

APPENDIX 5

A generic code of conduct for fishery observers

The following code of conduct for observers can be adapted to suit the circumstances of any programme:

ON BOARDING

- a) Observers shall, as soon as possible on boarding a vessel, present their identifications to the Master of the vessel and complete any formalities needed for joining the vessel. They will ensure that they understand the emergency procedures on board.

CONDUCT ON BOARD VESSELS

- a) Observers shall develop a diligent and professional working routine as soon as possible on boarding the vessel.
- b) Observers must maintain their independence at all times and must report any attempt to compromise or harass them. Observers shall not accept bribes in money or kind for neglect of duty or any other act deleterious to their proper duties.
- c) Observers shall ensure that they do not hinder or interfere with the proper functioning of the vessel for fishing or navigation purposes and shall respect the safety and sanitary rules of the ship.
- d) Observers shall attempt at all times to have a professional and courteous relationship with the Master and Crew and shall respect their private property and living space. Observers shall also endeavour to be clean and dress in an appropriate manner for the conditions and working or living space.
- e) Observers are not law enforcement officers but will be firm, fair and tactful in giving official notice to the Master, Captain and/or any member of the crew.
- f) Observers shall refrain from using bad language, exhibiting bad behaviour and making public complaints about other persons on board the vessel or on shore and shall not have sexual relations whilst on board. Observers should attempt to walk away from arguments or confrontations.
- g) Observers shall not drink alcohol on board the vessel or smoke in areas where this is forbidden, and where or when requested not to smoke.

RESPECT FOR PROPERTY AND CONFIDENTIALITY OF INFORMATION

- a) The observers will respect all property and equipment on board the vessel, including documents and logs and plans of the vessel.
- b) Observers shall not discuss fishing information, ship's position or vessel details over the radio unless specifically requested by a Fisheries Inspector or other authorised Officer.
- c) Observers shall ensure that data and information collected whilst on board are kept secure and confidential at all times and will not be discussed with the Fishing Master, Captain or Crew, but only at the official de-briefing.

ON ARRIVAL IN PORT

Observers shall wait on board in order to brief the Inspector who will oversee the unloading of the catch.

APPENDIX 6 Safety

1. BASIC LEVEL OF COMPETENCE EXPECTED OF OBSERVERS

The International Convention on Standards of Training, Certification and Watch-keeping for Seafarers was adopted by the IMO in 1978 and was revised in 1995. The Convention and associated Safety Codes (STCW-95 and STCW-F) establish minimum requirements for all personnel on board a fishing vessel. All personnel must be able to:

- i. communicate with other persons on board on elementary safety matters and understand safety information symbols, signs and alarm signals;
- ii. respond appropriately if a person falls overboard, fire or smoke is detected, or the fire or abandon ship alarm is sounded;
- iii. identify muster and embarkation stations and emergency escape routes;
- iv. locate and don life jackets;
- v. raise the alarm and have basic knowledge of the use of portable fire extinguishers;
- vi. take immediate action upon encountering an accident or other medical emergency before seeking further medical assistance onboard; and
- vii. close and open fire/weather-tight and watertight doors fitted on the particular ship other than those for hull openings.

2. FAMILIARITY WITH THE VESSEL

Each observer must ensure that he/she is aware of the STCW-F recommendations (as given above) and must apply them on each vessel he/she joins. Before departure from the dock, observers will request a tour of the vessel on which they are to be deployed, conducted by the vessel operator or appropriate safety officer, in order to become familiar with:

- i. general safety procedures for that vessel;
- ii. alarm signals used for each type of emergency and alarm locations;
- iii. location and operation of all safety equipment, including fire extinguishers, first-aid kits, life vests, life raft, and communications equipment;
- iv. escape routes from accommodations and/or work areas;
- v. where to report (muster stations) and procedures; and
- vi. identification of the officer in charge of medical treatment.

3. SAFETY PROCEDURES DURING DEPLOYMENT

When working on deck, observers must use good judgement and are required to wear protective clothing, hard hats, boots, and lifejackets at all times. Additionally, observers are required to:

- i. participate in all safety drills conducted;
- ii. respect safety and sanitary rules of the ship and not compromise these by his/her actions;
- iii. use a safe vantage point and takes adequate precautions while on deck to view the deployment or retrieval of gear, any gear handling procedures, or other activities of the vessel, as required;
- iv. ensure that adequate precautions are taken when working in any processing or storage area to which they have access;
- v. not operate any machinery on deck or in the fish factory under any circumstances and not become involved under any circumstance if problems with gear arise during any operation;
- vi. not work on the trawl deck of a stern trawler if the ramp doors are open;
- vii. act upon safety advice and any warnings given by the crew during normal or abnormal situations of gear handling.

4. HEALTH REQUIREMENTS

The health of prospective observers should meet the minimum standards of health and fitness as laid down by the *Merchant Ships Convention 1976 (ILO No 147)* under the requirements of *Article 2 (a) (iii)* as accepted as equivalent to *Medical Examination (Seafarers) Convention 1946 (no. 73)*. This requires that hearing and sight is satisfactory for the duties to be performed, including no impairment of colour vision.

To ensure prospective observers are physically fit and capable to undertake the tasks of a fishery observer, the programme should consider requiring that they take a medical examination by a qualified physician. In addition to general good health, this examination will be to certify the candidate's ability to:

- i. live in confined quarters;
- ii. tolerate stress; and
- iii. lift and carry heavy items.

