Ministry for Pr
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2012 Compliance Risks (Update)
West Coast/ East Coast South Island Hoki Fisheries

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June 2013

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1. Executive Summary

The MPI Operational Coordination Maritime team (OCM) were tasked to update the 2011 risk profile for the West Coast South Island (WCSI) and East Coast South Island (ECSI) hoki fisheries. This update is intended to provide fisheries management with an assessment of compliance risks relating to the 2012 season and, where possible, provide a comparison with the 2011 hoki season.

The hoki TACC was increased by 10,000 tonne (t) (from 120,000t to 130,000t) for the 2011/12 fishing year. The increase was allocated to the HOK1W area (WCSI & Southern/Sub-Antarctic areas) according to agreed quantities by quota owners. The agreed split for HOK1W and HOK1E is 70,000t and 60,000t respectively. The TACC remains at 130,000t for the 2012/13 fishing year. The TACC was fully caught in the 2011/12 fishing year.

OCM coordinated operations to gather, examine and analyse data pertaining to deepwater factory vessels operating in the WCSI and ECSI hoki fisheries. For the WCSI fishery a total of eight comprehensive in-port inspections were conducted. Two at-sea patrols, with the assistance of RNZN, were undertaken to board and inspect factory trawlers operating in the fishery. Information obtained during these two phases was analysed in conjunction with data collected by MPI Observers. For the ECSI hoki fishery, an at-sea patrol was conducted in conjunction with the RNZN to enable at-sea boardings of vessels.

OCM has identified areas that are still of concern in the hoki fishery. These include: inconsistent return completion, poor fishing and on-board catch handling practices, under-reporting greenweight, and fillets processed beyond state definition.

OCM recommend that this update be read in conjunction with the 2011 profile in order to gain a full appreciation of the issues pertaining to both WCSI and ECSI hoki fisheries. Twenty eight recommendations have been made which need to be addressed by MPI and discussed with industry in order to ensure more accurate reporting of hoki greenweight.

2. The WCSI & ECSI Hoki Risk Profile Update

OCM has updated the 2011 risk profile for the West Coast South Island (WCSI) and East Coast South Island (ECSI) hoki fisheries. This update is intended to provide fisheries management with an assessment of compliance risks relating to both hoki fisheries.

Due to resource limitations, this update does not identify risks associated with by-catch species in these two fisheries.

This update is based on the analysis of information obtained from in-port and at-sea inspections, MPI observers, unload schedules and vessel fishing returns.

2.1 WCSI hoki fishery

OCM coordinated Operation Bronto II to gather, examine and analyse data relating to vessels operating in the WCSI hoki fishery. The operation targeted deep-water vessels 46m or more in length that were fishing beyond the 25nm restricted zone operating in the hoki winter spawn

from July to September 2012. To maintain consistency with the 2011 profile, vessels less than 46m in length were excluded[1] from this update.

Like its predecessor, Operation Bronto II contained three phases: in-port inspections, at-sea inspections (Op Apate II) and MPI Observer coverage. Fishery Officers completed eight comprehensive in-port inspections during this phase of the operation. In conjunction with this, Fishery Officers participated in two at-sea patrols with the assistance of the RNZN, to board and inspect factory vessels operating in the hoki fishery. They boarded all but one of the vessels. Placement of MPI Observers provided 41% coverage of trips in the fishery.

Vessel permit holders were also required to supply unload schedules for all landings. This information provided a breakdown of all hoki landed by state and grade.

2.2 ECSI hoki fishery

The hoki risk update analyses included deep-water vessels operating in the ECSI hoki fishery. Information was gathered and analysed in relation to at-sea vessel inspections, fishing returns and MPI observer data. To maintain consistency with the 2011 profile, the analyses did not include the Cook Strait hoki fishery. Vessels operating in this fishery are less than 46m in length and are predominantly small inshore 'fresher' vessels which land whole hoki.

Fishery Officers participated in an at-sea patrol (Op Eris) with the assistance of the RNZN, to board and inspect factory vessels operating in the ECSI hoki fishery.

3. WCSI Hoki Update

3.1 General Information

During the period July to September 2012, approximately 44,191t of hoki (34% of the TACC) was reported as taken outside of the 25 mile restricted fishing zone by 24 deepwater factory trawlers. This is similar to the 2011 season when 32% of the TACC was reported from the area by 23 vessels.

Of the 24 deepwater trawlers operating during the 2012 season, 16 (67%), were foreign owned and crewed but chartered to New Zealand companies. This is one less than the 17 vessels (74%) chartered in 2011. The remaining eight vessels were New Zealand owned and operated. All but two of the 24 vessels operating in the WCSI hoki fishery did so during the 2011 winter spawning season. The two vessels new to WCSI hoki in 2012 were both New Zealand flagged[2]. Table 1 lists the number of vessels by nationality (based on nationality of senior crew and not flag state[3]).

Vessel's Nationality	Number of Vessels 2011	Number of Vessels 2012
Korean	11	10
Ukrainian	6	6
New Zealand	6	8
Total	**23**	**24**

Table 1 - Summary of foreign charter and New Zealand vessels operating in the WCSI hoki fishery

[1] These vessels were excluded as they are predominantly 'fresher' vessels that operate within the 25 nm restriction zone and the 12 nm Territorial Sea. Because "Fresher' vessels land hoki in a whole state little is known about the hoki length distribution, in the absence of onshore sampling of landings.
[2] Note: The FV s 9(2)(a) is NZ flagged and crewed but is foreign owned.
[3] The vessels s 9(2)(a) and s 9(2)(a) are flagged in Dominica but crew nationality is Ukraine.

The Korean vessels are all Limited Processing Factory Vessels[4] (LPFV)'s without meal plants and the Ukrainian vessels are all LPFV's with meal plants. The New Zealand vessels all have meal plants, with seven being fillet vessels and one an LPFV (s 9(2)(a)).

The bulk of hoki is processed to HGT (headed and gutted) and TSK (skin off trimmed fillet) states. Table 2 below provides a comparison of total greenweight by landed state for the 2011 and 2012 years.

Hoki State	2011 (greenweight kg)	% of landed	2012 (greenweight kg)	% of landed
HGT	27,801,972	64.51%	29,227,312	60.02%
TSK	9,820,069	22.79%	13,898,845	28.54%
DRE	1,214,429	2.82%	2,581,610	5.30%
TRF	3,117,978	7.23%	1,721,873	3.54%
MEA	565,319	1.31%	586,348	1.20%
UTF	253,206	0.59%	258,792	0.53%
MKF	138,478	0.32%	238,296	0.49%
GRE	184,999	0.43%	184,800	0.38%
HGU	1,209	0.00%		
Total	**43,097,658**		**48,697,876**	

Table 2 - Summary of greenweight (kg) by landed state for hoki

HGT/DRE and TSK/TRF product account for approximately 97% of total hoki processed. HGT/DRE is the main product produced, accounting for 65% of landed product, with TSK/TRF accounting for just 32%. The remaining 3% consisted of other landed primary states such as mince, meal and wholefish. Processed catch for the 2012 season is very similar to that reported for 2011.

The majority of fishing vessel captains commented that the 2012 hoki season was good, with good sized hoki, and was comparable to the previous season. Most fishers spoken to during at sea boardings acknowledged fishing was good, particularly for vessels targeting fish marks. Some fishers thought that the 2012 was better. Others mentioned that marks were not as good or intense as the previous season. Most fishers stated there were few small fish, which appears to be consistent with hoki length frequency (LF) data recorded by MPI Observers during the 2012 WCSI fishery [refer to LF graph in section 3.9].

3.2 Vessel Inspection Phases

3.2 (a) In-Port Phase

In this phase of the operation Fishery Officers completed, as planned, eight comprehensive in-port inspections of vessels that had fished on the WCSI. These represented 14% of all landings from trips fishing WCSI hoki. Fishery Officers completed inspections at a number of ports. They included all three vessel nationalities. Seven were LPFVs and one a fillet vessel. As well as these inspections, Fishery Officers made carton weight checks on one other landing made by a fillet vessel (but no other inspection requirements were fulfilled). The vessels inspected ranged in overall length from 58m to 105m. During the in-port inspections Fishery Officers examined and weighed approximately 30t of hoki.

Fishery Officers obtained unload schedule documents from vessels relating to 49 additional landings. The landing-by-grade data obtained for 58 landings comprises all 2012 WCSI hoki landings.

[4] A limited processing factory vessel is a vessel that processes fish to HGT or DRE state only, no fillet product is produced. These vessels may or may not have a meal plant.

3.2 (b) At-Sea Phase

Operation Apate II, the RNZN/MPI at-sea phase utilising the HMNZS *Taupo*, conducted two patrols on WCSI in 2012, reduced from four patrols in 2011. Fishery Officers conducted 23 inspections on 22 different vessels. One vessel was inspected twice. Fisheries officers made 16 of these inspections between the 20th and 27th July, and seven inspections between the 31st July and 6th August 2012, coinciding with the peak spawning period.

All vessels inspected during in-port and at-sea phases carried a current fishing permit, certificate of registration and ALC certificate on board. New Zealand and foreign charter vessels all had a current vessel manager and/or a charter representative responsible for the fishing operations of the vessel.

3.2 (c) Observer Phase

A total of 24 trips that fished WCSI hoki in 2012 carried MPI Observers on-board. Sixteen of these trips fished exclusively in the WCSI hoki fishery. On one of these trips the Observer disembarked prior to the end of the trip, upon completion of VSCF tasks. The remaining eight trips fished multiple FMAs. Twelve '*Observer Trip Summaries*', containing additional data to that usually collected by MPI Observers, were received. Nine of these related to trips fishing exclusively WCSI.

MPI Observer coverage for the 2012 season increased, with 41% of trips covered compared to 22% in the 2011 season.

3.3 Trawling Statistics

Table 3 shows the number of tows and type of fishing gear deployed by the deep-water vessels operating in the WCSI hoki fishery during the 2012 spawning season, as compared to the previous season.

	BT gear				MW gear					
	Number of tows (%)		Seabed depth range (m)		Number of tows (%)		Seabed depth range (m)		Average distance off seabed (m)	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Korean	941 85%	931 94%	122-755	150-785	168 15%	59 6%	166-579	375-536	1	0
Ukrainian					857 100%	936 100%	148-785	145-830	12	21
New Zealand	680 73%	817 72%	211-731	318-808	249 27%	315 28%	304-780	320-653	75	54

Table 3 - Summary of TCEPR data illustrating number of tows and fishing depth by method and nationality

Gear use was very similar to 2011, with both Korean (94% of the time) and New Zealand (72% of the time) vessels primarily using bottom trawl (BT) gear. Ukrainian vessels used mid-water (MW) gear exclusively, which is typical of vessels of this nationality.

Korean vessels typically fished on or near the seabed when using both BT and MW gear. New Zealand vessels fished off the bottom when using MW gear, but on the bottom when using BT gear. Ukrainian vessels fished near the bottom the majority of the time. Observer(s) noted that Ukrainian vessels used mid-water nets, typically fished on the sea bed but occasionally lifting the net off the bottom to target mid-water fish marks.

Korean vessels conducted fewer tows in 2012 than 2011, which is consistent with there being one less Korean vessel in the fishery in 2012. Ukrainian vessels conducted more tows in 2012 than the previous season, despite the same six vessels returning to the fishery. New Zealand vessels conducted more tows in 2012, which is largely due to the addition of two extra New Zealand vessels to the fishery. Average catch rates of hoki were similar in 2012 to those reported in 2011 across the fleet [refer to table 14 in section 3.6 (h)].

Table 4 below shows the number of tows conducted, reported target species and gear used (BT or MW) by nationality for both the 2011 and 2012 WCSI hoki seasons. This data relates to tows within FMA7 only.

	Number of tows BT						Number of tows MW					
	Target Species						Target Species					
	HOK		Tier 1[5]		Other ITQ		HOK		Tier 1		Other ITQ	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Korean	238 21%	369 37%	612 55%	441 45%	91 8%	121 12%	159 14%	59 6%	5 <1%		4 <1%	
Ukrainian							753 88%	821 88%	104 12%	77 8%		38 4%
New Zealand	671 72%	803 71%	8 1%	14 1%	1 <1%		249 27%	314 28%		1 <1%		

Table 4 - Summary of TCEPR data illustrating number of tows by target species, method and nationality

Trends for the 2012 season include:

- Korean vessels used BT gear for 931 tows, which represented 94% of trawls. Hoki was recorded as the target species for less than 40% of BT tows, with other Tier1 species (typically hake) being targeted more frequently when bottom trawling. The remaining 12% of tows targeted other ITQ species.
- Overall in 2012, Korean vessels reported targeting hake (Tier 1 species) as frequently as hoki. This differs from 2011 where hake was targeted on 20% more tows than hoki.
- When using MW gear Korean vessels reported targeting hoki for all trawls.
- New Zealand domestic and Ukrainian vessels principally reported targeting hoki.
- New Zealand vessels used BT gear for 72% of trawls and reported Hoki as the target species for 98% of these. MW gear was used for the remainder of tows targeting hoki.
- Ukrainian vessels used MW gear exclusively. They reported targeting hoki 88% of the time and other Tier 1 ITQ species 8% of the time.

3.4 *Destination of Landed Fish*

According to the data collected, all landed fish product was either:

- Transported to onshore cold storage facilities either owned or part-owned by the permit holder/licensed fish receiver; or
- Landed to an independent cold storage facility.

As was the case during 2011, no vessels were listed as mobile LFR premises during 2012. There is no data to indicate that landed frozen product was loaded directly into refrigerated containers on the wharf during the 2012 season. This practice, while not a compliance risk

[5] Tier 1 species = HAK, LIN, SBW, ORH, JMA, OEO, SCI, SQU

during the 2012 season, remains a potential risk if vessels were licensed as mobile LFRs in the future.

OCM recommend that no deepwater vessels are issued with mobile LFR licenses in the future, because the risk of product leaving New Zealand without any opportunity for a compliance inspection is too high.

3.5 Reporting Issues

3.5 (a) TCEPR estimated catch

Regulation 11(2)(a) of the Fisheries Reporting Regulations 2001 states that *"a person required to provide Trawl Catch, Effort, and Processing Returns for a vessel must complete a return on each day or part-day that the vessel is on a fishing trip"*. Section 2 (10 & 11) of the Explanatory Notes to the TCEPR describe how the section *"estimated catch by species in order of quantity"* should be completed. However, neither the regulations nor explanatory notes provide clarification about **when** this information should be entered into the TCEPR. As such, operators use a variety of methods for capturing this data. Table 5 below provides a brief summary of reporting and filing methods used across the fleet.

At time of tow	Once per day	Following processing	Combination	Not known
10 (8 filing EDT, 2 filing paper)	8 (All filing EDT)	3 (All filing paper)	1 (Filing EDT)	2 (Both filing EDT)

Table 5 - Summary of reporting and filing methods.

Completion of effort data is described in categories (a)-(d) as listed below:

(a) Real-time – fields are completed at time of tow. Ten vessels (*New Zealand:* s 9(2)(a) s 9(2)(a) ; *Ukrainian:* s 9(2)(a) 1; *Korean:* s 9(2)(a) s 9(2)(a)) report in this manner. Two of these vessels filed paper returns; the remaining 8 filed electronically (CEEDT).

(b) Entered once per day. Data is transferred from other records which are kept more timely. Eight vessels (*New Zealand:* s ; *Ukrainian:* s 9(2)(a) s 9(2)(a) s 9(2)(a) ; *Korean:* s 9(2)(a)) report in this manner. All vessels file electronically (CEEDT).

(c) Following completion of processing. Three vessels (*Korean:* s 9(2)(a) s 9(2)(a)) report in this manner. All file paper returns. In one case entry of this can be two days after the event due to a time lag between catching and processing data being available.

(d) One vessel (*Korean:* s 9(2)(a) uses a combination of reporting methods i.e. effort (e.g. date/time of shot) completed immediately, but estimate catch recorded upon completion of processing.

(e) For the remaining two vessels (*New Zealand:* s 9(2) ; *Korean:* s 9(2)(a)) it is unclear how catch effort data is reported.

Vessels' reporting of effort shows similar variation to that seen during the 2011 season. According to the available information, there has been an improvement in reporting in real time compared to the practices evident in 2011, where only three vessels recorded both effort and estimated catch information prior to processing. However, it is not possible to fully assess

the veracity of this information using either paper returns or the EDT audit data currently available [refer to section 3.5(c) below].

OCM recommend that greater clarification is needed in the Fisheries Reporting Regulations 2001 to improve reporting in this area. The requirement for the timely entry of effort and estimated catch data (e.g. "as soon as practicable once the trawl net has been landed on the vessel") should be paramount.

3.5 (b) TCEPR daily processing summary

Regulation 11(2)(a) of the Fisheries Reporting Regulations [see reference in 3.5 (a) above] is silent on the manner in which the daily processing summary should be completed. Section 3(1) of the Explanatory Notes to the TCEPR describes how the processed catch should be completed and instructs permit holders to "Fill out this section for the fish taken on the day written at the top of the form, whether or not it was processed on that day".

At the Compliance Group meeting held on the 28th June 2012, industry was advised to report in accordance with the explanatory notes. This required a change in reporting practices for some vessels. Feedback received indicated this change was causing serious disruption to the information flow on-board vessels and it was resulting in complications for some companies. As a result of this feedback, interim advice was given to companies that they should continue to report processing data using current on-board practices.

Sections a) and b) summarise information provided to Fishery Officers and Observers about when and how vessels completed the processed catch section of the TCEPR during 2012:

(a) Nine vessels (all Korean) recorded TCEPR processing summary data in relation to the day on which the tow began, regardless of when processing finished. As a consequence processing summary data was often not entered until final processing figures were available, up to 1 or 2 days after the relevant catch was taken. A further effect of this practice was the entry of effort data for subsequent tows was also delayed (where paper forms are used) until such time as the processing summary is complete for the previous day.

(b) The remaining 15 vessels (Ukrainian, New Zealand and 1 Korean: s 9(2)(a)) record processed catch in the TCEPR processing summary for product processed during set timeframes regardless of what day the catch came from. Table 6 below illustrates the 24 hour period used by each vessel nationality.

Nationality	00:00 – 24:00	01:00 – 01:00	20:00 – 20:00	22:00 – 22:00	Unknown
Korean	1				
Ukrainian			6		
New Zealand	3	2		1	2

Table 6 - Summary of time period used for reporting processed catch by vessels reporting according to set time rather than tows completed on a day

In the 2012 season, the majority of the fleet (62%) were completing TCEPR processing data in respect of product processed during a particular 24 hour period regardless of when the catch was taken. It is clear from this that current practice does not comply with the explanatory notes. However this method of completion is preferable for compliance auditing purposes, as it enables product flow analysis to be conducted.

OCM recommend that greater clarification is needed in the Fisheries Reporting Regulations 2001 to improve reporting in this area. The requirement for the timely entry of processed catch data should be paramount. Explanatory notes need to be amended to reflect the intent of the regulations and best practice for auditing purposes.

3.5 (c) Catch Effort Electronic Data Transfer Returns (CEEDT)

CEEDT was introduced to enable authorised users to meet their reporting obligations under the Fisheries Reporting Regulations 2001, to reduce costs and improve data quality.

In 2011, four vessels were using CEEDT to file returns. During the 2012 WCSI hoki season, there were 19 vessels using CEEDT to file returns, with only five (all Korean FCVs) still using paper returns. Appendix 1 lists methods used by vessels to file MPI returns.

The limited analysis of the audit data currently available shows there are differing methods of completing CEEDT, as listed in (a) to (c) below:

(a) Five vessels (all Ukrainian FCVs) were beginning and completing their returns within the space of about an hour, on the day after the date that the return related to. This was consistent with information provided to Fishery Officers and Observers in which these vessels stated EDT was completed once daily using data recorded in other source documents, which were kept contemporaneously.

(b) Thirteen vessels were creating a form on the day it related to but typically completing/signing it 1-2 days later. It is not possible to tell when each bit of information on the return was entered, i.e. whether effort and catch data for each tow was entered at the time of the tow or at some later time.

(c) The s 9(2)(a) appeared to have different practices depending on the authorised users onboard for a trip. For trips with Skipper s 9(2)(a), forms were completed the day after they were started. For trips with Skipper s 9(2)(a) & Mate s 9(2), the delay between starting a return and completing it varied from 2 to 8 days. This delay in completion is unacceptable.

The use of CEEDT should provide Compliance with a unique opportunity to monitor the timeliness of return completion; and to potentially identify false declarations including area mis-reporting, under-reporting and discarding. Accurate date/time stamping of each individual field populated is imperative for Compliance auditing purposes.

The issues noted in the 2011 profile with regards to auditing CEEDT data still remain of concern. Recommendations 26 to 28 from the 2011 profile need to be actioned to enable effective analysis and monitoring of reporting. This is becoming increasingly important due to the increasing number of vessels using EDT as their method of reporting.

OCM recommend that:

- The manner in which dates and times are written out to the CEEDT event fields needs to be amended to accurately record when the data was entered, in-accordance with the original CEEDT specifications.

- An analysis tool to process the CEEDT audit history data exported from the FishServe system is developed to enable prompt and accurate data analysis.

- The analysis tool to process the Compliance Management Tool (CMT) exported CEEDT audit history data needs to be further developed as only an early draft version of an analysis tool has been prepared at this stage.

3.5 (d) Accidental Loss, Abandonment and Authorised discards

Section 72 of the Fisheries Act 1996 prohibits the dumping of fish. However, 72(5)(c) provides for authorised discards in the presence of a fishery officer or Observer. All authorised discards of fish must be included in the appropriate returns, and reported against destination type code

(DTC) 'A'. This code relates to fish or fish product of the species or classes of fish subject to the quota management system established under Part 4 of the Fisheries Act 1996 that are returned to, or abandoned in, or accidentally lost at sea.

