

1.0 CONTACTS

Contacts: Rockfish - Lynne Yamanaka (250-756-7211);
Archipelago – Scott Buchanan (250-383-4535) - Jen Paton (250-383-4535)

Priority work for the observer is to determine the hook-by-hook catch and collect biological samples from Inshore rockfish.

2.0 DATA RECORDING

2.1 DATA REPORTING AND DELIVERY

Vessels involved in the survey will land fish in with the product being no greater than 6 days old. When the vessel lands, please fax an up to date timesheet and contact Jen/Scott with an update.

The original data forms and otoliths should be kept on board the vessel until the vessel has completed the survey. At the end of the survey, all original data forms and otoliths will be delivered to AMR in Victoria. A trip report must be completed for each survey.

2.2 FISHING EVENTS AND BRIDGE LOG INFORMATION.

The Southern PHMA/DFO Inshore rockfish research survey has been divided into 3 separate areal strata and 3 different depth strata (20-70m, 71-150m, 151-260m). The southern survey will alternate years with a similar northern survey. The southern survey will take place this year (2011). The three areas being surveyed this year occupy three depth strata in areas 3C, 3D, 5A and 5B. For an overview of the fishing areas please see the RFP included at the end of the briefing workbook. Vessels fishing the different areas will be responsible for fishing a different number of total sets, which must be conducted in randomly selected 2km X 2km grids.

The goal of the survey will be to obtain catch and biological data for inshore rockfish populations. It is the vessel's responsibility to set the fishing gear within the boundaries and appropriate depth strata for each survey location. For all research sets the Observer should document the random survey block number that the set is being executed within and the number of the temperature and depth (T/D) recorder for the set (recorded in the field notebook, ZN1 data form comments, and hook by hook catch form). For 2011, DFO will continue to provide 6 numbered T/D recorders to each vessel. One T/D should be attached midway along the groundline for each set. The T/Ds will be activated prior to the survey and downloaded at the end of the end of the survey. The Observer should coordinate with the vessel captain and crew the deployment and recording of the T/D number for each set. It will be the observer's responsibility to record the start (**first anchor in water**) and finish location

(last anchor in water) for each research string. If this cannot be done due to conflicts with biological sampling than this information can be garnered from the skipper as long as they are using the same definitions for this information. Set start time when the last **anchor** enters the water while finish time will be recorded when the first **anchor** is hauled after soaking. For research strings, a standardized soak time of 2 hours has been established. Positional and effort (gear) information collected is consistent with information collected for commercial longline fishing. This information also needs to be recorded for the first Catch By Hook data form for each set. Record the Hook 001 position to the catch-by-hook data form (start or end) for the string and the time that the first **anchor** comes out of the water when the hauling begins. The vessel crew should identify which end of the string is to be hauled first.

Please consult the data forms section of the briefing workbook for a description of this information, which includes:

- Number of hooks set (standardized as 450 hooks per research string) and retrieved
- Hook type and size (standardized as 14/0 circle hooks with a swivel and perlon for research strings with 8ft. spacing)
- Bait type (standardized as whole California squid for research strings, east coast squid can be used if it is cut to the size of California squid)
- Bird exclusion devices used by the vessel
- Seabird bait interaction

Only the header information, species name (fish only) and # of pieces, the survey block number and T/D recorder number (in the comments section) need to be completed on the ZN1 data form. (Weight, Util and SM not needed)

2.3 TOTAL CATCH ESTIMATION.

Total catch will not be determined.

2.4 SPECIES COMPOSITION RECORDING.

Sampling staff aboard this survey will be responsible for documenting all catch in each haul to the species level. Any organisms that present difficulty in identification should be frozen and labelled for confirmation after the survey.

- For all catch the species and utilization for each organism captured should be documented on a hook-by-hook basis. A catch by hook worksheet has been created and will be used on deck for the hook-by-hook species catch summary. This data form requires the documentation of which end of the set (latitude, longitude and depth) was retrieved by the vessel first.

