



## Ghost Net ID Guide



## Acknowledgements

GhostNets Australia (GNA) thanks all the indigenous rangers who have contributed to the ghost net program for the decade 2004-2014.

The tens of thousands of net data and samples provided have contributed to the information in this guide which has built upon the original WWF Net Kit first published in 2002.

All photographs used with permission. Aboriginal and Torres Strait Islander readers are warned that this booklet may contain images of deceased persons despite our best intentions.

Author: Riki Gunn, GhostNets Australia, ©2015

Design and Illustration by Picta Creative.



## References

**Information about the nets has been obtained from fishers in Indonesia and north Australia through surveys, face to face meetings and workshops.**

### Fishermen:

Bill Passey	NT Fish Trawl
Biage	NT Offshore Net and Line
Chris Newman	NT Inshore Set Net
Bradley Bosel	Qld Inshore Set Net
Dave Wren	Qld Offshore Net (shark)
Steve Colless	Northern Prawn Fishery
Pedro Knight	Northern Prawn Fishery
Michael O'Brien	Northern Prawn fishery
Syuaib	Shrimp trawl – Ambon
Mochtar Waly	Shrimp trawl – Ambon
Ibnu Purno	Shrimp trawl – Ambon
Musa Lamlon	Purse seine – Tual
Ismail	Purse seine – Tual
Muhammad Billahmar	Fish Trawl Association
Alias	Mini trawl – Aru Islands
Agus	Mini trawl – Aru Islands
Darman	Mini trawl – Aru Islands
Baba	Mini trawl – Aru Islands
Jupri	Mini trawl – Aru Islands
Risman	Mini trawl – Aru Islands
Junas	Mini trawl – Aru Islands
Baharudin	Mini trawl – Aru Islands
Rahim	Mini trawl – Aru Islands
Niko Choiri	Gillnet – Aru Islands
Dahlan Renyaan	Gillnet – Aru Islands
K. Hadi S.	Transboundary fisher
Kaimasa	Bobo/purse seine

Jamal	Fisherman bobo/purse seine
Ali	Fisherman bobo/purse seine
Hasan	Fisherman bobo/purse seine
Abbas	Fisherman bobo/purse seine
Kadanan	Fisherman bobo/purse seine
Umar	Fisherman bobo/purse seine
Rajab	Fisherman bobo/purse seine
Mikael	Gill net – Vessel: 2 GT- Mappi
Yohanes K	Mappi gillnetter also helps fisheries office with surveillance.
Mahyudin	Merauke gillnetter and chair of local fisheries association and surveillance committee.
Rokyat (Nikko)	Asmat – gill netter
Florens	Asmat – gill net (vessel 20 - 30 GT)
Eddy Lee	Manager of Chinese gillnet company based in Merauke – (fleet of 12 boats < 30 GT)
Larung	Merauke works for Eddy Lee.
Kasiran	Merauke gill net (26 GT), works for Eddy Lee.
Ali	Merauke gill netter (26 GT)
Mr Ling	Petesino – JV Company 'Sino' – 23 boats / 285 GT / fish trawl net.
Handoyo	Works for PT Sino – former head of local fisheries office.
Ricky	Merauke – gill netter (<30 GT)
Pitono	Merauke – gillnetter/ Surya Maro Sakti
William	Skipper – fish trawl net from Petesino.

### Other information has been obtained from:

Prof. Subhat Nurhakim (Jakarta)  
 Frederik H Noya (Eric) - Fisheries Gear Expert - Merauke  
 Jillian Hudgins and Martin Selfox - Maldives.  
 WWF Net Kit  
 Northridge, S. P. 1991. *Driftnet fisheries and their impacts on nontarget species: a worldwide review*.  
 FAO Fisheries Technical Paper, No. 320,  
 Food and Agriculture Organisation of the United Nations. Rome.



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# The purpose of this guide

This guide has two purposes:

Firstly it provides known information about the probable users and uses of the ghost nets washing up on north Australian shores. The secondary purpose is to provide simple instructions about how and what data needs to be recorded to aid GhostNets Australia in its efforts to reduce this significant flow of nets. Stopping the flow of nets is preferred to continually dealing with the ghost nets at the end of their destructive journey.

## GhostNets Australia

GhostNets Australia (GNA) was established in 2004, to resource and train local indigenous rangers across north Australia to manage a growing ghost net issue. By 2013 rangers had removed over 13,000 ghost nets mostly from the Gulf of Carpentaria.

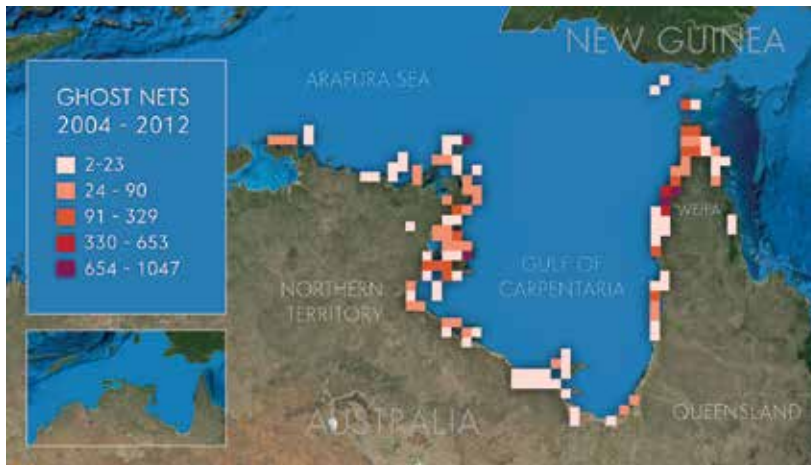
Analysis of the data recorded by rangers has enabled GNA to determine the abundance, distribution (Figure 1), major impacts and physical source of the problem. Further research, in partnership with CSIRO

(Commonwealth Scientific and Industrial Research Organisation - Australia) and ATSEA (Arafura and Timor Seas Ecosystem Action Program - Indonesia) involved interviewing fishers operating in the Arafura Sea to the north of Australia. Outcomes of the research identified the prime causes for fishing nets becoming lost, abandoned or discarded in this region.

The next step for GNA involves supporting fishers to make significant changes in their behaviour and fishing practices. GNA needs to link the ghost nets found to the fisheries operating in the region; hence this Ghost Net ID Guide. This is important, allowing us to target efforts at the appropriate fishing industry as well as monitor the effectiveness of changes within those operations.

For more information about the various projects that GNA has done in the past and is planning in the future visit:

[www.ghostnets.com.au](http://www.ghostnets.com.au).



**Figure 1:** Concentrations of ghost nets that have been cleaned up by Indigenous rangers 2004-2012. Red showing areas of most nets. Created with images from Google Maps.