The use of DTC 'A' in CLRs may relate to catch that was either (or a combination of): authorised discards, accidental losses (e.g. attributed to burst bag) and/or intentional releases (or abandonment) for reasons of vessel/crew safety. It is not immediately possible to identify what of these circumstances apply to catch recorded against DTC 'A' in a CLR. During the 2012 season 110,853 kg of hoki was recorded against DTC 'A' by 14 vessels. This is an increase from a total of 58,352 kg reported during the 2011 season.

Table 7 provides a summary, by vessel, of hoki reported against DTC "A" on CLRs during the 2012 hoki season. A comparison of TCEPR and CLR data, where DTC "A" was used, showed that 99% or more of hoki reported as "ACC" or "DIS" on TCEPRs was accounted for on the appropriate CLR.

Vessel	MPI Observer onboard	Landing date	HOK Reported as 'A' (kg)
s 9(2)(a)	Yes	20/07/2012	669
	Yes	27/07/2012	1,200
	Yes	11/08/2012	2
	No	29/07/2012	24,600
		29/08/2012	300
	Yes	13/07/2012	13,762
	No	17/08/2012	450
	Yes	1/08/2012	7,000
	Yes	8/08/2012	13,023
		5/09/2012	4,296
		10/10/2012	7,760
	Yes	29/08/2012	40
	Yes	3/08/2012	1
	No	23/08/2012	18,000
	Yes	13/08/2012	700
	No	25/07/2012	800
	No	11/09/2012	16,000
	No	17/09/2012	2,000
	No	23/07/2012	250
Total			**110,853**

Table 7 - Summary of vessels recording destination type code (DTC) "A" for HOK, as reported on CLRs

A total of 38,842 kgs of hoki was authorised as discards by MPI Observers. These discards are highlighted in pink in table 7 above. A total of 7,040 kgs was estimated as lost from burst Bags as reported by MPI Observers. These losses are highlighted in green in table 7. A total of 2,571 kgs relate to losses reported by the vessel but not reported by MPI Observers. These losses are highlighted in blue in table 7. MPI Observers' duties include the routine inspection of TCEPRs during the course of a trip. As such it is unusual for such losses to have gone undetected. These losses are likely to be attributable to burst bags or direct losses from the net, which were not observed and/or reported by MPI Observers. Subsequent checks of TCEPRs indicated that the losses occurred but there were no comments clarifying the loss.

MPI Observers noted the following methods for estimating losses from burst bags:

- Eyeball estimate made by bosun (s 9(2)(a))
- Eyeball estimate made by captain s 9(2)(a))

- Estimates taken from catch sensors before the net reached the surface (s 9(2) s 9(2)(a). *This method infers that the vessel calculates any loss by way of deduction.*

All authorised discards of hoki recorded by MPI Observers in trip reports was reported on the corresponding trips' CLRs.

Forty four percent (or 48t) of the hoki reported as 'A' on CLRs was reported by vessels carrying MPI Observers. Eighty percent of this relates to authorised discards. Burst bags accounted for 15%. The remaining 5% was due to losses and/or discards not documented by MPI Observers.

Fifty six percent (or 62 t) of hoki reported as 'A' came from trips not carrying MPI Observers, and therefore must relate to fish abandoned (for reasons of safety) or accidental losses associated with burst bags. These figures are in contrast to the 2011 season during which a larger proportion (74%) came from observed trips compared to that of non-observed. This is illustrated in table 8 below.

Trip Type	2011 'A' (kg)	2012 'A' (kg)
MPI Observer	42,952 (74%)	48,453 (44%)
No MPI Observer	15,400 (26%)	62,400 (56%)
Total	**58,352**	**110,853**

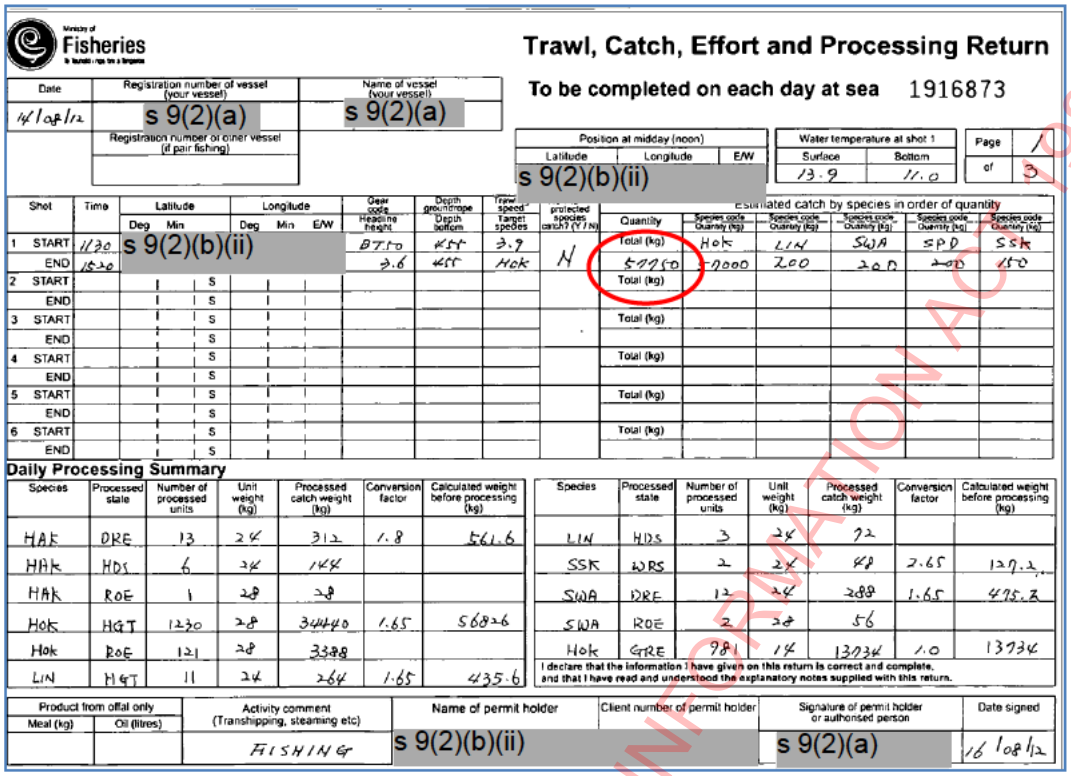
Table 8 – Percentage of hoki reported as destination type code (DTC) "A" on observed and non-observed trips

Recorded losses of catch (excluding authorised discards) related to either one off or multiple events during a trip. Where multiple events occurred, the average reported loss equated to 214 kg. Where single loss events occurred the range was 300 kg to 24,600 kg. There were three significant single loss events reported which were equal to or greater than 16,000 kg. One of these occurred onboard an LPFV with no meal plant and the other two events occurred on fillet vessels with meal plants.

As mentioned above the majority of catch reported against DTC "A" in 2012 (56%) relates to vessels not carrying MPI Observers. Reasons for this could include: vessels reporting legitimate 'losses"; or vessels attempting to legitimise illegal discarding by reporting this event as an "accidental loss". Although catch declared against DTC "A" is deducted from Annual Catch Entitlement (ACE), there is no way of verifying that the actual greenweight has been declared accurately.

<u>Example 1 – reporting of fish abandoned at sea</u>

The s 9(2)(a) (a LPFV with no meal plant) estimated catching just over 57t of fish whilst targeting hoki on the 14th August (see figure 1a below for details). At the end of their daily processing summary for that day (see figure 1b below for details), they reported 18t of hoki as "ACC" and annotated this entry with the comment "too much – safety first".



Fisheries

Trawl, Catch, Effort and Processing Return

To be completed on each day at sea 1916873

Date	Registration number of vessel (your vessel)	Name of vessel (your vessel)
14/08/12	s 9(2)(a)	s 9(2)(a)

Registration number of other vessel (if pair fishing):

Position at midday (noon)		
Latitude	Longitude	E/W
s 9(2)(b)(ii)		

Water temperature at shot 1	
Surface	Bottom
13.9	11.0

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Shot	Time	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	E/W	Gear code / Headline height	Depth groundrope / Depth bottom	Trawl speed / Target species	Non-fish / protected species catch? (Y / N)	Estimated catch by species in order of quantity: Quantity	Species code / Quantity (kg)	Species code / Quantity (kg)	Species code / Quantity (kg)	Species code / Quantity (kg)	Species code / Quantity (kg)
1 START	1130	s 9(2)(b)(ii)					BT10	455	3.9	N	Total (kg)	HOK	LIN	SWA	SPD	SSK
END	1520						3.6	455	HOK		5770	4000	200	200	200	150
2 START						S					Total (kg)					
END						S										
3 START						S					Total (kg)					
END						S										
4 START						S					Total (kg)					
END						S										
5 START						S					Total (kg)					
END						S										
6 START						S					Total (kg)					
END						S										

Daily Processing Summary

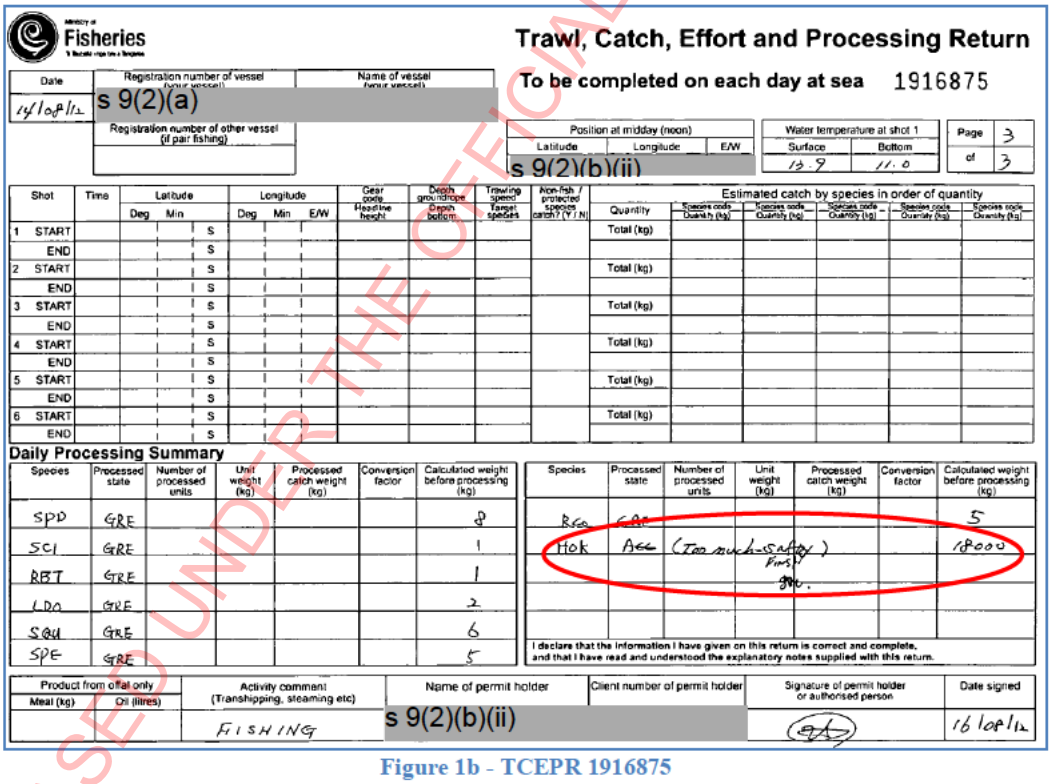
Species	Processed state	Number of processed units	Unit weight (kg)	Processed catch weight (kg)	Conversion factor	Calculated weight before processing (kg)
HAK	DRE	13	24	312	1.8	561.6
HAK	HDS	6	24	144		
HAK	ROE	1	28	28		
HOK	HGT	1230	28	34440	1.65	56826
Hok	ROE	121	28	3388		
LIN	HGT	11	24	264	1.65	435.6

Species	Processed state	Number of processed units	Unit weight (kg)	Processed catch weight (kg)	Conversion factor	Calculated weight before processing (kg)
LIN	HDS	3	24	72		
SSK	WRS	2	24	48	2.65	127.2
SWA	DRE	12	24	288	1.65	475.2
SWA	ROE	2	28	56		
Hok	GRE	981	14	13734	1.0	13734

I declare that the information I have given on this return is correct and complete, and that I have read and understood the explanatory notes supplied with this return.

Product from offal only: Meal (kg)	Product from offal only: Oil (litres)	Activity comment (Transhipping, steaming etc)	Name of permit holder	Client number of permit holder	Signature of permit holder or authorised person	Date signed
		FISHING	s 9(2)(b)(ii)		s 9(2)(a)	16/08/12

Figure 1a - TCEPR 1916873



Fisheries

Trawl, Catch, Effort and Processing Return

To be completed on each day at sea 1916875

Date	Registration number of vessel (your vessel)	Name of vessel (your vessel)
14/08/12	s 9(2)(a)	

Registration number of other vessel (if pair fishing):

Position at midday (noon)		
Latitude	Longitude	E/W
s 9(2)(b)(ii)		

Water temperature at shot 1	
Surface	Bottom
13.9	11.0

Page 3 of 3

Shot	Time	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	E/W	Gear code / Headline height	Depth groundrope / Depth bottom	Trawling speed / Target species	Non-fish / protected species catch? (Y / N)	Estimated catch by species in order of quantity: Quantity	Species code / Quantity (kg)	Species code / Quantity (kg)	Species code / Quantity (kg)	Species code / Quantity (kg)	Species code / Quantity (kg)
1 START						S					Total (kg)					
END						S										
2 START						S					Total (kg)					
END						S										
3 START						S					Total (kg)					
END						S										
4 START						S					Total (kg)					
END						S										
5 START						S					Total (kg)					
END						S										
6 START						S					Total (kg)					
END						S										

Daily Processing Summary

Species	Processed state	Number of processed units	Unit weight (kg)	Processed catch weight (kg)	Conversion factor	Calculated weight before processing (kg)
SPD	GRE					8
SCI	GRE					1
RBT	GRE					1
LDO	GRE					2
SWA	GRE					6
SPE	GRE					5

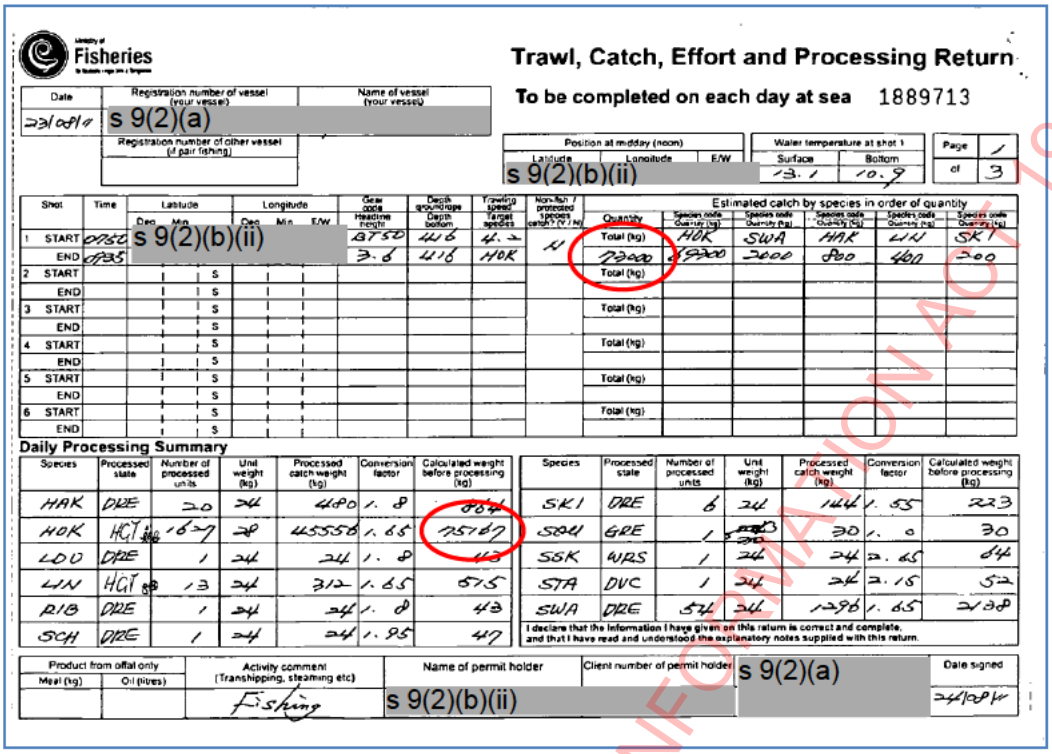
Species	Processed state	Number of processed units	Unit weight (kg)	Processed catch weight (kg)	Conversion factor	Calculated weight before processing (kg)
Ree	GRE					5
Hok	Alive	(Too much-Safety First)				18000

I declare that the information I have given on this return is correct and complete, and that I have read and understood the explanatory notes supplied with this return.

Product from offal only: Meal (kg)	Product from offal only: Oil (litres)	Activity comment (Transhipping, steaming etc)	Name of permit holder	Client number of permit holder	Signature of permit holder or authorised person	Date signed
		FISHING	s 9(2)(b)(ii)			16/08/12

Figure 1b - TCEPR 1916875

It is questionable whether this reported abandonment was for reasons of vessel safety as this vessel has previously reported hauling & processing bags in excess of 70t. For example figure 2 below demonstrates that the vessel is capable of hauling large bags, albeit this is an undesirable practice (as discussed in section 3.6 below).



Fisheries

Trawl, Catch, Effort and Processing Return

To be completed on each day at sea 1889713

Date	Registration number of vessel (your vessel)	Name of vessel (your vessel)
23/09/19	s 9(2)(a)	

Registration number of other vessel (if pair fishing):

Position at midday (noon)			Water temperature at shot 1	
Latitude	Longitude	E/W	Surface	Bottom
s 9(2)(b)(ii)			13.1	10.9

Page 1 of 3

Shot	Time	Latitude Deg	Latitude Min	Longitude Deg	Longitude Min	E/W	Gear code / Headline height	Depth ground rope / Depth bottom	Trawling speed / Target species	Non-fish / protected species catch? (Y / N)	Estimated catch by species in order of quantity: Quantity	Species code / Quantity (kg)	Species code / Quantity (kg)	Species code / Quantity (kg)	Species code / Quantity (kg)	Species code / Quantity (kg)
1 START	0750	s 9(2)(b)(ii)					BT50	416	4.2	N	Total (kg)	HOK	SWA	HAK	LIN	SKI
END	0935						3.6	416	HOK		72000	59200	2000	800	400	200
2 START						S					Total (kg)					
END						S										
3 START						S					Total (kg)					
END						S										
4 START						S					Total (kg)					
END						S										
5 START						S					Total (kg)					
END						S										
6 START						S					Total (kg)					
END						S										

Daily Processing Summary

Species	Processed state	Number of processed units	Unit weight (kg)	Processed catch weight (kg)	Conversion factor	Calculated weight before processing (kg)
HAK	DRE	20	24	480	1.8	864
HOK	HGT	1627	28	45556	1.65	75167
LOO	DRE	1	24	24	1.8	43
LIN	HGT	13	24	312	1.65	515
RIB	DRE	1	24	24	1.8	43
SCH	DRE	1	24	24	1.95	47

Species	Processed state	Number of processed units	Unit weight (kg)	Processed catch weight (kg)	Conversion factor	Calculated weight before processing (kg)
SKI	DRE	6	24	144	1.55	223
SQU	GRE	1	30	30	1.0	30
SGK	WRS	1	24	24	2.65	64
STA	DVC	1	24	24	2.15	52
SWA	DRE	54	24	1296	1.65	2138

I declare that the information I have given on this return is correct and complete, and that I have read and understood the explanatory notes supplied with this return.

Product from offal only: Meal (kg)	Product from offal only: Oil (litres)	Activity comment (Transhipping, steaming etc)	Name of permit holder	Client number of permit holder	Date signed
		Fishing	s 9(2)(b)(ii)	s 9(2)(a)	24/09/19

Figure 2 - TCEPR 1889713

Given this was a significant event, further enquiries relating to weather conditions and other variables relating to ship safety would be required to determine the veracity of the reported abandonment.

OCM recommend that the vessel's ship log and other relevant documentation (which may report danger to the vessel) are examined to clarify the circumstances of the abandonment.

Example 2 – reporting of burst bags

Fillet vessels s 9(2) and s 9(2)(a) reported one-off losses of 16,000 kg (CLR50009655) and 24,600 kg (CLR 50002511) respectively. There were no comments regarding these losses on the relevant returns. Both vessels operate meal plants and would therefore be able to meal and misreport damaged and small un-processable fish as an alternative to legitimising any illegal discards at sea. Assuming meal plants were not at capacity it is possible that these losses were associated with burst bag events, as otherwise unwanted catch could have been put through the meal plant. The presence of a meal plant however does not exempt vessels from illegally discarding particularly where the factory is operating beyond capacity.

OCM recommend that enquiries are made with the permit holders' and that the vessels' ship logs, and other relevant documentation, are examined in order to clarify the circumstances relating to these losses.

3.6 Fishing Practices

3.6 (a) Tow duration

TCEPR data indicates that all Korean vessels reported at least one tow that was in excess of 10 hours. Between 4 and 44% of tows conducted by individual vessels in the Korean fleet were in excess of 10 hours. The vessels with the longest average tow duration and highest

number of long tows, were the s 9(2)(a) & s 9(2)(a). Fishery officers noted that some vessels are still conducting long tows (E.g. s 9(2)(a)).

Table 9 below, shows the average tow duration (including range in tow duration) by vessel nationality and gear type.

