PROTOCOLS AND INDICATORS FOR OPENING A NEW FISHERY FOR BIVALVE MOLLUSCS

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Contents

1. INTRODUCTION

Bivalve molluscan shellfish such as mussels clams and cockles are filter feeders and can accumulate micro-organisms if they are in contact with sewage contaminated water. In addition, the phytoplankton upon which the shellfish feed are occasionally contaminated by blooms of toxin producing species. These naturally occurring toxins may not harm the shellfish when the phytoplankton is consumed by the filter-feeding molluscs but they can cause human illnesses where intoxicated or contaminated shellfish are subsequently eaten.

Food safety regulatory controls exist to limit these risks to public health, and an extensive shellfish monitoring programme exists in Ireland to support these controls. The central food safety requirements for the commercial fishing/harvesting/gathering of bivalve molluscan shellfish are that:

a. Bivalve molluscs may only be fished/harvested/gathered from classified shellfish production areas. These classified areas are listed on the Sea Fisheries Protection Authority's website at: http://www.sfpa.ie/Seafood-Safety/Shellfish/Classified-Areas
b. Bivalve molluscs may only be fished/harvested/gathered from classified production areas that are on an open biotoxin status. The 'Open' or 'Closed' biotoxin status for all classified production areas can be checked on the Marine Institute's website at: https://webapps.marine.ie/HABs/Locations

Ireland operates an extensive National Shellfish Monitoring Programme to monitor classified shellfish production areas for the presence of microbiological contamination and for the presence of harmful marine biotoxins.

Two codes of practice exist within Ireland's shellfish monitoring programme in order to ensure that consumers, both in Ireland and in other countries, can have confidence that the Irish shellfish they are purchasing is a safe product and that it meets the required legal health standards. One of these covers biotoxin monitoring and a separate code of practice covers the microbiological monitoring of bivalve mollusc production areas. Both of these codes are available on the Seafood Safety Section of the SFPA website (www.sfpa.ie/SeafoodSafety/Shellfish).

In addition to food safety requirements, bivalve mollusc fisheries require careful management and planning from the outset in order to avoid overexploitation and overinvestment and to minimise environmental impact, all of which are contrary to accepted objectives for fisheries resource management. The rate at which a new unmanaged fishery develops is dependent on licensing policy, investment costs, market demand, price for the target species and the accessibility of the new fishery to existing registered and licensed sea fishing vessels.

This document outlines the minimum amount of information that should be developed and evaluated when proposing a new bivalve fishery where the product is intended for human consumption. These potential fisheries are closed by default under food hygiene regulations (the codes of practice described above) or under environmental regulations (Annex I). Fishery management plans that incorporate environmental objectives need to be developed prior to these fisheries opening so that environmental risks, particularly within Natura 2000 sites, are managed.

This document describes the procedures for compiling and communicating information leading to a decision to classify a new production area in order to open new bivalve fisheries, which are otherwise

closed under food hygiene regulations or environmental regulations. Each marine agency has different roles and competencies in this respect (Annex II). The Inshore Management Group (IMG) provides a forum for these agencies and the Department of Agriculture, Food and the Marine (DAFM) to collate information and agree procedures. The IMG is therefore a pivotal group with respect to developing and communicating protocols to the industry's representative groups (Bivalve Working Group (BWG), Regional Inshore Fisheries Forums (RIFFs) and the National Inshore Fisheries Forum (NIFF)).

Indicators for pressures that the proposed fishery will cause on the target species and on the environment are detailed. These indicators feed into a risk assessment for the target species and other ecosystem components such as habitats and non-commercial species. Risk scores will determine the need for mitigation, control and management of the new fishery as well as the urgency of such measures in order to avoid poor outcomes with respect to habitats, non-target species, target species and fishing fleet performance. This risk assessment is separate and in addition to the public health risks which are mitigated through the codes of practice for biotoxin and microbiological monitoring previously mentioned.

