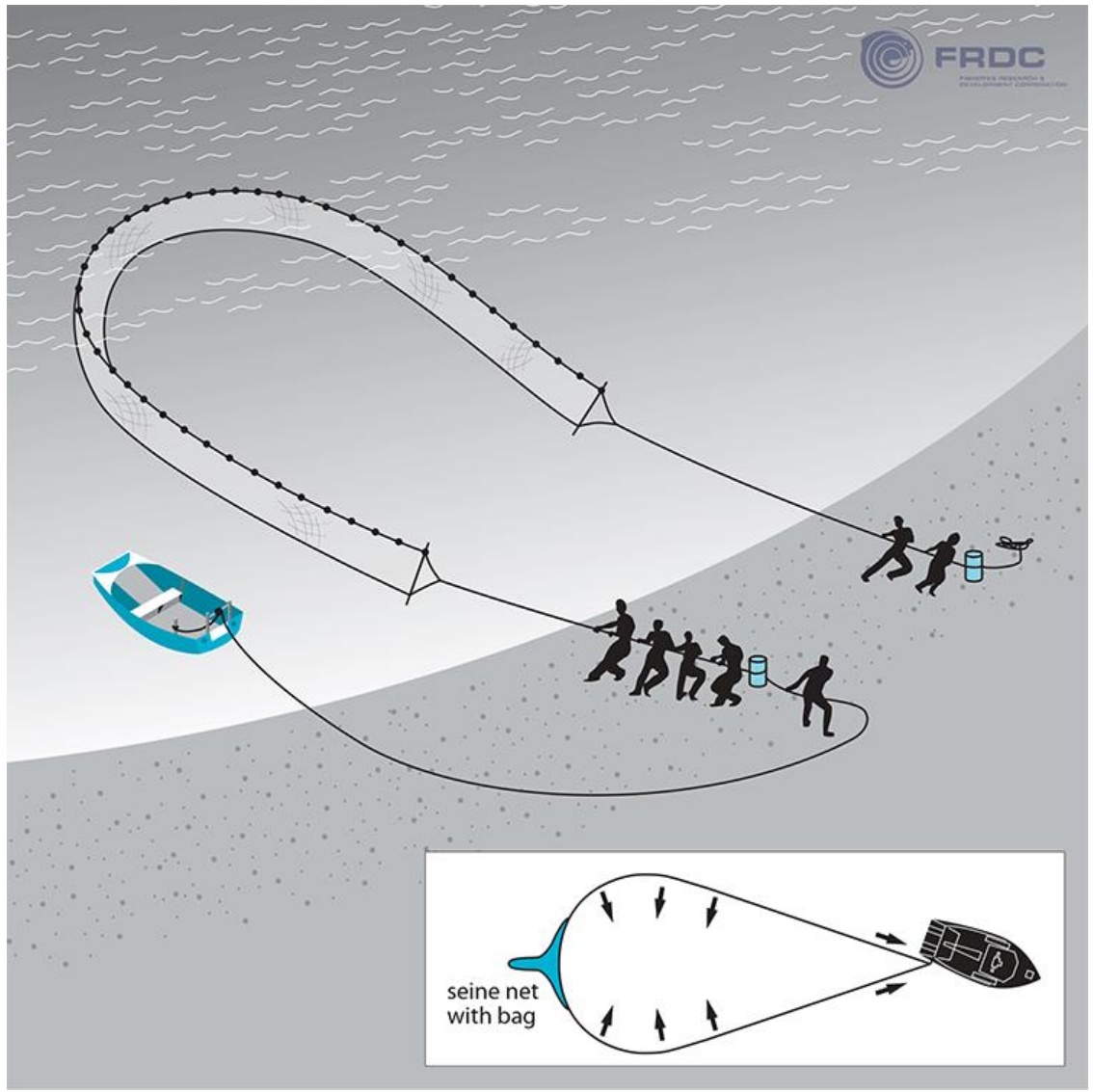
2. Purse seine net

- Seine nets usually have two long wings and a section that concentrates and holds the catch.
- Lengths of rope are added to the end of each of the wings.
- These ropes are negatively floating and extend the working area of the net while adding minimum drag to the hauling operation.
- The nets function on the principle that fish are unwilling to swim over a moving object in the water and instead try to swim in front of it.
- The fish are thus collected by the ropes and wing ends into the net.



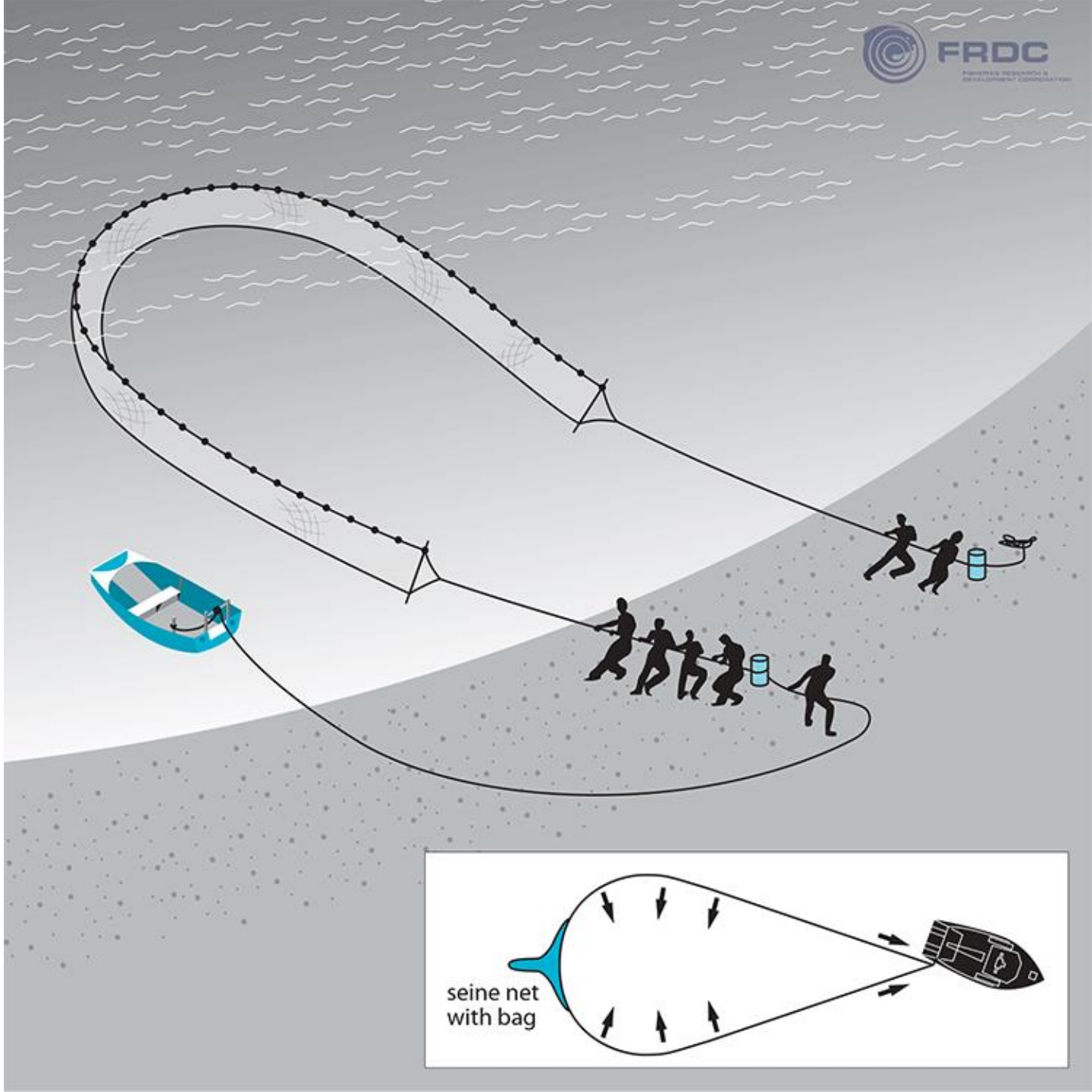
2. Purse seine net

- **Beach-seine nets** also called haul seines or estuary seines are used wide catch many species, including mullet, whiting, Australian Salmon, garfish.
- Beach-seine nets can be set around a sighted school of fish, or in an area where fish are known to assemble.
- **The net is either set from a dinghy** or can be walked out in shallow water, with the first length of rope being set perpendicular to the shore, the net set parallel to the shore, and the second rope set back to the shore.