2.6 HOOK BY HOOK CATCH RECORDING

Identify to species (for fish and all invertebrates) and record the hook-by-hook catch in the order in which the hooks are retrieved. Record the number of the temperature and depth (T/D) recorder upon hauling. An abbreviation list should be maintained for all species and include codes for empty hooks, bait, skin etc. There will be 450 hooks per set with an 8-foot spacing in between hooks. The catch-by-hook data forms have been designed to accommodate tallies on a skate by skate basis, which is not a data requirement for this survey. Therefore, hook-by-hook catch should be documented in sequence without spaces until the last hook (450) is hauled.

- Empty hooks, missing /bent hooks and hooks with bait or skin must also be recorded. (see abbreviations list)
- Fish that are lost at the rail should also be recorded as such. (see abbreviations list)
- When two fish are caught on the same hook, both fish should be recorded. The predator species should be recorded first, followed by a slash (/) then the prey species that was originally hooked on the bait.
- When the T/D recorder is taken off the set, record it's number on the hook by hook form.
- At the end of each set (or end of the day), compare the catch data for rockfish to the T23 (otolith) data collected. Record comments on the T23 form as to why any discrepancies exist between the number of fish caught and the number sampled.
- Record all fish species with the number of pieces on the ZN1 form.
- In order to document the utilization of the catch on a hook-by-hook basis, it will be best to use abbreviations to indicate utilization for those species that are being both retained and discarded during the survey. We do expect both utilizations for halibut, sablefish and lingcod during the execution of these surveys with all legal sized fish being retained. Suggested abbreviations for retained and discarded fish for these species are HR / HD, SR / SD and LR / LD respectively. Similar abbreviations can be used for other species with two utilizations. Fish that are predated or eaten by lice will be discarded and the species abbreviation is sufficient. It is expected that the vessels will retain all rockfish and as such only species abbreviations will be required. Fish and inverts that are discarded through the entire trip will also only require species abbreviations.
- Dogfish will not be retained and therefore will require additional utilizations for the discarded fish. The discard utilization is based on length

Length	Utilization	Suggested Abbrev.
Greater than 75 cm's	Discarded legal	L-DF
65 to 75 cm's	Sub-legal buffer discard	B- DF
Less than 66 cm's	Sub-legal discard	S-DF
Not determined	Discarded size undetermined	D-DF

3.0 BIOLOGICAL SAMPLING

During the survey only rockfish will be sampled. Sampling should commence after all gear is on board the vessel and the vessel is transiting to or waiting to haul the next station.

There may be times when you will not be able to complete all the required rockfish sampling before it is time to haul the next string. If this situation is encountered, the fish should be placed in baskets or buckets and stored out of the way, (and separate from fish on the next string) until there is sufficient time to complete the sampling. There will usually be time to complete the sampling at the end of the day or after the completion of sets that do not yield a large number of rockfish.

- Vessel staff will assist in recording data on the T22's, T23's and D03 in addition to dressing the sampled rockfish. Please consult with the crew of the vessel to determine the best time to conduct your samples (before or after the fish are dressed).
- During periods of heavy rockfish catch, there may not be enough time to properly clean otoliths as they are extracted. Otoliths can simply be extracted and stored in a tray until they can be properly cleaned later. Record each sample on the appropriate B01 form after each set. Mornings (while the gear is being set) are a good time to catalogue T23's and clean otolith samples collected the previous day. Remove and clean all otoliths from the collection tray, and place them in the correct cell of the clean delivery tray for that species. (use one label per tray) Check each sample against the B01 form for that species, to ensure there is no overlap in fish numbers.
- Otoliths will be stored in separate trays for each species and otolith numbers for each species will run consecutively. Use the following numbering system:

Species	Otolith # Range
Yelloweye	0001-1000
Redbanded	1001- 2000
Quillback	2001-2500
Copper	2501-3000
China	3001-3500
Tiger	3501-3700
Black	3701 –4000
Other Rockfish	*4001-6000

*Use blocks of 100 per species

- A **separate** B01 data form must be completed for each species rather than using a continuous B01. If a continuous B01 is used to help with daily tracking, please ensure the info is copied to the B01 for each individual species.

- Otolith tray labels have been created for the charter (see next page)
 - Set # must include all sets contained within tray. **If a set spans 2 trays, label the first tray set#(A), and the second tray set#(B)**

Species (Latin): _____ Tray: __ / __ Sets #: _____ include all set #'s contained in tray _____ Observer: _____ File #: _____ Maj Area: _____ Fish #'s: _____ <i>Archipelago Marine Research Ltd.</i>

- DFO has requested that if there is confusion over maturity states, we collect digital photos of all rockfish maturity states encountered by sex and species.

