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Title **THE AUTOLINE SYSTEM – AN UPDATED DESCRIPTIVE REVIEW OF THE METHOD WITH RECOMMENDATIONS TO CLARIFY CCAMLR CONSERVATION MEASURES REGULATING LONGLINE FISHERIES WITHIN THE CONVENTION AREA**

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ABSTRACT

The paper updates Fenaughty and Bennett (2005), Longlining Operations on New Zealand Autoline Vessels Fishing for Toothfish in CCAMLR Waters. Additional information is included listing and discussing circumstances and scenarios occurring with the method.

A definition of the fundamental unit of gear (a 'line') for longlines is proposed for the purposes of regulation and management. Current Conservation Measures dealing with longline fisheries carried out within the Convention Area are reviewed and changes are suggested clarify understanding of these measures.

The paper includes a recommendation for a review of Annex 41-01/B (2007) governing research within exploratory fisheries by WG-FSA with a view to assessing the option of simplifying this Measure in a similar manner to that successfully implemented in the exploratory fisheries in Subareas 88.1 and 88.2.

SUMMARY OF FINDINGS AS RELATED TO NOMINATED AGENDA ITEMS

Agenda Item	*Findings*
5	A definition of the fundamental unit of gear (a 'line') for longlines is proposed for the purposes of regulation and management. Current Conservation Measures dealing with longline fisheries carried out within the Convention Area are reviewed and changes are suggested clarify understanding of these measures.
5	The paper includes a recommendation for a review of Annex 41-01/B (2007) governing research within exploratory fisheries by WG-FSA with a view to assessing the option of simplifying this Measure in a similar manner to that successfully implemented in the exploratory fisheries in Subareas 88.1 and 88.2.

1. INTRODUCTION

CCAMLR Conservation Measures dealing with longline fisheries within the Convention Area are often adaptations or modifications migrated from existing measures used to manage CCAMLR trawl fisheries. In some cases the terms used within the measure are not easily understood or applied. In addition there is no comprehensive definition describing and defining exactly what constitutes an individual longline for the purposes of recording or regulation.

This paper updates Fenaughty and Bennett (2005), Longlining Operations on New Zealand Autoline Vessels Fishing for Toothfish in CCAMLR Waters (WG-FSA-05/54). An additional section is included listing and discussing circumstances and scenarios occurring with the method. A draft of this was used to inform an expert workshop held in New Zealand in July to assess the impact of long lining within the convention area as part of the required review of the impacts of bottom fishing in Antarctic waters. The section of the paper is submitted to WG-FSA with the intention of assisting the ongoing review of the impacts of bottom fishing within the Convention Area.

A number of CCAMLR Conservation Measures explicitly require as the fundamental unit of fishing gear, a completed (hauled) line. These measures deal with catch and effort recording, bycatch management, seabird mortality mitigation measures, and set down the levels of required scientific data collection. In some exploratory fisheries there is still a requirement for a specified number of research lines to be carried out with the intention of ensuring that adequate geographical spread of effort is made and that sufficient scientific data is collected. To this end it is important that the elemental unit of measure, a ‘line’, is well defined and unambiguous to fishers, observers, scientists, fishery managers, and officials. The paper reviews existing Conservation Measures pertaining to longlining with a focus on standardising terminology used, clarifying the intent of the measures, and recommends simplification of the rules in the circumstances governing data collection.
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2. A REVIEW OF THE AUTOLINE METHOD AS USED BY NEW ZEALAND FISHERS WITHIN THE CONVENTION AREA

Understanding the method and the procedures used to set and retrieve the line is fundamental to understanding characterisation of the fishery, CPUE, the ways in which seabirds may be trapped by the gear and is also valuable in clearly specifying Conservation Measures. Although the basic principles are similar for any longlining operation, there are great differences in the gear and in the manner in which the gear is set or retrieved, which will affect the catch of both target species and fish or non-fish bycatch.

a. GENERAL TERMS IN USE

In respect to the autoline method the following general terms are used when describing the fishing activity:

Setting: The process of deploying a line

Hauling: Retrieving a line

Soaking: The period following setting and before hauling during which the line is deemed to be fishing

Snood: A short section of line (normally of multifilament) that attaches the hook to the mainline

Mainline or Backbone: The main section of line extending horizontally along the bottom to which the snoods and hooks are attached

Downline: A vertical section of line buoyed at the surface and connected to a weight or a number of weights such as chains or grapnels at the beginning or end of the backbone. The length of the downline is typically determined by the depth being fished, the weather, and the strength of local tidal currents

A set: The term describing a complete set of autoline gear deployed in the water for fishing, a 'line'

Magazine: A metal rail storage system typically extruded aluminium holding the hooks, snoods and backbone, typically between 1000 and 1200 hooks. A magazine or mag is often used a unit of line measurement (e.g. a 4 mag line)

Combi: The combination hauler, a secondary hauler located in the hook-room (or 'skid') used for separating the hooks away from the backbone and guiding them onto the storage magazines – the hooks, snoods, and backbone remain connected at all times. This is done automatically and consistently as the gear is

hauled onboard. A secondary function of the unit is to keep tension on the gear coming from the main hauler

Grapnel: Generally - large weight with prongs used to anchor each end of a line to the seabed. Small grapnels attached to throwing lines are also used to recover floats

Chains: Small sections of chain (normally about 20kg) providing extra weight and stability to each end of a set line and to manage tension on the downlines

Dragging: The used of a specially weighted line and grapnel to recover lost gear. That is gear on the bottom with no downlines

Floating section: A section of floating line attached to the backbone to enable easy recovery using a drag. Generally used in ice conditions or when there are similar risk factors

Floating rope: Rope with positive buoyancy. Often used in downlines at the seabed end to prevent tangling of the downline and grapnel

Sinking rope: Rope with a negative buoyancy. Often used in downlines at the surface end to minimise the risk of a vessel propeller or ice picking up excess downline

Floating-off. Floats are attached to a section of line (or other part of the gear). Often used when backbone is tuck on the bottom. In this case the floats will be attached directly to the backbone

IWL: Integrated Weighted Line (IWL) used as a backbone which has lead embedded in the core to assist sinking as a seabird mortality mitigation measure. This weighting is about 50g per metre of backbone.

b. GENERIC LINE CONFIGURATION

Most deep-water autoliners carry between 20 and 30 magazines of longline. Each magazine holds about 1000 to 1200 hooks – depending on hook size and magazine length. The hooks and snoods are normally spaced at 1.4m intervals and connected to rotors and swivels that are permanently attached to the backbone, see Figure 1. Snoods are usually 300 to 400mm long.

The average length of backbone on each mag is between 1.4 to 1.5 km in length or 0.76 to 0.81 of a nautical mile.