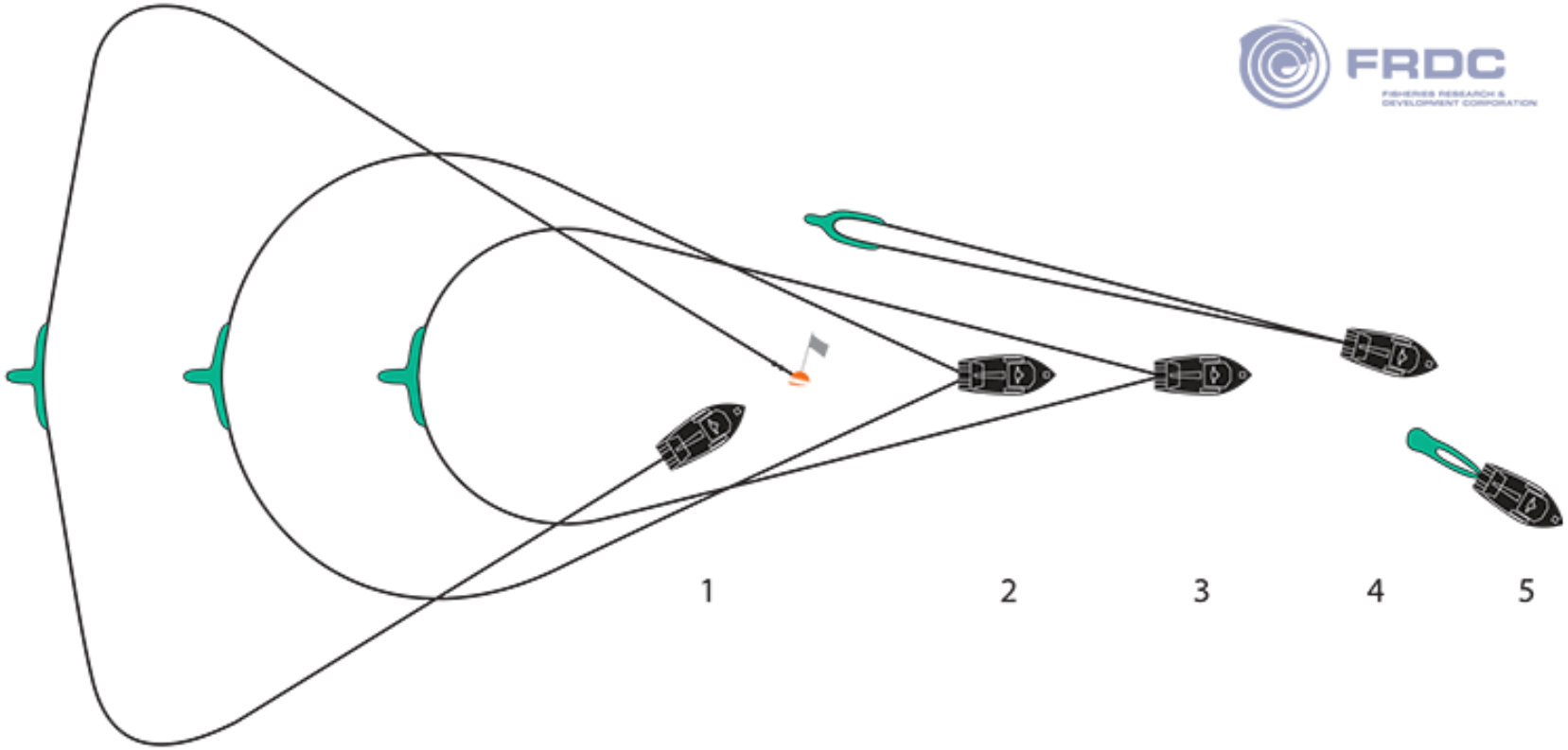
2. Purse seine net

- The ropes are then hauled onto the beach evenly, by hand, four-wheel drive vehicle or tractor, collecting the fish into the net.
- Hauling continues until the net and fish are dragged onto the shore, with the fish are concentrated in the bag.



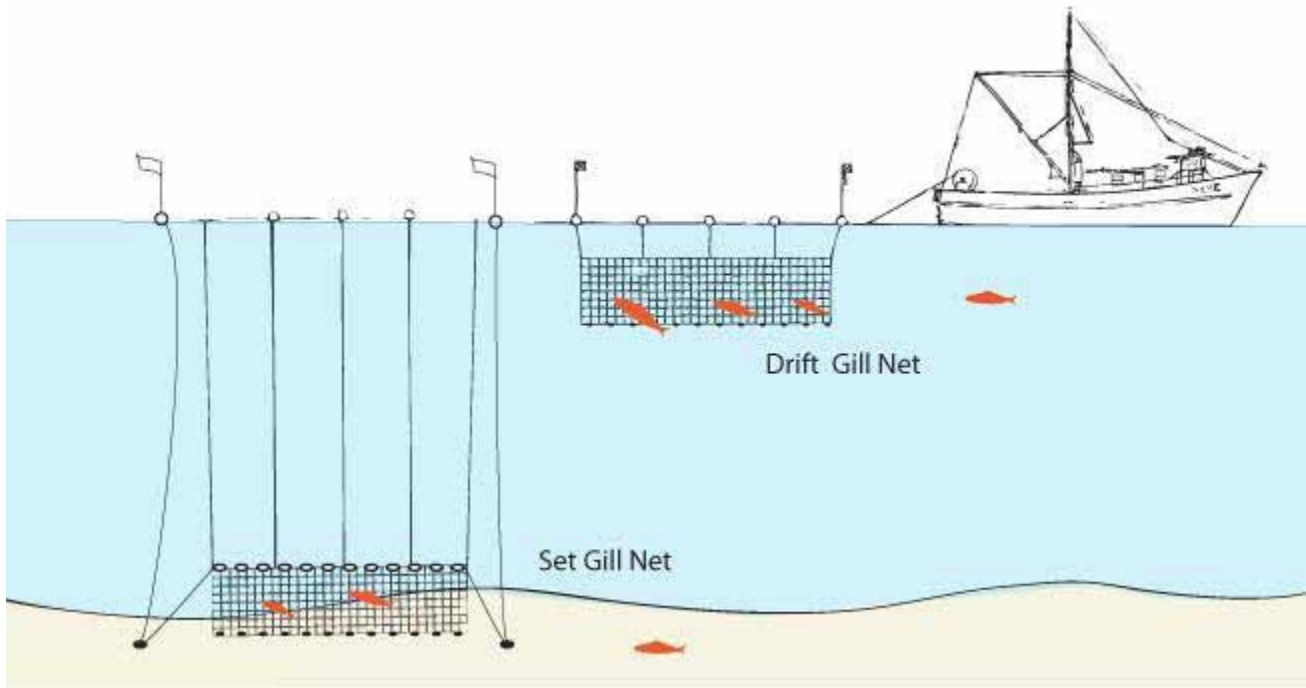
2. Purse seine net

- **Danish-seining** is the main form of boat seine used in Australia.
- It is used in Queensland, South Australia, Tasmania, Victoria and Western Australia to target a variety of species, including emperor, flathead, whiting and Redfish.



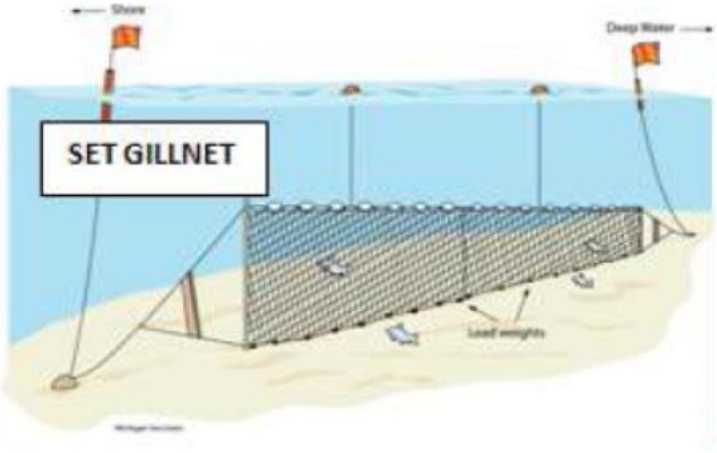
3. Gill net

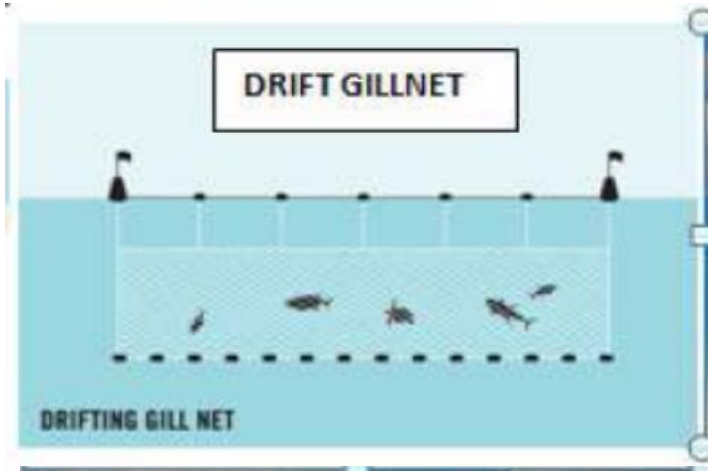
- Gill nets is rectangular walls of netting kept erect by means of floaters & sinkers and positioned in the swimming layer of the target fish, which catch the fish by holding them in the mesh by gilling.
- The size of the mesh in the net determines the size range of the species caught, as smaller fish are able to swim through the mesh.
- The legal net length and mesh size are set by individual authorities.
- Gillnets nets are used in offshore and inshore waters, and in rivers and estuaries.