Nationality	Method	Average Tow Duration (hrs)	Tow Duration Range (hrs)
Korean	BT	8.19	0.25-18.66
	MW	5.22	0.33-14
Ukrainian	MW	2.91	0.16-9.5
New Zealand	BT	2.95	0-10.55
	MW	3.07	0.05-7.95

Table 9 – Tow duration by nationality as reported on TCEPR

The data shows that Korean vessels typically have longer tows than both the Ukrainian and New Zealand vessels, which tend to have tows less than 3 ½ hours in length. Observers advise that long tows cause considerably more damage to hoki than short tows. There was a significant difference in tow duration between BT and MW gear use by Korean vessels, with longer tows occurring when using BT gear. Long tows using BT gear mostly occur at night and typically coincide with the captain being off duty. The gear is often hauled once the captain is back on duty again. Hoki are known to form dense aggregations on the bottom during the day, dispersing into the water column at night. Therefore long tows at night, typical of the Korean fleet, may well be a response to catch success (or lack of) at night compared to that of daytime catches.

Because of the heterogeneous distribution of hoki, long tows do not necessarily catch fish at a rate proportionate to the short tows. Fishery Officers observed one Korean vessel that had been towing for eight hours and had an estimated 12t in the codend. By contrast, a New Zealand vessel targeting fish marks recovered an 18t bag after the net had been on the bottom 37 minutes, and another vessel reported a similar sized bag after 11 minutes bottom time.

Typically long tows occurred when using BT gear compared to that of MW gear. BT gear is known to damage the seabed due to groundrope configuration. Therefore long BT tows employed by Korean vessels will have a greater impact on the seabed environment and number of by-catch species caught, as discussed in section 3.6 (b). To illustrate this, the total BT tow time reported by Korean vessels during the 2012 WCSI hoki fishery was 7,066 hours, compared to 2,412 hours for New Zealand vessels (about 1/3 of the Korean total).

Some New Zealand and Ukrainian vessels 'soak' or 'fly' the net (see section 3.6 (c) below for details). Observers noted that, on a number of occasions where vessels 'soaked' the net, the end time of the tow, recorded in the TCEPR, related to the time of hauling and not the time the net left the target fishing depth. Consequently average tow durations shown in table 9 above do not represent actual target fishing time but rather total time net is held in the water column.

Reporting of end of tow time in this manner is inconsistent with explanatory notes which state:

> *"The end of the shot is when the trawl net left the depth and position at which you intended to catch fish, or when fish were last caught, which ever occurred last".*

OCM recommend that industry report end of tow time in accordance with explanatory notes i.e. time at which net leaves the target fishing depth, excluding soak time, to accurately reflect tow duration.

3.6 (b) By-catch Species

It is generally accepted that trawling causes environmental effects, as well as impacts on both the target and by-catch species. The number of by-catch species caught is dependent on a number of variables, including: gear type (BT vs MW); tow duration; location; depth fished and whether or not the vessel fishes hard on the sea bed.

Within each vessel nationality, fishing practices tend to be analogous. Table 10 compares the number of species landed by vessel nationality for trips with and without MPI Observers.

Vessel Nationality	MPI Observer Aboard	Average Number of QMS Species Landed	Average Number of Non-QMS Species Landed	Total Average Number of Species Landed
Korean	No	25	33	58
	Yes	33	44	77
Ukrainian	No	28	16	44
	Yes	31	22	53
New Zealand	No	28	14	42
	Yes	27	14	41

Table 10 – Average number of QMS and non-QMS species landed by nationality for trips with and without MPI Observer aboard, as reported on CLRs

New Zealand vessels showed no increase in numbers of species reported on CLRs when MPI Observers were on-board. Both Korean and Ukrainian vessels reported more species on CLRs when MPI Observers were on-board. This suggests un-reported discarding, or mealing, occurred on trips with no MPI Observer coverage. In the presence of MPI Observers, Korean vessels reported on average 33% more species, and Ukrainian vessels reported on average 17% more species. As there is now a requirement for MPI Observers to be placed on-board all FCVs, reporting of by-catch species should be more accurate in the future. However, solo MPI Observer trips still provide opportunity for vessels to misreport whilst Observer is off-duty.

Korean vessels reported landing, on average, 77 species in total on observed trips. New Zealand vessels reported landing 41 species and Ukrainian vessels 53 species. Korean vessels caught nearly twice as many species as New Zealand vessels. Many of these species are un-wanted or un-marketable so are likely to be discarded.

3.6 (c) Soaking the Net

The practice known in the industry as 'soaking the net', 'flying the net' or keeping the bag "in the fridge" is typically used by vessels when they have reached their target catch weight and consequently lift the net from the target depth. During the time a vessel 'soaks' the net the vessel will keep the gear well away from any fish marks and usually away from the fleet that may still be fishing. A number of vessels, at least half of the fleet, are known to engage in this practice. They include, but are not limited to: s 9(2)(a)
s 9(2)(a)
s 9(2)(a)
Several instances of soaking the net were observed on New Zealand vessels during at-sea inspections. Fishery Officers noted no obvious deterioration of quality in these fish when they were brought aboard. Vessel crew commented that most damage is done to fish when the net is "bumping along the bottom," especially when there is a large swell. Soaked catch can sustain damage in rough sea conditions due to the 'washing machine' effect. Midwater trawled soaked fish is more likely to be in better condition to that of bottom trawled fish. When bottom trawling, damage is compounded by a combination of the catch being bounced around on the bottom and the effects of the species composition in the codend. Spiny dogfish and other sharks are known to cause considerable damage to hoki.
Comments made by Observers in relation to soaking are:

- s 9(2)(a) [Trip s]: *"Once catch sensor had gone off (aim was for 35T per tow), they would soak the net at non-fishing depth until factory had only 4T left to process, then haul."* [Trip s]: *"During a period of very high catch rates (HOK) the vessel hauled both tow 66 and tow 67 after towing at non-fishing depth for 3.5 hrs and 4 hrs respectively."*

- s 9(2)(a) [Trip s 9(2)]: *"On over 75% of tows, net was flown at non-fishing depth for a period of time until pounds were cleared in the factory, then net was hauled".*

- s 9(2)(a) [Trip s]: *"Net was soaked for 90 minutes and as a result the fish became soft and of poor quality, hence recovery from Baader fillet machines was poor."* It is unclear from the Observer report whether other variables contributed to the loss in quality e.g. period catch remained in pounds before processing.

'Soaking the net' appears to be employed mainly by Ukrainian and New Zealand vessels. The only exceptions noted were two Korean vessels the s 9(2)(a) and s 9(2)(a) . It is standard practice for Ukrainian vessels to soak the net until only a small amount of catch is left to process. This practice optimises fish flow through the factory.

'Soaking the net' can have varying impacts on fish quality depending on a number of variables including: bag size, species composition, vessel speed, soaking duration and sea conditions. In some circumstances this method may be preferable to hauling before the pounds are empty and the factory is ready to process the catch. Soaking may also be a direct response to competition between vessels for fish marks. The "grab it while you can" mentality appears to prevail, rather than risking the factory running out of a supply of fish. If vessels were to consistently catch to factory capabilities then the use of this practice may be avoided altogether.

OCM recommend that the practice of 'soaking the net' is monitored to identify and mitigate the use of bad practices e.g. catching beyond capacity.

3.6 (d) On-board Handling

Hoki is a soft fish that requires careful physical handling and good chilled storage practices once on board to mitigate deterioration and subsequent damage. This is particularly important when producing fillet product as wastage is potentially high due to fillet machines' limitations in processing damaged and soft fish.

On-board handling practices vary from vessel to vessel and directly affect quality of fish and product produced. Factors which affect fish quality include: size of bag, method of tipping catch into the pounds, pound design, use of refrigerated sea water (RSW) and/or ice slurry in the pounds and buffer tanks, distribution of staff in the factory, processing machinery, efficiency of factory processing, product flow, plate freezer capacity.

Different machines are used to process HOK, depending on the final product produced e.g. HGT versus fillet. Korean and Ukrainian vessels process HOK to an HGT state using circular heading and tailing saws. Fish are usually fed into these machines by hand. On board New Zealand vessels a combination of Baader machines are used to process hoki, most commonly to a fillet state. Processing machines are identified, by vessel, in table 11.

Vessel name	Circular saw	B424/429	B182	B190	B192	B212	Trio
FCVs	✓						
s 9(2)(a)		✓			✓	✓	✓

s 9(2)(a)		✓			✓	✓	✓
		✓			✓	✓	✓
		✓	✓		✓		✓
		✓	✓		✓		✓
		✓				✓ (header section only)	
		✓			✓	✓	✓
		✓ (B429)		✓		✓	✓

Table 11 – Processing equipment by vessel (FCV's grouped together as they use same type of equipment).

The Baader 182, 190, 192 and 212 are heading, gutting and filleting machines. Trio machines remove skins from fillets (for TSK products).

Baader 182 and 212 machines are typically used to process small hoki i.e. with an approximate size range of 55 - 70cm. Baader 190 and 192 machines are used to process large hoki i.e. approximate size range of 70 – 100cm. Generally fish less than 55cm are not processed to a fillet state however the Baader 182/212 machines do have the capability to do so if set up accordingly. The Baader 424 and 429 are heading machines and are commonly used for processing by-catch species. Often only one machine is operating at a time as vessels do not have the crewing capacity to operate more than this or to pack out the extra product produced.

On fillet vessels, trimmed skinned fillets (TSK) are produced initially. As hoki softens, the factory may shift to producing TRF, which is faster to process. However, if there are orders for a specific product then that will take precedence over other generic products. Fillet vessels usually make standard fish block from softened fish, because it produces a more homogeneous block.

Onboard handling practices are documented below as they relate to vessel nationality. Note that variations exist between vessels within each nationality.

<u>Ukrainian</u>

1. Deck – The codend can be partially emptied into the pounds through side zippers, before it is fully winched on board. This is feasible as the fish pound hatches open downward and do not restrict the retrieval of the codend on to the trawl deck. Individual hatches for each pound prevent the mixing of catches between pounds. The use of strops and winches to manoeuvre the codend on deck is not normally necessary and therefore consequential damage to catch due to excessive compression is avoided. A high volume hose is used to clear fish out of the codend via the side zippers which reduces the need to physically lift and shake the codend with the use of strops. Small amounts of fish remaining in the codend are shaken out by lifting the codend above the deck. Large catches of 50t can be easily handled in this manner and the risk of damage to fish is minimised.
2. Pounds – The vertical design of the pounds (similar to a silo) are such that fish are gravity fed from the trawl deck hatch to the pounds exit point. Refrigerated seawater (RSW) and/or ice slurry are used in the pounds to chill catch evenly, maintain fish quality and assist with flushing fish from the pounds. Physical handling of fish to remove it from the pounds is not required, minimising damage. There are three pounds situated next to each other. Tows are not mixed and the oldest fish is processed first.
3. Factory – Essentially fish pass through the factory in a continuous stream from the pounds, through the saws, gutting line and into the blast freezers. The period of time processed

fish remains at ambient factory temperature is minimised and assists with preserving fish quality. Time can be as little as 5 minutes or as much as 45 minutes due to:

i) Good fish flow management linked to the blast freezing capacity.
ii) The nature of the blast freezing system.

Fish are graded and processed to an HGT state. Processing HOK and placing this into the freezers is prioritised above the processing and freezing of by-catch species. Processed fish passes from the gutting line by conveyor to the blast freezer. At the freezer fish passes into a hopper in 10kg (1 block) increments. The hopper is tipped into pans that are a fixed integral part of a continuous chain of pans circulating through the blast freezer. As two hoppers are tipped into pans to form two new blocks in the chain, two frozen blocks pass out of the freezer enroute to the packaging area.

Two crew members accomplish the entire process of packing pans, loading the freezers and extracting the frozen blocks from the freezer. This system is labour efficient as the entire packing line is eliminated.

Each vessel has two blast freezer systems, one to port and starboard at the forward end of the factory. Each blast freezer is made up of 234 pairs of 10kg capacity pans. As one pair is loaded in another pair is ejected out. Freeze time is approximately 2.5 – 3 hours. The Ukrainian system is essentially a continuous chain conveyor with integrated pans attached passing non stop through a funnel with fan forced super cold air blown across the product. On occasions when a freezer break down occurs factory processing production ceases. If freezers are not working, there is no where for fish to go due to the integrated nature of the entire processing system.

4. Processing machinery – All hoki is processed through a basic circular saw by hand. Little damage results from this apart from occasional miss cuts of fish which are graded out prior to freezing. Losses and/or damage from conveyors are kept to a minimum.

<u>New Zealand</u>

1. Deck – A single fish pound hatch opens upward providing access to all pounds. This necessitates the codend to be fully hauled aboard to clear the hatch area prior to opening. The codend is emptied by unlacing the zipper at the end of the codend. Fish initially flows out of the codend. The codend is then lifted up to shake the remaining fish out. For large catches strops are placed around the codend during hauling aboard and manoeuvring on the trawl deck which may result in compression of the catch causing damage. Due to the configuration of the fish pound hatch it is difficult to prevent the mixing of catches within the pounds. In some cases plates are placed above the pounds to minimise mixing of catches and direct fish into an empty pound.
2. Pounds – The design of the pounds means fish must be moved horizontally from aft to forward out of the pounds. With full pounds, fish does initially flow out of the pounds via gravity. If fish become packed down it may require sluicing with hoses (e.g. using a heavy flow of ambient temperature seawater) and/or physical handling (e.g. being kicked out) to remove it from the pounds. The use of ambient temperature seawater (which warms the fish) and the physical removing of fish from the pounds cause physical damage and quality degradation. RSW and/or ice slurry are sometimes used in the pounds to chill catch and maintain fish quality. Fish quality varies from vessel to vessel due to the capacity, effectiveness and management of these systems.
3. Factory (fillet) – From the pounds fish can either pass directly to fillet machines for processing and/or be held in buffer tanks prior to filleting. RSW and/or ice slurry is sometimes used in buffers to keep fish cool and retain freshness. System capability and management varies between vessels. Long holding times in buffers results in degradation

and ultimately softening of hoki. Processed hoki is initially placed in plastic tubs where it may stay for up to 10mins before it is packed into block formers prior to freezing. Once packed in block formers these may sit at factory ambient temp for up to 1.5 hours. Pans are individually loaded into horizontal plate freezers. Freezing takes approximately 3 hours and is achieved by contact of the plate through which cold gas passes, chilling the product down to at least -20°. Freezers are then unloaded, pans are broken out and blocks are passed to packaging area.

4. Processing machinery (fillet) – Filleting machines process hoki in good condition efficiently, providing fish is size-graded to the appropriate machine. Soft hoki may jam in, or be thrown out of, filleting machines. Fillets produced from soft hoki require extensive trimming, devaluing the product. These losses are diverted to the meal stream, reducing recovery and increasing actual conversion factors. Diverting factory staff to trimming increases processing time. Correct adjustment and setting up of fillet and skinning machines is crucial for optimal recovery even from good quality fish.

<u>Korean</u>

1. Deck – The whole cod end is generally pulled onto the trawl deck prior to being emptied into the pounds. When the catch is too large to be fully pulled onto the trawl deck it may be pulled up and emptied in manageable sections. Once on deck, the fish is usually washed out of the codend using high pressure hoses. The codend is lifted by wires and strops from the vessel gantries. The high volume hoses assist the fish to flow from the codend and helps prevent further damage to the fish by reducing the need to physically lift and shake the fish from the codend. Fish pound hatches open downwards, which facilitates fish flow from the codend. There is also a stop door at the rear of the trawl deck to prevent fish from being washed down the trawl ramp into the sea and lost. This is a hydraulic door which is raised once the bag is on the deck.
2. Pounds – The pounds are created at the back of the factory deck by using removable stainless steel partition panels. The whole area can be deconstructed for cleaning proposes, leaving just the support posts. A central conveyor is used to deliver the hoki to the centre of the processing table. Crew use modified brooms to push fish onto the conveyor. Hoki is then sorted by grade and processed into pans. By-catch and larger fish are usually put into bins from the side of the pound and sent to a separate table for hand processing. There is no chilling system such as RSW or ice to retard deterioration of the fish in the pounds.
3. Factory – Fish fed via conveyor to the central processing table are headed and tailed by the saw operators, and then pass to the packers stationed around the table. The packers gut, clean, grade and pack the fish into block-former trays by hand. The filled trays are conveyed to the plate freezers. Freezing takes approximately 5 hours and is achieved by contact of the plate through which cold gas passes chilling the product down to at least -20°. Freezers are then unloaded, pans broken out and pass to packaging area. Once the plate freezers are full, additional trays of processed fish may be stacked either in the centre of the plate freezer room to keep cool (where freezing may commence due to air temperature of -20°C or less)[6] or off to the side of the factory at ambient air temperature. Product may be stored in this manner for extended periods, depending on factory and plate freezer room layout. Product which is frozen slowly outside the plate freezers is usually of lower quality than product frozen in the plate freezers due to the prolonged length of time it takes to fully freeze the pans. There is no distinction between product when packed. Product flow is usually governed by the freezing capacity of the vessel. Korean vessels do not integrate catching with processing and freezing capacity.

[6] The ability to freeze down in this manner outside the plate freezers is vessel specific and depends on the layout of the plate freezer rooms.

4. Processing machinery - All hoki is processed by hand through one of two basic unprotected circular saws which are used to remove the head and tail. The accuracy of head and tail cuts on most vessels is good. Little damage results from use of these saws apart from occasional miss cuts of fish.

Summary

Ukrainian – Vessels have good deck handling practices. Fish pound chilling systems tend to be efficient and well managed in most cases. Minimal exposure to ambient factory temperature as a result of processing output, linked to freezing capacity, ensures catch remains in good condition. In general terms target catch volume is integrated to pound capacity and the ability to maintain quality while held in the pounds. Processing rate is ultimately governed by freezing capacity of the blast freezers. Vessels operate within these limitations in order to maintain hoki product quality. Factory managers know their job, crew are well trained and disciplined. The blast freezing system used by the Ukrainian fleet is fundamentally different from both New Zealand and Korean contact plate freezer systems. The essential difference is that the loading of the blast freezers combines both the packing and loading process as a continuous process.

New Zealand – On these vessels fish damage sometimes occurs due to poor handling on deck, particularly with big catches. Management of fish in pounds varies. Poorly managed hoki deteriorates quickly in the pounds and becomes soft, causing problems with processing. In well-run factories holding times in buffers and losses due to soft fish are minimised, and filleting machines are well set up and maintained. The opposite is also true. The quality of factory management is highly variable and on some NZ vessels there was a high proportion of inexperienced factory crew. In some cases the catching, holding and processing of fish was not well coordinated. Production was often limited by the ability of the factory to process fish at the filleting stage but in some cases was limited by the vessels' freezing capacity. Cooling systems (RSW and ice slurry) that are well designed and correctly managed help maintain quality product.

Korean - Stacking trays awaiting freezer space is standard practice for Korean vessels. It allows them to load the plate freezers immediately after break-out thereby optimising processing time. Catch, processing and freezing systems onboard these vessels are not well integrated and in many cases the quality of product is sub-optimal.

The following examples illustrate various onboard practices and their effect on quality of fish product.

Catching versus capacity

Example 1

Incentives to illegally discard catch are often associated with a lack of coordination between catching and processing rates. Where large catches are brought aboard and are in excess of what the factory can process, fish may deteriorate and become unsuitable for processing.

Fishery Officers boarded the s 9(2)(a) at a time when the vessel had brought aboard successive catches of 37t and 44t. The factory had stopped processing because the plate freezers were all full. A full plate-freezer load of trays of processed fish was stacked waiting for of plate freezers break out so that these could be frozen[7] (see figure 3 below). The total plate freezer capacity for this vessel is 975 pans, equating to approximately 20t greenweight

[7] This is standard practice for Korean vessels as it allows them to load the plate freezers immediately after break out thereby optimising processing time.

(for hoki), which takes about 5 hours to freeze. There was an estimated 15t of unprocessed fish in the starboard pound and on the processing lines. At the time of boarding the vessel was still trawling and had an estimated catch of 23t. The general impression was that the factory was operating beyond its capacity.

The catching and factory operations on the s 9(2)(a) were completely unsynchronized. At the time Fishery Officers boarded the vessel, the master had clearly been catching fish at a rate far higher than the factory could manage. Some of the unprocessed fish observed would have been in the unrefrigerated factory for 24 hours or more before it was processed. The condition of some of this fish was poor. The potential for fish wastage and the incentives to discard were obvious. Despite the factory being well beyond its capacity to expeditiously process the fish already aboard, the captain continued to fish and catch large quantities.

The attitude of this vessel's operators was exemplified by a comment from the vessel manager to an MPI Observer after she raised the issue of the vessel catching more fish than it could process. His response was "it's none of your business how much fish we catch." The situation aboard the s 9(2)(a) was the most egregious example of bad fishing practice observed by Fishery Officers during Op Apate II patrol I.

Figure 3 – Pans of product on s 9(2)(a) 1 stacked waiting for plate freezers to be emptied

Example 2

Fishery Officers found a similar situation onboard the s 9(2)(a) during Operation Apate II. The vessel's plate freezers were full at the time and approximately 768 (as estimated by FO's) full pans of processed fish were stacked, waiting to be frozen. The vessel was still processing at the time of the inspection (17:40), with the last tow having been 31t hauled at 10:50. This was another example of a vessel catching beyond its freezing capacity. Figure 4 shows stacked pans in the centre of the plate freezer room, where the air temperature is approximately -20°C. Of concern is the quality of product still waiting to be processed, as this had been kept at ambient air temperature for in excess of 6 hours. Deterioration of hoki is inevitable under these circumstances.

Figure 4 – Pans of product on s 9(2)(a) tacked waiting for plate freezers to be emptied

Not mixing tows in pounds

Both examples provided below illustrate good examples of vessels that have systems in place whereby catching is integrated well with processing and freezing capability.