The examining physicians shall be made aware of the problems imposed by chronic motion sickness difficulty.

Observers must maintain good health whilst working to prevent fatigue and stress, which can make individuals more susceptible to accidents.

5. OBLIGATIONS OF THE VESSELS

All vessels operating in the fishery will be required to have at least the following certificates and documentation available for inspection by the observer or by the observer programme at any time to demonstrate its seaworthiness:

- i. Certificate of Registry, to verify that it is valid and that the marking of the vessel for its identification agree with the name of the Flag State given in the certificate;
- ii. Minimum Manning Certificate as issued by the Flag State, to confirm whether or not the vessel is manned accordingly;
- iii. in the event that a vessel is built, maintained and operated within the standards of a Classification Society, the certificates issued by that classification society;
- iv. documentation demonstrating compliance with SOLAS 1974; and
- v. documentation demonstrating compliance with the latest GMDSS, which will be expected under normal operating conditions while carrying an observer.

All vessels operating in the fishery will be required to have the following certificates and documentation available for inspection by the observer or by the observer programme at any time to demonstrate the competence and certifications of its crew:

- i. Information on its compliance with requirements under the International Convention on Standards of Training, Certification and Watchkeeping, 1978, as amended in 1995;
- ii. information on its compliance with the ILO Fishermen's Competency Certificate Convention, 1966 (No.125) in regards to certification of fishing masters, captains or mates under local or Flag-state regulations as developed or amended under the maritime law of the Flag State; and
- iii. a Safety Certificate as issued by the Flag State, which may include safety drills carried out before sailing or on a regular basis.

6. OCCUPATIONAL STANDARD: UNIT FOR PROVIDING FIRST AID

Every observer should have an accredited and valid first aid certificate that complies with the appropriate regulations concerning seafarers. An example of appropriate elements and performance criteria is given below.

1. Element: Assess and respond to an accident situation.

Performance Criteria:

- Alarm is raised.
- Actions appropriate to signs, symptoms and situation is taken.
- Communications are established with sources of assistance.
- Calm is maintained.

2. Element: Treat an unconscious casualty.

Performance Criteria:

- Casualty is positioned correctly and bleeding stopped if necessary.
- Airway is checked and cleared if necessary.
- Breathing is monitored and artificial respiration begun if necessary, using accepted techniques.
- Circulation is monitored and external cardiac massage (ECM) begun if necessary, using accepted techniques.

3. Element: Treat for shock.

Performance Criteria:

- Appropriate treatment is applied to minimise the effects of shock.
- Casualty is positioned to promote recovery and prevent complications.

4. Element: Treat for bleeding.

Performance Criteria:

- Appropriate measures are taken to minimise loss of blood and risk of infection.
- Appropriate action is taken where bleeding is an indication of other injuries.
- Measures are taken to avoid complications.

5. Element: Treat burns and scalds.

Performance Criteria:

- Casualty is removed from source of burn.
- Type and degree of burn is identified correctly.
- Appropriate measures are taken to minimise further damage and to promote recovery.
- Casualty is resuscitated if necessary, using accepted techniques.
- Casualty is treated for shock if necessary.

6. Element: Treat fractures.

Performance Criteria:

- Appropriate measures are taken to minimise further damage and to promote recovery.
- Appropriate treatment is applied as for symptoms and situation.
- Casualty is treated for shock if necessary.

7. Element: Treat hypothermia.

Performance Criteria:

- Casualty is assumed alive even in absence of all vital signs.
- Pulse is checked for at least one minute.
- ECM is applied if required using accepted techniques.
- Appropriate measures are taken to restore normal body temperature.

8. Element: Rescue and transport a casualty.

Performance Criteria:

- Severely injured person is moved from a stable situation only if there is a danger to life.
- Casualty is lifted and carried using accepted techniques and equipment.
- Casualty with spinal injuries is transported in specified manner.
- Rescuer is operating effectively as part of a team, communicating and acting in response to official instructions.

APPENDIX 7 Training material

In the following section examples of training material are given following the system explained in Chapter 3, i.e. one based on vocational learning outcomes and learning tasks divided into short training courses. Sections 1 to 3 show curricula that were developed to train observers in the sampling aspects of their work. These three curricula will take observers from a stage of no sampling ability to an advanced stage of sampling ability.

Sections 4 to 6 provide examples from each of the associated instructors' guides for the above three curricula. These are not complete but will give an idea into how instructors' guides can be set up.

No examples of observer manuals are included as these are very lengthy. But the curricula documents make it clear how to set up chapters to link in with the training courses.

1. CURRICULUM FOR TRAINING OBSERVERS IN THE FIRST LEVEL OF SAMPLING

1.1 Introduction

This curriculum document has been designed for the Observer Sampling Programme (OSP). The OSP trains observers to collect biological information from commercial vessels and to monitor catch and effort data. There are different levels of training for observers within the programme and this document describes the first level of training known as Grade One.

The document outlines learning outcomes and learning tasks that the observer must satisfy in order to achieve the level of a Grade One Observer. It should be used in combination with:

- The Observer Sampling Programme – Grade One Observer Manual; and
- The Observer Sampling Programme – Grade One Instructors Guide.

1.2 The Purpose of the Course

This course is intended to train Fishery Observers to collect and record basic biological and fishery information as required for fisheries management, and to understand the importance thereof.