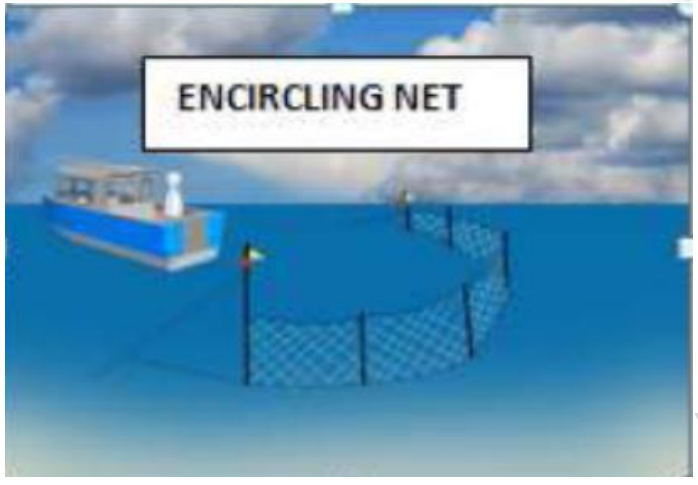


3. Gill net

- They are long wall of webbing hung vertically in water.
- **SET GILL NETS:** It gets set in water surface, mid water or at bottom by means of an anchor and floats to provide proper shape.
- **DRIFT GILL NETS:** The gill net which is allowed to drift along with water current. The one end of net either get attached with boat or both the ends get marked with buoys or any floating object.
- **ENCIRCLING GEAR:** It is also a long wall of webbing which use to encircle the fish by some means.



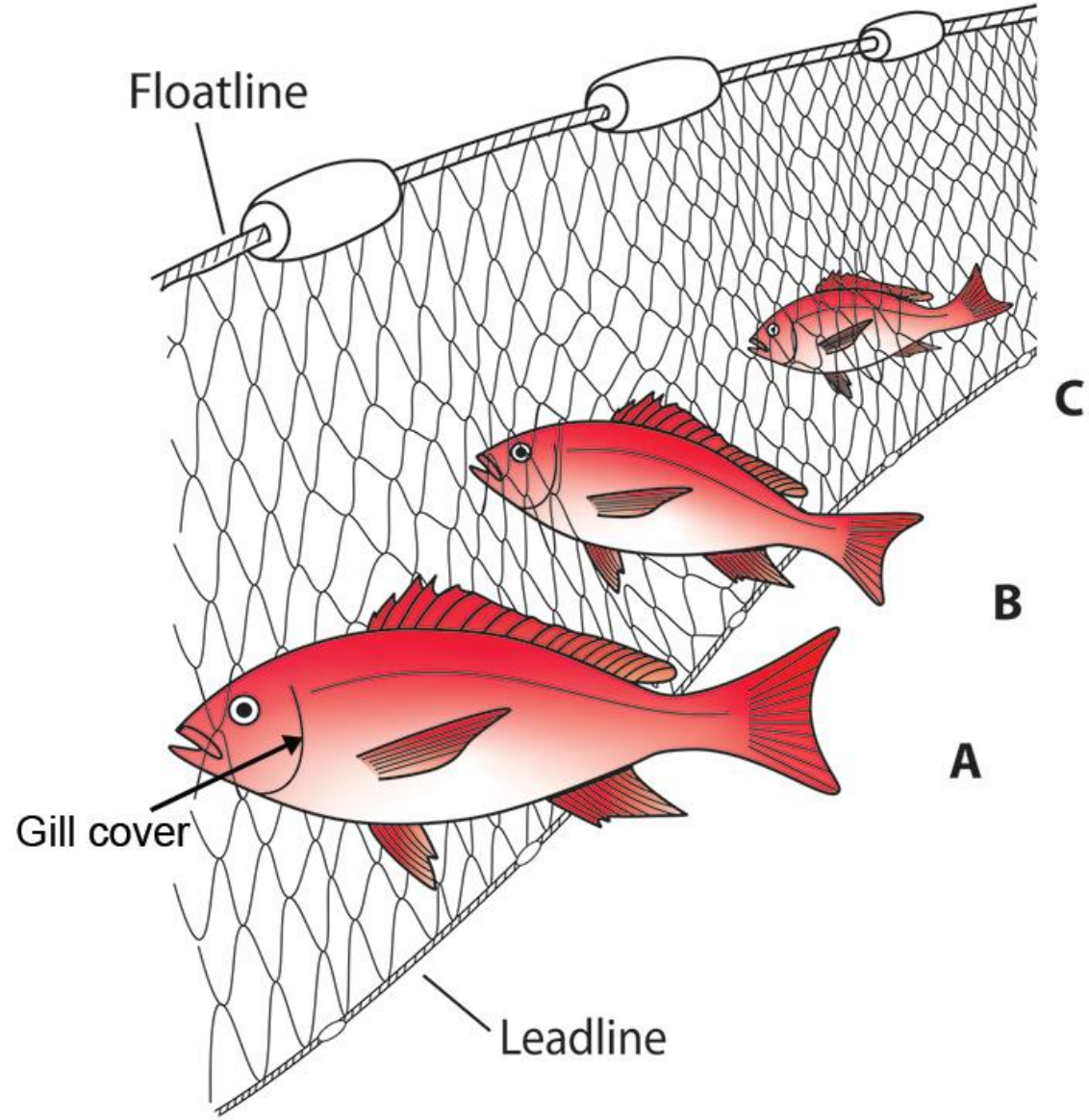




3. Gill net

- Fish are caught in gillnets in one of three ways:

- Gilled—the fish tries to swim through one or more meshes; if it cannot pass through, it becomes caught behind its gill covers as it tries to back out of the net.
- Wedged—the fish is tightly held in the net around the body by one or more meshes
- Tangled—the fish is caught in the net by some part of its body, such as extended fins or spines.

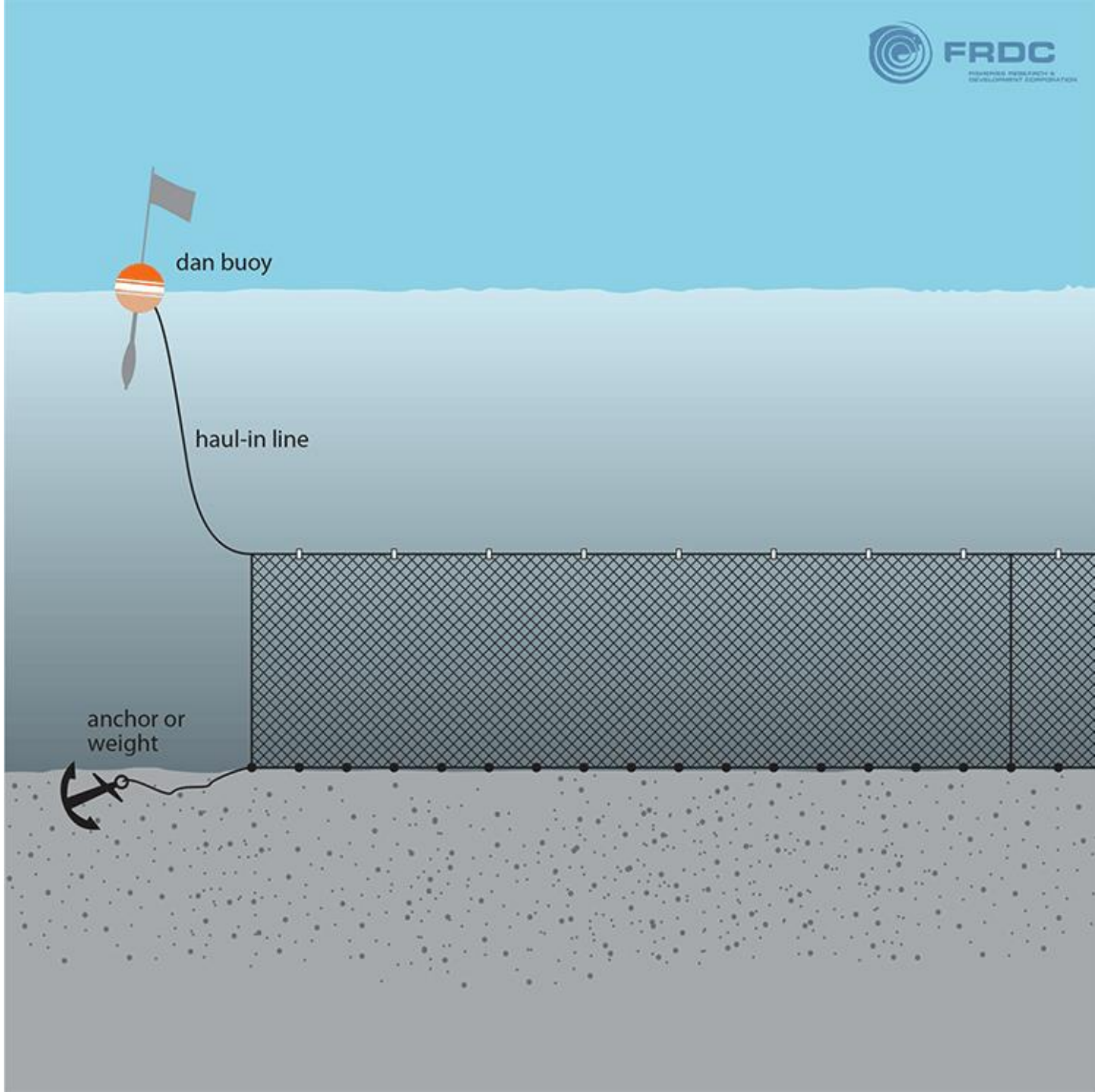


3. Gill net

- **Pelagic gillnets** (also known as drifting gillnets or drift nets) are used in a number of catch including, Queensland and Northern Territory waters to **target tropical sharks** and **mackerels**.
- **Pelagic gillnets** are made up of **individual net panels tied together**, allowing easy removal or replacement of damaged sections.
- They are set in open water and can be set with the headline on the sea surface (positively buoyant) or suspended below the surface (negatively buoyant), with one end of the net often remaining attached to the vessel.