3.1 SAMPLING PROTOCOLS

3.1.1 Rockfish

The vessel will retain all rockfish captured during the survey. Sample up to the first 50 rockfish per set for Length/Sex/Maturity/Otoliths (LSMO). The priority species is yelloweye rockfish followed by redbanded, quillback, copper, china, tiger and black rockfish. For 2011, DFO has requested that all Rougheye rockfish should be sampled for LSMO as well as DNA (Fin clip stored in ethanol) (See Section 3.1.4). DNA samples will be used after the survey to identify Rougheye rockfish from Blackspotted rockfish. All other rockfish species can be sampled for LSMO or for length only if time permits. Length only data can be reported to the nearest millimetre on a T23 otolith data form. If there are more than 50 yelloweye rockfish per set then randomly sub-sample 50 pieces for LSMO. If there is less than 50 yelloweye rockfish then sample them all and make up the rest of the 50 pieces with other rockfish i.e. redbanded, quillback, copper, china, tiger and black rockfish for a total of 50 rockfish sampled per set. Other rockfish species can also be sampled for LSMO if time permits. If you are encountering a very low number of pieces for any species (ie Tiger and China rockfishes) it may be advisable to sample all individuals for LSMO that are encountered during the entire survey as long as time permits, even if this exceeds the 50 fish preset guideline.

If you are consistently encountering 50 fish for sampling for each survey set it may be necessary to scale this sample size back on occasion: to 25 for LSMO and 25 for length only in order to keep up with your other responsibilities and facilitate the vessels efficient execution of the survey. The 50 fish target should be resumed as soon as work levels allow.

Rockfish Maturities (please consult the maturity plates and descriptions included in the briefing workbook and in the sampling gear kits)

- Rockfish cycle back to maturity stage **#3**, after the resting stage **#7**, for example: 1-2-3-4-5-6-**7-3**-4...
- Females- look for the presence of eyed larvae (small black dots on ovaries) to distinguish mature females (stage 3) from maturing females (stage 2), which do not have eyed larvae present.
- Males – look for the presence of residual milt in the seminal vesicle to distinguish developing testes (stage 3) from maturing testes (stage 2), which will not have residual milt present.

In 2011, DFO will be providing each sampler/vessel with a battery powered motion compensating scale for the collection of individual weight information. Weights should be recorded to the nearest gram. Observers will be required to sample **opportunistically** for individual weights in addition to LSMO data for a set number of individuals per species throughout the entire survey. There is a separate data form (PHMA Charter Sample Data Form – card type C01) that should be used for these samples. The data form is the same as the T23 but contains a four digit weight field. Sample type on the B01 for these samples is “24” (Age structure and associated data)

3.1.2 Documenting Collection Methods and Utilizations on T23 Data Forms

The following guidelines should be used for recording collection methods and utilizations for rockfish:

- All rockfish caught are sampled and retained:
Collection = **01** (whole haul) and Util = **1**
- All rockfish caught are sampled but some are **discarded** (poor quality),
Collection = **01** (whole haul) and Util = blank
- Sub-sample of rockfish caught are used for sampling:
Collection = **03** (random ungraded) and Util = **blank**
- Sub-sample of rockfish are used for sampling but all rockfish are retained:
Collection = **02** (random graded) and Util = **1**
- Please note that when fish are sampled before being gilled the fish state code should be 20 as hard coded on the T23 data form.
- If gilled fish are sampled please overwrite the 20 and document a fish state code of 04 to indicate that the lengths were recorded after the fish were gilled.