Example 1

An MPI Observer onboard the s 9(2)(a) noted that the vessel would shoot almost immediately after hauling in most cases. The target catch was 35t per tow. Once the catch sensor had gone off, they would soak the net at non-fishing depth until the factory had only 4t left to process, then haul. Catches were never mixed. It took the factory about 7 hours to process each tow (average 6t/hr).

Example 2

An MPI Observer noted [trip s] that the s 9(2)(a) aimed to catch between 15t and 20t per tow in order to preserve fish quality. This vessel also soaked the net until the pound was clear in order to avoid mixing catches.

Slow rate of processing and deterioration in fish quality

Example 1

An MPI Observer onboard the s 9(2)(a) noted that there were problems processing hoki as the crew, the majority of whom were new, were not familiar with this species. As a consequence the processing rate was slow. The rate dropped from 3t/hr to 2t/hr and some fish was in poor condition due to long periods held in pounds.

At 2t/hr processing rate, a 25t bag would result in some fish being held in pounds for over 12 hours. The Observer also noted that deterioration of fish was compounded by the soaking of the net and slow processing, which at times led to bulk mealing of whole fish. In this case, crew inexperience appears to be at the core of both of these issues, with freezing capacity not being a limiting factor. This vessel should be able to process at least 4t/hr.

Example 2

An MPI Observer onboard the s 9(2)(a) noted that the factory experienced difficulties keeping up production levels. As a result fish was held in pounds for long periods of time becoming soft. Fish was damaged due to being flushed from pounds with ambient temperature sea water. Soft fish was not processed effectively by the Baaders, which caused jams and slowed production. During the latter part of the trip the vessel did manage to produce 23t fillet per day.

These issues were compounded by inexperienced crew, low morale, slow processing, and catching more fish than the factory could process while maintaining quality. Mixing of tows in the pounds resulted in fish quality issues. At times the factory produced HOK UTF block to speed up processing as this state required little trimming and was fast to pack. The vessel reduced maximum bag size to 15t to maintain quality.

3.6 (e) Mechanisms for Disposal of Unwanted Fish

The illegal discharge of ITQ species remains a significant compliance risk, particularly on vessels with no meal plant. The 2011 profile described how large volumes of unwanted fish can easily be routed by conveyors to discard chutes, macerators and/or hashers and discharged illegally overboard. Illegal discards are not recorded in vessel documentation or fishing returns in which case the true greenweight extracted from the fishery is under-reported. Appendix 2 lists the discard chutes, macerators and/or hashers on-board vessels. Vessels with meal plants have opportunity to mis-report mealed whole fish as MEB
Legal alternatives include authorised discards, mealing unwanted fish, landing processed product as a lower grade or landing it whole. All options were utilised to various degrees during the 2012 season.

<u>Vessels with no meal plant</u>

Of the 10 Korean vessels operating within the fishery at least six used macerators for the discharge of unwanted whole fish and fish waste whilst four appear to have no macerating ability and therefore must discharge via a discard chute.

Macerators are either stand alone devices which feed into vessel sump pumps or are integrated within the vessel sump pump. Whole fish and/or fish waste from the factory are mixed with water and directed through the macerator which shreds it into a coarse product at high speed. Stand alone macerators can process large volumes of whole fish and/or fish waste and thus have a high output. Integrated sump pump macerators suck fish through the sump pump blades before discharging coarsely chopped product overboard. Integrated macerators are not as capable as stand alone types, and as such cannot cope with large volumes of whole fish. Consequently large quantities of whole fish discards would be via the discard chute. On Korean vessels the exit point for sump pumps is above the water line.

Macerators were introduced to help mitigate the capture of sea birds. The 2011 profile discussed compliance issues with the use of macerators, as fish is rendered into an unidentifiable state and illegal discards of whole QMS fish go undetected.

Informant information suggests that Korean FCVs illegally discard to remain profitable. This appears to be common practice, as described below.

Recent investigations and prosecutions of Korean vessels have highlighted the ongoing problem of discarding at sea. Crew stated that they were regularly ordered by the Korean officers to [illegally] discard quota species and that this practice was ongoing and often involved substantial quantities of fish. Crew were reluctant to complain or object to the discarding as this would have almost certainly resulted in instant dismissal and return to

Indonesia with severe financial penalties imposed. A common theme of all Indonesian crew statements was that small and/or damaged quota fish was thrown away. Amounts varied from tow to tow, species to species and area to area. The discarding of unwanted quota fish was systematic and an accepted culture on the vessel.

The practice of discarding results in the following benefits to the permit holder and vessel owner:

1. Discarding enables the practice of high grading i.e. filling the freezer hold with good quality fish with a high market value to maximise financial return on a trip by trip basis.
2. Unless fish is processed promptly it will lose quality and become very difficult to process. When fresh, quality fish has been caught, dumping poor quality and unwanted quota fish species is a quick way to make room for fresher product and increase factory production.
3. Factory production is more efficient and cost effective when "bulog" fish (i.e. small and damaged fish unsuitable for processing) is dumped without any effort to pack and store it.
4. Discarded quota species fish is not reported therefore there is no subsequent reduction of catching rights for that fish. The catching rights for that species are financially maximised.
5. Officers are often paid a fixed monthly wage plus a bonus paid at the end of their contract. Bonuses are paid to officers only and calculated on their seniority. They are based on Company profits and dependant on the quantity and quality of catch.
6. Employers praised officers for landing good quality, marketable fish, with an acceptable amount of 'bulog'.

In the absence of MPI Observers or fishery officers, LPFV's (without meal plants) must pack small and damaged hoki, unsuitable for processing, and land it green. Indonesian crew reported that small and damaged hoki was dumped from every tow after a token amount of hoki 'bulog' had been retained for appearances. Indonesian crew stated as much as 30% per tow of small and damaged hoki was discarded on busy days during the trip.

The crew relied on the orders of the Korean Officers in relation to what fish were kept and processed and what fish were discarded. Discarding required collusion between all the Korean officers to ensure that the discarded fish was not reported in any vessel internal records or returns provided to MPI.

Other methods for discharging unwanted fish have been identified. An MPI Observer onboard the s 9(2)(a) noted that fish guts (and potentially whole fish) were discarded directly overboard via a chute from the gutting table whenever crew were gutting, typically throughout processing. Factory floor drains exiting directly overboard were usually left open without the removable grates in place. Whole and cut fish were lost overboard both through the gut chute and directly from the factory deck. If these types of losses are continuous then this may well be considered a deliberate unauthorised discard.

Two vessels without meal plants reported packing 'B' grade hoki.

Table 12 shows the proportion of hoki landed as green block product for both the 2011 and 2012 seasons.

MPI Observer	2011	2012
No	1.8%	2.0%
Yes	2.67%	2.6%

Table 12 – Proportion of hoki landed as green block

There appears to have been some improvement in the reporting of hoki to green block since 2011 with the difference between observed and non-observed trips decreasing slightly. Since MPI Observers can authorise discards of unwanted fish, one would expect the proportion of wholefish retained and landed to be greater for non-observed trips.

Vessels with meal plants

Of the 14 vessels with meal plants operating within the fishery, at least two vessels used macerators to discharge unwanted whole fish and fish waste via discard chute or sump pump. Five vessels have hashers which operate as a grinder to shred whole fish (e.g. SPD) and/or fish waste en-route to the meal plant hopper. Fish are transported by conveyor to the hasher. Hashers can also be set up on a discard conveyor to grind whole fish and/or fish waste prior to direct discharge overboard.

On two New Zealand vessels it is unclear whether a macerator and/or hasher is available. The five remaining Ukrainian vessels have no macerator or hasher onboard. Unwanted whole fish (e.g. SPD) are discarded via sea doors which are located within close proximity to the main sorting conveyor just forward of the pounds. The sorting conveyor can be reversed to discharge fish over board via a chute temporarily positioned at the end of the conveyor to redirect fish out the sea door. If the meal plant was operating at capacity or broken down then unwanted fish could easily be illegally discarded.

Figures 5a & 5b provide examples of open sea doors on Ukrainian vessels. In figure 5a the main sorting conveyor is visible to the left of the image. In figure 5b the sea door is adjacent to the sorting area where fish come out of the pounds. The sea door is typically used to discard SPD and dead seals over the side.

Figure 5a - Sea door location

Figure 5b – Sea door illustrating metal slide for ease of discharge

Three vessels with meal plants reported packing 'B' grade hoki.

Methods for quantifying fish to meal vary from vessel to vessel. Appendix 3 documents meal procedures as recorded by MPI Observers.

New Zealand vessels generally use variations on time-run sampling to quantify whole fish to meal. There is a lack of consistency in sampling practice and sampling designs appear haphazard. In general, sampling rates appear to be low. On a number of vessels the fish-to-meal sample was from a meal conveyor which ran continuously whether or not sampling occurred. Sampling requires diverting the factory manager or a crew member from other tasks. This is less likely to happen when product flow is high. There was one example of a Factory Manager changing sampling practice, i.e. increasing sampling frequency, upon observer advice.

Ukrainian vessels calculate fish-to-meal from hoppers designated for hoki. Typically by-catch species going to meal are diverted into fish bins, for separate weighing by species. These systems have the virtue of potentially capturing all fish-to-meal streams providing:

- All fish consigned to meal are diverted to the hopper or bycatch bins rather than being put on the meal plant conveyor directly,
- Hoppers are consistently filled to the calibration mark,
- Their calibration is correct,
- The gate between the hopper and conveyor is not left open,
- All hoppers filled and bycatch bins are recorded on the tally boards.

There are reports that, in practice, hoppers are often:

- Operated with the gate open so they function as a direct chute to the meal conveyor,
- Filled beyond their calibration,
- Released without entries recorded on tally sheets.

Meal conveyors on Ukrainian vessels are easily accessible from most of the factory. Factory crew who handle fish aft of the packing stations are seldom more than a single step away from a meal conveyor. It is easy for factory staff to divert fish-to-meal without reporting it.

Fishery Officers aboard the s 9(2)(a) observed a direct chute from the trawl deck to the meal conveyor, as shown in figures 6a and 6b below. This would facilitate sending fish-to-meal from trawl deck without any weighing or recording.

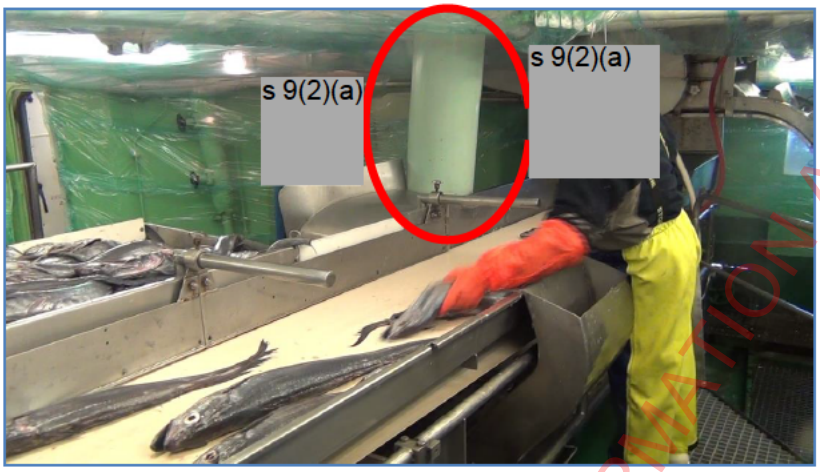


Figure 6a – PVC pipe leading from trawl deck into factory

Figure 6b – PVC pipe feeding into meal conveyor

Fishery Officers observed a similar chute aboard the s 9(2)(a) which fed from the trawl deck directly to the meal hopper by the main sorting conveyor, as shown in figure 7. Other Ukrainian vessels should be checked for similar devices.

Figure 7 – Steel pipe feeding into meal hopper

Table 13 compares hoki meal percentages reported in 2011 and 2012.

Vessel Name	Observed Trip	% Hoki Meal 2011	% Hoki Meal 2012
s 9(2)(a)	No	1.2%	N/A
	Yes	N/A	1.8%
	No	1.1%	1.1%
	Yes	1.3%	1.4%
	No	1.5%	N/A
	Yes	N/A	0.9%
	No	1.0%	1.4%
	Yes	1.0%	N/A
	No	3.6%	2.0%
	Yes	2.9%	N/A
	No	0.4%	1.0%
	No	0.2%	N/A
	Yes	1.7%	1.7%
	No	1.2%	1.1%
	Yes	N/A	1.3%
	Yes	N/A	2.0%
	No	0.7%	1.1%
	Yes	N/A	0.9%
	Yes	1.6%	N/A
	No	N/A	0.4%
	No	5.2%	1.4%
	Yes	N/A	0.5%
	No	2.0%	3.3%
	Yes	4.4%	2.6%
	No	N/A	0.6%
	Yes	N/A	2.5%
Overall Average	**No**	**1.65%**	**1.35%**
	Yes	**2.15%**	**1.5%**

Table 13 – Comparison of hoki meal reported in 2011 and 2012 on observed and non-observed trips

The use of N/A indicates that no trips were conducted. Reported levels of hoki to meal decreased in 2012 from those reported in 2011. Given the data available it is too difficult to assess why meal figures have reportedly decreased in the 2012 year. Reasons could include; a lack of small hoki going meal; vessels processing to a smaller size range; and inadequate systems for reporting accurate amounts to meal.

OCM recommend that with future profiles greater emphasis is placed on the reporting of fish to meal as this is an area where large volumes of fish can go unreported. Vessel systems for quantification of meal should be robust and able to be audited by MPI Observers and Fishery Officers.

Case Studies – Accounting for all sources of fish to meal (including processed fish)

1. s 9(2)(a) – Observer notes: "It is apparent that the recording of fish to MEA figures on the vessel is deficient. Increasingly I am seeing tests cited on the pounds sheets for time samples which have no relation to the quantities of fish mealed. On asking the pound man how he reached a figure of 200kg HOK/MEA on tow#59, he told me that he just "took a guess". On tow#60 I observed 5 large skates and estimated their weight at 200kg. There was not a mention of SSK on the meal sheet for this tow. The five minute timer for pound belt time sampling does not work, and the pond men have no means at their disposal to record fish to MEA except the

pound sheet at the end of the shift. I have observed several of the tows of the last two days for their full duration, due to the small size of the bags. Other than a cursory 5 minute time sample of MEA at the start of the tow, no other figures are recorded. Figures on the pound sheets for DIS, ie SPD, OSD etc appear to be made up from memory at the end of the 6-hour shift." Also, "Fish is too poor to do LF, and is mostly block. HOK/MEA figures on pounds sheet for these two tows bear no relation to the quantities observed being mealed." Observer records HOK MEA 44.442t meal vs vessel of 29.706t. During later stages of trip as meal hold was reaching capacity, non-ITQ and HOK HDS were discharged overboard. Meal plant broke down on one occasion, quota spp held until repaired, while all non-ITQ and offal discharged. Fillet recovered from factory floor quantified and sent to meal 150kg on one occasion.

2. s 9(2)(a) – Observer notes: "The deck crew were observed pulling stickers and target fish from the net. Damaged fish were retained in fish bins and sent to the fishmeal chute through the factory. A tally of the number of fish bins multiplied by the average weight of a bin was used for all fish including HOK, JMA, RBT, FRO and BEN sent to MEA by the deck crew."

Robust methodologies and consistent application of these are required for the accurate quantification of both wholefish and processed fish sent to meal.

OCM recommend that for the hoki fishery where:

- **Bulk quota fish go to meal,** that quantification is by accurate counts of buffer of known volume. Fish is accumulated in buffer by species, and sent to meal when buffer is full, with a tally kept for each shift. If this is not possible, then a best estimate by known volume of a pound (less deductions for by-catch) may be used. This method should not be used in preference to buffer counts. If necessary, modifications should be considered in order to apply the first option.
- **Low volumes of quota fish go to meal,** that quantification is by way of accumulating fish into bins with known average weight. An accurate count of bins is multiplied by the average bin weight. This eliminates issues associated with time sampling.
- **Non-quota fish go to meal,** that quantification by time sampling may be used. Belt timers should be required on all belts, with set sample time intervals and sample frequency. Sampling should consider both tow size and processing times, on a vessel type basis. Time sampling should not be used for quota species due to inconsistencies in the flow of damaged quota fish to meal. Set procedures need to be established across the industry.

OCM further recommend that companies submit documented procedures for quantification of fish to meal to MPI. Documentation should account for all sources of fish to meal, including processed product. In addition, where time sampling procedures are used for non-quota species, these must be statistically robust and verifiable.

3.6 (f) Vessel Management Plans and Seabird Scaring Devices

The Fisheries (Commercial Fishing) Regulations 2001 require trawlers 28m or more in length to use a "seabird scaring device", pursuant to NZ Gazette No. 29. This seabird scaring device must be deployed as soon as practicable after the shooting of the net and shall remain deployed for as long as practicable prior to the net being brought back on board the vessel. Seabird scaring devices include: paired streamer lines (Tori lines), bird bafflers and warp deflectors. The hoki fishery is recognised as having significant by-catch of a number of species of birds. It is imperative that the regulations relating to seabird scaring devices are adhered to.

Of 13 vessels observed, 11 used bird bafflers during all tows conducted. Ten vessels used tori lines, nine of which also used bird bafflers. MPI Observers noted that the s 9(2)(a) bird baffler needed repairing to meet requirements, and tori lines were only deployed when bird bafflers were out of action. The MPI Observer onboard the s 9(2)(a) also noted that tori lines were of poor construction and not very effective. MPI Observers recorded six vessels which routinely removed stickers from the net prior to shooting. Clearing the net of stickers is good practice as it helps mitigate captures of Non-Fish By-Catch (NFBC) such as sealions. MPI Observers also recorded instances where offal and/or whole fish were discharged overboard during shooting or hauling on two vessels (i.e. s 9(2)(a) and s 9(2)(a) . There were four other vessels s 9(2)(a) and s 9(2) s 9(2)) where offal spills from the factory floor were observed washing out factory sumps during shooting and/or hauling. In most instances it appears that vessels practice good offal management. Appendix 4 provides a summary of bird mitigation devices and offal management strategies used by each observed vessel.

Offences relating to the deployment of seabird scaring devices detected during at-sea inspections included:

1. s 9(2)(a) [trip s 9(2)(b)(ii)] - Tori line installed too high and considered ineffective by MPI Observer on-board.
2. s 9(2)(a) [24/7/12] – Port and starboard Tori lines were missing some streamers and streamers failed to meet length specifications.
3. s 9(2)(a) [24/7/12] – Tori line streamers were tangled around main line, in contravention of regulations which state they must be *"attached in a manner to prevent fouling of individual branched streamers on the main streamer line".*

In 2011, Fishery Officers detected no offences relating to the deployment of seabird scaring devices during at-sea boardings. The number of offences detected in 2012 is of concern.

OCM recommend that vessel operators ensure that vessels correctly maintain and deploy seabird scaring devices and follow correct offal management procedures.

3.6 (g) Shift Systems

Deepwater fishing vessels typically manage fishing and processing operations on a 24 hour basis. Both Ukrainian and New Zealand vessels operate a dual shift system whereby two crews work shift-on and shift-off to keep the factory running continuously. In contrast, the Korean fleet typically operate an inefficient single shift system, where all crew except senior officers work as and when required. Under these systems, crew may work continuously for up to 18 hours. For example, on board the s 9(2)(a) , the officers worked a six hour split shift system. Factory crew had no set shifts, their hours worked often depended on the state of the plate freezers and the availability of freezer pans. Despite factory crew working long hours, they are often under-employed. Productivity levels tend to be low under the inflexible one-shift system.

By changing to a dual shift system, Korean vessels could reduce tow length, regulate the amount of fish in each tow, reduce the amount of damaged fish and remove the necessity to work long shifts. Increasing productivity and improving the quality of fish product will benefit the vessels' operators and crews.

3.6 (h) Catch per tow

Table 14 below illustrates average total estimated catch by nationality together with total estimated catch range for all tows targeting hoki excluding nil catches.

Nationality	Average total catch per tow (kg)		Total catch range (kg)	
	2011	2012	2011	2012
Korean	23,331	23,801	900 – 73,000	1,100 – 70,230
New Zealand	14,578	15,428	100 – 53,900	20 – 65,000
Ukrainian	19,899	22,697	100 – 58,100	100 – 65,000

Table 14 - Total estimated catch per tow and total species catch range.

The data shows that both the Korean and Ukrainian vessels have higher catch rates per tow than New Zealand vessels. However Ukrainian vessels can process and freeze down more fish over a 24 hour period than the Korean vessels. The Korean vessels are restricted in the volume of fish they can process due to limitations including plate freezer capacity and freezer pan availability. In addition the Ukrainian vessels operate shift systems that enable them to process fish continually over a 24 hour period and have a continuous flow of fish through the blast freezer. Korean vessels operate a single shift system which does not facilitate 24 hour processing, or continuous flow of fish through the factory and freezers.

3.6 (i) Summary of fishing practices

Incentives to illegally discard catch are often a consequence of fishing and catch-handling practices.

- Practices that result in a high proportion of fish being too damaged to process, such as excessively long trawls, encourage discarding.
- Fishing in areas where there are high proportions of uneconomic by-catch or fish too small to process encourages discarding.
- Poor handling of catch aboard vessels encourages discarding.
- Bringing more catch aboard than the factory can process before fish deteriorate to an unprocessable condition encourages discarding.

Ukrainian and New Zealand vessels typically target fish marks and aim to limit bag size to co-ordinate fishing and factory operations. As a result, the time the net is at fishing depth is typically short. In contrast, Korean vessels generally tow historical paths for long periods of time with no attempt to co-ordinate fishing with factory operations and plate freezer capacity. This practice encourages high grading and the illegal discard of unwanted fish, which threatens sustainability. Illegal discarding and the poor-quality fish products produced by Korean vessels result in economic losses to New Zealand. Factory operations onboard Korean vessels are characterised by inefficient and inflexible one-shift systems. Informant information suggests New Zealand permit holders, in the past, have had little success in controlling the fishing practices of FCVs, particularly with respect to reducing tow times.