## How and where to record data

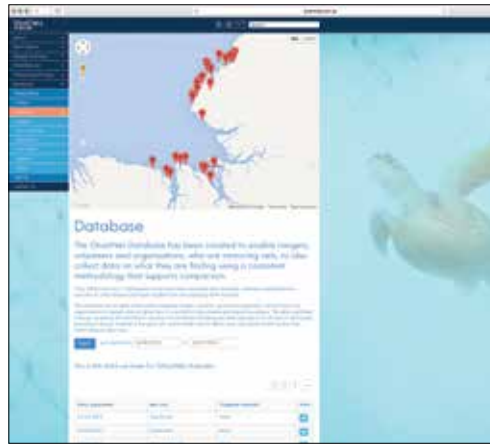
GhostNets Australia has set up an online database where data can be entered directly [www.ghostnets.com.au/resources/database/](http://www.ghostnets.com.au/resources/database/). There is also a copy of the data sheet at the rear of this guide that can be photocopied for ease of entry in the field. One data sheet should be used for every individual net.



The image shows a printed data sheet for recording net data. It is divided into several sections with various fields for data entry. The top section includes fields for 'Location', 'Date', and 'Time'. Below this, there are sections for 'Net Details' and 'Observer Information'. The bottom section contains a table for recording 'Net Results' with columns for 'Date', 'Time', 'Location', and 'Net Type'. The sheet is designed to be photocopied and used in the field.

The database is also able to upload data collected electronically. GhostNets Australia has created a data sequence for the freeware Cybertracker™. Both the sequence instructions and where and how to upload the software, can be found on our website.

The database has an open access policy enabling rangers, scientists, government agencies, communities and organisations to request data on ghost nets in Australia for educational and research purposes.



## All About Nets

For background information about types of fishing; why fishers use the nets they do; what is important to them when selecting the material they use in their nets, and briefly, how nets are made, refer to the adjunct to this guide, *All About Nets*. This will help in the understanding of the relevance of each bit of information required to identifying the net use.



# How to use this guide

The guide has been divided into nine sections governed by the mesh sizes of the ghost nets. This is in broad categories according to how many fingers or hands can fit comfortably in the opening of the mesh e.g. the 1 Finger section is for all nets with a mesh size ranging between 25-41 mm. It is not a unique way of measuring the mesh size for, prior to the creation of machines, fishers used this method when making their nets.

## How to look up a net

Each section is marked by an icon depicting the number of fingers that comfortably fit within the mesh. It also has a tab at the side showing the size range of the meshes (Figure 2). The size range accounts for the variations in hand sizes.

For detailed instructions on how to measure and determine the various characteristics that distinguish nets from each other see page 8.

Within each section look for the appropriate twine within that section. The net codes are arranged in increasing order starting with very thin twine and ending with double twines (two strands of twine together). Study the twine construction, feel it and note any other distinguishing features to be able to look up the appropriate ID.

**Note: If the net does not match any of the IDs then it is a new net sample. Please contact GhostNets Australia: [info@ghostnets.com.au](mailto:info@ghostnets.com.au) to find out where to send a sample of the ghost net so it can be included in new editions.**

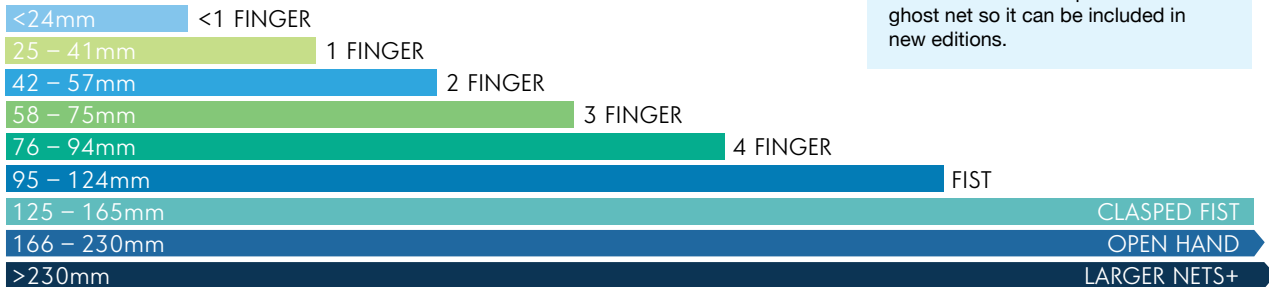


Figure 2: Side bars and icons used for each section

Each ghost net ID is divided into four distinct parts (Figure 3):

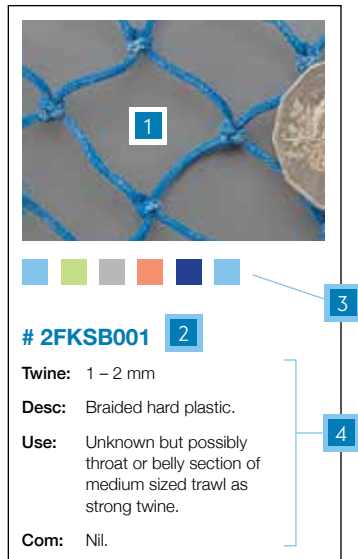


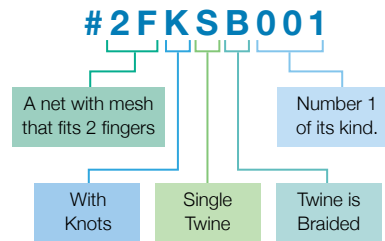
Figure 3: Ghost Net ID example

### 1 IMAGE

The picture shows either the mesh or a close up of the twine or other distinctive features. It is shot with a 50c piece in view to give a size comparison as not all shots are taken from the same distance.

### 2 IDENTIFICATION CODE

The ID codes are prefixed by a hash symbol (#). The codes indicate mesh size; presence of knots; twine configuration; twine construction and a 3 digit number.



What the codes indicate

Code	Definition	Code	Definition
NF	<1 Finger	XX	Larger Net +
1F	1 Finger	K	Knots
2F	2 Fingers	L	Knotless
3F	3 Fingers	D	Double Twine
4F	4 Fingers	S	Single Twine
FF	Fist	T	Twisted
CF	Clasped Fist	B	Braided
OH	Open Hand	M	Monofilament (Mono)

### 3 COLOUR BAR

Below the image is a colour bar showing all the sample colours found to date. No Colour, or Clear, is depicted as a blank box with a 'C' inside it.

### 4 TEXT

Within the text there is information to further help identify the net, and what has been learnt about the net to date.

**Twine** is the thickness of the twine to the nearest 0.5mm. In most cases there is a range for the twine to fall within as many samples have been measured.

**Description** is the construction of the twine: Whether it is Twisted (T), Braided (B), Monofilament (M); Number of strands for the twisted twine e.g. (T3) for three stranded; other distinguishing features such as the addition of floats or the feel of the material and its properties.