3.1.3 Collection of Length Conversion Data

If vessel crew are pre-dressing rockfish before sampling occurs, DFO has requested that we collect some length conversion factor (CF) data for each species of rockfish sampled after vessel crew has dressed them during the survey. Procedures for this sampling follow:

- **Step 1** ~ Collect up to 50 individuals of each species for sampling. These should be the same fish that you are sampling for otoliths during the survey. In order to collect 50 fish of each species you may have to do this sampling for several sets (samples). As the number of fish encountered for some species (i.e. Quillback) will be quite low, you should sample all individuals encountered. For species that are more numerous (i.e. yelloweye), spread the collection of this data out – do the first 10 fish of each sample until you have collected the data for 50 fish. This will spread out the time required for this sampling into manageable proportions.
- **Step 2** ~ Each fish sampled for length CF data should be measured for fork length to the nearest millimetre before the crew has dressed the fish. Pre dressed fish lengths can be recorded onto a separate T23 data form with the fish number (otolith number) but no sex or maturity data. The fish number should match the LSMO data collected for the fish during actual (post dressed) otolith sampling. On these data sheets record “Length CF Data” under the header information for the form, as it will be a duplicate of the actual otolith data recorded during sampling.
- **Step 3** ~ Allow the crew to gill (dress) the fish in the same manner to what has been done for otolith sampled fish to date.
- **Step 4** ~ Proceed with normal (post dressed) otolith sampling procedures ensuring that the post dressed length data can be matched to the pre dressed length information using the “otolith” fish number assigned to each individual.

LENGTH CONVERSION EXAMPLE

OTOLITH SAMPLE DATA FORM

VESSEL: LOTS A FISH OBSERVER: J. OTOLITH SPECIES: YELLOW EYE

FISHERY FILE NUMBER		VESSEL	OBSERVER	YEAR	MONTH	DAY	SET NO.
1	3	9	12	15	17	19	21
L	251234	LOT	JOT	05	06	04	007

SPECIES	COLLECTION METHOD	FISH STATE	FISH LENGTH	UTIL
24	27	29	31	33
442	01	2	0	02

LENGTH CF DATA

FISH NUMBER	LENGTH (mm)	SEX	MATURITY
0031	631		
2	527		
3	461		
4	560		
5	501		
6	555		
7	597		
8	621		
0039	832		
0040	828		

These are fresh fish lengths for CF data

CONTINUED ON NEXT PAGE? Y/N
 NO. MEASURED: _____
 MALE: _____ FEMALE: _____ UNKNOWN: _____ TOTAL: _____
 CARD TYPE:

45	46	47
T	2	3

 PAGE 1 OF 1
 AsopNew\General\GeneralForms\Trawl OptionA\2004IT23.FRP
 March 2000
page 2 of 27 for trip

OTOLITH SAMPLE DATA FORM

VESSEL: LOTS A FISH OBSERVER: J. OTOLITH SPECIES: YELLOW EYE

FISHERY FILE NUMBER		VESSEL	OBSERVER	YEAR	MONTH	DAY	SET NO.
1	3	9	12	15	17	19	21
L	251234	LOT	JOT	05	06	04	007

SPECIES	COLLECTION METHOD	FISH STATE	FISH LENGTH	UTIL
24	27	29	31	33
442	01	2	0	02

FISH NUMBER	LENGTH (mm)	SEX	MATURITY
0031	633	1	02
2	533	2	02
3	461	2	01
4	569	2	02
5	506	1	02
6	554	1	02
7	598	2	02
8	623	1	03
0039	633	1	02
0040	628	1	02
41	710	2	02
42	651	2	02
43	681	2	02
44	632	2	02
45	650	1	02
0046	630	1	02

This is the actual LSMO data with post-dressed lengths.

CONTINUED ON NEXT PAGE? Y/N
 NO. MEASURED: _____
 MALE: 8 FEMALE: 8 UNKNOWN: _____ TOTAL: 16
 CARD TYPE:

45	46	47
T	2	3

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 AsopNew\General\GeneralForms\Trawl OptionA\2004IT23.FRP
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3.1.4 Rougheye / Blackspotted rockfish DNA Samples

For 2011, DFO has requested that all Rougheye rockfish should be sampled for LSMO as well as DNA (Fin clip stored in ethanol). DNA samples will be used after the survey to identify Rougheye rockfish from Blackspotted rockfish. The following procedures should be followed for collecting and documenting these DNA samples:

Sample Vials – Pre-label each vial from 1-50. Leave a space on the vial label to put the 4-digit fish number once samples are collected.

T23/DO3 form:

- Record the vial # on the otolith sample form beside each fish number for each sampled fish (in the margin).

Sample vial labels:

- Record last 4 digits of the fish number from the otolith sample data form for each sampled fish.