Processing capacity on factory vessels is limited by:

- The ability of the crew to process catch before it deteriorates due to the holding period, and
- Blast freezing capacity – which depends on the physical capacity of the plate freezers and then the time it takes for product to freeze down to a minimum of -20°C.

If crew are producing product beyond the freezing capacity then they are working well. If plate freezers are working to capacity then the factory is operating well and maximum production is achieved. However blast freezing capacity is the ultimate limiting factor and cannot be improved. Ukrainian vessels operate well integrated systems where product flow is a continuous stream.

OCM recommend that all deepwater vessel operators engage in sustainable catching practices which are integrated with factory production and freezing capability. Conducting short tows, targeting fishing marks, and fishing off the bottom, whilst maintaining maximum

production through the factory, should be the main objective of every deepwater factory vessel operating in the hoki fishery.

3.7 Reporting Greenweight

Systems for capturing and reporting the greenweight of fish processed at sea usually fall into one of five categories:

(a) The vessel has automated weighing and recording systems capable of capturing greenweight and the permit holder/ LFR uses this data to report greenweight.

(b) The vessel has automated weighing and recording systems capable of capturing greenweight but the permit holder/ LFR does not use this data directly to report greenweight, and instead uses vessel data and/or onshore-weighing data to calculate greenweight.

(c) The vessel does not have automated weighing and recording systems capable of capturing greenweight, but conducts and documents onboard weight checks which are used to calculate greenweight. Onshore weight checks may or may not be conducted in combination with this.

(d) The vessel does not have automated weighing and recording systems capable of capturing greenweight, but conducts and documents onboard weight checks. These checks are not used to calculate greenweight. Onshore weight checks are conducted for calculation of greenweight.

(e) The vessel does not have automated weighing and recording systems capable of capturing greenweight. Infrequent and undocumented weight checks are conducted onboard but are not used to calculated greenweight. Onshore weight checks are required for calculation of greenweight.

Where onboard weighing procedures are inadequate, or incapable of accurately recording product weight, good onshore procedures for capturing and reporting greenweight are essential.

Where neither the vessel's nor the on-shore procedures are adequate for capturing greenweight, then reported greenweight is essentially an estimate, and that estimate typically under-reports the actual catch.

OCM recommend that where onboard automated weighing systems are in place then these should be used for informing greenweight reported on CLRs. Inadequate shore based sampling of carton weights should not be used in preference to automated weighing systems. Automated weighing systems should be monitored and verified by MPI.

OCM further recommend that all onboard and onshore sampling regimes used for determining greenweight are statistically robust and verifiable. Procedures must be documented and submitted to MPI. Both onboard and onshore weighing procedures should be monitored and verified by MPI.

Case Study - Vessel Automated Weighing and Recording Systems

In the 2011 season, both s 9(2) and s 9(2)(b) had on board vessels weighing systems capable of recording the weight of each carton produced. s 9(2) used weights recorded by these on-board systems to calculate the greenweights they declared on CLRs. s 9(2)(b) however, used on-shore weighing of a sample of cartons to determine average weights for CLR declaration. After discussion resulting from the 2011 profile, s 9(2)(b) began an exercise of comparing their on-shore sample results with the gross weights recorded by their at-sea

Marel/Innova weighing system. They claim to have used the heavier of these two weights in their CLR declaration for the period of this exercise. They have now, however, reverted to the 2011 system of using on-shore testing to obtain weights for CLR declaration. At present, s 9(2)(b) uses the Marel/Innova system at sea primarily for printing labels. Their intention is to put the Marel system onto their s 9(2)(b)(ii) vessels next, then their s 9(2) .
s 9(2) use a different weighing system on-board their vessels. These systems may not be able to automatically record carton weights. s 9(2) vessels do have an on-board product weight testing programme (PWTP) whereby net weights are tested, and product lines are re-declared if appropriate. In 2011, lines were only re-declared if the tested average weight was more than 2% heavier than the nominal weight. At a meeting in 2012, following the completion of the 2011 profile, s 9(2) were advised the practice of allowing a 2% buffer was to stop immediately, to which s 9(2) agreed. In addition, s 9(2) relinquished s of hoki under-fishing rights for the 2011/12 fishing year. Subsequent checks indicate that s 9(2) are no longer applying the 2% buffer. OCM compared s 9(2)(a) CLRs with the relevant PWTP documents. The s 9(2)(a) CLR appears to have been reported according to the PWTP on all hoki fillet and block lines. The s 9(2)(a) CLR unit weight reporting appears to be sufficient according to the PWTP for all hoki fillet lines, except block product. The s 9(2) s 9(2)(a) calculated CLR unit weight was lower than the PWTP weight for all except one hoki product line (HOK TSK fillets).

3.7 (a) Carton Examination

The purpose of carrying out in-port carton examinations and weight checks was to verify contents including: species, state, grade and weight. Fishery Officers selected non-random samples of cartons from each main hoki product line, for primary states only. The carton sample size was calculated according to the total number of cartons in the product line. The sample was then pro-rated across the grades within each product line, as determined from the unload schedule. Fishery Officers were instructed not to take the first cartons that came to hand, but rather to ensure the sample included cartons packed on a range of days throughout the trip.

For each carton, Fishery Officers recorded nominal weight recorded on the carton and gross carton weight. They weighed each block within each carton, where applicable. Where cartons included packaging, they recorded packaging weights so these could be deducted for calculating the actual net weight of processed fish in each carton. Fishery Officers recorded a count of the total number of fish (or pieces of fish) per block for those states where this was achievable i.e. DRE, HGT, GRE etc. Such counts were not feasible for states such as TSK, TRF and MKF because individual fillets and pieces were impossible to identify. Fishery Officers also assessed whether cartons were labelled correctly and, where possible, if states were compliant with the prescribed definition as per the Fisheries (Conversion Factor) Notice 2005.

OCM calculated the average net weight for each product line landed by a vessel in order to test the veracity of greenweight declarations on the CLR. To achieve this, cartons were weighed at all in-port inspections. Total quantities of hoki product inspected and checked, as described above, are shown in table 15.

	Number of cartons (HGT & Fillet)	Total HGT & Fillet Product Weight (kg)	Number of green blocks	Total green block weight (kg)	Total Weight Examined (product + green) (kg)
Hoki	1,188	29,526	109	1,924	31,450

Table 15 - Summary of product examined during in-port inspections

Table 16 provides a comparison between average weights calculated from in-port inspections and CLR greenweight declarations.

Historically some companies applied a 2% standard deduction to product weight to account for glaze water added to frozen blocks of fish produced by LPFVs. For this reason, a deduction of 2% to allow for glaze has been made in calculating average carton weight for HGT product. The deduction for glaze is not applicable for fillet product lines (MKF, TRF & TSK) as these products are not glazed.

Vessel	Landing Date	State	Calculated Ave Carton Wgt from FO Inspection Data	CLR Calculated Ave Unit Weight (from GW)	CLR # Units	Total Difference GW
s 9(2)(a)	10/8/12	HGT	20.38	20.48	45,297	4,530
	27/8/12	HGT	29.41	30.38	6,603	6,405
	26/7/12	HGT	20.36	20.18	55,361	-9,965*
	2/8/12	HGT	26.13	26.01	8,230	-988
	6/8/12	HGT	28.12	28.26	6,680	935
	25/7/12	HGT	21.26	21.49	54,008	12,422
	15/8/12	HGT	28.44	28.90	6,808	3,132
	26/7/12	TRF	20.86	20.70	3,407	-545
		TSK	20.91	20.67	9,288	-2,229
		TSK block	22.63	22.53	6,014	-601
	23/7/12	MKF	23.13	22.82	677	-210
		TRF	21.81	21.10	2,237	-1,588
		TSK	21.71	21.48	1,375	-316
		TSK block	22.83	22.67	15,103	-2,416

Table 16 - Comparison of in-port inspection data and CLR data for main product lines of hoki produced by vessel/trip combination. ** A glaze test sheet for s 9(2)(a) was received, indicating glaze amount of 2.5%. If this amount is used then the under-reported amount reduces to 6,394 kg (20.25 FO unit weight).*

Table 17 provides a summary of total hoki calculated as under-reported for each permit holder and associated vessel as detailed in table 16.

Company	Vessel	Estimated under-reported GW (kg)
s 9(2)(b)(ii)	s 9(2)(a)	9,965
s 9(2)(b)(ii)	s 9(2)(a)	988
Total HGT Product		**10,953**
s 9(2)(b)(ii)	s 9(2)(a)	3,375
s 9(2)(b)(ii)	s 9(2)(a)	4,530
Total Fillet Product		**7,905**
Grand Total		***18,858***

Table 17 - Summary of hoki under-reported by permit holder and vessel

As seen in table 17, the total estimated under-reported greenweight for fillet product (TSK, TRF, MKF) was 7,905kg, and for HGT product was 10,953kg. Total unreported greenweight was 18,858kg. This amount would not have been recorded in monthly harvest returns and therefore not attributable against ACE. Of product lines inspected, 64% appear to be underreported, with the remaining 36% appearing to be adequately reported.

Nine vessels had carton weight checks undertaken during the 2012 season. The average under-declared greenweight was 4.7t (relating to 44% of vessels inspected). In 2011, the average under-declared greenweight per vessel was 17.4t.

In order to obtain independent catch data, MPI Observers are required to carry out product block weight testing at regular intervals throughout the trip. Tests are conducted on each product line produced by the vessel. Table 18 compares block weights calculated by MPI Observers to those derived from the CLR. For LPFV's, landings highlighted in blue indicate where MPI Observer block weight testing was performed pre-glaze. For landings highlighted in green, tests were conducted post-freezing but it is not clear whether they were pre- or post-glaze. Since no glaze is applied to fillet product, testing of pre- and post-glaze weights is not relevant.

Vessel	Landing Date	State	Vessel Nominal Pan Weight	Observer Average Pan Weight	CLR Calculated Ave Unit Weight (from GW)	CLR # Units	Total Difference GW
s 9(2)(a)	20/7/12	HGT	10.0	10.29	20.58	32,850	0
	10/8/12*	**HGT**	**10.0**	**10.23**	**20.48**	**45,297**	**1,495**
	13/7/12	HGT	15.0	15.46	30.40	3,549	-3,045
	9/7/12	HGT	10.0	10.10	20.00	37,011	-12,214
	1/8/12	HGT	10.0	10.15	20.20	57,024	-9,409
	23/8/12	HGT	10.0	10.21	20.20	22,607	-8,206
	7/8/12	HGT	13.0	13.72	26.46	20,841	-33,700
	5/9/12	HGT	13.0	13.66	26.13	11,561	-22,700
	27/8/12	HGT	10.5	10.53	21.07	16,326	269
	6/8/12*	**HGT**	**14.0**	**14.41**	**28.26**	**6,680**	**-6,172**
	13/8/12	HGT	21.05	21.11	21.05	45,355	-4,490
	13/8/12	DRE	12.0	12.27	24.03	22,227	-20,404
	19/9/12	DRE	12.0	12.25	24.17	11,466	-6,811
	8/10/12	HGT	14.0	14.59	28.62	589	-544
	11/8/12	TSK	6.8	7.05	20.62	7,479	-10,504
		TSK – block	7.5	7.6	22.81	5,485	55
		TRF	6.8	7.05	20.61	10,246	-13,279
	2/8/12	TSK	20.4	20.63	20.66	4,748	442
		UTF	20.4	20.64	20.64	3,474	0
		TSK – block	22.5	22.79	22.78	11,695	-363
	12/9/12	TSK	6.8	6.97	20.68	4,227	-3,014
		TSK – block	7.5	7.66	22.77	11,228	-7,309
		UTF	6.8	6.98	20.75	1,344	-575
		MKF	7.5	7.66	22.64	112	-122
	15/8/12	TSK – block	7.5	7.69	22.75	20,897	-19,058
		TRF	6.8	7.03	20.34	1,088	-1,999
s 9(2)(a)	23/8/12	TSK - block	7.5	7.63	22.65	18,331	-11,878
		TRF	6.8	7.16	20.83	347	-507

Table 18 - Comparison of Observer pan weight test data and CLR data for main product lines of hoki produced by vessel/trip combination, for trips carrying MPI Observers

Total underreported greenweight by vessel is summarised in table 19. MPI Observer block weight testing indicates that HGT product was underreported by 127,695 kgs and that fillet product was underreported by 68,608 kgs. The total unreported equates to 196,303 kgs.

Company	Vessel	Estimated under-reported GW (kg)
s 9(2)(b)(ii)	s 9(2)(a)	29,829
		3,045
		6,172
		27,215
		4,490
	201	56,400
		544
Total HGT Product		**127,695**
		23,783
		21,057
		12,385
		11,383
Total Fillet Product		**68,608**
Grand Total		***196,303***

Table 19 - Summary of hoki under-reported by permit holder and vessel according to Observer pan weight tests

Of 19 observed trips, vessels underreported greenweight on 16 trips (84%) compared to Observer derived average block weights. The average underreported weight per trip was 12,269kg. If this average is applied across 84% of the fleet (excluding non observed trips inspected by FO's) then the total underreported greenweight is calculated to be 525,604kg. This figure is considered conservative as further stratification increases the underreported greenweight.

A comparison of average unit weights between trips with and without in-port carton checks shows that underreporting was common on trips where FO's did not carry out in-port inspections. This implies that permit holders took advantage of the time lag between landing and furnishing of CLRs to ensure that declared greenweights were a more accurate reflection of landed weight. Clearly, in the absence of FO carton checks Industry persistently underreport greenweight.

3.7 (b) Glaze Application

Prior to the 2012 season Industry were advised that they could not rely on the 2% glaze allowance that had historically been used. Companies were advised that vessels had to carry out their own glaze testing, preferably on a tow by tow basis. Results from testing needed to be documented and retained, and the measured glaze percentage applied when calculating and reporting greenweight. All relevant documents had to be retained and made available to FO's upon request. If product lines were not glazed, no allowance for glaze could be claimed.

Information obtained during Operation Bronto II is detailed below:

- All Ukrainian vessels glaze and appear to conduct glaze tests. However it is unclear what testing methodology entails.
- All Korean vessels apply glaze. Seven out of ten vessels advised that company Observers were either conducting, or intended to conduct, glaze tests.

- s 9(2)(a) – Chief Officer advised FO's during in-port inspection that vessel uses standard 2% glaze allowance. Glaze checks are made while fishing but documents are not kept.
- The s 9(2)(a) did not conduct glaze tests.
- The factory manager for the s 9(2)(a) did not understand the question.

- New Zealand fillet vessels do not glaze fillet product. By-catch species are often spray glazed by hand.
  - The s 9(2)(a) conducts tests pre- and post- application of glaze.
  - s 9(2)(a) - factory manager runs glaze tests on HGT/DRE product records results on "Fish Calculator", a self-developed spreadsheet application installed on the computer in his office.
  - s 9(2)(a) – all product that is frozen through plate freezers is glazed. MPI Observer did not see tests being conducted.

A number of vessels do not conduct glaze tests despite MPI advising them to do so. Nor do some vessels retain glaze test documentation. Currently it is unclear what each vessel deducts for glaze, what methodology is used to test for glaze, what documentation is completed and whether or not documentation is retained.

Companies can under-report greenweight by deducting a percentage for glaze that is greater than actually applied to fish product. This remains a compliance risk. In order to assess the accuracy of glaze deductions and deter false claims, monitoring of vessel glaze weight testing procedures and documented checks should continue.

OCM recommend that all vessel operators should document glaze test procedures (particular to each vessel) and submit to MPI.

OCM further recommend that MPI Observers verify vessel glaze test procedures including documentation completed, and that independent glaze weight tests are carried out on each trip.

3.8 Compliance with State Definition

Section 188 of The Fisheries Act 1996 provides for the setting of conversion factors. The Fisheries (Conversion Factor) Notice 2005 (FCFN) specifies conversion factors (CFs) for a number of fish species. CFs are used to convert the processed weight of fish (i.e. from the defined state) to the greenweight. Conversion factors are important for stock assessment and reporting purposes to ensure that accurate quantities of fish harvested are accounted for. S188 (2) also provides for the determination of vessel specific conversion factors (VSCFs).

3.8 (a) Limited Processing Factory Vessels

LPFVs typically process to HGT or DRE states which are packed to specific size grades and in some instances quality grades, such as 'A' and 'B'. Typically this product is destined for further processing offshore.

Fishery Officers noted that less than 1% of the cartons of HGT hoki they inspected contained non-compliant cuts. These related to tail cuts exceeding the maximum depth of 60mm.

Table 20 summarises results of conversion factor tests conducted by MPI Observers on LPFVs during the 2012 hoki season.

			Observer Conversion Factor testing	
Vessel	**State**	**Standard CF**	**Random**	**Non-Random**
s 9(2)(a)	HGT	1.65	Trip 1: 1.65 Trip 2: 1.603	Trip 1: 1.57 Trip 2: 1.62
	HGT	1.65	Trip 1: 1.51 Trip 2: 1.56	Trip 1: 1.61 Trip 2: 1.61 Trip 3: 1.65
	HGT	1.65	1.66	1.62
	HGT	1.65	1.60	1.64
	HGT	1.65	1.41 - 1.59	
	HGT	1.65	Trip 1: 1.49 Trip 2: 1.62	Trip 1: 1.53
	HGT	1.65	1.63	1.55
	DRE	1.8	Trip 1: 1.86 Trip 2: 1.85	Trip 1: 1.72 Trip 2: 1.67

Table 20 - Summary of Observer calculated CFs for LPFVs

All but one of the random and non-random test conversion factors for HGT product were equal to or less than the official conversion factor of 1.65. This indicates that the vessels are achieving good recovery. The only exception was the s 9(2)(a), where MPI observer random tests calculated a conversion factor of 1.66. This is only slightly above the official CF and is of little concern.

Observers conducted HOK DRE product conversion factor testing on one vessel only, the s s 9(2) i. The conversion factors calculated from non-random tests on this vessel were less than the official CF, suggesting good recovery for the state produced. However, the conversion factors calculated from random tests were greater than the official CF, suggesting poor recovery. This difference indicates there was a change in processing behaviour when crew were aware that Observers were testing CFs. The vessel is clearly able to achieve good recovery when necessary, but poor processing practices may be the norm, leading to under-reporting of greenweight. Had the random CF derived for the trip been applied to processed weights, an additional 83t in greenweight would have had to have been reported.

3.8 (b) Fillet Vessels

A single hoki may be processed to more than one state, depending on processing specifications and the condition and quality of the fish. These states could include combinations of: TRF, TSK (divided between different product lines), MKF, MBS and MEA.

New Zealand fillet vessels specialise in meeting the needs of their market by producing highly sought after product states such as trimmed skinless or skin-on fillets. These products are packed to specific size grades and quality specifications.

Information received indicates there has been no change to vessel processing procedures since 2011, so the risk remains for not all parts of a fillet to have the appropriate CF or VSCF applied, leading to under-declaration of greenweight.

Auditing fillet vessels' catch after it has been processed, packed and frozen provides ongoing challenges to compliance. Difficulties in assessing whether product complies with the FCFN include:

- Depth of tail cut;
- Angle and placement of anterior cut;
- Presence of epaxial line and horizontal septum along full length of fillet;
- Presence of hypaxial line from anus to posterior cut.

It is also extremely difficult for Fishery Officers to distinguish between legitimate trimmings and portions of the fillet that should be part of a principal landed state, even if for example, the ratios of fillet weights to MBS weights are anomalous.

Some of these difficulties have been mitigated (for some fillet vessels) by an allowance being made whereby TSK fillets can be subdivided into portions, providing all portions have the appropriate CF or VSCF applied (see details in VSCF section below).

Vessel Specific Conversion Factor (VSCF) Certificates

Currently five vessels hold hoki VSCFs. In addition there are two vessels which have been issued with a "VSCF Certificate" which provides for cutting beyond the state definition for a specified state, while still using the official CF to determine greenweight. A summary of certification by vessel is provided in table 21.

Vessel Name	VSCF	Provision to cut beyond state*
s 9(2)(a)	✓	✓
	✓	✓
	✓	✓
		✓
		✓
	✓	
	✓	

Table 21 – Summary of VSCFs and provisions for cutting beyond state for fillet vessels operating in the WCSI fishery in 2012

The special VSCF certificate provision for cutting beyond state applies to five vessels, as identified in table 21. This provision enables the master of the fishing vessel to apply the appropriate VSCF or CF (which ever is applicable) to hoki processed to a skin-off trimmed fillet state [TSK] then subdivided into portions i.e. processed beyond the TSK state definition. The conversion factor must be applied to all constituent portions. If combined together, these portions would be equivalent to the TSK state and the combined weights should be the same as a skin-off trimmed fillet. In practice, there is likely to be some weight loss during processing beyond the TSK state.

The remaining two vessels, s 9(2)(a) and s 9(2)(a), were not exempt and therefore had to comply with the FCFN state definitions. This is discussed further in the section on 'Processing Beyond State Definition'.

At present, the procedure for setting VSCFs remains the same as for the 2011 year. However, there is a current proposal to amend the VSCF setting process, which would dispense with dedicated VSCF sampling observed trips. Instead, VSCF testing would be carried out on all observed trips on vessels using VSCFs. The intent of this change is to reduce opportunities for factory crew to change processing techniques during VSCF testing, which leads to biased VSCF values. This proposal also refers to the removal of MBS as a product state [discussed further on page 47 & 48], and application of VSCFs to all product prior to trimming.