2. PROCEDURES

A. Information and Profiling of the Proposed New Bivalve Fishery

Local fishermen/gatherers should work together with BWG representatives from their local RIFF to put forward proposals for new bivalve fisheries including maps/charts of the geographic area. The proposals should be forwarded to the BWG Secretary with evidence of the viability of the proposed new fishery. They may also consult with the Marine Institute (MI) who may have or may provide additional evidence as to the viability of the fishery in the proposed area. The BWG will manage and prioritise these proposals. The BWG was established in 2017 to co-ordinate the identification and prioritisation of areas where new fisheries could be developed for bivalve molluscan shellfish, such as cockles, clams, razor clams, etc.

The BWG will consider the regional balance and industry cost-benefit when proposing a prioritised list of areas where new fisheries could be developed. The list will be communicated to the NIFF and IMG who will review the proposed areas. The IMG will assess the risk the proposed fisheries pose to the target species, by-catch, habitats and non-commercial species as well as possible spatial overlaps with other marine activities. On that basis, the IMG will communicate its recommendations to the BWG and NIFF and the degree to which management intervention is required on a case by case basis. The NIFF will be responsible for providing the RIFFs with updates on the prioritised lists.

In proposing a new fishery for bivalves the following information should be provided by the proposing fishermen/gatherers to the BWG. This is relatively simple and easily compiled information, but if presented as described below the pressure indicators and risk scores detailed in Annex II can be developed and assessed. The marine agencies can assist in compiling the information.

I. Target species
II. List potential by-catch bivalve species that will be landed
III. List potential by-catch species that will be discarded
IV. Geographic area (include map; shape file format)
V. The evidence that a commercially viable stock is present in the area

a) Data on landings from any previous fishery for the same species in the area
b) Data from exploratory fishing including tracks and catches
c) Data from surveys that the MI may have undertaken

VI. Gear(s) to be used

VII. Seasonality;
a) During what months will the fishery be active and for how many days per month?
b) Consider how sea conditions affect the operation of the fishing gear and how it therefore limits the conditions under which the fishery can occur.

VIII. What is the minimum size of marketable fish?

IX. What is the unit market price for the target species?

X. What is the unit market price of the main by-catch species?

XI. What is the cost of fishing gear to a vessel owner who wants to participate in this fishery?

XII. How many vessel owners are interested in participating in this fishery?

XIII. How many crew per vessel?

XIV. What other fisheries occur within the proposed fishing area?

B. Risk Assessment

Where evidence of commercial quantities of bivalves in a given area has been presented in a proposal from BWG, an assessment of the risks posed by a new fishery will be completed. The risk assessment aims to avoid over exploitation of the target species and ensure habitats are adequately protected, especially within Special Areas of Conservation (SAC) and Special Protection Areas (SPA). The level of management intervention required at the outset will be correlated with the risk score. The risk assessment will be completed by the MI, for the IMG, using methods outlined in Annex III.

C. Decisions Regarding Classifications

Once a risk assessment of a given prioritised area has been completed the IMG will indicate to the SFPA the areas where fisheries could be developed. The SFPA has sole responsibility in any decision to classify production areas for bivalve molluscs. The capacity to complete classifications, sanitary surveys and costs of same has to be considered in evaluating whether new proposed areas are developed as fisheries. EU Regulations require that a sanitary survey must be conducted on all shellfish production areas in order to establish the location of the representative monitoring points from which classification monitoring samples will be taken. Decisions and reasons to proceed or not to proceed to classification will be documented in each case in the national list of potential areas for new bivalve fisheries.