1.3 Duration and Location

The Grade One course takes place on shore, where lecture and laboratory facilities are available. The course will take five days to complete.

1.4 Certification

Successful candidates will receive a certificate and an observer record book for use at sea.

1.5 Content of the Course

No	Learning Outcome	Lesson Number	Manual Chapter	Time for lessons	Examination
1	Explain the importance and relevance of the Observer Sampling Programme	1 & 2	1	2 hours	Theory
2	Collect random samples from commercial fishing vessel catches	3 & 4	2	4 hours	Theory
3	Accurately complete the forms used by observers at sea	5 & 8	3	7 hours	Theory & written
4	Identify and measure the common commercially exploited organisms	6 & 8	4	7 hours	Theory & practical
5	Accurately complete all types of fisheries logsheets	7	5	7 hours	Theory & written
6	Explain the importance of fisheries management and the role of observers in this	9	6	2 hours	Theory
7	Demonstrate an understanding of the logistical requirements of Grade One Observers	10	7	1.5 hours	Theory

1.6 Examination Method

Exam No	Exam Type	Time	Pass Mark %
1	Theory	1 hour	60%
2	Written	0.5 hour	80%
3	Practical	1 hour	80%

LEARNING OUTCOME 1: EXPLAIN THE IMPORTANCE AND RELEVANCE OF THE OBSERVER SAMPLING PROGRAMME

No.	Learning Tasks
1.1	Explain the purpose and objectives of this course
1.2	Define the term 'commercial sampling'
1.3	Describe a brief history of the Observer Sampling Programme
1.4	Explain the need for commercial sampling
1.5	Describe the role of the observer in collecting the commercial sampling data
1.6	List the uses of observer-collected data in fisheries management
1.7	List further training possibilities for observers

LEARNING OUTCOME 2: COLLECT RANDOM SAMPLES FROM COMMERCIAL FISHING VESSEL CATCHES

No.	Learning Tasks
2.1	Collect representative samples by making use of random sampling techniques
2.2	Explain why the biological samples need to be collected randomly
2.3	Identify the main problems with collecting random samples on fishing vessels
2.4	List factors to consider when choosing a sampling site
2.5	Identify the correct procedures for sampling on different vessel types
2.6	List the target species and by-catch species that must be sampled on each vessel type
2.7	List the number of specimens required for each sample

LEARNING OUTCOME 3: ACCURATELY COMPLETE THE SAMPLING FORMS USED BY OBSERVERS AT SEA

No.	Learning Tasks
3.1	Briefly describe what the research database is
3.2	List the types of forms an observer uses at sea, and when each form should be used
3.3	Accurately complete the forms used by observers at sea
3.4	Demonstrate how to use guideline notes
3.5	List the most important fields on each form
3.6	Explain how to determine the station number of a trawl
3.7	Describe the trawl depth and bottom depth for different gear types

LEARNING OUTCOME 4: IDENTIFY AND MEASURE THE COMMON COMMERCIALLY EXPLOITED MARINE ORGANISMS

No.	Learning Tasks
4.1	List the common names of all the commercially exploited fish, identify them and distinguish between them
4.2	List the scientific names and codes of the more commonly exploited fish
4.3	Demonstrate the use of the laminated identification sheets
4.4	Use fish identification guides to locate and identify less common species
4.5	Define pelagic and demersal species
4.6	Distinguish between fork length, standard length and total length
4.7	Demonstrate the proper method of measuring fish
4.8	Measure the length of the carapace of lobster

LEARNING OUTCOME 5: ACCURATELY COMPLETE ALL TYPES OF FISHERIES LOGSHEETS

No.	Learning Tasks
5.1	Describe the importance of logsheets and why they are required
5.2	Describe what catch and effort data is
5.3	Illustrate the recording of the data in the applicable fields on different logsheet types
5.4	Explain the difference between daily, continuous and monthly logsheets
5.5	List the most important fields in the logsheets
5.6	Describe the difference between licence number, trip number and radio callsign
5.7	Illustrate how to explain to a Captain procedures for correctly completing a logsheet

LEARNING OUTCOME 6: EXPLAIN THE IMPORTANCE OF FISHERIES MANAGEMENT AND THE ROLE OF OBSERVERS IN THIS

No.	Learning Tasks
6.1	Explain what fisheries management is and why it is needed
6.2	Describe the relevance of Maximum Sustainable Yield in fisheries management
6.3	Describe the methods used to manage the National Fisheries
6.4	Define basic fisheries management terms
6.5	Explain the role of the observers in this management

LEARNING OUTCOME 7: DEMONSTRATE AN UNDERSTANDING OF THE LOGISTICAL REQUIREMENTS OF GRADE ONE OBSERVERS

No.	Learning Tasks
7.1	List the equipment required by a grade 1 observer
7.2	List the forms required for different trips
7.3	Describe what a trip report form is
7.4	Demonstrate how to complete an observer record book
7.5	List the type of things that would be discussed in a debrief session

2. CURRICULUM FOR TRAINING OBSERVERS IN THE SECOND LEVEL OF SAMPLING

2.1 Introduction

This curriculum document has been designed for the Observer Sampling Programme (OSP). The OSP trains observers to collect biological information from commercial vessels and to monitor catch and effort data. There are different levels of training for observers within the programme and this document describes the second level of training known as Grade Two. Before an observer can join a Grade Two cruise he or she must have successfully passed the Grade One course and shown the ability to perform the Grade One tasks to an acceptable standard.