Table 22 compares VSCFs with MPI Observer calculated CFs obtained during the 2012 hoki season. 'Greenweight difference" is the difference between the reported greenweight calculated using the VSCF and the greenweight calculated from the recovery actually achieved during the voyage. Vessels are required to use their VSCF (if applicable) when reporting greenweight. They may not use the gazetted CF or the actual CF derived by the MPI Observer.

Vessel	Trip Dates	State	Standard CF	VSCF	Observer CF Random	Observer CF Non-Random	Greenweight Difference using Obs Random CF (kg)
s 9(2)(a)	14/7 – 11/8/12	TRF	2.65	2.4	2.46	2.46	-12,673
		TSK	3.1	2.65	2.76	2.74	-32,821
	3-29/8 29/8-13/9	TSK	3.1	N/A	Trip 1: 2.85 Trip 2: 3.25	Trip 1: 3.06 Trip 2: 3.06	56,902 -51,466
	3-29/8 29/8-13/9	UTF	2.25	N/A	Trip 1: 2.27 Trip 2: 2.25	Trip 1: 2.39 Trip 2: 2.4	-309 0
	5/7-15/8	TRF	2.65	2.45	2.58	2.62	-2,876
		TSK	3.1	2.85	3.08	2.98	-112,717
	25/7-23/8	TRF	2.65	2.25			
		TSK	3.1	2.7	3.12	2.92	-174,824

Table 22 - Summary of standard CF, VSCF and Observer tested CF for fillet vessels carrying MPI Observers during the 2012 WCSI hoki season.

The data in table 22 shows that all VSCF's were less than observer derived CFs when tested. VSCFs are the result of pre, post and during spawn testing so vessels may not always meet their VSCF during WCSI spawn. It would be of concern if vessels never achieved VSCFs outside of the spawning period.

OCM support the proposal to dispense with dedicated VSCF sampling observed trips. Ongoing testing during all observed trips should provide a less biased representation of normal factory processing. This will give greater confidence in the accuracy of greenweight reporting.

OCM recommend that monitoring of variation between VSCFs and observer derived CFs is conducted at regular intervals to test the accuracy of greenweight reporting. Where VSCFs are routinely underreporting greenweight then VSCFs should be revised and greenweights redeclared.

Processing Beyond State Definition

The s 9(2)(a) and s 9(2)(a) are not exempt from cutting beyond the state definition (see table 21 above). s 9(2)(b) Product Specifications for hoki products provide quality requirements for processing of each product. These have been assessed for compliance with applicable FCFN state definitions. The Specifications include the following points:

Hoki fillets – skinless, boneless (TSK)

- Trim off all ragged edges, bruises and blood spots. Belly flap left intact.
- P & M grade fillets should be white to slightly pink. For L & LL grade, pink fillets are acceptable. Darker fillets should be packed in block.
- Nil black belly lining is not [sic] permitted.
- No excessively soft or mushy fillets to be packed in any of the grades.

- If a fillet has a large blemish that cannot be trimmed out without changing fillet shape, use for fillet block.
- Gaping where holes are larger than 3 x 1 cm must be packed as fillet block.

International Fillet Block "Premium"

- Bruises and bloodspots greater than 20mm in diameter must be trimmed out. Part fillets, following removal of defects may be included A block.
- Must be skinned deep enough to ensure there is no bridging between primary and secondary fat lines.
- No red or pink fillets with a red main fat-line should be packed as A block.

Piece Block

- Only fillets or pieces larger than 20g should be packed as piece block.
- Pieces with heavy bloodspots should not be packed into pieces. Refer to Mince block specification.

Mince Block

- A grade is MKF, B grade is MBS.
- Colour of A grade mince block should be white to pink, preferably white. Colour of B grade mince block should be light brown to light pink.

Premium Mince Block (Draft Specifications)

- Include only fillets and pieces that will result in a very white clean block; all other trimmings to be placed in subsequent quality grades ie B grade mince block.
- Remove all bloodspots and large or dark bruises
- White to pink fillets are acceptable, dark pink to red fillets should be used for B grade mince block.
- External colour of block should be white to slightly pink, colour must not be grey or red.

Issues with above specifications (highlighted in red) include:

- Allow fillet pieces, which is contradictory to FCFN.
- Allow whole fillets into B grade mince block, which is listed as MBS. Where this occurs product should be declared as MKF.

Example: Trimming beyond state definition for HOK TSK on s 9(2)(a)

Video footage taken during an at-sea inspection of the s 9(2)(a) shows fillets being cut beyond the prescribed state defined in the Fisheries Conversion Factor Notice 2005 (FCFN) for hoki TSK. This vessel does not have an exemption under its VSCF certificate that allows processing beyond the TSK state. During a 1 minute 24 second long clip, taken during hoki TSK block production, one factory hand trimmed approximately 17 fillets. At least five of these (29%) were trimmed beyond the state definition (see photographs below). There appeared to be five people working on the trimming line, however, it is not possible to assess the extent of trimming undertaken by other crew in this video clip. It appears that these workers were not being supervised to ensure their fillet trimming complied with the FCFN requirements.

Frames from this video are shown in figures 8a to 8g below. This series of images depicts one TSK fillet being trimmed. The trimmer makes four cuts to the fillet resulting in five fillet pieces. Two of these pieces are returned to the conveyor and were probably packed as fillet block product. The remaining three pieces appeared to go into a tub of trimmings which could have been destined for fillet block, meal or mince. Primary and secondary states are associated with meal and mince product. Secondary states such as MEB (meal by-product) and MBS (mince by-product) attract no ACE. Therefore it may be convenient to process these trimmings to meal or mince and declare as secondary states in order to avoid utilisation of ACE.

Figure 8a – Placement of whole fillet on cutting board

Figure 8b – First cut of fillet (possible incursion of epaxial line)

Figure 8c – Result of first cut

Figure 8d – Second cut (vertical cut through epaxial line, horizontal septum and hypaxial line)

Figure 8e – Third cut (vertical cut through epaxial line, horizontal septum and hypaxial line)

Figure 8f – Fourth cut (removes bottom edge of fillet)

Figure 8g – Two main pieces returned to conveyor

By contrast, during Op Apate II Fishery Officers observed minimal hand trimming of fillets onboard the s 9(2)(a) and s 9(2)(a). For the duration observed, fillets appeared to comply with FCFN definitions.

OCM recommend that Fisheries Management liase with s 9(2)(b)(i) to advise that there are exemptions available to allow them to cut TSK beyond the state definition in line with exemptions in place for s 9(2)(b)(ii).

MKF/MBS Issues

Hoki mince is produced by New Zealand fillet vessels. It is either produced as principal state MKF (from skin-off fillets) or as secondary state MBS (from legal trimmings off TSK fillets). Being a principal state, MKF must have greenweight calculated from the processed weight using the relevant CF, while MBS greenweight is not reported. As such, MKF attracts ACE but MBS does not.

Fillet production issues were evident on the s 9(2)(a). MPI Observers noted that whole hoki fillets were frequently sent to mince along with trimmings, both legal and illegal, and were all reported as MBS. The vessel appeared to have no systems in place to account for whole fillets to mince. One MPI Observer was informed by a crew member that it was up to the individual factory managers to sort out, rather than a vessel prescribed method for quantification particular to the factory operations onboard. Mince specifications obtained for the vessel were silent on the inclusion of whole fillets to mince (MKF). This was raised with the company and an updated specification was provided, including the following amendment:

> *"Any Whole fillets to mince (fillets that do not meet specification) to be reported separately as MKF. This could also include HOK TSK blocks after freezing that have been isolated for Damage, Voids/Ice Pockets & Underweight Blocks."*

This was accompanied by the following explanation by the company:

> *"The procedure for our vessels is for all MKF fillets to be weighed and reported separately on a shift/day basis with the weights manually entered into the marel records for the day. After weighing the MKF fillets will be mixed and minced with the MBS off cuts. This process is similar to the production of meal*

with MEA and MEB. As the processing specifications indicate each of MKF and MBS are combined dependent on whether they originate from skin on/skin off product. As with skin off - skin on product goes to MKF at the higher c/f where they don't meet the specifications set for that product."

Issues relating to MBS/MKF identified by an MPI Observer on the s 9(2)(a) were:

(a) Minced fillets were initially mixed with all trimmings to mince. Trimmings included both legal and illegal trimmings. At the start of the trip, all HOK to mince product, both trimmings and fillet, was placed together on the conveyor to the mincer. There was no separate quantification of whole fillets, which are a principal state, and trimmings that are a secondary state. Trimmings included those from fillets that were trimmed beyond the prescribed state and should therefore also be quantified separately.

(b) After the Observer raised the issue described above, the Factory Manager introduced a system under which factory crew were required to place fillets consigned to mince in tubs at the trimming line. These fillets were then weighed and their weights recorded before they were added to trimmings going to the mincer. The greenweight of these fillets was calculated using the appropriate fillet conversion factor. Under this method of calculating greenweight, no conversion factor is directly applied to the final mince product, rather greenweight is calculated pre mince state.

(c) Reporting of MKF volumes was highly variable from day to day. The ratio of MKF processed weight to HOK processed weight also varied considerably. Possibly, some fillets that could have gone to mince were consigned to meal. Full monitoring of mince production by the MPI Observer was not possible, given their workload.

(d) There were issues around how MKF is reported in the TCEPR. The number of packed units of MKF was not entered into the TCEPR. The total processed product weight was entered as the unit weight and the number of units is entered as '1', regardless of the unit weight. The vessel's captain told the Observer about an error in the green weight calculation which had resulted in an under-declaration of greenweight. This apparently had resulted from the use of an incorrect conversion factor in the vessel's internal daily report, which was then transferred via reporting software to the TCEPR. This Captain corrected the error in the TCEPR but he mentioned that this software is standard across the company.

(e) MKF/MBS is all processed and packed as the same product, and labelled as "mince".

MPI Observers on another trip on the s 9(2)(a) noted the following:

"Potentially a regulatory breach has occurred with hoki TSK going directly to mincer having not been weighed and declared at the official conversion factory of 3.2. Mince by-product (MBS) is declared at CF of 0, yet with fillet going to mince and not being weighed this could pose a problem. Observers believe the proportion of MKF should be higher and MBS recorded much lower as a result. The skin off whole and partial fillets that were seen going directly to the mincer, and not being weighed, should all have been weighed as MKF. Observers saw minimal trimmings cut from fillets, with trimmers acting more as sorters deciding on the grades of the fillets more so than trimming, which is potentially why more hoki skinned whole fillets and part fillets went straight to the mincer before being weighed and declared as MKF. The vessel did not produce skinned piece block hoki."

Currently, there is a proposal to dispense with MBS as a legal state. This would remove the opportunity for whole fillets or illegal trimmings from fillets to be reported as an additional

landed state mince. Under this regime all mince would have the appropriate conversion factor applied and be counted against ACE. There would still be opportunities to send whole fillets and illegal trimmings to meal and report them as MEB. The current proposal is a step in the right direction, but it will not guarantee accurate reporting of greenweight.

OCM recommend that clarification is sought with s 9(2)(b) regarding the manner in which MKF/MBS is reported in TCEPRs and how this is transferred to CLRs (see points (d) and (e) above regarding the s 9(2)(a)).

OCM recommend that the code MBS is removed as a legal state in line with the current proposal.

3.9 *Vessel Grading Systems*

Vessel grading systems often relate to fish size. The length/weight relationship for hoki is well known and was documented by Francis (2003)[8]. Length frequency (LF) data provides information about the size distribution of a fishery and what might be expected to be present in landed grades.

MPI Observers collected total length measurements of 41,570 hoki for the 2012 spawning season. By comparison, in 2011 27,526 hoki were measured due to fewer observed trips for this season. LF data for the 2012 and 2011 seasons for the WCSI hoki fishery is illustrated in figure 9.

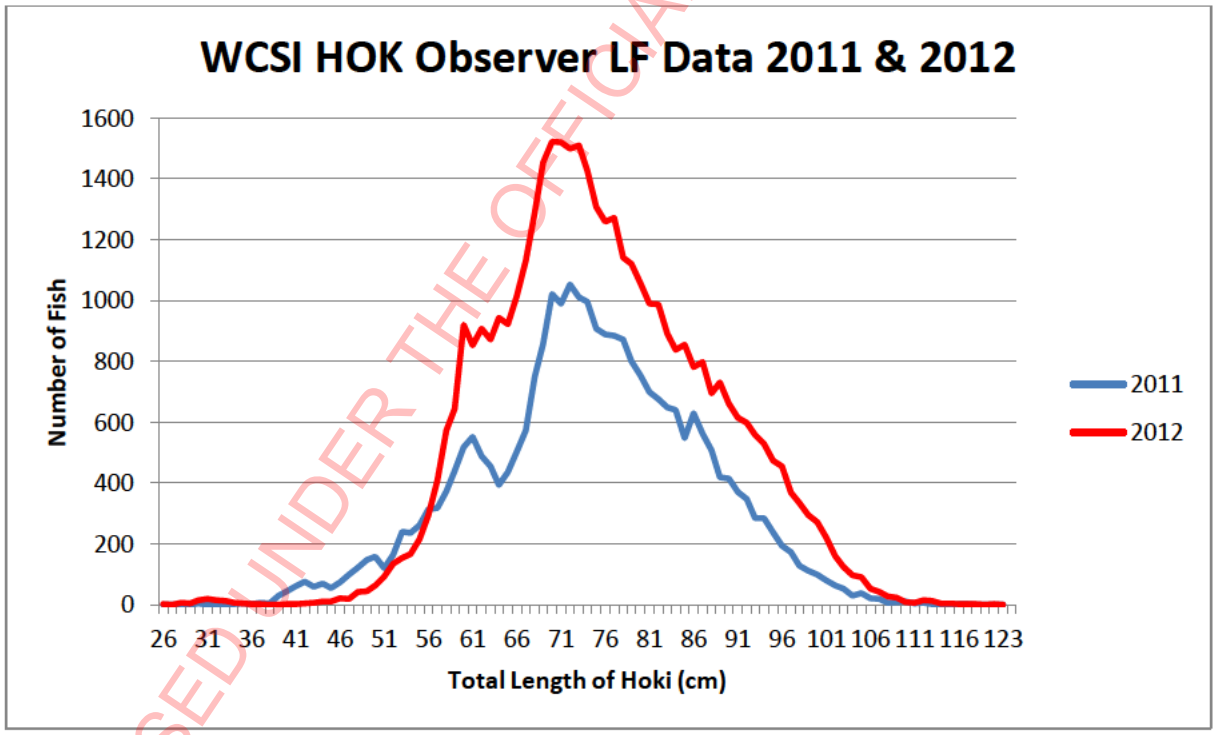


Figure 9 – WCSI hoki Observer LF data 2011 & 2012

The LF distribution of the WCSI hoki fishery remained similar throughout 2011 and 2012. The graph indicates the numbers of hoki with total lengths from 39cm to 56cm present in the fishery decreased between 2011 and 2012. This is consistent with observations across the fishing

[8] Francis, R.I.C.C (2003) Analyses supporting the 2002 stock assessment of hoki. NZ Fisheries Assessment Report 2003/5.

fleet, with the majority of vessels reporting less small grade fish in 2012 than in 2011. The first peak in the graph (at about 60cm total length) represents hoki that are approximately 4yrs old, and equate to a processed HGT weight of approximately 400g. The second peak, from 70-73cm in total length, represents hoki that weigh approximately 620-700g when processed to an HGT state.

MPI Observer reports and comments from fishing vessel crew indicated there were relatively low numbers of small hoki present in the WCSI fishery during 2012. This is supported by LF data, as shown in figure 9 above. As a consequence, compliance and sustainability risks associated with high-grading hoki were considered low for the 2012 season. If the numbers of small hoki present in the fishery increase, the risk of high-grading is likely to escalate.

OCM recommend that the reporting of small and unprocessable hoki continues to be monitored.

3.9 (a) Limited Processing Vessels

Table 23a shows proportions of hoki landed by grade for Korean LPFVs, as recorded on vessel unload manifests.

Vessel Name	Observer	HGT						DRE	GRE	
		N/A*	S	M	L	2L	3L	N/A*	N/A*	ACC*
s 9(2)(b)(ii)										
s 9(2)(b)(ii)	No	0.5%	7.4%	16.0%	24.8%	49.3%			2.0%	
	Yes		12.1%	17.4%	24.0%	42.1%				4.3%
s 9(2)(b)(ii)	No	1.8%	5.5%	14.8%	28.7%	48.1%			1.1%	
s 9(2)(b)(ii)	No	0.7%	4.1%	17.4%	28.3%	49.2%		0.1%	0.4%	
s 9(2)	No		6.7%	9.8%	27.0%	48.4%			4.9%	3.2%
	Yes		6.6%	15.3%	24.8%	49.7%			3.6%	
s 9(2)(b)(ii)										
s 9(2)(a)	No		4.2%	15.5%	20.5%	57.6%			2.3%	
	Yes		11.5%	17.9%	20.2%	48.2%			2.2%	
s 9(2)(a)	No	1.4%	13.4%	21.2%	21.1%	41.7%			1.3%	
	Yes	5.0%	26.1%	34.9%	20.6%	13.4%				
s 9(2)(a)	No	0.3%	4.8%	13.3%	24.2%	55.3%			2.1%	
s 9(2)(b)(ii)										
s 9(2)(a)	No	0.3%	1.2%	7.1%	15.8%	74.4%			1.2%	
s 9(2)(a)	Yes		7.3%	16.3%	27.1%	47.5%				1.8%
s 9(2)(b)(i)										
s 9(2)(a)	No		5.5%	6.1%	20.9%	43.7%	22.5%		1.3%	
Average	No	0.6%	5.9%	13.5%	23.5%	52.0%	2.5%	0.0%	1.8%	0.4%
Average	Yes	1.0%	12.7%	20.4%	23.3%	40.2%	0.0%	0.0%	1.2%	1.2%
Overall Average		**0.7%**	**8.3%**	**15.9%**	**23.4%**	**47.8%**	**1.6%**	**0.0%**	**1.6%**	**0.7%**

Table 23a - Proportions of hoki landed by grade for Korean LPFVs. ***(* No size grade recorded. Note: HGT, DRE and GRE Block ('N/A') figures taken from unload schedule; GRE ACC figures taken from CLR).***

Larger grade fish (L & 2L) accounted, on average, for approximately 71% of the product landed from all trips. Korean vessels all have similar grading specifications in which L and 2L grades consist of hoki over 700g HGT processed piece weight. Most vessels landed L grade product which accounted for between 20-29% of landed hoki. In most cases vessels reported 42-50% of landed hoki product as 2L.

The s 9(2)(a) (when not observed), s 9(2)(a) and s 9(2)(a) all reported more than 55% of their hoki as grade 2L. The s 9(2)(a) reported 66.2% of their hoki landings as grades

2L and 3L. None of these vessels had MPI Observers onboard during the trips preceding these landings. These vessels also reported low proportions of small and/or green fish for the same trips. These anomalous grade percentages indicate that hoki was high-graded.

On average S grade fish typically made up a higher proportion of the catch when MPI observers were onboard (12.7%) compared to non-observed trips (5.9%). In line with this, larger grades, i.e. 2L and 3L, were on average significantly lower on observed trips (40.2%) compared to non-observed trips (54.5%). These differences in grade proportions may indicate highgrading in the absence of MPI Observers.

Table 23b shows proportions of hoki landed by size grade for Ukrainian LPFVs, as recorded on vessel unload manifests.

Vessel Name	Observer	HGT					MEA	GRE
		N/A*	S	M	L	2L	N/A*	ACC*
s 9(2)(b)(ii)								
s 9(2)(a)	Yes	2.5%	0.0%	4.0%	20.8%	70.8%	1.9%	
s 9(2)(b)(ii)								
s 9(2)(a)	No	0.1%	0.0%	21.1%	45.9%	31.7%	1.1%	
	Yes	0.2%	0.0%	18.1%	33.8%	46.3%	1.4%	0.1%
s 9(2)(a)	No	0.5%	0.0%	17.5%	39.0%	41.8%	1.1%	
	Yes	1.6%	0.0%	14.7%	42.3%	40.2%	1.2%	
s 9(2)(a)	No	0.3%	0.1%	19.7%	31.6%	47.3%	1.1%	
	Yes	0.7%	0.0%	3.9%	55.5%	38.8%	1.0%	0.1%
Average	No	0.3%	0.0%	19.4%	38.8%	40.3%	1.1%	
Average	Yes	1.3%	0.0%	10.2%	38.1%	49.0%	1.4%	0.1%
Overall Average		**0.8%**	**0.0%**	**14.1%**	**38.4%**	**45.3%**	**1.3%**	**0.1%**

Table 23b - Proportions of hoki landed by grade for Ukrainian LPFVs using size grades. *(* No size grade recorded. Note: HGT figures taken from unload schedule, MEA and GRE ACC figures taken from CLR).*

Larger grade fish (L & 2L) accounted on average for approximately 84% of product landed across all trips. Thes 9(2)(b) vessels' packing specifications are similar to the Korean vessels in table 23a, with L and 2L grades representing HGT processed piece weights over 700g. The s 9(2)(a) , however, includes HGT piece weights of over 500g in their L grade which accounts for the difference in grade percentage distribution. On average s 9(2) vessels recorded slightly higher proportions of ungraded or unprocessed product, including meal, when carrying an MPI Observer than when not observed. This implies that in the absence of MPI Observers, unwanted hoki is likely to be put to meal without quantification and reported as MEB.

Table 23c shows proportions of hoki by weight grade landed by Ukrainian LPFVs, as recorded on vessel unload manifests. These vessels do not report by size grade such as 'S' or 'L', but by weight grades.