New Zealand vessels use Integrated Weighted Line (IWL) which has lead embedded in the core to assist sinking as a seabird mortality mitigation measure. This weighting is about 50g per metre of backbone.

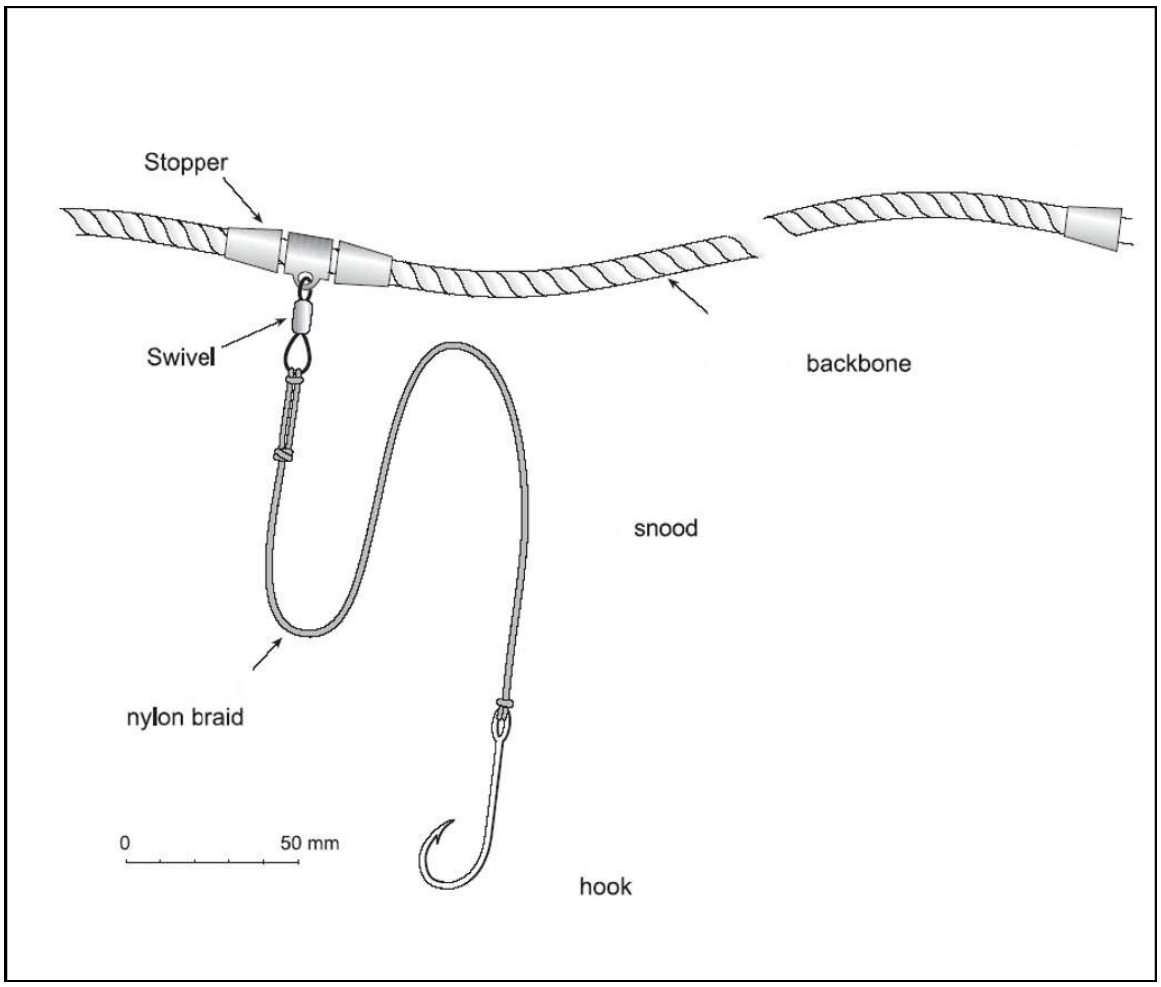

Figure 1. Generic arrangement of backbone and snood (modified from Smith 2001).

The line is pulled off the magazine, through the baiting machine, and over the stern. As each magazine is emptied a new magazine is slid into place, connected to the line being set and made ready for setting. The average set has about seven magazines connected together to make a line of about 5.7 nm in length. A typical setting operation from float to float takes about 1 to 1½ hours. Hauling the same line from 500m would take approximately 6 hours, or 8 hours when hauling from a depth of about 1,500m.

In relation to the soak time between three and six lines are usually set in the chosen fishing area depending on line length. These lines are normally left to fish for between 12 and 36 hours depending on the fishing operation, presence (or

absence) of sea-lice, ice conditions, and the number of lines already fishing in the area although a 48 hour soak time is not uncommon.

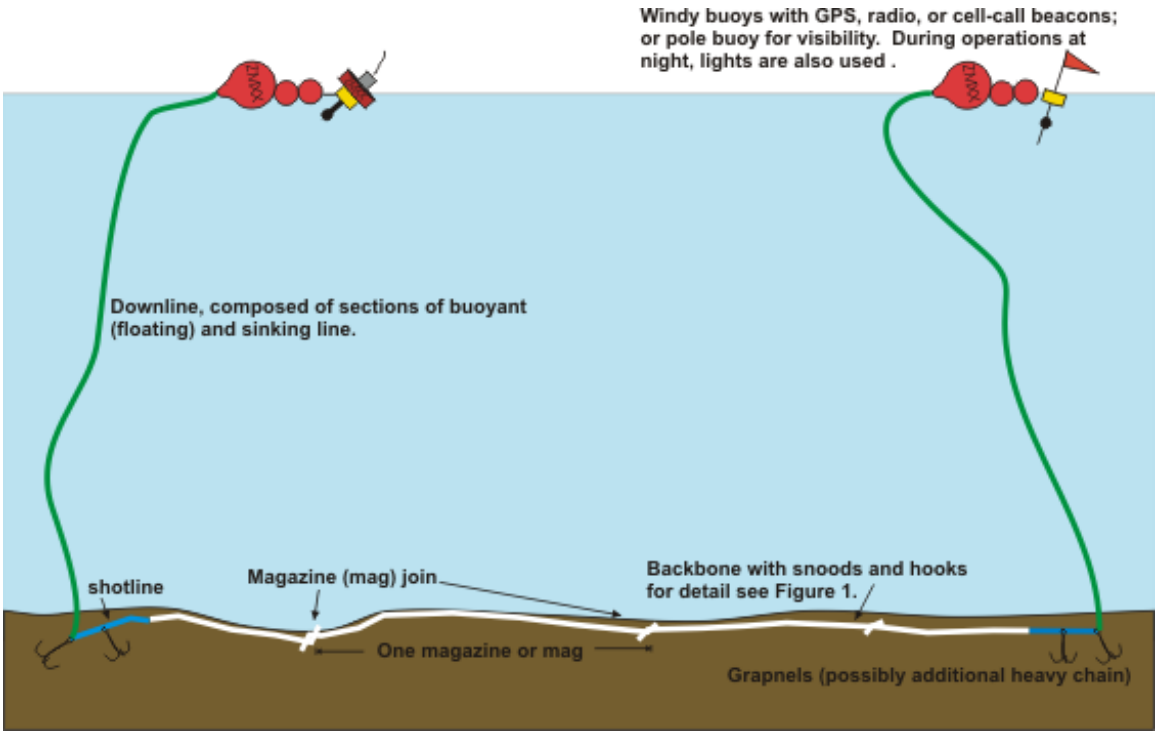

Figure 2. General arrangement for an autoline set.