The document outlines the learning outcomes and learning tasks that the observer must satisfy in order to achieve the level of a Grade Two Observer. It should be used in combination with:

- The Observer Sampling Programme – Grade Two Observer Manual; and
- The Observer Sampling Programme – Grade Two Instructors Guide.

2.2 The Purpose of the Course

The course is intended to train Fishery Observers to determine the composition of catches and to collect and record biological samples for all commercial species, and to understand the importance thereof.

2.3 Duration and Location

The Grade Two course takes place at sea onboard a research or commercial vessel. The course will last between 5 to 7 days, depending on the logistics of the cruise.

2.4 Certification

Successful candidates will receive a certificate.

2.5 Content of the Course

No	Learning Outcome	Lesson Number	Manual Chapter	Examination
1	Demonstrate a full working knowledge of the skills learnt as a Grade One Fishery Observer	2	1	1, 2, 3, 4
2	Calculate and record the composition of catches by weight and percentage	3,6,9,12	2	1, 2, 4
3	Determine and record the internal and external organs, including the different sex organs of finfish, crabs and lobster	4,7,10	3	1,3,4
4	Collect samples of otoliths from finfish	5,8	4	1,3
5	Describe the instruments on the bridge of a vessel as used for fishing and positioning operations	11	5	1

2.6 Examination Method

Exam No	Exam Type	Time	Pass Mark %
1	Theory - Multiple Choice	1 hours	60%
2	Practical - Catch Composition	1 hour	80%
3	Practical - Biological Sample	0.5 hour	80%
4	Practical - Species Identification	0.5 hour	80%

LEARNING OUTCOME 1: DEMONSTRATE A FULL WORKING KNOWLEDGE OF THE SKILLS LEARNT AS A GRADE ONE FISHERY OBSERVER

No.	Learning Tasks
1.1	Collect random samples
1.2	Accurately complete the forms used by observers at sea
1.3	Identify and measure the common commercial species
1.4	Demonstrate a working knowledge of using identification guides to identify less common species
1.5	Identify the difference between the two species of hake and the two species of monk
1.6	Demonstrate how to care for your sampling equipment and clothing
1.7	Demonstrate how to accurately complete the tally forms

LEARNING OUTCOME 2: CALCULATE AND RECORD THE COMPOSITION OF CATCHES BY WEIGHT AND PERCENTAGE

No.	Learning Tasks
2.1	Describe methods of making initial eyeball estimates of catch weight
2.2	Demonstrate or describe how to calculate catch composition from a vessel emptying the catch on the deck
2.3	Demonstrate or describe how to calculate catch composition from a vessel using a conveyor belt system
2.4	Demonstrate how to calculate the catch composition by weight and percentage using different methods
2.5	Complete the 1A form accurately with full catch composition information
2.6	Explain why it is so important for observers to estimate catch composition
2.7	Explain the methods used to estimate catch composition on longline and pole and line vessels

LEARNING OUTCOME 3: DETERMINE AND RECORD THE INTERNAL AND EXTERNAL ORGANS OF FINFISH, CRABS AND LOBSTER

No.	Learning Tasks
3.1	Draw a fish and label the external organs
3.2	Draw and label the main internal organs of a fish
3.3	Draw and label the external organs of a crab
3.4	Draw and label the external organs of a lobster
3.5	Distinguish between a male and female fish at different maturity stages
3.6	Distinguish between male and female crustaceans, and females in berry or soft shelled crustaceans
3.7	Explain the purpose or function of the main organs of fish
3.8	Complete the 2C and 2D form accurately

LEARNING OUTCOME 4: COLLECT SAMPLES OF OTOLITHS FROM FINFISH

No.	Learning Tasks
4.1	Explain why otoliths are collected for fisheries management and why the sample does not need to be random
4.2	Explain why a fish has otoliths
4.3	Demonstrate how to remove otoliths from different fish species
4.4	Record the required information on the otolith envelope
4.5	Make a collection of otoliths for different length classes and sexes of a certain fish species
4.6	Explain how an otolith collection would be made and complete the form correctly

LEARNING OUTCOME 5: DESCRIBE THE INSTRUMENTS ON THE BRIDGE OF A VESSEL AS USED FOR FISHING AND NAVIGATION

No.	Learning Tasks
5.1	List electronic aids used in the location or capture of fish and describe their use
5.2	Read and interpret the information displays on fish finding instruments
5.3	List the electronic navigation aids associated with fishing and describe their use
5.4	Read and interpret information displays on navigation systems

3. CURRICULUM FOR TRAINING OBSERVERS IN THE THIRD LEVEL OF SAMPLING**3.1 Introduction**

This curriculum document has been designed for the Observer Sampling Programme (OSP). The OSP trains observers to collect biological information from commercial vessels and to monitor catch and effort data. There are different levels of training for observers within the programme and this document describes the third level of training known as Grade Three. This grade of training is for the most experienced and successful observers from the Grade Two level. It involves three components:

- Fisheries Management;
- Fishery Module 1; and
- Fishery Module 2.

The document outlines learning outcomes and learning tasks that the observer must satisfy in order to achieve the level of a Grade Three Observer. It should be used in combination with:

- The Observer Sampling Programme – Grade Three Fishery Module Observer Workbook; and
- The Observer Sampling Programme – Grade Three Fishery Module Instructors Guide.