Vessel Name	Observer	HGT				MEA	GRE
		N/A*	200-400	400-700	>700	N/A*	ACC*
s 9(2)(b)(ii)							
s 9(2)(a)	No	1.6%	0.1%	14.4%	82.5%	1.4%	
s 9(2)(a)	Yes	0.8%	0.8%	14.4%	82.1%	1.7%	0.2%
Overall Average		**1.2%**	**0.5%**	**14.4%**	**82.3%**	**1.6%**	**0.1%**

Table 23c - Proportions of hoki landed by grade for Ukrainian LPFVs using weight grades. *(* No size grade recorded. Note: HGT figures taken from unload schedule, MEA and GRE ACC figures taken from CLR).*

Larger grade fish (>700g) accounted, on average, for approximately 82% of hoki product landed. Percentages for this grade are consistent with those for L and 2L grades (which account for product > 700g) for the other Ukrainian LPFVs in table 23b.
Table 23d shows proportions of hoki landed by weight grade for the single New Zealand LPFV, as recorded on vessel unload manifests.

Vessel Name	Observer	DRE					MEA
		N/A*	S	M	L	LL	N/A*
s 9(2)(b)(ii)							
s 9(2)(a)	Yes	4.1%	8.5%	39.3%	16.2%	29.4%	2.6%

Table 23d - Proportions of hoki landed by grade for New Zealand LPFV. *(* No size grade recorded. Note: DRE figures taken from unload schedule, MEA figures taken from CLR).*

Larger grade fish (L & LL) accounted for approximately 46% of product landed across all trips. This was much lower than the corresponding grade percentages exhibited by other LPFVs.

3.9 (b) Fillet vessels

Tables 24a and 24b show proportions of hoki landed by grade for fillet vessels, as recorded on vessel unload schedules.

Vessel Name	Observer	<6oz (170g)	>6oz (170g)	Portions/ Block	MEA	ACC
s 9(2)(b)(ii)						
s 9(2)(a)	Yes	9.5%	60.9%	28.9%	0.9%	0.0%
s 9(2)(a)	No	10.0%	57.2%	30.9%	1.1%	0.9%
s 9(2)(a)	No	5.7%	52.9%	39.1%	2.2%	0.0%
s 9(2)(b)(ii)						
s 9(2)(a)	Yes	3.6%	27.8%	66.3%	2.4%	0.0%
s 9(2)	No	1.5%	24.0%	72.0%	0.7%	1.9%

Table 24a - Proportion of hoki landed by grade for fillet vessels using weight grades

Vessel Name	Observer	M	L	LL	LLL	Block	UG	MEA*
s 9(2)(b)(ii)								
s 9(2)(a)	Part Trip	1.4%	1.7%	1.7%	2.0%	92.6%		0.8%
s 9(2)(a)	No	2.0%	2.6%	5.1%	5.6%	81.2%		3.4%
	Yes		0.2%	0.6%	0.8%	15.0%	80.7%	2.6%

Table 24b - Proportion of hoki landed by grade for fillet vessels using size grades

s 9(2)(b) and s 9(2) vessels produced mostly block product, which comprised 66%-93% of landings. In contrast, s 9(2) vessels produced more large-grade fillet products, which comprised 53%-61% of their landings.

4. ECSI Hoki Update

4.1 Changes in fishing patterns and effort.

Previous comparisons of data from the 2009/10 and 2010/11 fishing years showed little change in fishing patterns between these years in the East Coast South Island Chatham Rise area. This area comprises stat areas 020 to 023 inclusive and 401 to 410 inclusive, including

the Canterbury Banks and Mernoo Bank Hoki Management Areas, as shown in figure 10 on the next page.

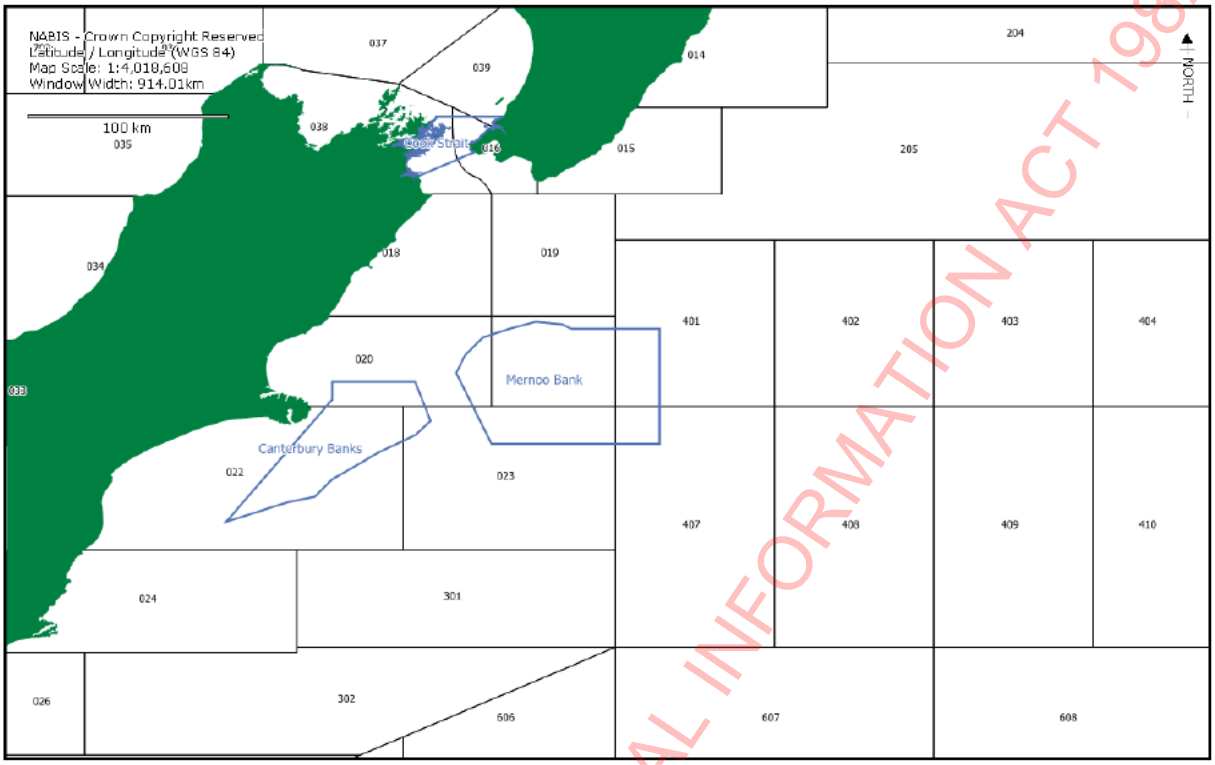


Figure 10 – Chart of statistical areas and Hoki Management Areas in the East Coast/Chatham Rise hoki fishery

Data from the 2011/2012 fishing year indicated a shift in effort from the west and north of the area. Effort and estimated HOK catch increased in areas 407, 408, 409 and 410, although catch per tow decreased in 409 and 410 (Table 25). Apart from area 020, estimated HOK catch declined in all other statistical areas, despite similar or increased effort in some areas (Table 26) HOK estimated catch per tow declined in some areas (Table 27).

	Total estimated catch (t)		Number of tows		Number tows targeting HOK		% targeting HOK	
Stat area	2010/11	2011/12	2010/11	2011/12	2010/11	2011/12	2010/11	2011/12
020	8,996	9,250	1,210	1,098	1,024	1,001	80%	91%
021	1,169	1,036	168	179	131	124	64%	69%
022	3,177	2,002	552	282	292	170	54%	60%
023	8,800	7,354	1,046	808	985	783	90%	97%
401	2,055	1,811	514	605	242	279	45%	46%
402	5,256	3,069	526	437	494	415	88%	95%
403	1,175	502	121	74	120	69	68%	93%
404	72	20	96	113	13	5	3%	4%
405	1	2	0	25	0	0	33%	0%
406	1	1	0	35	0	0	19%	0%
407	572	1,713	141	193	67	182	65%	94%
408	1,629	5,621	181	560	178	554	99%	99%
409	1,849	2,964	205	343	189	330	98%	96%
410	1,907	2,226	223	315	181	248	55%	79%

Totals	36,659	37,571	4,983	5,067	3,916	4,160	79%	82%

Table 25 - Hoki catch and effort by statistical area, 2010/11 and 2011/12

Historical and contemporaneous hoki length-frequency data indicate that small hoki are more abundant on the western Chatham Rise. The observed changes in fishing effort may indicate vessels are actively avoiding small hoki. Survey data indicate that at present there are exceptionally high abundances of juvenile hoki on the Chatham Rise. Vessel operators will need to develop strategies to avoid small hoki as these fish recruit to the fishery.

	Total estimated catch (t)		Number of tows		Number tows targeting HOK		% targeting HOK
Stat area	Change	% Change	Change	% Change	Change	% Change	Change
020	254	**2.82**	-112	**-9.26**	-23	**-2.25**	11
021	-133	**-11.38**	11	**6.55**	-7	**-5.34**	5
022	-1,175	**-36.98**	-270	**-48.91**	-122	**-41.78**	6
023	-1,446	**-16.43**	-238	**-22.75**	-202	**-20.51**	7
401	-244	**-11.87**	91	**17.70**	37	**15.29**	1
402	-2,187	**-41.61**	-89	**-16.92**	-79	**-15.99**	7
403	-673	**-57.28**	-47	**-38.84**	-51	**-42.50**	25
404	-52	**-72.22**	17	**17.71**	-8	**-61.54**	1
407	1,141	**199.48**	52	**36.88**	115	**171.64**	29
408	3,992	**245.06**	379	**209.39**	376	**211.24**	0
409	1,115	**60.30**	138	**67.32**	141	**74.60**	-2
410	319	**16.73**	92	**41.26**	67	**37.02**	24

Table 26 - Changes in HOK catch and effort by statistical area, 2010/11 and 2011/12

	HOK catch per tow			
Stat area	2010/11	2011/12	Change	% change
020	7.43	8.42	0.99	13.31
021	6.96	5.79	-1.17	-16.82
022	5.76	7.10	1.34	23.35
023	8.41	9.10	0.69	8.18
401	4.00	2.99	-1.00	-25.13
402	9.99	7.02	-2.97	-29.72
403	9.71	6.78	-2.93	-30.14
404	0.75	0.18	-0.57	-76.40
407	4.06	8.88	4.82	118.79
408	9.00	10.04	1.04	11.53
409	9.02	8.64	-0.38	-4.19
410	8.55	7.07	-1.48	-17.36

Table 27 - Hoki catch per tow by statistical area, 2010/11 and 2011/12

4.2 *Hoki Management Areas*

Effort and HOK catch declined in the Canterbury Banks HMA, but increased in the Mernoo Bank HMA. Total reported estimated HOK catch within the Canterbury Banks HMA decreased from 3,649t in 2010/11, to 2,255t in 2011/12. Two vessels, the s 9(2)(a) and the s s 9(2)(a) accounted for 75% of this catch. The s 9(2)(a) and s 9(2)(a) accounted

for another 10% of the total estimated HOK catch. Total reported estimated HOK catch within the Mernoo Banks HMA increased from 763t in 2010/11 to 1,173t in 2011/12. New Zealand flagged vessels caught 98% of this catch, as shown in table 28.

Vessel	HOK catch (t)	% of HMA total catch	Company %
s 9(2)(a)	220.5	18.8	39
	235.7	20.1	
	175.6	14.9	35
	236.8	20.2	
	62.8	5.4	24
	218.8	18.6	

Table 28 – Reported catch by NZ vessels in hoki HMAs in the 2011/12 fishing year

Total estimated HOK catch in the Canterbury and Mernoo Banks Hoki Management Areas decreased from 4,412t in 2010/11 to 3,428t in 2011/12, a 22% reduction. The 2011/12 estimated HOK catch within Hoki Management Areas still represented 9% of the total catch for the Chatham Rise area.

VMS data and at-sea boarding observations suggest there were some changes in fishing practices within the Canterbury Banks HMA from 2010/11 to 2011/12. In previous years this HMA was subjected to habitual targeting of HOK by some vessels, in contravention of the prevailing Industry voluntary code-of-practice, the *Deepwater Group Operational Procedures*. Some of these infractions were documented in the 2011 Compliance Risk Profile. Vessels "targeting" SWA in the Canterbury Banks HMA often caught more HOK than SWA. Some vessels targeting SWA in the Canterbury Banks now appear to be fishing shallower depths and thus reducing HOK bycatch. This practice can result in other bycatch issues however, such as high catches of SPD.

The incentives to fish areas within the HMAs where HOK and SWA are both relatively abundant persist. Access to the SWA resource within the HMAs remains a vexed issue for Industry.

High levels of HOK targeting just outside HMA boundaries were evident in 2011/12. Most of the reported HOK catch in the statistical areas enclosing the HMAs was caught by a small number of vessels, some of which also targeted HOK within the Hoki Management Areas. There is evidence of unreported HMA boundary crossing by some of these vessels. Hoki catches are relatively high on both sides of HMA boundaries where hoki are targeted. This indicates that the existing HMA boundaries provide little in the way of buffer zones for areas where small hoki are relatively abundant. LF data indicates there are likely to be high proportions of small HOK in the areas fished, on both sides of the HMA boundaries. There are indications that some vessels fishing these areas may be producing disproportionately high quantities of meal.

An Observer onboard the s 9(2)(a) (trip 3565) commented:

> *"There was continuous whinging from crew about other vessels not abiding by DWG rules regarding HMAs. The skipper said he had previously reported* s 9(2) *skipper* s 9(2)(a) *to* s 9(2)(b) *management for taking HOK while supposedly targeting SWA in HMA. Alleged that* s 9(2)(a) *had been put on* s 9(2)(a) *specifically to get HOK inside HMAs – vessels struggle to get much HOK outside HMAs – lots of 'rats & mice' bycatch."*

The MPI Observer believed the s 9(2)(a) was solely fishing outside HMA, but VMS indicates this may not be the case.

OCM recommend that ongoing monitoring of fishing in these areas remains necessary. It is also incumbent on the Deepwater Group to manage and monitor voluntary compliance within

the HMAs and to identify and inform vessels that are not complying with the Operational Procedures. It is incumbent on vessel operators to ensure their vessels comply with the Operational Procedures, and to take corrective action when they do not. Without active participation in and intervention by the responsible parties, the Hoki Management Areas cannot be regarded as effective management tools.

5. Export Double

HGT and DRE product produced by LPFV's accounts for 65% of reported landings. Of this, 94% is landed by foreign charter Vessels (FCVs) and exported for processing offshore. Fillet product (TSK and TRF) accounts for approximately 32% of reported landings by New Zealand fillet vessels. The majority of this is exported directly to overseas markets already in an added value state. Clearly there is room for adding further value to HGT/DRE product prior to export in line with MPI's "Export Double" objective.

Parts of a hoki that result from processing to the desired state (fillets or HGT) are often discarded (eg heads, tails, livers, in some cases roe). In other countries, parts such as these are sold. Operators of vessels fishing in New Zealand should make every attempt to exploit overseas markets for these "less desirable" products in order to maximise the export value of hoki in line with "Export Double".

Given that hoki deteriorates relatively quickly after death it is vital that processing is expeditious to retain quality and maximise earnings. Hoki held at temperatures of 10°C plus for 12 hours or more results in poor quality product. Information available indicates that New Zealand seafood has a bad reputation in Asia, primarily because of the poor quality of hoki. It may be that this hoki was measurably unfit for human consumption. Regardless, any loss of reputation regarding New Zealand primary produce would undermine MPI's goal to double exports.

OCM recommend that value adding and export of less desirable products is adopted by industry in order to increase export revenue in line with the "Export Double" vision.

OCM further recommend that consideration is given to utilise the expertise and facilities at Wallaceville labs to test frozen fish product to evaluate whether fish is fit for human consumption in order to ensure that NZ's reputation is not further damaged, particularly in Asia.

6. MPI observer coverage

A number of the Korean charter vessels boarded were carrying single MPI Observers. Single Observers are tasked to observe two-thirds of hauls during a trip. Korean vessels typically make two long trawls a day. Most single MPI Observers interviewed, during at sea boardings, were trying to observe all hauls and associated processing. Like the vessel crews, they were subsisting on small amounts of sleep and were often obviously tired. MPI Observers were aware of the risk of illegal discarding occurring when they were absent from the factory deck, particularly when vessels were catching more fish than they could process. Some MPI Observers mentioned instances of obstruction.

Vessel catch reporting data from observed trips has been an indispensable element of past deepwater profiling and investigations. In those instances, all data were from trips where there were at least two MPI observers were aboard. It cannot be assumed that vessel-reported catch data from single observer trips is of comparable reliability, nor that the presence of a single observer guarantees or significantly improves compliance. There is considerable

evidence, from New Zealand and elsewhere, that round-the-clock observer is effective in improving vessels' compliance and accuracy of catch reporting. There are many direct descriptions of vessel crews' behaviour changing when single observers are off duty.
Despite this, MPI has promoted single observer placements as being of comparable value to paired observer trips. This is at best disingenuous.

On some Korean vessels boarded, MPI Observers (on single and paired trips) were attempting to assist the crew establish and operate systems for managing and recording catch aboard their vessels. The inevitable inference is that these vessels did not previously have adequate on-board systems, despite most having operated in New Zealand waters for some years. Vessels should have these systems in place before they sail. It is not the observers' job to develop these systems from scratch, nor to work as de facto factory hands.
The lack of viable systems was particularly evident on the East Coast, where catches comprised a mixture of species. Vessels that had employed s 9(2)(a) until shortly before the September boardings exhibited profound deficiencies in their systems for capturing and recording mixed-species catch weights.

OCM recommend that high risk fisheries/vessels are given priority for paired Observer trips. Consideration should also be given to paired trips for fisheries undergoing compliance risk profiling in order that data collection is not comprised.

The best way to determine actual processed weight is at sea, prior to the application of glaze and/or packaging (if applicable). Currently MPI observers carry out block weight testing on a regular basis throughout a voyage to use in calculating processed weights. Until recently MPI Observer block weight data has not been used by compliance to assess the accuracy of greenweight declarations. Instead Fishery Officers have been tasked to carry out inport carton weight examinations which are both labour intensive and difficult. Providing block weight testing, by MPI Observers, is systematic and is conducted immediately after break out and prior to the application of glaze and/or packaging, then this data can be used to better inform us about processed weights. The analysis of MPI Observer data indicates that block weight data is collected at different points in the process, and in some cases it is unclear at what stage in the process weights were collected. To use Observer block weight data with confidence it is imperative that the manner in which testing is carried out is consistent and can be used in an unequivocal way.

OCM recommend that block weight testing methods used by MPI Observers are reviewed to ensure for: statistical robustness, independent assessment, consistency of testing and accuracy.

OCM further recommend that Observer block weight data is used routinely to test accuracy of greenweight declarations.

7. Summary of Identified Issues and Compliance Risks

The 2011 profile identified 31 issues/compliance risks. 21 of these related to the WCSI fishery and 10 to the ECSI. Five of the WCSI issues related to bycatch, which had no updated assessments made for 2012. Of the remaining 16 hoki-related WCSI issues identified in the 2011 profile, nine were still of concern in the 2012 season. The other seven issues were either not assessed for 2012 or it was unclear whether they had improved.

The 2012 update has identified 28 issues, as described below:

Reporting

1. Effort not reported in timely manner
2. Inconsistency in processed catch reporting
3. s 9(2)(a) EDT returns completion sometimes up to 8 days after date return relates to.
4. Problems with EDT audit system
5. Vessels potentially legitimising illegal discards by reporting as destination type "A", eg s 9(2)(a).

Fishing Practices

6. Operators not engaging in sustainable fishing practices ie conducting long tows, not targeting marks (towing historical paths), soaking net, not limiting bag size, not catching to factory capacity.
7. Poor on-board catch handling processes leading to damaged/poor quality product leading to incentive to discard. These include no RSW/slurry for cooling in pounds, slow processing, single shift systems, leaving pans of product stacked in factory (in warm temperatures) while waiting for freezers to be free.
8. Vessels still targeting hoki on borders of HMAs – lots of small hoki known to be in these areas. Hoki catch in Mernoo Banks HMA increased in the 2011/12 fishing year.

Disposal of Unwanted Fish

9. Discards of unwanted fish allegedly happens regularly especially on non-meal vessels. Use of macerators helps to hide product discharged.
10. Whole hoki landed GRE still lower on non-observed trips than those carrying MPI observers.
11. Sea doors on Ukrainian vessels can facilitate discarding.
12. Meal quantification methods insufficient.
13. Some LPFVs when not carrying MPI observers had low proportion small hoki and high proportion big hoki eg s 9(2)(a), s 9(2)(a), s 9(2)(a), s 9(2)(a). Could indicate discarding of smaller fish.

Environmental

14. Higher number of species landed for observed trips than non-observed trips (Korean & Ukrainian) – implies discarding/mealing bycatch species without reporting.
15. Long BT tows adverse impact on seabed and increased amounts of unwanted bycatch species.
16. Ineffective Seabird Scaring Devices.

Accurate Greenweight Declaration

17. Vessels not using onboard weighing systems to full potential to assist in accurate greenweight reporting.
18. Greenweight reporting more accurate for trips where FO's conducted in-port carton weighing exercises, than for those trips where no in-port weighing was carried out. Still significant under-reporting on trips without FO in-port inspection, according to Observer pan weight data.
19. Insufficient glaze testing and recording of glaze testing – may lead to more glaze being allowed for than is actually applied.

Fillet Processing

20. Problems with bias in VSCF testing
21. Cutting into portions without exemption in VSCF.
22. Company quality processing specifications conflicting with definitions in FCFN.
23. Excessive trimming – leading to under-declaration of greenweight
24. Declaration of MKF as MBS

Export Double

25. NZ Seafood reportedly getting bad reputation in Asia due to poor quality hoki being produced by Korean vessels fishing here.
26. Discarding of secondary parts of hoki (offal, heads, tails) that have potential to be exported is not in line with export double objective ie obtaining maximum export value from every fish caught.