c. GENERAL OPERATIONS
S. Shooting or setting the line:

S.1. Main considerations before setting:

- Ice, sea, wind, and tidal movement
- Local seabird activity, numbers and behaviour
- Location of other vessels and gear
- Seabed contour.

S.2. The vessel is slowed to about 5 knots, as the floats are thrown overboard. Floats usually consist of 2 to 3 windy buoys with a marker flag, GPS, or radio beacon; but in ice conditions may consist of necklaces of hard floats.

S.3. The vessel maintains 5 knots in the desired setting direction as the downline is thrown overboard. Downline deployment takes about 2 minutes for each 500m of fishing depth.

S.4. When the downline is fully deployed a length of chain (20kg) is thrown over followed by a grapnel or anchor (about 40kg).

S.5. The backbone or mainline is attached to the grapnel. As the vessel moves through the water the backbone is pulled from the storage magazines, the hooks attached to the backbone are pulled through the automatic baiting machine and into the water. The baiting machine is capable of baiting 3 hooks per second with a boat speed of about 6 to 7 knots. Normally three crew manage the setting and baiting operation.

S.6. The backbone enters the water at about 1.5m from the stern of the vessel and starts sinking immediately, the weight of the chain and grapnel helping to pull the line towards the sea bed.

S.7. During this phase the line sink rate can be adjusted to suit local seabird conditions, codes of practice and or fishing regulations by:

- The use of external weights attached to the back bone at pre-determined spaces before the line passes through the baiting machine
- The use of Integrated Weighted Line (IW line)
- The vessel speed through the water
- The vessels setting direction with regard to tidal movement and sea conditions.

S.8. The setting operation usually takes about 10 minutes per magazine. Lines range between 6 and 10 magazines in length.

S.8. At the end of the line another grapnel and chain are attached along with the down line and floats.

H. Hauling a line:

H.1. Choosing the end of the line to be hauled first is determined by weather and ice conditions at the time. The floats are located and retrieved at times with the aid of a GPS beacon, a radio beacon or visual flags or strobe lights at night.

H.2. The downline is hauled aboard using the main hauler through the vessels hauling room at about ½ a meter per second (about 17 minutes to haul 500m).

H.3. The grapnel and chain are removed from the line and the backbone is connected to a secondary hauler called the combi (combination hauler/hook separator).

H.4. As the main hauler hauls the line aboard the combi pulls the line from the hauling room to the hook room. The combi is designed to automatically pick the hooks up and stow them on the magazines with the backbone coiled below.

H.5. As the line comes over the side roller in the hauling room the fish are removed by the hauler-man, the hooks are then pulled through a hook cleaner to remove old baits before been dragged through to the combi. The hauling

operation stops infrequently mainly for hauler/combi problems, tangles, or fish tagging.

H.6. Routine maintenance is carried out on the line as it comes off the combi. There are typically two or three crew in the hook room replacing or reshaping lost and bent hooks. Dealing with tangles, replacing worn backbone and repairing or replacing swivels and rotors is a continuous ongoing maintenance process.

H.7. When each magazine is fully loaded with hooks and backbone (about every 45 minutes of hauling) they are disconnected from the combi rail and slid onto storage racks. An empty magazine is then positioned to receive the next section of the line.

C. Scenarios and circumstances: As with any fishing operation there are a number of environmental, human, and gear factors that can change the standard setting and hauling operations as set out above. Environmental factors include sea-ice and bergs, weather, tide, and bottom topography. Other issues that may cause deviation from the 'standard' setting and hauling operations are the presence of other vessels and gear, gear failure (broken lines), and human error.

These factors can be generally grouped as follows:

- One or both downlines are not connected to the gear
- Floats (and thus downline) cannot be located
- The line is stuck on the bottom
- The line breaks when being hauled
- The line is tangled with another set of gear or is covered by another set of gear
- The line is tangled with itself due to the setting process.

C.1. Normal operation as defined above under setting and hauling.

C.2. Floats dragged at one end. This is normally caused by sea ice or bergs capturing (or 'monstering') the floats at one end. Although vessels have evolved modified float set-ups to enable floats to pull under sea-ice this is not always successful. Considerations in this respect are the depth of the ice and the topography of the base of the floes (projections and rough surface as opposed to smooth underside). Typically and progressively with distance dragged the downline, floats, grapnel and chains and a small section of backbone will be moved. If moved far enough the line will part at a weak point often the start of the backbone unless a breakaway (an intentional weak point) is deliberately placed in the gear at a point closer to the floats. Recovery of the line is possible from the other (unaffected) end. If the downline has parted from the line this can be

hauled if the floats are found and normally includes the grapnels, chains, and the broken backbone.

C.3. Sea ice or bergs capture (or 'monster') floats at both ends. As for C.2., but an end still attached to the gear must be located or the line will need to be dragged for. In conditions where there is a risk of this, a floating section may be placed in the gear to enhance the chances of recovery.

C.4. One end of the gear cannot be located. This may be a result of C.2. above or may be due to tide pulling the gear down and 'drowning' the floats, poor visibility and weather, or a number of other circumstances. The other end of the gear will be located and hauled.

Figure 3. Showing pack ice and downline floats. Typically pack ice moves at about 1 nm per hour.

C.5. The line is stuck on the bottom. Backbone may be caught on an obstruction such as a ledge, could be caught on old fishing gear or may be held to the bottom by strong tides. In this instance the line may be floated off to release tension on the line - and then recovered again immediately. This sometimes frees the line. The line may also be floated-off for a period of hours or days (in cases where problems are caused by strong tides) waiting for the tide to ease. The vessel may also attempt to haul from the other end of the line.

C.6. The line is broken. The downline (or floats if the line had previously been floated off) at the other end is located and the line hauled from that end – which

breaks. In the case of a one-ended line (i.e. a line with a broken or missing second end) the gear will then need to be dragged for.