3. PROCESS FOR OPENING THE NEW FISHERY

In the case that areas for new fisheries which have been proposed by the BWG are recommended by the IMG to be further developed, and the SFPA has decided to classify the areas then:

A. The recommendations will be included in the national list maintained by the IMG and will be communicated to the BWG and NIFF.
B. SFPA will consider these areas for sanitary surveys ((EC) 854/2004 Annex II Chapter II A6) and microbiological sampling for classification (subject to the SFPA schedule of work).
C. The SFPA will revert to the IMG on the schedule for the sanitary surveys and microbiological classification programme for the proposed areas so that the expected date of completion of the area's classification can be forecast and additional steps for opening the fishery can then be planned. The national list will be updated with this schedule.
D. The IMG will communicate the sampling schedule to the NIFF and BWG.
E. Based on the SFPA schedule for sanitary survey and sampling for classification, the MI will undertake a survey of the stock(s). Sampling for classification, following completion of a sanitary survey, will take between 6 and 12 months[1,2]. The MI survey will be completed during the latter 3 months of this period. This survey will be used to provide advice on the annual Total Allowable Catches (TAC) for the fishery and will be separate to any previous surveys undertaken for the purpose of evaluating the commercial viability of a new fishery.
F. Prior to completion of sampling for classification the local fleet (the original proposers) intending to participate in the fishery, and working through the relevant RIFF, will develop a management plan that will include measures, in addition to any already legislated for, that will show how the fishery is to operate and that will take account of
    I. The risk assessment (Annex III); the risk score will in part determine the level of management intervention needed.
    II. The MI scientific advice based on the stock survey.
G. The management plan should clearly document and provide evidence of the degree to which consultation with prospective participants in the fishery has been completed and should, where necessary, indicate any risks of non-compliance with the management plan not already considered by the MI risk assessment.
H. If there is evidence or significant risk that the plan will not be implemented as documented the fishery should not open and the plan should not be published. In such cases, and where deemed necessary for the orderly operation of a new fishery, new legislation may be developed by DAFM.
I. The management plan will be forwarded from the relevant RIFF to the IMG, BWG and NIFF and will be published publicly on the Inshore Forums website (http://inshoreforums.ie).
J. When sampling for classification has been completed and the management plan has been published the SFPA will notify the NIFF, BWG, IMG and the laboratories responsible for biotoxin and microbiological sampling, that the site has been officially classified for the relevant species.
K. The fishery can then open.

[1] Supports for sampling may be available from BIM through the Inshore Fisheries Conservation Scheme once the IMG have been notified that the fishery is to progress to classification
[2] http://www.sfpa.ie/Seafood-Safety/Shellfish/Guidance-Documents

L. The implementation of the management plan, including non-regulatory measures, will be monitored. A short report will be produced which will provide evidence of how the measures in the plan were implemented. This report is the responsibility of the local fishermen/gatherers and should be compiled with assistance from the local RIFFs BWG representatives. This report should be submitted to the IMG.