Observers

27. High level of solo Observer trips (as opposed to paired trips) is leading to concerns regarding quality of data able to be obtained by MPI Observers and effect on vessel behaviour (ie vessel has opportunity for illegal behaviours while solo observer is asleep).
28. Expectation from some vessels that MPI Observers will assist them to establish and operate systems for managing and recording catch on board the vessel. This is not part of the Observers' role and it is concerning that vessels did not already have suitable procedures in place.
29. Inconsistent methodologies used by MPI observers in the testing of block weights of processed product.

8. Recommendations

There are 28 recommendations resulting from the 2012 Hoki Profile Update of the WCSI and ECSI fisheries. Recommendations are not in order of priority but follow findings as set out in the report.

Mobile LFRs

1. OCM recommend that no deepwater vessels are issued with mobile LFR licenses in the future, because the risk of product leaving New Zealand without any opportunity for a compliance inspection is too high.

Reporting Issues

2. OCM recommend that greater clarification is needed in the Fisheries Reporting Regulations 2001 to improve reporting in this area. The requirement for the timely entry of effort and estimated catch data (e.g. "as soon as practicable once the trawl net has been landed on the vessel") should be paramount.

3. OCM recommend that greater clarification is needed in the Fisheries Reporting Regulations 2001 to improve reporting in this area. The requirement for the timely entry of processed catch data should be paramount. Explanatory notes need to be amended to reflect the intent of the regulations and best practice for auditing purposes.

4. OCM recommend that:

    a. The manner in which dates and times are written out to the CEEDT event fields needs to be amended to accurately record when the data was entered, in-accordance with the original CEEDT specifications.

    b. An analysis tool to process the CEEDT audit history data exported from the FishServe system is developed to enable prompt and accurate data analysis.

c. The analysis tool to process the Compliance Management Tool (CMT) exported CEEDT audit history data needs to be further developed as only an early draft version of an analysis tool has been prepared at this stage.

5. OCM recommend that industry report end of tow time in accordance with explanatory notes i.e. time at which net leaves the target fishing depth, excluding soak time, to accurately reflect tow duration.

6. OCM recommend that the FV s 9(2)(a) ship log and other relevant documentation (which may report danger to the vessel) are examined to clarify the circumstances of the abandonment.

7. OCM recommend that enquiries are made with the permit holders' of the FVs s 9(2) and s 9(2) , and that the vessels' ship logs, and other relevant documentation, are examined in order to clarify the circumstances relating to these losses.

Fishing Practices

8. OCM recommend that the practice of 'soaking the net' is monitored to identify and mitigate the use of bad practices e.g. catching beyond capacity.

9. OCM recommend that with future profiles greater emphasis is placed on the reporting of fish to meal as this is an area where large volumes of fish can go unreported. Vessel systems for quantification of meal should be robust and able to be audited by MPI Observers and Fishery Officers.

10. OCM recommend that for the hoki fishery where:

a) **Bulk quota fish go to meal,** that quantification is by accurate counts of buffer of known volume. Fish is accumulated in buffer by species, and sent to meal when buffer is full, with a tally kept for each shift. If this is not possible, then a best estimate by known volume of a pound (less deductions for by-catch) may be used. This method should not be used in preference to buffer counts. If necessary, modifications should be considered in order to apply the first option.

b) Low volumes of quota fish go to meal, that quantification is by way of accumulating fish into bins with known average weight. An accurate count of bins is multiplied by the average bin weight. This eliminates issues associated with time sampling.

c) **Non-quota fish go to meal,** that quantification by time sampling may be used. Belt timers should be required on all belts, with set sample time intervals and sample frequency. Sampling should consider both tow size and processing times, on a vessel type basis. Time sampling should not be used for quota species due to inconsistencies in the flow of damaged quota fish to meal. Set procedures need to be established across the industry.

11. OCM further recommend that companies submit documented procedures for quantification of fish to meal to MPI. Documentation should account for all sources of fish to meal, including processed product. In addition, where time sampling procedures are used for non-quota species, these must be statistically robust and verifiable.

12. OCM recommend that vessel operators ensure that vessels correctly maintain and deploy seabird scaring devices and follow correct offal management procedures.

13. OCM recommend that all deepwater vessel operators engage in sustainable catching practices which are integrated with factory production and freezing capability. Conducting short tows, targeting fishing marks, and fishing off the bottom, whilst maintaining maximum production through the factory, should be the main objective of every deepwater factory vessel operating in the hoki fishery.

Carton Weights

14. OCM recommend that where onboard automated weighing systems are in place then these should be used for informing greenweight reported on CLRs. Inadequate shore based sampling of carton weights should not be used in preference to automated weighing systems. Automated weighing systems should be monitored and verified by MPI.

15. OCM further recommend that all onboard and onshore sampling regimes used for determining greenweight are statistically robust and verifiable. Procedures must be documented and submitted to MPI. Both onboard and onshore weighing procedures should be monitored and verified by MPI.

16. OCM recommend that all vessel operators should document glaze test procedures (particular to each vessel) and submit to MPI.

17. OCM further recommend that MPI Observers verify vessel glaze test procedures including documentation completed, and that independent glaze weight tests are carried out on each trip.

Compliance with state definition

18. OCM recommend that monitoring of variation between VSCFs and observer derived CFs is conducted at regular intervals to test the accuracy of greenweight reporting. Where VSCFs are routinely underreporting greenweight then VSCFs should be revised and greenweights redeclared.

19. OCM recommend that Fisheries Management liase with s 9(2)(b)(ii) to advise that there are exemptions available to allow them to cut TSK beyond the state definition in line with exemptions in place for s 9(2)(b) and s 9(2) .

20. OCM recommend that clarification is sought with s 9(2)(b) regarding the manner in which MKF/MBS is reported in TCEPRs and how this is transferred to CLRs.

21. OCM recommend that the code MBS is removed as a legal state in line with the current proposal.

Monitoring

22. OCM recommend that the reporting of small and unprocessable hoki continues to be monitored.

ECSI hoki

23. OCM recommend that ongoing monitoring of fishing in these areas remains necessary. It is also incumbent on the Deepwater Group to manage and monitor voluntary compliance within the HMAs and to identify and inform vessels that are not complying with the Operational Procedures. It is incumbent on vessel operators to ensure their

vessels comply with the Operational Procedures, and to take corrective action when they do not. Without active participation in and intervention by the responsible parties, the Hoki Management Areas cannot be regarded as effective management tools.

Export Double

24. OCM recommend that value adding and export of less desirable products is adopted by industry in order to increase export revenue in line with the "Export Double" vision.

25. OCM further recommend that consideration is given to utilise the expertise and facilities at Wallaceville labs to test frozen fish product to evaluate whether fish is fit for human consumption to ensure that NZ's reputation is not further damaged, particularly in Asia.

Observers

26. OCM recommend that high risk fisheries/vessels are given priority for paired Observer trips. Consideration should also be given to paired trips for fisheries undergoing compliance risk profiling in order that data collection is not comprised.

27. OCM recommend that block weight testing methods used by MPI Observers are reviewed to ensure for: statistical robustness, independent assessment, consistency of testing and accuracy.

28. OCM further recommend that Observer block weight data is used routinely to test accuracy of greenweight declarations.

Appendices

Appendix 1

		Method of Filing Returns	
Nationality	**Vessel Name**	**2011**	**2012**
Ukrainian	s 9(2)(a)	Paper	CEEDT
		Paper	CEEDT
		Paper	CEEDT
		Paper	CEEDT
		Paper	CEEDT
		Paper	CEEDT
New Zealand	s 9(2)(a)	CEEDT	CEEDT
		CEEDT	CEEDT
		CEEDT	CEEDT
		Paper*	CEEDT
		Paper	CEEDT
		Paper	CEEDT
		CEEDT	CEEDT
		Paper*	CEEDT
Korean	s 9(2)(a)	Paper	CEEDT
		Paper	CEEDT
		Paper	CEEDT
		Paper	CEEDT
		Paper	Paper
		Paper	Paper
	i	Paper	Paper
		Paper	Paper
		Paper	CEEDT
		Paper	Paper

* Vessels not fishing WCSI hoki in 2011

Appendix 2

Nationality	Vessel Name	Discard Outlets	Macerator/Hasher
Ukrainian	s 9(2)(a)	One discard hatch above water-line, easy to discard.	
		Two - 1 each side, exit above water-line.	
		Two - 1 each side, exit above water-line.	
		One discard hatch, starboard aft of factory. Easy access from sorting conveyor from pounds.	
		Two discard chutes near pounds, one on either side, exit above water-line.	Hasher for product to meal.
New Zealand	s 9(2)(a)	One port side, exit above water-line.	Hasher for product to meal.
		One at rear port corner of factory.	
		No information	
		One sea door, port aft of factory, exit above water-line. Main conveyor at pound-man station leads directly to the sea-door. Main belt into meal hopper is reversible – fish are then discarded via sea door.	Macerator on one sump pump (just aft of discard chute) for warehou heads – too oily to meal.
		One, port aft near pounds.	Mascerator for discards via discard chute.
		One, aft port, exits above water-line. Discards into buffer tank, weights estimated as fish go into buffer, when full then all released overboard. Fish lost on factory floor discharged via sump pumps.	Hasher for product that meal plant will struggle with (eg SPD).
		One, port aft, at end of main sorting conveyor. However, there is a chute on sorting conveyor that leads directly to meal plant, switch needs to be flicked to send fish to discard chute instead of meal.	Hasher for product to meal.
		One discard outlet, port side exits just above water-line. Discard conveyor belt leads from main sorting conveyor to chute, but is usually turned off so all discards go to meal.	Hasher for product to meal.
Korean	s 9(2)(a)	One port side directly in front of fishpond, exit above water-line. Two belts carry offal to discard chute which works continuously except during shooting & hauling. No hopper, appears to be very easy to discard	
		One port side. Discard conveyor from sorting, heading and gutting area to chute.	Macerator for discards.

	s 9(2)(a)	One port side, exit above water-line. Not connected to conveyor.	
		One port side. Discard conveyor from heading/gutting area to chute.	Macerator for discards.
		One port side, middle of factory, exit below water-line. Conveyor belt to discard chute.	
		One main chute, starboard aft of factory, exit above water-line. Belts from sorting & cutting tables run to hopper with sliding door – extremely easy to discard quota species. Quota species discarded without Observer approval on this trip. Floor fish also easily lost when no grates in floor chutes.	
		One, port side mid-ship. Discard conveyor from cutting area to chute	Macerator for discards.
		One, open sea door starboard aft in factory, exits above water-line. Easy to throw fish overboard via seadoor, but would need chute set up for bulk discards.	
		Two, 1 each side, exit above water-line. Any fish left or put on conveyor goes to mascerator then overboard, via sump pump.	Mascerator for discards on both sump pumps.
		Two, mid-ships port & starboard, exit above water-line.	Mascerator for discards on both sump pumps – run as necessary, more when fully processing, very noisy.
		Two, on either side, at front of factory, exit above water-line.	Mascerator for discards on both sump pumps.

Appendix 3

Nationality	Vessel Name	Observer Trip Number	Meal Procedure
Ukrainian	s 9(2)(a)	s	The quantity of non quota fish to meal (MEA) was documented in the sorting area by the bunkerman on each shift. Each bunkerman was responsible for either weighing species in full where practical or estimating the weight of species to MEA. The weights were recorded on a whiteboard maintained in the sorting area. All species and weights were passed onto the fishmaster either at the end of each tow or shift. Estimates were made for JMA and HOK sent to meal as this weight was often between 50kg and 400kg. There were 2 vertical bins attached to the sorting conveyor where damaged JMA or HOK were collected. The fish could be released by opening a flap and sending the fish into the meal auger. Each bin of JMA was recorded as 42kg and each bin of **HOK 45kg**. A tally of these bins was kept by the bunkerman to calculate the full weight of JMA or HOK sent to MEA from these collection points.
		s	Most fish to meal weighed in full at end of shift and recorded on whiteboard. Exception was small fish where this was not possible, which were recorded based on eyeball estimates. Hoki to meal was recorded in the number of hoppers of hoki that were mealed. Vessel recorded **each hopper as 35kg**.
	s 9(2)(a)	s 9(2)(b)(ii)	Whole fish to meal was generally species not normally processed for example SPD, RAT, JAV, BEN, DEA and BSP. This fish was usually weighed in full by the vessel when present in small amounts and on a few occasions SPD in particular was assessed using a count of bins x the average weight of a bin or a count of fish x an average weight of a fish. ITQ species mealed including SPD were generally weighed in full. Processed species sent to meal were assessed by collecting the damaged fish/small fish in a hopper at the sorting area by the pounds and at the heading saw then multiplying by the average weight of a hopper. This method was used for HOK, EMA, JMA and BAR. Two meal hoppers, port (30kg HOK) & starboard (100kg HOK) sides. Starboard hopper immediately in front of sorting station, port hopper off main conveyor line.
		s	Quota and non-quota species to meal were set aside in fish bins by the Poundsman and sent to meal at the end of tow or at shift changeover. The fish were weighed on vessel Salter scales and tallied on a board recording all fish to meal from the factory. At the end of each shift the Poundsman gives the meal tally figures to the Factory Master who records them in the factory book. Inaccurate meal counts are recorded due to there being just one centralised meal tally board whose responsibility lies with the Poundsman. On two occasions, the Factory Master was seen asking the Poundsman to add meal figures to the board from another area in the factory. In general, fish were seen to be sent to meal in an ad-hoc fashion across the factory without record.
	s 9(2)(a)	s	Fish to meal, both quota and non quota species, were quantified by weighing in full, eyeball estimates, exact count of fish x est. avg. weight and exact bin count x est. avg. weight of a bin. Processed species sent to meal were weighed in their processed state and multiplied the official CF. Meal hopper starboard side immediately in front of sorting station.
	s 9(2)(a)	s	All whole fish to meal is sorted from the main catch at the sorting station adjacent to the pounds. Each species is sorted into individual bins and weights determined by weighing in full or counts of bins multiplied by average weights. Hoki and Southern Blue Whiting to meal, both small and damaged fish are placed in a hopper with a nominal capacity of 150 kg and when full emptied directly into the meal stream. Processed HOK and SBW graded out due to damage was placed in bins, weighed up and multiplied by the appropriate conversion factor to determine greenweight.
New Zealand	s 9(2)(a)	s	Fish to meal was estimated by the meal man using a 5 minute time sample each tow.
	s 9(2)(a)	s	Fish to meal was estimated by the pound man using a 5 minute time sample at the start of the tow extrapolated over the total processing time for that tow. Pound sheets are varying in accuracy of reporting of MEA figures depending on the operator on shift, and are at times not reflecting product to MEA. E.g tow 26 obs fig SPD/MEA = 700 kgs and vessel figure = 130 kg. Observer had conversation with Captain regarding calculation of vessels fish to meal. Their practice was to conduct 5 minute time sample at start of tow and calculate entire meal figures from that. Observer suggested that time samples across the tow would give more accurate picture of fish to meal and illustrated this by comparing their SPD figures for tow 32 of 1,582 kg with vessel figures of 116kg. Captain subsequently implemented another time sample at end of tow, with agreement of factory manager.
		s	Meal and discard figures were calculated via time samples scaled up over the total time of processing. On some smaller tows or when meal volumes low enough, meal and discards would be weighed in full or calculated using accurate counts of fish multiplied by estimated weight of fish. Hoki to meal was usually accounted for by weighing in full the amount of binned hoki to meal occurring at the pounds, hoki to meal in areas other than the pounds was added to meal sheet daily. Hoki to meal that occurred around Baader machines or that may have fallen onto the factory floor throughout trip may not have been accounted for in vessel figures.
	s 9(2)(a)	s	Meal figures were recorded initially in a factory logbook. Meal assessment was based on **1 minute time samples** conducted every 2 hours by the B-424 operator. Samples were up-scaled to account for each tow. Separate fish bins were also set aside at the 182 and 192 Baader machines. Additional damaged, or undersized meal fish, were binned and the weight recorded by shift boss. For processed meal fish, a case was set aside as a collection point at fish sorting/packing station. At the completion of each shift, a crewman weighed the fish. The appropriate CF was applied to calculate greenweight.
	s 9(2)(a)	s	Whole fish to meal was assessed by calculation from species weights in a series of **10 minute time samples** taken from the meal conveyor then scaled up over the total time of processing. These samples were carried out during the processing of each tow by junior crew. Throughout processing any DRE or GRE state fish was either weighed in full or assessed by a full count of bins x estimated weight of bin x official CF. Fillet to meal was assessed by weighing in full x official or VSCF and recorded as additional weight to meal.
	s 9(2)(a)	s	Fish to meal was assessed both by **eyeball estimate** and **bin count x estimated bin weight**. Hoki that was mealed from a GRE state were assessed both by eyeball estimate and bin count x estimated bin weight. Hoki in DRE state that were mealed was assessed by bin count x estimated bin weight x official CF.
		s (Different Factory Manager)	Quota species to meal were weighed and multiplied by the official CF, eyeball estimated and bin/tank counts multiplied by a nominal quantity within.

Appendix 4

Nationality	Vessel	Paired Streamer Lines (Tori Lines)	Bird Bafflers	Warp Deflectors	Stickers	Marine Mammal Mitigation	Marine Mammal Captures	Offal Management	Bird Captures
	NO MEAL PLANT								
Korean	s 9(2)(a)	✓					Nil	Stopped discard belt during shooting and hauling but continuous all other times. No discard hopper to enable batch discarding.	Nil
	)	✓	✓				Nil	No discharge of fish or offal during shooting and hauling.	Nil
		✓ (poor construction and not very effective)	✓		Removed from net before shooting.		1 FUR caught - dead	Occasionally discharged offal and whole fish while shooting the net.	Nil
		✓ (only used when bafflers out of action)	✓ (had to be repaired to meet requirements)				Nil	Discharged offal during shooting and hauling on a number of occasions.	Nil
		✓	✓				Nil	Offal held during hauling and shooting, minced and discarded during tow. Grates around sump pumps minimise loss of fish/offal dropped on factory floor.	
	MEAL PLANT								
Ukraine	s 9(2) s 9(2)(b)		✓		Removed from net, damaged fish sent to meal via chute from trawl deck.		1 FUR caught - dead	No offal discharged during shooting or hauling events. Offal sent to meal plant unless technical problems with plant. Offal hopper in factory to hold quantity of offal that could be batch discharged in under 10 minutes.	Nil
	s 9(2) s 9(2)(b))	✓ (used every tow after the bird capture occurred)	✓			Nil	Nil	Held all offal during shooting and hauling, notified appropriate people after reaching a trigger point and deployed additional mitigation when required. All offal mealed.	6 (all dead, all from one tow)
	s 9(2)(a) (Trip s)	✓ (used after continual bird captures, weather dependent)	✓		Removed after every tow		2 (both dead)	Did not discard any offal, only whole species discarded were deepwater sharks.	2 (one alive, one dead)
	s 9(2)(a) (Trip s 9(2)	✓	✓ (2 or 3 times strong winds decreased effectiveness)				1 FUR (dead)	No offal released during hauling or shooting.	2 (one alive, one dead)
	s 9(2)(a) (Trip s	✓	✓				4 FUR (dead)	Offal discharge via scuppers from factory floor wash – increased bird and FUR activity.	Nil
	s 9(2)(a)		✓			Dolphin Dissuasive Devices used	Nil	No whole fish or offal discharged during shooting or hauling.	Nil
	s 9(2)(a)		✓		Removed at end of each tow		1 FUR – dead	A dedicated offal buffer tank is in place to retain offal for batch dumping if there is a meal plant failure. No whole fish was discharged during shooting or hauling of trawls. In the factory offal conveyors, shoots and augurs were shrouded to avoid offal spill onto the factory deck and consequent wash overboard. All offal passed directly to the meal plant when these measures were working effectively. Grills were placed around overboard outfalls to capture any inadvertent offal spills from processing. It was frequently noted that these grills were not effectively in place allowing the spill of waste, predominantly Hoki livers, overboard.	Nil
NZ	s 9(2)(a)						Nil	All species not processed sent to meal. Sump pumps ran normally during shooting & hauling but only small amounts of floor dropped fish washed into these pumps.	Nil
	s 9(2)(a))	✓ (for any tows where discarding took place, weather permitting)	✓		Removed all at end of trawl, weighed and mealed.			Discharging halted during shooting and hauling. Vessel mealed all offal and damaged fish except warehou heads. All accidental floor offal was kept to a minimum. Small quantity of spilt offal did get discharged by sump pumps, attracting seabirds. Offal scraps spilling from meal belt was contained, binned and mealed.	Nil
	s 9(2)(a)	✓ (only used when wind & wave	✓				1 FUR – dead.	Offal held and not produced by vessel during shooting and hauling, although it was regularly produced during the tows throughout the trip with the offal	3 (2 dead captures when no tori line, 1

		conditions allowed)						minced and SPD, SSH, CSH discharged whole from the factory.	alive with tori line)
	s 9(2)(a)	✓	✓				Nil	No whole fish or offal discharged overboard, except fish lost on factory floor and discharged via sump pumps. Mealed all offal and whole fish.	Nil
	s 9(2)(a)	✓	✓			Shot and hauled gear quickly.	Nil	No discarding of whole fish or offal for whole trip.	Nil
	s 9(2)(a) (Trips		✓				Nil	No discharge of offal during shooting or hauling. Offal and whole fish to meal.	Nil
	s 9(2)(a) (Trips	✓	✓		Removed from net at end of tow.	Removal of stickers	1 FUR caught alive & released unharmed	Fish heads/tail/offal and whole fish retained on board by passing through hasher and held in meal hopper. Emptied when trawl on board or vessel not towing.	Nil