C.7. The line is covered by another line (usually that of another vessel, as when two lines are intentionally crossed by the setting vessel the top line will be hauled first). Options include having the other gear hauled first, hauling the other gear up together with the target line and (depending on circumstances) cutting it, or cutting and retying it. Note that there is a strong risk of stripping hooks and fish from a line when a line is hauled from under another.

ADDITIONAL FIGURES

Figure 4. Combi (Combination hauler/hook separator).

Figure 5. Line hauler.

Figure 6. Loaded magazines with spare hooks and snoods in the foreground.

3. DISCUSSION - ON THE TERMINOLOGY USED BY CCAMLR IN CONSERVATION MEASURES GOVERNING LONGLINE OPERATIONS AND RECOMMENDATIONS FOR IMPROVED CLARITY.

There are a number of Conservation Measures which prescribe a basic unit to apply to longline fishing gear for management. For example, catch and effort, bycatch management, various seabird mortality mitigation measures, and scientific data collection purposes all require this fundamental unit – a completed line. In some exploratory fisheries, vessels are required to complete a specified number of research lines to ensuring that adequate geographical spread of effort is made and that sufficient scientific data is collected. It is therefore important that the elemental unit of measure, a line, is well defined and unambiguous to fishers, observers, scientists, fishery managers, and officials.

Longline fishing operations in some areas, such as the Ross Sea fishery, are often operations in areas where sea ice and bergs are common. There are wide seasonal variations in ice cover conditions. The presence of sea-ice or bergs, strong tides, or 'sticky' bottom all increase the risk of losing fishing gear; particularly the loss of downlines connecting the remainder of the gear on the sea floor with the surface. Loss of these downlines makes retrieving the gear difficult and requires the use of a drag to recover longline gear, an operation that is not always successful. Aside from the financial implications for such losses and the additional fishing time required to retrieve lost gear there are environmental implications. New Zealand vessels working in the Ross sea fishery (Subareas 88.1 and 88.2) have consequently developed a number of techniques to minimise this risk. These include using modified float arrangements on the end of the downlines, using floating underwater sections which enable successful retrieval of lines using a drag chain, using acoustically triggered devices on underwater sections to locate the lines in circumstances of higher risk, and ongoing modifications to the system of weighting used at the grapnel ends of the backbone to secure the line to the seafloor to prevent movement. Such developments are continuously evolving with additional experience in the fishery.

The use of 'connected' lines has caused some uncertainty with observers about the research requirements, data collection for each line, and bycatch management. A diagram of a typical line set up using a floating section is shown in Figure 7. There have been suggestions from some CCAMLR observers that the use of such connected lines is designed to circumvent bycatch mitigation measures, specifically CM 33-03 (2007), based on the fact that shorter lines have fewer hooks and thus less chance of exceeding the 1 tonne limit for bycatch specified in the Conservation Measure. There however is no CCAMLR management constraint on the use of short lines - the only difference with the use of a floating section being two downlines for two lines rather than four to minimise the risk of loss and to enable the use of a floating section to enhance the chances of recovering the gear; particularly given the use of acoustic devices. Shorter lines do however still require the same level of data collection

and thus the use of short lines increases the amount of data collected overall and impacts on observer workloads. It should be noted that to date there has been no apparent difficulty in meeting the research requirements required under Annex 41-01/B (2007).

In order to clarify this situation it would be constructive to define the basic unit of longlining – that is, the line. Although within CCAMLR Conservation Measures and instructions there are references to a line, a set, and a haul these are not defined.

I suggest that the key to such a definition can be found in Conservation Measures 33-02 (2007) footnote 3, 33-03 (2007) footnote 5, and 41-02 (2007) which state: For a longline or a pot, the path is defined from the point at which the first anchor of a set was deployed to the point at which the last anchor of that set was deployed.

A longline is thus a section of backbone with hooks and snoods having at either end a weight or weights in the form of grapnels to firmly anchor the ends of the line to the sea bottom. Although not specifically stated there also needs to be at least one downline with its accompanying labelled floats and possibly location devices on the line to enable retrieval of the gear and also to identify the vessel to which the gear belongs.

Adopting the terms in these footnotes I recommend that the following definition be considered to define the base unit of measure in longline fisheries:

For longlines a 'line' is defined as a section of backbone with baited hooks attached that has some form of weight designed to adequately prevent the ends of the line moving on the sea floor at each end and a downline connecting at least one end of the backbone to the surface. Flotation devices attached to this downline conform with Conservation Measure 10-01 (1998) governing the marking of fishing vessels and fishing gear.

A possible solution to the level of data collection would be to make the number of fish sampled per line a ratio of the number of hooks on that line. The basis for the initial change was presented to WG-FSA for consideration in Fenaughty 2005. Using the initial figures in that paper used to arrive at the current level of 35 *Dissostichus* of each species per line, the ratio would be one fish of each *Dissostichus* species sampled for each 150 hooks hauled.

It could also be argued that CM 33-03 could be modified to take the same proportional approach. This would be incorrect for the following reason. In general *Macrourus* concentrations are highly localised. Assuming a vessel wished (for some hypothetical reason) to fish in an area of high *Macrourus* abundance under a CPUE or catch per hook scenario it would be easy to circumvent the measure by setting longer rather than shorter lines and thus dilute the catch per hook. It is also important to note that the move on rule is rarely

triggered by vessels and that an additional measure in CM 33-03[1] makes vessels responsible for managing their individual *Macrourus* bycatch by penalising vessels exceeding a proportion of 16% of the *Macrourus* catch to the catch of *Dissostichus* spp. The overall catch of *Macrourus* for Subarea 88.1 has been declining since the introduction of this measure and removal of the prescribed research sets being 89% of the allowable catch in 2005/06, 54% in 2006/07, reducing to only 26% in the last fishing season 2007/08 possibly indicating both the success of these amendments and increased experience by fishers in avoiding areas where Macrourids are prevalent.