3.2 The Purpose of the Course

The course is intended to train Fishery Observers to collect and record advanced biological, fishery and catch information on a chosen fishery type, as required for the management of this fishery, and to understand the purpose thereof.

3.3 Duration and Location

The practical training in this course will take place during a research survey on either a commercial or research vessel. It will last for at least one week and be supervised by a member of the scientific staff.

3.4 Certification

Successful candidates of all three components at the Grade Three level will receive a certificate

3.5 Content of the Course

No	Learning Outcome
1	Complete a fishing and activity log for the vessel and your sampling
2	Demonstrate a working knowledge of the management methods used for a fishery, type to be specified
3	Demonstrate a working knowledge of the fishing and production methods used for this a fishery, type to be specified
4	Demonstrate a working knowledge of the anatomy of the target species
5	Demonstrate a working knowledge of the reproductive system of the target species
6	Explain the population structure of the target species

3.6 Examination Method

The course is marked out of 100%, with 80% being the pass mark. Ten percent of this mark is for participation and interest in the cruise, 78% is for the accurate completion of the workbook, and 12% is for overall understanding.

LEARNING OUTCOME 1: COMPLETE A FISHING AND ACTIVITY LOG FOR THE VESSEL AND YOUR SAMPLING

No.	Learning Tasks
1.1	Complete the table with trawl or fishing event information for all stations that you have worked with
1.2	Plot the positions of each fishing event on the map provided. If required add more maps of your own on a larger scale to show the localised fishing area
1.3	Complete the list of all the species caught during the cruise
1.4	Keep a written log of your sampling activities on each fishing event
1.5	Explain how the survey was designed (the distribution of the trawls or fishing events) in relation to the objective of the survey
1.6	Keep a log of the weather conditions at a certain time each day

LEARNING OUTCOME 2: DEMONSTRATE A WORKING KNOWLEDGE OF THE MANAGEMENT METHODS USED FOR A FISHERY, TYPE TO BE SPECIFIED

No.	Learning Tasks
2.1	Describe the management method(s) used for this fishery type
2.2	Using a graph plot the catches for this fishery type by month for the last year with data available
2.3	List the conversion factors for all the species and product forms in the fishery
2.4	Describe the composition of the fleet

LEARNING OUTCOME 3: DEMONSTRATE A WORKING KNOWLEDGE OF THE FISHING AND PRODUCTION METHODS USED FOR A FISHERY, TYPE TO BE SPECIFIED

No.	Learning Tasks
3.1	Demonstrate an understanding of the gear used in the fishery, by drawing and labelling the fishing gear
3.2	Explain the type of mesh or hooks used, with a diagram
3.3	Describe how the vessel processes the fish on board, if on a research vessel find out how the other vessels in the fishery process the fish
3.4	Describe how the factories on shore process the fish
3.5	Explain where the markets for the fish product are and the importance of the national contribution to these markets

LEARNING OUTCOME 4: DEMONSTRATE A WORKING KNOWLEDGE OF THE ANATOMY OF THE TARGET SPECIES

No.	Learning Tasks
4.1	Describe the external features of the target species
4.2	Describe the internal features of the target species
4.3	Analyse the macro contents of the stomach and relate these to the species habitat
4.4	Describe the basic food chain of the species through a diagram

LEARNING OUTCOME 5: DEMONSTRATE A WORKING KNOWLEDGE OF THE REPRODUCTIVE SYSTEM OF THE TARGET SPECIES

No.	Learning Tasks
5.1	Distinguish between the male and female of the target species in both external and internal features if appropriate
5.2	Distinguish between the maturity stages of the target species for both male and female
5.3	Explain the breeding behaviour of the target species

LEARNING OUTCOME 6: DEMONSTRATE A WORKING KNOWLEDGE OF THE POPULATION STRUCTURE OF THE TARGET SPECIES

No.	Learning Tasks
6.1	Illustrate graphically the length frequency composition of the target species by sex for one station
6.2	Demonstrate an understanding of the graph
6.3	Illustrate graphically the length weight relationship of the target species
6.4	Collect otoliths from the target species if possible and explain the purpose of these to fisheries management

4. AN EXAMPLE FROM THE INSTRUCTORS GUIDE FOR THE FIRST LEVEL OF OBSERVER TRAINING

LESSON PLANNING 3

1. Topic

- Random Sampling

2. Associated learning tasks

2.1	Collect representative samples by making use of random sampling techniques
2.2	Explain why the biological samples need to be collected randomly
2.3	Identify the main problems with collecting random samples on fishing vessels
2.4	List factors to consider when choosing a sampling site

3. Lesson preparation and background

Instructor:	1
Number of observers:	All the observers
Training time available:	1 hour
Equipment needed:	Overhead projector, wipe board pens and/or flip chart

4. Comments

- This lesson is very important, and observers must really understand what a random sample is.
- Be sure to study the manual first in Chapter 2 and understand the key concepts.
- Every vessel is different so we are not able to teach the solution to how or where to sample every time. This is why understanding the theory and knowing how to put it into practice is so important.
- Although this lesson covers four learning outcomes, concentrate on the first two; the others can be covered in the afternoon on vessels.
- Try to find examples – e.g. do you select your vegetables randomly or do you select the nice ones? or do you randomly select your boyfriend/girlfriend? what do you randomly select?
- Be sure to stress the vital importance of this to all sampling, and its practical implications.