**Use** is the information we have to date about the fishery and/or parts of a net.

**Comments** is any other relevant information.



# Instructions for recording data

The information required to identify ghost nets has been divided into two levels depending on their importance.

The first level (page 54) gives us the location, basic net characteristics, what animals are found and volume of the net.

The second level, which is optional, provides more in depth information to assist in better identification of the fishery that uses that net.

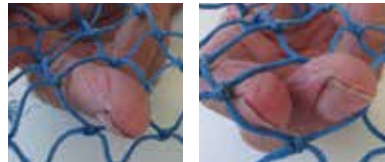
## Level 1 (Required)

**Contact details:** Enter your name and or your organisation. Contact details are also necessary in case of a query on the data. Email is preferred but if you have no email then a phone number will suffice.

**Location:** The Locality means the name of the place e.g. name of the beach, suburb or town. The Latitude and Longitude needs to be written as decimal degrees (e.g. Cairns is: -16.920334 Lat & 145.770860 Lon). These coordinates can be found by using a GPS (car or phone) or looking up the location on google earth.

**Measuring mesh size:** There are two alternatives to measuring the mesh:

- A.** Insert your finger/s through the mesh so that the twine rests between the first and second finger joints. Determine how many fingers fit comfortably inside the mesh. In the example shown in the photographs below, the mesh is in the one finger category. It is loose around one finger, but too tight for two fingers.



Photos 1 & 2: Demonstrating how to measure one finger mesh.

- B.** Pull the mesh closed so two knots meet in the middle (Figure 4). Measure between the two knots at either end of the mesh to the closest mm.

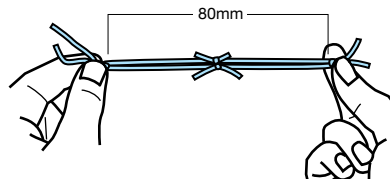


Figure 4: Stretching the mesh to measure between the knots.

**Choosing the correct category:** Use the mesh size to determine which category the net belongs to.



**<1 Finger:** Less than one finger. Mesh is too small to insert one finger.



**Fingers (1-4):** Measure mesh between the first and second finger joints.



**Fist:** When using a fist the widest part across the back of the hand needs to fit in the mesh.



**Clasped fist:** A clasped fist is a hand wrapped around a fist. Measure at the knuckles.



**Open hand:** An open hand is all the fingers spread as wide as possible. Measure from thumb tip to little finger tip.



**Larger Net+:** Anything larger than an open hand is grouped as Larger Net+.

If you've measured the net using a ruler (method B), refer to page 6 for the centimetre measurements associated with each category.

**Measuring twine size:** To measure the twine's thickness, pull a section of the twine straight and lay it across a ruler or the gauge on the back page of this guide to find the closest measurement.

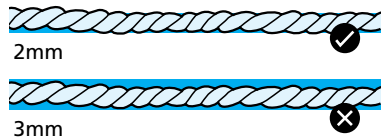


Figure 5: Match twine to closest millimetre.

**What type of twine:** How is the twine constructed? Is it twisted, braided like a shoe lace or monofilament like fishing line?

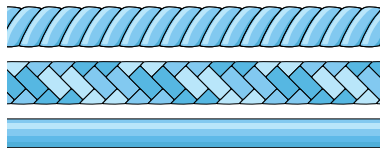


Figure 6: The types of twine construction from top to bottom: twisted; braided and monofilament

**Other net details:** Whether the mesh is constructed of single twine or twine that has been doubled up (Figure 7) and whether or not there are knots in the material (Figure 8).

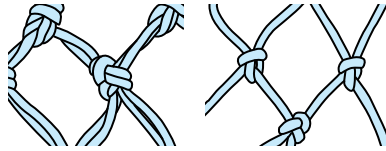


Figure 7: Double and single twine.



Figure 8: Knotless and knotted netting.



Photo 3: Turtles are often victims of ghost nets.

**Recording information about animals trapped:**

The animals that are listed are the most common found so for any others just mark the 'other' box with the number of them. For animals like small crabs where there are too many to count record a question mark (?) in the box.

**How big is the net?:** Imagine the net bundled up into a ball and estimate which of the four choices most closely matches in volume: a) football, b) Toyota tyre, c) wheelie bin or d) ute load (Figure 9).

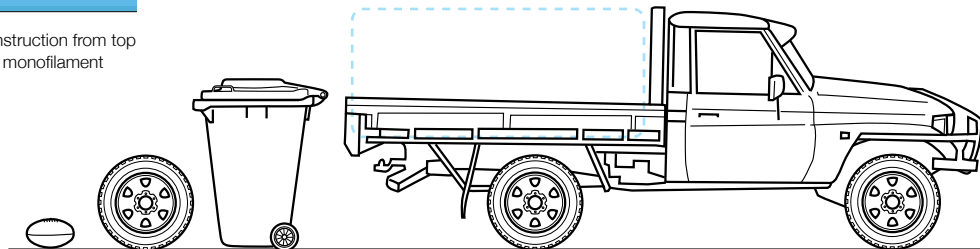


Figure 9: Size of a bundled net: football, tyre, wheelie bin or ute load.

## Level 2 (optional)

**Colour:** Some nets have multicoloured twine so it is acceptable to enter more than one colour. Be aware that sea salt and sun fade the colour pigments in the net, so there are many variations in colour.

**Feel:** The feel of the twine helps us know what type of material the twine has been constructed from. Really soft and silky twine has very fine fibres that are hard to tease apart. The fibres are very similar to those that make up old fashioned nylon stockings. Soft twine on the other hand is soft and easy to scrunch up, more like a nylon shirt but not the hard and stiff plastic like fishing line or rope.

**Floats:** These generally come in three shapes as per diagrams in Figure 10.

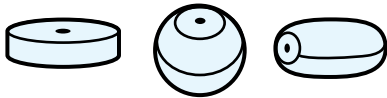


Figure 10: Various float shapes. (L-R) Disc, round and torpedo.

**Stretch of the Mesh:** Pull a mesh diagonally so that knots meet in the middle like the diagram on page eight. Then pull the other two knots on the mesh in the opposite direction, with knots meeting in the middle. Note whether they pull the same distance apart, or if one pulls longer than the other. If the distances are different then the answer to the question is yes.

**Netting:** Some ghost nets are made of multiple types of netting. This is obvious from the presence of seams (as in the photo opposite). What we need to know first is whether each section of netting is the same ID or different. If the netting is different for each section then we ask firstly how many sections there are, and secondly that you look up and enter the code for every additional section of netting that has not previously been recorded.

**Comments:** Write any other information about this net that is not captured any other categories on the data sheet. For example the net might have been tangled up with other ghost nets so you have only recorded details of the prime net selected. Or the net had bamboo attached to it (not just tangled in it) or other distinguishing features.