3. Gill net

- **Demersal gillnets** (also called bottom-set gillnets, shark nets) are **used to target Gummy Shark**.
- State-managed fisheries also use demersal gillnets to target finfish species.
- Demersal gillnets are similar to pelagic gillnets but are negatively buoyant and fish on the ocean floor.
- The boat does not remain attached to the gear, but may remain within a short distance of it.

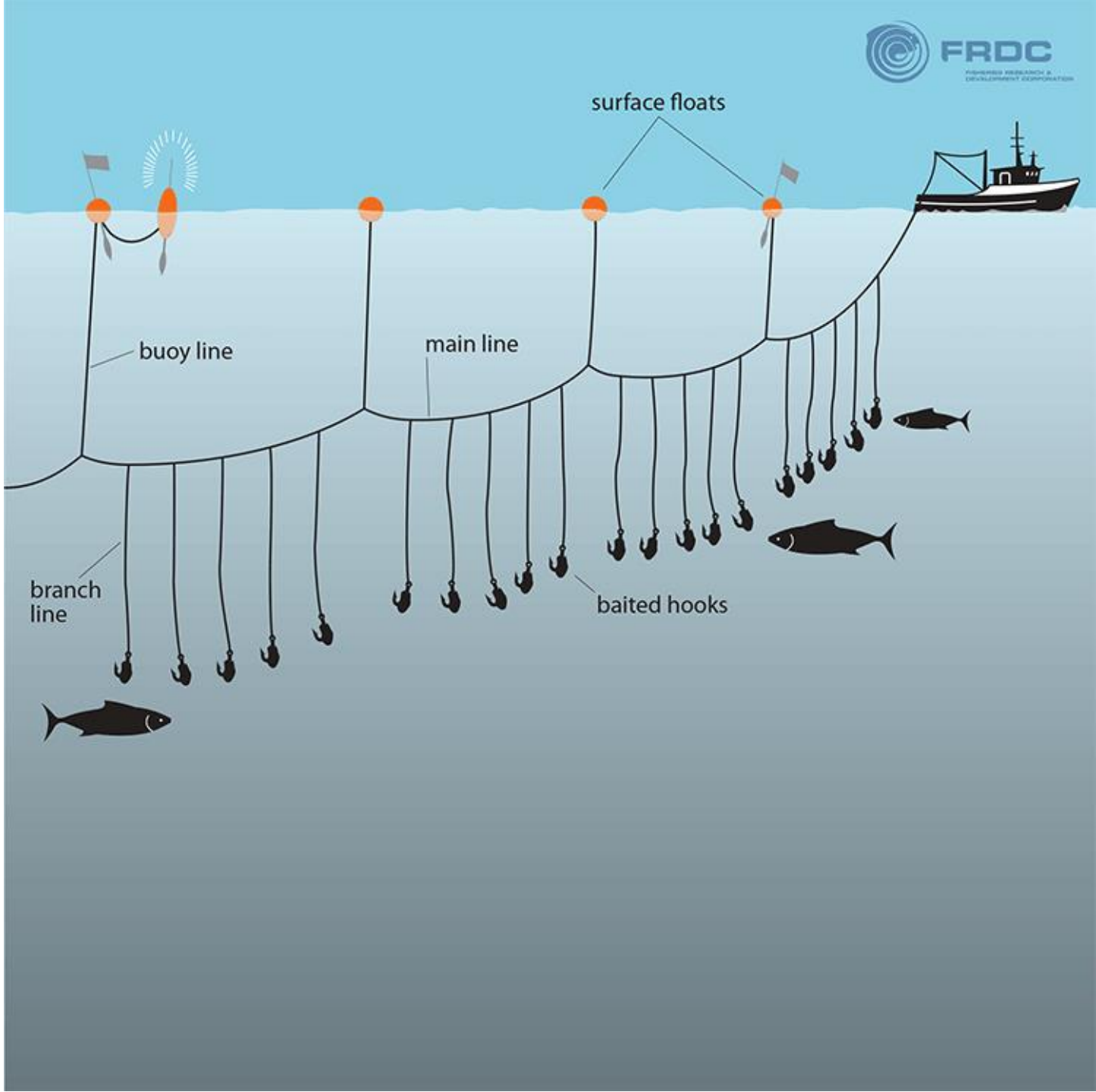


3. Gill net

- **Coastal-, estuary- and river-set gillnets** (also called swinger nets, mesh nets, running nets or offshore-set gillnets) are set in estuaries and adjacent to the coast.
- The **headline is tied to a tree** or otherwise held on the shore above the high-water mark.
- The **dinghy is used to set the net across the river** in a range of directions, depending on the tide and the species being targeted.
- Offshore-set gillnets are set in at least 2 m of water, but coastal-set gillnets are usually anchored on the shoreline and may even be exposed at low tide, only catching fish as the tide rises.

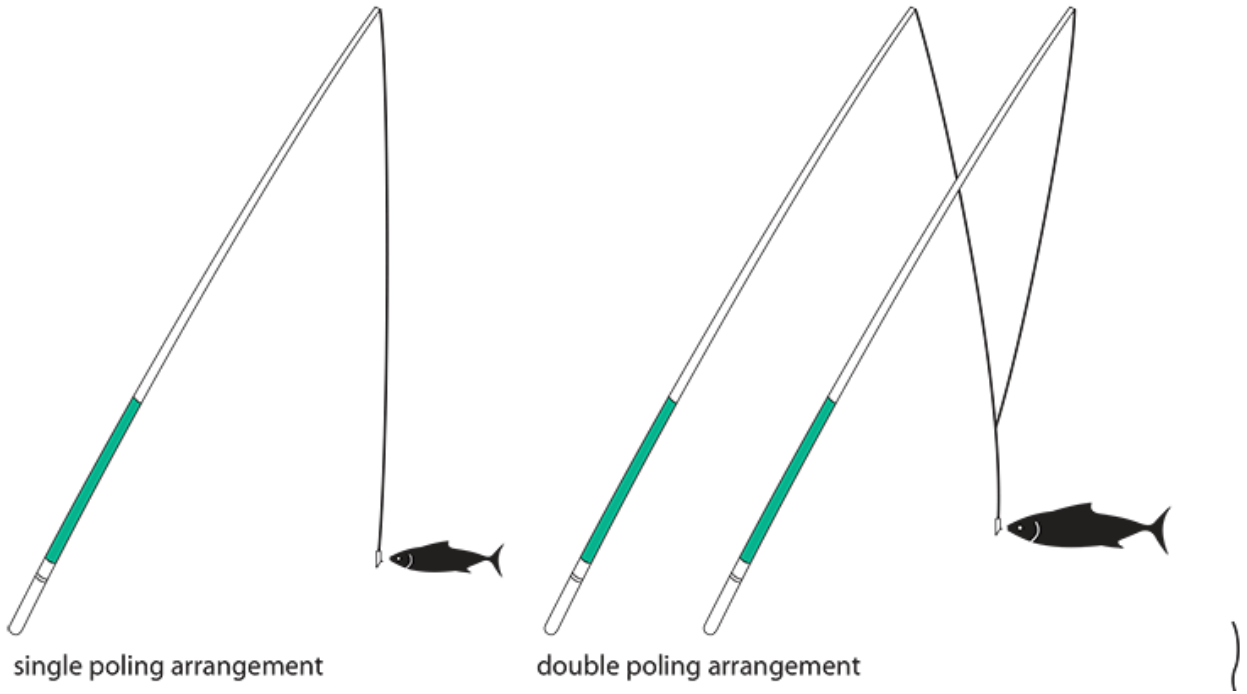
4. Hooks & lines

- In this method the fish get attracted by natural or artificial baits.
- The bait is used with hook so when fish take the bait inside the mouth, it is difficult for fish to escape.
- Following are the types hooks & lines.
  1. Hand lines
  2. Droplines
  3. Demersal longlines
  4. Drifting longlines
  5. Trolling