Sample caudal fin:

- Collect a piece no larger than 5mm x 2mm (match stick size);
- Preserve the sample in the vial of ethanol (95%) provided;
- Sample storage requires at least 5 times the volume of ethanol to fin sample; and,
- Samples should be stored at ambient temperature.

If you run out of vials: freeze individual caudal fin samples in plastic and label with the last 4 digits of the fish number.

4.0 DOCUMENTING GEAR PROBLEMS ON CATCH BY HOOK DATA FORM

4.1 GEAR SNARLS

The most frequent gear problem encountered during longline operations is the snarling of the line and the hooks. When the gear becomes snarled the recording of hooks and catch in sequential order becomes difficult at best. There are two basic scenarios.

1. The crew will bring the entire snarl aboard, remove the hooks and untangle the snarl. Then depending on the size of the snarl, they will throw the line outboard again and resume haul back. In this scenario you will be able to determine the total number of hooks involved because all the hooks involved will have been removed. However, you may not know the order of the hooks and the catch. In this situation record all hooks and catch in the boxes provided (do your best at estimating the sequential order) and then separate those hooks involved in the snarl with a set of brackets as illustrated in the example below. The brackets will inform the data transcribers that these items were caught, but the order is unclear because of a gear snarl.
2. The crew may bring the entire snarl aboard, but may not untangle the hooks and line at that time. In this particular situation you should record in the appropriate boxes all items caught, estimate the number of hooks, and then place brackets around those items. You will need to ask the crew to inform you about the total number of hook involved after they have untangled the snarl and you will need to note that in the comment section.

Hook Snarl Example

Vessel Name: U.King Sea Vessel Code: UKS ASOP File: 249999

Station: 234, Set Number: 022, Skate Number 1 Date: 07/25/04 Time of First Flag Out of Water: 1350

Hook 001 Position: Set Start End Latitude: 53 126, Longitude: 127 132, Depth: 85 fm

Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species
001	X	013	YE	025		037		049		061		073		085		097		109	
002	X	014	YE	026		038		050		062		074		086		098		110	
003	DF	015	X	027		039		051		063		075		087		099		111	
004	DF	016	X	028		040		052		064		076		088		100		112	
005	X	017	H	029		041		053		065		077		089		101		113	
006	X	018	S	030		042		054		066		078		090		102		114	
007	DF	019	DF	031		043		055		067		079		091		103		115	
008	H	020	X	032		044		056		068		080		092		104		116	
009	X	021	X	033		045		057		069		081		093		105		117	
010	X	022		034		046		058		070		082		094		106		118	
011	X	023		035		047		059		071		083		095		107		119	
012	H	024		036		048		060		072		084		096		108		120	

Comments: ↳ Parted gear after hook 21 (Go to skate #8)

Handwritten notes: "7 Hook Snarl Start of snarl" with an arrow pointing to hook 005. "End of snarl" with an arrow pointing to hook 011.

4.2 PARTING OF THE GEAR

When the longline parts the vessel must travel to the other end of the string (**hook 450**) in order to retrieve the gear. At the time when the longline parts you should place a double backslash after the last retrieved hook and then record what happened in the comment section provided. When the haul back resumes, you will need to record hook status in reverse order starting with hook 450. You will record hook status in reverse order for each skate for the remainder of the string. It is advisable to start at the position that hook 460 (hook 100 on page 4 of set) would be documented in order to allow enough space to document the catch for any extra hooks which may have been set by the vessel

Gear Part Example

Vessel Name: Star Wars Vessel Code: STA ASOP File: 241296
 Station: 235, Set Number: 023, Skate Number: 7 Date: 7/16/04 Time of First Flag Out of Water: 1350
 Hook 001 Position: Set Start End Latitude: _____ Longitude: _____ Depth: 90 fm

Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species
001	DF	013	YE	025	DF	037	X	049	X	061	X	073	X	085	X	097	YE	109	
002	X	014	YE	026	DF	038	X	050	X	062	X	074	X	086	H	098	YE	110	
003	X	015	X	027	DF	039	TL	051	X	063	X	075	X	087	H	099	H	111	
004	H	016	X	028	DF	040	DF	052	X	064	X	076	X	088	H	100	H	112	
005	H	017	X	029	DF	041	DF	053	H	065	X	077	X	089	X	101	X	113	
006	X	018	X	030	X	042	DF	054	H	066	SL	078	X	090	X	102	X	114	
007	X	019	X	031	X	043	X	055	H	067	H	079	X	091	SK	103	DF	115	
008	X	020	X	032	H	044	H	056	X	068	H	080	DF	092	S	104	X	116	
009	S	021	X	033	H	045	X	057	X	069	H	081	YE	093	B	105	X	117	
010	DF	022	X	034	DF	046	X	058	X	070	X	082	X	094	X	106	X	118	
011	H	023	H	035	DF	047	DF	059	DF	071	X	083	X	095	X	107	X	119	
012	H	024	DF	036	YE	048	DF	060	X	072	X	084	X	096	X	108	X	120	

Comments: Parted gear after hook #25

Parted line after hook #025. (Go to hook 460, and record backwards)

Station: 235, Set Number: 023, Skate Number: _____

Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species	Hook	Species
001		013	H	025	X	037	DF	049	X	061	X	073	X	085	X	097	X	109	
002		014	YE	026	DF	038	X	050	YE	062	H	074	H	086	DF	098	H	110	
003		015	S	027	X	039	X	051	B	063	H	075	H	087	DF	099	H	111	
004		016	S	028	S	040	X	052	B	064	H	076	X	088	X	100	H	112	
005		017	X	029	S	041	X	053	B	065	X	077	DF	089	X	101	X	113	
						042	X	054	S	066	X	078	X	090	X	102	X	114	
						043	X	055	S	067	X	079	X	091	X	103	X	115	
						044	DF	056	S	068	X	080	H	092	DF	104		116	
						045	X	057	DF	069	X	081	H	093	DF	105		117	
						046	X	058	DF	070	TL	082	X	094	X	106		118	
						047	X	059	DF	071	TL	083	X	095	B	107		119	
012	X	024	B	036	X	048	X	060	X	072	DF	084	X	096	S	108		120	

Comments: Started at end of skate

Start at the position of hook 460 and record catch in reverse hook order until you meet the location of the gear part.

Archipelago Marine Research Ltd. IPHC Set Line Survey Catch by Hook Data Form

APPENDIX I

Survey Equipment List

General

- 4 grey AMR baskets
- 2 sets of laminated Rockfish maturity templates
- role of duct tape
- gloves for sampling (marigolds)
- elastic bands for otolith trays and clipboards.
- 2 measuring boards (one as back-up)
- 2 plastic clipboards.
- wood pencils (one box) (mechanical pencils are not good)
- pencil sharpener
- Species ID manuals (inverts, rockfish and other fish)
- DFO issue Motion Compensating Scale and Batteries