LESSON STRUCTURE 3

↻ Indicates an overhead projection sheet that should be displayed

1. Introduction

- ↻3.1
- Read through the learning tasks and be sure everyone understands them.
- In the last lesson you learnt about the OSP and what commercial samples are. Now we will learn about the theory of sampling.

2. What is random sampling?

- Ask the observers what they know about random sampling.
- Can any of them define it?
- Use the flipchart or wipe board to record their answers.

- Then use ➡3.2

3. What are we trying to sample?

- Ask the observers what we are trying to sample at sea.
- They may say the 'fish stock' but the answer is 'the catch'.

4. Why do the samples need to be collected randomly?

- Why do we need a random sample?
- They should note that if the sample is not random then it is not representative but is biased; it therefore can not be used to build correct understanding of the fish stocks and proper advice to the Minister for TAC's.
- Try to use examples in everyday life of representative and non-representative samples, biased or non-biased, random or non-random.

5. Problems with collecting a random sample

- Get the observers to list on the board problems they may have in collecting a random sample.
- This could include such problems as:
 - natural tendencies to select the larger or more colourful looking fish;
 - the tendency of fish either in the codend or the holding area to stratify according to their size or buoyancy; or
 - the way that sorting by the crew can interfere with a random sample.
- ➡3.3
- Ask observers if they should choose small or large fish from the pile.
- They should say that they do not choose any fish because all fish must have equal chance of being sampled. They should always take all the fish in a pile or from the conveyor belt.
- Ask observers whether just taking large fish from the top of the pile would lead to a biased or unbiased sample?

6. Choosing a sampling site

- Ask observers how they would choose a good sampling site.
- They should note the need to study the processing of the vessel first, remembering that they need to be near unsorted fish and not in the way of production.

7. Main points

- ➡3.4

8. Summary

- ➡3.5
- Check that everyone has understood the associated learning tasks.

5. AN EXAMPLE FROM THE INSTRUCTORS GUIDE FOR THE SECOND LEVEL OF OBSERVER TRAINING

LESSON PLANNING 4

1. Topic

- **Biological Sampling 1**

2. Associated Learning Tasks

3.1	Draw a fish and label the external organs
3.2	Draw and label the main internal organs of a fish
3.7	Explain the purpose or function of the main organs of fish

3. Lesson preparation and background

Instructor:	1
Number of observers:	1 group of 3 or 4 observers
Equipment needed:	Baskets Paper and clip boards Pencils Knives ID sheets

Comments:

- All the information required for this is in the Observer Grade Two Manual - Chapter 3.
- Read through this first and be sure you recognize the main organs of the commercial species.
- The observers do not need to know all the parts of the fish but they must know the basics.

LESSON STRUCTURE 4

1. Brief the Observers before the trawl

The observers must perform the following tasks.

- Collect a sample of different commercial species from the catch, this should be mainly hake, monk and horse mackerel, if possible.
- Study the external organs of the fish and identify as many as they can and describe their purpose.
- Draw a picture of the fish and label the key organs.
- Cut the fish open and identify the internal organs.
- Draw the internal organs of the fish and label.

2. Observers perform above tasks

You are to check how the observer trainees are doing and guide them through the tasks. They will need help in the sexing of the fish although often some of them will already be familiar with all the tasks.

For fish anatomy they must be able to identify the following external organs:

1. Dorsal, Caudal, Anal, Pectoral and Pelvic fins
2. Eye
3. Snout
4. Gills
5. Scales
6. Anus

And the following internal organs:

1. Heart
2. Stomach
3. Gonads (testes and ovary)
4. Liver

3. Summary

- Once the above tasks are completed sum up the lesson and tell the observers how they did; let them know that in another lesson they will have a chance to practice with lobsters and crabs.

6. AN EXAMPLE FROM THE INSTRUCTORS GUIDE FOR THE THIRD LEVEL OF OBSERVER TRAINING

For the Grade Three level of training, observers join a research cruise with the fisheries management authority scientists. They assist with the sampling work of the cruise while being trained by the scientists. Observers thus get practical experience, whereas the scientists get to know observers and how they work. It has proved to be a very successful way to train certain observers.

Below are some examples of instructors' notes as used by the scientists in training observers to complete their workbooks.

LEARNING OUTCOME 1: COMPLETE A FISHING AND ACTIVITY LOG FOR THE VESSEL AND YOUR SAMPLING

The purpose of this learning outcome is to familiarise the observer with the overall cruise, and the design of the survey strategy in relation to cruise area, weather conditions, fish caught, etc.