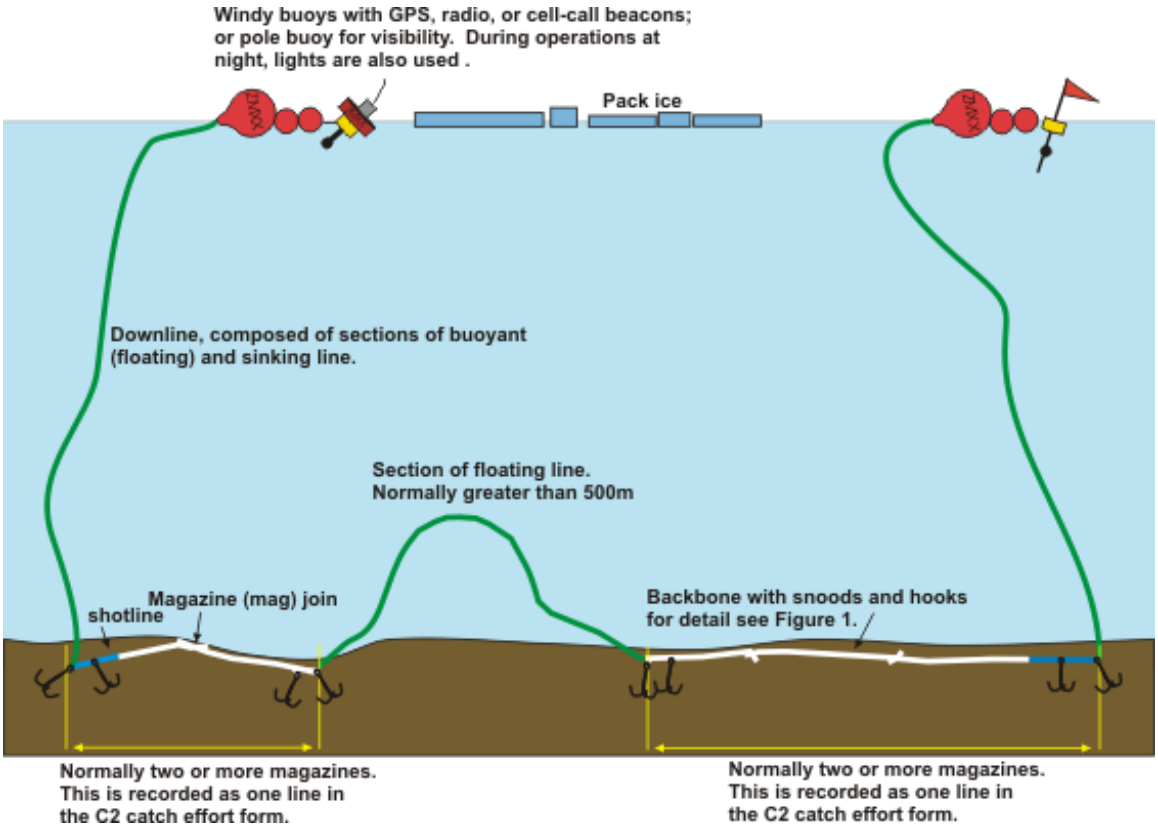

Figure 7. Two lines set with a floating section to minimise the risk of gear loss due to ice.

The following terms used in CCAMLR Conservation Measures to describe a unit of longline gear:

1. a set – CM's 33-02 (2007), 33-03 (2007), 41-01 (2007), 41-02 (2007) and 41-03 (2007);
2. a line – CM's 41-01A (2007) and 41-02 (2007);

[1] Paragraph 5 of CM 33-03 (2007)

3. a haul – CM's 33-02 (2007), 41-01 (2007), 41-02 (2007), 41-03 (2007), 41-04 (2007), 41-05 (2007), 41-06 (2007), 41-07 (2007), 41-08 (2007), 41-09 (2007), 41-10 (2007), 41-11 (2007).

For the purposes of catch and effort the reporting where indicated I recommend for consistency that the term haul is used for all fishing gear types including longlining to define any aspect dealing with the cumulative catch obtained from the deployment of that fishing gear.

There is still scope for confusion within Conservation Measure 41-01 (2007) specifying general measures for exploratory fisheries for *Dissostichus* spp. in the Convention Area. Within this measure there is a capacity to allow a number of lines to be combined to meet the minimum of 3500 hooks required in paragraph 4 (ii). This measure was incorporated to enable the investigation of small bathymetric features that may not individually allow for the deployment of a line of that number of hooks. Thus in trawl fisheries although a haul comprises a single deployment of the trawl net; in longline fisheries, a haul comprises the setting of one or more lines in a single location. This inconsistency also causes problems in respect to the requirement for the number of fish sampled. In exploratory fisheries other than the Ross Sea, all fish in a research haul (which may comprise one or more lines), up to 100 fish are to be measured and at least 30 fish sampled for biological studies. In the Ross Sea fishery the CM was changed so that all lines were deemed to be research lines and a requirement to sample 35 fish per line (on all lines) for biological studies was put in place and has resulted in the provision of quality data without the complex system of prescribed research lines formerly in place – in effect all lines are regarded as research lines. Several options for correcting this anomaly in other exploratory fisheries are as follows:

- Removing the 3500 hook minimum requirement in other exploratory fisheries and instituting the 35 fish per line sampling requirement as in the Ross Sea for all lines set as part of the research series – this is the recommended option
- Removing the 3500 hook minimum requirement in other exploratory fisheries and keeping the complex system of research hauls.

The following terms are used in CCAMLR Conservation Measures to describe the deployment of a unit of longline gear:

1. To set;
2. (The process of) setting;
3. Deploying;

The following terms are used in CCAMLR Conservation Measures to describe the retrieval of a unit of longline gear:

1. To haul;
2. (the process of) Hauling;
3. Hauled

4. RECOMMENDATIONS

(i) That the base unit of longline fishing gear in respect to position data, seabird mortality mitigation measures, and for the data collection plan in CCAMLR Conservation Measures be termed a 'line' and this be defined as follows:

For longlines a 'line' is defined as a section of backbone with baited hooks attached that has some form of weight designed to adequately prevent the ends of the line moving on the sea floor at each end and a downline connecting at least one end of the backbone to the surface. Flotation devices attached to this downline conform with Conservation Measure 10-01 (1998) governing the marking of fishing vessels and fishing gear.

(ii) For the purposes of catch and effort reporting I recommend for consistency that the term haul is used for all gear types including longlines.

(iii) That WG-FSA review the 3500 hook minimum requirement for those exploratory fisheries other than Subareas 88.1 and 88.2, in particular the merit of replacing the minimum hook requirement and instituting the 35 fish per line sampling requirement as in the Ross Sea for all lines.

(iv) I That WG-FSA review the necessity for the complex system of research hauls as specified in Annex 41-01/B (2007) with a view to assessing the possibility of simplifying the Measure, as has been successful in the exploratory fisheries in Subareas 88.1 and 88.2.

5. CONSERVATION MEASURES WITH RELEVANCE TO LONGLINING OPERATIONS

Listed below are all Conservation Measures specifically referring to longline activities within the Convention Area. Text pertaining to the activity of setting, or hauling, or deploying longlines is bolded; as are terms such as set, line, and haul referring to the line as a fundamental unit of fishing gear.

CONSERVATION MEASURE 24-02 (2005) Longline weighting for seabird conservation

A1. Prior to entry into force of the licence for this fishery and once per fishing season prior to entering the Convention Area, the vessel shall, under observation by a scientific observer:

(i) **set** a minimum of two longlines with a minimum of four TDRs on the middle one-third of each longline, where:

A2. During fishing, for a vessel to be allowed to maintain the exemption to night-time setting requirements (paragraph 4 of Conservation Measure 25-

02), regular longline sink monitoring shall be undertaken by the CCAMLR scientific observer. The vessel shall cooperate with the CCAMLR observer who shall:

(i) attempt to conduct a TDR test on one longline **set** every twenty-four hour period;

B1.