Photo 4: This ghost net is constructed of three different types of netting stitched together with red twine.

# Glossary of terms

Term	Description
<b>Artisanal Fishing</b>	These are small scale commercial fishing operations often crewed by family.
<b>Benthic</b>	Ocean floor.
<b>Braided twine (B)</b>	Twine that consists of fine filaments bunched into strands that are plaited like a shoelace.
<b>Belly</b>	Body of a net, sometimes divided into sections of different netting to enable efficient movement through the water.
<b>Cast Net</b>	In common use by recreational fishers in Australia this is a large circle of net that is thrown into the water and surrounds the fish as the outer edges sink.
<b>Coastal</b>	Within the continental shelf outside the tidal zone.
<b>Codend</b>	Bag end of a net to retain fish. Often small mesh with strong twine. Sometimes the twine is doubled to increase strength.
<b>Demersal</b>	Midwater or near the ocean floor.
<b>Filaments</b>	Fine continuous thread of plastic that forms the basis of twine.
<b>Diamond mesh</b>	The construction of standard net material creates diamond shaped meshes. These will close up when pulled in the right direction.
<b>Drift Net</b>	A gill net that is only anchored to a boat one end while the opposite end drifts with the currents.
<b>Foot and Head Ropes</b>	Top and bottom ropes the netting is hung on. These create the shape and structure of the net.

Term	Description
<b>Gear</b>	Other parts of fishing apparatus, such as lifting ropes, warp wires, otter boards or dahn buoys, where relevant.
<b>Ghost Gear</b>	Fishing apparatus e.g. pots, traps, hooks and baskets as well as ghost nets.
<b>Gill net or Set net</b>	A rectangular shaped net that is set (fixed at both ends) to create a wall that stops the fish in their tracks, entangling them by their gills.
<b>Gross Tonnage (GT)</b>	This is a complex calculation of a vessel that includes the length, engine power and volume of the hull. It is used to give a comparison of fishing capacity. E.g. a 5-10GT vessel is a small low (outboard) or no powered vessel that can only work inshore but a 250GT vessel would be between 20-30 metres in length with an engine capacity of >300hp.
<b>HP</b>	Horse Power.
<b>Industrial scale</b>	These are the large scale commercial operations with a crew who may or may not be associated with the ownership of the vessel or company.
<b>Inshore</b>	Shallow water within the tidal range. Also includes estuaries and parts of rivers.
<b>Lift Net</b>	Lift nets are attached to a fixed frame such as a floating platform, and left for a period of time like a trap, then hauled in occasionally to remove catch.
<b>Mesh</b>	The opening created by knotted or woven twine that forms the structure of netting.

Term	Description
<b>Mono(filament) twine (M)</b>	Twine that consists of only one filament, like fishing line.
<b>(Fishing) Net</b>	The netting after it has been cut, shaped, joined, hung on ropes and attached with chains and floats.
<b>Netting</b>	Twine that is knitted to form a sheet of material. Also known as webbing.
<b>Offshore</b>	Includes the continental slope and oceanic deep waters.
<b>Pelagic</b>	Fish that swim in the open water, often near the surface.
<b>Purse seine</b>	This net is set around a school of fish. Once the school is surrounded, a rope that passes through rings along the bottom edge of the net is tightened. This action resembles the pulling of 'purse strings'.
<b>Skirt</b>	Outer layer of netting over a codend to protect it from predators attacking the catch retained in the bag and to prevent damage. Often bigger mesh but much heavier twine than the codend and/or made of scraps like Photo 4 (page 10).
<b>Strands</b>	Fine filaments of the twine that are bunched together before twisting or braiding. The more strands there are, the stronger the twine.
<b>Square Mesh</b>	A mesh that keeps its square shape when fishing. The knots are aligned differently to the diamond mesh.

Term	Description
<b>Subsistence Fishing</b>	These are the fishers that only catch enough to eat and barter with. They usually work alone or in small family units. Their vessels (if they have one) have little to no mechanical aids. They operate inshore.
<b>Tangle and Trammel Nets</b>	These nets have two or three walls of different types of netting to ensure the fish is captured. The fish that passes through the larger meshed outer walls still get caught up in a pocket of finer meshed net in the middle.
<b>Trawl Nets</b>	These are nets shaped like a windsock and are dragged behind a vessel either at various depths. Stern trawl is one large net that is hauled on board the vessel via the back of the boat. Twin rig is two nets one each side and multi-rig is any other combination.
<b>Throat</b>	Section of a trawl net between the codend and the belly.
<b>Twisted Twine (T3)</b>	Twine that consists of strands twisted like rope. The three representing the number of strands. Three strand is the most common.
<b>Wings</b>	Large sections of nets that are used to herd the fish and haul the net towards the vessel that do not retain the catch. Often very large mesh.



<1 finger mesh  
<24mm





### # NFKSM001

**Twine:** 0.5 – 1 mm

**Desc:** Mono, very fine but stiff.

**Use:** Gill net or seine net for catching small bait like fish such as sardines, small shrimp or scad.

**Com:** Lightness of the net associated with hand fishing within inshore or shallow coastal waters in Asian countries.



### # NFKST001

**Twine:** 0.5 – 1 mm

**Desc:** T3; very soft and silky with fibres, rather than filaments, hard to tease apart.

**Use:** Body of a purse seine net used by artisanal fishers for catching small bait fish such as sardines, pilchards as well as squid.

**Com:** According to the fisherman, who provided the red sample in the photo, red or dark coloured twine 'scares' the fish into the centre of the 'purse' thus reducing damage to the fish. White twine may be used for a beach seine.



### # NFKST002

**Twine:** 0.5 – 1 mm

**Desc:** T3; very stiff plastic that keeps its shape (meshes stay open)

**Use:** Possibly part of a multi layered lift net used by subsistence fishers in Indonesia.

**Com:** Not confirmed.



### # NFKST003

**Twine:** 1 – 2 mm

**Desc:** T3; possibly cotton, flexible but not as soft as NFKST001. It has a tighter twist than usual for this soft material; square mesh that is very small.

**Use:** Possibly a lift net.

**Com:** Not sure if it is a fishing net at all. Sample in picture has mud encrusted on it.



### # NFKST004

**Twine:** 1 – 2 mm

**Desc:** T3; tightly twisted, stiff plastic.

**Use:** Codend from mini trawl (vessel 5gt) that works estuaries and close inshore near Aru Islands, Indonesia targeting small shrimp and other benthic (bottom) species.

**Com:** Dark green sample shown in the photo was provided by a fisher.



### # NFKDT001

**Twine:** 1 – 3 mm (x2)

**Desc:** Double T3; hard twisted plastic.

**Use:** Codends for mixed trawl gear.

**Com:** The colour is actually red, faded to pink and almost white in some places.







1 finger mesh  
25 – 41mm





### # 1FKST001

**Twine:** 0.5 – 1 mm

**Desc:** T3; very soft and silky with fibres, rather than filaments, hard to tease apart.

**Use:** Purse seine net used by artisanal fishers for catching small bait fish such as scad, sardines, pilchards, frigate tuna, skipjack and squid.