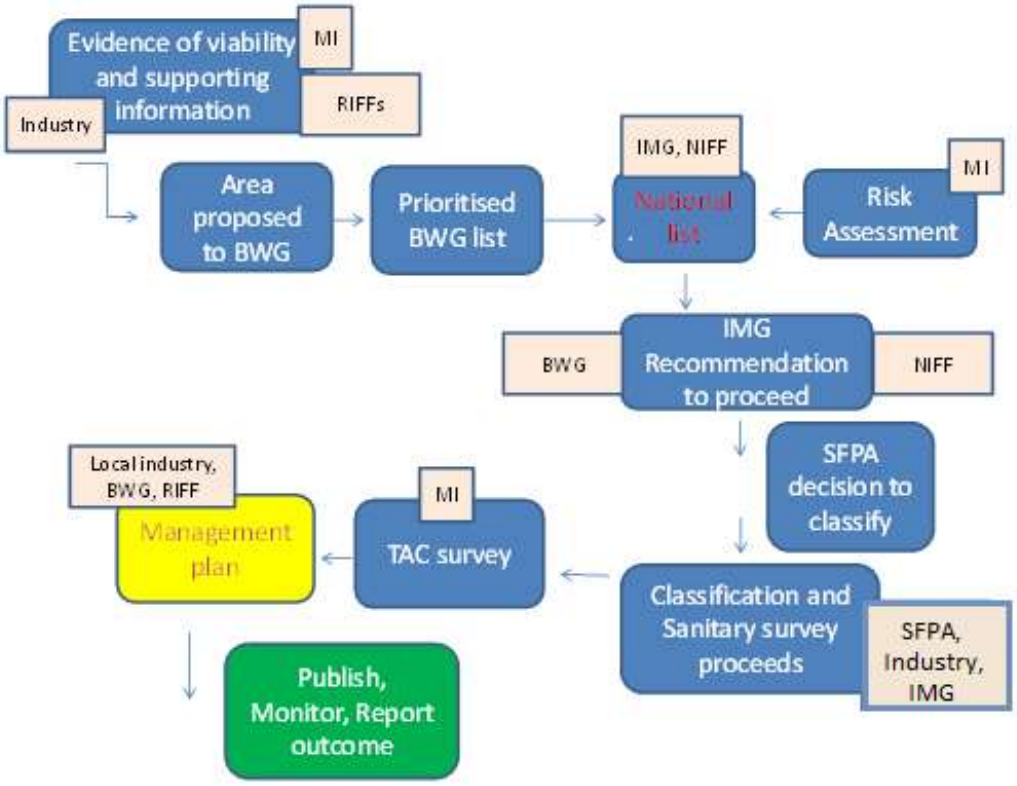

Figure 1. Process for opening a new bivalve fishery

Annex I. Food Hygiene and Environmental Regulations

Food Hygiene

Criteria for the classification of bivalve mollusc harvesting areas are described in Regulation (EC) 854/2004, Regulation (EC) 853/2004 and Regulation (EC) 2073/2005.

Sampling requirements for classification are outlined in the SFPA Code of Practice for the microbiological monitoring of bivalve mollusc production areas (www.sfpa.ie). These describe sampling requirements for microbiological classification and for maintenance of classification. Additional sampling requirements for the presence of harmful phytoplankton and for determination of open/closed/pending biotoxin status of the production area are outlined in the Code of Practice for the Irish Shellfish Monitoring Programme (Biotoxins). The requirements are set out in various codes of practice as follows:

1. Code of Practice for the Microbiological Monitoring of Bivalve Mollusc Production Areas. Version 6
2. Code of Practice for the Irish Shellfish Monitoring Programme (Biotoxins). Version 8
3. Enhanced official Controls for Shellfish and Phytoplankton Sampling under the Irish Shellfish Monitoring Programme.

Environment

The European Union (Birds and Natural Habitats) (Sea-fisheries) Regulations 2013 (S.I. 290/2013) give effect to the Habitats and Birds Directives in Ireland with respect to the potential risks posed to its objectives by fisheries. The legislation outlines the requirements to plan and assess fisheries such that their effects on habitats and species within European marine sites is minimised.

Annex II. Stakeholders:

Department of Agriculture, Food and the Marine (DAFM)

DAFM is responsible for overseeing implementation of national policies concerning the effective management, conservation and rational exploitation of fishing opportunities. DAFM is required to execute these functions having particular regard to the obligations set down in S.I. 477/2011 regarding the conservation of natural habitats and species in identified European sites. In the context of these directed requirements DAFM is obliged to monitor potential risks from fishing activities being undertaken in any identified European site and to introduce management measures to mitigate such risks where necessary. The bivalve mollusc classification system has the potential to identify new areas and stock for exploitation. The bivalve mollusc classification system has been identified as a useful indicator of risk, highlighting possible escalations of fishery activities that could have negative impacts on particular sites. DAFM is also responsible for drafting, including transposing, fisheries and food safety legislation for all fishery products under its remit.