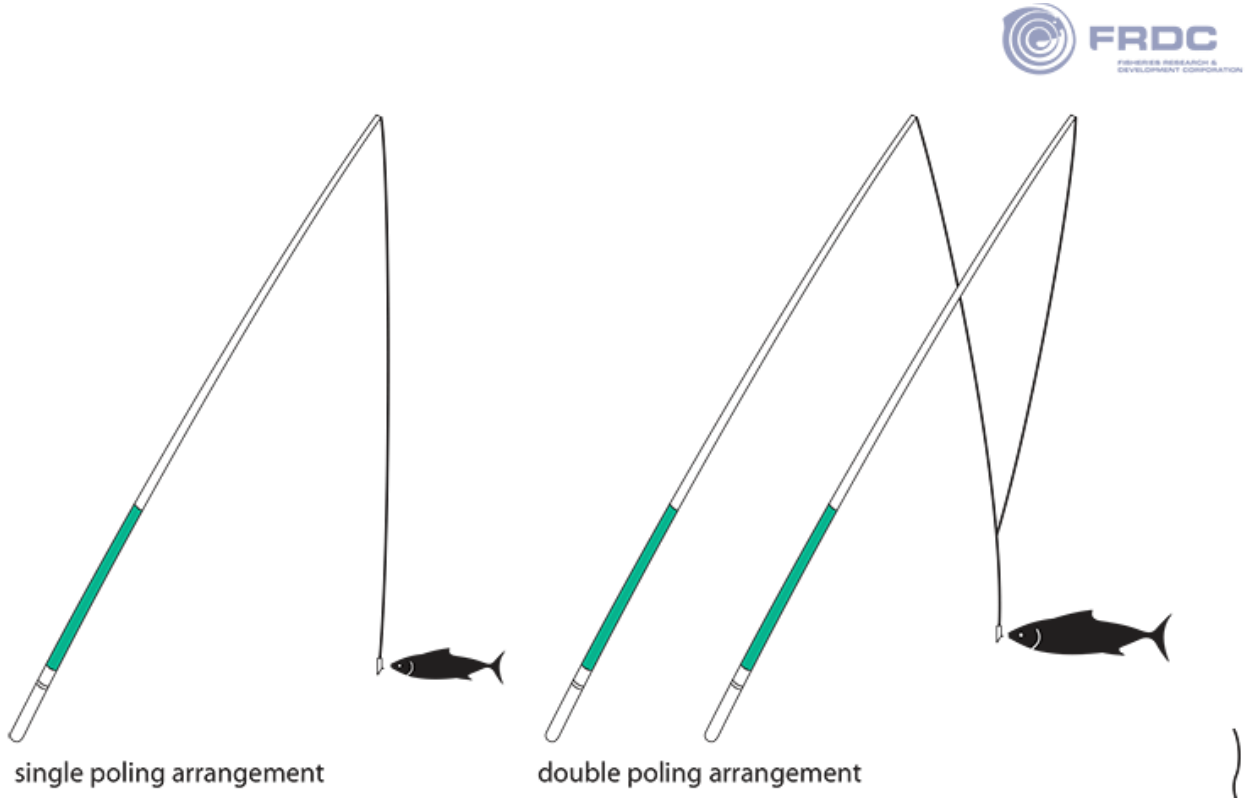
4. Hooks & lines

- **Hand lines:** Hand line is the simple form of fishing line.
- They consist of one or more baited hooks attached to a line, which is retrieved by hand.
- They may be used singly or several at a time.
- Hand reels can be mounted on the side of a vessel or attached to a rod (rod and line).



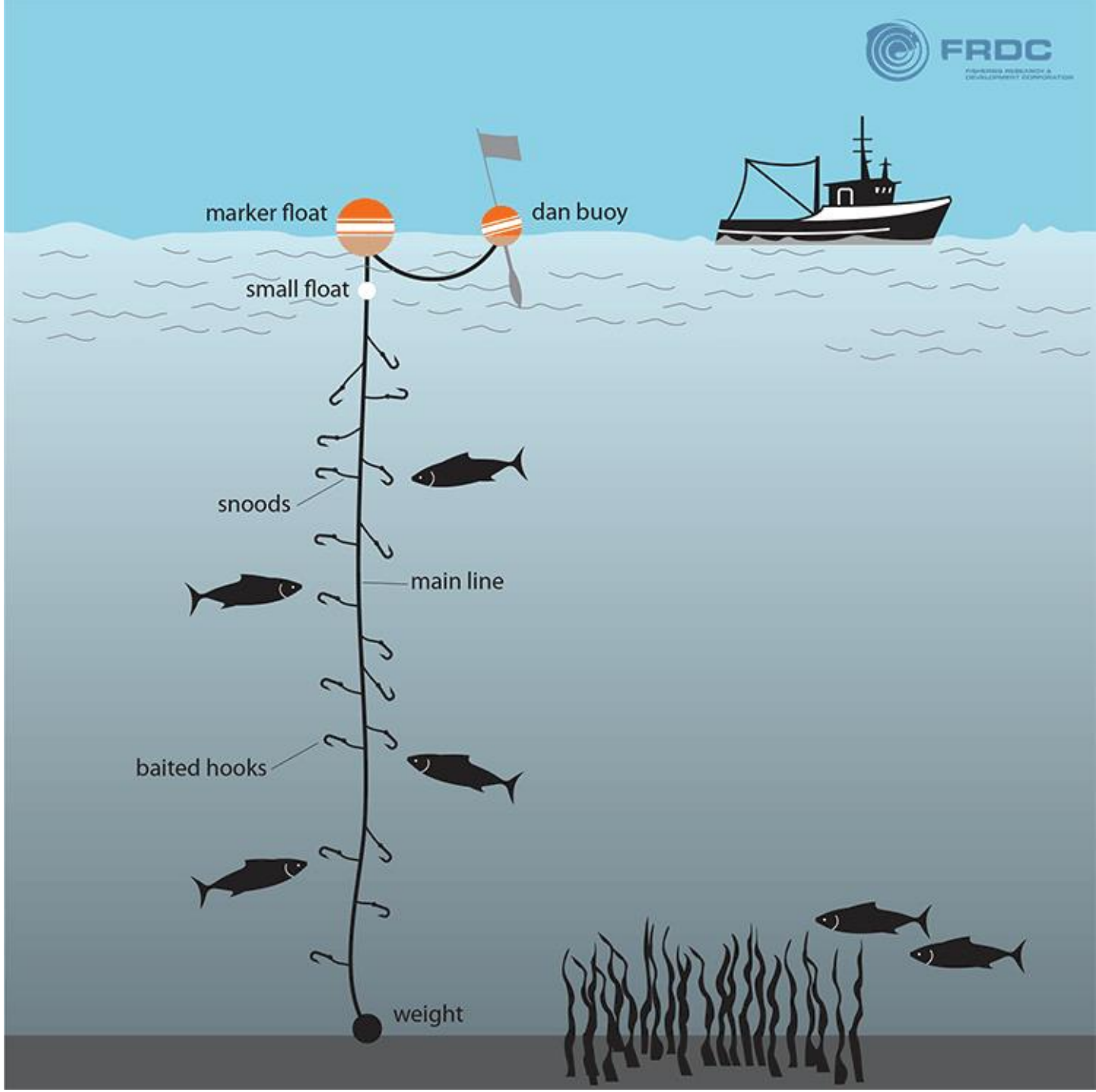
4. Hooks & lines

- **Hand lines:** Rod and line is the predominant method used by recreational fishers in Australia.
- Reels are used to set up and recover the line and are usually fitted with a drag system (a 'brake' system, which is designed to create resistance in the reel as the fish takes out line).
- To reduce the time and effort involved in setting and hauling the line, electric or hydraulic motors may be fitted to some larger reels (powered reels).