**Com:** The red sample was from an Australian fisher, the pale blue from an Indonesian fisher. The Indonesian vessel is 12 – 15m with 2 x 40HP motors.



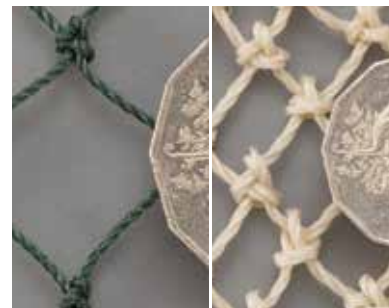
### # 1FKSB001

**Twine:** 1 – 2 mm

**Desc:** B; braided hard and stiff plastic.

**Use:** Unknown.

**Com:** 1FKSB001 and 1FKST001 are almost identical. Possibly used for a trawl net but unconfirmed.



### # 1FKST002

**Twine:** 1 – 2 mm

**Desc:** T3; tightly twisted, stiff and scratchy plastic.

**Use:** Small artisanal stern trawl net (Vessel 5-10gt), that works close inshore Aru Islands, Indonesia targeting shrimp.

This net material has also been matched to lift nets in the Maldivian Islands and could also possibly be used as gill nets working off-shore in the same region.

**Com:** Samples given from the Indonesian fisher are from two net sections; the belly (1mm twine - pic left) and the codend (2mm twine - pic right).



### # 1FKST003

**Twine:** 2 – 3 mm

**Desc:** T3 and T4; hard twisted plastic.

**Use:** Codends for twin rig otter board trawl for vessels <250gt (mostly Australian).

**Com:** Slight variations in twine density would be associated with differences in overall size of the gear depending on vessel HP.



### # 1FKSB002

**Twine:** 2 – 4 mm

**Desc:** B; hard plastic. The mesh for the black netting had orange braided stitching.

**Use:** Australian twin rig otter board benthic trawl vessel of <250gt that target prawns (shrimp).

**Com:** Braided twine was introduced to the Northern Prawn Fishery in 1997.



### # 1FLST001

**Twine:** 2 – 4 mm

**Desc:** Knotless T3, soft but keeps its shape (meshes stay open) as if there is hidden wire.

**Use:** Unknown.

**Com:** Knotless thought to be used by trawl fisheries to reduce drag in the water and therefore fuel costs. Other samples though have been thought to be used in purse seine fisheries to reduce damage to the fish. Not confirmed.



## # 1FKDT001

**Twine:** 1 – 3 mm (x 2)

**Desc:** Double Twine T3; hard twisted plastic.

**Use:** Codends from various sized vessels for trawl gear ranging in size and configuration that targets shrimps or prawns.

**Com:** Nil.



2 finger mesh  
42 – 57mm





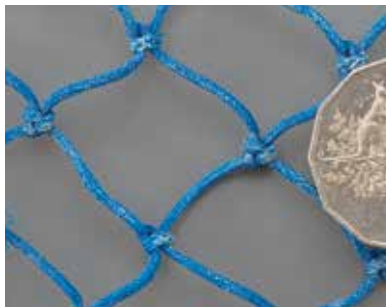
### # 2FKSM001

**Twine:** 0.5 – 1 mm

**Desc:** Mono; has 65mm ovoid float attached to one sample as shown in picture.

**Use:** Gill net for inshore and coastal fish. Probably used by hand and likely subsistence or recreational fishers.

**Com:** Nil.



### # 2FKSB001

**Twine:** 1 – 2 mm

**Desc:** Braided hard plastic.

**Use:** Unknown but possibly throat or belly section of medium sized trawl.

**Com:** Nil.



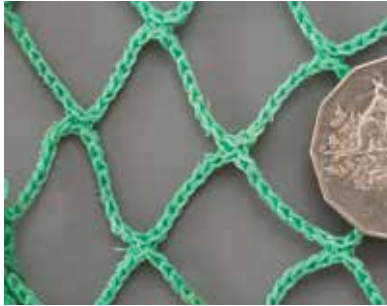
### # 2FKST001

**Twine:** 1 – 2 mm

**Desc:** T3; mostly hard twisted plastic although some have a softer, looser weave.

**Use:** The thinner samples (1mm) are from wings of a mini trawl (vessel 5-10-gt) while the heavier is from body of trawl net used by trawlers in Australia <250gt prior to 1992.

**Com:** Pre 1992 the Australian vessels used 4 nets (2 nets on each side) which meant nets were a lot smaller overall requiring lighter twine. Additionally, brown coloured net was chosen by the Raptis Fleet, to distinguish their nets from the rest of the Australian fleet.



### # 2FLSB001

**Twine:** 1 – 2 mm

**Desc:** Knotless Braided; very stiff that holds its shape almost as if it has wire in twine.

**Use:** Unknown.

**Com:** From a sample seen in factory in Slovenia that recycles nylon nets this is more than likely material used in purse seine gear.



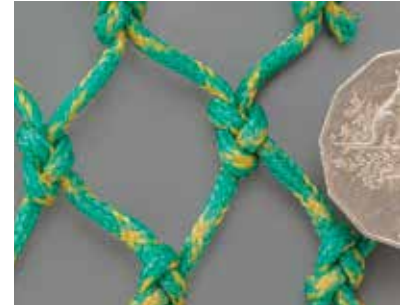
### # 2FLST001

**Twine:** 1 – 2 mm

**Desc:** Knotless. Twisted with two strands; Almost identical to 2FLSB001.

**Use:** Unknown.

**Com:** All knotless nets are thought to be from experimental trawl fisheries or purse seine.



### # 2FKSB002

**Twine:** 2 – 4 mm

**Desc:** Braided hard plastic.

**Use:** Trawl codends from Australian prawn fisheries.

**Com:** The sample is the new square mesh introduced to the Australian Northern Prawn Fishery in the year 2000.





### # 2FLST002

**Twine:** 2 – 4.5 mm

**Desc:** Knotless T2 and T3. The meshes keep their shape (stay open), although this is a relatively soft twine.

**Use:** Unknown.

**Com:** All knotless nets are thought to be from experimental trawl fisheries or purse seine.



### # 2FKST002

**Twine:** 2.5 – 4 mm

**Desc:** T3: hard twist.

**Use:** Codend for Australian trawl targeting shrimp/prawns.

**Com:** Pre 1992 the twine was lighter due to vessels towing 4 smaller nets rather than the 2 nets double the size. This is the same amount of fishing capacity but more efficient.