Marine Institute (MI)

The MI is the specific scientific advisory body to the Minister on the marine environment and fisheries. In particular, the MI undertakes appropriate assessment and risk assessment of fisheries when so requested by the Minister. In order to assist in the provision of accurate and timely advice concerning the risk of escalation of fisheries, both from a stock conservation and management perspective and from the perspective of protection of Natura sites, timely notification of applications to classify bivalve mollusc production areas would be particularly appropriate. The MI is designated as the National Reference Laboratory (NRL) for monitoring the microbiological, biotoxin and viral contamination of bivalve shellfish. The MI coordinates the activities of the national testing laboratories involved in the microbiological monitoring programme ensuring high quality standards for the relevant analysis are maintained. The MI also provides advice on monitoring programmes and a range of support services to the competent authorities.

Sea-Fisheries Protection Authority (SFPA)

The SFPA is the competent authority for the enforcement of seafood safety legislation on the island of Ireland and throughout the exclusive fishery limits of the State. The SFPA is responsible for food safety related controls of shellfish growing areas, transport and seafood establishments. The SFPA implements, manages and monitors the Irish Shellfish Monitoring Programme. Sea-Fisheries Protection Officers of the SFPA act as shellfish managers in shellfish production areas and monitor product traceability. Responsibility for developing and applying official monitoring programmes lies with the SFPA and monitoring requirements are given in Annex II of Regulation (EC) No 854/2004.

Bord Iascaigh Mhara (BIM)

BIM has the remit for fisheries development. In administers the EMFF Inshore Fisheries Scheme and has the primary role in facilitating and supporting the industry representative groups for inshore fisheries (RIFFs and NIFFs).

Inshore Management Group (IMG)

The IMG is a cross agency group chaired by DAFM that considers the management of small scale fisheries inside 6nm.

National Inshore Fisheries Forum (NIFF)

The NIFF is the national industry representative forum for small scale fisheries inside 6nm.

Regional Inshore Fisheries Forum (RIFF)

The RIFF is the regional industry representative forums for small scale fisheries inside 6nm.

Bivalve Working Group (BWG)

The BWG was established in 2017 to co-ordinate the identification and prioritisation of areas where new fisheries for bivalve molluscan shellfish could be developed.

Fisherman/Harvester/Gatherer of Bivalve Molluscs

A fisherman/harvester/gather of bivalve molluscs is a person who collects live bivalve molluscs by any means from a production area for the purpose of handling and placing on the market and who has primary responsibility for ensuring the safety of the food they produce.

Molluscan Shellfish Safety Committee (MSSC).

The MSSC was established in the late 1990s, following Ministerial direction, to provide a partnership forum within which all stakeholders involved in the production, processing, development, analysis and regulation of shellfish can frankly express their views in the interests of collective learning.

Annex III. Indicators for Risk Assessment

State indicators for the target species

This information will be obtained by the MI on the basis of the fishery profile provided. Some of this data does not feed into the initial risk assessment but should normally be collected from the beginning of a fishery in order to identify the initial (pre-fishery) condition of the stock.

If the fishery is to be developed it is good practice to know the condition of the stock prior to subjecting it to fishing mortality. Changes in the stock after fishing has started can then be evaluated against the 'B_o' or unexploited condition.

For some species it is relatively easy to obtain a biomass estimate and to map the distribution of density. This is the case for intertidal species or for species where the survey/fishing gear is efficient. It will not always be possible to obtain biomass estimates or to undertake surveys. If this is the case then data on catch and effort should be collected from the commencement of the fishery, preferably with a scientific observer on board. These are proxies for data that would be obtained on a scientific survey.

The size distribution of a species prior to exploitation will provide information on the rate of natural mortality. This is almost always unknown in exploited stocks and cannot easily be determined once fishing begins i.e. natural and fishing mortality rates are confounded in size and age distributions after fishing commences. This data could also be obtained at the beginning of the fishery if it is difficult to access samples from the stock prior to fishing.

1. Biomass
    a. If there is a biomass estimate, what is the biomass prior to the fishery commencing?
2. Population density
    a. What is the distribution of relative or absolute density of the target species prior to the fishery commencing?
3. Size or age distribution of fish
    a. A profile of size or age of the target species or significant retained by-catch species prior to the occurrence of any fishing mortality.