No.	Learning Tasks	Comments for Completion	Comments for marking Suggested marks given in ()
1.1	Complete the table with trawl or fishing event information for all sampling stations.	Information is gathered from the station forms.	<ul style="list-style-type: none"> ▪ If all stations included (1) ▪ If information accurate (1) ▪ Initiative, completeness and presentation (1)
1.2	Plot the positions of each fishing event on the map provided. If required add more maps of your own on a larger scale to show the localised fishing area.	Use data from above task. The scientists should provide maps.	<ul style="list-style-type: none"> ▪ All stations are plotted (1) ▪ The positions are correct (1) ▪ Initiative, completeness and presentation (1)
1.3	Complete the list of all the species caught during the cruise.	This should include all commercial and non-commercial species. Codes should be the observer codes, not the Nansen codes.	<ul style="list-style-type: none"> ▪ Accuracy of scientific name (1) ▪ Accuracy of code and common name (1) ▪ Completeness of list (1)
1.4	Keep a written log of your sampling activities on each fishing event.	This may be best done in a table. It must include the general sampling methodology and additionally any special events or unusual catches.	<ul style="list-style-type: none"> ▪ Description of sampling methodology (1) ▪ Unusual events (1) ▪ Initiative, completeness and presentation (1)
1.5	Explain how the survey was designed (the distribution of the trawls or fishing events) in relation to the objective of the survey.	Here it is important to explain the difference between commercial and research fishing. Observers should be able to describe in simple terms the strategy for the survey – i.e. if it is random trawls, within an area, or fixed trawl paths, etc. Relate this to the underlying population of the fish being surveyed.	<ul style="list-style-type: none"> ▪ Accurate description and understanding of the difference between commercial and research fishing (1) ▪ Explanation of strategy involved (1) ▪ Initiative, completeness and presentation (1)
1.6	Keep a log of the weather conditions at a certain time each day.	Allocate a different time per day for each observer.	<ul style="list-style-type: none"> ▪ Complete table (1) ▪ Accurate data (1) ▪ Initiative, completeness and presentation (1)

LEARNING OUTCOME 2: DEMONSTRATE A WORKING KNOWLEDGE OF THE MANAGEMENT METHODS USED FOR A FISHERY, TYPE TO BE SPECIFIED

The purpose of this learning outcome is to familiarise the observer with the management methods for a specific fishery. Trainees will have already studied management methods in general but this is an opportunity for them to understand the management regime for a particular fishery in more detail.

No.	Learning Tasks	Comments for Completion	Comments for marking Suggested marks given in ()
2.1	Describe the management method(s) used for this fishery type; include specific information such as catch limits (TAC's), gear restrictions and area limitations. Relate these to the Sea Fisheries Act and Regulations.	May take some time to explain, but it is necessary to understand what different methods go together to make up the management regime. Must be related to the Act and Regulations to enable the observer to understand their monitoring work more clearly.	<ul style="list-style-type: none"> ▪ Clear explanation of the management methods(1) ▪ All methods related to Act or Regulations (1) ▪ Initiative, completeness and presentation (1)
2.2	Using a graph, plot the catches for this fishery type by month for the last year with data available.	If possible show the observers how to do this on a computer using a spreadsheet package.	<ul style="list-style-type: none"> ▪ Data correctly plotted with time on the X axis and catch on the Y axis (1) ▪ The quality of the graph (1) ▪ Initiative, completeness and presentation (1)
2.3	List the conversion factors for all the species and product forms in the fishery.	Try to explain a little more about the conversion factors – e.g. how they are calculated, why Ministry rather than Industry-provided factors are used. If possible demonstrate how to calculate a conversion factor in practice.	<ul style="list-style-type: none"> ▪ Check all species are included (1) ▪ Correct Product forms (1) ▪ Completeness of list (1)
2.4	Describe the composition of the fleet.	Complete listing of vessels or just a summary, depending on the fishery. Include the type of processing, e.g. wet or freezer and other interesting facts.	<ul style="list-style-type: none"> ▪ Accurate description of the fleet (1) ▪ All vessel types included (1) ▪ Initiative, completeness and presentation (1)

LEARNING OUTCOME 3: DEMONSTRATE A WORKING KNOWLEDGE OF THE FISHING AND PRODUCTION METHODS USED FOR A FISHERY, TYPE TO BE SPECIFIED

The purpose of this learning outcome is to familiarise the observer with the fishing and production methods used within a specific fishery, (type to be specified). Most of the observers will have worked on many vessels within the fishery, and so are already familiar with the methods. A visit to one of the shore factories may be appropriate after the survey to explain further the methods used.

No.	Learning Tasks	Comments for Completion	Comments for marking Suggested marks given in ()
3.1	Demonstrate an understanding of the gear used in the fishery, by drawing and labelling the fishing gear.	This may include various types such as trawl and longline. It is important that the observers understand the uses of the different parts of the gear and any that may be illegal.	<ul style="list-style-type: none"> ▪ Good diagram of all gears (1) ▪ Accurate labelling of all relevant parts (1) ▪ Initiative, completeness and presentation (1)
3.2	Explain the type of mesh or hooks used, with a diagram.	If a trawler, the codend mesh should be drawn with the mesh size labelled. If a hook, the size and shape should be indicated. If a trap, the mesh size should be drawn and labelled.	<ul style="list-style-type: none"> ▪ Good diagram (1) ▪ Accurate labels (1) ▪ Initiative, completeness and presentation (1)
3.3	Describe how the vessel processes the fish on board, if on a research vessel find out how the other vessels in the fishery process the fish.	Use observers who have experienced different vessel types to help explain this to other observers. Discuss the experiences they have had.	<ul style="list-style-type: none"> ▪ Accurate description of different methods (2) ▪ Initiative, completeness and presentation (1)
3.4	Describe how the factories on shore process the fish.	If this product is processed on shore cover the different methods used and the product form that is shipped or flown overseas.	<ul style="list-style-type: none"> ▪ Accurate description of different methods (2) ▪ Initiative, completeness and presentation (1)
3.5	Explain where the markets for the fish product are and the importance of the national contribution to these markets.	Explain where and in what form the fish are sold to different national or international markets. It may be interesting to discuss where else the fish is caught in the world.	<ul style="list-style-type: none"> ▪ Accurate description of markets, both national and international (1) ▪ Some indication of the global catch of this species and the importance of National contribution to this (1) ▪ Initiative, completeness and presentation (1)

LEARNING OUTCOME 4: DEMONSTRATE A WORKING KNOWLEDGE OF THE ANATOMY OF THE TARGET SPECIES

The purpose of this learning outcome is to familiarise the observer with the anatomy of the target species and to learn how to relate this to the habitat and food chain of the species. Try to dissect specimens and have the observers name as many organs as possible. Relate these to both the habitat of the species and the position it holds in the food chain. The outcome will involve both theory and practical work.