### # 2FKDB001

**Twine:** 2 – 3 mm (x 2)

**Desc:** Double Braided: hard plastic with coloured flecks.

**Use:** Possible codend for Australian trawler but not confirmed.

**Com:** Nil.



## # 2FKDT001

**Twine:** 2 – 3.5 mm (x 2)

**Desc:** Double T3; hard plastic

**Use:** Codend for Australian trawl  
targeting shrimp/prawns.

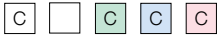
**Com:** Pre 1992 the twine was lighter due  
to vessels towing 4 nets rather than  
the bigger 2 nets.





3 finger mesh  
58 – 75mm





### # 3FKSM001

**Twine:** 0.5 – 1 mm

**Desc:** Monofilament with pale colours almost clear.

**Use:** Probable inshore gill net but actual fishery unknown

**Com:** Nil.



### # 3FKST001

**Twine:** 1 – 2 mm

**Desc:** T3; hard twisted plastic.

**Use:** Unknown

**Com:** Similar ghost nets have been found in the Maldives (Indian Ocean). They are reportedly used for off-shore gillnetting targeting needlefish. There they have been found in green, white and red.



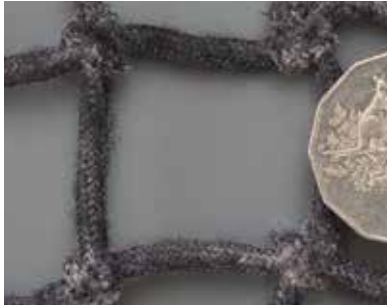
### # 3FKST002

**Twine:** 2 – 3 mm

**Desc:** T3 & T4, hard twist plastic.

**Use:** Codends from Indonesian demersal trawl used by vessels averaging 200gt.

**Coms:** Net material with four stranded twine is believed to belong to Chinese and South Korean vessels working in Indonesia with the nets made in South Korea. 2 samples supplied by fishers.



### # 3FKSB001

**Twine:** 3 – 4 mm

**Desc:** Braided; soft cotton, goes furry when old.

**Use:** Unknown, but square mesh so possibly codend for trawl net post 2000 when square mesh was introduced.

**Com:** Nil.



### # 3FKST003

**Twine:** 3 – 6 mm

**Desc:** T3: hard twisted; newer samples are shiny.

**Use:** Codend for large 400gt demersal trawl from Merauke, Indonesia.

**Com:** The large range of twine sizes in this ID reflects the range in vessel sizes and towing ability which affects the overall size of the nets.

Some samples were found attached to other nets and identified by fishers in Indonesia and matched to sample given by fisherman.



### # 3FKDT001

**Twine:** 2 – 3 mm (x 2)

**Desc:** Double T3; both hard and soft twisted plastic.

**Use:** Codend for large 400gt demersal trawlers from Merauke, Indonesia.

**Com:** Nil.



### # 3FKDB001

**Twine:** 3 – 7 mm (x2)

Note: twine flattens when old so hard to get an exact measurement.

**Desc:** Double Braided plastic.

**Use:** Unconfirmed codend or skirt of very large demersal trawl.

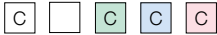
**Com:** Nil.



4 finger mesh  
76 – 94mm







### # 4FKSM001

**Twine:** 0.5 – 1 mm

**Desc:** Monofilament. Although at first glance the colour looks whitish, it actually has a faint tinge of green.

**Use:** Gill net very similar to # 3FKSM001 but slightly larger mesh.

**Com:** Nil.



### # 4FKST001

**Twine:** 0.5 – 1 mm

**Desc:** T3; loosely twisted plastic twine of thick filaments that appears more like several monofilament twines twisted together rather than the normal stranded twine.

**Use:** Found attached to # FFKSM001. Possibly a tangle or trammel net.

**Com:** Nil.



### # 4FKST002

**Twine:** 1 mm

**Desc:** Twisted multifilament (hard to tease apart and count) cotton.

**Use:** Gill net used by a Thai fishing vessel based in Aru Islands, Indonesia. Target species unknown but possibly demersal and semi demersal species.

**Com:** Cotton fibre sinks as it has negative buoyancy. Sample from fisher.



### # 4FKST003

**Twine:** 1 – 2 mm

**Desc:** T3; hard twisted plastic. Distinctive by the torpedo floats on head-rope.

**Use:** Drift net targeting pelagic species such as school shark and mackerel. Mostly used by Thai illegal fishers.

**Com:** Found a lot across all of northern Australia as a ghost net but, according to Indonesians, they do not use these nets much anymore.



### # 4FKST004

**Twine:** 2 – 3 mm

**Desc:** T3; hard twisted.

**Use:** Unknown.

**Com:** Nil.



### # 4FKSB001

**Twine:** 2 – 5 mm (on widest side).

Hard to find an accurate measurement of twine as flattens when old and worn.

**Desc:** Braided single coloured plastic.

**Use:** The heavier twine in this range is known to be the throat section of net used by an Australian 250gt demersal trawler whereas the lighter twine samples could be other sections of the belly.

**Com:** Samples from fisher.



#### # 4FKST005

**Twine:** 3 – 4 mm

**Desc:** T3; hard twisted; newer samples are shiny.

**Use:** Codend for stern trawl targeting shrimp and fish working out of Merauke, Indonesia.

**Com:** One sample given by fisher was matched by 13 others.



#### # 4FKST006

**Twine:** 4 – 9 mm

**Desc:** T3; T4 and T5; hard twisted plastic.

**Use:** Codend for large demersal trawls targeting fish such as tropical snappers.

**Com:** The sample from a stern trawler working out of Merauke, Indonesia was in the thinner end of the twine scale.

The really heavy twine could come from the protective 'skirt' of the codend. The four and five stranded twine is reputedly from Chinese and South Korean vessels working in Indonesian waters.



#### # 4FKSB002

**Twine:** 6 – 10 mm

**Desc:** Braided single coloured plastic.

**Use:** Unknown.

**Com:** Possibly codend, or protective 'skirt', from demersal trawl as overall twine thickness is similar to # 4FKDB001.



## # 4FKDB001

**Twine:** 4 – 6 mm (x 2)

**Desc:** Double Braided multi coloured plastic.

**Use:** Australian fish trawl codend. They are a demersal trawl that targets tropical snappers.

**Com:** Nil.





fist  
95 – 124mm





C

### # FFKSM001

**Twine:** 0 – 0.5 mm

**Desc:** Monofilament; clear extremely fine like hair.

**Use:** Possibly a tangle net

**Com:** Found attached to a twisted Multifilament net # 4FKST001.



C

### # FFKSM002

**Twine:** 0.5 – 1 mm

**Desc:** Monofilament; although it looks white or clear it has a slight bluish tint.

**Use:** Gill nets used by West Papuan fishermen.

**Com:** The lighter gauge in the ID is from a fisher working offshore while the heavier gauge by a fisher operating inshore.