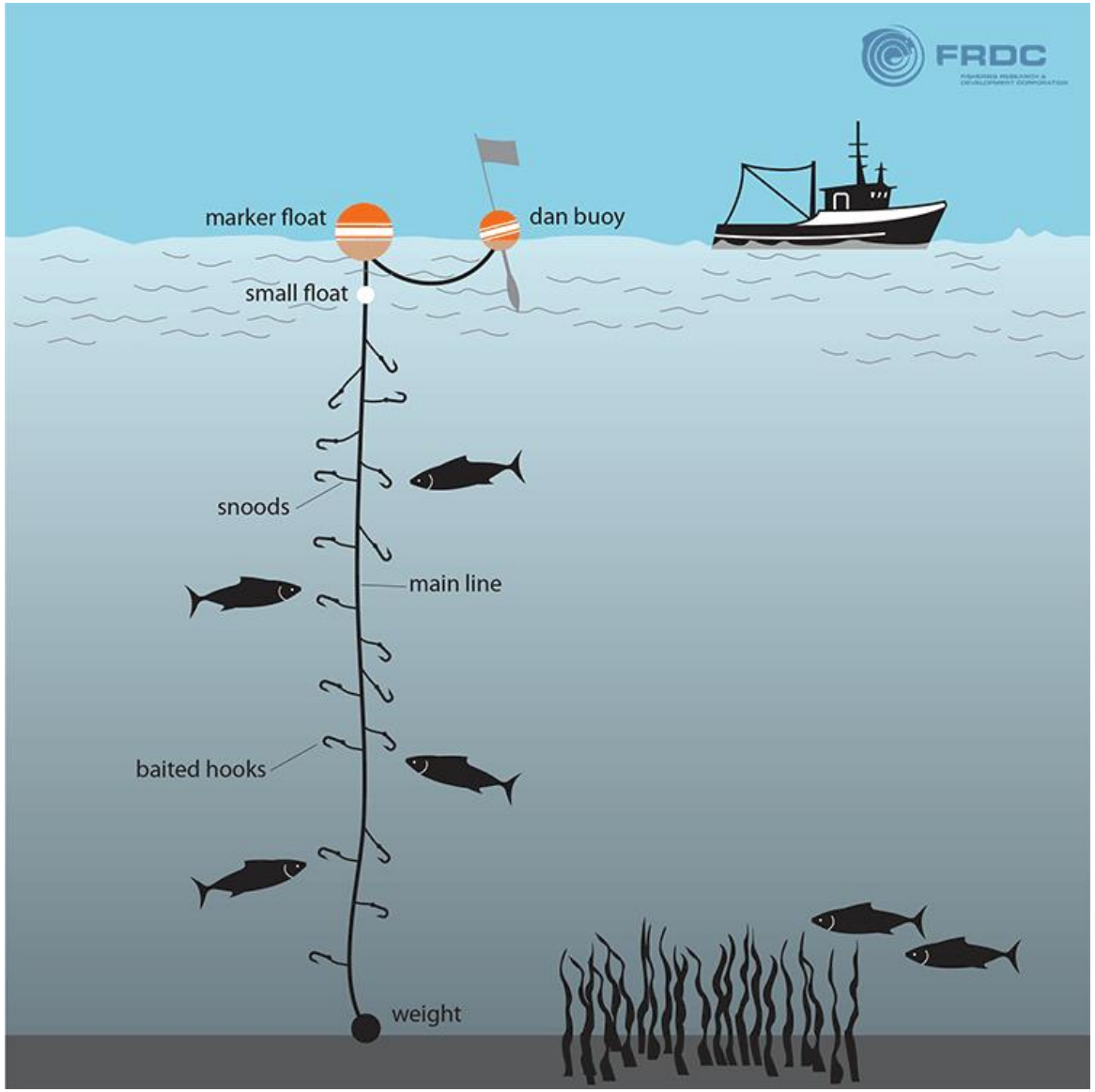
4. Hooks & lines

- **Droplines:** Dropline can be set vertically in the water column.
- Droplines are used mainly on the continental slope off south-eastern Australia to target Blue-Eye Striped Trumpeter and Hapuku, although Gemfish, sharks and Pink Ling are also taken.
- Off southern Western Australia, droplines are used on the continental shelf to target Snapper and shark species.
- In the Northern Territory, tropical snappers and emperors are targeted by drop lining in waters more than 80 m deep.



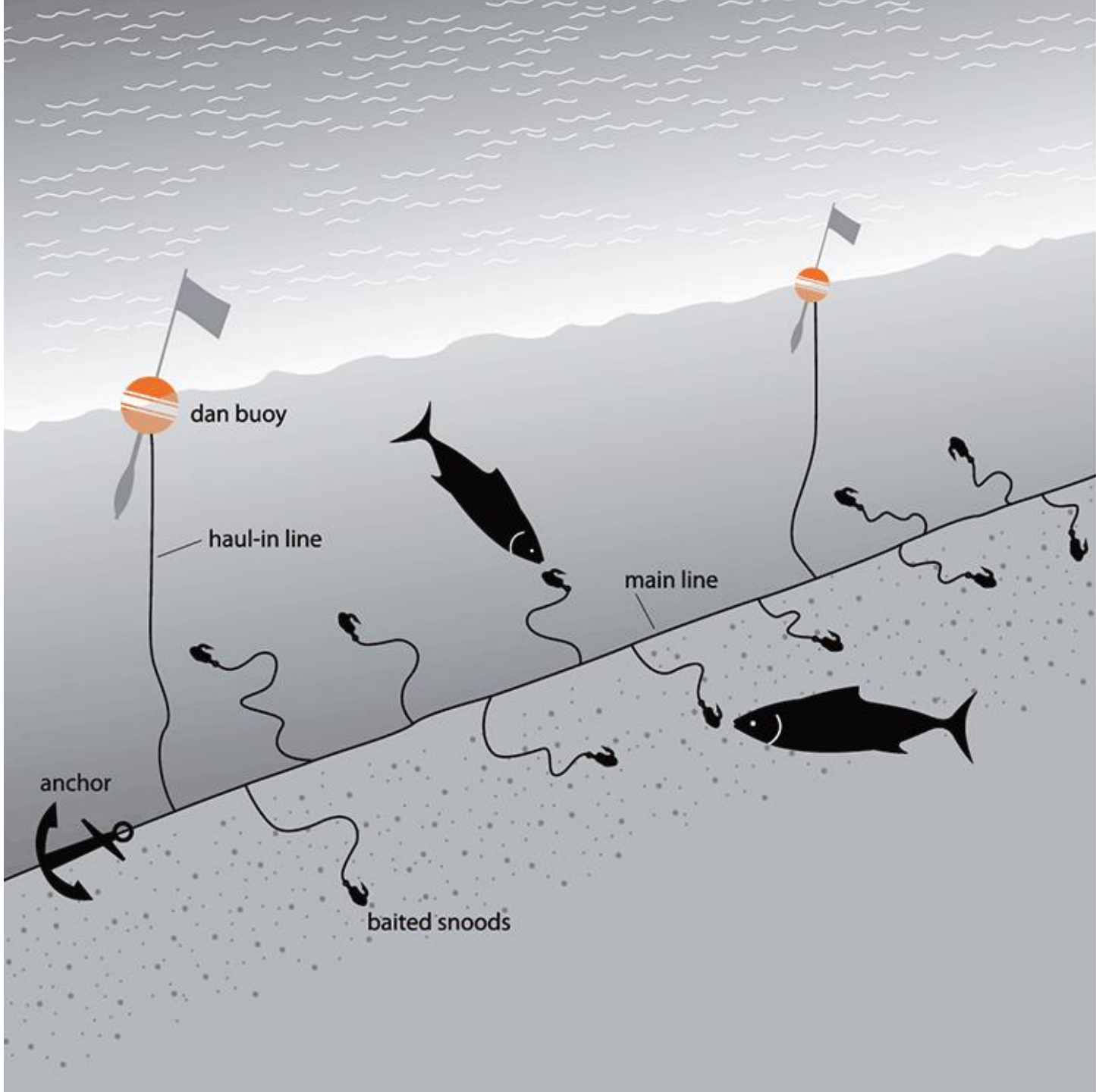
4. Hooks & lines

- **Droplines:** Droplines consist of a mainline of rope, wire or nylon that is anchored vertically in the water with a weight on the bottom and floats attached at the surface.
- Short lengths of twine or nylon called snoods or traces have a clip attached to one end and a hook on the other.
- When being set for fishing, the desired number of pre-baited snoods (usually between 10 and 100) is clipped at regular intervals along the lower section of mainline as it is fed out.
- Alternatively, the snoods may be permanently attached to the mainline, and are baited and lined up in order along individual shooting rails while the vessel is heading for the fishing grounds.
- When the weight is dropped overboard, they are pulled off the rails in turn as the line is set.



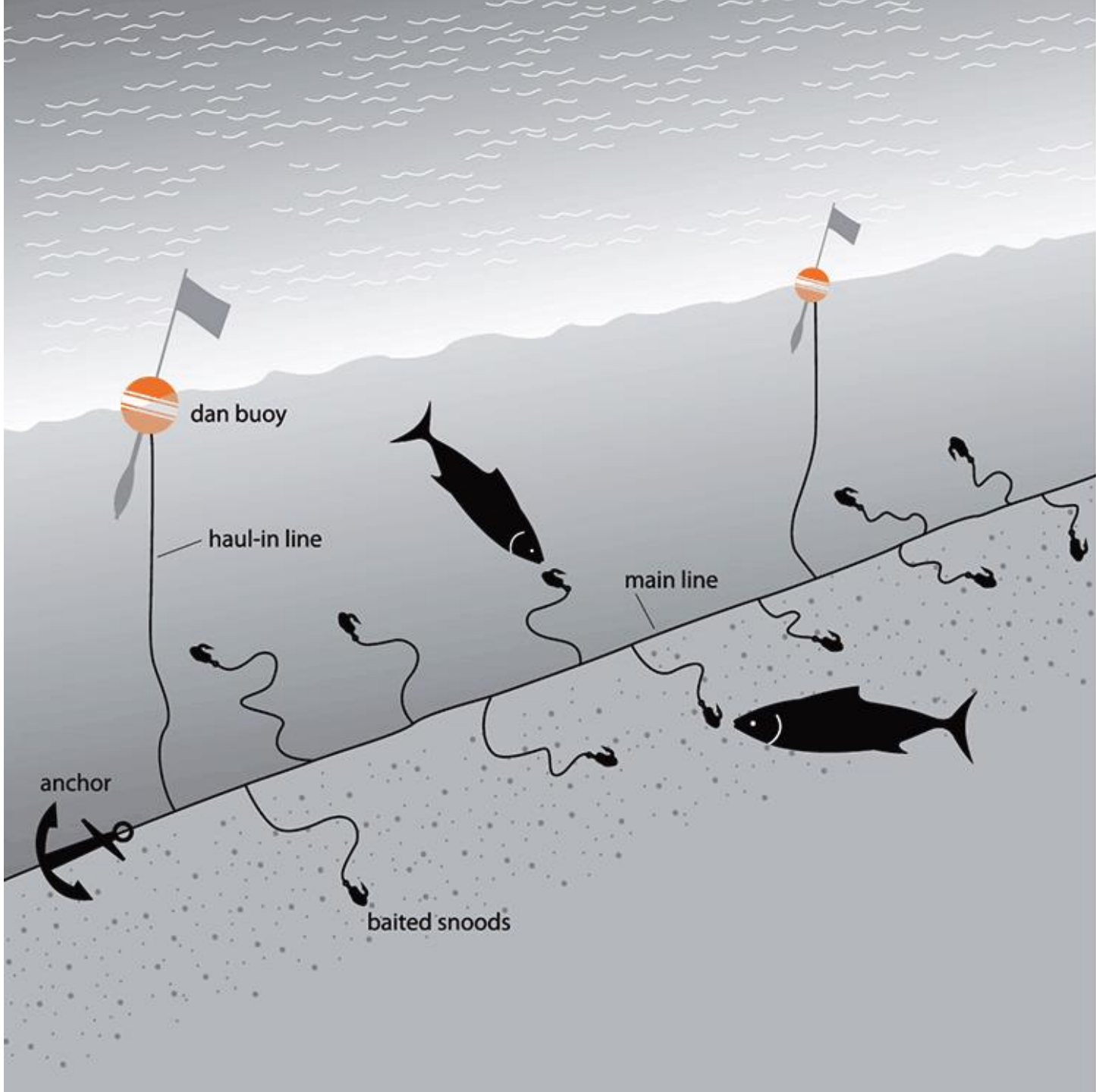
4. Hooks & lines

- **Demersal longlines:** This line differs from a dropline in that the mainline with the baited snoods attached is set along the seabed.
- One end of the haul-in line has a weight attached to anchor the end of the mainline, and the other has a dan buoy (a small buoy, with a flag, used to temporarily mark a position at sea) and float.
- The line is left to fish for up to 6 or more hours.