State indicators for habitats and species within the fishing area

This information will be provided by the Marine Institute based on a search for habitat information in the area of the proposed fishery. Where the area is within an SAC/SPA, the NPWS habitat maps will be used. Elsewhere, habitat information from INFOMAR, MESH and other seabed mapping projects may be useful. This information is input to the habitat-fishery risk assessment.

1. Main habitat type (at Eunis level III)
2. Marine community types (Eunis IV or NPWS descriptions) within the fishing area and their characterising species
3. List and distribution of species that are highly sensitive to physical abrasion caused by fishing gear
4. List and distribution of key habitat forming species within the fishing area

Pressure indicators for the target and retained by-catch species

All the pressure indicators can be developed from the information provided in the fishery profile. The individual indicators are combined in an index of how susceptible the stock is to the fishery.

1. Geographic area (footprint) of the fishery (km^2)
2. Temporal extent (TE): an index (range 0-1) of the distribution of activity during 1 year
    a. TE = (Active Days per month/30) *($N_{(months)}$/12)
3. Vulnerability: an index (range 0-1) which identifies the effectiveness of the gear as a product of its Efficiency (E) and Selectivity (S). Efficiency is the proportion of fish in the gear track that are captured and selectivity is the proportion of captured fish that are retained. This is estimated for different size (s) groups of fish.

$$V = Average\ (E * S) \qquad \text{Across size classes}$$

4. Discard mortality (DM): An index (range 0-1) which identifies the proportion of discarded fish that are likely to die. This can be estimated from other similar fisheries or from expert opinion based on the gear configuration and the species morphology.
5. Availability: The proportion of the area over which the stock is distributed relative to the area fished defines the stocks availability to the fishery
    a. $A = A_{fishery} / A_{stock}$
6. Susceptibility: The product of Availability, Temporal Extent and Vulnerability
    a. S = A*TE*V
    The S value is used within the P**S**A risk score

Pressure indicators for habitats and non-commercial species

Pressure on habitats from the proposed fishery can be developed by overlaying the proposed fishing area on habitat maps and estimating the overlap of the fishery and specific habitats or marine community types. Where the fishery is proposed in an SAC/SPA the NPWS Marine Community type maps will be used.

1. % overlap of fishery on Eunis III, Eunis IV or NPWS Marine Community types within the fishing area
2. % overlap of fishery on key structural habitat forming species, e.g. biogenic reef or other habitats with high sensitivity to the fishing activity concerned

Investment indicators and cost earnings ratio

1. Daily net profit = (Unit value * volume of catch) – Operating costs (excluding labour)
    a. The range in expected daily volume of catch can be estimated from similar fisheries elsewhere, from a pre-fishery survey of biomass or from a pre-fishery sampling regime.
    b. Anticipated operating costs can be estimated from similar fisheries elsewhere, from the proposed fishing map and distance to ports.

Risk assessment

Information from the fishery profile and the pressure indicators provide information for risk assessment of the effects the fishery may have on the target species, by-catch, habitats and non-commercial species.

Target species and retained by-catch species

1. Risk to reproductive potential (RP)

$$Risk_{RP} = S_{SOM}/S_{MARKET}$$

where S_{SOM} is size at which 50% of fish are mature and S_{MARKET} is the minimum market size.

Habitats and non-commercial species

1. Use the Natura risk framework in all cases whether the fishery is within or outside of a Natura 2000 site (www.fishingnet.ie). This framework was developed to assess risks posed by fisheries to the habitats and species in Natura 2000 sites and in particular in relation to the conservation objectives for these features. It is, however, applicable to any habitat or species given that the consequence categories in the framework relate to increasing levels of impact across a reasonably generic and easily understood scale.

Risk of escalation of fishing activity

1. Cost earnings (CE) ratio compared to other local fisheries. If the costs to earnings ratio is lower than for other local fisheries then vessels may switch to the new fishery.
2. Escalation potential (EP)
    a. EP = Earnings/(Cost + Investment)
    If the market price is high and the product is in high demand and if the cost of fishing relative to this is low then there is potential for escalation of fishing effort.