### # FFKST001

**Twine:** 1 – 1.5 mm

**Desc:** T3; mostly made of loosely twisted plastic that gives the net material a soft feel.

**Use:** Surface pelagic drift nets used mostly by illegal fishers from Thailand working in the Arafura and Timor Seas targeting shark, mackerel and other pelagic species.

**Com:** Similar to # 4FKST003 except bigger mesh. Reportedly mesh sizes have been decreasing since first identified in 1980s by Northridge (see references).



### # FFKST002

**Twine:** 2 – 3 mm

**Desc:** T3; hard twisted plastic

**Use:** Reportedly the belly section of a small demersal trawl.

**Com:** Unconfirmed.



### # FFKST003

**Twine:** 3 – 4 mm

**Desc:** T3; A mix of tight and medium twisted plastic with one sample fairly soft and loose.

**Use:** Demersal trawl, possibly throat or panel 3 of the belly section.

**Com:** One sample known to be linked to a stern trawler working out of Benjina, another from Merauke, Indonesia.



### # FFKST004

**Twine:** 4.5 – 7.0 mm

**Desc:** T3; hard twisted plastic

**Use:** Unknown.

**Com:** Thought to be cod-ends, reinforcing mesh for the throat or the protective skirts of large demersal trawlers targeting fish such as tropical snappers.





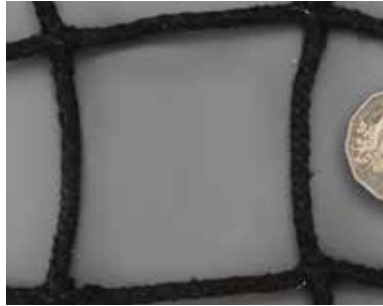
### # FFKSB001

**Twine:** 4 – 6.0 mm

**Desc:** B; plastic.

**Use:** Australian demersal trawl targeting tropical snappers.

**Com:** Possibly throat section.



### # FFKSB002

**Twine:** 5 mm

**Desc:** B; cotton with wire core that appears to be square mesh.

**Use:** Unknown.

**Com:** Nil.



### # FFKST005

**Twine:** 8 – 12 mm

**Desc:** T4; hard twisted plastic.

**Use:** Unknown.

**Com:** Due to immense size of twine thought to be protective skirt of extremely large demersal trawl net e.g. one towed between two vessels (pair trawl).



### # FFKDT001

**Twine:** 3.0 mm (x2 mm)

**Desc:** DT3; hard twisted plastic.

**Use:** Unknown.

**Com:** Due to the similarity between the overall twine and mesh size of # FFKST004 thought to be of similar use.



### #FFKDB001

**Twine:** 2.5 – 3.5 mm (x2 mm)

**Desc:** DB; plastic.

**Use:** Fish trawl, possibly throat.

**Com:** Similar to # FFKDT001.

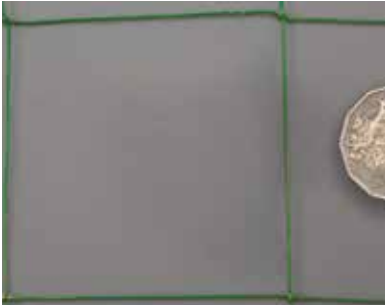




clasped fist

125 – 165mm





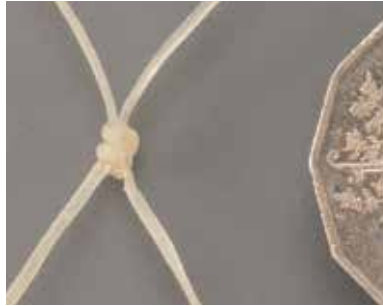
### # CFKST001

**Twine:** 0.5 – 1 mm

**Desc:** T3; silky thread, probably nylon.

**Use:** Unknown.

**Com:** Closest example is the purse seine nets; # NFKST001 and # 1FKST0015 although of obviously much smaller mesh.



### # CFKSM001

**Twine:** 1 mm

**Desc:** M; hard plastic.

**Use:** Demersal (set) gill net used by coastal fisheries targeting finfish. Specifically used by Northern Territory offshore net fisheries, Queensland inshore finfish (barramundi) and Indonesian off shore fishermen in Merauke targeting snapper.

**Com:** Nil.



### # CFKST002

**Twine:** 1.5 – 2.5 mm

**Desc:** T3; hard twisted plastic.

**Use:** Unknown.

**Com:** Nil.



### # CFKSB001

**Twine:** 2.5 – 4.5 mm

**Desc:** Braided

**Use:** Demersal trawl, both Australian and Indonesian.

**Com:** Possibly throat section or panel 3 of the belly (multicoloured sample supplied by Australian fisher).



### # CFKST003

**Twine:** 3 – 6 mm

**Desc:** T3; tight twisted plastic

**Use:** Demersal trawl, possibly throat.

**Com:** Nil.



### # CFKST004

**Twine:** 7 – 8 mm

**Desc:** T3; Tight twisted plastic

**Use:** Unknown but possibly skirt for demersal trawl.

**Com:** Nil.



## # CFKDT001

**Twine:** 2 – 2.5 mm (x2 mm)

**Desc:** Double T3; tight twisted plastic.

**Use:** Demersal trawl, possibly throat section of the net.

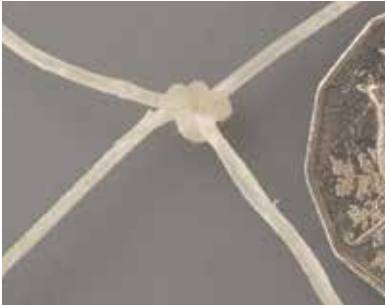
**Com:** Nil.



open hand  
166 – 230mm







### # OHKSM001

**Twine:** 1 – 1.5 mm

**Desc:** Mono.

**Use:** Unknown gill net.

**Com:** Possibly an inshore set net used to catch Barramundi net before changes in size limits were introduced in the 1980s.



### # OHKST001

**Twine:** 1.0 – 2.0 mm

**Desc:** T3; tight twisted plastic.

**Use:** Unknown but could be either trawl or gill net.

**Com:** Most likely part of a demersal trawl as some found with other net material joined to them although accurate records of this were not kept.



### # OHKST002

**Twine:** 2 – 3 mm

**Desc:** T3 & T5; tight twisted plastic.

**Use:** Unknown.

**Com:** Most likely part of a demersal trawl as some found with other net material joined to them although accurate records of this were not kept.