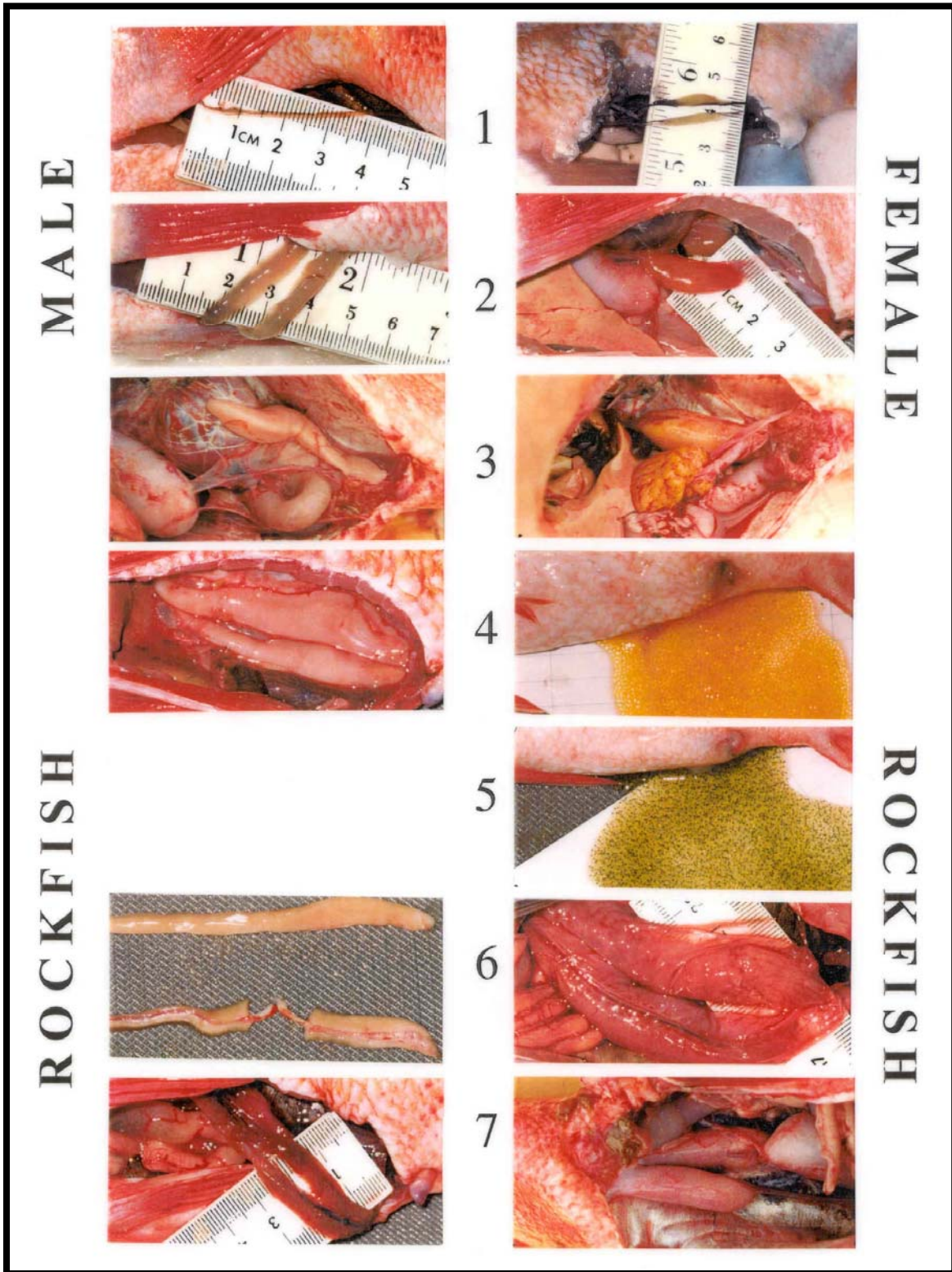
Sampling

- 2 heavy knives (rockfish)
- 2 fillet knives or pairing knives
- chisels (2 large size)
- 3 pairs of forceps
- otolith trays (one box)
- otolith tray labels (inside and outside)
- J-cloths (one box)
- Knife sharpener
- Scissors
- Coloured zap straps
- 50 DNA files for Rougheye rockfish samples

Data Forms

- Catch by Hook Data Forms (1 box and 2 forms per set required)
- T23 Otolith Data (1 box)
- ZN1 data forms (150)
- T22 Length Frequency Data (100)
- B01 Sampling Logs (50 sheets)
- Marine Mammal Sightings (25 sheets)
- Species Abbreviations List (2 sheets)
- 2011 PHMA/DFO Inshore Rockfish Research Survey Trip report (one)

APPENDIX II ROCKFISH MATURITY STATES



ROCKFISH

Sebastes spp.

Maturity Code	Gonad Condition
0	unknown
1	immature - translucent pink, males threadlike, females small
Females	
2	maturing - small , yellow eggs; no small black dots present (no reabsorbed larvae); translucent or opaque
3	mature - large , yellow or orange eggs; a few small black dots may be present (reabsorbed larvae); opaque
4	fertilized - large , orange-yellow eggs; translucent
5	embryos or larvae - include eyed eggs ; translucent
6	spent - large, flaccid, red ovaries ; a few larvae may be present
7	resting - moderate size, firm, orange-grey ovaries; some with dark blotches
Males	
2	maturing - string-like , slight swelling, translucent, residual milt not present
3	developing - swelling , brown-white, residual milt may be present in seminal vesicle
4	developed - large, white; easily broken
5	running - running sperm
6	spent - white-brown; sperm still in duct
7	resting - triangular in cross-section; small, brown