No.	Learning Tasks	Comments for Completion	Comments for marking Suggested marks given in ()
4.1	Describe the external features of the target species.	Practise drawing the species and labelling the external organs e.g. fins, scales.	<ul style="list-style-type: none"> ▪ Good clear diagram of correct species (1) ▪ Accurate labelling of all relevant organs (1) ▪ Initiative, completeness and presentation (1)
4.2	Describe the internal features of the target species.	Practise dissecting the species and others if possible. Label key organs.	<ul style="list-style-type: none"> ▪ Good diagram (1) ▪ Accurate labels (1) ▪ Initiative, completeness and presentation (1)
4.3	Analyse the macro contents of the stomach and relate these to the species habitat.	This is to try and demonstrate the concept of the foodweb. Set the observers some work to do on this and leave them to try and complete it in pairs.	<ul style="list-style-type: none"> ▪ If a good attempt has been made to dissect the animal and identify the species inside give (2) ▪ If these are related to the habitat (1)
4.4	Describe the basic food chain of the species through a diagram.	Observers should include all key components and clearly indicate the main food sources for the species and its main predators. If possible explain how this is the basis for an ecosystem approach to fisheries management.	<ul style="list-style-type: none"> ▪ All key components in diagram (1) ▪ Connections are correct (1) ▪ Initiative, completeness and presentation (1)

LEARNING OUTCOME 5: DEMONSTRATE A WORKING KNOWLEDGE OF THE REPRODUCTIVE SYSTEM OF THE TARGET SPECIES

The purpose of this learning outcome is to familiarise the observer with the reproductive system of the target species and how to differentiate between different maturity stages. Completion of learning tasks will depend on the availability of fish or crustaceans at different maturity stages. Diagrams and photos can be used as teaching aids.

No.	Learning Tasks	Comments for Completion	Comments for marking Suggested marks given in ()
5.1	Distinguish between the male and female of the target species in both external and internal features if appropriate.	Draw the different features of males and females and indicate at what stage in maturity do they become evident.	<ul style="list-style-type: none"> ▪ Good clear diagrams of correct features (1) ▪ Accurate labelling of relevant features (1) ▪ Initiative, completeness and presentation (1)
5.2	Distinguish between the maturity stages of the target species for both male and female.	Complete the table for as many stages as possible even if they are not seen on the vessel. Encourage the observers to use their own ways of describing the stages so that they will understand them later if required.	<ul style="list-style-type: none"> ▪ Complete table (1) ▪ Accurately completed (1) ▪ Initiative, completeness and presentation (1)
5.3	Explain the breeding behaviour of the target species.	This will depend on your knowledge of the fishery and the breeding patterns. If possible give seasons and areas and age at maturity.	<ul style="list-style-type: none"> ▪ If a good attempt has been made to describe the breeding behaviour with the information available (2) ▪ Presentation (1)

LEARNING OUTCOME 6: DEMONSTRATE A WORKING KNOWLEDGE OF THE POPULATION STRUCTURE OF THE TARGET SPECIES

The purpose of this learning outcome is to familiarise the observer with the population structure of the target species and through this to foster a clearer understanding of data collection needs. Time must be spent to explain the following learning tasks and to assist the observers in drawing the graphs, preferably in a spreadsheet package.

No.	Learning Tasks	Comments for Completion	Comments for marking Suggested marks given in ()
6.1	Illustrate graphically the length frequency composition of the target species by sex for one station.	The observer should make use of a tally form to sum the lengths and then use a spreadsheet to graph these. Each observer should do this separately with data they have collected.	<ul style="list-style-type: none"> ▪ Accurate tallying of lengths (1) ▪ Graph made with correct labels on axis (1) ▪ If the graph is plotted accurately and in a spreadsheet package (1)
6.2	Demonstrate an understanding of the graph.	The observer must describe the difference in the sexes and describe the mean length and the minimum and maximum lengths.	<ul style="list-style-type: none"> ▪ A description of the differences between the males and females (1) ▪ A description of the mean etc. (1) ▪ Initiative, completeness and presentation (1)
6.3	Illustrate graphically the length weight relationship of the target species.	You will need to assist the observer in this by showing how a length weight graph is created and what it means.	<ul style="list-style-type: none"> ▪ If the graph is made in a spreadsheet package (1) ▪ If the axis are labelled correctly (1) ▪ If the data is correct and a curve fitted (1)
6.4	Collect otoliths from the target species if possible and explain the purpose of these for fisheries management.	If the survey is making an otolith collection the observers should take part in this. They should draw an otolith and describe the use for determining age and for age analysis in stock assessment.	<ul style="list-style-type: none"> ▪ Collect otoliths and draw one (1) ▪ Discuss the use for age determination (1) ▪ Describe the need for stock assessment (1)