Management approach relative to risk

1. Target and by-catch species
    a. The need for management measures at the outset and the schedule for their development should be related to the degree of risk identified in the risk Indicators (RP, EP) for target and by-catch species.
    b. For most new bivalve fisheries there will be an annual TAC for each stock. The TAC will be estimated from a biomass survey and the harvest rate will be a given percentage of the biomass. This will be adapted as more information becomes available on the fishery and how each stock responds to exploitation. Other measures such as effort control could be used to limit the harvest rate.

2. Habitats and non-commercial species
    a. Where the fishery is within an SAC or SPA and where at least one of the habitats or species designated under the Habitats or Birds Directives could be directly or indirectly impacted by the fishery, the Natura risk assessment framework recommendations should be followed.
    b. Where the fishery is not within an SAC or SPA the response to high risk scores will be assessed on a case by case basis, considering the affected habitats and species.

Annex IV. Surveying of Proposed Production Areas

1. In order to identify areas where commercial quantities of bivalve species may occur, some exploration of these areas is required to provide the evidence outlined in the protocol. Such areas are outside of classified production areas (CPAs) or in CPAs which are not classified for the species concerned. Harvesting of bivalve molluscs, (with the sole exception of scallops) from outside classified production areas is prohibited, is a public health risk and contravenes legislation regulating the harvesting of bivalve molluscs. Such exploratory fishing, therefore, cannot result in landings of bivalves and the risk of landing occurring needs to be mitigated and controlled.

2. In order to assess stock in potential fishing grounds surveys will be required. These will be either unscientific surveys undertaken by fishermen without observers on board or scientific surveys supported by the MI. The following will apply to the conducting of surveys:

   A. Fishermen proposing a new area must submit the case to conduct initial surveys to the BWG, for consideration. They would also inform the RIFF secretariat in their area of their proposals.

   B. The BWG will prioritise and consolidate these proposals and will clearly identify the areas, the specific vessels & skippers involved and the anticipated dates of surveying for onward communication (via e-mail) to the NIFF and to the IMG.

   C. That this list be compiled on an annual basis, with quarterly updates communicated by the BWG to the NIFF and IMG.

   D. The IMG will communicate this information and quarterly updates to the SFPA for onward transmission to the local SFPA port offices in order that the SFPA are aware of what vessels are conducting surveys in their area.

3. Vessel(s) and skippers involved will be made aware of their responsibilities by the BWG, with regards to sea food safety and that the SFPA must be satisfied of the following:

   A. That NO bivalve molluscs from these surveys can be retained on board or landed.

   B. That NO bivalve molluscs from these surveys will be accepted for analysis

4. **Guidelines and conditions** to ensure compliance with above requirements will include:

   A. That the masters of all vessels involved in any such surveys have certified to local SFPOs that they will comply with the above conditions.
   B. That only vessels nominated by RIFFs, limited to two vessels in each RIFF area at any one time, can take part in exploratory fishing.
   C. That none of the vessels conducting surveys will also fish commercially in any classified production area until they have declared to local SFPOs that they are finished with survey work with the MI or with exploratory survey work where no observers are on board.
   D. Nominated vessels will make contact with local SFPOs indicating the time of departure and return from such surveys on a daily basis.

E. All nominated vessels will carry on board iVMS devices. The VMS data will be used to verify that the vessels are not fishing in CPAs during its agreed period for survey in addition to verifying where the exploratory surveys are being undertaken.
F. In order to verify that no bivalves are on board following exploratory surveys a number of options are available such as:
    I. Video evidence which is georeferenced and time and date referenced can be submitted to the MI (the MI can provide facility to do this through mobile phones). This will show an absence of catch on the deck or other storage areas on the vessel after the vessel leaves the survey area
    II. the SFPOs would meet the vessel on return to port (the VMS data can be reviewed by the SFPO as to time of arrival)