(i) **set** a minimum of two longlines with a minimum of four bottle tests (see paragraphs B5 to B9) on the middle one-third of each longline, where:

B2. During fishing, for a vessel to be allowed to maintain the exemption to night-time **setting** requirements (paragraph 4 of Conservation Measure 25-02), regular longline sink rate monitoring shall be undertaken by the CCAMLR scientific observer. The vessel shall cooperate with the CCAMLR observer who shall:

(i) attempt to conduct a bottle test on one longline **set** every twenty-four hour period;

C1. Prior to entry into force of the licence for this fishery and once per fishing season prior to entering the Convention Area, the vessel shall, under observation by a scientific observer:

(i) **set** a minimum of two longlines with either a minimum of four TDRs, or a minimum of four bottle tests (see paragraphs B5 to B9) on the middle one-third of each longline, where:

C2. During fishing, for a vessel to be allowed to maintain the exemption to **night-time setting** requirements (paragraph 4 of Conservation Measure 25-02), regular longline sink rate monitoring shall be undertaken by the CCAMLR scientific observer. The vessel shall cooperate with the CCAMLR observer who shall:

(i) attempt to conduct a TDR or bottle test on one longline **set** every twenty-four hour period;

C3. The vessel shall:

(i) ensure that all longlines are set so as to achieve a minimum longline sink rate of 0.2 m/s at all times whilst operating under this exemption;

CONSERVATION MEASURE 25-02 (2007) Minimisation of the incidental mortality of seabirds in the course of longline fishing or longline fishing research in the Convention Area.

Noting the need to reduce the incidental mortality of seabirds during longline fishing by minimising their attraction to fishing vessels and by preventing them from attempting to seize baited hooks, particularly during the period when the **lines are set**,

Recognising that in certain subareas and divisions of the Convention Area there is also a high risk that seabirds will be caught during **line hauling**,

Footnote 3: Hookline is defined as the groundline or mainline to which the baited hooks are attached by snoods.

2. Vessels using autoline systems should add weights to the hookline or use integrated weight (IW) hooklines while **deploying** longlines.

4. Longlines shall be **set** at night only (i.e. during the hours of darkness between the times of nautical twilight).

5. The dumping of offal is prohibited while longlines are being **set**. The dumping of offal during **the haul** shall be avoided. Any such discharge shall take place only on the opposite side of the vessel to that where longlines **are hauled**.

6. Vessels which are so configured that they lack on-board processing facilities or adequate capacity to retain offal on board, or the ability to discharge offal on the opposite side of the vessel to that where longlines **are hauled**, shall not be authorised to fish in the Convention Area.

7. A streamer line shall be deployed during longline **setting** to deter birds from approaching the hookline. Specifications of the streamer line and its method of deployment are given in the appendix to this conservation measure.

8. A device designed to discourage birds from accessing baits during **the haul** of longlines shall be employed in those areas defined by CCAMLR as average-to-high or high (Level of Risk 4 or 5) in terms of risk of seabird by-catch.

Footnote 7: Wherever possible, **setting** of lines should be completed at least three hours before sunrise (to reduce loss of bait to/catches of white-chinned petrels).

CONSERVATION MEASURE 31-02 (2007) General measure for the closure of all fisheries

2. On receipt of such notification by the vessel, no further longlines may be **set** within 24 hours of the notified closure date and time.

CONSERVATION MEASURE 33-02 (2007) Limitation of by-catch in Statistical Division 58.5.2 in the 2007/08 season

4. If, in the course of a directed fishery, the by-catch in any one **haul** of *Channichthys rhinoceratus, Lepidonotothen squamifrons, Macrourus* spp., *Somniosus* spp. or skates and rays is equal to, or greater than 2 tonnes, then the fishing vessel shall not fish using that method of fishing at any point within 5 n miles of the location where the by-catch exceeded 2 tonnes for a period of at least five days. The location where the by-catch exceeded 2 tonnes is defined as the path followed by the fishing vessel.

5. If, in the course of a directed fishery, the by-catch in any one **haul** of any other by-catch species for which by-catch limitations apply under this conservation measure is equal to, or greater than 1 tonne, then the fishing vessel shall not fish using that method of fishing at any point within 5 n miles of the location where the by-catch exceeded 1 tonne for a period of at least five days. The location where the by-catch exceeded 1 tonne is defined as the path followed by the fishing vessel.

Footnote 3. For a trawl the path is defined from the point at which the fishing gear was first deployed from the fishing vessel to the point at which the fishing gear was retrieved by the fishing vessel. For a longline or a pot, the path is defined from the point at which the first anchor of a **set** was deployed to the point at which the last anchor of that **set** was deployed.

CONSERVATION MEASURE 33-03 (2007) Limitation of by-catch in new and exploratory fisheries in the 2007/08 season

5. If the by-catch of any one species is equal to or greater than 1 tonne **in any one haul or set**, then the fishing vessel shall move to another location at least 5 n miles distant. The fishing vessel shall not return to any point within 5 n miles of the location where the by-catch exceeded 1 tonne for a period of at least five days. The location where the by-catch exceeded 1 tonne is defined as the path followed by the fishing vessel.

Footnote 5. For a trawl the path is defined from the point at which the fishing gear was first deployed from the fishing vessel to the point at which the fishing gear was retrieved by the fishing vessel. For a longline the path is defined from the point at which the first anchor of a **set** was deployed to the point at which the last anchor of that **set** was deployed.

CONSERVATION MEASURE 41-01 (2007) General measures for exploratory fisheries for *Dissostichus* spp. in the Convention Area in the 2007/08 season

1. This conservation measure applies to exploratory fisheries using the trawl or longline methods except for such fisheries where the Commission has given specific exemptions to the extent of those exemptions. In trawl fisheries, a haul comprises a single deployment of the trawl net. In longline fisheries, **a haul comprises the setting of one or more lines in a single location**.

3. (ii) the precise geographic position of a **haul/set** in longline fisheries will be determined by the centre-point of the line or lines deployed for the purposes of catch and effort reporting;

(iii) the vessel will be deemed to be fishing in any SSRU from the **beginning of the setting process** until the completion of the **hauling of all lines**;

(v) the Secretariat shall notify Contracting Parties participating in these fisheries when the total catch for *Dissostichus eleginoides* and *Dissostichus mawsoni* combined in any SSRU is likely to reach the specified catch limit, and of the closure of that SSRU when that limit is reached. No part of a trawl path may lie within a closed SSRU and no part of a longline may be **set** within a closed SSRU.