### # OHKSB001

**Twine:** 2 – 3.5 mm

**Desc:** Braided plastic.

**Use:** Australian demersal trawl, possibly throat section or panel 3 of the belly of the net.

**Com:** Nil.



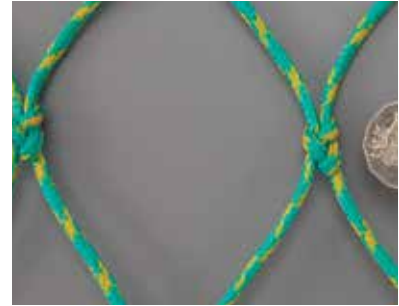
### # OHKST003

**Twine:** 3 – 4 mm

**Desc:** T3, T5 & T4; tight twisted plastic.

**Use:** Demersal trawl net with one sample from a Thai vessel working in the Arafura Sea targeting fish and prawns.

**Com:** Nil.



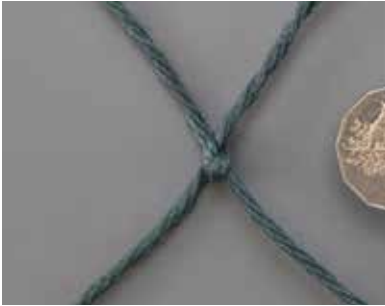
### # OHKSB002

**Twine:** 3 – 5 mm

**Desc:** B; tight plastic built around a black multifilament or clear monofilament core.

**Use:** This is from panel 4 of a Queensland demersal trawl targeting tropical snappers.

**Com:** Nil.



### # OHKST004

**Twine:** 3 – 5 mm

**Desc:** T3; T4 & T5 tight twisted plastic.

**Use:** Possibly demersal trawl but also possibly gill net for targeting shark.

**Com:** The 4 and 5 strand samples have been positively identified as used by Chinese and Korean vessels using Korean made nets.



### # OHKDB001

**Twine:** 4.2 – 4.6 mm (x2)

**Desc:** DB; tight plastic built around a dark blue multifilament core.

**Use:** Reinforcing mesh for mouth of a Queensland demersal trawl net.

**Com:** Nil.



### # OHKDT001

**Twine:** 1.5 – 2.5 mm (x2)

**Desc:** DT3; tight twisted plastic.

**Use:** Possibly demersal trawl.

**Com:** Nil.



Larger nets +  
>230mm





C

### # XXKSM001

**Twine:** <0.5 mm

**Desc:** Mono, very fine filament.

**Mesh:** 400 – 500mm

**Use:** Possibly a shark net (gill).

**Com:** Nil.



### # XXKST001

**Twine:** 2 – 3 mm

**Desc:** T3; cotton.

**Mesh:** 450 – 500mm

**Use:** Illegal shovel nose shark fishery reportedly from Merauke, west Papua province of Indonesia.

**Com:** Sample collected by an Australian fisher off the west coast of Cape York. Not generally found washed up as being cotton it sinks.



### # XXKST002

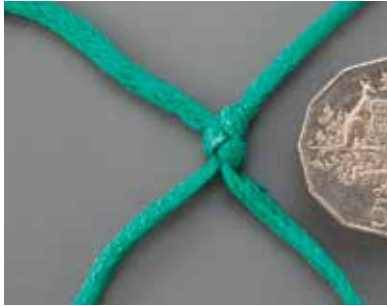
**Twine:** 2 – 3 mm

**Desc:** T3; T4 & T5; Tight plastic

**Mesh:** 260 – 600mm

**Use:** Many samples found joined to other nets so possibly wings or outer body parts of a demersal fish trawl.

**Com:** The 4 and 5 strand samples have been positively identified as used by Chinese and Korean vessels using Korean made nets.



### # XXKSB002

**Twine:** 3 – 4 mm

**Desc:** B; tight plastic.

**Mesh:** 350 – 400mm

**Use:** Possibly bottom set gill net targeting large shark e.g. shovel-nose.

**Com:** Nil.



### # XXKST003

**Twine:** 3 – 6 mm

**Desc:** T3; T4 & T5; tight twisted plastic.

**Mesh:** 340 – 3000 (3 Metres) mm

**Use:** Many samples found attached to other nets so possibly wings or outer body parts of a demersal fish trawl.

**Com:** The 4 and 5 strand samples have been positively identified as used by Chinese and Korean vessels using Korean made nets.



### # XXKDT001

**Twine:** 1.5 – 2 mm (x 2)

**Desc:** DT3; tight plastic.

**Mesh:** 250 – 300mm

**Use:** Unknown.

**Com:** Nil.

# GhostNets Australia™

## Data Collection Sheet

Name:

Email/phone number:

Organisation:

Please fill out one datasheet for each individual net found.

### Level 1

#### DATE AND LOCATION

Date net found:	State:
Locality:	
Latitude (Decimal Degrees):	
Longitude (Decimal Degrees):	

#### MESH

Use the finger measurements below to indicate mesh size.

- > 1 finger  
 1 finger  
 2 finger  
 3 finger  
 4 finger  
 Fist  
 Double Fist  
 Open hand  
 More than a hand

OR enter exact measurements:

 mm

#### TWINE

Enter twine size:

 mm

What type of twine?

- Braided (like a shoe lace)  
 Mono (like fishing line)  
 Twisted (like rope)

Is it double or single twine?

- Double  
 Single

Does the twine have knots?

- Yes  
 No

#### ANIMALS

Are there any animals trapped in the net?

No

Yes

*If yes, record how many*

#### NET SIZE

How big is the net when bundled up?

*Which of the following is it closest to?*

- Football  
 Fill a wheelie bin  
 Toyota tyre  
 Ute load

Crab

Crocodile

Dolphin

Dugong

Fish

Sea Snake

Shark/Ray/Swordfish

Turtle - Flatback

Turtle - Green

Turtle - Hawkesbill

Turtle - Oliver Ridley

Turtle - Unknown

Whale

Other

## Level 2 (optional)

### NET DETAILS

What colours are the net?

- Black
- Blue
- Brown
- Green
- Orange
- Red
- White
- Yellow
- Grey

How does the twine feel?

- Very soft like silk
- Soft like a T-shirt
- Hard and stiff

Are there any floats present?

- No
- Yes:
  - Disk float
  - Round float
  - Torpedo float

When you stretch the mesh does it have a short way and a long way?

- Yes
- No

### NETTING

Is the net made up of the same kind of netting throughout?

- Yes *(Skip to the samples section.)*
- No

### MULTIPLE NETTING

How many different netting sections does the net have?

List the net ID codes from the manual you think matches the sections in the net:

- Don't have a manual
- Doesn't match a code

### SAMPLES

Will you send us photos of the net?

- Yes

Will you send us a sample(s) of the net?

- Yes

Email [info@ghostnets.com.au](mailto:info@ghostnets.com.au) for our address details.

### Comments:

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Go online to [www.ghostnets.com.au](http://www.ghostnets.com.au) to enter your data on the Ghostnet database or seek further assistance.





# Twine guides

## Twine thickness

Use the ruler above to measure mesh width and twine thickness. Lay the twine along the blue bars to double check twine thickness for twine less than 5mm.



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**Australian Government**

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