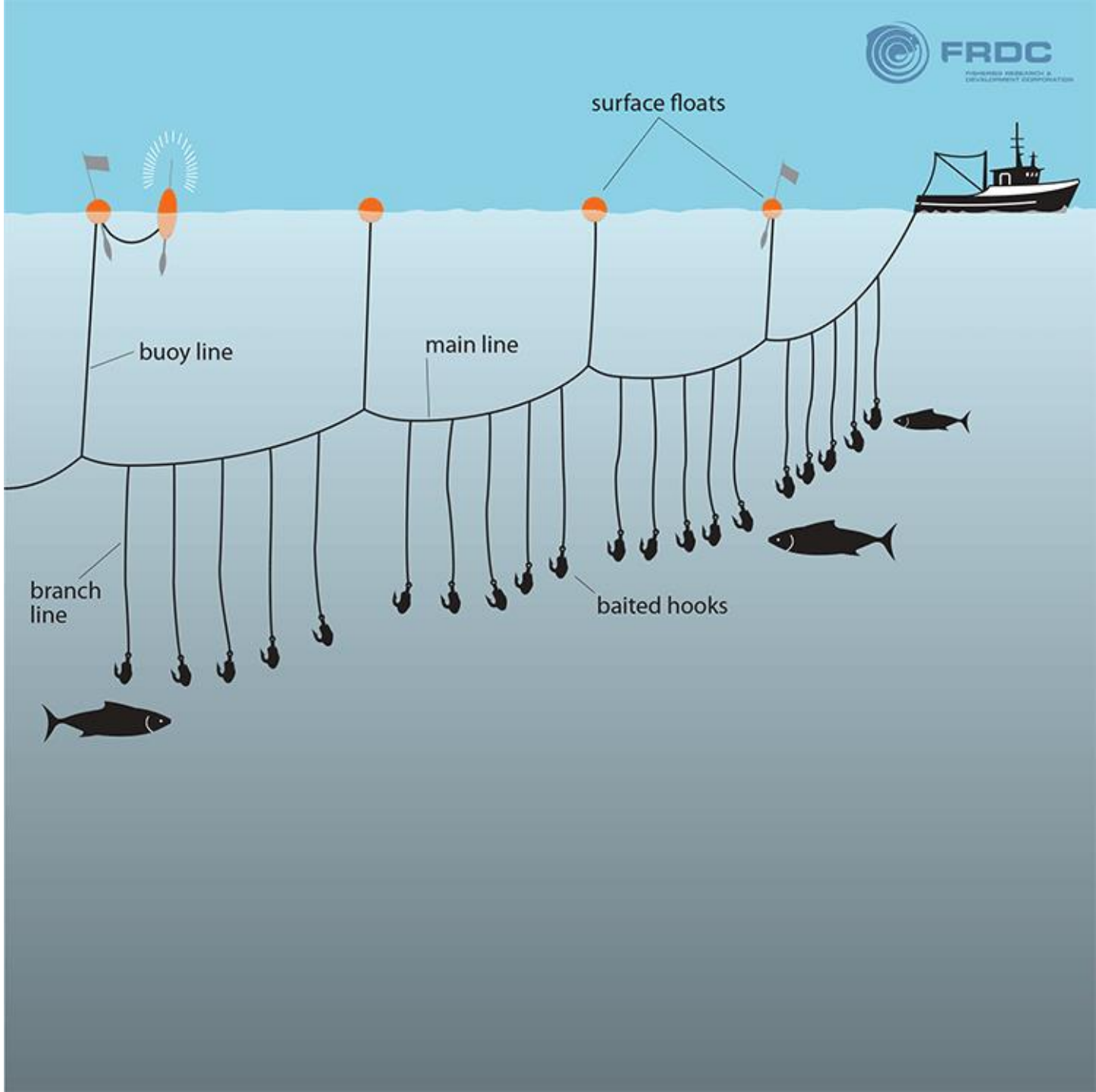
4. Hooks & lines

- **Demersal longlines:** Setting and hauling of longlines can be mechanized by hydraulic line setters and haulers, with snoods stored in magazines, and a baiting machine that attaches bait to the hooks as the line feeds over the vessel's stern.
- Such auto-longlines are used in the Commonwealth Gillnet, Hook and Trap Sector to target Deepwater finfish such as Blue-eye Trevalla and Pink Ling.



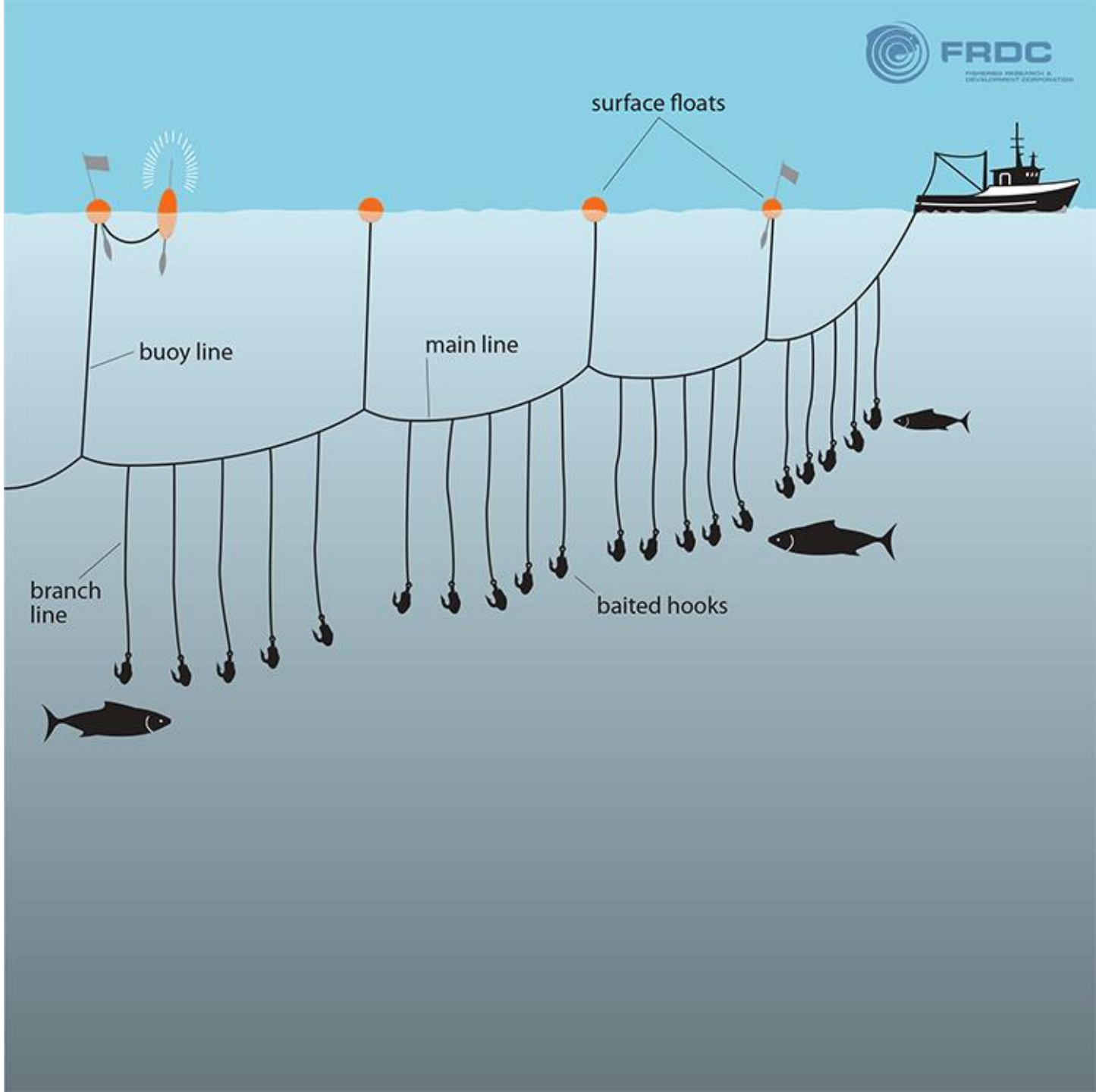
4. Hooks & lines

- **Drifting longlines:** Drifting longlines have the mainline suspended horizontally in the water at a predetermined depth by buoy lines, with floats spaced regularly every 200–400 m along their length.
- Branch lines 25–50 m long are attached at regular intervals along the mainline. Each branch line has a baited hook and fishes at a different depth, depending on its position and the curve of the mainline between floats.