ANNEX 41-01/A DATA COLLECTION PLAN FOR EXPLORATORY FISHERIES

2. All data required by the CCAMLR Scientific Observers Manual for finfish fisheries will be collected. These include:

(i) position, date and depth at the start and end of every **haul**;
(ii) **haul-by-haul** catch and catch per effort by species;
(iii) **haul-by-haul** length frequency of common species;

3. Data specific to longline fisheries will be collected. These include:

(i) position and sea depth at each end of **every line in a haul**;
(ii**) setting**, soak and **hauling** times;
(iv) number of hooks **set**;
(viii) sea and cloud conditions and phase of the moon at the time of **setting** the lines.

ANNEX 41-01/B RESEARCH PLAN FOR EXPLORATORY FISHERIES

3. Except when fishing in Statistical Subareas 88.1 and 88.2 (see paragraph 5), any vessel undertaking prospecting or commercial fishing in any SSRU must undertake the following research activities:

(i) On first entry into an SSRU, the first 10 **hauls**, designated 'first series', **whether by trawl or longline**, shall be designated '**research hauls**' and must satisfy the criteria set out in paragraph 4.

(ii) The next **10 hauls**, or 10 tonnes of catch for longlining, whichever trigger level is achieved first, or 10 tonnes of catch for trawling, are designated the 'second series'. **Hauls** in the second series can, at the discretion of the master, be fished as part of normal exploratory fishing. However, provided they satisfy the requirements of paragraph 4, these **hauls** can also be designated as research **hauls**.

(iii) On completion of the first and second series of **hauls**, if the master wishes to continue to fish within the SSRU, the vessel must undertake a 'third series' which will result in a total of 20 research **hauls** being made in all three series. The third series of **hauls** shall be completed during the same visit as the first and second series in an SSRU.

(iv) On completion of 20 research **hauls** the vessel may continue to fish within the SSRU.

4. To be designated as a research **haul**:

(i) each research **haul** must be separated by not less than 5 n miles from any other research **haul**, distance to be measured from the geographical mid-point of each research **haul**;

(ii) each **haul** shall comprise: for longlines, at least 3 500 hooks and no more than 10 000 hooks; this may comprise **a number of separate lines set** in the same location; for trawls, at least 30 minutes effective fishing time as defined in the Draft Manual for Bottom Trawl Surveys in the Convention Area (SC-CAMLR-XI, Annex 5, Appendix H, Attachment E, paragraph 4);

(iii) each **haul** of a longline shall have a soak time of not less than six hours, measured from the time of completion of the **setting** process to the beginning of the **hauling** process.

5. In the exploratory fisheries in Subareas 88.1 and 88.2, all data specified in the Data Collection Plan (Annex 41-01/A) of this conservation measure shall be collected for every **haul**; all fish of each Dissostichus species in a **haul** (up to a maximum of 35 fish) are to be measured and randomly sampled for biological studies (paragraphs 2(iv) to (vi) of Annex 41-01/A).

6. In all other exploratory fisheries, all data specified in the Data Collection Plan (Annex 41-01/A) of this conservation measure shall be collected for every research **haul**; in particular, all fish in a research **haul** up to 100 fish are to be measured and at least 30 fish sampled for biological studies (paragraphs 2(iv) to (vi) of Annex 41-01/A). Where more than 100 fish are caught, a method for randomly subsampling the fish should be applied.

CONSERVATION MEASURE 41-02 (2007) Limits on the fishery for *Dissostichus eleginoides* in Statistical Subarea 48.3 in the 2007/08 and 2008/09 seasons

Under bycatch

8. If the by-catch of any one species is equal to or greater than 1 tonne in any **one haul or set**, then the fishing vessel shall move to another location at least 5 n miles1 distant. The fishing vessel shall not return to any point within 5 n miles of the location where the by-catch exceeded 1 tonne for a period of at least five days. The location where the by-catch exceeded 1 tonne is defined as the path followed by the fishing vessel.

Under Data: catch/effort

11. For the purpose of implementing this conservation measure, the following shall apply:

(i) the Five-day Catch and Effort Reporting System set out in Conservation Measure 23-01;

(ii) the Monthly Fine-scale Catch and Effort Reporting System set out in Conservation Measure 23-04. Fine-scale data shall be submitted on a **haul-by-haul** basis.

Footnote 3. For a longline or a pot, the path is defined from the point at which the first anchor of a **set** was deployed to the point at which the last anchor of that set was deployed.

CONSERVATION MEASURE 41-03 (2006) Limits on the fishery for *Dissostichus eleginoides* in Statistical Subarea 48.4 in the 2005/06, 2006/07 and 2007/08 fishing seasons

Under Bycatch.

8. If the by-catch of any one species is equal to or greater than 1 tonne one **haul or set**, then the fishing vessel shall move to another location least 5 n miles1 distant. The fishing vessel shall not return to within 5 n miles of the location where the by-catch exceeded 1 tonne period of at least five days2. The location where the by-catch 1 tonne is defined as the path3 followed by the fishing vessel.

Under Data: catch/effort

9. For the purpose of implementing this conservation measure, the following shall apply:

(i) the Five-day Catch and Effort Reporting System set out in Conservation Measure 23-01;

(ii) the Monthly Fine-scale Catch and Effort Data Reporting System set out in Conservation Measure 23-04. Data shall be reported on a **haul-by-haul** basis. For the purposes of Conservation Measure 23-04, the target species is *Dissostichus eleginoides*, and 'by-catch species' are defined as any species other than *Dissostichus eleginoides*.

CONSERVATION MEASURE 41-04 (2007) Limits on the exploratory fishery for *Dissostichus* spp. in Statistical Subarea 48.6 in the 2007/08 season

Mitigation 5. The exploratory longline fishery for *Dissostichus* spp. in Statistical Subarea 48.6 shall be carried out in accordance with the provisions of Conservation Measure 25-02, except paragraph 4 (**night setting**), which shall not apply as long as the requirements of Conservation Measure 24-02 are met.

6. Any vessel catching a total of three (3) seabirds shall immediately revert to night setting in accordance with Conservation Measure 25-02.

Under Data: catch/effort

8. For the purpose of implementing this conservation measure, the following shall apply:

(i) the Five-day Catch and Effort Reporting System set out in Conservation Measure 23-01;

(ii) the Monthly Fine-scale Catch and Effort Reporting System set out in Conservation Measure 23-04. Fine-scale data shall be submitted on a **haul-by-haul** basis.

CONSERVATION MEASURE 41-05 (2007) Limits on the exploratory fishery for *Dissostichus* spp. in Statistical Division 58.4.2 in the 2007/08 season

Under Mitigation

8. The exploratory longline fishery for *Dissostichus* spp. in Statistical Division 58.4.2 shall be carried out in accordance with the provisions of Conservation Measure 25-02, except paragraph 4 (**night setting**) shall not apply, providing that vessels comply with Conservation Measure 24-02.

9. Any vessel catching a total of three (3) seabirds shall immediately revert to night **setting** in accordance with Conservation Measure 25-02.

Under Data: catch/effort
13. For the purpose of implementing this conservation measure, the following shall apply:

(i) the Five-day Catch and Effort Reporting System set out in Conservation Measure 23-01;

(ii) the Monthly Fine-scale Catch and Effort Reporting System set out in Conservation Measure 23-04. Fine-scale data shall be submitted on a **haul-by-haul** basis.

CONSERVATION MEASURE 41-06 (2007) Limits on the exploratory fishery for *Dissostichus* spp. on Elan Bank (Statistical Division 58.4.3a) outside areas of national jurisdiction in the 2007/08 season

Under Data: catch/effort
9. For the purpose of implementing this conservation measure, the following shall apply:

(i) the Five-day Catch and Effort Reporting System set out in Conservation Measure 23-01;

(ii) the Monthly Fine-scale Catch and Effort Reporting System set out in Conservation Measure 23-04. Fine-scale data shall be submitted on a **haul-by-haul** basis.

CONSERVATION MEASURE 41-07 (2007) Limits on the exploratory fishery for *Dissostichus* spp. on BANZARE Bank (Statistical Division 58.4.3b) outside areas of national jurisdiction in the 2007/08 season

Under Data: catch/effort
9. For the purpose of implementing this conservation measure, the following shall apply:

(i) the Five-day Catch and Effort Reporting System set out in Conservation Measure 23-01;

(ii) the Monthly Fine-scale Catch and Effort Reporting System set out in Conservation Measure 23-04. Fine-scale data shall be submitted on a **haul-by-haul** basis.

CONSERVATION MEASURE 41-08 (2007) Limits on the fishery for *Dissostichus eleginoides* in Statistical Division 58.5.2 in the 2007/08 and 2008/09 seasons

Under Mitigation

5. The operation of the trawl fishery shall be carried out in accordance with Conservation Measure 25-03 so as to minimise the incidental mortality of seabirds and mammals through the course of fishing. The operation of the longline fishery shall be carried out in accordance with Conservation Measure 25-02, except paragraph 4 (**night setting**) shall not apply for vessels using integrated weighted lines (IWLs) during the period 1 May to 31 October in each season. Such vessels may deploy IWL gear during daylight hours if, prior to entry into force of the licence and prior to entering the Convention Area, each vessel shall demonstrate its capacity to comply with experimental line-weighting trials as approved by the Scientific Committee and described in Conservation Measure 24-02.

During the period 15 April to 30 April in each season, vessels shall use IWL gear and in a manner that ensures lines are **set and hauled** sequentially, in conjunction with night **setting** and paired streamer lines.

Under Data: catch/effort
7. For the purpose of implementing this conservation measure, the following shall apply:

(i) the Ten-day Catch and Effort Reporting System set out in Annex 41-08/A;

(ii) the Monthly Fine-scale Catch and Effort Reporting System set out in Annex 41-08/A. Fine-scale data shall be submitted on a **haul-by-haul** basis.

CONSERVATION MEASURE 41-09 (2007) Limits on the exploratory fishery for *Dissostichus* spp. in Statistical Subarea 88.1 in the 2007/08 season

Under mitigation
6. The exploratory longline fishery for *Dissostichus* spp. in Statistical Subarea 88.1 shall be carried out in accordance with the provisions of Conservation Measure 25-02, except paragraph 4 (night **setting**), which shall not apply as long as the requirements of Conservation Measure 24-02 are met.

7. Any vessel catching a total of three (3) seabirds shall immediately revert to **night setting** in accordance with Conservation Measure 25-02.

Under Research
11. Each vessel participating in this exploratory fishery shall conduct fishery-based research in accordance with the Research Plan and Tagging Program described in Conservation Measure 41-01, Annex B and Annex C respectively. The **setting** of research **hauls** (Conservation Measure 41-01, Annex B, paragraphs 3 and 4) is not required.

Under Data: catch/effort
14. For the purpose of implementing this conservation measure in the 2007/08 season, the following shall apply:

(i) the Five-day Catch and Effort Reporting System set out in Conservation Measure 23-01;

(ii) the Monthly Fine-scale Catch and Effort Reporting System set out in Conservation Measure 23-04. Fine-scale data shall be submitted on a **haul-by-haul** basis.

CONSERVATION MEASURE 41-10 (2007) Limits on the exploratory fishery for *Dissostichus* spp. in Statistical Subarea 88.2 in the 2007/08 season

Under mitigation
6. The exploratory longline fishery for *Dissostichus* spp. in Statistical Subarea 88.2 shall be carried out in accordance with the provisions of Conservation Measure 25-02, except paragraph 4 (night **setting**), which shall not apply as long as the requirements of Conservation Measure 24-02 are met.

7. Any vessel catching a total of three (3) seabirds shall immediately revert to **night setting** in accordance with Conservation Measure 25-02.

Under Research
11. Each vessel participating in this exploratory fishery shall conduct fishery-based research in accordance with the Research Plan and Tagging Program described in Conservation Measure 41-01, Annex B and Annex C respectively. The **setting** of research **hauls** (Conservation Measure 41-01, Annex B, paragraphs 3 and 4) is not required.

Under Data: catch/effort
14. For the purpose of implementing this conservation measure in the 2007/08 season, the following shall apply:

(i) the Five-day Catch and Effort Reporting System set out in Conservation Measure 23-01;

(ii) the Monthly Fine-scale Catch and Effort Reporting System set out in Conservation Measure 23-04. Fine-scale data shall be submitted on a **haul-by-haul** basis.

CONSERVATION MEASURE 41-11 (2007) Limits on the exploratory fishery for *Dissostichus* spp. in Statistical Division 58.4.1 in the 2007/08 season

Under mitigation
6. The exploratory longline fishery for *Dissostichus* spp. in Statistical Subarea 58.4.1 shall be carried out in accordance with the provisions of

Conservation Measure 25-02, except paragraph 4 (night **setting**), which shall not apply as long as the requirements of Conservation Measure 24-02 are met.

7. Any vessel catching a total of three (3) seabirds shall immediately revert to **night setting** in accordance with Conservation Measure 25-02.

Under Data: catch/effort
14. For the purpose of implementing this conservation measure in the 2007/08 season, the following shall apply:

(i) the Five-day Catch and Effort Reporting System set out in Conservation Measure 23-01;

(ii) the Monthly Fine-scale Catch and Effort Reporting System set out in Conservation Measure 23-04. Fine-scale data shall be submitted on a **haul-by-haul** basis.

6. REFERENCES

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