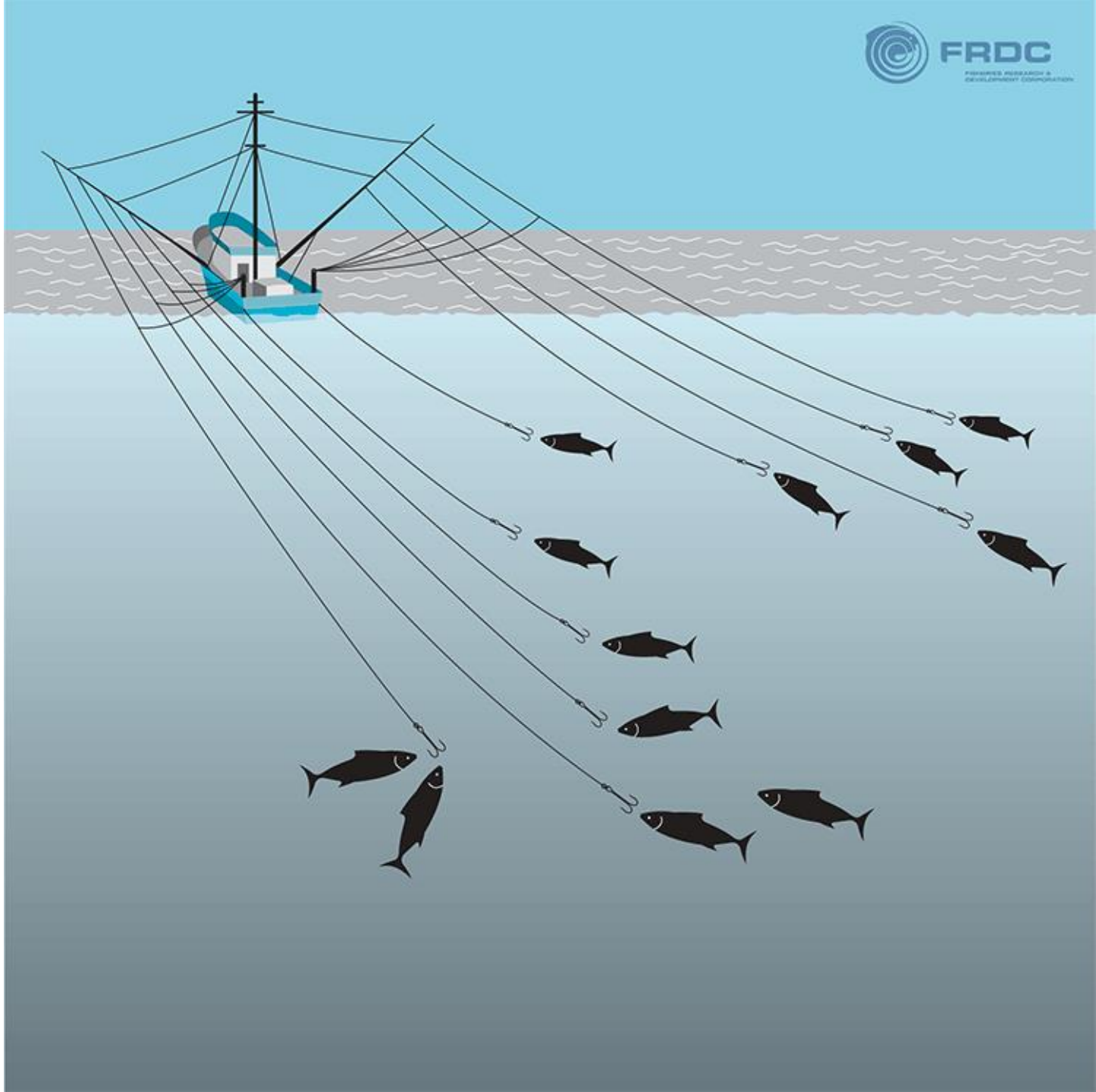
4. Hooks & lines

- **Drifting longlines:** Drifting longlines are set while the vessel is moving ahead.
- The buoys and branch lines are attached as the mainline feeds out.
- Mainlines can range from 10 km to 100 km in length, and can carry from 200 to 2000 hooks.
- The mainline takes 2–6 hours to set, while hauling takes approximately 4–12 hours.



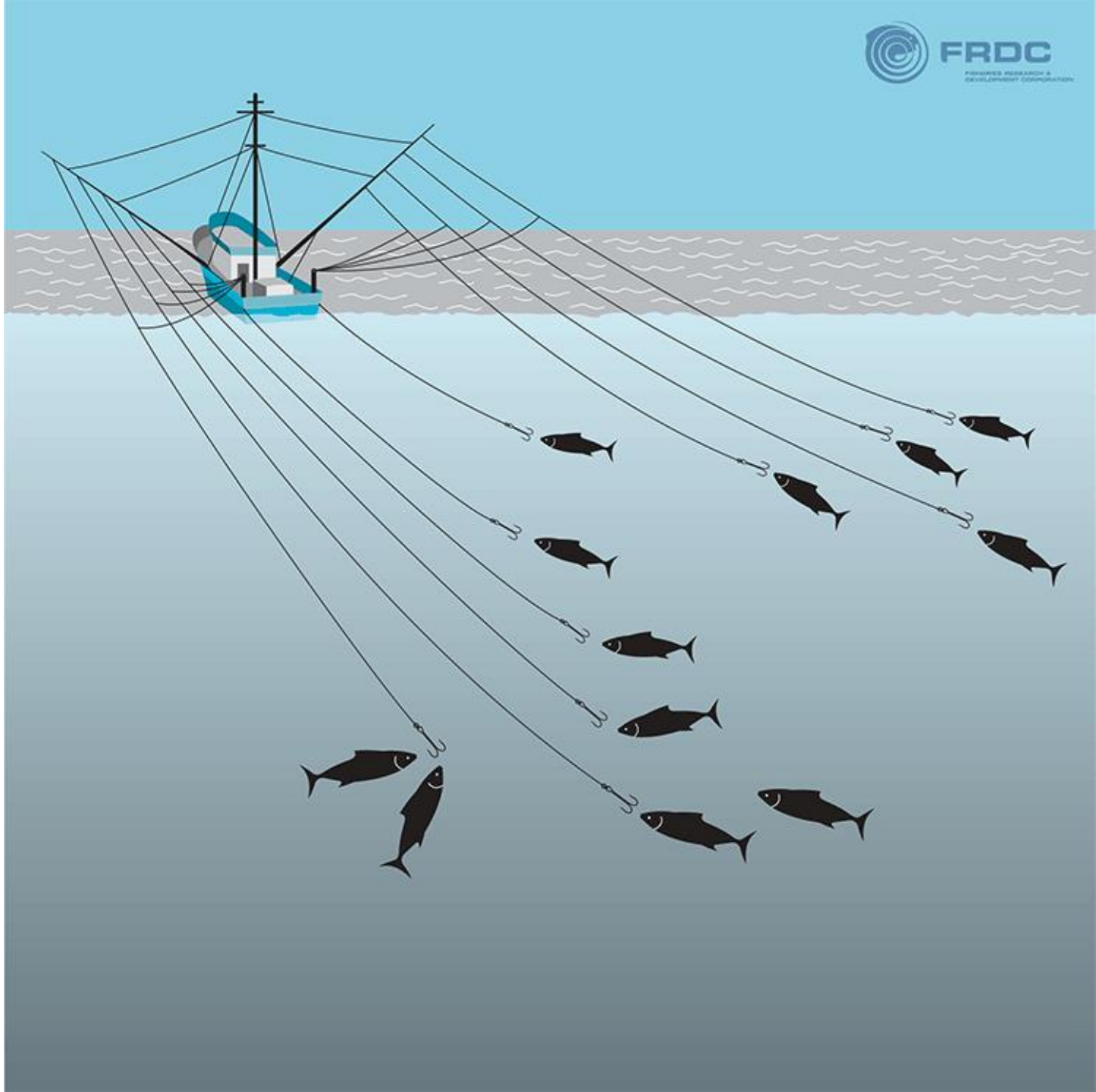
4. Hooks & lines

- **Trolling:** Trolling is a simple method of fishing in which lines with baits or lures are towed behind a vessel as it moves along at a speed of 2–10 km/h
- Most commercial operations use lines rigidly mounted to the stern of the vessel or off outriggers or booms, and troll 3–18 lines at once.



4. Hooks & lines

- **Trolling:** A variety of lines, rig designs, and lures or baits are used for trolling.
- In New South Wales, leadlines (lines with lead weights attached every 30 cm) are used to troll deeply for Yellowtail Kingfish.
- Bowden cable (galvanised cable of 1–1.5 mm diameter) is used to troll for Spanish Mackerel in Queensland.



Thank You